RPS

Restoration of Bay Lane Quarry

Environmental Impact Assessment Report
Volume II: Main Text

March 2019

rpsgroup.com/ireland

1

Bay Lane Soil Recovery Facility

Environmental Impact Assessment Report Volume II: Main Text

Document Control Sheet

Client:	GLV Bay Lane Limited
Project Title:	Bay Lane Soil Recovery Facility
Document Title:	Environmental Impact Assessment Report, Volume II: Main Text
Document No:	MDR1499Rp0001

Text Pages:	359	Appendices:	0	Current Revision:	F01

Rev.	Status	Date	Author(s)		Reviewed By		Approved By	
F01	Final	20 March 2019	RPS				CMG	Conor Mc Gowan

QUALITY ISO 9001:2015 NSAI Certified | ENVIRONMENT ISO 14001:2015 NSAI Certified | HEALTH & SAFETY OHSAS 18001:2007 NSAI Certified | INFORMATION SECURITY ISO 27001:2013 NSAI Certified | CERTIFIED IQNet MANAGEMENT SYSTEM | ENGINEERS IRELAND cpd ACCREDITED EMPLOYER

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF IMAGES

GLOSSARY

AADT – Annual Average Daily Traffic

ACA – Architectural Conservation Area

AER – Annual Environmental Report

AFM – Annals of the Four Masters

AONB – Areas of Outstanding Natural Beauty

ATC – Automatic Traffic Counter

BAP – Biodiversity Action Plan

C&D – Construction and Demolition

CDW – Construction and Demolition Waste

CFRAM – Catchment Flood Risk Assessment and Management

CIEEM – Chartered Institute of Ecology and Environmental Management

CIRIA – Construction Industry Research and Information Association

COMAH – Control of Major Accident Hazards

CRTN – Transport's Calculation of Road Traffic Noise

CSO – Central Statistics Office

CMP – Construction Management Plan

DAA – Dublin Airport

DAU – Development Applications Unit

DCHG – Department for Culture, Heritage and the Gaeltacht

DECLG – Department of Environment, Community and Local Government

DEFRA – Department of Environment, Food and Rural Affairs

DMRB – Design Manual for Roads and Bridges

DMURS – Design Manual for Urban Roads and Streets

EC – European Communities

EF – Emission Factor

EIAR – Environmental Impact Assessment Report

ELC – European Landscape Convention

EMRA – Eastern and Midland Regional Assembly

Environmental Impact Assessment

EPA – Environmental Protection Agency

EU – European Union

FCC – Fingal County Council

FDP – Fingal Development Plan

GDA – Greater Dublin Area

GHG – Greenhouse Gas

GWB – Groundwater Bodies

HA – High Amenity

HGV – Heavy Good Vehicle

HLC – Historic Landscape Characterisation

HLCT – High Lying Character Type

IAPS – Invasive Alien Plant Species

IEMA – Institute of Environment Management and Assessment

IFI – Inland Fisheries Ireland

IOA – Institute of Acoustics

LCA – Landscape Character Area

LCT – Landscape Character Types

LoW – List of Waste

LV – Light Vehicles

MCA – Multi-Criteria Analysis

NBDC – National Biodiversity Data Centre

NCT – National Car Test

NHA – National Heritage Areas

NIAH – National Inventory of Architectural Heritage

NLS – National Landscape Strategy

NPF – National Planning Framework

NPWS – National Parks and Wildlife Services

NRA – National Roads Authority

NTA – National Transport Authority

OPW – Office of Public Works

OS – Ordnance Survey

OSi – Ordnance Survey Ireland

pNHA – proposed National Heritage Areas

pSPA – proposed Special Protection Area

QLFS – Quarterly Labour Force Survey

QNHS – Quarterly National Household Survey

RFC – Ratio to Flow to Capacity

RMP – Record of Monuments and Places

RPO – Regional Policy Objectives

RPS – Record of Protected Structures

RSA – Road Safety Authority

RSES – Regional Spatial and Economic Strategy

SAC – Special Areas of Conservation

SCI – Site of Community Importance

SMR – Sites and Monuments Record

SPA – Special Protected Areas

TEN-T – Trans-European Networks

TII – Transport Infrastructure Ireland

TMP – Operating Traffic Management Plan

tpa – Tonnes per annum

TSGDA – The Transport Strategy for the Greater Dublin Area

UNESCO – The United Nations Educational, Scientific and Cultural Organisation

VOCs – Volatile Organic Compounds

WADT – Weekly Average Daily Traffic

WFD – Waste Framework Directive

WHO – World Health Organisation

WMA – Waste Management Act

ZoI – Zone of Influence

1 INTRODUCTION

This Environmental Impact Assessment Report (EIAR) has been prepared to accompany an application by GLV Bay Lane Limited for permission to develop a soil recovery facility at Bay Lane Quarry, County Dublin.

An EIAR is defined in the EIA Regulations as: *"a report of the effects, if any, which proposed development, if carried out, would have on the environment and shall include the information specified in Annex IV of the Environmental Impact Assessment Directive*". This EIAR is prepared by the developer (GLV Bay Lane Limited) and is submitted to a Competent Authority (in this case Fingal County Council - FCC) as part of a consent process.

This EIAR is produced as part of the Environmental Impact Assessment (EIA) process. The Environmental Impact Assessment process is governed by the EIA Directive (EU Directive 2014/52/EU), which has been adopted into Irish legislation principally via the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. 296 of 2018).

1.1 OBJECTIVE OF THE PROPOSAL

The objective of the proposed development is the phased backfilling of the existing quarry to allow for the full restoration of the lands.

To operate as a soil recovery facility, the site will require planning approval and a waste licence from the EPA. The proposed development will operate to requirements under any Waste Licence issued by the EPA., which will govern all associated enforcement and regulation from when operations start as a soil recovery facility.

It is within this context that this EIAR has been prepared and assessments have been undertaken. The objectives of this EIAR are to achieve the following:

- Identify the likely environmental impacts of the proposed development having regard to the characteristics of the local environment;
- Evaluate the magnitude and significance of the likely environmental impacts; and
- Propose appropriate measures to avoid or minimise adverse environmental impacts.

1.2 EIA PROCESS

Broadly speaking the EIA process involves steps which include the production of a report (EIAR), although this report is not the outcome but rather an output to assist in a wider decision-making framework. This EIAR will be used by FCC to decide to consent or refuse the application or to seek further information if required. In line with current guidance, the EIA for the proposal development commenced at the project design stage. Subsequently, the scope of the study was determined with input from specialists in technical, planning and environmental disciplines. This EIAR will accompany an application to FCC wherein it will be circulated to statutory stakeholders and made available to the public for consultation prior to any decision being made. It is acknowledged that the EIA process can extend beyond direct consent and into implementation of monitoring and mitigation programmes with the end focus being the protection of the environment in the long-term. **Figure 1.1** outlines the overall EIA process and the position of this EIAR in the overall process. Further details on the requirement for an EIAR and other related documentation is provided in **Chapter 3 Legislation and Policy**.

This EIAR has been prepared in accordance with the following guidance and reference sources:

- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.
- The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018).
- The EPA *Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR)* (2017).
- The DHPLG published the revised *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (August 2018).

A reference list detailing the sources used for the descriptions and assessments included in each of the technical assessments is listed in each EIAR chapter presented.

This EIAR has been compiled to comply with the requirements of Article 94 and Schedule 6 of the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018). The overall EIAR is arranged in three volumes, as follows:

- Volume I: Non-Technical Summary;
- Volume II: Main Text;
- Volume III: Technical Appendices.

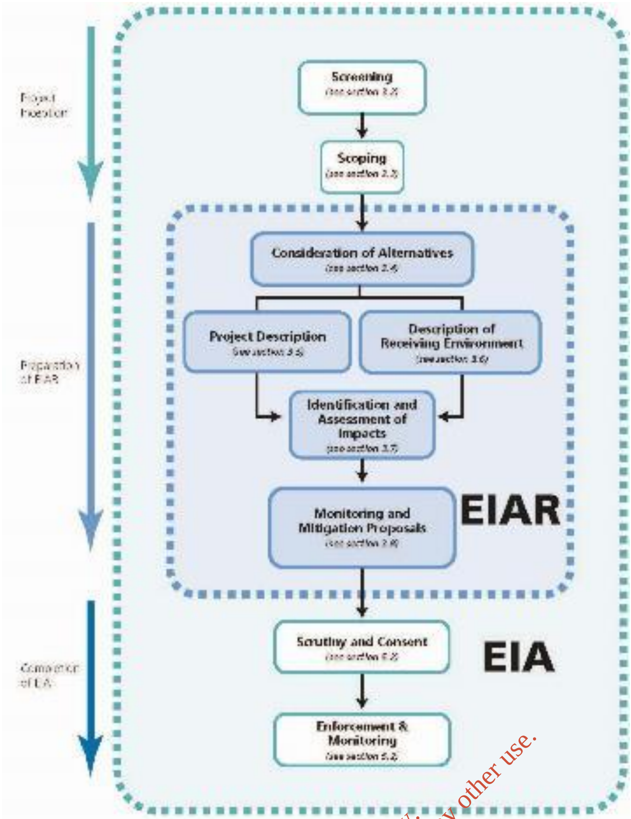


Figure 1.1: The Position of EIAR within the EIA Process[1]

1 source: EPA Guidelines on the Information to be Contained in an EIAR, draft May 2017

1.2.1 EIAR Study Team

This EIAR has been prepared by RPS, on behalf of GLV Bay Lane Limited with specialist inputs provided by a team of suitably competent experts as listed in **Table 1.1**.

Table 1.1: EIAR Competent Experts

Discipline	Specialist	Qualifications
Planning and Development	Valerie Brennan, RPS	BA International, MSc Town & Country Planning, Member of the Irish Planning Institute MIPI, Member of the Royal Town Planning Institute MRTPI 14 years professional planning experience advising on a wide range of waste, infrastructure, commercial and renewable energy projects.
Population	Valerie Brennan, RPS	BA International, MSc Town & Country Planning, Member of the Irish Planning Institute MIPI, Member of the Royal Town Planning Institute MRTPI 14 years professional planning experience advising on a wide range of waste, infrastructure, commercial and renewable energy projects.
Human Health	Paul Chadwick, RPS	BA (Mod) Chemistry M. Phil in Atmospheric Chemistry 18 years' experience in preparing EIA for waste, infrastructural, industrial and commercial development.
Biodiversity	Dr. Tim Ryle, RPS	Ph.D Ecology, BSc (Hons) Botany, Member of Institution of Environmental Sciences (MIEnvSc) 18 years experience in preparing ecological assessment for a range of developments in Ireland.
Air Quality and Climate	Paul Chadwick, RPS	BA (Mod) Chemistry M. Phil in Atmospheric Chemistry 18 years' experience in preparing EIA for waste, infrastructural, industrial and commercial development.
Geology and Soils	Geoff Petalka, RPS	BSc in Geological Engineering (1st Class) Queen's University, Kingston, Canada. Chartered Engineer, Engineers Ireland; Chartered Professional Engineer, Engineers Australia 10 Years' experience of civil, mining and energy infrastructure projects.
Water, Drainage	Barry Tyther, RPS	BEng (Hons) Structural Engineering, Cork Institute of Technology; MEngSc Sustainable Energy, University College Cork; Chartered Member of the Institution of Engineers of Ireland (CEng M.I.E.I.); Hydrological assessment using the FSU, IH124 Hydraulic Analysis – MicroDrainage & Infoworks ICM Culvert Design / Assessment using CIRIA Guide C689 Attenuation Design using the SuDS Manual CIRIA Guide C753 Flood Risk Assessments in accordance with the Planning System and Flood Risk Assessment Guidelines for Planning Authorities

Discipline	Specialist	Qualifications
		6 years' experience in hydrological studies, flood risk assessment and drainage design
Noise and Vibration	Caitriona Reilly, RPS	BSc (Hons) Environmental Science, HDip Geographical Information Systems, Dip Acoustics & Noise Control, Member of Institute of Environmental Sciences (MIEnvSc), Member of Institute of Acoustics (MIOA) 14 years' experience in the field of environmental assessment for a wide range of projects
Traffic and Transport	Ronan Grealy, RPS	B.E. (Hons) Civil and Environmental Engineering, M.Eng.Sc. (Civil): 'Traffic Impact Assessment of Developments' Chartered Member of the Institution of Engineers of Ireland 15 years' experience in Transport Assessments for EIA, preparing Sustainable Transport Plans and preparing Urban Area Transportation Studies.
Material Assets	Conrad Wilson, RPS	Honours Degree in Agriculture (Environmental) Advanced Farm Management Diploma, Farm Apprenticeship Board First Farm Management Diploma National Certificate in Agriculture 26 years' experience EIA for a wide range of waste and infrastructural projects.
Cultural Heritage	Dr Clare Crowley, Consultant Courtney Deery Heritage Consultancy Ltd.	20 years' experience in the field PhD in Archaeology BA (Hons) in Ancient History, Archaeology & French Certificate in Repair and Conservation of Historic Buildings Certificate in Condition Surveys of Historic Buildings
Landscape and Visual	Ray Holbeach, RPS	BSc (Hons) Environmental Science, Master of Landscape Architecture, Chartered Member of the Landscape Institute Member of the Irish Landscape Institute 27 years' experience in urban and rural design, and Landscape and Visual Impact assessment.

1.3 OBJECTIVES OF THIS EIAR

The objective of this EIAR is to:

- Identify the likely environmental impacts of the proposed development having regard to the characteristics of the local environment;
- Evaluate the magnitude and significance of the likely environmental impacts; and
- Propose appropriate measures to avoid or minimise adverse environmental impacts.

1.4 CONSULTATION

This section documents the extent and nature of third-party consultation that has taken place in relation to the proposed development of a soil recovery facility at Bay Lane Quarry. It also outlines the key issues raised during the consultation process and how these issues have been addressed by the project team and considered in the impact assessments as described in **Chapters 6 - 17**.

The process was developed and led by the project team. The aim of the process was to:

- Identify issues and concerns regarding the project and use these to inform the scoping of the Environmental Impact Assessment Report (EIAR) and the preparation of EIAR documents;
- Incorporate mitigation measures where possible into the design of the project in early stages;
- Take into consideration the expertise and knowledge of local communities, experts and interest groups;
- Encourage community participation in decisions yet to be made;
- Ensure members of the community are informed with up-to-date information about all aspects of the development throughout the full duration of the project; and
- To comply with the Aarhus Convention, on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters and other relevant legislation.

The consultation process consisted of communicating with both statutory and non-statutory organisations and other competent parties as listed in **Table 1.2**. The primary objective of involving these organisations and parties at an early stage in the EIA process is to aid in the scoping of and the content of this EIAR.

The programme of consultation was undertaken in October 2018 to seek the views of consultees on the proposed operations. The key components of the consultation process were mail outs to key environmental stakeholders. Mail outs were issued to the recipients listed.

These parties listed were consulted by email which included a brief project description coupled with a site layout map. The consultation process invited comments, queries or observations from the contacted parties on the nature of the proposed development, the potential environmental impacts and the content of this EIAR. **Table 1.2** presents the summary of the consultations issued and responses received. All comments and recommendations from each of the Statutory Authorities and Consultees have been taken into consideration in this EIAR.

Table 1.2: Statutory and Non-Statutory Organisations and other Competent Parties Consulted

Consultee	Response Received	Key Issues Identified in Response	How Addressed in EIAR
Development Application Unit, Department of Culture, Heritage and the Gaeltacht	Yes	The DCHG responded with observations / recommendations regarding the impacts backfilling has on nature conservation. The response gives recommendations and considerations to the EIAR scoping and Appropriate Assessment guidance for the impact on flora, fauna and habitats present. Construction management plan required.	Addressed in Chapter 8. Construction management plan included as appendix 5.1
Transport Infrastructure Ireland	Yes	TII suggest the developer should have regard, *inter alia*; the EIAR should identify the methods/techniques proposed to demonstrate that the developer can proceed complementary	Addressed in Chapter 13.

		to safeguarding the capacity, safety and operational efficiency of that network; consultation with local authority/National Road Design Office; identify haul routes and confirm their capacity to accommodate the proposed load; to TII guidelines including requirements for RSA and RSIA; to guidance, standards and other documents available; TII Environment Guidelines; previous EIS/EIARs imposed by ABP.	
Geological Survey of Ireland	Yes	GSI responded stating *inter alia* that there is no record of a County Geological Site in the immediate vicinity of the proposed development.	Addressed in Chapter 9.
ESB Networks	Yes	Responded, providing details of the overhead lines onsite.	Safety requirements noted in CMP – appendix to Chapter 5.
HSE	Yes	A response was received from • the HSE Health Protection Department • the HSE Environmental Health Unit, Blanchardstown. The HSE Environmental Health Officer, Blanchardstown made observations and submissions summarised as: • Recommended surface water monitoring. Additional storm and runoff impacts should be considered. • Adjacent houses may be affected by noise and dust, a baseline should be established, and monitored. • Pyrite: consideration must be given to potential pyrite implications of restoration/development. The HSE Department of Public Health East made observations and submissions summarised as: **Population profile** • The site is situated in an area of higher than average proportion of certain populations population growth.; non-Irish nationalities.; young families; children <10 years and; adults 25-45 years; travellers; persons in the deprived social groups (Mulhuddart). **Vulnerable populations** • Vulnerable populations proximity identified as: ○ residential housing c. 1km from site. ○ primary schools c. 1.5km from site. ○ crèche about 1.4km NW of site.	Addressed in Chapter 10. Addressed in Chapters 9, 11 and 12. Addressed in Chapter 9.

		○ no nursing homes in the vicinity. **Previous issues** • Unclear if pyrite rock has implications for the proposed filling and the future. **Health effects during the refilling stage** • concern about the noise and dust on houses. • The project will increase heavy goods traffic. **Water quality issues** • Onsite water may risk of contamination of groundwater. **Flooding** • The potential implications of flooding risk in the area need to be addressed. **Risk of a greater Health impact on the north Dublin population** • need to safeguard the public from environment related pressures and risks to health and wellbeing. • The site is upriver from sites of public health importance. • Pollution could pollute and damage the ecosystem necessary for health of north Dublin population. **Further development of the site** • residential development would lead to a dependence on private car usage. • The development of the recovered site for example as native woodland forestry would be compatible with the public health aims. **Specific requests/Recommendations** • Planning should take account of noise mitigation and operating hours with consideration for nearby residential communities • Planning should take account of mitigation of dust production during the refilling stage and potential respiratory health effects of same (not merely nuisance issue). • plans for this site should consider protecting safety of residents and require restriction of routes used by vehicles to minimise disturbance and risk to residents.	Addressed in Chapters 9, 11 and 12. Addressed in Chapters 10. Addressed in Chapters 10. Addressed in Chapters 10. Addressed in Chapters 10. Addressed in Chapters 13.
Department of Communications, Climate Action and Environment	No response		
Fingal County Council (Roads, Drainage,	No response		

Environment Depts)			
Department of the Housing, Planning, Community and Local Government,	No response		
An Bord Pleanala	No response		
Irish Aviation Authority	No response		
Failte Ireland	No response		
Inland Fisheries Ireland	No response		
Health Service Executive	No response		
Environmental Protection Agency	No response		
Heritage Council	No response		
Arts Council	No response		
Dublin Chamber of Commerce	No response		
Office of Public Works	No response		
Eastern and Midland Regional Assembly	No response		
Eastern-Midlands Regional Waste Office	No response		
IBEC	No response		
BirdWatch Ireland	No response		
An Taisce	No response		
Irish Environmental Network	No response		
Bat conservation Ireland	No response		
National Biodiversity Data Centre	No response		
Irish Landscape Institute	No response		
Institute of Public Health in Ireland	No response		
DAA	No response		

1.5 DIFFICULTIES ENCOUNTERED COMPILING THIS EIAR

Assumptions specific to certain environmental aspects are discussed in the relevant chapters of this EIAR. General Assumptions that have been made during preparation of this EIAR are set out below:

- Relevant information has obtained from publicly available sources and mapping databases such as the EPA, NPWS, GSI, OPW, etc. It has been assumed that the information is correct and while reasonable care and skill has been applied in review of this data no responsibility can be accepted for inaccuracies in the data supplied.

1.6 REFERENCES

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

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

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

Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, DHPLG (August 2018).

2 BACKGROUND AND NEED FOR THE DEVELOPMENT

2.1 SCOPE OF THE PROPOSED DEVELOPMENT

This application seeks permission for the backfilling of inert C&D wastes into Bay Lane Quarry for the purposes of reclamation of the former quarry to restore the site to natural levels.

Section 2.2 presents waste statistics and projections for the Greater Dublin Area (GDA) which display the need for inert C&D facilities due to the projected increases in soil and stone waste generation (national and GDA scale) and the projected decrease in capacity forecast due to facility closures in the area. Therefore, new facilities or continued operation at existing sites are required to ensure that the medium-term supply meets the projected demand. There is a need for the development of operations as proposed for Bay Lane Quarry, as without the facility the supply of soil and stone recovery options in the GDA will decrease as generation is projected to increase.

This chapter sets out the rationale for the requirement for the permitted operations at the site.

2.2 JUSTIFICATION OF NEED FOR THE OPERATION

2.2.1 Waste Arising Projections

The '*Construction & Demolition Waste Soil and Stone Recovery / Disposal Capacity*' 2016 report[2], published in a joint venture by all three Regional Waste Authorities in the country, identified capacity in the Irish market for recovery or disposal of waste soil and stone type materials. This information has been applied to the analysis presented in this section of this EIAR.

The National Waste Collection Permit Office record data on soil and stone materials and on construction and demolition waste collected nationally and in the Greater Dublin Area (GDA) Region. This data is reproduced in **Table 2.1** and the statistics illustrate that circa 70% of the national soil/stone waste generation rate is collected in the GDA.

Table 2.1: Soil and stone waste collected 2012 – 2015

Criteria	2012	2013	2014	2015
National Soil Stone	2,254,000	2,020,000	2,860,000	3,500,000
GDA Soil Stone	-	1,140,000	2,020,000	2,570,000

For this analysis it has been assumed the increases in construction related wastes, including soil/stone, are linearly co-related with the Total Construction Output factors. This annual indicator records the economic value of construction related output in the economy reported in the 81st Euroconstruct Report. This annual report records previous output as well as projecting the predicted rate of change to 2020. To project beyond 2020, growth factors have been applied. Combining the arisings above

[2] http://southernwasteregion.ie/sites/default/files/National-C-D-Capacity-Report.pdf

with high and low growth projections allows a projection of arisings into the future and this projection is depicted in **Figure 2.1**.

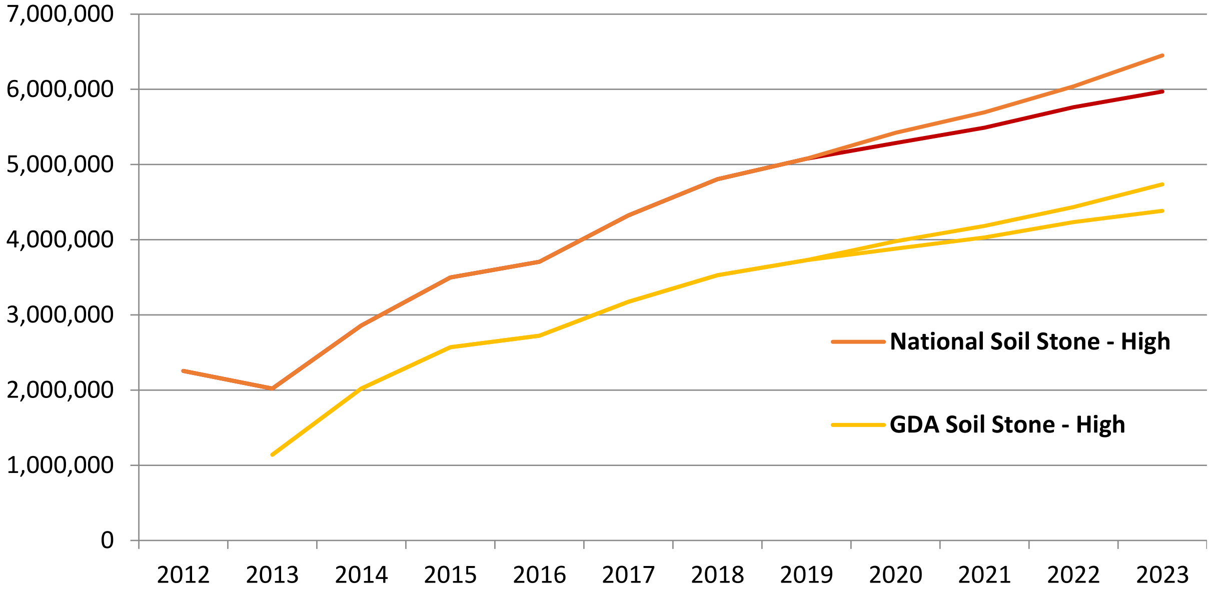


Figure 2.1: National and GDA soil and stone generation rates under high and low growth to 2023

The projected growth trends shown in **Figure 2.1** illustrate that the projected increases in generation rates of inert soil and stone from 2018 to 2023 are of the order of 20-40% in the GDA (depending on high or low growth rates employed). These increased generation rates will increase the demand for intake capacity in the region and hence there is a strong demand for suitably licensed soil and stone facilities within the GDA in the medium term.

2.2.2 Capacity Forecast

A forecast of the annual intake capacities available in the Irish market to 2023 are presented in **Table 2.2**. Data is published for each of the waste facilities operating under EPA licence and the forecasts presented assume facilities will continue to accept at the maximum authorised rate until those facilities reach capacity and cease to accept waste. All facilities with an authorisation have been included in the forecasts, however, those at application stage have been omitted as the future approval is not certain.

Facilities operating under certificates of registration and waste facility permits have not been included as the data is not sufficiently robust for remaining capacity and lifetime data. The available capacity to the market from these facilities is currently limited relative to the EPA licensed sites.

Article 27 of the European Communities (Waste Directive) Regulations, 2011 allows an ‘economic operator’ to decide whether a material is a by-product as opposed to a waste, under certain circumstances. Article 27 operations have the potential to divert inert waste and soil and stone waste from landfill, however, this not considered when assessing the capacities available in the GDA.

The analysis presented illustrates that between 2018 to 2023 the annual intake capacity in the GDA will decrease by circa 28% because of the closure of the Murphy Concrete (W0151-01) and Blackhall

Soil (W0247-01) sites. This 28% decrease in intake capacity is in stark contrast to the projected 20-40% increase in generation rates as presented in **Figure 2.1** for the medium term. This data highlights the need for continued and additional capacity at suitably licensed sites to accept the predicted increasing trend in soil and stone generation from construction.

Figure 2.2 graphically presents the projected data from **Table 2.2**. The figure illustrates the relative scales of the various facilities and capacities offered at the individual sites to the market. The largest facilities, Huntstown, Milverton and the IMS Hollywood facility are clearly identifiable from the other options as these provide between 43 – 60% of the market capacity in the GDA in the short term.

Table 2.2: Forecast of annual intake capacities available

Facility	2018	2019	2020	2021	2022	2023
Murphy Concrete W0151-01	750,000	0	0	0	0	0
Blackhall Soil W0247-01	344,000	344,000	344,000	344,000	344,000	0
Kiernan Sand & Gravel W0262-01	167,400	167,400	167,400	167,400	167,400	186,400
Huntstown W0277-03	750,000	750,000	750,000	750,000	750,000	750,000
IMS Hollywood W0129-2	500,000	500,000	500,000	500,000	500,000	500,000
Milverton W0272-01	400,000	400,000	400,000	400,000	400,000	400,000
Walshestown W0254-01	330,000	330,000	330,000	330,000	330,000	330,000
Drehid W0201-03	120,000	120,000	120,000	120,000	120,000	120,000
Ballynagran W0165-02	203,000	203,000	203,000	203,000	203,000	203,000
Clonbullogue W0049-02	70,000	70,000	70,000	70,000	70,000	70,000
Knockharley* W0146-02	200,000	200,000	200,000	200,000	200,000	200,000
Total	3,834,400	3,084,400	3,084,400	3,084,400	3,084,400	2,759,400

*Knockharley withdrew an application to increase the licenced rate of waste acceptance from 200,000 to 400,000 tonnes per annum (W0146-03).

Table 2.2 is depicted graphically as Figure 2.2.

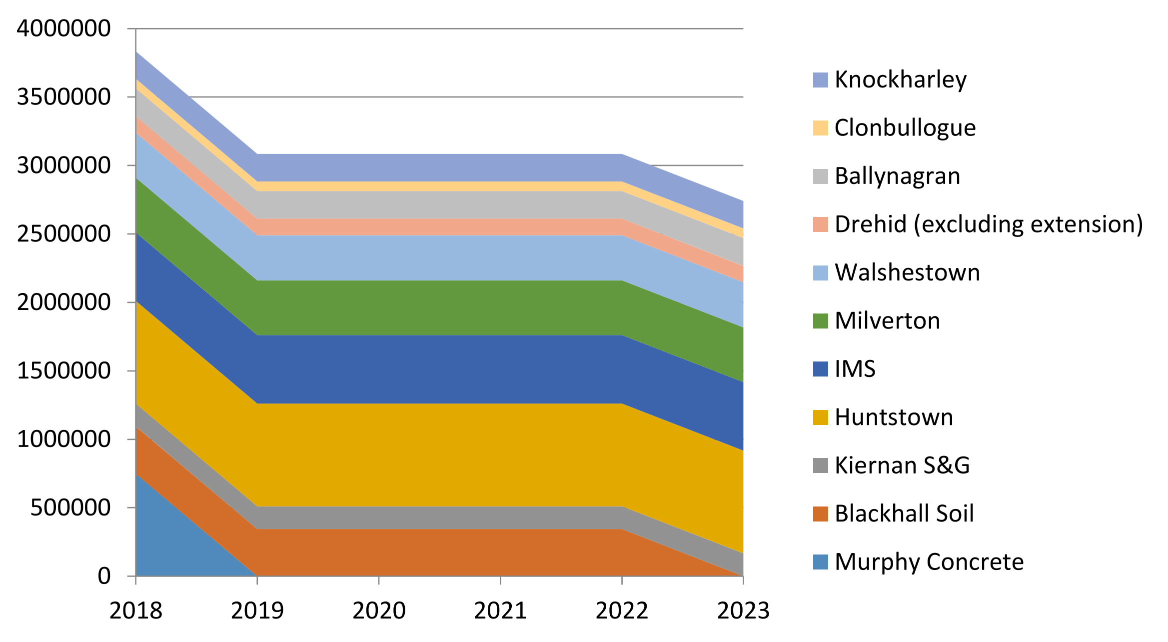


Figure 2.2: Available annual capacities of soil waste recovery sites in the Greater Dublin Area

Combining the soil waste and capacity projections generated provides a projection of the likely capacity shortfall. This exercise was completed in the '*Construction & Demolition Waste Soil and Stone Recovery / Disposal Capacity*' 2016 report, which produced the data provided in Table 2.3.

Table 2.3: Anticipated shortfall in capacity for soil and stones in GDA

2016	2017	2018	2019	2020	2021	2022	2023
1,279,600	1,200,000	1,533,000	2,621,000	2,958,000	3,283,000	3,456,000	3,979,000

This illustrates the importance of the GLV Bay Lane Limited facility to provide licensed capacity in the GDA for this waste stream. These statistics illustrate the need for the development.

2.3 SUMMARY

This application seeks permission for the backfill and restoration of a quarry with soil and stone waste with an estimated void fill requirement of c.740,000m^3 (712,129 m^3 usable void plus 27,918 m^3 soil covering).

Section 2.2 of this chapter presents the details of the increasing trend in generation of soil and stone inert wastes in the GDA and nationally based on projected construction trends. The growth trends illustrate that the projected increases in generation rates of inert soil and stone from 2018 to 2023 are of the order of 20-40% in the GDA (depending on high or low growth rates employed). These increased generation rates will increase the demand for intake capacity in the region and hence there is a strong demand for suitably licensed soil and stone facilities within the GDA in the medium term.

The analysis of licenced capacity to accept this waste stream illustrates that between 2018 and 2023 the annual intake capacity in the GDA will decrease by circa 28% because of the closure of two sites.

This 28% decrease in intake capacity contrasts with the projected 20-40% increase in generation rates outlined above. This data further highlights the need for the facility and the associated capacity to support the predicted increasing trend in soil and stone generation from construction.

The timeline projected to fill the current void is 30 months.

The operations at the site are essential to provide suitably licenced capacity for soil and stone from the projected construction increases proposed in the short term in the GDA.

2.4 REFERENCES

Construction & Demolition Waste Soil and Stone Recovery/Disposal Capacity, Regional Waste Authorities (2016).
81st Euroconstruct Report – Country Report, Euroconstruct (2016).
European Communities (Waste Directive) Regulations 2011, S.I. No. 126/2011

3 LEGISLATION AND POLICY

3.1 PLANNING AND DEVELOPMENT CONTEXT

3.1.1 Introduction

This purpose of this Section is to consider the proposed development having regard to potential impacts that the proposal will have to the relevant planning policy context concerned. This section therefore considers national, regional and local land use and transport planning and development policy which guides the proposed facility at Bay Lane. **Figure 3.1** illustrates an overview of the planning policy documents that comprise the Irish Planning System and the importance of policy in the assessment of planning applications. The relevant planning policies are set out for each level within the hierarchy in the sections that follow.

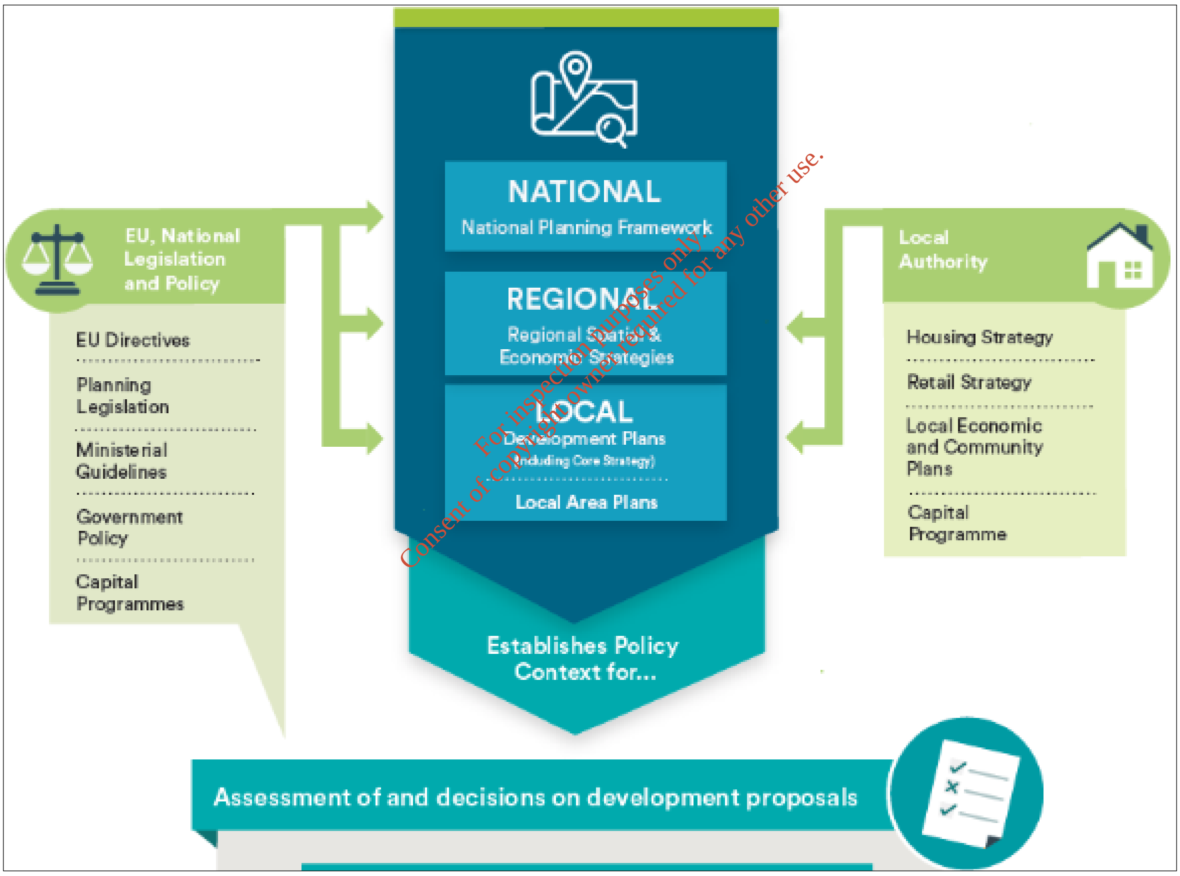


Figure 3.1 Overview of Irish Planning Policy Hierarchy, Source: Extract from Project Ireland 2040 – National Planning Framework, May 2018

3.1.2 National planning policy context

Project Ireland 2040 - National Planning Framework (NPF) which was adopted and published in May 2018, is the primary articulation of spatial, planning and land use policy within Ireland. The NPF is the Government's high-level strategic plan for shaping the future growth and development of Ireland out to 2040. It does so, inter alia, through setting out goals that are expressed in the Framework as National Strategic Outcomes (NSOs).

The National Strategic Outcomes of the NPF include NSO No. 9 i.e. the *"sustainable management of water, waste and other environmental resources".* More specifically, in the context of NSO No. 9, the NRF states that:

> *"Ireland has abundant natural and environmental resources such as our water sources that are critical to our environmental and economic wellbeing into the future. Conserving and enhancing the quality of these resources will also become more important in a crowded and competitive world as well as our capacity to create beneficial uses from products previously considered as waste, creating circular economic benefits."*

The NPF recognises that a key future enabler for Dublin includes improving sustainability in terms of waste and waste management. More broadly than that, the NPF promotes the circular and bio economy and the management of waste by having adequate capacity and systems to manage waste in an environmentally safe and sustainable manner such that waste is significantly reduced or even eliminated. The NPF specifically states that:

> *"In managing our waste needs, the NPF supports circular economy principles that minimise waste going to landfill and maximise waste as a resource. This means that prevention, preparation for reuse, recycling and recovery are prioritised in that order, over the disposal of waste."*

Due to its very nature and purpose, the subject soil recovery facility is wholly consistent with the waste related policies of the NPF and notably National Policy Objective 56 which is to:

> *"Sustainably manage waste generation, invest in different types of waste treatment and support circular economy principles, prioritising prevention, reuse, recycling and recovery, to support a healthy environment, economy and society."*

3.1.3 Regional Planning Policy Context

The key regional planning policy document is the Regional Spatial and Economic Strategy (RSES) prepared by the Eastern and Midland Regional Assembly (EMRA), which is currently in Draft form and due to be finalised and adopted during the first half of 2019. The RSES for EMRA replaces the Regional Planning Guidelines for the Greater Dublin Area 2010-2022, which were prepared in 2010. The Transport Strategy for the Greater Dublin Area, 2016 to 2035 also has some relevance for the subject application due to the site's proximity to the M50 and the N2 motorway.

3.1.3.1 Regional Spatial and Economic Strategy for the Eastern and Midland Region

The purpose of the RSES for EMRA is to support the implementation of national government policies and to set out a framework for local economic development and spatial planning in the region. The Draft RSES for EMRA is therefore a strategic plan, which identifies regional assets, opportunities and pressures and provides appropriate policy responses in the form of Regional Policy Objectives.

Compliance with the NPF and the Waste Management Plan for the region and reiterating those national and regional waste objectives to ensure there is continuity down to the more local county level development plans is a key reoccurring theme arising in the Draft RSES for EMRA. Regional Policy

Objectives (RPO) concerning regeneration and waste management contained within the Draft RSES for EMRA are particularly relevant to the subject proposal.

In terms of regeneration, RPO 9.13 is; *"To support at a National level, efforts to explore ways to deal effectively with waste and contamination relating to brownfield regeneration."*

In terms of waste management, RPO 10.20 states that; *"Development Plans shall identify how waste will be reduced, in line with the principles of the circular economy and how remaining quantums of waste will be managed and shall promote the inclusion in developments of adequate and easily accessible storage space that supports the separate collection of dry recyclables and food."*

3.1.3.2 Transport Strategy for the Greater Dublin Area 2016 - 2035

The Transport Strategy for the Greater Dublin Area 2016-2035 (TSGDA), prepared by the National Transport Authority (NTA), sets out how transport will be developed across the region, covering Dublin, Meath, Wicklow and Kildare up to 2035. The purpose of the strategy is to contribute to the economic, social and cultural progress of the Greater Dublin Area by providing for the efficient, effective and sustainable movement of people and goods.

The subject lands are located within approximately a 2-minute drive to the south west of J2 on the M2 motorway. The TSGDA recognises the N2 as a radial national route. It also identifies the subject lands as being in Radial Corridor B (i.e. *'Navan – Dunboyne – Blanchardstown – to Dublin City Centre*) and states that *"bus services on the N2 will be enhanced and that a core bus corridor will be provided to Tyrellstown via Ballycoolin from the N2 Finglas"*. Radial corridors are recognised as being of strategic importance to the strategic road network.

3.1.4 Local Planning Policy Context

3.1.4.1 Fingal Development Plan 2017-2023

The local planning policy framework is set out in the Fingal Development Plan 2017 – 2023 (FDP). Under the Waste Management Acts, the Development Plan is deemed to include the objectives of the Waste Management Plan for its administrative area. The FDP sets out the strategic visions for Fingal and this vision includes the objective to make better use of key resources such as land and waste infrastructure.

3.1.4.1.1 Waste Management Objectives

FDP recognises that in certain instances, quarries can be beneficial to the environment, particularly when they are decommissioned and when opportunities arise for habitat creation and alternative uses. In this respect and in the context of the proposed development, **Objective RF93** of the FDP is particularly relevant as the purpose of this objective, which concerns land reclamation and aggregate extraction is to:

> *"Encourage the recycling of construction and demolition waste to reduce the need for extraction."*

The FDP explicitly states that it has been prepared having full regard to the Eastern Region Waste Management Plan 2015-2021, which is described in detail in **Chapter 3** of this EIAR. **Table 3.1** sets out key specific objectives of the FDP which seek to ensure alignment with the Eastern Region Waste Management Plan 2015-2021.

Table 3.1: FDP Objectives regarding accordance with Eastern Region Waste Management Plan 2015-2021

FDP Objectives regarding accordance with Eastern Region Waste Management Plan 2015-2021	
Objective WM02	*"Facilitate the implementation of national legislation and national and regional waste management policy having regard to the waste hierarchy.*
Objective WM03	*Implement the provisions of the Eastern Midlands Region Waste Management Plan 2015 -2021 or any subsequent Waste Management Plan applicable within the lifetime of the Development Plan. All prospective developments in the County will be expected to take account of the provisions of the Regional Waste Management Plan and adhere to the requirements of that Plan.*
Objective WM04	*Facilitate the transition from a waste management economy to a green circular economy to enhance employment and increase the value recovery and recirculation of resources.*
Objective WM07	*Promote the increased re-use of waste in accordance with the Eastern Midlands Region Waste Management Plan 2015 -2021 (or any subsequent plan).*
Objective WM18	*Ensure that construction and demolition Waste Management Plans meet the relevant recycling / recovery targets for such waste in accordance with the national legislation and regional waste management policy.*
Objective WM19	*Protect floodplains and biodiversity where construction and demolition waste is to be recovered by land reclamation."*

3.1.4.1.2 Land Use Zoning

Within the FDP, the subject site is zoned for General Employment (GE) use (please refer to purple shading as illustrated in **Figure 3.2** below). The objective lands zoned GE to; *"Provide opportunities for general enterprise and employment."* More specifically, the purpose of this land use zoning objective is to facilitate opportunities for general employment uses and compatible forms of industry, logistics and warehousing.

According to the FDP, use classes that are permitted in principle on lands that are zoned GE include *'Open Space'*, *'Waste Disposal and Recovery Facility (Excluding High Impact)'*, *'Civic Waste Facility'* and *'Office Ancillary to Permitted Use'*. The subject proposal is therefore compliant with the permitted uses on the subject GE zoned lands.

The FDP has two specific objectives in relation to GE zoned lands, namely:

- *"Objective ED92: Prepare LAPs and Masterplans within the lifetime of the Development Plan for strategically important General Employment zoned lands in collaboration with key stakeholders, relevant agencies and sectoral representatives…*
- *Objective ED93: Encourage high quality sustainable design, permeability and pedestrian and / or cyclist friendly environments within General Employment zoned areas".*

Located within the Development Boundary, the subject lands are also zoned *"Subject to Local Area Plan"* (as illustrated via the hatched shading and the associated label *"LAP 12 A"*). In this respect, it is noted that the Cherryhound Local Area Plan 2012 (Cherryhound LAP) is already in place for the subject lands. While the Cherryhound LAP has been extended from 9 December 2017 until 8 December 2022, the FDP also specifically states that *"within the lifetime of the Development Plan, it is intended to prepare LAPs on GE zoned lands at Cherryhound".* The FDP also states that it intends to prepare a Masterplan for the GE zoned lands at Kilshane labelled *"MP 12A"* (to the East of the subject site).

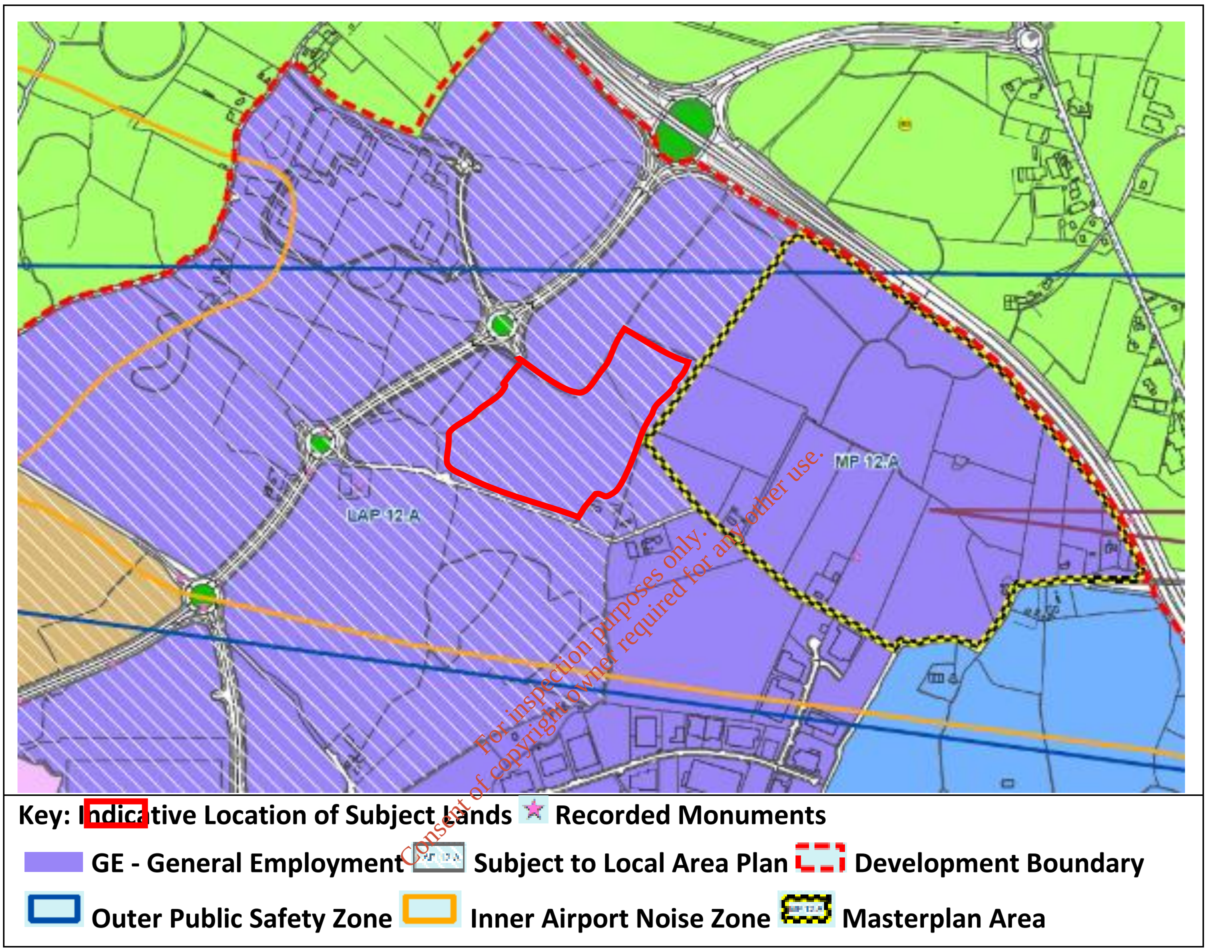


Figure 3.2: Extract from Fingal Development Plan 2017-2023, Sheet No. 12 (Blanchardstown North)

3.1.4.1.3 Inner Airport Noise Zone

The need to minimise the adverse impact of noise without placing unreasonable restrictions on development and to avoid future conflicts between the community and the operation of the airport is recognised in the FDP. As a result, the FDP identifies two noise zones, an outer airport noise zone within which appropriate development is restricted and an inner airport noise zone within which new provisions for residential development and other noise sensitive uses are actively resisted. As illustrated in **Figure 3.2**, the subject lands are located within the *'Inner Airport Noise Zone'.*

While the subject lands are located within the *'Inner Airport Noise Zone',* the proposed development of a soil recovery facility does not constitute a noise sensitive use. Nevertheless, it is noted that the FDP requires that any planning application that is situated in the noise sensitive zone is accompanied by a noise assessment report produced by a specialist in noise assessment which specifies all proposed noise mitigation measures. To address this requirement, please refer to **Chapter 12** of this EIAR.

3.1.4.1.4 Outer Public Safety Zone

It is noted that the FDP recognises that the subject lands are also located within the *'Outer Public Safety Zone'* (however, it is also noted that they are not located within the *'Inner Public Safety Zone'*). It is Objective DA14 of the FDP to; *"Review Public Safety Zones associated with Dublin Airport and implement the policies to be determined by the Government in relation to these Public Safety Zones.", The 'Outer Public Safety Zones'* (Outer PSZ) relates to an individual risk of fatality from aircraft to persons on the ground. In the outer zone, that risk is one in one million per year.

3.1.4.1.5 Recorded Monuments

While there are no recorded monuments located within the site boundary, it is noted that there are numerous recorded monuments located in the wider hinterland surrounding the subject lands. Objective CH07 of the FDP is to; *"Ensure that development within the vicinity of a Recorded Monument or Zone of Archaeological Notification does not seriously detract from the setting of the feature, and is sited and designed appropriately"*. Accordingly, please refer to **Chapter 15** of this EIAR which fully examines the archaeological impacts of proposed development, including any relevant impacts to recorded monuments situated in the wider vicinity of the site.

3.1.4.1.6 Access

As explained and addressed in detail in **Chapter 13** of this EIAR, it is proposed that the subject proposal will be accessed by re-using a previously established but currently disused former quarry main access onto Bay Lane. In this context, it is noted that the FDP states that:

> *"Where new entrances are necessary, the relevant road design standards will be applied (DMRB in rural situations i.e. the NRA Design Manual for Roads and Bridges - and DMURS in urban situations – Design Manual for Urban Roads and Streets). Such road standards are required to guarantee the safety of the general public in the County and protect the carrying capacity of the road network".*

In terms of access, it is also an Objective of the Development Plan to:

> *"Objective MT36: Maintain and protect the safety, capacity and efficiency of National roads and associated junctions in accordance with the Spatial Planning and National Roads Guidelines for Planning Authorities, DECLG, (2012), the Trans-European Networks (TEN-T) Regulations and with regard to other policy documents, as required".*

3.1.4.1.7 Green Infrastructure

The FDP identifies green infrastructure as a key strategic asset for Fingal and therefore includes policies for the protection, creation and management of this resource in an integrated manner. The FDP includes a statement of policy in relation to green infrastructure which is to; *"ensure that areas and networks of green infrastructure are identified, protected, enhanced, managed and created to provide a wide range of environmental, social and economic benefits to communities".*

It is also noted that Objective GI02 of the FDP is to; *"Create an integrated and coherent green infrastructure for the County by requiring the retention of substantial networks of green space in* *urban, urban fringe and adjacent countryside areas to serve the needs of communities now and in the future including the need to adapt to climate change."*

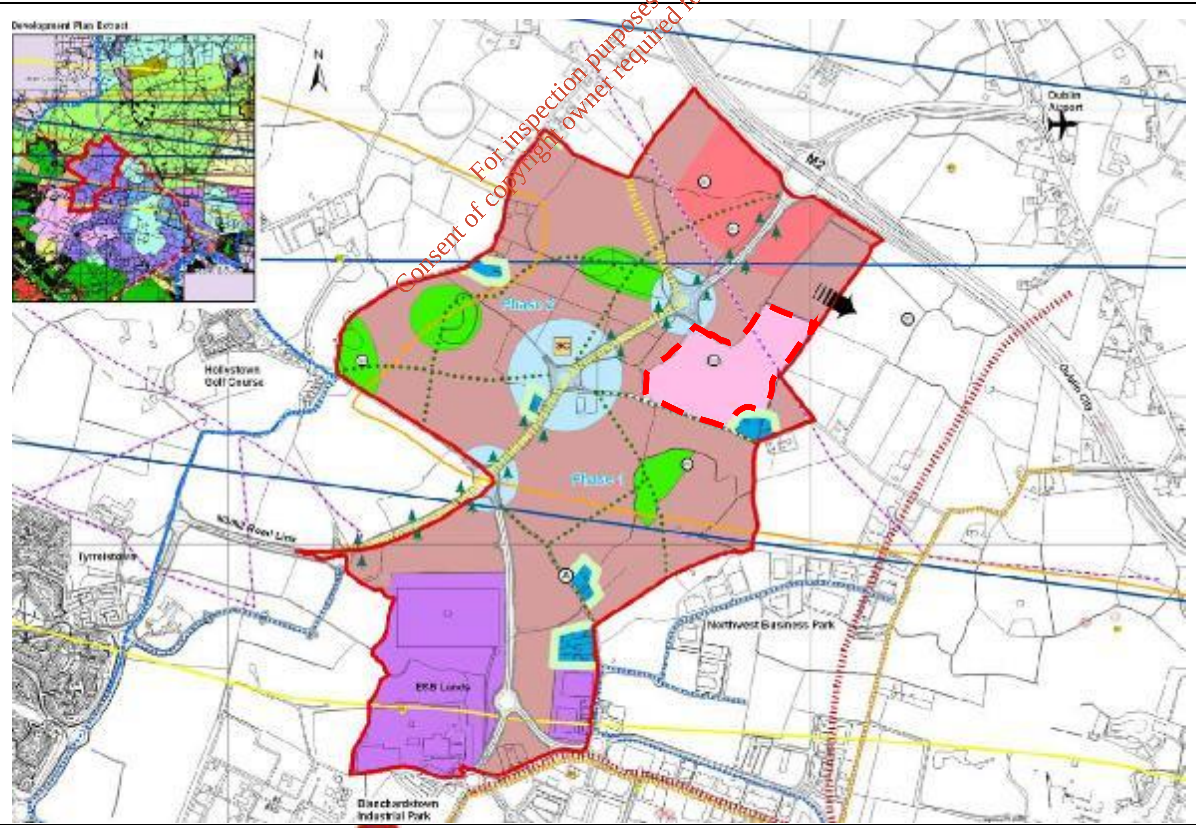
With specific reference to the subject proposal, the following is noted:

1. Green Infrastructure Map 1 identifies that the relevant Landscape Character Type for the subject lands is *"River Valleys Canal".*
2. Green Infrastructure Map 2 identifies the subject lands as being located south of a river and within a *"Nature Development Area"*.
3. Green Infrastructure Map 3 identifies that the EPA River Quality Status of the subject lands is *"Moderate"* i.e. where *"a reduced diversity of species and the presence of moderate pollution defines 'moderate' status water bodies"*.

The way the proposal interrelates with these green infrastructure strategic objectives is addressed in detail in **Chapter 16** of this EIAR.

3.1.4.2 Cherryhound Local Area Plan, December 2012

The Cherryhound Local Area Plan (LAP) was adopted in December 2012 and because it was extended in December 2017, it is now valid until 8 December 2022. The LAP itself concerns 240 ha. of land that are zoned GE in the FDP.



Key: Indicative Site Location Development Boundary Quarry 220kV Line General Employment Areas Residential Interface Existing Residential Development Indicative Pedestrian Cycle Links Outer Public Safety Zone Inner Airport Noise Zone Local Objective No. 361 Provide for the extraction of aggregates at this location

Figure 3.3: Extract from Cherryhound Local Area Plan

The stated purpose of the LAP is to promote the lands for the development of general enterprise opportunities and employment generation and detail a development framework strategy for the lands that will:

- Programme the delivery of support infrastructure to enable the development of a mixed-use area creating significant employment;
- Promote bio-diversity in the provision of parks, recreational open space and the landscape character;
- Promote Sustainable Drainage Systems (SuDS) and water management;
- Promote a high standard of design for commercial & industrial uses;
- Conserve/integrate archaeological heritage; and
- Reinvent the quarry for possible future recreation/leisure use.

3.1.4.2.1 Vision of for subject lands in LAP

As illustrated in **Figure 3.3**, the LAP identifies and zones the subject lands as a *'Quarry'* with the stated local objective (No. 361) to; *"Provide for the extraction of aggregates at this location."* Numerous references are made to the development potential of the subject quarry lands throughout the LAP, notably:

- Section 3.1 states that "an extensive quarrying operation in the area has ceased production."
- Section 3.2 states that "the limestone quarry which ceased operation in 2011 forms a major excavated land area at the eastern perimeter of the LAP lands."
- Section 4.2 states that "the quarry presents a particular challenge…the zoning of the lands for employment uses will however encourage its development for a more urban use once the quarry is exhausted."

The visions of the LAP reflect the purpose of the LAP. It is a specific objective CA6 of the LAP to**: "***Seek to reinvent permitted land uses in the quarry area."* The stated visions for the quarry include a vision that is: *"To create an environment of high quality, distinction and international rating, based on the proven application of innovative design/management and smart technology, by providing… Re-use of quarry for future leisure/recreational use".* It is submitted that the subject development fully complies with the LAP.

3.1.5 Impact Assessment and Conclusions

Due to its very purpose and nature, the subject proposal fully accords with the relevant strategic objectives as set out in the NPF, notably, the circular and bio economy and the management of waste. The RSES for EMRA contains regional planning policy in relation to regeneration and waste management that supports the subject proposal. In addition, from a regional transportation perspective, the proposed development maintains the strategic objectives of its surrounding road network as set out in the TSGDA.

In terms of the local planning policy context, the proposed soil recovery facility will provide opportunities for employment arising from the proposed operational requirements of the facility and it therefore complies with the FDP zoning objective for the site i.e. to "*Provide opportunities for general enterprise and employment."* In relation to the use classes of the FDP, the proposed development accords with those uses that are permitted in principle on lands that are zoned GE (i.e. *'Open Space', 'Waste Disposal and Recovery Facility (Excluding High Impact)'*, *'Civic Waste Facility'* and *'Office Ancillary to Permitted Use'*). The proposed recovery facility also accords with the inner airport noise zone, outer public safety zone, recorded monuments, access and green infrastructure objectives of the FDP. The way this is achieved is addressed in detail in Chapter 10, 11, 12 and 17 of this EIAR.

The proposed development also fully complies with the most local planning policy context via the visions and objectives of the Cherryhound LAP as once the quarry site is fully backfilled via the subject proposal. In conclusion, from a planning and development policy perspective, the subject proposal complies with all relevant national, regional and local level plans and all associated objectives that concern the proper planning and sustainable development of the area.

3.2 WASTE POLICY

A significant book of statute and policy statements governs the management of waste in Ireland. European policy and legislation provide much of the basis for national policy for managing waste and resource. This policy and legislation in Europe and Ireland are extensive and complex. European and national policies are increasingly focused on sustaining the lifespan of resources and a range of policy and market measures are being considered.

Irish waste legislation is made up of (1) a primary Act, the Waste Management Act 1996, (2) statutory instruments or waste regulations and (3) other related legislation.

3.2.1 EU Waste Policy

At EU level, the Waste Framework Directive (2008/98/EC) ('the WFD') has previously set the legal framework for waste management in the European Union. The WFD sets the basic concepts and definitions related to waste management, such as definitions of waste, recycling, recovery. It explains when waste ceases to be waste and becomes a secondary raw material (so called end-of-waste criteria), and how to distinguish between waste and by-products. The WFD lays down some basic waste management principles - it requires that waste be managed without endangering human health and harming the environment, and without risk to water, air, soil, plants or animals, without causing a nuisance through noise or odours, and without adversely affecting the countryside or places of special interest.

The Directive states that:

> '*Waste policy should also aim at reducing the use of resources, and favour the practical application of the waste hierarchy*'

The waste hierarchy consists of a methodology for the management of waste, with prevention of waste being the priority, followed by material re-use, recycling, recovery and disposal in that order. It goes on to state that the recovery of waste and use of recovered materials should be encouraged to conserve natural resources.

Regarding the subject material proposed to be imported to the site, the Directive states:

> '*The waste status of uncontaminated excavated soils and other naturally occurring material which are used on sites other than the one from which they were excavated should be considered in accordance with the definition of waste and the provisions on by-products or on the end of waste status under this Directive*'

It is clear from the Directive also that only soil/stone material excavated for a construction project on a site that is deemed surplus to requirements at that same site constitutes waste.

In May 2018 the EU published Directive (EU) 2018/851 of the European Parliament and of the Council amending Directive 2008/98/EC on waste. The revised Waste Framework Directive (WFD) provides the legislative framework for the collection, transport, recovery and disposal of waste in the EU and is to be transposed by July 2020. Of relevance to the proposed development the revised WFD notes the following:

The revised WFD adds several new definitions including the definition of C&D waste and backfilling:

- The term 'construction and demolition waste' means waste generated by construction and demolition activities;
- The term 'backfilling' means any recovery operation where suitable non-hazardous waste is used for purposes of reclamation in excavated areas or for engineering purposes in landscaping. Waste used for backfilling must substitute non-waste materials, be suitable for the purpose, and be limited to the amount strictly necessary to achieve those purposes.

These definitions are pertinent in that the proposed development relates to the 'backfilling' of inert C&D wastes into a former quarry for the purposes of reclamation of a former quarry to restore the site to natural levels. Soil and stone waste materials are suitable for purpose.

Finally, the proposed application is limited to the backfill of the remaining void space only (refer **Section 2** of this EIAR) and hence is limited to the amount strictly necessary to achieve those purposes.

The EPA notes that, as per the definition, backfilling is a recovery operation but does not have a clear assignment to the recovery (R) codes and depending on the wastes used for backfilling, it may be assigned to R5 or R10.

In short, the proposed development fully complies with the definition of 'backfilling' as presented in the revised WFD and hence, national and regional policies related to this operation are directly relevant to the proposed development.

3.2.2 National Policy and Legislation

A series of National Waste Policy Statements have been put in place since 1998 with the last publication, A Resource Opportunity, published in 2012. The policy landscape has changed from a focus on modernising Ireland's waste management systems through better regulation, enforcement and infrastructure to greater resource efficiency and life cycle thinking. It also introduced a rationalisation of waste management regions to ensure better planning, which in turn will free up resources for other priority areas. It sets out measures which Ireland can focus on to ultimately reduce the amount of waste produced annually. It sets out a waste hierarchy which follows that of the Waste Framework Directive as follows:

- Prevention;
- Reuse;
- Recycling;
- Recovery, and
- Disposal.

The management of construction wastes did not feature significantly in the last policy statement perhaps reflecting the low levels of waste generation in the sector at the time. The current increase in construction waste tonnages requires a management plan to avoid a cycle of market issues.

Regional policy which is aligned to the national agenda has been recently refreshed with the publication of the three regional waste management plans (refer **Section 3.2.4**) whose new focus is to help and deliver greater resource cycles through targeted actions involving all key stakeholders.

In Ireland, the primary legislative platform for waste is provided by the Waste Management Act (WMA), 1996, and the Protection of the Environment Act, 2003. The WFD was transposed into Irish law in 2011.

The EC (Waste Directive) Regulations, 2011 sets a 70% target for the reuse, recycling and recovery of man-made C&D non-soil and stone waste in Ireland by December 2020. The EPA has reported that Ireland had achieved a recovery rate of 97% for 2012. Although soil and stone materials are not addressed by this target for man-made materials, additional capacity will be required to manage the additional volumes generated by the pace of construction activity.

3.2.3 Construction and Demolition Waste: Soil and Stone Recovery / Disposal Capacity

The '*Construction & Demolition Waste Soil and Stone Recovery / Disposal Capacity*' 2016 report, published in a joint venture by all three Regional Waste Authorities in the country, identified capacity in the Irish market for recovery or disposal of waste soil and stone type materials. It identified the increased rates of construction and development experienced in the country during 2013 – 2016, and the subsequent associated rise in collection rates of soil and stones material which it states increased by 42% in 2014 and 22% in 2015. It goes on to state that future growth is expected. It presented data nationally and categorised same under three main scenarios:

- Facilities operating under Waste Licence;
- Facilities operating under waste facility permit; and
- Facilities operating under certificates of registration.

The report sets out the relevant findings of this data collection exercise for each of the three Waste Management Regions. Details of the market trends in the GDA and Eastern Midlands Region have been presented in **Chapter 2** of this EIAR relating to the need for the proposed development.

3.2.4 Regional Policy

The '*Eastern-Midlands Regional Waste Management Plan 2015-2021'* was launched on the 14th May 2015 and is the key waste policy driver for waste management in the GDA and Fingal region. One of the main policies of the plan relates to backfilling of inert waste which meets the recovery definition and complies with Articles 4 and 13 of the WFD.

The plan acknowledges the relatively low level of utilisation in this sector relative to intake capacity as this reflects the depressed activity in the construction sector in Ireland and, as a result, supply of capacity exceeding current demand. This trend has also been recorded at the proposed development (refer **Chapter 2**). However, this 2015 plan states that activity in the sector is expected to increase over the plan period (to 2021) as economic recovery continues to build nationally as shown in **Chapter 2** of this EIAR.

To this end the plan includes a specific policy (E14) relating to the future authorisation of backfilling sites in the region as follows:

Policy E14: The local authorities will co-ordinate the future authorisations of backfilling sites in the region to ensure balanced development serves local and regional needs with a preference for larger restoration sites ahead of smaller scale sites with shorter life spans. All proposed sites for backfilling activities must comply with siting criteria set out in the plan.

The proposed development specifically complies with the policy of the Regional Plan as follows:

- The existing and proposed operation complies with the WFD definition of backfilling as outlined in **Section 3.2.1** of this EIAR, so the site is directly relevant to the policy.
- The proposed development serves the local and regional needs as the site is well located near the GDA where circa 70% of the national soil/stone waste generation rate is collected.
- The operation will represent a large facility in the country for this waste stream and, as such, the establishment of the facility is favoured by this policy.
- The environmental protection criteria listed in Section 16.6 of the Regional Plan include criteria such as the avoidance of Natura 2000 sites and that any development (new or upgrades, enlargements, reviews) seeking consent should be subject to Appropriate Assessment. An AA has been prepared for the proposed development and has been submitted with this application to confirm no significant effect on a European site, either alone or in combination with other plans or projects.

It is clear that policy E14 is specifically designed to ensure the operation of larger soil/stone facilities such as the proposed development to meet the growing demand for capacity for this waste stream in the GDA.

3.2.5 Soil and Stone Waste or By-Product (Article 27)

Article 27 of the European Communities (Waste Directive) Regulations, 2011, allows an 'economic operator' to decide, under certain circumstances, that a material is a by-product and not a waste. Article 27 was introduced into Irish law to implement Article 5 of the 2008 Waste Framework Directive (2008/98/EU).

Decisions made by economic operators under Article 27 must be notified to the EPA and the EPA maintains a register of all decisions. To date there are circa 900 Article 27 notifications logged in the EPA Register and soil and stone one of the key by-products listed in the resister.

However, in October 2018 the EPA commenced consultation on proposed *Guidance on Soil and Stone By-products*. The purpose of guidance is to inform economic operators how to prevent waste soil and stone by classifying it as a by-product in accordance with the legislation and the EPA's proposed regulatory approach to determinations on soil and stone by-products.

While the Article 27 route does not apply to the proposed development, the publication and enforcement of guidance on soil and stone by the EPA may have significant implications for the volumes of waste accepted at the site.

3.2.6 End-of-Waste

End-of-Waste is a status conferred on a waste that has undergone a recovery process, including recycling, where the waste has been deemed to comply with specific criteria in accordance with a specific set of conditions. Once End-of-Waste status has been achieved, the material is no longer considered a waste, and waste legislation no longer applies. This should have the effect of adding value to the material which is now a product. Furthermore, it should open a wider market for reuse, thereby encouraging and improving recycling rates.

The EPA is the decision-making authority for End-of-Waste in Ireland. To date there have been no End-of-Waste decisions under Article 28 in relation to Construction and Demolition Waste (CDW). There are several applications principally for the reuse of aggregate derived from crushed concrete, under consideration at present, and the EPA expects to decide on these in 2019.

End-of-Waste status different from Article 27 by-product status and can only be conferred on a waste that has exited a recycling or recovery process. The processing of the waste is a waste activity and requires waste authorisation. For example, a demolition contractor may generate waste concrete which is directed to an authorised waste facility where it is crushed and processed under specific conditions and ultimately meets specific end-of-waste criteria. Once the material successfully exits that process, it is then a product and no longer a waste and can be sold on as a marketable product.

End-of-Waste will be expected to improve the recycling and beneficial reuse of CDW other than soil and stone but is not expected to offer a solution for surplus soil and stone arisings, which typically do not require processing.

3.3 REFERENCES

Project Ireland 20140: National Planning Framework, Department of Housing Planning and Local Government (2018).
Draft Regional Spatial and Economic Strategy for the Eastern and Midland Region, Eastern and Midland Regional Assembly, (2018).
Eastern-Midlands Region Waste Management Plan 2015-2021, Eastern-Midlands Waste Management Region (2015).
Transport Strategy for the Greater Dublin Area 2016 to 2035, National Transport Authority (2016).
Fingal County Development Plan 2017-2023, Fingal County Council (2017).

Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives
Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste
European Communities (Waste Directive) Regulations 2011, S.I. No. 126 of 2011
Waste Management Act 1996, No 10 of 1996 (as amended).
Protection of the Environment Act, Number 27 of 2003 (as amended).
Construction & Demolition Waste Soil and Stone Recovery/Disposal Capacity, Regional Waste Authorities (2016).
Guidance on Soil and Stone By-products - Draft Proposed for Public Consultation, EPA, (2018).
2000/532/EC: Commission Decision of 3 May 2000 replacing Decision 94/3/EC establishing a list of wastes pursuant to Article 1(a) of Council Directive 75/442/EEC on waste and Council Decision 94/904/EC establishing a list of hazardous waste pursuant to Article 1(4) of Council Directive 91/689/EEC on hazardous waste.

4 ALTERNATIVES

4.1 INTRODUCTION

This chapter sets out the context in which the main reasonable alternatives were considered by GLV Bay Lane Limited for the proposed development and an indication of the main reasons for the final project chosen, considering the effects on the environment. It outlines the main operational alternatives considered by GLV Bay Lane Limited to meet the identified need set out in Chapter 2 of this Environmental Impact Assessment Report (EIAR).

The proposed development of backfilling operations at the existing disused quarry offers clear environmental and economic advantages. The facility is close to a large economic centre (Dublin City and north County Dublin) and is very readily accessible using existing high quality national and regional road infrastructure. There is established precedent of this type of facility being developed into a soil recovery facility.

The consideration of alternatives has been undertaken by a multi-disciplinary technical, environmental and planning project team and is considered to have concluded with the identification and selection of a solution that provides the best balance between technical, environmental and community / social indicators.

The consideration of alternatives has been framed in the context of the overall project objective which is that GLV Bay Lane Limited has identified a shortage in available soil and stone recovery capacity in the Dublin market to support its operations. GLV Bay Lane Limited wishes to secure soil and stone recovery capacity to support its business needs.

The following 'Do nothing' alternatives were considered:

- Retain the Bay Lane Quarry site in its current condition;
- Onsite avoidance minimisation/reduction alternatives.
  - Prevent, minimise, reuse soil and stone generated at design (i.e. non-export from site of generation);
  - Site declaration as Article 27;
  - Third party management.

The 2002 EPA Guidelines highlight three different categories under which alternatives should be considered. This has been expanded to five categories in the draft 2015 guidelines as follows. The applicability of each of these five categories is considered below.

- Alternative locations;
- Alternative layouts;
- Alternative designs;
- Alternative processes; and
- Alternative mitigation measures.

Within these scenarios, the 'Do something' scenarios were investigated.

4.2 LEGISLATIVE CONTEXT

Annex IV to the **Environmental Impact Assessment (EIA) Directive** and Schedule 6 of the ***Planning and Development Regulations 2001*** (as amended), both require that information to be contained in an EIAR includes:

> '*An outline of the main alternatives studied by the developer and an indication of the main reasons for his or her choice, taking into account the effects of the environment."*

In preparing this chapter, the G***uidelines on the information to be contained in Environmental Impact Statements*** **(2002)** and ***Advice Notes on Current Practice*** **(in the preparation of Environmental Impact Statements) (2003),** published by the Environmental Protection Agency (EPA) have both been referenced. It is noted that both documents are currently being updated and draft texts have been available since 2015. To ensure the widest scope of consideration for the alternatives, all versions of the texts have been referenced for completeness. Where referenced, the version of the text is clearly referenced.

The EPA publication, Guidelines on the information to be contained in Environmental Impact Statements, states

> '*The consideration of alternatives also needs to be set within the parameters of the availability of land (it may be the only suitable land available to the developer) or the need for the project to accommodate demands or opportunities which are site specific. Such considerations should be on the basis of alternatives within the site, e.g. design, layout*'.

Backfilling activities (of inert waste), which meet the recovery definition and comply with Articles 4 and 13 of the **Waste Framework Directive**, sit on the other recovery tier of the waste hierarchy. The EPA is the competent body tasked with authorising significant backfilling of inert waste at large sites such as old quarries for restoration purposes, as at Bay Lane Quarry.

The **EC (Waste Directive) Regulations**, 2011 sets a 70% target for the reuse, recycling and recovery of man-made C&D non-soil and stone waste in Ireland by December 2020. The EPA has reported that Ireland had achieved a recovery rate of 97% for 2012. Although soil and stone are not addressed by this target for man-made materials, additional capacity will be required to manage the additional volumes generated by the pace of construction activity.

Given the sharp decrease in the number of operational landfills nationally, which were a significant outlet for soil and stone waste in the past, alternative recovery options are required to facilitate the recovery of soil and stone waste arising. Quarries frequently require large quantities of soil material to fill voids, and for other remediation and landscaping applications. The **Eastern Regional Waste Management Plan 2015-2021** notes that:

> '*Future planning and authorisation of backfilling sites must take account of the location of existing capacities and the scale of available capacity across the region to ensure there is adequate, appropriate and balanced supply*'.

This 'need' element is addressed in Chapter 2 of this EIAR.

Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, August 2018, Department of Housing, Planning and Local Government indicates, for reasonable alternatives that:

> *'4.12. The Directive requires that information provided by the developer in an EIAR shall include a description of the reasonable alternatives studied by the developer. These are reasonable alternatives which are relevant to the project and its specific characteristics. The developer must also indicate the main reasons for the option chosen taking into account the effects of the project on the environment.*
>
> *4.13. Reasonable alternatives may relate to matters such as project design, technology, location, size and scale. The type of alternatives will depend on the nature of the project proposed and the characteristics of the receiving environment. For example, some projects may be site specific so the consideration of alternative sites may not be relevant. It is generally sufficient for the developer to provide a broad description of each main alternative studied and the key environmental issues associated with each. A 'mini- EIA' is not required for each alternative studied.'*

4.3 ALTERNATIVE LOCATIONS

In support of this EIAR, alternative locations were assessed. This section outlines the main aspects which were taken into consideration for the alternative sites for the proposed development.

The proposed development is a backfilling and restoration operation of a particular disused quarry, therefore, there is little scope for assessing alternative locations.

The Fingal County Council Development Plan, 2017 – 2023, considers Waste Management in Chapter 7 '*Movement and Infrastructure*'. The prevailing Regional Waste Management Plan for Fingal, which has now been superseded by the Eastern Midlands Region Waste Management Plan 2015-2021.

The proposed location is approximately 1 km west of the N2 that links to Dublin City Centre and Dublin Airport.

There is existing capacity for waste intake in the Greater Dublin Area (GDA). Table 4.1 displays the facilities used in the capacity forecast, the distance from Bay Lane Quarry and their current capacity.

Table 4.1: Disposal facilities and the approximate distance from the proposed development

Facility	Approximate Distance from Bay Lane Quarry to Facility	Current Capacity (tonnes per annum)
Bay Lane Quarry	-	(532,800)
IMS Hollywood W0129-02	33 km	500,000
Murphy Concrete W0151-01	40 km	750,000
Blackhall Soil W0247-01	45 km	344,000
Kiernan Sand & Gravel W0262-01	35 km	167,400
Huntstown W0277-03	3 km	750,000
Milverton W0272-01	39 km	400,000
Walshestown W0254-01	45 km	330,000
Drehid W0201-03	58 km	120,000
Ballynagran W0165-02	73 km	203,000
Clonbullogue W0049-02	71 km	70,000
Knockharley W0146-02	30 km	200,000

The nearest facility to Bay Lane Quarry is Huntstown located approximately 3km away. The remaining facilities are 30km or further from the Bay Lane site. Murphy Concrete facility is due to stop accepting waste in 2019.

The overriding reason for the selection of the Bay Lane Quarry is due to the increasing demand for soil and stone disposal facilities and the reduction of capacity forecasted in the Greater Dublin Area, and a concern at potential lack of access to capacity.

GLV Bay Lane Limited has approximately 11,000 residential developments live and at pre-planning stage nationally. Volumes of soil and stones generated and requiring offsite haulage are site specific, but GLV Bay Lane Limited experience indicates generation of volumes of 175m^3 per unit, indicating generation rates of over 1.9 million m^3.

The consideration of location requires an examination of any available sites in respect of the following criteria:

- Availability of land and waste capacity;
- Location of site relative to the centroid of waste generation; Bay Lane Quarry is parsimonious in terms of travel distance for the materials from the listed developments.
- Current planning and environmental issues at the available sites;
- The void space available;
- The remoteness from dwellings;
- Access to local, regional and subsequently the motorway;
- The existence of a previously permitted quarry; and
- Natural screening from the physical characteristics of the site.

There were no suitable alternative development locations available to GLV Bay Lane Limited that offered this level of proximity to the Greater Dublin Area and GLV Bay Lane Limited likely points of waste generation. Because of these considerations, the quarry void at Bay Lane is the sole location proposed for development of the proposed facility.

4.4 LAYOUT

The alternative layout section is included in this EIAR to consider how different elements of the proposed development can be arranged on site and what environmental and design implications will arise with alternative layouts.

Development of the site will occur within the landownership boundary and in direct control of GLV Bay Lane Limited. The land area will be sufficient to maintain a buffer zone around the site perimeter.

The site is in a zone for General Employment use (Fingal County Council Development Plan 2017-2023. The visual impacts of operation below natural ground level are deemed to be insignificant, only during the final stages of operation when works are near the surface level there may be some temporary visual impacts.

4.4.1 Sensitive Receptors

When assessing alternative layouts, the sensitive receptors must be considered with a view to select a layout which would minimise the impact of the proposed development on the surrounding environment, and would be the most sustainable solution considering the following:

- Proximity to sensitive receptors (noise/dust/air quality);
- Buffer zone;
- Visual impact; and
- Compatibility with existing/proposed infrastructure.

The nearest sensitive receptor (the gable of the neighbouring dwelling house on the (southeast perimeter) is approximately 50 meters from the nearest element of the infrastructure to be used within the proposed development (the settlement tank). The distance of the same dwelling to the edge of the void is approximately 67 meters.

The proposed development is favourable for the visual impacts of the selected location. The backfill operation is unlikely to affect the visual landscape until the final stages of backfill and restoration when the operations would be near to the natural level. However, the proposed infrastructure will have an effect if it extends above the surrounding ground level.

4.4.2 Site Infrastructure, external and internal

The external layout of the proposed development will be the haulage routes of the materials brought to the facility. There is a restriction on vehicle sizes (ban on 3 and above axle vehicles) that are permitted to utilise Bay Lane to the southeast of the entrance of the quarry. This restricts haul vehicles to accessing the facility from northwest via Bay Lane Roundabout on the N2-R121 dual carriageway link road. The N2-R121 is a high capacity dual carriageway link road, which connects the M2/N2 road network to the R121 Ratoath Road and onwards. GLV Bay Lane Limited therefore proposes that haul routes will access Bay Lane Roundabout via this very suitable high capacity dual carriageway link road.

Accordingly, the haul route to Bay Lane Quarry via the N2-R121 is proposed.

The internal layout of the proposed development will be the temporary site works involved in the backfilling works which will deliver the final, contoured profile. These temporary site works will involve a phased fill, temporary water storage, temporary site roads, and inspection and quarantine areas. Alternative layouts would not offer environmental benefit and alternatives are therefore are not proposed. Temporary site works are operationally and environmentally optimal as proposed.

Site internal - office, canteen, weighbridge, parking - layout are operationally and environmentally optimal as proposed. Alternative layouts would not offer environmental benefit and alternatives are therefore are not proposed.

4.5 SIZE AND SCALE

4.5.1 Design

The size of the project (demand is c.740,000 m^3 (712,129 m^3 usable void plus 27,918 m^3 soil covering)) is fixed. The scale of the project (filling pace) is dictated by generation rates at the production sites.

Alternative rates of the maximum fill per year have been considered in this EIAR. This section considers the proposed waste licence acceptance limit (532,800 tpa).

The projections in **Table 4.2** have been used to estimate how many years it would take to fill the existing void of 740,000 m^3, assuming the maximum accepted waste value is achieved each year.

Table 4.2 Projection for time to fill the void using different maximum waste acceptance rates

Projection	Void Space remaining (m^3)	Years to Fill	m^3/ annum
Reduced Rate	740,000	5.0	148,000
Proposed Rate	740,000	2.5	296,000
Increased Rate	740,000	2.0	370,000

A higher pace of production means 'frontloaded' peaks in site impacts, such as noise or traffic. A higher pace of production also means that the site would fill faster and closes sooner. Although the filling pace will be dictated by waste arising rates, the fill period will not be shorter than the 30-months, with peaking, upon which impacts have been modelled. Impacts are therefore modelled at their maximum.

A lower pace of production means 'lower and longer' peaks in site impacts, such as noise or traffic. A lower pace of production also means that the site would fill slower and close later.

The net impacts on the immediate area will remain the same in each of the scenarios.

Accordingly, an alternative process is not optimal, and this application seeks to use the proposed duration of 2.5 years. The proposed development has suitable capacity for the acceptance of expected volumes of target wastes projected in **Chapter 2.2.1**.

4.6 PROCESSES

The following section outlines the main aspects which were considered for the alternative operations of the main elements of the proposed development. The alternatives will be assessed relative to the Do-Nothing scenario (**Section 4.7.1**). The main alternatives Multi-Criteria Analysis is summarised in **Table 4.3.**

4.6.1 Do-Nothing

In the Do-Nothing Scenario - i.e. absence of the proposed development - the facility would remain in its present condition. The following are considerations in relation to this scenario:

- The existing planning condition for the quarrying operation from An Bord Pleanála PL 06F.125541 decision on Planning Register Reference Number: F00A/0862 requires that '*Full restoration of the site as set out in the Environmental Impact Statement shall be completed within this period* [fifteen years from the date of this order].'
- The existing condition for the quarry with high rock walls and deep standing water present a potential health and safety hazard to humans and livestock. Securing the site would require instatement of fencing to protect humans and livestock from exposure to high rock faces and deep water onsite.
- In its current un-vegetated condition, the quarry has potential to generate dust nuisance.
- Retaining the facility in its present condition implies a reliance on other sites, including additional greenfield sites, given that there is a shortage of recovery capacity. This reliance on greenfield sites is not considered appropriate. Creation of new sources of supply, by developing greenfield sites, is problematic from environmental and community perspectives.
- Recovery of soil and stone materials provides an outlet for these materials. In the absence of this facility and the continuing national, regional and local growth over the medium to long term, together with the National Development Plan, the waste would require the sourcing of alternative sites, involving greater haul distances, with consequent cost and road nuisance impacts.
- The surrounding lands have development potential, as evidenced by the zoning of surrounding lands for 'GE - General Employment' and the excellent road network. This development potential

may be limited by the negative impacts associated with the retention of Bay Lane Quarry in an unrestored state.

Accordingly, the retention of Bay Lane Quarry in its current condition is excluded as a viable alternative.

4.6.2 Alternative Processes

4.6.2.1 Quarrying

The site has a history of quarrying rock for aggregate production. The aggregate produced subsequently proved to have a pyrite content that severely limits the applications to which the aggregates can be applied, and therefore the commercial value of the aggregate.

Accordingly, no further aggregate extraction is proposed for the site. This elimination of further aggregate extraction aligns with the preferences of Fingal County Council as expressed during the pre-planning meeting.

4.6.2.2 Landfill

Alternative processes for Bay Lane Quarry could include use as inert, non-hazardous or hazardous landfill. An inert, non-hazardous or a hazardous landfill would not meet GLV Bay Lane Limited requirements for an outlet for clean soil and stone. Further, these alternatives are not aligned with Regional Waste Management Plan or the County Development Plan objectives.

Accordingly, an alternative design other than use as a soil recovery facility is not proposed.

4.6.3 Continue Current (offsite) Waste Management Practices

GLV Bay Lane Limited, as for all housing developers, is required to apply an extensive waste prevention, avoidance, minimisation by default for all materials arising. GLV Bay Lane Limited considers waste minimisation and opportunities for re-use / recycling on a site-by-site basis as part of its site construction and demolition waste management plan. This considers how best to minimise the volume of soil and stone generated by its home building activities. There is a cost associated with removal of soil and stone offsite. This cost means that the first consideration, in all cases, for GLV Bay Lane Limited is to retain and re use soil and stone material onsite. GLV Bay Lane Limited therefore fully exploits any onsite retention options before considering removal.

The disposal of soil and stone waste generated during construction, including bulk excavation, is managed to maximise the environmental and development benefits from the use of surplus materials and to reduce any adverse effects of offsite management. In general, the waste management hierarchy, which favours waste prevention, minimisation, re-use and recycling over disposal, is favoured. Methods for waste reduction form the basic strategy for construction waste management from the start. These materials will generally be inert or environmentally benign and may have alternative uses on site or perhaps another site. Excavated material is reused on site where possible.

Where soil and stone prevention, avoidance, and reuse options have been exhausted, GLV Bay Lane Limited considers offsite (i.e. non-Bay Lane) options such as

- **Article 27**. The Waste Framework Directive provides for uncontaminated excavated soil to be considered in accordance with the definition of waste. The provisions on by-products and the provisions covering end-of-waste status are set out in Recital 11 of the 2008 Waste Framework Directive. Excess soil and stone produced during construction projects may be a by-product if it meets each of four by-product conditions. Article 27 declarations offer alternatives in certain circumstances, where there is a 'certain' demand for the soil and stone material. GLV Bay Lane Limited will make use of this option where circumstances allow – i.e. a receiving outlet is available. However, the Article 27 notifications process does not afford GLV Bay Lane Limited the certainty that it requires to manage soil and stone. The certainty of the development at Bay Lane Quarry is a requirement to support its business processes.
- **Permitted agricultural land improvement operations**: the small scale and temporary nature of these operations cannot be relied upon to adequately support the business needs that GLV Bay Lane Limited requires. GLV Bay Lane Limited will make use of this option where circumstances allow.
- **Provision of materials for use at landfill operations (Knockharley Landfill)**: Knockharley Landfill accepted some 39,000 tonnes soil and stone in 2017. The facility demand for soil and stone is smaller than GLV Bay Lane Limited requires, and it is not well located in relation to the GLV Bay Lane Limited sites of generation.

Accordingly, the full suite of soil and stone prevention, avoidance, and reuse activity is already being implemented maximally at the sites of generation and is not further considered as an alternative.

4.6.4 Article 27 Site

The Waste Framework Directive provides for uncontaminated excavated soil to be considered in accordance with the definition of waste. The provisions on by-products and the provisions covering End-of-Waste status set out in Recital 11 of the 2008 Waste Framework Directive. Excess soil and stone produced during construction projects may be a by-product if it meets each of four by-product conditions. Article 27 declarations offer alternatives in certain circumstances, where there is a *certain* demand for the soil and stone material.

In the Article 27 alternative scenario, the site would be used for accepting soil and stone by-products to backfill the void space and restore the site. GLV Bay Lane Limited operating at Bay Lane Soil Recovery Facility would make use of this option where circumstances allow (i.e. exporting outlets are available).

Becoming an Article 27 site, the facility could only accept certain uncontaminated excavated soil by prior authorisation agreement. This would limit the quality and quantity of soil and stone that the facility could intake, this would result in an inconsistent intake rate with inconsistent traffic patterns. By limiting the available material, the facility could take to certain uncontaminated excavated, the void space will take a longer period to backfill than if it was used for a soil recovery facility. Through becoming an Article 27 site, the mitigation and monitoring measures in place would be less than those applied by any Waste Licence issued by the EPA.

The backfilling and restoration of the void would result in positive health, biodiversity, land and soil, water, air and landscape.

The Article 27 notifications process does not afford GLV Bay Lane Limited the certainty it requires to manage soil and stone. This scenario would result in the backfilling and restoration of the void; however, a timeframe cannot be applied with certainty as there is additional dependence on external factors.

The Article 27 alternative is not suitable for the proposed development due to the uncertainty associated with the backfilling and restoration of the site. Accordingly, GLV Bay Lane Limited does not favour the route of declaring the site an Article 27 facility to fill the void.

4.7 LIMITATIONS

The EPA *Guidelines on the information to be contained in Environmental Impact Statements (2002)* notes that it is important to acknowledge the existence of difficulties and limitations when considering alternatives. These include:

Non-Environmental Factors: EIA is confined to the environmental effects which influence the consideration of alternatives. It is important to acknowledge that other non-environmental factors may have equal or overriding importance to the developer e.g. project economics, land availability, engineering feasibility, planning.

Site-Specific Issues: The consideration of alternatives also needs to be set within the parameters of the availability of land (it may be the only suitable land available to the developer) or the need for the project to accommodate demands or opportunities which are site specific. Such considerations should be based on alternatives within a site e.g. design, layout.

Hierarchy: It is important to acknowledge that in some instances neither the applicant nor the competent authority can be realistically expected to examine options which have already been previously determined by a higher authority.

4.8 MAIN ALTERNATIVES

Environmental considerations for the Bay Lane Quarry local environment that are related to the alternatives considered have been summarised in the following table.

Table 4.3: Main alternatives Multi-Criteria Analysis

	Population	Health	Land	Ecology	Traffic	Water	Air	Noise	Cultural heritage	Decision
	Environmental considerations									
Do Nothing	-	- -	- -	+/-	++	+/-	+/-	+	+/-	Excluded
Article 27	+	+	++	+	++	+	+	+	+/-	Excluded

Soil recovery facility	+	+	++	+	+/-	+	+	+/-	+/-	Included
Inert landfill	+/-	+/-	+	+	+/-	-	+/-	+/-	+/-	Excluded
Non-Hazardous landfill	-	-	-	-	+/-	-	-	+/-	+/-	Excluded
Hazardous landfill	- -	- -	- -	-	-	- -	+/-	+/-	+/-	Excluded
Note: + Positive; - Negative; +/- Positives and Negatives; O Neutral										

GLV Bay Lane Limited has excluded the do-nothing scenario as meeting its business needs. The evaluation shows a preference for Soil recovery facility development

4.9 CONCLUSIONS

Having regard to the reasonable alternatives possible in relation to the current proposal the preferred project alternative on which this EIAR is: the development of a soil recovery facility at Bay Lane Quarry. The completion of restorations at Bay Lane Quarry is considered to represent a viable option, in terms of location, availability, existing markets, technical characteristics and manageable environmental impacts.

5 CHARACTERISTICS OF THE SITE AND PROJECT

5.1 OVERVIEW

The objective of the proposed development is the restoration of the existing quarry to restore the lands to natural levels. Operations are anticipated to run over a period of 30 months. Restoration will use inert soil and stone generated in the Greater Dublin Region, without further processing.

Operations will require installation of temporary infrastructure – weighbridge, portable offices, hardstanding in specified purposes, etc. – to facilitate operations. Dewatering of the site will be required in advance of the restoration works.

The operations would be subject to requirements under any Waste Licence issued by the EPA. This waste licence would govern many site activities.

5.2 PROJECT LOCATION

The site is located approximately 1km southwest off Exit 2 on the M2 motorway, approximately 6km NNW of Exit 5 on the M50 motorway.

The site is located at Bay Lane, St. Margaret's, County Dublin[3].

- Location: 53°25'33.2"N 6°21'15.7"W
- Grid coordinates latitude 53.425899 and longitude -6.354347
- Google Maps link: https://goo.gl/maps/gpd9a6n9MYP2

The site area is approximately 13.67ha in total and lies approximately 59.5m above Ordnance Datum. The quarry void extends over an area of 8.59 hectares.

The site is located close to a good transport network including the N2/M2, M50, M1 and the N3, while also being accessible to the Dublin Port Tunnel and to Dublin City Centre.

The Ordnance Survey of Ireland historical maps were consulted. The 1888-1913 OS 25" Inch Mapping indicates that the site was a previously greenfield with no evidence of high-risk historic land use.

Ortho-photography of the site in 1995, 2000 and 2005 available from the OSI Public Map Viewer showing the sequence of change from greenfield to quarry in c2000.

The site falls under the Fingal County Development Plan 2017 – 2023 and the associated lands are zoned GE – General Employment '*Provide opportunities for general enterprise and employment*`, while also being subject to the Cherryhound Local Area Plan.

[3] Address per FCC planning decision 1694 reference F00A/0862 of 20 April 2001

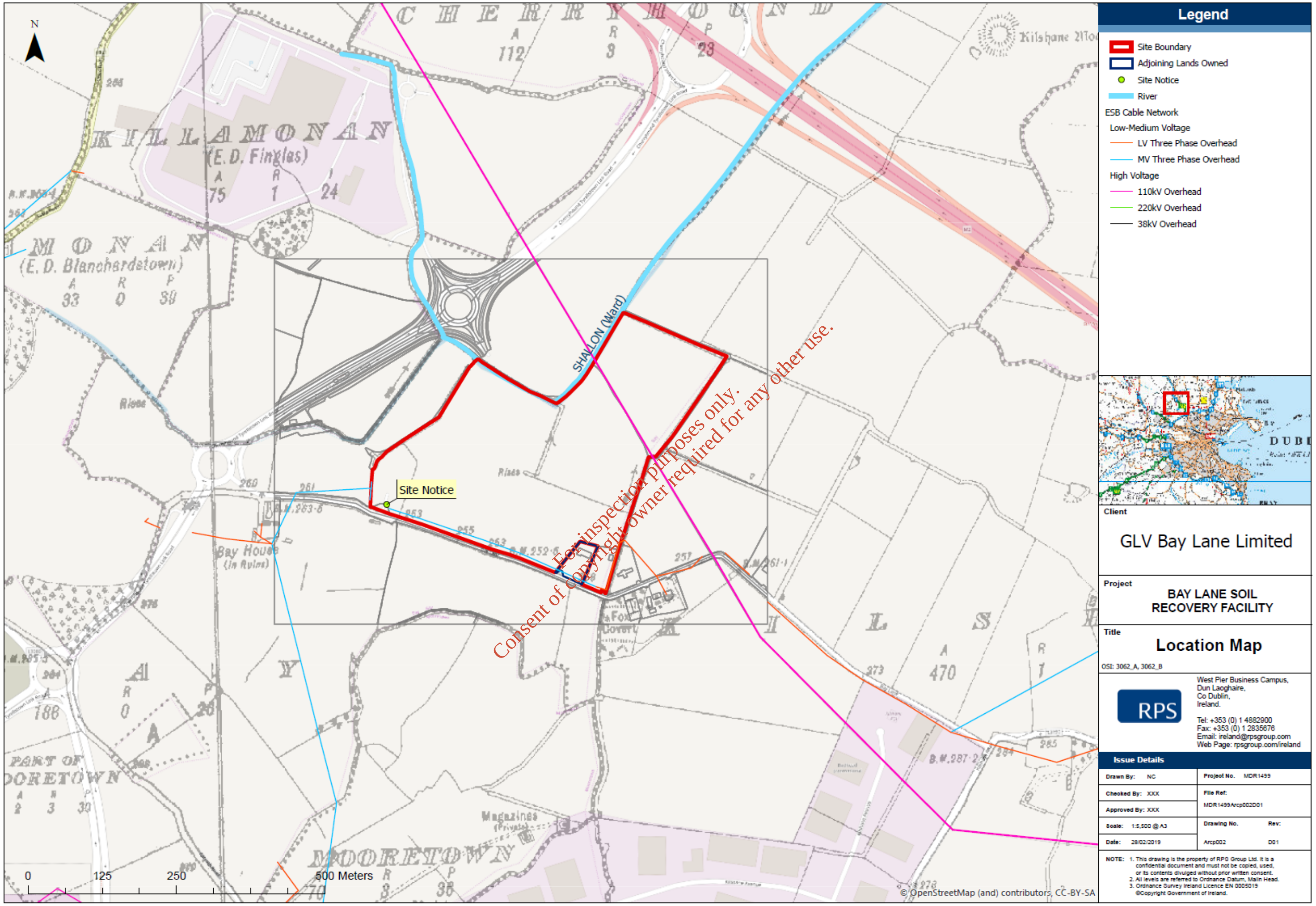


Figure 5-1: Site Location – see also Map 1

5.3 SITE HISTORY

The site was zoned for and used for agricultural use prior to 2001.

Figure 5.2: Bay Lane Quarry site, aerial photograph, 2002

Fingal County Council granted planning approval to develop a quarry in 2001. The planning approval required that the quarrying should cease, and that restoration be undertaken using dry inert fill.

Quarrying activities started in 2001 and included activities such as site clearance, blasting, crushing, grading and prior to loading for haulage offsite. These activities generated a void space. Quarrying activities ceased around 2009, as the rock was found to contain pyrite.

The site was purchased by Glenveagh Properties PLC in mid-2018.

Figure 5.3: Bay Lane Quarry early-2018 – red lines bound contiguous holdings

The volume of void fill required is approximately c.740,000m3, (712,129 m3 usable void plus 27,918 m3 soil covering).

5.4 PLANNING HISTORY

Fingal County Council granted planning approval to develop a quarry in 2001 in Planning Register Reference Number: F00A/0862.

This decision was appealed to An Bord Pleanála.

An Bord Pleanála granted planning approval to develop a quarry in 2002 in Planning Register Reference Number: F00A/0862.

Quarrying activity ceased in 2008/2009, and Fingal County Council indicated during pre-planning meeting a desire that quarrying not recommence at the facility.

This EIAR supports a GLV Bay Lane Limited planning application to restore the quarry lands to its original natural levels.

5.5 CURRENT SITE CONDITIONS

5.5.1 Overburden material

There is an overburden stockpile of soil and stone on the northeast perimeter. This material comprises the overlaying soils removed from the pit area during phase 1 of quarrying operations. This material was then placed the current stockpile area. Other overburden material was placed in screening mounds along site boundary.

All overburden material will be replaced back into the pit as part of the soil recovery works.

5.6 DO-NOTHING SCENARIO

The 'Do-Nothing' scenario refers to a scenario whereby the facility would remain in its current condition. GLV Bay Lane Limited has no alternate plans for the site if the proposed development were not permitted.

The EIA Regulations require a description of the relevant aspects of the current state of the environment (baseline scenario) as well as and an outline of the likely evolution thereof without the development. In this EIAR this scenario is referred to as the 'Do-Nothing' Scenario and the evolution of the baseline in the absence of the proposed development is addressed in each of the relevant environmental disciplines presented in this EIAR.

5.7 PROPOSED DEVELOPMENT

5.7.1 Characteristics

This application seeks permission for restoration of a 740,000m^3 void (712,129 m^3 usable void plus 27,918 m^3 soil covering) that requires backfilling to restore the quarry to natural ground levels. This will fill the quarry with soil and stone waste and then cover with a soil layer.

The proposed development would be subject to requirements under any Waste Licence issued by the EPA, which will govern all associated enforcement and regulation from when operations start as a soil recovery facility.

The site operating hours, location, list of wastes to be accepted, the waste acceptance procedures, environmental monitoring and the general operation will be as described in **Section 5.7**.

There are several infrastructural proposals sought under this application including a temporary administration office building, weighbridge, hard stand area for site vehicles and car parking and a revised internal road network. These are described within this section.

The operational elements of the facility are described within this section. **Drawing 4 - Proposed site plan layout** reproduced as Figure 5.4. shows the layout of the proposed development indicating the key site infrastructure developments.

A set of development drawings is presented as **Appendix 5.1** of Volume III of this EIAR. Included are:

- Map 1 - Location map
- Map 2 - Utilities map
- Drawing 3 – Site outline
- Drawing 4 - Proposed site plan layout
- Drawing 5 - Proposed site plan layout @ 1:500
- Drawing 6A - Phasing plan Phases 1 & 2
- Drawing 6B - Phasing plan Phase 3
- Drawing 6C - Phasing plan Phase 4
- Drawing 7 - Landscaping Restoration Plan
- Drawing 8 - noise monitoring locations
- Drawing 9 - Proposed wheel-wash details
- Drawing 10 - Proposed storage container
- Drawing 11 - Proposed managers office & staff welfare facilities
- Drawing 12 - Proposed weighbridge plan & elevations
- Drawing 13 - Proposed weighbridge office plan & elevations
- Drawing 14A - Drainage A – site location
- Drawing 14B - Drainage B – site layout
- Drawing 14C - Drainage C – site drainage systems layout
- Drawing 15A - Proposed Drainage Layout - Phase 1
- Drawing 15B - Proposed Drainage Layout - Phase 2
- Drawing 15C - Proposed Drainage Layout - Phase 3
- Drawing 16 – All sampling locations

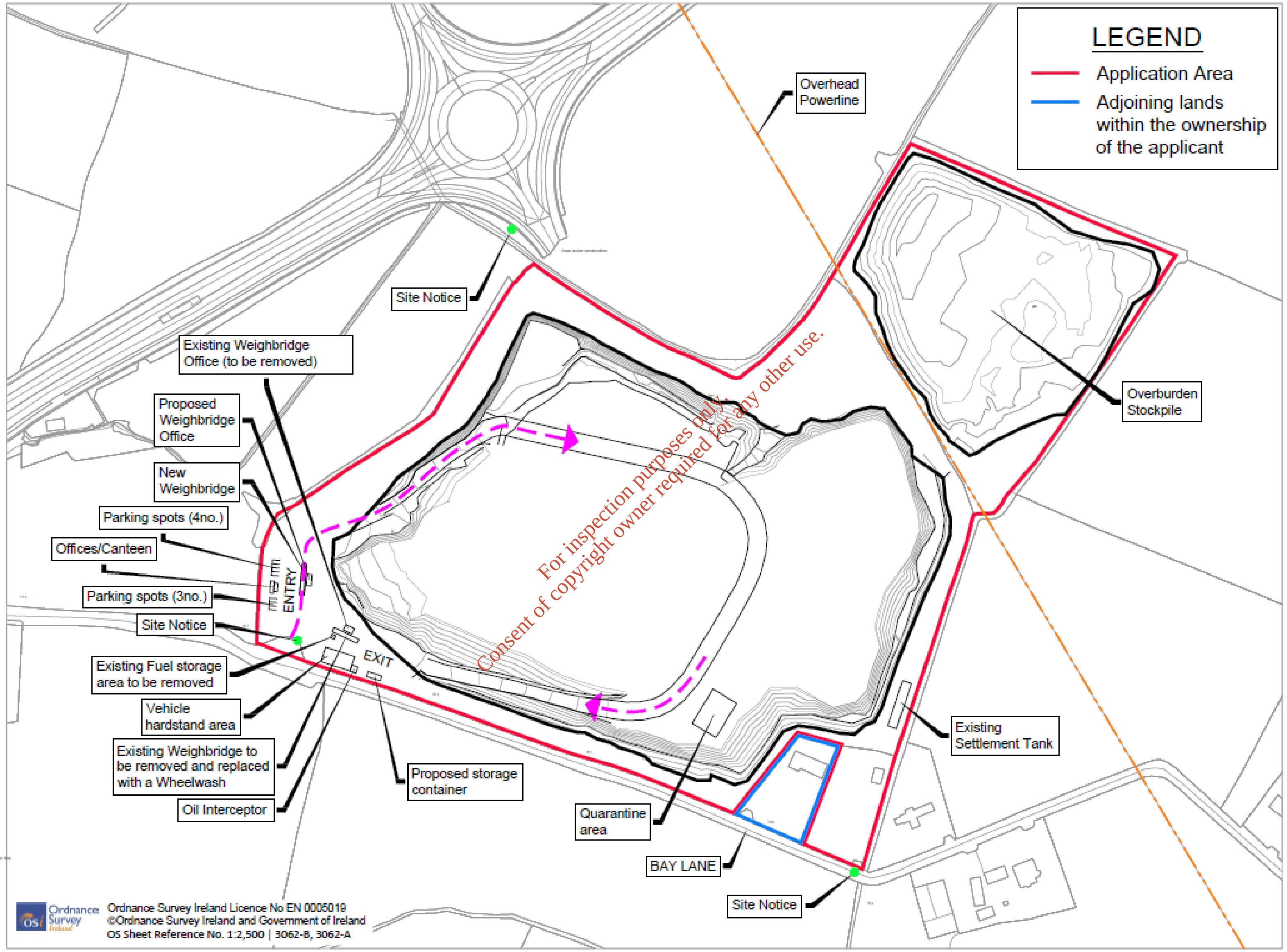


Figure 5.4: Proposed site layout - see Drawing 4

5.7.1.1 Roads and site access

The site entrance has been adequately set-back and splayed in accordance with Planning Register Reference Number: F00A/0862 to the satisfaction of the Planning Authority.

There is one point for vehicular access to the application site – the existing main assess.

Access to the site for importation of soil and stone will be provided only to appropriately licenced hauliers and this access will be gained through the existing main entrance onto Bay Lane.

5.7.1.2 Onsite traffic

The access road between the main site entrance and proposed weighbridge will be provided with a concrete surface.

After being weighed, incoming traffic will continue eastwards and down an existing unpaved haul road ramp into the quarry void, after which they will travel over a temporary haul road to the backfilling area. Internal hardcore haul roads are existing between the weighbridge and the quarry floor from previous quarrying operations. A new internal site road will be provided, using the existing onsite stockpiled aggregate, linking the bottoms of the access and egress ramps. Site traffic will move on the site haul roads in a one-way 'clockwise-direction' flow. These roads will be maintained at an adequate width for safety.

Traffic direction signs, warning signs, speed limit signs will be established throughout the site.

A concrete apron has been installed at the facility access. Routing exiting traffic over this surface after the wheel wash will help minimise clay and dust from being transported out of the proposed recovery facility onto the public road network. There will be adequate provision of car parking for employees and visitors.

Appropriate measures to ensure safe operations near the overhead power lines will be provided such as height restriction barriers and driver protocols.

5.7.1.3 Offices and welfare facilities

Temporary reception and office administration building, with access control, weighbridge and car parking and staff welfare facilities will be located inside the gates to the east (left hand side as entering) adjacent to the entrance, adjacent to the site access road. The buildings will comprise demountable / reusable single-storey flat roof 'portacabin' 4m high structures supplied with water, power and telecoms. The buildings will remain in place for the duration of the site activities.

The buildings will comprise:

- Facility Manager office for administration and management functions
- Canteen / welfare / washing / shower changing and toilet facilities.
- Weighbridge office and Records office

Staff welfare, changing, toilets / handwashing /shower and cooking/canteen facilities will be provided at a separate unit. Sinks and toilet facilities will be plumbed and connected to the wastewater treatment system.

Plans and elevations of the proposed offices and welfare facilities are provided in

- Drawing 9 - Proposed wheel-wash details
- Drawing 10 - Proposed storage container
- Drawing 11 - Proposed managers office & staff welfare facilities
- Drawing 12 - Proposed weighbridge plan & elevations
- Drawing 13 - Proposed weighbridge office plan & elevations.

Also provided in the proposed offices and welfare facilities area will be:

- Lighting for the site reception and office area.
- One car parking per employee plus two visitor places to be provided adjacent to the administration building.
- A revised internal un-paved road network leading from the reception area and serving the deposition areas.

5.7.1.4 Weighbridge

The existing weighbridge will be relocated to the road leading from the entrance and passing in front of the site office. The weighbridge facility will be upgraded in the process of being moved. The provision of a weighbridge will ensure that any heavy goods vehicles serving the site that are overloaded will be identified. Overloaded vehicles will be refused entry to the site.

CCTV cameras mounted at the weighbridge and weighbridge office will be available to inspect and record details of uncovered loads brought to the facility.

5.7.1.5 Wheel-wash

A wheel-wash will be provided for the duration of the development to prevent transport of soil onto the public road Bay Lane. This will be a wheel and undercarriage spray system measuring with a small collector sump and separate freestanding pump and header tank and spray system. Water will be recycled through the system. All HGV and tipper trucks exiting the proposed facility will be required to pass through the wheel wash.

The wheel washes will be self-contained, supported by appropriate servicing, to ensure this water is contained and there is no risk of accidental discharge.

All traffic (except cars) leaving the site will be directed to exit via the wheel wash prior to leaving the site.

5.7.1.6 Site Security

The proposed soil recovery facility will be located within the existing site boundaries, which is currently governed by Planning Register Reference Number: F00A/0862 and the site boundaries are aligned to its requirements.

This facility is in an area of low population density. The boundaries of the quarry are enclosed by a combination of drainage ditches, bunds, hedgerows, gate and fencing, which blends into the surrounding landscape. Ongoing monitoring will ensure that site boundaries are maintained in a proper manner, and these include thickening of hedgerows, fencing of the landholding, provision and maintenance of quarry signage, routine cleaning/housekeeping and the removal of unsightly features.

Appropriate warning signs to the public will be provided on the approaches to the site, and the access gate will be kept padlocked shut outside of the normal working hours.

All vehicles importing inert soil and stone to Bay Lane Soil Recovery Facility will be required to use the main entrance and to pass over a weighbridge installed along the access road. CCTV cameras will be installed around the weighbridge and used to monitor and document incoming loads.

Drivers will identify themselves at the weighbridge office before proceeding to the backfilling location. The receiving person at Bay Lane will take a copy of the weigh docket, record the time and date, the nature and origin of the imported soils, the client, licence plate number and waste collection permit details.

5.7.1.7 Plant and Machinery

The following Plant and machinery will be employed on site:

- 1 * tracked bulldozer with blades to level materials
- 1 * shovel Loader to transport materials
- 1 * tractor type vehicle to move water bowser and sprayer for the suppression of dust.
- 1 * road sweeper
- 1 * site vehicle for personnel and light good transport onsite

Plant and machinery on site will be used in accordance with the site's restoration plan. Bulldozers will be used push unloaded material and to level and grade this material and final restoration surfaces. Final cover material will be either stockpiled or to a final restoration surface where it will be levelled and prepared for seeding. Occasionally, the tracked bulldozer will be employed for landscape contouring purposes at the site.

Given the restricted access into Bay Lane Quarry, it is not necessary to provide a secure compound for plant and equipment at the waste recovery facility. Spare consumables will be stored in a storage container adjacent to the vehicle hardstand area.

5.7.1.8 Plant and machinery hardstand area

No fuel or oil will be stored on site pending use. A double skinned fuel bowser will be mobilised to site as required.

A hard-stand with drainage to oil interceptor will be provided as a designated refuelling area. Mobile plant and equipment will be refuelled at the hardstand parking area. The refuelling area will be underlain by a sealed concrete slab which will fall toward a central drain / gully. All surface water run-off over this slab will be captured by gullies and drains which will carry it to a hydrocarbon interceptor (fitted with silt trap) for treatment prior to discharge.

All oil and lubricant changes and routine servicing of wheeled or tracked plant will be undertaken on the concrete slab at the refuelling area. Waste oils and lubricants will be removed offsite by the mechanic as generated so there will be no routine onsite storage of these materials. Spare consumables will be stored in a secure container adjacent to the vehicle hardstand area.

GLV Bay Lane Limited will put in place an emergency response procedure for hydrocarbon spills and appropriate training of site staff in the implementation of the procedure. This is described in section "Emissions to the environment, monitoring and mitigation" of the Operations Report.

5.7.1.9 Services

Water

A potable water supply for the site office will be provided from the mains water line running along Bay Lane. The wheel wash will be supplied by surface water from the quarry surface water system.

Water used for dust suppression will also be sourced from the quarry surface water system. Rainfall occurs daily approximately 50% of the year in Ireland. On days requiring dust suppression water usage is estimated to amount to $10m^3$ per day. A use rate of $10m^3$ per 110 days[4] amounts to 1100 m^3 per annum.

Apart from short lengths of sewerage pipes running to or from existing infrastructure, no other buried water or waste water service pipes are present at the facility.

Sanitary effluent water

Sanitary effluent water will be generated from the canteen, toilet and wash facilities within the administration building. All effluent will be collected in a sealed underground pipe network and discharged to a packaged treatment plant with treated effluent percolated to ground. The proposed system will effectively treat effluent from the staff and visitors and will be sized to allow for additional loading. Location of this unit will be near office area, exact location will be determined by percolation testing. The system will be appropriately sized and will operate in compliance with appropriate code of practice for a facility, e.g. EPA Code of Practice: Wastewater Treatment Systems for Single Houses.

Electricity and lighting

Electricity supply to the administration building and associated infrastructure will be supplied from the grid network. Electricity is serviced to the meter box beside the site entrance. The reinstatement of the existing electricity new connection will be agreed with a utility provider. As part of the development, new power connections will be made from the existing connection to the site facilities. This existing electricity supply will provide lighting and heating to the office and weighbridge.

The lighting for the facility will be attached to any plant and machinery, the site office, and quarantine area. For the short periods when the operation will be working into darkness (i.e. over winter months), the operators will ensure that adequate lighting is provided to ensure safe operations. As waste

[4] Based on www.met.ie/climate/what-we-measure/rainfall# - 140 days of rain >0.2 at Phoenix Park for the 1961 to 2010 period, and estimating that half of remaining days require water applications

recovery activity will be screened from public view by the hedging, light dispersal from site activity will be minimal. All lighting used will be adequately shielded from above and will be directed onto an area below the horizontal.

A series of overhead electricity power line runs along the Bay Lane boundary of the site and within the site. Appropriate measures will be installed to ensure safe operation of vehicles working near the overhead power lines.

Telecoms

All site communication will be by means of conventional GSM telephony. No use of radio transmitters is proposed onsite.

5.7.1.10 Waste Quarantine Area

A designated waste quarantine area will be set up at the facility for inspection and storage of suspect waste. This quarantine area will hold, in appropriate storage, any identified separated non-inert construction and demolition waste (including metal, timber, plastic etc.) pending removal from the facility. There will be three dedicated bays, with mobile push walls, for temporary storage of arriving loads that have been tipped and are not suitable for recovery but that could not be immediately reloaded. These loads will be covered with tarpaulin to ensure that fall will not meet consignments of suspected contaminated waste. There is no requirement to install drainage infrastructure to provide for the separate collection and storage of potentially contaminated surface water run-off arising at this location.

This waste quarantine area will be located near the base of the "exit ramp" – the ramp that runs inside the perimeter from Bay Lane. The quarantine area will comprise an area of concrete storing appropriate skip containers.

See Drawing 4 - Proposed site plan layout for the proposed location of the waste quarantine area.

5.7.1.11 Sewerage Infrastructure

Sanitary effluent water will be generated from the canteen, toilet and wash facilities within the administration building. All effluent will be collected in a sealed underground pipe network and discharged to a packaged treatment plant with treated effluent percolated to ground. The proposed system will effectively treat effluent from the staff and visitors and will be sized to allow for additional loading. Location of this unit will be near office area, but exact location will be determined by percolation testing. The system will be appropriately sized and will operate in compliance with appropriate code of practice for a facility, e.g. EPA Code of Practice: Wastewater Treatment Systems for Single Houses.

5.7.1.12 Storm Water Management

To cater for the storm water generated by the additional hard stand associated with the paved site entrance road, car parking and associated areas, a dedicated storm water management system is included in the design. This system incorporates the following elements:

- Capture the storm water generated onsite through a gully and pipe network.
- Attenuate the flows using dedicated storm water attenuation to be located adjacent to the car park.
- Treatment of the storm water by means of a combined silt trap and petrol interceptor and sampling chamber which are designed to mitigate the potential for damage.
- Discharge of the treated storm water to the main site storm water management system for subsequent licensed discharge offsite.

The following drawings showing the details of this drainage infrastructure are contained in Volume III of this EIAR.

- Drawing 14A - Drainage A – site location
- Drawing 14B - Drainage B – site layout
- Drawing 14C - Drainage C – site drainage systems layout
- Drawing 15A - Proposed Drainage Layout - Phase 1
- Drawing 15B - Proposed Drainage Layout - Phase 2
- Drawing 15C - Proposed Drainage Layout - Phase 3

5.7.1.13 Resources used

The only raw materials that will be used on site will be diesel, hydraulic oil and engine oil, which will be used to operate plant on site. No process related raw materials, chemicals, solid or liquid wastes intermediates or products etc. will be consumed or generated by the proposed waste recovery activities at the application site.

The quantities of fuel oil used on site will be relatively small, will not be stored onsite and will be delivered to site as required.

There will be no requirement to use rodenticides and insecticides to control vermin and insects.

The main material requirement is excess inert soil and stone waste to be used in backfilling the quarry void. These materials will be generated by construction and development related activities in the North Dublin, Fingal and Meath areas.

5.7.2 Waste acceptance at the Waste Facility

Only clean soil and stones will be accepted at the Bay Lane Soil Recovery Facility during authorised opening hours. The hours of operation proposed by the applicant are from 08:00 to 18:00 hours Monday to Friday and 08:00 to 13:00 hours on Saturdays, with the facility being closed on Sundays and Public/Bank Holidays. No materials will be accepted at outside of these times.

Inert soil and stone waste material under the following European Waste Category (EWC) codes will be accepted for backfilling and restoration activities at the facility:

- 17 05 04 - Soil and Stones other than those mentioned in 17 05 03*
- 20 02 02 - Soil and Stones

A primary source of the material for the backfilling and restoration of Bay Lane Quarry will be the GLV Bay Lane Limited housing development/construction sites, that are in production at the time of operation. In certain circumstances, soil and stone materials will be accepted from other vetted and approved sources.

GLV Bay Lane Limited will implement a rigorous waste acceptance regime to ensure maximum traceability and protection on the environment. Waste acceptance procedures are outlined as below and will be aligned to requirements under any Waste Licence issued by the EPA.

5.7.2.1 Waste Source pre-approval and characterisation (Rejection point 1)

All waste accepted for recovery will undergo a pre-approval procedure to determine the nature of the generating site, the material, the volume and other relevant characteristics. This will include comprehensive waste acceptance, inspection and sampling procedures, as required, as described below.

All large sources of soil and stone will be identified in advance and subject to basic characterisation testing at the generating site to confirm that soils at that location can be classified as clean and inert and appropriate for acceptance at Bay Lane Soil Recovery Facility.

Approval to haul waste to the facility will only be issued to hauliers holding a valid waste collection permit and a proven track record in the construction, waste management and / or haulage sectors.

The Bay Lane Soil Recovery Facility will require all soil and stones accepted for backfilling and recovery purposes to be significantly free of construction and demolition waste or non-hazardous / hazardous domestic, commercial or industrial wastes.

Wastes deemed acceptable by pre-approval will be subject to routine compliance evaluation to further demonstrate/confirm that they do comply with the basic characterisation and acceptance criteria. This compliance analysis will focus on key contaminant indicators. The details of this process are described in Table 5.1 below. The methodology proposed is aligned to the EPA guidance "*Waste acceptance criteria and development of soil trigger values for EPA-licensed soil recovery facilities 2017*".

Any waste collector/producer identified as importing contaminated/unsuitable material to the facility will be advised that no further loads can be accepted from the source of the suspected material. Detailed characterisation, and testing if required, of all waste being generated at the source of suspected material to ensure that future loads imported are clean and free of contamination.

Records will be kept of all inspections and testing of suspect wastes.

Table 5.1: Waste Acceptance Methodology for Backfill Material

Material Type	Minimum Criteria
Greenfield soil and stone	Letter of suitability for the first 5,000 tonnes of soil and stone material received, and a further letter of suitability for each subsequent 5,000 tonnes of soil and stone material received. Each letter of suitability will be signed by a suitably qualified person and will include the following:

Material Type	Minimum Criteria
	▪ Confirm the waste is greenfield soil and stone ▪ A description of the source and nature of the soil and stone ▪ The location of the source of the soil and stone (including a map showing the source site boundary) ▪ The material is suitable for use as backfill within the facility ▪ The material will not cause environmental pollution at the facility GLV Bay Lane Limited notes that there is no requirement for testing greenfield soil and stone, unless directed by EPA. However, GLV Bay Lane Limited notes that is advisable that the suitably qualified person relies on soil test results to confirm the greenfield status of the source site before signing the letter of suitability. When the material arrives at Bay Lane Soil Recovery Facility, a visual video check may be conducted at the weighbridge (for uncovered loads only, for health and safety reasons) and upon tipping and placement to verify that the material delivered is in fact greenfield soil and stone.
Non-greenfield soil and stone	Prior to accepting material from each individual non-greenfield source site, GLV Bay Lane Limited will obtain information on the past use of the site and will reject non-greenfield sites where soil or groundwater contamination has been identified or where there is an increased risk of contamination being present. Soil and stone will not be accepted from sites where activities in the past have involved the manufacture or storage of hazardous substances e.g. chemical manufacturing facilities, oil storage facilities, retail filling stations. Up to 2% contamination with non-natural materials is acceptable within the soil and stone, i.e. anthropogenic or man-made substances such as rubble, concrete, bricks, metal and bitumen that are non-natural to the environment from which the material was extracted. There is no allowance for chemical contamination. Basic characterisation, compliance testing and on-site visual verification will be undertaken. Contaminant concentrations within the soil and stone will comply with soil trigger levels agreed with the EPA.

The waste acceptance and characterisation process for non-greenfield soil and stone is shown in Table 5.2.

Table 5.2: Waste Characterisation for Non-Greenfield Soil and Stone

Amount of Material	Testing Requirement	Frequency of Testing/Location of Sampling
Greater than 2,000 tonnes from a single source	Basic characterisation Note 1	To be carried out off-site prior to agreeing acceptance of the waste at the facility.
	Compliance testing Note 1	One representative sample will be analysed for every 2,000 tonnes of material received at the facility. Note 3.
	On-site verification Note 2	Every load received at the facility
Less than 2,000 tonnes from a single source	Basic characterisation Note 1	Sampling will be undertaken at the facility prior to the use of material as backfill. At least one representative

		sample will be collected from every 2,000 tonnes of material from the collective of single sources, each of which is less than 2,000 tonnes. Note 3.
	On-site verification Note 2	Every load received at the facility
In the case where there is conflict between Table above and the licence requirements, the licence requirements will prevail. Note 1: **Basic characterisation** constitutes a thorough determination, according to standardised analysis and behaviour testing methods, of the short and long-term leaching behaviour and/or characteristic properties of the waste. Parameters and trigger levels are to be agreed with the Agency. Note 2: **On-site verification** are rapid check methods (e.g. visual inspection) to confirm that a waste is the same as that which has been subjected to compliance testing and that which is described in any accompanying documents. Note 3. A portion of each sample will be retained on site for three years and will be available for inspection/analysis by the Agency.		

Contaminant concentrations within the soil and stone will comply with soil trigger levels agreed with the EPA.

5.7.2.2 Reception at weighbridge (Rejection point 2)

Each consignment of material arriving at the facility will be inspected under Standard Operating Procedures upon entry by trained personnel to ensure it complies with what was agreed with the consigning facility in the preapproval stage.

Upon entry into the facility:

- All loads will be weighed;
- Any description of the waste will be checked in to confirm they comply with the licence, and
- A record will be made of the waste type, quantity, source and haulier.

Arriving vehicles will access the site at the existing site entrance on Bay Lane and will proceed to the weighbridge. Here the haulier will provide the required waste documentation for verification and recording.

The documentation for each consignment will be presented for verification. Waste will be accepted at the facility provided that the waste being imported is the same as that described in the accompanying documentation and the accompanying documentation includes a valid identification number.

Loads from hauliers failing to produce the required documentation or where evidence of contaminated or unsuitable material is identified within the consignment, will be rejected and directed off-site. Records of rejected consignments will be kept for review and appropriate action by GLV Bay Lane Limited. The waste producer / waste collector who imported the suspect material to site will be advised that no further loads will be accepted from the same source as the suspect material, pending completion of more detailed waste characterisation (potentially including testing) to confirm that all waste generated at the same source is inert and substantially free of other waste materials. Testing will be undertaken at the expense of the waste producer / waste collector. The recycling manger will be informed immediately.

Soil and stone loads imported to the site that are uncovered may be visually inspected, by video, at the weighbridge.

Upon approval of the documentation and verification of any visual video check, the material will be directed towards the tipping area in the active backfilling area using the sites internal haul roads.

5.7.2.3 Tipping, On-Site Verification (Rejection point 3)

At the tipping area, the driver will be directed where to tip by the relevant machine operator. At this point, it will be visually inspected once again to ensure that there is no contaminated or unsuitable material intermixed within the load. Suspect contaminated or unsuitable materials will be identified through visual inspection (identification of unusual colour, intermixed wastes etc) or smell (unusual or distinct odours).

Contaminated or unsuitable loads identified during this stage will be reloaded and the load directed offsite immediately. If this is not possible, the contaminated or unsuitable materials will be moved to the quarantine area for appropriate storage or immediate removal offsite. The recycling manger will be informed immediately.

Any excessive (>2% as will be determined by a trained operator) quantities of non-inert soil and stone wastes (principally metal, timber, PVC pipes and plastic, concrete and brick) inadvertently imported and accepted at the site will be segregated (mechanically or by hand, as appropriate), stockpiled and transferred to storage skips at the waste quarantine area pending removal off–site to
to appropriate waste management facilities.

5.7.2.4 Placement, On-Site Verification (Rejection point 4)

The unloaded material that has been accepted upon tipping will be moved to the backfilling area immediately upon a dozer becoming available and compacted to avoid fugitive dust nuisance/arisings.

During this spreading, placement and compaction operation the material will be visually inspected again to ensure that there is no contaminated or unsuitable material intermixed within the load. Any unsuitable or contaminated material identified at this stage will be segregated and removed to the waste quarantine area and stored pending closer inspection and testing to establish suitability. The recycling manger will be informed immediately. Contaminated or unsuitable material will be removed for management at an appropriate facility.

5.7.2.5 Waste acceptance - summary

Opportunities for identification of unsuitable materials, and subsequent rejection, will be implemented as follows:

1. At pre-approval stage, and the materials will be refused admission onto the site or upon identification of issues at characterisation.
2. Upon video inspection at weighbridge (uncovered loads) – materials will be redirected offsite immediately.
3. Upon vehicle tipping. Materials will be reloaded and will be redirected offsite immediately. If reloading cannot occur immediately, the rejected waste will be separated and moved to the Quarantine Area. The recycling manger will be informed immediately. A waste

acceptance/rejection procedure will be applied. Non-natural materials in consignments will be manually removed where possible and transferred to the appropriate waste skip for appropriate management.

4. Before recovery stage. Materials will be reloaded and will be redirected offsite immediately. If reloading cannot occur immediately, the rejected waste will be separated and moved to the Quarantine Area. The recycling manger will be informed immediately. A waste acceptance/rejection procedure will be applied.

A flow diagram of the soil and stone waste handling and inspection process is provided in **Figure 5.5**.

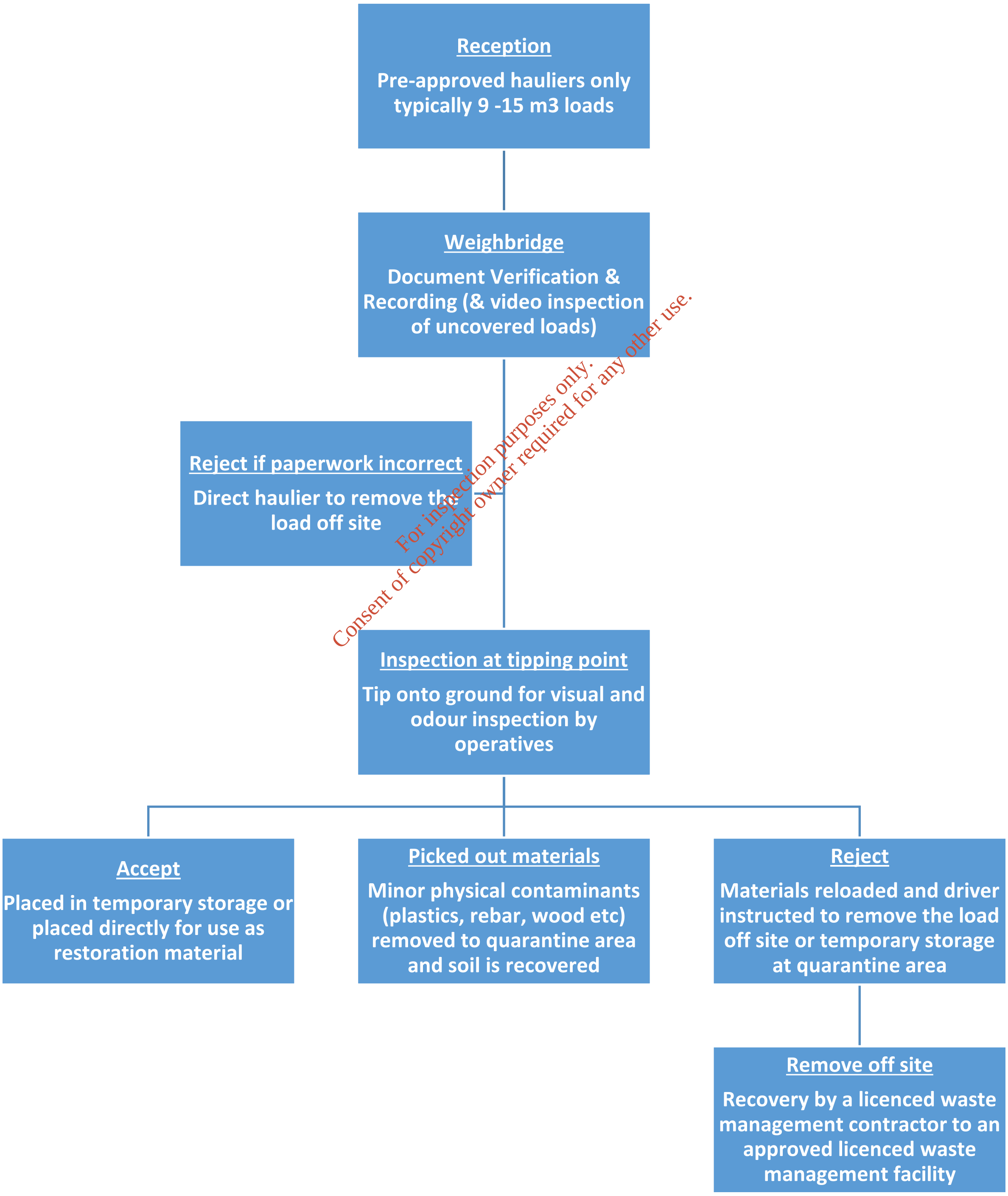


Figure 5.5: Flow diagram of the soil and stone waste handling and inspection process

5.7.3 Mobilisation

New structures and features will be constructed at the site as described in the previous **section 5.7.1**.

Mobilisation will proceed as per standard phasing including the following elements:

- Detailed design of the infrastructure developed from the drawings presented in Volume 3 of this EIAR by a suitably qualified design team.
- Enabling works to include preliminary site preparation.
- A key element of mobilisation will be the drainage of standing water from the site.
- Site clearance will be undertaken through the preparation of the ground around the proposed works. Any excavated material (subsoil / topsoil) will be retained on site and replaced during reinstatement. No material will be taken offsite, and all material will be retained on site to minimise construction traffic.
- Utilities and services will be installed/connected including electricity, telecommunications, potable water, foul water and storm water prior to the main operations starting.
- Installation of the structures will involve the development of an appropriate hardcore base for the temporary buildings.
- The mobilisation phase will be completed with the installation of road markings, weighbridge wheel wash and any other hard infrastructure as well as any landscaping required.
- The timeframe for mobilisation is estimated at circa three months.
- Renovation or replacement of the existing disused proprietary WWTP.

Traffic will be minimised through the retention of any soil and stone waste on site (as authorised under the licence) and the use of on-site quarried aggregates for sub-grade and base material. Traffic will be limited to the importation of the concrete surface, steel, cladding and ancillary equipment as well as staff.

A Construction Management Plan (CMP) is appended as Appendix 5.1 to address activities that commence during mobilisation phase.

5.7.4 Project Phasing / Staging

Phasing will operate in phases as described in following sections, and as outlined in **Drawing 6A - Phasing plan Phases 1 & 2,** and **Drawing 6B - Phasing plan Phase 3,** and **Drawing 6C - Phasing plan Phase 4**, which are outlined in figures **Figure 5.6**, **Figure 5.7**, **Figure 5.8**.

Backfilling of the bottom of pit floor will be undertaken in one main lift for each phase. The backfilled materials will be subject to compaction by tracked dozer. The materials placed at the bottom of the quarry will be further compacted by the weight of overlying material.

Phase 1 comprises filling of the area south west of the haul route between the southern and western ramps to final restoration profile. This phase of the development will result in the completion of backfilling of south western corners of the site to final restoration profile, with contoured slopes to the haul road. The final contoured areas will be covered and seeded.

Phase 2 comprises filling of the area north east of the haul route between the southern and western ramps to final restoration profile. The overburden stockpile will also be replaced in the pit area during this phase. This phase of the development will result in the completion of backfilling of north eastern part of the site to final restoration profile, with contoured slopes to the haul road. The final contoured areas will be covered and seeded.

See **Figure 5.6: Indicative Project Phasing of Backfilling and Restoration – Phase 1&2**

Phase 3 comprises filling of the haul route between the two reception area ramps to final restoration profile. The final contoured areas will be covered and seeded.

See **Figure 5.7: Indicative Project Phasing of Backfilling and Restoration – Phase 3**

On completion of the filling stage, in phase 4 a covering layer of subsoil and topsoil will be placed and graded across any remaining filled soil and stone which has not been covered and seeded. This topsoil will be planted with grass to promote stability and to minimise soil erosion and dust generation. The final contoured areas will be covered and seeded. Placement of the final covering layers will in all instances align to final restoration profile of the site and will be in accordance with the landscaping restoration scheme submitted with this EIAR, which is aligned to original site contours.

See **Figure 5.8: Indicative Project Phasing of Backfilling and Restoration – Phase 4**

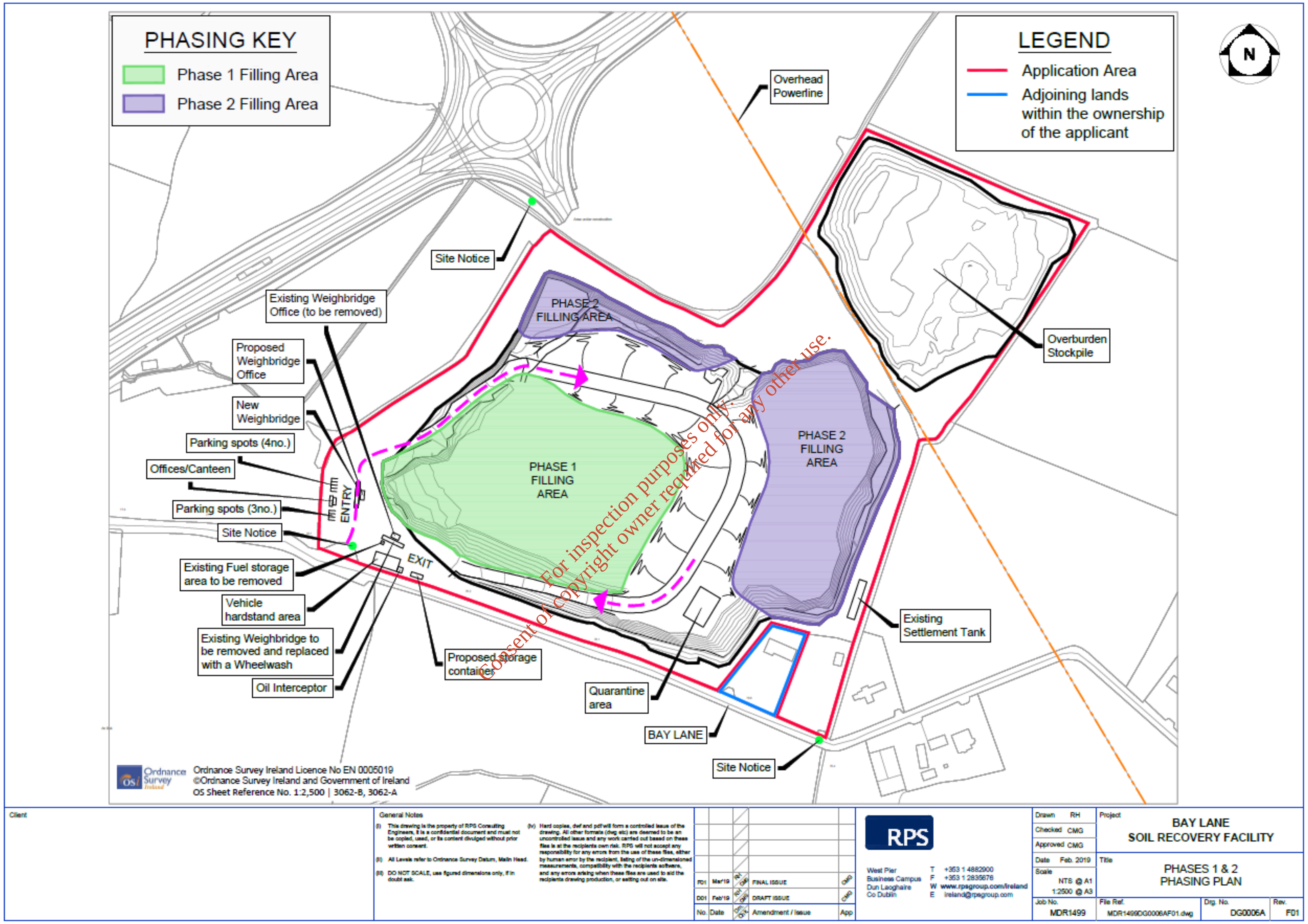


Figure 5.6: Indicative Project Phasing of Backfilling and Restoration – Phase 1&2

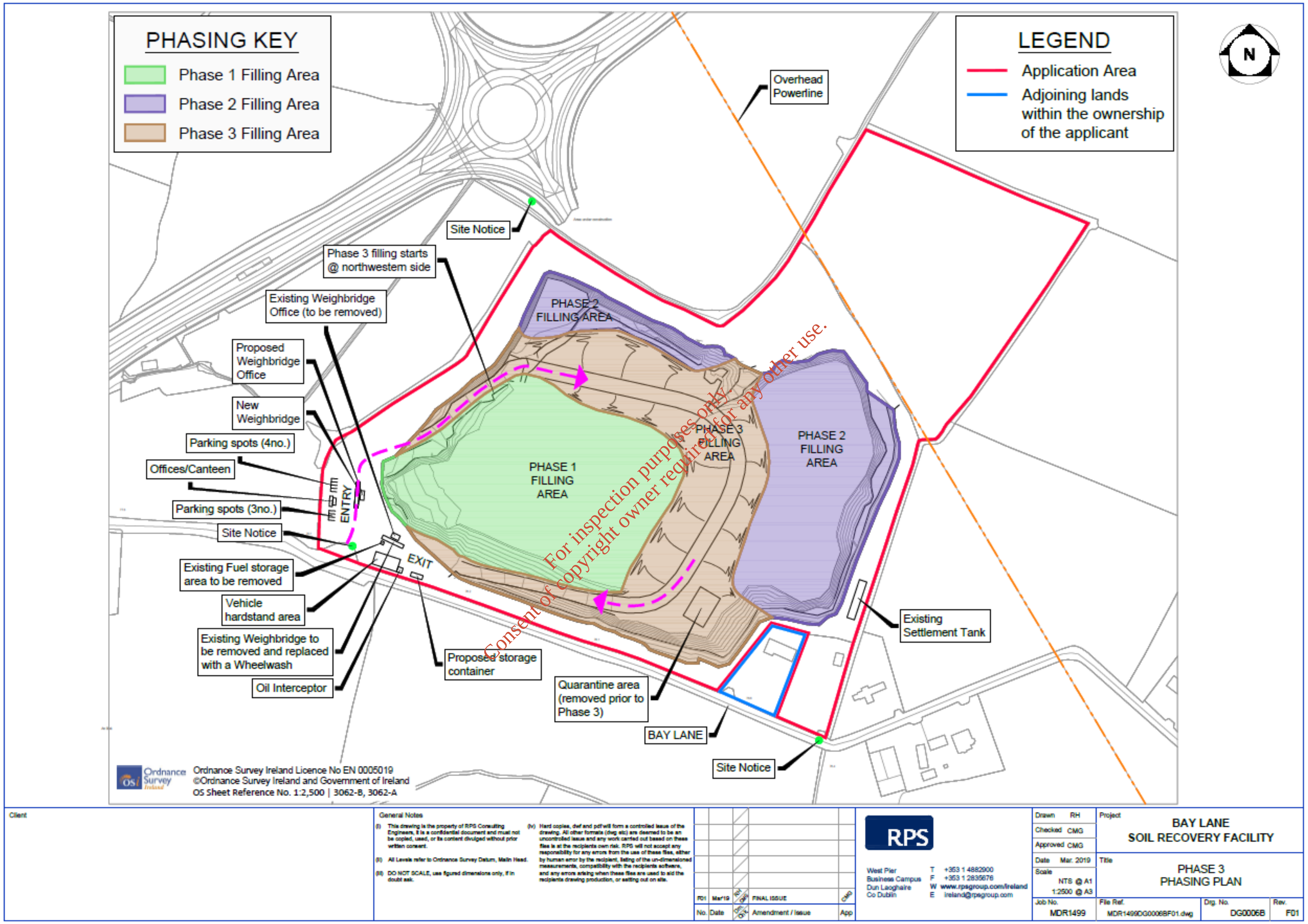


Figure 5.7: Indicative Project Phasing of Backfilling and Restoration – Phase 3

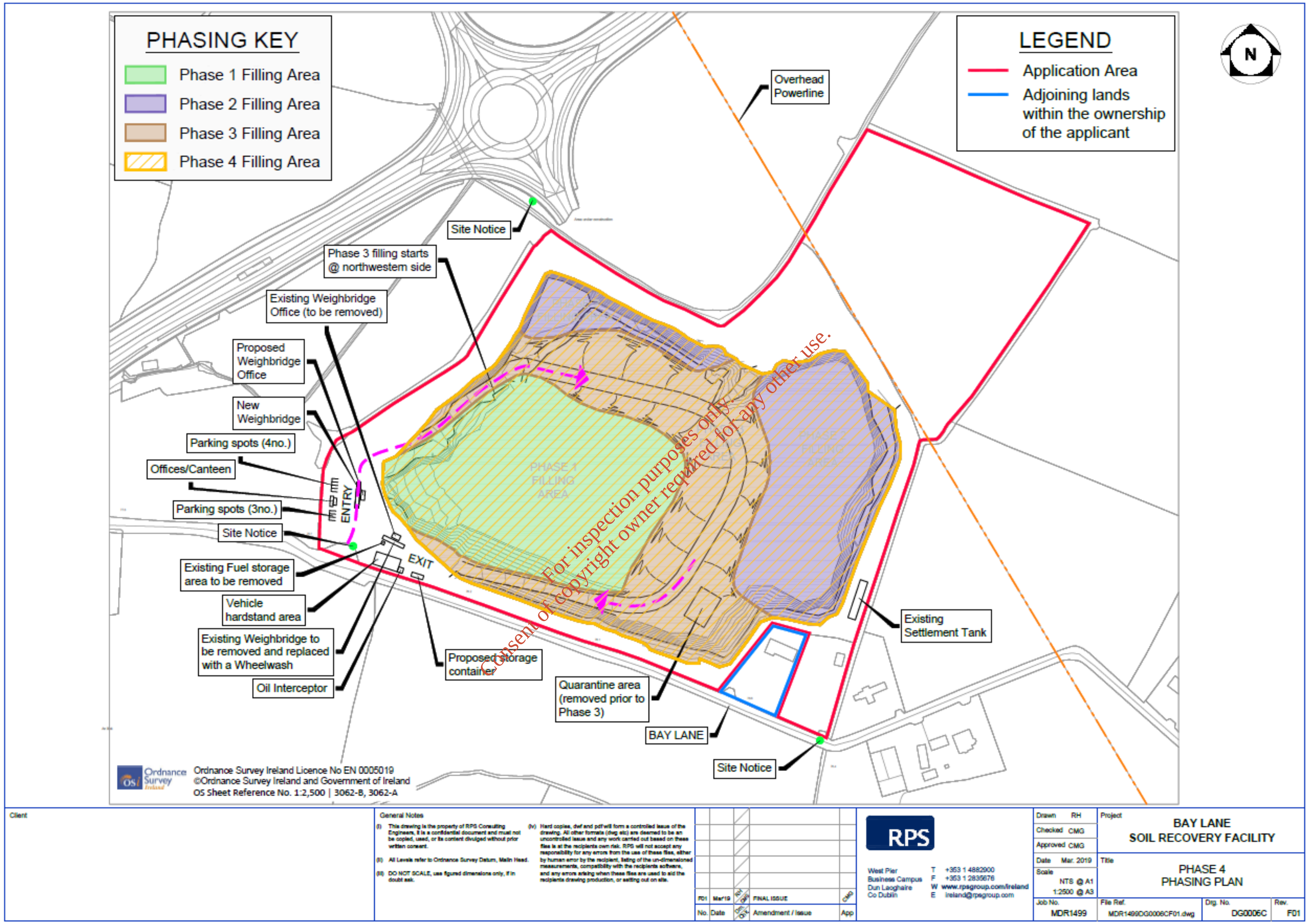


Figure 5.8: Indicative Project Phasing of Backfilling and Restoration – Phase 4

5.7.5 Site Restoration

The purpose of the prosed development is to allow for the backfill of the former quarry to facilitate the full restoration of the site to natural levels. After completion of the backfilling the site will be contoured and landscaped to allow for the site to drain naturally. This restoration will be sympathetic to the surrounding land uses.

As a licensee, GLV Bay Lane Limited will prepare and maintain a plan for the closure, restoration and aftercare of the site or part thereof, including details of the final profile. This closure, restoration and aftercare will provide details for the restoration, demolition/removal of existing structures and the broader procedures for leaving a site in a 'satisfactory state' in advance of a licence surrender.

This application seeks to refine the final contour levels and to this end a final contour layout of the fully restored site is presented in Chapter 16.

5.7.6 Risks of Major Accidents and Disasters

The Regulations require a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to the development. The *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (August 2018) state that there are two key considerations under this requirement, namely:

- The potential of the project to cause accidents and/or disasters, including implications for human health, cultural heritage, and the environment; and
- The vulnerability of the project to potential disasters/accidents, including the risk to the project of both natural disasters (e.g. flooding) and man-made disasters (e.g. technological disasters).

This section identifies the both the potential for the proposed development to cause, and vulnerability to, disasters/accidents. The resultant environmental impacts are identified in the various environmental chapters of this EIAR.

5.7.6.1 Potential to cause Accidents and/or Disasters

The proposed development relates to the backfilling of soil and stone waste material into a former quarry. As part of the operations there are two areas for storage and handling of fuels to reference:

- There is a former fuel tank and mobile plant filling area located along the internal access road located on concrete hardstand. This area is no longer in use, but the infrastructure remains in place. This will be decommissioned and removed.
- A mobile fuel bowser will be employed on site for fuelling mobile plant.

There are no additional facilities planned for the storage or handling of dangerous substances such as fuels, chemicals, compressed gases, flammable materials, oxidising agents, toxic materials, etc. As such, the potential for the proposed development to cause accidents from such material is negligible.

The main potential hazard from the proposed development relates to road traffic accidents associated with the road haulage to and from the site. For traffic accessing the site, the risk of accident will remain unchanged relative to the consented quarry operation. Further details are provided in the traffic and transportation section of this EIAR.

5.7.6.2 Vulnerability to Accidents and/or Disasters

The four key vulnerabilities that may potentially impact the proposed development include the following:

- Proximity to Seveso (COMAH) establishments;
- Site Subject to Flood Risk;
- Site Subject to extreme weather events; and
- Road traffic accidents and disruption to operations.

The Seveso establishments within the vicinity of the proposed development are listed in Table 5.3.

Also shown in the table is the approximate distance to the proposed development. The proximities show that all establishments are a significant distance from the site and hence the site is not vulnerable to accidents from these operations.

Table 5.3: Seveso Establishments Located in the area

Establishment Name	Tier	Location	Distance to Bay Lane Quarry
Astellas Ireland Co., Ltd	Lower	Damastown Road, Damastown Industrial Park, Mulhuddart, Dublin 15	4.8km
Clarochem Ireland Limited	Lower	Damastown, Mulhuddart, Dublin 15	4.9km
CLH Aviation	Lower	Corballis Road, Dublin Airport, Dublin 2	7.6km
Gensys Power Ltd.	Lower	Huntstown Power Station, Huntstown Quarry, Dublin 11	2.5km
SK Biotek (Swords Laboratories)	Lower	Watery Lane, Swords, Co. Dublin.	9.8km
Barclay Chemicals Manufacturing Ltd (t/a Barclay Crop Protection)	Upper	Damastown Way, Damastown Industrial Park, Mulhuddart, Dublin 15	3.9km
Chemco (Ireland) Limited (t/a Chemsource Logistics)	Upper	Macetown North, Damastown Industrial Estate, Dublin 15	3.7km
Contract & General Warehousing Ltd	Upper	Westpoint Business Park, Navan Rd. Mulhuddart, Dublin 15	4.5km
Guerbet Ireland ULC	Upper	Damastown, Mulhuddart, Dublin 15	4.9km

5.7.6.3 Vulnerability to floods and weather

The Strategic Flood Risk Assessment for the Fingal Development Plan 2017-2023 indicates that the site of the proposed development is not vulnerable to flood risk. A project specific flood risk assessment has been undertaken and confirms the low vulnerability and this is presented in **Chapter 10** of this EIAR.

Other extreme weather events also have the potential to significantly impact on operations and the frequency of such events at the nearest meteorological met station (Dublin Airport) are outlined below. These statistics are based on the 1981–2010 averages for Dublin Airport and it should be noted that these frequencies are anticipated to increase because of climate change.

- Absolute Maximum Temperature: 28.7^{0}C
- Absolute Maximum Temperature: -12.2^{0}C
- Greatest Daily Total Rainfall: 73.9mm
- Maximum Gust: 80knots
- Mean Days with Snow or Sleet per Year: 16.6 days
- Mean Days with Thunder per Year: 5.5 days

Vulnerability of the site to extreme weather includes factors as follows:

- Extreme rain event – increased surface water run-off and requirements for attenuation and management of storm water to mitigate the potential for surface water or groundwater impact. Refer **Chapter 10** of this EIAR for details on how such an event has been mitigated through the design and operations.
- Extreme weather event (e.g. heavy snow, hurricane, etc.) – such an event would likely result in a temporary shutdown of operations on site and hence no residual impact is predicted.
- Extreme cold event – potential for freezing of standing water across the site impacting on the handling systems and stockpile management where materials are 'bound' by the extreme temperatures. No residual impact on the environment is predicted.
- Drought and/or prolonged high temperature – potential for reduced capacity to implement dust mitigation measures and fugitive dust releases causing impacts on neighbouring communities. Refer **Chapter 11** of this EIAR for details on how such an event has been mitigated through operations. No other residual impact on the environment is predicted.
- Prolonged or extreme high winds – as above, there would be potential for increased need to implement dust mitigation measures (depending on levels of associated rainfall) and fugitive dust releases causing impacts on neighbouring communities. Refer **Chapter 11** of this EIAR for details on how such an event has been mitigated through operations. No other residual impact on the environment is predicted.

The traffic management and mitigation measures listed in **Chapter 13** of this EIAR includes specific details for emergency planning in the event of road accidents and will outline the approved and safe alternative approaches to be adopted by drivers accessing the site. Appropriate training, signage and communications will be incorporated into the site operating procedures to ensure full compliance with emergency procedures.

5.8 OTHER RELEVANT PROJECTS IN THE AREA

A review of other relevant operations in the area has been undertaken to determine the potential for cumulative impacts with the proposed development. These existing operations are outlined in the following sections of this report and the relevant cumulative impact assessed in the various environmental discipline chapters.

The By-Product Decisions and Notifications under Article 27 have been made by other economic operators in the general Bay Lane area are listed in **Table 5.4**.

Table 5.4 By-Product Decisions and Notifications made under Article 27 in the Bay Lane Area

Number	Date	Operator	Substance/Object	Destination
ART27-1151	11/12/2018	ROSSMORE CIVILS LIMITED	Natural uncontaminated Topsoil	Dublin Airport Authority PLC, Old Central Terminal Building, Dublin Airport, Co. Dublin
ART27-1137	23/11/2018	Intel Ireland Limited	Lucan Formation Limestone.	Roadstone Ltd., Huntstown South Quarry, Huntstown, Fingal, Dublin 11.
ART27-1136	23/11/2018	Intel Ireland Limited	Soil and Stone (including Natural Glacial Tills/Boulder Clays and Overburden)	Roadstone Ltd., Huntstown South Quarry, Huntstown, Fingal Dublin 11.
ART27-1133	22/11/2018	Balfour Beatty Group Limited	Road milling - recyclable asphalt	Lagan Asphalt, Rosemount Industrial Park, Ballycoolin Road, Ballycoollin Blanchardstown D11
ART27-0828	03/01/2018	Balheary Clay And Target Shooting Club Company Limited by Guarantee	Soil and stones	Skidoo, Ballyboughal, County Dublin
ART27-0761	19/09/2017	SHANNON VALLEY PLANT HIRE	Clean, uncontaminated Topsoil	Unit 12, Dublin Airport Logistics Park, Dublin.
ART27-0618	20/04/2017	Phoenix Rock Enterprises Limited	Crushed Concrete	Hollywoodrath, Hollystown, Dublin 15
ART27-0256	01/07/2015	Cedar Building Company Limited	Clay	St Patricks Nursing Home Dublin Road Baldoyle Co Dublin [N531958: W061353]

The Article 27 operations would have the potential to generate cumulative traffic, dust, noise and other impacts because of these operations in addition to the proposed development if they were operating alongside the Bay Lane Soil Recovery Facility. These operations have been factored into the analysis undertaken in the relevant chapters of this EIAR.

Further to the backfilling and haulage operations in the area, a review of the Fingal County Council planning website has been undertaken to determine the extent of any committed development in the area with potential for cumulative environmental impact. All applications that bound the site or are located on the site frontage on Bay Lane and the dual carriageway within the last seven years are listed in **Table 5.5.** The table illustrates that development in the area is small scale residential or agricultural with limited potential for cumulative impact.

Table 5.5 Development in the Area

Reference Number	Decision Date	Description
FW17A/0119	May 1, 2018	A logistics (warehouse and distribution) complex building.

Reference Number	Decision Date	Description
FW14A/0132	December 11, 2014	The development will consist of permission for an external sign (10.5m x 5.5m) on the northern end of the eastern elevation of the dry warehouse building which is part of a food distribution facility.
FW14A/0134	December 11, 2014	Retention permission for works completed at Killamonan. The subject of previously granted Planning Permission No's FW13A/0023 and FW14A/0019.
FW13A/0024	April 18, 2013	Permission for a principal access road, associated services and open space provision on a 4.0258 ha site.

On 20 June 2018 Irish Water submitted a direct planning application to An Bord Pleanála in Respect of a Strategic Infrastructure Development (A Proposed Wastewater Treatment Plant, Orbital Sewer, Outfall Pipeline, Sludge Hub Storage Centre and Regional Biosolids Storage Facility) which includes the development of a biosolids storage facility at Newtown, near Kilshane Cross. This facility would operate approximately 2.25km from Bay Lane Soil Recovery Facility.

6 POPULATION

6.1 INTRODUCTION

This purpose of this Section is to consider the proposed development having regard to potential impacts that relate to human population. To evaluate the magnitude and significance of likely environmental impacts in relation to population, this Section of this EIAR considers the proposed land use relative to recent trends in relation to population, employment, economic performance, amenity and the community. The assessment also proposes, wherever possible, appropriate mitigation measures that may be necessary to reduce and remedy, significant adverse effects on these elements of the environment.

Any potential impact on the status of the population by the proposal must be comprehensively assessed. The principal concern is that the population, particularly those living in the local environment, experience no significant unacceptable diminution in aspects of 'quality of life' because of the proposed use of the subject lands as a soil recovery facility for its anticipated life cycle of 2.5+ years.

6.2 ASSESSMENT CRITERIA

6.2.1 Methodology

To inform this Section, a site visit was carried out on 9th November 2018. The site visit included a walk through the existing site and a drive around the surrounding hinterland. During this visit, attention was paid to road conditions and the location of the nearest dwellings to the subject site. This enabled an appreciation to be gained of the existing general land uses in the area, the volume of population that located nearest the subject site in addition to an overview of the locality of the host community and its environs.

In addition to the site visit, several desk top exercises were undertaken. The desktop analysis included a review of demographic characteristics of the area as ascertained from Census of Population data and other statistics released by the Central Statistics Office (CSO) and the International Labour Organisation. The smallest geographical units distinguished by the CSO are Electoral Divisions for general statistical use (previously called District Electoral Divisions - previously known as Wards). Demographic trends and employment trends were analysed at state, county, and local levels for the purposes of this EIAR.

6.3 BASELINE CONDITIONS

The predicted baseline is defined as the receiving environment prior to the realisation of the operation of the proposed development. For this assessment, current trends in population and economic growth are expected to continue and as such these have been presented in the following sections with additional referencing to the most up to date CSO data.

6.3.1 Demographic Trends

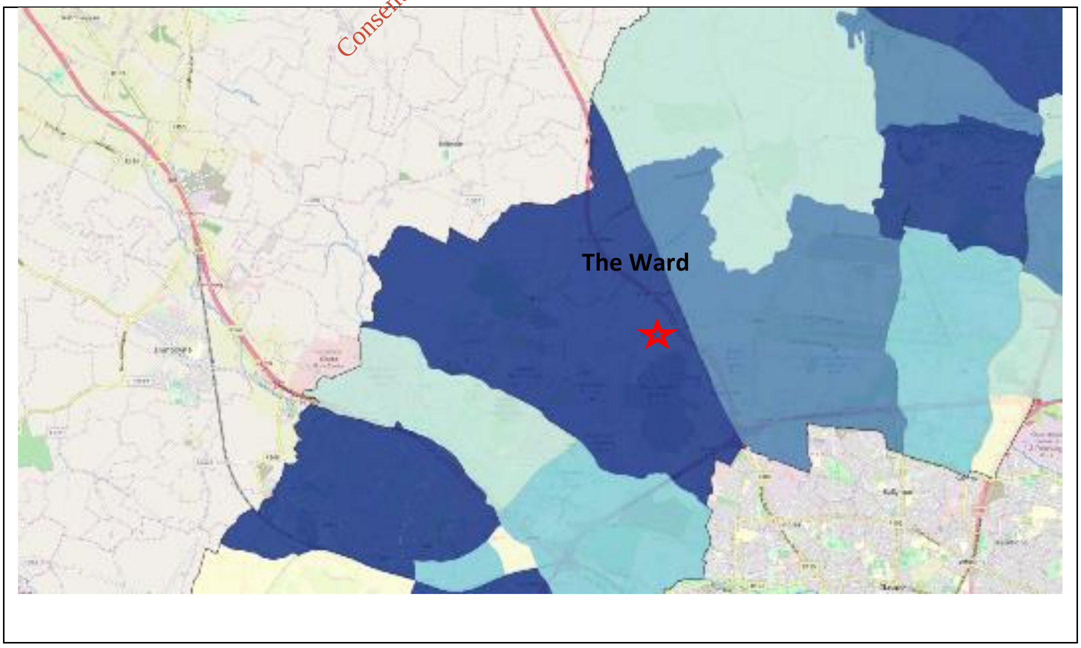
From the results of the 2016 Census and as set out in **Table 6.1**, the population of the State grew by 3.9% from 4,588,252 to 4,761,865 between 2011 and 2016. The 2016 population of 4,761,865 is the highest recorded population in Ireland since 1861. The Census figures also indicate that the population of the State grew from 4,239,848 to 4,588,252 persons between 2006 and 2011, representing an increase of 8.2%.

Table 6.1: Population at State and Local Level 2006, 2011 and 2016[5]

Area	2006	2011	2016	% Change 2006-2011	% Change 2011-2016
State	4,239,848	4,588,252	4,761,865	+8.1	+3.9
Dublin	1,187,176	1,273,069	1,345,402	+7.0	+5.7
Fingal	239,992	273,051	296,020	+13.8	+8.0
The Ward, Fingal	5,181	8,241	10,470	+57.9	+27.0

The Dublin area experienced an increase in population of approximately 5.7% between 2011 and 2016, while the Fingal administrative area experienced an increase of population of approximately 8.0% between 2011 and 2016; following an increase of 13.8% between 2006 and 2011.

As illustrated in **Figure 6.1**, the subject lands area located approximately within the centre of the 'The Ward' Electoral Division in the Fingal administrative area (hereafter referred to as the 'study area'). The CSO indicates that the study area experienced significant population increases over the last 12 years. According to the Census results, the rate of population increase in The Ward Electoral Division was 57.9% from 2006 to 2011 and 27% between 2011 and 2016.



[5] Source: Census of Population 2011 and 2016

★Approximate Location of Subject Site within 'The Ward' Electroal Division

Figure 6.1: Location Map of 'The Ward' Electoral Division

As shown in **Table 6.2,** based on 2016 CSO data, the average population density of the study area (424.6 people per square kilometre) is six times that of the average for the state, approximately a third of that of Dublin and two thirds smaller than that of Fingal. It is not unexpected that the area in which the subject site is located shows a lower population density relative to the Dublin and Fingal Area, given the nature of the existing surrounding land uses and the absence of any large residential areas.

Table 6.2: Area Size, Population and Calculated Population Density[6]

Area	Area Size (sq. km)	Population 2016	Population Density (per sq. km)
State	68,466.06	4,761,865	69.5
Dublin	923.78	1,345,402	1,456.4
Fingal	457.82	296,020	646.6
The Ward, Fingal	24.66	10,470	424.6

6.3.1.1 Age Profile

The age profile of the population of the State and Fingal for 2011 and 2016 are highlighted in **Table 6.3**. This table shows that the proportion of 0-14-year-olds increased in Fingal but dropped across the State as a whole. In Fingal, an increase of 0.3% on the 2011 figure was witnessed, while the corresponding increase for the State was a drop of 0.2%.

The 15-24-year-old age cohort showed an overall decrease of population throughout the State and in Fingal. The drop in population of this age cohort is possibly because of emigration and normal population dynamics as the population ages.

The 25-44 age cohorts for Fingal and the State also experienced a drop in population with a decrease of 2.1% and 3.0% in these areas respectively. Unsurprisingly the 65+ age group experienced an increase in population in both areas. This is reflective of an aging population generally.

Table 6.3: Population Structure 2011 and 2016[7]

Area/Age	0-14 (%)	15-24 (%)	25-44 (%)	45-64 (%)	65+ (%)
State 2011	21.3	12.6	31.6	22.7	11.7
State 2016	21.1	12.1	29.5	23.8	13.4
Change	-0.2	-0.5	-2.1	+1.1	+1.7
Fingal 2011	24.2	11.9	36.6	20.0	7.2
Fingal 2016	24.5	11.3	33.6	21.5	9.1

[6] Source: http://airomaps.nuim.ie/id/Census2016/
[7] Source: Census of Population 2011 and 2016

Area/Age	0-14 (%)	15-24 (%)	25-44 (%)	45-64 (%)	65+ (%)
Change	+0.3	-0.6	-3.0	+1.5	+1.9

Table 6.3 shows that there is a higher than average proportion of 0-9- and 25-44-year olds within Fingal which supports the suggestion that a large amount of young families within Fingal.

6.3.2 Employment Trends

The 2016 Census of Population was examined to determine trends in relation to employment including the number of persons at work, unemployment levels and the sectoral composition of the population, based upon principal economic status.

Table 6.4 shows the overall unemployment rate as measured by the responses to the question on principal economic status in the Census for 2011 and 2016. The unemployment rate is calculated by adding the number of persons unemployed to first time job seekers, and then dividing the total by the overall labour force (i.e., total amount of unemployed persons and employed persons).

Table 6.4: Principal Economic Status 2011 and 2016[8]

	State 2016	State 2011	Fingal 2016	Fingal 2011
At work	2,006,641	1,807,360	133,971	119,276
Looking for first regular job	31,434	34,166	1,850	2,224
Unemployed or given up previous job	265,962	390,677	13,565	20,416
Overall Unemployed	297,396	424,843	15,415	22,640
Labour Force	2,304,037	2,232,203	149,386	141,916
Unemployment Rate %	**11.5%**	**19.0%**	**10.3%**	**16.0%**

It is evident that the unemployment rate (as measured in the Census) in 2016 had decreased significantly doubling within the State and within Fingal, compared to the 2011 Census. The unemployment rate for Fingal was reduced to 10.3% in 2016 compared to 16% in 2011.

6.3.2.1 Monthly Unemployment Figures / Quarterly National Household Survey

The Quarterly National Household Survey (QNHS) and the Labour Force Survey are designed to produce quarterly labour force estimates that include the official measure of employment and unemployment in the state (International Labour Organisation or ILO basis). The ILO unemployment rate for the State for the period 2013 - 2018 is summarised in **Table 6.5**. In Q3, the 2017 the Quarterly Labour Force Survey (QLFS) replaced the Quarterly National Household Survey and included enhancements to the survey methodology.

At the time of writing (December 2018), it is reported that there was an annual increase in employment of 0.5% or 10,700 in the year to the third quarter of 2018, bringing total employment to

[8] Source: Census of Population 2011 and 2016

2,273,200. **Table 6.5** indicates, inter alia, that the unemployment rate for the state has been steadily decreasing since 2013 and the slight percentage decrease between Q2 and Q3 3018 indicates that the trends of reduction appear to be continuing throughout 2018.

Table 6.5: ILO Economic Status Unemployment Rate for State 2013-2018

	Q1 (%)	Q2 (%)	Q3 (%)	Q4 (%)	Average (%)
2013	13.7	13.9	13.0	11.7	13.1
2014	12.0	11.8	11.3	9.9	11.3
2015	10.0	9.8	9.3	8.7	9.5
2016	8.4	8.4	7.9	7.1	8.0
2017	6.8	6.2	6.7	6.4	6.5
2018	5.8	5.8	5.7	-*	-*
Note: *Not available at time of writing (December 2018)					

6.3.2.2 Persons at Work by Industry

Table 6.6 shows the proportion of persons at work by Industry in the State and in Fingal in 2016 and 2011. This data illustrates the impact of the general macro-economic environment on the different sectors, including the waste management (including remediation activities), construction and transport sectors, all of which relate to the subject proposal.

For the State, the proportion of the people employed in the construction and waste sector increased by a small percentage (not exceeding approx. 1%) over that 5-year period. This reflects the general collapse of the building and construction industry over that timeframe. Notably, the numbers of persons engaged in the transportation sector decreased by approx. 3-4% in both Fingal and the State between 2011 and 2016.

Table 6.6: Employment by Industry

Industry	State 2016 (%)	State 2011 (%)	Fingal 2016 (%)	Fingal 2011 (%)
Agriculture, forestry and fishing	4.44%	0.89%	5.06%	1.02%
Mining and quarrying	0.25%	0.04%	0.30%	0.04%
Manufacturing	10.03%	5.90%	10.16%	6.93%
Electricity, gas, steam and air conditioning supply	0.64%	0.63%	0.63%	0.63%
Water supply; sewerage, **waste management and remediation activities**	**0.51%**	**0.36%**	**0.52%**	**0.34%**
Construction	**5.08%**	**4.38%**	**4.83%**	**3.89%**
Wholesale and retail trade; repair of motor vehicles and motorcycles	13.29%	13.94%	14.51%	15.04%
Transportation and storage	**4.04%**	**7.98%**	**4.32%**	**8.22%**
Accommodation and food service activities	5.83%	5.33%	5.73%	5.09%
Information and communication	4.49%	6.20%	3.79%	5.67%

Industry	State 2016 (%)	State 2011 (%)	Fingal 2016 (%)	Fingal 2011 (%)
Financial and insurance activities	4.53%	7.29%	5.14%	8.42%
Real estate activities	0.45%	0.52%	0.46%	0.53%
Professional, scientific and technical activities	5.66%	5.82%	5.14%	5.22%
Administrative and support service activities	3.54%	4.78%	3.36%	4.54%
Public administration and defence; compulsory social security	5.28%	5.77%	6.25%	6.91%
Education	8.81%	7.66%	9.26%	8.05%
Human health and social work activities	11.15%	10.28%	10.92%	10.15%
Arts, entertainment and recreation	1.70%	1.76%	1.70%	1.72%
Other service activities	2.12%	1.96%	2.17%	1.92%
Activities of households as employers producing activities of households for own use	0.14%	0.14%	0.11%	0.11%
Activities of extraterritorial organisations and bodies	0.04%	0.07%	0.05%	0.05%
Industry not stated	7.97%	8.32%	5.61%	5.49%

6.4 IMPACT ASSESSMENT

6.4.1 Population

The construction phase of the proposed development will not have significant direct impacts on the population structure of the hinterland of the subject site. There may be a resultant increase in the temporary population of the area because of the employment of workers from outside the wider Dublin area that may choose to reside in the immediate local area during the construction process. This is likely to amount to only a small percentage of the workforce employed during the construction phase but will result in some additional trade for local accommodation and services.

The construction strategy will enable a managed approach to the development of the scheme within the curtilage of the site. It is expected that the majority of the workforce will travel from existing places of residence to the construction site rather than reside in the immediate environs of the site. However, some local employment from within the wider local area is expected.

The proposed development does not include residential element and will not result in an increase in the permanent population of the area.

6.4.2 Employment

The construction (staging) phase of the proposed development will proceed over an approximate 1-month period and will generate construction employment directly on-site. It will also benefit support industries such as building suppliers. There will also be a need to bring in specialist workers on a regular basis that may increase this working population at times. Specialists are only likely to stay for shorter periods depending on the nature of the work. The employment of the construction workforce will have a minor beneficial impact on services within the local area.

The construction (staging) phase therefore is considered to have the potential to have a medium, short term, slight beneficial impact on the economy and employment of the local and wider area.

6.4.3 Community

The construction (staging) phase of the proposed development will result in the creation of a construction site in a new area over phases that will have a potential negative impact on the immediate local environment, businesses and the small number of residents living locally.

The following temporary local impacts during the construction phase have the potential to affect the local residential community:

- Increased vehicular traffic; and
- Increased noise, dirt and dust generation.

While temporary inconvenience may be caused to the existing communities in the area, these impacts will be limited to the temporary construction (staging) phase. Potential impacts in respect of traffic and noise etc. are examined further in the respective sections of this EIAR and are not considered to be significant. Since the result will be a backfilled quarry as opposed to an operational quarry, the overall amenity value of the subject lands will be enhanced for the local community.

The increased traffic flows because of the construction of the proposed development is considered negligible compared to the existing traffic and are not predicted to give rise to adverse impacts for the small existing residential community in the area. A full and detailed appraisal of the impacts of the proposed development on roads, traffic and transportation aspects are in included in Section 12 of this EIAR.

The construction (staging) phase therefore is not considered to have a significant impact on the community.

6.5 MITIGATION MEASURES

6.5.1 Operational Phase (void filling)

The proposed development does not have the potential to result in any significant negative impacts on the resident or working population structure during operations. Any perceived negative impacts on the immediate local population will be short term and temporary in nature. Remedial measures will assist in minimising any potential disturbance and/or inconvenience to the existing resident, working and visiting communities. The operator will prepare and submit a Construction and Traffic Management Plan (CTMP) to Fingal County Council prior to the commencement of development. The CTMP would typically include the following: Operational Phase (void filling)

- Wetting the road surface near the entrances to the subject site with water when necessary to limit dust emissions;
- Prompt removal of any material spillage at the site entrances to prevent dispersion along the public road due to wind/rain action and subsequent re-suspension due to passing vehicles;

- Stockpiles of loose, fine aggregate or other similar sized construction material which could be easily re-suspended by the wind to be covered when not in use;
- Lorries importing/exporting loose materials to/from the construction areas to be covered;
- Establishing channels of communication between the operator, Planning Authority and resident communities; and
- Erection of barriers around items such as generators or high duty compressors.

Furthermore, car parking will be provided within the site for all construction operatives, and wheel wash facilities will be provided on site to minimise dirt/dust being transferred from the site to the public roads by vehicles. The operator will provide adequate space for full turning movements of all construction vehicles within the site.

Best practice measures will also be adopted to ensure that noise impacts from construction operations are minimised, to protect local amenity. Prior to the commencement of each phase of construction, the operator will prepare a detailed method statement for the project. This will include an assessment of potential noisy operations and outline the noise mitigation measures proposed.

Impacts on employment will be potentially positive if only slight within the immediate local area. Therefore, no mitigation measures are considered necessary.

6.5.2 Operational Phase (post void filling)

No adverse impacts are identified during the operational phase post void filling stage. Therefore, no mitigation measures are required.

6.6 RESIDUAL IMPACT

6.6.1 Operational Phase (void filling)

The operational - void filling stage of the development is predicted to have a slight beneficial effect in terms of the potential to generate a range of employment opportunities.

Given the scale of the proposed development, certain temporary adverse local impacts are expected to occur during the construction (staging) phase. These impacts would pose a potential nuisance such as an increase in daytime noise levels in the locality, albeit within statutory limits, and would include the impacts of such factors such as dust and construction traffic.

The operational - void filling stage of the development is predicted to have no negative effect in terms of capacity on the surrounding road network. The effects of noise and dust emissions arising because of construction traffic will be minimised by the implementation of the appropriate controls on site during the operational - void filling stage.

The application of the mitigation measures detailed above and in each of the additional specialist sections of this EIAR, as appropriate, will ensure that people and properties located near the subject site will not experience significant long-term adverse impacts during the operational - void filling stage of the proposed development.

6.6.2 Operational Phase (post void filling)

The nature of the already established land use of the subject site will alter because of the proposed development, from its status as a disused quarry, then a soil recovery facility, then it will be a zoned but undeveloped site.

No residual impacts are identified during the operational – post-void filling stage.

6.7 MONITORING

It is proposed that the Facility Manager will be responsible for realising the CTMP in addition to the full-time employees employed at the facility undertaken monitoring during the operations phase. Prior to any commencement of construction (staging) phase works on site, it is proposed that the dedicated Facility Manager and the Assistant Facility Manager, who already have a well-established relationship with the relevant host community consult with them regarding the proposed construction works. In addition, it is proposed that all monitoring requirements that are prescribed by the Planning Authority be complied with such that any potential for there to be adverse impacts on the relevant population in the locality is non-existent.

6.8 REFERENCES

Census of Population 2011 and 2016, available at: http://airomaps.nuim.ie/id/Census2016/ , Central Statistics Office.
Quarterly National Household Survey (QNHS), Central Statistics Office.
Labour Force Survey, Central Statistics Office.
Quarterly Labour Force Survey (QLFS), Central Statistics Office.

7 HUMAN HEALTH

7.1 INTRODUCTION

As per the amended EIA Directive and EIA Regulations, this chapter considers the potential impacts upon local communities and their health and provides a proportionate evaluation as to the magnitude and significance of any likely health impact on local communities directly attributable to the proposed development. Where appropriate, the appraisal builds upon and complements the wider environmental mitigation set to protect health, to reduce and remedy any significant adverse effects on local population and their health.

The primary objective of this chapter is to further investigate how local communities may be affected by the proposed application during construction, operation and restoration, and address potential issues through design and imbedded mitigation.

7.2 METHODOLOGY

To inform this assessment, several desk top exercises were undertaken. The desktop analysis included a review of health demographic characteristics of the area as ascertained from Census of Population data and other statistics released by the Central Statistics Office (CSO). In addition, interaction with the transport, air and noise analyses undertaken within this EIAR have also been considered.

7.3 BASELINE CONDITIONS

The results of the 2016 Census have been collated to identify the broad health baseline for the State, Dublin and the Fingal area and these are summarised in **Table 7.1**.

The CSO reports that life expectancy at birth in Ireland is 78.4 years for males and 82.8 years for females. Within County Dublin mortality rate from cancer has fluctuated over the years, and indicates an increasing trend, but remains below the national average. Between the years of 2010 and 2013, mortality rate from respiratory diseases within County Dublin has increased but remains consistently below the national average. Mortality rate from circulatory diseases within County Dublin has decreased over the same time and remains consistently below the national average. This is contrary to the national trend which continues to increase.

Between the years of 2010 and 2015, hospital admission rate for diseases of the circulatory system in Fingal follows, but remains consistently below, the national average. Hospital admissions for diseases of the respiratory system are also lower than the national average and show a decreasing trend within Fingal compared to national figures.

When considering mental health, hospital admissions for anxiety and depression have increased in Fingal over the years, from 1.4 per 1,000 population in 2014 to 24.9 per 1,000 population in 2015. Nationally, these have remained at 1.8 per 1,000 population within the same time.

Dublin has the highest number of fatal collisions compared to other counties in Ireland. This figure has increased from 21 in 2016 to 23 in 2017. However, greater increases can be seen in other counties. Overall, the number of fatal collisions on Irish roads has decreased within this period.

Table 7.1 Summary of health baseline conditions in Fingal, County Dublin and Ireland

Indicator	Fingal	County Dublin	Ireland	Source and date
Life expectancy (males)	N/A	N/A	78.4	CSO, 2011
Life expectancy (females)	N/A	N/A	82.8	CSO, 2011
Hospital admissions for circulatory disease (per 100,000 population)	3,425.8	N/A	3,794.9	IPH Community Profiles, 2015
Hospital admissions for respiratory disease (per 100,000 population)	2,597.9	N/A	2,712.5	IPH Community Profiles, 2015
Cancer Mortality (per 100,000 population)	N/A	189.40	191.90	CSO,2013
Respiratory disease mortality (per 100,000 population)	N/A	71.21	77.96	CSO,2013
Circulatory disease mortality (per 100,000 population)	N/A	177.99	210.18	CSO,2013
All age all-cause mortality (per 100,000 population)	N/A	609.32	653.55	CSO,2013
Hospital admissions for anxiety or depression (per 1,000 population)	24.9	N/A	1.8	IPH Community Profiles, 2015

7.4 IMPACT ASSESSMENT

7.4.1 Construction and operational (void filling) phases

The site set-up phase of the proposed development at Bay Lane Quarry will introduce temporary construction related air and noise emissions within the existing site boundary. Potential hazard exposure however, is largely limited to an occupational setting, with little opportunity for community exposure beyond the site boundary.

The main aspects with the potential to influence local communities and their health, comprises activities that extend beyond the site boundary, namely:

- Potential change in vehicular nature, number and routes;
- Potential fugitive emissions (noise, dirt and dust generation/resuspension); and
- Potential impacts to drinking water supplies.

The slight increase in traffic flows because of the construction of the site infrastructure at the proposed facility is considered negligible compared to the existing traffic and is not predicted to give rise to adverse impacts for the existing residential community in the area.

During the operational (void filling) phase of the development there will be a net change in the traffic volumes in the vicinity as there will be an increase in truck numbers accessing the site.

There will be no change to site access. The existing quarry entrance on Bay Lane, which was previously used when the site was active as a quarry from 2002-2009 years, will remain in place and will be used for entry and exit of the site throughout the operational (void filling) phase. As a result, there will be no change to existing road alignments, layout and sight lines of the site traffic. A detailed appraisal of the impacts of the proposed development on roads, traffic and transportation aspects are in included in **Chapter 13**, **Traffic and Transportation**, of this EIAR.

There is potential for inconvenience to be caused to the existing communities in the area during the operational (void filling) phase. Potential impacts in respect of traffic and noise etc. are examined further in the respective sections of this EIAR and are not considered to be of a magnitude, duration or timing to impact on health (i.e. sleep, cognitive function, hypertension), and are not considered significant. Equally, nuisance dust will be managed at source, with onsite wheel washing at the new site entrance.

Any potential for ground contamination at the site presents a potential risk to human health through drinking water contamination. However, **Chapter 9 Soils, Geology and Hydrogeology** provides analysis that illustrates that there is no hydrogeological pathway between the site and drinking water supplies and that there is no significant impact on human health.

The site set-up and operational (void filling) phases therefore are not considered to have a significant impact on the health of the community.

7.4.2 Post-Restoration Phase

Once complete, the proposed development will result in the complete backfill of the former quarry with inert material. This both addresses the environmental legacy of the former quarry, but also sterilises the site for alternative uses. The overall amenity value of the subject lands will therefore be returned to a pre-quarry state, for the local community. These lands are zoned for general employment.

7.4.3 'Do-Nothing' Impact

The 'Do-Nothing' scenario refers to a scenario whereby backfilling, restoration and related works at the site would not go ahead and the former quarry would remain in its current condition. In such scenario, the implications for socio-economic impact and employment would be a negative impact through the loss of potential employment that would be generated onsite coupled with associated activities including haulage, services to the site etc.

The site itself would remain in its current state, and a future use and activity at the site would remain unknown under the zoning for general employment. The population and health impact would therefore be mixed, as traffic volumes would remain in line with current levels until an alternative use is found; reducing any potential traffic, dust, or noise nuisance impact associated with increased traffic on the network. However, any potential environmental legacy will also remain (site safety) as the site will not be restored to a pre-quarry status. The absence of any site restoration would also result in a negative visual impact for the community.

7.5 MITIGATION MEASURES DURING THE OPERATION PHASE

A Construction Management Plan (CMP) will be developed prior to the commencement of activities (site set-up, operational, and restoration phases), to minimise the effects on the environment during project. The CMP will detail the working area, hours of work, principal construction methods and phases, construction traffic and will incorporate environmental protection measures. As such, the mitigation measures prescribed for water (**Chapter 10**), air (**Chapter 11**), noise (**Chapter 12**) and traffic (**Chapter 13**) will ensure that there will be no residual impact for human health, so no further mitigation is prescribed.

7.6 RESIDUAL IMPACT

There are no other predicted residual impacts to human health anticipated with the site set-up and operational (void filling) phase of the proposed development.

The restoration of the site will improve the community amenity in the area and hence has the potential for a slight positive residual impact on human health.

7.7 MONITORING

No monitoring of human health proposed.

7.8 REFERENCES

Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment.

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

Census of Population 2011 and 2016, available at: http://airomaps.nuim.ie/id/Census2016/ , Central Statistics Office.

IPH Community Profiles Tool (CPT) http://www.thehealthwell.info/community-profiles/?utm_source=IPH+Contacts+July+2015&utm_campaign=f4b43aa506-IPH_Newsletter_December_2015_copy_02_9_29_2015&utm_medium=email&utm_term=0_8f6e547325-f4b43aa506-83973317

8 BIODIVERSITY

8.1 INTRODUCTION

This chapter considers and assesses the effects of the proposed restoration of the derelict Bay Lane Soil Recovery Facility (the Proposed Development) on the ecological environment i.e. the Flora, Fauna, and their habitats, collectively referred to as Biodiversity. The aims of the chapter are to:

- Identify and describe all potentially significant ecological impacts associated with the Proposed Development;
- Ensure compliance of Proposed Development proposals with nature conservation legislation;
- Describe other existing and/or approved plans and projects, with which the Proposed Development may have significant 'cumulative impacts';
- Detail the minimum mitigation measures required to avoid or reduce significant impacts to acceptable levels;
- Identify appropriate compensation and/or enhancement or measures to supplement mitigation as required;
- Provide an assessment of the significance of any residual impacts; and
- Detail monitoring measures required to verify predictions regarding performance of mitigation measures, and to inform amended or additional mitigation as required.

8.1.1 Legislation, Policy and Guidelines

Legislation, policy and guidelines relevant to the assessment of biodiversity are outlined in this Section. The chapter has had regard for relevant guidance and the reader is referred to **Chapter 3** for reference to the Environmental Impact Assessment Directive 2014/52/EU.

8.1.2 Consideration of European, National and Local Sites

European sites consist of Special Areas of Conservation (SACs) and Special Protection Areas (SPAs), also known as "Natura 2000 network sites".

8.1.2.1 European Union Habitats Directive

The "Habitats Directive" (Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Flora and Fauna) is the main legislative instrument for the protection and conservation of biodiversity within the EU. The Habitats Directive lists habitats and species that must be protected within Special Areas of Conservation (SAC) on Annexes I and II, respectively. Additionally, the Habitats Directive identifies plant and animal species on Annex IV which are subject to strict protection anywhere they occur. The Habitats Directive sets out the protocol for the protection and management of SACs.

8.1.2.2 European Union Birds Directive

The "Birds Directive" (Council Directive 2009/147/EC on the Conservation of Wild Birds) provides a network of sites in all member states to protect birds at their breeding, feeding, or roosting areas. The Birds Directive identifies in Annex I species that are rare, in danger of extinction or vulnerable to changes in habitat and which require special protection (so-called 'Annex I' species). Special Protection Areas (SPAs) are designated under the Birds Directive to protect a range of bird populations including those of Annex I species.

8.1.2.3 European Union Water Framework Directive

The Water Framework Directive (WFD) 2000/60/EC provides a framework for the protection and improvement of rivers, lakes, marine and ground waters in addition to water-dependent habitats. The aim of the WFD is to prevent any deterioration in the existing status of water quality, including the protection of good and high-water quality status where it exists.

The WFD requires member states to manage their water resources on an integrated basis in order to achieve at least 'good' ecological status. In Ireland this is achieved through the River Basin Management Plan for Ireland 2018-2021 (DoHGLP, 2018; 'the RBMP). The Proposed Development site, off the M2 road, West of Kilshane Cross, lies within the Nanny-Delvin catchment in the midlands & eastern region. The RBMP outlines all the actions required to improve the water quality, with county councils and developments consented by it playing an important role in the implementation of the Plan.

8.1.2.4 Convention of Wetlands of International Importance

The *Convention on Wetlands* is an intergovernmental treaty adopted on 2 February 1971 in the Iranian city of Ramsar. The official name of the treaty *The Convention on Wetlands of International Importance especially as Waterfowl Habitats* reflects the emphasis on the protection of wetlands primarily as habitat for waterbirds. There are presently 147 contracting parties to the Convention, with 1524 wetland sites, totalling 129.2 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance[9]. The convention entered into force in Ireland on 15 March 1985 with 45 sites designated as *Wetlands of International Importance* (Ramsar Sites), with a surface area of 66.994ha.

8.1.2.5 National Legislation

The primary domestic statutes in the Republic of Ireland providing for wildlife protection are the Wildlife Acts of 1976 and 2000, as amended (hereafter 'The Wildlife Acts').

National sites consist of proposed Natural Heritage Areas (pNHAs) and Natural Heritage Areas (NHAs) and some of which contain boundaries that overlap with European sites. The proposed NHAs (pNHAs) have not been statutorily proposed or designated under the Wildlife Act 1976 (as amended). However, they are afforded some protection under planning legislation and objectives are included in the

[9] *An Introduction to the Ramsar Convention on Wetlands*, 7th ed. Ramsar Convention Secretariat, Gland, Switzerland.

current Fingal County Council Development Plan 2017-2023 specifically aimed at protecting pNHAs or providing complimentary protective measures that enhance the network of pNHAs.

All bird species are protected under the Wildlife Acts from offences including intentional killing or injury, and disturbance during the breeding season. The protection extends to the eggs, young, and nests of birds. The Wildlife Acts provide protection to a species not protected under the Habitats Directive (e.g. including badger *Meles meles*, two amphibian species, Small blue Butterfly *Cupido minimus*, common lizard *Zootica vivipara*). These species are all similarly protected from intentional killing or injury. The breeding or resting sites of all these species are also protected from wilful disturbance.

Where used in this Chapter, the term "invasive species" refers to those species scheduled to the European Communities (Bird and Natural Habitat) Regulations 2011 and 2015 (hereafter 'the Regulations'). The Regulations make it an offence to "plant, disperse, allow or cause to disperse, spread or otherwise cause to grow" any of the scheduled species.

A number of vascular (i.e. flowering plants) and non-vascular plant species (i.e. non-flowering or 'lower plants') are afforded legal protection under the Flora Protection Order 2015 (hereafter 'The Flora Protection Order'). It is an offence to cut, pick, collect, uproot or otherwise take, injure, damage, or destroy any specimens of the species listed under the Flora Protection Order.

8.1.2.6 Local Designation

A single local designation was identified from the Biodiversity Action plan and subsequent County Development Plan Mapping tool[10], namely that the Proposed Development site.

8.1.2.7 Policy

In addition to the policy framework set out in **Chapter 3** - Legislation and Policy, this section lists policy at national level, and below, of particular relevance to biodiversity.

National Plans

- National Biodiversity Plan 2017-2021

Other Plans

- Fingal County Development Plan (CDP) 2017 – 2023;
- Fingal heritage Plan 2018-2023;
- Fingal Biodiversity Action Plan 2010-2015;
- Cherryhound Local Area Plan Extended from period 2017-2022; and
- Proposed Kilshane Masterplan (lands adjoin part of the Eastern boundary of Bay Lane site).

[10] www.fingalbiodiversity.ie/resources/general/Fingal%20Biodiversity%20Plan.pdf

The site falls under the Fingal County Council Development Plan 2017 – 2023 and is zoned General Employment (GE) 'Provide opportunities for general enterprises and employment' while also being subject to the Cherryhound Local Area Plan[11]. Future post-restoration plans will have to be in line with both the council development and local area plan requirements. The Local authority map viewer shows the site to be situated with the "Blanchardstown Development Boundary"

8.1.2.8 Guidance

The methodology used to assess the potential impact of the Proposed Development on ecological features and develop relevant mitigation measures had regard for Draft EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, 2017), in addition to CIEEM's Guidelines for Ecological Impact Assessment in the UK and Ireland (CIEEM, 2018). Whilst drafted in the context of transport infrastructure, the National Roads Authority's (NRA) Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009) also provide useful guidance in the context of impact assessment, particularly in relation to the valuation of significant ecological features. Other guidance (e.g. for field surveys) is referenced throughout the chapter as relevant.

8.1.3 Summary Project Location

Full details of the project location are provided in **Chapter 5** (Characteristics of the Site and Project). The site at Bay Lane, St. Margaret's, County Dublin is located approximately 1km southwest off Exit 2 on the M2 motorway, approximately 6km North of Exit 5 on the M50 motorway. The site area is approximately 13.67ha in total and lies approximately 59.5m above Ordnance Datum. The quarry void extends over an area of 8.59 hectares.

8.1.4 Summary Project Description

Full details of the Proposed Development are provided in **Chapter 5**, with drawing of the proposed phasing (Figures MDR1499DG0006AF01, MDR1499DG0006BF01, MDR1499DG0006CF01 and the proposed landscaping arrangement for the site restoration Figure 16.1 Drawing 2011.5.01) included in Volume III of this EIAR. The site which has previously lain largely derelict since quarrying operations ceased in approximately 2010 was purchased in 2018 with the intention of developing the site as a soil and stone recovery facility in the course of restoring the facility Following the permitted backfilling of the quarry void, it would be the intention to restore the quarry on its completion to existing ground levels on the overall site area.

8.2 METHODOLOGY

8.2.1 Guidance

The surveys and impact assessment have been carried out in accordance with the following guidelines:

- *EPA Guidelines on the Information to be Contained in Environmental Impact Statements* (EPA, *2002) (and revised and draft guidelines 2015/2017);*

[11] http://www.fingalcoco.ie/media/2.4.3%20Cherryhound%20LAP%20Document.pdf. The plan which was published in December 2012, was extended in December 2017 to run until December 2022.

- *EPA Advice Notes on Current Practice in the Preparation of Environmental Impact Statements (EPA, 2003a) (and revised advice notes 2015);*
- *Chartered Institute of Ecology and Environmental Management (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland –Terrestrial, Freshwater, and Coastal;*
- *Best Practice Guidance for Habitat Survey and Mapping (*Smith *et al.*, 2011*);*
- *A Guide to Habitats in Ireland (*Fossitt, 2000*);*
- *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes (NRA, 2009a);*
- *Guidelines for the Assessment of Ecological Impacts of National Road Schemes Rev. 2. (NRA, 2009b);*
- *Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn.) (*Collins, 2016*);*
- *Bat Surveys: Good Practice Guidelines (*Hundt, 2012*);*
- *Bat Mitigation Guidelines for Ireland (*Kelleher & Marnell, 2006*);*
- *Environmental Planning and Construction Guidelines Series (*National Roads Authority, 2005 – 2011*); and*
- *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters (*IFI, 2016*).*

The assessment was carried out in two stages, initially through a desktop study, followed by field survey work in order to identify, describe and map areas of known or potential biodiversity value.

8.2.2 Relevant Legislation, Policy and Guidelines

The assessment of the likely significant impacts of the Proposed Development on ecological features has taken account of the following policy documents and legislation, where relevant:

- EU Birds Directive 2009/147/EEC;
- EU Habitats Directive 92/43/EEC (as amended);
- EU Water Framework Directive (WFD) 2000/60/EC;
- European Communities (EC) (Birds and Natural Habitats) Regulations 2011 (as amended);
- Planning and Development Act 2010 (as amended);
- Wildlife Acts 1976 and Wildlife (Amendment) Act (2000) (as amended); and
- Flora Protection Order 2015.

8.2.3 Consultation

Consultation is a key element for understanding the ecology of, and connectivity of other ecological elements to the Proposed Development site. Consultation was normally carried out by means of written communication but also involved telephone discussion on particular queries. These are detailed in **Section 8.2.5.3** and written responses included in **Appendix 8.A** (Volume III of this EIAR).

8.2.4 Zone of Influence

The 'zone of influence' (ZoI) for a project (or "spatial extent of the impact" as described in Annex III (3) of the new EIA Directive) is the area over which ecological features may be subject to significant impacts as a result of the proposed project and associated activities.

The ZoI is likely to extend beyond the boundary of a Proposed Development, for example where there are hydrological links extending beyond the site boundaries. Activities associated with the construction, operation, decommissioning (and where applicable, restoration) phases should be separately identified (where relevant).

The ZoI will vary for different ecological features depending on their sensitivity to an environmental change. It is therefore appropriate to identify different ZoI for different features. The features affected could include habitats, species, and the processes on which they depend. ZoI are specified for different features, and types of potential impact.

It is also important to acknowledge, as per draft EPA guidance (EPA, 2017) "that the absence of a designation or documented feature does not mean that no such feature exists within the site". As such, ZoI should be identified for all features potentially occurring within the Proposed Development site, in addition to any known to occur.

As recommended by CIEEM (2018), professionally accredited or published studies are used to determine ZoI. Following also the guidance set out by the (NRA, 2009b)[12], the Proposed Development has been evaluated based on an identified ZoI with regard to the potential impact pathways to ecological feature (habitats, flora and fauna). Having considered the Proposed Development, ZoI have been estimated for habitats and flora and fauna species and their habitats.

In the context of determining the ZoI for potential pollution effects from the Proposed Development, a conservative approach has been adopted assuming that the ZoI includes all areas downstream of the Proposed Development, which are within the same water catchment[13]. Adopting a precautionary approach, the distance over which surface water discharges could have a significant impact on receiving watercourses is considered to extend downstream of the Proposed Development site to the Irish Sea.

Desktop survey areas for the Proposed Development corresponded, as a minimum, to the ZoI of potentially significant effects for each ecological feature. Field surveys were constrained in cases by land access and/or by resources. Field studies for the ZoI for potential pollution effects, which included the entire downstream surface water catchment, were not carried out.

In this Chapter, the study area for cumulative effects includes the extent of the ZoI from the Proposed Development boundary.

[12] The National Roads Authority has been subsumed into Transport Infrastructure Ireland since the publication of this guidance.

[13] As a precautionary measure, a reasonable worst-case ZoI for water pollution from the Proposed Development site is considered to be the downstream surface water catchment. In this report the surface water catchment is defined at the scale of 'Catchment Management Unit (CMU)' as adopted in the River Basin Management Plan (RBMP) for Ireland 2018-20121 (DoHGLP, 2018). The CMU (of which there are 46 in the Republic of Ireland) is the major river catchment unit into which the RBMP is divided.

8.2.5 Desk Study

8.2.5.1 Extent

The National Biodiversity Data Centres (NBDC) online database was searched for records of invasive species, protected flora (the Flora Protection Order 2015), protected fauna (under the EU Habitats Directive 92/43/EEC), Birds Directive (2009/147/EC) and Wildlife Acts (1976 as amended) within the O04W and O14B 2x2km Grid Squares. The area covered by the mentioned Grid Squares encompasses the footprint of the study area and the immediate vicinity and it is, therefore, considered to be adequate to account for the species using the habitats potentially affected by the Proposed Development.

8.2.5.2 Desktop Data Sources

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

- EPA Unified GIS Application Guide http://gis.epa.ie/
- NPWS online maps and data, site synopsis and conservation objectives www.npws.ie [14];
- National Biodiversity Data Centre (NBDC) online maps and data www.biodiversityireland.ie[15];
- Conservation status of species in the Irish context from relevant Irish Red Lists; (e.g. Marnell *et al*., 2009 for mammals, O'Regan *et al*., 2010 for butterflies, King *et al*., 2011 for fish and amphibians; Lockhart *et al*., 2008 for bryophytes; Wyse Jackson *et al*., 2016 for vascular plants);
- Department of Housing, Planning and Local Government – River Basin Management Plan 2018-2021, available at https://www.housing.gov.ie/water/water-quality/river-basin-management-plans/river-basin-management-plan-2018-2021-0
- Geological Survey of Ireland online mapping www.gsi.ie;
- Information on the conservation status of birds in Ireland (Colhoun & Cummins, 2013);
- OSI Map Viewer www.osi.ie; and
- "Important biodiversity species" identified in the Fingal County Biodiversity Action Plan 2010-2015) which had not been updated at the time of writing in January 2019;
- Roadkill Database[16];
- Wetlands of Ireland database[17];
- Data on water quality in the surface water catchment within which the Proposed Development is located (i.e. the Nanny-Delvin catchment identified in the RBMP)[18] ; and
- Data on the extent and vulnerability of local groundwater bodies[19].

[14] Available online at www.npws.ie [Accessed January 2019].
[15] Available online at maps.biodiversityireland.ie [Accessed January 2019].
[16] Available online at http://www.biology.ie/home.php?m=npws [Accessed January 2019].
[17] Available online at http://www.wetlandsurveysireland.com/wetlands/map-of-irish-wetlands--/map-of-irish-wetlands--/ [Accessed January 2019].
[18] Available online at: https://www.catchments.ie/maps/ [Accessed January 2019]
[19] Available online at: https://gis.epa.ie/EPAMaps/ [Accessed January 2019].

The following records were excluded from the baseline of the EIAR, unless otherwise specified in the text:

- Records greater than 5 km of the Proposed Development;
- Records greater than 50 years old;
- Records of species identified as Regionally Extinct in national Red Lists;
- Any species listed as Least Concern on Red Lists; and
- Any species of upland habitats which would not make use of the (lowland) Proposed Development site.

8.2.5.3 Consultation

The following organisations listed in **Table 8.1** were consulted by email in relation to the proposed. A number of communications via telephone have also been carried out, notably with the Local Conservation Ranger, Mr. Niall Harmey but also the Fingal Biodiversity Officer Mr Hans Visser, as recommended as an action arising out of preplanning meeting with the Local Authority Planners and the client.

Table 8.1: Details of Consultations

Consultee	Origin of Consultation Request	Method of Consultation	Summary of Consultation
Department of Culture, Heritage and the Gaeltacht (Development Applications Unit (DAU));	RPS	Letter via Email	▪ General Scoping comments regarding nature conservation and ecological Survey and sources of baseline data. Development of CEMP and the need to subject the project to Appropriate Assessment.
NPWS Conservation Ranger	RPS	Telephone	Consideration for Peregrine and Newt presence in particular, owing to known records in proximity. Email confirmation of commencement regarding commencement of Licenced surveys
Inland Fisheries Ireland (IFI)	RPS	Letter via Email	No response at this time
Fingal Biodiversity Officer	RPS	Telephone discussion	Need for seasonally appropriate, full survey data to complete impact assessment
Irish Raptor Study Group	RPS	Email	No known raptor from database in 2017.

Consultation responses can be found in **Appendix 8.A** (Volume III of this EIAR).

8.2.6 Field Survey

All surveys typically had regard for relevant guidance including, but not limited to, the NRA's (2009) *Ecological surveying techniques for protected flora and fauna during the planning of national road schemes*, which provides useful information on appropriate survey seasons and methods for many of Ireland's protected species. However, some survey protocols were modified based on later best practice guidance as discussed or on the advice of specialist ecologist.

A number of visits have been made to the site initially by ecological consultants on behalf of the client and thereafter by RPS ecologists.

Following on from the early multidisciplinary survey, a number of other surveys including specialist or licenced survey were required. These included licenced Amphibian survey and specialist bird surveys in respect of understanding peregrine usage at the site. The details of the surveys are listed in **Table 8.2** with further description in the body of the report.

Table 8.2: Survey Dates and Details

Survey	Survey Date	Undertaken by	Comment
Site Assessment	11th April 2018	RPS tender team	Constraints Identification
Breeding Bird and bat Activity Survey	August 8th and 9th 2018	Brian Keeley (on behalf of the client)	Seasonal Surveys
Multidisciplinary survey and characterisation	9th October 2018	RPS Ecologists	▪ Plant & Habitat survey ▪ Invasive Alien Plant Species survey ▪ Mammal survey ▪ Incidental Bird survey and 1st vantage point for Raptors ▪ Preliminary assessment of potential Amphibian territory ▪ Preliminary Assessment of Watercourses
Seasonal surveys	18th December 2018	RPS Ecologists	▪ 2nd Raptor vantage point survey ▪ Assessment of current water bodies for Amphibian potential; and ▪ Badger survey
Site Visit	11th January 2019	RPS Ecologists	Site walkover with RPS Raptor specialist to ascertain site suitability and ongoing survey protocol
Licenced Amphibian Survey	March 4th, 2019 March 19th 2019	RPS Ecologists	▪ Licenced Survey 1 & 2 for Amphibians ▪ Confirmation of badger activity
Raptor – Activity and Breeding Surveys	March 4th, 2019 March 19th 2019	RPS Ecologists	▪ Search for peregrine activity and nesting potential

8.2.6.1 Survey Constraints

Both the bat activity survey and summer breeding bird survey were commissioned by the client directly, in advance of the contract with RPS. Ordinarily, it is recommended that breeding bird surveys are carried out earlier in the season, ideally comprising two separate visits. It is recognised that most birds have bred by early August, but in the context of a quarry, evidence of nesting might be clear.

An earlier summer survey, commissioned by the client, did not record any nesting by Peregrine falcon (*Falco peregrinus*) or Raven (*Corvus corax*) from within the quarry, although they were noted overflying. Both species are known from a number of adjacent quarries and as such were considered to be deserving of further assessment, particularly the peregrine which is a Birds Directive Annex I species and for which a juvenile was noted perching on a sloping rock face during the preliminary walkover survey.

The botanical survey was undertaken a little outside of the optimal floristic period. However, given the nature of the Bay Lane quarry which has lain largely abandoned for several years, this was not considered to greatly detract from the site characterisation and assessment.

The preliminary badger survey was not carried out within the optimal season, but this was overcome during a number of follow up visits.

In terms of the preliminary aquatic assessment, the drainage ditches surrounding the southern and eastern boundary of the site, which drain into the Shallon stream were on first appraisal ecologically poor. Indeed, the watercourse was dry along its upper sections (where it has been heavily modified) and considerable dumping/fly-tipping were apparent. The Shallon stream which is a tributary of the Ward River provides a potential direct connectivity to European sites. The potential to support aquatic ecology was considered poor and although follow on visits in winter 2018 and early 2019 when water-levels increased, the visual assessment of the water quality was such that no aquatic sampling was considered necessary.

Two of the four proposed newt surveys, as approved under the NPWS survey licence, between March and May were completed by the time of planning submission. Owing to the results from the first two surveys and an assessment of the site conditions, the potential to support newts was less than favourable and a conservative approach to impact assessment was adopted in this report. The remaining surveys will be completed as required with a survey after report being submitted to NPWS. This will be submitted

Sources of information are not exhaustive, nor easily available and every effort was made to obtain ecological data in the public domain to inform the baseline and impact assessment. It is possible that other information not in the public domain and known only to private individuals exists.

8.2.6.2 Surveys Scoped Out

Given the nature and condition of the abandoned quarry, the requirement to survey the following ecological features has been scoped out for the following reasons.

- **Winter bird surveys**: Despite the relative proximity of the site to coastal SPA's the terrain and conditions of the site are such that although wintering birds might make use of adjacent and open agricultural fields, there was no evidence of them using the quarry floor. For this reason, no detailed wintering bird survey was undertaken, merely ad hoc records.
- **Aquatic surveys**: A number of preliminary visits to the site during winter 2018 to confirm presence of water and/or levels in the Shallon stream. This is a highly modified watercourse and no shallow running water was noted downstream of the quarry. The conditions were such that it was not suitable to carry out an aquatic sampling.
- **Invertebrate survey (terrestrial)**: The habitats within the study area were searched for suitable vegetation that could support protected invertebrate species such as butterflies (e.g. *Euphydryas aurinia*). No suitable habitat was found, and no further assessment is provided.

8.2.6.3 Habitats and Flora Survey

Habitats on site were classified using *A Guide to Habitats in Ireland* (Fossitt, 2000) and mapped in accordance with the *Best Practice Guidance for Habitat Survey and Mapping* (Smith *et al*., 2011). The classification is the standard scheme for identifying, describing and classifying habitats in Ireland. The hierarchical classification operates at three levels, using codes to differentiate habitats based on the plant species present. Species recorded in this report are given both their scientific and common names, following the nomenclature given in the *New flora of the British Isles* (Stace, 2010). "Target notes" were recorded as necessary on maps in the field to identify location of features of note.

Invasive Alien Plant species including those listed on Schedule 3 of the Birds and Natural Habitats Regulations 2011 (as amended) were also searched for during site visits and findings are discussed in this report.

8.2.6.4 Protected Fauna Survey

The site survey included an assessment of the presence, or likely presence, of a range of rare or protected fauna and bird species. Habitats were assessed for field signs and/or usage by fauna, such as well-used pathways, droppings, places of shelter and features or areas likely to be of particular value as foraging resources. Some areas could not be accessed by virtue of the accessibility along cliff tops or density of scrub, particularly along some boundary ditches. In these instances, the assessment relied on observations of secondary evidence e.g. mammal runs into scrub.

Badger and Otter

Badger (*Meles meles*) and Otter (*Lutra lutra)* surveys as well as other mammals, were carried out in accordance with the National Roads Authority publication 'Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes'.

The site was systematically searched for evidence of badger on a number of occasions (**Table 8.2**). The badger survey methodology recorded usage of holes, and direction of tunnelling in accordance with Harris *et al.* (1989)., although the practicalities of confirming subterranean extent of tunnels are recognised. Any signs of badger activity were noted, including the presence of setts (ranked as potential main, annex, subsidiary or outlier setts), foraging evidence, access runs, tracks and prints.

Watercourses, drainage ditches and wetland habitats within the Proposed Development site and the wider ZoI were assessed for otter. The type of evidence that was searched for included spraints, footprints, or feeding remains. The survey methodology had regard for guidance of the NRA (2006a) and included searches for breeding or resting sites within up to 150 m to account for the potential effect of piling.

Bats

An assessment of features in the study area that were of potential value to bats, commissioned by the client and carried out by a specialist bat ecologist was also made in accordance with the Bat Conservation Trust Publication '*Bat Surveys - Good Practice Guideline*s' (Bat Conservation Trust (2012). A visual assessment of potential bat roosts (PBRs) was carried out by identifying features of most value to bats, for example, crevices, splits, holes, loose bark, hollows or cavities and thick ivy. Potential areas of value to bats for foraging or commuting were also noted, as was the presence of old or derelict buildings. No caves were noted, although an assessment of crevices in the quarry rock face is made.

Amphibian Survey

The proposed amphibian surveys will be carried out in accordance with NRA (2009) *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Roads Schemes*. Best practice dictates that four visits are undertaken to establish newt presence/absence between March and May. The survey protocol was reinforced with reference to some recent studies which reflect changes in understanding/interpretation with regards amphibian ecology and best practice. These include Meehan (2013), Anon (Undated) and Reid *et al*. (2013):

The licenced survey methodology specified approved by NPWS (**Appendix 8.C** – Volume III of this EIAR) includes a combination of the following:

- Vegetation/Egg searching;
- Netting;
- Torching; and
- Bottle/Funnel trapping.

A further supplementary technique, often used in the case of long-term studies where interference by outside elements such as livestock can be minimised, is refuge searching. At this time refugia (places that provide refuge for newts) are not being proposed.

Breeding Birds

A breeding bird survey within the Proposed Development site was commissioned by the client **Appendix 8.B** (Volume III of this EIAR). The focus of the survey was to identify any bird species of Medium or High Conservation Concern as per the latest Birds of Conservation Concern in Ireland listing (Colhoun and Cummins, 2013).

The breeding bird survey was undertaken over three different time periods over two days and included a visual and binocular examination of all rock faces, stone piles, rubble and crevices. Supplemental ad-hoc records noted during visits were included in the original bird list for the site with some indication of activity.

The early surveys noted peregrine activity above the quarry, but nesting features were on initial inspection less than ideal, although a young peregrine was noted ledge. Following on from the preliminary walkover survey and consultation response, a number of vantage point surveys over 8 hours on two separate dates were undertaken to understand usage of the site by Peregrine. Further studies informed by a visit by an RPS raptor specialist Adam McClure in the early part of the breeding season focussed on understanding peregrine activity above and adjacent to the quarry and vantage point surveys to identify nesting on site.

Other Protected and Notable Species

Ad-hoc records of sightings and secondary evidence of other fauna were sought during all visits. The potential was also noted for habitats of other protected fauna species to occur including Hedgehog *Erinaceus europaeus*, Stoat *Mustela erminea hibernica*, Pygmy shrew *Sorex minutus*, Red squirrel *Sciurus vulgaris*, Irish hare *Lepus timidus hibernicus*, Common lizard *Zootoca vivipara*, Marsh fritillary *Euphydryas aurinia* and small blue *Cupido minimus*. In the case of the latter two butterfly species, searches were made of suitable habitats for the larval food plants of marsh fritillary (Devil's-bit scabious, *Succisa pratensis*), and small blue (Kidney vetch, *Anthyllis vulneraria*).

Some surveys required licences issued from National Parks and Wildlife Service (NPWS) at the Department of Culture, Heritage and the Gaeltacht. These are detailed in the respective sections, as appropriate and copies of licences where appropriate are included in **Appendix 8.C** (Volume III of this EIAR).

8.2.6.5 Impact Assessment Methodology and Ecological Valuation

The methodology for the assessment of impacts is derived from CIEEM guidance (2018) and Guidelines for Assessment of Ecological Impacts of National Road Schemes (NRA, 2009b).

When describing changes/activities and impacts on ecosystem structure and function, reference was made to the parameters as discussed below.

Positive or Negative: Is the impact likely to be positive or negative? Positive impacts merit just as much consideration as negative ones, as international, national and local policies increasingly press for projects to deliver positive biodiversity outcomes.

Extent: 'Extent' should also be predicted in a quantified manner and relates to the area over which the impact occurs. Where the receptor is in an area of a particular plant community for example, Extent = Magnitude.

Magnitude: 'Magnitude' should be predicted in a quantified manner wherever possible and relates to the quantum of an impact, for example the number of individuals of a species affected by an activity or amount of habitat loss.

Duration: 'Duration' is intended to refer to the time during which the impact is predicted to continue, until recovery or re-instatement (which may be longer than the impact-causing activity). This should be quantified wherever possible and interpreted in relation to the ecological processes involved rather than on a human timescale.

Timing and frequency: The timing of impacts in relation to important seasonal and/or life-cycle constraints should be evaluated. Similarly, the frequency with which activities take place can be an important determinant of the impact on receptors and should also be assessed and described.

Reversibility: 'Reversibility' should be addressed by identifying whether an impact is ecologically reversible (either spontaneously or through specific action) and whether such an outcome is likely.

An informed integration of each of these impact characteristics, for each potentially significant impact is necessary in order to underpin the determination of impact significance. A significant effect can be a positive or negative ecological effect and is "an effect that either supports or undermines biodiversity conservation objectives for 'important ecological features' or for biodiversity in general" as defined in CIEEM (2018). In each case, it is important to assess the likelihood that the change will occur as anticipated and that the impact on ecological structure and function will manifest as predicted.

In accordance with NRA guidelines (2009b), ecological features valued as "Local Importance (Higher Value)" or higher as per the NRA evaluation criteria (**Table 8.3)** were considered in the impact assessment. Features of lower ecological value are excluded from the impact assessment.

Table 8.3: Ecological Evaluation Criteria from NRA Guidelines (NRA 2009b)

Ecological Valuation Criteria
International Importance: ▪ 'European Site' including Special Area of Conservation (SAC), Site of Community Importance (SCI), Special Protection Area (SPA) or proposed Special Area of Conservation. ▪ Proposed Special Protection Area (pSPA). ▪ Site that fulfils the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). ▪ Features essential to maintaining the coherence of the Natura 2000 Network.[20] ▪ Site containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. ▪ Resident or regularly occurring populations (assessed to be important at the national level)[21] of the following: o Species of bird listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and / or o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. ▪ Ramsar Site (Convention on Wetlands of International Importance Especially Waterfowl Habitat 1971). ▪ World Heritage Site (Convention for the Protection of World Cultural & Natural Heritage, 1972). ▪ Biosphere Reserve (UNESCO Man & The Biosphere Programme). ▪ Site hosting significant species populations under the Bonn Convention (Convention on the Conservation of Migratory Species of Wild Animals, 1979).

[20] See Articles 3 and 10 of the Habitats Directive.
[21] It is suggested that, in general, 1% of the national population of such species qualifies as an internationally important population. However, a smaller population may qualify as internationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

Ecological Valuation Criteria
▪ Site hosting significant populations under the Berne Convention (Convention on the Conservation of European Wildlife and Natural Habitats, 1979). ▪ Biogenetic Reserve under the Council of Europe. ▪ European Diploma Site under the Council of Europe. ▪ Salmonid water designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988, (S.I. No. 293 of 1988).[22]

National Importance:
▪ Site designated or proposed as a Natural Heritage Area (NHA).
▪ Statutory Nature Reserve.
▪ Refuge for Fauna and Flora protected under the Wildlife Acts.
▪ National Park.
▪ Undesignated site fulfilling the criteria for designation as a Natural Heritage Area (NHA); Statutory Nature Reserve; Refuge for Fauna and Flora protected under the Wildlife Act; and/or a National Park.
▪ Resident or regularly occurring populations (assessed to be important at the national level)[23] of the following:
  ○ Species protected under the Wildlife Acts; and/or
  ○ Species listed on the relevant Red Data list.
▪ Site containing 'viable areas'[24] of the habitat types listed in Annex I of the Habitats Directive.

[22] Note that such waters are designated based on these waters' capabilities of supporting salmon (*Salmo salar*), trout (*Salmo trutta*), char (*Salvelinus*) and whitefish (*Coregonus*).

[23] It is suggested that, in general, 1% of the national population of such species qualifies as a nationally important population. However, a smaller population may qualify as nationally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

[24] A 'viable area' is defined as an area of a habitat that, given the particular characteristics of that habitat, was of a sufficient size and shape, such that its integrity (in terms of species composition, and ecological processes and function) would be maintained in the face of stochastic change (for example, as a result of climatic variation).

Ecological Valuation Criteria
County Importance: ▪ Area of Special Amenity.[25] ▪ Area subject to a Tree Preservation Order. ▪ Area of High Amenity, or equivalent, designated under the County Development Plan. ▪ Resident or regularly occurring populations (assessed to be important at the County level)[26] of the following: o Species of bird listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. ▪ Site containing area or areas of the habitat types listed in Annex I of the Habitats Directive that do not fulfil the criteria for valuation as of International or National importance. ▪ County important populations of species, or viable areas of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan (BAP) if this has been prepared. ▪ Sites containing semi-natural habitat types with high biodiversity in a county context and a high degree of naturalness, or populations of species that are uncommon within the county. ▪ Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Local Importance (higher value): ▪ Locally important populations of priority species or habitats or natural heritage features identified in the Local BAP, if this has been prepared; ▪ Resident or regularly occurring populations (assessed to be important at the Local level)[27] of the following: o Species of bird listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; o Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; o Species protected under the Wildlife Acts; and/or o Species listed on the relevant Red Data list. ▪ Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality. ▪ Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value.

[25] It should be noted that whilst areas such as Areas of Special Amenity, areas subject to a Tree Preservation Order and Areas of High Amenity are often designated on the basis of their ecological value, they may also be designated for other reasons, such as their amenity or recreational value. Therefore, it should not be automatically assumed that such sites are of County importance from an ecological perspective.

[26] It is suggested that, in general, 1% of the County population of such species qualifies as a County important population. However, a smaller population may qualify as County importance where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

[27] It is suggested that, in general, 1%of the local population of such species qualifies as a locally important population. However, a smaller population may qualify as locally important where the population forms a critical part of a wider population or the species is at a critical phase of its life cycle.

Ecological Valuation Criteria
Local Importance (lower value): ▪ Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; ▪ Sites or features containing non-native species that are of some importance in maintaining habitat links.

8.3 RECEIVING ENVIRONMENT

8.3.1 Site Overview

The disused quarry is located at Bay Lane, St. Margaret's, County Dublin, approximately 1km southwest of Exit 2 on the M2 motorway. The derelict site which is almost entirely screened by hedge and tree-dominated vegetation is characterised by three areas, namely the lands around the main entrance where offices, parking and weighbridges were located, as well as the quarry void which together extends to approximately 8.59ha, whilst made ground in the eastern part of the site, covers a further 5.08ha. There is a derelict property comprising a residential dwelling (in the ownership of the client, but outside the Planning application) as well a maintenance shed in the south western corner of the site along with the inactive settlement tanks.

The surrounding landscape is largely characterised by large agricultural fields, although the lands which have been zone General employment have in parts been developed, as seen in **Figure 8.1**. There are a number of commercial developments in close proximity including an extensive warehousing /logistics facility to the north and a small cement batching plant to the west. The extensive Huntstown quarry complex is approximately 2km due south of Bay Lane Quarry.

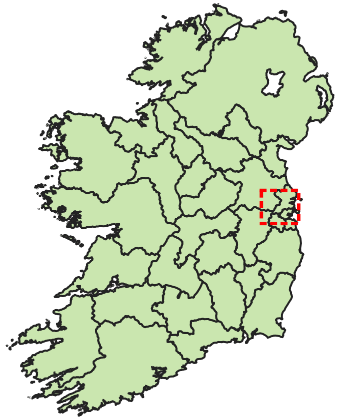
The Proposed Development site is located within the Nanny-Delvin WFD Catchment, adjacent to the Shallon River (IE_EA_08W010300), which flows along the northern boundary of the site. The Shallon is a small tributary stream that rises a short distance upstream of the Proposed Development site. The watercourse enters the Malahide Estuary approximately 13km downstream. It belongs to the WFD monitoring network having been at classed at *Good* WFD status at the reach closest to the Bay Lane quarry site (Ward_030).

The Shallon stream in and around the Proposed Development is highly modified at this point having been previously remodelled. The new road includes a number of junctions which would support the development of the surrounding lands. The watercourse, which is dry for part of the year, is characterised by shallow water during wetter periods and is heavily laden with silt with little obvious flow. It is also characterised by considerable accumulations of fly tipped debris alongside the road network.

The study area lies near the southern boundary of the Swords groundwater body (IE_EA_G_011). The Swords groundwater body mostly lies within a locally important aquifer, moderately productive but there are smaller areas of unproductive aquifer. The groundwater flow direction is generally towards the coast or neighbouring surface water bodies. The discharge distances are generally of less than 1km given the fissured nature of the bedrock and its general moderate permeability[28].

[28] https://jetstream.gsi.ie/iwdds/delivery/GSI_Transfer/Groundwater/GWB/SwordsGWB.pdf

Legend



Proposed Development

Shallon stream

Client

GLV Bay Lane Limited

Project **Bay Lane Soil Recovery Facility**

Title

Figure 8.1: Site overview

RPS

RPS Consulting Engineers
West Pier Business Campus
Dun Laoghaire
Co. Dublin
Tel: +353 1 488 2900

Issue Details

Drawn:	JMM	**Project:**	MDR1499
Checked:	TR	**File Ref:**	MDR1499QG1005F01
Approved:	CMG		
Scale:	1:10,000 @ A4	**Projection:**	IRENET95 / ITM
Date:	14/03/2019		

8.3.2 Sites Designated for Conservation

8.3.2.1 European Sites

There are six (6) Special Areas of Conservation (SACs) and five (5) Special Protection Areas (SPAs), collectively referred to as European sites, located within the Zone of Influence (ZoI) of the Proposed Development. The ZoI constitutes a 15km Buffer of the Proposed Development site and includes the direct downstream connectivity to Malahide Estuary, illustrated in **Figure 8.2** and listed in **Table 8.4.**

SACs are sites of international importance due to the presence of Annex I habitats and/or Annex II species listed under the EU Habitats Directive (92/43/EEC). SPAs are designated for the protection of bird species listed on Annex I of the Bird Directive (2009/147/EC), regularly occurring populations of migratory species and areas of international importance for migratory birds.

The European sites correspond to those that were subject to Appropriate Assessment (issued separately as part of the planning submission:). The Screening for Appropriate Assessment considered the European sites within the ZoI of the Proposed Development and/or with hydrological connectivity to the Proposed Development site and identified that the Proposed Development was likely to have a significant effect on European sites. A follow on Natura Impact Statement, which included mitigation measures, considered that the Proposed Development, either alone or in combination with other plans or projects would not adversely affect the integrity of any European site

8.3.2.2 RAMSAR Sites

The *Convention on Wetlands* is an intergovernmental treaty adopted on 2 February 1971 in the Iranian city of Ramsar. The official name of the treaty *The Convention on Wetlands of International Importance especially as Waterfowl Habitats* reflects the emphasis on the protection of wetlands primarily as habitat for waterbirds. There are presently 147 Contracting Parties to the Convention, with 1524 wetland sites, totalling 129.2 million hectares, designated for inclusion in the Ramsar List of Wetlands of International Importance[29].

The convention entered into force in Ireland on 15 March 1985 with 45 sites designated as *Wetlands of International Importance* (Ramsar Sites), with a surface area of 66.994ha.

There is one Ramsar site within 15 km of the study area, namely Broadmeadow Estuary (Site code 833). This site overlaps with the SPA designation. It is listed in **Table 8.5** and illustrated in **Figure 8.3**.

[29] *An Introduction to the Ramsar Convention on Wetlands*, 7th ed. Ramsar Convention Secretariat, Gland, Switzerland.

Table 8.4: European sites within the Zone of Influence

Site Name and Code	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance from Proposed Development	Connectivity
Special Area of Conservations (SACs)			
Baldoyle Bay **SAC (000199)**	**Conservation Objectives Series Version 1.0 (19/11/12)** **Annex I Habitats** ▪ Mudflats and sandflats not covered by seawater at low tide [1140] ▪ *Salicornia* and other annuals colonising mud and sand [1310] ▪ Atlantic salt meadows (Glauco-*Puccinellietalia maritimae*) [1330] ▪ Mediterranean salt meadows (*Juncetalia maritimi*) [1410]	*ca*. 14 km	No. There is no hydrological connectivity between the study area and the Baldoyle Bay SAC as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the European site is located at the Mayne_SC_010. For this reason, a pathway between the study area and the European site is unlikely to be established.
Malahide Estuary **SAC (000205)**	**Conservation Objectives Series Version 1.0 (27/05/13)** **Annex I Habitats** ▪ Mudflats and sandflats not covered by seawater at low tide [1140] ▪ *Salicornia* and other annuals colonising mud and sand [1310] ▪ *Spartina* swards (Spartinion maritimae) [1320] ▪ Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] ▪ Mediterranean salt meadows (Juncetalia maritimi) [1410] ▪ Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] ▪ Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]*	*ca*. 10.5 km	**Yes.** **The European site is located downstream of the study area, with potential direct hydrological connectivity via the Shallon river.**

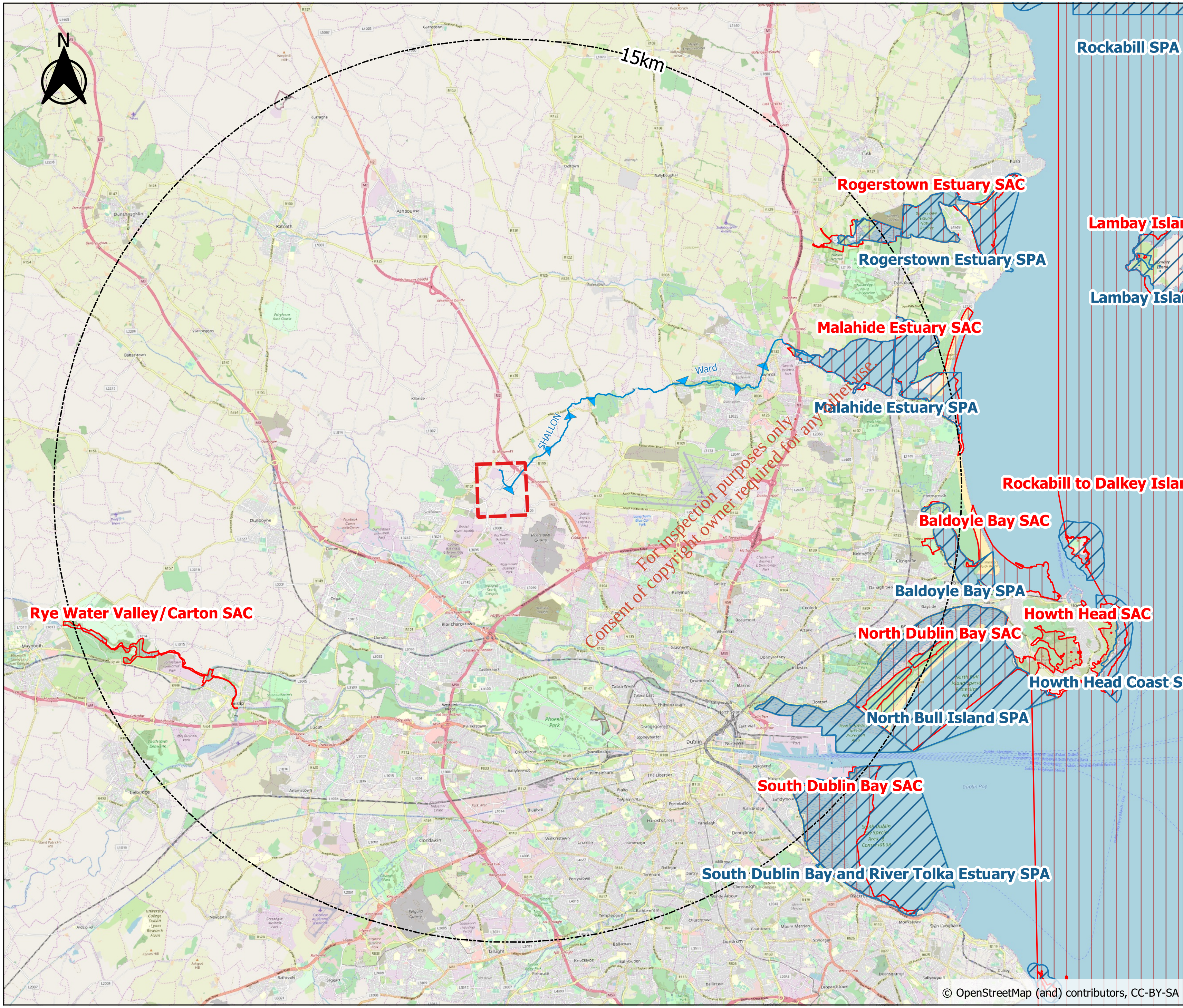
Site Name and Code	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance from Proposed Development	Connectivity
North Dublin Bay **SAC (000206)**	**Conservation Objectives Series Version 1.0 (06/11/13)** **Annex I Habitats** ▪ Mudflats and sandflats not covered by seawater at low tide [1140] ▪ Annual vegetation of drift lines [1210] ▪ *Salicornia* and other annuals colonising mud and sand [1310] ▪ Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] ▪ Mediterranean salt meadows (Juncetalia maritime) [1410] ▪ Embryonic shifting dunes [2110] ▪ Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] ▪ Fixed coastal dunes with herbaceous vegetation (grey dunes)* [2130] ▪ Humid dune slacks [2190] **Annex II Species** ▪ Petalwort *Petalophyllum ralfsii* [1395]	*ca*. 13.5 km	No. There is no hydrological connectivity between the study area and the North Dublin Bay SAC as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the European site is located at the Mayne_SC_010. For this reason, a pathway between the study area and the European site is unlikely to be established.
Rogerstown Estuary **SAC (000208)**	**Conservation Objectives Series Version 1.0 (14/08/13)** **Annex I Habitats** ▪ Estuaries [1130] ▪ Mudflats and sandflats not covered by seawater at low tide [1140] ▪ *Salicornia* and other annuals colonising mud and sand [1310] ▪ Atlantic salt meadows (Glauco-Puccinellietalia maritimae) [1330] ▪ Mediterranean salt meadows (Juncetalia maritimi) [1410] ▪ Shifting dunes along the shoreline with *Ammophila arenaria* (white dunes) [2120] ▪ Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]*	*ca*. 13 km	No. There is no hydrological connectivity between the study area and the Rogerstown Estuary SAC as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the European site is located at the Palmerstown_SC_010. For this reason, a pathway between the study area and the European site is unlikely to be established.
South Dublin Bay **SAC (000210)**	**Conservation Objectives Version 1.0 (22/08/13)** **Annex I Habitats** ▪ Mudflats and sandflats not covered by seawater at low tide [1140]	*ca*. 13.5 km	No. There is no hydrological connectivity between the study area and the South Dublin Bay SAC as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the European site is located at the Dodder_SC_010. For this reason, a pathway between the study area and the European site is unlikely to be established.

Site Name and Code	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance from Proposed Development	Connectivity
Rye Water Valley/Carton **SAC (001398)**	**Generic Conservation Objectives Version 6.0 (21/02/18)** **Annex I Habitats** ▪ Petrifying springs with tufa formation (Cratoneurion) [7220]* **Annex II Species** ▪ Narrow-mouthed Whorl Snail (*Vertigo angustior*) [1014] ▪ Desmoulin's Whorl Snail (*Vertigo moulinsiana*) [1016]	*ca*. 11 km	No. There is no hydrological connectivity between the study area and the Rye Water Valley/Carton SAC as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the European site is located at the Liffey_SC_080. For this reason, a pathway between the study area and the European site is unlikely to be established.
Special Protection Areas (SPA)			
Malahide Estuary (Broadmeadow/Swords Estuary) **SPA (004025)**	**Conservation Objectives Series Version 1.0 (16/08/13)** **Special Conservation Interests** ▪ Great Crested Grebe (*Podiceps cristatus*) [A005] ▪ Brent Goose (*Branta bernicla* hrota) [A046] ▪ Shelduck (*Tadorna tadorna*) [A048] ▪ Pintail (*Anas acuta*) [A054] ▪ Goldeneye (*Bucephala clangula*) [A067] ▪ Red-breasted (*Merganser Mergus serrator*) [A069] ▪ Oystercatcher (*Haematopus ostralegus*) [A130] ▪ Golden Plover (*Pluvialis apricaria)* [A140] ▪ Grey Plover (*Pluvialis squatarola*) [A141] ▪ Knot (*Calidris canutus*) [A143] ▪ Dunlin (*Calidris alpina alpina*) [A149] ▪ Black-tailed Godwit (*Limosa limosa*) [A156] ▪ Bar-tailed Godwit (*Limosa lapponica*) [A157] ▪ Redshank (*Tringa tetanus*) [A162] ▪ Wetlands [A999]	*ca*. 10.5 km	**Yes.** **The European site is located downstream of the study area, with potential direct hydrological connectivity via the Shallon river.**

Site Name and Code	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance from Proposed Development	Connectivity
South Dublin Bay and River Tolka Estuary **SPA (004024)**	**Conservation Objectives Series Version 1.0 (09/03/15)** **Special Conservation Interests** ▪ Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] ▪ Oyestercatcher (*Haematopus ostralegus*) [A130] ▪ Ringed Plover (*Charadrius hiaticula*) [A137] ▪ Grey Plover (*Pluvialis squatarola*) [A141] ▪ Knot (*Calidris canutus*) [A143] ▪ Sanderling (*Calidris alba*) [A144] ▪ Dunlin (*Calidris alpina alpina*) [A149] ▪ Bar-tailed Godwit (*Limosa lapponica*) [A157] ▪ Redshank (*Tringa totanus*) [A162] ▪ Black-headed Gull (*Chroicocephalus ridibundus*) [A179] ▪ Roseate Tern (*Sterna dougallii*) [A192] ▪ Common Tern (*Sterna hirundo*) [A193] ▪ Artic Tern (*Sterna paradisaea*) [A194] ▪ Wetlands [A999]	*ca*. 11 km	No. The study area and the South Dublin Bay and River Tolka Estuary SPA are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the European site is located at the Dodder_SC_010. For this reason, a pathway between the study area and the European site is unlikely to be established.
Baldoyle Bay **SPA (004016)**	**Conservation Objectives Series Version 1.0 (27/02/13)** **Special Conservation Interests** ▪ Brent Goose (*Branta bernicla* hrota) [A046] ▪ Shelduck (*Tadorna tadorna*) [A048] ▪ Ringed Plover (*Charadrius hiaticula*) [A137] ▪ Golden Plover (*Pluvialis apricaria)* [A140] ▪ Grey Plover (*Pluvialis squatarola*) [A141] ▪ Bar-tailed Godwit (*Limosa lapponica*) [A157] ▪ Wetlands [A999]	*ca*. 14 km	No. There is no hydrological connectivity between the study area and the Baldoyle Bay SPA as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the European site is located at the Mayne_SC_010. For this reason, a pathway between the study area and the European site is unlikely to be established.

Site Name and Code	Qualifying Interest Habitats and Species (*=Priority Habitat)	Distance from Proposed Development	Connectivity
North Bull Island SPA (004006)	**Conservation Objectives Series Version 1.0 (09/03/15)** **Special Conservation Interests** ▪ Light-bellied Brent Goose (*Branta bernicla hrota*) [A046] ▪ Shelduck (*Tadorna tadorna*) [A048] ▪ Teal (*Anas crecca*) [A052] ▪ Pintail (*Anas acuta*) [A054] ▪ Shoveler (*Anas clypeata*) [A056] ▪ Oystercatcher (*Haematopus ostralegus*) [A130] ▪ Golden Plover (*Pluvialis apricaria)* [A140] ▪ Grey Plover (*Pluvialis squatarola*) [A141] ▪ Knot (*Calidris canutus*) [A143] ▪ Sanderling (*Calidris alba*) [A144] ▪ Dunlin (*Calidris alpina alpina*) [A149] ▪ Black-tailed Godwit (*Limosa limosa*) [A156] ▪ Bar-tailed Godwit (*Limosa lapponica*) [A157] ▪ Curlew (*Numenius arquata*) [A160] ▪ Redshank (*Tringa tetanus*) [A162] ▪ Turnstone (*Arenaria interpres*) [A169] ▪ Black-headed Gull (*Chroicocephalus ridibundus*) [A179] ▪ Wetlands [A999]	*ca*. 13.5 km	No. There is no hydrological connectivity between the study area and the North Bull Island SPA as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the European site is located at the Mayne_SC_010. For this reason, a pathway between the study area and the European site is unlikely to be established.
Rogerstown Estuary SPA (004015)	**Conservation Objectives Series Version 1.0 (20/05/13)** **Special Conservation Interest** ▪ Greylag Goose (*Anser anser*) [A043] ▪ Brent Goose (*Branta bernicla hrota*) [A046] ▪ Shelduck (*Tadorna tadorna*) [A048] ▪ Shoveler (*Anas clypeata*) [A056] ▪ Oystercatcher (*Haematopus ostralegus*) [A130] ▪ Ringed Plover (*Charadrius hiaticula*) [A137] ▪ Grey Plover (*Pluvialis squatarola*) [A141] ▪ Knot (*Calidris canutus*) [A143] ▪ Dunlin (*Calidris alpina alpine*) [A149] ▪ Black-tailed (*Godwit Limosa limosa*) [A156] ▪ Redshank (*Tringa tetanus*) [A162] ▪ Wetlands [A999]	*ca*. 13.5 km	No. There is no hydrological connectivity between the study area and the Rogerstown Estuary SPA as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the European site is located at the Palmerstown_SC_010. For this reason, a pathway between the study area and the European site is unlikely to be established.

**indicates a priority habitat under the Habitats Directive*



Legend

- Study area
- Zone of Influence
- River waterbodies
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)

Data Source: NPWS (last updated: January 2019)

Client

GLV Bay Lane Limited

Project **Bay Lane Soil Recovery Facility**

Title

Figure 8.2: European Sites within the Zone of Influence

RPS

RPS Consulting Engineers
West Pier Business Campus
Dun Laoghaire
Co. Dublin
Tel: +353 1 488 2900

Issue Details

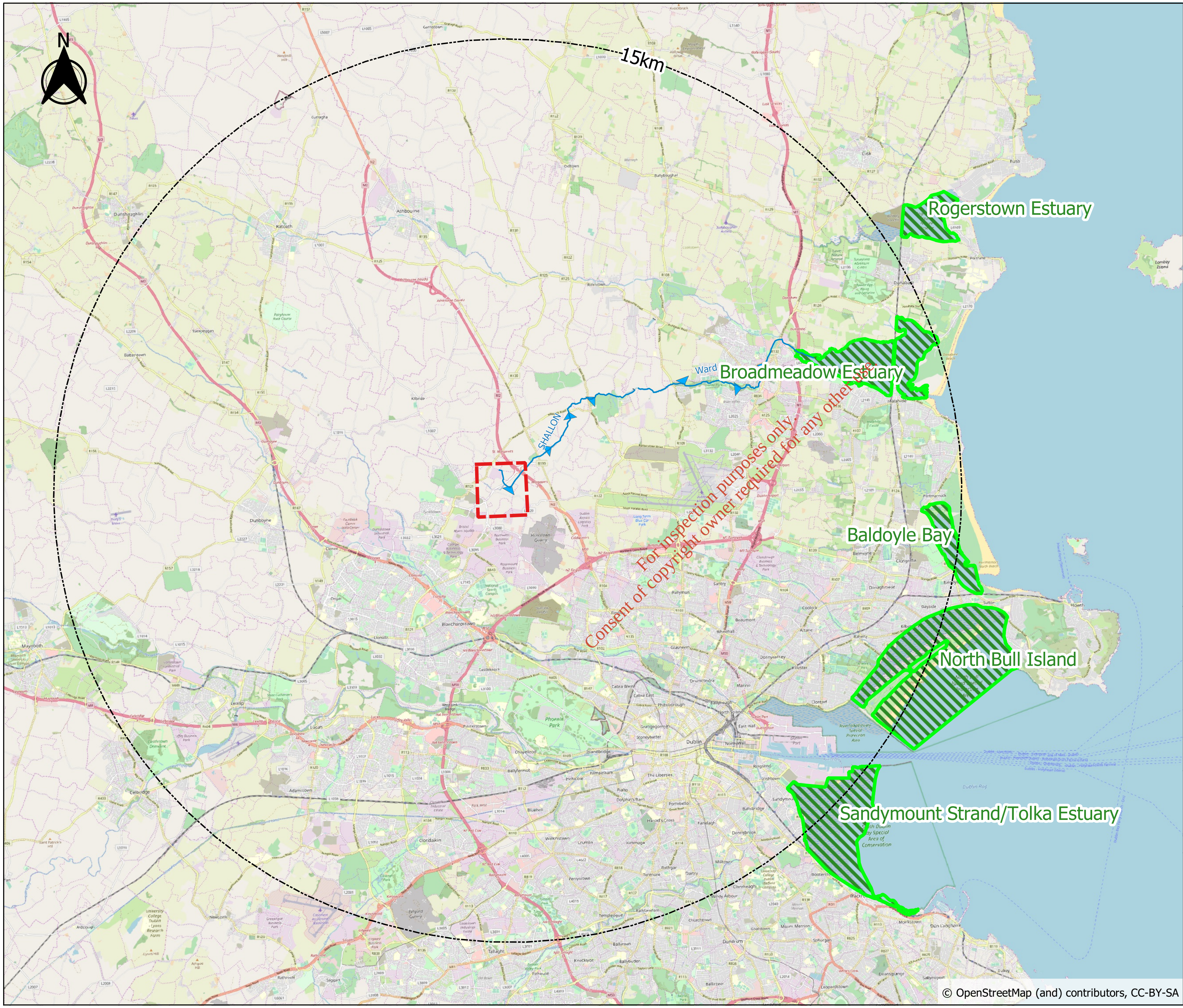
Drawn:	JMM	**Project:** MDR1499	
Checked:	TR	**File Ref:** MDR1499QG1006F01	
Approved:	CMG	**Projection:** IRENET95 / ITM	
Scale:	1:175,000 @ A4		
Date:	14/03/2019		

Notes
1. This drawing is the property of RPS Group Ltd. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
2. Ordnance Survey Ireland Licence No. EN 0005019 © Ordnance Survey Ireland/Government of Ireland

Table 8.5: RAMSAR Sites within the Zone of Influence

Site Name and Code	Site Description	Distance from Proposed Development	Connectivity
Ramsar			
Broadmeadow Estuary 833	Habitats: An estuary cut off from the sea by a large sand spit. The site includes well-developed saltmarshes, salt meadows, rocky shores, a well-developed outer dune ridge and sand mudflats exposed at low tide. Flora: Vegetation consists of a large bed of eelgrass (*Zostera noltii* and *Z. angustifolium*) and extensive mats of green algae (*Enteromorpha* spp. and *Ulva lactuca*). Fauna: The estuary is an important wintering site for numerous species of waterbirds. The Brent goose population is of international importance. The high number of diving birds reflects the lagoon-type nature of the inner estuary. Impacts: Water sports. There is a marina and some housing.	*ca.* 10.5 km	**Yes.** **Potential hydrological connection from the proposed development via the Shallon stream which is a tributary of the Ward river which discharges in Malahide estuary.**
North Bull Island 406	Habitats: A small island built up over 200 years against a harbour wall and the adjoining foreshore of sandy beaches, saltmarshes and mudflats. Unique in Ireland as it supports well-developed saltmarsh and dune systems displaying all stages of development. Flora: The site supports five protected or threatened plant species. Fauna: The site supports nationally important populations of three insect species. The area is important for nesting Little Tern (*Sterna albifrons)* (80 pairs, or about 30% of the Irish population) and for numerous species of wintering waterbirds. Impacts: Bait digging.	*ca.* 13.5km	No. There is no hydrological connectivity between the study area and the North Bull Island as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the National site is mostly located within the influence of the Mayne_SC_010.
Sandymount Strand/Tolka Estuary 832	Habitats: An intertidal system supporting a large bed of eelgrass (*Zostera noltii*) with extensive areas of sandflats. Flora: The site is important for various species of waterbirds, supporting internationally important numbers of Brent Geese and large numbers of roosting gulls and terns. Various species of annelids, bivalves and small gastropods occur.	*ca.* 13.5 km	No. There is no hydrological connectivity between the study area and the Sandymount Strand/Tolka Estuary as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the European site is located at the Dodder_SC_010.

Site Name and Code	Site Description	Distance from Proposed Development	Connectivity
	Impacts: Bait-digging is a regular activity on the sandy flats.		
Baldoyle Bay 413	Habitats: A tidal embayment separated from the sea by a major sand dune system. Vast mudflats are exposed at low tide. Flora: There are extensive beds of *Spartina.* Fauna: The site is internationally important for the wintering Brent geese *Branta bernicla hrota*, and nationally important numbers of various species of waterbirds use the site. Impacts: Bait digging, shooting, and low levels of recreational boating and fishing.	*ca.* 14km	No. There is no hydrological connectivity between the study area and the Baldoyle Bay as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the European site is located at the Mayne_SC_010.



Legend

Study area

Zone of Influence

River waterbodies

RAMSAR sites

Data Source: Ramsar Sites Information Service

Client
GLV Bay Lane Limited

Project Bay Lane Soil Recovery Facility

Title
Figure 8.3: RAMSAR Sites within the Zone of Influence

RPS

RPS Consulting Engineers
West Pier Business Campus
Dun Laoghaire
Co. Dublin
Tel: +353 1 488 2900

Issue Details

Drawn:	JMM	**Project:**	MDR1499
Checked:	TR	**File Ref:**	MDR1499QG1007F01
Approved:	CMG	**Projection:**	IRENET95 / ITM
Scale:	1:175,000 @ A4		
Date:	14/03/2019		

Notes
1. This drawing is the property of RPS Group Ltd. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
2. Ordnance Survey Ireland Licence No. EN 0005019
© Ordnance Survey Ireland/Government of Ireland

8.3.2.3 Nationally Designated Sites

Natural Heritage Areas (NHAs) are sites deemed to be of national ecological importance and are afforded protection under the Wildlife (Amendment) Act 2000. Many NHA boundaries overlap with European sites. The proposed NHAs (pNHAs) have not been statutorily proposed nor designated under the Wildlife Act 1976 (as amended). However, they are afforded some protection under planning legislation and objectives are included in the current Fingal County Council Development Plan 2017-2023.

The Fingal County Development Plan 2017-2023 (Fingal, 2017) sets out policies and complimentary protective measures to develop and improve the ecological, visual, recreational, environmental and amenity value of the County's proposed Natural Heritage Areas and associated habitats. It defines as objectives for NHAs and pNHAs the following:

- **Objective NH16**

  Protect the ecological integrity of proposed Natural Heritage Areas (pNHAs), Natural Heritage Areas (NHAs), Statutory Nature Reserves, Refuges for Fauna, and Habitat Directive Annex I sites.

- **Objective NH17**

  Ensure that development does not have a significant adverse impact on proposed Natural Heritage Areas (pNHAs), Natural Heritage Areas (NHAs), Statutory Nature Reserves, Refuges for Fauna, Habitat Directive Annex I sites and Annex II species contained therein, and on rare and threatened species including those protected by law and their habitats.

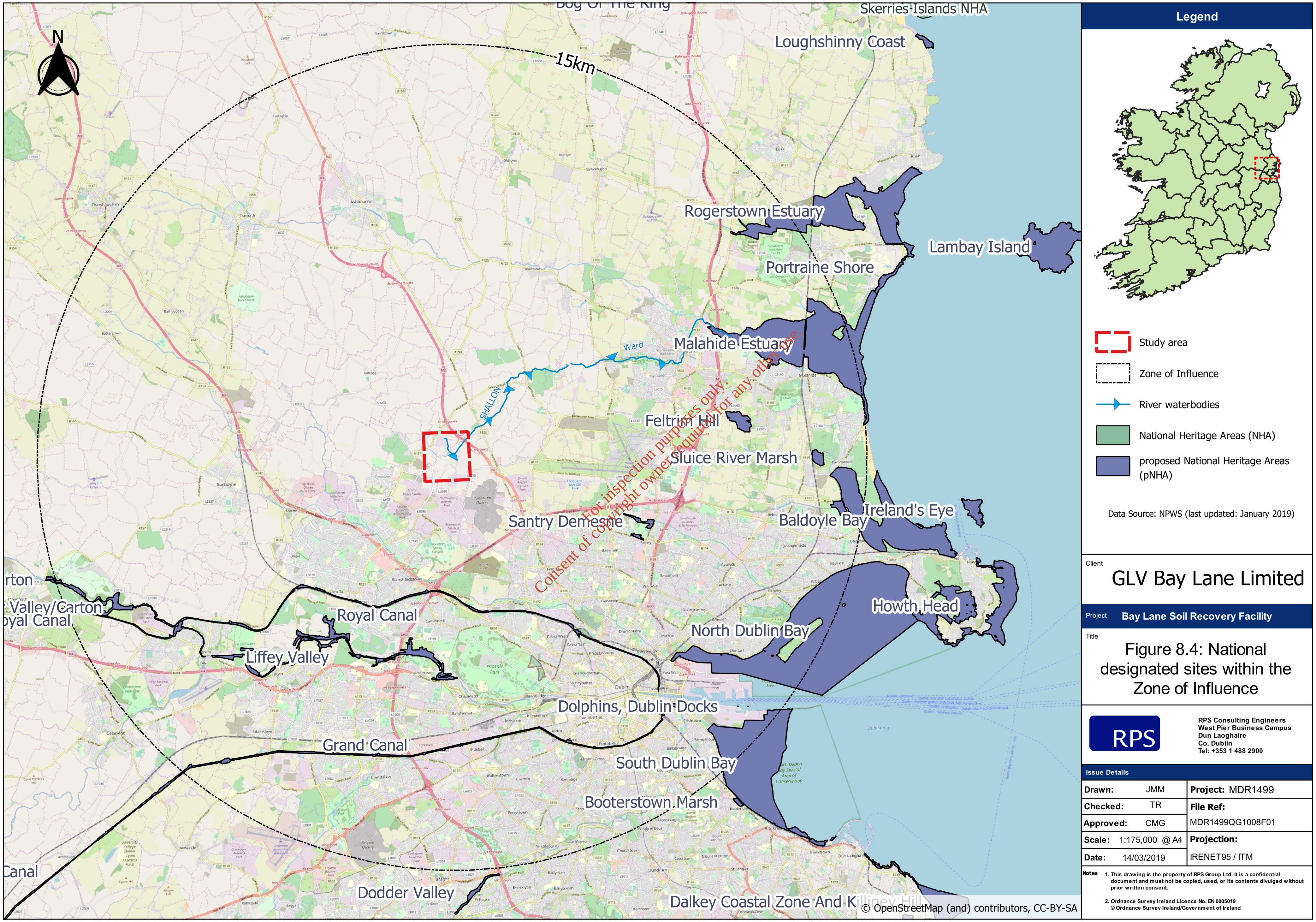
There are thirteen (13) proposed pNHAs and no NHAs located within 15km of the study area. They are listed in **Table 8.6** and illustrated in **Figure 8.4**.

Table 8.6: Nationally Designated Sites within the Zone of Influence

Site Name and Code	Summary Description	Distance from Proposed Development	Pathway
Proposed Natural Heritage Areas (pNHA)			
Baldoyle Bay **pNHA (000199)**	This proposed Natural Heritage Area is included within the confines of Baldoyle Bay SAC.	*ca.* 14 km	No. There is no hydrological connectivity between the study area and the Baldoyle Bay pNHA as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the National site is located at the Mayne_SC_010.
Dolphins, Dublin Docks **pNHA (000201)**	There is a man-made mooring structure located at the Dublin Port where both common Tern (*Sterna hirundo*) and Arctic Tern (*Sterna paradisaea*) breed - the E.S.B. dolphin.	*ca.* 14 km	No. The study area and the Dolphins, Dublin Docks pNHA are located in different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the National site is located at the Dodder_SC_010.
Feltrim Hill **pNHA (001208)**	Knoll-reef dating from the Carboniferous period, containing two rare plant species: Spring Squill (*Scilla verna*) and Long-stalked Crane's-bill (*Geranium columbinum*).	*ca.* 10 km	No. There is no hydrological connectivity between the study area and the Feltrim Hill pNHA as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the National site is located at the Mayne_SC_010.
Grand Canal **pNHA (002104)**	The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.	*ca.* 14.5km	No. The site within the Zone of Influence is not considered to be hydrologically connected to the proposed development.

Site Name and Code	Summary Description	Distance from Proposed Development	Pathway
Liffey Valley **pNHA (000128)**	This site consists of two separate subsites, one of which is 9.7km to the west of the alignment and the other is 5.7km to the west of the alignment. The rare and legally protected hairy St. John's wort (*Hypericum hirsutum*) has been recorded on this site, along with the threatened yellow archangel (*Lamiastrum galeobdolon*). Both are Irish Red Data Book listed species. This site is included in the Liffey Valley Special Amenity Area Order 1990. The diversity of aquatic and terrestrial habitats and the presence of rare and threatened plant species make this site very important.	*ca. 5km*	No. There is no hydrological connectivity between the study area and the Liffey Valley pNHA as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the National site is located at the Liffey_SC_100.
Malahide Estuary **pNHA (000205)**	This Natural Heritage Area is included within the confines of Malahide Estuary SAC.	*ca. 8km*	**Yes.** **Potential hydrological connection from the proposed development via the Shallon stream which is a tributary of the Ward river which discharges in Malahide estuary.**
North Dublin Bay **pNHA (000206)**	This site is located within the SAC and, is considered of international and national importance for the range of bird species and three insect species. The site also contains at least seven species of regionally or nationally important invertebrates.	*ca. 15km*	No. There is no hydrological connectivity between the study area and the North Dublin Bay pNHA as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the National site is mostly located within the influence of the Mayne_SC_010.
Rogerstown Estuary **pNHA (000207)**	This Natural Heritage Area is included within the confines of Rogerstown Estuary SAC.	*ca.* 14.5km	No. There is no hydrological connectivity between the study area and the Rogerstown Estuary pNHA as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the National site is located mostly within the influence of the Palmerstown_SC_010.
Royal Canal **pNHA (002103)**	The ecological value of the canal lies more in the diversity of species it supports along its linear habitats than in the presence of rare species. It crosses through agricultural land and therefore provides a refuge for species threatened by modern farming methods.	*ca. 14.5km*	No. There is no hydrological connectivity between the study area and the Royal Canal pNHA. The study area is located within the Broadmeadow_SC_010 WFD subcatchment while the National site does not intersect it at any stage.

Site Name and Code	Summary Description	Distance from Proposed Development	Pathway
Rye Water Valley/Carton pNHA (001398)	This proposed Natural Heritage Area is included within the confines of Rye Water Valley/Carton SAC	*ca. 14.5km*	No. There is no hydrological connectivity between the study area and the Rye Water Valley/Carton pNHA as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the National site is located at the Liffey_SC_080.
Santry Demesne pNHA (000178)	The site comprises the remnants of a former demesne woodland. The primary importance of this site is that it contains a legally protected plant species, Hairy St. John's wort (*Hypericum hirsutum*) whereas the woodland is of general ecological interest as it is an area where little has survived of the original vegetation.	*ca. 6.5km*	No. There is no hydrological connectivity between the study area and the Santry Demesne pNHA as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the National site is located at the Mayne_SC_010.
Sluice River Marsh pNHA (001763)	Relatively intact freshwater marsh which is considered rare in County Dublin. The site which is bounded by the railway embankment and Malahide golf course is characterised by a mosaic of marsh, wet grassland, wet woodland and scrub.	*ca. 13 km*	No. There is no hydrological connectivity between the study area and the Sluice River Marsh pNHA as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the National site is located at the Mayne_SC_010.
South Dublin Bay pNHA (000210)	This Natural Heritage Area is included within the confines of South Dublin Bay SAC.	*ca.* 13.5 km	No. There is no hydrological connectivity between the study area and the South Dublin Bay pNHA as they are located at different subcatchments - the study area is located within the Broadmeadow_SC_010 WFD subcatchment while the European site is located at the Dodder_SC_010.



N
15km
Bog Of The Ring
Skerries Islands NHA
Loughshinny Coast
Rogerstown Estuary
Lambay Island
Portraine Shore
Malahide Estuary
Ward
SHALLON
Feltrim Hill
Sluice River Marsh
Santry Demesne
Baldoyle Bay
Ireland's Eye
Howth Head
North Dublin Bay
Royal Canal
Liffey Valley
Dolphins, Dublin Docks
Grand Canal
South Dublin Bay
Booterstown Marsh
Dodder Valley
Dalkey Coastal Zone And Killiney Hill
Canal
For inspection purposes only.
Consent of copyright owner required for any other use.
© OpenStreetMap (and) contributors, CC-BY-SA
Legend
Study area
Zone of Influence
River waterbodies
National Heritage Areas (NHA)
proposed National Heritage Areas (pNHA)
Data Source: NPWS (last updated: January 2019)
Client
GLV Bay Lane Limited
Project
Bay Lane Soil Recovery Facility
Title
Figure 8.4: National designated sites within the Zone of Influence
RPS
RPS Consulting Engineers
West Pier Business Campus
Dun Laoghaire
Co. Dublin
Tel: +353 1 488 2900
Issue Details
Drawn: JMM
Project: MDR1499
Checked: TR
File Ref:
Approved: CMG
MDR1499QG1008F01
Scale: 1:175,000 @ A4
Projection:
Date: 14/03/2019
IRENET95 / ITM
Notes
1. This drawing is the property of RPS Group Ltd. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
2. Ordnance Survey Ireland Licence No. EN 0005019
© Ordnance Survey Ireland/Government of Ireland

8.3.2.4 Records of Protected and Invasive Species

The proposed restoration site lies within the O04W and O14B Ordnance Survey 2x2km Grid Squares. Records of rare and protected faunal species and Invasive Alien Plant Species (IAPS) from these grid squares were obtained from the National Biodiversity Data Centre (NBDC) online database[30] (**Table 8.7**) and the National Parks and Wildlife Service database (NPWS) (**Table 8.8**)[31].

Table 8.7: NBDC Database records of Protected and Invasive species for 2km grid squares O 04W & O 14B

Common Name	Scientific Name	Location/ Grid Square Ref	Number of Records	Date of Last Record	Designation
Birds					
Barn Swallow	*Hirundo rustica*	O14B	2	21/12/2011	Wildlife Acts, BoCCI Amber List
Common Bullfinch	*Pyrrhula pyrhula*	O14B	2	31/12/2011	Wildlife Acts, BoCCI Amber List
Common Linnet	*Cardelius cannabina*	O14B	1	31/12/2011	Wildlife Acts, BoCCI Amber List
Common Pheasant	*Phasianus colchicus*	O14B	1	31/12/2011	Wildlife Acts, BoCCI Amber List Annex II Section 1 Annex III Section 1
Common Starling	*Sturnus vulgaris*	O14B	3	31/12/2011	Wildlife Acts, BoCCI Amber List
Common Swift	*Apus apus*	O14B	2	31/12/2011	Wildlife Acts, BoCCI Amber List
Common Wood Pigeon	*Columba palumbus*	O 04W & O14B	1,3	31/12/2011	Wildlife Acts, Annex II Section 1 & Annex III Section 1
House Martin	*Delichon urbicum*	O14B	2	31/12/2011	Wildlife Acts, BoCCI Amber List
House Sparrow	*Passer domesticus*	O14B	3	31/12/2011	Wildlife Acts, BoCCI Amber List
Northern Lapwing	*Vanellus vanellus*	O 04W & O14B	1,1	31/12/2011	Wildlife Acts, BoCCI Red List Annex II Section II
Rock Pigeon	*Columba livia*	O14B	3	31/12/2011	Wildlife Acts, Annex II Section II
Stock Pigeon	*Columba oenas*	O14B	1	31/07/1991	Wildlife Acts, BoCCI Amber List
Yellowhammer	*Emberizia citrinella*	O 04W & O14B	1,1	31/07/1991	Wildlife Acts, BoCCI Red List
Invasive Species					
Eastern Grey Squirrel	*Sciurus carolinensis*	O 04W	1	31/12/2012	High Impact Invasive Species EU regulation No. 1143/2014 SI 477
Mammals					
Irish Stoat	*Mustela ermine* subsp. *hibernica)*	O 04W	1	22/06/2015	Wildlife Acts

[30] www.biodiversityireland.ie accessed January 2019
[31] www.npws.ie accessed January 2019

* BoCCI=Birds of Conservation Concern Ireland (2014-2019)

The NBDC database did not return any records in the searched area for EU protected faunal species and scheduled Invasive Plant species.

Table 8.8: List of Protected (Flora Protection Order) species from NPWS

Common Name	*Scientific name*	Location	Date of Record	Grid Reference
Hairy Violet	*Viola hirta*	Santry Demense	1997	O 163406
Red Hemp Nettle	*Galeopsis angustifolia*	Feltrim	1836	O 1040
Meadow Barley	*Hordeum secalinum*	Brackenstown 2	1903	O 1040
Meadow Barley	*Hordeum secalinum*	Brackenstown 1	1904	O 1646
Meadow Barley	*Hordeum secalinum*	Saucerstown	1898	O 1549
Meadow Barley	*Hordeum secalinum*	Saucerstown	1955	O 1549
Hairy St Johns Wort	*Hypericum hirsutum*	Santry Court	1833	O1640
Hairy St Johns Wort	*Hypericum hirsutum*	Santry Court	1991	O 1640

8.3.2.5 Other data

There are no documented records of roadkill in proximity of the study area returned from a search of the Biology Ireland roadkill database[32].

8.3.3 Field Survey Results

8.3.3.1 Habitats

The areas subjected to the ecological survey comprised the quarry and surrounding fields (**Figure 8.1**). The habitat survey was primarily conducted in early October 2018 although this was supplemented on in spring 2019 to help overcome seasonal bias. The habitats were identified were mapped according to Fossitt (2000) classification (**Appendix 8.D,** Volume III of EIAR).

[32] www.biology.ie/mapv.php?m=npws

The site is typically comprised of habitats of low ecological value and nature conservation value. None of the habitats corresponds to EU Annex I habitats. This corresponds to an ecological survey undertaken in 2011 for the Cherryhound LAP[33]. The following habitats were recorded:

- Depositing/lowland rivers (FW2);
- Drainage Ditches (FW4);
- Other artificial lakes and ponds (FL8);
- Buildings and artificial surfaces (BL3);
- Spoil and bare ground (ED2);
- Recolonising bare ground (ED3);
- Exposed calcareous rock (ER2);
- Wet grassland (GS4);
- Dry Calcareous and Neutral grassland GS1;
- Reed and large-scale sedge swamps (FS1);
- Calcareous springs (FP1);
- Hedgerow (WL1);
- Treelines (WL2) and
- Scrub (WS1).

DISTURBED or MANMADE GROUND

The abandoned quarry accounts for a considerable part of the site and the anthropogenic nature of the site is obvious. Notwithstanding this fact there is little built infrastructure comprising concrete or other man-made structures. Thus, the **Buildings and artificial surfaces (BL3)** is represented by the quarry entrance, along with the retained weighbridge and settlement tank. Vegetation cover is scarce or non-existent.

Spoil and Bare Ground (**ED2**) habitat is characterised by level ground in the quarry void with some compacted stockpiles of mixed size limestone rich-stone and other fine materials with occasional colonisation of species, typically pioneer species but also algae. There is little development of vegetation on the exposed rock faces, although seepage from rock faces can result in localised nutrient enrichment on the ground and locally abundant moss and herbaceous species.

Despite the quarry being largely abandoned for eight years, surprisingly little vegetation has become re-established within the quarry or atop the bulk of the stored overburden. Given the nature of compacted sediment on the quarry floor, there is limited scope for recolonising vegetation except around the periphery, or in drier areas which are prone to winter flooding. However, **Recolonising Bare Ground (ED3)** is locally abundant in disturbed areas, particularly on the overburden. The overburden comprises both topsoil and sub soil from above the quarry void, there appears to be little evidence of organic matter that is typical of such soils. Certainly, the established flora is characteristic of compacted soil. This is reflected in the relative paucity of plants that are commonly encountered atop the main area of overburden.

Grasses, scrub and occasional swathes of monodominant herbs such as the self-seeding Teasel (*Dipsacus* spp.) were noted. Commonly encountered species included Yorkshire fog (*Holcus lanatus*) Rosebay WillowHerb (*Chamerion angustifolium*), White Clover (*Trifolium repens*), Cocksfoot (*Dactylis glomerata*) and Colts-foot (*Tussilago farfara*), whilst on drier area False oat Grass (*Arrhenatherum*

[33] Goodwillie, R (2011) *Ecology report for Cherryhound LAP*. Report prepared for MacCabe Durney Barnes.

elatius) was noted. Another species of interest is Yellow Wort (*Blackstonia perfoliata*) which was locally scattered across overburden.

The transition to scrub or patches of wet grasslands was noted in some areas, but rarely was it extensive at this site.

Occasionally patches of Nettles (*Urtica dioica*) were noted, but often in areas where recent disturbance had occurred. Most scrub was located in peripheral locations associated with hedgelines, whilst elements of wet grassland were often found associated ephemeral accumulations of standing water.

The quarry face is characterised by **Exposed calcareous rock (ER2)**, which includes the unstable cliff faces, which are at most 15 metres but typically no more the 8-10 metres. They are for the most part devoid of vegetation except where small accumulations of soil, have gathered allowing small herb and grasses to become established. Despite the nature of the quarry and variable orientation of the exposed geological layers, the ledges are typically shallow, and do not show much evidence of nesting by birds.

GRASSLANDS

The site has been extensively remodelled with the result that there is little development or establishment of extensive grassland sward, even on the spoil overburden, which was is characterised by revegetating bare ground despite almost ten years of inactivity at the site.

The peripheral berms support elements of grassland habitats in mosaic with scrub, woodland and revegetating bare ground. The grassland mosaic is characterised in places by species typical of drier, albeit unmanaged swards, which are best characterised by **Dry calcareous and Neutral grasslands (GS1)**. Although the quarry lithologies is calcareous in nature, much of the grassland sward is on disturbed ground – often berms and embankments. Elsewhere where standing water may accumulate in the wetter periods or even in local patches among drier sward, particularly where soils/overburden is compacted or where drainage is impeded elements of **Wet Grasslands (GS4)** are noted.

Unlike managed grasslands, the grassland mosaic at Bay lane is characterised by an intricate mosaic. The rank sward is characterised by a number of typical species including Scutch grass (*Elytrigia repens*), Bent grass (*Agrostis* spp.), Field Poa grass (*Poa trivialis*), Cocksfoot (*Dactylis glomeratus*), Yorkshire fog (*Holcus lanatus*) with some wiry Fescue (*Festuca* spp.). As might be expected from the disturbed site, there is limited development of Perennial ryegrass (*Lolium perenne*). Common herbaceous species include: Clovers (*Trifolium* spp.), Buttercups (*Ranunculus repens* and *R. acris*), Daisy (*Bellis perennis*), Plantain (*Plantago lanceolata*) and Meadow vetchling (*Lathyrus pratensis*).

In wetter situations species such as Creeping Bent (*Agrostis stolonifera*), Cinquefoil (*Potentilla reptans*), Cuckoo flower (*Cardamine pratensis*), Celandine (*Ficaria verna*) and sedges (*Carex* spp. including *C. flacca*) were noted. Large areas of wet grassland were not noted and their vegetation was limited in extent and vegetative cover, particularly on overburden. Elsewhere the species composition is almost dominated by Sharp-Flowered rush (Juncus *acutiflorus*) such as at newt survey feature 2.

Strictly speaking, there is no **Reed and large sedge swamps FS1** on the site, by virtue of the extent and nature of the habitat. However, a small patch of vegetation assignable to the habitat, but atypical of natural conditions was noted alongside the man-made sump pond (newt survey feature 1). The iron-rich waters that slowly seeps from the small sump pond flow through waterlogged ground, that is approximately the same size as the adjacent water feature. The vegetation is characterised by Bulrush (*Typha latifolia*), Horsetail (*Equisetum* spp.) and some Water forget-me-not (*Myosotis scorpioides*). The water flows downslope along the access track where the ground is characterised by calcareous precipitate coating the ground (See **Calcareous Springs FP1**).

WOODED VEGETATION

With the exception of the main site entrance and some landscaped planting around the derelict house at the South western corner of the site, much of the Bay lane site is bordered **by hedgerows (WL1)** with locally abundant development of linear assemblages of mature trees some of which form **Treelines (WL2),** as well as **Scrub (WS1).**

The height of the hedgerow ranges between 2 metres and 3.5 metres, although the trees range from sub-canopy heights of up to 4.5 metres, and up to approximately 12-14 metres in the case of the mature Beech in the South-Eastern corner of the site.

Structurally the hedges are poorly maintained and in accessible areas such as along Bay lane road, have been cut and also subject to considerable fly tipping. The vegetation surrounding the stored overburden has by virtue of a lack of interference matured. Floristically however, the hedges are species poor, characterised by relatively small number of commonly occurring species.

There is no woodland habitat at the site, although canopy forming trees include Ash *(Fraxinus excelsior*), Beech (*Fagus sylvatica*) along with occasional Sycamore (*Acer pseudoplatanus*) are common in the hedgerow, particularly along the eastern perimeter of the site.

The hedgeline understorey vegetation is characterised by a somewhat greater diversity, but nonetheless the hedges are poorly maintained and overgrown which does not encourage diversity of flora. Hawthorn (*Crataegus monogyna*), Ivy (*Hedera helix*) and Brambles (*Rubus fruticosus* agg.) along with some limited Blackthorn (*Prunus spoinosa)* are present*.* Herbaceous species are few or locally abundant in the hedges and the ground layer is primarily characterised by whatever is located nearby rather than woodland remnants that might be expected*.* However, Cow parsley (*Anthriscus sylvestris*), Primrose (*Primula vulgaris*), Herb Robert (*Geranium robertianum*) were noted, often in grassier situations along the outside of hedgeline along Bay Lane Road.

The only true examples of treelines (WL2) are to be found in the South-western corner of the site along the boundary planting separating the derelict residential house (outside the planning area) from the quarry. The key species here are coniferous with Leylandii dominating.

The development of **Scrub (WS1)** is noticeable around the site, often intermingled with hedgelines or as “saum” vegetation extending into open land. This however is not common in the site. In the main scrub is dominated by Brambles (*Rubus fruticosus* agg.), although some small patches of intermingled Butterfly-bush (*Buddleia davidii*) and Brambles (*Rubus fruticosus* agg.).

WATERFEATURES

The Shallon river drains the northern boundary of the study area. The study area is located near the source of this waterbody for it is of a low stream order at this location. Despite the Shallon stream at its upper end, it cannot be characterised as an eroding or upland river (FW1). Rather it is described as a **Depositing /lowland River (FW2)** by virtue of its physical dimensions and topographical slope. The river bed grain size shows evidence that the surveyed reach is a zone of accumulation rather than erosion, with high percentages of silt and sand.

It is also a watercourse which has been heavily modified in the recent past, particularly with infrastructural developments of the local road network and large commercial/logistics premises to the north of the study area. This is reflected not only on the channel width but also on the water it carries – the channel is either dry for much of its length along the periphery of the Study area (summer months) or holding almost stagnant pools.

Further visits in winter months noted shallow water along much of the length of the watercourse as far upstream as the point where it is culverted under the road. There was little or no instream vegetation present, and the river is heavily overshadowed by hedge, trees and scrub. Species typical of streams were occasionally noted elsewhere on site where standing water gathers – atop the main area of stored overburden. These areas are quite ephemeral however.

A characteristic of the muddy river bed was the considerable accumulation of debris which had been fly tipped into the river near the road. This had not changed on further visits. Indeed, although the landscape has changed since the Quarry EIS surveys (2000), dumping was a feature of the watercourse also.

While some limited macroinvertebrate life was noted, the quality and volume of water was such that the river does not have much potential to support much aquatic organisms.

The site is currently bounded by two **ditches (FW4),** one on the South-eastern boundary which flows into the second ditch dividing the study area from agricultural fields, although an earlier EIS (2000) noted that the agricultural lands had another canalised ditch crossing it.

Both of the current ditches contain some water but with little obvious flow. The substrate is muddy and is heavily overshadowed by hedges and treelines except for a small number of gaps. In terms of floristics, there was little instream vegetation, although occasional clumps of Fools watercress (*Apium nodiflorum*), Willowherbs (*Epilobium* spp.) and Rushes (Juncus acuitflorus and *J. effusus*) as well as overlapping species from adjacent habitats that might extent towards the drainage ditch.

The historical licenced discharge from the site are evident from the muddy substrates that line the ditches along its upper extent. Like the watercourse into the ditch finally flows, there was limited evidence of potential so support aquatic macroinvertebrate.

Calcareous springs (FP1) are not an abundant feature of the landscape within the site, although a number of seepage zones were noted in discrete locations around the site, typically associated with gaps in the exposed rock face or occasionally out of overburden. No artesian springs were noted from the site, although the EIS prepared for the original quarry application (2000) noted the presence of a small spring in the centre of the site which fed a canalised stream (presumably the Shallon stream) to the north of the site. The original spring fed into a small shallow pond, which was considered to have been created through cut-off of the natural above ground flow line coupled with compaction of horses enabling a localised build-up of water characterised by a "brown diatomaceous slime". Given the considerable change in the landscape since the 2000 Quarry EIS, the spring may correspond to the area in the centre of the site where a small man-made pond collects water before is drains down slope . This is the principle potential newt pond at the site (**Appendix 8.D,** Volume III of this EIAR), although a second area of pockmarked ground atop the spoil heap is also being subject to licenced survey.

Although often small or discrete in distribution, a key characteristic of springs is the presence of brown mosses, and it may or may not be peat forming conditions. There is no evidence of peat formation at this site and the development of moss is locally abundant. Some of these areas are characterised by the presence of low moss carpet, often monodominant, but along seepage zones, there is often no moss development on the rock face, nor where the water reaches the quarry void. The species identified do not correspond to the suite of species both mosses and herbaceous species that characterise petrifying springs as described in the recent Irish publication (Lyons 2016). The species that describe the priority Annex I habitat: petrifying springs with tufa formation (Cratoneurion) [7220] are typically dominated by mosses with species such as *Cratoneuron* spp. and *Bryum* spp. being ever present. This is a habitat of limited distribution throughout the country and is reliant on specific edaphic conditions to support it. The vegetation at Bay lane shares some affinities, it does not however correspond to the Annex I habitat by virtue of the character species outlined in the EU Interpretation manual[34] and the more recent Irish publication on the ecology of the rare habitat[35].

Standing water is a feature of the quarry and it is classified as **Other Artificial Lakes and Ponds (FL8).** There was considerable fluctuation in its extent between October visits and December 2018/Spring 2019 where the entirety of the quarry void flooded to a depth in excess of 1 metre.

A constant in relation to this habitat is a reinforced sump in the north eastern corner of the quarry from where accumulating water was previously pumped to a concrete settlement tank before discharge under Local Authority licence to an adjacent field ditch. The water in the sump is deep and over time some debris has accumulated. There is little development of vegetation in the water although some pondweed was observed beneath the water. Elsewhere within the quarry void, it is clear that the influence of water on the character of the quarry floor. There is no development of organic soils on the quarry floor, and little development of vegetative cover. Key species include minor Butterfly bush (*Buddliea davidii*), Silverweed (*Potentilla anserina*) and some mosses.

Ecological surveys carried out in the winter months noted that there had been considerable expansion in the extent of water, so much so that the entire quarry void was underwater, with only the taller remnant spoil heaps obvious. The volume of water was such that its depth quickly surpassed 1m deep from the access ramps.

8.3.3.2 Protected and Notable Flora

No rare or protected plant species are noted from the NBDC grid square O 04W and O 014B.

The NPWS dataset contains the following records for the 10K Gird square 014. None of these species listed in **Table 8.8** were noted from the site. Although not identified from the website, attention was

[34] European Commission (2013). *Interpretation manual of European habitats EUR 28*.
[35] Lyons, M.D. (2015). *The flora and conservation status of petrifying springs in Ireland*. Ph.D. Thesis, TCD, Dublin.

also paid to Red Hemp nettle (*Galeopsis angustifolia),* a species that is known to occur on exposed sand and gravel deposits.

None of the rare or protected species of flora were recorded from within the application area.

8.3.3.3 Aquatic Environment

Both banks of the Shallon stream and the sites peripheral ditches that drain in to the stream are overgrown with rank hedge and scrub with little development of aquatic vegetation. Couple with the modified nature of the watercourse with its muddy substrate and the level of fly tipping, the conditions are less than favourable at this point to support aquatic ecology.

For this reason, an aquatic survey was not undertaken. However, downstream the Ward River is known to support Brown trout and conditions are favourable to support nursery, whilst evidence of otter activity has been noted on few occasions along several parts of the Ward river (pers. observation).

8.3.3.4 Invasive Alien Plant Species (IAPS)

None of the species listed in the EU Regulation 1143/2014 of *Species of Union Concern*, European Communities (Birds and Natural Habitats) Regulations 2011 e.g. Japanese knotweed (*Fallopia japonica*), Himalayan balsam (*Impatiens glandulifera*) etc., and in the list of *High Risk recorded species* from the Invasive Species in Ireland prioritization risk assessment (Kelly, O'Flynn & Maguire, 2013) was identified during the October site visit. However, two *Medium Impact Species* were observed around the study area – Butterfly bush (*Buddleia davidii*) and Sycamore (*Acer pseudoplatanus*). The butterfly bush, which is a fast coloniser of derelict ground, was rarely extensive. Sycamore was occasional and typically confined to perimeter vegetation.

The preliminary survey was at the tail end of the botanical season, and it is likely that annual species could have been overlooked. However, this was compensated for through further survey in spring 2019.

8.3.3.5 Protected Fauna

Badger (Meles meles)

Badgers are legally protected under the Wildlife Act 1976 (as amended). The NBDC database indicates the presence of badger within the study area, which extended to some fields outside the proposed planning boundary. There was evidence of Badger activity around the periphery of the quarry, particularly along the southern boundary and Northern boundary, as well as evidence of commuting alongside the overburden at the eastern part of the site. The bulk of the evidence comprised individual droppings rather than well-defined latrines. One potential large latrine, on closer inspection turned out to organic compound seeping from an overturned barrel at the side of the shed.

The droppings were scattered across most of the original ground level and peripheral parts of the site, although none were noted from the quarry floor. Prints were occasionally found but rarely extending in well-defined or continuous trails. The best examples of continuous trails (**Appendix 8.E**, Volume III of this EIAR - Mammal trails) were observed in privately-owned agricultural land to the south of the site, and also fields between the quarry and remodelled road. There is overlap in trails identified on site, and only characteristic and faithful badger trails are shown.

The preliminary survey identified one area with a number of badger-sized holes, with trails leading to them. However, they did not for the most part appear to be active in early October as evidence by infilling leaf debris and a lack of fresh digging. From the preliminary evidence they did not appear to be main setts and repeat visits confirmed rabbit usage. These are not further discussed.

A second, now abandoned sett was noted nearby under Elder (*Sambucus nigra*) (**Appendix 8.E**, Volume III of this EIAR – note BS2). This area which is in close proximity to the new road showed evidence of historical persecution in the form of openings having been dug by spade. Some of the tunnels are now exposed and the area appeared to be occupied by rabbits. The site was revisited in December 2018 and January 2019 and the originally identified holes outside the site were either infilled with vegetation or were occupied by rabbits as evidenced by the droppings.

The December site visit identified a recently dug badger sett (**Appendix 8.E**, Volume III of this EIAR - note BS1) (as evidenced by the freshly excavated spoil) on the periphery of the site alongside the Shallon stream, which had shallow water by December 2019, unlike the October visit when it was dry. A large area of spoil, overlain by bedding material, was present at a bifurcating tunnel. A well-worn badger trail had previously been noted with some potential prints on the dry river bed leading to agricultural fields. latrine was also noted December 2018 and was in regular use in March 2019. The location of latrines near setts is atypical of badger, as they are considered to maintain clean sett.

Otter (Lutra lutra)

Otters are protected under the Wildlife Act 1976 (as amended) and are listed on Annex II and Annex IV of the EU Habitats Directive.

Evidence of Otter was not forthcoming during the survey and no holts were identified. Accessible sections of the drainage ditch along the southern and eastern perimeter and the Shallon River were walked and although small holes in bankface or gaps under overhanging trees was noted, they were typically small in nature and likely suitable to small rodents. The nature and quality of water features around the periphery of the site was such that aquatic resources were poor making the area less than ideal for otter occupancy.

The quarry floor had areas of shallow standing water (other than the sump in the north eastern corner of the site) in October 2018. There is little obvious flow in the water other than seepage/drainage from rock faces. The quarry floor was completely inundated by December 2018 with no bare ground in the quarry void other than the tops of some remnant spoil heaps.

During the vantage point surveys for birds, holes in the rock face above the waterline were visually examined by binoculars but there was no evidence of otter activity in the deeper water, nor from the holes. The artificial nature of these habitats in the quarry void, coupled with the relative lack of permanent water to support aquatic organism that otter might prey upon in the Shallon stream and associated drainage ditches suggests that otter are not residing in the study area.

Hedgehog (Erinaceus europaeus)

Hedgehog are protected under the Wildlife Act 1976 (as amended). There is potential for hedgehog to occur within the study area particularly within the wooded areas along the southern perimeter. And while none were observed, a single small dropping, approximately 4.5cm long was recorded on concrete hardstanding outside a derelict shed which was attributed to Hedgehog. Its location is indicated in **Appendix 8.E –** Volume III of this EIAR – note H1.

Bats

Bat resting and breeding places are wholly protected by the Wildlife Act 1976 (as amended). Furthermore, they are listed as Annex IV species under the Habitats Directive, while the Lesser Horseshoe bat (*Rhinolopus hipposideros*) is also an Annex II species requiring strict protection.

The site has potential to support bats, both in terms of exposed rock faces with gaps, as well as mature perimeter vegetation which includes ivy-rich mature trees and tress with tears and other features that could accommodate bat roosting. There are also some derelict structures - boarded up residential property and maintenance shed at the South western part of the site off Bay lane road.

A bat activity survey was commissioned by the client in August 2018. It was undertaken by Brian Keeley and the survey findings are included in **Appendix 8.B** (Volume III of this EIAR). In summary, the key findings of the survey confirmed that a number of bat species were feeding within the quarry, namely: Common pipistrelle (*Pipistrellus pipistrellus*), Soprano pipistrelle (*Pipistrellus pygmaeus)* and Leisler's bat (*Nyctalus leisleri*). These same species and one other, the woodland specialist Brown longed-eared bat (*Plecotus auritus*) were recorded feeding around the derelict bungalow and metal barn.

The bulk of the activity recorded in August 2018 was associated with the Northern boundary of the site (**Appendix 8.B –** Volume III of this EIAR - Figure 1) and corresponds to areas with significant tree cover providing connectivity to the quarry. Despite the grouping of records in this area, the bat activity report concluded that, based on the duration of records, no bats were roosting within the site, either in quarry rock faces, perimeter trees or the derelict structures. Bats were commuting to site to forage.

Other Mammals

The only mammal that was visually observed was Fox (*Vulpes vulpes*). A single fox was rousted from cover along the quarry berm leading towards the derelict house. Asides from this single encounter, evidence of fox activity included a large number of well-defined trails in undergrowth, along droppings, some bird kill and plentiful prints including one area where a large concentration of prints on the quarry floor. No dens were or suitably sized holes in hedges were noted.

There was considerable localised evidence of Rabbit (*Oryctolagus cuniculus*) throughout the site, although not a single rabbit was observed. There was an abundance of rabbit droppings in a number of areas, typically atop and around the spoil overburden and around the sheds. Most holes/burrows that were checked in hedgerows/scrub were sized for rabbit rather than badger or fox. The concentration of droppings testament to this fact.

Mink or American Mink (*Mustela vison*) are related to Otter, Stoat and Pine marten. They are highly adaptive and have been recorded from most habitats in Ireland. They do require slow-moving fresh water body. The drainage ditch and remaining wet part of the Upper Shallon river have shallow stagnant water. Within the Quarry itself, there is a relatively large deep pond (in excess of 1 metre) and for which a number of cracks in the rock face were noted. Of the prints checked in the quarry floor, none conformed to typical Mink dimension (4 obvious toes in star shaped pattern approximately 4cm long). However, a single distinctive, unpleasant slimy faecal deposit containing rabbit fur was noted on an access track in close proximity to the ESB pylon. It may have been associated with mink but this was not confirmed owing to a lack of other evidence. There was overlapping evidence of Fox, Badger, Rabbit and Dog along a corridor that led towards the maintenance shed.

Rodents typically comprised Rat (*Rattus* spp.), characterised by distinctive claw prints, although it is probable that other small mobile mammals such as fieldmice (*Apodemus sylvaticus*) and pygmy shrew (*Sorex minutus*) might also be encountered.

There was evidence of one final domesticated mammal, in the form of large dog prints. It is not clear if the prints were those of security dog. Although none of them were recorded from the area associated with the main access gate, having been noted towards the quarry ramp leading uphill to the overburden area.

8.3.3.6 Avifauna

It is important to note the potential for a large number of bird species to use the study area as breeding or feeding habitat, as highlighted in the National Biodiversity Data Centre online records for the area. A total of nineteen bird species were recorded during the summer 2018 breeding bird survey (**Appendix 8.B** – Volume III of this EIAR). The data from the survey have been supplemented by ad hoc records recorded during follow on site visits and are detailed in **Table 8.9**.

The earlier survey did not identify the presence of Peregrine falcon (*Falco peregrinus*) or Raven (*Corvus corax*), however, as these species could be expected in suitable quarries along the eastern seaboard[36] and which is known from the adjacent Huntstown quarry 2km south of Bay Lane.

Whilst the site was visited by a range of common or widespread bird species, typically associated with urban habitats, the Bay Lane quarry presents limited opportunities for breeding birds, unlike the the larger Huntstown quarry which has greater biodiversity opportunity through the range and extent of habitats present.

Table 8.9: Bird Species identified during surveys

Common Name	Scientific name	Location	Breeding Bird Survey (Summer 2018)	Incidental Records (All other surveys)	Conservation status
Blackbird	*Turdus merula*	Hedgerows & Barn	Yes	Yes	Green-Listed
Blue Tit	*Parus caeruleus*	Hedgerows at site entrance	Yes	Yes	Green-Listed

[36] IRSG (2017). *Annual review.* Available at: http://irsg.ie/IRSGAR2017.pdf

Common Name	Scientific name	Location	Breeding Bird Survey (Summer 2018)	Incidental Records (All other surveys)	Conservation status
Bullfinch	*Pyrrhula pyrrhula*	Hedgerows	Yes	Yes	Green-Listed
Buzzard	*Buteo buteo*	Overflying	Yes	Yes	Green-Listed
Great Tit	*Parus major*	Hedgerows at site entrance	Yes		Green-Listed
Herring Gull	*Larus argentatus*	Overflying site	Yes	Yes	Red-listed
Hooded Crow	*Corvus cornix*		Yes	Yes	Green-Listed
House Sparrow	*Passer domesticus*		Yes	No	Green-Listed
Jackdaw	*Corvus monedula*	Perching on overhead cables	Yes	Yes	Green-Listed
Lesser Black-backed Gull (Unconfirmed)	*Larus fuscus*	Overflying	Yes		Amber Listed
Magpie	*Pica pica*	Overflying.	Yes	Yes	Green-Listed
Peregrine Falcon	*Falco peregrinus*	Overflying, young on cliff		Yes	Green-Listed
Pheasant	*Phasianus colchicus*	Adjacent fields	Yes	Yes	Green-Listed
Pied Wagtail	*Motacilla alba*	Quarry	Yes	No	Green-Listed
Raven	*Corvus corax*	Overflying. No evidence on cliff face	Yes	Yes	Green-Listed
Robin	*Eritacus rubecula*	Hedgerows	Yes	Yes	Amber listed
Rook	*Corvus frugilegus*	Overflying.	Yes	Yes	Green-Listed
Songthrush	*Turdus philomelos*	Vocalising	Yes	Yes	Green-Listed
Sparrowhawk	*Accipter nisus*	Flying across overburden at eastern end of site		Yes	Amber Listed
Stock Dove	*Columba oenas*	Quarry, Cliff face	Yes		Amber Listed

Common Name	Scientific name	Location	Breeding Bird Survey (Summer 2018)	Incidental Records (All other surveys)	Conservation status
Swallow	*Hirundo rustica*	Quarry	Yes		Green-Listed
Woodpigeon	*Columba palumbus*	Quarry, Cliff face	Yes	Yes	Green-Listed
Wren	*Troglodyes troglodytes*	Hedgerows	Yes	Yes	Green-Listed
Yellowhammer	*Emberizia citrinella*	Hedgerows	Yes	Yes	Red-listed

*BoCCI= Birds of Conservation Concern in Ireland; CMS= Convention on the Conservation of Migratory Species of Wild Animals

In terms of most bird species, they comprised three groupings:

- larger birds flying around or overflying the site;
- Passerines associated with the site perimeter vegetation; and
- Birds landing on the quarry void dry or flooded.

The most common large birds were Buzzard (*Buteo buteo*), for which a pair are thought to be breeding in close proximity to the site, between the motorway and eastern site boundary. Other larger birds were Peregrines, Ravens and a Sparrowhawk (*Accipter nisus*) and a Pheasant (*Phasianus colchicus*). Both raven and peregrine were regularly observed overflying the site, particularly in the Eastern end of the site above wooded vegetation alongside the Shallon stream.

Peregrine falcon is one of the species the one with higher conservationist concern from the site. It is listed in Annex I of the Birds Directive (Directive 79/409/EEC, amended to Directive 2009/147/EC) and is protected by the Wildlife Act (1976, amended in 2000). Both legal implements bind the State to maintain and create habitats for this species along with providing the species with legal protection against disturbance, especially during breeding season. The nearest European Site where this Annex I bird occurs is Wicklow Mountains SPA (004040) which is beyond the 20km range the Peregrine normally forage. Core Peregrine foraging ranges during breeding are estimated c. 2 km (maximum c. 18 km) in Britain (SHN, 2016); with reported pair density between 1.47 (Wicklow, Ireland) to 4.47 (Cumbria, England) per 100km^2.

In addition to repeat perimeter searches to identify area of activity, vantage point (VP) surveys were quickly established to identify potential nesting sites and understand site usage. Two dedicated VP spots were established at the bottom of two of the quarries three access ramps to enable full view of rock faces (**Appendix 8.E** – Volume III of this EIAR – notes VP1 and VP2). Peregrine, up to five individuals, were regularly seen overflying or circling the study area. A young peregrine was photographed, autumn 2018 during vantage point study of the rock face perching on a shallow-sloped ledge 3 metres below the original ground level near the North western corner of the site in close proximity to the original office infrastructure (**Appendix 8.E** – Volume III of this EIAR – note P1).

The Proposed Development activity will result in loss of potential breeding habitat due to the backfilling of the area where the peregrine nests and backfilling the former quarry area, especially the south-western corner, will result in the reduction of cliff height along with total loss of breeding habitat for peregrine. Although the timing is difficult to predict, cliff abandonment is likely to occur and the loss of breeding habitat.

The observations confirmed earlier records, observations and consultation response of peregrine activity from the area. No records of known breeding from within the site based on earlier survey and response from Irish Raptor Study Group (**Appendix 8.B** - Volume III of this EIAR). Peregrine are known to be re-establishing along eastern seaboard and in suitable quarries, based on the data from the 2017 IRSG national survey[37]. 425 breeding pairs were recorded from across the country, although the IRSG consultative response had no record from 2017 or earlier for the Bay Lane site.

Cliff height is the most important factor with regards to peregrines choice of nesting and that they tend to use the largest suitable cliffs available, with the smallest quarry cliff occupied by peregrines found in Ireland being 18m tall (Moore *et al.,* 1997). The heights of the exposed rock face at Bay lane at 8-10 metres is less than what would be expected coupled with the nature of the ledges and their relative accessibility to predators, e.g. fox. Furthermore, the proximity to Huntstown quarry (2km due south) where Peregrine are long established suggest that the presence around Bay lane is typical (IRSG). In winter peregrine often occupy areas where they do not breed, often frequenting areas with large concentrations of prey. Peregrine are also known from Hollywood quarry, approximately 16km North west of Bay lane as recent ecological surveys in support of planning application confirmed[38].

Up to five Peregrine were noted flying above the site, particularly in the Eastern part. They rarely flew over the quarry floor itself and were not seen to land. However, a single juvenile noted perched on a ledge for almost 1 hour. Further examination of the ledge from atop the easily accessible rock face, after the young peregrine had left noted faecal staining and some down. The site was subject to a number of visits and vantage point surveys of all the rockfaces were undertaken. The site was visited in January by a raptor specialist Mr Adam McClure and based on the visit, it was considered that although Peregrine were clearly active in the area, the quarry itself, by virtue of the height of the rock faces, the orientation of the rock face, the potential ease of predation from fox, and the proximity to Huntstown quarry, offered less than ideal situation for nesting peregrine. No nesting has been noted in tow visits to the site in March, which is the within the likely nesting timeframe.

Pheasant were heard calling in adjacent fields in October and a single bird was observed walking across the site in December.

A single fleeting low-flying observation of Sparrowhawk was noted along the southern hedgeline on one occasion whilst Raven and Peregrine were jostling in the sky above a high voltage electrical transmission pylon that sits within the site.

Herring Gull (*Larus argentatus*) are widespread in the locale. They were noted on a number of occasions overflying the site, but a mixed grouping of 27 gulls including Herring gull were noted resting atop the extensive water body in the quarry void before dispersing in late afternoon.

The majority of passerines were associated with hedges around the perimeter of the site, although occasionally some flew across open ground towards distant cover. A key red-listed species were small flocks of Yellowhammer (*Emberiza citronella*) overflying the site on a number of occasions. There are

[37] IRSG (2017). Annual Review 2017. http://irsg.ie/IRSGAR2017.pdf

[38] RPS (2019). *Extended Operation at Hollywood Landfill Environmental Impact Assessment Report*. Planning submission to Fingal County Council on behalf of Integrated Materials Solutions Limited Partnership.

large arable fields to the east and north of the site where this species would ordinarily be expected to congregate.

Given the nature of the fluctuating artificial waterbody, there is a lack of food source for wildfowl. There is potential for temporary occupation during passage to other sites. However, apart from some gulls, no wintering wildfowl or SCI species from the SPA were noted using the site at any time, even when the quarry floor was flooded. Five unidentified geese were noted overflying the site from East to West during at the commencement of the dusk newt survey.

There was no potential for Kingfisher (*Alcedo atthis*) along the Shallon Stream both in terms of the cover and lack of suitable conditions that would support small fish.

8.3.3.7 Amphibians and Reptiles

Smoot Newt (*Lissotriton vulgaris*), frogs (*Rana temporaria*) and Viviparous Lizard (*Zootaca vivpara*) are protected under the Wildlife act 1976 (as amended). Frogs are afforded further protection under the Habitats Directive as they are listed as an Annex V species.

Quarries, particularly abandoned ones can offer good potential to support Amphibians and Reptiles.

From the preliminary walkover survey, it was clear that there was plentiful shallow water across the quarry floor. However, there was little establishment of vegetation in the open water and no cover from potential predation. Moss-dominated areas corresponding to winter flooding have the potential to support Frog and Newt, but the lack of cover would make them or their spawn easy prey from birds, etc. The quarry was completely flooded in December 2018, thereby reducing the potential for these species. Two small areas were identified for monitoring under licence from NPWS (**Appendix 8.C** – volume III of this EIAR). The locations are shown in **Appendix 8.E** – Volume III of the EIAR- notes N1 and N2.

Frogs

Although adult frogs have not been recorded during any site visit, two young frog (approximately 2cm in length) as well as frog spawn was noted in a small number of areas in March 2019. It is likely that frogs are present in damp areas around peripheral parts of the site and the spoil overburden.

The bulk of the spawn was associated with the small man-made water-feature that was the subject of the licenced newt surveys. Although late in the season, the spawn was locally abundant, although the majority was in poor condition, with the outside of most clumps showing signs of desiccation or cloudiness. Other spawn was retarded in size. This was most noticeable in the iron-rich runoff from the pond that led down to the quarry floor. The small tadpoles, noted in March 19th 2019 site visit, showed little sign of being alive after dispersing from the egg mass.

There was evidence of predated spawn around pond N1, which suggested the presence of otter or mink. A single mink footprint had previously been noted in October 2018, but there is no evidence suggesting the presence of otter. The discarded spawn along the top of the retaining berm surrounding the water feature on closer examination was seen to have the remains of the adult frog intestines wrapped around them on a number of occasions. Despite searching it was not possible to locate evidence that might confirm the identity of the predator.

Smooth Newts

Quarries can provide ideal situations to locate newts, given the occurrence of pools and ponds. The NBDC contains a 2010 record from Hollystown Golf Club (~2km North west of the Bay Lane site) whilst other records include the environs of the Grand Canal. The local NPWS Conservation Ranger indicated that they are known to be present at Huntstown Quarry, approximately 2km due south of Bay Lane (N. Harmey, NPWS, pers. comm.)

While no licence is required in identification of potential habitat, confirmatory survey work in relation to the smooth newt was undertaken under NPWS licence (**Appendix 8.C** – Volume III of this EIAR). The results of the two survey visits are detailed in **Table 8.10** and the locations of the water-features that were subject to survey are shown in **Appendix 8.E** (Volume III of this EIAR).

Based on the initial findings from the two surveys with presence of frog spawn only, thus far being confirmed. There is some confusion that newts and frogs can co-exist in the same pond, with some suggesting that newts predate frog spawn. This is unclear. However, it is considered that the two water-features at Bay lane are less than favourable for newt occupation. Despite the size of the man-made waterbody, the relative lack of flow is ideal for newts. The standing water atop the spoil heap is also ideal and provides some limited cover from predation.

Although the shallower parts of the man-made water-feature were dominated by frog spawn, the lack of suitable vegetation with which the newts might attached their spawn (especially in the quickly deepening water is another factor which would reduce the suitability of the water-feature. Separately the standing water atop the spoil and in ruts is also considered less than favourable owing to the predominance of rushes, a circular plant with modified leaves that would be less than ideal to hold and cover newt eggs.

Thus, on the evidence to date, it is preliminarily considered that the Bay lane site does not support Newts. However, the licenced surveys require four visits which extend to early May. The various surveys overcome practical difficulties with confirming the presence of this elusive species. Two remaining surveys will be undertaken in compliance with the licence requirement which also requires that a full after report be submitted to NPWS shortly after termination of the survey. The current report includes easily applied best practice mitigation measures which will benefit frog also. This is being recommended to enable the proposed project to progress, without impacting on newt, were their presence confirmed at a later date. A full copy of the survey report will also be submitted to the Planning Authority.

Viviparous Lizard

Viviparous lizard can be found on grassland, hedgerows and road embankments (Edgar *et al.*, 2010). While none were observed at bay lane site, moving or indeed basking in the fine weather, there remains the potential that they could be present in the Proposed Development area, towards the elevated ground atop the spoil overburden. However, given the paucity of vegetation with which to provide cover from predation, the area is less than ideal to support lizards.

8.3.3.8 Insects

Butterflies & Moths

No butterflies have been recorded, owing to seasonality and undoubtedly the windy conditions during survey which may have had an impact on activity. A search of vegetation and host plants did not identify any potential for Marsh Fritillary (*Euphydryas aurinia*) or Small Blue *(Cupido minimis*).

The presence of unidentified night flying moths was noted, during dusk surveys for newts.

Dragonflies

The only species recorded, in October 2018, were Common Darter *(Sympetrum striolatum),* which were locally abundant, mostly flying across the quarry floor.

Table 8.10: Licenced Amphibian Survey Results

Survey #	Date	Survey Type	Weather Conditions	Waterfeature*	Comment
1	4/3/19	▪ Visual search, followed by hand search and sweep net of deeper water ▪ Dusk Torching (this survey was finished earlier than proposed owing to private SI contractor temporarily in charge of site and going off site.	Dry, but cold	▪ N1- Small man-made sump pond and adjacent seepage zone towards quarry floor ▪ N2 – Rush dominated we area atop Spoil, at south Eastern Corner of site.	No evidence of newt from either of the two survey areas or several smaller water accumulations in ruts. Several clumps of frog spawn in waterbody 9N1) and adjacent shallow run off seepage – All in poor condition.
2	19/3/19	▪ Visual search ▪ Full torch survey	Dry, and mild	▪ N1- Small man-made sump pond and adjacent seepage zone towards quarry floor ▪ N2 – Rush-dominated wet area atop Spoil, at south Eastern Corner of site.	No evidence of newt from either of the two survey areas or several smaller water accumulations in ruts. Limited egg masses recorded. Those that were noted were largely characterised by small, poorly developed tadpoles, with many that dispersed showing little sign of activity. (Considerable iron rich encrustation of sediment present.

*Waterfeatures (N1 and N2) to which licenced Amphibian survey carried out correspond to those indicatively illustrated in **Appendix 8.E** (Volume III of the EIAR)**.** Suitable terrestrial habitat and long-established ruts in the ground were also examined for spawn.

8.3.4 Summary Valuation of Significant Ecological Features

As per the impact assessment methodology, significant ecological features are considered to be those valued at *Local Importance (Higher Value*) or higher as per the NRA (2009b) definition. Ecological features valued at *Local Importance (Lower Value*) or of negligible value were not considered significant features and were not carried forward for impact assessment. **Table 8.11** summarises all significant ecological features identified within the ZoI of potentially significant impacts.

Table 8.11: Summary valuation of Significant Ecological Features and Features scoped into Assessment

Ecological Feature	International Protection	Ecological Valuation (NRA, 2009)	Ecological Receptor?
Designated Sites			
European			
Malahide Estuary SAC (000205)	European Site	International	**Yes (Table 8.4.)**
Rogerstown Estuary SAC (000208)	European Site	International	No (Table 8.4.)
Baldoyle Bay SAC (000199)	European Site	International	No (Table 8.4.)
North Dublin Bay SAC (000206)	European Site	International	No (Table 8.4.)
South Dublin Bay SAC (000208)	European Site	International	No (Table 8.4.)
Rye Water Valley/Carton SAC (0013987	European Site	International	No (Table 8.4.)
Broadmeadow/Swords Estuary SPA (004025)	European Site	International	Yes (Table 8.4.)
North Bull Island SPA (004006u)	European Site	International	No (Table 8.4.)
South Dublin Bay and River Tolka Estuary SPA (004024)	European Site	International	No (Table 8.4.)
Baldoyle Bay SPA (004016)	European Site	International	No (Table 8.4.)
Rogerstown Estuary SPA (004015)	European Site	International	No (Table 8.4.)
National			
Baldoyle Bay pNHA (000199)	No	County	No (Table 8.6)
Dolphins, Dublin Docks pNHA (000201)	No	County	No (Table 8.6)
Feltrim Hill pNHA (001208)	No	County	No (Table 8.6)
Grand Canal pNHA (002104)	No	County	No (Table 8.6)
Liffey Valley pNHA (000128)	No	County	No (Table 8.6)
Malahide Estuary pNHA (000205)	No	County	**Yes (Table 8.6)**
North Dublin Bay pNHA (000206)	No	County	No (Table 8.6)
Rogerstown Estuary pNHA (000207)	No	County	No (Table 8.6)
Royal Canal pNHA (002103)	No	County	No (Table 8.6)
Rye Water Valley/Carton pNHA (001398)	No	County	No (Table 8.6)
Santry Demense pNHA (000178)	No	County	No (Table 8.6)
Sluice River Marsh pNHA (001763)	No	County	No (Table 8.6)
South Dublin Bay pNHA (000210)	No	County	No (Table 8.6)
Ramsar			
Broadmeadow Estuary (no. 833)	International Convention on Wetlands	International	**Yes (Table 8.5)**
North Bull Island (no. 406)	International Convention on Wetlands	International	No (Table 8.5)
Sandymount Strand/Tolka Estuary (No. 832)	International Convention on Wetlands	International	No (Table 8.5)

Ecological Feature	International Protection	Ecological Valuation (NRA, 2009)	Ecological Receptor?
Baldoyle Bay (No. 413)	International Convention on Wetlands	International	No (Table 8.5)
Habitats			
Depositing/lowland rivers (FW2)	No	Local (Higher)	**Yes***
Drainage Ditches (FW4)	No	Local (Lower)	No
Other artificial lakes and ponds (FL8)	No	Local (Lower)	**Yes****
Buildings and artificial surfaces (BL3)	No	Local (Lower)	No
Spoil and bare ground (ED2)	No	Local (Lower)	No
Recolonising bare ground (ED3)	No	Local (Lower)	No
Exposed calcareous rock (ER2)	No	Local (Lower)	No
Wet grassland (GS4)	No	Local (Lower)	No
Dry Calcareous and Neutral grassland GS1	No	Local (Lower)	No
Reed and large Sedge swamps (FS1)	No	Local (Lower)***	No
Calcareous Springs (FP4)	No	Local (Lower)	No
Hedgerows (WL1)	No	Local (Higher)	No – the activities within the study area will either not result in loss of this habitat type or, in the construction areas where hedgerows will be removed, these are highly managed and are considered unsuitable for bat commuting habitat or for bird nesting.
Scrub (WS1)	No	Local (Lower)	No
Treelines (WL2)	No	Local (Lower)	No
Aquatic Environment	No	Local (Lower)	No
Protected Species			
Peregrine Falcon (*Falco peregrinus*)	European	International	**Yes**
Herring Gull	European	International	**Yes**
Yellowhammer (*Emberizia citronella*)	No	Local (Higher)	**Yes**
Western European Hedgehog (*Erinaceus europaeus*)	No	Local (Higher)	**Yes**
Eurasian Badger (*Meles meles*)	No	Local (Higher)	**Yes**
European Otter (*Lutra lutra*)	Annex II and IV of EU Habitats and Species Directives	Local (Higher)	No

Ecological Feature	International Protection	Ecological Valuation (NRA, 2009)	Ecological Receptor?
Bats	Annex IV of EU Habitats Directive	County	No – No roosts were located, and their activities are largely confined to linear woodland features, all of which are being retained by the project.
Frogs	No	County	**Yes**
Smooth Newts	No	County	**Yes******
Invasive Species	-	-	No

*by virtue of the connectivity to European sites rather than the condition of the small watercourse
** by virtue of the amphibian potential rather than the small vegetation poor habitat.
*** by virtue of its very limited extent and persistence owing to retention of man-made sump.
**** Although not being recorded, it shares similarities with frog and is similarly assessed and mitigated for.
Populations of species including Hedgehog have been presumed to be present due to their broad habitat preference, and the practical difficulty in confirming presence in the course of acceptable EIAR survey resources and effort.

8.4 SCOPING FOR ECOLOGICAL IMPACT ASSESSMENT

In accordance with best practice guidance (NRA, 2009; CIEEM, 2018), the following Ecological Features have been scoped out from further assessment due to:

- **European sites**: the potential impacts to the European Sites within the ZoI have been analysed as part of the Appropriate Assessment process (issued under separate cover as part of this planning application). The assessment concluded that there is hydrological connectivity between the Proposed Development and two European sites – Malahide Estuary SAC (000205) and Malahide Estuary SPA (004025). Beyond these two European sites, any other European sites within the ZoI are not considered for further assessment;
- **National sites**: as with the case of European sites, there is direct hydrological connectivity with Malahide Estuary pNHA (000208). Beyond this National site, any other National sites within the ZoI are not considered for further assessment;
- **Ramsar sites**: as with the case of European and National sites, there is direct hydrological connectivity with Malahide (or Broadmeadow) Estuary (no. 833). Beyond this Ramsar site, any other Ramsar sites within the ZoI are not considered for further assessment;
- **Habitats**: habitats with a valuation below Local Importance (Higher Value) do not represent key ecological receptors and detailed assessment is not required;
- **Protected species**: the ecological survey did not reveal evidence for the presence of either Otter (*Lutra lutra*). There was secondary evidence of Hedgehog (*Erinaceus europaeus*) Eurasian badger (*Meles meles*) within the study area. However, the location for this evidence is on the northwest corner, outside the operation zone. Because there was no evidence of badger presence within the operation zone, the Proposed Development is not considered likely to produce detrimental effects for this species, but nonetheless it is considered for further assessment. No hedgerows or mature trees were found within the study area that could be considered as likely to host bats. The riparian corridor around the Shallon stream, on the northern and North eastern boundary of the study area and the drainage ditches, is the only identified suitable area for bats. Since this habitat is not going to be affected by the Proposed Development, bats are not considered for further assessment; and
- Medium risk Invasive species Butterfly bush (*Buddleia davidii*) and Sycamore (*Acer pseudoplatanus*) were recorded within the study area. However, in the case of the Butterfly bush, it was not well established despite the dereliction of the site and potential habitat to expand into. Regarding Sycamore, there is no concern about its presence in the hedgerow.

8.5 PREDICTED IMPACTS OF THE PROPOSED DEVELOPMENT (OPERATION AND RESTORATION)

The purpose of an Environmental Impact Assessment Report (EIAR) is to identify the environmental effects of a development and examine how these impacts can be avoided or reduced during the design process, operation (normally referred to as construction, but that is not wholly appropriate given the nature of the project) and Restoration (used here instead “operation” which is normally used for a construction project, as the project entails but as the “operation” of the site concerns the return of the land to its agricultural origins) operational stages of the Proposed Development. The impacts are evaluated in terms of their significance, nature and magnitude, and in the absence of mitigation measures. The assessment is completed in respect to a Proposed Development, prior to the commencement of the works, i.e. the abandoned quarry has been excavated and the Proposed

Development comprises site preparation and then the importation of material until such time that the site is to be restored to the original ground levels that existed prior to the commencement of the historical quarrying.

8.5.1 Outline of Predicted Impacts of the Proposed Project

The restoration of the site is anticipated to take approximately 3 years for the operation of the soil recovery facility with additional time for the landscaping phase, i.e. site restoration. Potential impacts associated with remediation include but are not limited to:

- **Direct habitat loss** – Loss of several habitats and reduction in mosaic particularly in the quarry void
- **Severance** - i.e. fragmentation of habitat, prevention of animal and seed dispersal and discontinuity of habitat or loss of foraging habitat.
- **Mortality** – of protected species associated with vegetation removal and construction activities.
- **Disturbance** – associated with works in the vicinity of retained habitats, for example impacting tree roots or protected species commuting/forage corridors.
- **Contamination** – such as hydrological impacts associated with accidental pollution events, spillages.

The predicted impacts on Key Ecological Receptors (KERs) during the operation and restoration phases, in the absence of mitigation, are provided below.

8.5.2 Operation

8.5.2.1 European Sites

There are two European sites with direct hydrological connectivity via the Shallon stream to the study area, namely Malahide Estuary SAC and SPA. There is potential impact from advance works to drain the site of the ponded water which could result in increased sedimentation of the Shallon stream and or a pollution event, with an ultimate impact at the Malahide Estuary downstream. There has been no recent monitoring of the site since quarrying operations ceased, but a recent water sampling survey where an upstream and downstream sample were taken to inform the baseline[39], has been undertaken and informs the Water (Hydrogeology) baseline Assessment (**Chapter 10**).

The proposed operation of the site will involve discharge of surface water and groundwater discharges to the Shallon stream. The proposed temporary holding pond and the settlement tank will provide storage for up to the 50-year return period whilst the peak flow discharge to the unnamed stream is limited to greenfield run-off rate to reduce the flooding downstream. The 100-year return period event can be stored on site and will not be discharged downstream during a flood event. These works are estimated to take approximately 1 month. This operation can only be done under Local Authority permit to ensure that suspended solids would not lead to a deterioration of the watercourse.

[39] Exova Jones Environmental (2019). *Test report on seven samples from up and downstream of Shallon Stream undertaken as baseline measurement*. Report prepared for RPS.

Thereafter as the site become operational there would be a need to maintain a dry working surface in the quarry. This will require constant pumping of water to the settlement tank for the duration of the project or until such time that ponding water can drain through the soil layers.

Overall, given the distance of both European sites from the Proposed Development footprint, impacts are likely to be localised, temporary and significant at the Local geographic scale only. The impact of the proposed backfilling operation and final restoration on the Ward River at the confluence with the Shallon stream will be negligible.

8.5.2.2 National Sites

There is one National site with direct hydrological connectivity to the Study Area, namely Malahide Estuary pNHA. Given the distance of the pNHA from the study area, there is no potential for habitat loss within the designated site. However, as with the designated European sites (**section 8.5.2.1,** there is a hydrological link between the Proposed Development and the Malahide Estuary. Therefore, a potential pollution incident including sedimentation impacts during the site preparation and later operation of the soil recovery facility cannot be ruled out, however unlikely. In the absence of mitigation given the distance of the pNHA from the Proposed Development footprint impacts are likely to be localised, temporary and significant at the Local geographic scale only.

8.5.2.3 RAMSAR Sites

There are a number of sites designated as *Wetlands of International Importance*, collectively known as Ramsar sites identified within the zone of influence of the project, however, there is only one Ramsar site with direct hydrological connectivity to the Study Area, namely Malahide Estuary, which largely overlaps with Malahide Estuary SPA.

As with the previously mentioned designated sites, a potential hydrological pathway exists between the study area and Malahide Estuary via the Shallon Stream. In the absence of mitigation given the distance of the RAMSAR site from the proposed project footprint impacts are likely to be localised, temporary and significant at the Local geographic scale only.

8.5.2.4 Habitats

The bulk of the proposed works are located within habitats of Local (lower) importance (e.g., Spoil and bare ground, Recolonising bare ground and Scrub). Habitats of Local (lower) importance do not require impact assessment as per NRA guidelines (2009b). There are a number of habitats that ordinarily would be classified as being of Local (Higher) importance but owing to the site conditions and project parameters e.g. Hedgerows, the impact assessment has bene downgraded to reflect the absence of any hedgerow removal.

The Proposed Development would lead to the permanent loss of habitat and the mosaic, although none has affinities to Annex I habitats. The peripheral vegetation would be retained and so is classified as a positive impact which would benefit fauna. The net loss of these habitats from the central part of the quarry and overburden are negligible in terms of floristic evaluation and the impact will be significant and permanent at the local geographic scale, albeit negligible.

8.5.2.5 Invasive Species

Besides spreading of the medium impact Invasive Alien Plant Species (IAPS) identified during the ecological survey, there is potential, by virtue of the project parameters, for other invasive species to be introduced or become established during the construction and operation works. Machinery, equipment and material (including soil) which may be transported onto the site for construction could lead to the introduction of invasive species to the site with potential to displace natural biodiversity. This could lead to a significant impact at the local to international level.

8.5.2.6 Aquatic Environment

Despite the highly disturbed nature of the modified watercourse and the lack of aquatic potential, there is nonetheless potential for siltation or a pollution incident to impact downstream in the Ward system, which is known to support brown trout and otter. In the absence of mitigation, the net impact on the downstream aquatic environment are likely to be localised, temporary and significant at the Local geographic scale only.

8.5.2.7 Protected Species

Peregrine falcon (*Falco peregrinus*)

Advance site work to drain the quarry void and the commencement of Backfilling works have the potential to disturb peregrine falcon activity in the area. Based on the survey findings, while there will be no direct loss of habitat, the displacement of birds due to disturbance and/or reduction of habitat suitability cannot be ruled out.

Peregrine need open areas with plentiful supply of birds to hunt and secure site to breed. While activity is common above the quarry and with the exception of a single sighting of young peregrine perching on an exposed rock face (**Appendix 8.E** – Volume III of this EIAR – Note P1), most activity related to foraging. No breeding has been identified and the quarry conditions are such that peregrine are not considered likely to utilise the relatively shallow cliff face (Adam McClure, pers. comm). Indeed, the long-established breeding sites from the adjacent Huntstown quarry, as well as the Hollywood quarry approximately 16km to the North East, would suggest that the Peregrine are merely frequenting the site in search of suitable prey around the surrounding open fields.

The impacts associated with the operation phase are predicted as a Direct loss of foraging habitat only. It is not common for Peregrines to forage within a nesting quarry and, therefore, it is assumed the Proposed Development will have negligible effects on the amount of available foraging habitat. The potential impacts to the species would be short-term at most and are not predicted to be significant above local geographic scale by virtue of the widespread distribution in the locale and plentiful suitable habitat.

Herring Gull (***Larus argentatus***)

The Herring Gull is a red listed species owing to general decline in the breeding population in Ireland. This coastal species will happily venture inland particularly where landfills and suitable feeding potential exists. It was not recorded using the site, merely overflying and is abundant in the wider location. While it was recorded temporarily resting on water in mid-March 2019, this did not appear to be common. There is considerable suitable habitat for the species. Thus, no net impact on the population is predicted.

Yellowhammer (*Emberiza citronella)*

Largely resident this flocking passerine is a red listed species in Ireland owing to declines in breeding and population dynamics. It is however, known to be widespread in North County Dublin, particularly in winter months where it makes use of stubble fields. It was seen at various times overflying the site. There will be no loss of nesting habitat, merely possible interference to flight patterns owing to increased disturbance. The potential impacts to the species would be short term and are not predicted to be significant above local geographic scale by virtue of the widespread distribution in the locale and plentiful suitable habitat.

Badger (*Meles meles*)

Badger activity was noted around peripheral areas with several forms of secondary evidence noted. The presence of a recently excavated sett along a peripheral area with direct access to adjacent fields could be impacted upon. The sett which is nestled behind an earth berm along the Shallon stream, would unlikely be disturbed as a result of the water drawdown operations.

Potential significant impacts to the badger sett are likely, however, during the phased backfilling. The sett would be within 30 metres of the edge of the quarry void. Depending on the season and the proximity of works, there could be disturbance to the breeding sett.

In the absence of mitigation measures, open excavation associated with redistribution of overburden could trap badger if they strayed into these areas with no means of escape provided. Furthermore, badger could dig new setts in suitable territory within or bordering the site, e.g. the Northern hedgeline.

Taken together the potential impacts to badger in the absence of mitigation could be significant at a Local geographic scale for the duration of the works and thereafter as other lands outside of the control of the applicant are developed.

Frog (Rana temporaria)

Common frog spawn was confirmed in the small man-made sump pond. No other areas of spawn were identified in the site or in ephemeral water bodies in tyre ruts. While no adults were noted they obviously occur in some part of the site. Works in or around, and removal of, this habitat through a change in the natural drainage at a time of year when spawn, tadpoles or froglets are most likely to be present – (February to July inclusive) and/or permanent loss of spawning habitat significant at a local geographic scale. It is not possible to predict population-level impacts, the duration of the potential impacts is predicted to be limited to the short-term due to the abundance of common frog and their ability to readily repopulate suitable wetland habitats.

Even though the planned works will be undertaken in the vicinity of habitats confirmed as spawning ground (i.e. the existing small sump pond (Feature N1, Appendix 8.E), the process of site clearance and earthworks can result in the incidental mortality of individual amphibians and they can be killed attempting to cross the study area or access roads, particularly during their breeding migrations in spring.

Smooth Newt (*Lissotriton vulgaris*)

Despite the potential suitability of at least one man-made sump-pond, the presence of newts has not been confirmed. The survey findings to date, coupled with the abundance of frog spawn suggest that the habitat conditions and surrounding territory is less than ideal for newt.

Even though the planned works will be undertaken in the vicinity of habitats potentially used by amphibians (i.e. the existing small sump pond), the process of site clearance and earthworks can result in the incidental mortality of individual amphibians and they can be killed attempting to cross the study area or access roads, particularly during their breeding migrations in spring.

8.5.3 Restoration Phase (Post filling, landscaping and return to agricultural usage)

8.5.3.1 European Sites

Having regard to the proposed restoration of the study lands to original ground level, there remains a hydrological pathway between the proposed lands and the downstream European sites namely; Malahide Estuary SAC and Malahide Estuary SPA, which could trigger potentially significant impacts such as a sedimentation event and or a pollution incident associated with refuelling of machinery (although unlikely, given the nature and duration of the works to return the site to agricultural origins with natural greenfield run-off rates. Hence a negligible impact is predicted.

8.5.3.2 National Sites

Having regard to the proposed restoration of the study lands to original ground level, there remains a hydrological pathway between the proposed lands and Malahide Estuary pNHA, which could trigger potentially significant impacts such as a sedimentation event and or a pollution incident associated with refuelling of machinery (although unlikely, given the nature and duration of the works to return the site to agricultural origins with natural greenfield run-off rates. Hence a negligible impact is predicted.

8.5.3.3 RAMSAR Sites

Similarly, to the assessment presented for European sites at **section 8.5.3.1**, there remains a hydrological pathway to the downstream RAMSAR site which might trigger potentially significant impacts such as a sedimentation event and or a pollution incident associated with refuelling of machinery (although unlikely, given the nature and duration of the works to return the site to agricultural origins with natural greenfield run-off rates. Hence a negligible impact is predicted.

8.5.3.4 Habitats

There will be loss of habitat diversity as a result of the filling and restoration phase, albeit habitats of Local value only. The requirement to return the restored lands to original ground level e.g. the ground levels which were present prior to the commencement of quarrying is considered negligible in terms of floristic diversity but might have longer term positive benefits to wildlife.

8.5.3.5 Invasive Species

At this juncture, it is not possible to identify if an impact pathway is present, as this will depend on the preceding works and management of same should an invasive species become established.

8.5.3.6 Aquatic Environment

No potential for significant impacts are predicted.

8.5.3.7 Protected Species

Peregrine falcon (Falco peregrinus)

With the exception of potential short-term disturbance during the landscaping works, it is predicted that there will be no restoration phase impacts in respect of this species.

Herring Gull *(Larus argentus)*

With the exception of potential short-term disturbance during the landscaping works, it is predicted that there will be no restoration phase impacts in respect of this species.

Yellowhammer *(Emberiza citronella)*

With the exception of potential short-term disturbance during the landscaping works, it is predicted that there will be no restoration phase impacts in respect of this species.

Badger *(Meles meles)*

Although the evidence indicates that badger roam along the periphery of the site, there will be considerable change to their roaming landscape, upon the filling of the quarry void. The restored agricultural ground should not in itself provide new habitation territory, merely new ground in which to forage. Thus, it is predicted if the badger population is resident after the quarry backfilling and given the abundance of suitable foraging habitat around the site, it is predicted that the impact would not be significant.

Frog *(Rana temporaria)*

In the absence of mitigation impacts on frog population it is difficult to quantify the impact local for frog populations owing to the considerable alteration of the sites terrain. The results are likely to result in a permanent significant impact at the Local geographic scale.

Smooth Newt (*Lissotriton vulgaris*)

Owing to the absence of smooth newt, it is predicted that there can be no restoration phase impacts in respect of this species.

8.5.4 Do Nothing Scenario

The likely do-nothing scenario for the development is the continued use of the lands in their current state. Thus, there would be no appreciable change to the existing environment and likely no appreciable change in current practices. Thus, there would be no significant changes in the ecology of the area.

8.5.5 Worst Case Scenario

The worst-case scenario would be the importation of material not approved for the backfilling and restoration of the site and the potential unknown damage to the environment both at a local sense but also potentially in the wider landscape.

8.6 CUMULATIVE IMPACTS

8.6.1 National and Local Plans

National Development Plan 2018-2027

National Strategic Outcome 9 of the National Development Plan 2018-2027 (Government of Ireland, 2018) details the Sustainable Management of Water and other Environmental Resources. Within this outcome, Waste Management and Resource Efficiency has been identified as an investment action. The action states that:

"*Investment in waste management infrastructure is critical to our environmental and economic well-being for a growing population and to achieving circular economy and climate objectives. Capacity will continue to be built in waste facilities, including anaerobic digestion, hazardous waste treatment, plastics processing, recycling, waste to energy, and landfill and landfill remediation, to meet future waste objectives…… Significant infrastructure capacity development will be required to separate and process various waste streams at municipal and national levels to achieve new EU legally-binding targets and the additional investment may include a potential role for public investment.*"

The Plan was subject to SEA and Appropriate Assessment and a mitigation measure included an objective (NPO 75) to "*ensure that all plans, projects and activities requiring consent arising from the National Planning Framework are subject to the relevant environmental assessment requirements including SEA, EIA and AA as appropriate*".

The Fingal County Development Plan 2017-2023

The Fingal County Development Plan 2017-2023[40] highlights a number of potential larger infrastructural projects within the county. Within this Plan, the Proposed Development site is classified as GE – General Employment; a class attributed to providing opportunities for general enterprise and

[40] http://www.fingal.ie/media/Written%20Statement%202017-2023.pdf

employment. Two specific objectives are set: Objectives NH51 and NH52. These Objectives state the intention of protecting these areas from inappropriate development and that development reflects and reinforces the distinctiveness of these areas, which provide a higher level of protection against the development of large infrastructural projects/developments.

A NIS has been completed of the Fingal County Development Plan 2017-2023[41], which concluded:

"*As a result of the assessment process, it is concluded that mitigatory measures identified in the stage 2 Appropriate Assessment are adequate to ensure the integrity of the European Sites which will not be significantly affected as a result of the potential impacts of the objectives contained with the Fingal Development Plan*."

Cherryhound LAP

The proposed soil restoration facility is within the boundary of the Cherryhound Local Area Plan 2012-2018[42] which has been extended to 2022. In keeping with the higher-level County Development Plan, its zonation is for GE – General Employment.

The LAP (as extended to 2022) has little detail in respect of specific projects or objectives, although it does recommend *"that the strong field boundaries and individual freestanding trees should be retained to assist with the structuring of the area"*. The AA Screening report[43] accompanying the LAP concluded that *"the LAP alone or in combination with others would not have significant effects on Natura sites".*

MetroLink

The National Transport Authority commissioned the Fingal/North Dublin Transport Study to identify optimum long-term transport solutions to connect Dublin City Centre, Dublin Airport and Swords. The report was published in 2015 and the commencement of the construction phase is scheduled by 2021, with operation by 2026/2027 (NTA, 2015). Although the project is located to the east of the Bay lane facility nonetheless, it is proposed to cross the Ward River. There is insufficient information publicly available to allow further assessment and confirm potential cumulative impacts, except to say that environmental assessment will be required to consider in combination impacts with other projects. The potential for the development of the Metro North scheme to entail impacts to Biodiversity and European sites will be contemplated within its own Environmental Assessment together with possible cumulative and in-combination impacts.

8.6.2 Projects

8.6.2.1 Fingal Planning Portal

There are a number of commercial and industrial developments in the local area of the Bay Lane Quarry. Some share the same access road as the site including a cement company (Halton Concrete)

[41] http://www.fingal.ie/media/Natura%20Impact%20Report.pdf
[42] http://www.fingalcoco.ie/media/2.4.3%20Cherryhound%20LAP%20Document.pdf
[43] http://www.fingalcoco.ie/media/2.4.3%20Habitats%20Directive%20Screening%20Dcoument.pdf

located 200m to the west of the site and a commercial bus yard (Butlers Bus Tours) located approximately 250m to the east of the site.

There are a large number of residential and commercial planning applications in the planning system throughout Fingal administrative area[44] but only a small number identified in close proximity to Proposed Development. There is potential for in-combination impacts on water quality in particular if both the Proposed Development and the planning applications resulted in water pollution of surface or ground waters. Many of these applications have on-site foul effluent treatment systems associated with them. However, due to the measures incorporated into the construction methodology for the proposed soil recovery facility to ensure protection of all waterbodies and water quality it is not anticipated that the Proposed Developments will result in any in-combination impacts.

Two current commercial projects are located in close proximity to the Proposed Development.

- Planning Reference FW17A/0119 – Permitted development after appeal to ABP of Logistics Complex in greenfield site immediately north of proposed Bay Lane Soil recovery facility. The project planning documents included an AA Screening report[45], Landscape and Drainage design[46] to ensure that proposed SUDS drainage features including swales would not be planted to attract birds, and that the road network immediately adjacent to the site entrance be upgraded in advance of Proposed Development owing to the nature of truck movements on the local road network.
- Planning reference FW19A/0006 – additional information was sought by the Local authority on March 6th for a proposed single storey commercial facility, located c. 200m north-west of the prosed development. The date for FCC decision is unknown. The AA screening submitted with the planning application concluded that there would be no significant direct or indirect impacts on the Malahide Estuary SAC/SPA resulting in this project[47].

8.6.2.2 Strategic Infrastructure Development

A key SID project is the Irish Water sponsored Greater Dublin Drainage Project (ABP 301908) which consists new wastewater treatment plant, sludge hub centre, orbital sewer, outfall pipeline and regional biosolids storage facility. The project has been subject to detailed environmental Impact assessment and has been subject to NIS, both of which include considerable mitigation measures to protect local biodiversity and aquatic environment and ensure that no adverse effects upon the integrity of European sites is likely. Oral Hearing is due to commence, and it is estimated that a decision will be forthcoming in 28/6/2019. A separate CPO application to ABP (#301807) in respect of the Reginal Biosolids Storage Facility Project has been lodged (6/6/2018). Planned construction commencement in 2022 although it would be phased for specific elements. There could be overlap in construction impacts, but unlikely to be significant owing to distance between both sites and mitigation measures to ensure protection of watercourses., etc.

[44] Planning applications viewed online in March 2019: http://fingalcoco.maps.arcgis.com/apps/webappviewer/index.html?id=3fa7d9df584c4d93aab202638db9dd1a
[45] http://documents.fingalcoco.ie/NorthgatePublicDocs/00561272.pdf
[46] http://documents.fingalcoco.ie/NorthgatePublicDocs/00561265.pdf
[47] Moore Group Environmental Services (2016) Truck facility and Future Use Development Killamonan, The Ward, Co. Dublin: Report for the purpose of Appropriate Assessment Screening.

There are multiple planning and SID applications in respect of Dublin airport authority (daa). Current and future developments could have construction and or operation impacts owing to overlap in timing of projects and potential sedimentation to tributaries for the Ward River. However, in combination impacts are considered is unlikely to be significant owing to distance between both site and mitigation measures to ensure protection of watercourses.

8.6.2.3 SHD Current list

No current Strategic Housing Developments, pertinent to the current project, are currently listed on the website of An Bord Pleanála (which website accessed 15/3/2019).

8.6.3 In combination Conclusion

The key pathway in terms of construction and operational impacts relates to the potential sedimentation of watercourses. No other pathways have been identified by which any plan or project could have a likely significant in combination effect. However, owing to the design, layout and implementation measures proposed to protect watercourses, specifically the Shallon stream (see **Chapter 10** - Hydrology and Drainage of this EIAR document), the residual impact on the watercourse is predicted to be imperceptible to slight impact on the local hydrology. There is therefore, no potential for cumulative or in-combination impacts.

8.7 SUMMARY OF POTENTIAL IMPACTS

The following tables (**Table 8.12** and **8.13**) summarise the scale of the potential impact significance for the duration of the Proposed Development.

Table 8.12: Summary of Potential Impacts from the Proposed Development for Designated Sites, Habitats and Flora

Ecological Feature	Valuation	Potential Soil Recovery Facility Operation Phase Impacts	Significance of Soil Recovery Facility Operation phase Impact	Potential Restoration Phase Impacts	Significance of Restoration Phase Impact	Mitigation Measures Proposed Additional to Design	Residual Significance	Cumulative Residual Impact Significance
European sites (SAC and SPA)	International	Pollution/Sedimentation	Not significant	None	N/A	Yes	Not significant	Not significant
National sites	National	Pollution/Sedimentation	Not significant	None	N/A	Yes	Not significant	Not significant
RAMSAR sites	International	Pollution/Sedimentation	Not significant	None	N/A	Yes	Not significant	Not significant
Depositing Lowland River (FW2)	Local (Higher Value)	Pollution/Sedimentation	Not significant	None	N/A	Yes	Not significant	Not significant
Drainage Ditches (FW4)	Local (Lower Value)	Pollution/Sedimentation	Not significant	None	N/A	Yes	Not significant	Not significant
Other Artificial lakes and ponds (FL8)	Local (Lower Value)	Habitat Loss	Significant	Limited habitat recreation	Limited, positive	Yes	Not significant	Not significant
Buildings and artificial surfaces (BL3)	Local (Lower Value)	N/A	Not significant	Habitat Loss	N/A	No	Not significant	Not significant

Ecological Feature	Valuation	Potential Soil Recovery Facility Operation Phase Impacts	Significance of Soil Recovery Facility Operation phase Impact	Potential Restoration Phase Impacts	Significance of Restoration Phase Impact	Mitigation Measures Proposed Additional to Design	Residual Significance	Cumulative Residual Impact Significance
Spoil and bare ground (ED2)	Local (Lower Value)	Habitat Loss	Significant	Change to agricultural sward as new planting re-establishes	N/A	No	Not significant	Not significant
Recolonising Bare ground (ED3)	Local (Lower Value)	Habitat loss	significant	Change to agricultural sward as new planting re-establishes	N/A	No	Not significant	Not significant
Exposed calcareous rock (ER2)	Local (Lower Value)	Habitat loss	significant	None	N/A	No	Not significant	Not significant
Wet Grassland (GS4)	Local (Lower Value)	Habitat loss	significant	Change to agricultural sward as new planting re-establishes	N/A	No	Not significant	Not significant
Dry Calcareous and Neutral Grassland (GS1)	Local (Lower Value)	Habitat loss	Local	Change to agricultural sward as new planting re-establishes (except on retained	N/A	No	Not significant	Not significant

Ecological Feature	Valuation	Potential Soil Recovery Facility Operation Phase Impacts	Significance of Soil Recovery Facility Operation phase Impact	Potential Restoration Phase Impacts	Significance of Restoration Phase Impact	Mitigation Measures Proposed Additional to Design	Residual Significance	Cumulative Residual Impact Significance
				peripheral berms)				
Reed and large Sedge swamp (FS1)	Local (Lower Value)	Habitat loss	significant	None	N/A	No	Not significant	Not significant
Calcareous springs (FP4)	Local (Higher Value)	Habitat loss	Local	None	N/A	No	Not significant	Not significant
Hedgerows (WL1)	Local/County	None	Not significant	Habitat enhancement	Positive Impact – net gain in extent	Yes	Not significant	Not significant
Scrub (WS1)	Local (Higher Value)	Habitat loss	Local	None	N/A	Yes	Local	Local
Treelines (WL2)	Local/County	None	Not significant	None	N/A	No	Not significant	Not significant
Aquatic Environment	Local/County	Pollution/Sedimentation to downstream areas	Not significant	None	N/A	Yes	Not significant	Not significant
IAPS	___	Introduction of Third schedule species	Local	None	N/A	Yes	Not significant	Not significant

RPS

Table 8.13: Summary of Potential Impacts from the Proposed Development for Fauna

Ecological Feature	Valuation	Potential Quarry Filling Phase Impacts	Significance of Quarry Filling Phase Impact	Potential Post Quarry Restoration Phase Impacts	Significance of post Quarry Restoration Phase Impact	Mitigation Measures Proposed Additional to Design	Residual Significance	Cumulative Residual Impact Significance
Bats (Roosting)	Local County	None - no roosting bats identified	Not significant	None Predicted	Not significant	Yes	Not significant	Not significant
Bats (Foraging)	Local County	Disturbance/Displacement	Local	Loss of habitat quarry mosaic	Not significant	Yes	Not significant	Not significant
Badger (Foraging, inhabiting)	Local (Higher Value)	Mortality or injury Disturbance/Displacement Loss of Habitat	Local	Displacement (negative) Increase in roaming territory (Positive)	Local	Yes	Local	Local
Otter	County	N/A	N/A	N/A	N/A	No	Not significant	Not significant
Protected mammal Species - Hedgehog (presumed resident)	Local (Higher Value)	Mortality or injury Disturbance/Displacement	Local	None Predicted	Not significant	Yes	Local	Local
Breeding Common Frog	County	Loss of wetland breeding pond, Mortality	Local	Displacement due to loss of suitable habitat	Limited positive recreation of breeding pond	Yes	Local	Local

Ecological Feature	Valuation	Potential Quarry Filling Phase Impacts	Significance of Quarry Filling Phase Impact	Potential Post Quarry Restoration Phase Impacts	Significance of post Quarry Restoration Phase Impact	Mitigation Measures Proposed Additional to Design	Residual Significance	Cumulative Residual Impact Significance
Smooth Newts*	County	Loss of wetland breeding pond, Mortality	Local	Displacement due to loss of suitable habitat	Limited positive recreation of breeding pond	Yes	Not significant	Not significant
Peregrine Falcon	International	Disturbance to, and loss quarry perch	Local	Absence of Quarry	Not significant – Foraging still possible. Breeding likely in Huntstown	No	Local	Local
Herring Gull	International	Disturbance	Not significant	None Predicted	N/A	No	Local	Local
Yellowhammer	Local (Higher Value)	Disturbance	Not significant	None Predicted	N/A	No	Local	Local
Other Breeding birds	Local (Lower Value)	Disturbance to, and loss quarry perch	Significant	N/A	N/A	Yes	Local	Local
Invertebrates	Local (Lower Value)	Habitat Loss, Mortality	Local	N/A	Not Significant	No	Local	Local

8.7.1 Predicted Residual Impact

It is considered unlikely that there will be any residual impacts as a result of the Proposed Development. The operations if carried out in accordance with standard protective measures and implementation of ecological mitigation measures described below and in other interrelated chapters e.g. **Chapter 9** - Soils, Geology and Hydrogeology, **Chapter 10** - Water (Hydrology) and **Chapter 16** Landscape and Visual Assessment in particular of this EIAR should ensure that the ecology should not greatly alter.

8.8 MITIGATION MEASURES

There are a number of key mitigation measures that will be undertaken in order to minimise the overall impact of the proposed Project. Prior to commencement of the Soil recovery facility operations, the contractor shall prepare a Construction l Management Plan (CMP). The CMP shall contain these mitigation measures and plans identified in the following sections and elsewhere in the EIAR where overlap with ecological features requires mitigation. The appointed contractor shall ensure that they are fully implemented during the advance site preparation and main operation phase, to prevent or reduce the impacts identified in the impact assessmentIn respect of the Proposed Development, key protective principles support the overall mitigation measures are summarised thus:

All proposed ecological mitigation measures and enhancements for biodiversity are outlined below. A number of the mitigation measures outlined below will need supervision or liaison with a suitably qualified ecologist. In this regard the Appointment of Retained Ecologist, or Ecological Clerk of Works (EcOW) as necessary to oversee and advise the contractors staff on mitigation implementation.

8.8.1 Operation Phase

The operation phase covers the site preparation whereby the water on the quarry floor is discharged under permit, enabling commencement of subsequent soil recovery operations and phased backfilling of the quarry void for the estimated 3-year programme duration. It does not include the restoration of the site which describes the post-filling return to agricultural origins of the site. Mitigation measures for this are dealt with in **Section 8.8.2**.

8.8.1.1 Retained Ecologist/Ecological Clerk of Works

The client will retain an Ecologist to advise them during the duration of the project. The client may also appoint an Ecological Clerk of Works (EcOW) who may be the Retained Ecologist, or a specialist/licenced ecologist as necessary to undertake or supervise particular operations/surveys.

The retained ecologist shall have relevant experience in the management of ecological constraints on construction/quarry restoration sites and hold or have held a protected species licence (s) in the Republic of Ireland. Ideally, they would be a full member of a relevant institution such as the Chartered Institute of Ecology and Environmental Management (CIEEM).

The Retained Ecologist will advise the Client on ecological mitigation and monitor/oversee as appropriately. They will be appointed sufficiently in advance of project commencement to arrange for any licensing or mitigation requirements arising from pre-construction surveys to be incorporated into the Contractor's CMP and programme. As detailed in the sections below and depending on the time frame for commencement of works following grant of permission, pre-construction surveys are proposed for:

- Badger; and
- Frogs and Newt

In accordance with NRA guidance (2005) for badger, preconstruction surveys should be repeated after 10-12 months as previously collected data can change considerably.

The confirmation of frog spawn on site will likely require a licence to be sought from NPWS to enable translocation of frog spawn during the appropriate season. A suitable donor site away from the proposed works is being proposed as part of the mitigation measures.

Although Peregrine do not nest on rock faces on the site, there is potential for other smaller birds to utilise and or nest on small ledges and in crevices in the rock face. For each area in which a rock face is present, a bird survey shall be undertaken on prior to commencement of backfilling. Ideally crevices and ledges should be cleared (outside the bird nesting season to reduce the possibility of nesting. If nesting is confirmed, however, works in that area cannot proceed until mitigation proposal and derogation licence application to NPWS.[48]

(Asides from the mitigation measures identified in **Section 8.8.1.4** regarding timing of vegetation clearance and protection of retained vegetation, there are no specific mitigation measures recommend for other birds. And although the potential for nesting birds within the site is considered low based on the nature of the site and the level of disturbance, that does not preclude the potential nesting site within the works area in rock crevices or in spoil. In the event of such an occurrence, the ecological Consultant will advise on requirements and/or protective measures that would be required.

There is no specific mitigation recommended in relation to bat roosting in crevices in the quarry face, given the findings of the Summer 2018 survey. Notwithstanding this fact, bat activity was concentrated around the western and northern boundary of the site. These areas coincide with wooded vegetation, which is being retained. No specific mitigation is required in this regard. However, best practice recommends that lighting design principles will incorporate avoidance of lighting within particularly sensitive areas. Measures to mitigate the impact of lighting disturbance on bats during the operation phase should include:

- The avoidance of artificial lighting in the first instance;
- Avoid lighting of retained habitats, particularly in the vicinity of boundary treelines/hedgelines. This will ensure that important roosting, foraging and commuting corridors are maintained;
- Lighting if required shall be of a low height (as low as possible without compromising safe working standards) to ensure minimal light spill and where feasible timers or motion sensors shall be used to ensure areas are retained in darkness as much as possible. Lighting shall be directed to where it is required only, and this can be achieved by fitting louvres to the lighting;

[48] There is no guarantee that this approach would be permitted, in light of ongoing legal review of sections of the Wildlife Act).

Owing to the nature of the site and the proposed importation of material from other area, a watching brief shall be maintained for the duration of the works for establishment of IAPS. Where a scheduled species becomes established, the retained ecologist shall impose a works exclusion zone (typically 7m in the case of Japanese knotweed) until such time that an Invasive Species Management Plan (ISMP) with suitable treatment protocols has been prepared by the retained ecologist, if so experienced or a specialist contractor.

8.8.1.2 Construction Management Plan (CMP)

An Outline CMP has been prepared in respect of the project (**Appendix 5.2** -Volume III of this EIAR). The outline CMP or similar will be finalised prior to the commencement of site activities, in order to minimise the effects on the environment during site preparation and backfilling. The CMP will detail the working area, hours of work, principal construction methods and phases, construction traffic, parking arrangements and will incorporate environmental protection measures.

The finalised CMP, for which the Retained Ecologist shall contribute, will include a site biodiversity management plan which will be cognisant of the landscape design and implementation. The CMP will address the following as a minimum.

- Badgers – protection of on-site sett and monitoring for additional potential;
- Habitat retention – Vegetation retention and protection, timing of scrub clearance within the site;
- Frog translocation (adult/spawn under licence);
- Precautionary monitoring for Newt;
- Vegetation clearance Scheduling of works to allow for minimising disruption to biodiversity; and
- Advising on timing of works and/or requirement to undertake annual surveys as well as acting as scientific agent in respect of NPWS licence applications.

The Retained Ecologist will advise and supervise/liaise as necessary in respect of any new feature of ecological importance that monitoring or annual surveys identify.

8.8.1.3 Sediment Control - Protecting Watercourses and Water Quality

Mitigation and monitoring measures in relation to water quality are detailed in **Chapter 10 - Water – Hydrology.** The measures reflect the likely permitted activities in relation to the Local Authority permitted discharge of water during the advance works to prepare the site or the subsequent permitted discharge of water during the operation phase of the by the EPA.

With reference to the potential for impact on the Shallon stream to the north of the site and ultimately the Malahide Estuary, the CMP will include for best practice general protection during the operation phase, around the overburden to ensure that runoff from the overburden of exposed wet soil will not flow to the drainage ditches or the Shallon steam directly. The specification and location of the peripheral silt fencing around the overburden shall be detailed in the Construction Management Plan (CMP) or similar (and shall be cognisant of the proposed amphibian mitigation measures detailed at **Section 8.8.1.7.**

8.8.1.4 Vegetation clearance

Scrub clearance or other removal of vegetation from within the central (working part of the Proposed Development site) should be planned and carried out outside of the bird breeding season, which extends from 1st March to 31st August, inclusive.

In subsequent years, small scale re-establishment of individual shrubs could be cleared in any season, whilst large areas of re-established scrub should be subject to after ecological inspection and verification that no nesting birds present. There can be no guarantee that inspections undertaken during the bird nesting season would not find nesting and hence, the removal of re-establishing vegetation where practical should eb undertaken outside the bird nesting season.

There is no requirement to remove vegetation from anywhere along the site boundary. All trees and hedgelines along the site boundary that are intended to be retained, both within and adjacent to the site boundary (where the root protection area of the tree extends into the site boundary), will be fenced off at the outset of works in the adjacent working area and for the duration of the remediation works in that area to avoid structural damage to the trunk, branches or root systems of the trees. Temporary fencing (post and rail) will be erected at a sufficient distance from linear features so as to enclose the Root Protection Area (RPA) of the tree. In general, the RPA covers an area equivalent to a circle with a radius 12 times the stem diameter (measured at 1.5m above ground level for single stemmed trees, or above the root flare for multi-stemmed trees).

Where fencing is not feasible due to insufficient space, protection for the trees will be afforded by wrapping hessian sacking (or equivalent) around the trunk of the tree and strapping stout buffer timbers around it.

The area within the RPA will not be used for vehicle parking or the storage of materials (including soils, oils and chemicals). The storage of hazardous materials (e.g. hydrocarbons) will not be undertaken within 10m of any retained trees, hedgerows and treelines.

If construction activities are required within the RPA, e.g. excavation work, then a qualified arborist will advise on the best methods for protecting the tree. For example, any excavation works carried out within the RPA will need to avoid damage to the protective bark covering larger roots. This may involve excavation by mini-digger and/or hand as deemed appropriate. Exposed roots will be wrapped in a hessian sacking to avoid desiccation and roots less than 2.5cm in diameter can be pruned back to a side root. The advice of a qualified arborist will be sought if larger roots that influence anchorage need to be severed. Any remedial works required to trees will be carried out by a qualified arborist.

Where tree removal may be required (due to health and safety considerations) in areas not previously identified e.g. along Bay Lane road, liaison with a suitably qualified ecologist will be required.

8.8.1.5 Managing Invasive Alien Plant Species

Any mitigation strategy in relation to invasive plant species will in the first instance be based on the *Guidelines on the Management of Noxious Weeds and Non-native Invasive Plant Species on National Roads* (National Roads Authority, 2010a), but should also take into account best practice for individual species that may become established on site. In summary, the following are applicable:

- If presence / establishment confirmed by Ecological Consultant, works including access will need to avoid disturbing the infestation or potentially contaminated soil within at least 7m of the infested area (this is the normal exclusion zone that is cited for Japanese knotweed);
- The Ecological Consultant or a specialist contractor should draw up an Invasive Species Management Plan (ISMP) for any Third schedule IAPS; and
- If works cannot be avoided within the exclusion zone the IAPS and contaminated soil will need to be appropriately treated and/or excavated and potentially removed off site or buried on site under licence from the NPWS, this would be detailed in the invasive species management plan.

8.8.1.6 Badger Mitigation

The active badger sett is being retained along the perimeter of the site and there is no requirement to close the sett (permanently or temporarily). A preconstruction survey will be undertaken by the retained ecologist prior to commencement of works to confirm the status of the breeding sett and any potential newly established setts. Thereafter, works will be scheduled to ensure that undue disturbance and interference with the sett does not occur.

The mitigation measures described below follow the recommendations set out in the *Guidelines for the Treatment of Badgers during the Construction of National Road Schemes* (National Roads Authority, 2005). The mitigation measures that apply in relation to the known badger sett within the ZoI are discussed below.

Prior to remediation works commencing within the vicinity of the main sett all site personnel will be given a Toolbox talk where they will be briefed on the presence of the sett and the legal protection that badgers, and their setts, are afforded.

An exclusion zone of 30 metres shall be maintained around the sett in the summer season (extended 50m during the breeding season defined as November to June inclusive). The indicative extent of these buffer zones are shown on **Appendix 8.E** (Volume III of this EIAR). The buffer will be clearly demarcated around the sett, using barrier tape. The purpose of the buffer should be noted as Biodiversity Feature rather than Badger to prevent potential persecution of this protected species.

The summer exclusion zone reduces from 30metres for heavy vehicles to 20m for site vehicles and 10m for pedestrians. Any works within the exclusion zone of the sett will be supervised by a suitably qualified ecologist.

Works within the exclusion zones above should only be carried out during daylight hours so as not to disturb foraging badgers. Night-time working, where required will be restricted as far as possible within 100m of the sett. As badgers are nocturnal, disturbance will be reduced by restricting the amount of night-time working within the vicinity of sett. Night-time, in terms of badger nocturnal activity, is defined as beginning one hour before sunset and lasting to one hour after sunrise.

The use of noisy plant and machinery in the vicinity of badger setts will cease before sunset; If the works involve excavations they will either be covered (with plywood), fenced or have an escape ramp installed overnight to prevent badgers, or other wildlife, from falling into them and becoming trapped;

Temporary Spoil heaps will be sited at a minimum distance of 30m from known setts.

Chemicals shall not be stored nor used within 30m of a badger sett.

The area closest to the active sett is scheduled to be the last one restored, some of the measures above will become more proscriptive by virtue of proximity to the sett. The ecological consultant will advise on programme of works and supervise as necessary.

During the course of the restoration project, poor management of spoil presents the potential for new sett creation, particularly if disturbance in another part of the site. It is recommended that in conjunction with annual preconstruction badger surveys, that a careful watching brief is maintained for signs of new badger activity in the form of setts. Where a new sett is confirmed, and its status ascertained, the consultant ecologist shall consult with NPWS in respect of potentially applying for a derogation licence as necessary to exclude the sett. This is seasonally dependant operation and would require evidence of alternative sett to naturally move on to. Where no such alternatives may be found, consideration of construction of an artificial sett should be discussed with the NPWS. This is not a favoured mitigation measure and as such there can be no guarantee that a derogation licence to close sett would be issued by NPWS in light of current legal review of the Wildlife Act.

The retained ecologist will ensure that the appointed contractor is complying with the mitigation measures outlined above.

8.8.1.7 Frog & Amphibian Mitigation

The confirmation of frog spawn means that frogs are present on site, although no adults have been recorded and the bulk of the existing habitat on site is considered less than favourable. Smooth newts have not been recorded on two site visits and the habitat conditions are less the favourable to support its use of the small man-made sump pond. Notwithstanding this fact, newts are wholly protected and as a precautionary measure it is recommended that the recommended measures applicable to frog are equally valid.

In terms of mitigation, the removal of the man-made sump pond (**Appendix 8.E** – Volume III of this EIAR – Note N1) should only be undertaken outside the breeding/hibernating season e.g. in summer months to minimise significant impact of local populations.

Until such time that the sump pond is to be removed, the potential for amphibian occurrence in the areas cannot be ruled out. An annual licence should be sought by the retained ecologist on behalf of the client to enable the removal of frog spawn and /or adults each season to suitable donor sites. The licence should also specify Amphibian translocation as a precautionary measure. The location of the donor site would be agreed in advance with NPWS and would require a suitable pond with suitable supporting vegetation or very slow-moving stream. There is limited potential adjacent to the site with which to guarantee the persistence of the local amphibians, who are known to return to ponds.

As such a newly created donor site is recommended to be constructed on site, to the north of feature N1. It is recommended that a smaller hollow is constructed in an existing topographical hollow alongside the Shallon Stream. As the site is directly beneath a flight path from Dublin Airport, it is recommended that large open water bodies are not proscribed, owing to the potential to encourage birds, which can pose a risk to airplanes. For this reason, the proposed shallow pond/scrape should measure approximately 4 or 5 metres in diameter, be irregularly shaped and should ideally be situated near cover both to discourage usage by larger birds (unlikely at this site) and provide cover from predation should it be used as a spawning site.

The construction of the relatively simple pond should be undertaken at the commencement of the project, so that any issues regarding seeping water and recharge can be sorted out before amphibians return to spawn. The design of the pond should be relatively shallow but incorporate stones ledges for ease of access. It should be seeded with some plants from the original sump pond or similar aquatic substitutes.

Until the newly created pond is successfully constructed, the wet hollow surrounding feature N1 and extending northwards alongside the overburden towards the Shallon Stream should have newt barrier fencing installed based on final site-specific recommendations of the retained ecologist. This fencing which is a relatively inexpensive proprietary product, available through specialist suppliers may be used, or a geotextile membrane fence may be employed. Either way, it will ensure (if properly maintained) that Amphibians cannot easily venture beyond the defined range within the works area. The final design of the amphibian fence will be cognisant of the sediment runoff fence described in **Section 8.8.1.3**.

8.8.1.8 Hedgehog Mitigation

The presence of Hedgehog was confirmed by a single distinctive dropping. Leaf piles that were carefully searched in December 2018 did not have any adults. As there is no known method for excluding pygmy shrew or hedgehog from nest / hibernation sites and therefore the seasonal clearance of vegetation for breeding birds (as described elsewhere) will be implemented. This means vegetation clearance works will avoided during the period 1st March – 31st August, inclusive. This mitigation will simultaneously avoid the majority of the main breeding season for most small mammal species (Hayden & Harrington 2001).

In terms of site changes, and potential impacts on hedgehog population, it is recommended that two hedgehog hibernation boxes be installed by the Retained Ecologist. One is recommended for the hedgeline east of the existing settlement tank to overcome previous clearance of scrub during separate SI works. A second box is proposed for the North eastern corner of the site in rank hedgeline alongside the Shallon Stream. This is proposed to disturbance of adjacent hedgeline which is subject to a consented development and for which considerable leaf cover was noted. The final location of the boxes should be notified to the Fingal Biodiversity Officer and the Local NPWS conservation ranger for their records.

8.8.2 Restoration Phase

8.8.2.1 Biodiversity Enhancements

There is limited scope for biodiversity enhancement at the site, as there is a previous planning requirement to return the unenclosed parts of the site to its original ground level and reinstate it to agricultural grassland sward. There is some, albeit limited, scope to enhance the perimeter vegetation. Thus, the landscaping design has been cognisant of this requirement and interaction with ecological requirements have been incorporated into the design as appropriate. There will be some additional planting of hedgerow material within the site boundary to reinforce the screening effect and strengthen faunal corridors. These measures will not become wholly effective for a number of years post planting.

With the exception of the planting, the bulk of the mitigation measures should be completed in advance of implementation of landscape design. Other, relatively small-scale biodiversity enhancement measures are recommended below.

8.8.2.2 Habitats

Much of the quarry habitats and its constituent vegetation mosaic will all be lost as a result of the proposed soil recovery facility. The majority of these habitats are of little ecological value other than in the mosaic present and the niche that they offer in the wider landscape. There is little scope for significant habitat recreation or enhancement at the site and there are limitations as to where tree planting can take place.

The proposed landscaping design is outlined in **Chapter 16** of the EIAR. The key protective measure is the retention of all boundary vegetation including mature trees and hedgelines lines will be retained. Additional planting to reinforce gaps will occur wherever practicable.

As outlined in the All-Ireland Pollinator Plan 2015-2020[49] all planting should, where practicable, comprise native species of local provenance and certainly be typical of the area. However, there is limited scope to provide large area of species-rich habitats among the agricultural grassland sward. Species-rich native seed mixes are not being recommended into the final design. However, it is possible that small areas of dereliction such as at field corners, where nettles and flowering species may develop.

The small amphibian pond that is recommended will be planted with appropriate wetland herbs and grasses through both natural establishment from seed bank and where necessary from seeding from small clumps of suitable vegetation from the drainage ditch.

8.8.2.3 Badger

Impacts on badger foraging resource are considered non-significant and no specific restoration phase mitigation measures are proposed. There is an abundance of optimal badger habitat within the immediate wider landscape, albeit much of it designated for development in the future.

8.8.2.4 Amphibians

Whilst no significant impacts are anticipated during the restoration phase, the implementation of the landscaping design may coincide with peak breeding/spawning times. The retained ecologist should ensure receipt of the Amphibian translocation licence for this period.

Areas of prepared ground where standing water are present should not be allowed to develop as this could encourage spawning in the new landscape. Where spawn is found, it should be translocated to the previously constructed donor site. This operation need only be undertaken in the event that the works are being carried out in the spawning season.

The location of the proposed shallow water feature alongside the Shallon stream should have a post and rail fence installed around it to prevent livestock from entering and trampling the ground around the constructed water feature, if the fields are returned to grazing. The temporary newt fencing installed during the commencement of the quarry backfilling works can be removed at this time.

[49] http://pollinators.ie/

8.9 MONITORING

In relation to monitoring, the draft guidance from the EPA states that:

"It may be appropriate, where relevant, to propose monitoring to take place after consent is granted in order to demonstrate that the project in practice conforms to the predictions made."

Furthermore, the guidance also notes the following points:

- "It is important to avoid excessive reliance on monitoring because this has the potential to lead to operational changes that fall outside the scope of project that was subject to scrutiny during the consent process."
- "Monitoring post-consent should similarly not be used to allow the deferral of the gathering of information that is necessary for the assessment/consent."
- "Monitoring descriptions should refer to remedial actions to be taken; as well as responsible parties."

With this in mind, monitoring measures, and targets as appropriate have been recommended in relation to the Proposed Development.

8.9.1 Operational Monitoring

An outline Construction Management Plan has been prepared in respect of the planning submission for the Proposed Development. A Retained Ecologist shall be appointed by the contractor to advise and/or oversee the implementation of all ecological mitigation measures. They may call upon specialist or licenced ecologists in respect of certain elements. The findings will be documented and retained for inspection by the planning authority (if requested) or Statutory agencies such as EPA, IFI or NPWS as appropriate.

A key part of the Retained Ecologist role will be to advise the contractor(s) on the implications of any pre-construction and/or updated ecological surveys for protected species, if necessary in accordance with relevant licences and/or conditioned survey/mitigation after reports to NPWS. Updated surveys may influence the scope, timing or requirement for mitigation proposed within this EIAR.

Having reviewed this EIAR, and any relevant planning conditions, post-consent consultations with statutory bodies or post consent monitoring results, the Retained Ecologist specifically will have a role in advising the applicant on the following, if necessary with reference to expert ecological advice:

- Phasing of enabling/advance works and construction works (particularly requiring vegetation removal) to comply with EIAR mitigation measures and/or legal protections for protected species such as nesting birds;
- Managing mitigation conflicts (e.g. the time and manage the licensed translocation of frog spawn (January to March) whilst ensuring vegetation clearance is completed in the non-breeding bird season (September to February inclusive);
- Ensuring that as the retained overburden is moved to cover each of filled areas, that badger activity and or newly established setts are not impacted upon;
- Appropriate locations and installation methods for provision of compensatory Amphibian habitat; and

- Verification, if necessary with reference to changes to the site as a result of consented adjacent developments – Bat connectivity, badger movement etc.
- All new ecological data and/or records gathered during the course of the project should be issued to the planning authority including the Biodiversity officer, and consideration given to submission to the National Biodiversity Data Centre as approved.

8.9.2 Post-restoration Monitoring

Depending on the outcome of licence requirement, the applicant and their scientific agent will be responsible, during restoration phase when importation of material has ceased, and vegetation is becoming established on the remodelled site, to ensure that any additional mitigation measures that may have been implemented are put in place e.g. treatment of IAPS and documented confirmation of eradication.

A final report on all works and monitoring concerning monitoring should be issued to the planning authority including the Biodiversity officer to confirm compliance with same.

No further monitoring measures are recommended as the site will be returned to agricultural use.

8.10 REFERENCES

Anon. (Undated) Amphibian and Reptile Conservation (Anon.). *National Amphibian and Reptile Recording Scheme – NARRS: Amphibian surveys.*

CIEEM. 2018. *Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd Edition.* Winchester.

Collins, J. (Ed.). (2016). *Bat surveys for professional ecologists: good practice guidelines*. Bat Conservation Trust.

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

Department of Housing, Planning and Local Government. 2018. *River Basin Management Plan for Ireland 2018 – 2021*.

Edgar, P., Foster, J., & Baker, J. (2010). *Reptile Habitat Management Handbook*. ARC, Bournemouth.

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

Fingal County Council (2012). *Cherryhound Local Area Plan.* (Extended from 2017 to 2022)

Fingal County Council (2017). *County Development Plan 2017-2023*.

Fossitt, J. (2000). *A Guide to Habitats in Ireland.* The Heritage Council, Kilkenny, Ireland.

Hayden, T. & Harrington, R. (2001). *Exploring Irish Mammals*. Town House Publishers, Dublin.

Hundt, L. (2000). *Bat Surveys: Good Practice Guidelines.* The Heritage Council, Kilkenny, Ireland.

IFI. (2016). *Guidelines on Protection of Fisheries During Construction Works in and Adjacent to Waters.* Inland Fisheries Ireland.

Kelleher, C., & Marnell, F. 2006. *Bat Mitigation Guidelines for Ireland.* Irish Wildlife Manuals, No. 25. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland.

Kelly, J., O'Flynn, C., and Maguire, C. 2013. *Risk analysis and prioritisation for invasive and non-native species in Ireland and Northern Ireland*. A report prepared for the Northern Ireland Environment Agency and National Parks and Wildlife Service as part of Invasive Species Ireland.

King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., FitzPatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. and Cassidy, D. (2011). Ireland Red List No. 5: Amphibians, Reptiles and Freshwater Fish. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Lockhart, N., Hodgetts, N., Holyoak, D. (2008). *Ireland Red List No. 8 Bryophytes*. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Marnell, F., Kingston, N., and Looney, D. (2009). Ireland Red List No. 3: Terrestrial Mammals, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Meehan, S., (2013). *IWT National Smooth Newt Survey 2013 Report*. Irish Wildlife Trust.

Moore, N.P., Kelly, P.F., Lang, F.A., Lynch, J.M., & Langton, S.D. (1997). *The peregrine Falco peregrinus in quarries: current status and factors influencing occupancy in the Republic of Ireland.* Bird Study **44(2),** pp 176-181.

National Roads Authority (NRA). 2005. *Guidelines for the Conservation of Bats in the Planning of National Road Schemes*. National Road Authority.

National Roads Authority (NRA). (2009a). *Ecological Surveying Techniques for Protected Flora and Fauna during the Planning of National Road Schemes.* National Roads Authority.

National Roads Authority (NRA). (2009b). *Guidelines for Assessment of Ecological Impacts of National Roads Schemes.* National Roads Authority.

National Roads Authority (NRA). 2010. *Guidelines on the Management of Noxious Weeds and Non-Native Invasive Plant Species on National Roads*, Revision 1. National Roads Authority.

Regan, E.C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Nash, D., Nixon, D., and Wilson, C.J. (2010). *Ireland Red List No. 4 – Butterflies.* National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Ireland.

Reid, N., Dingerkus, S.K., Stone, R.E., Pietravalle, S., Kelly,R., Buckley, J., Beebee, T.J.C. & Wilkinson, J.W. (2013). *National Frog Survey of Ireland 2010/11*. Irish Wildlife Manuals 58. National Parks and Wildlife Service, Department of arts, Heritage and the Gaeltacht, Dublin, Ireland.

RPS (2019). *Extended Operation at Hollywood Landfill Environmental Impact Assessment Report*. Planning submission to Fingal County Council on behalf of Integrated Materials Solutions Limited Partnership.

Smith, G., O'Donoghue, P., O'Hora, K., & Delaney, E. (2011). *Best Practice Guidance for Habitat Survey and Mapping*. Kilkenny, The Heritage Council, Ireland.

SNH. 2016. *Assessing Connectivity with Spatial Protection Areas (SPAs) – Guidance*. Scottish Natural Heritage, Version 3. www.snh.gov.uk

Stace, C. (2010). *New Flora of the British Isles.* Cambridge University Press.

Wyse Jackson, M., FitzPatrick, Ú., Cole, E., Jebb, M., McFerran, D., Sheehy Skeffington, M. and Wright, M. (2016). Ireland Red List No. 10: Vascular Plants. National Parks and Wildlife Service, Department of Arts, Heritage, Regional, Rural and Gaeltacht Affairs, Dublin, Ireland.

9 SOILS, GEOLOGY AND HYDROGEOLOGY

9.1 INTRODUCTION

This chapter of the environmental impact assessment report (EIAR) evaluates the impact of the proposed backfilling of the Bay Lane Quarry pit on the soils, geology and hydrogeology of the site and the wider region. This evaluation has been carried out in consideration of baseline conditions established from published sources and site observations.

This chapter has been prepared in accordance with 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (Institute of Geologists of Ireland, 2013).

9.2 ASSESSMENT OF THE RECEIVING ENVIRONMENT

9.2.1 Bedrock Geology

As shown on **Figure 9.1**, the site lies on the contact between the Rush Conglomerate Formation to the north and the Tober Colleen Formation to the south. These formations consist of visean limestone and calcareous shale of Missippian Age' (Department of Communications, Climate Action and Environment, 2018). The Rush Conglomerate Formation is a shale/limestone conglomerate consisting of graded quartz and limestone pebble conglomerate and lithic sandstones, interbedded with laminated shale and thin limestones. It is up to 300m thick and is equivalent to the 'Calp', a term used to describe basinal argillaceous limestones which dominate rock types of the Dublin Basin. The Tober Colleen Formation is a calcareous shale/limestone conglomerate consisting of dark grey, calcaereous, commonly bioturbated mudstones and subordinate thin micritic limestones. It is 50m to 250m thick. (Department of Communications, Climate Action and Environment, 2018).

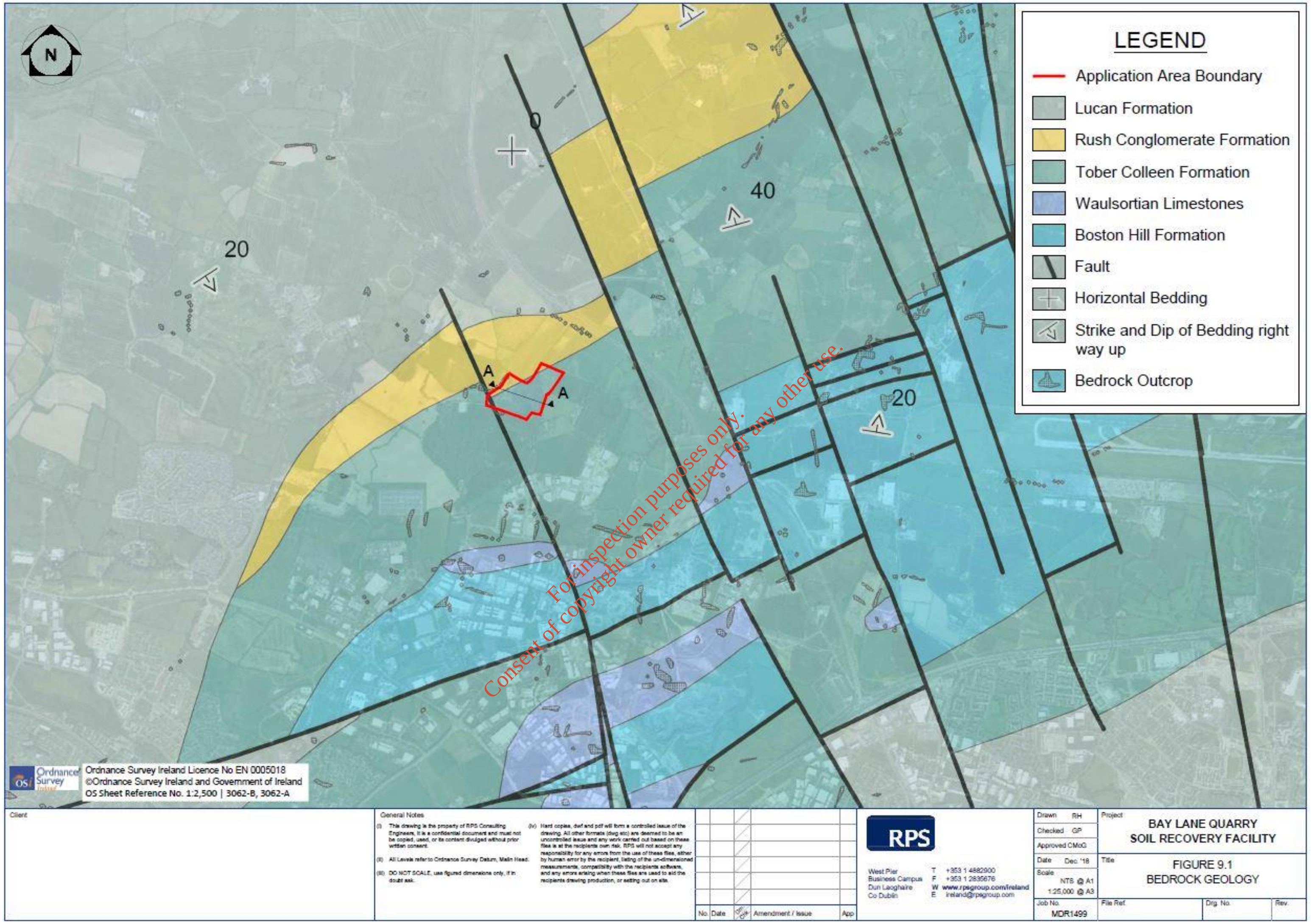


Figure 9.1: Bay Lane Quarry - Bedrock Geology

There are bedrock outcrops to the northwest of the site and the quarry itself is a manmade outcrop. There are no karst features recorded in the region (Department of Communications, Climate Action and Environment, 2018).

The geological structure of the area consists of a simple anticline dissected by two series of faults, one running parallel to the regional strike (NE-SW) and the other running NNW-SSE. These faults are steep and display some sinistral movement. The Bay Lane Quarry site lies at the western end of the northern limb of this feature where the dip is moderate to steep northwards. An NNW-SSE trending fault is located at the SW corner of the site (Strogen, Somerville, & Jones, 1988).

Information on local geology is based on a ground investigation carried out during planning of Bay Lane Quarry in September 1999. The ground investigation consisted of 6 no. boreholes. Ground investigation logs or a ground investigation report are not available. Information on the ground materials encountered during the investigation is recorded in the EIS for the excavation of Bay Lane Quarry (Frank L. Benson and Partners, 2000). The boreholes were drilled to depths between 41m and 61m below ground level (35mOD to 15mOD). The boreholes encountered moderately strong to strong, dark grey to grey, fine to medium grained, thinly bedded, silty limestones with bands of black moderately weak to weak black shale or shaley limestone. Thin layers of clay were encountered between 15m and 24m below ground level (61mOD to 52mOD) in 3 no. of the 6 no. boreholes. The bedrock was generally consistent across the site and is consistent with the regional geology. The dip of strata in the cores varied between 23° and 40°. A weak rubbly zone was recorded in a borehole in the centre of the site at a level of approximately 41mOD. This may indicate minor faulting. No other broken ground or solution features were recognised in the boreholes. High RQD values were generally recorded with most fractures occurring on bedding surfaces. Joint inclinations were typically between 65° and 80° (Frank L. Benson and Partners, 2000).

Permeability testing carried out in the bedrock in September 1999 indicates an overall permeability of approximately 10^{-7}m/s. It is likely that the bulk of the groundwater flow would be through discrete, high-permeability flow horizons, possibly faults, while the intact rockmass has permeability significantly lower than the measured values (Frank L. Benson and Partners, 2000).

The exposed bedrock faces observed during a site visit in November 2018 are consistent with the published information and borehole descriptions. As shown on **image 9.1**, the strata are dipping at an apparent angle of approximately 45° in the north pit wall.

Image 9.1: North pit wall

The pit walls had a blocky, ravelling surface but no signs of significant instability were observed.

Aggregate from this quarry was used at a building construction site where problems subsequently arose from the presence of reactive pyrite in the under-floor fill material (Tuohy, 2012). The bedrock at the site and the aggregate piles at the base of the pit may contain reactive pyrite. Pyritic bedrock may damage buildings founded on this rock, particularly where the rock is exposed to air by excavations for foundations or services (Watts & Charles, 2015). The bedrock and aggregate piles at the base of the pit are sufficiently far below the proposed backfilled surface that any heave exhibited by these materials will have a minor impact on the surface profile.

9.2.2 Overburden Geology (Teagasc Subsoils)

The site is located mostly within a bedrock outcrop formed by the excavation of the Bay Lane Quarry. As shown on **Figure 9.2,** the stockpile in the northeast corner of the site is located on 'till derived from limestones. (Department of Communications, Climate Action and Environment, 2018). This subsoil type is dominant across the region. The stockpile is understood to be comprised of this overburden material which was removed during the excavation of the quarry.

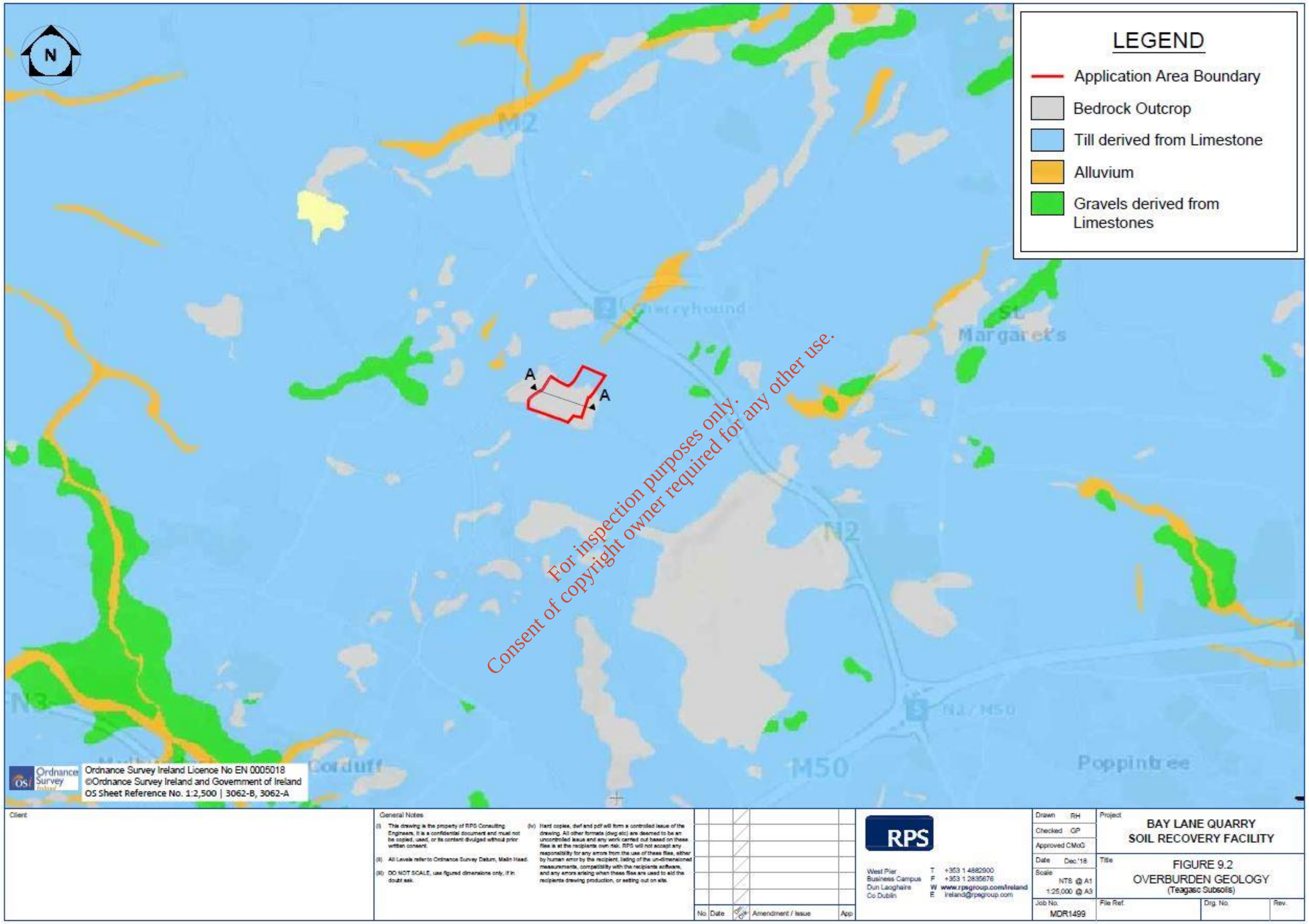


Figure 9.2: Bay Lane Quarry - Overburden Geology (Teagasc Subsoils)

From the September 1999 ground investigation records, the overburden is described as silty, clayey soil overlying silty sands, clay and gravel. The overburden was recorded to be 2m to 4m thick with typically 1m of gravel overlying the bedrock (Frank L. Benson and Partners, 2000).

It is expected that within the overburden the fine upper layers would have permeability values of 10^{-7}m/s or lower and the coarse lower layers, overlying the bedrock, would have permeability values of 10^{-5}m/s or higher (Frank L. Benson and Partners, 2000).

The stratigraphy of the overburden was visible during the site visit and is shown on **Image 9.2.** The overburden appears to consist of approximately 4m of gravelly clay.

Image 9.2: Stratigraphy of overburden

9.2.3 Soil

The surficial soil is classified as 'Straffan' described as 'Fine loamy drift with limestones' according to the Irish Soil Information System (SIS), as shown on **Figure 9.3**. The drainage is classified as 'Poor' (Environmental Protection Agency, 2018).

The Teagasc Soil classification at the site is 'BminPD – Mineral poorly drained (Mainly basic)' (Department of Communications, Climate Action and Environment, 2018), as shown on **Figure 9.4**.

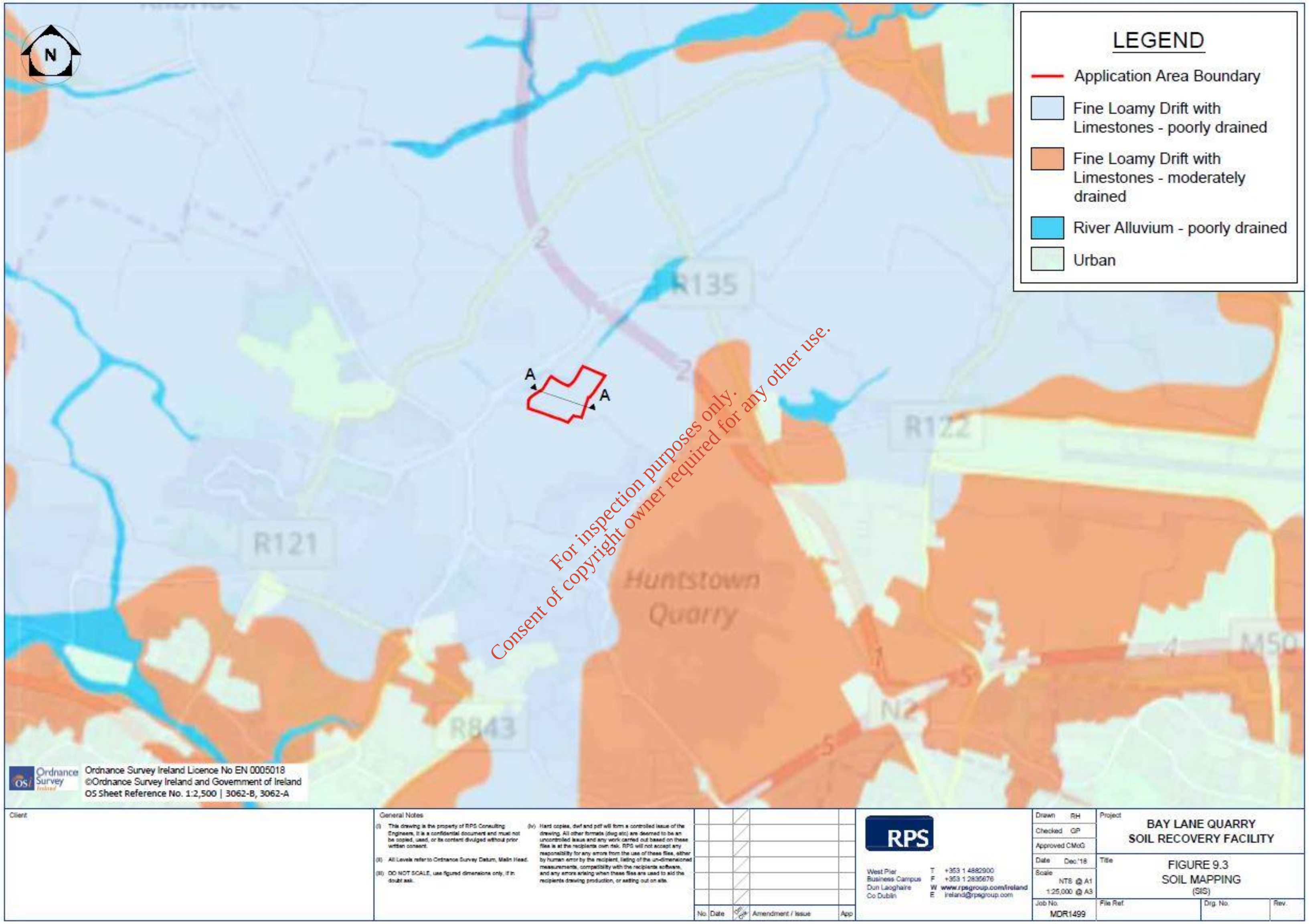


Figure 9.3: Bay Lane Quarry - Soils (SIS)

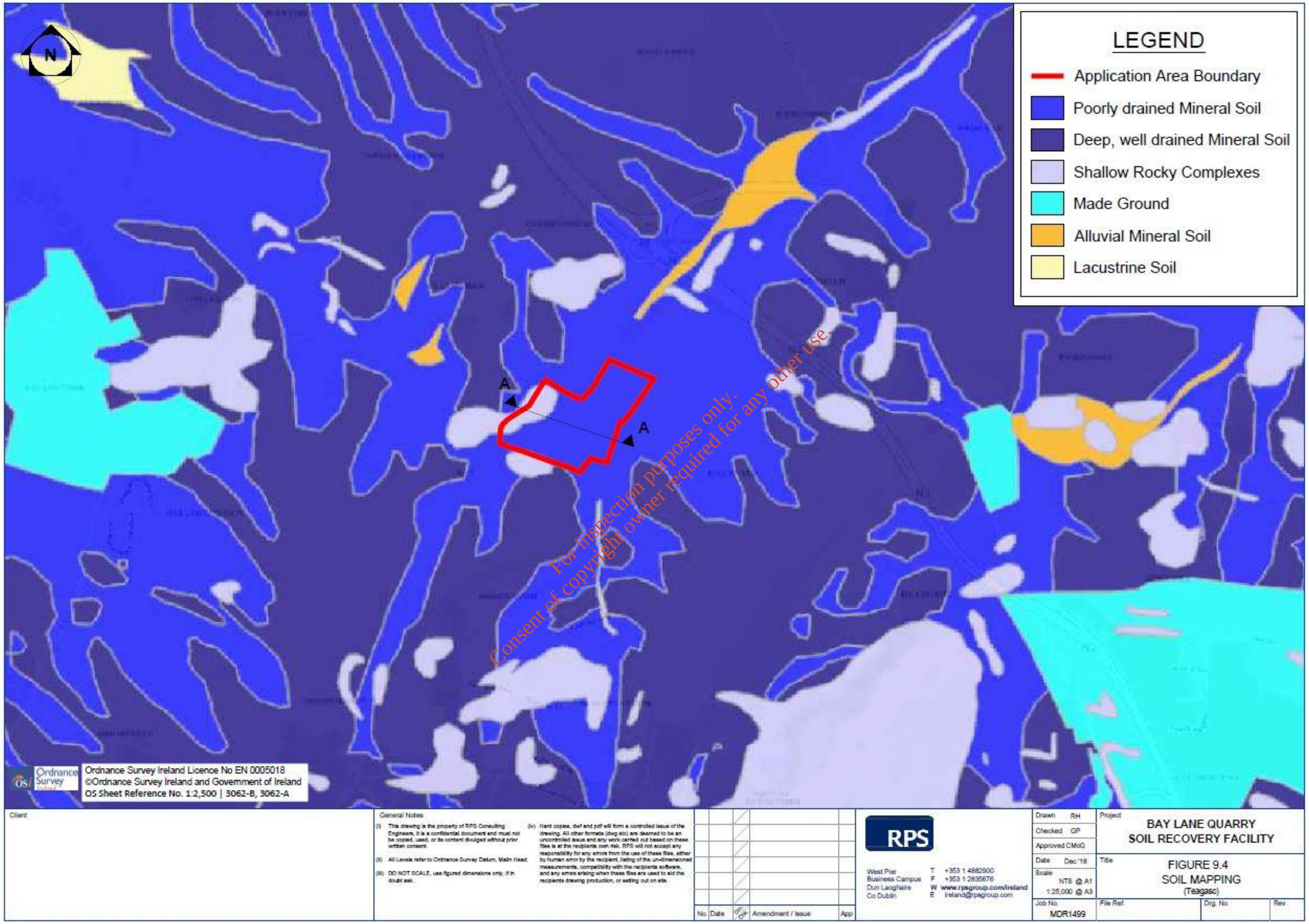


Figure 9.4: Bay Lane Quarry - Soils (Teagasc Soils)

The soil layer is visible in **Image 9.2**. The bulk soil that would have been originally present on site would have been incorporated in the stockpile, along with the subsoils.

9.2.4 Topography

The regional topography is generally flat and is shown on the aerial photography on **Figure 9.5** (Microsoft Corporation, 2018). The topographic contours of the site are shown on **Figure 9.6**. The ground levels at the site boundary are between 74mOD and 76mOD (the natural ground level).

The stockpile at the northeast of the site rises from the natural ground level to a maximum height of approximately 87mOD. The stockpile is gently sloping towards the east (approximately 1V:15H) and steeply sloping towards the west (approximately 1V:1.7H).

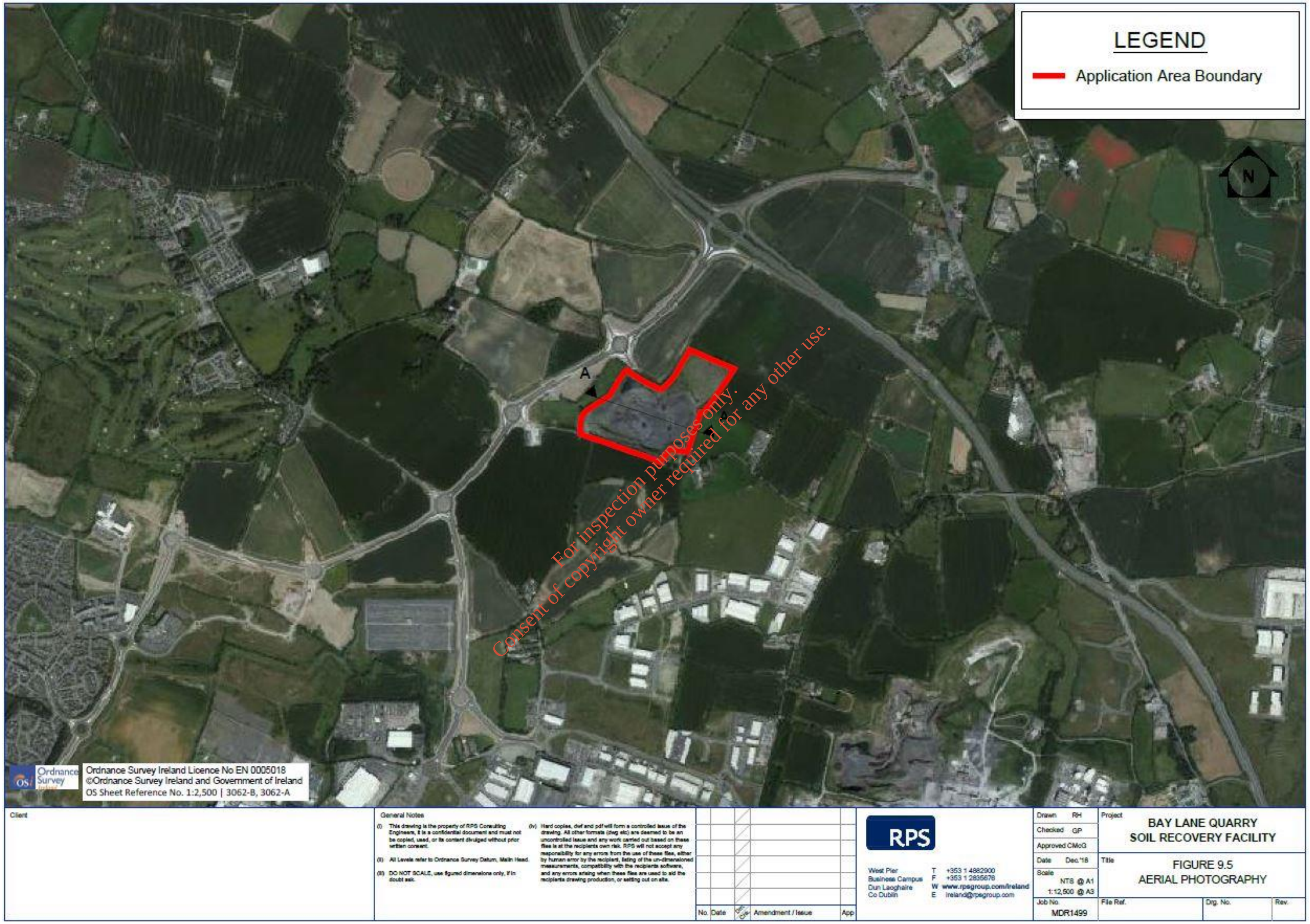


Figure 9.5: Bay Lane Quarry - Aerial Photography

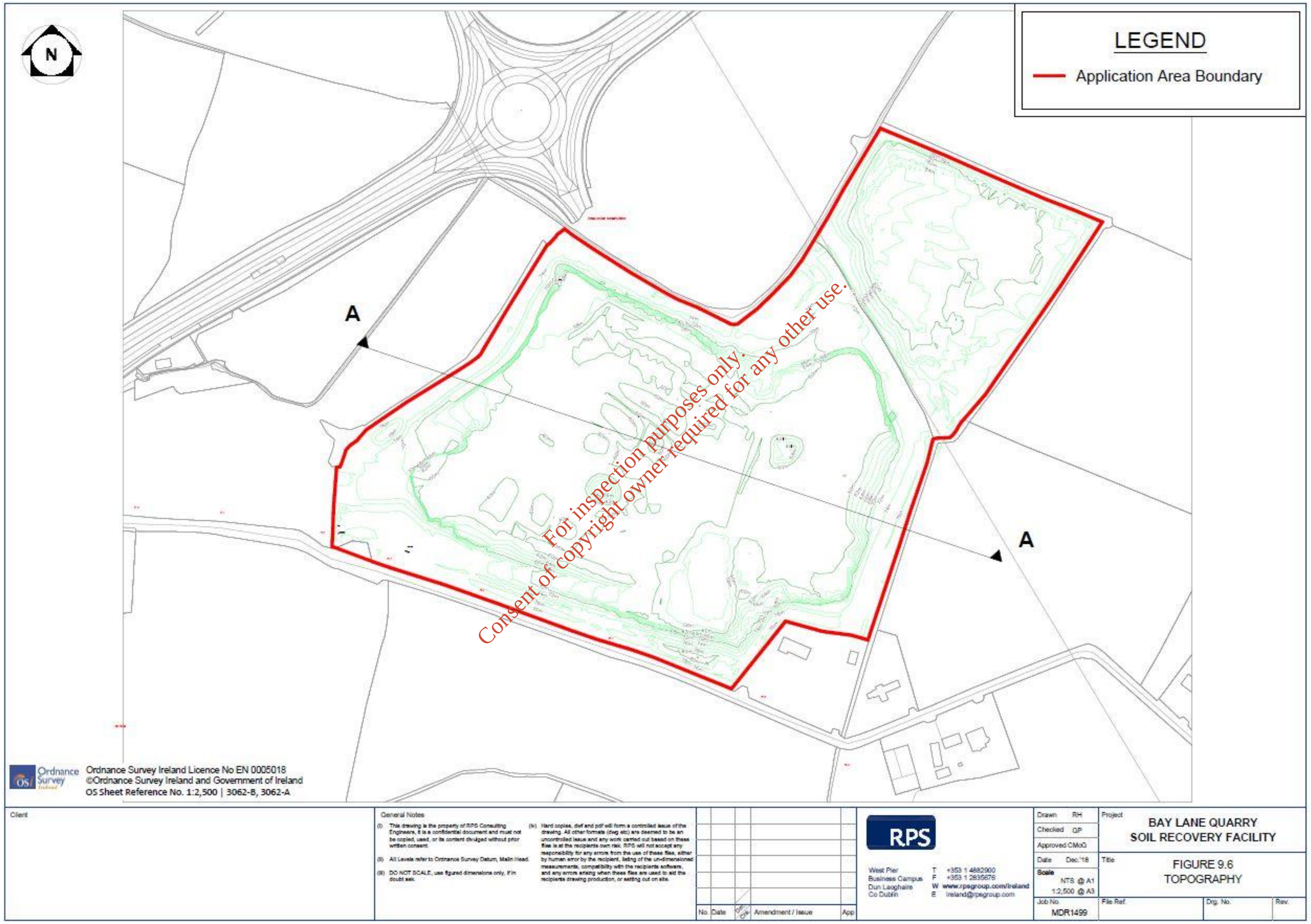


Figure 9.6: Bay Lane Quarry - Topography

A berm extends around the pit where it is adjacent to the site boundary. The top level of the berm is approximately 76mOD on the north and east sides and approximately 77mOD to 80mOD on the south side. Inside the berm, the overburden has been removed to expose the bedrock.

The pit slopes are near-vertical and extend from the top of rock to approximately 59mOD. There are rubble piles in the base of the pit ranging from 2m to 8m high.

The topography of the quarry site and the adjacent agricultural land are shown on Image 9.3 and Image 9.4 respectively.

Image 9.3: Topography of the Bay Lane Quarry site

Image 9.4: Topography of adjacent agricultural land

9.2.5 Groundwater

The groundwater levels measured in the September 1999 boreholes were within the overburden and displayed limited fluctuation. This indicates that in this area the groundwater is typically discharging from the bedrock into the overburden and the groundwater levels are controlled by flow into the overburden (Frank L. Benson and Partners, 2000). Groundwater flow to the overburden will discharge through surface water drainage systems described in Chapter 10 of this EIAR. Details of how this will affect ecology are included in Chapter 8 of this EIAR.

During the site visit in late November 2018, the groundwater level was observed to be near the base of the pit, as shown in **Image 9.5**. The comparatively low groundwater level may be due to the unusually dry, hot weather experienced in 2017 and 2018.

Image 9.5: Bay Lane Quarry pit - November 2018

Regionally, the bedrock is likely being recharged from topographic highs where the groundwater level in superficial is high and downward vertical flow can occur. Discharge of groundwater is into surface water drainage systems in low-lying areas (Frank L. Benson and Partners, 2000). Regional groundwater flow direction may not be consistent and the potential for flow to occur in any direction has been considered.

The site is located within the Swords Groundwater Body and the Eastern River Basin District. The flow regime in this body is classified as 'Poorly productive bedrock' (Department of Communications, Climate Action and Environment, 2018).

The Ground Waterbody Water Framework Directive (WFD) Status (2007 to 2012 and 2010 to 2015) is 'Good'. This is based on an assessment of groundwater chemical and quantitative figures drawn from representative monitoring points selected specifically for this assessment (Environmental Protection Agency, 2018). The WFD Ground Waterbody Approved Risk is 'Not at risk' (Environmental Protection Agency, 2018).

The 2008 Groundwater Waterbody Score 2008 is 2a 'Expected to achieve good status', calculated as part of the Article 5 characterisation and risk assessment report carried out to identity waterbodies at risk of failing the objectives of the WFD 2000/60/EC, Water Policy Regulations 2003 (SI no. 722/2003) (Environmental Protection Agency, 2018).

The nearest groundwater monitoring location on the EPA WFD Groundwater Monitoring Network is the Curragha PW1 Station. The following measurements were recorded (Environmental Protection Agency, 2018):

- Ammonium concentration (2007-2009) – 0.113mg/l
- Ammonium concentration (2014) – 0.107mg/l
- Nitrate concentration (2007-2009) – 1.4mg/l
- Nitrate concentration (2014) – 0.45mg/l
- Phosphate concentration (2007-2009) – 0.012mg/l
- Phosphate concentration (2014) – 0.0093mg/l
- Maximum Faecal Coliforms (2007-2009 and 2014) – 0 per 100ml

The site is located within an area where the WFD Ground Waterbodies intersect with designated Nutrient Sensitive Areas waterbodies in accordance with the Urban Waste Water Treatment (UWWT) Directive 91/271/EEC on Urban Waste Water Treatment and S.I. 254 / 2001, S.I. 440/2004 and S.I. 48/2010 (Environmental Protection Agency, 2018).

The site is mainly within an area designated as 'Extreme' groundwater vulnerability with localised areas of rock outcrops. The groundwater vulnerability map is included on **Figure 15.7**. The effective groundwater recharge is approximately 95mm/year (Department of Communications, Climate Action and Environment, 2018).

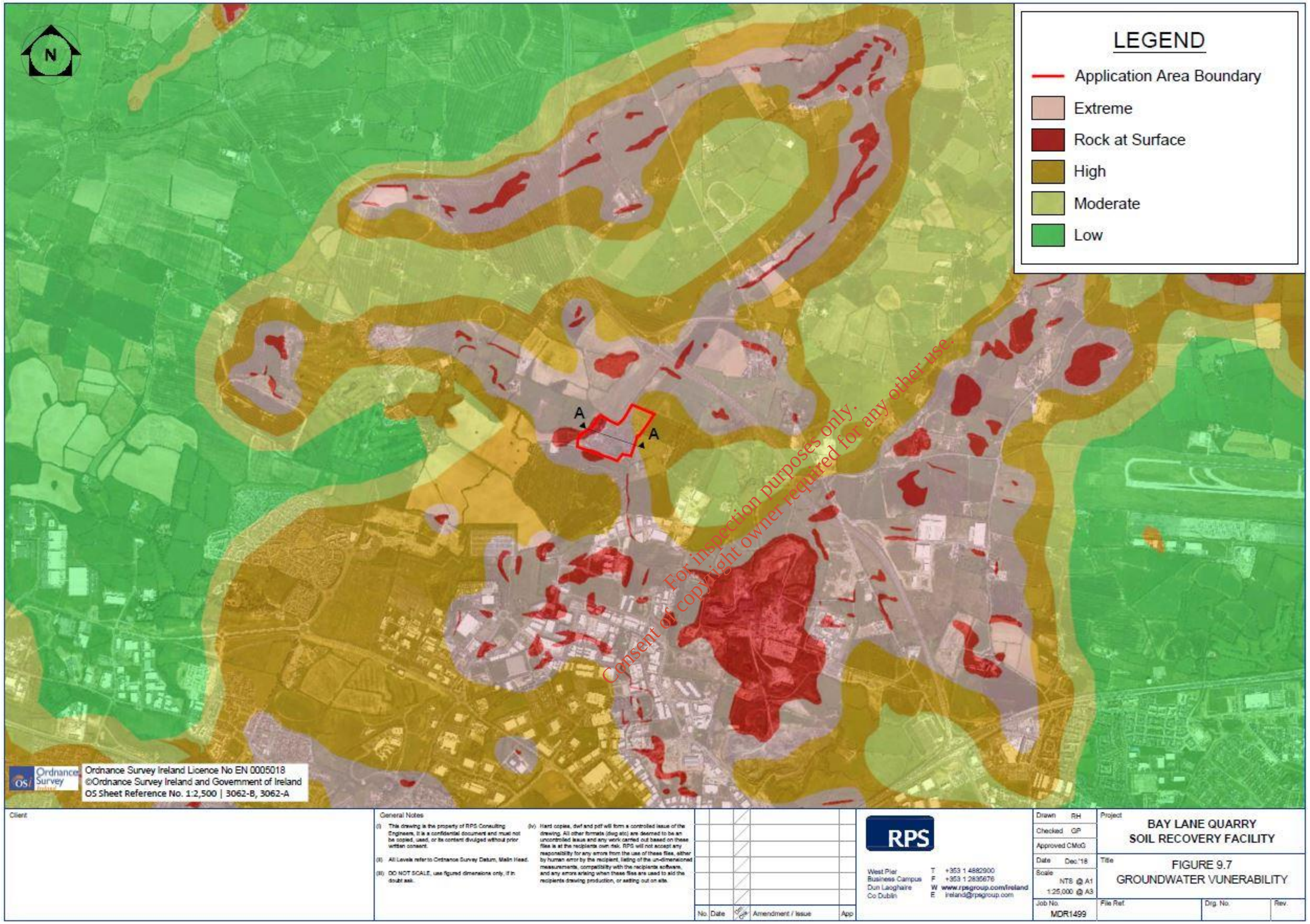


Figure 9.7: Bay Lane Quarry - Groundwater Vulnerability

9.2.6 Aquifers

The site straddles two aquifer designations, as shown in the map on **Figure 9.8**. To the north of the site, and including the north corner of the pit, is designated a 'Locally important Aquifer – Bedrock which is Moderately Productive only in Local Zones'. The bulk of the pit, and to the south of the site, is designated a 'Poor Aquifer – Bedrock which is Generally Unproductive except for Local Zones'. The boundary is at the contact between the Rush Conglomerate Formation to the north and the Tober Colleen Formation to the south. (Department of Communications, Climate Action and Environment, 2018).

The site and surrounds are within an area of groundwater that is a source of drinking water, as delineated in accordance with European Communities (Drinking Water) (No. 2) Regulations 2007 (SI no. 278/2007). The nearest Groundwater Drinking Water Protection Area is 7km to the west. (Department of Communications, Climate Action and Environment, 2018).

There are a number of groundwater wells and springs in the vicinity of the site as shown on **Figure 15.8** (Department of Communications, Climate Action and Environment, 2018) (Frank L. Benson and Partners, 2000). The wells that are within 2km of the site and are in active use as a domestic water supply are labelled DWS01 to DWS08. The well depth is shown on the table on **Figure 9.8**.

There is a Section 4 Discharge Licence for Bay Lane Quarry held by Irish Asphalt Ltd, which Fingal County Council considers expired. The Licencing Authority is Fingal County Council. There are other Section 4 Discharge Licences (Environmental Protection Agency, 2018) held by businesses in the vicinity, as shown on **Figure 9.8.**

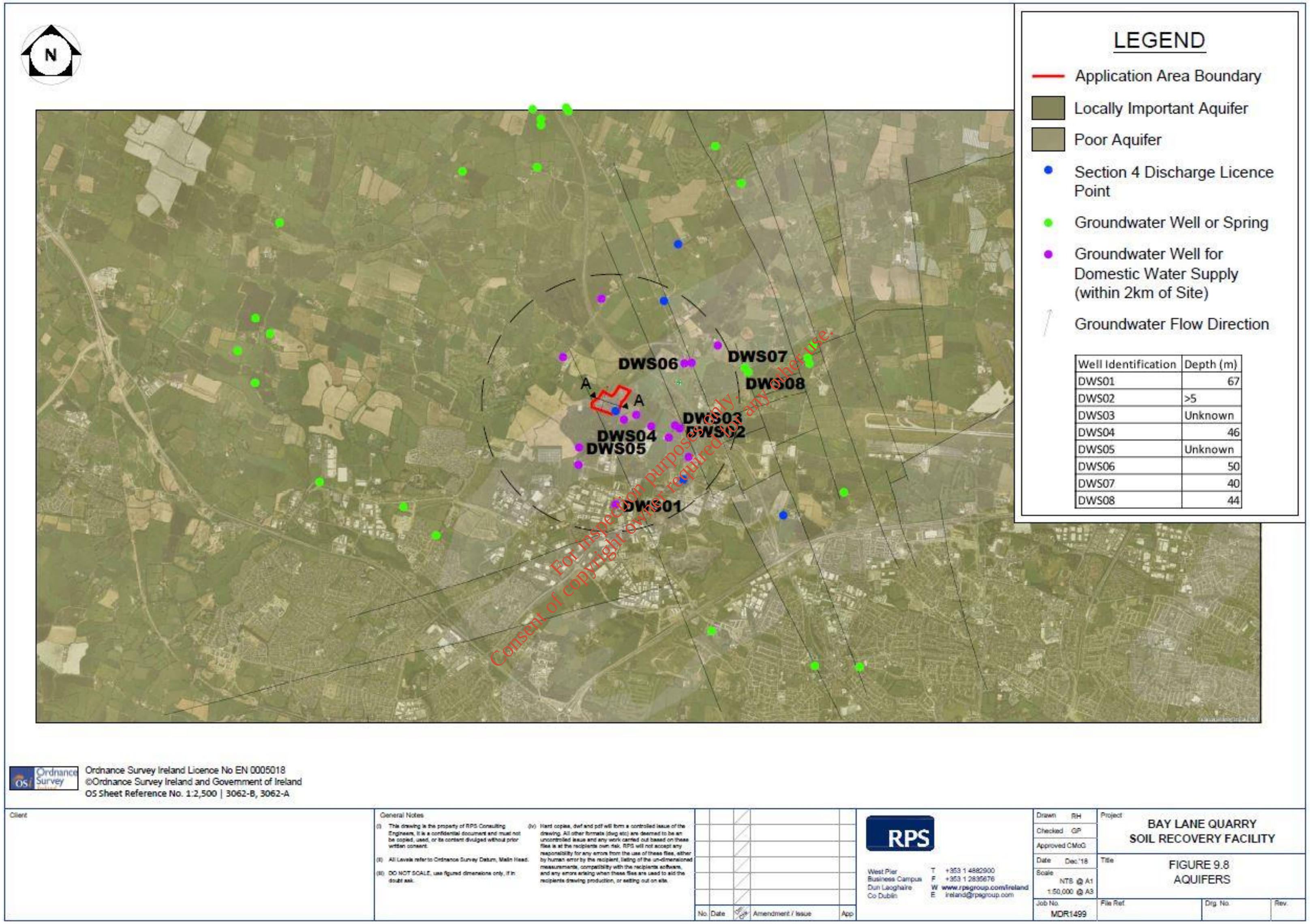


Figure 9.8: Bay Lane Quarry - Aquifers

9.2.7 Designated Sites

9.2.7.1 Geological Heritage

The nearest Geological Heritage Site or County Geological Site is the Huntstown Quarry, approximately 1.3km to the southeast. This feature is recorded as a limestone quarry showing the base of the Tober Colleen Formation where it directly overlies the Waulsortian Formation. It is a County Geological Site (Department of Communications, Climate Action and Environment, 2018).

The Priest Town Tectonite is located approximately 4km northeast of the site. It consists of a quarry within a 2km long morainic ridge showing limestone boulder diamicton. The moraine, composed of bedrock, tectonite and till, marks the active, oscillating ice margin as it was retreating northwestwards (Department of Communications, Climate Action and Environment, 2018).

The Southeast Meath Till Plain is located approximately 7km northwest of the site. It consists of a till plain featuring a series of northwest-southeast gently undulating till flutings.

These sites are shown on **Figure 9.9.**

Consultation with the Geological Survey Ireland determined that there is no envisaged impact on the integrity of County Geological Sites by the P~~p~~roposed D~~d~~evelopments.

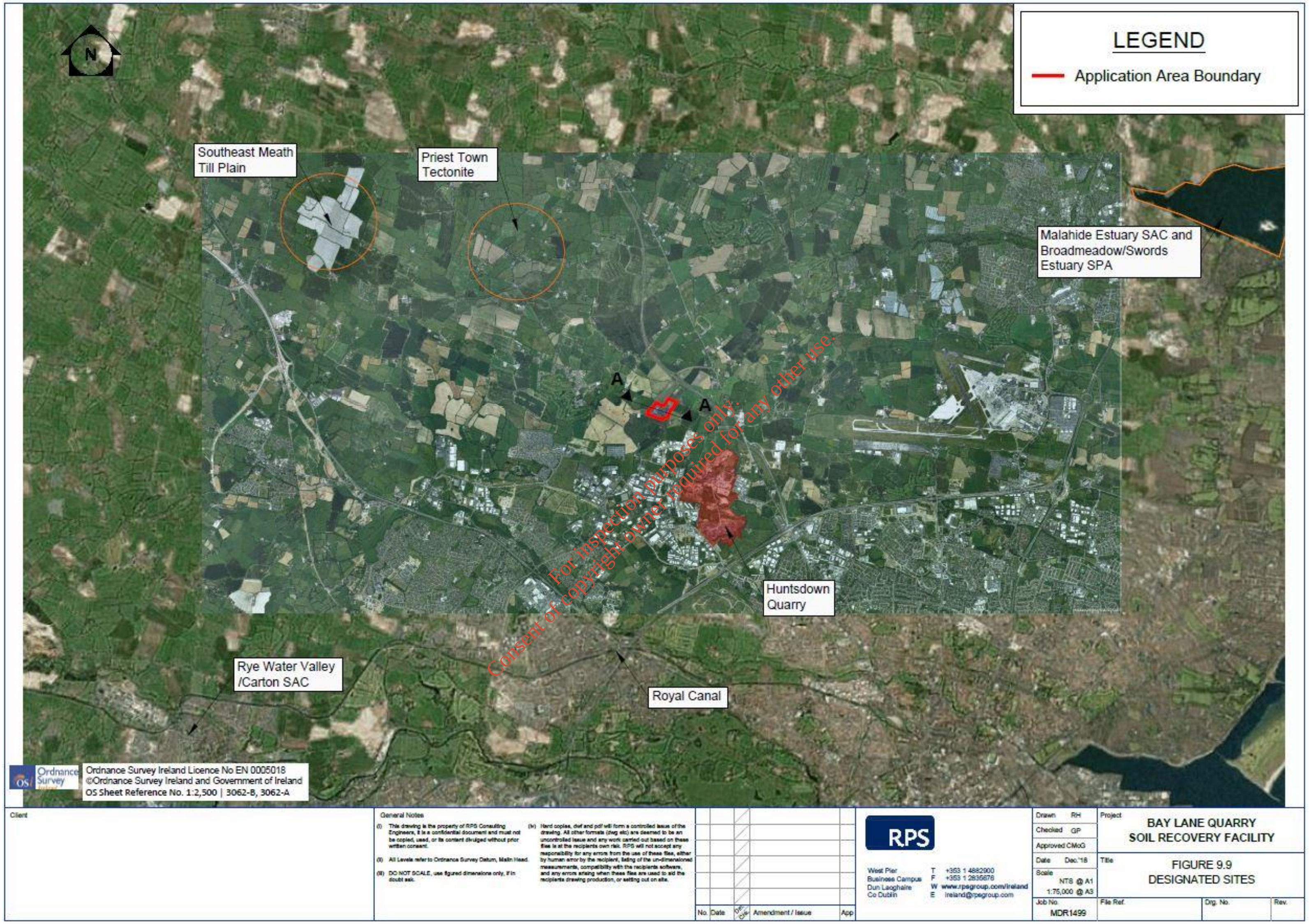


Figure 9.9: Bay Lane Quarry - Designated Sites

9.2.7.2 Natura 2000 Sites

The nearest Natura 2000 Sites are the following Habitats Directive Sites, shown on **Figure 9.9**:

- Approximately 11km to the northeast of the site, near the town of Swords, there is the Malahide Estuary SAC and the Broadmeadow/Swords Estuary SPA. (European Commission, 1995 - 2018).
- Approximately 13km to the southwest of the site there is the Rye Water Valley/Carton SAC. (European Commission, 1995 - 2018).

9.2.7.3 National Heritage Areas

The nearest National Heritage Area is the Royal Canal, approximately 5km to the south as shown on **Figure 9.9** (Environmental Protection Agency, 2018).

9.2.8 Aggregate Potential and/or Economic Materials

As shown on **Figure 9.10,** historic quarries are located 600m to 1000m north and northwest of the site. A historic pit is located 600m southeast of the site.

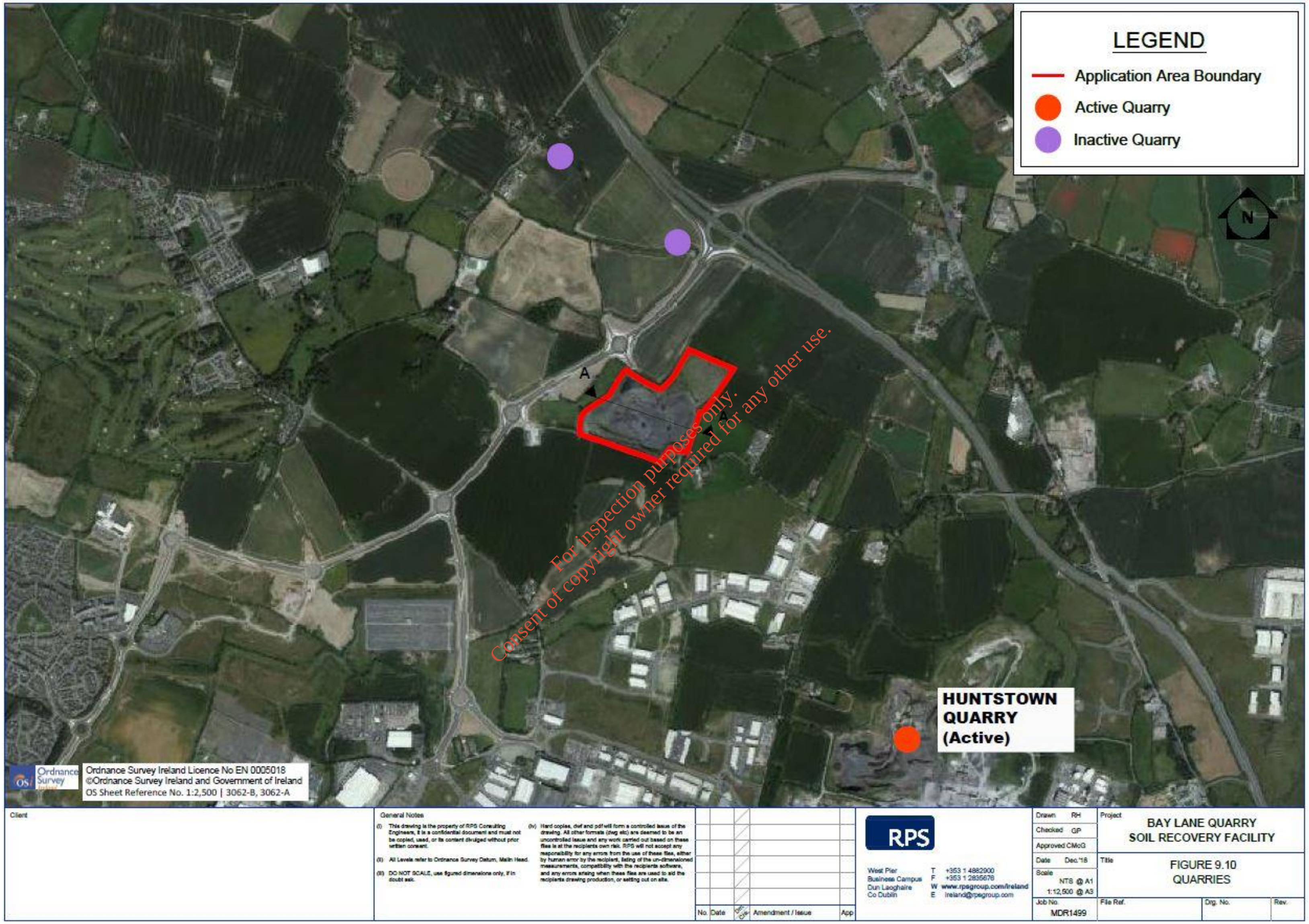


Figure 9.10: Bay Lane Quarry - Quarries

The active Huntstown Quarry is located approximately 1.3km to the southeast. Traces of lead are noted on an old Geological Survey of Ireland in a separate disused limestone quarry approximately 1.3km to the south (Department of Communications, Climate Action and Environment, 2018).

The following aggregate potential was also identified:

- Granular aggregates
    - Very High potential – 800m west of the site
    - High potential – 600m southeast of the site
    - Very Low potential – 400m northwest of the site
- Crushed rock aggregate
    - The site is within an area of Moderate to High potential with smaller zones of Very High potential within 100m of the site boundary.

There is no aggregate potential in the overburden.

Other material assets are discussed in **Chapter 14** of this EIAR.

9.2.9 Waste Licence and Permits

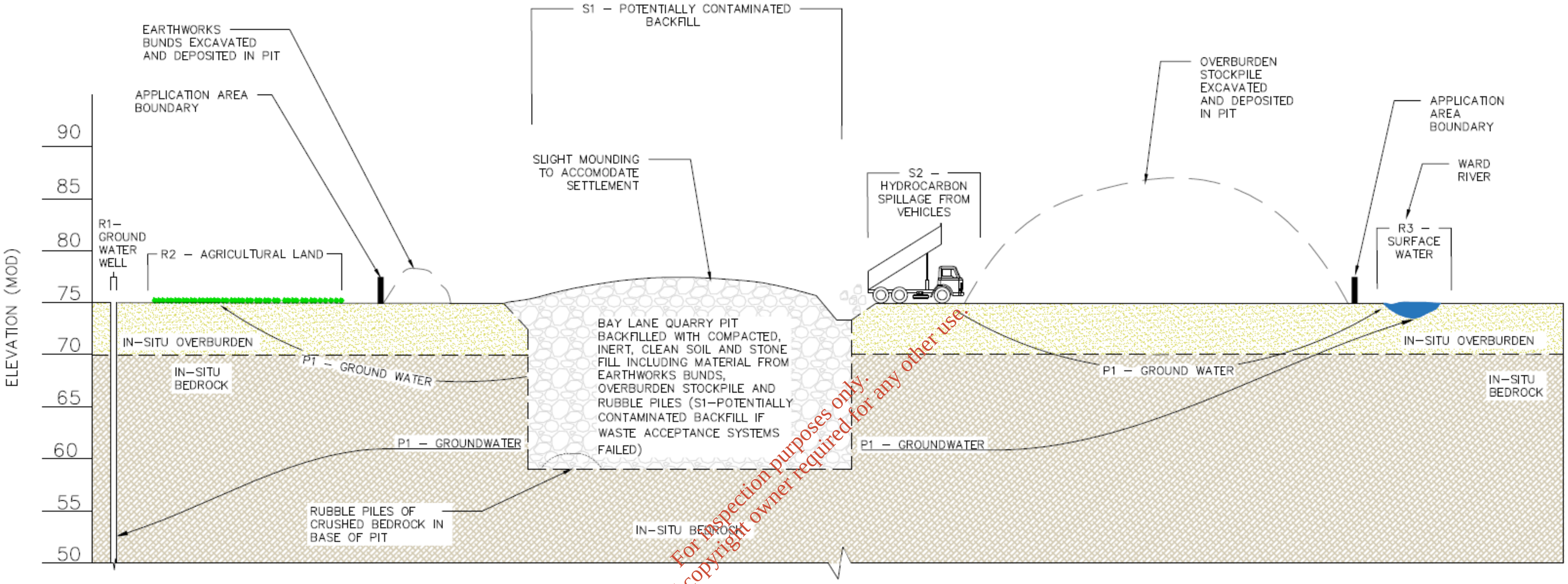
The Huntstown Inert Waste Recovery Facility is a currently licenced facility located 1.3km southeast of the Bay Lane Quarry site. There are no other current or historical licenced facilities within 3km of the site.

Waste management plans from the local authority (Fingal County Council, 2018) do not have any records of landfills or large-scale illegal dumping near the site.

9.3 IMPACT DETERMINATION OF THE PROPOSED DEVELOPMENT

9.3.1 Summary

The Impact Determination has been carried out in accordance with Step 9 and Appendix C of the 'Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements' (Institute of Geologists of Ireland, 2013). The Impact Determination is summarised in **Table 9.1**. The Impacts are also shown graphically on the interpretive cross section in **Figure 9.11**.



SOURCE	PATHWAY	RECEPTOR
S1– POTENTIALLY CONTAMINATED BACKFILL	P1 – GROUNDWATER	R1– GROUNDWATER WELLS
S2– HYDROCARBON SPILLAGE FROM VEHICLES		R2 – AGRICULTURAL LAND
		R3 – SURFACE WATER

Figure 9.11: Bay Lane Quarry - Interpretive Cross Section A-A

9.3.2 Topography and Geohazards

The proposed backfilling of the Bay Lane Quarry pit will restore the ground surface to its original, pre-quarrying level. This is a Positive Impact as it will smooth the site topography and make it more consistent with the surrounding landscape. It will also eliminate geohazards associated with slopes and rock faces. This Impact is Significant as it alters an aspect of the environment. The Impact is Permanent as it is expected to last longer than 60 years. The 'Type' Impact Characteristic is not applicable to this Impact.

Landscaping is discussed in more detail in **Chapter 16** of this EIAR. The effects of the reprofiling on noise and air quality are discussed in **Chapters 12** and **11** of this EIAR.

9.3.3 Groundwater

9.3.3.1 Importance

The Importance of the local hydrogeology is Low as the aquifer supplies less than 50 homes with potable water.

9.3.3.2 Contamination from Contaminated Backfill

There is the potential for contaminated material to be inadvertently included in the backfill imported to site. This could affect groundwater quality and could migrate off site to affect receptors including groundwater wells, surface water bodies and agricultural land.

This Impact would be Negative as it would reduce the quality of the environment. The Significance is Significant as it may alter a sensitive aspect of the environment. The Duration is Permanent as contaminated material could contaminate the groundwater for more than 60 years. The Type is Indeterminable as the full consequences of the change in the environment cannot be determined.

9.3.4 Contamination from aggregate piles

There is the potential for the aggregate piles at the base of the quarry to contain enough pyrite to cause sulphate-containing leachate. Backfilling the quarry would reduce the exposure of the aggregate piles to air.

This Impact would be Positive as it would reduce the leachate potential of the aggregate piles. The Significance is Slight as the aggregate piles are not likely to be forming damaging leachate. The Duration is Permanent as the exposure to air will be reduced permanently. The 'Type' Impact Characteristic is not applicable to this Impact.

9.3.4.1 Contamination from Hydrocarbon Spillage

The backfilling of the pit will increase traffic volume at the site which increases the likelihood of hydrocarbon spillage. Proposed traffic changes are discussed in **Chapter 13** of this EIAR. If left unremediated, this could affect groundwater quality and could migrate off site to affect receptors including groundwater wells, surface water bodies and agricultural land.

This Impact would be Negative as it would reduce the quality of the environment. The Significance is Slight as it could affect the environment without affecting its sensitivities. The Duration is Short-term as this contamination would be diluted to an imperceptible level within 7 years. The Type is Indeterminable as the full consequences of the change in the environment cannot be determined.

9.3.4.2 Groundwater Vulnerability

The backfilling will provide soil cover to the bedrock which will reduce the groundwater vulnerability and the likelihood of future groundwater contamination.

This Impact would be Positive as it would improve the quality of the environment. The Significance is Slight as it would not affect the environment's sensitivities. The Duration is Permanent as it would last longer than 60 years. The 'Type' Impact Characteristic is not applicable to this Impact.

9.3.5 Designated Sites

The Importance of the Designated Sites is Very High as they have value on a regional or national scale. The Magnitude of the Impact is Negligible as the Designated Sites are sufficiently far removed from the Bay Lane Quarry site that there will be no measurable changes in attributes resulting from the proposed backfilling.

9.3.6 Aggregate Potential and/or Economic Materials

The Importance of the Aggregate Potential is Very High as there are proven economically extractable resources near Bay Lane Quarry. The Magnitude of the Impact is Negligible as the sites are sufficiently far removed from the Bay Lane Quarry site that there will be no measurable changes in attributes resulting from the proposed backfilling.

9.3.7 Do-nothing Scenario

The 'do-nothing' scenario for this site would maintain the existing disruption to the ground surface caused by the quarrying and stockpiling. The exposed bedrock in the pit is a potential pathway for groundwater contamination. The exposed aggregate piles at the base of the pit could form sulphate-containing leachate. There is also risk of pit wall or stockpile slope instability.

Table 9.1: Impact Determination

Feature/Attribute	Status/Occurrence	Importance	Description of Impact	Quality	Significance	Duration	Type
Topography and geohazards	Overburden stockpile present in the northeast of the site Crushed aggregate stockpiles present on pit floor Quarry pit walls	-	Backfilling of the pit with stockpiled materials and backfill to regrade the surface to near-horizontal	Positive	Significant	Permanent	-
Groundwater	Groundwater levels vary between near-surface (~75mOD) and below the base of the existing pit (~59mOD)	Low	Potential contamination from contaminated backfill	Negative	Significant	Permanent	Indeterminable
			Potential contamination from fuel/oil spillage from traffic	Negative	Slight	Short-term	Indeterminable
			Potential contamination from aggregate piles	Positive	Slight	Permanent	-
			Placing soil cover above bedrock	Positive	Slight	Permanent	-
Designated sites	Various, see **Section 9.2.7**	Very High	Negligible	-	-	-	-
Economic geology	Various, see **Section 9.2.8**	Very High	Negligible	-	-	-	-

9.4 MITIGATION MEASURES

The mitigation measures proposed in this section are designed to either reduce the likelihood of an event occurring or reduce the magnitude of the consequences if the event does occur.

A site-specific traffic management system will be adopted to implement best-practice measures to reduce the likelihood of a hydrocarbon leak occurring. These include speed limits, vehicle inspections, controlled refuelling and the use of spill kits.

To reduce the likelihood of importing contaminated backfill, the sources of imported materials will be controlled to confirm that they are inert. Visual inspection of imported materials will be carried out on-site during unloading and unsuitable materials will be identified, separated, moved to a quarantine area, stored and moved offsite. A similar testing process will be used to classify the aggregate piles at the base of the quarry. The testing criteria will be in accordance with the Waste Management (Management of Waste from the Extractive Industries) Regulations (S.I. No. 566/2009).

Full waste acceptance procedures will be applied.

9.5 RESIDUAL IMPACTS

The site-specific traffic management system will make spillage of hydrocarbons to ground unlikely. In addition, any spills to ground will be quickly and efficiently contained and remediated. Considering mitigation measures and the relative impermeability of the bedrock, the Magnitude of this Residual Impact is considered to be Imperceptible.

The management of the backfill material will make it unlikely that any contaminated material will be deposited on site. The Magnitude of this Residual Impact is considered to be Imperceptible.

The Final Impact Assessment is summarised in **Table 9.2**.

Table 9.2: Final Impact Assessment

Feature/Attribute	Impact	Mitigation Measures	Magnitude of Residual Impact
Groundwater	Potential contamination from fuel/oil spillage from traffic	Site-specific traffic management system	Imperceptible
	Potential contamination from contaminated backfill	Visual inspections and WAC testing	Imperceptible

9.6 CONCLUSIONS

The baseline soils, geology and hydrogeology conditions at the Bay Lane Quarry site have been established from the sources listed in **Section 9.7.** Site observations were also considered.

The environmental impacts associated with the proposed backfilling of the quarry pit have been considered and mitigation measures are proposed to limit these impacts. Any Negative Residual Impacts are considered to be Imperceptible.

9.7 REFERENCES

Department of Communications, Climate Action and Environment. (2018). *Public Data Viewer Series*. Retrieved November 29, 2018, from Geological Survey Ireland: https://dcenr.maps.arcgis.com/apps/MapSeries/index.html

Environmental Protection Agency. (2018). Retrieved November 29, 2018, from EPA Maps: https://gis.epa.ie/EPAMaps/

ESB. (2018, November 13). Personal communication (email).

European Comission. (92/43/EEC). *Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.* Official Journal of the European Union 206.

European Commission. (1995 - 2018). *Natura 2000 Network Viewer*. Retrieved November 29, 2018, from http://natura2000.eea.europa.eu

European Parliament and European Council. (2009/147/EC). *Directive 2009/147/EC of 30th November 2009 on the Conservation of Wild Birds (2009/147/EC).* Official Journal L20/7, 2010.

Fingal County Council. (2018). Retrieved December 12, 2018, from http://www.fingalcoco.ie/

Frank L. Benson and Partners. (2000). *Environmental Impact Statement in respect of a Proposed Limestone Quarry And Associated Developement at Bay Lane, St. Margret's, Co. Dublin.*

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

Microsoft Corporation. (2018). Bing Maps.

NRA. (2009b). *Guidelines for Assessment of Ecological Impacts of National Roads Schemes.* National Roads Authority.

Strogen, P., Somerville, I. D., & Jones, G. L. (1988). *The Lower Carboniferous (Dinantian) of the Huntstown Area, County Dublin and its regional significance.*

Tuohy, B. (2012). *Report of the Pyrite Panel.*

Watts, K., & Charles, A. (2015). *Building on fill: geotechnical aspects (Third Edition).* BRE.

10 WATER (HYDROLOGY AND DRAINAGE)

10.1 INTRODUCTION

This chapter of the EIAR presents baseline information on the local hydrology and assesses the likely significant effects of the proposed development on the receiving water environment. The objective of this chapter is the following:

- To describe the hydrological characteristics of the catchment and present a baseline study;
- Identify likely potential impacts of the proposed development (positive or negative) on surface water;
- Identify mitigation measures to avoid, remediate or reduce significant negative impacts (if any);
- Identify residual impacts post mitigation,
- Assess hydrological cumulative impacts of the proposed development along with other activities and developments in the local area, and
- An assessment of flood risk using the recommended three-part staged approach from the OPW Flood Risk Management Guidelines considering all types of flood risk associated with the development.

The local hydrology and drainage for the site is inter-related with the aquatic ecology of the receiving waters and with the hydrogeology of the study area. Further details can be found in **Chapter 8** (Biodiversity) and **Chapter 9** (Soils, Geology and Hydrogeology) of this EIAR.

10.2 METHODOLOGY

10.2.1 Assessment Approach

The EIAR was carried out in accordance with the following specific guidelines in relation to hydrology:

- Environmental Protection Agency (2017): Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Environmental Protection Agency (September 2015): Draft - Advice Notes on Current Practice (in the preparation on Environmental Impact Statements);
- Environmental Protection Agency (September 2015): Draft – Revised Guidelines on the Information to be Contained in Environmental Impact Statements;
- Environmental Protection Agency (2003): Advice Notes on Current Practice (in the preparation on Environmental Impact Statements);
- Environmental Protection Agency (2002): Guidelines on the Information to be Contained in Environmental Impact Statements;
- National Roads Authority (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes;

- Environmental Protection Agency (2011): BAT Guidance Note on Best Available Techniques for the Waste Sector: Landfill Activities; and,
- Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors. CIRIA C532. London, 2001.
- The Planning System and Flood Risk Management Guidelines for Planning Authorities (OPW, 2009).

10.2.2 Information Sources Used

As part of the desktop study to inform the assessment, reference has been made to the following:

- Online databases of the Environmental Protection Agency (EPA) https://gis.epa.ie/EPAMaps/, and www.catchment.ie, for information on:
- Surface water courses in the area and their respective water quality status;
- Special Areas of Conservation & Special Protected Areas; and
- Water Framework Directive (WFD) data.
- Office of Public Works (OPW); www.opw.ie and www.floodinfo.ie for flooding information;
- Ordnance Survey Ireland aerial photographs and historical mapping;
- Met Eireann www.met.ie for historic rainfall data;
- National Parks and Wildlife Services (NPWS) http://webgis.npws.ie/npwsviewer/ for designated sites
- Other online databases consulted included:
- www.epa.ie/licensing for Annual Environmental Reports (W0129-02)
- www.fingalcoco.ie for Fingal County Development Plan 2017-2023.
- Flood Studies Update (FSU) Web Portal http://opw.hydronet.com/
- www.floodinfo.ie OPW Flood Extent mapping for the Fingal East Meath Flood Risk Assessment and Management Study (FEM FRAMS)
- http://www.myplan.ie/webapp/

A review of the relevant EIA consultation responses from Statutory Authorities and Consultees as outlined in **Section 1.4** of this EIAR was also undertaken.

10.3 ASSESSMENT CRITERIA

The significance of an impact is defined by first considering the importance of the attribute impacted and secondly the magnitude of the impact. The importance of hydrology attributes (rating criteria) is defined in accordance with the NRA Guidelines (NRA, 2008). This guidance includes intermediate steps for rating site importance (**Table 10.1**) and magnitude of impact (**Table 10.2**) and then significance (Table 10.3).

Table 10.1: Rating Criteria for Site Importance of Hydrology Attributes

Importance	Criteria	Typical Examples
Extremely high	Attribute has a high quality or value on an international scale.	River, wetland or surface water body ecosystem protected by EU legislation e.g. 'European sites' designated under the Habitats Regulations or 'Salmonid waters' designated pursuant to the European Communities (Quality of Salmonid Waters) Regulations, 1988.
Very high	Attribute has a high quality or value on a regional scale.	River, wetland or surface water body ecosystem protected by national legislation – NHA status Regionally important potable water source supplying >2500 homes Quality Class A (Biotic Index Q4, Q5) Flood plain protecting more than 50 residential or commercial properties from flooding Nationally important amenity site for wide range of leisure activities
High	Attribute has a high quality or value on a local scale.	Salmon fishery Locally important potable water source supplying >1000 homes Quality Class B (Biotic Index Q3-4) Flood plain protecting between 5 and 50 residential or commercial properties from flooding Locally important amenity site for wide range of leisure activities
Medium	Attribute has a medium quality or value on a local scale	Coarse fishery Local potable water source supplying >50 homes Quality Class C (Biotic Index Q3, Q2-3) Flood plain protecting between 1 and 5 residential or commercial properties from flooding
Low	Attribute has a low quality or value on a local scale	Locally important amenity site for small range of leisure activities Local potable water source supplying <50 homes Quality Class D (Biotic Index Q2, Q1) Flood plain protecting 1 residential or commercial property from flooding Amenity site used by small numbers of local people

Table 10.2: Rating Criteria for Estimation Magnitude of Impact on Hydrology Attributes

Magnitude	Criteria	Typical Examples
Large Adverse	Results in loss of attribute and /or quality and integrity of attribute	Loss or extensive change to a waterbody or water dependent habitat Increase in predicted peak flood level >100mm Extensive loss of fishery Calculated risk of serious pollution incident >2% annually Extensive reduction in amenity value
Moderate Adverse	Results in impact on integrity of	Increase in predicted peak flood level >50mm Partial loss of fishery Calculated risk of serious pollution incident >1% annually

	attribute or loss of part of attribute	Partial reduction in amenity value
Small Adverse	Results in minor impact on integrity of attribute of loss of small part of attribute	Increase in predicted peak flood level >10mm Minor loss of fishery Calculated risk of serious pollution incident >0.5% annually Slight reduction in amenity value
Negligible	Results in an impact on attribute but not of sufficient magnitude to affect either use or integrity	Negligible change in predicted peak flood level Calculated risk of serious pollution incident <0.5% annually
Minor Beneficial	Results in minor improvement of attribute quality	Reduction in predicted peak flood level >10mm Calculated reduction in pollution risk of 50% or more where existing risk is <1% annually
Moderate Beneficial	Results in moderate improvement of attribute quality	Reduction in predicted peak flood level >50mm Calculated reduction in pollution risk of 50% or more where existing risk is >1% annually
Major Beneficial	Results in major improvement of attribute quality	Reduction in predicted peak flood level >100mm

Table 10.3: Rating of Significant Environmental Impacts

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

10.4 BASELINE CONDITIONS

10.4.1 Rainfall and Climate

The 30-year average annual rainfall measured at Dublin Airport is 757.9mm for the period 1981 to 2010. The annual average values for the period 2010 to 2018 are shown in **Table 10.4** where data is available. The data shows that since 2016 the average rainfall has been lower than the 30-year average. Annual potential evapotranspiration has not changed significantly since 2015 and has a peak value of 584mm/year in 2018. Effective rainfall which is the amount of rainfall available to infiltrate the ground (and not evaporated or taken up by plants) has been notably low in 2017 and 2018. In 2018, dry summer months were counteracted by wet winter months.

Table 10.4: Annual Rainfall and Potential Evapotranspiration measured at Dublin Airport

Year	Rainfall (mm/yr)	Potential Evapotranspiration (mm/yr)	Effective Rainfall (mm/yr)
2018	709.4	584.1	125.3
2017	660.7	552.7	108
2016	713.6	571.0	142.6
2015	878.4	551.3	327.1
2014	927.2	-	-
2013	763.9	-	-
2012	849.5	-	-
2011	671.8	-	-
2010	671.4	-	-

10.4.2 Site Area Description

The site area is approximately 13.67ha in total and the regional topography surrounding the site is generally flat. The topographic contours of the site are displayed in **Figure 9.6 in the Soils, Geology and Hydrogeology Section**, the natural ground level at the site boundary range between 74mAOD and 76mAOD. The pit slopes surrounding the quarry open cut that represent the land awaiting backfill are near-vertical and extend from the top of the rock to approximately 59mAOD. A berm extends around the pit within the site boundary, the top of the berm varies around the site between 76mAOD (north and east) and 80mAOD (south).

The proposed backfilling of the existing Bay Lane Quarry pit will restore the ground surface to the pre-quarrying levels, making the site more consistent with the surrounding landscape. The backfilling and restoration will be slightly domed to allow surface flow and compacted to allow for future built development if this were permitted. The final proposed restoration is shown in **Drawing 7 - Landscaping Restoration Plan** and referenced in the Landscape Chapter. Landscaping is discussed in more detail in **Chapter 16** of the EIAR.

10.4.3 Existing Site Drainage

Regionally, the bedrock is likely being recharged from topographic highs where the groundwater level in superficial is high and downward vertical flow can occur. Discharge of groundwater is into surface water drainage systems in low-lying areas. The groundwater levels on site vary between near-surface approximately 75mAOD and 59mAOD. The site contains a sump in the north-north-west of the site and a settlement tank in the south-east.

Since the quarry has ceased activity in 2008/2009 it would appear that it has drained only through evaporation and/or surface water runoff. The surface water run-off that fell within the open pit remained with no direct discharge to the nearby streams hence contributing to the pooling of standing water. The ground level areas of the site either drain into the open pit or via percolation to the existing groundwater and discharge into the local drainage ditches. There was no surface water run-off discharging to the settlement tank.

When the site was an active quarry, the sump in the north-north-west section of the site was used in conjunction with a pump to control the groundwater level within the open pit. Water from the sump was pumped to a settlement tank located on south-east of the site, where water was collected, settled and discharged into a near-by stream, which is tributary of the River Ward (River Shallon on EPA mapping), on the eastern boundary of the site.

The settlement tank is constructed from reinforced concrete with 6m x 31m dimensions and a height to top water level of 5m. Accumulated settled solids are periodically removed by draining down the tank and pumping out the solids using the sludge pump. After settlement, clarified water drains by gravity to an adjacent separator tank, the discharge from the separator is piped directly to a nearby ditch.

The site was previously controlled by Irish Asphalt Ltd. Irish Asphalt undertook monitoring of surface water / surface water discharge on an annual basis and released annual analysis of the surface water quality of discharge. Grab samples were obtained from the discharge point at the site in accordance with the requirements of the Trade Effluent Licence. Irish Asphalt was licenced from Fingal County Council (FCC) (Registration number WPW/F/047) to discharge this water into the stream until 2008 which has since been inactive.

An application, by GLV Bay Lane Limited, has been made to FCC to reactivate the discharge licence in to empty the pit of standing water using the same proposed site drainage for Phase 1 of the pit backfilling. The first phase will consist of constructed surface water channels to direct the flow path of standing water and surface water runoff within the open pit to discharge to the existing sump located on the north-north west section, where it will be pumped to the settlement and separator tank at the south-east corner of the site. The flow from the pond is to be pumped to the settlement and separator tank for treatment. The final effluent from the tank is to discharge to nearby stream through an outfall pipe with peak flow restricted to greenfield run-off rate (45.74 l/s). This arrangement is to be maintained until the standing water level is reduced to sufficiently low level to allow machinery operate within the open pit.

10.4.4 Proposed Site Drainage

GLV Bay Lane Limited will have applied for a licence from FCC to pump standing water from the quarry floor into a settlement tank, and then to discharge the water into the stream with peak flow restricted to greenfield run-off rate prior to backfilling of the pit. This proposed drainage will also be utilised during Phase 1 of the filling of the pit. The drainage layout is displayed in **Figure 10.1.**

Following the emptying of the pit of standing water, approval will be sought from the EPA via the waste licence to maintain surface water drainage from the pit during the operational period of the quarry restoration. The proposed drainage arrangement for the open pit during operation will consist of varying drainage arrangements for three phases of the backfill operation. All discharges from the site will be sent to the settlement and separator tank, prior to discharge to adjacent unnamed stream with peak flow restricted to greenfield run-off rate (45.74 l/s).

The first phase of the operational period will consist of contouring the backfill in the south west area of the pit towards surface water channels adjacent to the proposed access directing the flow of standing water and surface water runoff to discharge to the existing sump located in the north west of the pit, where it will be pumped (rate - 0.05 m^3/s) to the settlement and separator tank at the south-east corner of the site. Other surface water channels will be contoured around the edge of the pit to direct flow towards the sump. The flow from the pond is to be pumped to the settlement and separator tank for treatment. The final effluent from the tank is to discharge to nearby stream through an outfall pipe with peak flow restricted to greenfield run-off rate.

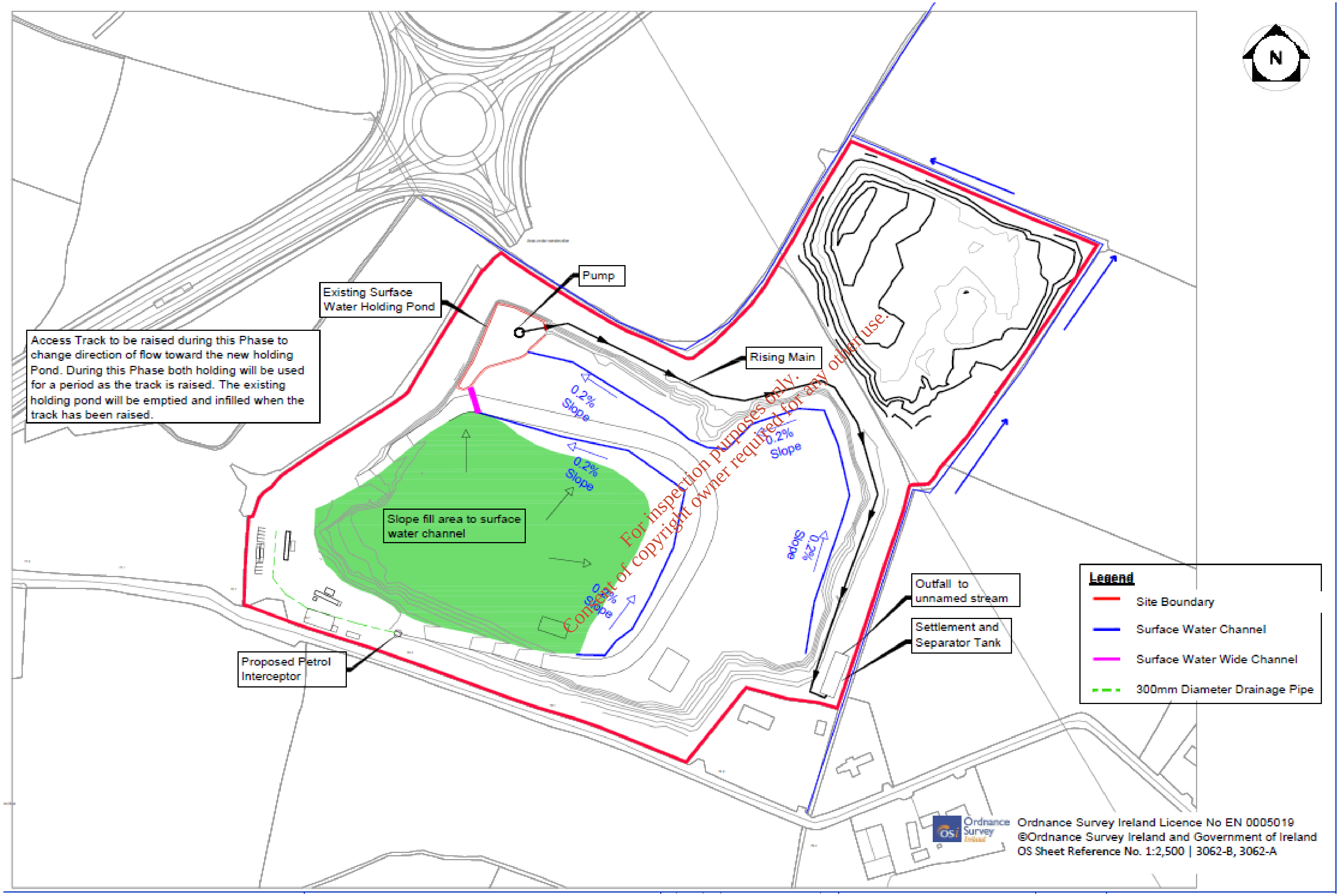


Figure 10.1 Proposed Drainage Layout Phase 1

The second phase**, Figure 10.2**, consists of additional surface water channel constructed along the access track to convey surface water run-off and groundwater discharge to a sump at the south-east corner of the open pit. The backfilling will take place in the north east of the pit and backfill the existing sump (which will be emptied prior to being backfilled) The access track will need to be partially backfilled to slope towards to secondary sump in the south east corner. During this phase both sumps may need to be used during the transition period of the access track to slope to the south eastern sump. The flow from the second sump is to be pumped to the settlement and separator tank for treatment prior to discharge to nearby stream. The final effluent from the tank is to discharge to nearby stream (mean flow rate 48 l/s) through an outfall pipe with peak flow restricted to greenfield run-off rate (45.74 l/s).

The final phase, **Figure 10.3**, will consist of backfilling the access road and the second sump. As the land is raised it will be sloped towards the existing drainage ditches along the boundary of the site. This also allow surface water and groundwater to begin to discharge back into the existing ditches to replicate the drainage of the site prior to the excavation of the quarry.

As the pit is backed filled it will be compacted during all phases to limit the infiltration of the surface water to allow the groundwater to rebound to its natural state. The pit will not be lined and dewatering of the pit will continue during the backfill period to ensure slope stability and prevent ponding of surface water.

The surface water run-off for the site compound will discharge to a proposed plastic pipe which will be treated by a petrol interceptor prior to discharge to the sumps via a surface water channel.

Upon final restoration, as referenced in the Landscape Chapter 16, of the entire site the surface water channels will be buried. The petrol interceptor, drainage pipes and settlement tank to be removed from site. The proposed ground surface at final restoration will be domed to allow surface water run-off and groundwater to discharge to existing ditches located to the north, south, east and west of the site boundary.

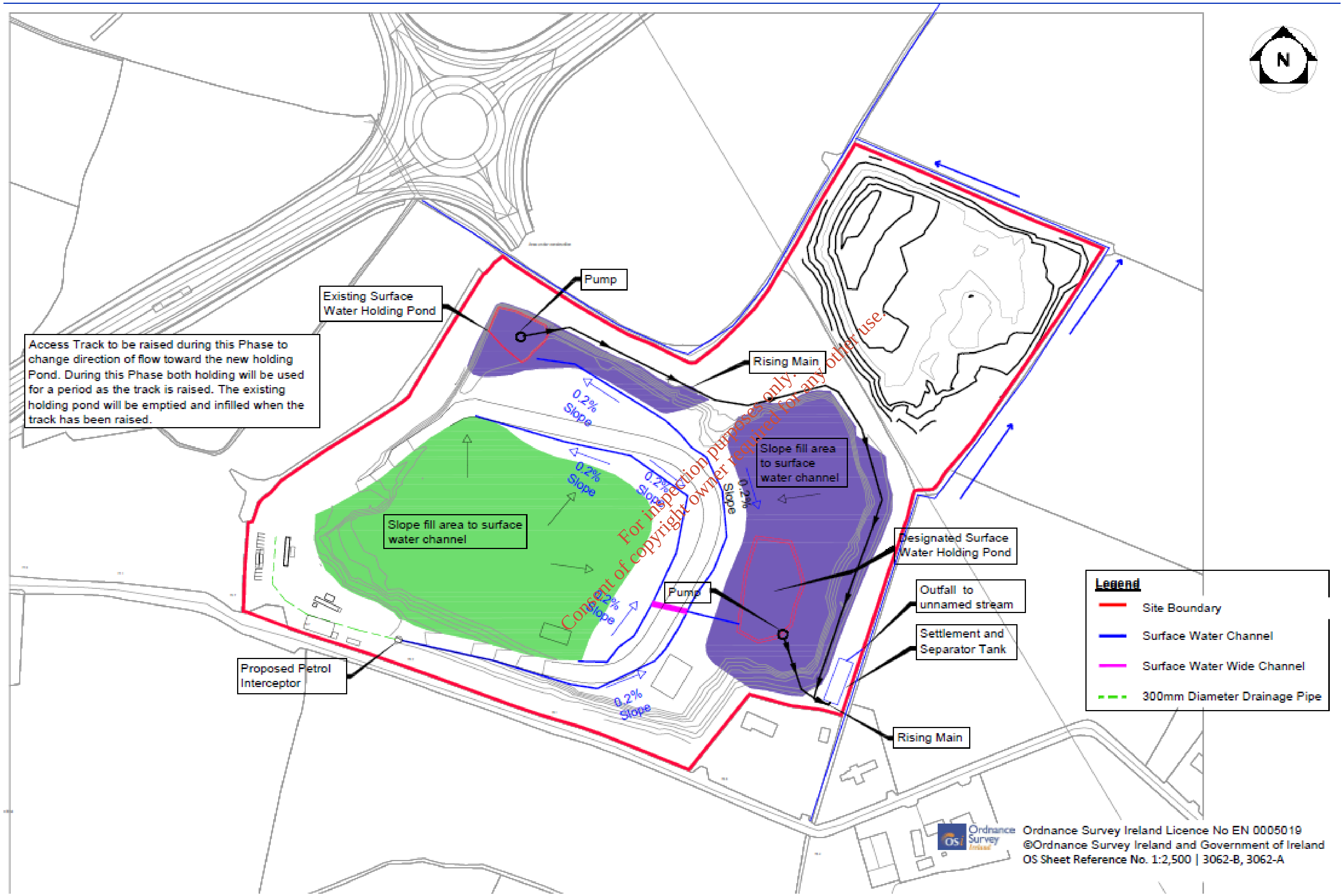


Figure 10.2 Proposed Drainage Layout Phases 1 and 2

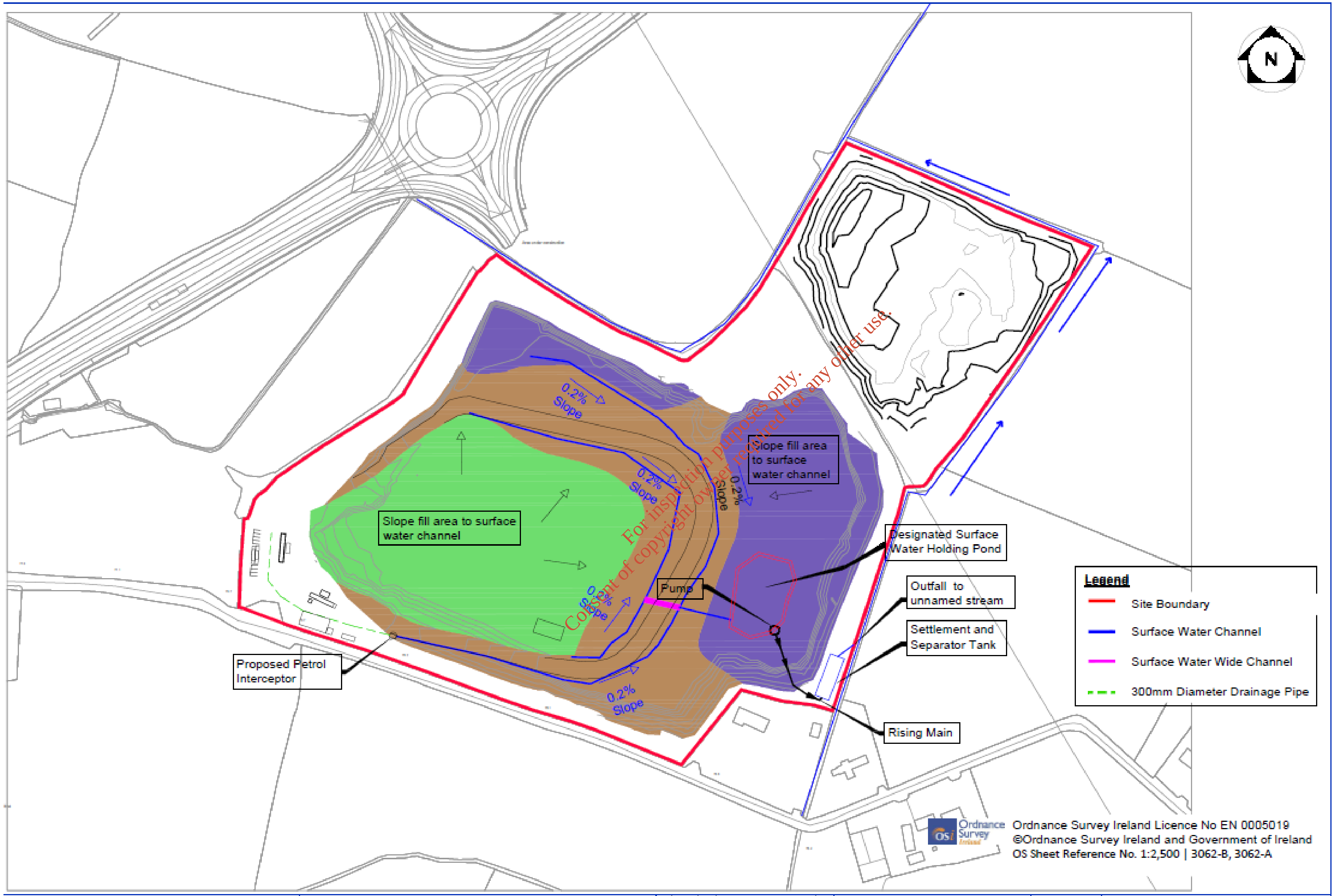


Figure 10.3 Proposed Drainage Layout Phase 3

Open Channels

The open channel proposed for the site will consist of a trapezoid shape and sized to convey the peak surface water run-off rate for the 5-year return period and groundwater discharge during the backfilling operations. The sizing for the proposed channel was designed based on a longitudinal slope (fall) of 1 in 500. The proposed dimensions for the open channel are indicated in **Figure 10.4** below.

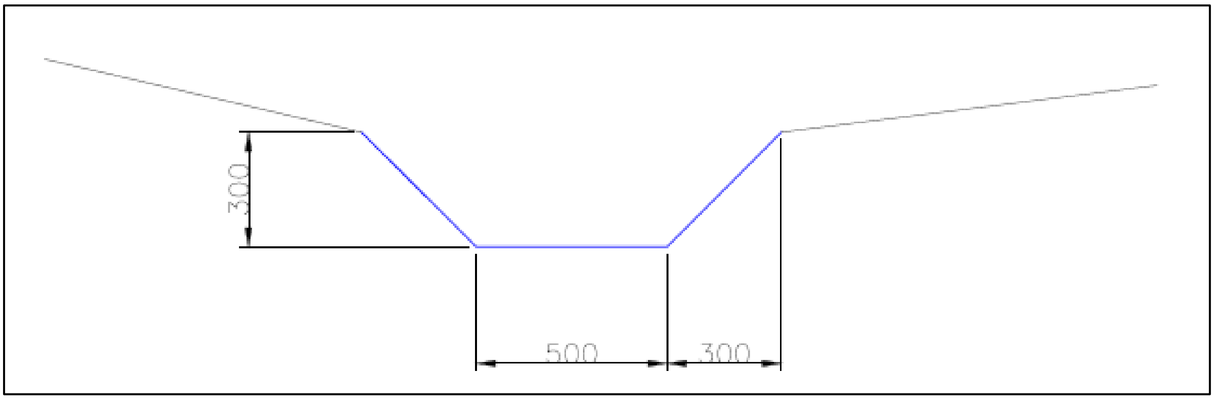


Figure 10.4 Open Channel Dimensions

Further modification was made with the open channel design just for a section of the channel for a wider channel to allow Heavy Goods Vehicles (HGVs) to cross the channel onto the access ramp from the open pit. The side slopes for the channel was reduced to 1 in 3 slope to allow for HGV access. The proposed dimensions for the wide channel are indicated in **Figure 10.5** below.

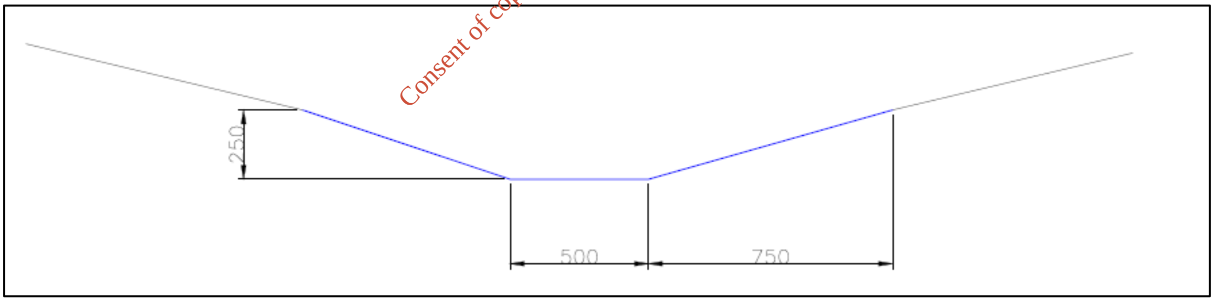


Figure 10.5 Wide Channel Dimensions

Sizing attenuation storage

The Frequency Duration Depth (FDD) table supplied by Met Eireann for the site location was used to predict surface water run-off within the open pit during storm events. The design return period has been taken at 1 in 50 years. For the purpose of estimating design storm run-off, the site has been divided into two areas, the open pit itself and the surrounding non-excavated ground to account for the variation with infiltration from the site.

The infiltration rates have been attributed for the two areas based on the results of the rising head tests undertaken on site previously and the resulting run-off calculated for different duration storms.

The peak total run-off occurs after 4 hours, although run-off rates are greater for smaller duration events. The maximum total run-off for the site has been estimated to be 3,098 m^3 for a 4-hour event.

The settlement and separator tank provide 500m^3 storage hence the storage requirement for the site and the sumps temporary is 2598 m^3. This storage volume can be distributed between both sumps during the phasing of the backfill. During the final phases of the backfilling operation as the fill material itself will be able to retain some storage volume. However, as the material will be compacted to raise the water table the estimated 30-year storage volume (2103 m^3) will be maintained during the backfilling duration as a conservative mitigation measure. The invert level of the sump will be raised as the backfilling takes place during Phase 2 and Phase 3.

10.4.5 Surface Water Catchment

According to the EPA database, the river that flows along the west and north of the site is the Ward River (part of the Shallon River Network – IE_EA_08W010300). The EPA mapping locates the Shallon River within the Broadmeadow river catchment (Broadmeadow_SC_010). The flow direction of this Ward River from the site is generally to the north east and flows towards Swords where it discharges into the Broadmeadow River. There is an unnamed stream to the east of the site which is a tributary of the Ward River.

The Shallon River Network (**Figure 10.6**) is known as the Water Framework Directive (WFD) Broadmeadow[river]_SC_010 sub-catchment and forms part of the wider EPA Hydrometric Area no. 08 (HA08). A review of OSi Historic maps between 1837 and 1913 show that the river and stream courses have not changed significantly in the interim.

Potential dependent Groundwater Bodies (GWBs) which spatially intersect the Broadmeadow WFD sub-catchment include:

- Swords GWB (IE_EA_G_011)
- Lusk-Bog of the Ring GWB (IE_EA_G_014)

Groundwater bodies are discussed further detail in **Chapter 9** (Soil and Geology and Hydrogeology).

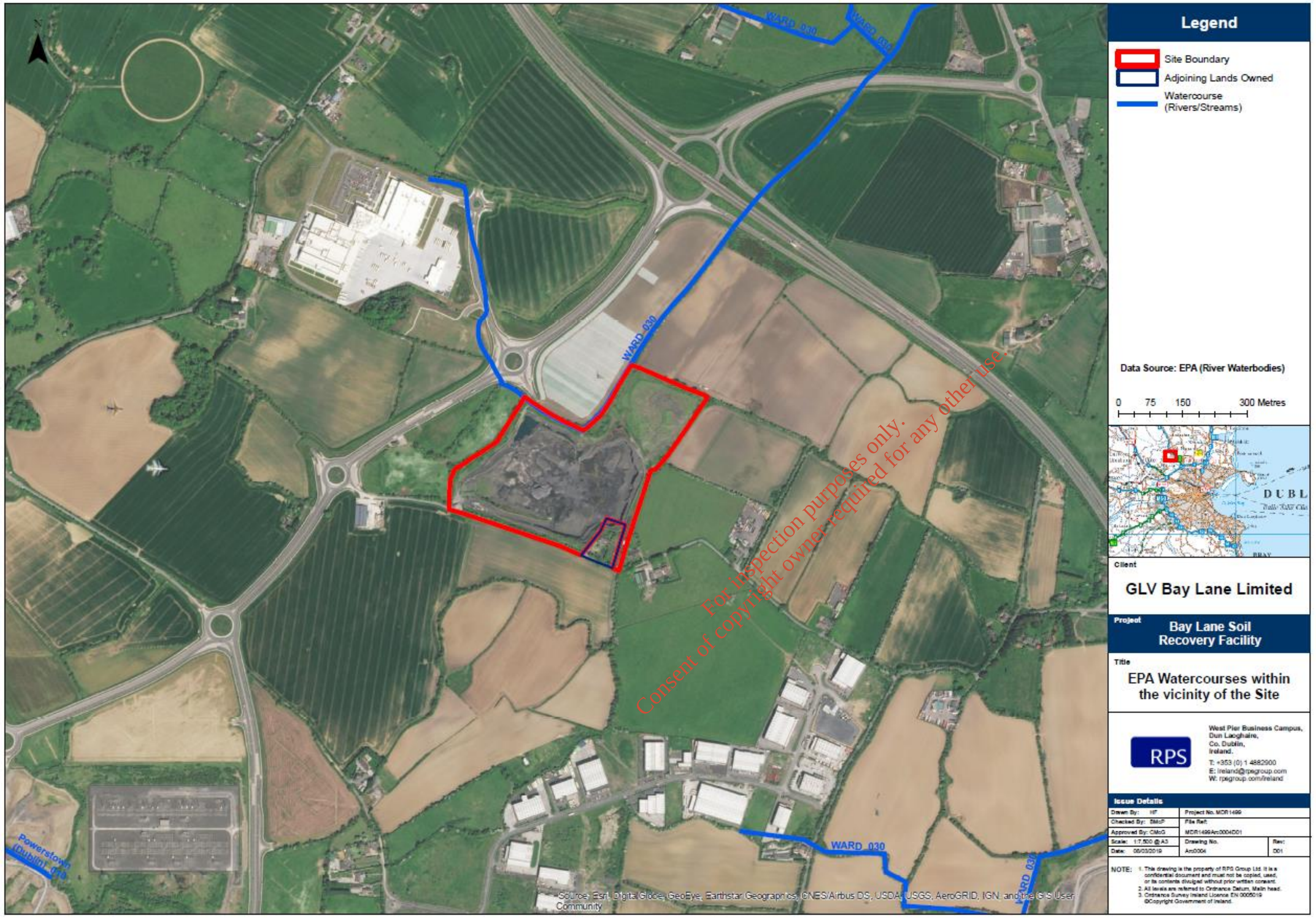


Figure 10.6 Surface Water Environment

10.4.6 Surface Water Quality

10.4.6.1 Regional

The WFD requires 'Good Water Status' for all European waters by 2015 or at the latest by 2027, to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both 'Good Ecological Status' and 'Good Chemical Status'. The overall objective of the river basin management plans is to restore the status to 'Good' by 2021.

The WFD status 2010 to 2015 for the Ward River adjacent to the site (IEEA_08W0103000) is 'Good', however, as the river approaches Swords, the status becomes 'Poor' and projected 'At Risk'.

The WFD status 2010 to 2015 for Broadmeadow Transitional Waterbody (IE_EA_060_0100) is assigned as 'Moderate'.

The biological quality of the Ward River is assessed by the EPA at Ward – Chapelmidway Bridge monitoring station (RS08W010100), located approximately 6km north east (down gradient) of the site and at Bridge North of Killeek monitoring station (RS08W010300) located approximately 8km north east of the site (down gradient).

Q-Values are used by the EPA to express biological water quality, based on changes in the macro invertebrate communities of riffle areas brought about by organic pollution. The higher the pollution level in a watercourse, the lower the Q-value as summarised in **Table 10.5**.

Table 10.5: EPA Biological Q – Value Ratings

Quality Ratings (Q)	Status	Water Quality
Q5, Q4-5	High	Unpolluted
Q4	Good	Unpolluted
Q3-4	Moderate	Slightly polluted
Q3, Q2-3	Poor	Moderately polluted
Q2, Q1-2, Q1	Bad	Seriously polluted

Table 10.6: EPA Q Values for Ward River

Station Code	1988	1991	1994	1996	1998	2001	2005	2008	2010	2014
Ward – Chapelmidway Bridge monitoring station (RS08W010100)	2-3	2	3	-	-	-	-	-	-	-
Bridge North of Killeek monitoring station (RS08W010300)	3	2	-	3	3	3	2-3	3	3	4

The EPA Q values for the Ward River between 1988 and 2017 are displayed in **Table 10.6**, the results indicate predominantly moderate pollution within this surface waterbody.

10.4.6.2 Locally

Samples (4 No.) were obtained from the standing water within the open pit and also from the unnamed stream (2 No.) to confirm the water quality within the site and potential impact of the discharging effluent on water quality of the adjacent stream. The sample location points are shown in **Figure 10.7** and were:

1. P1 - from the standing water within the open pit
2. P2 - from the standing water within the open pit
3. P3 - from the standing water within the open pit
4. P4 as a replicate of p2 - from the standing water within the open pit
5. P5 a blank
6. In the Shallon Ward river upstream with reference to the proposed discharge point.
7. In the Shallon Ward river downstream with reference to the proposed discharge point.

The results are presented in Appendix 9.

Surface water results have been compared to guideline values within the following legislation:

- European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (SI No. 272 of 2009) and (Amendment) Regulations 2015 (SI No. 386 of 2015)

Reported inorganic concentrations were all below the relevant surface water guidelines with the exception of:

- Ammoniacal Nitrogen as N which exceeded the guideline of 0.065mg/l within samples; P1 (0.11mg/l), upstream (0.37mg/l) and downstream (0.5mg/l).
- BOD which exceeded the guideline of 1.5mg/l within samples; upstream (2mg/l) and downstream (2mg/l).
- Dissolved Copper which exceeded the guideline of 30mg/l within the sample; P5 (122mg/l).
- Dissolved Nickel which exceeded the guideline of 4mg/l within the samples; P1 (15mg/l), P2 (15mg/l), P3 (15mg/l) and P4 (14mg/l).

Reported organic concentrations (volatiles or semi-volatiles) were all below relevant surface water guidelines with the exception of Fluoranthene which exceeded the guideline of 0.0063µg/l in the downstream sample (0.068 µg/l).

Reported pesticide concentrations were all below laboratory detection limit.

10.4.7 Flood Risk

The lands and the surrounding area fall within the Fingal East Meath Flood Risk Assessment and Management (FEMFRAM) Study (2011). The outputs of the study included flood extent mapping, flood risk management proposals and flood risk management plans. However the OPW flood mapping website does not show that the site falls within any modelled flooding. The closet recorded and predicted flood risk to the site as per the OPW flood risk mapping tool are available on the flood info website (http://www.floodinfo.ie/map/floodmaps/). The Preliminary Flood Risk Assessment (PFRA) extents for the proposed development, **Figure 10.8**, shows that the site is not in an area of fluvial, or groundwater or coastal flood risk (Flood Zone C, probability of flooding less than 0.1%). The figure does show a large pluvial extent for the site which however this can be attributed the quarry pit being open and potential rainwater gathering there. As the pit will be restored to the existing ground levels the risk of pluvial flooding will reduced to standard greenfield runoff.

The flood mapping website also contains records of historical flooding incidents in the surrounding area. The nearest single flood event listed is approximately 1.5km south east of the site occurring at the N2 in November 2002. The flooding at the N2 contributed from runoff from adjacent grasslands. Drainage works was carried out at this location in 2005. There are currently no OPW flow gauges present within the Broadmeadow sub-catchment or within the Broadmeadow River Catchment. The review of all available data concluded that site is an appropriate development within this area, and there any flooding or surface water management issues related to the site are extremely low.

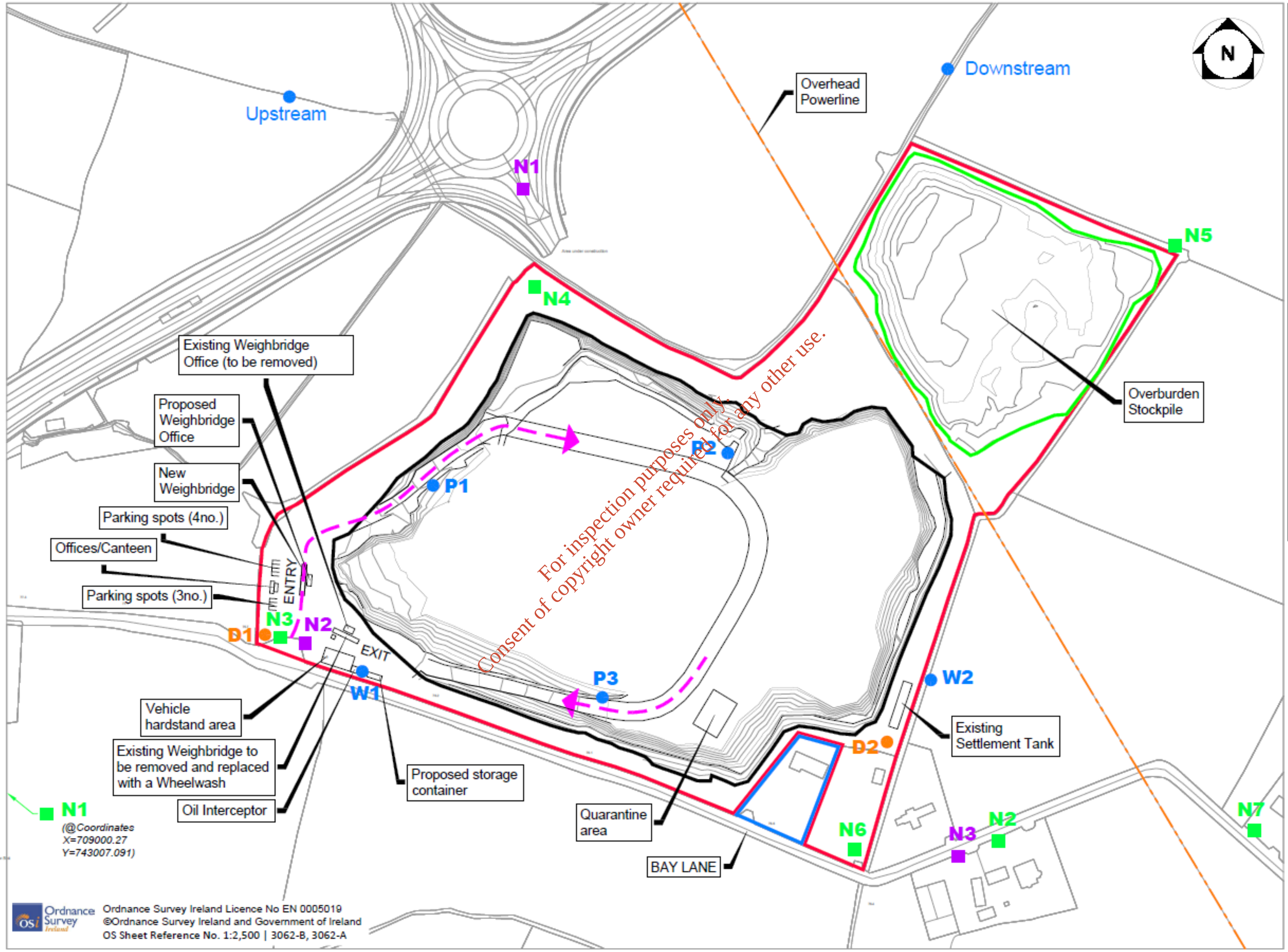


Figure 10.7 Surface Water Monitoring Locations denoted as p1, p2, p3, and upstream and downstream

Figure 10.8 PFRA Pluvial Flood Extents (myplan.ie)

10.4.8 Areas of Conservation

The NPWS database lists no areas of conservation in the immediate vicinity of the site. The sites designated for nature conservation within a 20km radius are as follows:

- <u>Special Areas of Conservation (SAC)</u>
    - Rogerstown Estuary SAC (000208)
    - Malahide Estuary SAC (000205)
    - Ireland's Eye SAC (002193)
    - Rockabill to Dalkey Island SAC (003000)
    - Baldoyle Bay SAC (000199)
    - North Dublin Bay SAC (000206)
    - Rye Water Valley/Carton SAC (001398)
- <u>Special Protected Areas (SPA)</u>
    - Rogerstown Estuary SPA (004015)
    - Malahide Estuary SPA (004025)
    - Ireland's Eye SPA (004117)
    - Baldoyle Bay SPA (004016)
    - North Bull Island SPA (004006)

- Proposed National Heritage Areas (pNHA)
  - Rogerstown Estuary (000208)
  - Malahide Estuary (000205)
  - Ireland's Eye (000203)
  - Baldoyle Bay (000199)
  - North Dublin Bay (000206)
  - Rye Water Valley/Carton (001398)

Further details on the above designated sites and their respective distance from the site are presented in **Chapter 8 (Biodiversity)**.

10.4.9 Other Projects and Facilities

Huntstown Landfill (W0277-03) lies approximately 2km south east of the site and is accessed along various unnamed roads. The Huntstown Landfill has the largest capacity of annual intake in the Greater Dublin Area (GDA) accepting 750,000 tonnes per annum and is forecasted to remain the largest following the closure of the Murphy Concrete facility in 2018.

The IMS Hollywood, Murphy Concrete, Kiernan Sand and Gravel, Milverton and Knockharley waste facilities are within a 40km radius of the Bay Lane Proposed Recovery facility, accepting between 167,400tpa to 750,000tpa.

The immediate area surrounding Bay Lane Quarry is not highly populated. The local area surrounding the site primarily consists of a mix of commercial, industrial, agricultural and undeveloped lands and one-off residential properties. The lands surrounding the site, while much of it is still being actively farmed, are subject to a number of commercial developments. The airport is situated to the east and the site is in line with a flight path.

The south-eastern perimeter of the site is bounded by road frontage. The north-western, northern and western perimeter of the site is bounded by lands in active agricultural use. At the south-eastern perimeter, across the perimeter from the disused and boarded up house and farm building is an occupied dwelling house.

There are a number of commercial and industrial developments in the local area of the Bay Lane Quarry. Some share the same access road as the site including a cement company (Halton Concrete) located 200m to the west of the site and a commercial bus yard (Butlers Bus Tours) located approximately 250m to the east of the site.

10.4.10 Water Supply and Waste Water

A water mains connection point will be required for the proposed site offices and facilities, the connection point needs to be identified and agreed with the utility provider. The activities on site that require water include the wheel washing facility, canteen, shower, toilet facilities and dust management systems.

No sewer main is located at the site and so no connection is available. The nearest sewer main is located to the west of the site along the unnamed road stretching between the N2 and the junction for Bay Lane.

Construction and operational activities onsite will not result in a significant impact on the local water infrastructure and supply as intense water use on site is not expected. There will be reuse of rainwater collected on site for controlling dust and mud nuisance.

Sanitary effluent water will be generated from the canteen, toilet and wash facilities within the administration building. All effluent will be collected in a sealed underground pipe network and discharged to a packaged treatment plant with treated effluent percolated to ground. The proposed system will effectively treat effluent from the staff and visitors and will be sized to allow for additional loading. Location of this unit will be near office area, exact location will be determined by percolation testing.

The system will be appropriately sized and will operate in compliance with appropriate code of practice for a facility, e.g. EPA Code of Practice: Wastewater Treatment Systems for Single Houses.

10.5 IMPACT ASSESSMENT

10.5.1 General

The following section identifies, describes and presents an assessment of the likely significant impacts of the proposal on the hydrological environment. The characteristics of the proposal with regard to the water and hydrological environment, relates to operation and post-restoration activities. Issues related to water quality impact on the groundwater are addressed in **Chapter 9**.

10.5.2 Do Nothing – Current Scenario

If the proposal to use the disused quarry as soil and stone recovery facility does not proceed, the existing site would remain exposed and derelict.

Based on the information presented in **Section 10.4.3**, the impact on the Ward River and the unnamed stream will be **Imperceptible**. There are no activities on site which may impact surface water run-off and there is no significant surface water run-off from the site discharging into these watercourses.

10.5.3 Do Something - Proposal

10.5.3.1 Direct Impacts

The sumps, settlement tank and separation tank provide storage for surface water run-off for up to the 50-year return period and is designed to allow for sedimentation prior to discharge to the adjacent stream. Surface water drains will be designed to convey run-off during backfilling operations and for the final restoration to convey run-off to the settlement and separation tank.

As highlighted in this chapter, there is no existing drainage arrangement for the site, however the construction of surface water channels within the boundary of the open pit will be constructed to drain the surface water run-off from the pit to a pond prior to pumping to the settlement tank during backfilling operations. The surface water channels will be raised during the backfilling operations to ensure the drainage within the open pit are maintained to prevent disruptions to the backfilling operations from flooding or ponding.

The surface water channels are to be buried with drainage pipes and settlement tank to be removed from site when the backfilling of the open pit reaches pre-extraction levels. The proposed finished ground within the open pit will be slightly domed to allow for run-off to discharge to adjacent streams at the north, west, east and south boundaries.

The proposal for the site includes vehicles in operation within the site during the backfilling which increases the potential risk for accidental spillage and leaks. It is recommended that spill kits are always kept on site during the backfilling operations to contain accidental spillage and/or leaks to reduce potential impact. All surface water and groundwater discharges will be treated at the settlement and separator tank prior to discharge to the unnamed stream. The impact of the proposed backfilling operation and final restoration on the unnamed stream will be **negligible**. Hence there are no additional mitigation measures required.

10.5.3.2 Indirect Impacts

The proposed operation of the site will involve discharge of surface water and groundwater discharges to the unnamed stream. The proposed temporary holding pond and the settlement tank will provide storage for up to the 50-year return period whilst the peak flow discharge to the unnamed stream is limited to greenfield run-off rate to reduce the flooding downstream. The 100-year return period event can be stored on site and will not be discharged downstream during a flood event. The impact of the proposed backfilling operation and final restoration on the Ward River at the confluence with the unnamed stream will be **negligible**.

Table 10.7: Potential Temporary Impacts during operational (void filling) phase

Construction Activity	Attribute	Character of Potential Impact	Importance of Attribute (Table 10.1)	Magnitude of Potential Impact (Table 10.2)	Significance of Potential Impacts (Table 10.3)
Surface Water Run-Off	Surface Water	Silt-laden water can arise from exposed ground and soil stockpiles during construction. Surface water run-off containing large amounts of silt can cause damage to watercourses, in particular drains connecting to the stream, which can cause significant pollution of water through the generation of suspended solids. The site is situated within the Ward River sub-catchment which is classed as Good. All surface water will be restricted to greenfield runoff rates to prevent any flooding downstream.	Medium	Small Adverse	Slight
Accidental Spills and Leaks	Surface Water	Accidental spillages of fuels, chemicals or other contaminants during operational (void filling) phase may result in localised contamination of soils and groundwater underlying the site, and/or surface water run-off could cause release of pollutants to surface water, if materials are not stored and used in an environmentally safe manner. Any spillage which migrates to a local water course could be detrimental to water quality and local fauna and flora.	Medium	Small Adverse	Slight

10.5.4 Mitigation Measures

The proposal for the site has taken account of the potential impacts on the hydrology environment local to the area, e.g. surface water attenuation. Additional measures to mitigate the potential effects on the surrounding hydrology during the operation and final restoration stages are described in further detail below.

- Surface Water channels to be constructed and maintained with pumped discharge to tank during operational (void filling) phase,
- Surface Water channels and settlement tank to be removed at final restoration stage. Finish Ground Profile for the open pit to be slightly domed to allow for surface water run-off to adjacent streams,
- Accumulated settled solids from the settlement tank will be periodically removed by draining down the tank and pumping out the solids using a sludge pump. The settled solids, which are non-hazardous are to be deposited within a sludge bin and removed from site on a regular basis,
- To prevent spillages and leaks of potentially polluting materials and minimise the impact of any spillages that do occur, the following measures will be implemented at the site:
    - No potentially polluting liquids (principally fuel) will be stored onsite. They will be transported onsite in mobile bowsers constructed to the appropriate Irish, British or International Standard, meeting the requirements of the Local Government (Water Pollution) Acts 1977 to 1990 and associated regulations,
    - Potentially polluting liquids such as lubricating oils, waste oils derived from vehicle maintenance, pesticides etc, will be not be stored onsite longer than necessary during their use. Waste oils and fuels generated will be transported offsite immediately by the service provider generating them. Any necessary temporary storage will be in containers located on sealed ground,
    - Spill kits with a supply of materials suitable for absorbing and containing any minor spillage will be available on site at all times. Staff will be appropriately trained in their use.
    - Materials suitable for containing spills including sealing devices and substances for damaged containers, drain seals and booms, and overdrums will be maintained at the site. Staff will be appropriately trained in their use.
    - Surface water channels and drains will be subject to visual inspection by the Facility Manager. Action will be taken to remove any obstructions to flow.
    - In the event of spillage of polluting materials, immediate action will be taken to contain the spillage. The spillage will be reported to the Facility Manager, who will assess the situation and decide on the most appropriate course of action. The action taken will depend upon the size of the spillage, the location of the spillage in relation to sensitive receptors and the chemical and physical nature of the spilled material.
    - Action taken may include:
        - if possible, the leak will be stopped;
        - if it safe to do so, the cause of the spill or leak will be isolated;
        - If the spillage is small, spill granules will be used immediately if necessary to prevent the spill spreading. The area will be cleared and all contaminated material will be sent offsite for appropriate management;

- for large spills, clay or sand will be used to make a containment and specialist help will be sought to clean up;
- in the event of a potentially serious spillage, immediate action will be taken to prevent the spread of the spill. The Environment Protection Agency will be informed immediately, and remedial action agreed; if the spillage cannot be contained using approved materials, the Environment Protection Agency and senior management will be contacted immediately and specialist help obtained;
- if a vehicle is found to be leaking, it will be moved to a position where the spillage can be contained i.e. quarantine facility, or other hard surfaced area, if it is safe to do so; and
- all personnel will follow instructions provided by managers or other competent persons.

- Appropriate precautions will be taken depending upon the nature of the spilled material to:
  - prevent any harm to human health, and all personnel involved in clean-up will wear protective clothing appropriate for the nature of the spilled material.
  - All spillage incidents, site inspections, and remedial actions will be recorded in the site records.

10.5.5 Residual Impact

The residual impacts are those that would occur after the mitigation measures have taken effect.

Implementing the mitigation measures during the operation and final restoration stage would result in imperceptible to slight impact on the local hydrology.

10.5.6 Monitoring

There will be a water quality monitor with a telemetry signal installed in the unnamed stream immediately downstream of the outfall from the settlement tank. The water quality monitor will provide continuous water quality results for the final effluent. The compliance monitoring and reporting will serve to monitor any potential impacts.

The water quality monitor will test the effluent for Total Suspended Solids, Turbidity, pH, Temperature, Dissolved Oxygen and Electrical Conductivity at regular intervals (i.e. 15mins) and the results will be checked online on a regular basis during the operational (void filling) phase. If the values for the testing exceed the prescribed limits under any Waste Licence issued by the EPA during operation it would indicate a failure with the drainage system which will be investigated and actions taken to fix any issues. Any exceedance of the EPA waste licence limits would be recorded and reporting to the appropriate authorities.

10.5.7 References

EPA (2002): Guidelines on the Information to be Contained in Environmental Impact Statements, Environmental Protection Agency.

EPA (2003): Advice Notes on Current Practice (in the preparation on Environmental Impact Statements, Environmental Protection Agency.

EPA (2011): BAT Guidance Note on Best Available Techniques for the Waste Sector: Landfill Activities, Environmental Protection Agency.

EPA (2015): Draft - Advice Notes on Current Practice (in the preparation on Environmental Impact Statements), Environmental Protection Agency.

EPA (2015): Draft – Revised Guidelines on the Information to be Contained in Environmental Impact Statements, Environmental Protection Agency.

EPA (2017): Draft Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Environmental Protection Agency.

Fingal County Development Plan 2017-2023. Fingal County Council.

NRA (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, National Roads Authority.

11 AIR QUALITY AND CLIMATE

11.1 INTRODUCTION

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the Air Quality and Climate impacts associated the proposed soil recovery activity which comprises the importation of inert soil material to fill existing quarry voids.

This study will identify, describe and assess the impact of the subject site in terms of air quality and climate during the site set-up and operational (void filling) phase of the proposed soil recovery activity. Attention will be focused on sensitive receptors, such as residential and commercial areas adjacent to or in vicinity of the site. Dust and increased traffic volumes associated with the subject site is likely to be the main impact source. When the activities cease post restoration there will be no potential for impact on air quality or climate.

This assessment was prepared in accordance with the EIA Directive 2014/52/EC and having regard for the following guidance:

- Department of Environment, Heritage and Local Government (DoEHLG) (2004), *Quarries and Ancillary Activities, Guidelines for Planning Authorities*;
- EPA (2006), Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals);
- EPA (2017) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports, Environmental Protection Agency;
- EPA (2015) Advice Notes for Preparing Environmental Impact Statements Draft, Environmental Protection Agency;
- NRA (2011) Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (Rev. 1) National Roads Authority (now Transport Infrastructure Ireland).

This section should be read in conjunction with the site layout plans for the site and project description at Chapter 5 of this EIAR.

Impacts to air quality, such as from the generation of dust and road traffic, will arise during both the site set-up and operational (void filling) phases of the proposed development. The proposed development has been examined to identify those that have the potential for air emissions. Where applicable, a series of suitable mitigation measures have been listed.

11.2 ASSEMENT METHODOLOGY

11.2.1 Baseline Air Quality

As the site is located within Air Quality Zone A (Dublin Conurbation), baseline air quality has been determined from the data available from the EPA monitoring results for the Zone A network and the Dublin Airport Authority (daa) air quality monitoring network. This data will be used to determine (if air quality projections) will be in line / be compliant with relevant ambient air legislation.

11.2.2 Operational Dust Emissions

Dust dispersion has the potential to cause local impacts to cause local impacts through dust nuisance to the nearest sensitive receptors and sensitive ecosystems. The potential for dust generation associated with the proposed soil recovery facility will be assessed based on a review of the proposed methodologies and the proximity of these activities to sensitive receptors.

The operations associated with the proposed development such as the importation of inert soil and stone, excavation, earth moving, and backfilling may produce quantities of dust, particularly in dry weather conditions. The extent and nature of potential dust arisings is dependent on the nature of materials (soils, gravel, sands, peat, silts etc.) and the nature of the backfilling operations. Additionally, the potential for dust dispersion and deposition is dependent on metrological factors such as rainfall and wind direction and speed.

The potential for dust emissions from the proposed development is addressed qualitatively in accordance with the NRA Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes (Rev. 1) (NRA 2011; referred to hereafter as the TII Guidelines).

11.2.3 Road Traffic Emissions

Emissions from construction vehicles are assessed, in accordance with TII guidance, where construction traffic results in a significant (>10%) increase in AADT (annual average daily traffic) flows near sensitive receptors.

Given the limited duration and scale of the site set-up phase for the proposed site infrastructure and facilities, the associated traffic volumes are not predicted to exceed the 10% of the current AADT on Bay Lane. As such, the predicted impacts of traffic at this stage of the development on local air quality are not considered significant.

A prediction of the local impact of traffic-derived pollution during the operational (void filling) phase was carried out using the local assessment model in the Design Manual for Road and Bridges (DMRB), Volume 11, Section 3, Part 1 as per the TII guidelines for assessment of impacts to air from road transport. Traffic data was provided in the form of Annual Average Daily Traffic (AADT) for the future operational year with the site operating at full backfill capacity.

11.2.4 Odour

The main potential odour from any operations associated with waste handling and/or a landfill derive from the handling, storage and decomposition of wastes. The waste licence sought for the proposed development would only accept clean inert soil and stone material (EWC 17 05 04 and 20 02 02) which do not cause odour nuisances.

No bio-degradable waste materials will be accepted at the facility and so odour risk at the site will be very low and so there are no likely significant odour impacts associated with the proposed operations.

Mitigation measures are not required as the inert restoration materials used will not cause odour.

11.2.5 Climate

Existing climate data for the study area have been derived from the Met Éireann 30-year averages (1981 – 2010).

The climate assessment was carried out to identify sources and quantify total GHG emissions generated from the operational activities associated with the proposed development. This assessment was carried out using the carbon calculator for construction activities developed by the Environment Agency (EA) in the UK. The carbon calculator calculates the embodied carbon dioxide (CO_2) of materials plus CO_2 associated with their transportation. It also considers personal travel, site energy use and waste management.

In addition to GHG generation as described above, the adaptability of the proposed development to climate change has also been assessed. The potential impact of flooding in the area has been addressed through consultation with the CFRAM mapping for the area and interaction with the drainage specialist on the project. The site is not identified as being at risk of flooding. These details are presented in **Chapter 10** of this report.

11.2.6 Air Quality Assessment Criteria

11.2.6.1 Dust

During the operational (void filling) phase, dust is considered the principal risk of pollution to the atmosphere. According to the *Quarries and Ancillary Activities,* Guidelines for Planning Authorities (Department of Environment, Heritage and Local Government (DoEHLG), (2004) and *Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals)* (EPA, 2006) quarries by their nature, generate dust, with the main impact being dis-amenity due to dust deposition. However, there is no Irish or European Union or Commission guideline or legislative limits for total suspended particles.

Therefore, the limits provided by the German Government under the TA Luft guidance *Technical Instructions on Air Quality Control* (TA Luft, 2002) are employed. Under this guidance the backfilling operations are required to maintain monthly dust levels below the guideline of 350mg/m^2/day as an annual average at sensitive receptors using the Bergerhoff Method. Below this threshold, the potential for dust nuisance to impact people in the nearest residential, commercial or other structures will be minimised.

Dust monitoring will be carried out as per Waste Licence requirements to ensure that the dust from the activities proposed shall not give rise to deposition levels.

11.2.6.2 Odour

Like dust, there is no legislative limit for odours in Ireland and standard industry guidelines are typically applied. The Odour Impact Assessment Guidance for EPA Licensed Sites (AG5) is a procedure that offers a consistent and systematic approach to the assessment of odours on and in the local area of facilities and installations licenced by the EPA. This sensory assessment is used to determine if an odour has potential to cause nuisance.

11.2.6.3 Combustion Gases/Particulates (Traffic)

In May 2008, the European Commission introduced a revised Directive on ambient air quality and cleaner air for Europe (2008/50/EC), which has been transposed into Irish Legislation through the revised Air Quality Standards Regulations (S.I. 180 of 2011).

The Directive and Regulations specify limit values in ambient air for sulphur dioxide (SO_2), lead, benzene, particulate matter (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), nitrogen dioxide (NO_2) and oxides of nitrogen (NO_x). These limits are mainly for the protection of human health and are largely based on review of epidemiological studies on the health impacts of these pollutants. In addition, there are limits that apply to the protection of the wider environment (ecosystems and vegetation). These limits are presented in **Table 11.1.**

Table 11.1: Limit Values in Ambient Air Quality (Source: S.I. 180 of 2011)

Pollutant	Criteria	Value
Nitrogen Dioxide	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200 $\mu g/m^3$ NO_2
	Annual limit for protection of human health	40 $\mu g/m^3$ NO_2
	Annual limit for protection of vegetation	30 $\mu g/m^3$ NO + NO_2
Benzene	Annual limit for protection of human health	5 $\mu g/m^3$
Carbon Monoxide	Maximum daily 8-hour running mean	10 mg/m^3
Lead	Annual limit for protection of human health	0.5 $\mu g/m^3$
Sulphur Dioxide	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	350 $\mu g/m^3$
	Daily limit for protection of human health - not to be exceeded more than 3 times/year	125 $\mu g/m^3$
	Annual limit for protection of vegetation	20 $\mu g/m^3$
Particulate Matter PM_{10}	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50 $\mu g/m^3$ PM_{10}
	Annual limit for protection of human health	40 $\mu g/m^3$ PM_{10}
Particulate Matter $PM_{2.5}$	Annual target value for the protection of human health	25 $\mu g/m^3$ $PM_{2.5}$

The TII Guidelines specify the significance criteria for determining air quality impacts. The predicted increases or decreases from road traffic pollution may been utilised to determine the significance of any impact in relation to the TII criteria as presented in **Tables 11.2, 11.3 and 11.4.**

Table 11.2: Definition of Impact Magnitude for Changes in Ambient Air Pollutant Concentrations (Source: NRA, 2011)

Magnitude of Change	Annual Mean NO_2/PM_{10}	No. of Days with PM_{10} Concentration greater than 50µg/m³	Annual Mean PM
Large	Increase/decrease ≥4µg/m³	Increase/decrease >4 days	Increase/decrease ≥2.5µg/m³
Medium	Increase/decrease 2 - <4µg/m³	Increase/decrease 3 of 4 days	Increase/decrease 1.25 - <2.5µg/m³
Small	Increase/decrease 0.4 - <2µg/m³	Increase/decrease 1 or 2 days	Increase/decrease 0.25 - <1.25µg/m³
Imperceptible	Increase/decrease <0.4µg/m³	Increase/decrease <1 day	Increase/decrease <0.25µg/m³

Table 11.3: Air Quality Impact Descriptors for Changes in Annual Mean Nitrogen Dioxide Concentrations at a Receptor (Source: NRA, 2011)

Absolute Concentration in Relation to Objective/Limit Value	Changes in Concentration		
	Small	Medium	Large
Increase with Proposed Project			
Above Objective/Limit Value with development (≥40µg/m³ of NO_2 or PM_{10}) (≥25µg/m³ of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value with development (36-<40µg/m³ of NO_2 or PM_{10}) (22.5-<25µg/m³ of $PM_{2.5}$)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value with development (30-<36µg/m³ of NO_2 or PM_{10}) (18.75-<22.5µg/m³ of $PM_{2.5}$)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value with development (<30µg/m³ of NO_2 or PM_{10}) (<18.75µg/m³ of $PM_{2.5}$)	Negligible	Negligible	Slight Adverse
Decreased with Proposed Project			
Above Objective/Limit Value with development (≥40µg/m³ of NO_2 or PM_{10}) (≥25µg/m³ of $PM_{2.5}$)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value with development (36-<40µg/m³ of NO_2 or PM_{10}) (22.5-<25µg/m³ of $PM_{2.5}$)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value with development (30-<36µg/m³ of NO_2 or PM_{10}) (18.75-<22.5µg/m³ of $PM_{2.5}$)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value with development (<30µg/m³ of NO_2 or PM_{10}) (<18.75µg/m³ of $PM_{2.5}$)	Negligible	Negligible	Slight Beneficial

Table 11.4 Air Quality Impact Descriptors for Changes in Number of Days with PM10 Concentrations Greater than 50µg/m^3 at a Receptor (Source: NRA, 2011)

Absolute Concentration in Relation to Objective/Limit Value	Changes in Concentration*		
	Small	Medium	Large
Increased with Proposed Project			
Above Objective/Limit Value with development (≥35days)	Slight Adverse	Moderate Adverse	Substantial Adverse
Just Below Objective/Limit Value with development (32-<35days)	Slight Adverse	Moderate Adverse	Moderate Adverse
Below Objective/Limit Value with development (26-<32days)	Negligible	Slight Adverse	Slight Adverse
Well Below Objective/Limit Value with development <26 days)	Negligible	Negligible	Slight Adverse
Decrease with Proposed Project			
Above Objective/Limit Value with development (≥35days)	Slight Beneficial	Moderate Beneficial	Substantial Beneficial
Just Below Objective/Limit Value with development (32-<35days)	Slight Beneficial	Moderate Beneficial	Moderate Beneficial
Below Objective/Limit Value with development (26-<32days)	Negligible	Slight Beneficial	Slight Beneficial
Well Below Objective/Limit Value with development <26 days)	Negligible	Negligible	Slight Beneficial

In addition to the statutory limits for the protection of human health listed in Air Quality Standards Regulations (S.I. 180 of 2011), the World Health Organisation (WHO) has published a set of air quality guidelines for the protection of human health. The key publication is the "*WHO Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulphur Dioxide, Global update 2005 Summary of Risk Assessment*". The WHO guidelines are based on reducing the risk to human health and in some cases the levels differ from the EU statutory limits as these limits are based on balancing health risks with technological feasibility, economic considerations and various other political and social factors in the EU.

The 2005 WHO guidelines are presented in **Table 11.5** and illustrate that while the NO_2 levels are analogous to those in S.I. 180 of 2011 (excluding the tolerance levels for the 1-hour averages), the annual average PM_{10} and $PM_{2.5}$ levels specified by the WHO are half of the limits specified in the legislation. The WHO note that these are the lowest levels at which total, cardiopulmonary and lung cancer mortality have been shown to increase with more than 95% confidence in response to long-term exposure to $PM_{2.5}$. The EPA has called for movement towards the adoption of these stricter WHO guidelines as the legal standards across Europe and in Ireland.

Table 11.5 WHO 2005 Air Quality Guidelines

Pollutant	Criteria	Value
Nitrogen Dioxide (NO_2)	Hourly level for protection of human health	200 µg/m^3 NO_2
	Annual level for protection of human health	40 µg/m^3 NO_2
Sulphur Dioxide (SO_2)	10-minute level for protection of human health	500 µg/m^3
	Daily level for protection of human health	20 µg/m^3
	24-hour level for protection of human health	50 µg/m^3 PM_{10}

Pollutant	Criteria	Value
Particulate Matter (PM_{10})	Annual level for protection of human health	20 $\mu g/m^3$ PM_{10}
Particulate Matter ($PM_{2.5}$)	24-hour level for protection of human health	25 $\mu g/m^3$ $PM_{2.5}$
	Annual level for protection of human health	10 $\mu g/m^3$ $PM_{2.5}$

11.2.7 Climate Assessment Criteria

CO_2 emissions have a global climate warming effect. This is regardless of their rate of release, location or the weather when they are released into the atmosphere. This is unlike pollutants that affect local air quality where the rate of release, location and prevailing weather, as well as the amount of pollutant, determines the local concentrations and the impact. Local ambient concentrations of CO_2 are not relevant and there are no limits or thresholds that can be applied to sources of carbon emissions. Any amount of CO_2 released into the atmosphere will contribute to climate warming, the extent of which is determined by the magnitude of the release. Although CO_2 emissions are typically expressed as kilogrammes or tonnes per year, there is a cumulative effect of these emissions because CO_2 emissions have a warming effect which lasts for 100 years or more.

It is difficult to assess the scale and significance of any adverse (increased) changes in CO_2 emissions resulting from the proposed development in a similar way to other impacts within this EIAR. The effect, the term used to describe an environmental response resulting from an impact or series of impacts, is not possible to assess for individual CO_2 emissions. However, commentary and context to the calculated CO_2 emissions reported is provided with reference to historic and projected national emissions in Ireland.

The National Policy Position on Climate Action and Low Carbon Development was published on the 23rd April 2014. The policy sets a fundamental national objective to achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy by 2050. The policy states that GHG mitigation and adaptation to the impacts of climate change are to be addressed in parallel national strategies – respectively through a series of National Mitigation Plans and a series of National Climate Change Adaptation Frameworks.

The National Policy Position envisages that development of National Mitigation Plans will be guided by a long-term vision of low carbon transition based on the following:

- An aggregate reduction in carbon dioxide (CO_2) emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors; and
- In parallel, an approach to carbon neutrality in the agriculture and land-use sector, including forestry, which does not compromise capacity for sustainable food production.

Further to the National Policy Position, the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) was enacted on the 10th of December 2015. The Climate Act sets out the proposed national objective to transition to a low carbon, climate resilient and environmentally sustainable economy by the end of 2050.

On 14th May 2018, the European Council adopted a regulation on greenhouse gas emission reductions, the EU effort Sharing Regulation, which sets out 2030 targets for member states. The starting point is an average of 2016 – 2018 emissions with binding emission reduction targets of 30% compared to 2005 levels.

In 2016, total emissions of greenhouse gases in Ireland were 61,545.82ktCO_{2e}, which is 10.9% higher than emissions in 1990. The total for 2016 is 12.8% than the peak of 70,555.06ktCO_{2e} in 2001 when emissions reached a maximum following a period of unprecedented economic growth.

Waste is currently one of Irelands largest individual contributors of GHG emissions at 1% (which consists of landfill, incineration and open burning of waste, mechanical & biological treatment and wastewater treatment). Emissions in the waste sector are primarily attributed to methane emissions from landfills, however, the EPA projects the reduction in waste going to landfill, subsequently reducing GHG emissions during this projection.

The EPA estimate emissions to 2035 using two scenarios as follows:

- "With Existing Measures" - scenario assumes that no additional policies and measures, beyond those already in place by the end of 2017 (latest EPA GHG Emissions Projections Report), are implemented; and
- "With Additional Measures" - scenario assumes implementation of the "With Existing Measures" scenario in addition to progressing of renewable and energy efficient targets for 2020.

GHG projections by sector under "With Additional Measures" projects that waste will contribute to 0.9% of Irelands total GHG emissions in 2020, this is projected to decrease to 0.7% in 2030. Emissions in the waste sector are projected to decrease 40% to 0.5 Mt CO_{2eq} between 2017 and 2020 and by 53% between 2017 and 2030 (0.4 Mt CO_{2eq}).

11.3 EXISTING ENVIRONMENT

11.3.1 Receiving Environment

The site of the proposed development a disused quarry, is located at Bay Lane, St. Margaret's, County Dublin[50], approximately 1km southwest of Exit 2 on the M2 motorway, approximately 4km NNW of Exit 5 (N2) on the M50 motorway and is approximately 7km west of Dublin Airport.

The south-eastern perimeter of the site is bounded by road frontage. The north-western, northern and western perimeter of the site is bounded by lands in active agricultural use.

There are various sensitive receptors (houses, commercial operations) located in the area and these receptors vary in distance from the proposed development. These receptors may experience a change in air quality and the extent of these changes in air quality is identified in this assessment. The nearest sensitive residential receptors to the proposed development are the residential dwellings on Bay Lane.

[50] Address per FCC planning decision 1694 reference F00A/0862 of 20 April 2001

A small number of commercial operations are within the proposed developments vicinity. The nearest commercial receptors include various operations along the Cherryhound-Tyrellstown (N2-R121) Link Road and Bay Lane.

The nearest Natura 2000 sites to the proposed development are all located over 10km away from the site. The nearest sites of note are:

- Malahide Estuary SAC (site code 000205) and SPA (site code 004025) are located circa 14km to the north east of the site;
- Baldoyle Bay SAC (site code 000199) and SPA (site code 004016) are located circa 15km to the east of the site;
- North Bull Island SAC (site code 000206) and SPA (site code 004006) are located circa 15km to the south east in Dublin Bay; and
- Rye Water Valley/Carton SAC (site code 001398) located circa 13km south west of the site.

There are no other habitats or species located within the vicinity of the proposed development that may be adversely impacted by air quality emissions from the proposed development. As such, this interaction is not addressed further within this assessment.

11.3.2 Existing Sources in the Area

The main existing sources of pollution near the site are from road traffic, air traffic and general dusts. The road network around the proposed development is predominantly composed of national and local roads including Bay Lane to the south that connects to Kilshane Road (L3120) to the east and the Cherryhound-Tyrellstown (N2-R121) Link Road to the west and subsequently the N2 and M50 motorways that link to Dublin city.

The local and regional roads serve HGVs and vehicles entering and leaving the N2 for the operations in in the area including Northwest Business Park, Pallas Foods, Halton Concrete and local housing construction sites in the vicinity.

The on-going soil and stone transport and backfilling operations will give rise to dust dispersion and deposition around the proposed development. The dust dispersion in the area is dependent on the amount of road traffic and the HGVs used at the proposed development and the surrounding operations.

Dublin Airport is located approximately 7km from the site at Bay Lane, with the western end of the existing Runway 10/28 located approximately 3.5km from the site’s eastern boundary. The site is also located beneath an existing flight path, with aircraft passing overhead on a regular basis.

Waste operations in the area can give rise to odour and dust nuisances to the receptors in the area. There are two waste facilities in the surrounding area that are licenced by the EPA:

- W0277 - Huntstown Inert Waste Recovery Facility (Roadstone Limited): Operating as a Soil Recovery Facility and circa 1.5km south east of the site.
- W0183 - Starrus Eco Holdings Limited, Cappagh Road – Materials Recovery Facility and circa 2km south of the site.

In addition, there are a further set of industrial licensed facilities in the area as follows:

- P0474 - Patrick Kelly Timber Limited (wood processing) circa 2km east of the site.
- P0993 - Huntstown Bioenergy Limited (powergen) circa 2km south east of the site.
- P0483 - Huntstown Power Company Limited (powergen) circa 2km south east of the site.
- P0777 - Viridian Power Limited (powergen) circa 1.5km south east of the site.
- P0552 - Swords Laboratories (pharmachem) circa 3km south west of the site.

Each of the above operations have potential emissions of both scheduled emissions (through stacks, at powergen) and fugitive emissions of dusts (the waste operators) as well as road traffic serving each operation.

11.3.3 Baseline Air Quality

Air quality legislation in Ireland deals with air quality by the means of “zones” based on population. For Ireland, four zones are defined, and the main areas defined in each zone are:

- Zone A: Dublin Conurbation
- Zone B: Cork Conurbation
- Zone C: Other cities and large towns comprising Galway, Limerick, Waterford, Clonmel, Kilkenny, Sligo, Drogheda, Wexford, Athlone, Ennis, Bray, Naas, Carlow, Tralee, Dundalk, Navan, Letterkenny, Celbridge, Newbridge, Mullingar, Balbriggan, Greystones, Leixlip and Portlaoise.
- Zone D: Rural Ireland, i.e. the remainder of the State excluding Zones A, B and C.

The proposed development is located on Bay Lane, St. Margaret’s, North Co. Dublin in the jurisdiction of Fingal County Council. As such, the site lies within EPA Air Quality Zone A (Dublin Conurbation). The EPA air quality monitoring network for Zone A and the Dublin Airport Authority (daa) air quality monitoring network have been reviewed and suitable representative data is presented to identify the background air quality around the proposed development.

A summary of the EPA monitoring carried out in Zone A (Dublin Conurbation) is presented in the following sections. The EPA monitoring networks in Zone A includes several monitoring locations in North Dublin. Of these Blanchardstown, Finglas and Swords monitoring stations would be most representative of the site location at Bay Lane. However, each of these monitoring locations do not record all ambient air quality parameters outlined in the Directive on ambient air quality and cleaner air for Europe (2008/50/EC). Therefore, air quality in the receiving environment is described using the average annual mean value concentrations from all measured monitoring stations in Zone A.

Table 11.6 shows the aggregated annual mean value concentrations measured for SO_2, PM_{10}, $PM_{2.5}$, NO_2, NO_X, CO and benzene in Zone A for 2016 and 2017. The table compares the annual mean measured levels with the limit values defined in the National Air Quality Standards Regulations 2011 (S.I No. 180 of 2011). The averages are considered representative of the north Co. Dublin area and the site of the proposed development.

Table 11.6: Extract of summary data from EPA Ambient Air Monitoring for Zone A in 2016 and 2017

Pollutant	Unit	Annual Mean Concentration in 2016	Annual Mean Concentration in 2017	Annual Limit for Protection of Human Health
Nitrogen Dioxide (NO_2)	µg/m^3	23.7	20.8	40
Nitrogen Oxide (NOx)	µg/m^3	42.8	37.6	30
Sulphur Dioxide (SO_2)	µg/m^3	1.2	1.66	20
Particulate Matter (PM_{10})	µg/m^3	13.5	12.4	40
Particulate Matter ($PM_{2.5}$)	µg/m^3	8.6	7.5	25
Carbon Monoxide (CO)	mg/m^3	0.3	0.285	10
Benzene	µg/m^3	1.01	0.92	5

The existing baseline levels of SO_2, PM_{10}, $PM_{2.5}$, NO_2, CO and Benzene based on data from the EPA monitoring network are currently below annual ambient air quality limit values in Zone A. The annual mean for Nitrogen Oxide (NO_x) is above the annual limit in Zone A, however, NO_x exceedances are more concerning in areas of sensitive ecosystems due to potential effects on vegetation and hence these elevated levels in the Dublin area are not considered a significant compliance issue.

Dublin Airport is located approximately 7km east of the site at Bay Lane, with the western end of the existing Runway 10/28 located approximately 3.5km from the site's eastern boundary. The site is also located beneath an existing flight path, with aircraft passing overhead on a regular basis.

A summary of the Air Quality monitoring carried out by daa is presented in the following sections. The daa monitoring network includes an on-site monitoring location which monitors NO_2 and PM_{10} and ten off-site monitoring locations which monitor NO_2 and Benzene.

Table 11.7: Dublin Airport Air Quality Monitoring Figures (on-site monitoring - continuous analyser)

Pollutant	Unit	Annual Mean Concentration in 2016	Annual Mean Concentration in 2017	Annual Mean Concentration in 2018	Annual Limit for Protection of Human Health
Nitrogen Dioxide (NO_2)	µg/m^3	23	20	28	40
Particulate Matter (PM_{10})	µg/m^3	23	21	20	40

The existing baseline levels of PM_{10}, and NO_2 based on data from the daa on-site monitoring location are currently below annual limits of protection for ambient air quality limit values. The daa off-site air quality monitoring figures for NO_2 and Benzene (annual limit of 5 µg/m^3) for 2016, 2017, and 2018 were all below annual limit values.

In summary, existing baseline levels of pollutants based on the data from both the EPA Zone A and daa monitoring networks are currently below ambient air quality limit values and by extension the levels near the proposed facility are also considered to be below the limit values.

11.3.4 Baseline Climate

The weather in Ireland is influenced by the Atlantic Ocean, resulting in mild, moist weather dominated by maritime air masses. The prevailing wind direction is from a quadrant centred on west-southwest. These 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 northeast in spring and warmer weather from the southeast in summer. The site of the proposed soil recovery facility is approximately 15km west of the east coast would experience a higher frequency of easterly winds than more inland locations or those on the west coast.

The nearest meteorological station to the area is the Met Éireann Station in Dublin Airport which lies approximately 7km (terminal buildings) east of the subject site. The 30-year averages from the station at Dublin Airport are presented in **Table 11.9**.

Table 11.9 The 30-Year Average Meteorological Data from Dublin Airport (Annual Values from 1981-2010, source: www.met.ie)

Parameter	30-Year Average
Mean Temperature (°C)	9.8
Mean Relative Humidity at 0900UTC (%)	83.0
Mean Daily Sunshine Duration (Hours)	3.9
Mean Annual Total Rainfall	758.0
Mean Wind Speed (knots)	10.3

11.3.4.1 Temperature

At Dublin Airport the 30-year record for temperature (**Table 11.10**) shows that the average daily temperature across a calendar year is 9.8°C with an average maximum of 13.3°C and an average minimum of 6.4°C. Across the calendar year the average number of days with air frost is 29.4.

Table 11.10 The 30-Year average data for rainfall at Dublin Airport (Annual Values from 1981-2010, source: www.met.ie)

Temperature (°C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Daily Max	8.1	8.3	10.2	12.1	14.8	17.6	19.5	19.2	17	13.6	10.3	8.3	13.3
Mean Daily Min	2.4	2.3	3.4	4.6	6.9	9.6	11.7	11.5	9.8	7.3	4.5	2.8	6.4
Mean Temperature	5.3	5.3	6.8	7.3	10.9	13.6	15.6	15.3	13.4	10.5	7.4	5.6	9.8
Mean num. of Days with Air Frost	6.4	6.5	3.8	2.4	0.3	0	0	0	0	0.5	3.0	6.4	29.4

11.3.4.2 Wind

The prevailing wind direction for the area is between west and southwest (10-20%) as presented in the wind-rose for Dublin Airport Meteorological Station for 1981-2010 in **Figure 11.1**. Northerly and north-easterly winds tend to be very infrequent (less than 5%) with easterly and south-easterly winds marginally more frequently (5-10%).

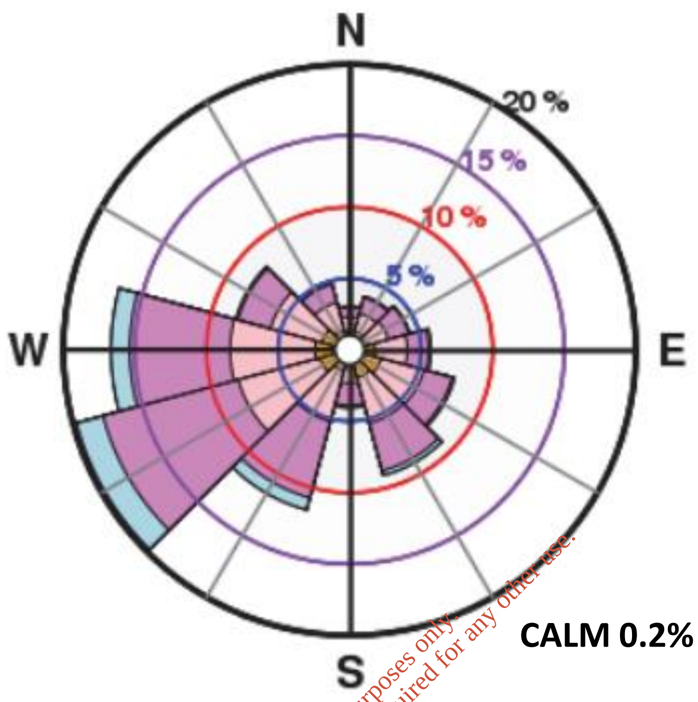


Figure 11.1 Wind-rose for the Dublin Airport Meteorological Station 1981 – 2010 (Source: www.met.ie)

Wind characteristics are typically moderate with relatively infrequent gales with an average of 8.2 days with gales per annum with an average maximum wind gust of 80 knots during the year (January) (**Table 11.11**).

Table 11.11 30-Year average data for wind at Dublin Airport (Annual Values from 1981-2010, source: www.met.ie)

Wind (knots)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Monthly Speed	12.5	12.0	11.6	9.9	9.2	8.6	8.7	8.7	9.2	10.4	11.0	11.3	10.3
Max. Gust	80	73	66	59	58	53	54	56	59	69	66	76	80
Mean num. of Days with Gales	2.3	1.5	1.1	0.1	0.1	0.1	0.1	0.1	0.2	0.5	0.8	1.3	8.2

11.3.4.3 Rainfall

The average yearly rainfall in the 30-year average is 758.0mm, this is broken down into monthly averages in **Table 11.12**. The greatest daily total of rain is recorded in May (73.9mm) with moderately frequent days with ≥5.0mm per annum (42 days).

Table 11.12 30-Year average data for rainfall at Dublin Airport (Annual Values from 1981-2010, source: www.met.ie)

Rainfall (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Monthly Total	62.6	48.8	52.7	54.1	59.5	66.7	56.2	73.3	59.5	79.0	72.9	72.7	758.0
Greatest Daily Total	27.1	28.1	35.8	30.4	42.1	73.9	39.2	72.2	40.6	53.2	62.8	42.4	73.9
Mean num. Days with ≥5.0mm	4	3	3	3	3	3	3	4	4	4	4	4	42

11.3.4.4 Weather Events

The proposed development must consider weather events relating to cold weather, wind, rain and events (storms, snow etc.) that may disrupt operations.

Table 11.13 displays the mean number of days per annum on average across the 30-year average a weather event occurs. Snow lying at 0900UTC is infrequent occurring on average 3.4 days per annum, posing a low risk to operations. Fog is the most frequent weather event observed at Dublin Airport during the 30-year average records, occurring on average 41.5 days per annum.

Table 11.13 30-Year average data for weather events at Dublin Airport (Annual Values from 1981-2010, source www.met.ie)

Weather (mean num. of days with…)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Snow or Sleet	4.6	4.2	2.8	1.2	0.2	0	0	0	0	0	0.8	2.9	16.6
Snow lying at 0900UTC	1.6	0.6	0.1	0	0	0	0	0	0	0	0.1	0.9	3.4
Hail	1.2	1.5	2.0	1.9	1.3	0.1	0.2	0.1	0.1	0.3	0.3	0.7	9.7
Thunder	0.3	0.2	0.3	0.2	0.9	0.8	0.8	0.9	0.3	0.3	0.2	0.2	5.5
Fog	3.3	3.1	3.6	3.6	3.4	2.8	3.3	3.8	4.2	3.2	3.1	4.1	41.5

11.4 POTENTIAL IMPACT OF THE PROPOSAL

11.4.1 Operational Dust

Dust is considered a risk of pollution to the atmosphere from the activities associated with the proposed development.

In accordance with the NRA Guidelines, where there are operations at a construction, quarrying or dust risk site, there is a risk that dust may cause an impact at sensitive receptors near the source of the dust generated. The distances identified within which impacts may arise are presented in **Table 11.14** (source NRA Guidelines, May 2011 Revision).

Table 11.14: TII (formerly NRA) Assessment Criteria for the Impact of Dust Emissions from Construction Activities, (with standard mitigation in place)

Source		Potential Distance for Significant Effects (Distance from source)		
Scale	**Description**	**Soiling**	**PM_{10}**	**Vegetation Effects**
Major	Large Construction sites, with high use of haul routes.	100m	25m	25m
Moderate	Moderate Construction sites, with moderate use of haul routes.	50m	15m	15m
Minor	Minor Construction sites, with minor use of haul routes.	25m	10m	10m

A single residential property located immediately to the south east of the boundary of the site at Bay Lane is located within 100 metres of the works and potentially the proposed operations in this area. Another property is located to the south east; however, this is circa 130m from the site boundary. Operations related dust from the proposed development the nearest property is likely to result in a '**Short-Term Slight Adverse**' impact without additional mitigation measures in place. Where dust related impacts are anticipated avoidance and mitigation measures will be put in place to reduce the impact level.

11.4.2 Road Traffic

Road traffic associated with the proposed development can impact directly on local air quality and any sensitive receptors that are located adjacent to the local road networks may experience the impacts to local air quality. Traffic on the road network is predicted to increase during the operational hours of the proposed soil recovery facility. **Section 13.4.3** of this EIAR states that there is a potential peak of circa 196 trucks arriving to the quarry per day (392 truck movements in total) on top of the existing levels during the operation stage.

The main haul route is expected to be via the N2 but other routes such as the R135 and R121 may also be employed depending on the origin of the material sources for the Bay Lane Site. To that end, an assumption of all traffic on the haul routes impacting on any property within 10 metres of the haul route has been undertaken. The results of the analysis along the haul route are presented in **Table 11.15** for the "Do-Nothing" (no development) and "Do-something (with development) for each scenario years 2019, 2021, 2024.

Table 11.15: Local impact to air quality because of road traffic

Scenarios	Nitrogen Dioxide (µg/m^3)	Particulates (PM_{10}) (µg/m^3)		Benzene (µg/m^3)	Carbon Monoxide (mg/m^3)
	Annual Average NO_2	Annual Average PM_{10}	Days > 50µg/m^3	Annual Average Benzene	Annual Average CO
Background	20.8	12.4	-	0.92	0.285
2019 Do-Nothing	23.40	13.17	0.00	0.97	0.33
2019 Do Something	23.86	13.25	0.00	0.97	0.33
2021 Do-Nothing	23.41	13.18	0.00	0.97	0.33
2021 Do Something	23.85	13.26	0.00	0.97	0.33
2024 Do-Nothing	23.47	13.22	0.00	0.97	0.33
2024 Do Something	23.92	13.30	0.00	0.97	0.33
Annual Limit	**40**	**40**	**35**	**5**	**10**

The results indicate that all levels of pollutants are predicted to remain within the limits for the protection of human health and the WHO guidelines along the proposed haul route for all future scenario years. Using the NRA significance criteria (as outlined in **Table 11.9)** the predicted increases associated with the proposed development relative to the baseline scenario is classed as 'imperceptible'. While the levels remain below the relevant limits these increases and air quality impact from this traffic are classed as '**negligible**'.

11.4.3 Odour

As no biodegradable material will be accepted at the site, there will be no potential for nuisance such as odour, leachate, landfill gas, or vermin at the site.

Inspection at the weighbridge will check the visual appearance and odour of each load, only if both these characteristics are satisfactory can the transaction be complete and delivered to the backfilling area.

The nature of the waste significantly limits the generation of odour impacts; therefore, the impact of odour is considered "**negligible**" and no mitigation measures are required.

11.4.4 Emissions of Greenhouse Gases

Emissions of GHG from the proposed development may arise from the following sources:

- Embodied emissions in site materials relative to other materials;
- Direct emissions from plant machinery/equipment;
- Transport emissions from vehicles importing/exporting material to and from the site.

Embodied emissions are the carbon footprint of a material, i.e. the total emissions released throughout the supply chain of the material. This includes the energy required for extraction, processing, operation and disposal of a material and for some materials such as steel or glass the use of recycled materials has a lower embodied GHG emission than the use of virgin material.

These emissions have been estimated using the Environment Agency (EA) *Carbon Calculator for Construction Sites* and the results are presented in **Table 11.10**.

Table 11.10: Summary of Greenhouse Emissions from the Proposed Development

Item	Estimated GHG Emissions (tCO_2eq)
Quarried Material (waste soil and stone)	7,400
Plant Emissions	318
Material Transport	7,897
Personnel Transport	75
TOTAL	**15,690**

The total estimated greenhouse gas emissions associated with the proposed development is calculated at 15,690 tonnes of CO_{2eq} which will result in a "**permanent slight adverse impact**" for climate.

11.4.4.1 Climate Change Adaptation

In terms of the risk of major disasters which are relevant to the proposed development, given the location and physical characteristics of the proposed development, the main potential risks of flooding, wind, rain and weather events are reduced.

Regarding the flood risk of the proposed development, the Waste Licence boundary is will not be affected by a 100-year event. A flood risk assessment of the proposed development is presented in **Chapter 10** and confirms the low vulnerability of the proposed development.

11.4.5 Potential for Cumulative Impacts

Cumulative impacts from the existing waste operations, power generation and other industrial operations have been accounted for the in the baseline assessment undertaken.

The Article 27 operations in the area have the potential to generate cumulative traffic emissions and fugitive dust in addition to the proposed Bay Lane Soil Recovery Facility.

The proposed Irish Water development of a biosolids storage facility at Newtown, near Kilshane Cross would operate approximately 2.25km from Bay Lane Soil Recovery Facility. This operation has the potential to generate fugitive odours, however, as outlined earlier the proposed Bay Lane facility will have negligible odour impact so hence no cumulative odour impact is predicted.

11.4.6 'Do-Nothing' Impact

The 'Do-Nothing' scenario refers to the site remaining vacant as per the existing baseline scenario. This scenario will result in short term positives for the areas air quality as it will reduce the amount of traffic as HGVs will no longer report to the site. However, negative medium- and long-term dust impacts have potential to occur with the open faces remaining unrestored.

11.5 MITIGATION MEASURES

11.5.1 Dust

The potential for dust to be emitted depends on the type of activity being carried out in conjunction with environmental factors including levels of rainfall, wind speeds and wind direction. The potential for impact from dust depends on the distance to potentially sensitive locations and whether the wind can carry the dust to these locations.

To mitigate dust emissions during the site set-up and operational (void filling) phase, a dust minimisation plan will be prepared as part of the final Environmental Management Plan required under the EPA Licence.

The dust minimisation plan will be prepared in line with industry guidelines such as the Building Research Establishment document entitled '*Control of Dust from Construction and Demolition Activities'* and the Construction Industry Research and Information Association (CIRIA) '*Environmental Good Practice on Site'*, 3rd Edition, 2010.

The implementation of a dust minimisation plan during the operation of the project will includes measures such as:

- The physical characteristics of the site, this is the overriding dust mitigation method. As most of the site is below ground level, this acts as a natural barrier, containing the dust within the void and preventing nuisance to the surrounding landscape;
- Monitoring and reporting to the EPA will be carried out, as per licence requirements;
- Concrete surfaces will be used at the site entrance to minimise dust generation in these areas;
- Dust control equipment to be used to control dust levels;
- The active tipping area will be restricted in location and area;
- Site roads will be regularly cleaned and maintained as appropriate. Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic only;
- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions (also applies to vehicles delivering material with dust potential), a mobile water bowser is on site for deployment during dry weather periods;
- Concrete surfaces will be used at the site entrance to minimise dust generation in these areas;
- Any site roads with the potential to give rise to dust will be regularly watered, as appropriate, during dry and/or windy conditions (also applies to vehicles delivering material with dust potential);
- All vehicles exiting the site will make use of a wheel wash facility prior to entering onto public roads, to ensure mud and other wastes are not tracked onto public roads. Wheel washes will be self-contained systems that do not require discharge of the wastewater to water bodies;

- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary;
- A road sweeper will be used on internal haul roads and on intermediate approach roads to the facility; A road sweeper will be used on site to mitigate against dust on and around the site;
- Material handling systems will be designed and laid out to minimise exposure to wind;
- The transport of very fine soils should be undertaken in covered vehicles;
- Water misting, or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods;
- All vehicles which present a risk of spillage of materials, while either delivering or removing materials, will be loaded in such a way as to prevent spillage onto the public road;
- All vehicles suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.

To ensure that potential dust nuisance is minimised, a series of mitigation measures have been listed. If the applicant adheres to good working practices and the dust mitigation measures outlined above, the levels of dust generated are assessed to be minimal and are unlikely to cause an environmental nuisance.

Dust deposition is not likely to cause a problem because of the proposed development, as it will continue to be controlled in the appropriate and adequate manner (under the supervision of the EPA, through their enforcement of the Waste Licence).

11.5.2 Road Traffic

Mitigation of road traffic emissions are mainly achieved through EU legislation driven improvements in fuel and engine technology resulting in a gradually reducing emissions per vehicle profile. The collection of EU Directives, known as the Auto Oil Programme, have outlined improved emission criteria which manufacturers are required to achieve from vehicles produced in the past and in future years. This is a trend which has been in operation for many years and is destined to continue in future years for both cars and heavy-duty vehicles. The introduction of the National Car Test (NCT) has also helped to reduce transport emissions by ensuring that all vehicles on Irish roads over four years old undergo an emissions test.

Traffic will be controlled on site with the use of signage, speed restrictions and a one-way system to limit the varying speeds of traffic that negatively impacts air quality. All vehicles must use the wheel wash facility before leaving the site. The dust deposition associated with road traffic is not likely to cause a problem because of the proposed development. The development will be controlled in the appropriate and adequate manner, under supervision of the EPA.

11.5.3 Odour

No emissions are expected; therefore, no mitigation measures are required. Any non-conforming and/or fly-tipped waste will be quarantined and removed off site to an approved facility for processing.

11.5.4 Greenhouse Gases

Consideration is given in this section to specific measures associated with the proposed development at and wider measures applicable to the overall quarry operations. It is noted that the mitigation measures proposed in **Sections 11.5** will also benefit in terms of reducing CO_2 emissions.

Monitoring of meteorological conditions as stipulated in the EPA licence requirements will be adhered to. Climatic data for the site will be compiled, relating to temperature, rainfall, wind and evapotranspiration. Monitoring will be undertaken mainly for context of dust nuisance control and other environmental management factors.

Mitigation measures to minimise CO_2 emissions from the construction/operational (void filling) phase include the following:

- Implementation of a Traffic Management Plan prepared in advance of activities.;
- Reducing the idle times by providing an efficient material handling plan that minimizes the waiting time for loads and unloads. Reducing idle times could save up to 10% of total emissions during operations;
- Turning off vehicular engines when not in use for more than five minutes. This restriction will be enforced strictly unless the idle function is necessary for security or functionality reasons;
- Regular maintenance of plant and equipment. Technical inspection of vehicles to ensure they will perform the most efficiently;
- The operator will implement an Energy Management System which may include such as:
    - The use of thermostatic controls on all space heating systems in site buildings to maintain optimum comfort at minimum energy use;
    - The use of sensors on light fittings in all site buildings and low energy lighting systems;
    - The use of adequately insulated temporary building structures for welfare facilities and site offices fitted with suitable vents;
    - The use of low energy equipment and "power saving" functions on all PCs and monitors in the site offices;
    - The use of low flow tap fittings; and
    - The use of solar/thermal power to heat water for the on-site welfare facilities.

11.5.5 Monitoring

Monitoring on dust deposition will be carried out (as per licence requirements) at monitoring locations (to be identified) to assess the potential impact of the soil recovery activities and to inform the dust minimisation plan.

The applicant will be required to maintain monthly dust levels below the guideline of 350mg/m^2/day as a 30-day average at sensitive receptors using standard Bergerhoff gauges. Where dust levels are measured to be above this guideline the mitigation measures in the area must be reviewed as part of the dust minimisation plan.

11.5.6 Post-Restoration Phase

Upon completion of the restoration of the former quarry site to natural levels, the sources of pollution (i.e. dust and traffic) associated with the operational (void filling) phase will be eliminated. As a result, there would cease to be any potential impact to air quality for this phase. As such the post-restoration phase would result in a "**negligible**" impact on air quality.

11.6 RESIDUAL IMPACT

On implementation of the dust minimisation plan and ongoing monitoring the impact of construction dust from the proposed backfilling on the community is considered “**negligible**”.

The residual odour impact of the prosed backfilling operations is considered “**negligible**”.

As the construction traffic volumes predicted with the operational (void filling) phase are not considered significant, the resultant air quality impact from this traffic is “**negligible**”.

The total estimated greenhouse gas emissions associated with the proposed development is calculated at 15,690 tonnes of CO_{2eq} which will result in a “**permanent slight adverse impact**”.

12 NOISE AND VIBRATION

12.1 INTRODUCTION

This chapter assesses the predicted noise and vibration impacts of the proposed soil and stone recovery facility at the Bay Lane Quarry site. A detailed description of the Bay Lane Quarry Restoration works is outlined in **Chapter 5**.

The main objectives of this assessment were to:

- Present and discuss the existing ground noise environment in the vicinity, by characterising the existing baseline noise environment and a review of available historic noise monitoring data;
- Assess the noise and vibration impacts of the transportation of material as well as deposition of the material at the site as part of the proposed works;
- Recommend mitigation measures, where appropriate, in relation to the proposed operations and residual effects associated with such mitigation measures.

Attention is focused on sensitive receptors, such as residential dwellings adjacent to the transport road, as these would experience the greatest level of impact regarding noise and vibration.

12.2 METHODOLOGY

12.2.1 Guidelines

This assessment was prepared having regard for the following guidance:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, Draft, August 2017);
- Advice Notes for Preparing Environmental Impact Statements (EPA, Draft September 2015);
- Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (TII, 2014); and
- EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4, January 2016).

12.2.2 Scope of Assessment

This assessment has been undertaken in line with best practice assessment procedures for environmental noise impact. A desk top study was undertaken to review the existing site layout, Google Earth™ imagery and OSI mapping of the surrounding environment to determine the context of the proposal under consideration and the surrounding environment in which it is located.

The desk top study identified the main scope of the baseline noise climate and the location of the closest noise sensitive locations to the proposed operations for the impact assessment. A review of historic noise monitoring results associated with the 2000 EIS prepared for the proposed limestone quarry and associated development at Bay Lane was also undertaken.

Scoping of the proposal with interested parties also identified the following for consideration in this EIAR:

- Planning should take account of noise mitigation and operating hours with consideration for nearby residential communities;
- Any plans for this site must give due consideration to protecting the safety of nearby residents and will require strict restriction of routes that can be used by vehicles accessing the site to minimise the disturbance and risk to residents;
- There are houses adjacent to the site which may be affected by increased HGV traffic to and from sites of production in terms of the potential effects of increased noise and dust. For this reason, it is recommended that a baseline is established, and that noise and dust be continually monitored at this facility.

12.2.3 Fundamentals of Noise

Noise is typically defined as "unwanted sound"; sound being the human sensation of pressure fluctuations in the air. Sound pressure levels are expressed in decibels (dB) on a logarithmic scale. Audible sound for humans ranges from 0dB (i.e. the threshold of hearing) to the threshold of pain at 120dB. A doubling or halving of pressure equates to a 3dB increase or decrease in decibel level. Typically, under normal circumstances, a 3dB change in environmental noise level is the smallest noticeable change to the human ear. A 10dB increase or decrease in sound level equates to a subjective doubling or halving of noise which is a perceived doubling or halving by the human ear according to *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4*) (EPA, January 2016).

The frequency of sound is the rate at which a sound wave oscillates and is expressed in Hertz (Hz). The sensitivity of the human ear to different frequencies in the audible range is not uniform. For example, hearing sensitivity decreases markedly as frequency falls below 250 Hz. A mechanism known as "A-weighting" has been adopted to account for this non-linearity of the human ear. Sound levels expressed using "A-weighting" are typically denoted dB(A). An indication of the level of common sounds on the dB(A) scale is presented in **Figure 12.1.**

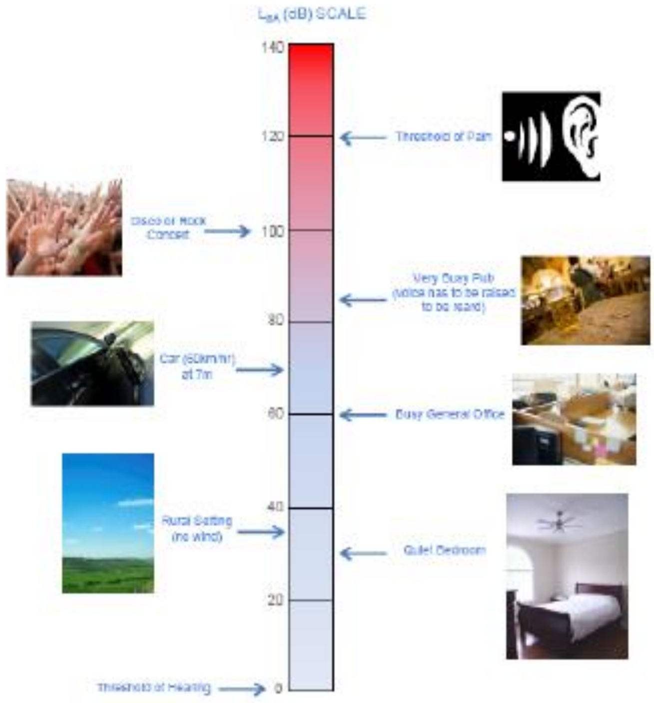


Figure 12.1: L_{pA} (dB) Scale and Indicative Noise Levels

The parameter most commonly used for the assessment of noise impacts is L_{Aeq}, which is defined as being the A-weighted equivalent continuous steady sound level during the sample period and effectively represents an average value. In other words, the L_{Aeq} is a good measure of the average ambient noise level. The L_{A10} index has been historically considered a good indication of road traffic noise, while the L_{A90} index is considered a good indication of the background noise level. A glossary of noise level indices terms is given below for ease of reference:

L_A Denotes measurements were made using the A-weighting network. The A-weighting represents the response of the human ear to sound.

$L_{Aeq,T}$ The continuous equivalent A-weighted sound pressure level. This is an 'average' of the sound pressure level over a period of time (T).

$L_{AMax,T}$ This is the maximum A-weighted sound level measured during a period of time (T).

$L_{Amin,T}$ This is the minimum A-weighted sound level measured during a period of time (T).

$L_{A90,T}$ The A-weighted noise level exceeded for 90% of the measurement over a period of time (T). This is normally used to indicate background noise.

$L_{A10,T}$ The noise level exceeded for 10% of the measurement over a period of time (T). This is normally used to indicate road traffic noise.

12.2.4 Fundamentals of Vibration

Vibration standards come in two varieties: those dealing with human comfort and those dealing with cosmetic or structural damage to buildings. In both instances, it is appropriate to consider the magnitude of vibration in terms of Peak Particle Velocity (PPV).

P.P.V is defined in BS 5228+A1 (2014): Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration as the:

'instantaneous maximum velocity reached by a vibrating element as it oscillates about its rest position.'

The unit of measurement of P.P.V is most commonly millimetres per second, mm/s. However, when dealing with human perception to vibration and the tolerances of sensitive equipment the unit of measurement of micrometres per second, µm/s, may be used. It is also important to take account the frequency at which the vibration occurs, which is like sound is expressed in Hertz (Hz).

Buildings are sensitive to vibration at very low frequencies, i.e. less than 10Hz, and are more resistant to vibration at higher frequencies, i.e. above 50Hz.

It is acknowledged, however, that humans are sensitive to vibration stimuli at much lower magnitudes than those likely to cause damage to buildings. Vibration typically becomes perceptible at around 150 to 300µm/s PPV and may become disturbing or annoying at higher magnitudes. However, higher levels of vibration are typically tolerated for single events or events of short-term duration, particularly during construction projects and when the origin of vibration is known.

12.2.5 Information Sources Used

The following standards and guidelines were used in completing this assessment:

- Quarries and Ancillary Activities, Guidelines for Planning Authorities (Department of Environment, Heritage and Local Government (DoEHLG), 2004);
- Environmental Management Guidelines: Environmental Management in the Extractive Industry (Non-Scheduled Minerals) (EPA, 2006);
- Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures, Third Edition (ISO 1996-1, 2016);
- BS 6472-1:2008 'Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting';
- BS 6472-2:2008 'Guide to evaluation of human exposure to vibration in buildings. Blast-induced vibration'; and
- BS 7385-2:1993 'Evaluation and measurement for vibration in buildings. Guide to damage levels from ground borne vibration'.
- ISO 1996-1:2003 'Acoustics - Description, measurement and assessment of environmental noise - Part 1: Basic quantities and assessment procedures';
- ISO 1996-2:2007 'Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise level';

- BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Noise';
- BS 5228-2:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Vibration';
- Calculation of Road Traffic Noise (CRTN), Department of Transport Welsh Office, HMSO, 1988.

12.3 ASESSMENT CRITERIA

12.3.1 Noise Criteria

The level of environmental noise generated during the operational phase of any development is determined primarily by the exact methods employed. The significance of the noise impact of such methods will arise from the specific sound power levels generated by the plant and machinery used, the duration of each activity, as well as the time and location in which the equipment is used.

The potential sources of environmental noise during the Operational (void filling) phase of the proposed development will primarily arise from increased traffic on the surrounding road network (from construction workers and delivery of plant and materials) and actual on-site works where heavy plant and earth moving machinery may be required.

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction (staging) phase of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion. The EPA waste licence will dictate operational noise limits.

The site is currently a disused quarry. To operate as a soil recovery facility, the site operators, GLV Bay Lane Limited will require a waste licence from the EPA. EPA NG4 Guidance requires that licensed sites are screened to determine whether they are a "quiet area" in accordance with the EPA publication "Environmental Quality Objectives – Noise in Quiet Areas (2003) (Step 1 of NG4) or areas of low background noise (Step 3 of NG4). This screening is used to determine the most appropriate noise levels for licensed sites. As the subject site will be subject to a waste licence application, the guidance note is considered applicable.

In accordance with the NG4 guidance, the criteria in Table 12.1: Quiet Area Screening (EPA NG4) must be satisfied for a site to be deemed to be a "quiet area".

Table 12.1: Quiet Area Screening (EPA NG4)

Criteria	Details
Is the site >3km away from urban areas with a population >1,000 people?	No. The site is 3km south west of the small village of St. Margaret's, 3km north east of Mulhuddart, and 2.8km west of the closest boundary of Dublin Airport.
Is the site >10km away from urban areas with a population >5,000 people?	No

Criteria	Details
Is the site >15km away from urban areas with a population >10,000 people?	No, c.4km from Settlement of Dublin city and suburbs with a population of 1,173,1791[51]
Is the site >3km away from any local industry?	No, 1km from Northwest Business Park
Is the site >10km away from any major industry centre?	No, 1km from Northwest Business Park
Is the site >5km away from any national primary route?	No, 260m southeast of the roundabout on the N2-R121 dual carriageway link road
Is the site >7.5km away from any motorway or dual carriageway?	No, located 1km southwest off Exit 2 of M2 motorway & 6km NNW of Exit 5 of M50 motorway
Quiet Area	No
Other Relevant Comments	The site is located within 2.8km west of the closest boundary of Dublin Airport. The Dublin Airport Strategic Noise Mapping (Round 3 2017) was consulted. The south western portion of the site falls within the 60-64 dB L_{den} while the south eastern portion of the site falls within the 65-69dB L_{den} contour.

There is a noise monitoring terminal (NMT) located at Bay lane (NMT 1) operated by Dublin Airport to monitor aircraft noise levels and flight tracks. NMT 1 is located under the extended runway centreline of Runway 28. Its purpose is to monitor Runway 28 departures and Runway 10 arrivals. The latest noise monitoring report[52] for the period January – June 2018 was consulted and the results are presented in Table 12.2 below.

Table 12.2: Summary of Aircraft Noise at Bay Lane

NMT	Number of correlated aircraft noise events				Daytime noise level, $L_{Aeq,\,16\,h}$ [dB]		Night-time noise level, $L_{Aeq,\,8\,h}$ [dB]	
	Description	Arrivals	Departures	Total	Total	Aircraft	Total	Aircraft
1	Arrivals Runway 10, Departures Runway 28	17,173	26,608	43,781	63.9	62.8	58.9	57.2

Based on Table 12.2 it has been determined that the site is not located within a "quiet area". In accordance with Section 6.1 of NG4, a series of attended noise measurements at the nearest noise sensitive locations were carried out over the day, evening and night-time period and were screened to determine if they satisfied the criteria for "areas of low background noise" outlined below:

- Average Daytime Background Noise Level ≤40dB L_{AF90}, and;
- Average Evening Background Noise Level ≤35dB L_{AF90}, and;
- Average Night-time Background Noise Level ≤30dB L_{AF90}.

[51] 2016 Census data

[52] Noise Monitoring Report January - June 2018, Dublin Airport available at https://www.dublinairport.com/docs/default-source/noise/Noise-Monitoring-Report-January-June-2018.pdf?sfvrsn=4

The results of the baseline noise survey are outlined in **Section 12.4.1.** The results of the baseline survey indicate that the daytime, evening and night-time L_{A90} levels exceeded 40dB, 35dB and 30dB respectively therefore the site is not located within an area of low background noise and as such the following noise criteria are applicable as outlined in **Table 1.3**.

Table 12.3: Guidance Note NG4 Recommended Noise Emission Limits

Period	Noise Criterion dB $L_{Ar,T}$
Daytime Noise Criterion, (07:00 to 19:00hrs)	55
Evening Noise Criterion, (19:00 to 23:00hrs)	50
Night-time Noise Criterion, (23:00 to 07:00hrs)	45

The information presented in **Table 1.4** is taken from the 'Guidelines for Noise Impact Assessment' produced by the Institute of Environmental Management and Assessment (IEMA). This document replaces the draft guidelines published by the Institute of Acoustics (IOA) and IEMA in April 2002 and shows an appropriate impact rating procedure for noise levels attributable to certain operations based on perception of loudness. It should be noted that the subjective description outlined in **Table 12.4** applies to relatively continuous noise only. RPS would therefore deem the outlined changes as suitable criteria for assessing noise arising from the subject site, from both onsite and road traffic related noise impacts.

Table 12.4: Likely impact associated with a change in noise level

Change in Noise Level	Subjective Reaction	Impact Guidelines for Noise Impact Assessment Significance	Impact Guidelines on the Information to be contained in EIARs (EPA)
0 dB	No change	None	Imperceptible
0.1 to 2.9 dB	Barely perceptible	Minor	Slight
3.0 to 4.9 dB	Noticeable	Moderate	Moderate
5.0 to 9.9 dB	Up to a doubling or halving of loudness	Substantial	Significant
10 dB or more	More than a doubling or halving of loudness	Major	Profound

12.3.2 Vibration Assessment Criteria

There are generally accepted criteria for vibration levels that would be likely to lead to complaints, and vibration levels that would be likely to lead to structural damage. These levels are outlined in the guidance documents BS6472: 1992 Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz), and BS7385: Part 2 1990: Evaluation and measurement for vibration in buildings - Guide to damage levels from ground-borne vibration.

Construction practices employed should have regard to best practice as recommended in the following standards and guidance:

- BS 6472-1 (2008) Guide to evaluation of Human Exposure to Vibration in Buildings - Vibration sources other than Blasting.
- BS 7385-1 (1990) Evaluation and Measurement for Vibration in Buildings - Guide for Measurement of Vibration and evaluation of their effects on buildings.
- BS 7385-2 (1993) Evaluation and Measurement for Vibration in Buildings - Guide to damage levels from Ground borne Vibration.
- BS 5228-2:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.

In the case of nominally continuous sources of vibration, such as traffic, vibration is perceptible at around 0.5 mm/s and may become disturbing or annoying at higher magnitudes. However, the operational (void filling) phase of the proposed restoration works will not generate perceptible vibrations.

12.4 RECEIVING ENVIRONMENT

The site is in the town land of Bay St. Margaret's, County Dublin to the north of Blanchardstown, about 3km south west of the small village of St. Margaret's, 3km north east of Mulhuddart, and 2.8km west of the closest boundary of Dublin Airport. It is situated on the north side of a local road, known as Bay Lane, which connects the N2 at Kilshane Bridge with the N3 at Hollystown.

The area is generally rural in character. Much of the land immediately surrounding the site is undeveloped and is utilised for various agricultural practices. There are several commercial and industrial developments in the local area of the Bay Lane Quarry. Some share the same access road as the site including a cement company (Halton Concrete) located 200m to the west of the site and a commercial bus yard (Butlers Bus Tours) located approximately 250m to the east of the site. A food (Pallas Foods) wholesale supplier's foodservice centre is located approximately 350m north northwest of the site. Several business parks are located to the south of the site including Northwest Business Park, which is located approximately 600m to the south east of the quarry site.

There is a small amount of low-density residential housing in the local area. The immediate area is rural, and housing consists mainly of one-off detached residential properties located along Bay Lane.

There are approximately four occupied residential properties near the site boundary. A vacant bungalow, which is owned by the applicant, is located at the south east corner of the site boundary. Other residential properties located along, or Just off Bay Lane are at least 500m away from the quarry's eastern boundary.

The road network around the site is comprised of Bay Lane, the N2-R121 dual carriageway link road and the associated roundabout. As mentioned above, Halton Concrete and Butlers Bus Tours share the same access road as the site.

12.4.1 Baseline Noise Survey

The survey was conducted in general accordance with ISO 1996-1: 2003: 'Acoustics - Description, measurement and assessment of environmental noise - Part 1: Basic quantities and assessment procedures' sets out requirements for conducting a baseline survey to establish prevailing noise levels.

A noise survey was conducted on the 14th and 15th of February 2019 to meet with these requirements. During the survey, 3 attended monitoring locations were monitored simultaneously.

Procedure

Measurements were conducted over 30-minute periods on a cyclical basis during the daytime between 13:00 to 19:00 hours. Evening and night-time measurements were conducted over 15-minute periods between the hours of 19:00 and 01:00 hours.

The measurement equipment used was a Bruel and Kjaer 2250 Type 1 Sound Level Meter with outdoor microphone protection. All measurements were free field, measured >2m from reflecting facades and the microphone was positioned at a height of 1.5m above ground level.

Weather conditions during the surveys were in line with the conditions described within ISO 1996, Acoustics 'Description and Measurements of Environmental Noise'. All measurement equipment complies with the relevant Type 1 requirements of: IEC651 Specification for Sound Level Meters and IEC804 Specification for Integrating – Averaging Sound Level Meters and were checked and calibrated before and after the survey using a Brüel and Kjaer 4231 piston phone calibrator to an accuracy of +/- 0.3dB.

The measurement results were noted onto survey record sheets immediately following each measurement and stored in the instrument's internal memory for subsequent analysis. Notes were taken in relation to the primary contributors to noise build-up at each location.

Measurement Parameters

The noise parameters recorded during the baseline noise assessment were:

L_{Aeq} is the A-weighted equivalent continuous steady sound level during the measurement period and effectively represents an average ambient noise value. This is the equivalent continuous sound level.

L_{A10} refers to those A-weighted noise levels in the top 10 percentile of the sampling interval; it is the level which is exceeded for 10% of the measurement period. It is used to determine the intermittent high noise level features of locally generated noise and usually gives an indicator of the level of road traffic.

L_{A90} refers to those A-weighted noise levels in the lower 90 percentile of the sampling interval; it is the level which is exceeded for 90% of the measurement period. It will therefore exclude the intermittent features of traffic and is used to describe a background level.

Measurement Locations

Measurements were carried out at the nearest noise sensitive locations to the proposed soil and stone recovery facility. The EPA defines a noise sensitive location as "any dwelling house, hotel or hostel, health building, educational establishment, place of worship or entertainment, or any other facility or other area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels".

Monitoring locations were comprised of 3 attended measurements locations, which are detailed in Table 12.5 and outlined in Figure 12.2.

Table 12.5: Noise Monitoring Locations

Position	Description
N1	Roundabout north of site
N2	Site entrance (south west)
N3	Farm & residence to the south east of site

The main noise sources in the study area comprise of road traffic noise from the N2-R121 dual carriageway link road and local passing traffic along Bay Lane, aircraft noise from Dublin Airport and agricultural practices within the vicinity of the area.

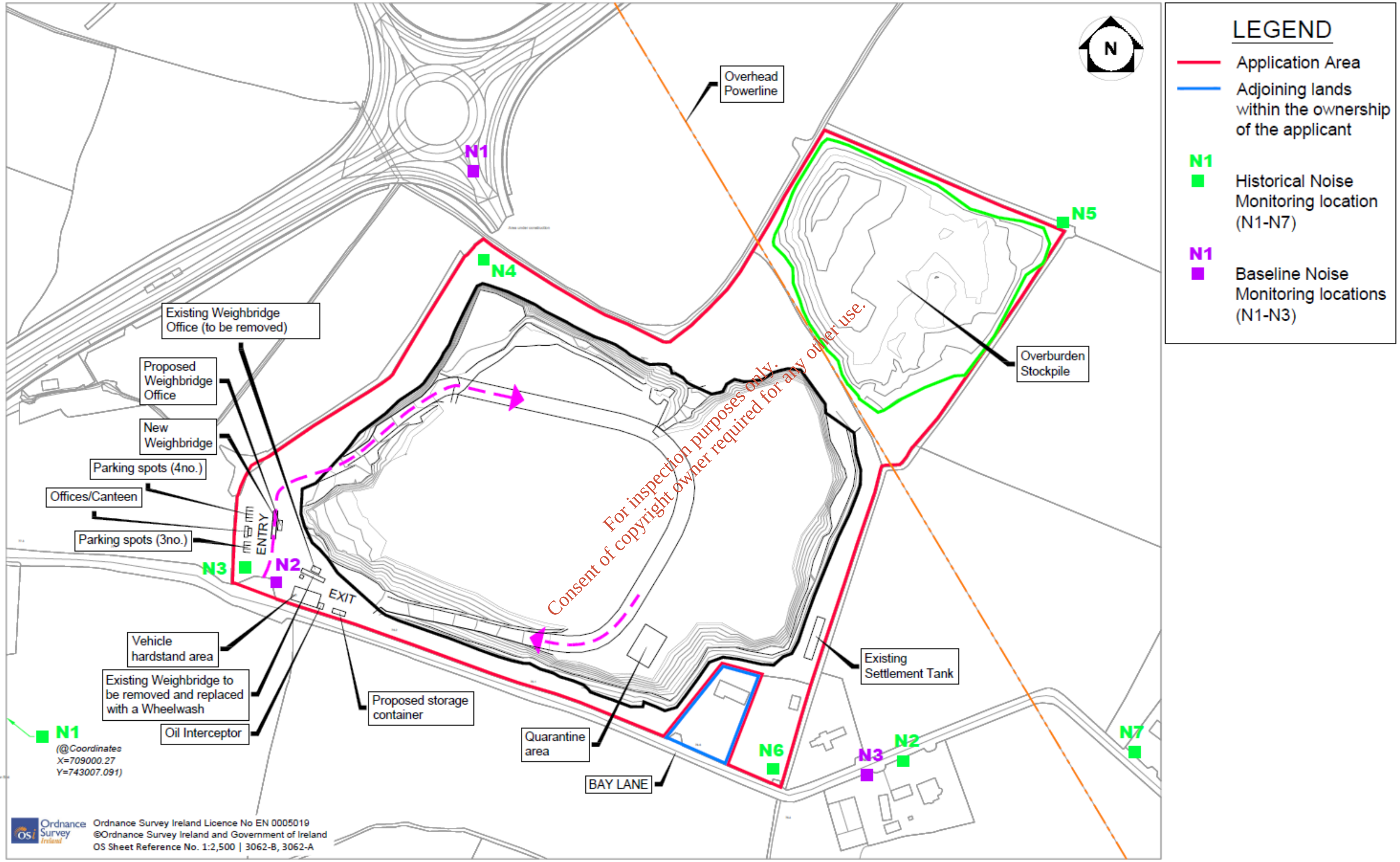


Figure 12.2: Noise Monitoring Locations – baseline and historic

12.4.2 Baseline Noise Survey Results

The results of the baseline noise survey carried out are shown below in **Table 12.6, Table 12.7** and **Table 12.8.** Daytime measurements were 30 minutes in duration while evening and night-time measurements were 15 minutes in duration. All noise monitoring results are presented rounded to the nearest whole integer, with 0.5 being rounded up.

Table 12.6: Baseline Noise Survey Results for N1

Position Number	Period	Measurement Period	Measured Noise Levels (dB re. 2x10-5 Pa)		
			L_{Aeq}	L_{A10}	L_{A90}
N1	Daytime	13:01 – 13:31	68	71	55
		15:17 – 15:47	66	69	55
		16:57 – 17:27	67	70	59
		Arithmetic Average of LAF90 (dB)			56
		Daytime Criterion, dB LAr,T			**55**
	Evening	19:40 – 19:55	61	64	52
		Arithmetic Average of LAF90 (dB)			52
		Evening Criterion, dB LAr,T			**50**
	Night-time	23:37 – 23:52	53	56	42
		00:32 – 00:47	54	55	40
		Arithmetic Average of LAF90 (dB)			41
		Night-time Criterion, dB LAr,T			**45**

A minimum of three sampling periods were carried out for daytime measurements. Noise levels recorded were in the range of 66 to 68dB $L_{Aeq,\ 30\ minutes}$ with an arithmetic average of 67dB $L_{Aeq.}$ During the daytime, dominant noise source was passing local traffic with some aircraft passing overhead contributing to the noise environment. This is confirmed by analysis of the L_{A10} statistical noise parameter which had an arithmetic average of 70dB. Background noise levels in the range of 55 to 59dB $L_{AF90,\ 30\ minutes}$. The arithmetic average of the $L_{AF90,\ 30\ minutes}$ was 56dB, which excludes the contribution from any intermittent noise sources such as road traffic noise and as such is more representative of the noise at this location.

The evening background noise level was measured as 52dB $L_{A90,\ 15\ minutes}$. Similarly, to the daytime noise measured, the dominant noise source was noted to be continuous local road traffic noise with some passing aircraft overhead.

A minimum of two sampling periods were carried out for night-time measurements. During the night-time period it was observed that road traffic noise was the dominant source with some noise from Pallas Foods associated with truck movements audible in the distance. Measured noise levels were 53 and 54dB $L_{Aeq,\ 15\ minutes}$ with background noise levels measured at 42 and 40dB $L_{AF90,\ 15\ minutes}$. The arithmetic average of the $L_{AF90,\ 15\ minutes}$ was 41dB.

Table 12.7: Baseline Noise Survey Results for N2

Position Number	Period	Measurement Period	Measured Noise Levels (dB re. 2x10-5 Pa)		
			L_{Aeq}	L_{A10}	L_{A90}
N2	Daytime	13:37 – 14:11	64	67	51
		15:49 – 16:19	64	68	52
		17:31 – 18:01	64	66	51
		Arithmetic Average of LAF90 (dB)			51
		Daytime Criterion, dB LAr,T			**55**
	Evening	19:00 – 19:15	62	63	49
		Arithmetic Average of LAF90 (dB)			49
		Evening Criterion, dB LAr,T			**50**
	Night-time	23:18 - 23:33	55	52	43
		00:13 – 00:28	45	46	40
		Arithmetic Average of LAF90 (dB)			42
		Night-time Criterion, dB LAr,T			**45**

Three sampling periods were carried out for daytime measurements. Noise levels recorded were 64dB $L_{Aeq,\ 30\ minutes}$. During the daytime, dominant noise source was distant traffic from the N2-R121 dual carriageway link road with intermittent noise from aircraft passing overhead and local passing traffic along Bay Lane. This is confirmed by analysis of the L_{A10} statistical noise parameter which had an arithmetic average of 67dB. Background noise levels in the range of 51 to 52dB $L_{AF90,\ 30\ minutes}$. The arithmetic average of the $L_{AF90,\ 30\ minutes}$ was 51dB, which excludes the contribution from any intermittent noise sources such as road traffic noise and as such is more representative of the noise at this location. There was also some audible faint plant noise from Halton Concrete at this location.

The evening background noise level was measured as 49dB $L_{A90,\ 15\ minutes}$. Similarly, to the daytime noise measured, the dominant noise source was noted to be continuous distant road traffic noise from the N2-R121 dual carriageway link road.

Two sampling periods were carried out for night-time measurements. During the night-time period it was observed that distant road traffic noise was the dominant source. Measured noise levels were 55 and 45dB $L_{Aeq,\ 15\ minutes}$ respectively with background noise levels measured at 43 and 40dB $L_{AF90,\ 15\ minutes}$. The arithmetic average of the $L_{AF90,\ 15\ minutes}$ was 42dB.

Table 12.8: Baseline Noise Survey Results for N3

Position Number	Period	Measurement Period	Measured Noise Levels (dB re. 2x10-5 Pa)		
			L_{Aeq}	L_{A10}	L_{A90}
N3	Daytime	14:26 – 14:59	64	63	46
		16:22 – 16:52	66	69	50
		18:06 – 18:36	64	68	46
		Arithmetic Average of LAF90 (dB)			47
		Daytime Criterion, dB LAr,T			**55**

Position Number	Period	Measurement Period	Measured Noise Levels (dB re. 2x10-5 Pa)		
			L_{Aeq}	L_{A10}	L_{A90}
	Evening	19:20 – 19:35	63	64	44
		Arithmetic Average of LAF90 (dB)			44
		Evening Criterion, dB LAr,T			**50**
	Night-time	23:01 – 23:16	48	51	41
		23:56 – 00:11	45	49	37
		Arithmetic Average of LAF90 (dB)			39
		Night-time Criterion, dB LAr,T			**45**

Three sampling periods were carried out for daytime measurements. Noise levels recorded were in the range of 64 to 66dB $L_{Aeq,\ 30\ minutes}$ with an arithmetic average of 65dB $L_{Aeq.}$ During the daytime, dominant noise source was distant road traffic noise from the N2-R121 dual carriageway link road and passing local traffic with intermittent aircraft passing overhead contributing to the noise environment. This is confirmed by analysis of the L_{A10} statistical noise parameter which had an arithmetic average of 67dB. Background noise levels in the range of 46 to 50dB $L_{AF90,\ 30\ minutes}$. The arithmetic average of the $L_{AF90,\ 30\ minutes}$ was 47dB, which excludes the contribution from any intermittent noise sources such as road traffic noise and as such is more representative of the noise at this location.

The evening background noise level was measured as 44dB $L_{A90,\ 15\ minutes}$. Similarly, to the daytime noise measured, the dominant noise source was noted to be road traffic noise.

Two sampling periods were carried out for night-time measurements. During the night-time period it was observed that road traffic noise was the dominant source. Measured noise levels were 48 and 45dB $L_{Aeq,\ 15\ minutes}$ with background noise levels measured at 41 and 37dB $L_{AF90,\ 15\ minutes}$. The arithmetic average of the $L_{AF90,\ 15\ minutes}$ was 39dB.

12.4.3 Historic Noise Surveys

As noted previously, a review of historic noise monitoring results associated with the 2000 EIS prepared for the proposed limestone quarry and associated development at Bay Lane (Ref: F00A/0862) was also undertaken. As part of this application a baseline noise survey was carried out in 2000 at 7 locations, 3 of which were noise sensitive locations (residential properties).

The results of the most recent of these surveys are outlined below in Table 12.9. Please note the locations referred to as N1 – N7 are different locations to where the baseline noise survey was undertaken. Please refer to Table 12.9 for details of these locations.

Table 12.9: Historic Noise Survey Results

Position Number	Date	Measurement Period	Measured Noise Levels (dB re. 2x10-5 Pa)			Comments
			$L_{Aeq,\ 60\ min}$	$L_{A10,\ 60\ min}$	$L_{A90,\ 60\ min}$	
N1	14/02/2000	13:00 – 17:00	62	50	30	

Position Number	Date	Measurement Period	Measured Noise Levels (dB re. 2x10-5 Pa)			Comments
			$L_{Aeq, 60 min}$	$L_{A10, 60 min}$	$L_{A90, 60 min}$	
N2	17/02/2000	09:45 – 15:25	66	60	40	Aircraft passing overhead, occasional road traffic on Bay Lane
N3		11:50 – 12:50	67	61	42	
N4	21/02/2000	11:30 – 12:30	71	71	38	Aircraft passing overhead
N5		12:35 – 13:35	70	69	35	
N6		14:00 – 15:00	64	46	34	
N7		15:05 – 16:05	68	60	43	Aircraft passing overhead, occasional road traffic on Bay Lane

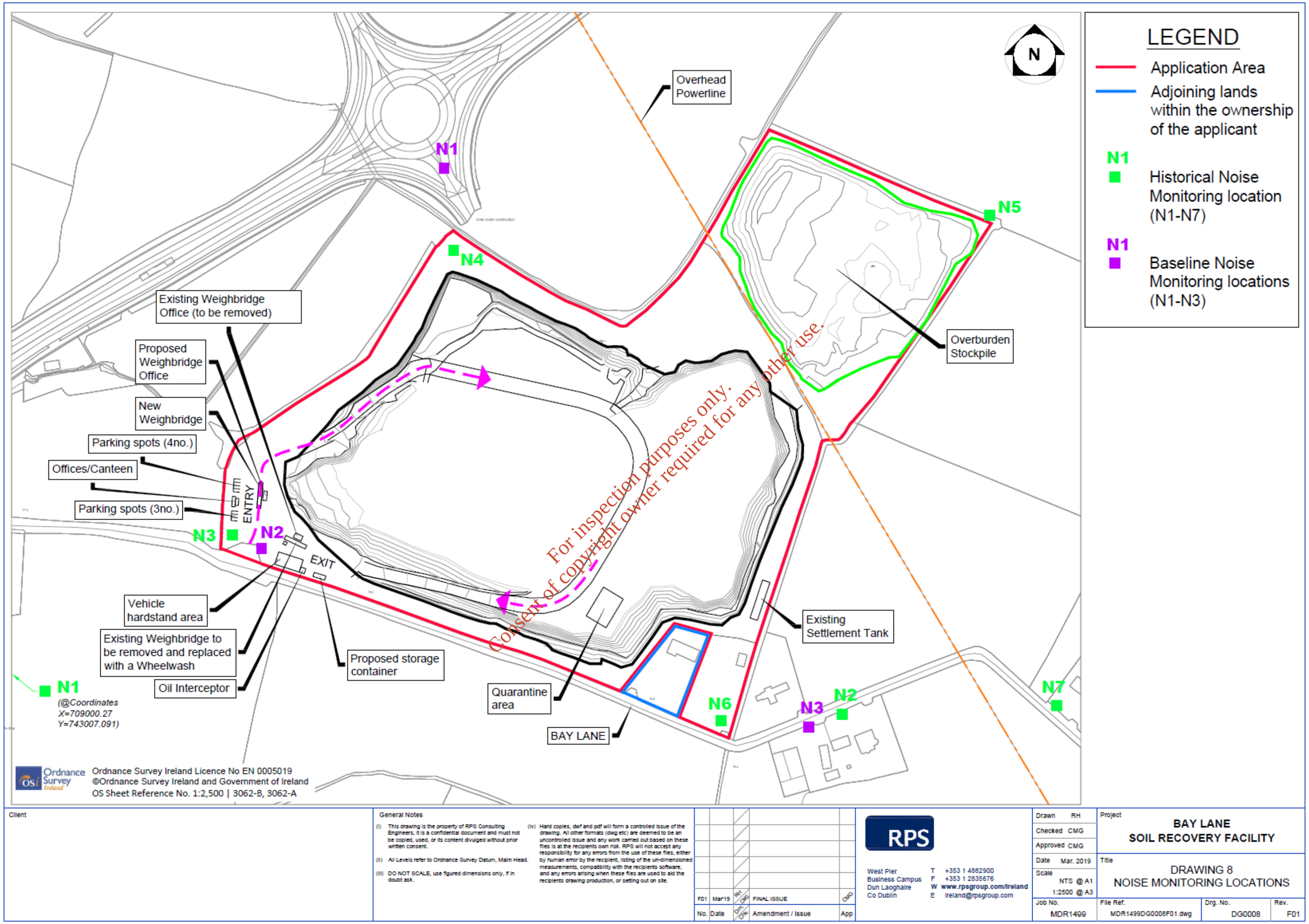


Figure 12.3: Historic and baseline Noise Monitoring Locations (Drawing 8)

12.4.4 Baseline Vibration

It has not been considered necessary to undertake baseline vibration monitoring as there is no evidence to suggest that existing receptors are currently affected by appreciable environmental vibration.

12.5 IMPACT ASSESSMENT

This section of the report discusses the potential impact of the proposed works in relation to noise and vibration. The potential noise and vibration impacts of the proposed works have been evaluated for the operational stage to include road traffic noise associated with HGV movements to the facility and backfilling of the inert C&D wastes into the quarry.

12.5.1 Road Traffic Noise

The road traffic impact has been undertaken in accordance with the UK's Highway Agency, Design Manual for Roads and Bridges (DMRB) HD 213/11 Volume 11, Section 3, Part 7 Revision 1. The DMRB states that noise should only be assessed when changes in traffic flow are greater than 25% or a 20% decrease in traffic flow. It is envisaged that the soil will be imported locally via the R121 or from wider locations via the M2/N2. The traffic impact assessment outlined in **Chapter 13** therefore was focused on Bay Lane Roundabout and the impact on the N2-R121 Link Road.

Traffic data in the form of existing and proposed AADT volumes on the N2-R121 Link Road and Bay Lane are presented in **Chapter 13** of this EIAR. The traffic assessment has considered the following two scenarios for "with soils recovery" – a typical average scenario and a peak scenario if there is a surge in demand. The background scenario represents "without soils recovery".

12.5.1.1 Typical Average Scenario

Regarding proposed HGV numbers, the proposed scenario as set out in **Chapter 13** 'Traffic' comprises the following:

> "The proposed soil recovery works will comprise 740,000 m^3 of fill to be imported to the site over a 30 month works programme. Based on a volume per truck of $11m^3$ and a 30-month work programme it is considered that typically the soil importation works will generate circa 2,160 trucks to the site per month. Based on an average 22 working days per month this equates to an **average of circa 98 trucks arriving to the quarry per day** (196 truck movements in total)."

When operating at this typical average scenario, the site will generate a total additional daily movement of circa 196 trucks onto the local road network. Table 12.10 presents the traffic volume figures and the associated change in noise level that will be experienced by the residential properties situated along these roads.

Table 12.10: Change in Noise Level due to Traffic (typical average scenario over 30-month programme)

Year	N2-R121 Link Road		Change in Noise Level	Bay Lane		Change in Noise Level
	Background	"with soils recovery "		Background	"with soils recovery "	
2018 (Base Year)	10,469	10,665	0.1	271	467	2.4
2019 (Year of Commencement)	10,836	11,032	0.1	281	477	2.3
2021 (2.5 Years – Earliest Works Completion)	11,150	11,346	0.1	289	485	2.2
2024 (5.0 Years – Worst Case Completion)	11,639	11,835	0.1	300	496	2.2

It is anticipated that the additional road traffic noise attributable to the development will result in an increase in the baseline noise environment by less than 3dB(A) for properties located along N2-R121 link road and Bay Lane with other receptors further from the road network experiencing a lower impact.

Table 12.10**,** Table 12.11 offers guidance as to the likely impact associated with a change in traffic noise level. The predicted increase in traffic noise is barely perceptible and the associated noise impact is classified as Minor. The increase in traffic associated with the proposed development scheme is therefore not expected to give rise to significant noise nuisance in the area.

12.5.1.2 Peak Scenario

Regarding proposed HGV numbers, the proposed peak scenario as set out in **Chapter 13** Traffic' comprises the following:

> "However, it is expected that the profile of movements over the 30 months will not be consistent and it is considered there will be short term peak surges within the duration of the works which will be compensated then by times where the truck numbers drop below average. It is unknown for how long any peak profiles would occur, but it could be for six summer months within a year (with no truck movements then for the remaining six months of the year). For this assessment it is proposed to also undertake a worst-case analysis of the potential peak profiles where it is assumed that double the average amount of trucks will arrive on site. This equates to a potential peak of circa 196 trucks arriving to the quarry per day (392 truck movements in total)."

When operating at this peak scenario, the site will generate a total additional daily movement of circa 392 trucks onto the local road network. **Table 1.11** presents the traffic volume figures and the associated change in noise level that will be experienced by the residential properties situated along these roads.

Table 12.11: Change in Noise Level due to Traffic (peak scenario over 30-month programme)

Year	N2-R121 Link Road		Change in Noise Level	Bay Lane		Change in Noise Level
	Background	"with soils recovery "		Background	"with soils recovery "	
2018 (Base Year)	10,469	10,861	0.2	271	663	3.9
2019 (Year of Commencement)	10,836	11,228	0.2	281	673	3.8
2021 (2.5 Years – Earliest Works Completion)	11,150	11,542	0.2	289	681	3.7
2024 (5.0 Years – Worst Case Completion)	11,639	12,031	0.1	300	692	3.6

It is anticipated that the additional road traffic noise attributable to the development will result in an increase in the baseline noise environment during this peak scenario by less than 4dB(A) for properties located along Bay Lane with other receptors further from the road network experiencing a lower impact. The predicted increase in traffic noise is noticeable and the associated noise impact is classified as Moderate for properties along Bay Lane. It should be noted that this impact is associated with short term peak surges and as such would be temporary in nature.

The increase in road traffic noise for the typical average and peak scenario has been assessed. Based on the existing noise climate which is located along a flight path from Dublin Airport is influenced by airborne aircraft noise and road traffic noise along the N2-R121 dual carriageway link road. As such the increase in traffic associated with the proposed development is therefore not expected to give rise to significant noise nuisance in the area.

12.5.2 Daily Truck Movements

The delivery of soils materials by HGVs to the site would produce a near constant source of noise emissions due to the predicted number of HGV trips expected on an hourly and daily basis. Filled trucks produce less noise due to the weight of material preventing little movement of the trailer, empty trucks are recognised to be noisier as the trailers tend to bounce on internal springs and produce intermittent and unpredictable loud bangs, and such bangs are echoed within the walls of typical stone and soils trailers when empty.

To assess the potential traffic noise level during the different scenarios "with soils recovery", the specific noise levels associated with passing traffic added to the existing baseline has been assessed. For mobile items of plant that pass at intervals (such as earth-moving machinery passing along a haul road), it is possible to predict an equivalent continuous sound level using the method F.2.5 outlined in BS 5228 - 1. The general expression for predicting the L_{Aeq} alongside a haul road used by single-engine items of mobile plant is:

$$L_{Aeq} = L_{WA} - 33 + 10\log10Q - 10\log10V - 10\log10d$$

where:

L_{WA} is the sound power level of the plant, in decibels (dB);
Q is the number of vehicles per hour;
V is the average vehicle speed, in kilometres per hour (km/h);
d is the distance of receiving position from the centre of haul road, in metres (m).

12.5.2.1 Typical Scenario

Using the traffic data provided for the Typical Scenario the calculation has assumed that there will be 20 deliveries of stone material per hour (10 inbound and 10 outbound). The item of plant delivering the fill material will be a 7 tonne Dumper (Ref C.4.3 of BS5228-1) with a sound pressure level of 76dB, travelling an average speed of 64.9 km/hr with a minimum distance of 20m between the haul route and the nearest noise sensitive receptors. As such, the predicted noise level at a residential property 20m from the haul road will result in a noise level of 56dB.

12.5.2.2 Peak Scenario

Using the traffic data provided for the Peak Scenario the calculation has assumed that there will be 40 deliveries of stone material per hour (20 inbound and 20 outbound). The item of plant delivering the fill material will be a 7 tonne Dumper (Ref C.4.3 of BS5228-1) with a sound pressure level of 76dB, travelling an average speed of 64.9 km/hr with a minimum distance of 20m between the haul route and the nearest noise sensitive receptors. As such, the predicted noise level at a residential property 20m from the haul road will result in a noise level of 59dB.

12.5.3 On-site Sources for Backfilling Works

During void filling, the principal sources of additional noise around the application site will be from bulldozers and dump truck movements. To determine the impact of the proposed backfilling activities at the site, noise predictions were undertaken in accordance with BS 5228-1: 2009: *Code of Practice for Noise and Vibration Control on Construction and Open Sites: Noise to predict noise levels at nearby noise sensitive receptors*. Operational (void filling) phase noise levels will vary considerably depending on the nature of the activity required. **Table 12.12** provides an overview of the type of plant and machinery which will be required as part of the works.

Table 12.12: Typical Construction Noise Levels

Item & BS5228-1: 2009 Reference	No. Required	Predicted dB at 10m
Tracked bulldozer with blades to level materials (Ref C.5.14)	1	86
Shovel Loader to	1	90

transport materials (Ref C.9.7)		

The backfilling activities consist of backfilling the quarry with soil and stone waste and then covering with a soil layer for the purposes of reclamation of the former quarry to restore the site to natural levels. This will involve firstly the waste acceptance for backfill material as outlined in Chapter 5 and secondly the backfilling, covering and contouring by compaction by tracked dozer. Indicative phasing of the proposed backfill works is presented in figures in Section 5.

As per Section 5.7 plant and machinery on site will be used in accordance with the site's restoration plan. A single residential property located immediately to the south east of the boundary of the site at Bay Lane is located within 100 metres of the works (R1) and potentially the proposed operations in this area. Another property is located to the south east; however, this is circa 130m from the site boundary (R2). Given the transient nature of the site and the proposed layout, activities will be at varying distances from the nearest sensitive receptors depending on the location of works.

For the majority of the time, plant and equipment will be a greater distance from the nearest noise sensitive locations than that used for the calculations and consequently will have lesser impact. The assessment is therefore representative of a "worst-case" scenario and the following assumptions have been made in predicting construction noise levels:

- The use of a dozer or tracked excavator which may be required to move and compact imported fill material within the quarry void.
- The nearest noise sensitive locations are located approximately 100m and 130m from proposed work areas; there are no residences located within 10m of the subject site.
- All items listed are operating for a proportional period of 1 hour.
- All items are operating simultaneously for 100% of the time.

Table 12.13 summarises the noise prediction calculations at the noise sensitive locations located 100m and 130m respectively from the proposed works area.

Table 12.13: Predicted Operational Noise Levels at Noise Receptors

Item & BS5228-1: 2009 Reference	No. Required	Sound Pressure Level L_{Aeq} at 10m	Predicted Noise Levels at Receptors	
			R1 (100m)	R2 (130m)
Tracked bulldozer with blades to level materials (Ref C.5.14)	1	86	56	53
Shovel Loader to transport materials (Ref C.9.7)	1	90	60	57
Combined Level dB $_{LAeq,1hour}$			61	59
Existing Baseline Noise level (using the arithmetic average L_{Aeq} for NSL3)			65	
Cumulative Noise Level $_{LAeq}$			66	66

Predictions are based on a $L_{Aeq,1hour}$ value with all machinery operating for proportional periods of 1 hour. This may be considered a worst-case scenario as this machinery will not all operate simultaneously and will be used at varying stages as the works progress. In reality this will not occur, and noise levels would be expected to be significantly below those predicted as machinery would operate intermittently.

The results of the assessment indicate that the predicted noise levels for backfilling works would result in combined noise levels of 61dB L_{Aeq} and 59dB L_{Aeq} at R1 and R2 respectively. With regards to the potential impact of the proposed operations the predicted specific $_{LAeq, 1hr}$ dB(A) noise levels have been logarithmically added to the existing ambient noise levels for the daytime period at NSL3 (65dB L_{Aeq}). With reference to the *Guidelines for Noise Impact Assessment* produced by the Institute of Environmental Management and Assessment (IEMA) as outlined in Table 12.13, the cumulative noise impact from machinery associated with the backfilling operations at receptors R1 and R2 is Negligible.

12.5.4 'Do-Nothing' Impact

If the proposed works do not proceed, the existing noise environment near the study area would remain at ambient levels as are currently typical of the area.

Traffic volumes on the surrounding road network are not likely to increase by any noticeable amount, therefore the existing noise environment is not expected to change in the Do-Nothing scenario.

Over time, it is anticipated that the volume of industrial activities and aircraft movements in the area will increase as economic activity increases and that this in turn is likely to lead to an increase in ambient and background noise levels.

12.6 MITIGATION MEASURES - CONSTRUCTION/OPERATIONAL (VOID FILLING) PHASE

Mitigation measures may be introduced to ameliorate or reduce negative impacts.

The following mitigation measures are proposed to reduce noise levels from plant and machinery at the subject site, as well as from HGVs travelling on the N2-R121 dual carriageway link road and on Bay Lane.

- HGVs will only be allowed to import material to the site during the proposed operational hours;
- To streamline and manage the arrival/departure of trucks over a working day along the Bay Lane, a booking and scheduling system will be implemented to avoid the scenario of the development related trucks meeting on the sections of Bay Lane with reduced road width;
- All vehicle engines will be switched off when not in use and there should be no unnecessary revving of engines;
- Care should be taken when unloading vehicles to reduce or minimise potential disturbance to residents;
- All equipment will be regularly maintained to ensure that they are operating effectively and not producing additional noise emissions or potential tonal sources;

- Where practicable the number of machines in simultaneous operation will be minimised;
- Plant and machinery used on-site will comply with the EC (Construction Plant and Equipment) Permissible, Noise Levels Regulations, 1988 (S.I. No. 320 of 1988); and
- All contractors will employ the best practicable means to minimise noise emissions and will be obliged to comply with the general recommendations of BS 5228-1:2009+A1:2014 and "*Environmental Good Practice Site Guide*" 2005 compiled by CIRIA and the UK Environmental Agency.

12.7 RESIDUAL IMPACT

The site is currently a disused quarry with a proposal to restore to previous agricultural condition. The proposed input is 296,000m^3 per annum, over a 2.5-year lifetime (approx. 740,000m^3 total void capacity). Proposed input materials are soil and stones (for restoration works).

There will be a temporary negative impact on noise as development of the site to a soil and stone recovery facility will result in the introduction of truck movements to the facility associated with the soil reprofiling works.

As outlined in **Chapter 13 Traffic**, there will be an average of circa 98 trucks arriving to the quarry per day (196 truck movements in total) over the 30-month work programme, equating to 2,160 trucks to the site per month. However, traffic impacts will be temporary in nature, with trip numbers anticipated to diminish after filling operations and will be eliminated entirely upon cessation of the backfilling activities. In addition, noise associated with backfilling works due to heavy ground moving plant will cease once backfilling works are completed.

12.8 MONITORING AND REINSTATEMENT

To operate the site as a soil recovery facility, the site will require a waste licence from the EPA. As such, to demonstrate the site remains in compliance, it is recommended that a noise survey is carried out and reported to the EPA at the frequency specified in the licence and that the site complies with the limits specified in the licence.

It is proposed that the recommended frequency of monitoring is on an annual basis and that any noise emission limit values as specified in the licence are applicable at the nearest noise sensitive locations and not the licence boundary. This monitoring should continue while the licensed activity remains in effect.

13 TRAFFIC AND TRANSPORTATION

13.1 INTRODUCTION

This chapter will assess the traffic and transportation aspects of the proposed soil recovery facility to establish the potential impact it could have on the operational capacity of the local road network. It includes a comprehensive description of the transportation characteristics of the receiving environment, a first principle assumption on the expected level of trips associated with the development and an analysis on the impact the trips have on the capacity and operating performance of Bay Lane, the N2-R121 dual carriageway link road and the associated roundabout.

13.2 METHODOLOGY

The scope of this TTA is consistent with Transport Infrastructure Ireland's (TII) '*Traffic and Transport Assessment Guidelines'*, May 2014. Traffic surveys were undertaken on the N2-R121 link road in October 2018, where two-way traffic flows and speeds were recorded on the N2-R121 dual carriageway link road and Bay Lane. The turning movements at the roundabout junction between the N2-R121 Link Road and Bay Lane (known henceforth as Bay Lane Roundabout) were also recorded. This data will be used when assessing the scale of traffic impact generated by the soil reprofiling works.

13.3 RECEIVING ENVIRONMENT

13.3.1 Road Network

The existing access to the quarry is located approximately 260m southeast of the roundabout on the N2-R121 dual carriageway link road. The local road that connects this roundabout to the quarry access is called Bay Lane.

13.3.1.1 N2-R121 Link Road

The N2-R121 is a high capacity dual carriageway link road, which connects the M2/N2 road network to the R121 Ratoath Road and onwards to Blanchardstown Road, Snugborough Road and Ballycoolin Road. The link road is a Type 2 dual carriageway with two 3.5m wide lanes in each direction and separate off-road cycle tracks and footways. The dual carriageway has a flat vertical profile between the Bay Lane Roundabout and the M2/N2 grade separated junction. The horizontal alignment is straight for approximately 500m and then it is a long, prolonged curve for the 500m southwest of M2/N2 grade separated junction. **Images 13.1** and **13.2** show the characteristics of the N2-R121 Link Road (between the roundabout access to the quarry and the M2/N2 grade separated junction). There is a pedestrian crossing that traverses the N2-R121 Link Road, which is shown in **Image 13.3**.

Image 13.1: N2-R121 Link Road looking northeast from roundabout

Image 13.2: N2-R121 Link Road approaching the M2/N2 grade separated junction

Image 13.3: Pedestrian Crossing on the N2-R121 Link Road

13.3.1.2 Bay Lane

Bay Lane is the name of the local road that runs adjacent to the quarry. The road width varies between 5.0m and 5.4m for the approximately 260m length between Bay Lane Roundabout and the access to the quarry. South of the access to the quarry, Bay Lane reduces in road width to approximately 3.1m, but there is a ban on 3+ axle road users from this point. The presence of the vehicle size restriction limit, and the ceasing of operations at the quarry, results in Bay Lane having limited traffic movements.

13.3.2 Existing Traffic

An Automatic Traffic Counter (ATC) was placed on the N2-R121 Link Road and on Bay Lane between Wednesday 24th October 2018 and Tuesday 30th October 2018. The locations of the traffic counters are shown in **Figure 13.1**.

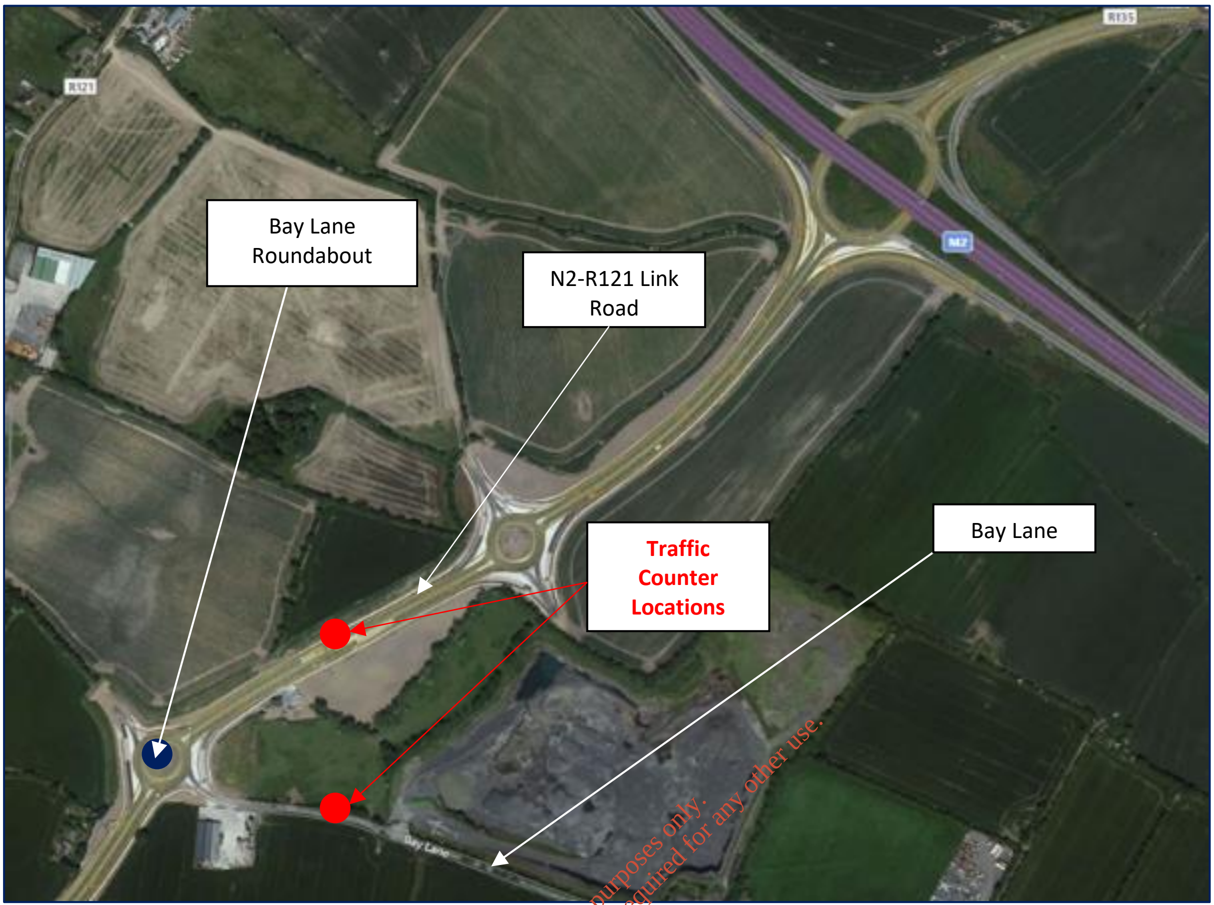


Figure 13.1: Traffic Counter Location

The ATC counter recorded the volume and type of vehicles on the N2-R121 Link Road and Bay Lane. The results of the survey are provided in **Table 13.1** and **Table 13.2**.

Table 13.1: Traffic Survey – N2-R121 Link Road

Time (24 Hour)	Northeast		Southwest	
	Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles
Wednesday 24th October 2018	6790	911	6396	663
Thursday 25th October 2018	6750	870	6463	607
Friday 26th October 2018	6555	874	5863	666
Saturday 27th October 2018	3297	226	3101	173
Sunday 28th October 2018	2550	82	2538	57
Monday 29th October 2018	2736	169	2612	121
Tuesday 30th October 2018	6275	878	5880	684
Weekly Average Daily Flow	**4,993**	**573**	**4,693**	**424**

Table 13.2: Traffic Survey – Bay Lane

Time (24 Hour)	Northwest-bound		Southeast-bound	
	Light Vehicles	Heavy Vehicles	Light Vehicles	Heavy Vehicles
Wednesday 24th October 2018	182	9	139	9
Thursday 25th October 2018	170	7	144	4
Friday 26th October 2018	165	4	122	3
Saturday 27th October 2018	133	1	114	1
Sunday 28th October 2018	110	0	87	0
Monday 29th October 2018	119	2	79	3
Tuesday 30th October 2018	170	13	135	12
Weekly Average Daily Flow	**150**	**5**	**117**	**5**

13.3.3 Annual Average Daily Traffic (AADT)

Annual Average Daily Traffic (AADT) is the term used to show the average traffic volume in both directions on a section of road, adjusted for seasonal variation and it is a recognised parameter for assessing traffic volumes. The traffic survey data set out in Table 13.1 and 13.2 provides the Weekly Average Daily Traffic (WADT).

This data was subsequently expanded in accordance with Transport Infrastructure Ireland's (TII) *Project Appraisal Guidance Unit 16.1 – Expansion Factors for Short Period Traffic Counts, October 2016*, to derive the 2018 AADT on the N2-R121 Link Road and Bay Lane. As the surveys were undertaken in October an index factor of 0.98 was applied to the WADT to estimate the 2018 AADT. The resulting AADT figures are presented in **Table 13.3** and **Table 13.4.**

Table 13.3: 2018 AADT Calculation – N2-R121 Link Road

	Two-Way Traffic N2-R121 Link Road
Weekly Average Daily Traffic (WADT)	10,683
Monthly Index Factor (from TII PAG Unit 16.1 Appendix C)	0.98
2018 Annual Average Daily Traffic (AADT)	10,469

Table 13.4: 2018 AADT Calculation – Bay Lane

	Two-Way Traffic Bay Lane
Weekly Average Daily Traffic (WADT)	277
Monthly Index Factor (from TII PAG Unit 16.1 Appendix C)	0.98
2018 Annual Average Daily Traffic (AADT)	271

13.3.4 Collision Data

A review of the Road Safety Authority's (RSA's) Road Collision Database for the period 2005 to 2014 inclusive has been undertaken. The database contains information on all reported collisions by severity of injury and year of collision during this period. No collisions were reported on the N2-R121 Link Road and Bay Lane for this period.

13.3.5 Existing Access to the Site

There is 1 no. vehicular access point from Bay Lane into the existing quarry landholding. The access is a wide entrance with extended splays due to the extent of the boundary walls. Although the quarry is not currently in operation it is proposed to recommission this access and use it for the soil recovery works.

13.4 POTENTIAL IMPACTS

13.4.1 Future Growth in Traffic Flows on the Surrounding Road Network

Background future traffic volumes on the N2-R121 Link Road and Bay Lane are determined using growth factors from TII's *Project Appraisal Guidelines for National Roads Unit 5.3, Travel Demand Projections*, October 2016. Information within these guidelines is provided for Region 1 (Dublin) from 2013-2030 and from 2030-2050 for low, central and high growth scenarios. Growth factors are provided for heavy and light vehicles and these have been applied to the expanded AADT data for the N2-R121 Link Road and Bay Lane to derive future year background traffic flows adjacent to the site. Medium growth factors are set out in **Table 13.5** below for light vehicles (LVs) and heavy vehicles (HVs).

Table 13.5: TII Traffic Growth Factors (Central) — Region 1 (Dublin)

Year	Annual Growth Factor — LV	Annual Growth Factor - HV
2013-2030	1.0134	1.0237
2030-2050	1.0038	1.0176

13.4.2 Assessment Periods

Forecast background traffic levels were derived for each of the following assessment years:

- Year of commencement of soil reprofiling works, assumed to be 2019 (subject to planning permission);
- 2021 Future Year (+2.5 year - which is the earliest the soil reprofiling works will be complete);
- 2024 Future Year (+ 5.0 years – which is a worst-case scenario that the works programme is delayed).

The forecast background traffic levels on the N2-R121 Link Road and Bay Lane, for these years are shown in **Table 13.6** below**.**

Table 13.6: Background Future Year Traffic on N2-R121 Link Road and Bay Lane (AADT)

Year	N2-R121 Link Road AADT	Bay Lane AADT
2018 (Base Year)	10,469	271
2019 (Year of Commencement)	10,836	281
2021 (2.5 Years – Earliest Works Completion)	11,150	289
2024 (5.0 Years – Worst Case Completion)	11,639	300

13.4.3 Future Traffic Projections for the Soil Recovery Works

The proposed soil recovery works will comprise the placement of c.740,000 m^3 of fill soil and stone material (712,129 m^3 usable void plus 27,918 m^3 soil covering) to be imported to the site over a 30 month works programme. Based on a volume per truck of 11m^3 and a 30-month work programme it is considered that typically the soil importation works will generate circa 2,160 trucks to the site per month. Based on an average 22 working days per month this equates to an **average of circa 98 trucks arriving to the quarry per day** (196 truck movements in total).

It is expected that the profile of movements over the 30 months will not be consistent and it is considered there will be short term peak surges within the duration of the works which will be compensated then by times where the truck numbers drop below average. It is unknown for how long any peak profiles would occur, but it could be for six summer months within a year (with no truck movements then for the remaining six months of the year). For this assessment it is proposed to also undertake a worst-case analysis of the potential peak profiles where it is assumed that double the average amount of trucks will arrive on site. This equates to a potential peak of circa **196 trucks arriving to the quarry per day** (392 truck movements in total).

It is envisaged that the soil will be imported via the R121 or from wider locations via the M2/N2. Therefore, the focus of the assessment is on Bay Lane Roundabout and the impact on the N2-R121 Link Road.

13.5 PREDICTED IMPACTS OF THE WORKS

13.5.1 Duration of Works

The proposed soil reprofiling works are envisaged to take approximately 30 months so any impact on the roads will be temporary. To assess the traffic impact of the works we also include a scenario where the works will take 60 months to complete if there is any unforeseen event that delays the work programme (potential shortfall in soil provision).

13.5.2 Impact on the Road Link Capacity

13.5.2.1 N2-R121 Link Road

The N2-R121 Link Road is a Type 2 Dual Carriageway. Table 6.1 of TII documentation DN-GEO-03031 (Rural Road Link Design) outlines the theoretical capacity for different types of rural road for Level of Service D. For a Type 2 Dual Carriageway it states that the theoretical capacity of the road is an AADT of 20,000.

A short-term peak movement of 392 trucks per day to the site would only comprise approximately 2% of the theoretical capacity of the N2-R121 Link Road.

The 2018 AADT on the N2-R121 Link Road (to the northeast of Bay Lane Roundabout) is 10,469 vehicles, which is the significantly below the theoretical capacity of the road so there is amble capacity to cater for the temporary peak increase of 392 trucks per day. Due to the low levels of traffic flow on Bay Lane it is considered that the AADT on the N2-R121 Link Road (west of Bay Lane Roundabout) is off a similar magnitude so it is also significantly below the theoretical capacity of the road.

Table 13.7 outlines the temporary percentage impact the peak volume of trucks generated by the soil reprofiling works will have on the N2-R121 Link Road for each of the assessment years.

Table 13.7: Background Future Daily Year Traffic on N2-R121 Link Road

Year	N2-R121 Link Road Background AADT	Peak Daily Traffic Flow	Percentage Impact
2018 (Base Year)	10,469	392	+ 3.7%
2019 (Year of Commencement)	10,836	392	+ 3.6%
2021 (2.5 Years – Earliest Works Completion)	11,150	392	+ 3.5%
2024 (5.0 Years – Worst Case Completion)	11,639	392	+ 3.4%

The percentage increase in peak daily traffic flow generated by the soil reprofiling work on the N2-R121 is circa 3-4%, which is an insignificant traffic impact on this road network. The peak daily traffic flow is also a temporary increase with is countered by extended periods where there may be no traffic flow associated with these soil reprofiling works.

In addition, the provision of a dual carriageway road will permit the overtaking of any slow-moving trucks that are travelling on the N2-R121 Link Road.

13.5.2.2 Bay Lane

Due to the low daily volumes on Bay Lane the peak profile of 392 truck movements associated with the soil reprofiling works will have a resulting large percentage increase in the traffic flow; so, it is not the appropriate mechanism for assessing the potential future impact on the operating performance of Bay Lane.

Therefore, it is considered that the following assessments are more appropriate for establishing the predicted impact of the development:

- A link road assessment of the overall impact on the theoretical capacity of Bay Lane. The theoretical capacity is based on road width and the functionality of the road.
- A first principle assessment of the suitability of Bay Lane for truck movements.
- A peak hour capacity assessment at the Bay Lane Roundabout.

13.5.2.3 Impact on the Theoretical Capacity of Bay Lane

The TII publication "*Rural Road Link Design*" DN-GEO-03031 provides guidance on theoretical capacity for different types of single and dual carriageway roads. Although Bay Lane is a local road not under the jurisdiction of TII this document will provide guidance on the potential daily capacity of Bay Lane. In the '*Rural Road Link Design'* document a Type 3 single carriageway (6.0m wide carriageway) is the lowest standard of road of which there is a stated daily capacity. The characteristics and road width of Bay Lane is of a lower hierarchy than a Type 3 single carriageway, so a reduction factor will need to be applied. Based on the expected, albeit limited, growth in traffic flow on Bay Lane and the maximum number of trucks that could be generated by the soil recovery works, the total daily traffic flows are compared to theoretical daily link capacity. The outcome of this assessment is shown in **Table 13.8**. The peak daily traffic flow combines the predicted year 2024 AADT (shown in Table 12-6) with the predicted peak daily soil recovery traffic flow (392 movements – 196 in each direction).

Table 13.8: Comparison of Potential Peak Daily Traffic Flow and Link Capacity

	Daily Peak Total Traffic Flow (Background and Development)	Theoretical Capacity*
Bay Lane		
Between the Quarry and the Roundabout	692	4,500

* Type 3 Single Carriageway Capacity of 5,000 AADT (DN-GEO-03031 – Table 6.1) with a reduction factor of 10% applied as the road width of Bay Lane is less than 6.0m.

13.5.3 Bay Lane

It should be noted that the entrance to the quarry is located only approximately 260m away from Bay Lane Roundabout so the journey time for each truck on the route could be approximately 31 seconds (based on a 30kph travel speed). At peak there could be circa seven trucks an hour travelling with soil to the quarry which on average is a truck circa every nine minutes. With an expected 30 second journey time between the site and the roundabout it is envisaged that trucks related to the soil recovery facilities will not meet when travelling in different directions on Bay Lane.

Bay Lane has a road width that varies between 5m and 5.4m with 1.0-1.6m verges on both sides of the road. **Image 13.4** shows Bay Lane to the west of the entrance to the quarry. It should be noted that there is a restriction on vehicle sizes (ban on 3+ axle vehicles) that are permitted to utilise Bay Lane to the southeast of the entrance of the quarry as shown in **Image 13.5**. Therefore, this has an impact on the profile of traffic that utilises Bay Lane with cars/lights good vehicles the predominant mode of vehicle on this road. Therefore, the existing road will have enough width to allow trucks carrying soil material to pass oncoming vehicles without causing an obstruction to free flow traffic movement. In addition, the traffic surveys showed that the daily volumes on Bay Lane are low which means that scenario where two vehicles meet while travelling in different directions is minimal.

Image 13.4: Bay Lane - Looking West

Image 13.5: Bay Lane - Looking South East

13.5.4 Bay Lane Roundabout Capacity

The key junction on the haul route is the Bay Lane Roundabout which is shown in **Image 13.6**.

Image 13.6: Bay Lane Roundabout

A capacity assessment was undertaken at peak hour to establish the impact that could be generated by an increase in truck movements along Bay Lane. The assessment was carried out using JUNCTIONS modelling software, where the geometric parameters and peak hour traffic flows (based on various scenarios) were input into the model and the Ratio of Flow to Capacity (RFC) was established. The results of each of the scenarios are discussed below.

An RFC of 0.85 would indicate that a junction is operating at practical capacity. It represents the point at which queuing, and delays would occur on the approach arms to a junction.

The capacity analysis was undertaken for the AM peak hour (8:00 - 9:00am) and PM peak hour (5:00pm - 6:00pm) based on the predicted traffic flows and the geometric parameters of the roundabout. The roundabout is a new built and a high specification with two circulating carriageways and dedicated left turn slip lanes. The assessment is for the year 2024 to represent a worst-case future year where trucks will be still arriving with soil material.

Figure 13.2 illustrates the predicted AM peak hour (8:00-9:00pm) traffic flows at the Bay Lane Roundabout for the 2024 scenario without the soil recovery works being undertaken. **Figure 13.3** illustrates the predicted PM peak hour (5:00-6:00pm) traffic flows at the Bay Lane Roundabout for the year 2024 scenario without the soil recovery works being undertaken.

Figure 13.4 illustrates the predicted AM peak hour (8:00-9:00am) traffic flows at the Bay Lane Roundabout for the 2024 scenario with the soil recovery works being undertaken. **Figure 13.5** illustrates the predicted PM peak hour (5:00-6:00pm) traffic flows at the Bay Lane Roundabout for the year 2024 scenario with the soil recovery works being undertaken.

Table 13.9 shows the results of the junction capacity assessment for the 2024 AM peak hour (8:00-9:00am) assessment). Ratio of Flow to Capacity (RFC), Queue Lengths and Delays are presented for the year 2024 'Do-Nothing - Without Soil Recovery Works' versus 'Do-Something – With Soil Recovery Works' scenarios.

Table 13.10 shows the results of the junction capacity assessment for the 2024 PM peak hour (5:00-6:00pm) assessment). Ratio of Flow to Capacity (RFC), Queue Lengths and Delays are presented for the year 2024 'Do-Nothing - Without Soil Recovery Works' versus 'Do-Something – With Soil Recovery Works' scenarios.

Figure 13.2: 2024 Peak Hour (8:00-9:00am) Traffic Flow at the Bay Lane Roundabout without the soil recovery works

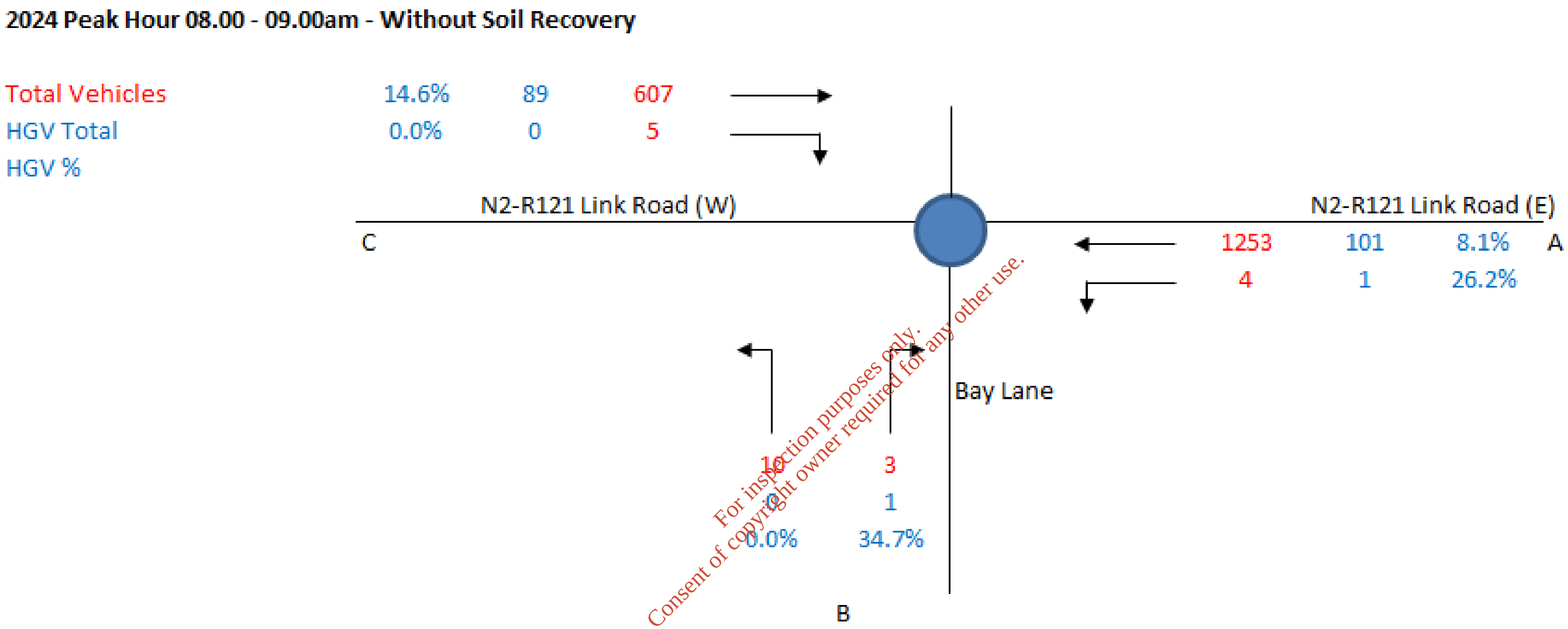


Figure 13.3: 2024 Peak Hour (5:00-6:00pm) Traffic Flow at the Bay Lane Roundabout without the soil recovery works

2024 Peak Hour 05.00 - 06.00pm - Without Soil Recovery

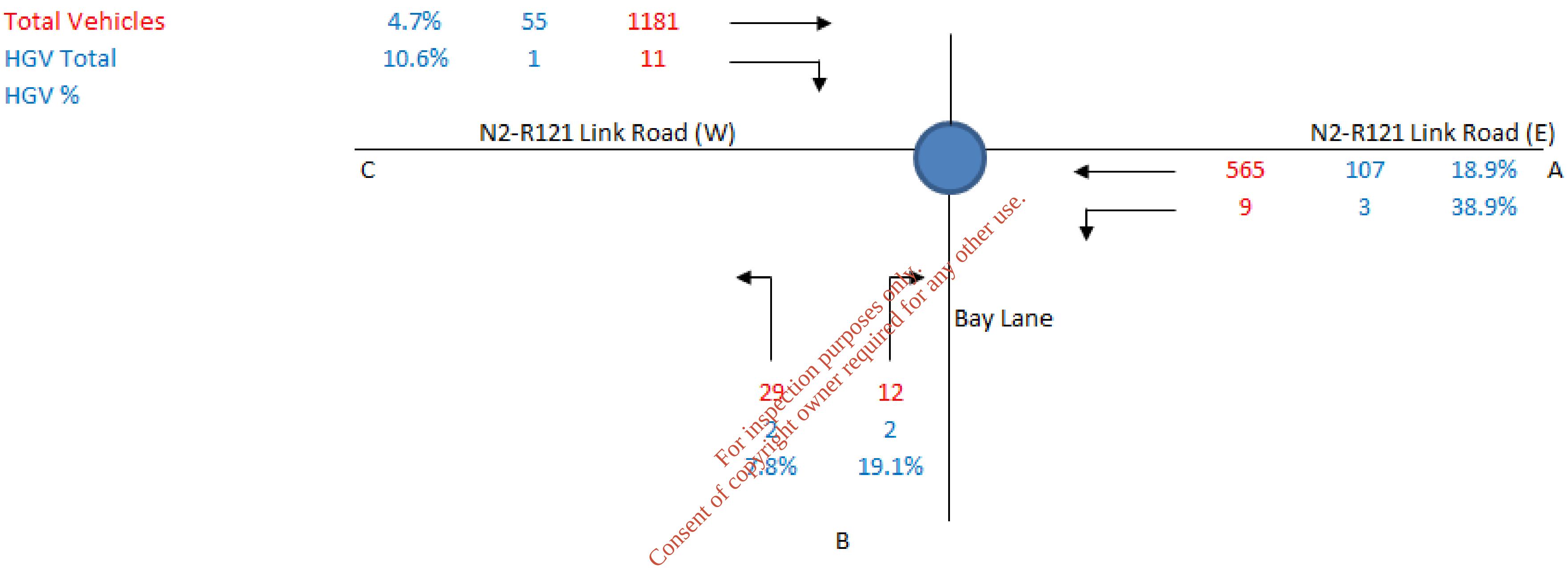


Figure 13.4: 2024 Peak Hour (8:00-9:00am) Traffic Flow at the Bay Lane Roundabout with the soil recovery works

2024 Peak Hour 08.00 - 09.00am - With Soil Recovery

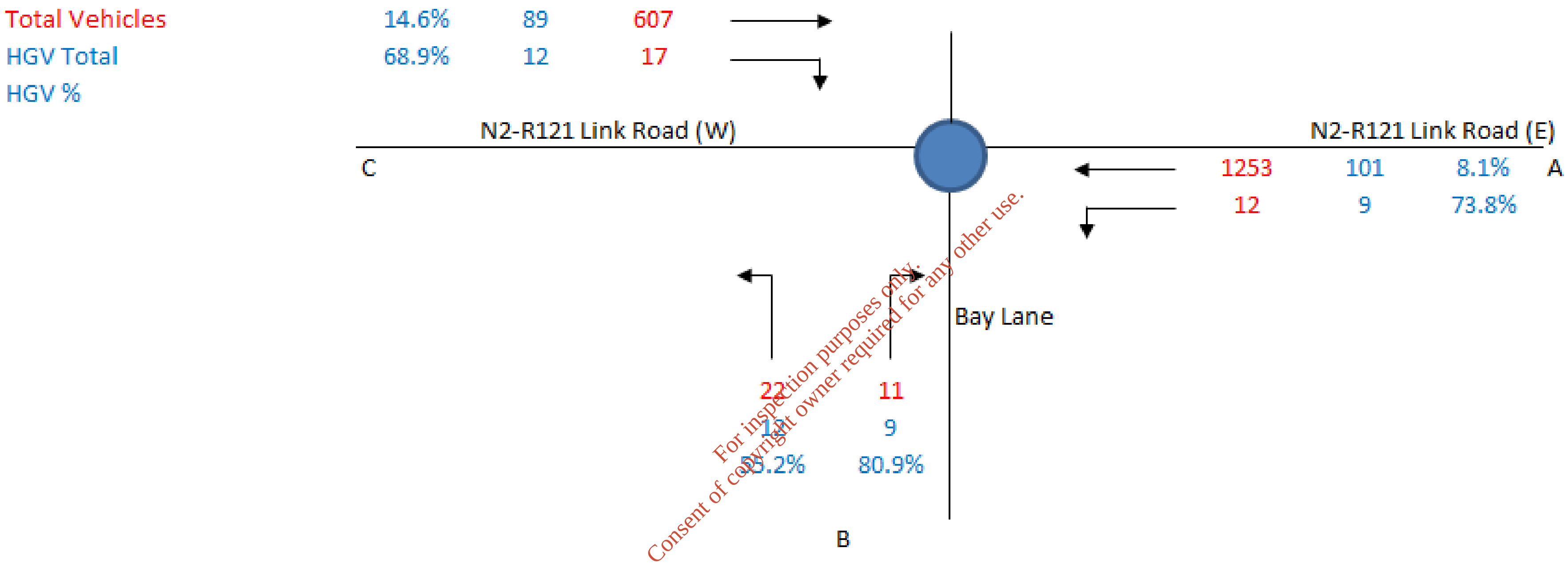


Figure 13.5: 2024 Peak Hour (5:00-6:00pm) Traffic Flow at the Bay Lane Roundabout with the soil recovery works

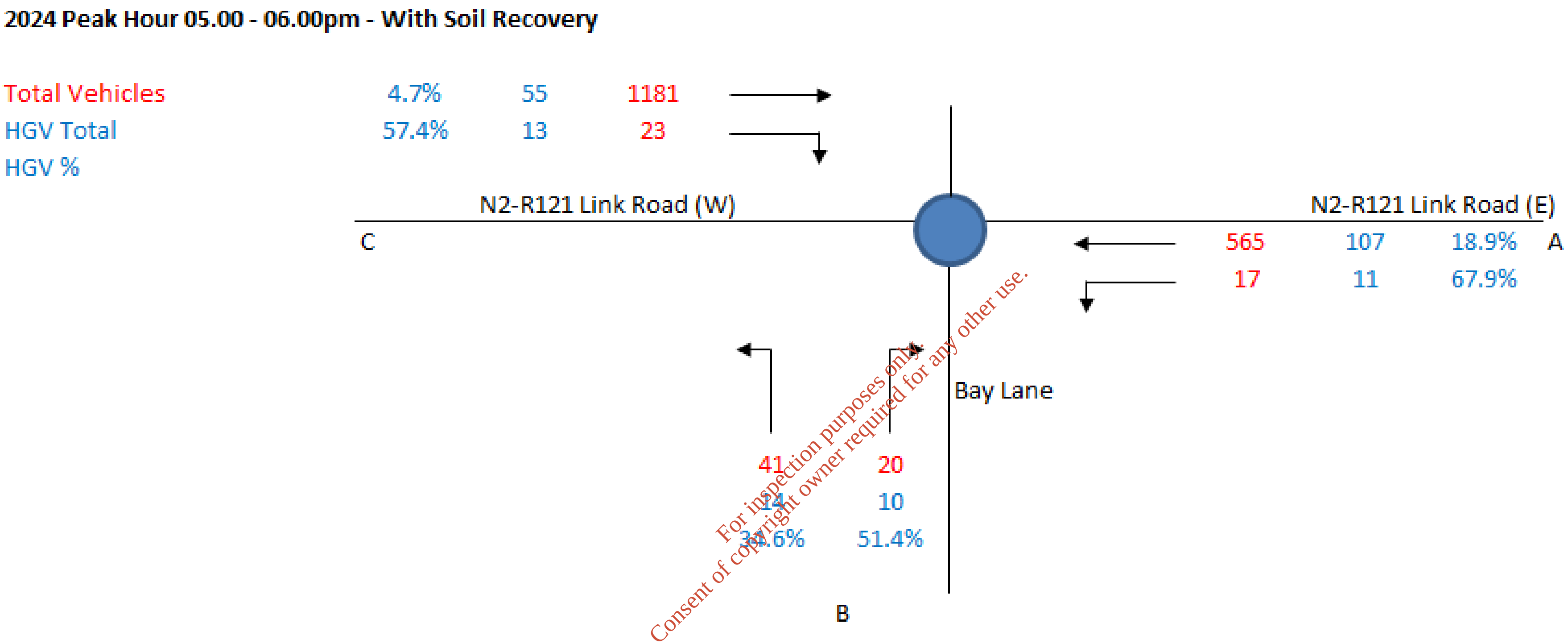


Table 13.9: 2021 Peak (08:00-09:00) Capacity Assessment 'Do-nothing' v 'Do-Something'

	'Do-Nothing - Without Soil Recovery Works'			'Do-Something – With Soil Recovery Works'			Difference		
	RFC	Queue (PCU)	Delays (Secs)	RFC	Queue (V)	Delays (Secs)	RFC	Queue (V)	Delays (Secs)
N2-R121 Link Road (East)	0.54	1.18	2.85	0.55	1.23	2.93	+0.01	+0.05	+0.08
Bay Lane	0.02	0.02	3.90	0.06	0.07	4.09	+0.04	+0.05	+0.19
N2-R121 Link Road (West)	0.28	0.39	1.84	0.29	0.42	1.88	+0.01	+0.03	+0.04

The junction assessment shows that the 'Do-Something – Soil Recovery Works' will have a negligible impact on the operating preformation of Bay Lane Roundabout in the 2024 AM peak hour.

Table 13.10: 2021 Peak (17:00-18:00pm) Capacity Assessment 'Do Nothing' v 'Do-Something'

	'Do-Nothing - Without Soil Recovery Works'			'Do-Something – With Soil Recovery Works'			Difference		
	RFC	Queue (V)	Delays (Secs)	RFC	Queue (V)	Delays (Secs)	RFC	Queue (V)	Delays (Secs)
N2-R121 Link Road (East)	0.27	0.38	1.80	0.28	0.39	1.83	+0.01	+0.01	+0.03
Bay Lane	0.04	0.04	2.83	0.07	0.08	2.93	+0.03	+0.04	+0.10
N2-R121 Link Road (West)	0.51	1.02	2.68	0.52	1.07	2.75	+0.01	+0.05	+0.07

The junction assessment shows that the 'Do-Something – Soil Recovery Works' will have a negligible impact on the operating preformation of Bay Lane Roundabout in the 2024 PM peak hour.

13.6 ACCESS ARRANGEMENTS

It is proposed to utilise the existing access to Bay Lane Quarry for the trucks importing soil to enter and exit the quarry. The existing access is shown in **Image 13.7** and **Image 13.8** has a wide frontage due to stone boundary walls being splayed at an angle from the gated entrance. This access has been used to date as part of the quarry extraction works without incident or any accidents. The access is located approximately 260 metres southeast of the Bay Lane Roundabout.

Due to the 3+ axle ban on Bay Lane and the recorded low levels of traffic flow on the same road the risk of conflict between trucks turning and other traffic on Bay Lane is considered negligible. The existing sightlines to the northwest from the existing access are maximised due to the wide splayed out boundary walls and trucks exiting will have circa 150m sight lines looking towards the roundabout. This exceeds the requirements for a 70kph design speed and it will suffice as the recorded 85th Percentile speeds on Bay Lane is 64.9kph. The sightlines to the southeast also benefit from the splayed-out boundary walls but are more restricted due to vegetation growth, which will be cut back to optimise visibility. The forward visibility of the access for vehicle travelling from Bay Lane Roundabout is circa 150m, which provides enough time for road users travelling southeast on Bay Lane to observe trucks exiting the site.

Image 13.7: Existing Access to the Quarry

Image 13.8: Existing Gate to the Quarry

13.7 MITIGATION MEASURES

13.7.1 Road Signage

It is proposed to provide warning signage of the existing access to the quarry. The signs will be located along Bay Lane at 50m distances in both directions. All warning signage will be in accordance with Chapter 6 of the Department of Transport, Tourism and Sports Traffic Signs Manual as shown in **Figure 13.6** and will be complemented by supplementary plates stating, 'Quarry Entrance Ahead' and the distances.

Figure 13.6: Hazard Signage

13.7.2 Booking System

To streamline and manage the arrival/departure of trucks over a working day along the Bay Lane, a booking and scheduling system will be implemented to avoid the scenario of the development related trucks meeting on the sections of Bay Lane with reduced road width. On a weekly basis the site manager will evaluate the daily profile of truck movements proposed for the upcoming week and schedule them to spread out over the day to prevent any potential overlap.

There will be staff onsite during opening hours, including facility manager and appropriate levels of staff.

13.7.3 Operating Traffic Management Plan (TMP) Development and Implementation

If granted planning permission, the applicant will prepare a full Operating Traffic Management Plan. The characteristics of the Operating Traffic Management Plan will be agreed with the Local Authority.

The sightlines on Bay Lane to the southeast will be improved by cutting back to vegetation growth, to optimise visibility.

14 MATERIAL ASSETS

14.1 INTRODUCTION

This chapter considers the material assets of human and natural origin within the vicinity of the Bay Lane Quarry which could be impacted because of the proposed change of use to a soil recovery facility (SRF). A detailed description of the characteristics of the project is contained in **Chapter 5**.

Material Assets are defined within the EPA Draft Advice Notes for Preparing Environmental Impact Statements (EPA, 2015) as *'Resources that are valued and that are intrinsic to specific places are called 'material assets'. They may be of either human or natural origin. The assessment shall be concerned primarily with ensuring equitable and sustainable use of resources'.*

Further to this, Material Assets are noted in the EPA Draft EIAR Guidelines (EPA, 2017) to include built services and infrastructure, including utilities, road and traffic and waste management.

The main objectives of this assessment were to:

- Establish the existing material assets of human and natural origin;
- Assess potential changes to material assets because of the proposed change of use; and
- To recommend mitigation measures where appropriate in relation to the proposed development and its associated operations.

14.1.1 EIA Scoping

Scoping of the proposed development identified the following issues for consideration in this EIAR:

- Potential impacts on commercial enterprises located in proximity to the site;
- Potential impacts on settlements and housing in proximity to the site;
- Potential impacts on surrounding agriculture and land use;
- Potential impacts on transport infrastructure in the local area;
- Potential changes to utility infrastructure in the local area.

Other chapters within this EIAR are relevant to material assets including **Chapter 6 Population**, which discusses social, amenity and tourism assets and **Chapter 13 Traffic and Transportation** which provides a detailed assessment of the potential impacts that the proposed development may have on the transport network. **Chapter 15 Cultural Heritage** provides a detailed assessment that covers physical cultural assets including archaeology and architecture effects from proposal. Other relevant chapters include **Chapter 7 Human Health, Chapter 9 Soils, Geology and Hydrogeology, Chapter 10 Water and Chapter 11 Air Quality and Climate.** This chapter deals with those material assets items and issues not already covered in these chapters.

14.2 METHODOLOGY

14.2.1 Assessment Approach

Assessment of the likelihood for significant impacts arising, having regard to the nature of the receiving environment and the nature and extent of the proposed activities and development at the site was based on a desk-top review of online and published resources, guidance documents, legislation, information contained within this EIAR and information provided by the applicant and a walkover of the site and surrounding areas.

14.2.2 Information Sources Used

As part of the desktop study to inform the assessment, the following information sources have been consulted in relation to the assessment of Material Assets:

- Previous data collected from 2000 EIS and amendments;
- Planning permission for the previous development An Bord Pleanála Ref. F00A/0862 PL 06F.125541 and Fingal County Council Reg. Ref. F00A/0862;
- Fingal Development Plan 2017 – 2023;
- OSi 50,000 Mapping;
- Aerial Photography;
- Google Earth™ imagery;
- Existing Project mapping;
- An Post GeoDirectory;
- Site Visit;
- Consultation;
- Utility Providers;
- Chapters of this EIAR.

14.2.3 Assessment Criteria

The criteria used to assess the potential impacts of the proposal on material assets near the site are outlined in Table 14.1, Table 14.2 and Table 14.3.

Table 14.1: Assessment Criteria - Significance

Significance of Impact	Criteria
Imperceptible	An effect capable of measurement but without noticeable consequences
Not Significant	An effect that alters the character of the environment without affecting its sensitivities
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 or emerging trends

Significance of Impact	Criteria
Significant Effects	An effect, which by its character, magnitude, duration or intensity alters a sensitive aspect of the environment
Very Significant Effects	An effect, which by its character, magnitude, duration or intensity significantly alters a sensitive aspect of the environment
Profound Effects	An effect which obliterates sensitive characteristics

Table 14.2: Assessment Criteria - Duration

Duration of Impact	Criteria
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.

Table 14.3: Assessment Criteria – Quality

Quality of Impact	Criteria
Positive	A change which improves the quality of the environment (for example, by increasing species diversity; or the improving reproductive capacity of an ecosystem, or by removing nuisances or improving amenities).
Negative	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Neutral	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.

14.2.4 Definition of Study Area

The study area for material assets has been defined with reference to the area in which there is potential for direct and indirect impact on natural and human material assets because of the proposed soil recovery facility (SRF). The assessment focused on 1.5km area surrounding the site, which considers the land and roadways south west of the N2 motorway that may be impacted by associated site traffic. Other notable material assets that lie beyond this 1.5km area, such as nearest clustered settlements, have also been considered.

14.3 RECEIVING ENVIRONMENT

14.3.1.1 Proposed Site

The site, a disused quarry, is located at Bay Lane, St. Margaret's, County Dublin[53], approximately 1km southwest off Exit 2 on the M2 motorway, approximately 4km NNW of Exit 5 (N2) on the M50 motorway.

The site area is approximately 13.67ha in total and original ground level lies approximately 59m above Ordnance Datum. The quarry void extends over an area of 8.59 hectares. There is currently no activity on site. There are signs of significant previous rock excavation and crushed stone production evident at the site. The pit floor is generally flat rock with a layer of soil or stone. Within the open pit, small mounds of aggregate remain, awaiting use.

The north eastern section of the site has not been excavated for quarrying purposes. A volume of overburden material from previous activities has been stockpiled in this area. On the surface it appears that the overburden material is like a quarrying by-product.

The south-eastern perimeter of the site is bounded by road frontage. The north-western, northern and western perimeter of the site is bounded by lands in active agricultural use.

Current existing assets located within the site compound include;

- Two portacabins, one being an office, the other being toilets;
- A weighbridge;
- An un-bunded metal fuel/oil tank; and
- A settling Tank, and a nearby disused farm building.

An unoccupied boarded up residential property is located on south east corner of the site – this is in the ownership of GLV Bay Lane Limited, but no development proposal is presented for this property, and it is located outside of the 'red line' perimeter proposed for the site waste licence.

It is noted that the site falls under the Fingal County Council Development Plan 2017 – 2023 and is zoned General Employment (GE) 'Provide opportunities for general enterprises and employment' while also being subject to the Cherryhound Local Area Plan.

14.3.2 Surrounding Land Use and Property

The site is a disused quarry that was previously in operation from 2001 to 2009. Prior to 2001, it was in agricultural usage. The quarry has not been active, and no extraction has taken place for approximately 10 years since the finding that the onsite rock materials contain pyrite levels that make it unsuited to certain construction uses.

53 Address per FCC planning decision 1694 reference F00A/0862 of 20 April 2001

The area within 1.5km of Bay Lane Quarry is not highly populated and primarily consists of a mix of commercial, industrial, agricultural properties and undeveloped lands and one-off residential properties.

Using An Post GeoDirectory, 73 residential and 231 commercial properties were identified within a 1.5km radius of the site. Of these 2 commercial properties are located along or just off the stretch of road between Exit 2 off the M2/N2 motorway and the existing site entrance.

According to An Post GeoDirectory, there are 10 residential and 15 commercial properties located along or just off the entire stretch of Bay Lane (west to east) towards the bridge crossing the N2 (approximately 1.45km south east of Exit 2).

14.3.2.1 Commercial and Industrial Development

A concrete company (Halton Concrete) is located 200m to the west of the site and a commercial bus yard (Butlers Bus Tours) is located approximately 250m to the east of the site. These share the same access road as the site.

An application for planning approval has been lodged for the development of a logistics operation on the lands immediately west of the southern portion of the Bay Lane Quarry site. This development proposes an entrance to the west of the Bay Lane Quarry entrance.

A food (Pallas Foods) wholesale supplier's foodservice centre is located approximately 350m north northwest of the site. Several business parks are located to the south of the site including Northwest Business Park, which is located approximately 600m to the south east of the quarry site.

A golf club is partly located within the 1.5km study area to the west of the site. A quarry operated by Roadstone, is located 1.5km south east at Huntstown.

14.3.2.2 Settlements and Housing

There is a small amount of low-density residential housing in the local area. The immediate area is rural and consists mainly of one-off detached residential properties located along Bay Lane.

There are four residential properties identified within 250m of the site's eastern boundary. One of these, a vacant bungalow which is owned by the applicant, is located at the south east corner of the site boundary. The remaining residential properties located along or just off Bay Lane are all at least 500m or further away from the quarry's eastern boundary. Two residential properties are located 400m west of the site entrance.

There is a housing development underway in Hollystown approximately 1km west-southwest of the site entrance.

14.3.2.3 Agriculture

Much of the land immediately surrounding the site is undeveloped and is utilised for various agricultural practices, including but not limited to, tillage and dry stock.

14.3.3 Utilities

Utilities and services located in proximity to the site were identified using:

- Mapping;
- Aerial photography;
- Site Visit;
- Existing available information from site operator; and
- Utility providers.

14.3.3.1 Power and Fuel

An 110kV overhead powerline and associated pylons traverse the site in a north west direction through the north east section of the site. This overhead line is part of the Corduff-Platin network. The circuits traversing the site are confirmed by ESB (ESB, 2018) to be the following:

- A Distribution System Operated by ESB Networks;
- A Transmission System Operated by EirGrid.

A medium voltage three-phase overhead electricity power line runs along the southern boundary of the site. This line has already been placed underground where it crosses the site entrance.

A low voltage three-phase overhead electricity power line is located at the south east corner of the south east corner of the site at the unoccupied property. Here it turns and runs north along the eastern boundary of the site for approximately 100m. A small section of low voltage cable is also located underground at the south west corner of the site boundary beside the site entrance.

An ESB substation, the Corduff 220kV station, is located 1km to the south west of the site.

There are no underground gas pipelines traversing the site and no gas connection is available at the main site address. To the west of the site a Gas Networks Ireland medium pressure distribution pipeline travels north east in line with the N2-R121 dual carriageway link road (see figure 14.1 and Map 2 – Utilities Map). Part of this pipeline ends at the north west corner of the site at the roundabout and incomplete road.

14.3.3.2 Telecommunications

Telecommunications services, including phone and broadband, are available at the site and surrounding area according to the Eir Coverage Map. There is mobile phone coverage available at the site and local area.

Telecom transmission poles and lines are evident along parts of Bay Lane and at the vacant property located at the south east corner of the site. Three telecom masts were identified within the study area; however, these are all located 1km or further from the site.

14.3.3.3 Water - Potable and Waste

A water supply is available to the site. A water main runs along the southern site boundary on Bay Lane. No water main traverses the site.

No sewer main is located within the site and there is currently no connection to a sewer main. To the west of the site a sewer main travels north east in line with the N2-R121 dual carriageway link road (see figure 14.1 and Map 2 – Utilities Map) between the N2 and the junction for Bay Lane.

Sanitary facilities remaining at the site from previous activities are two prefabricated toilet units are located adjacent to the site entrance. These discharged in to a prefabricated mechanically aerated treatment unit, where the final discharge was via sub-surface irrigation/percolation system to the soil along the parking area at the site entrance. These units are in disrepair at time of writing. Water supply and foul sewer are considered further in **Chapter 10 Water**.

Water is considered further in **Chapter 9 Soils, Geology and Hydrogeology** including details of wells in proximity of the site**.**

14.3.3.4 Water

In the north-northwest section of the site (excavated area) there is a sump which was previously used, in conjunction with a pump, to control the groundwater level within the open pit**.** Water from this was pumped to a settlement tank located on the east side of the site, where water was collected, settled and discharged into a near-by stream, which is a tributary of the Ward River, on the eastern boundary of the site. The previous site operator was licenced to discharge this water into the stream from Fingal County Council; Registration number WPW/F/047. No expiry date for this licence has been set. The pump and associated piping were removed from the site and this process is not active in March 2018 but is subject to a March 2018 application to Fingal County Council for permission to discharge.

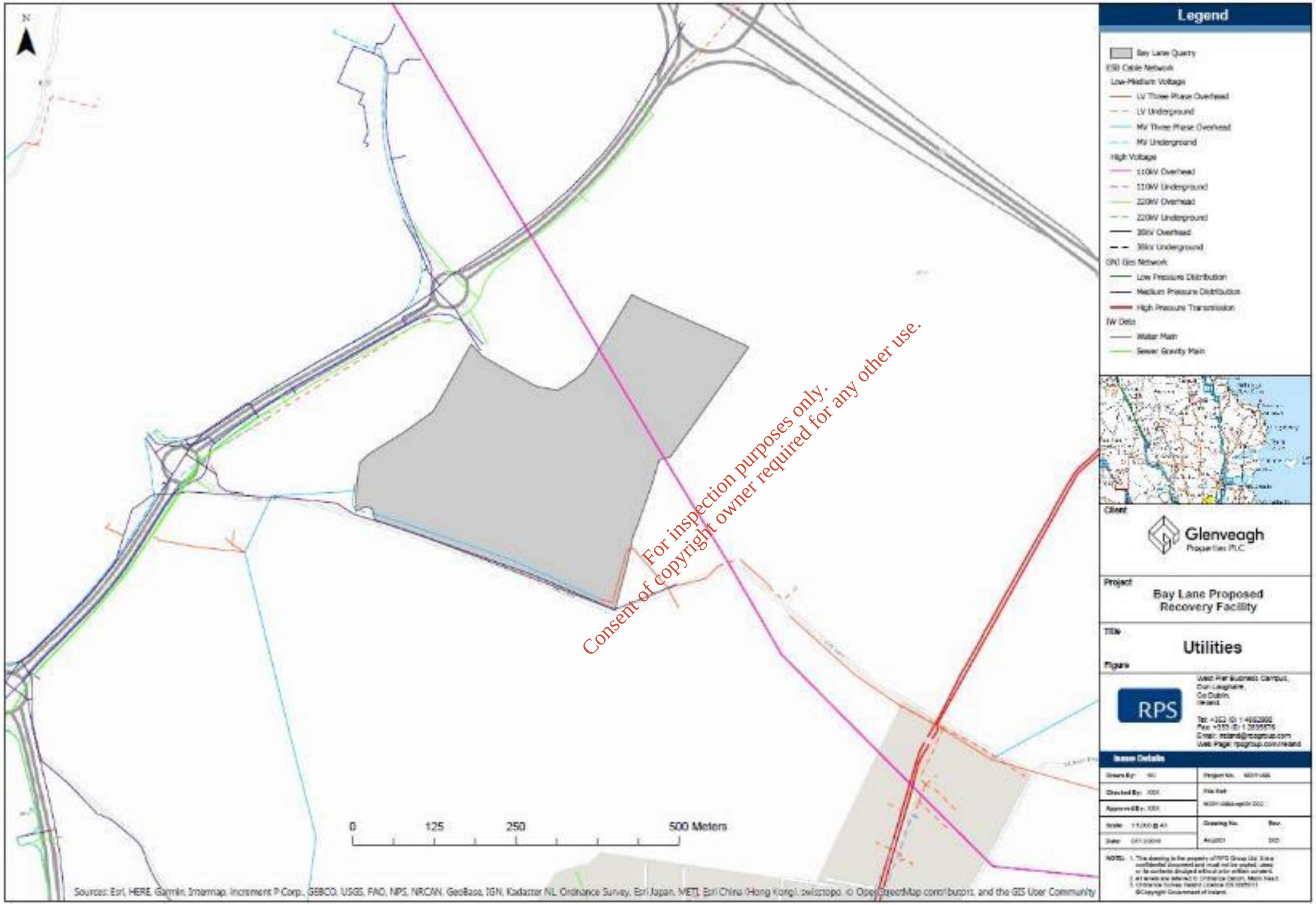


Figure 14.1: Known Utilities at the Site – extract from Map 2 – Utilities Map

14.3.4 Roads and Traffic

The site is located close to a good transport network including the N2/M2, M50, M1 and the N3, while also being accessible to the Dublin Port Tunnel and to Dublin City Centre.

The site accessed via the N2-R121 dual carriageway link road. The site is situated on a local road (Bay Lane) which it shares with some commercial and residential properties. The site entrance gate is set back 20m from the road centre line, creating a pull-in area. A stone wall marks the perimeter of this area.

Chapter 13 Traffic and Transportation provides a detailed assessment of the traffic and transportation and the potential impacts that the proposed development will have on the network**.**

14.3.5 Air Traffic

Dublin Airport (DAA) runway is situated 3km to the east of the quarry boundary at the nearest point. A flight path passes over the site (DAA, 2016).

14.3.6 Waste Management

The site is currently not operational, and no waste is being generated at present.

14.4 IMPACT ASSESSMENT

14.4.1 Proposal

The proposal seeks to operate the Bay Lane Quarry site as a soil recovery facility (SRF) resulting in the eventual restoration of the surface to its pre-extraction level, compacted and slightly domed to allow runoff to surface drainage.

The quarry land has a limited asset value in its current state. Use of the site for quarrying is limited due to the presence of pyrite. No further rock extraction will occur at the site.

The fill material will be clean soil and stone, primarily generated at sites operated by GLV Bay Lane Limited. Waste Acceptance Criteria (WAC) analysis will be carried out at production sites, before consignment to Bay Lane, to determine that the material is appropriate for management. Materials arriving at the site will be ready for immediate placement in the pit or temporary stockpiling prior to placement.

Soil and stone fill may require screening before placement and screening will be conducted on site. Materials that have been screened out will be stockpiled prior to removal offsite for recovery or disposal.

The proposed infrastructural changes at the site will include a temporary administrative building, to be located adjacent to the entrance, incorporating the following:

- Weighbridge (The existing weighbridge will be used);
- Weighbridge office;
- Records office;
- Facility Manager office; and
- A wheel wash;
- Re-fuelling tank; and
- Car parking.

The operational area will consist of a hardstand area for mobile plant machinery, a designated quarantine area for inspection and storage. There will be an un-paved haul road network on-site.

The use of the site as an SRF, optimising the land in its current state, will result in positive long-term effects such as the increased asset value of the site as restored land and enhancing the surrounding area.

14.4.2 Land Use and Property

Overall, any impacts of the proposed development on land use and property in the vicinity will be temporary to short-term in duration and not significant.

The potential impacts and effects on commercial, residential and agricultural land use and property are outlined in Table 1.4 below.

Table 14.4: Land Use & Property Impact Assessment

Impact	Asset	Description of Effects
Traffic	**Commercial and Industrial Development**	During the initial site set-up phase of the proposal, there will be a temporary slight effect on the local road network due to associated activity at the site. This temporary slight effect will not be significant.
	Settlements and Housing	During the operational (void filling) phase there will be a change to traffic volumes in the area due vehicles entering and exiting the site at peak times. This will result in a short-term slight effect on traffic in the area. This temporary slight effect will not be significant
	Agriculture	Potential impacts on traffic and transport infrastructure in the area are considered in detail in **Chapter 13 Traffic and Transportation.**
Air Quality	**Commercial and Industrial Development**	During the initial site set-up phase of the proposal there will be intermittent temporary slight effects to ambient dust levels in proximity of the construction area; however, these effects will not be significant.

Impact	Asset	Description of Effects
	Settlements and Housing	As biodegradable material will not be accepted at the site, there will be no potential for nuisance such as leachate, landfill gas, odour or vermin at the site. There will be potential for short-term slight effects on air in terms of dust generated during the operational (void filling) phase; however, these effects will be intermittent and not significant. Dust minimisation measures will be undertaken onsite to mitigate the potential effects of dust and are detailed in **Chapter 9 Soils, Geology and Hydrogeology and Chapter 11 Air Quality and Climate.**
	Agriculture	
Noise	**Commercial and Industrial Development**	During the initial site set-up phase of the proposal there will potentially be intermittent brief and slight increases to noise levels in proximity of the construction area. These potential increases to noise levels during the operational (void filling) phase, which are because of vehicle and plant machinery use, will be intermittent, slight and not significant. Potential noise impacts and mitigation measures are detailed in **Chapter 12 Noise and Vibration**.
	Settlements and Housing	

The site's history as a quarry is already established in the local area. The former quarry will be restored to natural levels, capped and landscaped resulting in an improved material asset value for the area. The restored site will also benefit the area in terms of employment and local economy and improved visual amenity for the local community. The restored site will be a positive effect on the value of property or landholdings in vicinity because of the operations at and eventual restoration of the site.

Chapter 6 Population, Chapter 7 Human Health, and Chapter 10 Water provide a more detailed assessment of the potential impacts that the proposed development will have on the inhabitants of the surrounding area**.**

14.4.3 Utilities

14.4.3.1 Power and Fuel

Power will be required for the purposes of administrative activities, canteen, welfare and changing facilities for staff on site. A connection point will be identified and agreed with the utility provider.

In terms of Health and Safety onsite, there will be engagement with utility providers and the ESB Code of Practice and HSA guidance regarding exclusion and safe operating distances around electricity infrastructure will be adhered to. Height restriction barriers and equipment will be used onsite to demark electricity infrastructure.

Impacts of the site set-up works and operational activities onsite on electricity infrastructure in area will not be significant.

There are no underground gas pipelines located in proximity of or traversing the site and no gas connection or supply will be required on site. Operations at the site will not impact gas pipe lines located in the area.

Fuel will be used on site in the form of marked diesel (for site plant) and road diesel (for waste transport vehicles). The fuel will be stored in bunded facilities. Power and fuel consumption will be recorded and reported to the EPA in the applicants Annual Environmental Report.

14.4.3.2 Telecommunications

A broadband connection will be required for the purposes of administrative activities on site. A telecommunications connection point will be identified and agreed with the utility provider.

The impact of the site set-up works on telecommunications infrastructure in area will not be significant. Operational activities onsite will not result in a significant impact on the broadband, mobile and telecoms network in the area.

14.4.3.3 Water

The following activities and services on site will require a water supply; wheel washing, canteen, shower, toilet facilities and dust management.

A water mains connection point will be required at the newly constructed site offices and facilities. A connection point will be identified and agreed with the utility provider.

A settling tank and a discharge point were installed and used by the previous operator. The pump and piping that fed the settlement tank have since been removed offsite. The approval to operate these was licensed to the previous owners and has not been transferred. GLV Bay Lane Limited is applying to Fingal County Council to get a new discharge licence.

Sanitary effluent water will be generated from the canteen, toilet and wash facilities within the administration building. All effluent will be collected in a sealed underground pipe network and discharged to a packaged treatment plant with treated effluent percolated to ground. The proposed system will effectively treat effluent from the staff and visitors and will be sized to allow for additional loading. Location of this unit will be near office area, exact location will be determined by percolation testing. The system will be appropriately sized and will operate in compliance with appropriate code of practice for a facility, e.g. EPA Code of Practice: Wastewater Treatment Systems for Single Houses.

Site set-up and operational activities onsite will not result in a significant impact on the local water infrastructure and supply as intense water use on site is not expected. There will be reuse of rainwater collected on site for controlling dust and mud nuisance.

Water consumption will be recorded and reported to the EPA in the applicants Annual Environmental Report.

Chapter 9 Soils, Geology and Hydrogeology and **Chapter 10 Water** provide a more detailed assessment of the potential impacts that the proposed development will have on water infrastructure, surface water, and storm water drainage in the immediate and surrounding area**.**

14.4.4 Roads and Traffic

A temporary, but not significant impact on traffic may be noted during the site-set up period.

During the operational (void filling) phase there will be a change to traffic volumes in the area due vehicles entering and exiting the site at peak times. This will result in short-term but not significant effects on traffic volumes in the area.

Overall, activities at the site will not result in a significant impact on road infrastructure, traffic and access in the immediate and surrounding areas of the site.

Chapter 13 Traffic and Transportation provides a detailed assessment of the potential impacts that the proposed development will have on the network**.**

14.4.5 Air Traffic

The nature of the proposed activities will not have an impact on the Dublin airport or the existing flight path.

As the site will be operating as an SRF and not accepting mixed municipal waste there will be no potential for avian vermin and bird strike as no biodegradable waste will be present on site.

No blasting, extraction or crushing activities will be taking place. Dust potential arises from onsite activities. Dust suppression measures will be undertaken onsite to mitigate any dust generated from backfilling activities. These mitigation measures are outlined in **Chapter 11 Air Quality and Climate**.

No significant impacts because of activities at the site are foreseen in relation to air traffic safety in the area.

14.4.6 Waste Management

Any existing waste on site, such as fly-tipped waste, will be collected, sorted and disposed of appropriately prior to operations commencing.

It is expected that waste generated onsite will be Mixed Municipal Waste consisting of primarily office and canteen waste.

Waste generated on site will be segregated and removed by a licensed waste collector(s).

Any additional waste brought onsite during the operational (void filling) phase with backfill materials will be identified and will be separated, quarantined, sorted and managed appropriately.

All waste generated will be recorded and reported to the EPA in the applicants Annual Environmental Report.

14.4.7 'Do Nothing' Scenario

The potential loss of opportunity to restore the site for future use, providing employment opportunities, is a negative impact.

14.5 MITIGATION MEASURES

No mitigation measures are considered necessary in respect of utilities or waste during the site set-up and operational (void filling) phase.

Dust mitigation measures will be carried out on site to minimise dust nuisance arising from onsite activities. These are outlined in **Chapter 11 Air Quality and Climate**.

Mitigation measures relating to the local road network and site related haulage are identified in **Chapter 13 Traffic and Transportation.**

Mitigation measures relating to noise management are identified in **Chapter 12 Noise and Vibration.**

14.6 RESIDUAL IMPACTS

The proposed development will have a significant positive impact in terms of waste management by providing a suitably located site of substantial volume to accept waste generated by the construction sector within the Region.

The use of the waste soil and stone as an asset will have a significant positive long-term benefit on the restoration of Bay Lane Quarry.

There are no predicted residual ongoing impacts on material assets during the initial site set-up, operational and post-restoration phases.

14.7 MONITORING PROPOSALS

No monitoring or reinstatement measures are recommended for material assets beyond the requirements for monitoring to be established in the site's waste licence.

14.8 REFERENCES

EPA: Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015;

EPA: Draft Guidelines on the information to be contained in Environmental Impact Assessment Reports, August 2017.

15 CULTURAL HERITAGE

15.1 INTRODUCTION

The cultural heritage chapter provides an architectural heritage, archaeological and cultural heritage background with respect to the proposed development. The objective of the report is to assess the impact of the proposed development on the receiving architectural heritage, archaeological and cultural heritage environments and to propose ameliorative measures to safeguard any monuments, features, finds of antiquity or features of architectural or cultural heritage merit.

This chapter was prepared by Dr Clare Crowley, Senior Heritage Consultant at Courtney Deery Heritage Consultancy Ltd. Clare has more than 20 years' experience in the field and holds a PhD in Archaeology (Dublin Institute of Technology, 2009), a BA (Hons) in Ancient History, Archaeology & French (Trinity College Dublin, 1996), a Certificate in Repair and Conservation of Historic Buildings (Dublin Civic Trust, 2004) and a Certificate in Condition Surveys of Historic Buildings (University of Oxford, 2017).

Figure 15.1: Site location map

The current application area comprises a disused quarry site (c. 14.5 hectares) located on the north side of Bay Lane, in north County Dublin (**Figure 15.1**). It is located approximately 1km southwest off Exit 2 on the M2 motorway, to the east of the Tyrrelstown to M2 link road. There are no known archaeological sites or architectural and cultural heritage sites within the site boundaries. Quarrying activity throughout much of the site has negated the archaeological potential within these areas, though the potential remains in the north-eastern section of the site where activity has been restricted to stock-piling.

15.2 METHODOLOGY

15.2.1 Evaluation Process

The assessment was based on a desk study and site inspection of the application area. The desk study availed of the following sources:

- The National Monuments, Preservation Orders, Register of Historic Monuments list for County Dublin was sourced directly from the Department for Culture, Heritage and the Gaeltacht (DCHG);
- Record of Monuments and Places (RMP) and Sites and Monuments Record (SMR): The SMR, as revised in the light of fieldwork, formed the basis for the establishment of the statutory Record of Monuments and Places in 1994 (RMP; pursuant to Section 12 of the National Monuments (Amendment) Act, 1994). The RMP records known upstanding archaeological monuments, their original location (in cases of destroyed monuments) and the position of possible sites identified as cropmarks on vertical aerial photographs. The information held in the RMP files is read in conjunction with published constraint maps. Archaeological sites identified since 1994 have been added to the non-statutory SMR database of the Archaeological Survey of Ireland (National Monuments Service, DCHG), which is available online at www.archaeology.ie and includes both RMP and SMR sites. Those sites designated as SMR sites have not yet been added to the statutory record, but are scheduled for inclusion in the next revision of the RMP;
- Record of Protected Structures (RPS) and Architectural Conservation Areas (ACAs);
- The topographical files of the National Museum of Ireland;
- Cartographical sources: OSi Historic Mapping Archive, including early editions of the Ordnance Survey, historical mapping (such as Down Survey 1656 Map) and Griffith's Valuation, 1853;
- Excavations Bulletins and Excavations Database (1970-2018);
- Dublin County Excavations online database (www.heritagemaps.ie);
- Fingal County Development Plan 2017–2023;
- National Inventory of Architectural Heritage (NIAH), Building Survey and Garden Survey;
- Aerial imagery (Google Earth 2001–2018, Bing 2013; OSi 1995, 2000, 2005);
- Other documentary sources (as listed in the references, Section 15.10).

15.2.2 Site Inspection

A site inspection was undertaken on 6th November 2018 to assess the present topography and land use. This was carried out within the context of an assessment of the archaeological and cultural heritage potential of the Bay Lane area, taking cognisance of the potential implications of the development on the surviving cultural heritage landscape. It also considered the setting of any surviving architectural heritage in the vicinity.

15.2.3 Standards and Guidelines

The following legislation, standards and guidelines were consulted to inform the assessment:

- National Monuments (Amendments) Acts, 1930-2014;
- The Planning and Development Act 2000, as amended;
- Heritage Act, 1995;
- The UNESCO World Heritage Convention, 1972;
- ICOMOS Xi'an Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas, 2005;
- Council of Europe Convention for the Protection of the Architectural Heritage of Europe (Granada) 1985, ratified by Ireland in 1991;
- Council of Europe European Convention on the Protection of the Archaeological Heritage (Valletta) 1992, ratified by Ireland in 1997;
- The Burra Charter, the Australia ICOMOS Charter for Places of Cultural Significance 2013;
- The European Landscape Convention (ELC), ratified by Ireland 2002 European Landscapes Convention 2010. (The Department of the Environment, Heritage and Local Government 'Landscape and Landscape Assessment Guidelines' have been in draft form since 2000, however the Draft National Landscape Strategy (NLS) was launched in July 2014);
- Guidance on Heritage Impact Assessments for Cultural World Heritage Properties – A publication of the International Council on Monuments and Sites, January 2011;
- Guidelines on the information to be contained in Environmental Impact Statements, 2002, EPA;
- Advice Notes on Current Practice (in preparation of Environmental Impact Statements), 2003, EPA;
- EPA: Draft Revised Guidelines on The Information to be Contained in Environmental Impact Statements, September 2015;
- EPA: Advice Notes for Preparing Environmental Impact Statements, Draft, September 2015;
- Frameworks and Principles for the Protection of the Archaeological Heritage, 1999, (formerly) Department of Arts, Heritage, Gaeltacht and Islands;
- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 2000 and the Planning and Development Act 2000;
- Code of Practice between the National Roads Authority (NRA) and the Minister for Arts, Heritage and the Gaeltacht, June 2000;
- Guidelines for the Assessment of Architectural Heritage Impact of National Road Schemes, 2006, NRA;
- Guidelines for the Assessment of Archaeological Heritage Impact of National Road Schemes, 2006, NRA;
- Guidelines for the Testing and Mitigation of the Wetland Archaeological Heritage for National Road Schemes, 2006, NRA; and
- National Landscape Strategy for Ireland 2015-2025, Department of Arts, Heritage and the Gaeltacht.
- Historic England (July 2015), Historic Environment Good Practice Advice in Planning, Note 3: The Setting of Heritage Assets;
- Historic Scotland (October 2010), Managing Change in the Historic Environment;
- The Heritage Council (2010), Proposals for Irelands Landscapes; and International Council on Monuments and Sites (2011), Guidance on Heritage Impact Assessments for Cultural World Heritage Properties.

Excerpts from the relevant legislation are contained in Summary of the Relevant Legislation section of this chapter.

15.2.4 Rating of Impacts

Cultural heritage sites/landscapes are considered to be a non-renewable resource and cultural heritage material assets are generally considered to be location sensitive. In this context, any change to their environment, such as construction activity and ground disturbance works, could adversely affect these sites. The likely significance of all impacts is determined in consideration of the magnitude of the impact and the baseline rating upon which the impact has an effect (i.e. the sensitivity or value of the cultural heritage asset). Having assessed the magnitude of impact with respect to the sensitivity/value of the asset, the overall significance of the impact is then classified as imperceptible, slight, moderate, significant, or profound. A glossary of impact assessment terms, including the criteria for the assessment of impact significance, is contained in at end of this chapter.

In accordance with the NRA 'Guidelines for the Assessment of Archaeological Heritage Impact of National Road Schemes' (2006) the significance (i.e. value) criteria used to evaluate an archaeological site, monument or complex are as follows: existing status (level of protection), condition or preservation, documentation or historical significance, group value, rarity, visibility in the landscape, fragility or vulnerability, and amenity value. The archaeological and cultural heritage environment is assigned a baseline rating, considering the importance, value and/or sensitivity of the receiving environment (Cf. glossary of impact assessment terms).

Architectural heritage sites include structures listed in the Record of Protected Structures (RPS), which have statutory protection. Architectural heritage sites also include structures listed in the National Inventory of Architectural Heritage (NIAH) Building Survey, demesne landscapes and historic gardens listed in the NIAH Garden Survey, and undesignated, newly identified sites such as examples of vernacular architecture (e.g. a dry-stone wall or upstanding structure depicted on the first edition OS six-inch map). In this assessment each building or structure that is considered is assigned a rating in accordance with the NIAH system or is stated to be not of special architectural interest (Cf. glossary of impact assessment terms).

15.3 RECEIVING ENVIRONMENT

15.3.1 Archaeological and Historical Background

15.3.1.1 Introduction

The proposed planning application area, Bay Lane Quarry, lies within the townland of Bay, in the civil parish of Mulhuddart and the barony of Castleknock. Bay and the surrounding area have been subject to rapid development over the past decade, which has included new business parks, industrial estates and quarrying activities (as at Bay Lane), in addition to infrastructural projects such as roads, gas pipelines and drainage. The level of development has resulted in a notable alteration of the historic landscape and has led to the discovery of new sites that point to a rich archaeological landscape which was occupied for much of the prehistoric and historic periods.

15.3.1.2 Prehistoric Activity

There is considerable evidence for activity in the study area from the Neolithic period onwards. A prehistoric enclosure site was discovered and excavated in advance of the N2 Finglas-Ashbourne road in 2004 (now the M2 motorway), c. 1km southeast (SMR DU014-093). The site was located on a gently undulating gravel ridge along a tributary of the Ward river and consisted of an irregular segmented ditch enclosing an-egg shaped area (38.5m by 27.5m). Antler tines possibly used in ditch construction were found in the primary fill and one of the largest Neolithic bone assemblages from an excavated context was deposited around the full circumference of the ditch. This was followed by the deposition of a mid- Neolithic broad-rimmed, round bottomed vessel. Subsequent activity in the Early Bronze Age consisted primarily of a series of deposits and features cutting into ditch fill. This produced some bone that had been worked into pins and awls, lithic material and a large pottery assemblage. In the northern area of the site there were cremation pits directly associated with burials of single bones. The only intact burial was that of a single crouched inhumation, located south of centre of the enclosure. A single hearth represents activity later in the Bronze Age (SMR file).

A burial site dated to the Middle Bronze Age was uncovered closer to the proposed development in Bay townland (c. 600m southwest), in advance of the Tyrrelstown to N2 Interchange Link Road (SMR DU013-045; Licence No. E003918). The burial site produced evidence for an annular ring ditch with a diameter of 4.2m, that enclosed a charcoal-rich cremated deposit, while a second cremation burial was located beside the outer edge of the ditch. A sample of cremated bone was radiocarbon dated to 1370–1110 cal. BC (Excavations Bulletin Ref. 2008:371). A series of Late Bronze Age cremation burials, also in Bay, were investigated in advance of the same road scheme, 190m to the southwest of the burial site (SMR DU013-043; Licence No. E003917). Two of the burials consisted of token cremated remains that were interred within adjacent pits, while the third cremation was placed into an upright Late Bronze Age vessel. A sample of bone from this funerary pot was radiocarbon dated to 1010–840 cal. BC (Excavations Bulletin Ref. 2008:370).

There is further evidence for continued Bronze Age activity, which was found during excavations in advance of the N2 Finglas-Ashbourne Road Scheme in 2004, in Ward Upper townland c. 1km northwest. A random grouping of features was revealed, including a small burnt pit, a linear feature and a small pit or cremation; the pit produced 280 pieces of prehistoric pottery of Late Bronze Age date (SMR DU011-091).

In addition, the remains of an Iron Age hearth or kiln was uncovered in Bay townland, c. 620m southwest of the proposed development, which produced a radiocarbon determination of 160 cal. BC to AD 840 (SMR DU013-044001).

More recent archaeological investigations in Bay townland – including geophysical survey, testing and excavation – revealed several previously unknown Bronze Age sites that were hidden beneath the deeply ploughed flat fields, c. 810m southwest of the proposed development (O'Donovan *et al.* 2017). The principal excavated sites comprised a penannular enclosure (dated to the Middle Bronze Age by a small deposit of pottery from the ditch), a triple-ditched ring-barrow (with evidence for cremation burials), and a circular ring-barrow (possibly preceded by a small house or smaller ring-barrow). Provisional interpretations of the results suggest that this area may have been at, or close to, the centre of a Bronze Age population or even a small kingdom; the nearby presence of what appears to be an early medieval ringfort points to the continuity of settlement in this landscape (O'Donovan *et al.* 2017).

15.3.1.3 Early Medieval and Medieval Activity

The local landscape is sited within the Plain of Brega, which was known as *Síl nÁedo Sláine* during the early medieval period and formed part of the dynasty of the southern Uí Néill (Cróinín 1995). The most frequently encountered monument from this period are ringforts, which typically consist of a circular ditched embankment or stone rampart. In the latter case, they are often referred to as cashels, which derives from the Irish *caisel*, while those with earthen enclosures are known as a *raths* or *lios*. Ringforts represent the remains of defended farmsteads, and date from AD 500–1200. Ringforts would have enclosed a circular house, as well as ancillary buildings such as barns or byres. A considerable number of these monuments have been destroyed in Leinster because of agricultural practices, and often the only indication of the former presence of a ringfort is preserved via townland names such as *dún*, *rath*, *cashel*, or *lios*, as for example at Hollywoodrath.

Three possible ringforts and a souterrain are recorded in the townland of Cloghran, where they were identified as cropmark enclosures and an associated linear feature (RMP DU014-014001 to -014004, c. 1.2km south of the proposed development site); these were built-over during the construction of the Northwest Business Park. Another possible ringfort was identified by geophysical survey and testing in Bay townland, c. 620m southwest of the proposed development (Licence No. 15E0267; Clancy & McLoughlin 2015). Additional evidence for early medieval activity was uncovered in the townland of Bay during the construction of Tyrrelstown to N2 Interchange Link Road. Two early medieval pits and a gully were excavated in Bay in 2008 (Licence No. E003919, Excavations Bulletin Ref. 2008:372; SMR DU013-046001); a charcoal sample from one of the pits returned a radiocarbon date of cal. AD 660–780. Further northwest, in Cherryhound townland, an industrial site was uncovered during excavations in advance of the N2 Finglas-Ashbourne Road Scheme, which produced probable souterrain ware (SMR DU011-093).

There is also evidence for ecclesiastical activity in the wider landscape. A previously unknown burial ground of possible early medieval date was discovered during topsoil monitoring in 1988 in Kilshane townland, c. 470m southwest of the proposed development site (RMP DU014-048). The follow-up excavations revealed 123 skeletons, many of whom were children and adolescents. These were aligned roughly east-west in the Christian manner, many haphazardly placed. Some of the individuals had stones around and under the heads. The presence of 'pillowstones' may indicate a date of between 9th and 13th century for the site (Gowen 1989; cited in SMR file). A church, burial ground and holy well are recorded further southwest in the same townland, c. 1.3km southwest of the proposed development site (DU014-012001, -012002, -012003).

Another church site is recorded in Cloghran townland, c. 1.2km to the south. Cloghran church and graveyard (RMP DU013-008) are located on an elevated site, and contains 18th century memorials, as well as 18th and 19th century grave markers (Stubbs 1897; Egan 1991). Prior to c. 1300 the church formed part of the parish of Finglas until the 14th century, when it ceded to the priory of All Hallows in Dublin City. The possessions of All Hallows, which included Cloghran chapel, were granted to the Corporation of Dublin at the time of the Dissolution in AD 1538 (Ronan 1940; Simington 1945). Ball in his History of the County of Dublin (1902-1920) has a chapter devoted to the Parish of Cloghran, also referred to as Cloghran-Huddart. He tells us that all references to the church before 1531 appear to have been lost. The placename, however, would indicate an early medieval foundation here; Cloghran is *clochrán* in Irish, a diminutive of *clochar,* literally a 'stone house' but also a term for a convent or community house. Cloghran Hiddart or Huddart derives from the Irish *Clocharan Chuidbert*, which associates the place with St Cuthbert, a 7th century Northumbrian saint, associated with Lindisfarne.

In the centuries following the Anglo-Norman invasion of 1169, those of English ancestry were concentrated in a district around Dublin, which became known as 'The English Land' or 'The Pale'. It was here, in an area covering counties Dublin and Louth, parts of Kildare, Westmeath and Wicklow, and much of Meath, that the customs of the English largely survived, in contrast to the Gaelic culture, which persisted outside the Pale. The location of the Pale, around Dublin, was due to the fertile quality of the soil and the geographical proximity to England (Joyce 1994). Anglo-Norman influences are reflected in the archaeological site types which have survived into the present, such as mottes, mounds, castles, as well as moated and ecclesiastical sites etc, which are all common to the region. In the aftermath of the Anglo-Norman invasion, the lands of Mulhuddart and Clonsilla were granted to Hugh Tyrrell, the first baron of Castleknock, by Hugh de Lacy c. 1172 (Cotter 2008).

There is a motte recorded in Kilshane townland, c. 650m northeast of the proposed development site (RMP DU014-001), which was may have acted as the centre for secular power in the area. The investigations along the Tyrrelstown to N2 Link Road also produced evidence for later medieval agricultural activity, and an assemblage of 13th and 14th century ceramics were recovered, while a medieval corn-drying kiln was uncovered in Hollywoodrath, c. 1km southwest of the proposed development site (SMR DU013-042, Licence No. E003920). The kiln was orientated southeast-northwest and included four stratified deposits and a concave oxidised base. The charred remains of alder, hazel, cherries, elm and apple type woods were identified from the deposits, and a charcoal sample was radiocarbon dated to cal. AD 1020–1180. A sherd of Dublin-type ware and a flint flake were recovered from the topsoil (Excavations Bulletin Ref. 2008:464). Further south, a field system is recorded in Goddamendy townland, which may have formed part of a medieval settlement, though it is now destroyed and built over as part of an industrial park (c. 1.3km southwest of the proposed development site; RMP DU013-007).

15.3.1.4 Post-Medieval Period

By the early part of the 17th century, the lands within Mulhuddart parish passed from the Tyrell family to the Bellings, with their seat at Tyrrelstown. Richard Bellings had been a distinguished lawyer and solicitor-general for Ireland from 1574 to 1584, while his son Sir Henry Billings held the office of provost marshal (Ball 1920). The parish suffered badly during the Confederate Wars in the mid-17th century and by the time of the Civil Survey in 1654, only the walls of the Bellings' house were left standing and much of the parish had been laid waste (Simington 1945). The survey records that Bay townland (named 'The Bay') comprised 50 acres valued at £20, of which the majority was arable land. It was in the possession of Sir Henry Bealing (Belling) and mortgaged to Dan Wybraw (*Ibid*).

At the time of the Restoration in the 1660s, there were 29 English and 149 Irish adults recorded as living within the parish, and apart from Powerstown and Damastown, no house was assessed for more than two hearths (Ball 1920). According to Ball, by the later 17th century, Henry Bellings, a grandson of Sir Henry, is recorded as living at 'the Bay in Mulhuddart', possibly in the house shown on the Down Survey mapping (DU014-089).

Lewis (1838) records the parish containing 478 inhabitants in the earlier 19th century, with the principal seats being Hollywood, the residence of Major Thompson, Tyrrelstown (A. Rorke Esq.), and Kilmartin (J. Hoskins Esq.). No mention is made of the house at Bay, which suggests it was a farm house (as indicated on the Down Survey) rather than a larger country house of note. Nonetheless, it is likely to have been the house of a prosperous farmer. Griffith's Valuation in 1853 records it as the residence of John Jerrard (or Gerard), Esq., with the land valued at £326 17s (www.griffiths.askaboutireland.ie).

15.3.2 Recorded Archaeological Monuments

There are no RMP/SMR sites recorded within or near the proposed development site (Figure 15.2). The closest recorded archaeological site is located c. 160m to the west, at the site of the former Bay House, which is marked on the first edition OS map. Bay House may have been constructed on the site of an earlier dwelling illustrated on the mid-17th century Down Survey map (RMP No. DU014-089).

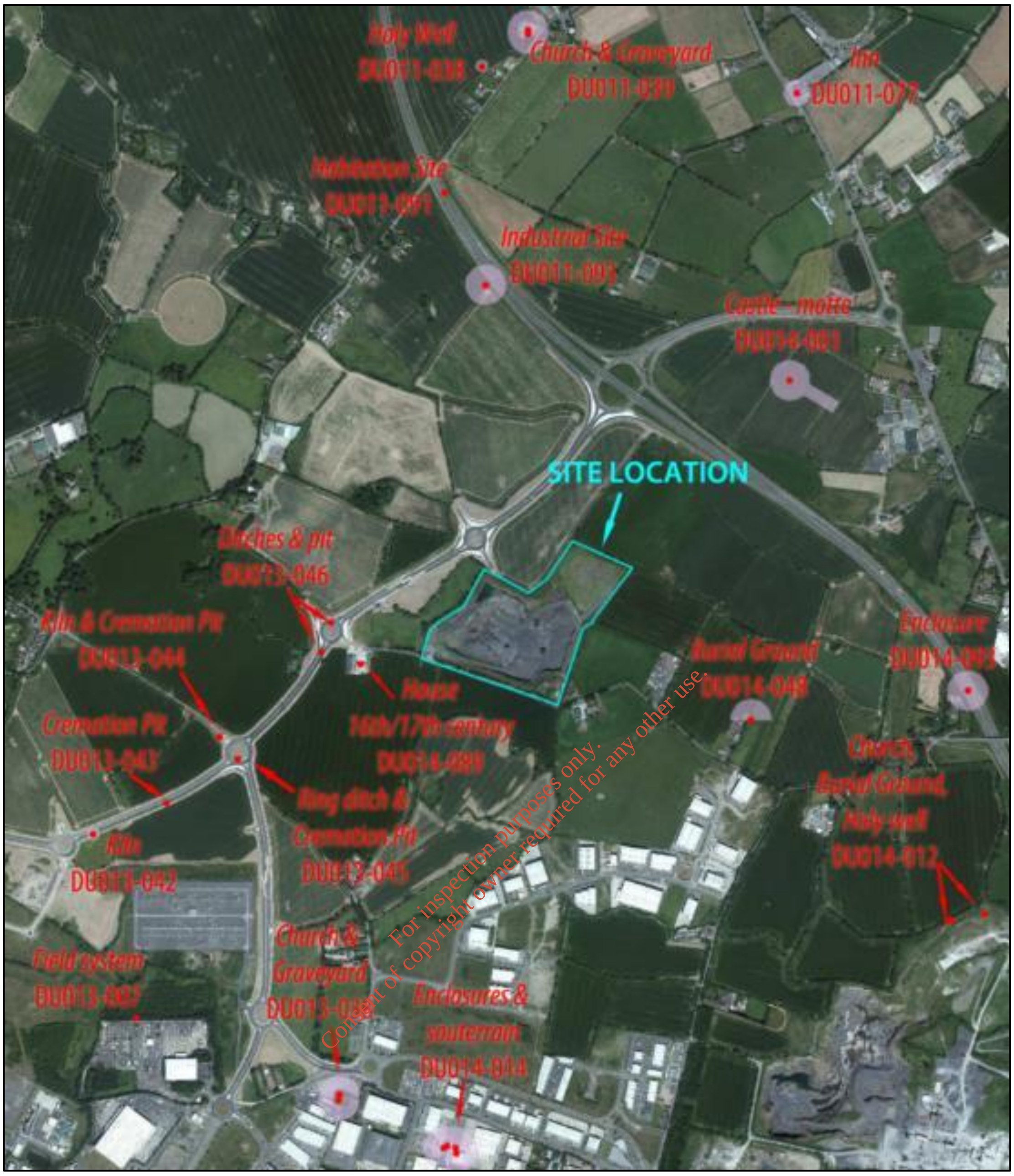


Figure 15.2: Map showing RMP / SMR sites within c. 1.5km

Additional features potentially related to the house site were discovered during excavations (Licence No. E3919) on the Tyrrelstown to N2 Link Road, c. 275m west of the site. The majority lie within Bay townland. They revealed evidence of medieval activity including two ditches, a collection of isolated pit features and a deposit of clay which contained medieval pottery (DU013-046001). Further excavations on the same road scheme have revealed an early medieval pit (DU013-046002, c. 250m west), an Iron Age kiln (DU013-044001, c. 620m southwest), a Bronze Age ring ditch (DU013-045001, c. 615m southwest) and a series of Bronze Age cremation pits (DU013-045002, DU013-043, DU013-044002), suggesting the area was the focus of funerary and agricultural activities from at least as early as the Bronze Age. A corn-drying kiln in Hollywoodrath (DU013-042, c. 1km southwest) was radiocarbon dated to AD 1020-1180, putting it at the close of the early medieval period.

The only other recorded site within 500m is a burial ground of possible early medieval date in Kilshane townland, c. 470m southwest of the proposed development site. This and other relevant sites in the wider landscape are discussed in the context of the archaeological and historical background in **Section 15.3.1** and shown on **Figure 15.2**.

15.3.3 Topographical Files

There are no stray finds recorded to Bay townland or the surrounding townlands in the topographical files of the National Museum of Ireland.

15.3.4 Cartographic Analysis

15.3.4.1 Down Survey Maps, 1655

Very little of the land within Castleknock barony was forfeited, which means that there is a lack of detail recorded in the survey and on the map. Several townlands in Mulhuddart parish were forfeited, however, including Bay and the neighbouring townland of Killamonan, as well as Buzzardstown and Tyrrelstown to the south and southwest (**Figure 15.3**: Down survey map of the barony of Castleknock, 1655).

Figure 15.3: Down survey map of the barony of Castleknock, 1655

The parish map and accompanying terrier provide more detail, showing 'a Farmhouse' at the centre of Bay townland, noting that the land was at the time in the possession of Sir Henry Bealing (Belling), Irish papist (**Figure 15.4**). The terrier describes the parish containing arable, meadow and pasture land, with 'but little improvement' – namely the ruins of a large house in Buzzardstown and several farm houses (including the one in Bay) – and 'all the rest Waste' (www.downsurvey.tcd.ie). The house shown in Bay is recorded as RMP site DU014-089.

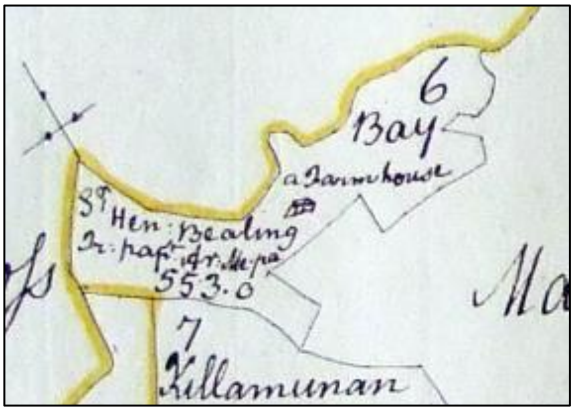


Figure 15.4: Down survey map of the parish of Mulhuddart, 1655

15.3.4.2 Rocque's Map of Dublin County, 1760

Rocque's map of county Dublin shows considerably more detail – e.g. named houses and other features, and a recognisable road network – allowing us to gauge an approximate location for the proposed development site, in agricultural fields on the north side of the road bounding Bay House (the present Bay Lane).

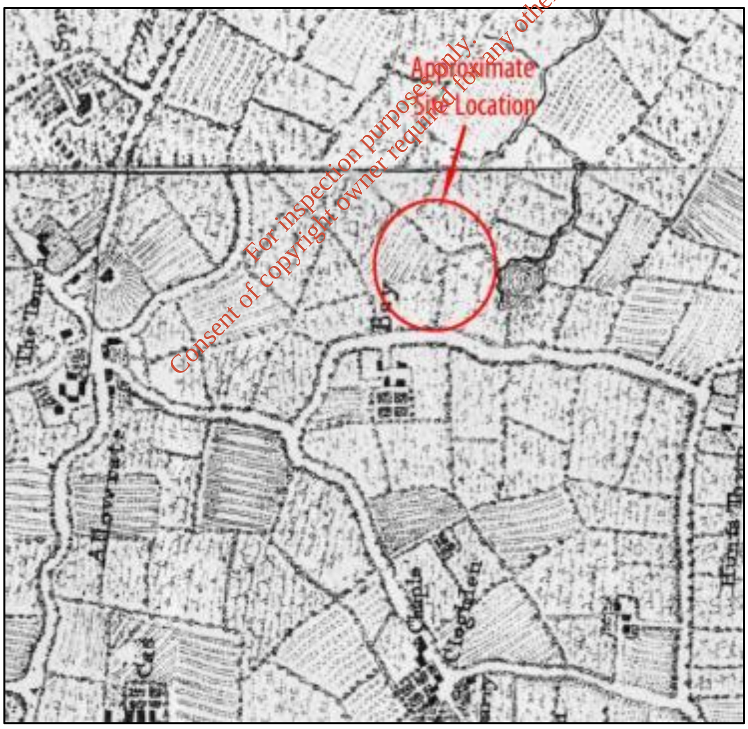


Figure 15.5: Rocque's map of Dublin county, 1760

The latter is named 'Bay' on the map, with the house and outbuildings arranged around the short entrance avenue and yard, and kitchen gardens laid out to the rear. No features are depicted within the fields on the north side of the road, save a stream that flows from the northeast to empty into a large pond. This appears to lie east of the proposed development site, though given the less than accurate scale of Rocque's map, it is possible that it extends within the site itself.

15.3.4.3 Taylor's Map of Dublin, 1816

Taylor's map, while less detailed, provides some additional information (**Figure 15.6**). The area encompassing Bay townland is named 'The Bay', with two other placenames referring to it: 'Lough of the Bay', on the west side of the approximate site location (presumably the feature depicted on Rocque's map), and 'Bush of the Bay' on the south side of the road. Bay House is depicted, but not named.

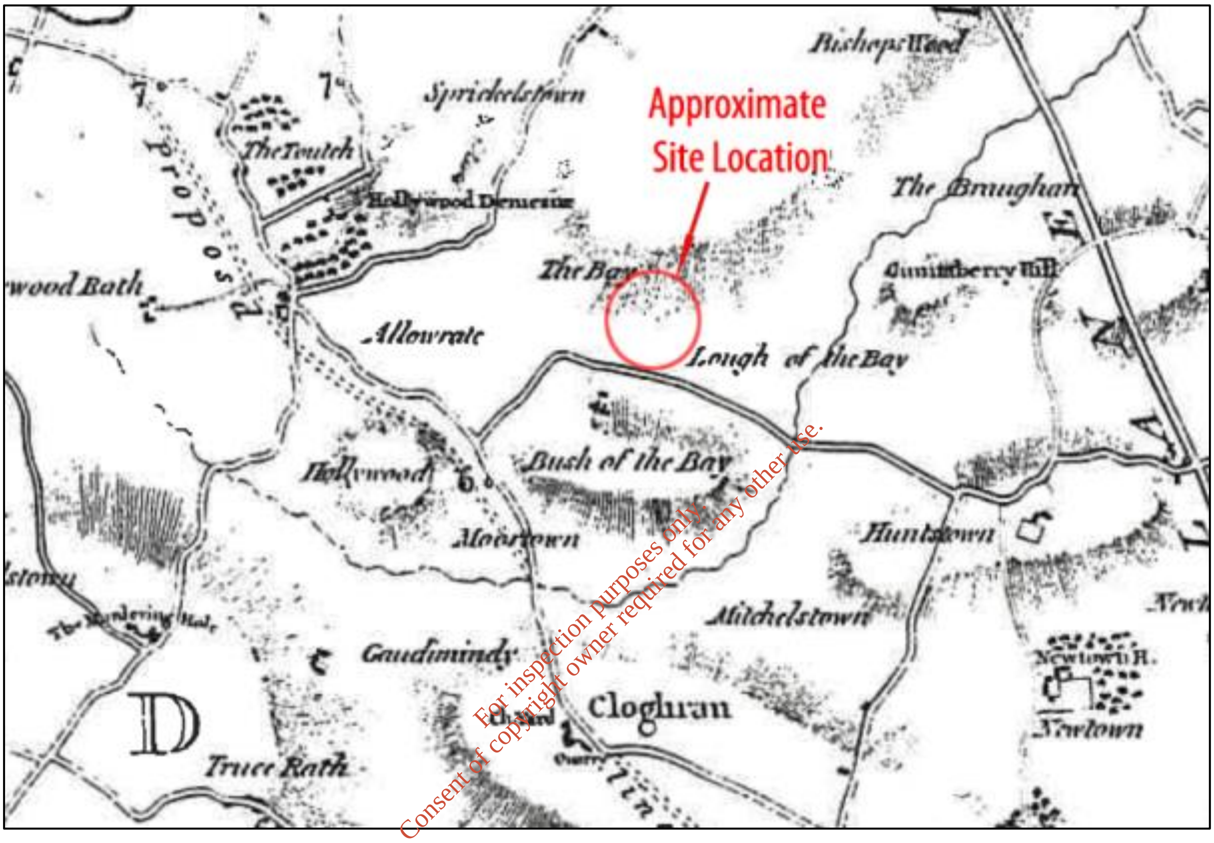


Figure 15.6: Taylor's map of Dublin, 1816

15.3.4.4 Ordnance Survey Maps

The historic Ordnance Survey (OS) mapping is the earliest accurate and detailed cartographic source for the study area. On the first edition OS six-inch map (**Figure 15.7**), the proposed development site occupies an area of agricultural fields on the north side of a public road. The Bay / Kilshane and Bay / Cherryhound townland boundaries form the northern and western boundaries to the site. A tributary of the Ward river flows along the Bay / Cherryhound townland boundary. A canalised watercourse flows south from the tributary (along the western site boundary), terminating at (feeding) a small pond. There are three rectangular fields in the eastern side of the site.

Two small property plots are depicted in either corner of the southernmost field, at the roadside, containing an outbuilding (west) and cottage (east). A small cottage fronts onto the road, opposite the western plot, in the field to the south (outside the site boundaries).

There is no indication of the feature depicted on Rocque's map (and named 'Lough of the Bay' on Taylor's map); the canalised watercourse and pond shown on the first edition map appears to be a far smaller feature and is further west. Bay House is named on the south side of the road and is shown as a substantial complex of farm house and outbuildings with a short entrance and two courtyards. The regular layout of the kitchen gardens to the rear as shown on Rocque's map is not represented here; instead there is a semi-circular area planted with trees (possibly an orchard). Park land planted with trees to the west and south forms part of the landholding.

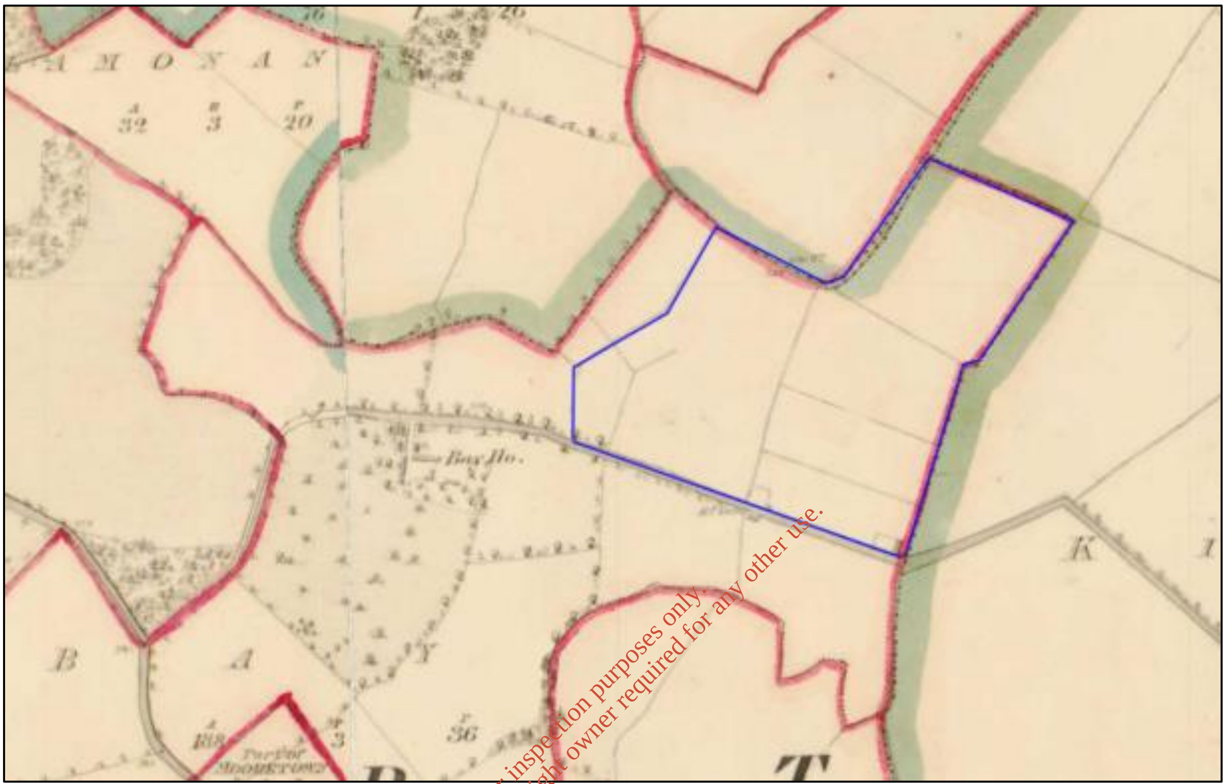


Figure 15.7: First edition OS six-inch map, 1843, showing proposed development site (in blue)

By the time of the revised edition OS 25-inch map of 1906-09 (**Figure 15.8**), several of the field boundaries within the site have been removed, leaving two large fields and part of a third in the southwestern corner. Both properties shown on the earlier map are gone, as is the cottage on the south side of the road. The canalised watercourse and pond are still shown on the map.

Bay House is indicated as being in ruins, with several of the outbuildings already demolished and the parkland cleared of trees, suggesting it had been put to agricultural use. A fox covert is depicted on the south side of the road, opposite the south-eastern corner of the proposed development site.

There are no significant changes by the time of the revised edition OS six-inch map of 1935-38 (not shown).

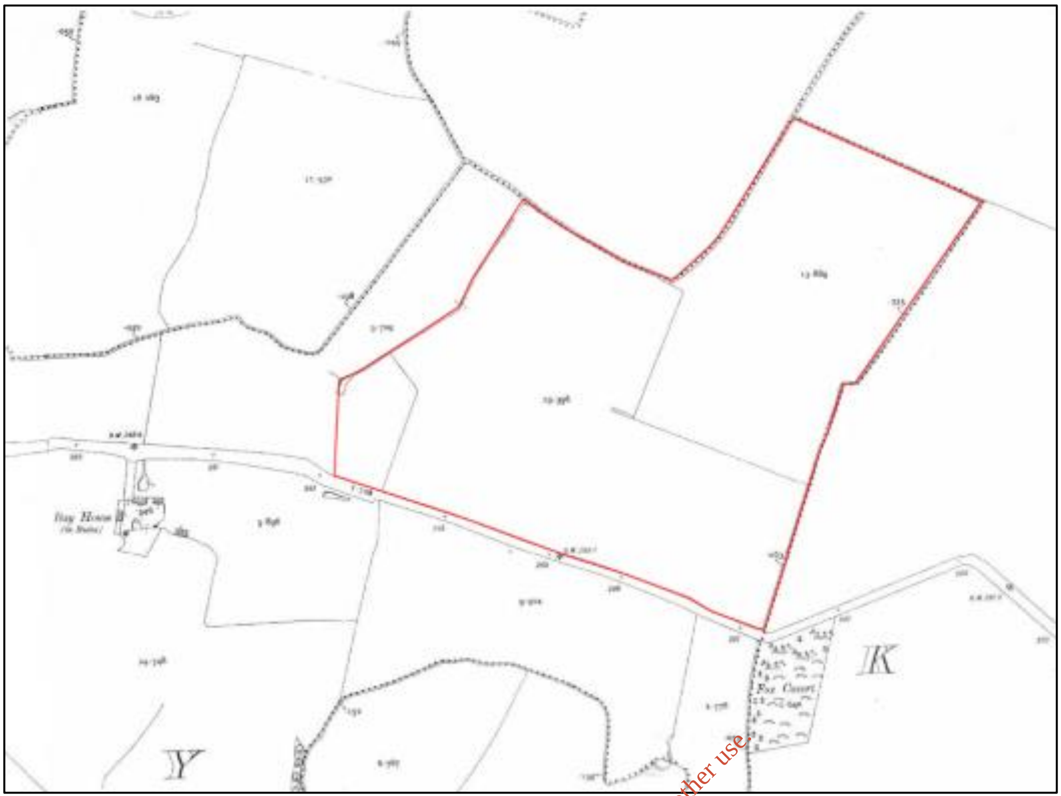


Figure 15.8: Revised edition OS 25-inch map, 1906-09, showing development site (in red)

15.3.5 Place Name Evidence

The surveyors for the Ordnance Survey wrote down townland names in the 1830s and 1840s, when the entire country was mapped for the first time. The mapmakers, soldiers and antiquarians who collected the placenames and local history varied in their interests and abilities. While most placenames were anglicised or translated relatively accurately, some were corrupted virtually beyond recognition. Irish placenames can, therefore, be problematical and reliable translations and interpretations cannot always be guaranteed. Nonetheless, a variety of placenames, whether of Irish, Viking, Anglo-Norman, English, or in very rare cases, Anglo-Saxon origin, appears throughout Dublin. The appearance of the different languages is often a good indicator of the cultural heritage and, therefore, of the archaeological record of the area.

The names in this part of north County Dublin are derived from Irish, English and Viking sources. They are an invaluable source of information not only on the topography, land ownership, and land use within the landscape, but also on its history, the archaeological monuments and the folklore. Where a monument has been forgotten or destroyed, a placename may still refer to it, and may therefore indicate the possibility that remains may survive below the ground surface.

Bay townland is referred to as ‘The Bay’ in 1547 (OS Name Book, www.logainm.ie), a name that also appears on Taylor’s 1816 map of Dublin (along with ‘Bush of the Bay’ and ‘Lough of the Bay’). Its origins are unclear, though it may be a phonetic anglicisation of an Irish word, such as *beith*, meaning birch tree. Cloghran is another placename of Irish origin; *clochrán* in Irish, a diminutive of *clochar,* literally a ‘stone house’ but also a term for a convent or community house. Killamonan derives from the Irish *Coill Mic Monain*, meaning Mac Monan’s wood. In contrast, the prefix ‘kil’ in Kilshane derives from the Irish *cill* (church), meaning the church of John (*Cill Seáin*; OS Name Book, www.logainm.ie).

Some of the surrounding townlands derive their names from the families who settled here in the medieval period (e.g. Cruiserath, Tyrrelstown and Huntstown). Cruiserath may preserve a mixture of both Irish and English heritage, referring to the medieval owners of the land, the Cruise family, as well as to the presence of a rath. While this is likely to be a pre-existing early medieval ringfort, it is also possible that the reference is to a medieval moated earthwork site (perhaps built by the Cruise family). According to the OS Name Book, the townlands of Hollywood and adjoining Hollywoodrath derive from 'holy wood' rather than 'holly wood' (www.logainm.ie), and Ball states that it is the name of the residing Holywood family (Ball 1920). As with Cruiserath, the rath element presumably indicates the former presence of a ringfort (though none is now known here). Huntstown is derived from the occupation of the lands by a family called Hunt, whose last representative, Nicholas Hunt, was outlawed for treason towards the close of the 14th century. Tyrrelstown derived its name from the occupation of the lands by cadets of the Tyrrell family. At that time Powerstown was the chief seat of the Tyrrell family, and it was then occupied by John Tyrrell, who was a member of the Great Council and one of the chief judges (Ball 1920).

One of the more obscure names in the area is Goddamendy, a townland bounding Bay to the south. Local tradition records that while delivering a mass at Cloghran, a priest witnessed a person stealing a horse and foal. This caused the priest to utter 'God amend thee', which was then applied as the name of the neighbouring townland of Goddamendy (Egan 1991). However, another folk tradition suggests the name evolved when a priest arrived too late to deliver the last rights to a sick man. A disgruntled relative cursed the tardy clergyman, who in response replied, 'May God amend thee'. An alternative origin for the townland name may be more prosaic; in the latter half of the 14th century, these lands were occupied by James Goodman and it is possible that 'Goddamendy' is a corruption of 'Goodmandtown'.

15.3.6 Previous Archaeological Investigations

There have been no previous archaeological investigations within the proposed development site. Archaeological monitoring of topsoil-stripping was specified as the mitigation for the site prior to the commencement of quarrying in an EIS undertaken in 2000 (Frank L. Benson & Partners, 2000, Section 16.6). Despite this, there is no record that any such monitoring took place, either in the online national excavations database or in the Dublin County Archaeology online database (www.excavations.ie and www.heritagemaps.ie).

The nearest archaeological investigations to the site are those carried out along the Tyrrelstown to N2 Link Road in 2007/2008, which runs to the southwest and northwest of the site. The results of the investigations suggest that the area was the focus of funerary and agricultural activities from at least as early as the Bronze Age. The newly discovered archaeological sites were added to the SMR and are described above in **Section 15.3.2**.

15.3.7 Aerial Photography

The sequence of development from the original greenfield site in 2000 (**Figure 15.9**) to the present disused quarry can be seen in aerial imagery (**Figure 15.10**). No features of archaeological interest are evident in the aerial imagery prior to quarrying and none were identified during the field inspection carried out by ACS Ltd in 2000 as part of the previous EIS for the site.

Figure 15.9: OSI aerial images 2000 (left) and 2005 (right)

Figure 15.10: Google Earth aerial image (2018) showing proposed development site

15.3.8 Results of Site Inspection

The site was visited on 6th November 2018, in dull but dry conditions. It is bounded to the south by Bay Lane, with hedgerow and ditch boundaries to the east, west and north, generally obscured by vegetation overgrowth. Streams flow along the boundary ditches, tributaries of the Ward river to the north.

The site is a disused quarry, with significant previous rock excavation in most of the site which has removed any potential for the discovery of archaeological remains in this area (the extraction work has left a pit volume of 828,963 m^3). The pit floor is generally flat rock with a layer of soil or stone, much of which was under water in October 2018.

Image 15.1: View of quarry pit, facing north-east in October 2018

The north-eastern section of the site was not excavated for quarrying purposes and is crossed by a 110kv overhead powerline. This area has been used to stockpile a large volume of material, predominantly excess stone from quarrying Image 15.2. The original field surface is not visible. No archaeological or cultural heritage features were noted in this area during the field inspection undertaken prior to the quarrying in 2000. There is, however, the potential that previously unknown sites may survive intact below intact surface.

Image 15.2: Stockpiling in north-eastern section of disused quarry

There is a disused and boarded up house (a modern bungalow) and disused modern farm shed in the southeast corner of the site. The structures are not depicted on the historic OS mapping, indicating that they date to the second half of the 20th century (the style of the bungalow confirms a later 20th century build-date). Neither structure is of built heritage interest.

Image 15.3: View south-west across disused quarry

15.3.9 Cultural and Industrial Heritage

The Bay / Kilshane and Bay / Cherryhound townland boundaries form the northern and western boundaries to the site.

Townlands are land divisions that form a unique feature in the Irish landscape, their origins can be of great antiquity and many are of pre-Norman date. They existed well before the establishment of parishes or counties. Townland boundaries can take the form of natural boundaries or routeways as well as artificially constructed earthen banks and ditch divisions. They are often formed of substantial boundaries which are usually distinguishable from standard field division boundaries. There are 62,000 townlands in Ireland, grouped into civil parishes, then counties and finally provinces. While the boundaries of many townlands may not have been clearly defined until the post medieval period or later, particularly in areas of poor-quality land such as bog and mountain, the boundaries in the areas of better land were almost certainly defined at an early date. The townland names and boundaries were standardised across the country in the 19th century when the Ordnance Survey began to produce large-scale maps of the country. The townland boundaries recorded by the Ordnance Survey, therefore, may well be aligned on older land divisions dating to early historic times and may physically overlie archaeological evidence for such early forms of land division.

No other features of cultural or industrial heritage interest were identified during the assessment, either within or in proximity to the proposed development site.

15.3.10 Architectural Heritage

15.3.10.1 General

The study area forms part of the northern urban fringe of the city. It is a landscape that is, in places, still somewhat rural in character (as for example in the fields surrounding the quarry). Land use varies extensively from arable cultivation, residential and industrial development, particularly in the area south of the quarry. These processes have created a modern agricultural, residential and industrial landscape.

The landscape of north County Dublin has a rich and varied heritage of historic buildings ranging from estate houses to more modest vernacular architecture. The area is noted for its tillage and relative prosperity and stability throughout historic times. There are many rural buildings in the county that have served varied purposes—domestic, agricultural, educational, religious and industrial. In particular, the expansions of agriculture and population in the late 18th and early 19th centuries led to the construction of the familiar 'cottage' in farmyards along roadsides throughout the countryside (McCullough & Mulvin 1987). The rural countryside is also full of secondary buildings or structures that would have been necessary and important for the daily workings of rural life. They include bridges, mills, schoolhouses, dispensaries, railway stations, creameries and forges or smithy's, typically of 18th and 19th century date. There are no surviving vernacular structures near the study area. Bay House, which was probably the house of a prosperous farmer, does not survive.

Stone manor houses, or what became known in Ireland as the 'big house', were generally constructed by planter families in north County Dublin (as elsewhere in the country) roughly between the years 1670 and 1850, and they are often found near to or on the sites of older ruined castles or tower houses, churches or defunct administrative centres. Many are now in ruins; in many other cases, demesne woodland remains as a vestigial element in landscapes where all trace of the original house, its gate lodges and follies have vanished.

Large estates or demesnes, which took advantage of the good agricultural land in the area are a later feature of the Dublin landscape, and some of the houses associated with them remain. Some archaeological remains were incorporated as landscape features while many others were levelled for land improvements. One such example in the surrounding area is Hollywoodrath House, which was built c. 1810, just over 1km northwest of the proposed development site (NIAH Ref. 11347001; RPS 665). It sat at the heart of a demesne that incorporated designed landscape features such as a pond with an island, a summer house, walkways, parkland and specimen trees. The associated gate lodge also survives, c. 1.3km west (NIAH Ref. 11347003). Much of the former estate has been given over to modern housing and forms part of a golf course.

15.3.10.2 Record of Protected Structures

There are no protected structures located within the proposed development site or within a c. 1km radius of it.

15.3.10.3 National Inventory of Architectural Heritage (NIAH)

There are no NIAH sites located within the proposed development site or within a c. 1km radius of it.

15.4 CHARACTERISTICS OF THE PROPOSED DEVELOPMENT

GLV Bay Lane Limited has identified a shortage in available soil and stone treatment capacity in the Dublin market to support its business. GLV Bay Lane Limited therefore wishes to secure soil and stone treatment capacity to support its business needs. GLV Bay Lane Limited purchased Bay Lane Quarry during 2018. Its intention is to restore the facility during its use as a soil and stone recovery facility.

The fill material will be clean soil and stone. The volume of fill required is approximately c.740,000m^3, (712,129 m^3 usable void plus 27,918 m^3 soil covering) with an anticipated 30-month life cycle. A 30-month fill rate would require an average of 1,121 return vehicle movements/month. There is an overburden stockpile (116,834m^3) on the northeast perimeter. This material was removed from the 'pit' area of the quarry prior to quarrying and moved to the current stockpile area. This material will be replaced back into the pit as part of the soil recovery works.

A cover layer of soil will be placed to facilitate revegetation.

Infrastructure required on site includes a weighbridge (existing), weighbridge and records office, Facility Manager offices, staff changing facilities, canteen / welfare facilities for personnel, car parking places, hardstand for site loader / dozer with appropriate drainage, refuelling tank, and designated quarantine area.

15.5 POTENTIAL IMPACT OF THE PROPOSED DEVELOPMENT

15.5.1 Filling Phase

The existing quarry is located within an area of high archaeological potential. This has been proven by the archaeological investigations undertaken in its vicinity and in the surrounding area, which have yielded significant evidence for human activity since the Neolithic period and especially during the Bronze Age. While this potential has been negated in much of the site, through active quarrying, the north-eastern section of the site appears to have remained intact beneath the stock-piling. This was formerly a green field under pasture and is likely to have been ploughed in the past, as much of the townland is noted as being under crop in the 17th century.

Greenfield areas are considered to have an inherent archaeological potential, with agricultural practices tending to obscure surviving subsurface archaeology (e.g. where ploughing activity has removed surface traces of a monument). The presence of streams along the site boundaries, tributaries of the Ward river, is also of interest. Rivers and their environs are a potentially rich source of archaeological material, as both settlement and ritual activity are often associated with rivers. Archaeological sites such as *fulachta fia*, Bronze Age cooking sites, are commonly found close to watercourses.

There is the potential that previously unknown archaeological sites, features or deposits may survive subsurface within the north-eastern part of the site, below the original ground surface which is overlain by stockpile material. This overburden will be removed as part of the proposed development. No development is proposed within this part of the site.

No potential impacts were identified in relation to cultural, industrial or architectural heritage. The proposed site boundary follows that of the existing Bay Lane Quarry lands; the townland boundaries forming the northern and western boundaries to the site will not be affected by the proposed works.

15.5.2 Post-filling Phase

The post-filling phase of the development will have no impact on the cultural heritage environment of the area, as it is anticipated that any impact to archaeological heritage features would be encountered at the site preparation stage and resolved prior to the post-filling phase.

15.5.3 'Do-nothing' Impact

There would be no opportunity to establish the extent of possible below-ground archaeological remains and there would be no potential to impact on buried archaeological features. The area would remain in its present state.

15.6 REMEDIAL REDUCTIVE MEASURES

15.6.1 Construction (filling) Phase

It is recommended that the removal of overburden in the north-eastern section of the site be monitored by an archaeologist to ensure that there is no disturbance below the original ground level.

The monitoring should be carried out by a qualified archaeologist, under licence to the Department of Culture, Heritage and the Gaeltacht (DCHG). This will ensure that the original ground surface is not breached, thus safeguarding any potential archaeological sites that may survive below ground.

This proposed strategy will be subject to consultation with and approval from the adjudicating authority. This suggested strategy does not prejudice the recommendations made by the National Monuments Service of the DCHG and Fingal County Council.

The attention of the developer is also drawn to National Monuments Legislation (1930–2004) (see Summary of the Relevant Legislation), which states that in the event of the discovery of archaeological finds or remains, the National Museum of Ireland should be notified immediately. Provision must be made to allow for, and fund any, archaeological work that may be needed if any remains should be noted during ground preparation works or during construction. If the original ground surface is disturbed, and archaeological features are revealed, the area will need to be investigated, allowing no further development to take place until the identified site is fully identified, recorded and excavated or, alternatively, avoided.

For this study we have had regard to the Record of Protected Structures (RPS), the NIAH and the Architectural Heritage Protection Guidelines for Planning Authorities (2004). There are no protected structures or buildings of an architectural heritage merit within or in proximity to the proposed development site. No mitigation measures are required in relation to architectural heritage features.

15.6.2 Post-filling Phase

No remedial or reductive measures are required for the post-filling phase of this development.

15.7 PREDICTED IMPACT OF THE PROPOSED DEVELOPMENT

15.7.1 Filling Phase

The predicted impact is that the proposed development may directly impact upon potential (previously unrecorded) below-ground archaeological remains.

15.7.2 Post-filling Phase

The post-filling phase of the development will have no impact on the cultural heritage environment of the area as it is anticipated that any impact to archaeological heritage features would be encountered at the site preparation stage and resolved prior to the post-filling phase.

15.7.3 Worst Case Impact

Under the worst-case scenario, the site preparation works for the proposed development would have disturbed (and destroyed) previously unknown sub-surface archaeological features, or a large-scale complex. Archaeological monitoring of the proposed works in the north-eastern section of the site will ensure that the original ground surface is not breached.

Attention is drawn to the relevant portions of National Monuments legislation (1930-2004; see Summary of the Relevant Legislation), which describes the responsibility of the site owners to report the finding of archaeological items if any should be discovered during construction works.

15.8 MONITORING

All physical archaeological, architectural and cultural heritage impact issues will be resolved at the pre-construction stage of the development and therefore no potential impacts are envisioned at the operation stage of the development. There will be no requirement for monitoring post-construction.

15.9 REINSTATEMENT

No reinstatement measures will be required.

15.10 REFERENCES

Ball, F.E. 1920. *A History of the County of Dublin*, Vol 6. Dublin: Royal Society of Antiquaries of Ireland.

D'Alton, J. 1838. *The history of the county of Dublin*. Dublin: Hodges and Smith.

Egan, M. T. 1992. *Memorials of the Dead: Dublin City and County*, Volume 5. Dublin.

Fingal County Council. 2008. *Fingal Historic Graveyards Project.*

Archaeological Consultancy Services Ltd. 2000. *Chapter 16 (Archaeology & Cultural Heritage) of Environmental Impact Statement, Proposed limestone quarry and associated development at Bay Lane, St Margaret's, Co. Dublin*. Frank L. Benson & Partners.

Gywnn, A. & Hadcock, R. 1988. *Medieval Religious Houses: Ireland*, Irish Academic Press

Joyce, P. W. 1994 reprint. *The origin and History of Irish Names of Places* (Volume III), Edmund Burke Publishers, Dublin.

Clancy, P. and McLoughlin, G. 2015. *Archaeological Impact Assessment, Goddamendy and Bay Lands, Co. Dublin, Licence No. 15E0267*. Unpublished report, Courtney Deery Heritage Consultancy.

Lewis, S. 1837. *A Topographical Dictionary of Ireland.* London: S. Lewis & Co.

MacCotter, P. 2008. *Medieval Ireland: Territorial, Political and Economic Divisions*. Dublin: Four Courts Press.

Ó Cróinín, D. 1995. *Early Medieval Ireland 400-1200*. Longman Publications: London & New York.

O'Donovan, E., Rice, K. and la Piscopia, P. 2017. 'Rediscovering a lost archaeological landscape', in *Archaeology Ireland* **31** (**2**), 26-30.

O'Hara, R. (2008) *Excavation Bay 1, Co. Dublin E3917* Excavations Bulletin 2008:370

O'Hara, R. (2008) *Excavation Bay 2, Co. Dublin E3918* Excavations Bulletin 2008:371

O'Hara, R. 2008. *Excavation Bay 3, Co. Dublin E3919* Excavations Bulletin 2008:372

O'Hara, R. 2008. *Archaeological testing, 07E1147 Tyrrellstown to Cherryhound Interchange*, Bay / Cherryhound / Cloghran / Cruiserath / Goddamendy / Hollywoodrath / Killamonan, Co. Dublin Excavations Bulletin 2008:369

Ronan, M.V. 1940. 'Mulhuddard and Cloghran-Hiddert', in *Journal of the Royal Society of Antiquaries* Vol.10, No.4, pp. 182-193.
Simington, R. C. 1945. *The Civil Survey A.D. 1654-1656, Vol. VII, County of Dublin*. Dublin: The Stationery Company.

15.11 SUMMARY OF THE RELEVANT LEGISLATION

National Monuments Legislation

All archaeological sites have the full protection of the national monument's legislation (Principal Act 1930; Amendments 1954, 1987 and 1994).

In the 1987 Amendment of Section 2 of the Principal Act (1930), the definition of a national monument is specified as:

> any artificial or partly artificial building, structure or erection or group of such buildings, structures or erections,
>
> any artificial cave, stone or natural product, whether forming part of the ground, that has been artificially carved, sculptured or worked upon or which (where it does not form part of the place where it is) appears to have been purposely put or arranged in position,
>
> any, or any part of any, prehistoric or ancient
>
> (i) tomb, grave or burial deposit, or
>
> (ii) ritual, industrial or habitation site,
>
> and
>
> any place comprising the remains or traces of any such building, structure or erection, any cave, stone or natural product or any such tomb, grave, burial deposit or ritual, industrial or habitation site...

Under Section 14 of the Principal Act (1930):

> 'It shall be unlawful...
>
> to demolish or remove wholly or in part or to disfigure, deface, alter, or in any manner injure or interfere with any such national monument without or otherwise than in accordance with the consent hereinafter mentioned (a licence issued by the Office of Public Works National Monuments Branch),

or

> to excavate, dig, plough or otherwise disturb the ground within, around, or in the proximity to any such national monument without or otherwise than in accordance…

Under Amendment to Section 23 of the Principal Act (1930),

> 'A person who finds an archaeological object shall, within four days after the finding, make a report of it to a member of the Garda Síochána...or the Director of the National Museum...'

The latter is of relevance to any finds made during a watching brief.

In the 1994 Amendment of Section 12 of the Principal Act (1930), all the sites and 'places' recorded by the Sites and Monuments Record of the Office of Public Works are provided with a new status in law. This new status provides a level of protection to the listed sites that is equivalent to that accorded to 'registered' sites (Section 8(1), National Monuments Amendment Act 1954) as follows:

> The Commissioners shall establish and maintain a record of monuments and places where they believe there are monuments and the record shall be comprised of a list of monuments and such places and a map or maps showing each monument and such place in respect of each county in the State.

> The Commissioners shall cause to be exhibited in a prescribed manner in each county the list and map or maps of the county drawn up and publish in a prescribed manner information about when and where the lists and maps may be consulted.

> In addition, when the owner or occupier (not being the Commissioners) of a monument or place which has been recorded, or any person proposes to carry out, or to cause or permit the carrying out of, any work at or in relation to such monument or place, he shall give notice in writing of his proposal to carry out the work to the Commissioners and shall not, except in the case of urgent necessity and with the consent of the Commissioners, commence the work for a period of two months after having given the notice.

The National Monuments Amendment Act 2004

The National Monuments Amendment Act enacted in 2004 provides clarification in relation to the division of responsibilities between the Minister of Environment, Heritage and Local Government, Finance and Arts, Sports and Tourism together with the Commissioners of Public Works. The Minister of Environment, Heritage and Local Government will issue directions relating to archaeological works and will be advised by the National Monuments Section and the National Museum of Ireland. The Act gives discretion to the Minister of Environment, Heritage and Local Government to grant consent or issue directions in relation to road developments (Section 49 and 51) approved by An Bord Pleanála and/or in relation to the discovery of National Monuments

14A. (1) The consent of the Minister under section 14 of this Act and any further consent or licence under any other provision of the National Monuments Acts 1930 to 2004 shall not be required where the works involved are connected with an approved road development.

(2) Any works of an archaeological nature that are carried out in respect of an approved road development shall be carried out in accordance with the directions of the Minister, which directions shall be issued following consultation by the minister with the Director of the National Museum of Ireland.

Subsection 14A (4) Where a national monument has been discovered to which subsection (3) of this section relates, then

(a) the road authority carrying out the road development shall report the discovery to the Minister

(b) subject to subsection (7) of this section, and pending any directions by the minister under paragraph (d) of this subsection, no works which would interfere with the monument shall be carried out, except works urgently required to secure its preservation carried out in accordance with such measures as may be specified by the Minister

The Minister will consult with the Director of the National Museum of Ireland for a period not longer than 14 days before issuing further directions in relation to the national monument.

The Minister will not be restricted to archaeological considerations alone, but will also consider the wider public interest.

Planning and Development Act, 2000

Structures of architectural, cultural, scientific, historical or archaeological interest can also be protected under the Planning and Development Act, 2000.

This act provides for the inclusion of protected structures into the planning authorities' development plans and sets out statutory regulations regarding works affecting such structures. Under the new legislation, no distinction is made between buildings formerly classified under development plans as List 1 and List 2. Such buildings are now all regarded as 'protected structures'.

The act defines a 'protected structure' as follows:

(a) a structure, or

(b) a specified part of a structure,

which is included in a record of protected structures, and, where that record so indicates, includes any specified feature which is within the attendant grounds of the structure and which would not otherwise be included in this definition.

'Protection', in relation to a structure or part of a structure, includes conservation, preservation, and improvement compatible with maintaining the character and interest of the structure or part;

Part IV of the act deals with architectural heritage, and Section 57 deals specifically with works affecting the character of protected structures or proposed protected structures.

> …the carrying out of works to a protected structure, or a proposed protected structure, shall be exempted development only if those works would not materially affect the character of—
>
> (a) the structure, or
>
> (b) any element of the structure which contributes to its special architectural, historical, archaeological, artistic, cultural, scientific, social or technical interest.

Section 58, subsection 4 states that:

Any person who, without lawful authority, causes damage to a protected structure or a proposed protected structure shall be guilty of an offence.

15.12 GLOSSARY OF IMPACT ASESSMENT

Significance Criteria (NRA Guidelines 2006)

The significance criteria can be used to evaluate the significance of an archaeological site, monument or complex. It should not, however, be regarded as definitive, rather it is an indicator which contributes to a wider judgment based on the individual circumstances of a feature. Different archaeological heritage asset types lend themselves more easily to assessment and it should be borne in mind that this can create a bias in the record, for example an upstanding stone monument such as a fortified house is easier to examine with a view to significance than a degraded enclosure site.

Significance Criteria, NRA Guidelines 2006 (Archaeological Heritage)

Criteria	Explanation
Existing Status	The level of protection associated with an archaeological site / monument is an important consideration.
Condition /Preservation	The survival of a monument's archaeological potential both above and below ground is an important consideration and should be assessed in relation to its present condition and surviving features. Well-preserved sites should be highlighted, this assessment can only be based on a field inspection.
Documentation /Historical Significance	The significance of a monument may be enhanced by the existence of records of previous investigations or contemporary documentation supported by written evidence or historic maps. Sites with a definite historical association or an example of a notable event or person should be highlighted.
Group Value	The value of a single monument may be greatly enhanced by its association with related contemporary monuments or with monuments from different periods indicating an extended time presence in any specific area. In some cases, it may be preferable to protect the complete group, including associated and adjacent land, rather than to protect isolated monuments within that group.
Rarity	The rarity of some monument types can be a central factor affecting response strategies for development, whatever the condition of the individual feature. It is important to recognise sites that have a limited distribution.
Visibility in the Landscape	Monuments that are highly visible in the landscape have a heightened physical presence. The inter-visibility between monuments may also be explored in this category.
Fragility/ Vulnerability	It is important to assess the level of threat to archaeological monuments from erosion, natural degradation, agricultural activity, land clearance, neglect, careless treatment or

	development. The nature of the archaeological evidence cannot always be specified precisely but it may still be possible to document reasons to justify the significance of the feature. This category relates to the probability of monuments producing material of archaeological significance because of future investigative work.
Amenity Value	Regard should be taken of the existing and potential amenity value of a monument.

Determining Significance of Architectural Heritage Assets

The significance of perceived impact on structures and sites of architectural merit is determined by a combination of the architectural heritage importance of the structure and the degree of impact. In each case the structure is given a rating as to its importance and, if higher than "Record only", the nature of its special interest is given. The rating definitions are in accordance with those given by the National Inventory of Architectural Heritage (NIAH):

- *International:* Structures or sites of sufficient architectural heritage importance to be considered in an international context. Examples include St Fin Barre's Cathedral, Cork. These are exceptional structures that can be compared to and contrasted with the finest architectural heritage in other countries.
- *National:* Structures or sites that make a significant contribution to the architectural heritage of Ireland. These are structures and sites that are considered to be of great architectural heritage significance in an Irish context. Examples include Ardnacrusha Power Station, Co. Clare; the Ford Factory, Cork; Carroll's Factory, Dundalk; Lismore Castle, Co. Waterford; Sligo Courthouse, Sligo; and Emo Court, Co. Laois.
- *Regional:* Structures or sites that make a significant contribution to the architectural heritage within their region or area. They also stand in comparison with similar structures or sites in other regions or areas within Ireland. Examples would include many Georgian terraces; Nenagh Courthouse, Co. Tipperary; or the Bailey Lighthouse, Howth. Increasingly, structures that need to be protected include structures or sites that make a significant contribution to the architectural heritage within their own locality. Examples of these would include modest terraces and timber shop fronts.
- *Local:* These are structures or sites of some vintage that contribute to the architectural heritage but may not merit being placed in the RPS separately. Such structures may have lost much of their original fabric.
- *Record only:* These are structures or sites that are not deemed to have enough presence or inherent architectural or other importance at the time of recording to warrant a higher rating. It is acknowledged, however, that they might be considered further at a future time.

Where the rating is deemed to be higher than "Record only" the category of special interest is noted. It should be noted that the term "special architectural interest" applies only in the context of this assessment of architectural heritage and does not imply that those buildings and other structures that are not considered to be of special architectural interest are in any way inferior or are of lower value.

The special interest is based on the categories set down in the Planning and Development Act, 2000. While that Act gives no criteria for assigning a special interest to a structure, the National Inventory of Architectural Heritage (NIAH) offers guidelines to its field-workers. This offers guidance by example rather than by definition, and is the system adopted for the present assessment. There are eight categories set down in the Act, viz. archaeological, architectural, historical, technical, cultural, scientific, social and artistic, and the NIAH guidance for each is as follows:

Archaeological

It is to be noted that the NIAH is biased towards post-1700 structures. Structures that have archaeological features may be recorded, providing the archaeological features are incorporated within post-1700 elements. Industrial fabric is considered to have technical significance and should only be attributed archaeological significance if the structure has pre-1700 features.

Architectural

A structure may be considered of special architectural interest under the following criteria: -

- An aspiration of aesthetic appeal to its design.
- Good quality or well executed architectural design
- The work of a known and distinguished architect, engineer, designer, craftsman
- Modest or vernacular structures may be considered to be of architectural interest, as they are part of the history of the built heritage of Ireland.
- Well-designed decorative features, externally and/or internally.

Historical

A structure may be considered of special historical interest under the following criteria:

- A significant historical event associated with the structure
- An association with a significant historical figure
- Has a known interesting and/or unusual change of use, e.g. a former workhouse now in use as a hotel
- A memorial to a historical event.

Technical

A structure may be considered of special technical interest under the following criteria:

- Incorporates building materials of interest, i.e. the materials or the technology used for construction
- Incorporates innovative engineering design, e.g. bridges, canals or mill weirs
- A structure which has an architectural interest may also merit a technical interest due to the structural techniques used in its construction, e.g. a curvilinear glasshouse, early use of concrete, cast-iron prefabrication.
- Mechanical fixtures relating to a structure may be considered of technical significance.

Cultural

A structure may be considered of special cultural interest where there is an association with a known fictitious character or event, e.g., Sandycove Martello Tower which featured in Ulysses.

Scientific

A structure may be considered of special scientific interest where it is considered to be an extraordinary or pioneering scientific or technical achievement in the Irish context, e.g., Mizen Head Bridge, Birr Telescope.

Social

A structure may be considered of special social interest under the following criteria:

- A focal point of spiritual, political, national or other cultural sentiment to a group of people, e.g. a place of worship, a meeting point, assembly rooms.
- Developed or constructed by a community or organisation, e.g. the construction of the railways or the building of a church through the patronage of the local community
- Illustrates a particular lifestyle, philosophy, or social condition of the past, e.g. the hierarchical accommodation in a country house, philanthropic housing, vernacular structures.

Artistic
A structure may be considered of special artistic interest under the following criteria:

- Work of a skilled craftsman or artist, e.g. plasterwork, wrought-iron work, carved elements or details, stained glass, stations of the cross.
- Well-designed mass-produced structures or elements may also be considered of artistic interest.
- In the evaluation of the special interest of a structure it is possible for the structure to have a special interest under more than one of the above categories.

Assessment of Material Assets, as Defined by the EPA (2002)

Context	Describe the location and extent of the asset. Does it extend beyond the site boundary?
Character	Describe the nature and use of the asset. It is exploited, used or accessible? Is it renewable or non-renewable and if so over what period?
Significance	Describe the significance of the asset. Is the material asset unique, scarce or common in the region? Is its use controlled by known plans, priorities or policies? What trends are evident or may reasonably be inferred?
Sensitivity	Describe the changes in the existing environment which could limit the access to, or the use of, the material asset.

Glossary of Impacts as defined by the NRA Guidelines 2006, with reference to the EPA (2002 & 2015)

Impacts are generally categorised as either being a direct impact, an indirect impact or as having no predicted impact. A glossary of impacts as defined by the EPA are as follows: -

- A **direct impact** occurs when a cultural heritage asset is located within the proposed development area and entails the removal of part, or the entire asset.

- **Indirect impacts** may be caused due to the proximity of a development to a cultural heritage asset. Mitigation strategies and knowledge of detail design can often ameliorate any adverse indirect impact. Indirect impacts may include severance of linked features, degradation of setting and amenity or provide a visual intrusion.

- **No predicted** impact occurs when the proposed development does not adversely or positively affect a cultural heritage asset.

The impacts of the proposed scheme on the cultural heritage environment are first assessed in terms of their quality i.e. positive, negative, neutral (or direct and indirect):

Negative Impact A change that will detract from or permanently remove a cultural heritage asset from the landscape.

Neutral Impact A change that does not affect the cultural heritage asset.

Positive Impact A change that improves or enhances the setting of a cultural heritage asset.

Duration of Impacts:

Temporary Impact	Impact lasting for one year or less.
Short-term Impacts	Impact lasting one to seven years.
Medium-term Impact	Impact lasting seven to fifteen years.
Long-term Impact	Impact lasting fifteen to sixty years.
Permanent Impact	Impact lasting over sixty years.

Types of Impacts:

Cumulative Impact	The addition of many small impacts to create one larger, more significant, impact.
Do Nothing Impact	The environment as it would be in the future should no development of any kind be carried out.
Indeterminable Impact	When the full consequences of a change in the environment cannot be described.
Irreversible Impact	When the character, distinctiveness, diversity or reproductive capacity of an environment is permanently lost.
Residual Impact	The degree of environmental change that will occur after the proposed mitigation measures have taken effect.
'Worst case' Impact	The impacts arising from a development in the case where mitigation measures substantially fail.

Magnitude of Impact

- *Extent* – size, scale and spatial distributions of the effect
- *Duration* – period of time over which the effect will occur
- *Frequency* – how often the effect will occur
- *Context* – how will the extent, duration and frequency contrast with the accepted baseline conditions.

Magnitude Criteria

Magnitude of Impact	Criteria
Very High	Applies where mitigation would be unlikely to remove adverse effects. Reserved for adverse, negative effects only. These effects arise where a cultural heritage asset is completely and irreversibly destroyed by a proposed development.

Magnitude of Impact	Criteria
High	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 cultural heritage asset would be permanently impacted upon leading to a loss of character, integrity and data about the archaeological / cultural heritage feature/site.
Medium	A moderate direct impact arises where a change to the site is proposed which though noticeable is not such that the archaeological / cultural heritage integrity of the site is compromised, and which is reversible. This arises where an archaeological / cultural heritage feature can be incorporated into a modern-day development without damage and that all procedures used to facilitate this are reversible.
Low	An impact which causes changes in the character of the environment which are not significant or profound and do not directly impact or affect an archaeological / cultural heritage feature, site or monument.
Negligible	An impact capable of measurement but without noticeable consequences.
No change	No change to the asset or setting

Sensitivity Criteria

An evaluation of the sensitivity / value of sites and features is based on the extent to which assets contribute to the archaeological or built heritage character, though their individual or group qualities, either directly or potentially and guided by legislation, national policies, acknowledged standards, designations and criteria. The table below presents the scale of sensitivity / value together with criteria.

Sensitivity Criteria

Sensitivity / Value	Criteria
Very High	Sites of international significance: World Heritage Sites National Monuments Protected Structures of international and national importance Designed landscapes and gardens of national importance Assets of acknowledged international importance or that can contribute significantly to international and national research objectives
High	RMP / SMR sites Designated assets that contribute to regional research objectives Protected Structures of regional importance Architectural Conservation Areas
Medium	Recently / newly identified archaeological sites (not yet included on the SMR / RMP; the importance of the resource has yet to be fully ascertained) Undesignated assets that contribute to regional research objectives NIAH Building Survey and Garden Survey Sites
Low	Undesignated Sites of local importance (e.g. townland / field boundaries) Assets compromised by poor preservation and/or poor survival of contextual associations Assets of limited value but with the potential to contribute to local research objectives (e.g. potential buried foundations associated with features / structures shown the 1st edition OS six-inch mapping)

Sensitivity / Value	Criteria
	Historic townscapes or built up areas of limited historic integrity in their building or their settings
Negligible	Assets with very little or no surviving archaeological interest. Buildings of no architectural or historic note
Unknown	The nature of the resource has yet to be fully ascertained, e.g. sites or areas of specific archaeological potential, greenfield areas or riverine / stream / coastal environs with inherent archaeological potential. Structures with potential historic significance (possibly hidden or inaccessible).

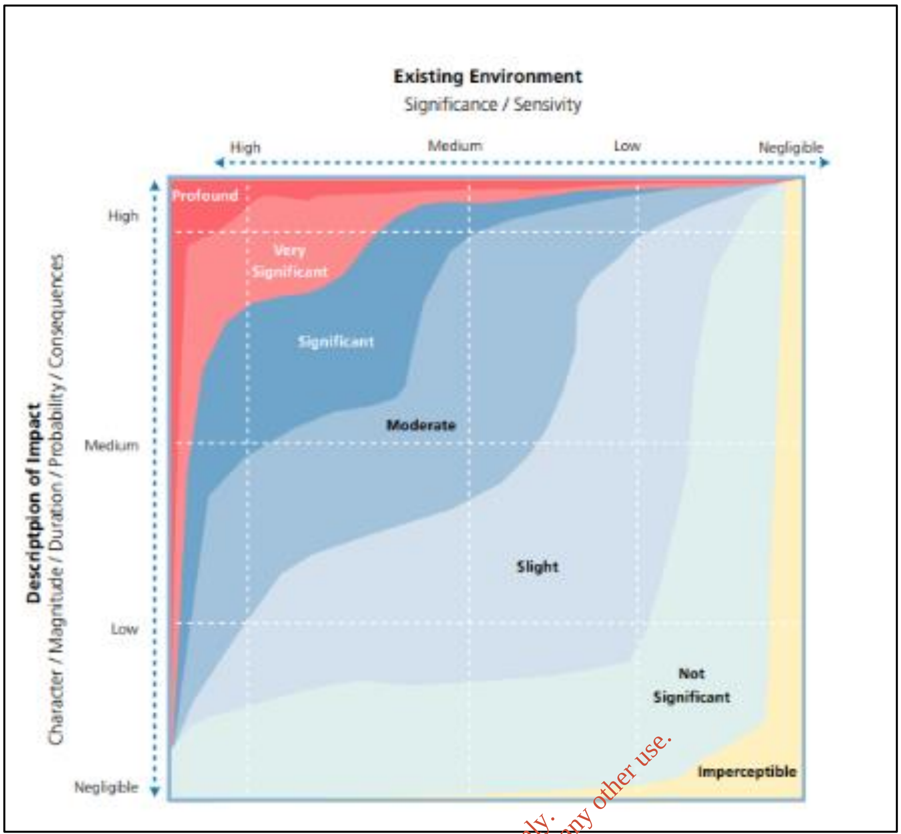
Criteria for Assessment of Impact Significance

Using both the sensitivity of the heritage asset and the magnitude of impact, the impact significance is established (see second table below).

The Draft EPA Revised Guidelines on Information to be contained within an EIS (September 2015) has also added the following levels of significance of effect (as per figure below):

Significance of Effects (EPA draft 2015)

Significance of Effect	Description
Very Significant	An impact which by its character, magnitude, duration or intensity significantly alters the majority of a sensitive aspect of the environment, for example in this case a monument
Not Significant	An effect which causes noticeable changes in the character of the environment but without noticeable consequences.



Source: Draft EPA Revised Guidelines on Information to be contained within an EIS (September 2015), p.43

Impact Significance Matrix

Impact Significance					
Magnitude Impact (+/-)	**Sensitivity / Value of Cultural Heritage asset**				
Neutral	Very Low	Low	Medium	High	Very High
Very Low	Imperceptible	Not significant	Slight	Slight	Slight
Low	Imperceptible	Slight	Moderate	Moderate	Moderate
Medium	Slight	Moderate	Moderate	Significant	Significant
High	Slight	Moderate	Significant	Significant	Profound
Very High	Slight	Moderate	Significant	Very Significant	Profound

16 LANDSCAPE & VISUAL

16.1 INTRODUCTION

RPS was commissioned by GLV Bay Lane Limited to undertake a Landscape and Visual Impact Assessment (LVIA) for a proposed soil recovery facility on land formerly used as a quarry (Bay Lane Quarry) approximately 0.7km south-west of Exit 2 of the M2 motorway (refer Appendix 16 Figure 1.1). This report assesses the potential landscape and visual impact of the proposed development on the landscape and visual resources of the area. This LVIA report seeks to:

Establish the baseline conditions

Record and analyse the existing character, quality and sensitivity of the landscape and visual resource. This should include elements of the landscape such as;

- Landform;
- Land cover including the vegetation, the slopes, drainage, etc.;
- Landscape character;
- Current landscape designations and planning policies; and
- Site visibility, comprising short, medium and long-distance views.

Analyse baseline conditions

Comment on the scale, character, condition and the importance of the baseline landscape, its sensitivity to change and the enhancement potential where possible. A visual analysis (illustrated by photographic material) describing characteristics which may be of relevance to the impact of the design and to the method of mitigation.

Describe the development

Provide a description of the characteristics of the proposed development that are relevant to the landscape & visual impact assessment.

Identify the Impacts of the development on Landscape and Visual Resource

Identify the landscape and visual impacts of the proposed change to permitted operations at different stages of its life cycle, including:

- Direct & indirect landscape impacts of the proposed development on the landscape of the site and the surrounding area; and
- Visual impacts including: the extent of potential visibility; the view and viewers affected; the degree of visual intrusion; the distance of views; and resultant impacts upon the character and quality of views.

Assess the significance of impacts

Assess the significance of the landscape and visual impacts in terms of the sensitivity of the landscape and visual resource, including the nature and magnitude of the impact.

Propose mitigation

Detail measures proposed to mitigate significant residual detrimental landscape and visual impacts and assess their effectiveness.

Assess acceptability

Assess the ability of the landscape and visual resource to absorb the proposed development.

16.2 ASSESSMENT METHODOLOGY

16.2.1 General Approach

The methodology for the LVIA has been derived from Guidelines for Landscape and Visual Impact Assessment, Third Edition (The Landscape Institute and Institute of Environmental Management & Assessment, 2013) (GLVIA3).

The landscape has been appraised to allow it to be described and classified into landscape character areas that in turn enable the classification of landscape quality. The capacity of the landscape to accept change of the type proposed is assessed by determining the sensitivity of each landscape character area. Overall key landscape components are normally landform, vegetation and historical and cultural components. Landform relates to topography, drainage characteristics and geology. Historical and cultural components include historic landscapes, listed buildings, conservation areas and historic designed landscapes. Vegetation plays an important role in how the landscape and visual resources of an area are viewed and is an integral component of a landscape character.

Assessment has been undertaken through analysis of:

- Up to date digital copies of Ordnance Survey Ireland maps;
- Aerial photography;
- Fingal County Council Landscape Character Assessment;
- Fingal County Development Plan 2017 – 2023;
- Cherryhound Local Area Plan;
- The National Inventory of Architectural Heritage (NIAH) of the Department of Arts; and
- Detailed description and drawings of the proposed development.

Site visits were undertaken to assess the existing environment, to establish the existing visual resource and to identify sensitive receptors, i.e. residential properties, scenic viewpoints. The site visit was also used to establish the perceived extent of landscape and visual impacts that may be associated with the proposed development.

The proposed development is then applied to this landscape and visual baseline and potential impacts predicted.

16.2.2 Identifying Effects

Assessing the significance of an effect is a key component of the LVIA and is an evidenced based process combining professional judgments on the nature of a landscape or visual receptor's sensitivity, their susceptibility to change and the value attached to the receptor. It is important to note that judgments in this LVIA are impartial and based on professional experience and opinion informed by best practise guidance.

The effects of the proposed development are of variable duration and are assessed as being either medium-term or long-term, and permanent or reversible. Effects are considered to be long-term during the post remediation phase of the proposed development as land will be returned to agricultural use, whilst other operations and infrastructure such as temporary compounds and stockpiling, apparent only during the operational (void filling) phase are considered to be a medium-term effect.

16.2.3 Assessment Criteria

The objective of the assessment process is to identify and evaluate the predicted significant effects arising from the proposed development. Significance is a function of the:

Sensitivity of the affected landscape and visual receptors; and

Scale or Magnitude of Impact that they will experience.

These definitions recognise that landscapes vary in their capacity to accommodate different forms of development according to the nature of the receiving landscape and the type of change being proposed.

Significance is not graded in bands, and a degree of informed judgement is required. Even with the application of pre-defined criteria, interpretation may differ between individuals, but this allows the process of reaching these conclusions to be transparent.

16.2.4 Landscape Impact Assessment

The LVIA firstly assesses how the proposed development would impact directly on any landscape features and resources. This category of effect relates to specific landscape elements and features (e.g. woods, trees, walls, hedgerows, watercourses) within the site that are components of the landscape that may be physically affected by the proposal. Physical effects are restricted to the area within the site boundary and are the direct effects on the fabric of the site, such as the removal or addition of trees and alteration to ground cover.

The LVIA then considers impacts on landscape character at two levels. Firstly, consideration is given to how the landscape character is affected by the removal or alteration of existing features and the introduction of new features. This is considered to be a direct impact on landscape character. Secondly, the indirect impacts of the proposal on the wider landscape are considered. The assessment of impacts on the wider landscape is discussed using the surrounding character areas identified in the relevant regional landscape character assessments. It is acknowledged there is an overlap between perception of change to landscape character and visual amenity, but it should be remembered that landscape character in its own right is generally derived from the combination and pattern of landscape elements within the view.

The significance of effects on landscape features and character is determined by cross referencing the sensitivity of the feature or landscape character with the magnitude of impact.

Consideration of the sensitivity of the landscape resource against the magnitude of impact caused by the proposal is fundamental to landscape and visual assessment and these two criteria are defined in more detail below.

16.2.5 Landscape Sensitivity

The determination of the sensitivity of the landscape resource is based upon an evaluation of each key element or characteristic of the landscape likely to be affected. The evaluation reflects such factors as its quality, value, contribution to landscape character and the degree to which the particular element or characteristic can be replaced or substituted.

For the purpose of this assessment, landscape quality is categorised as:

Very High: Areas of especially high quality acknowledged through designations such as Areas of Outstanding Natural Beauty (AONB) or other landscape based sensitive areas. These are of landscape significance within the wider region or nationally;

High Quality: Areas that have a very strong positive character with valued and consistent distinctive features that gives the landscape unity, richness and harmony. These are of landscape significance within the district;

Medium Quality: Areas that exhibit positive character but which may have evidence of alteration/degradation or erosion of features resulting in a less distinctive landscape. These may be of some local landscape significance with some positive recognisable structure; and

Low Quality: Areas that are generally negative in character, degraded and/ or in poor condition. No distinctive positive characteristics and with little or no structure. Scope for positive enhancement.

As previously discussed, landscape sensitivity is influenced by several factors including value, condition and the type of change brought about by the proposal. To assist with bringing these factors together the following five-point scale has been used. **Table 16.1** below defines the criteria that have guided the judgement as to the Sensitivity of the Landscape Resource.

Table 16.1: Landscape Sensitivity

Definition		Sensitivity
Landscape resource sensitivity	**Landscape resource value**	
Exceptional landscape quality, no or limited potential for substitution. Key elements / features well known to the wider public. Little or no tolerance to change.	Nationally / internationally designated/ valued landscape, or key elements or features of national / internationally designated landscapes. Little or no tolerance to change	Very High
Strong / distinctive landscape character; absence of landscape detractors. Low tolerance to change.	Regionally / nationally designated / valued countryside and landscape features. Low tolerance to change.	High
Some distinctive landscape characteristics; few landscape detractors. Medium tolerance to change	Locally / regionally designated / valued countryside and landscape features. Medium tolerance to change	Medium
Absence of distinctive landscape characteristics; presence of landscape detractors. High tolerance to change	Undesignated countryside and landscape features. High tolerance to change	Low
Absence of positive landscape characteristics. Significant presence of landscape detractors.	Undesignated countryside and landscape features.	Negligible

High tolerance to change	High tolerance to change	

16.2.6 Magnitude of Landscape Impacts

Direct resource changes on the landscape character in the study area are brought about by the introduction of the proposed development and its impact on the key landscape characteristics. The categories and criteria used are given in **Table 16.2** below.

Table 16.2: Magnitude of Landscape Impact

Definition	Magnitude
Total loss or addition or/ very substantial loss or addition of key elements / features / patterns of the baseline, i.e., pre-development landscape and/ or introduction of dominant, uncharacteristic elements with the attributes of the receiving landscape	Large
Partial loss or addition of or moderate alteration to one or more key elements / features / patterns of the baseline, i.e., pre-development landscape and / or introduction of elements that may be prominent but may not necessarily be substantially uncharacteristic with the attributes of the receiving landscape.	Medium
Minor loss or addition of or alteration to one or more key elements / features / patterns of the baseline, i.e., pre-development landscape and or introduction of elements that may not be uncharacteristic with the surrounding landscape.	Small
Very minor loss or addition of or alteration to one or more key elements / features / patterns of the baseline, i.e., pre-development landscape and/or introduction of elements that are not uncharacteristic with the surrounding landscape approximating to a 'no-change' situation.	Negligible
No loss, alteration or addition to the receiving landscape resource	No change

16.2.7 Visual Impact Assessment

The assessment of effects on views is an assessment of how the introduction of the proposed development will affect views throughout the study area. Assessment of visual effects therefore needs to consider:

Direct impacts of the proposal upon views of the landscape through intrusion or obstruction;

The reaction of viewers who may be affected, e. g. residents, walkers, road users; and

The overall impact on visual amenity.

16.2.8 Viewpoint Selection

Based on a desktop study and site survey, viewpoints were chosen from which the proposed development may, theoretically be visible and which give a representative sample of views of the proposed development within the landscape from different distances and directions.

In total four viewpoints have been selected following site visits and analysis to reflect typical views obtained of the site, using the parameters of distance and direction of view.

Selected viewpoints are considered to meet the following criteria, with locations illustrated on Appendix 16; Figure 1.3;

A balance of viewpoints from where main direction of view is towards the proposed development;

- Selected viewpoints have all been located within the study area associated with the proposed development; and
- Locations of interest e.g. settlements or close residential receptors.

16.2.9 Visual Sensitivity

Visual sensitivity is defined with reference to the landscape sensitivity of the viewpoint location and the view. Other factors affecting visual sensitivity include:

- The location and context of the viewpoint;
- The expectations and occupation or activity of the receptor; and
- The importance of the view.

Although the interpretation of viewers' experience can have preferential and subjective components, there is generally clear public agreement that the visual resources of certain landscapes have high visual quality.

Viewer sensitivity, as set out in **Table 16.3** below, is a combination of the sensitivity of the human receptor (for example resident, commuter, tourist, walker, recreationist or worker, and the numbers of viewers affected) and viewpoint type or location (for example house, workplace, leisure venue, local beauty spot, scenic viewpoint, commuter route, tourist route or walkers' route).

Table 16.3: Viewer Sensitivity

Definition		Sensitivity
Visual resource sensitivity	Visual resource value	
Views of remarkable scenic quality, of and within internationally designated landscapes or key features or elements of nationally designated landscapes that are well known to the wider public. Little or no tolerance to change.	Observers, drawn to a view, including those who have travelled from around Ireland and overseas to experience the views. Little or no tolerance to change.	Very High
Views from residential property. Public rights of way, National Trails, Long distance walking routes and nationally designated countryside/ landscape features with public access. Low tolerance to change.	Observers enjoying the countryside from their homes or pursuing quiet outdoor recreation are more sensitive to visual change. Little tolerance to change.	High
Views from local roads and routes crossing designated countryside / landscape features and 'access land' as well as promoted paths. Medium Tolerance to change.	Observers enjoying the countryside from vehicles on quiet/ promoted routes are moderately sensitive to visual change. Medium tolerance to change.	Medium

Definition		Sensitivity
Visual resource sensitivity	Visual resource value	
Views from work places, main roads and undesignated countryside / landscape features. High tolerance to change.	Observers in vehicles or people involved in frequent or infrequent repeated activities are less sensitive to visual change. High tolerance to change.	Low
Views from within and of undesignated landscapes with significant presence of landscape detractors. High tolerance to change.	Observers in vehicles or people involved in frequent or frequently repeated activities are less sensitive to visual change. High tolerance to change.	Negligible

16.2.10 Magnitude of Visual Impacts

The magnitude of impact on the visual resource results from the scale of change in the view, with respect to the loss or addition of features in the view, and changes in the view composition. Important factors to be considered include: proportion of the view occupied by the proposal, distance and duration of the view. Other vertical features in the landscape and the backdrop to the proposal will all influence resource change. Magnitude of visual impact is defined in **Table 16.4**.

Table 16.4: Magnitude of Visual Impact

Definition	**Magnitude**
Complete or very substantial change in view dominant involving complete or very substantial obstruction of existing view or complete change in character and composition of baseline, e.g., through removal of key elements	Large
Moderate change in view: which may involve partial obstruction of existing view or partial change in character and composition of baseline, i.e., pre-development view through the introduction of new elements or removal of existing elements. Change may be prominent but would not substantially alter scale and character of the surroundings and the wider setting. Composition of the view would alter. View character may be partially changed through the introduction of features which, though uncharacteristic, may not necessarily be visually discordant	Medium
Minor change in baseline, i.e. pre-development view - change would be distinguishable from the surroundings whilst composition and character would be like the pre-change circumstances.	Small
Very slight change in baseline, i.e. pre-development view - change barely distinguishable from the surroundings. Composition and character of view substantially unaltered.	Negligible
No alteration to the existing view	No change

16.2.11 Significance of Effects

The purpose of this LVIA is to determine, in a transparent way, the likely significant landscape and visual effects of the proposal. It is accepted that, due to the nature and scale of the proposed development, the proposal could potentially give rise to some notable visual and landscape effects.

GLVIA3 identifies that 'The Regulations require that a final judgment is made about whether or not each effect is likely to be significant. There are no hard and fast rules about what effects should be deemed 'significant' but LVIAs should always distinguish clearly between what are considered to be significant and non-significant effects'.

Significance can only be defined in relation to each development and its specific location. The relationship between receptors and effects is not typically a linear one. It is for each LVIA to determine how judgements about receptors and effects should be combined to derive significance and to explain how this conclusion has been arrived at.

As a general guide it is considered that the following are likely to be considered effects of the greatest significance:

- Major loss or irreversible negative effects, over and extensive area, on elements and/or aesthetic and perceptual aspects that are key to the character of nationally valued landscapes; or
- Irreversible negative effects on people who are particularly sensitive to changes in view, on recognised and important viewpoints or scenic routes, large-scale change which introduces non-characteristic, discordant or intrusive elements into the view.

The identification of significant effects would not necessarily mean that the effect is unacceptable in planning terms. What is important is that the likely effects on the landscape and visibility are transparently assessed and understood in order that the determining authority can bring a balanced, well-informed judgement to bear when making the planning decision.

The significance of effects on landscape, views and visual amenity are evaluated according to a six-point scale: Substantial Major, Moderate, Minor, Negligible or None.

For those effects indicated as being Moderate to Major the assessor will exercise professional judgement in determining if the effect is considered significant.

For the purposes of this assessment those effects indicated as being of Substantial, Major to Substantial are considered significant as per **Table 16.5**, below. Effects of 'Moderate' and lesser significance have been identified in the assessment but are not considered significant upon the character and quality of the landscape and on views although they remain worthy of consideration throughout the decision-making process.

Table 16.5: Significance of Effect Matrix

Magnitude of impact	Sensitivity				
	Negligible	**Low**	**Medium**	**High**	**Very High**
No Change	None	None	None	None	None
Negligible	Negligible	Negligible to Minor	Negligible to Minor	Minor	Minor
Small	Negligible to Minor	Negligible to Minor	Minor	Minor to Moderate	Moderate to Major
Medium	Negligible to Minor	Minor	Moderate	Moderate to Major	Major to Substantial

Magnitude of impact	Sensitivity				
	Negligible	Low	Medium	High	Very High
Large	Minor	Minor to Moderate	Moderate to Major	Major to Substantial	Substantial

A conclusion that an effect is 'significant' should not be taken to imply that the proposal is unacceptable. Significance of effect needs to be considered with regard to the scale over which it is experienced.

16.2.12 Landscape & Visual Assessment Definitions

The following provides a list of landscape and visual definitions for the terms used within this assessment:

Landscape Capacity: the capacity of a particular type of landscape to absorb change without unacceptable adverse effects on its character;

Landscape Character Area: distinct types of landscape which are generic in character in that they may occur in different parts of the country, but wherever they are they share broadly similar combinations of geology, topography, drainage patterns, vegetation and historical land use and settlement pattern. Landscape character area (LCA) names are generic, for example 'Upland Hills', 'river valley' and 'urban landscape';

Landscape Fabric: is the physical pattern of elements and features such as vegetation, landform and land use that combine to create landscape character. The effects of a development on landscape fabric are those that alter the physical pattern of elements. These effects are restricted to the landscape within which the proposal is located as it is within this area that the physical pattern will alter, for instance through loss of vegetation, re-contouring or changes to land use;

Landscape Quality (or condition): is based on judgements about the physical state of the landscape, and about its intactness, from visual, functional, and ecological perspectives. It also reflects the state of repair of individual features and elements which make up the character in any one place;

Landscape Resource: the combination of elements that contribute to landscape context, character and value;

Landscape Value: the importance attached to a landscape (often as a basis for designation or recognition) that expresses national or local consensus, because of its quality, cultural associations, scenic or aesthetic characteristics;

Sensitivity: vulnerability of a sensitive receptor to change;

Sensitive receptor: physical or natural resource, special interest or viewer group that will experience an impact;

Magnitude: size, extent and duration of an impact;

Visual Amenity: the value of a particular area or view in terms of what is seen;

Visual Character: when a viewer experiences the visual environment, it is not observed as one aspect at a time, but rather as an integrated whole. The viewer's visual understanding of an area is based on the visual character of visible features and aspects and the relationships between them. The visual character is descriptive and not evaluative;

Visual Effect: is a change to an existing view because of development or the loss of particular landscape elements or features already present in the view;

Visual Resources: The visual resources of the landscape are the stimuli upon which actual visual experience is based. They are a combination of visual character and visual quality; and

Visual Quality: Although the interpretation of viewers' experience can have preferential and subjective components, there is generally clear public agreement that the visual resources of certain landscapes have high visual quality. The visual quality of a landscape will reflect the physical state of individual features or elements. Due to the subjective value of the evaluation there is no comprehensive official process for identifying visual quality. The visual quality of this evaluation has been carried out by one Chartered Landscape Architect and verified by another.

16.3 PROPOSED DEVELOPMENT

The proposed development is described in the Project Description Report accompanying the planning application by GLV Bay Lane Limited for the soil and stone recovery facility. The overall purpose of the proposed development is to allow for the backfill of the former quarry to facilitate the full restoration of the site to natural levels for agricultural purposes. After completion of the backfilling the site will be landscaped to allow for the site to be restored for future agricultural use.

16.4 RECEIVING ENVIRONMENT

16.4.1 General Overview

The proposed development site is located approximately 0.7km south-west of Exit 2 of the M2 on the western, fringes of Dublin. The site is a former quarry facility with signs of previous rock working, excavation and crushing evident within the central and southern portions. The north-eastern portion of the site has not been excavated for quarrying purposes and has been used for the storage of overburden material. All boundaries of the proposed development site are well defined by tall hedgerows with mature trees which effectively screen the previous use within the surrounding landscape (refer Appendix 16; Figure 1.1).

The landscape surrounding the proposed development site, primarily agricultural in nature, has become eroded and more fragmented in nature by newer pockets of residential and industrial development, particularly to the south and west of the proposed development site which have easy access to the M2 transport corridor via newly implemented link road. To the south of the proposed development site lies the Northwest Business Park, whilst newer industrial development to the north-east and south-west include Pallas Foods and McArdle Skeath developments. To the west lies Hollystown Golf Club, which is becoming enclosed by residential development to the north associated with Hollywood and to the south by new residential development at Hollywoodrath.

To the immediate north-east of the proposed development site lies the M2 corridor which forms the main transport link between Dublin, to the south and Ashbourne to the north and which runs through the study area in a generally north-south orientation. Other large-scale man-made features include high voltage pylons, which traverse the study area in a north-south orientation, the Halton Concrete facility to the immediate south-west, Huntstown Quarry and Power station to the south-east and electricity sub-station to the south.

16.4.2 Landscape Character Assessment Fingal County Development Plan 2017- 2023

The proposed development site and associated study area are located within the Fingal County Council area, covered by the Fingal County Development Plan 2017 – 2023 (FCDP). As part of the FCDP the Fingal Council has carried out a Landscape Character Assessment, which has identified six Landscape Character Types (LCT) within Fingal County.

A review of the Landscape Character Assessment accompanying the FCDP has identified that the proposed development and accompanying study area is wholly located within the Low-Lying Landscape Type (LLCT).

The FCDP describes the LLCT as follows;

This is an area characterised by a mix of pasture and arable farming on low lying land with few protected views or prospects. The Low Lying Character Type has an open character combined with large field patterns, few tree belts and low roadside hedges. The main settlements located within the area include Oldtown, Ballyboghil and Lusk and parts of Malahide and Donabate. Dublin Airport is located in this area.

This low lying area is dominated by agriculture and a number of settlements. The area is categorised as having a modest value. It contains pockets of important value areas requiring particular attention such as important archaeological monuments and demesnes and also the Feltrim Hill and Santry Demesne proposed Natural Heritage Areas.

The sensitivity of the LLCT is considered by the Development Plan to be of low sensitivity, stating that the LLCT *can absorb a certain amount of development once the scale and forms are kept simple and surrounded by adequate screen boundaries and appropriate landscaping to reduce impact on the rural character of the surrounding roads. The protection of views and riparian corridors from inappropriate development is of paramount importance in these areas.*

Within the FCDP the following Principles for Development have been identified;

- The skyline should be protected.
- Existing tree belts should be retained and managed and older stands of trees restocked. Roadside hedging should be retained and managed. Proposals necessitating the removal of extensive field and roadside hedgerows or trees should not be permitted. Strong planting schemes using native species, to integrate development into these open landscapes, will be required.
- Establish riparian corridors free from new development along all significant watercourses in the County. Ensure a 10 to 15-metre-wide riparian buffer strip measured from top of bank either side of all watercourses, except in respect of the Liffey, Tolka, Pinkeen, Mayne, Sluice, Ward, Broadmeadow, Corduff, Matt and Delvin where a 30m wide riparian buffer strip from top of bank to either side of all watercourses outside urban centres is required.
- Sites with natural boundaries should be chosen, rather than open parts of larger fields.
- Clustering with existing farmhouse and/or farm buildings is generally preferable to standalone locations.

16.4.3 Landscape Objectives Fingal County Development Plan 2017- 2023

A review of the FCDP has established that there are several landscape objectives relating to the study area;

- Objective NH33: Ensure the preservation of the uniqueness of a landscape character type by having regard to the character, value and sensitivity of a landscape when determining a planning application.
- Objective NH34: Ensure development reflects and, where possible, reinforces the distinctiveness and sense of place of the landscape character types, including the retention of important features or characteristics, taking into account the various elements which contribute to their distinctiveness such as geology and landform, habitats, scenic quality, settlement pattern, historic heritage, local vernacular heritage, land-use and tranquillity.

Objective NH35: Resist development such as houses, forestry, masts, extractive operations, landfills, caravan parks and large agricultural/horticulture units which would interfere with the character of highly sensitive areas or with a view or prospect of special amenity value, which it is necessary to preserve.

Objective NH36: Ensure that new development does not impinge in any significant way on the character, integrity and distinctiveness of highly sensitive areas and does not detract from the scenic value of the area. New development in highly sensitive areas shall not be permitted if it:

Causes unacceptable visual harm

Introduces incongruous landscape elements

Causes the disturbance or loss of; (i) landscape elements that contribute to local distinctiveness, (ii) historic elements that contribute significantly to landscape character and quality such as field or road patterns, (iii) vegetation which is a characteristic of that landscape type; and (iv) the visual condition of landscape elements.

Objective NH37: Ensure that new development meets high standards of siting and design.

Objective NH38: Protect skylines and ridgelines from development.

Objective NH39: Require any necessary assessments, including visual impact assessments, to be prepared prior to approving development in highly sensitive areas.

16.4.4 Landscape Designations Fingal County Development Plan 2017- 2023

As mentioned previously the proposed development site lies within the Fingal County Council area, covered by the FCDP. A review has taken place of the FCDP and other relevant statutory documents to establish if there are any relevant landscape related designations that may influence the assessment within the study area.

Highly Sensitive Landscapes

A review of the FCDP has identified that there are no Highly Sensitive Landscapes (HSL) within the Study Area (refer Appendix 16; Figure 1.2).

The closest HSL, Blanchardstown, is approximately 3km south-west of the proposed development site and is considered to experience no significant effect because of the proposed development due to screening provided by topographical changes, intervening built form and vegetation cover.

Historic Landscape Characterisation

The FCDP states that Historic Landscape Characterisation (HLC) is a process involving two stages, beginning with the identification and description of historic landscape character types followed by an assessments phase which may examine management questions, issues of significance and sensitivity. A HLC can therefore ensure that the landscape evolves in a way in which its richness and diversity are sustained. Thirty-eight historic landscape character types have been identified using this approach and all have been verified in the field. Outputs include the GIS based Historic Landscape Characterisation which has been integrated into the Council’s GIS system.

A review of the available information has identified that none of the identified HLC types are contained within or in close proximity to the study area associated with the proposed development and as such are considered to experience no significant effects as a result of the proposed development

Historic Gardens and Designed Landscapes

The National Inventory of Architectural Heritage (NIAH) under the remit of the Department of Arts, Heritage and the Gaeltacht (DoAGH) has prepared a survey of Historic Gardens and Designed landscapes.

A review of the NIAH has identified that the following Historic Garden and Designed Landscape (HGDL) is located within the study area associated with the proposed development;

Hollywoodrath House; approximately 1.2km north-west of the western boundary of the site is described by the NIAH as having main features substantially present, with some loss of integrity.

Views and Prospects

A review of the FCDP has identified that there are a no Protected Views contained within the study area associated with the proposed development.

16.5 POTENTIAL IMPACTS

16.5.1 Staging / Operational (void filling) phase Impacts

As the proposed development consists of a proposal to recover soil an backfill an existing quarry, the staging phase and operational (void filling) phases have been treated as a single phase. During the construction/ operational (void filling) phase, potential impacts include;

Site preparation/enabling works and operations including temporary stockpiles;

Site compound location;

Site infrastructure and access for construction traffic;

Lorry / haulage traffic on local roads;

Vehicular and plant movements including screening machinery and earthwork modifications; and

Ground level views of the site from surrounding areas are restricted by existing boundary vegetation which forms an effective screen to the proposed development site. The location of the majority of works within the existing quarry pit also significantly offsets the visibility of activities on site during the lifetime of the filling operations until finished levels have been achieved.

16.5.1.1 Landscape Impacts - Low Lying Character Type

An assessment of the significance of the impact of the proposed development during the construction/ operational (void filling) phase on the landscape character area described previously has been completed and is summarised below.

The proposed development is directly located within the LLCT, although it is contained within an existing quarry that is a feature of the local landscape near Bay Lane. The proposed development will alter topography within the development site, with the existing stock pile of material in the north-eastern corner being reduced and utilised as fill within the existing quarry footprint. Proposed activities will not directly affect existing established boundary vegetation which will screen activities within the proposed development site.

Staging / operational (void filling) phase traffic movements to and from the proposed development will be locally prominent, however such activities are considered to be broadly like those currently found within the study area due to the presence of the existing concrete works immediately south, the under construction residential development to the west and the large-scale developments to the north-west and south-west.

The LLCT is considered by the FCDP to have a low sensitivity to change.

The predicted magnitude of impact associated with the proposed development is localised and small as internal operations will be largely screened by existing boundary vegetation.

Remaining portions of the LLCT beyond the site boundary are predicted to experience no significant impact during the construction/ operational (void filling) phase due to screening provided by retained boundary vegetation and topography.

Localised negligible to minor, effects are predicted to be experienced during the operational (void filling) phase of the proposed development.

16.5.1.2 Landscape Designation Impacts

Construction/ operational (void filling) phase impacts on relevant designations contained within the FCDP are discussed below.

Highly Sensitive Landscapes

As previously identified, the proposed development site is not located on or in close proximity to land identified as an HSL and as such there are predicted to be no direct or indirect effects upon land designated as an HSL identified in the FCDP.

Historic Landscape Characterisation

As previously identified, the proposed development site is not located on or in close proximity to land identified as an HLC and as such there are predicted to be no direct or indirect effects upon land designated as an HLC identified in the FCDP.

Historic Gardens and Designed Landscapes

As previously identified, the proposed development site is not located on land identified as a Historic Gardens and Designated Landscape within the NIAH and as such there are predicted to be no direct or indirect effects upon this designation.

Table 16.6: Summary of Construction/ Operational (void filling) phase Landscape Impacts

Landscape Character / Designation	Predicted Effect (Without Mitigation)
Low Lying Character Type	Localised negligible to minor, effects are predicted to be experienced during the construction/ operational (void filling) phase of the proposed development.
Highly Sensitive Landscapes	None
Historic Landscape Characterisation	None
Historic Gardens and Designed Landscape	None
Views and Prospects	None

16.5.1.3 Visual impact assessment

A series of 4 representative viewpoints have been selected to illustrate the existing visual context for the proposed development and as an aid to the visual impact assessment (refer Appendix 16; Figure 1.3). All the viewpoints have been located on publicly accessible roads, footways and verges and available views are represented on Appendix 16; Figure 1.4 to Figure 1.7 which should be read in conjunction with the following assessments.

A summary of the following viewpoint assessments in the absence of mitigation is presented in **Table 16.7** below.

Viewpoint 1: View South from M2, Exit 2 off Slip

Viewpoint Description and Sensitivity

This viewpoint is located on the verge adjacent to the off slip at Junction 2 from the M2, approximately 0.4km north of the northern boundary of the proposed development site. The view is considered to be representative of oblique views experienced by road users traveling south on the newly constructed M2 / N3 link road.

The viewer sensitivity is considered to be medium due to the travel speeds.

Existing View

The existing view available from this location (refer Appendix 16 figure 1.4a) is generally open and panoramic in nature, though views of agricultural land at closer distance are partially screened by intervening roadside vegetation within the immediate foreground. Distant horizons are formed by roof lines associated with the built form of the Northwest Business Park, to the south of the proposed development site, though are partially obscured by intervening vegetation. Existing overburden / spoil heap located in the north-eastern corner of the proposed development site is partially visible above intervening vegetation, forming a minor punctuation in the distant horizon. The character of the view has been impacted upon by the new N3/ M2 link road, visible to the right of the view, with street lighting adding verticality within the immediate foreground and at mid-distance. Existing large-scale pylons carrying overhead lines are visible in the view, forming further verticality in the view.

Visual Effects

Ground level construction/ operational (void filling) phase activities associated with the proposed development will not be readily discernible within the view due to screening by intervening boundary vegetation. Temporary staging phase activities, where perceived, will form a localised, long-term, point of interest within the overall available view though it is considered that such activities will not significantly impact on the view. Construction/ operational (void filling) phase activities associated with the removal of the spoil heap, within the central portion of the view, will be form a localised, short-term point of interest within the view, though the removal of the spoil heap will rationalise existing perceived horizon lines and is considered to be a beneficial impact.

Magnitude of Impact:

The magnitude of visual impact during the construction/ operational (void filling) phase of the proposed development is considered to be small as a minor portion of the proposed development site is visible in the available view.

Significance of Effect:

Minor, long-term, beneficial effect during the construction/ operational (void filling) phase of the proposed development as a result of removing the existing stock-pile.

Viewpoint 2: View East from M2 Link Road

Viewpoint Description and Sensitivity

This viewpoint is located adjacent to the roundabout forming new access from the new link road to the west of the proposed development site. The viewpoint is located approximately 0.2km west of the western site boundary of the proposed development site. The view is considered to be representative of views experienced by road users on the new link road and commercial properties within the vicinity.

The viewer sensitivity is considered to be medium.

Existing View

The existing view available from this location (refer Appendix 16; Figure 1.5a) is partially restricted in nature by intervening boundary vegetation, associated with the new link road and roundabout junction. Existing ground level of the proposed development site is not visible in the view due to screening effects of intervening vegetation. The existing overburden / stock-pile is visible at mid-distance within the central portion of the view, forming a visual point of interest. A single large-scale pylon is visible within the central portion of the view, with overhead cables perceived as an elevated horizon above existing landform and vegetation.

Visual Effects:

Ground level construction/ operational (void filling) phase activities associated with the proposed development will not be readily discernible within the view due to screening by intervening boundary vegetation. Temporary staging phase activities, where perceived, will form a localised, medium-term, point of interest within the overall available view though it is considered that such activities will not significantly impact on the view. Construction/ operational (void filling) phase activities associated with the removal of the spoil heap, within the central portion of the view, will be form a localised, short-term point of interest within the view, though the removal of the spoil heap will improve the view and is considered to be a beneficial impact.

Magnitude of Impact:

The magnitude of visual impact during the construction/ operational (void filling) phase of the proposed development is considered to be localised and medium as a result of reducing stock-pile height within the view.

Significance of Effect:

Moderate, long-term, beneficial effect during the construction/ operational (void filling) phase of the proposed development as a result of removing the existing stock-pile.

Viewpoint 3: View North-east from Junction of Bay Lane and M2 Link Road

Viewpoint Description and Sensitivity

This viewpoint is located on the footpath adjacent to the roundabout forming the junction of Bay Lane and the M2 link road. The viewpoint is located approximately 0.2km west of the western site boundary of the proposed development site, in close proximity to the entrance to the Halton Concrete facility. The view is considered to be representative of views experienced by local road users and commercial properties within the vicinity.

The viewer sensitivity is considered to be medium.

Existing View

The existing view available from this location (refer Appendix 16; Figure 1.6a) is restricted in nature by vegetation associated with the western boundary of the proposed development site, visible across a large, central portion of the view at mid-distance. Mild steel railings and timber fencing associated with the link road and roundabout junction are visible at close distance, partially screening land beyond. Street lighting and road signs are visible at a variety of distances within the view and are often perceived above existing tree canopies. Large scale pylons carrying high power lines are visible in the view as minor points of visual interest. The overburden / spoil-heap is screened in views from this location by intervening site boundary vegetation, though the proposed development site is visible within a small portion of the view, beyond the electrical switch cabinet located in the roadside verge on the right of the view.

Visual Effects:

Ground level construction/ operational (void filling) phase activities associated with the proposed development will be partially visible within a small portion of the view available from this location. Such activities will become more apparent as ground levels are increased to match existing adjacent levels, though will only be fully visible as ground levels within the quarry footprint are raised. Temporary staging phase activities, where visible, will form a localised, long-term, point of interest within the overall available view though it is considered that such activities will not significantly impact on the view. Construction/ operational (void filling) phase activities associated with the removal of the spoil heap will be screened by intervening boundary vegetation.

Magnitude of Impact:

The magnitude of visual impact during the staging phase of the proposed development is considered to be localised and small.

Significance of Effect:

Minor, temporary, adverse effect during the construction/ operational (void filling) phase of the proposed development which is considered to be not significant.

Viewpoint 4: View North from Bay Lane

Viewpoint Description and Sensitivity

This viewpoint is located on Bay Lane, approximately 100m east of the eastern site boundary of the proposed development site, in close proximity to a residential property. The view is considered to be representative of views experienced by local road users and residential properties within the vicinity.

The viewer sensitivity is considered to be high.

Existing View

The existing view available from this location (refer Appendix 16; Figure 1.6a) is restricted by roadside vegetation, which prevents views of surrounding agricultural land. Upper canopies of existing trees forming the eastern boundary of the proposed development site are visible above the intervening vegetation and are perceived as an elevated horizon. Upper portions of a large-scale pylon, located within the north-eastern corner of the proposed development site is visible, centre right, in the view.

Visual Effects:

Ground level construction/ operational (void filling) phase activities associated with the proposed development will not be visible in view from this location due to screening effects of intervening vegetation.

Magnitude of Impact:

The magnitude of visual impact during the staging phase of the proposed development is considered to be no change.

Significance of Effect:

The predicted significance of effect during the construction/operational (void filling) phase of the proposed development is none.

Table 16.7: Summary of Construction/ Operational Visual Impact Assessment

Nrs.	Viewpoint Name	Predicted Effect Construction/Operational (void filling) phase (Without Mitigation)
1	View South from M2, Exit 2 off Slip	Minor, beneficial long-term effect during the construction/ operational (void filling) phase of the proposed development as a result of removing the existing stock-pile
2	View East from M2 Link Road	Moderate, beneficial long-term effect during the construction/ operational (void filling) phase of the proposed development as a result of removing the existing stock-pile.
3	View North-east from Junction of Bay Lane and M2 Link Road	Minor, adverse temporary effect during the construction/ operational (void filling) phase of the proposed development which is considered to be not significant
4	View North from Bay Lane	None

16.5.2 Restoration Phase Impacts

The overall purpose of the proposed development is to allow for the backfill of the former quarry to facilitate the full restoration of the site to natural levels for agricultural purposes. After completion of the backfilling the site will be landscaped to allow for the site to be restored for future agricultural use.

16.5.2.1 Landscape Impacts - Low Lying Character Type

The proposed development and associated restoration phase works are wholly located within the LLCT, although largely contained within the existing quarry feature. The restoration stage activities will be locally prominent, will restore existing disturbed areas of landscape and will blend with existing agricultural lands albeit as a modified landscape. The surrounding landscape has the potential to quickly absorb any changes locally. During the restoration works, surface level activities will have a negligible impact at a local level as the remediated site will be hard to discern from within the wider landscape.

The LLCT is considered by the FCDP to have a low sensitivity to change.

The predicted magnitude of impact associated with the restoration phase is localised and negligible as operations will be largely screened by existing boundary vegetation.

Localised negligible to minor, effects are predicted to be experienced during the restoration phase of the proposed development.

16.5.2.2 Landscape Designation Impacts

Restoration phase impacts on relevant designations contained within the FCDP are discussed below.

Highly Sensitive Landscapes

As previously identified, the proposed development site is not located on or in close proximity to land identified as an HSL and as such there are predicted to be no direct or indirect effects upon land designated as an HSL identified in the FCDP.

Historic Landscape Characterisation

As previously identified, the proposed development site is not located on or in close proximity to land identified as an HLC and as such there are predicted to be no direct or indirect effects upon land designated as an HLC identified in the FCDP.

Historic Gardens and Designed Landscapes

As previously identified, the proposed development site is not located on land identified as a Historic Gardens and Designated Landscape within the NIAH and as such there are predicted to be no direct or indirect effects upon this designation.

Views and Prospects

A review of the FCDP has identified that there are a no Protected Views contained within the study area associated with the proposed development.

Table 16.8: Summary of Restoration Phase Landscape Impacts

Landscape Character / Designation	Predicted Effect (Without Mitigation)
Low Lying Character Type	Localised negligible to minor, effects are predicted to be experienced during the restoration phase of the proposed development.
Highly Sensitive Landscapes	None
Historic Landscape Characterisation	None
Historic Gardens and Designed Landscape	None
Views and Prospects	None

16.5.2.3 Visual Impact

A summary of the following viewpoint assessments at restoration phase in the absence of mitigation is presented in **Table 16.9** below.

Viewpoint 1: View South from M2, Exit 2 off Slip

Visual Effects

Ground level restoration phase activities associated with the proposed development will not be readily discernible within the view due to screening by intervening boundary vegetation.

Magnitude of Impact:

The magnitude of visual impact during restoration phase of the proposed development is considered to be negligible.

Significance of Effect:

The predicted significance of effect during the restoration phase of the proposed development is negligible to minor and not significant.

Viewpoint 2: View East from M2 Link Road

Visual Effects:

Ground level restoration phase activities associated with the proposed development will not be readily discernible within the view due to screening by intervening boundary vegetation. Temporary restoration phase activities, where perceived, will form a localised point of interest within the overall available view though it is considered that such activities will not significantly impact on the view.

Magnitude of Impact:

The magnitude of visual impact during restoration phase of the proposed development is considered to be negligible.

Significance of Effect:

The predicted significance of effect during the restoration phase of the proposed development is negligible to minor and not significant.

Viewpoint 3: View North-east from Junction of Bay Lane and M2 Link Road

Visual Effects:

Restoration phase operations associated with the proposed development will be largely screened in this view by intervening boundary vegetation. Temporary restoration phase activities, where perceived, will form a localised point of interest within the overall available view though it is considered that such activities will not significantly impact on the view. HGV's will be noticeable along this road, but such vehicles are already a feature of the view on this road due to the location of the adjacent concrete plant.

Magnitude of Impact:

The magnitude of visual impact during restoration phase of the proposed development is considered to be negligible.

Significance of Effect:

The predicted significance of effect during the restoration phase of the proposed development is negligible to minor and not significant.

Viewpoint 4: View North from Bay Lane

Visual Effects:

Ground level operational / staging phase activities associated with the proposed development will not be visible in view from this location due to screening effects of intervening vegetation.

Magnitude of Impact:

The magnitude of visual impact during the restoration phase of the proposed development is considered to be no change.

Significance of Effect:

The predicted significance of effect during the restoration phase of the proposed development is none.

Table 16.9: Summary of Restoration Phase Visual Impact

Nrs.	Viewpoint Name	Predicted Effect Restoration Phase (Without Mitigation)
1	View South from M2, Exit 2 off Slip	The predicted significance of effect during the restoration phase of the proposed development is negligible to minor and not significant.
2	View East from M2 Link Road	The predicted significance of effect during the restoration phase of the proposed development is negligible to minor and not significant.
3	View North-east from Junction of Bay Lane and M2 Link Road	The predicted significance of effect during the restoration phase of the proposed development is negligible to minor and not significant.
4	View North from Bay Lane	None

16.6 MITIGATION MEASURES

Mitigation measures are those taken to help reduce the impacts arising from any visually intrusive or insensitive elements within the proposed development. These can be undertaken as part of the scheme design or as remedial works undertaken following completion of the proposed development.

16.6.1 Staging/Operational (void filling) phase

A list of objectives in terms of mitigation for visual quality and landscape character shall include the following for the staging stage;

- Temporary storage heaps associated with backfill materials and soil not to exceed 2m height;
- Storage compound areas will be reinstated to former land use upon completion of the works.
- Vehicles exiting compound areas will be subject to wheel wash facilities to maintain clean roads;
- Protection of existing vegetation along all site boundaries. The services of a qualified aboriculturist will be sought to perform a tree survey of all trees along the development site boundary. Existing vegetation, including trees and hedgerows should be assessed to quantify their age, condition and tagged with metal tags. Prior to commencement of construction, existing vegetation which is to be retained will be protected by erection of temporary fencing to ensure no works are carried out under reach of their canopies. Unstable trees should be removed under direction of the aboriculturist;
- Ensuring existing landscape framework remains dominant by cleaning up of debris, protecting or reinforcing existing boundary vegetation; and
- Proposed hedgerow planting with trees to reinforce and amalgamate existing hedgerows to the western boundary of the proposed development site. Proposed tree and hedgerow species shall be comprised of locally appropriate species.

16.6.2 Restoration Phase

The impact of the proposed development should be ameliorated through a landscape restoration plan, prepared in conjunction with the engineering design which would, in time ensure integration of the proposed development into the broader environment (**see Appendix 16; Figure 1.8 - Landscape Restoration Plan**). Given the nature of the proposals, particular mitigation measures shall be incorporated as part of the proposed development. A list of objectives in terms of mitigation for visual quality and landscape character shall include the following for the restoration phase;

- New hedgerow and tree planting to proposed new field boundaries to be defined by post and wire fencing;
- The restoration and reinstatement of the levels and topography within the development site boundary for the purpose of agricultural use; and
- Removal of all site infrastructure and equipment.

16.7 PREDICTED RESIDUAL IMPACTS

16.7.1 Residual Landscape Impacts

This section of the report assesses the impact of the proposed development on the landscape character and visual receptors after the mitigation described above has been fully implemented.

Within the wider landscape the proposal will continue to blend with the existing agricultural landscape around the site with a Moderate to Major beneficial permanent residual landscape impact. The creation of new hedgerows and pastoral fields on the site will restore the quarry site to its former appearance within this landscape.

16.7.1.1 Residual Visual Impacts

With regards to visual impact, beneficial impacts on existing views will occur and the site will appear as a new feature being a restored site for those viewpoints with views in close proximity and overall the visibility of the site will be limited as the restored site blends within the local visual context.

16.8 CONCLUSION

The proposed development site is located approximately 0.7km south-east of Exit 2 of the M2 on the western, fringes of Dublin. The landscape immediately surrounding the proposed development site is primarily agricultural in nature, though has become eroded and more fragmented in nature by pockets of residential and industrial development, particularly to the south and west of the proposed development site.

During the construction/ operational (void filling) phase of the proposed development the predicted magnitude of landscape resource change will be small, and the significance of landscape impact will be localised, negligible to minor and not significant.

During the restoration phase of the proposed development the predicted magnitude of landscape resource change will be negligible, and the significance of landscape impact will be localised, negligible to minor and long term. Such effects are considered to be not significant as the surrounding landscape contains features which quickly absorb the restoration phase operations.

A total of 4 viewpoints, located within close proximity to the proposed development, have been assessed for both construction/ operational (void filling) phase and restoration phase impacts. None of the assessed viewpoints are predicted to experience significant visual impacts. It is considered that the proposed development will remain as a new feature within localised viewpoints in very close proximity but overall the visibility of the site is limited by existing boundary vegetation.

In summary the broader landscape character area and visual context around the proposed development site has the capacity to absorb a development of this scale in landscape and visual terms.

17 INTERACTIONS

17.1 INTRODUCTION

This chapter identifies the interrelationships of impacts as identified throughout the Environmental Impact Assessment Report (EIAR). An impact measure from one environmental topic may indirectly cause a secondary impact on another topic. While direct and indirect impacts have been assessed within the relevant chapters of this EIAR, the overall purpose of this chapter is to highlight the main areas of interrelated impacts identified for the proposed development.

17.2 INTERELATIONSHIP OF IMPACTS

The Draft Advice notes for preparing Environmental Impact Statements (EPA, 2015) state that:

'*All environmental factors are inter-related to some extent. This heading draws attention to significant interaction and interdependencies in the existing environment*'.

This advises of the importance of checking and cross-referencing environmental effects and impacts against all environmental topics. To support this, the Draft Revised Guidelines on the Information to be contained in Environmental Impact Statements (EPA, 2017) advise that:

'*It is general practice to include a matrix to show where interactions between effects on different factors have been addressed*'.

In this regard, a matrix has been provided in **Table 17.1** of this chapter. **Table 17.1** identifies the interactions as identified in this EIAR and illustrates that impacts resulting from one aspect of the environment can have a direct effect on other elements of the environment.

Table 17.1 Interaction of Impacts

	Population	Human Health	Biodiversity	Soil, Geology and Hydrogeology	Water	Air Quality and Climate	Noise and Vibration	Traffic and Transportation	Material Assets	Cultural Heritage	Landscape and Visual Assessment
Population		X						X	X	X	X
Human Health				X	X	X	X	X			
Biodiversity				X	X	X					X
Soil, Geology and Hydrogeology					X						
Water											
Air Quality and Climate								X			
Noise and Vibration								X			
Traffic and Transportation									X		
Material Assets											
Cultural Heritage											
Landscape and Visual Assessment											

Interaction between Population, Human Health, Traffic and Transportation, Material Assets, Cultural Heritage and Landscape and Visual Assessment

The population environmental topic relates to the human population and subsequently and the community. The operational (void filling) phase of the proposed development has potential for a negative cumulative impact on the immediate local environment, business and residents. The topics listed have the potential to impact the population and community.

The local community and their wellbeing may be negatively impacted by the increased vehicular traffic associated with site operations. The increased traffic has the potential to negatively impact material assets and cultural heritage sites by generating dirt and dust and impacting transport infrastructure from HGVs. The proposed traffic volumes are not expected to cause significant/additional disturbance to local communities.

The completion of the proposed development will be a backfilled and restored plot of land that is currently a negative landscape, human health, traffic and material asset impact.

The restoration of the void will result in positive impacts to human health through backfilling a human and livestock hazard and reducing the volume of traffic in the area. The development will improve material assets and landscape, improving social, amenity and tourism assets.

Interaction between Human Health, Soil, Geology and Hydrogeology and Water

Human health can be impacted by soil, geology and hydrogeology and water if mitigation measures are not in place. Water and soil, geology and hydrogeology have direct interactions as water is transferred to groundwater through the soil and underlying geology. The restoration of the site to previous natural levels will have a positive impact to surface water drainage by reducing the vulnerability of the underlying aquifer and reducing run-off to a rate.

Human health interacts with water and hydrogeology as they have the potential to become contaminated and subsequently impact drinking water supply that would result in negative impacts on human health without mitigation.

Interaction between Human Health, Air Quality and Climate, Noise and Vibration and Traffic and Transportation

Large scale developments have the potential to have an interaction between traffic and noise and vibration, as well as traffic and air quality and climate. This is the case for developments which give rise to HGV traffic which emit higher noise and emissions than standard vehicular traffic. This development is reliant on HGV movements to and from the site, over which have such noise and air quality potential implications. The transport of soil and stone material in particular in this case can impart dust and CO_2 emissions which impact air quality and climate. The increased HGV movement and interacting impacts may have negative implications on human health.

The proposed development however will manage and limit the traffic through applying for the continued rate of backfill, the chosen rate of 532,800 tonnes per annum will limit the traffic and associated implications during the proposed 2.5-year timeframe whilst providing long term benefits to the listed topics through restoring the site.

Interaction between Biodiversity, Soil, Geology and Hydrogeology, Water and Air Quality and Climate

Negative environmental impacts to soil, geology and hydrogeology, air quality and climate and water have the potential to result in adverse effects to the areas biodiversity. The varying quality of land, water and air quality may impact on the biodiversity present at the site.

Monitoring and mitigation measures will be put in place to minimise adverse land, water and air quality impacts and will subsequently support existing and future biodiversity.

Interaction between Biodiversity and Landscape and Visual Assessment

Changes to the landscape and subsequent changes to habitats have the potential to impact biodiversity. The proposed development has the potential to disturb existing biodiversity that have nested in the current void with potential for medium term negative impacts.

The proposed restoration of the existing quarry void for future use and to blend the site with the surrounding natural environment will provide suitable habitats and a long-term improved biodiversity through improving the existing landscape.

17.3 REFERENCES

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

RPS Dublin
West Pier Business Campus
Dun Laoghaire