EIA VOLUME 2 - MAIN REPORT

Enva Healthcare Risk Waste Facility
Development at 402 Grants Drive,
Greenogue Business Park, Rathcoole,
Co. Dublin, D24 AP04

April 2024

rpsgroup.com

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
F01	Final	RPS	KF	CMcG	01.12.23

Approval for issue

CMcG	1st December 2023

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Chapters

PREFACE

Enva Ireland Ltd are modifying two buildings at their existing waste facility to provide for the future management of 24,000 tonnes per annum of Health Risk Waste (HRW). HRW management will replace the current bulking up and transfer of hazardous waste and contaminated soils activities which will in future no longer be undertaken at the 402 Grants Drive, Greenogue facility.

Enva Ireland Ltd have appointed RPS to prepare the Environmental Impact Assessment Report (EIAR) to support the planning application for the Proposed Scheme to An Bord Pleanála.

The EIAR is laid out in three volumes, as outlined in the preface at the start of each Volume of the EIAR for clarity. The volumes and titles that make up the full EIAR are:

- **Volume 1: Non-Technical Summary -** This provides a non-technical summary of the information contained in Volumes 2 and 3.
- **Volume 2: Main EIAR -** This provides general information on the Proposed Development and presents the environmental assessments of the Proposed Development on the receiving environment.
- **Volume 3: Technical Appendices -** This volume includes technical detail and raw data referenced in Volume 2.

GLOSSARY

Term	Meaning
Annual Exceedance Probability (AEP)	The percentage Annual Exceedance Probability, or 'AEP' represents the probability of an event of this, or greater, severity occurring in any given year. For example, a 1% AEP flood event has a 1%, or 1 in a 100, chance of occurring or being exceeded in any given year.
Annual Environmental Report (AER)	As part of the EPA's Waste Licence an Annual Environmental Report (AER) is formulated that collates and reports all monitoring data each year. A comparative assessment is made with the data from previous years. This report is also to be submitted to the EPA.
AERMOD Dispersion Model	The model is a steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources.
Aquifer	The EU Water Framework Directive (WFD, 2000/60/EC) defines an aquifer as a: "subsurface layer of … geological strata ..[which allows].. either a significant flow of groundwater or the abstraction of significant quantities of groundwater".
Best Available Techniques (BAT)	This is the most effective technique available to a particular industry sector to achieve a high general level of protection of the environment.
Bio-aerosol	A bio-aerosol is an airborne collection of biological material.
Brief effect	Effects lasting less than a day.
Catchment Flood Risk Assessment Management Study (CFRAMS)	The CFRAM Programme was developed to meet the requirements of the EU Floods Directive and national flood policy and aims to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity.
Cumulative Effects	The addition of many minor or significant effects, including effects of other projects, to create larger, more significant effects.
Decommissioning	The final closing down and putting into a state of safety of a development, project or process when it has come to the end of its useful life.
'Do-Nothing Effects'	The environment as it would be in the future should the subject project not be carried out.
Duration	Defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes (CIEEM, 2018).
Electoral District	An area used by the Central Statistics Office for recording Census data and described as the smallest legally defined administrative areas in the State.
Extent	The spatial or geographical area over which the impact/effect may occur under a suitably representative range of conditions (CIEEM, 2018).
Forb	Sometimes referred to as herbs. Forbs are herbaceous (not woody), broadleaf plants that that is not a graminoid (grass, sedge, or rush).
Fragmentation	A decrease in some or all types of natural habitats, and the dividing of the habitats into smaller and more isolated pieces.
Frequency	The number of times an activity occurs will influence the resulting effect (CIEEM, 2018).
Frequency of Effects	Describes how often the effect will occur.
Greenhouse Gas	Greenhouse gases (also known as GHGs) are gases in the earth's atmosphere that trap heat, they include Carbon dioxide (CO_2) and Methane.
Groundwater Body (GWB)	The Groundwater Body (GWB) is the management unit under the Water Framework Directive (WFD). Groundwater bodies are subdivisions of large geographical areas of aquifers so that they can be effectively managed in order to protect the groundwater and linked surface waters.
Important Ecological Feature	Habitats, species or ecosystem (and their functions/processes) which, either by themselves or in a network, contribute significantly to an ecosystem's productivity, biodiversity, and resilience.

Term	Meaning
Irreversible Effect	An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it (CIEEM, 2018).
Health Risk Waste (HRW)	Health Risk Waste is the solid or liquid waste arising from healthcare and medical activities such as diagnosis, monitoring, treatment, prevention of disease or alleviation of handicap in humans or animals, including related research performed under the supervision of a medical practitioner or veterinary surgeon.
Facility	Enva's hazardous waste transfer/recovery facility within Greenogue Business Park located at 402 Grants Drive, Greenogue Business Park, Rathcoole, Co. Dublin, Eircode D24 AP04.
Industrial Emissions Directive (IED) Licence	The EPA issues Industrial Emissions Directive licences that contain strict conditions including Emission Limit Values (ELVs) on how an activity must operate so as to protect the environment from pollution that might otherwise arise.
Imperceptible	An effect capable of measurement but without significant consequences.
Junction Capacity Assessments	Standardised methods of estimating traffic capacity on links and at junctions.
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
$L_{A10,18hr}$	The A-weighted sound pressure level that is exceeded for 10 % of an 18-hour sample period.
L_{Aeq}	The continuous equivalent A-weighted sound pressure level. An 'average' of the sound pressure level.
$L_{Aeq,30min}$	The continuous equivalent A-weighted sound pressure level measured over a 30-minute sample period.
$L_{Aeq,T}$	The continuous equivalent A-weighted sound pressure level measured over the sample period, where *T* is the duration of this period in units of time.
L_{AF10}	The A-weighted sound pressure level that is exceeded for 10 % of the sample period.
L_{AF90}	The A-weighted sound pressure level that is exceeded for 90 % of the sample period.
L_{AFmax}	The maximum A-weighted sound pressure level measured during the sample period.
$L_{eq,T}$	The continuous equivalent sound pressure level measured over the sample period, where *T* is the duration of this period in units of time.
L_{night}	The night-time A-weighted continuous equivalent noise level, where $_{night}$ is defined as the period between 23:00 and 07:00.
Long-Term Effects	Effects lasting fifteen to sixty years.
Material Assets	According the EPA, Material assets is taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure.
Magnitude	Refers to size, amount, intensity and volume (CIEEM, 2018).
Medium-Term Effects	Effects lasting seven to fifteen years.
Mitigation Measures	Measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
National Road	National primary roads form the major routes between the major urban centre.
National Monument	The National Monuments Act (1930, Section 2) defines a 'National Monument' as 'a monument or the remains of a monument the preservation of which is a matter of national importance by reason of the historical, architectural, traditional, artistic or archaeological interest attaching thereto'.
Negative/Adverse Effect	A change which reduces the quality of the environment (CIEEM, 2018).
Negative Air Pressure	Negative air pressure extraction hoods will capture residual air at various points in the process. This air will be routed through HEPA (High Efficiency Particulate Air) filters to capture pollen, dirt, moisture, bacteria and viruses.

Term	Meaning
Noise Sensitive Location (NSL)	NSL refers to noise and vibration sensitive receptors. NSLs are typically residential premises but can also include schools, places of worship and other noise sensitive locations.
Not Significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Permanent Effects	Effects lasting over sixty years.
$PM_{2.5}$	Particulate Matter (diameter ≤ 2.5 µm).
PM_{10}	Particulate Matter (diameter ≤ 10 µm).
Positive Effect	A change that improves the quality of the environment (CIEEM, 2018).
Ramsar	The Convention on Wetlands of International Importance.
Receptor	Any element in the environment which is subject to impacts.
Recorded Monuments and Places	Archaeology features listed on the Record of Monuments and Places (RMP) maintained by the Department of Housing, Local Government and Heritage (DHLGH). The RMP documents known upstanding archaeological monuments, their original location (in cases of destroyed monuments) and the position of possible sites in rural areas identified as cropmarks on vertical aerial photographs dating to before 1700 AD (with some later ones also being included).
Pathway	The route by which an effect is conveyed between a source and a receptor.
Protected Structures	A protected structure is a structure that is considered to be of ‘special interest’, which is broadly defined by the Planning and Development Act, 2000 as structures of architectural, historical, archaeological, artistic, cultural, scientific, social or technical point interest.
Regional Road	A regional road is a class of road not forming a major route, but nevertheless forming a link in the national route network.
Residual Effects	The final predicted effect / impact remaining after mitigation.
Reversible Effect	A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation (CIEEM, 2018).
River Basin Management Plan 2022 - 2027(RBMP)	The Plan is required under the Water Framework Directive for the period 2022-2027. The Plan sets out the environmental improvements to be delivered during a river basin planning cycle. The plans contain water quality objectives and a programme of measures to achieve those objectives.
Road Network	The existing and proposed public and private roads within the study area.
Seveso	Seveso Sites are defined as Industrial sites that, because of the presence of dangerous substances in sufficient quantities, are regulated under Council Directives 96/82/EC and 2003/105/EC, commonly referred to as the Seveso II Directive.
Sharps	Sharps Directive and Regulations (HSA) - define sharps as ‘objects or instruments necessary for the exercise of specific healthcare activities, which are able to cut, prick or cause injury or infection’. This includes equipment such as needles, blades (such as scalpels) and other sharp medical instruments.
Short-Term Effects	Effects lasting one to seven years.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Strategic Infrastructure Development	Strategic Infrastructure Development can generally be described as development which is of strategic economic or social importance to Ireland, the region or local areas. Since 2007, planning applications for proposed strategic infrastructure development are not submitted to the local planning authority but instead they are submitted to An Bord Pleanála for a decision.
Sustainable Urban Drainage System (SuDS)	Sustainable Urban Drainage System or SuDS is a way of managing rainfall so that it mimics the drainage process found in nature and addresses the issues with conventional drainage.

Term	Meaning
Source	The activity or place from which an effect originates.
Temporary Effects	Effects lasting less than a year.
Trip	One movement, in or out of the study area by foot, cycle or vehicle.
The Board	An Bord Pleanála.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Water Framework Directive (WFD)	The EU Water Framework Directive (2000/60/EC) requires all Member States to protect and improve water quality in all waters so that we achieve good ecological status by 2015 or, at the latest, by 2027.
Zone of Influence	The ZoI (or “spatial extent of the impact” as described in Annex III(3) of the EIA Directive) is the area over which ecological features may be subject to significant impacts as a result of the Proposed Development and associated activities.

ACRONYMS

Term	Meaning
AA	Appropriate Assessment
AADT	Annual Average Daily Traffic (expressed in vehicles per day)
ABP	An Bord Pleanála
ACA	Architectural Conservation Area
ADR	Agreement concerning the international carriage of Dangerous goods by Road
AEP	Annual Exceedance Probability
AER	Annual Environmental Report
AIEMA	Associate Member of the Institute of Environmental Management and Assessment
AQIH	Air Quality Index for Health
ATC	Automatic Traffic Counter
B&K	Brüel & Kjær
BAT	Best Available Techniques
BCT	Bat Conservation Trust
BSE	Bovine Spongiform Encephalopathy
BOCCI	Birds of Conservation Concern in Ireland
BOD	Biological Oxygen Demand
CDP	County Development Plan
CEMP	Construction Environmental Management Plan
CFRAM	Catchment-based Flood Risk Assessment and Management
CIA	Cumulative Impact Assessment
CIRIA	Construction Industry Research Information Association
CIEEM	Chartered Institute of Ecology and Environmental Management
CLP	Classification, Labelling and Packaging of substances and mixtures
CO	Carbon monoxide
COD	Chemical Oxygen Demand
COMAH	Control of Major Accident Hazards
COR	Certificate of Registration
CRAMP	Closure, Restoration and Aftercare Management Plan
CRTN	Calculation of Road Traffic Noise
CSAD	Continuous Steam Auger Disinfection
CSO	Central Statistics Office
CTMP	Construction Traffic Management Plan
DECC	Department of the Environment, Climate and Communications
DCHG	Department of Culture, Heritage and the Gaeltacht
DHLGH	Department of Housing, Local Government and Heritage
DHPLG	Department of Housing, Planning and Local Government
DMRB	Design Manual for Roads and Bridges
DMURS	Design Manual for Urban Roads and Streets
DoT	Department of Transport
EA	Environment Agency (UK)

Term	Meaning
EAL	Environmental Assessment Level
EC	European Communities
ECoW	Environmental Clerk of Works
ED	Electoral District
EE	Enterprise and Employment
EHS	Environment, Health Safety
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
ELV	Emission Limit Values
EMRWMP	Eastern Midlands Region Waste Management Plan
END	Environmental Noise Directive
EPA	Environmental Protection Agency
ESRI	Economic and Social Research Institute
EU	European Union
FPO	Flora (Protection) Order
GDSDS	Greater Dublin Drainage Strategy
GLC	Ground Level Concentrations
GLVIA3	Guidelines for Landscape and Visual Impact Assessment, 3rd Edition
GNI	Gas Networks Ireland
GP	General Practitioner
GSI	Geological Survey Ireland
HEPA	High-Efficiency Particulate Absorbing
HGV%	Percentage of Heavy Goods Vehicles
HGV	Heavy Goods Vehicle
HIA	Health Impact Assessment
HMSO	Her Majesty’s Stationary Office
HRW	Healthcare Risk Waste
HSA	Health and Safety Authority
HV	Heavy Vehicles
IAH	International Association of Hydrogeologists
IAPS	Invasive Alien Plant Species
ICOMOS	International Council on Monuments and Sites
IE	Industrial Emissions
IED	Industrial Emissions Directive
IEF	Important Ecological Feature
IEMA	Institute of Environmental Management and Assessment
IG	Irish Grid
ILO	International Labour Organization
IPH	Institute of Public Health
IPPC	Integrated Pollution Prevention and Control
ISO	International Organisation of Standardisation
ITM	Irish Transverse Mercator

Term	Meaning
IWEA	Irish Wind Energy Association
LAP	Local Area Plan
LCA	Landscape Character Assessment
LGV	Light Goods Vehicle
LVIA	Landscape and Visual Impact Assessment
LV	Light Vehicles
MPA	Marine Protected Area
MSW	Municipal Solid Waste
NAF	National Adaptation Framework
NBAP	National Biodiversity Action Plan
NBDC	National Biodiversity Data Centre
NHWMP	National Hazardous Waste Management Plan
NIAH	National Inventory of Architectural Heritage
NMI	National Museum of Ireland
NML	Noise Monitoring Location
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
NPF	National Planning Framework
NPWS	National Parks and Wildlife Service
NRA	National Roads Authority
NSL	Noise Sensitive Location
NSO	National Strategic Outcome
NTS	Non-Technical Summary
OD	Ordnance Datum
OEL	Occupational Exposure Limit
OEM	Original Equipment Manufacturer
OM	Operation and Maintenance
OMP	Odour Management Plan
OPW	Office of Public Works
OS	Ordnance Survey
OSI	Ordnance Survey Ireland
OSPAR	The Oslo and Paris Conventions or The Convention for the Protection of the Marine Environment of the North-East Atlantic
PAG	Project Appraisal Guidelines
PC	Personal Computer
PEC	Predicted Environmental Concentration
PMI	Project Management Institute
PPE	Personal Protective Equipment
PUP	Pandemic Unemployment Payment
QI	Qualifying Interest
QLFS	Quarterly Labour Force Survey
QNHS	Quarterly National Household Survey
RBMP	River Basin Management Plan

Term	Meaning
RFC	Ratio of Flow to Capacity
RMP	Record of Monuments and Places
RPS	Record of Protected Structures
RSA	Road Safety Authority
RSES	Regional Spatial & Economic Strategy
RTN	Road Traffic Noise
RU	Rural
RWMP	Resource and Waste Management Plan
SAC	Special Area of Conservation
SCADA	Supervisory Control and Data Acquisition
SCI	Special Conservation Interest
SDCC	South Dublin County Council
SDCDP	South Dublin County Development Plan
SEAI	Sustainable Energy Authority of Ireland
SFRA	Strategic Flood Relief Assessment
SHD	Strategic Housing Development
SID	Strategic Infrastructural Development
SMR	Sites and Monuments Record
SO_2	Sulphur dioxide
SO_4	Sulphate
SPA	Special Protection Area
STEL	Short Term Exposure Limit
SuDS	Sustainable Urban Drainage System
TA	Transport Assessment
THF	Tetrahydrofuran
TPSE	Threshold of Potential Significant Effect
TSE	Transmissible Spongiform Encephalopathy
TII	Transport Infrastructure Ireland
UN	United Nations
USEPA	United States Environmental Protection Agency
UTC	Coordinated Universal Time
UTM	Universal Transverse Mercator
VOC	Volatile Organic Compound
WADT	Weekly Average Daily Traffic
WEEE	Waste Electrical and Electronic Equipment
WFD	Water Framework Directive
WHO	World Health Organisation
WtE	Waste to Energy
YoO	Year of Opening
ZoI	Zone of Influence

UNITS

Term	Meaning
°C	Degrees Celsius (Temperature)
cm	Centimetre (Distance)
CO_2/kWh	Carbon dioxide produce per electricity unit (Greenhouse gas)
dB	Decibel (Noise)
dB(A)	A-weighted Decibel (Noise)
dB(Z)	Z-weighted Decibel (Noise)
g/s	Grams per second (Mass Flow Rate)
ha	Hectare (Area)
Hz	Hertz (Frequency)
m	Metre (Distance)
K	Kelvin (Temperature change rate)
$kgCO_2/km$	Kilograms of CO_2 per kilometre
$kgCO_{2e}/m^3$	Kilograms of CO_2 equivalent per meter cubed
km	Kilometre (Distance)
km^2	Kilometre squared (Area)
km/ h	Kilometres per hour (Speed)
kWh	Kilowatt hour
m^3/hr	Cubic metre per hour
$mg/m^2/day$	Milligrams per square metre per day
mg/m^3	Milligrams per cubic metre
mg/Nm^3	Milligrams per normal cubic meters
mm	Millimetre
Mt	Megatonne
MW	Megawatt
Nm^3/hr	Normal cubic meters per hour
OU_E/m^3	Odourants evaporated per cubic meter
OU_E/Nm^3	Odourants evaporated per normal cubic meters
OU_E/s	Odourants evaporated per second
PCU	Passenger Car Unit (Traffic Modelling)
tCO_2eq	Tonne of CO_2 equivalent
$\mu g/m^3$	Micrograms per cubic metre
$\mu g/Nm^3$	Micrograms per normal cubic meters

CHAPTER 1
INTRODUCTION

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1 INTRODUCTION AND EIA APPROACH

1.1 Background

Enva Ireland Ltd (hereafter, Enva) currently operates a hazardous waste transfer/recovery facility within Greenogue Business Park located at 402 Grants Drive, Greenogue Business Park, Rathcoole, Co. Dublin, Eircode D24 AP04 (hereafter referred to as the facility). The location is shown in **Figure 1-1**.

The facility is managed in accordance with the requirements of an existing planning approval (Planning Application reference SD09A/0050) and Environmental Protection Agency (EPA) industrial Emissions licence (IED Licence W0192-03). Current activities at the site include the storage, bulking up and transfer of hazardous wastes such as contaminated soils and electrical transformers as well as hydrocarbon waste treatment and recovery of used hydrocarbon storage drums.

Enva wishes to modify two buildings at the existing waste facility to provide for the future management of 24,000 tonnes per annum of Health Risk Waste (HRW). HRW management will displace some of the existing current hazardous waste management activities which will in future no longer be undertaken at Greenogue facility. There will be no change in the tonnage of waste managed at the facility. The modification will allow for the following processes to be undertaken at the facility:

- Process 1 - HRW Disinfection followed by bulking up and transportation offsite.
- Process 2 - Reusable sharps containers management, emptying and disinfection, followed by Process 1 disinfection of the emptied HRW.
- Process 3 - Transfer of HRW that is not suited to Process 1 treatment to its onward consignment to the following:
  - AGR, Herten, Germany
  - Remondis TRV, Cologne, Germany
  - Indaver NV, Antwerp, Belgium
  - SWS, Denmark
  - Fortum, Nyborg, Denmark

1.2 EIAR Purpose

This Environmental Impact Assessment Report (EIAR) has been prepared to support the following consent applications:

- A Strategic Infrastructural Development (SID) Planning Application to An Bord Pleanála (hereafter referred to as ‘the Board’).
- The review of the current EPA IED Licence.

The purpose of the EIAR is to present the environmental information which has been gathered to carry out an assessment of the likely significant environmental effects of the Proposed Development. The EIAR specifically:

- Provides statutory and non-statutory consultees with technical information to enable an understanding of the Proposed Development.
- Provides a description of the reasonable alternatives considered for the Proposed Development and an indication of the main reasons for the options selected.
- Presents the existing environmental baseline information established from desktop studies, site-specific surveys and/or consultation.
- Indicates any limitations encountered during the compilation of the environmental information, including the acknowledgement of any data gaps or deficiencies and confidence in the information gathered.
- Describes the methodology used within the EIA process.

- Presents the potential environmental impacts arising from the Proposed Development. This will be based on the baseline information coupled with the analysis and impact assessments completed.
- Proposes mitigation measures to avoid, prevent and reduce any identified significant adverse effects on the environment. Where mitigation measures have been identified, the residual significance of effects has also been identified.

Figure 1-1: Location of Enva Waste Transfer/Recovery Facility

1.3 Strategic Infrastructure Development

The Planning and Development Act, 2000, as amended, provides for a special planning application process for Strategic Infrastructure Development (SID). This procedure allows for an application to be made directly to the Board rather than to the local authority. The types and sizes of development that fall under SID are set out in the Seventh Schedule of the Planning and Development Act 2000, as amended. They include large projects in the energy, transport, environmental and health infrastructure sectors. To qualify as a SID, a proposed development must be one of the specific classes prescribed in the Seventh Schedule and must exceed the defined development thresholds for that class. The Board then decides (following formal consultation) whether the proposed development would:

- Be strategically, economically or socially important to the State or the region in which it would be situated; and/or
- Contribute substantially to fulfilling any of the objectives of the National Planning Framework or the Regional Spatial and Economic Strategy for the location(s) of the development and/or
- Have a significant effect on the area of more than one planning authority.

If the proposed development meets any one of these criteria, then it can be considered as a SID, and an application for planning permission can be made directly to the Board. If not, then the application is made to the local planning authority.

In line with procedure, RPS sought pre-application consultation with the Board in terms of Section 37B of the Planning and Development Act, 2000.

> *37B.— (1) A person who proposes to apply for permission for any development specified in the Seventh Schedule shall, before making the application, enter into consultations with the Board in relation to the proposed development.*

The Board responded to the request by written correspondence dated 2 June 2023 noting the following:

> *Please be advised that the following consultations under section 37B of the Planning and Development Act, as amended, the Board hereby serves notice under section 37B(4)(a) that it is of the opinion that the proposed development falls within the scope of paragraphs 37A(2)(a), (b) and (c) of the Act. Accordingly, the Board has decided that the proposed development would be strategic infrastructure within the meaning of section 37A of the Planning and Development Act, 2000, as amended. Any application for permission for the proposed development must therefore be made directly to An Bord Pleanála under section 37E of the Act.*

This means that the Proposed Development falls within the scope of paragraphs 37A(2)(a), (b) and (c) of the Planning and Development Act, 2000 as amended. Accordingly, the Board has decided that the proposed development would be strategic infrastructure within the meaning of Section 37A of the Act.

1.4 EIA Methodology

1.4.1 Guidance

The requirement for an EIA for a project was initially set out in European Union (EU) Directive (85/337/EEC) as amended by Directive 97/11/EC, 2003/35/EC and 2009/31/EC on the assessment of the effects of certain public and private projects on the environment. The amendments were codified by Directive 2011/92/EU of the European Parliament and the Council on the assessment of the effects of certain public and private projects on the environment (and as amended in turn by Directive 2014/52/EU). The Directives as amended being herein referred to as the 'EIA Directive'. The EIA Directive requires that certain developments be assessed for likely significant effects before planning permission can be granted. An EIAR is required to be produced by the developer of a project under Articles 5(1) and 5(2), and with reference to Annex 1 and 2, of the EIA Directive and must contain the information specified in Annex IV.

The EIAR requirements of the EIA Directive are transposed into Irish Law in the Planning and Development Regulations 2001 (as amended and substituted).

The preparation of this EIAR has been informed by relevant international and national EIA guidelines including the following:

- Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022).
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (DHLGH, 2018).
- Environmental Impact Assessment of Projects – Guidance on Screening (Directive 2011/92/EU as amended by 2014/52/EU) (European Commission, 2017).
- Environmental Impact Assessment of Projects – Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU) (European Commmission, 2017).
- Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017).
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission, 2017).
- Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects, published by the Planning Inspectorate, an executive agency of the Ministry of Housing, Communities and Local Government of the United Kingdom (2019).

Other legislation, guidelines from Transport Infrastructure Ireland (TII), IEMA, and other bodies have also been considered and are detailed in the relevant technical assessment chapters of this EIAR. Each environmental factor assessed in this EIAR sets out the legislative context, policy context and guidance relevant to that environmental factor. In addition to the applicable EIA legislation and guidance, relevant EU Directives and national legislation relating to the specialist areas have also been considered as part of the process and are addressed in each of the relevant assessment chapters contained in this EIAR.

1.4.2 Screening

Screening is the first step in the EIA process and involves deciding whether an EIAR is required or not. As indicated in Section 1.3, the Proposed Development is an SID in terms of Section 37A of the Planning and Development Act, 2000. An SID application must be accompanied by an EIAR. A Natura Impact Statement (NIS) may also be required, depending on the circumstances of the case. As per Section 37E, application for permission to the Board must be accompanied by an EIAR.

1.4.3 Scoping

Scoping is an integral part of the EIA process, the aim of which is to identify matters that should be covered in the EIAR. Scoping identifies the aspects of the environment where there is likely to be an interaction (either direct or indirect, positive or negative) with the proposed development and the potential effects, which need to be assessed. The process is dynamic, reflecting the evolution of the project design, comment from stakeholders and development of baseline information relevant to the receiving environment as a result of desktop and field surveys.

A scoping process to identify the issues that are likely to be most important during the EIA process was carried out by RPS and this informed the terms of reference for the EIAR.

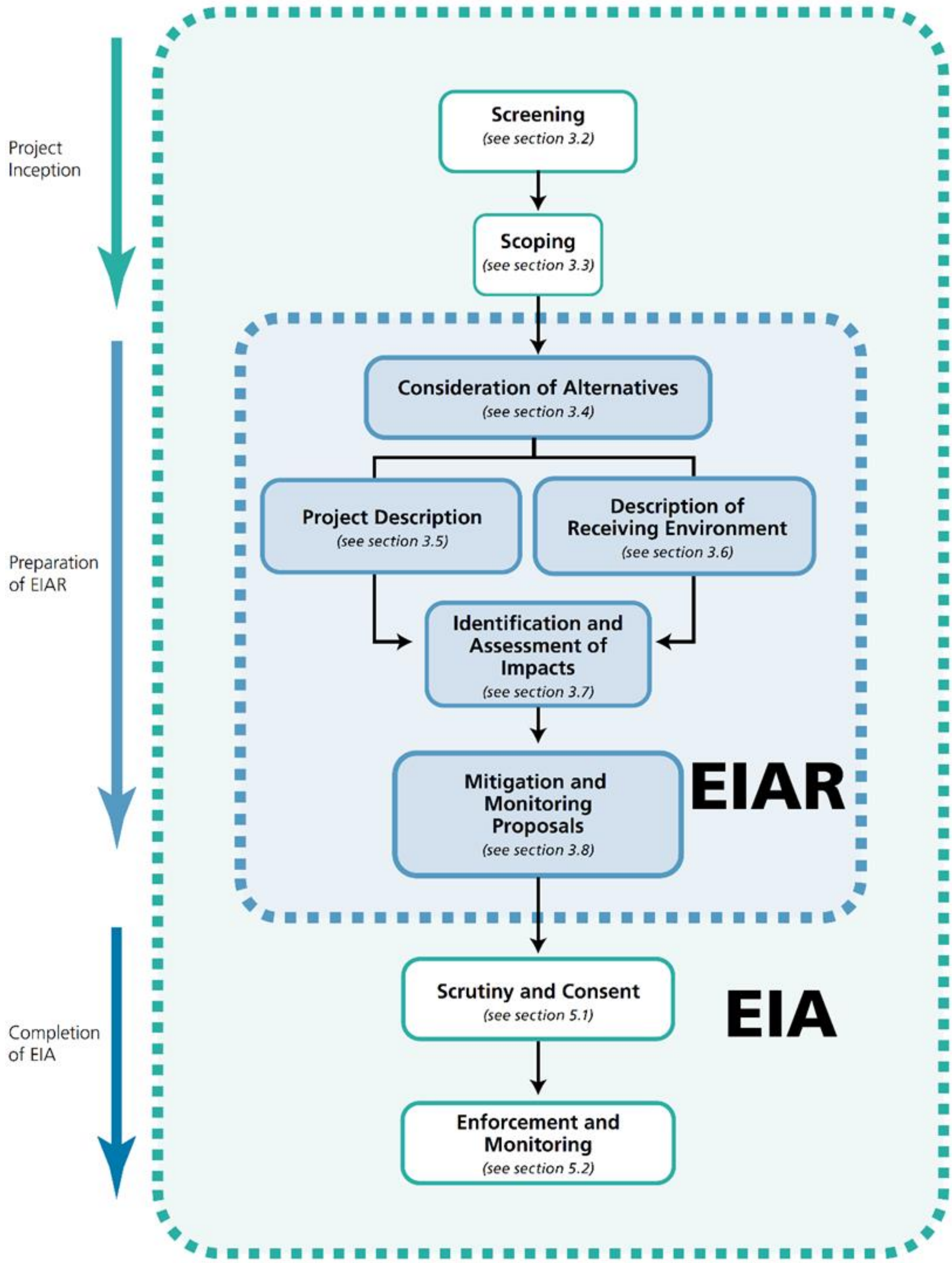
1.4.4 EIAR

The EPA (2022) define EIA as:

> *"The process of examining the anticipated environmental effects of proposed project - from consideration of environmental aspects at design stage, through consultation and preparation of an Environmental Impact Assessment Report (EIAR), evaluation of the EIAR by a competent authority, the subsequent decision as to whether the project should be permitted to proceed, encompassing public response to that decision".*

An EIAR is a statement prepared by the developer, providing information on the significant effects on the environment based on current knowledge and methods of assessment. It is carried out by competent experts, with appropriate expertise to provide an informed assessment on the environmental factors as required under the EIA Directive. The EIAR consists of a systematic analysis and assessment of the potential effects of a Proposed Development on the receiving environment.

Figure 1-2 outlines the overall EIA process and the position of the EIAR in the process (EPA, 2022). The following sections outline the key activities undertaken for the Proposed Development during project inception, preparation and completion of the EIAR.



Source: *Guidelines on information to be contained in the Environmental Impact Assessment Report (EPA, 2022)*

Figure 1-2: The EIA Process with reference to the EPA Guidelines, 2022

1.5 Description of Effects

Method, language and meaning are vital to accurately explain the full range of effects. Unless specifically stated with reason e.g., due to the application of standard applicable to a particular discipline, the terminology as provided in the EPA Guidelines, 2022 have been used to describe the effects that the Proposed Development may have on the environment (**Table 1.1)**. This aims to provide clarity, consistency and comparison between the significance of such effects different environmental factors.

Table 1.1: Description of Effects

Term	Definition
Quality of Effects	
Positive Effects	A change which improves the quality of the environment.
Neutral Effects	No effects or effects that are imperceptible, within normal bounds of variation or within the margin of forecasting error.
Negative/adverse Effects	A change which reduces the quality of the environment (for example, lessening species diversity or diminishing the reproductive capacity of an ecosystem; or damaging health or property or by causing nuisance).
Describing the Significance of Effects	
Imperceptible	An effect capable of measurement but without significant consequences.
Not significant	An effect which causes noticeable changes in the character of the environment but without significant consequences.
Slight Effects	An effect which causes noticeable changes in the character of the environment without affecting its sensitivities.
Moderate Effects	An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
Significant Effects	An effect which, by its character, magnitude, duration or intensity alters a sensitive aspect of the environment.
Very Significant	An effect which, by its character, magnitude, duration or intensity significantly alters most of a sensitive aspect of the environment.
Describing the Extent and Context of Effects	
Extent	Describe the size of the area, the number of sites, and the proportion of a population affected by an effect.
Context	Describe whether the extent, duration, or frequency will conform or contrast with established (baseline) conditions.
Describing the Probability of Effects	
Likely Effects	The effects that can reasonably be expected to occur because of the planned project if all mitigation measures are properly implemented.
Unlikely Effects	The effects that can reasonably be expected not to occur because of the planned project if all mitigation measures are properly implemented.
Describing the Duration and Frequency of Effects	
Momentary Effects	Effects lasting from seconds to minutes
Brief Effect	Effects lasting less than a day
Temporary Effects	Effects lasting less than a year
Short-term Effects	Effects lasting one to seven years.
Medium-term Effects	Effects lasting seven to fifteen years.
Long-term Effects	Effects lasting fifteen to sixty years.
Permanent Effects	Effects lasting over sixty years
Reversible Effects	Effects that can be undone, for example through remediation or restoration
Frequency of Effects	Describe how often the effect will occur.
Describing the Types of Effects	

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

Reference has been made to the EPA Guidelines, 2022 in terms of determining the significance of the effect (**Figure 1-3**).

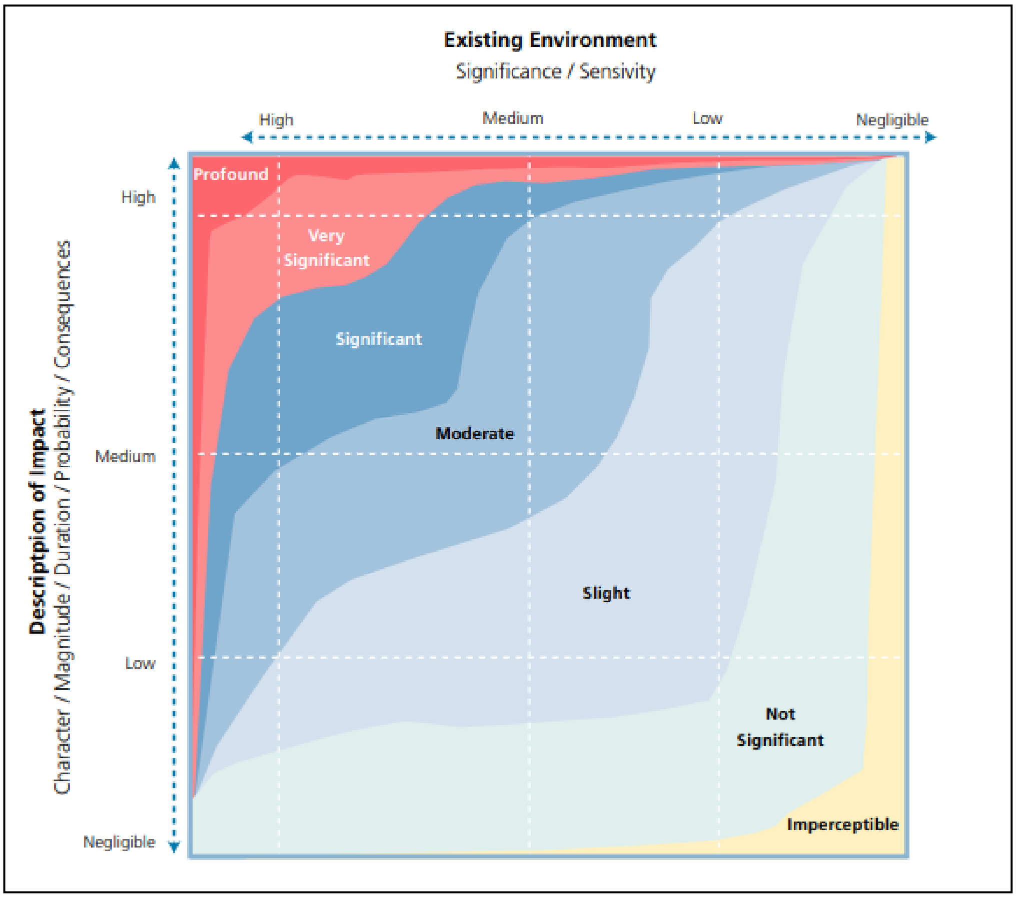


Figure 1-3: Chart Showing Typical Classifications of the Significance of Effects, EPA Guideline (2022)

1.6 Structure of the EIAR

The EIAR is divided into three volumes:

- **Volume I:** Non-Technical Summary (NTS)
- **Volume II:** EIAR Main Body
- **Volume III:** Technical Appendices

Table 1.2 provides a breakdown of the contents of the EIAR volumes and the organisations that have contributed to the EIAR. This EIAR has been prepared on behalf of Enva by RPS with input from specialist sub-consultants. The list of the EIAR contributors outlining their competence and experience, including relevant qualifications is provided in **Table 1.3**.

Table 1.2: EIAR Structure, Content and Contributors

Volume	Chapter Ref	Report	Competent Expert
Volume I EIAR NTS		Non-Technical Summary	Kerry Fairley
Volume II EIAR Main Body	**1**	Introduction	Kerry Fairley
	2	Background and Need for the Proposed Development	Kerry Fairley
	3	Consideration of Alternatives	Conor McGovern
	4	Description of the Proposed Development	Kerry Fairley
	5	Description of the Construction Phase	Kerry Fairley
	6	Consultation	Kerry Fairley
	7	Traffic & Transportation	Ronan Grealy
	8	Population	Valerie Brennan
	9	Noise and Vibration	John Mahon
	10	Air Quality & Climate	Paul Chadwick
	11	Human Health	Ryngan Pyper
	12	Landscape & Visual	Eimear O' Connor
	13	Cultural Heritage	Siobhan Deery
	14	Biodiversity	Robert Rowlands
	15	Water	Tim Cooke
	16	Land & Soil, Geology & Hydrogeology	Eoin Hurst
	17	Material Assets	Kerry Fairley
	18	Risks of Major Accidents and/ or Disasters	Kerry Fairley
	19	Interactions Between Environmental Factors	Kerry Fairley
	20	Cumulative Effects	Kerry Fairley
	21	Schedule of Environmental Commitments	Kerry Fairley
Volume III Technical Appendices	**4.1**	Hazardous wastes authorised by the Enva facility IED Licence	Kerry Fairley
	7.1	Traffic Survey Results	Ronan Grealy
	9.1	Noise Sensitive Locations (NSLs)	John Mahon
	9.2	Photographs of Noise Monitoring Locations	John Mahon
	9.3	Equipment Calibration Certificates	John Mahon
	9.4	One-Third Octave Band Analysis	John Mahon
	10.1	Aermod Modelling	Paul Chadwick
	14.1	Biodiversity Supporting Information	Robert Rowlands
	20.1	Cumulative Impact Assessment Stage 1	Kerry Fairley
	20.2	Cumulative Impact Assessment Stage 2	Kerry Fairley

1.7 Study Team

Table 1.3: Qualifications and Experience of EIAR Competent Experts

Expert	Qualification	Relevant Experience
Kerry Fairley (RPS)	BSc (Hons), CEnv	Kerry is a Senior Associate with RPS. She has over 20 years' experience in the environmental assessment and implementation of several multi-disciplinary projects. Kerry has been responsible for the enviro-legal review, permitting processes and environmental impact assessment for projects in numerous countries (South Africa, Namibia, Malawi, Zimbabwe, Ghana, England and now Ireland). She is the author of several environmental impact assessments, environmental due diligence reports, environmental management programmes, closure and rehabilitation plans.
Ronan Grealy (RPS)	B.E. (Hons) , Meng.Sc.	Ronan Grealy is a Senior Associate at RPS with 20 years' experience working in the transportation sector within RPS. Ronan has a wide range of experience and skills in the delivery of transport and land use development plan projects through concept, appraisal, stakeholder consultation, planning and preliminary design stages. Ronan's key competency is managing the delivery of Active Travel Schemes, preparing and managing Transport Assessments (Tas), preparing Sustainable Transport Plans and preparing Urban Area Transportation Studies including junction designs and operational assessments. Ronan has also worked as a project communication consultant on a €500M energy project called The Grid Link Project where he liaised directly with the Client's project team, key stakeholders, interest groups, facilitated consultation workshops and analysed stakeholder feedback.
Valerie Brennan (RPS)	MSc, Higher Diploma, BA International (Hons)	Valerie is the Planning Business Unit Director within the Planning Unit of the Environment, Planning and Renewables Sector. She is a chartered Town Planner and is currently the chair of the Royal Town Planning Institute. She currently sits on the Planning Advisory Forum of the Planning Review. She is an infrastructure specialist and has an excellent variety of experience having worked in the public, private and semi-state sectors including periods of secondment / semi-secondment to Irish Water, EirGrid and the Dublin Airport Authority and having worked as Senior Planning and Development Manager with Coillte for over 8 years. Valerie has over 18 years' professional planning experience advising a wide range of strategic infrastructure, commercial and renewable energy projects in the areas of project management, feasibility studies, masterplans, environmental impact assessment management, statutory approval procedures, planning appeals, stakeholder and public consultation. Valerie has completed Project Management Institute (PMI) training and has experience of project management, portfolio management, commercial development and business development roles.
John Mahon (RPS)	BA BAI (Hons), PhD, MIEI, MIA, Ceng	John Mahon has 19 years' experience in environmental projects including planning applications and environmental impact assessments for a wide range of strategic infrastructure projects. He is a Chartered engineer with Engineers Ireland where his primary experience is in environmental noise include, he has contributed to Irish Wind Energy Association (IWEA) planning group and provides expertise on the area of wind turbine noise. John also sits on the Irish and European Committees for Standardization CEN/TC226/WG 6 (Road traffic noise reducing devices).
Paul Chadwick (RPS)	A (Hons), Mphil, AIEMA	Paul is a Technical Director with the Energy, Environment and Resources Sector and leads the team responsible for environmental, waste and resource management and assessment of infrastructural and industrial projects for RPS in Ireland. Paul specialises in the fields of air quality and climate. He has considerable experience, both academic and professional, in ambient air quality and a wide range of atmospheric pollutants from waste / wastewater, road traffic, air traffic, industrial and stationary sources. As a result of two years research in atmospheric chemistry, he has an in-depth knowledge of the chemical and physical transformations associated with local and regional air pollution and climate change. Paul is a trained and experienced expert witness and is supported by a team of multidisciplinary environmental experts across RPS in Ireland.

Expert	Qualification	Relevant Experience
Ryngan Pyper (RPS)	BA & MA (Hons), PGDip Public Health, Gdip Law, PGDip Legal Practice	Ryngan is the Director of Health and Social Impact at RPS. Ryngan has over 15 years' experience as a professional consultant and works across the fields of public health, environmental science and impact assessment. Ryngan provides health input into EIA for major infrastructure schemes including road transport. He also advises Government and professional bodies on good practice. Ryngan has advised the World Health Organization on addressing health in EIA and in 2021 was involved in the updated Health Impact Assessment (HIA) Guidance for Ireland and Northern Ireland for the Institute of Public Health (IPH), incorporating the most recent developments and best practice in the field. Ryngan is the current chair of the health section of the International Association for Impact Assessment.
Eimear O'Connor (RPS)	BSc Master of Landscape Architecture Full member Irish Landscape Institute Chartered Member Landscape Institute UK	Eimear is a chartered landscape architect with over 34 years' of experience in advising on landscape and visual assessment matters for a diverse range of projects in transport, waste, power, mining and minerals and mixed use development sectors. She has also provided advice in relation to the design of public parks including a future park on a former landfill site. She is highly experienced in all stages of the landscape and visual impact assessment process through to oral hearing. She has provided advice on projects at both options appraisal stage and also detailed design stage for a wide range of transport schemes and other development types. Her recent experience includes delivery of Stage (II) Option selection, design and Landscape and Visual Impact Assessment (LVIA) for two road schemes in Ireland. Eimear has worked for two years on the North West Coast Connections powerline project in Cumbria for National grid UK for which she provided design and LVIA services as part of the DCO.
Siobhan Deery **(Courtney Deery)**	MA(Hons), Hdip, MIAI	Siobhan Deery has over 23 years' experience in carrying out surveys and evaluations of archaeological monuments, buildings, sites and landscapes for the purposes of conservation, environmental impact assessment, management and development control. Siobhan has accumulated a significant knowledge in identifying and communicating to all interested parties the uniqueness of the character of cultural heritage in various landscapes and cityscapes and the issues surrounding the treatment, protection and promotion of archaeological and architectural sites and remains in these environments.
Robert Rowlands (RPS)	BSc (Hons), PhD, MCIEEM, Cenv	Dr. Rob Rowlands is a Technical Director in RPS with over 20 years' experience. He is an experienced multi-disciplinary project manager; in particular, advising on strategy with respect to ecology, landscape, heritage/archaeology and arboriculture. He is an experienced ecologist. His ecological experience has included the completion of Ecological Impact Assessments (including for EIA) and Appropriate Assessments with respect to the Habitats and Birds Directive.
Tim Cooke (RPS)	BE (Hons), BSc	Tim is an Associate Flood Risk Engineer in the Water and Utilities team, specialising in flood risk management and hydraulic modelling. He has recently managed projects including Office of Public Works (OPW) Flood Relief Schemes, Flood Risk Assessments, Flood Mapping Studies for the OPW and the UK Environment Agency, and application of Local Authorities' Local Area Plans (LAP) County Development Plans (CDP) and Strategic Flood Relief Assessments (SFRA) policies.
Eoin Hurst (RPS)	BEng (Hons), DIC, MSc, MIEI	Eoin is a Senior Engineer in RPS with over 13 years' experience working in the fields of civil and environmental engineering, geo-environmental science, and related policy. Eoin holds a BE Civil Engineering from NUI Galway, a MSc in Environmental Technology from Imperial College London and is a full member of Engineers Ireland (MIEI) and the International Association of Hydrogeologists (IAH).
Conor McGovern	BSc (Hons), Meng (MEM), PGDip, MCIWM	Conor is an experienced Project Manager and Chartered Waste Manager with 27 years' experience. An associate with RPS, he manages waste planning, waste, and biowaste management, market development, regulatory compliance, Circular Economy, and sustainability projects. Conor is an experienced waste planner, delivering statutory and institutional waste management strategies and plans at national, regional, institutional, and private levels.

1.8 References

DHLGH, 2018. *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment,* Dublin: gov.ie.

EPA, 2022. *Guidelines on information to be contained in Environmental Impact Assessment Reports, S.l.:* s.n.

European Commission, 2017. *Environmental Impact Assessment of Projects – Guidance on Screening (Directive 2011/92/EU as amended by 2014/52/EU) ,* Luxembourg: s.n.

European Commission, 2017. *Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report ,* Luxembourg: s.n.

European Commission, 2017. *Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions ,* Luxembourg: s.n.

European Commmission, 2017. *Environmental Impact Assessment of Projects – Guidance on Scoping (Directive 2011/92/EU as amended by 2014/52/EU),* Luxembourg: s.n.

National Infrastructure Planning, United Kingdom, 2019. A*dvice Note 17. Cumulative Effects Assessment Relevant to Nationally Significant Infrastructure Projects,* London: gov.uk.

CHAPTER 2
BACKGROUND AND NEED FOR THE PROPOSED DEVELOPMENT

Contents

Tables

2 BACKGROUND AND NEED FOR THE PROPOSED DEVELOPMENT

2.1 Background

2.1.1 Health Risk Waste (HRW)

HRW is the solid or liquid waste arising from healthcare and medical activities such as diagnosis, monitoring, treatment, prevention of disease or alleviation of handicap in humans or animals, including related research performed under the supervision of a medical practitioner or veterinary surgeon.

HRW may have the following hazard characteristics:

- Biological (e.g., recognisable anatomical waste).
- Infectious.
- Chemical, toxic, or pharmaceutical including cytotoxins.
- Sharps (e.g., needles, scalpels, sharp broken materials).

Radioactive HRW is not proposed for treatment as part of the Proposed Development.

HRW is a waste stream of major concern from environmental, occupational health and safety and public health concerns. Infection control remains the overriding priority in the healthcare sector.

2.1.2 HRW Management in Ireland

HRW management is a critical aspect of ensuring the safety and well-being of both healthcare professionals and the public. Proper management of HRW helps to prevent the spread of diseases and ensures that the environment is protected from the potential harmful effects of such waste.

In Ireland, the management of health risk waste is governed by regulations[1], which outline the requirements for the segregation, storage, transport, treatment, and disposal of HRW, and apply to HRW management facilities.

HRW must be transported in secure, leak-proof containers that are clearly labelled. Transport companies that manage health risk waste must be licensed and must follow specific procedures[1] for the safe handling and transport of such waste.

Once HRW has been collected, it is typically transported to a treatment facility where it is treated and disposed of in a manner that does not pose a risk to human health or the environment. Disinfection using steam is the primary management option for HRW in Ireland, with the resultant disinfected waste being treated by incineration.

2.1.3 HRW Arisings Trends

The NHWMP 2021-2027 noted that during the COVID-19 pandemic, volumes of health risk waste produced by the HSE increased by 24 %. HRW production is on an upward trend in Ireland. The NHWMP 2021-2027 noted that:

> *"As this crisis abates, there is an opportunity to learn from the pressure points detected in the system and the measures taken to address them. This work should consider and present options to strengthen the resilience and preparedness of the country to effectively manage hazardous waste during similar future major shock events – whether health-based or otherwise."*

[1] The transportation of healthcare waste is governed by regulations dealing with different concerns relating to the materials transported. All waste carriers require waste collection permits as per the requirements of the Waste Management (Collection Permit) Regulations, the movement of hazardous waste must be accompanied by Waste Transfer Forms as per the Shipments of Hazardous Waste Regulations and Transfrontier Shipment documentation is required for the export of hazardous health risk waste as per the Waste Management (Shipments of Waste) Regulations.

HRW arisings are increasing globally and in Ireland. Global Market Insights projects[2] a 6.8 % compound annual growth rate in HRW arisings from 2022 to 2030 in Europe and a global increase of 84 % in the market size from 2021 to 2030.

Factors contributing to this include an aging population coinciding with increased availability of healthcare, advances in new treatments and procedures. Hospital Acquired Infections, i.e., infections acquired during hospital care which are not present or incubating at admission, have a detrimental impact on the patient outcome while placing huge burdens on healthcare facilities. Infection control practices have been updated to address this challenge including increased use of single use disposable medical devices and consumables all of which have contributed to large increases in HRW volumes. Enhanced hygiene practices and the increased use of single use Personal Protective Equipment (PPE) such as gloves, wipes, and aprons have exploded the volume of HRW but not necessarily the density.

Therefore, increasing volumes of HRW arisings are anticipated to beyond 2030.

2.1.4 Impact of HRW Arisings Trends on Management in Ireland

The growth in HRW arisings combined with the fixed production capacity in Ireland at the two authorised HRW management facilities has meant that it has become necessary to ship HRW abroad for appropriate management in increasing volumes.

Enva is proposing a HRW management development that will add significant capacity, and thereby strengthen the resilience, and preparedness to Irelands HRW treatment sector by expanding management capacity.

2.1.5 Existing Health Risk Waste Management Services in Ireland

The State has annual HRW treatment capacity as set out in **Table 2.1**.

Table 2.1: Existing HRW Treatment Capacity in Ireland

Facility Name	Capacity
Stericycle facility, licensed as SRCL, facility at Beech Road, Western Industrial Estate, Dublin (Waste Licence 55-02)[3]	15 000 TPA. Also transfers 2 000 TPA hazardous waste & manages 1 000 TPA non-hazardous waste)
Stericycle facility, licensed as SRCL Limited facility at Kylemore Road, Dublin 10, (Waste Licence 54-02)[4].	7 332 TPA
Total licenced HRW management capacity	22 332

These two facilities have experienced increased volumes of HRW arisings requiring treatment since the COVID19 pandemic.

2.1.6 National Policy Framework and Regional Spatial and Economic Strategy

The National Planning Framework (NPF) (DHLGH, 2018) notes that waste management is a particular priority. The overarching aim outlined in the NPF is to decouple, as much as possible, consumption from waste generation. However, it is recognised that there continues to be waste generated and there is an ongoing need to treat such waste.

[2] https://www.gminsights.com/industry-analysis/medical-waste-management-market and https://apps.who.int/iris/bitstream/handle/10665/67350/WHO_CDS_CSR_EPH_2002.12.pdf

[3] https://epawebapp.epa.ie/terminalfour/ippc/ippc-view.jsp?regno=W0055-02

[4] https://epawebapp.epa.ie/terminalfour/ippc/ippc-view.jsp?regno=W0054-02

National Policy Objective 56 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."*

Section 6.2 on Healthy communities explains:

> *"Our health and our environment are inextricably linked. Specific health risks that can be influenced by spatial planning include heart disease, respiratory disease, mental health, obesity and injuries. By taking a whole-system approach to addressing the many factors that impact on health and wellbeing and which contribute to health inequalities, and by empowering and enabling individuals and communities to make healthier choices, it will be possible to improve health outcomes, particularly for the next generation of citizens.*"

National Strategic Outcome 9 of the NPF includes:

> "*Development of necessary and appropriate hazardous waste management facilities to avoid the need for treatment elsewhere …[and] Adequate capacity and systems to manage waste… to mitigate appropriately the risk to environmental and human health*".

The Eastern and Midlands Regional Spatial & Economic Strategy 2019-2031 (RSES) includes "*Sustainable Management of Water, Waste, and other Environmental Resources'* as one of 16 Regional Strategic Outcomes, in support of NSO 9 of the NPF.

The RSES also supports the circular economy. In terms of waste management, it defers to the strategic objectives, targets and goals set out in the Eastern and Midlands Region Waste Management Plan 2015-2021, noting that the *"overall vision of the Regional Waste Management Plan is to rethink the approach taken towards managing waste and that waste should be seen as a valuable material resource".*

Waste Management Regional Policy Objective 10.25 is:

> *"Development plans shall identify how waste will be reduced, in line with the principles of the circular economy, facilitating the use of materials at their highest value for as long as possible and how remaining quantum's 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 and shall take account of the requirements of the Eastern and Midlands Region Waste Management Plan."*

Improving Irish waste management infrastructure is a clear policy ambition of the waste plan. The policy aim is for the region and the State to become more self-sufficient, in terms of treating the wastes generated and which it is currently exporting.

2.2 Need for the Proposed Development

2.2.1 Adding Capacity to the Existing HRW Management System

The Proposed Development will add significant capacity, and thereby strengthen the resilience, and preparedness to the State's HRW treatment sector by expanding management capacity.

Adding an additional 24 000 TPA capacity will alleviate the burden at these two facilities which are among those with the "*poorest environmental performance*". It will also reduce their reliance on export of HRW.

2.2.2 Adding a Second Supplier to the Existing HRW Management System

The Proposed Development will add a second supplier of HRW treatment services to the current single provider in Ireland, thereby further strengthening the resilience and preparedness of the system which underpins the Irish healthcare system which is recommended by the EPA's NHWMP 2021-2027.

2.2.3 Reduce Reliance on Export of Unprocessed HRW

The Proposed Development will reduce reliance on export of unprocessed HRW. This will support the delivery of Regional Waste Management Plan A.4 Policy:

> "*Aim to improve regional and national self-sufficiency of waste management infrastructure for the reprocessing and recovery of particular waste streams, such as mixed municipal waste, in accordance with the proximity principle*."

2.2.4 Adding Capacity to Allow for Rapid Growth of the HRW Arisings

Adding capacity to the HRW management system will prepare the system for the growth in HRW arisings that are set out in **Section 2.1.3**.

2.2.5 Strategic Economic or Social Importance to the State or the Region

The Proposed Development can be considered to be of "*strategic economic or social importance to the State or the region"* and are particularly important in terms of the quantum and type of waste to be treated. It is therefore clear that the Proposed Development can be considered of "*strategic economic or social importance to the State or the region."*

2.2.6 Alignment with Objectives of the NPF and RSES

The Proposed Development accords with National Strategic Outcome (NSO) nine of the NPF "*sustainable management of water, waste, and other environmental resources*." as it provides necessary and appropriate hazardous waste management facilities to avoid the need for treatment elsewhere.

The Proposed Development is delivering increased capacity for the treatment of HRW within the facility. The Proposed Development would *"contribute substantially to the fulfilment of any of the objectives in the National Planning Framework or in any regional spatial and economic strategy in force."*

2.3 Chapter References

DHLGH, 2018. *National Planning Framework - Ireland 2040 Our Plan,* Dublin: gov.ie.

Eastern and Midland Regional Assembly, 2019. *Regional Spatial & Economic Strategy 2019-2031,* s.l.: s.n.

EPA, 2021. *National Hazardous Waste Management Plan 2021-2027,* s.l.: s.n.

CHAPTER 3
CONSIDERATION OF ALTERNATIVES

Contents

Figures

3 CONSIDERATION OF ALTERNATIVES

3.1 Introduction

This chapter of the EIAR presents an overview of the main reasonable alternatives studied by Enva during the development of the project. The consideration of alternatives has been undertaken by a multi-disciplinary team of technical, environmental, and planning experts 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. This chapter of the EIAR builds on the initial considerations in **Chapter 2 - Background and Need for Proposed Project**. It outlines the main operational alternatives considered to meet the identified need set out in **Chapter 2 - Background and Need for Proposed Project**.

The Proposed Development of HRW processing operations at the existing facility offers clear environmental and economic advantages. The facility is close to a large economic centre (Dublin City) of production of HRW and is very readily accessible using existing high quality national and regional road infrastructure.

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 EPA 2022 Guidelines highlight six different categories under which alternatives should be considered:

- Do-Nothing alternative
- Alternative locations
- Alternative layouts
- Alternative designs
- Alternative processes
- Alternative mitigation measures

Each of these categories is assessed within this chapter to illustrate considered in each category and identify the rational for proceeding with the Proposed Development.

The consideration of alternatives has been framed in the context of the overall project objective which is that Enva has identified a shortage in available HRW management capacity in the market. Enva wishes to secure HRW management capacity to address this shortage.

3.2 Legislation, Policy and Guidance

The consideration of alternatives is a mandatory part of the EIA process in section 31 of the 2014 EIA Directive. Article 5(1)(d) of the Directive, for example provides that the information to be provided by the developer shall include:

> "*A description of the reasonable alternatives studied by the developer, which are relevant to the project and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the project on the environment.*"

The 2017 "Guidance on the preparation of the environmental impact assessment report (Directive 2011/92/EU as amended by 2014/52/EU)" notes that

> *"Identifying and considering Alternatives can provide a concrete opportunity to adjust the Project's design in order to minimise environmental impacts and, thus, to minimise the Project's significant effects on the environment. Additionally, the proper identification and consideration of Alternatives from the outset can reduce unnecessary delays in the EIA process, the adoption of the EIA decision, or the implementation of the Project."*

The Guidelines on the information to be contained in Environmental Impact Assessment Reports (EPA, 2022) states the following in respect of alternatives:

> "*The objective is for the developer to present a representative range of the practicable alternatives considered. The alternatives should be described with 'an indication of the main reasons for selecting the chosen option'. It is generally sufficient to provide a broad description of each main alternative and the key issues associated with each, showing how environmental considerations were taken into account in deciding on the selected option. A detailed assessment (or 'mini-EIA') of each alternative is not required*".

Alternatives may be considered at several stages in the EIA process, reflective of initial stages where location and form are most relevant and at later stages where alternative designs may be required to address emerging environmental issues.

3.3 Consideration of Alternative

3.3.1 Do-Nothing Alternative

Annex IV of the EIA Directive sets out the information required to be included in an EIAR. This includes "a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge". The 'Do-Nothing' scenario or evolution of the environment in the absence of the project refers to a situation whereby the site of the Proposed Development would remain in its current condition.

In assessing the environmental impact and considering alternatives for the development of the proposed HRW management facility, the "do nothing" alternative has been considered. The "Do Nothing" Alternative in this context involves maintaining the status quo without taking any proactive steps to address the existing challenges and growing demands in the HRW management sector.

The Proposed Development offers a proactive solution by significantly expanding HRW management capacity, strengthening the resilience of the HRW treatment sector, and aligning with regional and national waste management objectives.

The strategic importance of the Proposed Development is underscored by its potential to enhance the resilience and preparedness of the HRW treatment system. The EPA National Hazardous Waste Management Plan 2021-2027 highlights the importance of strengthening the system to effectively manage hazardous waste during future major events, whether health-related or otherwise. The Proposed Development will add significant capacity and will thereby strengthen the resilience and preparedness of Irelands healthcare sector and its HRW treatment sector by expanding management capacity.

Another key factor necessitating the development of additional capacity is the significant increase in HRW production both in baseline long-term trends and that increase observed during the COVID-19 pandemic. A 24 % rise in tonnages of HRW generated by the Health Service Executive (HSE) is noted in the EPA National Hazardous Waste Management Plan 2021-2027. An ongoing global trend in arisings is also noted. This surge in HRW volumes underscores the urgency of expanding HRW management capacity to accommodate this growth in Ireland.

Local pressures are evident within the HRW management system. Currently, there is a sole operator of two facilities providing healthcare risk waste treatment services in the Irish market. The operator has experienced a substantial increase in HRW volumes, as noted above. This has necessitated changes in its HRW management approach. This has resulted in the need to rely on the export of waste to sustain its operations.

Relying on the export of unprocessed HRW is not a sustainable solution and does not align with regional waste management goals to improve self-sufficiency and to adhere to the proximity principle. The Proposed Development will reduce this reliance on exports, aligning with Regional Waste Management Plan Policy and will contribute to national self-sufficiency in waste management infrastructure. This highlights the need for additional capacity to alleviate the burden on these existing facilities and to enhance environmental performance.

The global and local trend of increasing HRW volumes and the recommendations of the national hazardous waste management plan to strengthen HRW infrastructure in the wake of experiences during the COVID-19 pandemic. This means that 'do-nothing' is not a viable option.

3.3.2 Alternative Locations

Ownership of the site is a critical determinant in the decision-making process for site selection. The utilisation of the existing Enva premises at 402 Grants Drive, Greenogue Business Park, Rathcoole, Co. Dublin rather than the acquisition of alternative site, mitigates the significant financial and timeline implications associated with land procurement and infrastructural development.

Access to the existing Enva site is made from the south via Junction 4 of the N7 national road, which leads onto the R120 regional road. The site's strategic proximity to the motorway network considerably enhances the logistical efficiencies for the efficient inbound delivery of HRW and the outbound collection of processed waste and sanitised waste containers. This logistical advantage substantially optimises operational workflows, contributing to sustained operational efficiency. Employee accessibility is also facilitated by the location within the serviced industrial estate.

The Enva site is a fully serviced brownfield location that has been home to a hazardous waste management facility for two decades, with existing infrastructure such as utility connections, sewage systems, and public services. This reduces likelihood of cultural, historical, or archaeological significance of the lands, which could affect planning permissions or public perception.

The facility location within a very large industrial zone, distant from residential premises, also reduces the potential for community impacts and for objections based on environmental or health concerns.

The Dublin Region is the central focus of HRW production in Ireland, indicating that the Dublin Region is also an appropriate location for a HRW management facility. In addition, the current facility is in an area that is appropriately zoned for the proposed use.

In summary, the site proposed has the following strong advantages over alternative approaches:

- The site, which is in Enva ownership, already operates under IED licence and has done for 20+ years without difficulty. The IED licence currently allows management of hazardous wastes including some of the proposed HRW streams. The site has space that is under intensively utilised for Enva needs and that can be made available for HRW management. The alternative to develop a greenfield or brownfield site would have a more extensive timeline. This more extensive timeline would require purchase, EIA and other process development, planning approval, EPA approval and finally development. The timeline associated with these processes is shortened by the development of the proposed site.
- The characteristics of the site make it well suited to the Proposed Development. The site is located in a large commercial park that is suited to the proposed use and that has other waste management activity in the area. This park is located near a major locus of HRW arisings – the Dublin Region. The site has excellent transport links to the motorway network which is important due to its 24-hour operational nature.

Alternative locations are not considered to be more advantageous than the optimised location presented in the proposal. No alternatives were considered further.

3.3.3 Alternative Layouts

The considerations of alternative layouts on the site have been informed and constrained by the current physical infrastructure on the site. The orientation of the proposed buildings and structures around the development site has been designed around the following constraints:

- Site footprint of 1.1 ha.
- Size of the buildings (including Building 1 and 3) with a footprint of 2 150 m^2.
- The neighbouring businesses located to the immediate east and west of the Proposed Development.
- Grants Drive and a stream which bound the site to the south and north respectively.

The Proposed Development will be incorporated into a significant portion of Building 1, which is currently a hazardous waste transfer station and Building 3 which is currently an ancillary support office. **Figure 3-1** shows the Proposed Development boundary in red, and the rest of the site delineated in blue. No works are proposed for Building 2, the site boundary, or the existing access arrangements. The external footprint of Building 1 requires only minor changes; however, the building will be modified internally including the removal of some or all of one or more internal walls. Even with internal modifications to the building, it still poses certain limitations to the layout and requires careful consideration. These limitations are primarily a result of the interplay of factors that significantly influence the layout and design possibilities of the facility.

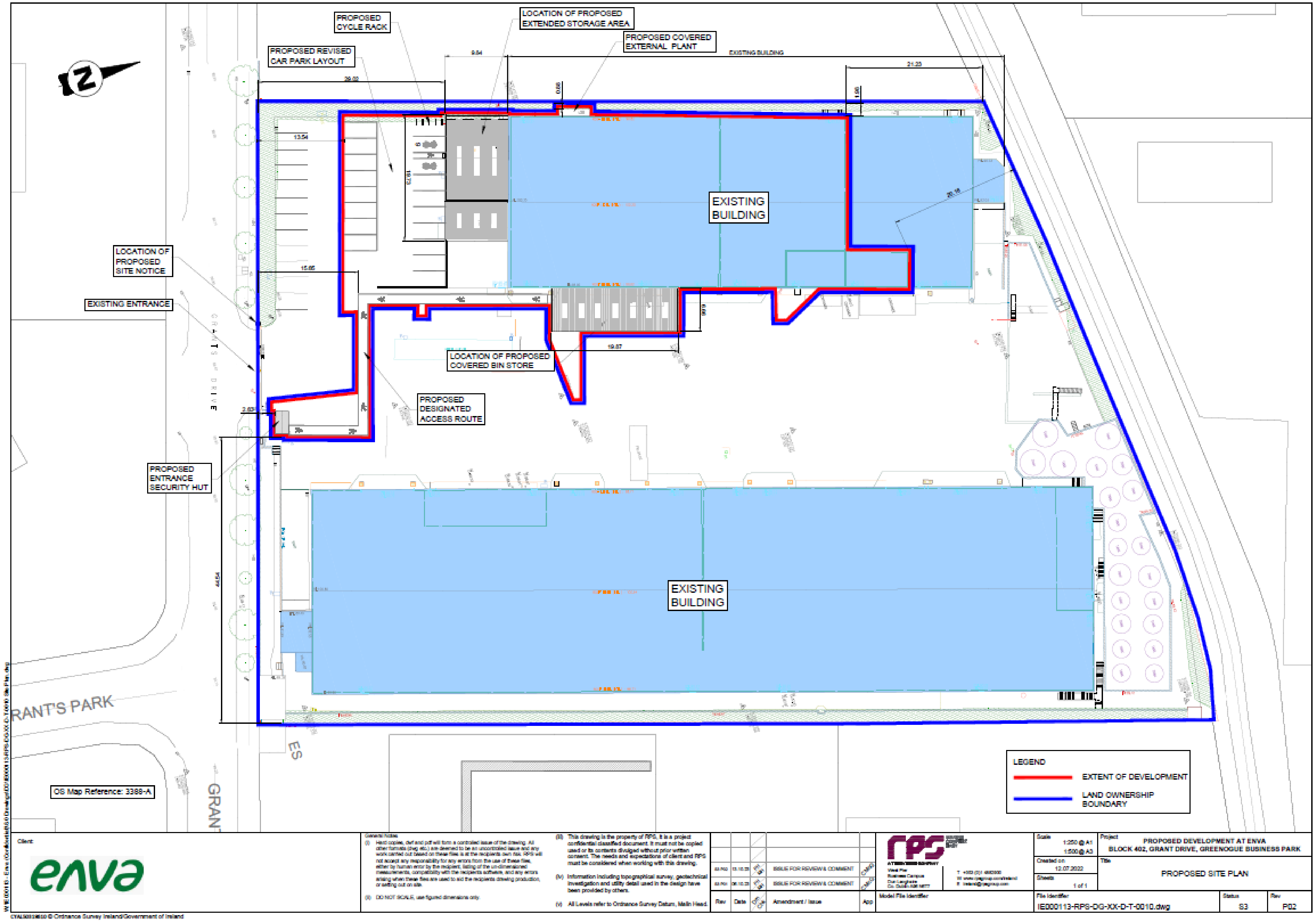


Figure 3-1: Extent of the Proposed Development

The strategic positioning of each element of the HRW management facility within the building's footprint is essential for utilising the existing building footprint without compromising the setup and operation of HRW treatment systems.

A central challenge arises from the substantial dimensions of the two treatment units required to process the significant annual volume of 24 000 tonnes of HRW. These are large treatment units – each over 20 m long and 9 m wide at the widest point. These dimensions in conjunction with the building layout constrain the potential layout orientation options to south-south-west to north-north-east (approximately) or the opposite. A decision was made to orient south-south-west to north-north-east to facilitate HRW movement in and out of the facility. The need for the treated HRW to be loaded into large articulated walking floor trailers was the main driver to locate the trailer loading at the south-south-west end, nearest the entrance to the site. This orientation in turn dictates at which orientation the shredder is to be placed and the HRW subsequently travels.

The placement of areas designated to manage a high volume of bins containing HRW along with bin scales and bin washers requires careful consideration within the layout to facilitate smooth workflow and optimal resource management. The bin scales should be placed adjacent to where bins are unloaded from delivery vehicles and near to the bin storage. This allows them to be weighed and scanned efficiently and stored efficiently. Bins containing the HRW need to be strategically positioned within the building to optimise throughput and prevent bottlenecks in the workflow. Bottlenecks in the system have the potential to reduce the volume of HRW that can be treated. Effective operational management necessitates the allocation of an area for bin washers, which are instrumental for sanitising of empty bins. The washers should be strategically positioned within the layout, to ensure a seamless workflow. A second limiting factor within the layout is the requirement for a dedicated storage area for housing sanitised empty bins prior to collection.

In summary, given the constraints of the building footprint, the dimensions of the plant required to treat HRW along with the storage areas needed to store a high volume of bins, there are limited opportunities for alternative layouts. The layout has been designed to balance the requirement to handle and treat high volumes of HRW within the spatial constraints of the building. In this regard, there are no potentially significant alternative layouts considered over the optimised layout presented.

3.3.4 Alternative Designs

A decision to alter Building 1 rather than its demolition and a complete redesign, was driven by practical and strategic considerations. This approach is deemed a more viable approach, as it allows for the utilisation of the current footprint without the need for extensive structural changes or a complete overhaul of the design. Central to the alterations is the planning surrounding the integration of essential plant and equipment for HRW treatment processes within the site.

In the case of Building 3 (the existing office), the decision to demolish it was taken to facilitate the construction of a trailer bay intended for collecting treated HRW. This streamlined approach minimises disruptions to the overall facility layout and ensures the efficient flow of operations, from the treatment processes within Building 1 to the collection of treated waste in the designated trailer bay. By strategically modifying Building 1 and removing Building 3, the project aims to reduce generation of unnecessary excess material.

In terms of material balance, opting for these modifications and reducing demolition activities aligns with a sustainability-oriented approach. This approach ensures a reduction in the volume of excavated and demolition materials, promoting resource efficiency and minimising waste generation. The decision to use the existing building and to forgo an alternative building design stems from a pragmatic assessment of how to optimise the existing structures, facilitate HRW treatment processes, and uphold environmentally conscious practices by minimising material waste and maximising resource utilisation.

3.3.5 Alternative Processes

3.3.5.1 Continuous Steam Auger Disinfection (proposed process)

The proposed HRW treatment process for the development is Continuous Steam Auger Disinfection (CSAD). This CSAD process involves the use of an auger mechanism to mechanically feed HRW into a continuous system where the waste is subjected to high-temperature steam. The elevated temperature for a specified residence time effectively kills or inactivates pathogens, including bacteria, viruses, and spores, rendering the waste non-infectious and safe for thermal treatment by waste to energy (WtE).

The continuous nature of CSAD can handle large quantities of waste efficiently in a continuous (non-batch) process, thereby serving the high waste throughput rates expected. CSAD doesn't produce harmful emissions like dioxins or heavy metals and is relatively energy efficient. It also minimises handling, thereby reducing occupational risks for the facility staff involved in HRW management.

Operational costs of CSAD are comparatively low, and the system is relatively easy to maintain with no pre-processing or arrangement of the waste required other than shredding. Due to its high efficiency and lower environmental impact, the scale of management required for CSAD is appropriate for the scale required.

CSAD is commonly applied as a HRW treatment option, having proven effectiveness.

CSAD technology was selected for these reasons.

3.3.5.2 Incineration (without energy production)

Incineration (without energy production) is a thermal treatment process that involves burning HRW at high temperatures (800°C to 1200°C). This method reduces the volume of waste significantly and effectively destroys pathogens, including viruses and bacteria, ensuring their safe disposal. Modern incinerators are equipped with air pollution control devices to minimise emissions of harmful gases and particulates. Incineration is a widely used method due to its efficiency in eliminating infectious agents and reducing waste volume, making it suitable for large-scale waste management.

Incineration (without energy production) is effective in destroying pathogens and reducing waste volume, making it suitable for a wide range of HRW types. It also produces energy in the form of heat, which can be harnessed for other purposes, such as electricity generation. Moreover, the process can handle a large quantity of waste efficiently, making it a viable option for hospitals and healthcare facilities with high waste generation rates.

One of the main concerns with incineration (without energy production) is the emission of potentially hazardous pollutants, such as dioxins, furans, and heavy metals to the atmosphere from a stack. This can pose environmental and health risks if not adequately controlled. Additionally, incineration requires specialised equipment and strict regulatory compliance, making it a costly option for waste treatment.

Incineration (without energy production) is not provided as a treatment option/service for HRW in Ireland. The existing Dublin WTE and the Duleek facilities operate with energy production.

In summary, incineration is highly effective in destroying pathogens and reducing waste volume but has significant environmental impacts and requires substantial management and investment.

The scale of management and capital and operational investment required to deliver adequate control for incineration means it is not a viable alternative process option for Enva to develop for the Proposed Development.

3.3.5.3 Waste to Energy (WtE)

Energy can be generated from the controlled combustion of suitable wastes to generate heat which drives a turbine to generate electricity. The WtE process not only reduces the volume of hazardous waste but also provides a sustainable energy source while minimising environmental impacts associated with HRW disposal.

WtE offers advantages for HRW management. Firstly, it provides a safe and efficient means of disposing of biohazardous waste, reducing the potential risk of infection and disease transmission. Secondly, by converting HRW into usable energy can help alleviate the burden on landfills and reduce the release of harmful greenhouse gases like methane, which may be generated from decomposing biohazardous waste.

WtE also presents challenges. Like incineration, the principal disadvantage is the requirement to manage emission of harmful pollutants. While these discharges may be suitably controlled with mitigation measures and monitored to ensure compliance, the significant production of potentially hazardous pollutant from incineration can raise environmental and health concerns.

WtE is not provided by the existing Dublin WTE and the Duleek facilities as a treatment option/service for HRW that has not been disinfected.

In summary, Waste to Energy provides a sustainable energy source while reducing waste volume but faces similar environmental management and investment concerns as incineration.

The scale of management required to deliver adequate control for WtE means it is not a viable alternative process option to develop for the Proposed Development.

3.3.5.4 Irradiation

Irradiation is a HRW treatment process that involves using ionizing radiation, such as gamma rays or electron beams, to sterilise HRW. During irradiation, the HRW is exposed to a controlled dose of radiation, which damages the DNA/RNA of pathogens and renders them non-viable. This process effectively eliminates the risk of infection and ensures that the waste is safe for final disposal. Irradiation is suitable for treating a wide range of HRW, including infectious materials, sharps, and other biohazardous items.

Irradiation offers advantages for HRW treatment. Firstly, it is a highly effective method for sterilisation, as it can destroy a wide variety of pathogens, including bacteria, viruses, and spores. Secondly, irradiation is a cold process, meaning it does not involve heating the waste to high temperatures like incineration or autoclaving. This makes it ideal for heat-sensitive materials, such as certain plastics and electronic devices, which may not withstand traditional thermal treatment methods.

Despite its advantages, there are disadvantages to consider when using irradiation for HRW treatment. A main concern is the significant initial capital investment required to set up an irradiation facility, as the technology and equipment can be expensive. The process also requires careful monitoring and adherence to safety protocols, as ionizing radiation can be hazardous to human health if not properly managed.

Irradiation is not provided as a treatment option/service in Ireland for HRW.

In summary, irradiation is highly effective for a wide range of waste types, including heat-sensitive materials, but requires significant capital investment and strict safety measures.

These disadvantages together preclude the use of irradiation for the Proposed Development.

3.3.5.5 Chemical disinfection

Chemical disinfection uses chemical agents to kill or inactivate pathogens present in HRW. The chemical agents work by disrupting the cell structures and functions of pathogens, rendering them non-viable and safe for disposal. Chemical disinfection is often used for liquid HRW, such as laboratory specimens, or items that cannot undergo thermal treatment methods like incineration or autoclaving.

Chemical disinfection offers several advantages for HRW treatment. Firstly, it is effective for a wide range of pathogens, making it suitable for various types of HRW. Chemical disinfection is a quick and relatively simple process, requiring less energy and infrastructure compared to thermal treatment processes like incineration. Additionally, chemical disinfection does not produce harmful emissions.

Chemical disinfection comes with certain disadvantages. One concern is the potential release of hazardous chemical by-products during the disinfection process. If not managed properly, these chemicals can pose risks to human health and the environment. It is essential to handle and dispose of the chemical disinfectants and the treated waste according to strict safety guidelines and regulations. Another drawback is the need for careful selection and use of appropriate chemical disinfectants for different types of pathogens and waste materials. Improper disinfection may not fully eliminate all pathogens, leading to potential health risks if the waste is not properly managed. Additionally, the effectiveness of chemical disinfection can be influenced by factors such as contact time, temperature, degree of contact, HRW particle size, and the concentration of the disinfectant, requiring precise control and monitoring during the process.

In summary, chemical disinfection is effective and environmentally friendly for specific types of waste but can produce hazardous by-products if not managed correctly.

These challenges together preclude the use of chemical disinfection for the Proposed Development.

3.3.5.6 Autoclaving

Autoclaving is a steam sterilisation method used to treat HRW. It utilises pressurised steam at high temperatures (approximate range 120°C to 140°C) to kill microorganisms and spores. This process is effective for treating biohazardous waste, such as laboratory waste, surgical instruments, and other items that come into contact with bodily fluids.

The primary advantage of autoclaving is its effectiveness in sterilising a wide variety of materials without the release of harmful pollutants. Unlike incineration, it does not emit toxic gases or particulates.

There are challenges associated with autoclaving. The process requires rigorous validation and quality control to ensure the complete sterilisation of waste, especially if the waste material is dense or arranged in a way that steam penetration is hindered. Autoclaving operates on a batch basis and is not designed for ongoing, continuous operations, it is labour intensive, and energy intensive, making it less suitable than the continuous steam auger for facilities with high volumes of waste as is proposed by Enva.

Although the operating costs may be lower, the initial capital costs for autoclaving equipment can be relatively high, especially for larger systems.

Irradiation is not provided as a treatment option/service in Ireland for HRW.

In summary, autoclaving is effective and environmentally friendly for a wide range of waste types but requires rigorous quality control and may not be suitable for all materials.

These challenges together preclude the use of autoclaving for the Proposed Development.

3.3.5.7 Summary of Alternative Processes

Alternative processes for HRW treatment to the continuous steam auger have been considered for the - Proposed Development. These include incineration, waste-to-energy, irradiation, chemical disinfection, and autoclaving. Each process comes with advantages and disadvantages, and the suitability of each option depends on factors such as the type of waste, volume, available infrastructure, and environmental concerns.

None of these processes can be considered a one-size-fits-all solution. Each presents specific challenges in terms of economic viability, technical feasibility, and environmental impact. Due to the scale of the challenges with each of the methods, none are considered to be viable alternatives to the continuous steam auger treatment proposed for the development.

3.3.6 Alternative Mitigation Measures

As part of a facility currently licenced under the Industrial Emissions Directive (2010/75/EU), the Proposed Development will be required to comply with legislative driven mitigation measures that are applied for such facilities across the EU. Given the prescriptive nature of the licensing regime, there is limited capacity for the consideration of alternative mitigation measures to be implemented at the Proposed Development.

When setting the licence conditions, the EPA will have to comply with the legal requirements of the Commissions Implementing Decisions (EU) 2018/1147 of August 2-19 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (notified under document C (2018) 5070) – commonly referred to as the BAT Conclusions for the waste treatment sector. This legislation applies across the EU and the EPA are obliged to implement the requirements to ensure consistency in these types of operation within the EU.

As noted throughout this chapter of the EIAR, the requirements for BAT have been incorporated in full into the design of the Proposed Development to ensure that the facility can operate in line with European best practice.

The following is a list of binding mitigation measures that are enforced by the EPA through the IE Licencing process, and alternative mitigation measures that were considered.

3.3.6.1 Odour Mitigation

- BAT12. To prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an odour management plan, as part of the environmental management system, that includes all the following elements:
  - A protocol containing actions and timelines.
  - A protocol for conducting odour monitoring as set out in BAT 10.
  - A protocol for response to identified odour incidents, e.g., complaints.

- An odour prevention and reduction programme designed to identify the source(s); to characterise the contributions of the sources; and to implement prevention and/or reduction measures. BAT 13. To prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques listed in the BAT Conclusion.
- BAT 14. To prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques listed in the BAT Conclusion.
- BAT 29. To prevent or, where that is not practicable, to reduce emissions of organic compounds to air, BAT is to apply BAT 14d, BAT 14h and to use the techniques listed in the BAT Conclusions.
- BAT 31. To reduce emissions to air of organic compounds, BAT is to apply BAT 14d and to use one or a combination of the techniques listed in BAT Conclusion.

Alternative mitigation measures that have been considered but that have been excluded while remaining compliant with the mandatory BAT mitigation are set out here.

Consideration was given to the refusal to accept waste streams that are malodorous by identifying these early in the process and diverting these to another outlet. This is considered to be impractical as the materials may already be at the facility (although upstream refusal to collect could be applied) and generating odours when they are identified as being malodorous. Alternative outlets to manage odorous HRW streams are required in order to provide biosecurity. These alternative outlets would prove impossible to locate as the alternatives would have similar concerns about managing malodours. The solution selected is to apply onsite operational procedures to manage incoming HRW streams that are malodorous.

Consideration was given to the adoption of biofilters as a cost-effective odour management technique. The high space demand for this option (compared with more space efficient options such as condenser, filtration and stack) precluded biofilter implementation at the proposed facility.

3.3.6.2 Noise Mitigation

- BAT 17. To prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to set up, implement and regularly review a noise and vibration management plan, as part of the environmental management system (see BAT 1), that includes techniques listed in the BAT Conclusion.
  - A protocol containing appropriate actions and timelines.
  - A protocol for conducting noise and vibration monitoring.
  - A protocol for response to identified noise and vibration events, e.g., complaints.
  - A noise and vibration reduction programme designed to identify the source(s), to measure/estimate noise and vibration exposure, to characterise the contributions of the sources and to implement prevention and/or reduction measures.
- BAT 18. To prevent or, where that is not practicable, to reduce noise and vibration emissions, BAT is to use one or a combination of the techniques given in the BAT Conclusions.

Alternative mitigation measures that have been considered but that have been excluded while remaining compliant with the mandatory BAT mitigation are set out here.

Alternative locations for the blast cooler were considered, including inside Building 1 and at the yard side of Building 1. The need to locate the blast cooler close to the point of use of the hydraulic oil but with access to outside air precluded indoor use without the use of dedicated active air exchange. The rear of Building 1 was selected as the best option as it allows access to open air, is furthest away from the most trafficked part of the yard and the existing vegetation mitigates any noise effects. The decision to enclose the bulk trailer loading area is partially driven by a desire to mitigate potential noise arising from the loading of materials via conveyors and vehicle movements. This enclosure also has the effect of reducing windblown litter and controlling the appearance of the loading area. An alternative enclosure technique observed at a similar HRW management facility was to use netting to capture windblown litter. The lack of noise mitigation was a factor in determining the need for a solid enclosure.

3.3.6.3 Water Mitigation

- BAT 19. To optimise water consumption, to reduce the volume of wastewater generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques listed in the BAT Conclusions.
- BAT 20. To reduce emissions to water, BAT is to treat waste using an appropriate combination of the techniques listed in the BAT Conclusions.
- BAT 35. To reduce the generation of wastewater and to reduce water usage, BAT is to use all the techniques listed in the BAT Conclusion.

Alternative mitigation measures that have been considered but that have been excluded while remaining compliant with the mandatory BAT mitigation are set out here.

Incorporating a greywater recycling system could optimise water usage and reduce wastewater generation. Enva is considering the use of a greywater recycling system to reduce the water demand of the HRW management facility, a decision that will be influenced by water management decisions for the greater site. Until that point, the default position is to rely on the existing wastewater treatment network.

3.3.6.4 Energy Mitigation

- BAT 28. To use energy efficiently, BAT is to keep the shredder feed stable.
- Incorporating variable speed drives could optimise energy use in real-time, adjusting to varying loads.

Enva has planning approval to install solar panels on roofing on the neighbouring building at the 402 Grants Drive site. These can power some of the facility operations, thereby reducing the facility’s overall carbon footprint. The use of solar power will decarbonise the electricity-energy use at the entire Enva facility where used, including the HRW management facility.

Alternative mitigation measures that have been considered but that have been excluded while remaining compliant with the mandatory BAT mitigation are set out here.

Enva has been reducing the carbon intensity of its carbon-based fuel use at the site, and this thinking mirrors the plan for the HRW management facility. The historical baseline for heat generation onsite is oil, which is carbon intensive. In 2020 Enva installed a natural gas boiler, which decarbonised the heat production. Enva now plans to use re-processed fuel oil from Enva Portlaoise (W0184-02) to operate the steam raising boiler on site which would further decarbonise heat generation for the packaging waste management area of the site from 2024. Oil was considered for as alternative energy sources and discarded in favour of natural gas which is more carbon efficient. Further, Enva is considering the future use of re-processed fuel oil in the HRW management facility, a decision which will be informed by the 2024 trial.

The decision not to proceed with the option immediately is informed by the need for further technological development and awareness of the techniques required for its implementation. These will be influenced by the current plans to use re-processed fuel oil for the packaging waste management area of the site from 2024.

3.4 Chapter References

Commission Implementing Decision (EU) 2018/1147 of 10 August 2018 establishing best available techniques (BAT) conclusions for waste treatment, under Directive 2010/75/EU of the European Parliament and of the Council (notified under document C (2018) 5070).

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

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.

EPA, 2022. *Guidelines on the information to be contained in EIA Reports.*

Industrial Emissions Directive (2010/75/EU).

South Dublin County Council, 2022.*South Dublin County Development Plan 2022-2028.*

CHAPTER 4

DESCRIPTION OF THE PROPOSED DEVELOPMENT

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4 DESCRIPTION OF THE PROPOSED DEVELOPMENT

4.1 Site Location

Enva currently operates a hazardous waste transfer/recovery facility within Greenogue Business Park in southwest County Dublin.

The elevation of the site is approximately 87.5 mOD (Ordnance Datum). Site location details are set out in **Table 4.1**.

Table 4.1: Site Location Details

Grid Reference	O 01579 28492
X (Easting)	301579
Y (Northing)	228492
Latitude	53.297216
Longitude	-6.4770453
X (Irish Transverse Mercator, ITM)	701521
Y (ITM)	728517
X (Universal Transverse Mercator, UTM)	668135
Y (UTM)	5908302
Eircode	D24 AP04

4.2 Site Description

The Enva site covers approximately 1.1 hectares (ha), and it is covered extensively in hard standing concrete and buildings.

The overall Enva site is bounded:

- To the north by the Griffeen River.
- To the south by Grants Drive.
- To the east by an adjoining commercial holding, primarily used for vehicle parking.
- To the west by two adjoining commercial holdings, primarily used for vehicle parking.

A strip of landscaping, up to 2 m wide, is maintained and managed along the inside perimeter of the overall Enva site which comprises thin strips of recolonised bare ground habitat.

The Enva site location and immediate surrounds are shown in **Figure 4-1.**

The site includes 3 buildings **(Figure 4-1)**. Buildings 1 and 3 will be modified to accommodate the proposed HRW activities.

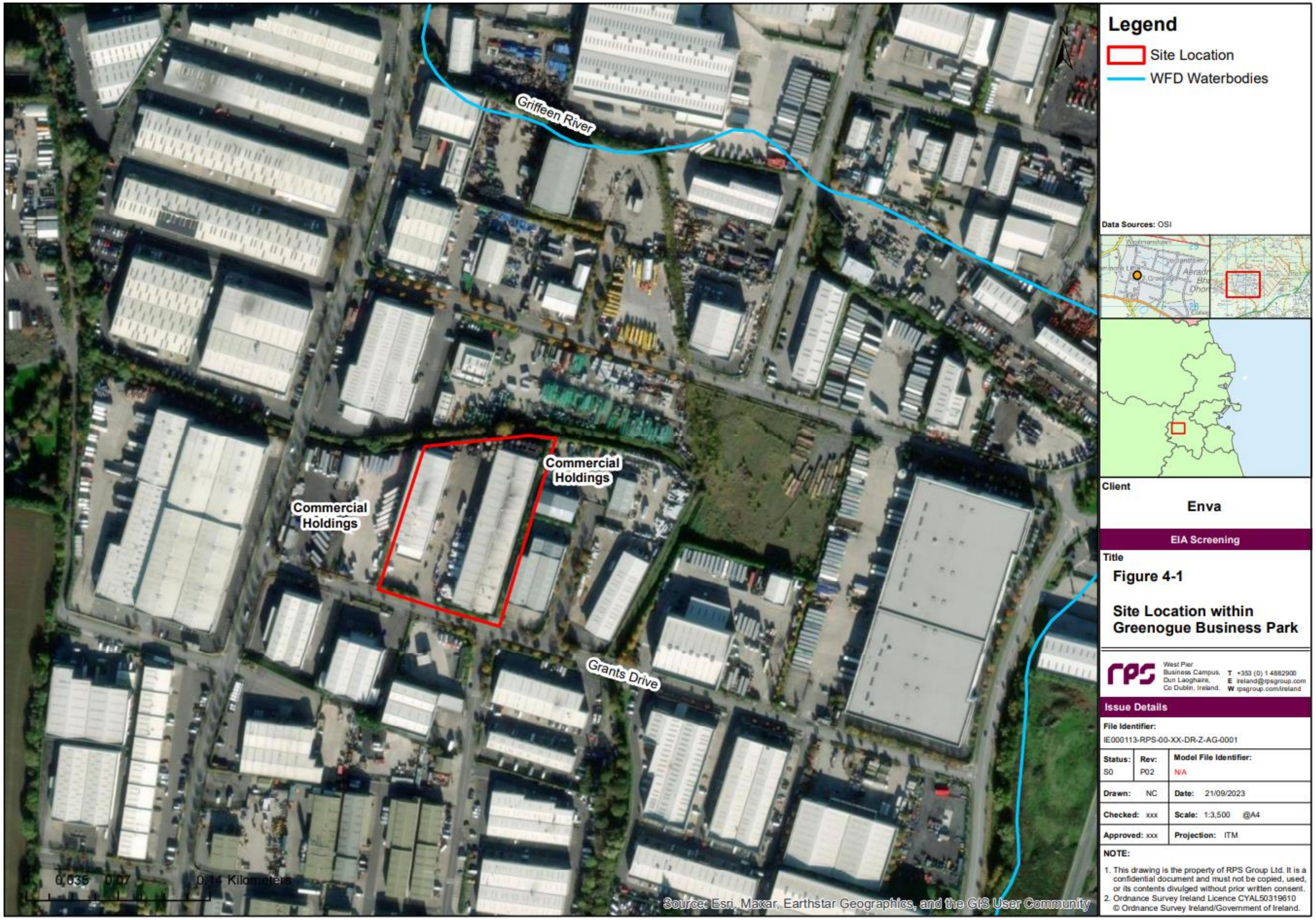


Figure 4-1: Site Location within Greenogue Business Park

4.3 Site Layout and Existing Operations

4.3.1 Current Waste Intake

The existing hazardous waste transfer/recovery facility was constructed on a serviced site in the Greenogue Industrial Estate and has been in operation since December 2004. The facility is authorised by planning approval Reg. Ref. SD07A/0260 as amended to process throughput of 106,000 tonnes of hazardous waste per annum, and 5,000 tonnes per annum of non-hazardous waste.

Condition 4.a of the current planning approval (Planning Application reference SD09A/0050) requires Enva to comply with the EPA IED licence. Condition 4.b of the planning approval (Reg. Ref. SD09A/0050) limits total site intake to 111,000 tonnes per annum. EPA (IED Licence W0192-03) limits total site intake to 111,000 tonnes per annum of specified materials.

The waste intakes authorised by the IED Licence, are amended by Technical Amendment A which changed the wording of Note 3 to read*: The limitation on individual hazardous and non-hazardous waste types may be varied with the agreement of the Agency subject to the total annual waste quantity remaining the same*.

Note 4 to this table in the IED Licence states that: *"Hazardous waste types as detailed in attachment H.1 after review application for this licence Reg number W 0192 - 03 or as may be otherwise detailed in advance by the Agency."* The hazardous waste types as detailed in attachment H.1

Within Table A.2 of the IED Licence, the composition of "Other" is to be as specified in Attachment H1 of the IED Licence application. See **Appendix 4.1** of this chapter for detail of these streams.

4.3.2 Site Layout

The facility comprises 2 main buildings (Building 1 & Building 2) within which are housed three operations and an ancillary support office (Building 3), as shown in **Figure 4-2.**

Enva is the sole occupant of the site, and controls access to the facility with security arrangements including gates, fencing and personnel monitoring access. The redline boundary and environmental monitoring points for the IED licence are indicated in **Figure 4-3**.

The existing facility layout provides for the following:

- Containment of each facility to prevent pollution to air, soil, or water.
- All operations take place within enclosed buildings, which mitigate potential noise, odour, and dust impacts.
- The separate control of foul and surface waters on site.
- Sufficient road areas within the site to accommodate queuing and the free flow of vehicles on site.
- On-site administration facilities for site staff.
- Sufficient room for vehicle parking and landscaping of the site.

A weighbridge located beside the office building weighs waste on arrival at the site, where details are logged before being moved into the site. The concreted marshalling yard provides storage area and access to Buildings 1 and 2. A tank farm is located at the northernmost part of the facility. A strip of landscaping, of up to 2 m wide, is maintained and managed along the inside perimeter of the site. The facility car park with 32 parking spaces is located between the office space and Grants Drive and to the west of the facility entrance.

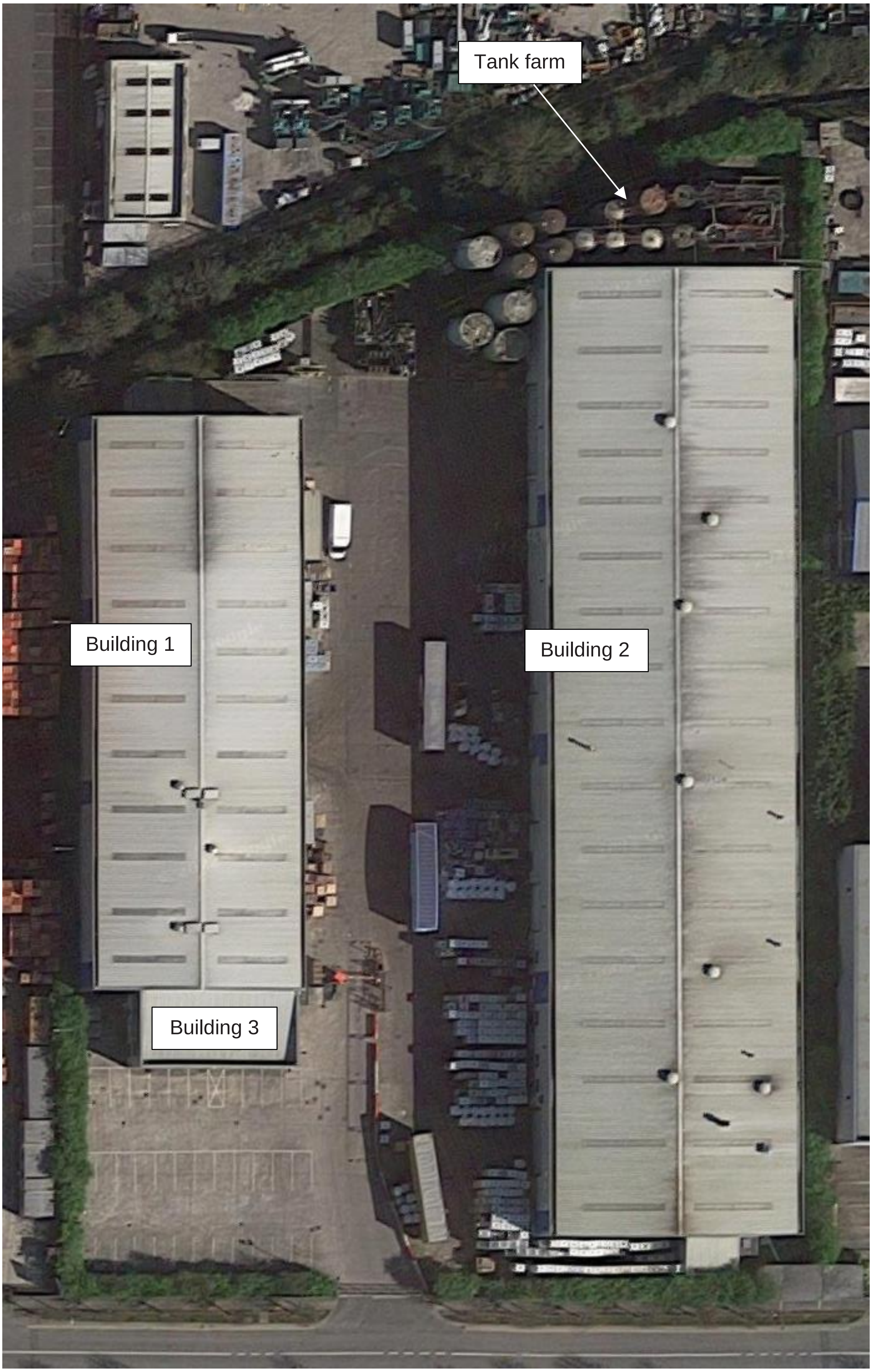
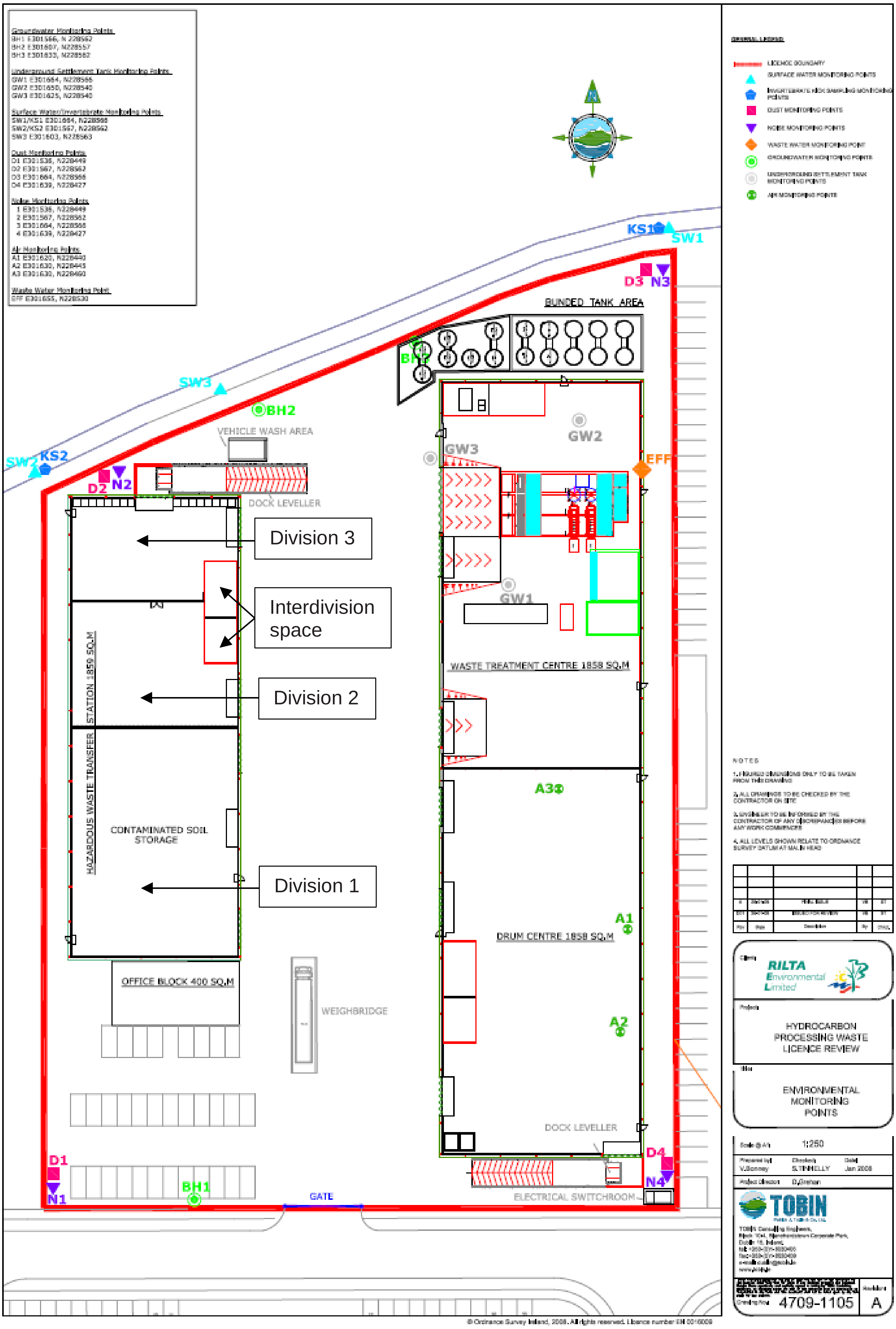


Figure 4-2: Enva Existing Site Layout


Groundwater Monitoring Points
BH1 E301566, N 228562
BH2 E301607, N228557
BH3 E301633, N228562
Underground Settlement Tank Monitoring Points
GW1 E301664, N228566
GW2 E301650, N228540
GW3 E301625, N228540
Surface Water/Invertebrate Monitoring Points
SW1/KS1 E301684, N228568
SW2/KS2 E301567, N228562
SW3 E301603, N228563
Dust Monitoring Points
D1 E301538, N228449
D2 E301567, N228562
D3 E301684, N228568
D4 E301639, N228427
Noise Monitoring Points
1 E301538, N228449
2 E301567, N228562
3 E301684, N228568
4 E301639, N228427
Air Monitoring Points
A1 E301620, N228440
A2 E301630, N228443
A3 E301630, N228460
Waste Water Monitoring Point
EFF E301655, N228530
GENERAL LEGEND
SURFACE WATER MONITORING POINTS
DUST MONITORING POINTS
NOISE MONITORING POINTS
WASTE WATER MONITORING POINT
UNDERGROUND SETTLEMENT TANK MONITORING POINTS
AIR MONITORING POINTS
KS1
SW1
D3 N3
BUNDED TANK AREA
BH3
SW3
BH2
VEHICLE WASH AREA
GW2
SW2 KS2
GW3
EFF
D2 N2
DOCK LEVELLER
Division 3
Interdivision space
GW1
WASTE TREATMENT CENTRE 1858 SQ.M
Division 2
HAZARDOUS WASTE TRANSFER STATION 1859 SQ.M
A3
CONTAMINATED SOIL STORAGE
Division 1
A1
DRUM CENTRE 1858 SQ.M
OFFICE BLOCK 400 SQ.M
WEIGHBRIDGE
A2
DOCK LEVELLER
D1
D4
BH1
N1
GATE
ELECTRICAL SWITCHROOM
N4
NOTES
RILTA Environmental Limited
HYDROCARBON PROCESSING WASTE LICENCE REVIEW
ENVIRONMENTAL MONITORING POINTS
1:250
Jan 2008
TOBIN
4709-1105
A
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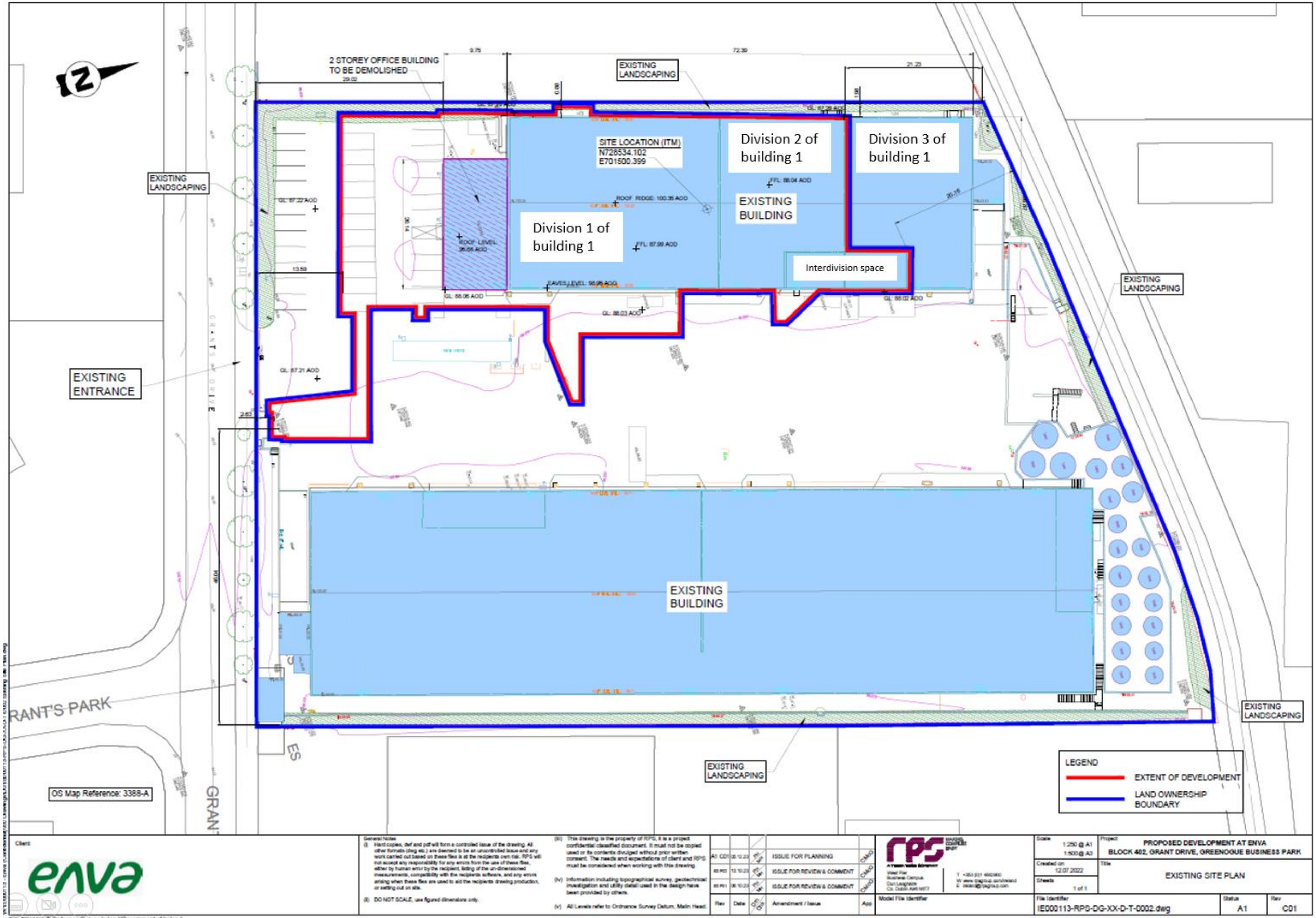

Figure 4-3: Existing Site Layout Showing Building 1 Subdivisions

4.3.3 Existing Operations

4.3.3.1 Building 1 - Hazardous Waste Transfer

Building 1 is a metal clad building that has a floor area of approximately 1,900 m^2 (72.0 m long and 26.0 m wide) and is approximately 12.2 m in height. This building is divided into divisions by internal block walls. Each division currently houses a separate operation:

- **Division 1** (southerly end of Building 1, located closest to Grants Drive): A hazardous waste transfer station, where storage, bulking up and transfer of contaminated soil for disposal and recovery is conducted. There is no ‘processing’ of the soils waste in the warehouse. This division of the building is also authorised (by SD09A/0050) to process and recover waste drill cuttings (created when drilling into the earth). Division 1 dimensions are approximately 32.5 m long and 26.0 m wide.
- **Division 2** (central): A hazardous waste transfer station, where storage on shelving units, bulking up and transfer of packaged hazardous waste for disposal and recovery is conducted. There is no processing of this material on site. Division 2 dimensions are approximately 19.5 m long and 26 m wide.
- **Division 3** (northerly end of Building 1, located furthest from Grants Drive): this division is currently used for the storage, bulking up and transfer of transformers. Building 3 dimensions are approximately 20.0 m long and 26 m wide.
- There is a two-story “interdivision” area located between Divisions 2 and 3 of Building 1. This space was previously used as an office and is serviced with an internal stair and internal entrance doors from both Division 2 and 3 of Building 1.

These divisions and the internal “interdivision” area are depicted in **Figure 4-3**.

Works proposed as part of the Proposed Development will occur within and around divisions 1 and 2 and the two-story “interdivision” area within Building 1 (and the existing office area which is described in a later section of this chapter).

4.3.3.2 Building 2 - Hydrocarbon Waste Treatment & Drum Recovery

Building 2 is a metal clad building that has a floor area of approximately 3,750 m^2 (121.0 m long and 31.0 m wide) and is approximately 12.6 m in height. This building is divided into two divisions, which house the following operations:

- The hydrocarbon waste treatment centre, approximately 1,900 m^2 (60.5 m long and 31.0 m wide) where treatment and recovery of hydrocarbon contaminated waste from sources such as bilge tanks of ships, petrol stations and oil spills. The waste oil treatment process involves decanting high levels of water from the oil, filtering using vibrating screen filters and mesh filter baskets to remove suspended solids, chemical treatment with dewatering agents, de-emulsifiers and de-ashing agents and heat treatment.
- A drum recovery centre, approximately 1,900 m^2 (61.0 m long and 31.0 m wide), for the reconditioning or recycling of empty industrial packaging such as steel drums, plastic drums, and intermediate bulk containers.

Enva processes aqueous, hydrocarbon and sludge wastes in the Hydrocarbon Waste Treatment Centre. Waste oils processed at the facility are sent off-site for further recovery or disposal. The concreted marshalling yard provides storage area and access to Buildings 1 and 2. A tank farm is located at northern most part of the facility.

No works are proposed within Building 2 as part of the Proposed Development, and it is outside the red line boundary.

4.3.3.3 Building 3 – Office Space

The office is located inside the entrance, facing onto Grants Drive, and adjoins Building 1. The office is currently in use. The office structure has a floor area of approximately 180 m^2 and approximately 7.6 m in height. The office area has two entrance doors from the yard. There is no direct link through the dividing wall between the office and Building 1.

The office structure is depicted in **Figure 4-2**.

4.4 Proposed Development

4.4.1 Proposed HRW Intake

Enva proposes to manage up to 24,000 tonnes of HRW per annum. The HRW types proposed for management at the HRW facility is set out in **Table 4.2**. The table also indicates whether the HRW is to be disinfected onsite or stored without disinfection prior to transfer offsite. Some of these materials are not currently authorised by the Environmental Protection Agency (EPA) Industrial Emissions Directive (IED) licence and their acceptance at the facility will require IED licence review – also indicated in the table following.

Table 4.2: List of Waste Types Proposed for Acceptance at the HRW Facility

18 WASTES FROM HUMAN OR ANIMAL HEALTH CARE AND/ OR RELATED RESEARCH		Primary Process - Disinfect or Transfer	Approved in IED Licence?[1]
18 01 Wastes Natal Care, Diagnosis, Treatment, Human Diseases			
18 01 01	Sharps (except 18 01 03)	Disinfect	Yes
18 01 02	Body parts and organs including blood bags and blood preserves (except 18 01 03)	Transfer	No
18 01 03*	Wastes whose collection and disposal is subject to special requirements to prevent infection	Disinfect	No
18 01 04	Wastes whose collection and disposal is not subject to special requirements to prevent infection (for example dressings, plaster casts, linen, disposable clothing, and diapers)	Disinfect	No
18 01 06*	Chemicals consisting of or containing dangerous substances	Transfer	Yes
18 01 07	Chemicals other than those mentioned in 18 01 06	Transfer	No
18 01 08*	Cytotoxic and cytostatic medicines	Transfer	No
18 01 09	Medicines other than those mentioned in 18 01 08	Transfer	Yes
18 01 10*	Amalgam waste from dental care	Transfer	No
18 02 Wastes Research, Diagnosis, Treatment, or Prevention of Animal Disease			
18 02 01	Sharps except (18 02 02)	Disinfect	
18 02 02*	Wastes whose collection and disposal is subject to special requirements to prevent infection	Disinfect	Yes
18 02 03	Wastes whose collection and disposal is not subject to special requirements to prevent infection	Disinfect	No
18 02 05*	Chemicals consisting of or containing dangerous substances	Transfer	Yes
18 02 06	Chemicals other than those mentioned in 18 02 05	Transfer	Yes
18 02 07*	Cytotoxic and cytostatic medicines	Transfer	Yes
18 02 08	Medicines other than those mentioned in 18 02 07	Transfer	Yes

Enva does not propose to change the 111,000 gross annual tonnage intake limits. The annual intake of other waste at the facility will be reduced by 24,000 tonnes, meaning that the gross annual tonnage intake at the facility will remain unchanged at 111,000 tonnes.

The shredding and stream treatment process applied to the HRW will lead to a change in weight and volume compared to what was accepted at the facility. Enva estimates this volume reduction at 80%.

[1] "Approved" means the stream is listed in Attachment H1 of IED Licence review and is approved for Storage D15 & R13.

100% of the wastes accepted for disinfection will be moved offsite to energy recovery after having passed through the thermal screw disinfection process.

Some liquids will be dewatered from the disinfected HRW. These disinfected liquids will be captured by the facility wastewater management system.

Miscellaneous waste streams will arise from the maintenance of equipment on site, primarily oils and greases, and from other depleted consumables. These will be managed appropriately by an appropriately authorised service provider.

4.4.2 Water Management

4.4.2.1 Stormwater Management

The site is currently operational and is primarily covered in hard standing “made ground.” Stormwater and rainwater are captured and managed appropriately through a hydrocarbon interceptor prior to discharge.

There will be no net change to the volume or quality of stormwater arising. Therefore, minor changes only are proposed to the management of the existing stormwater arrangements. These minor changes will simply reflect the change of rainwater capture arrangements on roofing and the yard.

4.4.2.2 Foul Water Management

Foul water from the proposed activities will arise from the following and will be discharged into sewer. The HRW management process:

- Washing of bins (will contain a biodegradable detergent used to decontaminate the bins).
- From management of condensate and other dewatering of the treated HRW.

Foul water from site operations is currently made to sewer following wastewater treatment and with appropriate monitoring in accordance with the facility EPA IED licence. The foul water discharge from the Proposed Development will not be subject to on-site treatment prior to the discharge to sewer.

Foul water discharge must comply with the EPA IED Licence Emission Limit Values (ELVs) set out in **Table 4.3.**

Table 4.3: Emission Limit Values for Water Discharge to Sewer

	Grab Sample (mg/l)	Daily Mean Concentration	Daily Mean Loading (kg/day)
BOD	2,000	800	144
COD	4,000	1,600	288
Suspended Solids	500	100	72
Sulphates (as SO_4)	1,000	1,000	180
Mineral Oils	10	10	18
Detergents (as MBAS)	100	100	18
Benzene	1	1	0.18
Toluene	1	1	0.18
Ethyl Benzene	1	1	0.18
o/p/m Xylenes	1	1	0.18
Zinc	3	3	0.54
Copper	1	1	0.18
Nickel	1	1	0.18
Chromium	1	1	0.18
Arsenic	0.5	0.5	0.09

	Grab Sample (mg/l)	Daily Mean Concentration	Daily Mean Loading (kg/day)
Lead	0.2	0.2	0.04
Temperature	42 °C max	42 °C max	42 °C max
pH	6-10	6-10	6-10
Maximum per day	**Total 180 m^3**		
Maximum per hour	**Total 40 m^3**		

Foul water will arise from the condensers and other dewatering systems at the post-process (after the thermal screw) end of the plant. This means that this foul water will have been exposed to the same sterilisation parameters as the rest of the waste. Parameters such as COD, BOD, Suspended Solids, pH, etc., will be monitored and controlled by Enva in accordance with the IED licensing requirements.

The emissions to water will be subject to EPA IED licence and South Dublin County Council (SDCC) discharge licence. The EPA would be directed by the Local Authority as to criteria to be incorporated in the EPA licence. Local Authority staff would be involved in sampling as appropriate but EPA that would enforce any exceedances. Process water will be discharged to sewer at the existing EPA-licensed foul sewer drainage point.

It is expected that the outputs will not exceed the following values as set out in **Table 4.4**.

Table 4.4: Expected Water Quality Outputs from the Facility

Parameter	Mg / l	Daily Mean Concentration mg / l	Daily Mean Loading kg / day
BOD	1,000	800	16
COD	3,000	2,400	48
Suspended Solids	1,000	400	8
Detergents (as MBAS)	100	100	2
Fats Oils Greases	100	100	2
Temperature	42 °C Max		
pH	6-10		
Volume Output Maximum	40 m^3/day and 10 m^3/hour		

4.4.2.3 Water – Potable Consumption

In 2021, 7,677 m^3/per year of water was consumed which was a decrease by 3.5 % when compared to 2020. Proposed water use at the HRW management facility is estimated at 10,000 m^3/per year.

4.4.2.4 Flooding

Areas within Greenogue Business Park have a history of and are susceptible to flooding (OPW (Office of Public Works), 2022)[2], however, the Enva facility is not within an area that is subject to flooding or that has any historically recorded flood event, and does not intersect any area associated with low, medium, or high flood probability.

The proposed changes to development are located inshore (approximately 20 km) and away from Dublin Bay; therefore, risk of coastal flooding is not applicable.

[2] /www.floodinfo.ie/map/floodmaps/#

4.4.2.5 Groundwater

Enva has a groundwater monitoring programme in place. Groundwater is monitored on-site via three groundwater monitoring wells. These are monitored as per the sites environmental licence and randomly throughout the year by the EPA.

Groundwater monitoring results over the last 5 years indicated the presence of groundwater pollution. Groundwater pollutants identified are:

- Electrical conductivity
- Total petroleum hydrocarbons
- Nickel
- Chloride
- Sodium

In 2020, additional groundwater monitoring wells were drilled on and off site in an effort to better understand the groundwater quality. These also assisted in determining if the contamination issues were migrating to the site or because of the site use.

Based on the data collated, it appears that the contamination issues are as a result of historic site activities where contaminants have remained in the soil and groundwater and are still persisting a number of years later. Monitoring results are showing that contaminant levels are continuing to decrease over time.

4.4.3 Air Quality Management

Negative air pressure extraction hoods will capture residual air at various points in the process. This air will be routed through HEPA (High Efficiency Particulate Air) filter to capture pollen, dirt, moisture, bacteria, and viruses. The filters will be changed at appropriate intervals and dispatched to an appropriately licenced incinerator. The air is then to be directed through condensers to remove moisture before being passed through activated carbon filtration which will remove any trace odour before it is released to atmosphere through a stack which will be located at the roofline Building 1 near the sources of emissions and where there would be ease of access for monitoring. The stack will protrude a maximum of 2 m from the eastern edge of the roof. Stringent air emissions limits will be enforced by the EPA. Independent monitoring will be conducted at pre-determined intervals.

4.4.4 Proposed Site Layout

The existing building that currently houses divisions 1 and 2 and the interdivisional area of the hazardous waste transfer (Building 1), and the existing office building (Building 3) are incorporated within the development site. No works are proposed to adjust Building 2, the site boundary, or the existing access arrangements.

Figure 4-4 shows the extent of the proposed development boundary in red, and the rest of the site delineated in blue. This includes the location of the weighbridge office and the pedestrian pathway to the weighbridge office. **Figure 4-5** shows the proposed ground floor plan. **Figure 4-6** shows the proposed internal layout on the mezzanine floor.

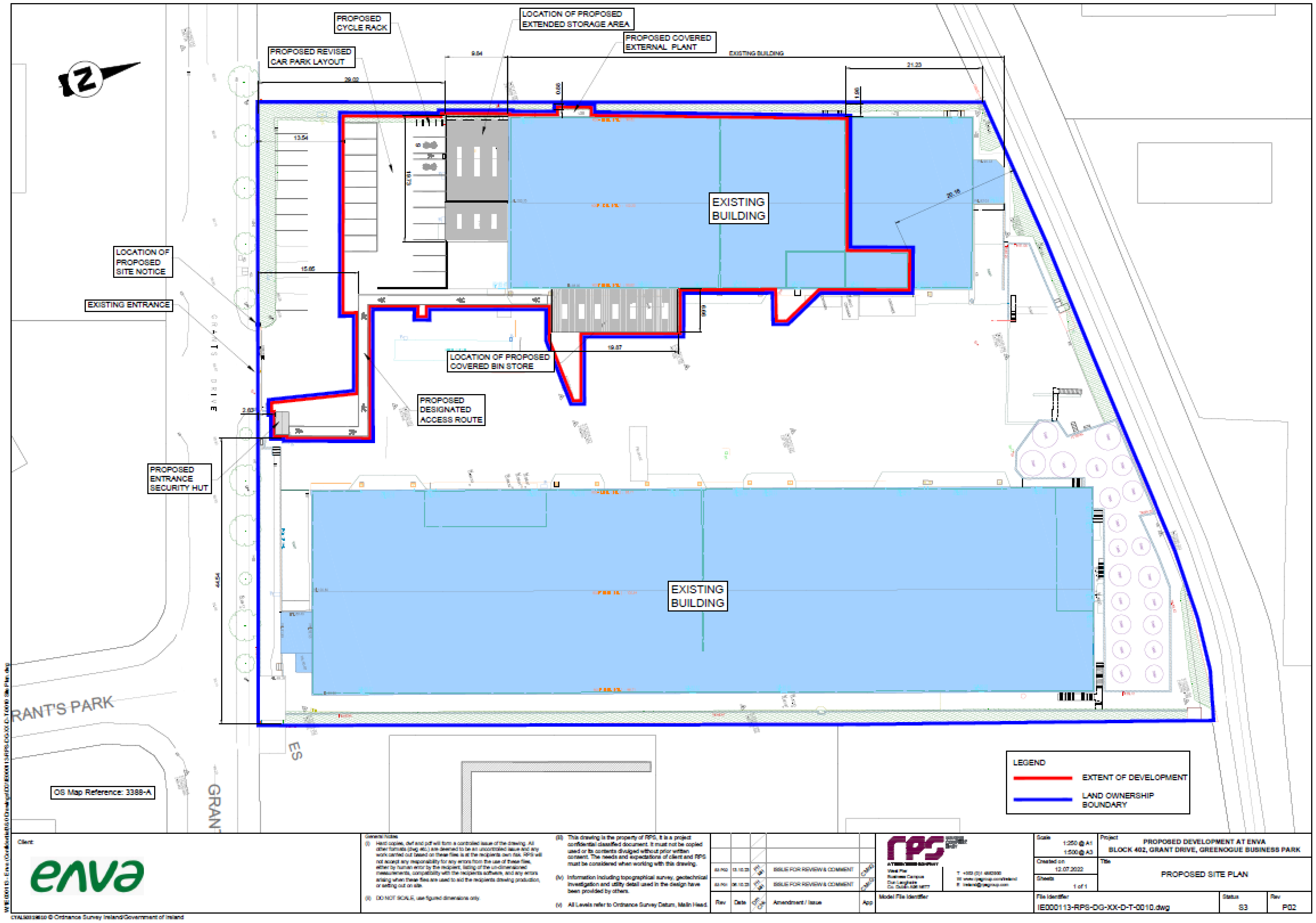

Figure 4-4: Extent of Proposed Development

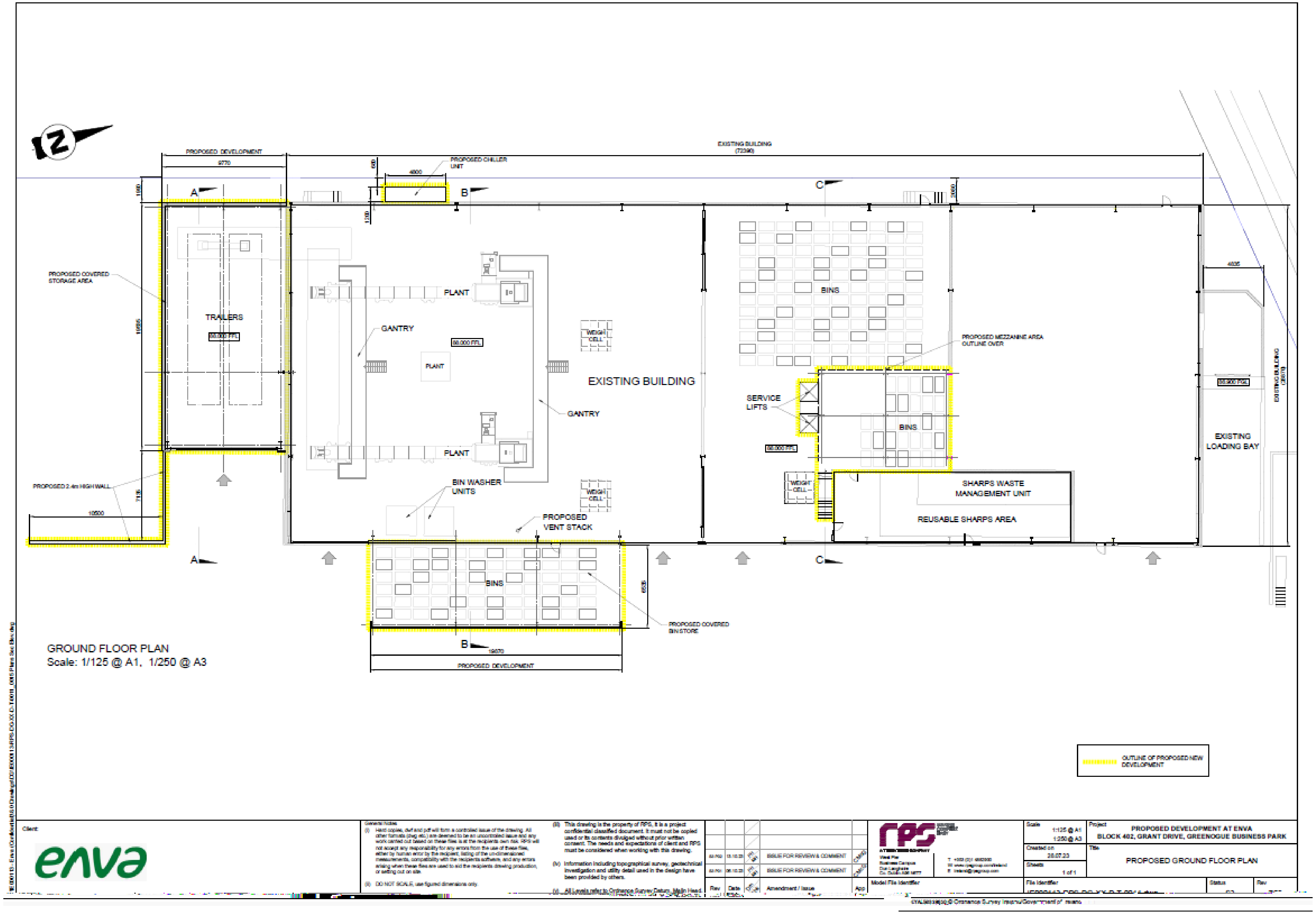

Figure 4-5: Proposed Ground Floor Plan

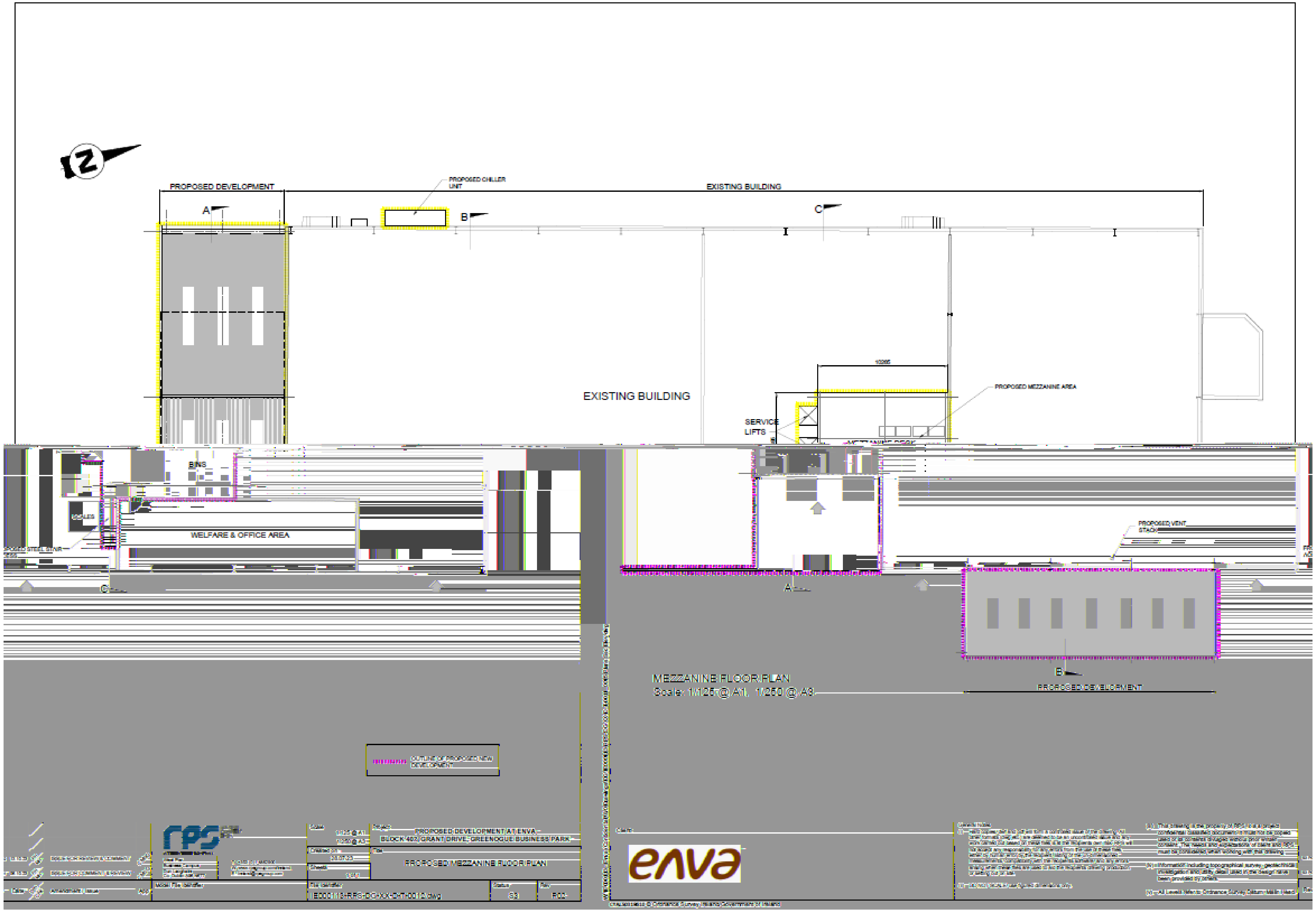

Figure 4-6: Proposed Mezzanine Floor Plan

4.4.5 Proposed Processes

Enva proposes to manage up to 24,000 tonnes of HRW per annum. There will be no change to the 111,000 gross annual tonnage intake limits. The annual intake of other waste at the facility will be reduced by 24,000 tonnes, meaning that the gross annual tonnage intake at the facility will remain unchanged at 111,000 tonnes.

The proposed processes to be undertaken are shown in **Figure 4.7.**

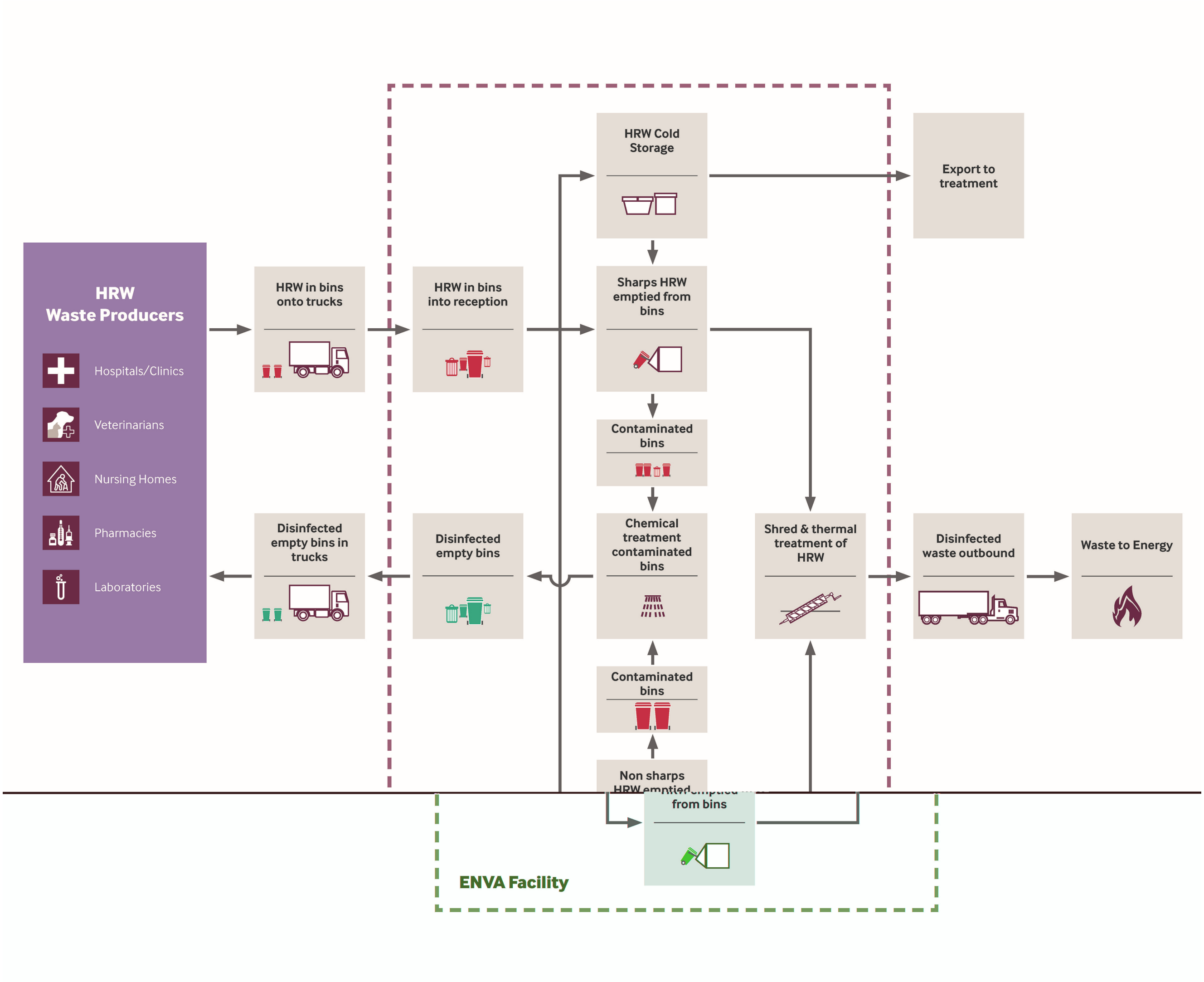

Figure 4-7: Summary of Processes

4.4.5.1 Disinfection of HRW

Process Overview

HRW materials received will be moved into a reception area in Division 2 of Building 1. Here, the materials will be registered, weighed, and consigned to the appropriate process.

The treatment process for the HRW materials is a fully automated technology that shreds then applies steam heat disinfection. The system used will be designed to shred and disinfect appropriate forms of HRW - biohazardous, hospital, and biomedical waste including sealed containers and their contents.

The sequence of treatment will be:

1. The bin will be weighed prior to being mechanically loaded into a continuous operation feed hopper.
2. The bin is lifted and the HRW dropped into the shredder. A continuous supply of steam raises the temperature within the unit and decontaminates the waste continuously during operation.
3. The shredded HRW then enters the continuous feed, steam treatment auger (an inclined 'thermal screw') thermal treatment section. In this part of the system, additional steam is applied through multiple ports to raise the temperature within the unit. This raises the temperature of the waste to a level which achieves the necessary level of disinfection. This provides decontamination and disinfection of the waste. This process does not involve combustion.
4. This is followed by a dehydration process which removes free liquids. An odour control agent may be automatically applied to the waste to mask or remove odours in the waste. The moisture eliminated from the waste is to be discharged to the existing site drainage system.
5. Shredded and treated HRW is then moved into a bulk trailer and consigned off site for recovery. The resultant waste product will be reduced in volume by a ratio of 7:1, meaning that the volume of outgoing waste is significantly reduced. This unrecognisable residual treated waste will be sent to licenced thermal treatment.
6. Daily microbiological testing will demonstrate the efficacy of the system.

The process reduces the waste by up to 80 % in volume.

Figure 4-8 shows a schematic of a HRW management model which is proposed.

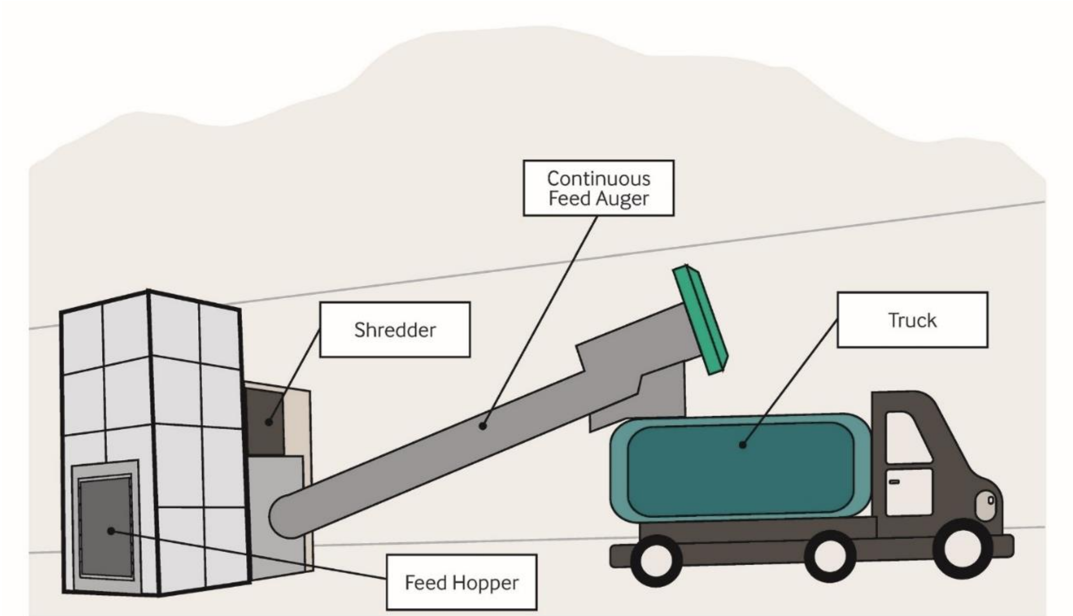

Figure 4-8: Schematic of Treatment Unit

Two separate, parallel treatment units are proposed. Indicative calculations are presented in **Table 4.5** based on 7 days/week operation, 50 weeks (351 days) per annum. The treatment units may be rated to different capacities depending on the configuration selected.

Table 4.5: Example Annualised Throughputs 355-Day Operation

Units	Tonnes / hr Rated Capacity	TPA @ 24 Hours / Day
1	1.354	11,406
2	2.708	22,812

The equipment operation is continuous, but throughput varies by the hours of operation. Once the process is complete the disinfected waste is discharged from the treatment lines into a self-contained enclosed conveyer system which will move the waste and discharge into the bulking trailers. The trailers will be equipped with walking floors to aid loading. The bulk trailers will be parked and loaded inside an enclosure that will be at approximately 9.1 m in height. The shredded and treated material will then be consigned off site for recovery. It is proposed to manage the disinfected waste produced by thermal recovery by incineration in the Republic of Ireland.

Disinfection treatment lines will be supported by bin washing, bin reception/scanning/weighing, bin storage and other facilities. The bin washing units will wash bins in a short rotation time, with manual loading and unloading. The bulk trailers will be parked and loaded (via a conveyor system) with treated material for removal offsite. This enclosure will be at the same height as the existing office.

Equipment

The equipment required for the Disinfection Process will be:

- Combined disinfection unit including:
  - Lifting tipper
  - Hopper
  - Push ram
  - Shredder
  - Archimedes thermal screw steam auger
  - Extraction system
  - Conveyors
  - Waste dewatering
- Gas fed steam generators
- Air treatment
  - Dehumidifiers
  - HEPA filters
  - Carbon filter
  - Stack
- Air blast cooler (located outside and to the rear of Building 2)
- Maintenance gantry/Crane
- Certuss steam generator (gas-fired)
- Compressors
- Bin washers
- Bin storage areas
- Bin movement guide rails
- Bulk trailer loading conveyors
- Water treatment for the bin washer – sand and carbon filter
- Telecoms, Supervisory Control and Data Acquisition (SCADA), etc.
- Reception facility to record details of all incoming HRW

The entire floor area will be treated with hard wearing resin with different colours employed to designate how separate areas, e.g., Pre-process/Clean bins are used.

4.4.5.2 Reusable Sharps Containers Management

Process Overview

HRW sharps (such as needles, blades and other sharp medical instruments) will be conveyed to the facility in standard sized reusable sharps containers. These containers will be received, weighed, logged, and fed to an automated processing line located in the ‘interdivision’ space between Divisions 2 and 3 of Building 1. The processing line will feed the containers into an automated emptying system. The containers will continue into an automated washing and disinfection system. The empty, washed, and disinfected containers will then be moved to a storage area for outwards dispatch to customers. The extracted sharps and other contents of the containers will be moved manually in wheeled containers into the Process 1 thermal screw disinfection units for management.

Equipment

Automated sharps management will comprise a unit for automated emptying, washing, and disinfecting of sharps containers. This enclosed area will be served with ventilation fans to extract air to treatment.

4.4.5.3 HRW Transfer Station and Office/Welfare

Process Overview

The proposed transfer station will be located within the mezzanine area of Building 1. This will allow the HRW fraction that cannot be processed in the treatment plant to be consolidated, stored, and repacked in preparation for onward shipment to an appropriately licensed treatment/disposal facility.

The waste will be typically solid in nature and packaged in purpose-made containers United Nations (UN)-Approved containers up to 60 litres in capacity with standard purple lids and black lids.

- Purple lid rigid containers comprise healthcare waste contaminated with cytotoxic/cytostatic medicines, chemicals, or pharmaceuticals.
- Black lid rigid containers comprise materials such as un-autoclaved Category B cultures, materials contaminated with blood or blood components, contaminated large metal objects (which cannot be shredded and where no other suitable form of recovery is available).

No onsite treatment processes are proposed for these materials – simply ambient temperature storage and repacking. Storage will be conducted to 48-60 hours at the upper level of the mezzanine area. These will be stored and bulked up (collecting small volumes of waste and storing them until a large enough volume is accumulated to make the shipping offsite more cost-effective). Following bulking up, the HRW will be transported offsite for management by recovery processes.

The materials proposed for this bulking process are marked as “transfer” in **Table 4-2**. The annual tonnage throughput of purple and black lidded waste proposed is 1 680 tonnes. This operation will occur on a mezzanine floor that will be installed over the automated sharps management area. This mezzanine floor will be serviced by a lift to move incoming and outgoing materials up and down. This material will either arrive palletised or will be palletised after arrival. As each pallet is completed, it will be shrink-wrapped in preparation for transfer offsite. It is anticipated that waste would be dispatched offsite on a weekly basis for management by recovery processes.

Waste handled in this part of the facility will be consigned for incineration at facilities outside of Ireland including:

- AGR, Herten, Germany
- Remondis TRV, Cologne, Germany
- Indaver NV, Antwerp, Belgium
- SWS, Denmark
- Fortum, Nyborg, Denmark

Office and Welfare Unit

An office and welfare unit will be located on the existing upper floor of this area.

Equipment

This facility will comprise the following:

- Materials hoist/lift to first floor
- Ambient temperature storage for 48-60 hours
- Office facilities

- Welfare facilities including WC and showers

4.4.6 Utility and Material Requirements

The approximate utility requirement of the thermal screw element of equipment is set out in **Table 4.6**.

Table 4.6: Required Utilities

Utility Type		Specifications for Each Unit
Water - liquid	Input	4 m^3/HR @ 2 bar atm drawn from the existing water mains connections
Water - steam supply for disinfection of the waste	Input	800 kgs/HR @ 1 bar regulated
Water - foul sewer drain	Output	Liquid condensate captured after the auger, dispatched to 50 mm flush trapped floor drain directed to foul sewer
Air - ventilation of steam	Output	100 mm dia. to outside above roof steam vent
Air - ventilation from High-Efficiency Particulate Absorbing (HEPA) filter	Output	200 mm dia. to outside above roof HEPA exhaust
Air - make up air	Input	6 800 m^3/HR
Air - compressors	Input	
Electrical supply	Input	500 AMPS @ 400 V, 50 Hz, 3-phase - other voltages require higher amperage supply
Natural gas for heating the water		88 cu..m./HR. 50-50mbar
Conveyors to move waste from augers to bulk trailers		TBC
Communications	Input and output	Ethernet CAT 5 dedicated I.P. address

The other raw material that will be utilised by the facility core process will be disinfectants and detergents (for cleaning and disinfection of wheeled bins).

Note that planning permission was granted by South Dublin County Council on 08 November 2022 for the installation of solar panels at the Enva Greenogue site (Planning reference SD22A/0326). Although they have not been installed, they will serve to supplement energy supply to the facility.

4.4.7 Lighting

The following changes to the facility lighting arrangements will be required:

- There will be a small bin store attached to Building 1. New lighting will be provided for this area.
- New lighting will be provided for the new approximately 191 m^2 steel-clad structure providing space for two bulk trailers will be constructed on approximately the same footprint as the existing office.
- A new portacabin type structure will be installed inside and west of the main entrance to the facility. New lighting will be provided for the new configuration.
- The existing lighting arrangements in the yard, including in the entrance area where the footpath will be located will be reviewed considering the new operation. Changes (additions, removals, relocations) may be made to the existing lighting based on this review. All artificial lighting installed on site shall be directional lighting (i.e., lighting which only shines on the required working area and not adjacent habitats) to prevent overspill onto the Griffeen River corridor and surrounding hedgerows. This will be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area within the Proposed Development site only.
- The internal changes to Building 1 that will require additional lighting.
- The proposed stack will not exceed a maximum of 2 m above roof height and will not require a navigation beacon (TBC).

When new lighting is installed, this lighting would be energy efficient using low energy Light Emitting Diodes (LEDs) or lighting of similar efficiency.

4.4.8 Employment

Enva currently employs approximately 38 full time personnel at the existing integrated waste management facility. This staffing includes operations managers, general managers, yard managers, maintenance engineers, vehicle drivers, general operatives, and office staff.

The Proposed Development will result on the transfer of approximately 12 persons currently working at the contaminated soil management facility and the packaged hazardous chemicals transfer facility. Both operations will be moved offsite to other facilities operated by Enva. Employment displaced from the 402 Grants Drive facility will be taken up at the offsite facilities.

The activities on this site are in a transitionary phase with staffing requirements altering continuously because of automation and business unit movements. It is estimated that the total future staffing needs at the site will 29 people.

4.4.9 Operational Traffic and Site Access

The site is strategically located for access to the greater Dublin area, with the N7 connecting to the orbital M50 motorway. The R120 is a regional road connecting with the R835 at Lucan to the N7 at Rathcoole. It forms the primary access to the Greenogue Business Park from the south.

The business park has three access roundabout junctions.

- The first junction is located at the junction between the R120 and Grants Road, south-west of the facility.
- The second junction, a roundabout, is located at the junction between the R120 in College Road south-east after facility.
- The third junction, a roundabout, is located on the Rathcoole side of the R120 road, to the east of the facility.

The Proposed Development is expected to generate up to an additional 97 vehicle movements during a typical day. The breakdown of the modes of transport that will be generated by the development site is as follows:

- 79 heavy vehicle HRW movements;
- 16 staff cars; and
- 2 supplies and other non-waste, non-staff related traffic.

4.4.10 Operational Working Hours

The HRW facility will require 24-hour traffic movements and operation to service the health sector including large hospitals which operate 24/7. The reasoning for this requirement is set out in this section. For health and safety reasons, HRW cannot be compacted, therefore the HRW is low density and high volume in nature, requiring more frequent collection. Access to a lot of the HRW-production sites (hospitals, clinics, etc.) is heavily congested between the hours of 07:00 and 18:00 so the practical solution is to schedule the waste collections outside of these hours.

The plant has a fixed productivity rate per hour based on the operating parameters of the steam auger. To optimise production, operating 24/7 minimises the space required. Continuous operating also minimises energy consumption.

The HRW stream destined for Process 1 is collected in 770 litre UN-approved wheelie bins. The quantity of bins required is typically based on a ratio of 3 per hospital location, i.e., one bin at the plant, one in transit and the other at floor level in the hospital. This ratio relies on 24/7 production to minimise the quantity of wheelie bins in the supply chain and ensure an efficient turnaround to meet the hospitals’ needs.

The facility already has approval for 24-hour operation for some activities. Reg. Ref. SD09A/0050: granted permission for 24-hour operations at the facility (after daytime hours) for activities within the existing solid shed relating to the drill cutting waste processing and recovery.

4.4.11 Environmental Emergency Procedures/Contingency

The Proposed Development will be designed, constructed, and operated in accordance with the following health and safety regulations and guidelines (or as updated):

- Safety, Health & Welfare at Work (Construction) Regulations 2006 to 2013 (S.I. 291 of 2013).
- Safety, Health, and Welfare at Work (Construction) (Amendment) Regulations 2019 (S.I. No. 129 of 2019).
- Safety, Health & Welfare at Work Act 2005 (S.I 10 of 2005).
- Safety, Health & Welfare at Work (General Application) Regulations 2007 to 2016.

Accident prevention and emergency response during the operation of the Proposed Development will continue to be carried out in accordance with the Accident Prevention Procedure and Emergency Response Procedures under existing licence W0192-03.

Consideration has also been given to sites (i.e., SEVESO sites) that have potential for major accident hazard under the Chemical Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No.209 of 2015) (COMAH (Control of Major Accident Hazards) Regulations).

The Major Accidents (Seveso III) Directive (2012/18/EU) is a European Union (EU) Directive that seeks to prevent major industrial accidents involving dangerous substances and to limit the consequences of such accidents on people and the environment. In Ireland, the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the “COMAH Regulations”), implements the Seveso III Directive.

The COMAH Regulations place an obligation on operators of establishments that store, handle or process dangerous substances above certain thresholds to take all necessary measures to prevent major accidents and to limit the consequences for human health and the environment. Under the Regulations, an establishment may qualify as upper tier or lower tier, depending on the inventory of dangerous substances; sites that store, handle or process dangerous substances below a certain threshold do not qualify as establishments under the Regulations.

The occurrence of a major emission, fire or explosion resulting from a COMAH establishment has the potential to give rise to a major accident and/or disaster, immediate or delayed, inside or outside the establishment, and involving one or more dangerous substances. There are two tiers of COMAH establishment, which are related to the quantities of dangerous substances present. Depending on quantity, an establishment may be classed as lower tier or upper tier. Upper tier establishments have greater quantities of dangerous substances present and are obliged to comply with additional requirements specified in the Regulations.

There are number of COMAH Establishments situated in County Dublin and County Kildare. Two COMAH Establishments were identified in the Rathcoole area; one Lower Tier and one Upper Tier establishment:

- Lower Tier - Brenntag Chemicals Distribution Ltd., Unit 405, Greenogue Business Park, Rathcoole, Dublin 24 (approximately 50 m east); and
- Upper Tier - Dachser Ireland Ltd., Blackchurch Business Park, Rathcoole, Dublin (approximately 3.7 km southwest).

The Proposed Development does not have the potential to cause an accident at the Seveso site, and there are no mitigation by design measures that can reduce the risk of an accident at a Seveso site. Enva will ensure there is adequate communication with sites in the vicinity (i.e., Brenntag Chemicals Distribution Ltd.), and for which they are within the consultation distance of, during construction and operation. Furthermore, the Seveso site identified within the vicinity will have an emergency response plan registered with the Health and Safety Authority (HSA).

4.5 Decommissioning

To make provision for the proper closure of the activity ensuring protection of the environment Condition 10 of the Enva IED Licence requires that:

> *10.1- Following termination, or planned cessation for a period greater than six months, of use or involvement of all or part of the site in the licensed activity, the licensee shall, to the satisfaction of the Agency, decommission, render safe or remove for disposal/recovery any soil, subsoil, buildings, plant or equipment, or any waste, materials or substances or other matter contained therein or thereon, that may result in environmental pollution.*

Decommissioning Management Plan

> *10.2.1 - The licensee shall review the Decommissioning Management Plan annually and proposed amendments thereto notified to the Agency for agreement as part of the AER. No amendments may be implemented without the agreement of the Agency.*
>
> *10.2.2 - The licensee shall have regard to the Environmental Protection Agency Guidance on Environmental Liability Risk Assessment, Decommissioning Management Plans and Financial Provision when implementing Condition 10.2.1 above*.
>
> *10.3 - A final validation report to include a certificate of completion for the Decommissioning Management Plan, for all or part of the site as necessary, shall be submitted to the Agency within three months of execution of the plan. The licensee shall carry out such tests, investigations or submit certification, as requested by the Agency, to confirm that there is no continuing risk to the environment.*

The Enva facility has an existing Closure, Restoration and Aftercare Management Plan (CRAMP). The CRAMP is used to determine the known environmental liabilities associated with the closure and decommissioning of the known environmental liabilities post closure. Should planning permission and EPA IED licence be granted, the CRAMP will be updated to accommodate the change in activities at the facility. Provision will be made to manage any environmental liabilities identified.

Decommissioning of the facility following closure is expected to take approximately 8 weeks. It will include:

- Either the processing of any untreated wastes onsite or the transfer of such wastes to other facilities for processing.
- Removal of all treated HRW and waste containers.
- The dismantling, disinfection, and removal of the treatment plant.
- Decontamination of the building if required.

Because of the light industrial nature of the proposed development, extensive or long-term aftercare is not expected to be required to allow the future reuse of the facility for other industrial or commercial activities.

4.6 Chapter References

OPW, 2022. *Flood Maps.* [Online] Available at: https://www.floodinfo.ie/map/floodmaps/

CHAPTER 5
DESCRIPTION OF THE CONSTRUCTION PHASE

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Tables

5 DESCRIPTION OF THE CONSTRUCTION PHASE

5.1 Proposed Construction and Demolition Works

The Enva Greenogue site includes 3 buildings (see **Figure 4-2**). Buildings 1 and 3 will be modified to accommodate the proposed Health Risk Waste (HRW) activities. No changes will be made to Building 2. As indicated in **Section 4.4.5** of **Chapter 4 - Description of the Proposed Development**, the existing building that currently houses divisions 1 and 2 and the interdivisional area of the hazardous waste transfer (Building 1), and the existing office building (Building 3) are incorporated within the development site. No works are proposed to adjust Building 2, the site boundary, or the existing access arrangements.

The following figures are given in **Chapter 4 - Description of the Proposed Development**:

- **Figure 4-4** shows the extend of the Proposed Development.
- **Figure 4-5** and **Figure 4-6** show the proposed ground and mezzanine floor plans, respectively.

The nature and scale of the proposed works are given in **Table 5.1**.

Table 5.1: Nature and Scale of Works During the Construction Period

Construction Phase	No. of Weeks	No. of People	Total Hours	No. of Person Days
Strip Existing Contents	1	2	74	10
Design Q/S	10	2	740	100
Install Drainage	2	4	296	40
Pour/ Patch Floor	1	6	222	30
First Fix Electrical	3	4	444	60
Boiler and Cold-Water Feeds	2	3	222	30
Install Hoists, Shredder. Auger, Maintenance Gantry, PLC, Conveyors, Bin Washers, Weigh-Cells	12	10	4440	600
Reusable Sharps Plant	4	6	888	120
Installation Emissions Ducting/ Hoods/ Fans	3	6	666	90
2nd Fix Electrical	2	3	222	30
Resin Floor / Pedestrian Walkways etc	1	3	111	15
Demolition/ Replacement of Office Block	10	10	3700	500
Painting of Vertical Surfaces	1	3	111	15
Validation of Plants X3	3	3	333	45
Workstations	0.5	2	37	5
Construction of Bin Storage	2	5	370	50

5.1.1 Preparatory Works

The following preparatory works are to be undertaken:

- Demolition of the existing office space (366 m^2) on the gable side of the building facing Grants Drive.

  The existing office space on the gable side of the building facing Grants Drive (Building 3) is to be demolished. This building comprises block and steel cladding with associated office fixtures and fittings.

- Removal of existing hazardous soil management and hazardous waste transfer operations located in Divisions 1 and 2 of Building 1, along with associated fixtures and fittings. Decontamination of these divisions may be required and will be determined during the decommissioning phase.
- Removal of existing fixtures and fittings in the interdivisional space between Divisions 2 and 3.
- Modifications to the car parking area including the repainting of the lines of the footpath. A small number of spaces may be lost.

Contaminated soils have been managed, with no 'processing', in the warehouse proposed to house the HRW processing plant for more than 15 years. After the contaminated soils operation has been removed from this warehouse, and before the HRW management operation would be commenced in this building, the whole building would be washed down and inspected. Any minor repairs and assessments required will be undertaken. It is not expected that additional extra groundwater monitoring, outside the current regime, would be required. The floor of the warehouse is comprised of a 300 mm concrete/steel mix. The warehouse is fully bunded, with a 'physical lip' bund to allow for the holding of any leachate that may be produced during the soil management process. The warehouse floor is regularly inspected and any sitting leachate on the warehouse floor removed by a vacuum tanker.

5.1.2 Construction Works

5.1.2.1 Thermal Treatment and Trailer Loading Area

A thermal treatment area will be installed in Division 1 of Building 1, supported by the following new plant and equipment:

- A bin-emptying unit that collects waste into a hopper and shredder. The shredded waste is subsequently fed into thermal screws.
- Two thermal screws designed to disinfect health risk waste through steam heat application.
- An air management system comprising:
  - Two HEPA filters will manage air emissions from the shredder area.
  - Hoods over the shredders to capture and filter air emissions.
  - Fans to service the system.
  - A stack with a 300 mm diameter protruding approximately 2 m from the eastern roofline.
  - A condenser.
  - A carbon filter.
  - An access platform for stack sampling.
- A natural gas-fired steam generation boiler, complete with associated pipework and a mains connection.
- A blast chiller situated on the western face of Building 1 to cool hydraulic oils.
- A weighing cell and reception area for recording incoming and outgoing materials.
- Washing units to wash and disinfect emptied bins.
- A bin reception and marshalling area for temporary storage of incoming bins prior to emptying and subsequent washing.
- Construction of a new roofed enclosure approximately 130 m^2 (dimensions 6.6 m wide x 19.9 m long and 6.2 m high) located the east face of the Building 1 for storage of clean bins.

- A new steel-clad structure, approximately 191 m^2 and 9.1 m in height will be constructed to accommodate two bulk trailers. This structure will be erected on roughly the same footprint as the office building slated for demolition and will be serviced by a conveyor system that transports waste from the thermal screws to the trailers.

5.1.2.2 Office, Canteen, and Welfare Facilities Area

An office, canteen, and welfare facilities will be installed on the upper floor of the interdivisional space between Divisions 2 and 3. This area will include:

- Office space;
- Shower, wash, and toilet facilities; and
- A kitchen and break room.

5.1.2.3 HRW Bulking-Up Transfer Area

A HRW bulking-up transfer area will be installed, comprising:

- A new mezzanine floor in Division 2, attached to the interdivisional space between Divisions 2 and 3;
- A steel staircase and two service lifts for transporting incoming and outgoing waste; and
- A storage area for health risk waste during the bulking-up process.

5.1.2.4 Sharps Management Equipment and Facilities

Sharps management equipment and facilities will be installed, including:

- A loading area equipped with a robotic arm to empty sharps containers into a wheeled bin;
- A sharps container wash conveyor belt, loaded by the robotic arm, for washing and disinfecting sharps containers; and
- A storage area for short-term storage of washed and disinfected sharps containers.

5.1.2.5 Ancillary Services and Infrastructure

The development will be supported by the installation and/or connection of:

- Ancillary services supply, including electricity, water, telecoms, and natural gas;
- The existing site weighbridge, with office services to be relocated to a new portacabin-type weighbridge office structure (4.3 m^2 and 2.7 m in height) at the main entrance to the facility situated beside the main facility gate;
- A footpath connecting the car parking area to the new portacabin-type weighbridge office structure, also providing access to Building 2;
- Modifications to integrate wastewater into the *existing* wastewater management system;
- Modifications to integrate stormwater into the *existing* stormwater management system; and
- Alterations to the existing lighting system, as required.

5.2 Construction Management Procedure

The duration of the construction works for the Proposed Development would be approximately 18 weeks. The anticipated commencement date will be determined by the date that the Environmental Protection Agency (EPA) issues the reviewed Industrial Emissions Directive (IED) Licence. The following are some of the key aspects of the construction phase:

- The proposed core construction on site working hours will be from 8:00 AM to 7:00 PM Monday to Friday and from 8:00 AM to 4:00 PM on Saturdays. Normal construction working hours will be observed for structural and external works. The intent is to minimise construction traffic on the local road network. Enva will notify and engage with South Dublin County Council if works are required outside these standard proposed parameters.
- Construction staff facilities will be provided on site and construction staff will not typically depart from site during their working day. Access to the existing on-site office, kitchen and toilet facilities will be made available for use by the construction personnel.
- Access and egress would be provided through the existing site entrance.
- The existing space within Building 1 will be provided to the construction contractor for use as a store and compound for the duration of the construction works.
- All construction parking will be accommodated within the existing site boundaries.
- Construction of the new bulk trailer parking will involve the erection of a steel portal framed structure.
- The existing floor slab will be retained as the floor for the new building. Foundation works are anticipated to be confined to limited excavation to support equipment installation.
- Limited shallow excavation works will also be required for the reconfiguration of the surface water drainage system to include the relocation of existing drains and the installation of a new surface water drain to collect the roof run-off.
- On completion of the drainage works, the yard and floor area excavated will be reinstated.
- The internal works will comprise the installation of the plant and equipment required. This will include electrical cable installation for lighting and power for the operation.
- Minor civil works including the reconfiguration of the existing parking surfaces, installation of bicycle parking and enhancement of the site boundary landscaping will complete the construction phase.

Enva will appoint a contractor for the construction phase of the project.

Site environmental controls to be implemented during the construction phase. Similarly, there will be management of construction related traffic to and from the site. Following grant of planning permission, plans will be finalised by the contractor in advance of the commencement of construction works.

5.3 Construction Waste Management

Waste will arise from construction and demolition activities. Demolition activities will be comprised only of the demolition of the existing single-story office of 366 m^2 (Building 3), the floor area of which is approximately 180 m^2. This building comprises of block and steel cladding with associated office fixtures and fittings and services.

The exact volumes will be defined during the design process for the planning application. On site segregation of all waste materials will take place. Enva has an existing network of licenced and permitted waste management facilities. It is therefore well positioned to manage waste associated with the construction phase, and to maximise recycling rates achieved.

5.4 Construction Traffic

During the construction phase, traffic generation is predicted to include 20 private vehicles per day and 4 construction traffic movements (heavy and light good vehicles). Therefore, traffic volumes associated with the construction phase will not result in a significant impact to the local road network.

CHAPTER 6
CONSULTATION

Contents

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6 CONSULTATION

6.1 Pre-application Consultation

Pre-application consultation for the project occurred with the Board for the Strategic Infrastructure and with South Dublin County Council, Planning Department in relation to the particulars of planning permission as set out in the following sections.

6.1.1 Pre-application Consultation – South Dublin County Council

RPS and the client engaged in pre-planning consultation with South Dublin County Council (SDCC), planning department on 25th April 2022 (Pre-Planning Ref. No. PP030/22). The following are the key points that were raised by the SDCC.

24-Hour Operations

Hours of delivery and operation will need detailed justification, e.g., need flexibility for situations such as Covid. Noted that no 24/7 delivery at present.

Staffing Numbers

Details of changes in staff should be provided.

Stack

Considering stack height may be an issue for aviation traffic using the nearby Baldonnel airport. It was suggested that RPS consult the Department of Defence and the Aviation Authority.

New County Development Plan (CDP)

New CDP may be in place and should be considered when submitting the application.

Seveso and EIAR

Seveso and EIAR should be considered. Note that the proposed development is close to the threshold for EIAR. A robust Screening Report must be submitted and must take account of all existing uses on site, not just those within the development boundary.

Strategic Infrastructure Development (SID)

SDCC to consider SID requirements. Applicant not currently looking for a negative opinion from the Board. Again, any consideration as to whether the development is/is not SID must take account of all existing waste management uses on site, not just those within the redline.

Drainage

SDCC drainage section recommend / note:

- Consider green roofs and porous surfaces where possible.
- Existing and proposed surface water, foul water and water supply plans should be provided.
- Ensure there is no adverse impact on flood risk.

Roads

The following was recommended /noted:

- Consideration should be given to bike/parking rates.
- Mobility and EV charging should be considered.
- Turning in and out of site should be indicated.
- Traffic & Transport Assessment to include current data, route from N7 should be indicated.

Parks

Regarding this development public realm department would require tree protection fencing in accordance with BS 5837: 2012 to be erected prior to the commencement of development and maintained until the development has been completed to ensure the protection of existing boundary trees/hedgerow.

6.1.2 Pre-application Consultation – An Bord Pleanála (the Board)

It is a mandatory requirement for a prospective applicant for planning permission for development listed in the Seventh Schedule of the Planning and Development Act, 2000, as amended, to enter pre-application consultations with the Board and obtain notice from the Board stating whether the Proposed Development is regarded as a Strategic Infrastructure Development (SID):

> *37B.— (1) A person who proposes to apply for permission for any development specified in the Seventh Schedule shall, before making the application, enter into consultations with the Board in relation to the proposed development.*

For the purposes of these consultations, the prospective applicant must supply sufficient information to the Board to enable it to assess the proposed development in the light of the criteria set out for SID.

The process consists of written information and meetings between staff of the Board and the prospective applicant. A record is kept of these meetings. This record is available for public inspection once the process has been formally concluded. To keep the public informed, the Board is required to:

- Publish a weekly list of 'cases received' including requests for consultations.
- Publish a weekly list of 'cases determined' including consultations concluded.

The Board's records of the pre-application consultation are available to inspect and purchase once consultations are finished.

The purpose of pre-applications is set out in the Planning and Development Act, 2000, as amended, and in the Planning and Development Regulations, 2001, as amended. In pre-application consultations the Board may give advice to the prospective applicant regarding the proposed application including:

- Whether the Proposed Development constitutes SID, having regard to the provisions of the legislation.
- The procedures involved in making an application for permission to the Board and in considering such an application.
- Considerations, relating to proper planning and sustainable development or the effects on the environment, which may in the Board's opinion, have a bearing on its decision in relation to the application.
- An indication of the bodies/persons who the prospective applicant should consult with prior to lodging an application and completion of an Environmental Impact Assessment Report (EIAR).
- The Prescribed Bodies (under Art. 213) which should be notified of the application.

In November 2022, Enva sought pre-application consultations with the Board concerning a prospective SID in accordance with the provisions of Section 37B of the Act. The Board responded to the request by written correspondence dated 2 June 2023 noting the following:

> *Please be advised that the following consultations under section 37B of the Planning and Development Act, as amended, the Board hereby serves notice under section 37B(4)(a) that it is of the opinion that the proposed development falls within the scope of paragraphs 37A(2)(a), (b) and (c) of the Act. Accordingly, the Board has decided that the proposed development would be strategic infrastructure within the meaning of section 37A of the Planning and Development Act, 2000, as amended. Any application for permission for the proposed development must therefore be made directly to An Bord Pleanála under section 37E of the Act.*

Further to this the Board also noted on 2 June 2023:

> *In accordance with section 146(5) of the Planning and Development Act, 2000 as amended, the Board will make available for inspection and purchase at its offices the documents relating to the decision within 2 working days following its decision. This information is normally made available on the list of decided cases on the website on the Wednesday following the week the decision is made.*

6.2 Project Website

A specific project website www.enva.com/hrw will be created and will include all of the application documentation.

6.3 Public Notice

Public participation in the planning process is essential to ensure transparent and robust decision-making. The planning legislation for SID gives defined time periods when the public and interested organisations are invited to give their views.

Prior to making an application to the Board, Enva will publish notice of the proposed application in a newspaper circulating in the locality, stating:

- That an application is to be made to the Board for permission/approval within a specified timescale (at least six weeks).
- The nature and location of the proposed development.
- That an EIAR has been prepared.
- The times and places where the application (and EIAR) can be inspected and purchased.
- That submissions and observations can be made to the Board within a period specified in the notice (which must be at least six weeks).
- The types of decision which the Board may make and that the public and others, e.g., prescribed bodies may make a submission to the Board, and that the Board must include notice of receipt of the application in its weekly list of new cases.

6.4 Notification of Prescribed Bodies

In accordance with requirements of the Board as set out in the communication of 2 June 2023, the following list of prescribed bodies (under Art. 213) will also be notified of the application (and EIAR) for the Proposed Development:

- An Taisce
- Department of the Environment, Climate and Communications
- Eastern and Midland Regional Assembly
- Environmental Protection Agency
- Health Service Executive
- Irish Water
- Transport Infrastructure Ireland
- Dublin County Council
- Dún Laoghaire-Rathdown County Council
- Fingal County Council
- South Dublin County Council

Notice of the application will be sent to the above list of prescribed bodies prior to the submission of the application to the Board.

6.5 Oral Hearing

The Board may decide to hold an oral hearing on SID applications because of the complexities of the issues involved. While the SID applicant, prescribed bodies, and members of the public can request an oral hearing, the Board has absolute discretion to decide whether or not to hold a hearing.

The Board may also decide to hold a ‘limited agenda’ oral hearing to deal with specific issues, in which case, additional matters cannot be raised. The oral hearing is conducted by an Inspector appointed by the Board. The Inspector will determine how the oral hearing is conducted. Members of the public and prescribed bodies can make a submission to the oral hearing. If a member of the public did not make a submission during the prescribed period, they may be permitted to make a contribution to the oral hearing, but only where it is considered appropriate in the interest of justice and subject to payment of any required observer fee.

6.6 Notification of Decision

All involved in the application (including those who made submissions and spoke at an oral hearing) are notified of the decision by post. The decision is also published on the Board’s website.

The Board is subject to a statutory objective to seek to determine SID cases within 18 weeks commencing on the last day for receiving submissions from the public. Proposed SID projects can be large and complex and necessitate extensive consideration of all the relevant issues. It can also be time consuming to obtain all the relevant information. Therefore, it may not be possible or appropriate to determine the case within the 18-week time frame, particularly where an oral hearing is held. In such cases, the Board must notify all concerned and give a revised date by which it intends to determine the matter.

CHAPTER 7
TRAFFIC & TRANSPORT

Contents

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7 TRAFFIC AND TRANSPORT

7.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) presents the Traffic and Transportation Assessment (TTA) of the potential effects of the Proposed Development during the construction, operational and decommissioning phases.

This chapter describes the likely effects of the Proposed Development on the existing road network. From a transport perspective, the key components of the Proposed Development are:

- The traffic generated by the staff and plant machinery associated with the construction works.
- The trips generated by staff and deliveries during the future operation of the Proposed Development.

The TTA presented is informed by the following EIAR Technical Appendices:

- Appendix 7.1: Traffic Survey Data.

7.2 Methodology

7.2.1 Legislation, Policy and Guidance

7.2.1.1 Legislation

The key legislation and guidance referenced in the preparation of the EIAR is outlined in **Chapter 1 - Introduction** (**Sections 1.5**, **1.6** and **1.7**).

Specific to traffic and transport, the principal legislation relevant to the assessment is set out in the following:

EU Legislation

- EU Directive 2008/96/EU on Road Infrastructure Safety Management.

7.2.1.2 Policy

The assessment has had due regard to relevant policy that include the following:

- South Dublin County Development Plan (SDCDP) 2022-2028.

7.2.1.3 Guidance

The assessment of impacts has been undertaken, as appropriate, in accordance with, or with reference to, the following guidance documents:

- Spatial Planning and National Roads - Guidelines for planning authorities (2012).
- TII Publication PE-PDV-02045 - Traffic and Transport Assessment Guidelines (2014).

The TTA has followed the methodology set out in the following guidance documents:

- TII - Traffic and Transport Assessment Guidelines – May 2014 (Doc No: PE-PDV-02045) (hereafter 'TII Guidelines').
- Department of Transport (DoT) - Design Manual for Urban Roads and Streets (DMURS) - May 2019.
- Department of Transport (DoT) - Traffic Signs Manual - August 2019.

7.2.2 Zone of Influence

The proposed Zone of Influence (ZoI) (see **Figure 7-1**) is Greenogue Business Park and in particular the approach roads and junctions impacted by the Proposed Development.

The TTA ZoI was developed by considering where the highest percentage of potential effect will be on traffic flows and the routes within Greenogue Business Park that will be used by both construction vehicles and employees.

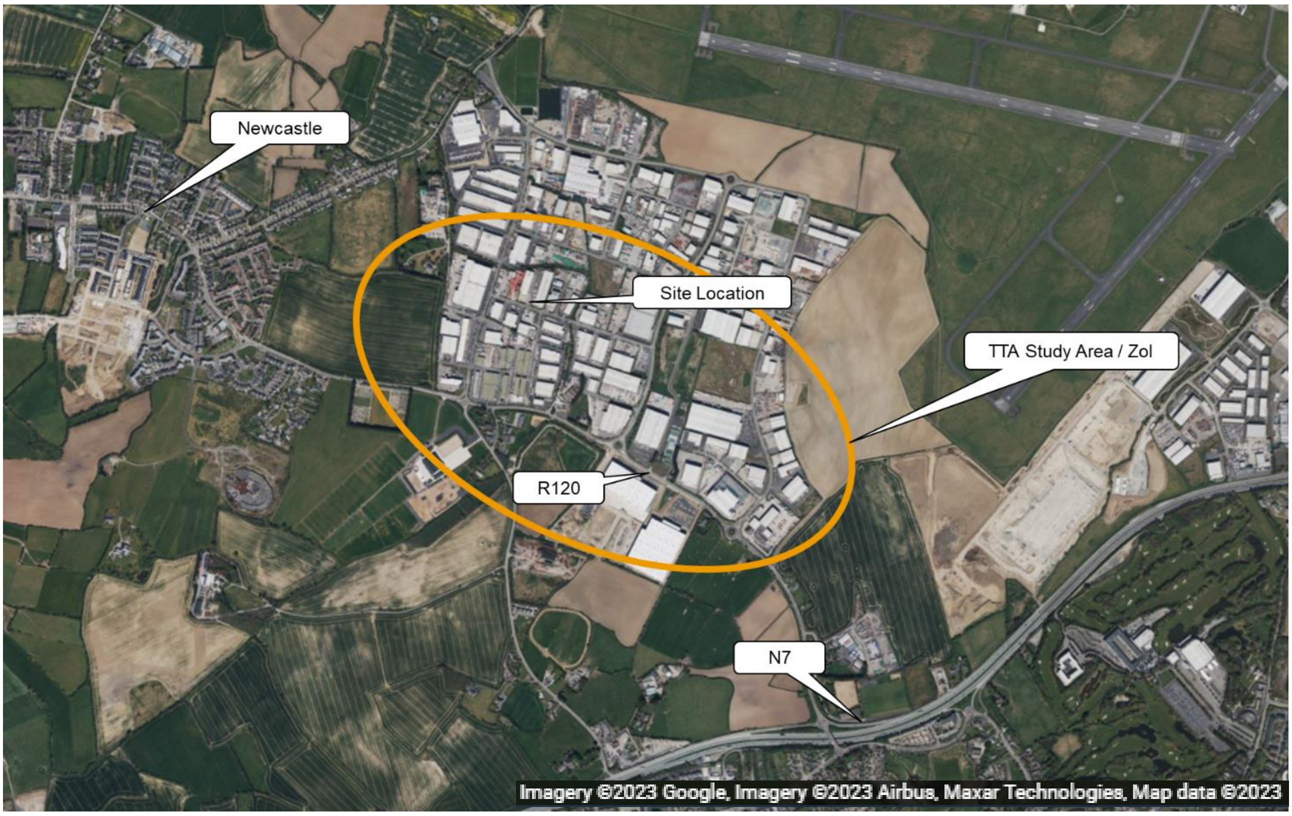

Figure 7-1: TTA Study Area / ZoI

7.2.3 Sources of Information to Inform the Assessment

Information on traffic and transportation within the TTA ZoI was collected through a site survey carried out in May 2023 and traffic surveys carried out in April 2022. **Table 7.1** provides a summary of the surveys undertaken to inform the TTA.

Table 7.1: Sources of Information

Survey	Extent	Overview	Survey Contractor	Date	Reference to Further Information
Walkover Survey	Greenogue Business Park and approach roads	Road / lane widths recorded, and photos taken at junctions	RPS Project Team	May 2023	**Section 7.3**
Traffic Surveys	Newcastle Roundabout and Enva Weighbridge	Cameras were positioned at the junctions to record the turning movements and volumes between 7am to 7pm on a single day.	Irish Traffic Surveys	April 2022	**Section 7.3**

7.2.4 Key Parameters for Assessment

7.2.4.1 Growth Rates

Forecast future traffic volumes on the roads in the vicinity of the Proposed Development have been estimated using growth factors from TII Publication PE-PAG-02017 – *Project Appraisal Guidelines (PAG) for National Roads Unit 5.3, Travel Demand Projections*, October 2021. The guidelines provide various growth rate factors for the Dublin Metropolitan Area that are applicable to the periods 2016-2030, 2030-2040 and 2040-2050. Growth rate factors are provided for low sensitivity, central and high sensitivity growth rate scenarios with factors provided for both Heavy (HV) and Light Vehicles (LV). The Central Growth factors have been applied to the 2026 Annual Average Daily Traffic (AADT) data to estimate future year traffic flows on the receiving road network. Given the location and function of the local roads the application of national growth rates is considered likely to be a robust approach. The growth factors applied are set out in **Table 7.2** for LV and HV.

Table 7.2: TII Traffic Growth Factors (Central) — Dublin Metropolitan Area

Year	Annual Growth Factor - LV	Annual Growth Factor - HV
2016-2030	1.0162	1.0295
2030-2040	1.0051	1.0136
2040-2050	1.0044	1.0162

7.2.4.2 Assessment Periods

Forecast background network traffic levels were accordingly derived for each of the assessment years and are shown in **Table 7.3**. The forecast background network traffic levels are provided for the following years:

- Construction year of operation, assumed to be 2024.
- Year of Opening (YoO), assumed to be 2025.
- Year of Opening + 5yrs (YoO + 5 yrs), (i.e., 2030).
- Year of Opening + 15yrs (YoO + 15 yrs), (i.e., 2040).

Table 7.3: Future Year Background AADT Volumes - Without Development

Road Name	Construction Year 2024 AADT	Opening Year 2025 AADT	Opening Year + 5 Yrs 2030 AADT	Opening Year +15 Yrs 2040 AADT
R120 Greenogue Roundabout to Newcastle Roundabout	11,089	11,637	11,550	12,001
R120 Newcastle Roundabout to Newcastle	9,765	10,247	10,171	10,568
Grants Road	5,090	5,341	5,301	5,509

7.2.5 Assessment Criteria and Significance

7.2.5.1 Impact Assessment Criteria

The significance of effects is determined using a two-stage process that involves defining the magnitude of the impacts and the sensitivity of the receptors. This section describes the criteria applied in this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors.

Table 2.1 in the TII Traffic and Transport Assessment Guidelines (2014) provides a number of thresholds for when a Traffic and Transport Assessment is automatically required. One of these thresholds relates to the percentage impact that a new development would have on the adjoining road network, where it states the following:

> *'Traffic to and from the development exceeds 10% of the traffic flow on the adjoining road. Traffic to and from the development exceeds 5% of the traffic flow on the adjoining road where congestion exists, or the location is sensitive'.*

It is considered standard practice to reference the scale of percentage thresholds when assessing the likely long-term operational effects of large-scale trip generators such as resident, educational, health or commercial developments. Although the Proposed Development is not a large-scale trip generator, it is proposed to still take cognisance of the percentage thresholds, stated in Table 2.1 of the TII Guidelines when establishing the potential magnitude of impacts.

In addition to establishing the magnitude of impact it is also considered that the sensitivity of the receptors (receptors being the receiving road network in the context of this assessment) should be included when establishing the level of significance of the traffic impact generated by the additional construction vehicles.

The criteria for defining magnitude in this chapter are outlined in **Table 7.4**. The breakdown of the magnitude of impacts is based on an expert judgement of the scale of percentage impacts of the additional traffic flows on the local road network.

Table 7.4: Definition of Terms Relating to the Magnitude of an Impact

Magnitude of Impact	Definition
High	The scale of additional traffic exceeds 10% of the background traffic flow on the receiving road network.
Medium	The scale of additional traffic is between 5% and 10% of the background traffic flow on the receiving road network.
Low	The scale of additional traffic is between 1.5% and 5% of the background traffic flow on the receiving road network.
Negligible	The scale of additional traffic is less than 1.5% of the background traffic flow on the receiving road network.

The criteria for defining sensitivity in the TTA are outlined in **Table 7.5** below.

Table 7.5: Definition of Terms Relating to the Sensitivity of the Receptor

Sensitivity	Definition
High	High importance and rarity, national scale and limited potential for substitution.
Medium	High or medium importance and rarity, regional scale, limited potential for substitution.
Low	Low or medium importance and rarity, local scale.
Negligible	Very low importance and rarity, local scale.

The significance of the effect upon traffic and transportation is determined by correlating the magnitude of the impact and the sensitivity of the receptor. The method employed for this assessment is aligned with the EPA Guidelines on the Information to be contained in EIARs (2022) and is presented in **Table 7.6**, where a range of effects are presented and the final assessment for each effect is based upon expert judgement. For the purposes of this assessment, any effects with a significance level of slight or less have been concluded to be not significant in terms of the EIA Regulations.

Table 7.6: Matrix Used for the Assessment of the Significance of the Effect

		Magnitude of impact			
		Negligible	**Low**	**Medium**	**High**
Sensitivity of	**Negligible**	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight
	Low	Imperceptible or slight	Imperceptible or slight	Slight	Slight or moderate
	Medium	Imperceptible or slight	Slight	**Moderate**	**Moderate or major**
	High	Slight	Slight or moderate	**Moderate or major**	**Major or Profound**

7.2.6 Data Limitations

This chapter of the EIAR has been prepared based upon the best available information and in accordance with current best practice and relevant guidelines.

There were no technical difficulties or otherwise encountered in the preparation of this chapter of the EIAR.

7.3 Description of the Existing Environment (Baseline Scenario)

7.3.1 Baseline Environment

This section defines the baseline environment in the TTA ZoI in terms of road network, public transport, traffic flows and AADT.

7.3.1.1 Road Network

The following sections describe the key junctions in the TTA ZoI.

R120

The R120 is a key route for traffic travelling to Greenogue Business Park, connecting the N7 and Rathcoole to the business park from the southeast and Newcastle from the northwest. From the N7 junction to Aerodrome Roundabout (approximately 700 m) the R120 is a two-way system with curved horizontal alignment with a paved width of circa 8.5 m and a pedestrian footpath to the east. From Aerodrome Roundabout to Greenogue Roundabout (approximately 450 m) the R120 is a two-way system with reasonably straight horizontal alignment with a paved width of circa 7.5 m and pedestrian footpaths on both sides. From Greenogue Roundabout to Newcastle Roundabout (approximately 500 m) the R120 is a two-way system with curved horizontal alignment with a paved width of circa 7.5 m and a pedestrian footpath to the east. Greenogue Business Park, Aerodrome Business Park and Greenogue Logistics Park are the largest receptors in the area accessed from this route.

Figure 7-2: R120 (Northwest Bound Direction)

Aerodrome Roundabout

Aerodrome Roundabout is a four-arm roundabout which provides access for traffic to Aerodrome Business Park to the north and Greenogue Logistics Park to the south. Traffic travelling to the Enva site travel straight through this roundabout along the R120. The paved width around the roundabout is circa 7.6 m. There are provisions for pedestrians to cross on all arms of the roundabout.

Figure 7-3: Aerodrome Roundabout

Greenogue Roundabout

Greenogue Roundabout is a four-arm roundabout which provides access for traffic to the eastern section of Greenogue Business Park to the north and Greenogue Logistics Park to the south. Traffic travelling to the Enva site travel straight through this roundabout along the R120. The paved width around the roundabout is circa 7.4 m. There are provisions for pedestrians to cross on all arms of the roundabout.

Figure 7-4: Greenogue Roundabout

Newcastle Roundabout

Newcastle Roundabout is a four-arm roundabout which provides access for traffic to the western section of Greenogue Business Park to the north. Traffic travelling to the Enva site turn off the R120 onto Grants Road at this roundabout. The paved width around the roundabout is circa 5.8 m. There are provisions for pedestrians to cross on all arms of the roundabout.

Figure 7-5: Newcastle Roundabout

Grants Road / Grants Drive Junction

The Enva site is located on Grants Drive approximately 125m from the T-junction with Grants Road. Traffic accesses the Enva site by travelling along Grants Road and turning onto Grants Drive. Grants Road is a two-way system with straight horizontal alignment and a paved width of circa 7m and pedestrian footpaths on both sides. Grants Drive is a two-way system with straight horizontal alignment and a paved width of circa 6.5 m and pedestrian footpaths on both sides. Traffic and pedestrians enter the Enva site through a 12 m wide entrance gate.

Figure 7-6: Grants Road / Grants Drive Junction

Figure 7-7: Grants Drive / Enva Site Entrance

7.3.1.2 Public Transport

Dublin Bus run a number of bus services that can be used to travel to Greenogue Business Park. The route number 68 bus runs to Greenogue Business Park from Dublin City Centre and the route number 69 bus runs to Rathcoole which is a ten-minute walk to the business park.

It is anticipated that 20 to 30 persons, will be involved in the construction activities for this development. It is anticipated that the number of construction personnel utilising public transport will be negligible.

7.3.1.3 Baseline Traffic Flows

Traffic surveys were carried out at Newcastle Roundabout in April and June 2022. Newcastle Roundabout was identified as the junction that existing traffic access the Enva site through and the instructions during construction and operational phase of the Proposed Development will be to follow this route. The traffic surveys recorded the volumes and type of vehicles travelling in all directions (see further detail on traffic count data in **Appendix 7.1: Traffic Survey Data**). These surveys provide a profile of the traffic flow over a two-day timeframe in two different months and provide adequate baseline data to establish the AADT on each of the roads. **Table 7.7** to **Table 7.9** show the profile of the daily traffic flows on the following roads on the approach to the Enva site:

- R120 Greenogue Roundabout to Newcastle Roundabout.
- R120 Newcastle Roundabout to Newcastle.
- Grants Road.

Table 7.7: Profile of the R120 Greenogue Roundabout to Newcastle Roundabout Daily Traffic Flows

Day	Westbound	Eastbound	Total	Weekly Flow Indices – Dublin Region	WADT
Tuesday 26 April 2022	5,058	3,928	8,986	0.94	8,447
Wednesday 27 April 2022	6,734	5,794	12,528	0.92	11,526
Wednesday 01 June 2022	7,375	6,012	13,387	0.92	12,316
Thursday 02 June 2022	6,818	5,808	12,626	0.92	11,616
Average WADT	6,496	5,386	11,882		10,976

Table 7.8: Profile of the R120 Newcastle Roundabout to Newcastle Daily Traffic Flows

Day	Westbound	Eastbound	Total	Weekly Flow Indices – Dublin Region	WADT
Tuesday 26 April 2022	4,449	3,583	8,032	0.94	7,550
Wednesday 27 April 2022	5,545	5,612	11,157	0.92	10,264
Wednesday 01 June 2022	6,202	5,499	11,519	0.92	10,597
Thursday 02 June 2022	5,550	5,601	11,151	0.92	10,259
Average WADT	5,437	5,074	10,465		9,668

Table 7.9: Profile of Grants Road Daily Traffic Flows

Day	Northbound	Southbound	Total	Weekly Flow Indices – Dublin Region	WADT
Tuesday 26 April 2022	1,700	2,614	4,314	0.94	4,055
Wednesday 27 April 2022	2,684	3,117	5,801	0.92	5,337
Wednesday 01 June 2022	2,703	3,118	5,821	0.92	5,355
Thursday 02 June 2022	2,744	3,140	5,884	0.92	5,413
Average WADT	2,458	2,997	5,445		5,040

7.3.1.4 Annual Average Daily Traffic (AADT)

AADT is the term used to describe the average traffic volume in both directions on a section of road, adjusted for seasonal variation. It is a standard industry recognised parameter for assessing traffic volumes. The traffic survey data gathered allowed a WADT flow to be determined as indicated in the previous tables. This data was expanded in accordance with TII's *PAG for National Roads Unit 16.1 — Expansion Factors for Short Period Traffic Counts* (October 2016), to derive the AADT on the key sections of the road.

As the surveys were undertaken in both April and June an index factor of 1.01 was conservatively applied to the WADT to estimate the AADT. The conversion factor recognizes the seasonal variation that can occur in traffic flow across the year. The AADT volume calculations are presented in **Table 7.10** below.

Table 7.10: AADT Volume Calculations

Road	WADT	Monthly Index Factor (from TII PAG Unit 16.1 Annex C) – Dublin Region	AADT
R120 Greenogue Roundabout to Newcastle Roundabout	10,976	1.01	11,089
R120 Newcastle Roundabout to Newcastle	9,668	1.01	9,765
Grants Road	5,040	1.01	5,090

7.3.2 Evolution of the Environment in the Absence of the Proposed Development

Annex IV of the Environmental Impact Assessment (EIA) Directive sets out the information required to be included in an EIAR. This includes "*a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the Proposed Project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge*".

In the absence of the Proposed Development, no significant change to the future baseline scenario is anticipated other than that which may occur due to other developments and potential replacement/additional equipment at the Enva facility. Due to the industrial nature of the site's location, it is possible that other surrounding facilities may propose similar operational or structural changes in the future which could result in increased construction or operational traffic.

7.4 Description of Likely Significant Effects

The following sections outline the typical daily trips that are expected to be generated by the Proposed Development and the predicted scale of impact on the local road network. These comprise of the temporary trips generated during the construction phase and the permanent trips generated once the facility is operational.

Due to the type of development (i.e., employment) it is envisaged that the trips will comprises of both vehicle and active travel modes of transport such as cycling/walking.

7.4.1 Construction Phase

7.4.1.1 Magnitude of Impact

The construction phase of the Proposed Development will comprise a number of activities including demolition of the existing office space, installation of a new prefabricated office, including associated services, near the entrance to the facility, construction of the new bulk trailer parking area, construction of a clean bin storage shed adjacent to the door of the entranceway to Division 1 of Building 1 and installation of plant and equipment internally.

The duration of the construction works for the Proposed Development would be approximately 18 weeks. The anticipated commencement date will be determined by the date that the EPA issues the reviewed IED Licence.

Indicative daily movements for the construction team operating on site are provided below:

- Twenty vehicles (cars/vans) will arrive on site in the morning (08:00) and depart in the evening (19:00).
- Up to four Heavy Vehicles (HVs) will arrive and depart the site throughout the typical working day (08:00 – 19:00).

An indicative daily construction traffic flow is assumed to be 48 two-way vehicle movements per day.

The scale of percentage impacts of the additional traffic flows on local road network were quantified for each assessment year in order to establish a magnitude of impact on each of the key roads in the TTA Study Area and these are shown in **Table 7.11**.

Table 7.11: Magnitude of Impact - Construction Phase

Magnitude of Impact – Construction Stage				
	Construction Year 2024 AADT	Peak Daily Construction Traffic (Two Way Flows)	Percentage Impact	Magnitude of Impact on Total Traffic Flow during the Construction Year 2025
R120 Greenogue Roundabout to Newcastle Roundabout	11,089	48	0.4%	Negligible
R120 Newcastle Roundabout to Newcastle	9,765	48	0.5%	Negligible
Grants Road	5,090	48	0.9%	Negligible

Across the network, it is considered that the scale of magnitude is low due to the low percentage impact of the construction HVs, and staff vehicle trips compared to the background traffic flows in 2024.

7.4.1.2 Sensitivity of Receptor

The sensitivity of the receptor is defined through the vulnerability of the receptor, the recoverability of the receptor, and the importance of receptor in the context of national, regional, and localised scale. As roads are categorised as national, regional, and local the simplistic way would be to define the receptors in terms of these categories. However, some of the local roads in the TTA study area go through residential areas and adjacent to retail units so this was considered when defining the sensitivity during the construction phase. **Table 7.12** outlines the sensitivity of the roads during the construction phase.

Table 7.12: Sensitivity of the Receptor – Construction Phase

Sensitivity of the Receptor – Construction Phase	
R120 Greenogue Roundabout to Newcastle Roundabout	Medium
R120 Newcastle Roundabout to Newcastle	Medium
Grants Road	Medium

7.4.1.3 Significance of the Effect

The significance of the effect is determined by correlating the magnitude of the impact and the sensitivity of the receptor for each of the roads and are based on the method of assessment shown previously in **Table 7.6**. As the construction phase has a fixed duration, any effects will be temporary and the effects with a significance level of slight or less have been concluded to be **not significant** in EIA terms.

Table 7.13 outlines the significance of effect during construction phase.

Table 7.13: Significance of Effect – Construction Phase

Sensitivity of the Receptor – Construction phase			
	Magnitude of Impact	Sensitive of Receptor	Significance of Effect
R120 Greenogue Roundabout to Newcastle Roundabout	Negligible	Medium	Imperceptible
R120 Newcastle Roundabout to Newcastle	Negligible	Medium	Imperceptible
Grants Road	Negligible	Medium	Imperceptible

Overall, the temporary effect on the road network during the construction phase is **imperceptible** which is **not significant** in EIA terms.

The R120 Greenogue and Grants Roads have road widths more than 6.0 m. This is in the upper range of the standard carriageway width for Link Streets with low to moderate design speeds, as stated in the DMURS.

Therefore, these roads have sufficient width to accommodate the HV travelling to the site of the Proposed Development.

7.4.2 Operational Phase

7.4.2.1 Magnitude of impact

Enva currently employs approximately 38 full time personnel at the existing integrated waste management facility which generates a maximum of 66 light vehicle daily movements. In addition to this there is a maximum of approximately 228 in and out HV movements based on existing weighbridge records.

The Proposed Development is expected to generate up to an additional 97 vehicle movements during a typical day. The breakdown of the modes of transport that will be generated by the development site is as follows:

- 79 HV waste movements
- 16 staff cars
- 2 supplies and other non-waste, non-staff related traffic

This model share may change over time due to the objective of encouraging modal shift towards public transport and active travel modes of transport.

Based on a review of the percentage distribution of traffic flow at the surveyed junction, the key routes into the facility and taking into consideration the location, the additional 97 vehicle movements distributed onto the road network are as follows:

- 100% via Grants Road
- 90% via the R120 Rathcoole Road (towards N7)
- 10% via the R120 Newcastle Road

Table 7.14 outlines the distribution of the Proposed Development daily trips across the local road network.

Table 7.14: Distribution of the Proposed Development Daily Trips

Daily Development Trips		
	Arrivals	Departures
R120 Greenogue Roundabout to Newcastle Roundabout	87	87
R120 Newcastle Roundabout to Newcastle	10	10
Grants Road	97	97

The scale of percentage impacts of the additional traffic flows, taking account of those vehicle movements removed, on the local road network were quantified for each assessment year in order to establish a magnitude of impact on each of the key roads in the TTA study area and these are shown in **Table 7.15** to **Table 7.17**.

Table 7.15: Magnitude of Impact – Opening Year 2025

Magnitude of Impact - Opening Year 2025				
	Opening Year 2025 AADT	Daily Development Traffic (Two-Way Flows)	Percentage Impact	Magnitude of Impact on Total Traffic Flow during the Opening Year 2025
R120 Greenogue Roundabout to Newcastle Roundabout	11,637	87	0.7%	Negligible
R120 Newcastle Roundabout to Newcastle	10,247	10	0.1%	Negligible
Grants Road	5,341	97	1.8%	Low

Table 7.16: Magnitude of Impact – Interim Year 2030

Magnitude of Impact – Interim Year 2030				
	Interim Year 2030 AADT	Daily Development Traffic (Two-Way Flows)	Percentage Impact	Magnitude of Impact on Total Traffic Flow during the Interim Year 2030
R120 Greenogue Roundabout to Newcastle Roundabout	11,150	87	0.8%	Negligible
R120 Newcastle Roundabout to Newcastle	10,171	10	0.1%	Negligible
Grants Road	5,301	97	1.8%	Low

Table 7.17: Magnitude of Impact – Design Year 2040

Magnitude of Impact - Design Year 2040				
	Design Year 2040 AADT	Daily Development Traffic (Two-Way Flows)	Percentage Impact	Magnitude of Impact on Total Traffic Flow during the Design Year 2040
R120 Greenogue Roundabout to Newcastle Roundabout	12,001	87	0.7%	Negligible
R120 Newcastle Roundabout to Newcastle	10,568	10	0.1%	Negligible
Grants Road	5,509	97	1.8%	Low

Based on the above comparison of trips to the site, both to the existing Enva 402 Grants Drive facility operations and to the Proposed Development, there will an additional 97 HV movements per day to the site.

Across the network it is considered that the scale of magnitude is **negligible to low** due to the insignificant percentage impact of the operational staff vehicle trips compared to the background traffic flow levels.

7.4.2.2 Sensitivity of the receptor

The sensitivity of receptor is defined through the vulnerability of the receptor, the recoverability of the receptor, and the importance of receptor in the context of national, regional, and localised scale. As roads are categorised as national, regional, and local the simplistic way would be to defining the receptors in terms of these categories. However, some of the local roads in the TTA study area go through residential areas and adjacent to retail units so this was considered when defining the sensitivity during operational phase. **Table 7.18** outlines the sensitivity of the routes during operational phase.

Table 7.18: Sensitivity of the Receptor – Operational Phase

Sensitivity of the Receptor – Operational Phase	
R120 Greenogue Roundabout to Newcastle Roundabout	Medium
R120 Newcastle Roundabout to Newcastle	Medium
Grants Road	Medium

7.4.2.3 Significance of the Effect

The significance of the effect is determined by correlating the magnitude of the impact and the sensitivity of the receptor for each of the roads and are based on the method of assessment shown previously in **Table 7.6**. For the purposes of this assessment, any effects with a significance level of slight or less have been concluded to be **not significant** in terms of the EIA Regulations. **Table 7.19** outlines the significance of effect during the operational phase.

Table 7.19: Significance of Effect – Operational Phase

Significance of Effect – Operational Phase			
	Magnitude of Impact	Sensitive of Receptor	Significance of Effect
R120 Greenogue Roundabout to Newcastle Roundabout	Negligible	Medium	Imperceptible
R120 Newcastle Roundabout to Newcastle	Negligible	Medium	Imperceptible
Grants Road	Negligible	Medium	Imperceptible

Overall, the effect on the road network is **imperceptible**, which is not significant in EIA terms.

7.4.2.4 Impact of Junction Capacity

Junction capacity assessments were undertaken at the adjacent R120 Newcastle Roundabout junction as its directly impacted by the Proposed Development.

The junction capacity assessments were carried out using ARCADY 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 1.0 indicates that a junction is operating at its maximum capacity. An RFC of approximately 0.85 is considered to represent the maximum practical capacity of a junction/roundabout when queuing and delays will occur. A junction operating at more than its practical capacity will operate with reduced efficiency.

The capacity analysis was undertaken for the Opening Year 2025 AM Peak Hour (08:00am - 09:00am) and PM Peak Hour (4:15pm - 5:15pm) ‘without Proposed Development’ scenario compared to the ‘with Proposed Development’ scenario in order to establish the scale of the impact the Proposed Development could have on the junction.

Table 7.20 and **Table 7.21** outline the significance of effect during operational phase.

Table 7.20: Opening Year 2025 AM Peak Hour Junction Assessment – R120 Newcastle Roundabout

R120 Newcastle Roundabout – Opening Year AM Peak Hour									
	Without Development			With Development			Impact		
	RFC	Queue (V)	Delays (Secs)	RFC	Queue (V)	Delays (Secs)	RFC	Queue (V)	Delays (Secs)
Arm B Rathcoole (R120)	0.74	2.71	11.53	0.76	2.79	11.94	0.02	0.08	0.41
Arm C Tay Lane (L6033)	0.05	0.05	4.06	0.05	0.05	4.06	0.00	0.00	0.00
Arm D Newcastle (R120)	0.86	5.66	24.46	0.87	5.78	27.12	0.01	0.12	2.66
Arm A Grants Road	0.27	0.36	5.09	0.27	0.36	5.09	0.00	0.00	0.00

Table 7.21: Opening Year 2025 PM Peak Hour Junction Assessment – R120 Newcastle Roundabout

R120 Newcastle Roundabout – Opening Year PM Peak Hour									
	Without Development			With Development			Impact		
	RFC	Queue (V)	Delays (Secs)	RFC	Queue (V)	Delays (Secs)	RFC	Queue (V)	Delays (Secs)
Arm B Rathcoole (R120)	0.98	17.61	69.45	0.99	17.72	70.92	0.01	0.11	1.47
Arm C Tay Lane (L6033)	0.05	0.05	4.78	0.05	0.05	4.78	0.00	0.00	0.00
Arm D Newcastle (R120)	0.42	0.73	5.29	0.44	0.80	5.76	0.02	0.07	0.47
Arm A Grants Road	0.71	2.37	10.22	0.71	2.37	10.22	0.00	0.00	0.00

The above ARCADY results for the junction show that Arm D (to Newcastle R120) is currently exceeding the recommended 0.85 RFC value during the existing without development AM period while Arm B (to Rathcoole R120) is currently exceeding the recommended 0.85 RFC value during the existing without development PM period.

Given the nature of the Proposed Development the AM and PM peak produce similar results in terms of RFC values when compared to the current arrangements. It should also be noted that the Proposed Development will be operational 24 hours a day which will result in a reduced traffic volume associated with the facility at peak times.

The results of the peak hour junction capacity assessments show that the impact of the Proposed Development is **imperceptible** on this junction.

The effects of the Proposed Development on the capacity of this junction are **not significant** based on the above results.

7.4.3 Decommissioning Phase

Decommissioning of the facility following closure is expected to take approximately 8 weeks. It will include:

- Either the processing of any untreated wastes onsite or the transfer of such wastes to other facilities for processing.
- Removal of all treated HRW and waste containers.
- The dismantling, disinfection, and removal of the treatment plant.
- Decontamination of the building if required.

Because of the light industrial nature of the proposed development, extensive or long-term aftercare is not expected to be required to allow the future reuse of the facility for other industrial or commercial activities.

The activities associated with decommissioning of this infrastructure would result in potential impacts on traffic and transport similar in nature to those outlined for the construction phase but on a much smaller scale.

7.5 Cumulative Impact Assessment

A cumulative impact assessment (CIA) has been undertaken for traffic and transport in C**hapter 20: Cumulative Effects.**

7.6 Interactions

Interactions between environmental topics with Traffic and Transport has been addressed in **Chapter 19 – Interactions Between the Environmental Factors**.

7.7 Mitigation Measures

7.7.1 Construction Phase

A Construction Traffic Management Plan (CTMP) is to be prepared which outlines measures to be implemented by the appointed contractor during the construction phase in order to reduce impacts on local communities and residents adjacent to the Proposed Development and wider road network.

7.7.2 Operational Phase

No significant traffic and transport impacts are anticipated during the operational phase of the Proposed Development and as such, no mitigation measures are required. However, it is recommended that best practice measures to minimise operational traffic and transport impacts are implemented. This will include the developer promoting the use of sustainable transport modes by future employees, providing information on public transport services in the area, information on the health benefits for active travel uses, setting up the Bike to Work Scheme, assessing the scope for car sharing schemes.

7.7.3 Decommissioning Phase

Enva will ensure that construction traffic measures are implemented by the appointed contractor during the decommissioning phase in order to reduce impacts on local communities and residents adjacent to the Proposed Development and wider road network.

7.8 Residual Impacts

Residual effects are those effects which will remain after the proposed mitigation measures have been implemented. As no mitigation is proposed outside of general best practice measures, no significant residual effects will arise as a result of the Proposed Development.

7.9 Monitoring

7.9.1 Construction Phase

Prior to the commencement of construction, a detailed Construction Traffic Management Plan (CTMP) will be prepared by the selected contractor to ensure construction traffic is appropriately managed.

7.9.2 Operational Phase

There is no traffic and transport monitoring proposed for the operational phase of the Proposed Development.

7.9.3 Decommissioning Phase

Prior to the commencement of the decommissioning phase, a detailed Construction Traffic Management Plan (CTMP) will be prepared by the selected contractor to ensure construction traffic is appropriately managed.

7.10 Schedule of Environmental Commitments

A summary of the environmental commitments, with regard to this chapter is set out at **Chapter 21 - Schedule of Environmental Commitments**.

7.11 Chapter References

Department of Transport (DoT), 2019. *Design Manual for Urban Roads and Streets (DMURS),* Dublin: DoT.

Department of Transport (DoT), 2019. *Traffic Signs Manual,* Dublin: DoT.

Transport Infrastructure Ireland (TII), May 2014. *Traffic and Transport Assessment Guidelines (PE-PDV-02045),* Dublin: TII.

Transport Infrastructure Ireland (TII), May 2019. *Project Appraisal Guidelines (PAG) for National Roads Unit 5.3, Travel Demand Projections (PE-PAG-02017),* Dublin: TII.

Transport Infrastructure Ireland (TII), October 2016. *Project Appraisal Guidelines (PAG) for National Roads Unit 16.1 Expansion Factors for Short Period Traffic Counts (PE-PAG-02039),* Dublin: TII.

CHAPTER 8
POPULATION

Contents

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8 POPULATION

8.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) provides an assessment of the potential impacts of the Proposed Development on the population during construction, operation and decommissioning phases.

The assessment presented is informed by the following technical chapters:

- Chapter 7 - Traffic and Transport
- Chapter 9 - Noise and Vibration
- Chapter 10 - Air Quality and Climate
- Chapter 11 - Human Health
- Chapter 15 - Water
- Chapter 18 - Risks of Major Accidents and or Disasters

For the sake of brevity, this chapter does not seek to repeat text or replicate data from other EIAR chapters but rather cross-refers to the relevant sections of those chapters.

8.2 Methodology

The focus of the chapter is to establish likely potential and significant impacts on population in the zone of influence (ZoI) which includes the residential, working and visiting community. Each section will set out the detail of the existing environment; the characteristics of development that could have effects; the consequences of such effects; and mitigation measures, where considered necessary. Where associated and inter-related potential likely and significant impacts are more comprehensively addressed elsewhere in this EIAR document, these are referred to and the reader is directed to the relevant environmental chapter for a more detailed assessment.

In order to ensure a robust assessment, this chapter separately addresses matters of land use, community aspects (amenity), employment and population (demographic trends). It does so by undertaking the assessment of both the positive and negative impacts, of the proposal on land use and settlement patterns, residential amenity and local communities, economic activity and employment, and demographics and local population.

8.2.1 Legislation, Policy and Guidance

The requirement to carry out an assessment of potential impacts on population and human health is set out in the Environmental Impact Assessment (EIA) Directive (2014/52/EU). The recitals to the 1985 and 2011 Directives refer to ‘Human Health’ and include ‘Human Beings’ as the corresponding environmental factor. The 2014 Directive changes the title of this factor to ‘Population and Human Health’.

The Environmental Protection Agency (EPA) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (2022) provide some commentary on relevant matters with regard to the scope of assessment under the ‘Population and Human Health’ environmental heading. The guidelines note relevant topics as follows:

- Land use patterns (see **Section 8.4.2.1** and **8.4.3.1** for assessment of the Proposed Development on land use).
- Community Aspects (Amenity) (see **Section 8.4.2.2** and **8.4.3.2** for assessment of the Proposed Development on recreational, amenity and community facilities).
- Employment (see **Section 8.4.2.3** and **8.4.3.3** for assessment of the Proposed Development on employment).

- Population (Demographic trends) (see **Section 8.4.2.4** and **8.4.3.4** for assessment of the Proposed Development on Demographic trends).

The guidelines further clarify that,

> *"The transposing legislation does not require assessment of land-use planning, demographic issues or detailed socioeconomic analysis. Coverage of these can be provided in a separate Planning Application Report to accompany an application for planning permission. This should be avoided in an EIAR, unless issues such as economic or settlement patterns give rise directly to specific new developments and associated effects (ref. section 3.5.7). The main purpose of such identification and assessment is to provide the CA with a context for their determination. (Examples would include future warehousing beside a new port, transmission lines in the vicinity of a new electrical substation or commercial developments on zoned land beside a new road)."*

8.2.2 Zone of Influence

The ZoI for the population assessment has considered all receptors in the surrounding areas of land which may be potentially impacted by the Proposed Development. The ZoI has been defined with reference to the potential for effects based on an initial examination of the environment using available information and professional judgement. The smallest geographical units distinguished by the Central Statistics Office (CSO) for general statistical use are Small Areas (50 – 200 households). The ZoI identified for population encompasses the Small Areas, as defined by the CSO in 2016 located partially or wholly within 1 km from the red line boundary of the site.

The small areas boundaries used by the CSO in reporting the 2022 census data differ from the 2016 Small Areas. Therefore, the area for which data has been reported from the 2022 census is different from the ZoI defined by 2016 data. The 2022 Small Areas that match those most closely used in 2016 have been used in gathering 2022 data. These slight differences in area can be seen in **Figure 8-1**.

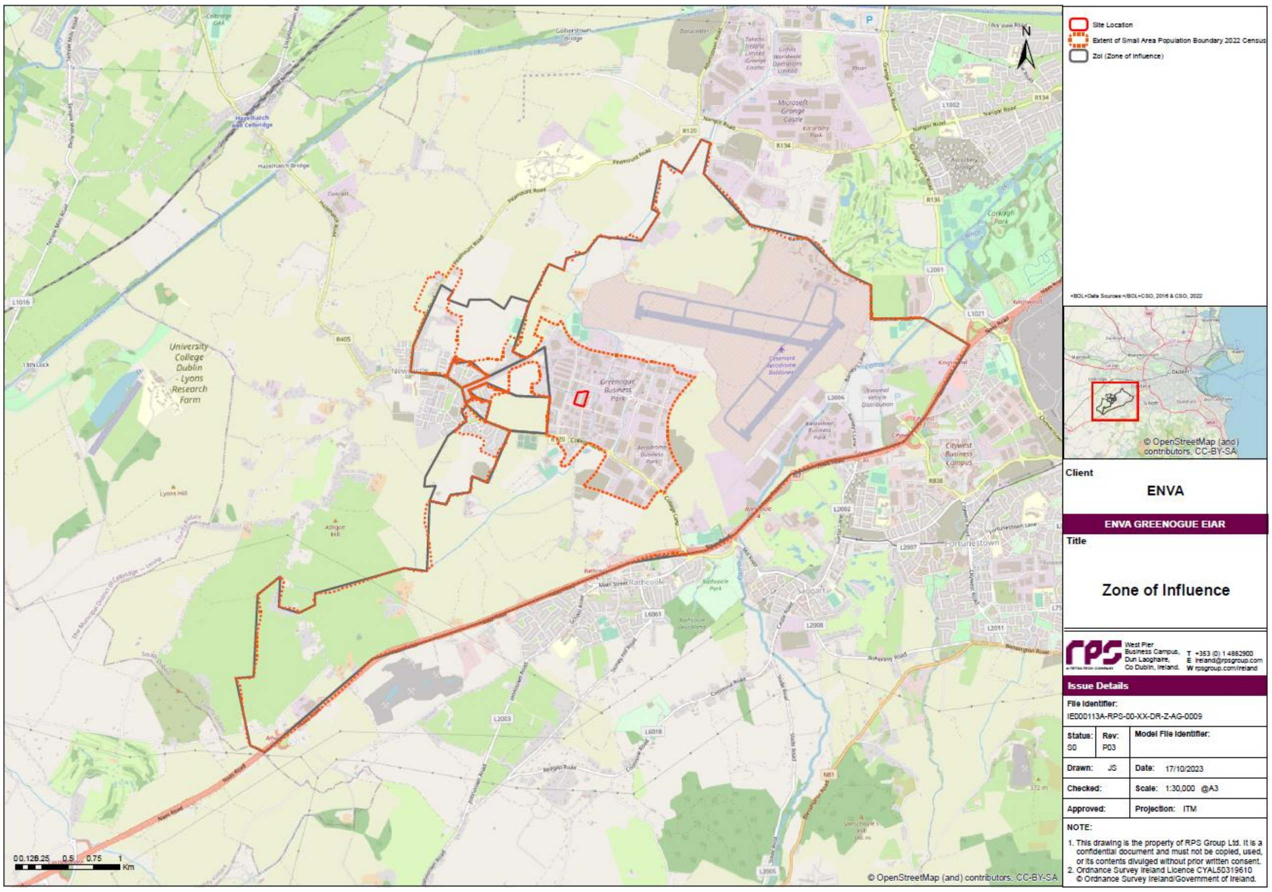

Figure 8-1: Zone of Influence and Extent of Small Area Population Boundary Used for 2022 Census

In identifying the principal receptors that may be potentially affected by the construction, operational and decommissioning phases, consideration was given to the Proposed Development and the identified receiving environment. It should be noted that it is not always possible to determine the catchment area for community facilities, as residents of any area may utilise facilities located within different counties, regions or neighbourhoods.

8.2.3 Sources of Information to Inform the Assessment

A desk-based review was carried out of publicly available information relevant to the project in terms of land-use, community / social facilities, economic activity employment and population, health and safety and human health with the following data sources referenced:

- CSO data website www.cso.ie.
- Economic and Social Research Institute (ESRI) Quarterly Economic Commentary.
- Google Earth.
- Google Maps.
- Newcastle Local Area Plan (as extended 2017) from South Dublin County Council (SDCC) expired in December 2022[1].
- Planning Applications Online Search (South Dublin and An Bord Pleanála's (ABP) websites).
- Pobal Mapping https://maps.pobal.ie/.
- Project Ireland 2040 - National Planning Framework.
- Regional Spatial and Economic Strategy for the Eastern and Midlands Regional Assembly.
- South Dublin County Development Plan (SDCDP) 2022 – 2028.
- Tailte Éireann mapping, formerly known as Ordnance Survey of Ireland (OSI).

All data sources were consulted in October 2023 except where otherwise stated.

8.2.4 Key Parameters for Assessment

The likely significant effects that the construction, operational and decommissioning phases of the Proposed Development may have on the topics are outlined below.

8.2.4.1 Land Use and Settlement Pattern

The assessment sets out how the Proposed Development may impact on land use and the settlement patterns within the ZoI.

8.2.4.2 Residential and Local Community Amenity

The assessment considers how peoples' enjoyment of their residential and local community amenity may be affected in the construction and operational stages.

Assessing the effect of the Proposed Development on residential and community amenity takes cognisance of the affects from other assessment topics (including Air Quality, Noise, Traffic) which have the potential to impact on people's enjoyment of existing amenities in the area, or their enjoyment of their own residence.

[1] https://www.sdcc.ie/en/services/planning/local-area-plans/existing/newcastle/

8.2.4.3 Economic Activity and Employment

The assessment of economic activity and employment includes all potential direct and indirect effects on the economic activity and employment in the ZoI. There is no consolidated methodology or practice for assessing the impact on employment set out in EPA guidance. The impact of the proposed modifications of an existing waste management facility on economic activity and employment will be assessed within the ZoI over the course of the construction, operational, and decommissioning phases.

8.2.4.4 Demographics and Local Population

The assessment includes effects on the local population in the ZoI. The impact of the proposed modifications to the existing waste management facility on the local population and demographics over the course of the construction and operational phase of the Proposed Development will be assessed.

8.2.5 Assessment Criteria and Significance

In undertaking the assessment of the impact of the proposal on human beings, community and the local socio-economic environment both positive and negative impacts are considered. The assessment criteria and significance are outlined in the methodology section in **Chapter 1 - Introduction**.

8.2.6 Data Limitations

This chapter of the EIAR has been prepared based upon the best available information.

The most recent Census of Population was undertaken in April 2022. As stated above, CSO Small Areas used in reporting 2016 and 2022 census results have been modified. This has impacted somewhat on the robustness of the data for the CSO data used at ZoI level.

There were no additional technical difficulties or otherwise encountered in the preparation of this chapter of the EIAR.

8.2.7 Consultation

Chapter 6 - Consultation of this EIAR summarises the wider consultation process and each of the key elements/stages of consultation. South Dublin County Council noted the potential requirement for an EIAR and requested detail on staffing levels at the proposed facility when operational. This is addressed in **Section 8.4.2** of this chapter.

8.3 Description of the Existing Environment (Baseline Scenario)

8.3.1 Baseline Environment

An outline of the likely evolution without implementation of the project as regards natural changes from the baseline scenario is also provided.

The existing environment is considered in this section under the following headings:

- Land Use and Settlement Pattern.
- Residential and Local Community Amenity.
- Economic Activity and Employment.
- Demographics and Local Population.

The ZoI for the consideration of population is as described in **Section 8.2.2**.

8.3.1.1 Land Use and Settlement Pattern

The site of the project is located at 402 Grants Drive, Greenogue Business Park, Greenogue, Rathcoole, Co. Dublin. The is located approximately 15 km southwest of Dublin City Centre and 1.7 km north of the N7 road. The site covers approximately 1.1 ha and is bound to the north by the Griffeen River, to the south by Grants Drive, to the east the site is bound by an adjoining commercial holding which is primarily used for vehicle parking. The west of the site is bound by 2 adjoining commercial holdings, primarily used for vehicle parking. A strip of landscaping, approximately 2 m wide, is maintained and managed along the inside perimeter of the overall site. The overall site comprises 2 main buildings (Building 1 & Building 2) which house 3 waste treatment processes and an ancillary support office (Building 3) which is located to the south of Building 1. Enva is the sole occupant of the site, and controls access to the facility with security arrangements including gates, fencing and personnel monitoring access.

Greenogue Business Park is approximately 190 ha in area and is bound to the east by Newcastle village. The N7 road and Rathcoole are located to the south of the Business Park. Casement Aerodrome (Baldonnel) bounds the Business Park to the north and to the west. The Business Park and its immediate surrounds are shown in **Figure 8-2**. The predominant land use immediately surrounding the subject site comprises commercial and industrial activities within the Business Park. To the east and west, there are commercial warehouse facilities. There are a variety of businesses located in the park, such as manufacturing companies, logistics and distribution centres, and research and development facilities. The park also features amenities for the convenience of tenants, including on-site car parking and cafes. There are no notable tourist attractions or facilities within the ZoI.

The *SDCDP 2022-2028* serves as the key planning policy document for the county and includes policies, objectives and design standards to guide future developments. Within the *SDCDP 2022-2028*, the business park is designated an economic cluster, and it is in an area zoned EE (enterprise and employment). The lands surrounding the business park are zoned RU (rural). The land use zonings along with the policy objectives are outlined in **Chapter 2 - Background and Need for the Proposed Development** of this EIAR.

Figure 8-2: Enva Site Location and Adjacent Land Uses

8.3.1.2 Residential and Local Community Amenity

Local Services / Amenity (social infrastructure) includes a wide range of services and facilities including health, education, community, recreational and sports facilities that contribute to the quality of life. The immediate area within which the Proposed Development is located is commercial and industrial in nature. Due to the existing land uses in the immediate environment of the site, there are limited amenities in the immediate vicinity. However, there are a wider range of community facilities and residences to the west of the site in and around Newcastle.

The residential population within the ZoI is centred on Newcastle, with two-storey, semi-detached housing being the dominant housing typology. The local population is further described in **Section 8.3.1.4.**

Social, Sports, and Community Services

Social and community services within or adjacent to the ZoI are set out in **Table 8.1** and illustrated in **Figure 8-3**.

Table 8.1: Social and Community Services within ZOI

Type	Amenity	Distance from Site (km)
Sports and Leisure Facility	Greenogue Equestrian	0.45 km
Sports Club	Peamount Utd FC	0.55 km
Sports Club	St Finians GAA	0.8 km
Post Office	Post Office	1.0 km
Sports and Leisure Facility	Haughans Field Peamount	1.3 km
Sports Club	Commercials Hurling and Camogie Club	1.7 km
Sports Club	St. Francis Football Club	2.9 km
Sports Club	St Francis Football Club Dublin	3.1 km

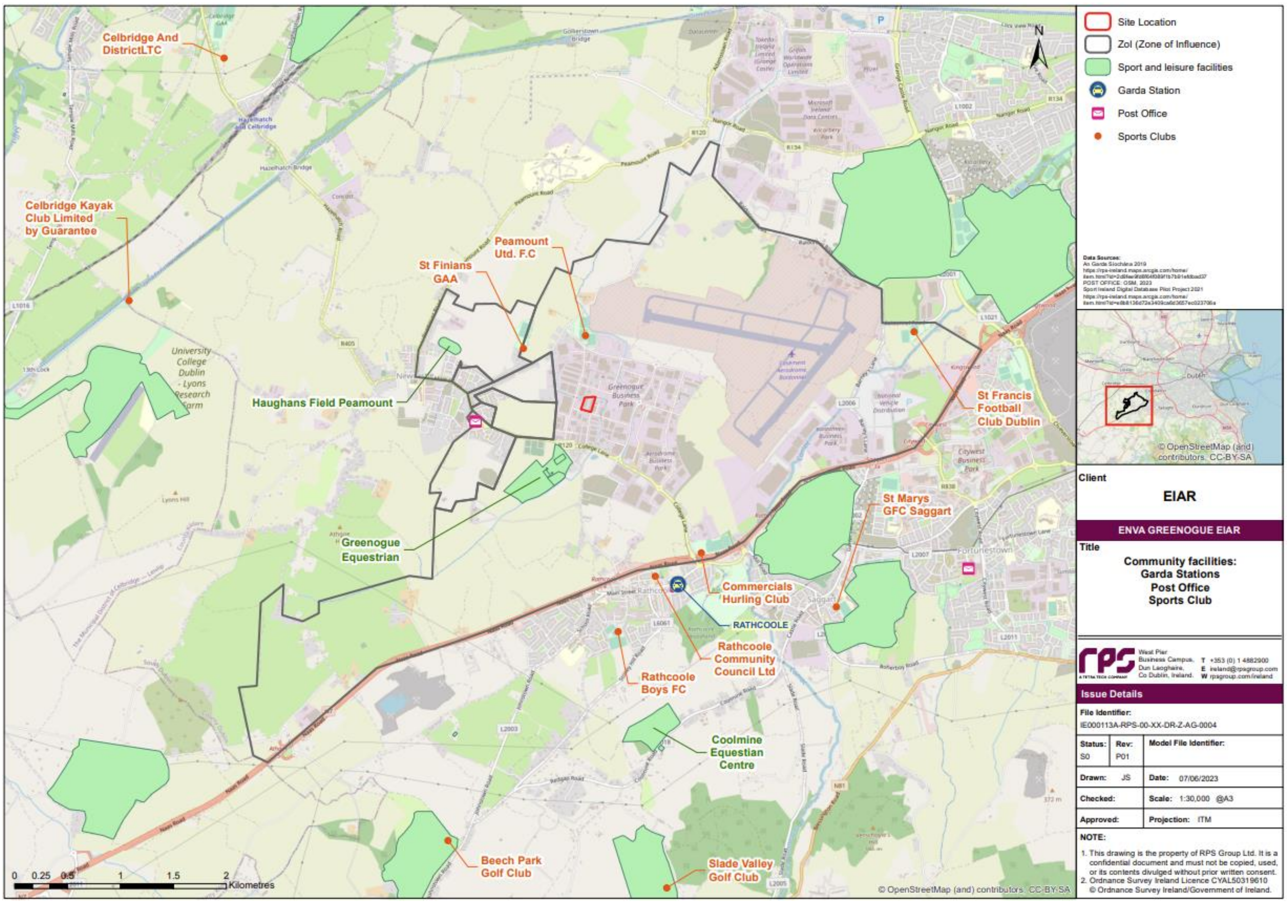

Figure 8-3: Social, Sports, and Community Services[2]

Education and Childcare Facilities

The location of schools and childcare facilities (as per Pobal Mapping) are illustrated in **Figure 8-4**. Reflecting the low level of resident population within the ZoI, no education or childcare facilities were found within the ZoI.

[2] Source: gis.epa.ie

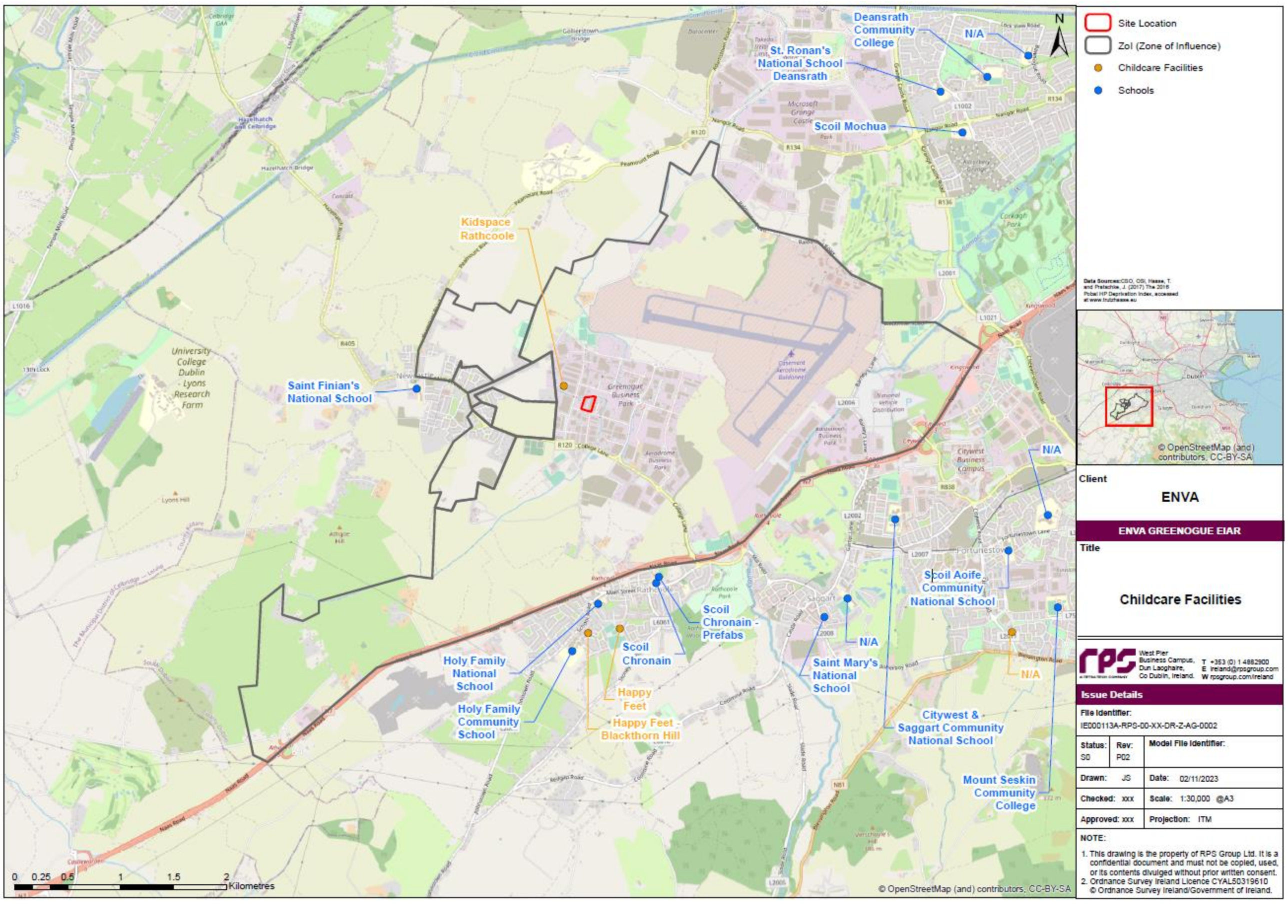

Figure 8-4: Education and Childcare Facilities

Health Facilities

Health facilities including dentists, general practitioners (GPs) and pharmacies within the ZoI are set out in **Table 8.2** and illustrated in **Figure 8-5**. Also shown in **Figure 8-5** are health facilities proximate to the ZoI.

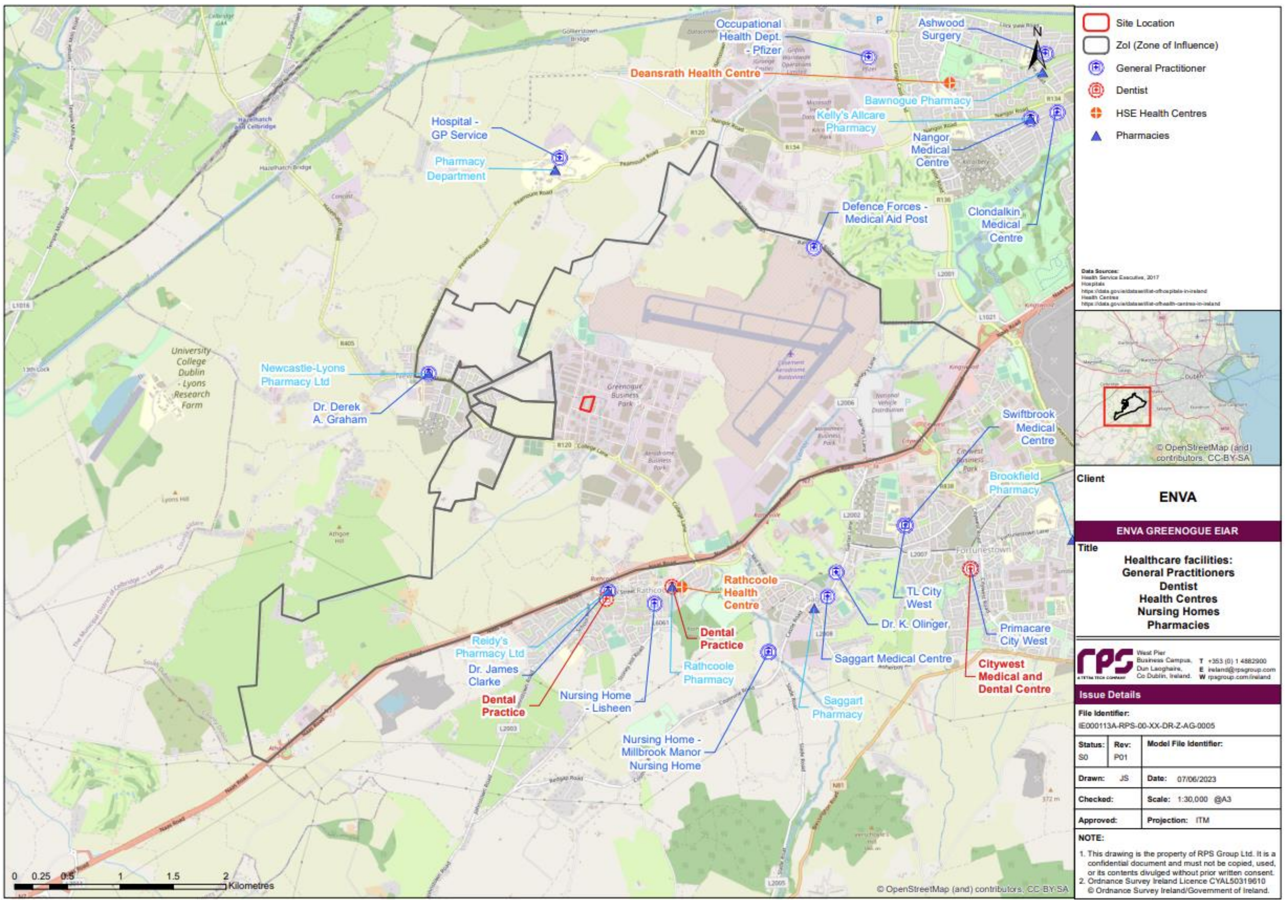

Figure 8-5: Healthcare Facilities

Table 8.2: Healthcare Facilities

Type	Facility	Distance from site (km)
Pharmacy	Lyons Pharmacy Ltd	1.5 km
GP	Dr. Derek A. Graham	1.5 km
GP	Defence Forces – Medical Aid Post	2.5 km

8.3.1.3 Economic Activity and Employment

The 2022 Census data was examined 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 8.3 shows the overall unemployment rate as measured by the responses to the question on principal economic status in the Census for 2011, 2016 and 2022. 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 8.3: Principal Economic Status 2022, 2016 and 2011[3]

Economic Status	State 2022	State 2016	State 2011	South Dublin 2022	South Dublin 2016	South Dublin 2011	ZoI 2022	ZoI 2016	ZoI 2011
At Work	2,320,297	2,006,641	1,807,360	137,111	119,210	106,534	1,384	1,092	1,032
Looking for First Regular Job	34,526	31,434	34,166	2,208	2,030	2,361	19	14	12
Unemployed or Given Up Previous Job	176,276	265,962	390,677	10,841	16,235	23,678	30	80	117
Overall Unemployed	210,802	297,396	424,843	13,049	18,265	26,039	90	94	129
Labour Force	2,531,099	2,304,037	2,232,203	150,160	137,475	132,573	1,474	1,188	1,161
Unemployment Rate %	8.3 %	11.5 %	19.0 %	8.7 %	13.3 %	19.6 %	9.4 %	7.9 %	11.1 %

Table 8.4: Persons Within the ZoI at Work by Occupation 2016 and 2022[4]

	2016		2022	
Occupation	No. of Persons	%	No. of Persons	%
Managers, Directors and Senior Officials	116	9.90 %	131	9.00 %
Professional Occupations	162	13.82 %	262	18.00 %
Associate Professional and Technical Occupations	221	18.86 %	191	13.12 %
Administrative and Secretarial Occupations	146	12.46 %	164	11.27 %
Skilled Trades Occupations	131	11.18 %	171	11.75 %
Caring, Leisure and Other Service Occupations	74	6.31 %	114	7.83 %
Sales and Customer Service Occupations	67	5.72 %	75	5.15 %
Process, Plant and Machine Operatives	83	7.08 %	97	6.66 %
Elementary Occupations	85	7.25 %	105	7.21 %
Not Stated	87	7.42 %	145	9.96 %
Total	1,172	100.00 %	1,455	100.00 %

The unemployment figures for the ZoI from the 2016 Census are significantly lower within the State, South Dublin County Council, and the ZoI in comparison to the 2011 Census. The unemployment rate for South Dublin was reduced to 13.3% in 2016 compared to 19.6% in 2011. In this same period, unemployment within the ZoI fell from 11.1% to 7.9%.

The unemployment figures at State level from the 2022 census also show a decrease in the unemployment rate from 11.5% in 2016, to 8.3% in 2022. In this same period, the unemployment rate in South Dublin decreased from 13.3% in 2016 to 8.7% in 2022. This decrease in unemployment would seem to arise from the improvement in economic conditions and an increase in job opportunities across many economic sectors (see **Table 8.4**). Data published from the 2022 census to date does not include the principal economic status at County or Local level.

[3] Source: cso.ie

[4] Source: cso.ie

Quarterly National Household Survey[5]

The Quarterly National Household Survey (QNHS) and the Quarterly Labour Force Survey (QLFS) are designed to produce quarterly labour force estimates that include the official measure of employment and unemployment in the state (International Labour Organisation (ILO) basis). The ILO unemployment rate for the State for the period 2019 - Q1 2023 is summarised in **Table 8.5**.

Table 8.5: ILO Economic Status Unemployment Rate for State 2019- Q1, 2023

	Q1 (%)	Q2 (%)	Q3 (%)	Q4 (%)	Average (%)
2019	4.8	5.4	5.2	4.5	5.0
2020	4.6	5.1	7.1	5.7	5.6
2021	7.1	7.3	5.7	4.8	6.2
2022	4.8	4.5	4.2	4.2	4.4
2023	4.1	4.4	-	-	4.2

In March 2020, the CSO began publishing a supplementary measure of monthly unemployment in parallel with the routine Monthly Unemployment Estimates, which incorporates those in receipt of the Pandemic Unemployment Payment (PUP) into the calculation to produce a COVID-19 Adjusted Measure of Monthly Unemployment. This is reported in **Table 8.6**, the publication of such data has now ceased.

Table 8.6: ILO Economic Status Unemployment Rate for State[6]

	Q1 (%)	Q2 (%)	Q3 (%)	Q4 (%)	Average (%)
2020	-	23.1	15.9	19.4	19.5
2021	25.7	16.2	8.9	7.4	14.6

The increased unemployment rates in late 2020 and early 2021 reflect the economic impacts of the COVID-19 pandemic. The decreased unemployment rates in late 2021 and on into 2022 / 2023 show the economic recovery from these impacts as economic activity increased.

Affluence and Deprivation

The Pobal Deprivation Index is Ireland's most widely used social gradient metric, which scores each small area in terms of affluence or disadvantage. The index uses information from Ireland's census, such as employment, age profile and educational attainment, to calculate this score. All of the small areas within the ZoI are classified as "*Marginally Above Average*". There is no variation in the level of affluence and deprivation in the ZoI as shown in **Figure 8.6**.

[5] Source: cso.ie

[6] Source: cso.ie

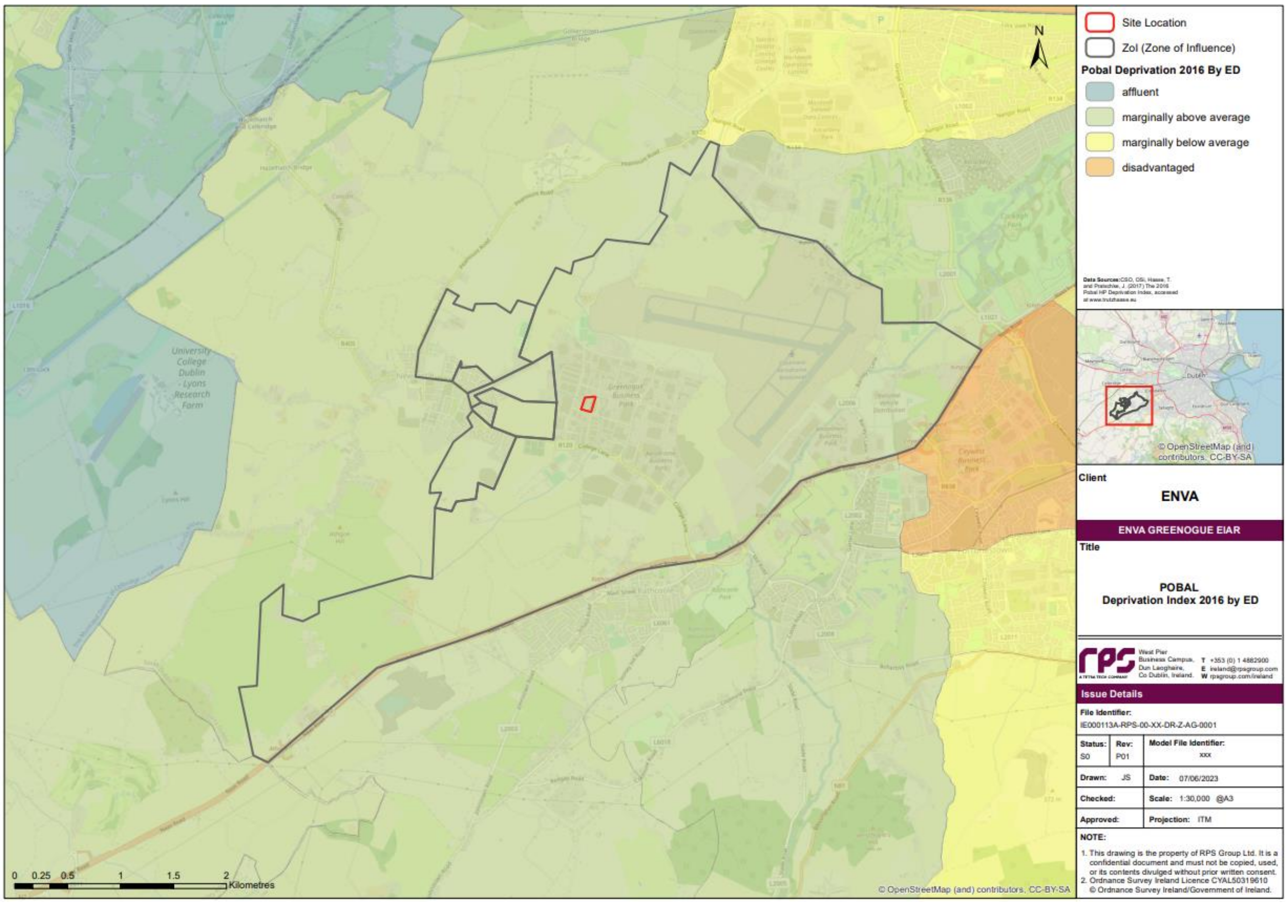

Figure 8-6: Deprivation Index[7]

Education Profile

Census 2016 found that the average age of persons aged 15 and over that had completed their full-time education in April 2016 within South Dublin was 19.7. This was below the average age of completion of 19.9 years within the state. 41% of the population within the County were found to have a third level education. This was slightly below the national average of 42%.

8.3.1.4 Demographics and Local Population

The most recent Census of Population was undertaken in April 2022. Demographic trends are analysed at state, county, and local levels for the purposes of this EIAR. It is noted that the subject site is located in Newcastle Electoral District (ED). For the purposes of examining Census population data, the Small Areas partially or wholly within a 1 km buffer of the site boundary of the Proposed Development (i.e., the ZoI) will be included.

Population

Table 8.7 illustrates the population increase at state and local level between 2011 and 2016, and 2022. South Dublin experienced a population increase of approximately 8% between 2016 and 2022 and an increase of 5.1% between 2011 and 2016. This reflects the high rate of growth proximate to, but outside of city centre locations throughout the state in recent decades.

[7] Source: Pobal, 2016

From 2011 to 2016, the rate of population increase within the ZoI of 12.1% is significantly above the general rate of increase for South Dublin and the state over the same period. From 2016 to 2022, the rate of population increase of 28% in the ZoI is significantly above the general rate of increase for South Dublin and the state over the same period.

The population of the State grew by 8.1% from 4,761,865 to 5,149,139 between 2016 and 2022. South Dublin has also experienced a population increase of 8% between 2016 and 2022. Over the same time period, Newcastle ED recorded a significant population increase of 23.5% which is well above the population change at State and County level over the same period. As set out in **Section 8.2.2,** the small areas used by the CSO to report the 2022 Census data are different from those used in 2016. Therefore, the growth recorded in the intercensal period within the ZoI serves only to confirm the general growth trend, rather than provide precise data.

Table 8.7: Population at State Level and Local Level in 2011, 2016 and 2022[8]

Area	2011	2016	% Change 2011-2016	2022	% Change 2016-2022
State	4,581,269	4,761,865	3.8	5,149,139	8.1%
South Dublin	265,205	278,767	5.1	299,793	8%
Newcastle ED	3,749	4,257	13.5	5,566	23.5%
Zone of Influence	2,077	2,328	12.1	2,988	28%

Population Density

As shown in **Table 8.8**, the population density of the ZoI is higher than the national average based on 2022 data, and significantly lower than that of South Dublin. The population density of the ZoI is also shown in **Figure 8-7** below.

[8] Source: cso.ie

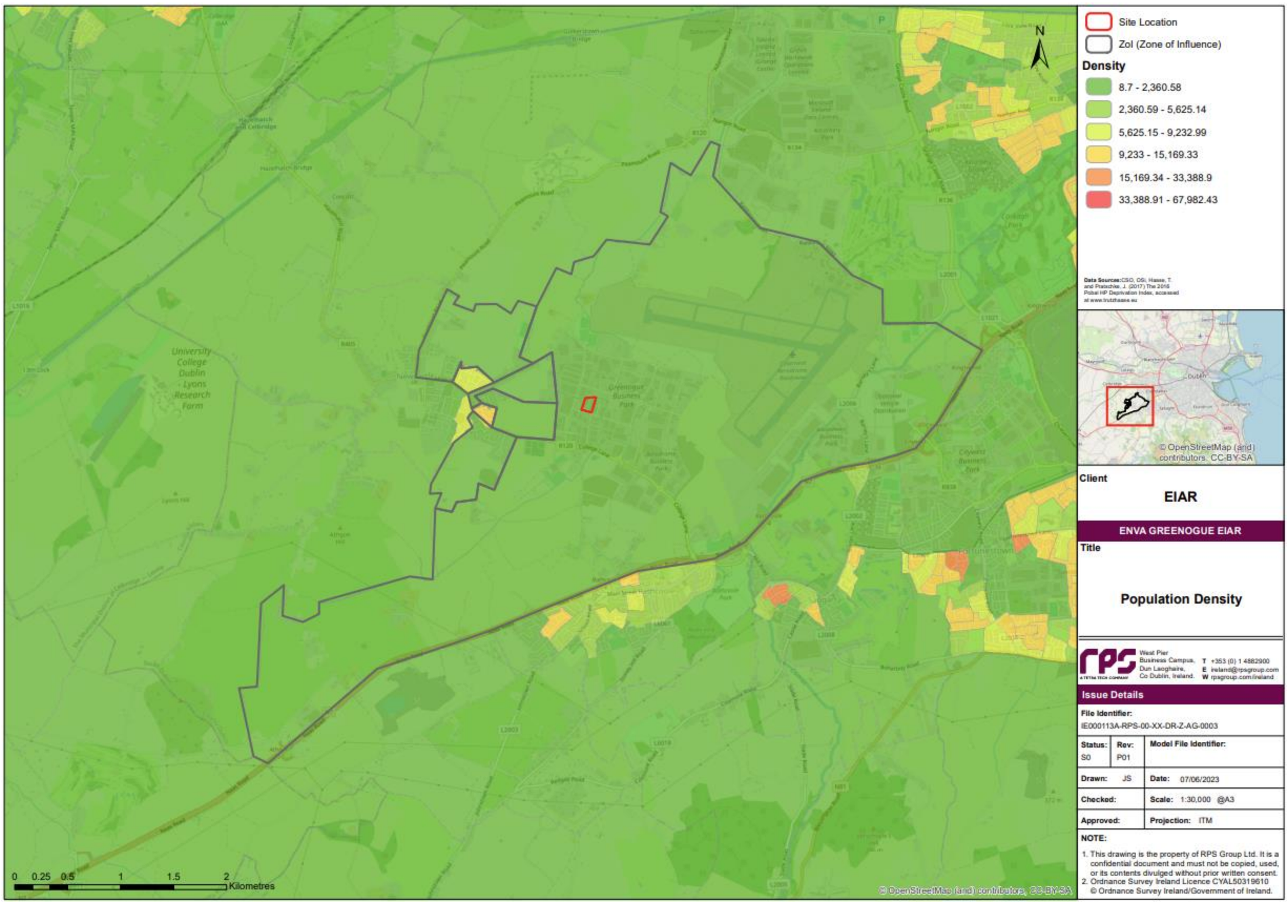

Figure 8-7: Population Density within the ZoI 2016

Table 8.8: Population Density at State, South Dublin, Newcastle ED, and ZoI in 2022[9]

Population Density			
Area	**Area Size (km^2)**	**Population 2022**	**Population Density (per km^2)**
State	67,980.5	5,149,139	76
South Dublin	223	301,075	1,350
Newcastle ED	32.1	5 566	173
ZoI	14.3	2 988	209

Age Profile

Newcastle town centre is located approximately 1 km to the west of the subject site, and a portion of the town is located within the ZoI.

As shown in **Table 8.9**, the ZoI age cohorts over 44 years are significantly below the national average and show a significantly higher proportion in the 0-14 years than the national average in 2011 and 2016. The population structure for 2022 shows the same trend continuing. **Table 8.9** also shows the percentage of people in 0-14 years age is significantly higher than the national average in 2022.

[9] Source: cso.ie

Table 8.9: Population Structure 2011, 2016 and 2022 [10]

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
State 2022	19.7	12.5	27.6	25.1	15.1
South Dublin 2011	24.2	11.9	36.6	20.0	7.2
South Dublin 2016	24.5	11.3	33.6	21.5	9.1
South Dublin 2022	21.3	2.9	29.4	23.2	13.2
Newcastle ED 2011	32.9	8.2	49.9	8.2	1.2
Newcastle ED 2016	24.6	9	33.9	18.8	13.7
Newcastle ED 2022	26.2	9.8	31.7	19.7	12.3
ZoI 2011	22.4	9.9	39.9	19.2	8.6
ZoI 2016	25.9	9.1	36.5	17.2	11.3
ZoI 2022	27.7	10.5	30.8	20.4	10.5

Sources: CSO.ie

8.3.2 Evolution of the Environment in the Absence of the Proposed Development

In the event that the Proposed Development does not proceed, no significant change to the future baseline scenario is anticipated except as caused by other developments in the area. Due to the industrial nature of the area, it is likely that the area will continue to function as an employment centre, supporting the local employment and residential population. The land use and settlement patterns of the area would likely remain similar to the current status due to the industrial presence in the area. The number of vehicles to access the site will remain consistent with current levels and there will be no direct effects on residential properties.

8.4 Description of Likely Significant Effects

An assessment of the specific direct and indirect effects that the Proposed Development may have during the construction, operational, and decommissioning phases, in the absence of any remedial or reductive measures have been considered. The predicted effects will be discussed having regard to their character, magnitude, duration, consequences, and significance. Where there are identified associated and inter-related potential likely and significant effects which are more comprehensively addressed elsewhere in this EIAR document, these are referred to.

8.4.1 Construction Phase

The effects of the Proposed Development on population during the construction phase are set out below.

8.4.1.1 Land Use and Settlement

The construction phase of the Proposed Development will consist of the installation of a prefabricated office located near the entrance to the facility. There will be the construction of the new bulk trailer parking area, as well as construction of a clean bin storage shed adjacent to Building 1 and associated works. Construction works for the Proposed Development is estimated to be approximately 18 weeks.

[10] Source: cso.ie

The Proposed Development complies with the statutory land use zoning of the business park. All construction works shall take place within an existing waste facility. No direct change in land use arises from the Proposed Development.

Given the existing land use in the immediate context of the site, construction of the Proposed Development is likely to have a temporary and **not significant effect** on land use and settlement patterns.

8.4.1.2 Residential and Local Community Amenity

There are a limited number of local services and amenities in the ZoI. All of the existing facilities and local amenities will remain in place and operational during the construction period of the Proposed Development. Any effects on access or environmental impacts such as noise and air quality have been considered in the relevant EIAR chapters. **Chapter 9 - Noise and Vibration** concluded the impact of the proposed construction works on the nearest NSLs was assessed as **not significant**. **Chapter 10 - Air Quality and Climate** found the temporary effect on the local road network during the construction phase would be **imperceptible**. **Chapter 7 - Traffic and Transport** has assessed the potential effect of the construction phase on the road network. The potential effect was found to be **imperceptible**. No direct or indirect effect has been identified which will impact on the enjoyment of their residences or community amenities by the local population arising from the Proposed Development.

8.4.1.3 Economic Activity and Employment

The construction phase will grow the local construction sector in terms of employment generation and capital spend on materials and construction labour costs. The construction will result in a temporary increase in employment, which will have a temporary, positive effect on economic activity. During the construction of the Proposed Development, construction staff will be provided facilities on the site. This will result in construction staff not typically departing from the site during the working day and not interacting with the local retail economy as would be typical for some employment locations. There will be minimal impact on local retail activity and this effect will be temporary and **not significant**.

There will be positive effects through off-site employment and economic activity associated with the supply of construction materials and provision of services such as professional firms supplying civil, legal and a range of other professional services to the project. Such employment shall be geographically dispersed and have no discernible impact.

Whilst construction is ongoing those currently employed within the existing waste facility will not be affected, other than the 12 persons whose employment is on the hazardous waste soil and stone management operation that is to be displaced. Both these operations will be moved offsite to other facilities operated by Enva. Employment displaced from the subject site will be taken up at the offsite facilities.

Overall, the impact on economic activity and employment will be **positive**, **temporary and not significant**.

8.4.1.4 Demographics and Local Population

The construction phase of the Proposed Development will generate some construction employment. This temporary (approximately 18 weeks), construction period and the small-scale nature of the construction works mean there will not be discernible changes in local population arising from the Proposed Development. The temporary period of construction works is likely to generate an **imperceptible effect** on the local population.

8.4.2 Operational Phase

The effects of the Proposed Development on population at the operational phase are set out below.

8.4.2.1 Land Use and Settlement

The development and operation of the subject site complies with the statutory land use zoning. The Proposed Development is based within an existing waste facility and will not alter existing land use patterns but will further underpin the continuation of this use.

The project will have a **permanent, not significant positive effect** according with the local and wider county, regional and national land use and waste management objectives.

8.4.2.2 Residential and Local Community Amenity

There are limited local services and amenities in the immediate surroundings of the site. There are a number of amenities within the ZoI. The Proposed Development, once operational, will generate an increase in the number of vehicle movements accessing the site. As the development is located in an existing business park with access to the National N7 roadway via the R120 regional road, the Proposed Development will not result in any significant impacts on traffic in the ZoI once operational, and the effect will be long term and **not significant**. **Chapter 7 - Traffic and Transport** states across the network it is considered that the scale of magnitude is **negligible to low** due the low number of additional operational staff travelling to and from the site. The local community facilities will continue to operate and access to these facilities will not be impacted. **Chapter 9 - Noise and Vibration** states that the potential impact from the plastic shredder, proposed air blast cooler and vehicle movements was **imperceptible to negligible** in impact.

There are no direct effects on residential properties. The additional traffic associated with the Proposed Development will have a **negligible effect** on existing residential amenity. Air quality impact from the Proposed Development are also classed as **negligible**. At the operational stage of the Proposed Development, any impact on people's enjoyment of their homes will be **imperceptible**.

8.4.2.3 Economic Activity and Employment

Once the Proposed Development has been constructed and is operational there a requirement for 29 no. employment roles at the site. The treatment of HRW within the state rather than exporting for such treatment (as currently happens for a portion of the national HRW) has generally positive effects, but these will be geographically dispersed and overall, the Proposed Development will have a **neutral** and **imperceptible** effect.

8.4.2.4 Demographics and Local Population

The Proposed Development does not provide any residential accommodation or facilities. The Proposed Development will result in a small reduction in employment over that which currently pertains onsite. The staffing estimations are stated in **Chapter 4 - Description of Proposed Development,** it states that the current 38 full time staff will be redeployed to other ENVA facilities and will be reduced to 29 at operation. The impact of the Proposed Development on demographics and local population is considered to be **neutral and long term** and **imperceptible**.

8.4.3 Decommissioning Phase

Decommissioning of the facility following closure would be expected to take approximately 8 weeks and in many respects the effects are expected to be similar to those in the construction phase.

8.4.3.1 Land Use and Settlement

The decommissioning phase of the Proposed Development will consist of the removal of the new bulk trailer parking area, as well as removal of a clean bin storage shed adjacent to Building 1 and associated works.

Given the existing land use in the immediate context of the site, decommissioning of the Proposed Development is likely to have a **permanent** and **not significant** effect on land use and settlement patterns.

8.4.3.2 Residential and Local Community Amenity

There are a limited number of local services and amenities in the ZoI. All of the existing facilities and local amenities will remain in place and operational during the decommissioning period of the Proposed Development. Any effects on access or environmental impacts such as noise and air quality have been considered in the relevant EIAR chapters.

No direct or indirect impact has been identified which will impact on the enjoyment of their residences or community amenities by the local population arising from the decommissioning of the Proposed

Development have been identified. Decommissioning of the Proposed Development is likely to have an **imperceptible effect** on residential and local community amenity.

8.4.3.3 Economic Activity and Employment

The decommissioning phase will grow the local construction sector in terms of employment generation and capital spend on decommissioning labour costs. The decommissioning will result in a temporary increase in employment, which will have a temporary, positive effect on economic activity. During the decommissioning of the Proposed Development, construction staff will be provided facilities on the site. This will result in construction staff not typically departing from the site during the working day and not interacting with the local retail economy as would be typical for some employment locations. There will be minimal impact on local retail activity and this effect will be temporary and **not significant**.

There will be positive effects through off-site employment and economic activity associated with the supply of decommissioning materials and provision of services such as professional firms supplying civil, legal and a range of other professional services to the project. Such employment shall be geographically dispersed and have no discernible impact.

Whilst demolition works are ongoing and subsequently those currently employed within the existing waste facility will not be employed at the subject site.

Overall, the impact on economic activity and employment will be **negative**, **temporary** and **slight**.

8.4.3.4 Demographics and Local Population

The decommissioning phase of the Proposed Development will generate some construction employment while reducing the number employed onsite in the waste treatment process. The temporary period of decommissioning works is likely to generate an **imperceptible** effect in terms of local population levels.

8.5 Cumulative Impact Assessment

A Cumulative Impact Assessment (CIA) has been undertaken with regard to the Proposed Development and is set out at **Chapter 20 - Cumulative Effects**.

8.6 Interactions

The interaction of traffic and transport effects with other disciplines are given in **Chapter 19 - Interactions between Environmental Factors**.

8.7 Mitigation Measures

8.7.1 Construction Phase

No population specific mitigation measures are required. Prior to the commencement of construction, a detailed Construction Traffic Management Plan (CTMP) will be prepared by the selected contractor to ensure construction traffic is appropriately managed.

8.7.2 Operational Phase

No significant adverse effects to population have been identified within this discipline in relation to the operational phase of the Proposed Development. Accordingly, no further mitigation measures are required beyond those recommended under the following topics such as water, air quality and climate, noise and human health.

8.7.3 Decommissioning Phase

There are no significant population effects identified in relation to the decommissioning phase of the Proposed Development. Accordingly, no further mitigation measures are required beyond those recommended in the Decommissioning Plan that will be prepared by the selected contracted to ensure the decommissioning of the development is managed appropriately.

8.8 Residual Impacts

Given the nature and scale of the Proposed Development within an existing business park no significant adverse residual effects on the population have been identified arising from the Proposed Development.

8.9 Monitoring

Measures to avoid negative impacts on population are largely integrated into the design and layout of the Proposed Development. Compliance with the design and layout will be a condition of any permitted development.

In relation to the impact of the Proposed Development on population, it is considered that the monitoring measures outlined in regard to the other environmental topics such as water, air quality and climate, noise and human health are sufficient in this regard.

8.10 Schedule of Environmental Commitments

A summary of the environmental commitments, with regard to this chapter is set out at **Chapter 21 - Schedule of Environmental Commitments**.

8.11 Chapter References

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CHAPTER 9
NOISE AND VIBRATION

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9 NOISE AND VIBRATION

9.1 Introduction

This chapter of the EIAR identifies, describes and presents an assessment of the likely significant noise and vibration effects of the Proposed Development on the receiving environment during both the construction and operational phases. The assessment presented is based on the information provided in **Chapter 4 - Description of the Proposed Development** and **Chapter 5 - Description of the Construction Phase**. The assessment presented is further informed by the following EIAR chapters:

- Chapter 7 – Traffic and Transport
- Chapter 8 – Population
- Chapter 11 – Human Health
- Chapter 14 – Biodiversity
- Chapter 16 – Land, Soils, Geology and Hydrogeology

9.2 Methodology

The methodology adopted for this assessment is as follows:

- Review of appropriate guidance documents to identify suitable noise criteria.
- Characterisation of the receiving noise and vibration environment.
- Characterisation of the Proposed Development.
- Prediction and measurement of noise and vibration levels to determine the noise and vibration impacts of the Proposed Development.
- Specification of mitigation measures where necessary.

9.2.1 Legislation, Policy and Guidance

9.2.1.1 Legislation

The key legislation and guidance referenced in the preparation of the EIAR is outlined in **Chapter 1 - Introduction** (**Section 1.4**).

Specific to noise and vibration, the principal legislation relevant to the assessment is set out in the following primary European and National legislation:

European Union (EU) Legislation

- EU Directive 2011/92/EU as amended by Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment.
- Commission Directive (EU) 2015/996 of 19 May 2015 establishing common noise assessment methods according to Directive 2002/49/EC.
- European Council Directive 2002/49/EC relating to the assessment and management of environmental noise (the Environmental Noise Directive).

National Legislation

- European Communities (Environmental Noise) Regulations (S.I. No. 549 of 2018).
- European Communities (Environmental Noise) (Amendment) Regulations 2021, (S.I. No. 663 of 2021).
- EC (Environmental Noise) Regulations 2006 (S.I. No. 140 of 2006).
- EC Noise Emission by Equipment for Use Outdoors (Amendment) Regulations (S.I. No. 241 of 2006).

9.2.1.2 Policy

The assessment has had due regard to relevant policy that include the following:

- South Dublin County Development Plan 2022 – 2028.
- Dublin Agglomeration Environmental Noise Action Plan December 2018 – July 2023, Volume 4 – South Dublin County Council.

9.2.1.3 Guidance

The assessment of impacts has been undertaken, as appropriate, in accordance with, or with reference to, the following guidance documents:

- EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4, 2016).
- British Standard (BS) 4142:2014+A1:2019: Methods for rating and assessing industrial and commercial sound.
- BS 5228-1:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites – Part 1: Noise.
- BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites – Part 2: Vibration.
- International Organization for Standardization (ISO) 1996-1:2016 Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures.
- ISO 1996-2:2017 Acoustics – Description, measurement and assessment of environmental noise – Part 2: Determination of sound pressure levels.

9.2.2 Zone of Influence

There is no guidance or legislation in Ireland regarding the extent/size of the noise and vibration study area to adopt for the assessment of noise and vibration effects. The noise and vibration study areas for construction, operation and decommissioning in this chapter have been set with consideration of the guidance contained in BS 5228 and EPA's NG4. Professional judgement has been used to determine the distances over which noise impacts may occur during construction and operation along with consideration of the likely magnitude and duration of impact and the sensitivity of locations.

During the construction phase, the noise and vibration study area considers noise sensitive locations up to 600 m from elements of the Proposed Development. The zone of influence (ZoI) associated with the operation of the waste facility will also consider noise sensitive locations at a maximum of 600 m away from the facility. The ZoI includes the nearest noise sensitive locations to the Proposed Development as well as noise sensitive locations adjacent to haulage routes.

For assessment of the potential for cumulative effects with other projects, a ZoI of 600 m from elements of the Proposed Development is set.

9.2.3 Sources of Information to Inform the Assessment

Table 9.1 below outlines the key datasets and sources used to inform the noise and vibration assessment.

Table 9.1: Summary of Key Datasets and Sources Used

Title	Source	Year
EPA Waste Licence W0192-03	EPA	2011
IED Licence W0192-03 Compliance Surveys	Damian Brosnan Acoustics	2019 – 2022
Traffic Flow Data	Chapter 7 - Traffic and Transport	2023
Baseline Noise Data	RPS Noise Surveys	2023
Aerial Mapping	Aerial Mapping	2021
South Dublin County Council Noise Action Plan 2018 – 2023	South Dublin County Council	2018

9.2.4 Key Parameters for Assessment

The description of the Proposed Development is provided in **Chapter 4 - Description of the Proposed Development**. The following key parameters were identified as having the potential to result in significant effects on noise- and vibration-sensitive locations:

- Noise impact due to construction activities.
- Noise impact due to operational activities.
- Noise impact due to increased traffic as part of the operational phase.
- Vibration impact due to construction activities.

Section 9.2.5 describes the types of receptors that are considered sensitive to noise and vibration for this assessment. An overview of potential impacts considered in relation to the above parameters during the construction and operational phases is contained in **Table 9.2** below.

Table 9.2: Potential Impacts Considered in the Assessment

Parameter	Phase* C O D	Potential Impact
Noise impact due to construction activities	✓ × ×	Construction activities during the construction phase of the Proposed Development may increase noise levels at noise sensitive locations in the vicinity of the facility.
Noise impact due to the facility's operational activities	× ✓ ×	As part of the facility's operational phase, operational processes may cause an increase in noise levels at noise sensitive locations.
Noise impact due to increased traffic during the operational phase	✓ × ×	Due to the proposed processing of HRW waste, additional vehicle movements will be generated which may result in increased noise levels at noise sensitive locations.

*C = Construction, O = Operational, D = Decommissioning

9.2.4.1 Impacts Scoped Out of the Assessment

Based on the baseline environment and the description of the Proposed Development, a number of impacts are proposed to be scoped out of the assessment for noise and vibration. These impacts are outlined, together with a justification for scoping them out, in **Table 9.3**.

Table 9.3: Impacts Scoped Out of the Assessment on Noise and Vibration

Potential Impact	Justification
Vibration impact from facility operations	Vibration attenuates rapidly with distance. Due to the nature of the operations of the facility and the distance between sensitive locations and the facility, operational vibration impact is proposed to be scoped out of the noise and vibration assessment.
Vibration impact from increased traffic using the facility	Due to the distance between sensitive locations and the road and the negligible additional traffic created by the Proposed Development, operational vibration impact from increased traffic is proposed to be scoped out of the noise and vibration assessment.
Noise impact from construction traffic	Due to the negligible amount of additional traffic movements proposed, traffic noise impact as part of the construction phase will be negligible. Therefore, it is proposed that this element of the assessment be scoped out.
Vibration impact due to construction activities	Construction plant have the potential to generate vibration. However, the nearest buildings to the proposed construction activities are industrial in nature and have high vibration thresholds. The vibration levels at the nearest sensitive locations are significantly below the threshold for damage and it is proposed that this element of the assessment be scoped out.

9.2.5 Assessment Criteria and Significance

In referring to noise sensitive receptors, the term “noise sensitive location” (NSL) is most commonly used in Ireland as it is the terminology used in EPA guidance for noise. Hereafter in this chapter, NSL will be used to refer to noise and vibration sensitive receptors. NSLs are typically residential premises but can also include schools, places of worship and other noise sensitive locations. Site and project specific considerations play a part in determining the sensitivity of a receptor and noise assessment standards in general include implicit considerations of sensitivity (e.g., through consideration of background noise levels).

Table 9.4 presents general categorisations of NSL sensitivities for use in Ireland. The table has been developed based on professional judgement and experience in completing noise assessments.

Table 9.4: General Categorisation of NSL Sensitivity

Sensitivity	Description	Examples of NSLs	Modifiers
High	Locations where people or operations are particularly susceptible to noise.	Residential, including private gardens where appropriate; Hospitals/residential care homes; Schools during the daytime; Quiet outdoor areas used for recreation; and Places of worship.	Modifiers are factors that can change the sensitivity categorization of NSLs. These include: Magnitude and character of baseline noise, period of occupancy, noise insulation of buildings.
Medium	Locations moderately sensitive to noise, where it may cause some distraction or disturbance.	Offices; Bars/Cafes/Restaurants where external noise may be intrusive; Community facilities and amenity areas; Sports grounds when spectator noise is not a normal part of the event and where quiet conditions are necessary (e.g., tennis, fishing and golf); Wildlife refuges; and Recording studios and concert halls are also included in this category.	
Low	Locations where distraction or disturbance from noise is low.	Buildings not occupied during the daytime; Sports grounds when spectator noise is a normal part of the event; and Night Clubs.	
Negligible	Locations where distraction or disturbance from noise is negligible.	All other areas such as those used primarily for industrial or agricultural purposes.	

While the tables above are generally useful, the specific categorisations of magnitudes and sensitivities are determined using professional judgement and applicable standards, which are detailed in the following sections. For noise and vibration, consideration of magnitudes and sensitivities are inherent to the assessment process for most categories of emissions.

The majority of NSLs which have the potential to be affected by noise and vibration impacts arising from the Proposed Development are commercial locations at a medium sensitivity level or lower. The nearest residential location is greater than 300 m away.

9.2.5.1 Construction Noise Criteria

There are no published statutory guidelines on noise levels from construction sites in Ireland. However, the ABC method outlined in section E3.2 of BS 5228-1 has been used for the purposes of controlling noise. This approach involves assigning a specific category (A, B or C) to an NSL based on existing ambient noise levels in the absence of construction noise. This then sets a threshold noise value that, if exceeded at this location, indicates that a potential significant noise impact is associated with the construction activities. These thresholds apply to residential buildings.

Table 9.5 outlines the applicable noise Threshold of Potential Significant Effect (TPSE) at the nearest NSL. The determination of which category to apply is dependent on the existing ambient (L_{Aeq}) noise level (rounded to the nearest 5 dB) at the nearest NSL. For weekday daytime, if the ambient noise level is less than the Category A threshold limit, the Category A threshold limit (i.e., 65 dB) applies. If the ambient noise level is the same as the Category A threshold limit, the Category B threshold limit (i.e., 70 dB) applies. If the ambient noise level is more than the Category A threshold limit, the Category C threshold limit (i.e., 75 dB) applies.

Table 9.5: Threshold of Potential Significant Effect at Nearest NSLs

Assessment Category and Threshold Value Period (L_{Aeq})	Noise Threshold Value, in decibels (dB)		
	Category A[A]	Category B[B]	Category C[C]
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends[D]	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

NOTE 1: A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

NOTE 2: If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.

NOTE 3: Applied to residential locations only.

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

D) 19:00–23:00 weekdays, 13:00–23:00 Saturdays and 07:00–23:00 Sundays.

These thresholds apply to residential buildings and locations with a high sensitivity as described in **Table 9.4**. For commercial buildings (offices, industrial facilities, sport clubs etc.) which are less noise sensitive, Category C values from **Table 9.5** apply. Over-runs/emergencies may occur on occasion particularly where, for health and safety reasons or due to engineering requirements, a specific work item needs to be completed before the worksite can be left in a safe state, or there is a risk of an engineering or structural failure if the works are not completed.

Table 9.6 presents the construction noise initial significance rating of effects. The table provides an initial indication of the significance of effect which is then modified based upon the duration and frequency of the construction activity and other relevant modifiers.

Table 9.6: Construction Noise – Initial Significance Rating of Effects

Noise Levels	EPA Initial Magnitude of Impact	Initial Significance Rating	Modifiers
≤ Baseline noise level or ≤ BS 5228 threshold - 10dB	Negligible	Imperceptible / Not Significant	Modifiers are factors that can change the magnitude of impact or significance rating. These include: Baseline noise levels, duration, frequency and likelihood of occurrence. Public attitudes to, and acceptability of, the project itself.
> Baseline noise level and ≤ BS 5228 threshold	Low	Slight / Moderate	
> BS 5228 threshold to ≤ BS 5228 threshold + 5 dB	Medium	Moderate / Significant	
> BS 5228 threshold +5 to + 10 dB	High	Significant / Very Significant	
> BS 5228 threshold + 10 dB		Very Significant / Profound	

In many circumstances, the most important modifier of significance of effects for construction noise is the duration of the activities. For assessing the significance of effect, reference has been made to the EPA Guidelines (2022) and the Design Manual for Roads and Bridges (DMRB) which states:

"*Construction noise and construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:*

1) *10 or more days or nights in any 15 consecutive days or nights;*
2) *A total number of days exceeding 40 in any 6 consecutive months.*"

9.2.5.2 Operational Noise Criteria

The Enva facility is currently operated under EPA Industrial Emissions Directive (IED) licence W0192-03 and the Proposed Development will result in an amendment to this licence. For completeness, the noise limit criteria in the current IED licence below are assessed in this chapter.

Condition 4.5 of the licences state… *"Noise from the facility shall not give rise to sound pressure levels (Leq,T) measured at the boundary of the facility which exceed the limit value(s)."* Schedule B.4 Noise Emissions provides details on applicable limits measured at the site boundary and these are reproduced in **Table 9.14**. Daytime hours in the licence refer to 08:00 – 22:00 and night-time hours refer to 22:00 – 08:00. Section C.4 outlines the noise monitoring parameters and frequency.

The noise emission criteria extracted form EPA Licence W0192-03 are presented below in **Table 9.7**.

Table 9.7: Noise Emission Criteria from EPA Licence W0192-03

Daytime dB(A) L_{Aeq} (30 min)	Night-time dB(A) L_{Aeq} (30 min)
55 Note 1	45 Note 1
Note 1: There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.	

Table 9.8 presents the initial significance rating of effects for operational noise from Enva waste facility. The ratings apply at the nearest NSLs.

Table 9.8: Operational Noise - Initial Significance Rating of Effects

<table>
<tr><th>Noise Levels</th><th>EPA Initial Magnitude of Impact</th><th>Initial Significance Rating</th><th>Modifiers</th></tr>
<tr><td>≤ Background noise level and no objectively detectible tonality at night</td><td>Negligible</td><td>Imperceptible / Not Significant</td><td rowspan="5">Modifiers are factors that can change the magnitude of impact or significance rating. These include:

Baseline noise levels, duration, frequency and likelihood of occurrence.</td></tr>
<tr><td>> Background noise level and
≤ Noise emission criteria and
no tonal or impulsive elements audible</td><td>Low</td><td>Slight / Moderate</td></tr>
<tr><td>≤ Noise emission criteria and tonal or impulsive elements audible</td><td>Medium</td><td>Significant</td></tr>
<tr><td>> Noise emission criteria to
≤ Noise emission criteria + 5 dB</td><td>Medium</td><td>Significant / Very Significant</td></tr>
<tr><td>> Noise emission criteria +5 to + 10 dB</td><td>High</td><td>Very Significant / Profound</td></tr>
</table>

9.2.5.3 Traffic Noise Criteria

There is currently no Irish legislation that limits noise levels from construction traffic to a limit value. South Dublin County Council prepared a noise action plan in accordance with the requirements of EU Directive 2002/49/EC (known as the Environmental Noise Directive, or "END"). The most recent version of the Noise Action Plan covers the period 2018–2023. It states that "*The key objective of the Noise Action Plan 2018–2023 is to avoid, prevent and reduce, where necessary, on a prioritised basis the harmful effects, including annoyance, due to long term exposure to environmental noise*."

In the absence of specific noise limit values from traffic, the traffic noise impact is assessed with respect to the DMRB LA111 – Noise and Vibration Revision 2, UK Highways Agency (2020). This document presents details on the classification of magnitude of noise impacts in the short term (e.g. when the project is opened) and long term (typically 15 years after project opening). A change in road traffic noise of 1 dB in the short term is the minimum that is considered perceptible. In the long term, a 3 dB change is considered perceptible. The significance that can be attached to changes in noise level perceptible to human beings applicable to traffic noise is shown in **Table 9.9**. However, the changes are subjective and will vary among individuals.

Table 9.9: Traffic Noise Level – Magnitude of Change

<table>
<tr><th colspan="2">Noise Change – $L_{A10,18hr}$ or L_{night}</th><th rowspan="2">DMRB Magnitude of Change</th><th rowspan="2">EPA Magnitude of Impact</th><th rowspan="2">Initial Significance Rating</th></tr>
<tr><th>Short Term</th><th>Long Term</th></tr>
<tr><td>< 1.0</td><td>< 3.0</td><td>Negligible</td><td>Negligible</td><td rowspan="2">Not Significant</td></tr>
<tr><td>1.0 to 2.9</td><td>3.0 to 4.9</td><td>Minor</td><td>Low</td></tr>
<tr><td>3.0 to 4.9</td><td>5.0 to 9.9</td><td>Moderate</td><td>Medium</td><td rowspan="2">Significant</td></tr>
<tr><td>≥ 5.0</td><td>≥ 10.0</td><td>Major</td><td>High</td></tr>
</table>

The absolute noise level is an important consideration when determining the response to noise levels along affected roads within the study area. This is particularly valid for locations where a 'moderate' or 'major' magnitude of change rating applies against comparably low absolute noise levels.

9.2.6 Data Limitations

This chapter of the EIAR has been prepared based upon the best available information and in accordance with current best practice and relevant guidelines. There were no technical difficulties or otherwise encountered in the preparation of this chapter of the EIAR.

9.3 Description of the Existing Environment (Baseline Scenario)

9.3.1 Baseline Environment

The Proposed Development is located within the Greenogue Business Park, an industrial estate in Southwest Dublin adjacent to the Aerodrome Business Park. It is primarily accessed by the R120 regional road which joins the N7 to the south of the estate. The site is surrounded by numerous commercial and industrial premises within the Greenogue and Aerodrome Business Parks and specific details can be found in **Chapter 2 - Background and Need for the Proposed Development**. Outside of the industrial estate, the Casement Aerodrome runway in Baldonnel is situated to the east. The town of Newcastle is located to the west and the Newcastle Graveyard lies approximately 500 m from the Proposed Development to the southwest. Seven NSLs within 600 m of the site, with the closest being greater that 300 m to the west were used to assess the noise and vibration impact. **Figure 9.1** shows the location of each of these NSLs while **Appendix 9.1** provides their coordinates and categorisation. Due to its location within the Greenogue Business Park, the Proposed Development is surrounded by large industrial buildings which restrict any line of sight between the Proposed Development and surrounding NSLs. This is an important feature of the location which significantly reduces noise emissions experienced by the NSLs from construction and operational activities occurring at the site. As part of the IED licence, annual noise monitoring is conducted within the site at four locations around the boundary. Generally, this historical data have shown levels of 51 dB $L_{Aeq,30min}$ or less, which is lower than the licence limit of 55 dB $L_{Aeq,30min}$. At present, the Enva facility's operating hours are 07:00 - 18:00 but there is an existing allowance to work 24 hours.

Figure 9-1: Map of Noise Sensitive Locations

9.3.2 Baseline Noise Survey

The baseline noise survey provides quantification and an understanding of the acoustic environment adjacent to and in proximity to the Proposed Development. The purpose of the noise monitoring surveys was to:

- Determine the background and ambient noise levels at the nearest NSLs to the Proposed Development.
- Evaluate the noise climate in the Noise and Vibration Study Area.
- Define the applicable construction noise threshold in accordance with British Standard BS5228-1.
- Determine the significance rating when baseline noise levels are higher than licensed noise criteria.

9.3.2.1 Baseline Noise Survey – Overview

A baseline noise survey was undertaken at the two closest NSLs to the site, six locations within the Enva facility and one location at the site boundary. Attended measurements were conducted during the daytime period on 26 April 2023 and the evening and night-time periods on 2 May 2023 to determine existing noise levels and to characterise the baseline noise environment at NSLs close to the Proposed Development. All measurements were undertaken in accordance with ISO 1996-1 and ISO 1996-2.

9.3.2.2 Noise Monitoring Locations (NMLs)

Two locations (NML1 and NML2) were identified for obtaining representative ambient and background noise levels near the Proposed Development. Four locations were identified within the site boundary to characterise the noise emissions of the Enva facility itself (N1, N2, N3 and N4). These four internal locations correspond to positions chosen in historical annual noise emissions surveys required by the facility's EPA licence. Details of the noise monitoring locations are described in **Table 9.10** and locations are shown in **Figure 9-2**. Accompanying photographs of each location are provided in **Appendix 9.2**.

Table 9.10: Noise Monitoring Location Details

NML ID	Irish Transverse Mercator (ITM) Coordinates		Description	Photographs (Appendix 9.2)
	Easting	Northing		
NML1	701231	728513	This location was identified as being representative of the noise environment at the nearest NSL to the Enva facility. At approx. 240 m to the west of the facility's boundary, line of sight was blocked by a large 4 m high wall and multiple large industrial buildings at an adjacent site. The soundscape was dominated by noise sources arising from sites in the immediate vicinity of NML1, such as the opening/closing of roller doors and trucks arriving, leaving and idling. Local road traffic noise from internal roads around the business park was present as well as distant road traffic noise from the R120.	**Plate 9-1**
NML2	701406	728084	NML2 was identified as being representative of the noise environment at NSLs to the south of the Enva facility and the Greenogue Business Park as a whole. The location was approx. 395 m from the facility and adjacent to a haulage route along the R120 road. The soundscape was dominated by road traffic noise from the R120 with a mix of light goods vehicles (LGV) and Heavy Goods Vehicles (HGV) present. Some residential noise could be heard such as a distant dog barking and a bin lorry along the local road. Often, vehicles travelling along the R120 would run over a grate in the road which created a louder impulsive noise. Some moderate birdsong could be heard and	**Plate 9-2**

NML ID	Irish Transverse Mercator (ITM) Coordinates		Description	Photographs (Appendix 9.2)
	Easting	Northing		
			some industrial noise like tonal reverse warnings was present when there was a break in the traffic.	
N1	701470	28475	N1 is located in the corner of the car park at the front of the facility. The doors to the operating bays were open and the continuous noise emitted by the plastic granulator operating in Bay 9 was clearly audible. However, passing trucks outside the facility dominated when present. Aside from this, some brief impulsive machinery could be heard from one of the bays along with general industrial noise from outside of the site.	**Plate 9-3**
N2	701500	728579	N2 is located at the rear corner of the facility, with direct line of sight to site operations blocked by the walls of the Enva building. General industrial noise from outside the site boundary was the dominant noise source, with trucks being loaded and leaving at an adjacent facility. There were some minor low frequency contributions to the noise emissions at N2 from the facility's operations. Road traffic noise on internal park roads was present.	**Plate 9-4**
N3	701587	728583	N3 is located to the rear of the site, adjacent to its water and oil tanks. In the corner, a piece of machinery emitted continuous broadband noise. Aside from general industrial noise from sites adjacent to the Enva facility, occasional steam releases from some of the water/oil tank pipework was observed along with local road traffic noise on internal park roads.	**Plate 9-5**
N4	701557	728450	N4 is located in the eastern front corner of the site, 1 to 1.5 m below ground level. Extractor fan noise was present along the side of the Enva building and local road traffic noise, but the dominant sound was a loud steam release adjacent to N4. The noise source was triggered every thirty seconds and lasted for approx. two seconds, resulting in loud, impulsive, broadband noise despite the enclosure surrounding it. A gap beneath the enclosure door was present, creating a noise breakout. With hard reflective surfaces all around, this location was very reverberant.	**Plate 9-6**

9.3.2.3 Noise Monitoring Locations – Spot Measurements

Spot measurements were undertaken at two locations within the site boundary and one location outside to supplement the baseline measurements. Measurements ranged between one and two mins each. Details of the noise monitoring locations are provided in **Table 9.11** and locations are shown in **Figure 9-2.**

Accompanying photos at each location are contained within **Appendix 9.2**.

Table 9.11: Noise Monitoring Location Details – Spot Measurements

NML ID	ITM Coordinates		Description	Photographs (Appendix 9.2)
	Easting	Northing		
S1	701573	728498	The purpose of this measurement was to measure the level of noise breakout from a hole in the metal bay wall and from a gap on the underside of the metal where it meets the concrete.	**Plate 9-7**
S2	701547	728444	Throughout the measurement at N4, a loud short steam release from inside the pictured enclosure repeated every thirty seconds. This spot measurement was taken at the site boundary to quantify the reduction in level of this noise source with distance. The sound level meter was pointed at the enclosure through the railings approx. 9 m away.	**Plate 9-8**
S3	701537	728501	Taken at a distance of 5 m from the noise source, the aim of this measurement was to characterise the acoustic profile and estimate the sound power level of the plastic granulator. This is the loudest piece of equipment operating at the facility.	**Plate 9-9**

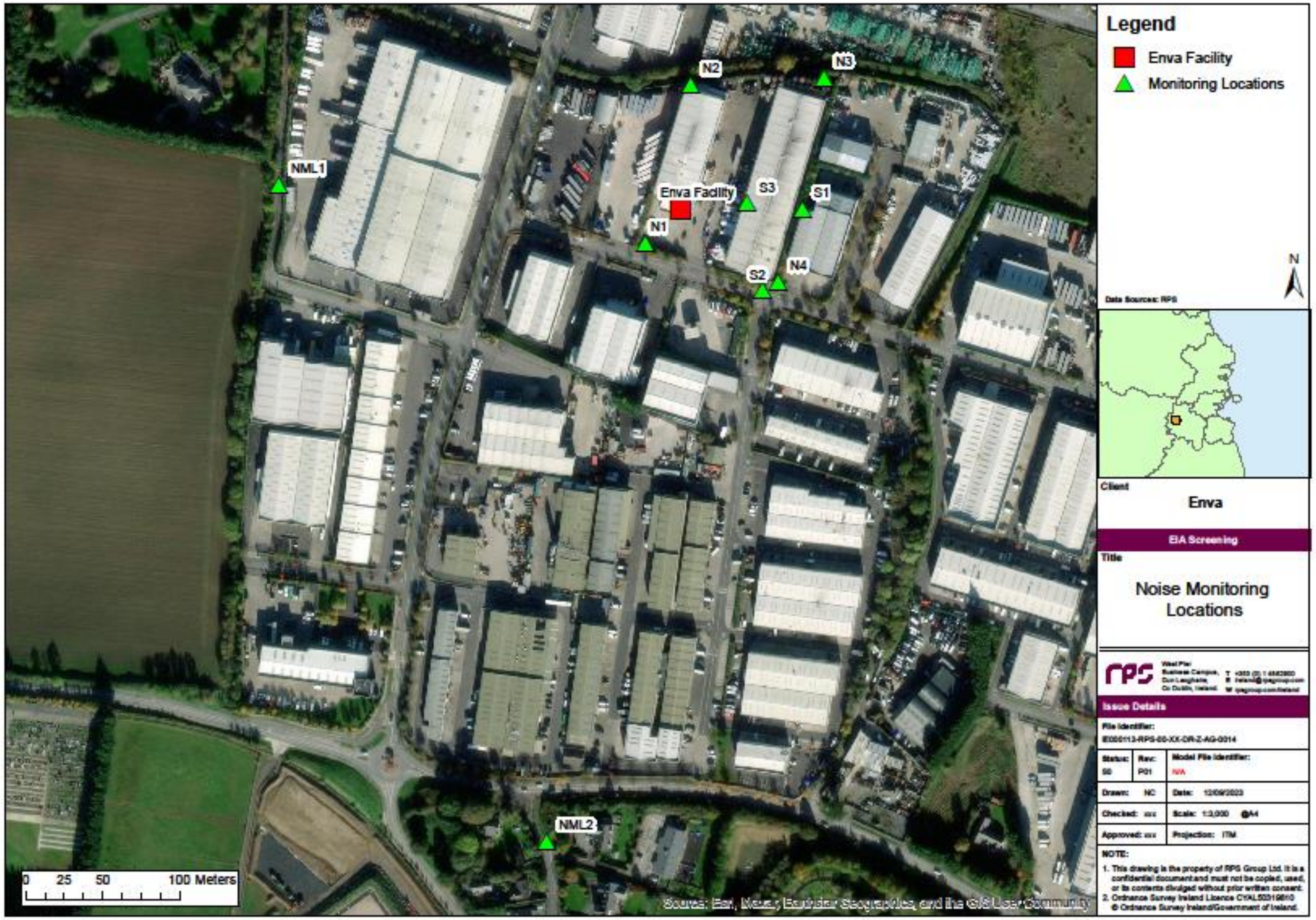

Figure 9-2: Noise Monitoring Locations

9.3.2.4 Monitoring Equipment and Procedure

Attended measurements were undertaken using a Brüel & Kjær (B&K) 2250 Class 1 Sound Level Meter with a B&K UA-0237 windscreen. The meter was mounted on a tripod at a height of 1.2 – 1.5 m. The sound level meter was calibrated before and after the survey using a B&K 4132 Class 1 Acoustic Calibrator and the drift in calibration was within an acceptable range (as per criterion in ISO 1996). Laboratory calibration certificates for the equipment used are provided in **Appendix 9.3**.

9.3.2.5 Meteorological Conditions

The weather conditions during the daytime noise survey on 26 April 2023 were dry and mild with temperatures ranging from 10 ˚C to 15 ˚C. Cloud cover was initially 100% but decreased throughout the survey to approx. 60%. The average wind speed was less than 2 m/s at all measurement locations with no extreme gusts observed.

The weather conditions during the evening noise survey on the 2 May 2023 were dry and overcast with a temperature of 12°C. The average wind speed was less than 1 m/s with some occasional light gusts of up to 1.8 m/s at NML2.

The weather conditions during the night-time noise survey on the 2 May 2023 were dry with a temperature of 11 °C. The average wind speed was less than 1 m/s, ranging from non-existent to 0.7 m/s with occasional light gusts.

No rain or wind speeds above 5 m/s were observed during any part of the surveys. Best practice requires that measurements taken in these conditions should be removed from each data set.

The meteorological conditions during the noise surveys were within the thresholds outlined in EPA’s NG4 guidance.

9.3.2.6 Baseline Noise Survey Results

Table 9.12 and **Table 9.13** present a summary of the noise monitoring results at the locations adjacent to the NSLs.

Table 9.12: Noise Monitoring Results – NML1

NML1 Results						
Period	**Time**	L_{Aeq}	L_{AF10}	L_{AFmax}	L_{AF90}	**Comments**
Day	26/04/2023 09:17	53	57	67	43	Dominated by industrial noise from adjacent sites. HGVs entering/exiting sites and idling. Local and distant Road Traffic Noise (RTN) inside and outside park.
	26/04/2023 10:08	49	51	71	41	
	26/04/2023 13:04	45	48	58	41	
	Arithmetic Average of L_{AF90}				**42**	
Evening	02/05/2023 21:34	49	50	63	48	Tonal generator at adjacent site dominant. Occasional movements within park. Distant RTN.
	Arithmetic Average of L_{AF90}				**48**	
Night	02/05/2023 23:02	49	50	57	48	Generator still present – Dominant sound. No internal movements on local roads. Very occasional distant RTN.
	02/05/2023 23:47	48	49	56	47	
	Arithmetic Average of L_{AF90}				**48**	

Table 9.13: Noise Monitoring Results – NML2

NML2 Results						
Period	**Time**	**L_{Aeq}**	**L_{AF10}**	**L_{AFmax}**	**L_{AF90}**	**Comments**
Day	26/04/2023 09:46	58	61	79	50	Dominated by RTN on the R120. Distant industrial noise from the park. A grate in the road was frequently ran over by vehicle wheels – Loud and impulsive sound.
	26/04/2023 12:43	56	60	71	49	
	26/04/2023 13:27	56	59	66	43	
	Arithmetic Average of L_{AF90}				**47**	
Evening	02/05/2023 21:58	51	55	63	48	Soundscape the same as day period with less traffic present. Extractor fan at a facility within the park.
	Arithmetic Average of L_{AF90}				**48**	
Night	02/05/2023 23:25	47	50	63	40	Sporadic traffic on R120 – Mainly LGVs. Extractor fan noise still present at facility. Very occasional distant impulsive noise from adjacent facility.
	03/05/2023 00:12	46	47	62	41	
	Arithmetic Average of L_{AF90}				**40**	

These results have been used to determine the current noise levels experienced at locations representative of the most exposed dwellings to noise sources within the Proposed Development as well as existing noise sources.

The ABC method outlined in section E3.2 of BS 5228-1 has been used for the assessment of construction noise. The measured ambient (L_{Aeq}) noise levels have been used to determine the threshold of potential significant effect in keeping with the requirement set out in BS 5228-1. In all cases the daytime noise levels indicate that the appropriate category for determining the potential significant effects is Category A (i.e. 65 dB L_{Aeq} during daytime periods) for residential locations.

The internal (N1 to N4) and spot measurement (S1 to S3) results are used to determine the site-specific noise emissions at boundary locations from the existing facility. **Table 9.14** presents a summary of the noise monitoring results.

Table 9.14: Noise Monitoring Results – Internal and Spot Measurements

Internal and Spot Measurements Results						
Location	**Time**	**Period**	**L_{Aeq}**	**L_{AF10}**	**L_{AFmax}**	**L_{AF90}**
N1	26/04/2023 11:14	15 min	57	60	69	52
N2	26/04/2023 10:52	15 min	51	52	69	46
N3	26/04/2023 11:37	15 min	52	54	65	50
N4	26/04/2023 12:01	15 min	65	71	80	58
S1	26/04/2023 11:56	1 min	64	65	65	64
S2	26/04/2023 12:19	2 min	65	68	79	53
S3	26/04/2023 12:33	1.5 min	94	94	95	93

9.3.3 Evolution of the Environment in the Absence of the Proposed Development

Annex IV of the Environmental Impact Assessment (EIA) Directive sets out the information required to be included in an EIAR. This includes "*a description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the Proposed Project as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge*".

In the absence of the Proposed Development, no significant change to the future baseline scenario is anticipated other than that which may occur due to other developments and potential replacement/additional equipment at the Enva facility. Due to the industrial nature of the site's location, it is possible that other surrounding facilities may propose similar operational or structural changes in the future which could result in increased construction or operational noise. Furthermore, a negligible increase in road traffic noise due to population growth is expected.

9.4 Description of Likely Significant Effects

This section includes an assessment of the specific direct and indirect impacts the Proposed Development may have during its construction, operational and decommissioning phases in the absence of any remedial or reductive measures.

9.4.1 Construction Phase

Short-term increases in noise impact will occur during the construction phase of the Proposed Development due to the requirement to use heavy plant and machinery. There is generally a higher tolerance for short-term construction related noise than that which causes annoyance over the long term. This is reflected in the construction noise criteria in **Section 9.2.5.1**.

Construction works for this Proposed Development are expected to last approximately 18 weeks. A detailed description of the proposed construction works and proposed working hours is presented in **Chapter 5 - Description of the Construction Phase** of this EIAR. The main works to be carried out include:

- Installation of a prefabricated office including associated services.
- Construction of a new bulk trailer parking area.
- Construction of a clean bin storage shed.
- Demolition of an existing office space.
- Installation of plant within buildings.
- Construction traffic.

Construction noise predictions have been undertaken for the proposed construction activities at all NSLs in the noise and vibration study area using the methodology described in BS 5228-1. This method involves taking the sound power level of each construction noise source and applying a series of corrections such as distance to NSL, percentage on-time and façade reflection to obtain the predicted noise level at each NSL.

All construction plant is assumed to be operational at the closest point to NSLs. The core construction working hours, as outlined in **Chapter 5 - Description of the Construction Phase**, will be from 08:00 to 19:00 Monday to Friday and from 08:00 to 16:00 on Saturdays. Noise levels have been assessed over the daytime (07:00 to 19:00) period in accordance with these proposed working hours.

9.4.1.1 Structures Demolition

As part of the Proposed Development, the existing office building on the gable side of the building facing Grants Drive is to be demolished. This building comprises block and steel cladding with associated office fixtures and fittings. It is to be replaced by a steel-clad enclosure providing space for two bulk trailers. Demolition of this office building is discussed in this section and further details can be found in **Chapter 4 - Description of the Proposed Development**. **Table 9.15** presents the likely plant associated with this activity, their respective Annex C BS 5228 reference, sound power levels and likely duty cycles.

Table 9.15: Typical Construction Plant for Demolitions Works

Activity	Plant	BS 5228 Reference	Sound Power Level dB(A)	Duty Cycle / No. Loads per Hour
Demolition	Pulveriser mounted on excavator	C.1.5	100	75 %
	Wheeled excavator	C.4.10	94	75 %
	Road lorry (full)*	C.6.21	108	1 load
	Backhoe mounted hydraulic breaker	C.5.1	116	25 %

Table 9.16 lists the distance from the proposed demolitions works to the nearest NSLs and the predicted L_{Aeq} levels likely to be experienced at each due to the proposed works.

Table 9.16: Predicted Noise Levels at the Nearest NSLs for Demolitions Works

Location ID	Distance (m)	Predicted L_{Aeq}
NSL1	510	41
NSL2	545	41
NSL3	300	46
NSL4	385	44
NSL5	365	44
NSL6	355	45
NSL7	380	44

The predicted construction noise level from demolitions activities at the nearest NSL, greater than 300 m from the site, is 46 dB L_{Aeq}. This is the highest level predicted for demolitions activities. Predicted noise levels decrease to 41 dB L_{Aeq} at NSL2, approximately 545 m from the site. In practice, the actual noise levels experienced at each NSL as a result of demolitions works is likely to be less for a number of a reasons. The predictions assume that all items of plant will be operating at the same time which may not happen. Furthermore, the ground over which the noise propagates is assumed to be completely reflective (i.e. no sound energy is lost to ground absorption or destructive interference). In reality, the ground around many of the NSLs is acoustically soft, which will contribute to a reduction in level. The plant item with the potential for greatest impact is the backhoe mounted hydraulic breaker with a sound power level of 116 dB and predicted noise levels are on average 9 dB lower when it is not operating.

Taking the measured baseline levels into account, the impact of demolitions works on the nearest NSLs is assessed as **not significant**.

9.4.1.2 Building Construction

As described in **Section 9.4.1.1**, the existing office building is to be demolished and replaced by a new steel-clad enclosure which will provide space for two bulk trailers. This enclosure will span approximately 191 m^2 with a height of approx. 9.1 m.

Table 9.17: Typical Construction Plant for Building Construction

Activity	Plant	BS 5228 Reference	Sound Power Level dB(A)	Duty Cycle / No. Loads per Hour
Preparation of Hardstandings	Tracked excavator	C.4.17	99	75 %
	Articulated dump truck (tipping fill)	C.2.32	102	10 %
	Dozer	C.2.13	106	50 %
	Vibratory roller*	C.5.25	103	50 %
Concrete Pours	Concrete mixer truck (discharging)	C.4.28	103	50 %
	Poker vibrator	C.4.34	97	25 %
	Road lorry (full)*	C.6.21	108	1 load
Plant Installation	Mobile telescopic crane	C.4.46	95	75 %
	Telescopic handler	C.4.54	107	50 %
	Angle grinder (grinding steel)	C.4.93	108	50 %
	Lifting platform	C.4.57	95	75 %
	Road lorry (full)*	C.6.21	108	1 load
Building Construction	Wheeled mobile crane	C.5.37	104	75 %
	Dumper	C.4.8	84	50 %
	Lifting platform	C.4.57	95	75 %
	Road lorry (full)*	C.6.21	108	1 load

The predicted L_{Aeq} levels at various distances from building construction activities is shown in **Table 9.18**.

Table 9.18: Predicted Noise Levels at Nearest NSLs for Building Construction Activities

Location ID	Distance (m)	Hardstandings	Concrete Pours	Plant Installation	Buildings
NSL1	510	37	33	39	35
NSL2	545	36	33	39	35
NSL3	300	41	38	44	40
NSL4	385	39	36	42	38
NSL5	365	39	36	42	38
NSL6	355	40	36	42	38
NSL7	380	39	36	42	38

At the nearest NSL, the highest level predicted is 44 dB L_{Aeq} during plant installation. However, as this work is to be carried out inside the buildings following their construction, it is likely to be partially or fully enclosed and reduced in level. The assumptions of a hard reflective ground and simultaneous plant operation made **Section 9.4.1.1** are also made here, likely resulting in lower levels in reality.

Overall, the impact of the proposed construction works on the nearest NSLs is assessed as **not significant**.

9.4.2 Operational Phase

The main activities with the potential to generate noise include:

- Proposed shredder.
- Proposed air blast cooler.
- Vehicle movements.

9.4.2.1 Proposed Shredder

As part of the Proposed Development, a new shredder will be housed in Building 1. This will be a high-torque, low-speed machine which will handle a broad range of materials. Noise emissions from this new shredder are expected to be 77 dB(A) at 10 m.

Table 9.19 below lists the approx. distance from Building 1 to each of the nearest NSLs and predicted noise levels due to the shredder's operation. The predictions assume that there is no line of site between the shredder and each NSL and that the shredder's emissions propagate over 100 % reflective ground surface.

Table 9.19: Shredder Noise Predictions

Location ID	Distance to Shredder (m)	Predicted Level (dB(A))
NSL1	510	33
NSL2	545	32
NSL3	300	37
NSL4	425	34
NSL5	405	35
NSL6	410	35
NSL7	440	34

All predicted noise levels at the nearest NSLs are below the measured background levels for daytime, evening and night-time. In reality, predicted levels are likely to be lower as the shredder will be housed within a building, providing an enclosure around the noise source.

Furthermore, during the daytime survey of the Enva facility, noise levels of 94 dB L_{Aeq} were measured at 5 m from the existing plastic granulator. The noise emissions from the existing granulator are over 10 dB higher than the proposed shredder resulting in negligible change in cumulative noise emissions from the site. It was also observed that the existing granular was inaudible at the nearest NSLs. Therefore, the impact of the proposed shredder at the nearest NSLs is assessed as **not significant**.

9.4.2.2 Proposed Air Blast Cooler

An air blast cooler is proposed to be fitted to the outside of Building 1 along the western boundary of the site. This piece of machinery uses three fans to blow ambient air over a radiator core in order to provide additional cooling. The air blast cooler will be fitted with a thermostat which will result in intermittent operation.

The air blast cooler is expected to generate noise levels of 77 dB(A) at a 10 m distance, giving a sound power level of 105 dB(A). Using the "Air Cooler" noise source from Predictor-LimA V2021.1 noise modelling software, a frequency spectrum for the proposed air blast cooler can be assumed. This spectrum is tabulated in **Appendix 9.4**.

Table 9.20 below lists the approx. distance from each of the nearest NSLs to the proposed air blast cooler and the anticipated noise level due to its operation. The predictions assume that there is no line of sight between the cooler and each NSL and that the cooler's emissions propagate over 100 % reflective ground surface.

Table 9.20: Air Blast Cooler Noise Predictions

Location ID	Distance to Cooler (m)	Predicted Level (dB(A))
NSL1	536	32
NSL2	565	32
NSL3	303	37
NSL4	450	34
NSL5	435	34
NSL6	438	34
NSL7	476	33

All predicted noise levels at the nearest NSLs are below the measured background levels for daytime, evening and night-time. As a result, the impact of the air blast cooler at the nearest NSLs is assessed as **not significant**.

9.4.2.3 Tonality and Impulsivity

The current IED licence states that: *"There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location."* Reflecting the assessment criteria in **Section 9.2.5.2**, tonal and impulsive criteria contained within the current licence are assessed below in the interest of completeness.

In accordance with BS 4142: Annex C (normative): Objective method for assessing the audibility of tones in sound: One-third octave method, a prominent discrete tone to be identified as present, the time-averaged linear sound pressure level in the one-third-octave band of interest is required to exceed the time-averaged linear sound pressure levels of both adjacent one-third octave bands by some constant level difference.

The appropriate level differences vary with frequency. They should be greater than or equal to the following values in both adjacent one-third-octave bands:

- 15 dB in low-frequency one-third-octave bands (25 Hz to 125 Hz)
- 8 dB in middle-frequency bands (160 Hz to 400 Hz)
- 5 dB in high-frequency bands (500 Hz to 10,000 Hz)

To identify the presence of any tonal noise at the nearest NSLs, both NML1 and NML2 measurements were subject to one-third octave band analysis. No tones were identified. Furthermore, all spot measurements were subjectively assessed with no tonal characteristics identified. The one-third octave band spectra for NML1 and NML2 are tabulated in **Appendix 9.4**.

The activity on site was also subjectively assessed for impulsive character. Impulsive character was observed at location N4 within the site boundary. However, the impulsive character and operational noise from Enva was **not audible** at the nearest NSLs.

The noise emission from the Enva facility complies with the numerical noise limits as well as meeting the criteria regarding the absence of a clearly audible tonal or impulsive character at the nearest noise sensitive locations.

9.4.2.4 Off-Site Traffic Noise Impact

The Proposed Development will result in a minor increase in traffic volumes along the R120. **Table 9.21** presents the AADT figures and the percentage of heavy goods vehicles (HGV%) accessing the Newcastle roundabout without the Proposed Development (do-nothing) and with the Proposed Development (do-something). 90 % of traffic exiting the Enva facility leaves Greenogue Business Park (Arm A) and exits the roundabout on to the R120 towards the N7 (Arm B). The remainder of the traffic exiting the park leaves the roundabout on to the R120 travelling west to Newcastle (Arm D).

Table 9.21: Traffic Noise Impact – Existing Environment and Future Environment

Traffic Movements	Existing		Proposed Project		AADT % Diff.	Change in Noise Level	Significance Rating
	AADT	HGV %	AADT	HGV %			
Arm A to Arm B	2997	17.5 %	3188	18.7 %	6.4 %	0.8	Negligible
Arm B to Arm A	3372	15.8 %	3562	16.9 %	5.7 %	0.7	Negligible
Arm A to Arm D	1566	5.0 %	1587	5.5 %	1.4 %	0.3	Negligible
Arm D to Arm A	1435	5.5 %	1456	6.0 %	1.5 %	0.3	Negligible

The predicted change in noise from road traffic was calculated using *Calculation of Road Traffic Noise* (CRTN), Department of Transport Welsh Office, HMSO 1988. The magnitude of noise effects was assessed using the criteria in the UK's DMRB LA 111 - Noise and vibration, Revision 2 (2020) which distinguishes between short-term and long-term impacts on the basis that NSLs habituate to road traffic noise and annoyance/sleep disturbance effects reduces over time.

When the predicted additional traffic flow from the Proposed Development is added to the existing traffic flow, the do-something scenario noise level shows a negligible increase (< 1 dB) in predicted traffic noise levels from the R120, which is not significant in EIA terms. Furthermore, the Proposed Development is unlikely to cause a change in 3 dB in the long term.

Eighty percent of the total additional traffic generated by the facility's new operations will access the site between the hours of 06:00 - 18:00. The remainder will access the site between the hours of 18:00 and 06:00.

Overall, the impact of off-site traffic noise on the nearest NSLs is assessed to be **imperceptible**.

9.4.3 Decommissioning Phase

Decommissioning of the facility following closure is expected to take approximately 8 weeks. It will include:

- Either the processing of any untreated wastes onsite or the transfer of such wastes to other facilities for processing.
- Removal of all treated HRW and waste containers.
- The dismantling, disinfection, and removal of the treatment plant.
- Decontamination of the building if required.

None of the above activities are anticipated to generate noise levels above and beyond those which have been predicted for the construction or operational phases of the Proposed Development. As such, the impact of the facility's decommissioning phase on the nearest NSLs is assessed to be **not significant**.

9.5 Cumulative Impact Assessment

A cumulative impact assessment (CIA) has been undertaken for noise and vibration in **Chapter 20 - Cumulative Effects**.

9.6 Interactions

Interactions between environmental topics with Noise & Vibrations has been addressed in **Chapter 19 – Interactions Between the Environmental Factors**.

9.7 Mitigation Measures

9.7.1 Construction Phase

No significant noise impacts were identified at the nearest NSLs and no specific construction noise limits are required. Similarly, the vibration levels as a result of this development's construction phase are not anticipated to be significant at the nearest NSLs.

Nonetheless, works will be carried out using Best Practicable Means (BPM) to minimise noise and vibration, such measures will include:

- Noisy works shall be scheduled to normal working hours.
- Quiet working methods (e.g. using plant with lower noise emission levels) shall be used.
- Working methods that minimise vibration generation particularly with regard to demolition activities and piling shall be adopted.
- Plant such as pumps and generators used on or near NSLs will be contained within an acoustic enclosure.

- 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).
- All noise producing equipment will comply with S.I. No 632 of 2001 European Communities (Noise Emission by Equipment for Use Outdoors) Regulations 2001 and S.I. No. 241/2006 - European Communities (Noise Emission by Equipment for Use Outdoors) (Amendment) Regulations 2006.
- Measures outlined in "*Environmental Good Practice Site Guide*" 2005 compiled by CIRIA and the UK Environmental Agency and the "London Good Practice Guide: Noise & Vibration Control for Demolition and Construction" 2016 will be applied as appropriate.
- All plant shall be properly maintained, (mechanisms properly lubricated, faulty silencers replaced, worn bearings replaced, cutting tools sharpened etc.).
- Acoustic covers to engines shall be closed when in use or idling.
- The unnecessary revving of engines shall be avoided and equipment shall be switched off when not in use.
- Starting-up plant and vehicles sequentially shall be used rather than at the same time.
- Drop heights of materials shall be minimised.
- Regular briefings shall be provided for all site-based personnel so that noise and vibration issues (including the requirement to employ Best Practicable Means at all locations at all times) are understood and that generic and site-specific mitigation measures are explained and adhered to.
- Unloading shall be carried out within the worksite rather than on adjacent roads or layby.
- Phasing of materials deliveries shall be controlled on a 'just in time' basis to minimise noise and congestion on roads around the site.
- Records of any noise complaints relating to the construction operations will be investigated as soon as possible and reported to the County Council.

9.7.2 Operational Phase

No significant noise and vibration impacts are anticipated during the operational phase of the Proposed Development and as such, no mitigation measures are required. However, best practicable means to minimise operational noise and vibration will include:

- Roller doors shall be closed during operation of internal equipment, where practicable.
- Drop heights of materials shall be minimised.
- The unnecessary revving of engines shall be avoided and equipment shall be switched off when not in use.
- Equipment shall be properly maintained and inspected regularly.

9.7.3 Decommissioning Phase

No significant noise and vibration impacts are anticipated during the decommissioning phase of the Proposed Development and as such, no mitigation measures are required. However, best practicable means to minimise decommissioning noise and vibration shall be implemented and noise emissions shall not exceed the EPA licence criteria outlined in **Table 9.7**.

9.8 Residual Impacts

No significant residual effects will arise as a result of the Proposed Development.

9.9 Monitoring

9.9.1 Construction Phase

Given the low levels of predicted noise and vibration at the nearest NSLs, no specific requirements for noise and vibration monitoring have been identified for the construction phase of the Proposed Development.

9.9.2 Operational Phase

There is no additional noise monitoring proposed for the operational phase of the Proposed Development outside of that which is currently required by EPA Licence W0192-03. Similarly, no vibration monitoring is proposed.

9.9.3 Decommissioning Phase

Given the low levels of anticipated noise and vibration at the nearest NSLs, no specific requirements for noise and vibration monitoring have been identified for the decommissioning phase of the Proposed Development.

9.10 Schedule of Environmental Commitments

A summary of the environmental commitments, with regard to this chapter is set out at **Chapter 21 - Schedule of Environmental Commitments**.

9.11 Chapter References

British Standard BS 4142:2014+A1:2019 – Methods for Rating and Assessing Industrial and Commercial Sound;

British Standard BS 5228-1:2009+A1:2014 – Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise;

British Standard BS 5228-2:2009+A1:2014 – Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration;

British Standard BS 6472-1:2008 – Guide to Evaluation of Human Exposure to Vibration in Buildings – Part 1: Vibration Sources Other than Blasting;

British Standard BS 6472-2:2008 – Guide to Evaluation of Human Exposure to Vibration in Buildings – Part 2: Blast-Induced Vibration;

British Standard BS 7385-2:1993 – Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Groundborne Vibration;

British Standard BS 7385-2:1993 Evaluation and Measurement for Vibration in Buildings. Guide to Damage Levels from Groundborne Vibration

Dublin Agglomeration Action Plan Relating to the Assessment and Management of Environmental Noise December 2018 – November 2023 (Noise Action Plan) Volume 4

Environmental Noise Directive (2002/49/EC);

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

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

EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EIAR), (EPA, 2022);

Geodirectory. (2021). Available from: https://www.geodirectory.ie;

Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (NRA, 2014);

Guidelines for the Treatment of Noise and Vibration in National Road Schemes (NRA, 2004b);

International Organization for Standardization (ISO) 1996-1:2016 – Description, Measurement and Assessment of Environmental Noise – Part 1: Basic Quantities and Assessment Procedures;

International Organization for Standardization (ISO) 1996-2:2017 – Description, Measurement and Assessment of Environmental Noise – Part 2: Determination of Sound Pressure Levels;

International Organization for Standardization (ISO) 9613-1 – Attenuation of Sound During Propagation Outdoors – Part 1: Calculation of the Absorption of Sound by the Atmosphere;

International Organization for Standardization (ISO) 9613-2 – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation;

ProPG: Planning & Noise, Professional Practice Guidance on Planning & Noise, Acoustics & Noise Consultants, Institute of Acoustics and Chartered Institute of Environmental Health (2017)

South Dublin County Council Development Plan 2022 – 2028;

Standards for Highways, DMRB LA 111 – Noise and Vibration (2020);

UK Department of Transport Document, Calculation of Road Traffic Noise, 'CRTN' 1988

CHAPTER 10
AIR QUALITY AND CLIMATE

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10 AIR QUALITY AND CLIMATE

10.1 Introduction

This chapter assesses the impacts to air quality and climate associated with the construction, operational and decommissioning phases of the Proposed Development. Impacts to air quality, such as from the generation of dust and road traffic, will arise during the construction phase of the Proposed Development. In addition, the construction of the Proposed Development has potential for the generation of greenhouses gases through the transport of material and personnel, site operations and embodied carbon in the materials used on site.

During the operational phase, the potential impacts to air quality and climate will arise from the transport of material to and from the facility, the potential for odour/bioaerosol generation from the processing and the release of both direct and indirect greenhouse gas emissions.

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.

10.2 Methodology

10.2.1 Legislation, Policy and Guidance

10.2.1.1 Climate Legislation

Ireland is a signatory to both the United Nations Framework Convention on Climate Change (UNFCC 1992) and the Kyoto Protocol (UNFCC 1997). The Paris Agreement (UNFCC 2015), which was implemented in 2016, is an integral milestone concerning international climate change accords. Its overarching goal is to hold 'the increase in the global average temperature to well below 2°C above pre-industrial levels' and pursue efforts 'to limit the temperature increase to 1.5°C above pre-industrial levels.' The aim is to confine global GHG emissions to 40 gigatonnes per year expeditiously, in addition to recognising that the decreasing of GHG emissions will be prolonged in developing countries. Implementation of the Paris Agreement requires economic and social transformation, based on the best available science. The Paris Agreement works on a five-year cycle of increasingly ambitious climate action carried out by countries. Since 2020, countries have been submitting their national climate action plans, known as nationally determined contributions (NDCs).

Accomplishing the commitments of the Paris Agreement spurred the European Union (EU) to enforce 'Regulation (EU) 2018/842' on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action. Another Directive, 'Regulation (EU) No. 525/2013' was amended to procure realising EU climate goals (European Parliament and Council of Europe 2018). That regulation amendment intends to frugally deliver reductions in EU GHG emissions of 43% from the Emission Trading Scheme (ETS) and 30% from non-ETS sectors by 2030 relative to 2005.

The ETS is an EU-wide scheme which regulates the GHG emissions of larger industrial emitters which encompass electricity generation, cement manufacturing and heavy industry.

The non-ETS sectors includes all domestic GHG emitters which do not fall under the ETS scheme and thus constitutes GHG emissions from transport, residential, commercial and agriculture. Essentially, Ireland is required under the Effort Sharing Regulation (Regulation (EU) 2023/857) to attain a 42% decrease in non-ETS GHG emissions by 2030 compared to 2005 levels.

In 2015, the Climate Action and Low Carbon Development Act was enacted by the Oireachtas. The function of the 2015 Act was to facilitate Ireland's just-transition to a low carbon, climate resilient and environmentally sustainable economy, and this was cited as the 'national transition objective'.

In June 2020, the Government published the Programme for Government – Our Shared Future (Government of Ireland 2020). Regarding climate, there is a pledge to an average 7% per annum decrease in total GHG emissions from 2021 to 2030. This would result in 51% reduction by the end of the decade, and ultimately obtaining net zero emissions by 2050.

In 2021 the Climate Action and Low Carbon (Amendment) Act was passed in Ireland, granting statutory effect to the core objectives stated within the *Climate Action Plan* (CAP)[1]. The 2021 Climate Act entails carbon budgets and sectoral emissions limits and outlines the carbon budget as the total GHG emissions that are allowed during the budget period. Consequently, the 2021 Climate Act has eradicated any mention of a national mitigation plan and replaced it with references to the former and latest versions of the Climate Action Plan as well as a sequence of National Long Term Climate Action Strategies. It has also updated the national transition objective to a national climate objective which commits '*to pursue and achieve, by no later than the end of the year 2050, the transition to a climate resilient, biodiversity rich, environmentally sustainable and climate neutral economy*.'

10.2.1.2 Climate Policy

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 particular 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 Environmental Impact Assessment Report (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 greenhouse gas 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 CO_2 emissions of at least 80% (compared to 1990 levels) by 2050 across the electricity generation, built environment and transport sectors.
- 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.

On 14th May 2018, the European Council adopted a regulation on greenhouse gas emission reductions – EU effort Sharing Regulation 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.

The *Climate Action Plan 2019*[2] (CAP19) was published by the Government in June 2019. The plan had 183 cross-sectoral targets and actions including for the electricity sector, enterprise, built environment, transport, agriculture, waste and the circular economy and the public sector. The plan sets out how Ireland will achieve its 2030 targets for carbon emissions and puts Ireland on a trajectory to achieve net zero carbon emissions by 2050.

[1] Climate Actions Plans (CAP) had been prepared prior to the legislation in 2019 and 2021.The current CAP23 is the first to be published under the new legislation.

[2] CAP19: gov.ie - Climate Action Plan 2019 (www.gov.ie)

Building on The *Climate Action Plan 2019*, The *Climate Action Plan 2021*[3] (CAP21) represents a more ambitious and detailed sectoral roadmap designed to deliver a 51% reduction in GHG emissions by 2030. *CAP21* sets out almost 500 actions to support Ireland's journey towards a 51% reduction in GHGs by 2030 compared to the 2018 baseline as set out in the Climate and Low Carbon Development Act 2021. The plan envisages large-scale renewable electricity generation (wind and solar up to 80% by 2030), almost a million electric vehicles (EVs) on the road, retrofitting 500,000 homes to Building Energy Rating (BER) B2 or better, increasing the cost of emissions for industry and reducing chemical nitrogen usage on farms. It sets indicative ranges of emissions reductions for each sector of the economy. It will be updated annually.

Published in December 2022, *Climate Action Plan 2023*[4] (*CAP23*) is the second annual update to Ireland's *Climate Action Plan 2019* and builds on the previous climate action plans and is the first plan to implement economy-wide carbon budgets and sectoral emissions ceilings agreed in July 2022. The updated Climate Action Plan focuses on how to achieve the required system change across society and the economy. The plan requires, by 2030, 75% reduction in electricity sector emissions, 45% reduction in commercial/public buildings emissions, 40% reduction in residential buildings emissions, 50% reduction in transport sector emissions, 35% reduction in industry emissions and 25% reduction in agricultural emissions.

The waste sector currently contributes 1.5% (which consists of landfill, incineration and open burning of waste, mechanical and biological treatment and wastewater treatment) of Ireland's national GHG emissions. 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.

Long-term decreases from the waste sector are a result of decreased quantities of Municipal Solid Wastes (MSW) disposed of at landfills and a decrease in the proportion of organic materials (food and garden waste) in MSW as well as a diversion of paper products from landfills. Improved management of landfill facilities, including increased recovery of landfill gas utilised for electricity generation and flaring is also a big driver in decreased emissions from the waste sector.

Waste sector emissions are projected to decrease by 33.6% between 2019 and 2030 to 0.59 Mt CO_2eq. It is assumed that the amount of landfill gas flared and utilised for energy production remains at 60% from 2020 onwards in line with more recent trends in the latest inventory.

Ireland's first statutory *National Adaptation Framework*[5] (NAF) was published in 2018. The *NAF* sets out the national strategy to reduce the vulnerability of the country to the negative effects of climate change and was developed under the Climate and Low Carbon Development Act 2015. The *NAF* provides a framework to ensure local authorities, regions and key sectors can assess the key risks and vulnerabilities of climate change, implement action so as to build resilience to climate change and ensure climate adaptation considerations are mainstreamed into all local, regional, and national policy. The *NAF* also aims to improve the enabling environment for adaptation through ongoing engagement with civil society, the private sector and the research community. The key actions of relevance to the project include:

> *Action 2: Sectoral Ministers to prepare and submit a sectoral adaptation plan to the Government for approval.*
>
> *Action 11: Ensure climate proofing considerations are fully integrated into arrangements and reforms arising from the new Ireland 2040 – National Planning Framework including Guidelines, updated guidance on adaptation proofing of SEA and EIA and also in revisions of building standards.*

The 2015 Climate and Low Carbon Development Act (the Climate Act) requires that the *NAF* be reviewed at least every five years. The *NAF* review process took place in 2022 and a report on the *NAF* Review was approved by the Minister of the Environment, Climate and Communications in October 2022 and recommended the development of a new *NAF* in 2023. A revised *NAF* is due to be published in the short term.

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[3] CAP21: gov.ie - Climate Action Plan 2021 (www.gov.ie)

[4] CAP23: gov.ie - Climate Action Plan 2023 (www.gov.ie)

[5] National Adaptation Framework gov.ie - National Adaptation Framework (NAF) (www.gov.ie) [Accessed 07/02/2023]

10.2.2 Zone of Influence

10.2.2.1 Air Quality

The Institute of Air Quality Management's (IAQM) *Guidance on the assessment of dust from demolition and construction* states that a dust assessment is typically required where there is:

- A 'human receptor' within:
  - 350 m of the boundary of the site.
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).
- An 'ecological receptor' within:
  - 50 m of the boundary of the site or
  - 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s).

To ensure a robust assessment and given the ecological sensitivities in the area, the zone of influence (ZoI) for the construction phase dust impacts is set at 500 m from the Proposed Development.

10.2.2.2 Climate

The ZoI for climate includes the national environment (Ireland), where the receptor is the climate and the global atmosphere. Effects arising from the potential impacts on climate are considered to impact on a national level. National, regional and local data have been considered where relevant and available. CO_2 emissions have a global climate warming effect. This is regardless of their rate of release, location, or the weather when 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 particular 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 kilograms 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.

10.2.3 Sources of Information to Inform the Assessment

10.2.3.1 Baseline Air Quality

Currently three air monitoring points are associated with a metal drum painting process and a drum washing process. Recent monitoring as per 2022 AER indicated 100% compliance with licence requirements.

The nearest EPA air monitoring station is in Tallaght located near Old Bawn Football Field approximately 8 km east of the site. Continuous monitoring is undertaken at this station for nitrogen oxides, as well as particulate matter $PM_{2.5}$ and PM_{10}. These data are referenced as representative of the background air quality within the environs of the site. Formal odour monitoring is not required as part of the existing licence, however, odour management is required as part of the environmental management programme and this is carried out as part of a weekly check on the site.

10.2.3.2 Baseline Climate

Existing climate data for the Study Area have been derived from the Met Éireann 30-year averages (1981 – 2010) for the nearest meteorological station. The nearest stations to the site are Casement (approximately 2 km to the northeast) and Dublin Airport (approximately 20.5 km to the northeast). Given the proximity to the site, the Casement station is considered the most representative of the meteorological conditions for the site.

As per EPA Guidance Note AG4 five years of meteorological data has been compiled from Casemount Aerodrome to support the air dispersion modelling of emissions from the Proposed Development.

During the operational phase, the Proposed Development will generate GHGs through the following pathways:

- Scope 1 which includes all direct emissions from the activities of Enva or under Enva's control. Specifically at the Proposed Development this includes fleet vehicles transporting waste and materials to and from the site.
- Scope 2 – Indirect emissions from electricity purchased and used at the site to power the treatment process and
- Scope 3 – All other indirect emissions including the wider changes in GHG emissions from the changes to the waste treatment regime from the proposed pre-treatment and recycling operations.

Each of the above are estimated using standard EPA emissions factors and project specific activity date to allow for the determination of the annual carbon footprint of the Proposed Development.

10.2.3.3 Construction Dust

Dust dispersion has the potential to cause local impacts through dust nuisance at the nearest sensitive receptors and also to sensitive ecosystems. The potential for dust generation associated with the construction of the Proposed Development is assessed on the basis of a review of the proximity of the planned construction activities to sensitive receptors. The potential for dust emissions from the Proposed Development is addressed qualitatively in accordance with the National Roads Authority (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 (Transport Infrastructure Ireland) Guidelines).

10.2.3.4 Construction Greenhouse Gas Emissions

The assessment of GHG emissions from the construction phase is carried out using the carbon calculator for construction **activities** developed by the Environmental Agency 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.

10.2.3.5 Road Traffic (Construction and Operation)

A prediction of the local impact of traffic-derived pollution during the operational phase was carried out using the TII Road **Emissions** Model as per the TII guidelines for assessment of impacts to air from road transport. Future traffic data was provided in the form of Annual Average Daily Traffic (AADT) from the **Chapter 7 - Traffic and Transportation**.

10.2.3.6 Odour and VOCs (Operational Phase)

This assessment has been undertaken in line with the requirements of the EPA Guidance Note AG9 *Odour Emissions Guidance Note* (September 2019). The document sets out recommended approaches for the development of odour management plans, abatement strategies and test programmes and should allow for improved consistency and reliability in addressing odour at industrial and waste facilities.

As part of the Proposed Development, one combined new emission point to atmosphere will become operational treating air from emissions including from two augers, two waste shredder emissions, two bin washers and four sharps (bin areas, washing, disinfection and drying) emissions will be installed.

Emissions from the new emission point have been modelled using the AERMOD dispersion model (Version 22112) which has been developed by the U.S. Environmental Protection Agency (USEPA) and following guidance issued by the EPA. The model is a steady-state Gaussian plume model used to assess pollutant concentrations associated with industrial sources and has replaced ISCST3 as the regulatory model by the USEPA for modelling emissions from industrial sources in both flat and rolling terrain. The model has more advanced algorithms and gives better agreement with monitoring data in extensive validation studies.

The air dispersion modelling input data consisted of information on the physical environment (including building dimensions and terrain features), design details from all emission points on-site and five years of appropriate hourly meteorological data. Using these input data, the model predicted ambient ground level concentrations beyond the site boundary for each hour of the modelled meteorological years. The model post-processed the data to identify the location and maximum of the worst-case ground level concentration.

This worst-case concentration was then added to the background concentration to give the worst-case Predicted Environmental Concentration (PEC). The PEC was then compared with the relevant ambient air quality standard to assess the significance of the releases from the site.

The information used in the dispersion model for the proposed emission points which release VOCs is shown in **Table 10.1** and **Table 10.2**.

VOCs are assumed to be released from all emission points and have been modelled at a potential IED licence emission limit value of 30 mg/m^3. This is the maximum VOC emission concentration expected. The VOC emissions consist of a combination of several chemical compounds, the carbon fractions for which are listed in **Table 10.2**. These were then applied to the modelled ambient VOC concentrations in turn for each emitted VOC. It is assumed that where more than one compound is being emitted from any emission point, as a worst-case assumption, the Total VOC (as C) consists of only one compound (in turn) with each compound compared to the 1-hour Environment Assessment Level and annual Environment Assessment Level.

For the odour modelling, the carbon fractions in **Table 10.2** were applied to the VOC emission concentration in **Table 10.1**, to produce a carbon adjusted emission concentration for each compound. This concentration was then divided by the odour detection emission threshold (which by definition is 1.0 OU_E/ m^3) to produce an OU_E/ m^3 emission concentration for each compound.

In order to compare to the odour criteria, a value of 1.5 times the odour detection threshold should be used.

Table 10.1: Emission Point Parameters Used In The Air Dispersion Modelling

Stack Parameters	Auger	Waste Shredder 1	Waste Shredder 2	Sharps (Bin)	Sharps (Washing)	Sharps (Disinfection)	Sharps (Drying)
Irish Grid (IG) Stack Location	E301632 N228545	E301639 N228509	E301624 N228513	E301608 N228462	E301610 N228461	E301607 N228460	E301609 N228459
Stack Diameter (m)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Surface Area (m^2)	0.071	0.071	0.071	0.071	0.071	0.071	0.071
Stack Height (m)	12	12	12	12	12	12	12
Temp (°C)	96	96	96	96	96	96	96
Temp (K)	369.15	369.15	369.15	369.15	369.15	369.15	369.15
Velocity (m/s)	13.75	13.75	13.75	13.75	13.75	13.75	13.75
Volume Flow (Nm^3/hr)	3,500	3,500	3,500	3,500	3,500	3,500	3,500
Total VOC Emission Concentration (mg/Nm^3)	30	30	30	30	30	30	30
Total VOC Emission Rate (g/s)	0.022	0.026	0.026	0.025	0.025	0.025	0.025

Table 10.2: Emissions Details for VOCs Used in The Air Dispersion Modelling

Compound	Carbon Weight	Molecular Weight	Carbon Fraction	Odour Detection Threshold (mg/Nm^3)	Odour Emission Concentration (OU_E/Nm^3)	Odour Emission Rate OU_E/s
Acetone	36.03	58.08	0.620	13,900	3.5	3.0
Butyl Acetate	72.06	116.16	0.620	285	169.7	146.1
Ethanol	24.02	46.07	0.521	280	205.5	177.0
Ethyl Acetate	48.04	88.11	0.545	2,410	22.8	19.7
Heptane	84.07	100.21	0.839	163,943	0.2	0.2
Isobutanol	48.04	74.12	0.648	2,001	23.1	19.9
Isobutyl Acetate	72.06	116.16	0.620	1,710	28.3	24.3
Isopropanol	36.03	60.10	0.600	2,458	20.4	17.5
Isopropyl Acetate	60.05	102.10	0.588	4,176	12.2	10.5
Methanol	12.01	32.04	0.375	4,000	20.0	17.2
Methyl Acetate	36.03	74.08	0.486	515	119.8	103.1
Methyl Ethyl Ketone	48.04	72.11	0.666	15,930	2.8	2.4
Tetra-Hydrofuran (THF)	48.04	72.11	0.666	265	169.7	146.1
Toluene	84.07	92.14	0.912	644	51.1	44.0
Xylene	96.08	106.16	0.905	78	425.0	365.9
1,2-Dichloro-Ethane	24.02	98.96	0.243	16,392	7.5	6.5

The most important parameters governing dispersion in the atmosphere are wind speed, wind direction and the stability or turbulence of the atmosphere. These parameters along with the ambient temperature and inferred mixing heights for each hour were included in the modelling using data from an appropriate met station with validated met data. The AG4 Guidance requires five years of meteorological data from an appropriate station should be used in the assessment and the most recent year of the five-year dataset should be within the last ten years. The nearest representative met station is the Casement station which lies approximately 2 km northeast of the site. Five years of meteorological data from the Casement Station have been applied for the modelling.

Three receptor grids were created at which concentrations would be modelled. Receptors were mapped with sufficient resolution to ensure all localised “hot-spots” were identified without adding unduly to processing time. The receptor grids were based on Cartesian grids with the site at the centre. An outer grid extended to 8,000 m^2 with the site at the centre and with concentrations calculated at 200 m intervals. A middle grid extended to 3,000 m from the site with concentrations calculated at 100 m intervals. A smaller denser grid extended to 1,000 m from the site with concentrations calculated at 100 m intervals. Boundary receptor locations were also placed along the boundary of the site, at 25 m intervals, giving a total of 2,843 calculation points for the model. All receptors have been modelled at 1.5 m to represent breathing height.

10.2.4 Key Parameters for Assessment

The key parameters to be assessed in this chapter are:

- Dust.
- Odour.
- Volatile Organic Compounds (VOCs).
- Greenhouse gas emissions.
- Bioaerosols

These parameters have been assessed as they have the potential to result in significant effects on surrounding receptors and the environment during the construction, operational and decommissioning phases of the Proposed Development and are outlined in the following sections.

10.2.5 Assessment Criteria and Significance

10.2.5.1 Construction Dust

During construction, dust is considered the principal risk of pollution to the atmosphere but there is no legislative ambient air quality limit that is applied to dust from construction. In the absence of a limit, the relevant guidelines for dust are the German Government TA Luft limits and under this guideline construction works are required to maintain monthly dust levels below the guideline of 350 mg/ m^2/ day as an annual average at sensitive receptors. This limit is applied by the EPA via the facility IED licence.

10.2.5.2 Combustion Gases/Particulates from Road Traffic

In May 2008, all previous European Directives on air quality were replaced with a revised Directive on ambient air quality and cleaner air for Europe (2008/50/EC) which has been transposed into Irish legislation as the Air Quality Standards Regulations 2011 (S.I. 180 of 2011). These Regulations are presented in **Table 10.3** and represent the main assessment criteria for traffic from the Proposed Development.

The 2011 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). All predicted concentrations from the operation of the Proposed Development are compared to the air quality limits to determine the extent of any impact on residential or ecological receptors.

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 WHO Guidelines are particularly pertinent in relation to the statutory limits for the protection of human health as presented in **Table 10.3**. The WHO Guidelines are based on reducing the risk to human health and in some cases the levels differ from the 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 2021 Air Quality Guidelines (AQG) and interim targets recommended by the WHO are presented in **Table 10.4.**

These guidelines are not legally binding, however, they do provide WHO Member States with an evidence-informed tool to inform legislation and policy. The levels are presented as an ultimate guideline as well as a series of interim targets which are proposed as incremental steps in a progressive reduction of air pollution and are intended for use in areas where pollution is high.

Table 10.3: Limits as Specified in Air Quality Standards Regulations 2011 (S.I. 180 of 2011)

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

Table 10.4: WHO Recommended Air Quality Guideline (AQG) Levels and Interim Targets (2021)

Pollutant	Averaging Time	Interim target				AGQ Level
		1	2	3	4	
$PM_{2.5}$ (µg/ m^3)	Annual	35	25	15	10	5
	24-hour	75	50	37.5	25	15
PM_{10} (µg/ m^3)	Annual	70	50	30	20	15
	24-hour	150	100	75	50	45
O_3 (µg/ m^3)	Peak season	100	70	-	-	60
	8-hour	160	120	-	-	100
NO_2 (µg/ m^3)	Annual	40	30	20	-	10
	24-hour	120	50	-	-	25
SO_2 (µg/ m^3)	24-hour	125	50	-	-	50
CO_2 (mg/ m^3)	24-hour	7	-	-	-	4

10.2.5.3 VOCs

In order to reduce the risk to health from poor air quality, national and European statutory bodies have set limit values in ambient air for a range of air pollutants. The Industrial Emission Directive (2010/75/EU) outlines appropriate mass emission limits of VOCs from a range of industries. However, no statutory air quality standards for the individual organic compounds exist in Irish legislation. In the absence of statutory standards, it is common practice to reference other suitable authorities such as the WHO or derive an ambient air quality guideline from Occupational Exposure Limits (OEL).

In line with the approach outlined in AG4, where no EU air quality standard exists, relevant statutory standards from other EU countries such as the UK, Germany or Denmark should be used. The most stringent European guideline / limit value from the sources outlined below should be referenced when determining compliance in the absence of an applicable EU ambient air quality standard. The relevant statutory guidance can be obtained from the following sources:

- Environmental Assessment Level (EAL) based on the Health & Safety Authority publication 2021 *Code of Practice for the Safety, Health and Welfare at Work* (Chemical Agents) Regulations 2001 (S.I. No. 619 of 2001). The EAL should be derived using the approach outlined in Appendix D of UK Environment Agency *IPPC H1 - IPPC Environmental Assessment for BAT* (Best Available Techniques). The guidance outlines the approach for deriving both short-term and long-term EALs. In relation to the long-term (annual) EAL, this can be derived by applying a factor of 100 to the 8-hour OEL. The factor of 100 allows for both the greater period of exposure and the greater sensitivity of the general population. For short-term (1-hour) exposure, the EAL is derived by applying a factor of 10 to the Short-Term Exposure Limit (STEL). In this case, only the sensitivity of the general population need be taken into account as there is no need for additional safety factors in terms of the period of exposure. Where STELs are not listed then a value of 3 times the 8-hour time weighted average occupational exposure limit may be used.
- EALs outlined in the UK Environment Agency guidance IPPC H1.

Table 10.5 identifies the appropriate short-term and long-term EALs, derived from the most stringent sources above, for the specific compounds which are likely to be used on-site.

Table 10.5: VOC Guideline Values Derived from OEL For Key Compounds Expected from Hazardous Medical Waste Treatment Onsite

Pollutant	Regulation	Limit Type	1-Hour EAL (µg/ m^3)	Annual Mean EAL (µg/ m^3)
Acetone	IPPC H1 EAL	Guideline Value	362,000	18,100
Butyl Acetate	IPPC H1 EAL	Guideline Value	96,600	7,240
Ethanol	IPPC H1 EAL	Guideline Value	576,000	19,200
Ethyl Acetate	IPPC H1 EAL	Guideline Value	420,000	14,600
Heptane	2021 Code of Practice	Guideline Value	6,255	208,500
Isobutanol (2-Methylpropan-1-ol)	IPPC H1 EAL	Guideline Value	23,100	1,540
Isobutyl Acetate	IPPC H1 EAL	Guideline Value	90,300	7,240
Isopropanol	IPPC H1 EAL	Guideline Value	125,000	9,990
Isopropyl Acetate	IPPC H1 EAL	Guideline Value	84,900	-
Methanol	IPPC H1 EAL	Guideline Value	33,300	2,660
Methyl Acetate	IPPC H1 EAL	Guideline Value	77,000	6,160
Methyl Ethyl Ketone	2021 Code of Practice	Guideline Value	9,000	60,000
Tetrahydrofuran (THF)	IPPC H1 EAL	Guideline Value	59,900	3,000
Toluene	IPPC H1 EAL	Guideline Value	8,000	1,910
Xylene	IPPC H1 EAL	Guideline Value	66,200	4,410
1,2-Dicholorethane	IPPC H1 EAL	Guideline Value	165,000	8,230

Note 1: *No annual OEL is available for isopropyl acetate*

10.2.5.4 Odour

Guidance from the UK, and adapted for Irish EPA use, recommends that odour standards should vary from 1.5 – 6.0 OU_E/ m^3 as a 98th percentile of one hour averaging periods at the worst-case sensitive receptor based on the offensiveness of the odour and with adjustments for local factors such as population density. A summary of the indicative criterion is given below in **Table 10.6** (taken from EPA Guidance document AG9.

Table 10.6: Indicative Odour Standards Based on Offensiveness of Odour And Adapted for Irish EPA[6]

Industrial Sectors	Relative Offensiveness of Odour	Indicative Criterion Note 1
Processes involving decaying animal or fish remains. Processes involving septic effluent or sludge. Waste sites including landfills, waste transfer stations and non-green waste composting facilities.	Most Offensive	1.5 OU_E/ m^3 as a 98th percentile of hourly averages at the worst-case sensitive receptor
Intensive Livestock Rearing Fat Frying / Meat Cooking (Food Processing) Animal Feed Sugar Beet Processing Well aerated green waste composting Most odours from regulated processes fall into this category i.e. any industrial sector which does not obviously fall within the "most offensive" or "less offensive" categories.	Moderately Offensive	3.0 OU_E/ m^3 as a 98th percentile of hourly averages at the worst-case sensitive receptor
Brewery / Grain / Oats Production Coffee Roasting Bakery Confectionery	Less Offensive	6.0 OU_E/ m^3 as a 98th percentile of hourly averages at the worst-case sensitive receptor

Note 1: Professional judgement should be applied in the determination of where the worst-case sensitive receptor is located.

Given that the emissions from the Proposed Development are arising from medical waste, a highly offensive odour criterion of 1.5 OU_E/ m^3 as a 98^{th} percentile of hourly averages is conservative. The odour detection threshold criteria associated with the chemicals arising onsite is outlined in **Table 10.7**. In order to compare to the odour criteria, a value of 1.5 times the odour detection threshold, which by definition is 1.0 OU_E/ m^3, should be used.

Table 10.7: Odour Detection Thresholds & Nuisance Criteria for Key Compounds Expected from Hazardous Medical Waste Treatment Onsite

Pollutant	Source	Odour Detection Threshold (μg/ m^3) Equivalent to 1 OU_E/ m^3	Odour Concentration (μg/ m^3) Equivalent to 1.5 OU_E/ m^3
Acetone	IPPC H4 Threshold	13,900	20,850
Butyl acetate	Haz-Map	285	428
Ethanol	IPPC H4 Threshold	280	420
Ethyl Acetate	IPPC H4 Threshold	2,410	3,615
Heptane	Haz-Map	163,943	245,914
Isobutanol (2-Methylpropan-1-ol)	Haz-Map	2,001	3,001
Isobutyl acetate	Haz-Map	1,710	2,565
Isopropanol	Haz-Map	2,458	3,687
Isopropyl Acetate	Haz-Map	4,176	6,264
Methanol	AEA Technology	4,000	6,000
Methyl acetate	Haz-Map	515	773

[6] UK Health and Safety Authority (2021) 2021 Code of Practice for the Safety, Health and Welfare at Work (Chemical Agents) Regulations (2001-2021) and the Safety, Health and Welfare at Work (Carcinogens) Regulations (2001-2019)

Pollutant	Source	Odour Detection Threshold (µg/ m^3) Equivalent to 1 OU_E/ m^3	Odour Concentration (µg/ m^3) Equivalent to 1.5 OU_E/ m^3
Methyl ethyl ketone	USEPA Hazard Summary	15,930	23,895
Tetrahydrofuran (THF)	Haz-Map	265	398
Toluene	IPPC H4 Threshold	644	966
Xylene	IPPC H4 Threshold	78	117
1,2-dicholorethane	USEPA Hazard Summary	16,392	24,588

Note 1: Taken from AEA Technology Report “Odour Measurement and Control – An Update” (1994). Where a range in values is given the lowest value is used.

10.2.5.5 Bioaerosols

Bioaerosols are found naturally within the environment and consist of airborne particles that contain living organisms, such as bacteria, fungi and viruses or parts of living organisms, such as plant pollen, spores and endotoxins from bacterial cells or mycotoxins from fungi. While typically associated with composting facilities, the potential impact of bioaerosols from the Proposed Development has been assessed for completeness.

While no assessment criteria for bioaerosols are available for Ireland or the UK, the UK Environment Agency Technical Guidance Note (Monitoring) *M9 Environmental monitoring of bioaerosols at regulated facilities* (2018) is used as a reference. In this guidance, the total bioaerosols from a regulated facility should be less than one colony forming units (CFUs).

10.3 Description of the Existing Environment (Baseline Scenario)

10.3.1 Baseline Environment

The site is located in the Greenogue Business Park at Rathcoole Ordinate Survey Ireland townland in Co. Dublin. The site is situated approximately 14 km southwest of Dublin City Centre in the administrative area of South Dublin County Council. Land use in the local area surrounding the site comprises a commercial and industrial area on the outskirts of Dublin city, in South Dublin County Council. The business park is designated as an Enterprise zone and offers commercial space solutions, including office, industrial and warehousing units, to businesses of all sizes.

There are a variety of businesses located in the park, such as manufacturing companies, logistics and distribution centres, research and development facilities. The park also features amenities for the convenience of tenants, including on-site car parking and cafes.

There are no residential properties within 300 m of the Proposed Development. The majority of residential properties are centred in Newcastle, 1 km from the site. Two-storey, semi-detached housing is the dominant housing typology. Social and community services within 1 km include Greenogue equestrian centre, Peamount United Football Club and St. Finians GAA club. Due to the existing land uses in the immediate environment of the site, there are limited amenities in the immediate vicinity.

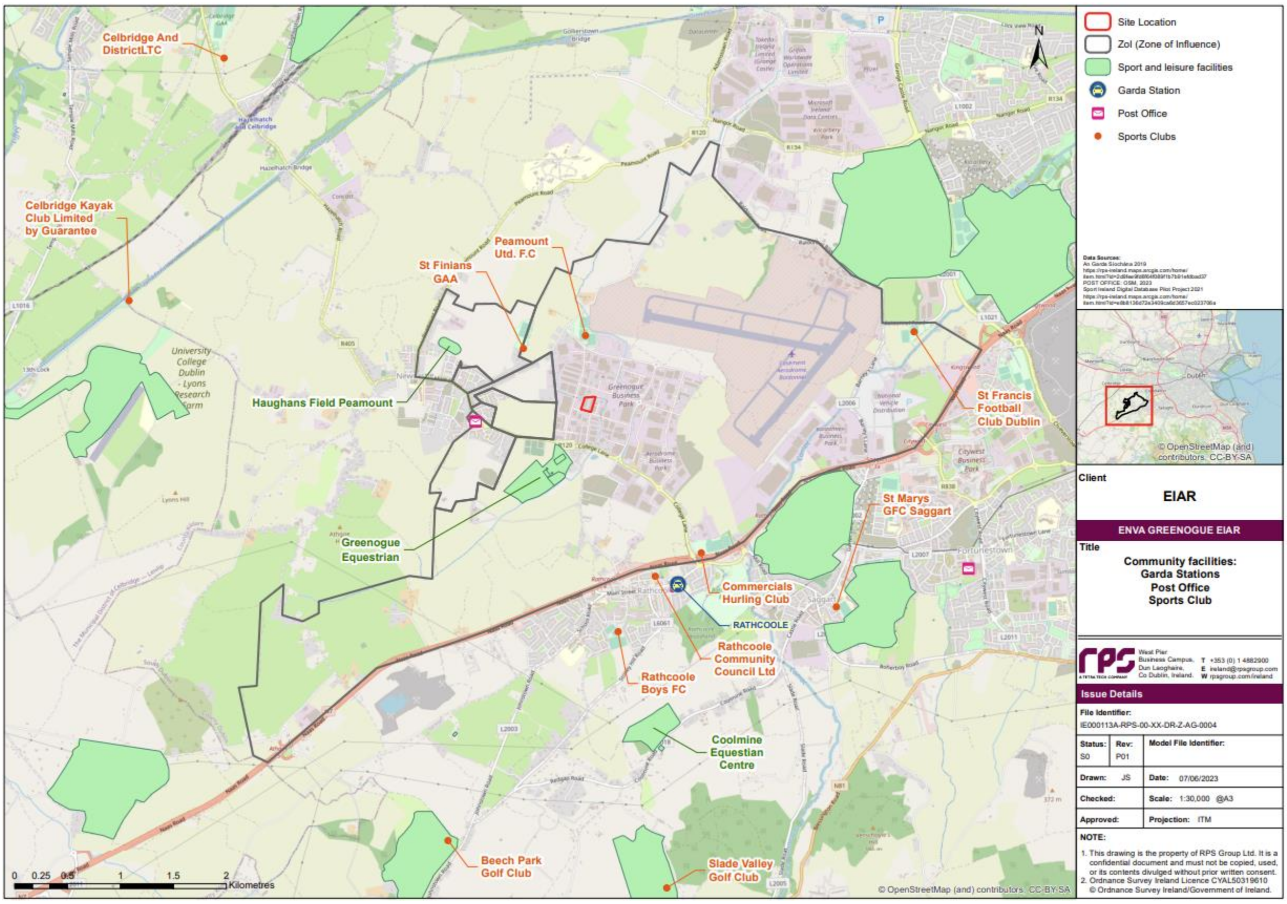

Figure 10-1: Social, Sports and Community Services[7]

10.3.1.1 Existing Sources in the Area

The main existing sources of pollution in the vicinity of the site are from road traffic, air traffic at the nearby Casement Aerodrome, surrounding businesses within the business park and surrounding agriculture.

The Casement Aerodrome is the headquarters and sole airfield of the Irish Air Corps. It is also used for other government purposes. Casement is primarily used for training military pilots as well as supporting the operations of the Irish Air Corps. The airport is also used for civilian purposes, such as air ambulance services and search and rescue missions. The Enva site is approximately 1.4 km northeast of the site.

The N7 motorway to the east, is an existing source of pollution including combustion gases and particulates. The TII traffic counter on the N7 between Junctions 4 and 3 shows that AADT volumes on the motorway were 100 380 vehicles in 2023 an increase of 11 456 since 2022.

Agricultural land use in the area will generate low levels of dust and odour and this will seasonally vary throughout the year with higher levels during harvest.

10.3.1.2 Baseline Air Quality

The site lies with Air Quality Zone A: Dublin Conurbation. The site is situated within the Dublin City (Region 1) region of the EPA Air Quality Index for Health (AQIH). Overall, existing baseline levels of pollutants based on the data for EPA Zone A are generally below ambient air quality limit values and by extension the levels in the vicinity of the Enva facility may also be considered to be below the limit values. In summary, from the data available, it can be concluded that the Rathcoole / Greenogue area experiences ‘Good’ air quality.

[7] Source: gis.epa.ie

Nitrogen Dioxide (NO_2)

NO_2 is classed as both a primary and a secondary pollutant. As a primary pollutant NO_2 is emitted from all combustion processes (such as a gas/oil fired boiler or a car engine). As a secondary pollutant NO_2 is derived from atmospheric reactions of pollutants that are themselves, derived mainly from traffic sources.

The results of the EPA network monitoring in Tallaght for the last three years are presented in **Table 10.8**. The results indicate compliance with the limits for the protection of human health and the WHO Guidelines indicating that the area currently experiences compliant air quality.

The compliance level is to some extent a result of Ireland's location in western Europe where there is a strong prevailing westerly wind, high rainfall levels and low sunshine levels that allows for the rapid dispersion of pollutants and generally good air quality. In addition, at EU level there is legislation driven improvements to vehicles in terms of both engine performance and fuel specification (known as the Auto Oil Program) which has also helped in the reduction of pollutants over the past three years.

Note that the reduced level in 2020 is likely a result of the reduced traffic volumes associated with the COVID-19 lockdown and the 2021 and 2022 data is more representative of the Tallaght area.

Table 10.8: Results of NO_x Monitoring Carried Out by the EPA in Tallaght

Year	Annual Mean NO2 (µg/ m^3)	Annual # of NO2 Values Exceeding Hourly Limit for Protection of Human Health >200µg/ m^3	Annual Mean NOx (µg/ m^3)
2020	14	0	27.3
2021	12.6	0	23.3
2022	13.5	0	27.9
Limit	40 (Annual limit for protection of human health)	18 (No of samples not to exceed the year)	30 (Annual limit for protection of vegetation)
WHO Guideline	40	-	-

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate Matter ($PM_{2.5}$ and PM_{10}) may be emitted as a primary pollutant from road vehicle exhausts and also from solid fuel burning which is the main source in urban areas. In rural areas, sources will include traffic, agricultural activities and natural processes such as sea salt aerosol. $PM_{2.5}$ and PM_{10} may also be formed as secondary pollutants from the condensation or reaction of chemical vapours in the atmosphere.

The results of the EPA monitoring in Tallaght for the last three years are presented in **Table 10.9**. As with NOx, the $PM_{2.5}$ and PM_{10} data shows compliance with the human health limits presented in **Table 10.3**. In addition, the results are below the WHO guidelines for air quality (**Table 10.4**) which are significantly lower than the statutory limits.

Table 10.9: Results of $PM_{2.5}$ and PM_{10} Monitoring Carried Out by the EPA in Tallaght

Year	Annual Mean $PM_{2.5}$ (µg/ m^3)	Annual # of $PM_{2.5}$ Values Exceeding 24 Hour Limit for Protection of Human Health >25µg/ m^3	Annual Mean PM_{10} (µg/ m^3)	Annual # of PM_{10} Values Exceeding 24 Hour Limit for Protection of Human Health >50µg/ m^3
2020	-	-	10	0
2021	6.4	16	9.8	0
2022	6.2	14	11.1	1
Limit	N/A	N/A	40 (Annual limit for protection of human health)	35 (No of samples not to exceed the year)
WHO Guideline	25	-	20	-

Sulphur Dioxide (SO_2)

The largest sources of SO_2 emissions are as a primary pollutant from fossil fuel combustion at power plants and other industrial facilities. SO_2 is linked with a number of adverse effects on the respiratory system.

The levels in SO_2 in Rathmines over the past three years are presented in **Table 10.10**. The levels are low and less than 20% of the limit for the protection of human health. These levels are generally decreasing largely as a result of the ban on smoky coal under the Air Pollution Act, 1987 (Marketing, Sale and Distribution of Fuels) Regulations (1998-2011).

Table 10.10: Results of SO_2 Monitoring Carried out by the EPA in Rathmines

Year	Annual Mean SO_2 (µg/ m³)	Annual # of SO_2 Values Exceeding 24 Hour Limit for Protection of Human Health >125 µg/ m³	Annual # of SO_2 Values Exceeding 1 Hour Limit for Protection of Human Health >350 µg/ m³
2020	1.4	0	0
2021	1.1	0	0
2022	1.8	0	0
Limit	20 (Annual limit for protection of vegetation)	3 (No of samples not to exceed the year)	24 (No of samples not to exceed the year)
WHO Guideline	20	-	-

10.3.1.3 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 Development is approximately 4 km west of the east coast and 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 Casement Aerodrome which lies approximately 2 km northeast of the subject site. The 30-year averages from the Casement Aerodrome Meteorological Station are presented in **Table 10.11**. The Proposed Development must consider the extreme weather events relating to cold weather, wind, rain and events (storms, snow, etc.).

Table 10.11: 30-year Average Metrological Data from Casement Aerodrome (Annual Values from 1991-2020)

Parameter	30-year Average
Mean Temperature (°C)	9.9
Mean Relative Humidity at 0900 UTC (%)	84.2
Mean Daily Sunshine Duration (Hours)	3.8
Mean Annual Total Rainfall (mm)	783.5
Mean Wind Speed (knots)	10.1

At Casement Aerodrome Meteorological Station the 30-year record for temperature (**Table 10.12**) shows that the average daily mean temperature across a calendar year is 9.9°C with an average maximum of 13.4°C and an average minimum of 6.3°C. Across the calendar year the average number of days with air frost is 34.8.

Table 10.12: 30-Year Average Temperature Data at Casement Aerodrome (Annual Values from 1991-2020)

Temperature (°C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Daily Max	8.0	8.5	10.3	12.4	15.4	18.	19.8	19.4	17.0	13.7	10.3	8.3	13.4
Mean Daily Min	2.4	2.2	3.1	4.5	6.9	9.6	11.6	11.4	9.6	7.2	4.4	2.6	6.3
Mean Temperature	5.2	5.3	6.7	8.5	11.2	13.8	15.7	15.4	13.3	10.4	7.4	5.4	9.9
Mean no. of Days with Air Frost	6.8	7.1	5.0	2.9	0.8	0.0	0.0	0.0	0.1	1.1	3.7	7.3	34.8

The prevailing wind direction for the area is between south to north-westerly in direction (5-18%) as presented in the wind-rose for Casement Aerodrome Metrological Station for 1981-2010 in **Figure 10.2**. Northerly and north-easterly winds tend to be very infrequent (less than 9%) with easterly and south-easterly winds less frequent (less than 5%).

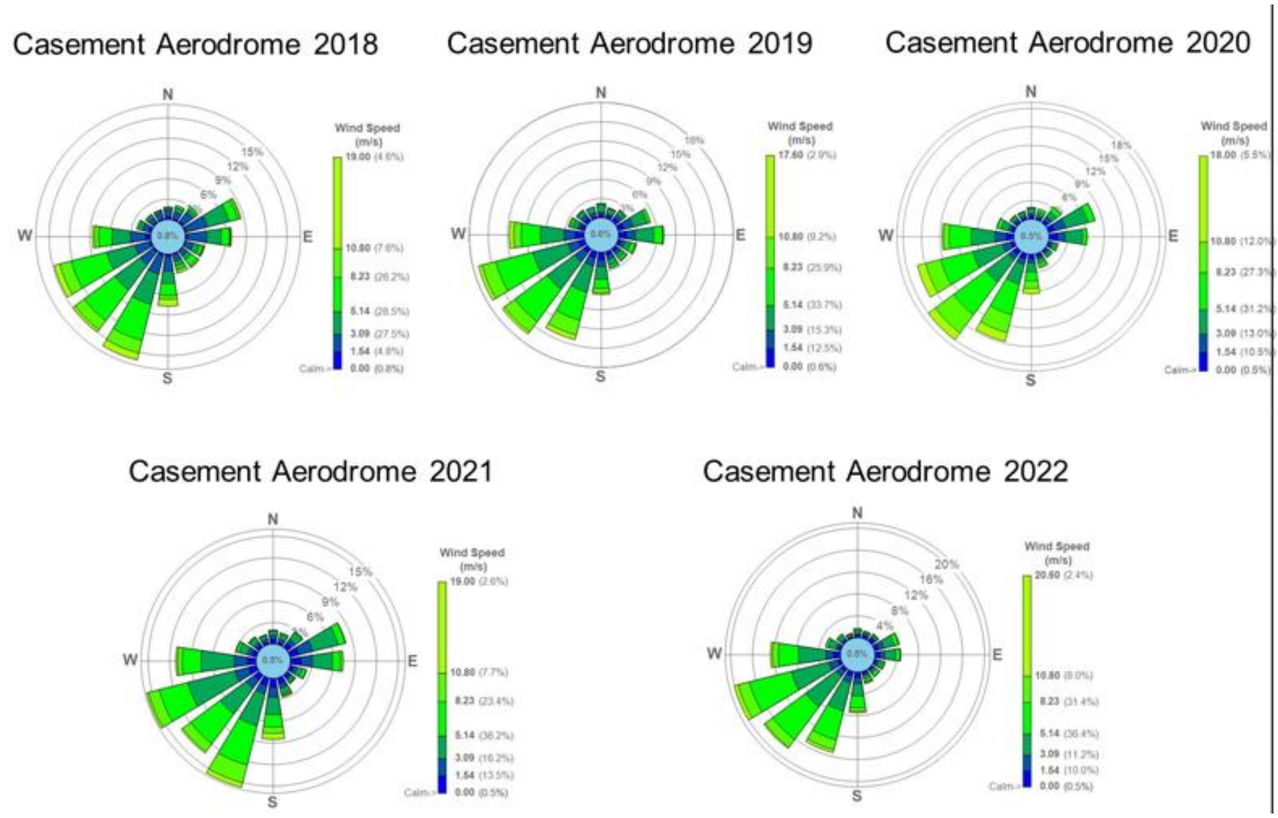

Figure 10-2: Wind-Rose for the Casement Aerodrome Meteorological Station 2018-2022

Wind characteristics are typically moderate with relatively infrequent gales with an average of 12.6 days with gales per annum with an average maximum wind gust of 80 knots during the year as show in **Table 10.13**.

Table 10.13: 30-year Average Data for Wind at Casement (Annual Values from 1991-2020)

Wind (knots)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Monthly Speed	12.4	12	11.1	9.5	9	8.4	8.4	8.7	9	10.1	10.9	11.7	10.1
Max Gust	80	74	71	59	62	55	45	53	59	64	64	82	82
Mean no. of Days with Gales	3.3	2.4	1	0.6	0.3	0.1	0	0	0.2	0.8	1.2	2.6	12.6

The average yearly rainfall in the 30-year average is 783.5 mm, this is broken down into monthly averages in **Table 10.14**. The greatest daily total of rain is recorded in June (98.5 mm) with moderately frequent days with ≥5.0 mm per annum (49.9 days).

Table 10.14: 30-year Average Data for Rainfall at Casement (Annual Values from 1991-2020)

Wind (knots)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Monthly Total	65.0	55.2	51.8	55.3	59.1	65.7	59.4	71.2	61.6	81.6	81.9	75.7	783.5
Greatest Daily Total	30	35.6	34.2	41.5	36	98.5	33.7	36	51.1	86.1	82	46.8	98.5
Mean no. of Days with ≥5.0 mm	4.7	3.4	3.3	3.8	3.6	3.9	3.7	4.5	4.1	4.7	5.1	5.1	49.9

The Proposed Development must consider weather events that may disrupt operations. **Table 10.15** displays the mean number of days per annum on average across the 30-year average a weather event occurs. Snow lying at 0900UTC (Coordinated Universal Time) 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 Casement Aerodrome during the 30-year average records, occurring on average 19.8 days per annum.

Table 10.15: 30-Year Average Data for Weather Events at Casement Aerodrome (Annual Values from 1991-2020)

Weather (Mean no. of Days With)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Snow or Sleet	3.2	3.1	2.2	0.7	0.1	0	0	0	0	0	0.6	2	11.9
Snow lying at 0900 UTC	1	0.9	0.6	0	0	0	0	0	0	0	0.1	0.7	3.4
Hail	1.1	1.8	2.3	2.7	1.5	0.3	0.2	0	0.1	0.1	0.5	0.7	11.3
Thunder	0.1	0.1	0.2	0.6	0.8	0.9	1.2	1.1	0.4	0.4	0.1	0	6.1
Fog	1.7	1.4	1.8	1.3	1.1	1.1	0.9	1.4	2.6	2.3	1.8	2.2	19.8

10.3.2 Evolution of the Environment in the Absence of the Proposed Development

The 'Do-Nothing' scenario refers to a scenario whereby the site would continue to operate as a hazardous waste transfer/recovery facility. This scenario will result in a neutral impact for air quality in the area and climate relative to base and a positive impact relative to the Proposed Development for the following reasons:

- The site would remain in its current use with low levels of dusts generated. The absence of major construction on site would eliminate the potential for temporary dust nuisance.
- Existing traffic levels generated by site staff and vehicles transporting waste, including heavy and light goods vehicles, will remain unchanged and are not expected to have any impact on the local road network.
- The site will continue to operate as a hazardous waste transfer/recovery facility which hold an existing Industrial Emissions Licence (IED) that requires that no emissions including odours, from the activities carried on at the site shall result in an impairment of, or an interference with amenities or the environment beyond the facility boundary or any other legitimate uses of the environment beyond the facility boundary.
- The impact from carbon emission during the construction and operational phases of the Proposed Development would be reduced under the 'do-nothing' scenario.

10.4 Description of Likely Significant Effects

The following sections consider the potential impact of the Proposed Development on air quality and climate during the construction and operational phases. The construction assessment considers potential impacts due to construction activities and construction-related traffic. The operational phase assesses the potential impact locally and regionally due to traffic emissions. The 'Do-Nothing' scenario outlining the likely evolution without the development has been presented in **Section 10.3.2**.

10.4.1 Construction Phase

10.4.1.1 Construction Dust

In accordance with the TII Guidelines, where there are operations at a construction site there is a risk that dust may cause an impact at sensitive receptors in close proximity to the source of the dust generated. These distances are presented in **Table 10.16** (Source: TII Guidelines, May 2011 Revision).

Table 10.16: TII 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	100 m	25 m	25 m
Moderate	Moderate Construction sites, with moderate use of haul routes	50 m	15 m	15 m
Minor	Minor Construction sites, with minor use of haul routes	25 m	10 m	10 m

It is important to note at the outset that one of the principle factors affecting dust generation and dust deposition relates to moisture content. Moisture increases the mass of a dust particle meaning particles are less friable and hence, less prone to dust dispersion. In most construction projects, the principal means of dust suppression is through maintaining a high moisture level on dust particles.

Given the extent of works the scale of the construction site is considered to be **not significant**. The nearest residential property is just more than 300 m from the site. The other nearby receptors such as the Creche and Montessori, Kidspace Rathcoole (play area) and Peamount United Football Club lie within 1 km of the works. All of these properties are located outside of the 100 m threshold and hence, these properties will experience **negligible** dust impact from the proposed construction phase.

10.4.1.2 Construction Traffic

The predicted levels of construction traffic from the Proposed Development are presented in **Chapter 7 - Traffic and Transportation**. Construction traffic can impact directly on local air quality and any sensitive receptors that are located adjacent to the local road networks may experience the effects to local air quality. Overall, the temporary effect on the local road network during the construction phase is i**mperceptible**. This impact may be experienced by the one property to the east of the site and the 9 residential properties located along the R120 to the junction with the N7 national route which will be used as a haul route for construction vehicles. This potential impact may be mitigated through dampening or covering this material and the use of wheel washes and road sweeping. With these measures in place there is **no significant effect** predicted for properties along the haul route.

10.4.1.3 Construction Greenhouse Gases

Consideration is given in this section to the GHG emissions that may arise during the construction phase of the development. Emissions from the construction phase 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 development 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. For some materials, such as steel, the use of recycled materials has a lower embodied GHG emission than the use of virgin material.

The existing office building on the gable side of the building facing Grants Drive is to be demolished and replaced by an approximately 225 m^2 steel-clad enclosure providing space for two bulk trailers. This building comprises block and steel cladding with associated office fixtures and fittings.

A new structure to house the bulking up trailers will be constructed. This will be an approximately 225 m^2 steel-clad enclosure providing space for two bulk trailers to hold the disinfected Health Risk Waste (HRW) prior to its transfer offsite.

An opening will be created in the wall between Building 1 and the bulking trailer loading structure to create an access point to allow a fully enclosed conveyer system to pass disinfected waste through to be deposited into the bulking up trailers.

In addition to the new structure to house the bulking of materials a new enclosure of approximately 90 m^2 will be added to the west face of the building for storage of clean bins.

These emissions for the construction phase have been estimated using the UK Environment Agency (EA) Carbon Calculator for Construction Sites and the results are presented in **Table 10.17**. The results indicate that the construction of the Proposed Development will generate approximately 429.7 tCO_{2eq} and this is considered to have **slight adverse effect** on climate.

Table 10.17: Estimated GHG Emissions from the UK Environmental Agency (EA) Carbon Calculator for Construction Sites

Item		Estimated GHG Emissions (tCO_{2eq})
Concrete		63.1
Metals	Cladding	9
	Structural Steel	18.4
Material Transport		4.2
Plant and Equipment		326.3
Personnel Transport		5.6
Total		429.7

10.4.2 Operational Phase

10.4.2.1 Operational Traffic

Road traffic during the operational phase mainly relates to the transport of materials to and from the Proposed Development and these traffic volumes have been quantified in **Chapter 7 - Traffic and Transportation.** This chapter also includes an assessment of the baseline levels of traffic on the local road network.

During the operational phase there will a minor increase of traffic volumes entering and exiting the site at peak times compared to the current baseline. The effect on the road network is considered to '**imperceptible**' during the operational phase.

10.4.2.2 Operational VOC Emissions from New Stacks

As noted in **Section 4.4.3** of **Chapter 4 - Description of the Proposed Development** of this Volume of the EIAR, there are significant air quality controls in place for the Proposed Development to control emissions to atmosphere. This control system will be through a series of containment and treatment solutions as follows:

1. Negative air pressure extraction hoods will capture residual air at various points in the process and reduce any potential for fugitive emissions into the workplace or the wider environment. A sample of such hoods is provided in the image over. Moisture-laden emissions – as from bin washing and the thermal screw – will pass through a condenser at this point.

2. Air at ambient temperature will be routed through HEPA filtration.
3. Moisture laden air from the treatment process and wheelie bin washers will first be routed through condensers before emission to atmosphere via carbon filtration.
4. This dry, treated air will then meet the ELV for VOCs, odours and aerosols and will be released to atmosphere through the stack at Building 1 and will project up to 2 m above the existing roof height.
5. Stringent air emissions limits will be enforced by the EPA and will require independent periodic monitoring to be conducted at pre-determined intervals.

Ambient Ground Level Concentrations (GLCs) of the potential discharges of VOCs from this stack have been modelled and the results are presented in **Table 10.18** and **Table 10.19.**

The results indicate that the ambient GLCs are below the relevant air quality guidelines for individual VOCs, even when it is assumed that each emission point is emitting solely the VOC of concern at the maximum permissible emission concentration for the full year. Emissions from the proposed VOC emission points lead to ambient individual VOC concentrations which are no more than 4% of the maximum 1-hour limit value at the worst-case receptor (see **Table 10.18**) and no more than 1% of the annual mean limit value at the worst-case off-site location (**Table 10.19**).

Table 10.18: Dispersion Modelled Results – VOCs – Maximum 1-Hour Scenario

Pollutant	1-Hour EAL (µg/Nm^3)	2017 (µg/Nm^3)	2018 (µg/Nm^3)	2019 (µg/Nm^3)	2020 (µg/Nm^3)	2021 (µg/Nm^3)	Max PEC / EAL
Acetone	362,000	240.1	287.9	305.0	305.0	317.3	0.1%
Butyl Acetate	96,600	240.1	287.9	305.0	305.0	317.3	0.3%
Ethanol	576,000	285.6	342.6	362.9	362.9	377.5	0.1%
Ethyl Acetate	420,000	273.1	327.6	347.0	347.0	361.0	0.1%
Heptane	6,255	177.5	212.9	225.5	225.5	234.6	4%
Isobutanol	23,100	229.8	275.6	291.9	291.9	303.7	1%
Isobutyl Acetate	90,300	240.1	287.9	305.0	305.0	317.3	0.4%
Isopropanol	125,000	248.4	297.9	315.6	315.6	328.3	0.3%
Isopropyl Acetate	84,900	253.2	303.7	321.7	321.7	334.7	0.4%
Methanol	33,300	397.3	476.5	504.7	504.7	525.1	2%
Methyl Acetate	77,000	306.2	367.2	389.0	389.0	404.7	0.5%
Methyl Ethyl Ketone	9,000	223.5	268.1	284.0	284.0	295.5	3%

Pollutant	1-Hour EAL (µg/Nm³)	2017 (µg/Nm³)	2018 (µg/Nm³)	2019 (µg/Nm³)	2020 (µg/Nm³)	2021 (µg/Nm³)	Max PEC / EAL
Tetrahydrofuran (THF)	59,900	223.5	268.1	284.0	284.0	295.5	0.5%
Toluene	8,000	163.2	195.7	207.4	207.4	215.7	3%
Xylene	66,200	164.5	197.3	209.1	209.0	217.5	0.3%
1,2-dicholorethane	165,000	613.5	735.8	779.5	779.5	811.0	0.5%

Note 1: Background levels of all VOCs are likely to be well below 1 µg/ m³ in the vicinity of the facility.

Note 2: As a worst-case all VOCs released assumed to consist of each individual VOC in turn for the annual mean scenario.

Table 10.19: Dispersion Model Results – VOCs During Proposed Operation – Annual Mean Scenario

Pollutant	1-Hour EAL (µg/Nm³)	2017 (µg/Nm³)	2018 (µg/Nm³)	2019 (µg/Nm³)	2020 (µg/Nm³)	2021 (µg/Nm³)	Max PEC / EAL
Acetone	18,100	20.0	21.0	19.9	19.9	21.3	0.1%
Butyl Acetate	7,240	20.0	21.0	19.9	19.9	21.3	0.3%
Ethanol	19,200	23.8	25.0	23.7	23.7	25.4	0.1%
Ethyl Acetate	14,600	22.8	23.9	22.7	22.7	24.2	0.2%
Heptane	208,500	14.8	15.5	14.7	14.7	15.8	0.01%
Isobutanol	1,540	19.2	20.1	19.1	19.1	20.4	1%
Isobutyl Acetate	7,240	20.0	21.0	19.9	19.9	21.3	0.3%
Isopropanol	9,990	20.7	21.7	20.6	20.6	22.1	0.2%
Isopropyl Acetate	-	21.1	22.1	21.0	21.0	22.5	-
Methanol	2,660	33.2	34.7	33.0	33.0	35.3	1%
Methyl Acetate	6,160	25.6	26.8	25.4	25.4	27.2	0.4%
Methyl Ethyl Ketone	60,000	18.7	19.5	18.6	18.6	19.8	0.03%
Tetrahydrofuran (THF)	3,000	18.7	19.5	18.6	18.6	19.8	0.7%
Toluene	1,910	13.6	14.3	13.6	13.6	14.5	0.8%
Xylene	4,410	13.7	14.4	13.7	13.7	14.6	0.3%
1, 2-dicholorethane	8,230	51.2	53.7	51.0	51.0	54.5	0.7%

Note 1: Background levels of all VOCs are likely to be well below 1 µg/m³ in the vicinity of the facility.

Note 2: As a worst-case all VOCs released assumed to consist of each individual VOC in turn for the annual mean scenario.

The geographical variations in ground level VOC concentrations beyond the facility boundary for the worst-case years modelled are illustrated as concentration contours in **Figure 10.3** and **Figure 10.4**.

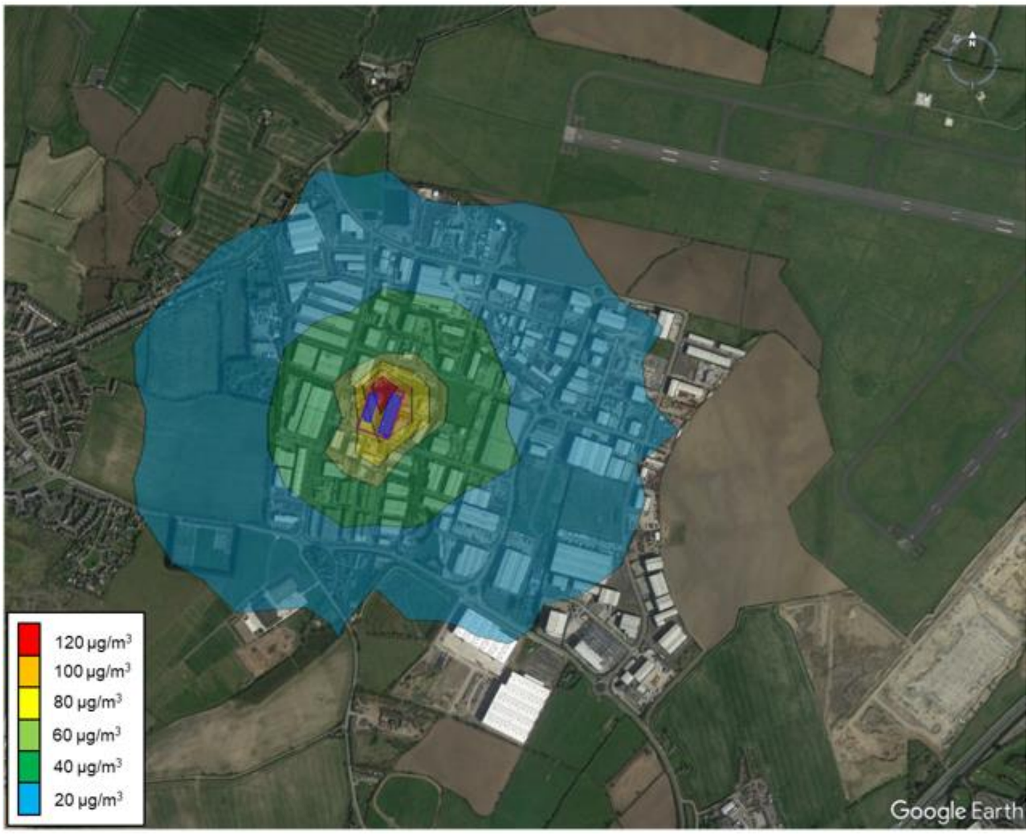

Figure 10-3: Maximum 1-Hour Total VOC Concentrations (µg/ m^3, as Carbon) (Excluding Background Concentrations)

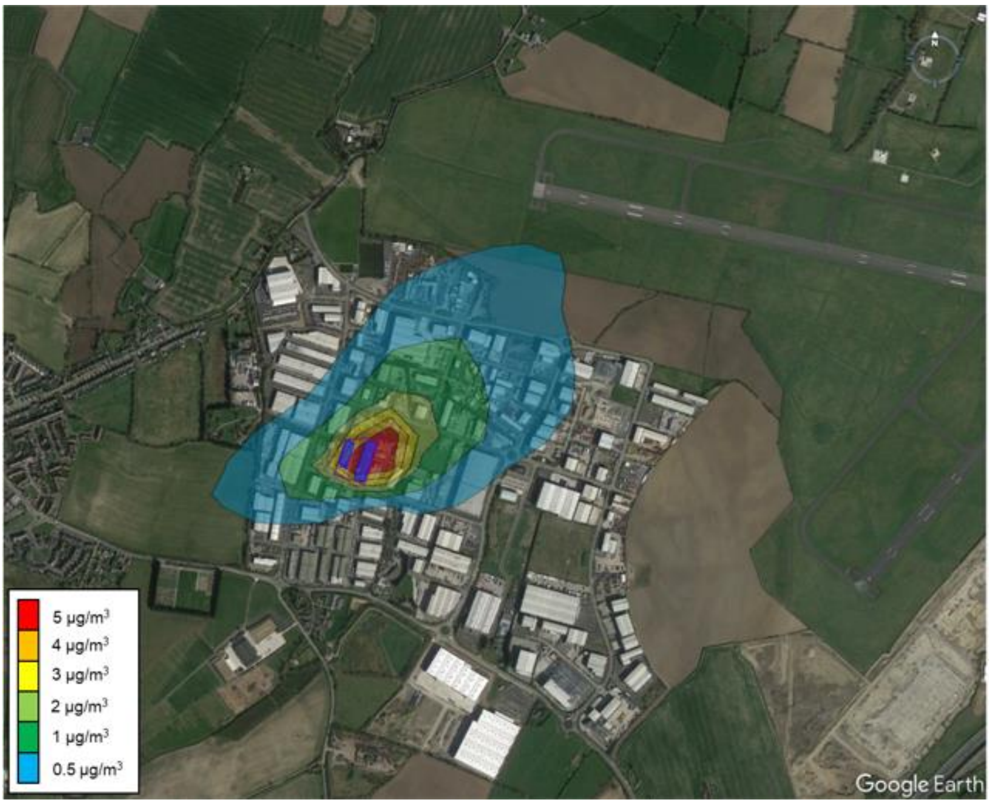

Figure 10-4: Maximum Annual Mean Total VOC Concentrations (µg/ m^3, as Carbon) (Excluding Background Concentrations)

10.4.2.3 Operational Odour Emissions

The odour modelling results during proposed operation are detailed in **Table 10.20**. The results indicate that the predicted GLCs are below the odour nuisance thresholds for each individual VOC. Emissions from the facility lead to a predicted odour concentration which is 6.6% of the odour guideline value at the worst-case sensitive receptor for the worst-case year modelled.

The geographical variations in ground level odour concentrations beyond the facility boundary for the worst-case year modelled are illustrated as concentration contours in **Figure 10.5**.

Table 10.20: Dispersion Model Results – Odour Nuisance Assessment at Nearest Receptors

Pollutant	Averaging Period	2018 (OU_E/Nm^3)	2019 (OU_E/Nm^3)	2020 (OU_E/Nm^3)	2021 (OU_E/Nm^3)	2022 (OU_E/Nm^3)	Odour Guidance (OU_E/ m^3)	Max PEC / EAL
Acetone	Maximum 1-Hour (as a 98th percentile)	0.0007	0.0008	0.0007	0.0008	0.0008	1.5	0.1%
Butyl Acetate		0.03	0.04	0.04	0.04	0.04		2.6%
Ethanol		0.04	0.05	0.04	0.04	0.05		3.2%
Ethyl Acetate		0.004	0.005	0.005	0.005	0.005		0.4%
Heptane		0.00004	0.00005	0.00005	0.00005	0.00005		0.003%
Isobutanol		0.005	0.005	0.005	0.005	0.005		0.4%
Isobutyl Acetate		0.006	0.007	0.006	0.006	0.006		0.4%
Iso-propanol		0.004	0.005	0.004	0.004	0.005		0.3%
Isopropyl Acetate		0.002	0.003	0.003	0.003	0.003		0.2%
Methanol		0.004	0.005	0.004	0.004	0.004		0.3%
Methyl Acetate		0.02	0.03	0.03	0.03	0.03		1.9%
Methyl Ethyl Ketone		0.0006	0.0007	0.0006	0.0006	0.0006		0.04%
Tetra-hydrofuran (THF)		0.03	0.04	0.04	0.04	0.04		2.6%
Toluene		0.01	0.01	0.01	0.01	0.01		0.8%
Xylene		0.08	0.10	0.09	0.09	0.10		6.6%

Note 1 Odour nuisance criteria is based on 1.5 OU_E/ m^3 (as a 98th percentile) which is equivalent to 1.5 times the odour detection threshold (as a 98th percentile).

Note 2 As a worst-case all VOCs released assumed to consist of each individual VOC in turn for the 98th percentile odour nuisance scenario.

Figure 10-5: 98th Percentile of 1-Hour Mean Xylene Odour Concentrations (OU_E/ m^3) (Excluding Background Concentrations)

10.4.2.4 Operational Bioaerosols

The presence of potentially pathogenic bioaerosols in healthcare waste is known. The microbial load in healthcare environments is highly influenced by the number of occupants, their activity and the levels of ventilation. In this regard, there is a known presence of potentially pathogenic bioaerosols in the healthcare waste that will be accepted at the Proposed Development.

However, the potential for bioaerosol dispersion from the Proposed Development to the wider environment is low with the planned controls as follows:

- All soft waste deliveries to the facility will be packaged inside sealed UN-approved bags and sharp waste will be packaged in locked UN-approved packaging all of which will be delivered inside locked UN-approved wheelie bins.
- All healthcare waste will be managed within the building which will operate under negative pressure to prevent fugitive emissions.
- Loading of waste into the bin emptying/shredder hopper area will be controlled via negative air pressure extraction hoods to prevent dispersion within the workplace.
- This extracted air from the hoods will be routed through high-efficiency particulate absorbing (HEPA) filters which are designed to capture and remove airborne pathogens prior to being released to the atmosphere.
- The filters will be changed at appropriate intervals and dispatched to an appropriately licenced incinerator.
- The dense pleated layers in the filter will achieve a 99.97% efficiency in trapping particles as small as 0.3 µm.

- The air is then directed through condensers to remove moisture before being passed through activated carbon filters before it is released to the atmosphere through a stack.
- Stringent air emissions limits will be enforced by the EPA. Independent monitoring will be conducted at pre-determined intervals.

With these controls in place, the potential for dispersion of bioaerosols within the environment around the Proposed Development is considered **not significant**.

10.4.2.5 Operational Greenhouse Gases

The Proposed Development will generate GHG emissions both from energy use on site and from the transport of materials. The GHG emissions from these sources are quantified in **Table 10.21**. The table illustrates that the delivery of HRW to the facility is the main source of emissions accounting for 45% of the annual projected emissions. The energy demands for the facility largely relates to the mechanical plant and equipment required to treat HRW and the bins used for transportation. Overall, these GHG emissions are considered to cause a ’**slight effect’** to climate.

Under the Emissions Trading Regulations (S.I. 490 of 2012) any activity listed in Schedule 1 of the Regulations requires a GHG emissions permit issued by the EPA. As the Proposed Development does not constitute one of the specified Schedule 1 activities and does not require the combustion of fuels in installations with a total rated thermal input exceeding 20 MW, the Proposed Development will not require an emissions trading permit.

Table 10.21: Estimated Greenhouse Gas Emissions from the UK EA Carbon Calculator for Construction Sites

Scope	Description	Activity Data	Emission Factor	Annual Emissions (tonnes CO_2)
1	Direct emissions from delivery vehicles	19,649 deliveries per annum (each delivering on average 1.2 tonnes HRW) 4,725 349 km	0.69390 $kgCO_2$/ km (an average emission factor based on the types of vehicles delivering HRW to site)	3,279
1	Fuel Consumption on site	Estimated 261.75 m^3/hr (site operation 355 days per annum for 24 hours)	2.02 $kgCO_2$/ m^3 (for natural gas, DEFRA data for 2022)	3,029.2
2	Electricity Use (on-site plant)	Estimated 2,982,682 kWh per annum	347.8 g CO_2/kWh (Sustainable Energy Authority of Ireland (SEAI) data for 2021)	1,037
3	Emissions from non-fleet vehicles	1,200 trips per annum (each truck carrying an estimated 20 tonnes of treated HRW) 138,480 km	Articulated (>33 tonnes) 1.07563 kgCO2/ km	149
Total Estimated Footprint				7,494.2

Note 1: Vehicles used to deliver HRW include articulated double deck, rigid double decker, rigid small truck, rigid 18 tonnes truck, rigid 7.5 tonnes truck, 3.5 tonnes luton body and panel van LWB/HR.

Note 2: Total estimated footprint does not reflect that other activities on site will be discontinued so the gross site figures will be lower.

10.4.2.6 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 site, the main potential risks of flooding, wind, rain and weather events are reduced.

Regarding the flood risk of the Proposed Development, areas within Greenogue Business Park have a history of and are susceptible to flooding (OPW (Office of Public Works), 2022), however, the Enva facility is not situated in a location subject to flooding. A flood risk assessment of the Proposed Development is presented in **Chapter 15 - Water** and confirms the low vulnerability of the Proposed Development.

10.4.3 Decommissioning Phase

Decommissioning of the facility following closure is expected to take approximately 8 weeks. It will include:

- Either the processing of any remaining untreated wastes onsite or the transfer of such wastes to other facilities for processing.
- Removal of all treated HRW and waste containers.
- The dismantling, disinfection, and removal of the treatment plant.
- Decontamination of the building if required.

Because of the light industrial nature of the Proposed Development, extensive or long-term aftercare is not expected to be required to allow the future reuse of the facility for other industrial or commercial activities.

The activities associated with decommissioning of this infrastructure would result in potential impacts on air quality and climate similar in nature to those outlined for the construction phase but on a much smaller scale.

10.5 Cumulative Impact Assessment

A cumulative impact assessment (CIA) has been undertaken for Air Quality and Climate in **Chapter 20 - Cumulative Effects** to consider the potential for cumulative impacts of the Proposed Development with other approved projects.

10.6 Interactions

The interaction of water effects with other disciplines are given in **Chapter 19 - Interactions between Environmental Factors**.

10.7 Mitigation Measures

10.7.1 Construction Phase

10.7.1.1 Construction Dust

The dust mitigation measures will be based upon the industry guidelines in the Building Research Establishment document entitled *Control of Dust from Construction and Demolition Activities (2003)*. The potential for dust to be emitted depends on the type of construction 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.

The following mitigation is proposed both for wider mitigation and to mitigate the potential for adverse impact for the three properties to the southwest of the site:

- Any temporary site compound will be located at a distance greater than 100 m from the three properties at the southwest of the site.
- Similarly, no stockpiling or material storage maybe undertaken within 100 m from the three properties at the southwest of the site (with the exception of the construction of the landscaping berms).
- Site roads shall be regularly cleaned and maintained as appropriate. Any constructed hard surface roads shall be swept to remove mud and aggregate materials from their surface while any un-surfaced roads shall 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).

- All Heavy Goods Vehicles (HGVs) and other site vehicles exiting the site will be managed to ensure that mud and other wastes are not tracked onto the roads.
- Public roads outside the site shall be regularly inspected for cleanliness, and cleaned as necessary.
- Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind.
  - The number of handling operations will be kept to a minimum by ensuring dusty material isn't moved or handled unnecessarily.
  - Fencing will be erected in areas anticipated to generate dust. Fencing around stockpiles should be approximately the same size as the stockpile being protected.
- Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods.
- All movements of potentially dusty material to and from the site will be dampened or covered, as appropriate, to mitigate the potential for fugitive dusts along the haul route.
- 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 on to the public road.

In the event that the mitigation measures as outlined are implemented in the construction phase as set out in the application documentation, the levels of dust generated are assessed to be **minimal and are unlikely to cause an environmental nuisance.**

10.7.1.2 Construction 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 following additional mitigation is proposed in relation to construction traffic management for the Proposed Development:

- Implementation of a Traffic Management Plan which will be prepared in advance of the works and will outline measures to minimise congestion and queuing, reduce distances of deliveries and eliminate unnecessary loads.
- The use of a designated delivery route for all materials to/from the site via the N7 and R120.
- Drivers will be required that all vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.

10.7.1.3 Construction Greenhouse Gases

Mitigation measures to minimise and CO_2 emissions from the Proposed Development operations include the following:

- Consultation with a wider variety of internal and external stakeholders to ensure all relevant information is included in the development of the plans.
- Turning off vehicular engines (and mobile plant) 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 plant will perform the most efficiently.
- 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 the construction phase.

- An Energy Management system will be implemented for the duration of the works. This will include the following measures: – 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 the construction compound fitted with suitable vents.
  - The use of low energy equipment and 'power saving' functions on all personal computers (PCs) and monitors in the site offices.
  - The use of low flow showers and tap fittings.

10.7.2 Operational Phase

10.7.2.1 Traffic

As outlined for the construction phase, mitigation for road traffic emissions are largely EU driven policy and legislation with limited scope on a project specific basis. However, to manage the potential impact of road traffic emissions from material transport the following mitigation is applied:

- The use of a designated delivery route for all materials to/from the site via the N7 and R120.
- Drivers will be required that all vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.

10.7.2.2 Bio-aerosols

To manage potential risk of microbial exposure due to bio-aerosols arising from the management of HRW, air will be drawn into the bin emptying/shredder hopper area and will move around the waste via negative air pressure extraction hoods.

This air will be routed through high-efficiency particulate absorbing (HEPA) filters. These HEPA filters will capture and remove airborne pathogens prior to being released to the atmosphere. HEPA filters are designed to trap and retain extremely small particles, including bio-aerosols, prior to appropriate discharge. The filters will be changed at appropriate intervals and dispatched to an appropriately licenced incinerator. The dense pleated layers in the filter can achieve a 99.97% efficiency in trapping particles as small as 0.3 µm.

The air is then directed through condensers to remove moisture before being passed through activated carbon filters before it is released to the atmosphere through a stack. Stringent air emissions limits will be enforced by the EPA. Independent monitoring will be conducted at pre-determined intervals.

10.7.2.3 Odour

Formal odour monitoring is not currently required as part of the current licence. At present odour management is based on good lines of communication to and from the facility. Enva regularly communicate and interact with industrial neighbours to ensure current works are not causing any concern.

The facility will continue to be licenced by the EPA and is required to comply with the management, mitigation and monitoring regimes set out in AG9. In particular, AG9 requires the development of an Odour Management Plan (OMP) to prevent, address and control odour at a facility and this OMP will be prepared for the facility as a requirement of the IED Licence. In addition, the following AG9 specific mitigation has been applied to the Proposed Development to mitigate odour impact:

- Truck deliveries of any all waste will be in enclosed refuse vehicles.
- The facility will operate a 'just in time' escalated management approach for odorous waste material and processing will be undertaken as soon as feasible under elevated odour management systems. Items will be bulked up and sent off site once feasible.
- The OMP will outline a preventative maintenance schedule for the facility including preparing relevant standard operating procedures for key odour control equipment and activities (such as the condenser and carbon filtration).

- Good housekeeping of all outdoor areas will be implemented.
- All spills, overflows and leaks will be cleaned up promptly with all operators aware and trained in the relevant standard operating procedures for this procedure.
- The design of the extraction of air through a negative pressure system to a point source will reduce fugitive emissions associated with passive sources such as general ventilation exhausts, louvers, windows or doors.

In addition, under the Commission Implementing Decision (EU) 2018/1147 of 10th August 2018 establishing BAT conclusions for waste treatment, there are a series of best practice requirements that must also be implemented and imposed in the licence from the EPA. A number of these relate to odour and these are listed as follows:

- BAT 10. BAT is to periodically monitor odour emissions and odour emissions can be monitored using:
  - EN standards (e.g. dynamic olfactometry according to EN 13725 in order to determine the odour concentration or EN 16841-1 or -2 in order to determine the odour exposure).
  - When applying alternative methods for which no EN standards are available (e.g. estimation of odour impact), International Organisation of Standardisation (ISO), national or other international standards that ensure the provision of data of an equivalent scientific quality.
- BAT 12. In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an OMP, as part of the environmental management system, that includes all of the following elements: – A protocol containing actions and timelines.
  - A protocol containing actions and timelines.
  - A protocol for conducting odour monitoring as set out in BAT 10.
  - A protocol for response to identified odour incidents, e.g. complaints.
  - An odour prevention and reduction programme designed to identify the source(s); to characterise the contributions of the sources; and to implement prevention and/or reduction measures.
- BAT 13. In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given below:
  - Minimise the residence time of (potentially) odorous waste in storage or in handling systems, in particular under anaerobic conditions.
  - Using chemicals to destroy or to reduce the formation of odorous compounds (e.g. to oxidise or to precipitate hydrogen sulphide).
- BAT 14. In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below:
  - Storing, treating and handling waste and material that may generate diffuse emissions in enclosed buildings and/or enclosed equipment (e.g. conveyor belts).
  - Maintaining the enclosed equipment or buildings under an adequate pressure.
  - Collecting and directing the emissions to an appropriate abatement system via an air extraction system and/or air suction systems close to the emission sources.
- BAT 31. In order to reduce emissions to air of organic compounds, BAT is to apply BAT 14d and to use one or a combination of the techniques given below:
  - Absorption
  - Biofilter
  - Thermal oxidation
  - Wet scrubbing

In addition to the above requirements, the measures outlined in **Section 10.7.2.2** will also help to mitigate the potential for the impact of odour.

10.7.2.4 Greenhouse Gases

The projected carbon footprint of the operation shows that the plant and equipment used to treat HRW, and bins are the key source of operational GHG emissions at the facility. Under the terms of the IED licence, ongoing energy efficiency assessments are required to establish options and opportunities to improve the efficiency of the plant. With these EPA driven improvements in efficiency at the site there is potential for some further reductions in energy use on site.

Enva have been granted planning permission for solar panels at Enva Building 2 which is adjacent to the Proposed Development on Building 1. The large surface area of the roof provides an opportunity to help reduce the electricity demand during the operational phase. Due to the continuous 24-hour operation of the Proposed Development, the site is very suitable for solar panels, as it can fully utilise the energy generated.

Enva has set environmental goals which it aims to achieve by the end of 2023. These goals will help to reduce environmental pollution and their impact on the environment. The environmental goals set out by Enva are outlined in **Chapter 17 - Material Assets**.

Further measures to minimise CO_2 emissions from the Proposed Development during the operational phase include the following:

- 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 the construction compound 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 showers and tap fittings.

10.7.3 Decommissioning Phase

Due to the light industrial nature of the Proposed Development, extensive or long-term aftercare is not expected to be required to allow the future reuse of the facility for other industrial or commercial activities.

The activities associated with decommissioning of this infrastructure would result in potential impacts on air quality and climate similar in nature to those outlined for the construction phase but on a much smaller scale. Mitigation measure outlined for the construction phase will be undertaken during the decommissioning phase to minimise any potential adverse effects to air quality and climate.

10.8 Residual Impact

Residual impacts are assessed for the construction, operational and decommissioning phases of the Proposed Development.

10.8.1 Construction Phase

Implementation of the mitigation measures outlined in **Section 10.7.1**, alongside monthly dust monitoring (**Section 10.9.1**) the residual impact to the properties within 100 m of the Proposed Development is predicted to be ‘**not significant**’.

The resultant impact to air quality from the construction traffic on the proposed haul routes is predicted to be ‘**not significant**’.

The total estimated GHG emissions associated with the proposed construction of the development is calculated at 49 tonnes of CO_2eq. The construction of the Proposed Development is predicted to have a ‘**slight adverse**’ effect.

10.8.2 Operational Phase

The results of the analysis of the predicted changes in road traffic patterns as a result of the Proposed Development indicates that all levels of pollutants are predicted to remain within the limits for the protection of human health at residential areas along transport routes. While the levels remain below the relevant limits these increases and air quality impact from this traffic are classed as negligible. The impact on air quality from predicted changes in road traffic patterns is considered '**not significant**'.

The results indicate that the ambient GLCs are below the relevant air quality guidelines for individual VOCs even when it is assumed that each emission point is emitting solely the VOC of concern at a maximum emission concentration for the full year. Under proposed operation, emissions from the proposed VOC emission points onsite lead to ambient individual VOC concentrations which are no more than 4% of the maximum 1-hour limit value at the worst-case receptor and no more than 1% of the annual mean limit value at the worst-case off-site location.

In relation to odour, all ambient concentrations are below the odour nuisance thresholds for each individual VOC under proposed operating conditions. Emissions from the facility lead to a predicted odour concentration which is at most 6.6% of the odour guideline value at the worst-case sensitive receptor for the worst-case year modelled.

In summary, all emissions from the facility under proposed operation of the facility will be in compliance with the ambient air quality standards and will not lead to a substantive risk of odour nuisance.

The results of the assessment indicate that the total annual greenhouse gas emissions from the operational phase will equate to approximately 7,350.5 tonnes of CO_2 per annum. The residual impacts are considered to be '**Slight Adverse**'.

10.8.3 Decommissioning Phase

The activities associated with decommissioning of this infrastructure may result in potential impacts to air quality and climate similar in nature to those outlined for the construction phase but on a much smaller scale. Mitigation measure as detailed for the construction phase will be implemented during the decommissioning phase to minimise any potential adverse effects to air quality and climate. As a result, the residual impact on air quality and climate are considered to be **not significant**'.

10.9 Monitoring

10.9.1 Construction Phase

Monthly monitoring of dust deposition levels shall be undertaken for the duration of construction for comparison with the guideline of 350 mg/ m^2/day (for non-hazardous dusts). This monitoring should be carried out at a minimum of four locations at sensitive receptors around the proposed works.

Where dust levels are measured to be above this guideline of 350 mg/ m^2/day, the mitigation measures in the area must be reviewed and improved to ensure that dust deposition is reduced to below 350 mg/ m^2/day. Should high dust levels continue to occur following these improvements, the contractor shall provide alternative mitigation measures and/or will modify the construction works taking place.

10.9.2 Operational Phase

Under the requirements of the IED Licence from the EPA, the following monitoring will be required for the Proposed Development during the operational phase:

- Periodic monitoring of odour from the emission stacks to ensure that the emissions comply with the levels presented within this EIAR.
- Periodic monitoring of volume flow and any other characteristics from the emission stacks.

All monitoring must be undertaken by a suitably accredited monitoring team (to ISO 17025) and must be undertaken in line with the EPA *Air Emissions Monitoring Guidance Note (AG2)*. All monitoring data must be collated and reported to the EPA for publication on the EPA website.

In addition, the EPA *Guidance Odour Impact Assessment Guidance Note for EPA Licensed Sites* (AG5) offers a consistent and systematic approach to the assessment of odours on and in the local area of facilities and installations that are licensed by the EPA. This approach will be used to periodically assess the facility's compliance with odour related license conditions and/or to investigate odour complaints received.

10.9.3 Decommissioning Phase

The activities associated with decommissioning of this infrastructure would result in potential impacts on air quality and climate similar in nature to those outlined for the construction phase but on a much smaller scale. Monitoring undertaken for the construction phase will be carried out during the decommissioning phase.

10.10 Schedule of Environmental Commitments

A summary of the environmental commitments, with regard to this chapter is set out at **Chapter 21 - Schedule of Environmental Commitments**.

10.11 Chapter References

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CHAPTER 11
HUMAN HEALTH

Contents

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11 HUMAN HEALTH

11.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) addresses the potential human health impacts relating to the construction, operation and decommissioning of Enva Health Risk Waste facility referred to hereafter as the Proposed Development.

The chapter reports on how the potential risks to human health have been assessed and mitigated. This includes issues relating to infection risk, as well as conventional environmental exposures. Regard has been given to both the actual risks to physical health, and to how community concern may affect mental health. The chapter explains how appropriate health protection measures are adopted to safeguard public health.

Human Health in Environmental Impact Assessment (EIA) takes a public health approach, meaning it reaches conclusions on the health outcomes to defined populations, rather than the health outcomes of individuals (Pyper, Lamming, et al., 2022; Pyper, Waples, et al., 2022).

The Proposed Development would manage wastes from human or animal health care and/ or related research, termed health risk waste (HRW). Wastes would either be disinfected with steam treatment, then moved offsite; or certain pre-packaged HRW would be temporality stored and then transferred offsite in batches. Further details of the types of waste, the processes and the facility infrastructure are set out in **Chapter 4 - Description of the Proposed Development.**

The context of HRW is explained by the Environmental Protection Agency, EPA, (National Hazardous Waste Management Plan 2021 - 2027, 2021):

- "*Hazardous waste is generated by all sectors of Irish society, from large industry, healthcare, to small businesses, households and farms. It is for the most part managed by a professional hazardous waste industry and is treated appropriately and in accordance with legal requirements*".
- "*Hazardous wastes are controlled by strict regulations to protect against the threat to people and the environment. The legislation principally originates in EU directives and regulations and is implemented in Ireland by the Waste Management Act 1996 as amended, related statutory instruments and other acts*."

The Proposed Development represents a key opportunity for improving HRW management for the people of South Dublin (the administrative area of South Dublin County Council) and other communities in the Republic of Ireland. This aligns with the Healthy Ireland policy position to improve people's health and wellbeing (Department of Health, 2019). It also aligns with the National Planning Framework (NPF) Section 6.2 on healthy communities and Section 9.4 on creating a clean environment for a healthy society (Government of Ireland, 2018a) The NPF states:

Section 6.2 on Healthy communities explains: *"Our health and our environment are inextricably linked. Specific health risks that can be influenced by spatial planning include heart disease, respiratory disease, mental health, obesity and injuries. By taking a whole-system approach to addressing the many factors that impact on health and wellbeing and which contribute to health inequalities, and by empowering and enabling individuals and communities to make healthier choices, it will be possible to improve health outcomes, particularly for the next generation of citizens.*"

National Policy Objective 56 of the NPF 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*."

National Strategic Outcome 9 of the NPF includes: "*Development of necessary and appropriate hazardous waste management facilities to avoid the need for treatment elsewhere …[and] Adequate capacity and systems to manage waste… to mitigate appropriately the risk to environmental and human health*".

The Proposed Development supports public health in the Republic of Ireland through improving infrastructure capacity for safe management and treatment of HRW.

The chapter follows guidance and good practice, giving the public health perspective of impacts. In so doing, the chapter:

- Takes a population health approach to assessing physical and mental health outcomes.
- Considers the wider determinants of health, that may be significantly affected directly or indirectly.

- Assesses the potential for health inequalities to vulnerable groups.
- Considers opportunities to improve the Proposed Development to further benefit population health.

The potential for the Proposed Development to change population health outcomes may arise from various health pathways. The effects on physical and mental health link to impacts discussed throughout this EIAR. In particular, the health assessment draws inputs from the following chapters:

- **Chapter 4 - Description of the Proposed Development**
- **Chapter 7 - Traffic and Transport**
- **Chapter 8 - Population**
- **Chapter 9 - Noise and Vibration**
- **Chapter 10 - Air Quality and Climate**
- **Chapter 15 - Water**

The health assessment takes as its input the residual effect conclusions of the EIA Technical Chapters listed above. In this regard the health assessment relies on the mitigation measures set out in those chapters and does not repeat them. This avoids duplication and keeps the assessment proportionate.

11.2 Methodology

11.2.1 Legislation and Guidance

11.2.1.1 Legislation

The following legislation is relevant to the assessment of the effects on human health (**Table 11.1**).

Table 11.1: Health Legislation

Legislation	Description
The Safety, Health and Welfare at Work etc Act 2005 (as amended) (Government of Ireland, 2005)	Sets out general duties on employers, including ensuring, so far as is reasonably practicable, that employees (and individuals at the place of work who are not employees) are not exposed to risks to their safety, health or welfare.
The Environmental Protection Agency (EPA) Act 1992 (as amended) (Government of Ireland, 1992)	Governs environmental exposures, including provisions in relation to nuisance.
The Air Quality Standards Regulations 2011 (Government of Ireland, 2011)	Sets the regulatory thresholds for air quality. These are the standards considered acceptable in terms of public health protection in the Republic of Ireland.
Environmental Noise Regulations 2018 (as amended) (Government of Ireland, 2018b)	Sets a common approach to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to exposure to environmental noise.
Local Government (Water Pollution) Acts 1977 to 1990, as amended	Sets the framework for controlling water pollution in the Republic of Ireland.

11.2.1.2 Guidance

The following guidelines have informed the baseline/ assessment (**Table 11.2**).

Table 11.2: Health Guidance

Guidance	Description
Institute of Environmental Management and Assessment (IEMA) 2022 guidance on health in EIA series, effective scoping (Pyper, Lamming, et al., 2022) and determining significance (Pyper, Waples, et al., 2022).	EIA practitioner guidance on assessing human health, applicable to Republic of Ireland and Northern Ireland. Guidance sets out principles and methods of assessment.
Environmental Protection Agency (EPA). Guidelines on the information to be contained in Environmental Impact Assessment Reports, 2022 (Environmental Protection Agency, 2022)	The EPA present a health protection position statement on the coverage of health in EIA. The wider public health remit is covered by the IPH 2021 and IEMA 2022 guidance.
Institute of Public Health (IPH), Guidance, Standalone Health Impact Assessment (HIA) and health in environmental assessment, 2021 (Pyper et al., 2021)	This Republic of Ireland and Northern Ireland guidance sets current good practice for the assessment of human health in EIA, including assessment methods. This updates the 2009 guidance from the IPH.
International Association for Impact Assessment (IAIA) and European Public Health Association (EUPHA). A reference paper on addressing Human Health in EIA (Cave et al., 2020), and academic discussion of the same (Cave et al., 2021)	This international consensus piece informed the IPH 2021 guidance. The publication explains EIA for public health stakeholders and sets out transparent assessment approaches adopted by the IPH.
IAIA. HIA International Best Practice Principles, 2021 (Winkler, M et al., 2021).	Confirms the relationship between HIA and EIA. Confirms the application of HIA principles when undertaking health in EIA.

In addition, regard has been given to World Health Organization (WHO) advisory guidelines, e.g. (WHO, 2021) and (WHO, 2018) as appropriate. The application of such guidelines for health in EIA is described by (Pyper, Waples, et al., 2022) (Pyper et al., 2021) (Cave et al., 2021).

11.2.2 Zone of Influence

The following Study Areas are used in the assessment:

- The 'site specific' area is Newcastle Electoral Division (ED) where the Proposed Development is located.
- The local area is South Dublin (the administrative area of South Dublin County Council).
- The regional area is Dublin.
- The national area is the Republic of Ireland.

As Study Areas do not necessarily define the boundaries of potential health effects, particularly mental health effects, the health chapter uses Study Areas to broadly define representative population groups, including in relation to sensitivity rather than to set boundaries on the extent of potential effects.

The health assessment has regard to the zones of influence (ZoI) defined by other EIAR chapters that are interrelated technical disciplines for the health assessment. Those chapters provide data inputs to the health assessment. Those ZoIs are relevant and inform the health chapter's consideration of effect magnitude.

11.2.3 Sources of Information to Inform the Assessment

Data from the inter-related technical disciplines have been used to inform the health assessment. This data informs the health assessment by identifying potential receptors and community assets for these disciplines, such as schools, residential properties, walking and cycling routes, as well as tourism and recreational amenities. No separate health specific data collection surveys have been undertaken. The health analysis is informed by scheme-wide consultation.

The following data sources have informed the health baseline assessment:

- Central Statistics Office (CSO) Small Area Population Statistics (SAPS) Interactive Mapping Tool (Central Statistics Office, 2016).
- CSO StatBank (Central Statistics Office, 2020).

- Pobal HP Deprivation Index (Pobal, 2023).
- Google Earth Pro 2021 aerial and street level photograph.

11.2.4 Scope of the Assessment

A proportionate and evidence-based approach to the EIA health chapter scoping has been undertaken. Scoping has followed the IEMA 2022 list of determinants of health and population groups (Pyper, Lamming, et al., 2022). The following issues are assessed in **Section 11.4**:

- Air quality
- Water quality or availability
- Noise and vibration
- Transport modes, access and connections

Effects which are not considered to have the potential for 'likely significant population health effects' have been scoped out of the assessment. This is in line with a proportionate assessment as set out in guidance (Pyper, Lamming, et al., 2022). A summary of the effects scoped out is presented in **Table 11.3.**

Table 11.3: Impacts Scoped Out of the Human Health Assessment

Wider Determinants of Health	Justification (including Consideration of Embedded Mitigation Measures)
Health Related Behaviours	
Risk taking behaviour	**Construction, operation and decommissioning:** Issues of community health behaviours being detrimentally affected by the presence of the construction, operational and decommissioning workforces are scoped out. It is assumed that the majority of the workforce lives in the local/regional area, and interactions with the public would be minimal. The workforce is unlikely to be sufficiently large in number to affect local markets, e.g., for alcohol, cigarettes or gambling, to an extent which could significantly affect community health. Healthy workforce behaviour would be encouraged through Enva's Environment, Health Safety (EHS) management systems with reference to the Health and Safety Act of Ireland, 2021. There is not considered to be the potential for a likely significant population health effect associated with risk taking behaviour by the workforces; **this** issue is scoped out.
Diet and nutrition	**Construction, operation and decommissioning:** The Proposed Development is neither expected to require agricultural land take, nor disrupt food related production or transport. The changes are not considered likely to affect availability or price of food to a degree that could affect population health.
Physical activity	**Construction, operation and decommissioning:** While during construction there may be temporary disruptions to walking and cycling paths and active travel routes within the business park, there is not considered to be the potential for a significant population health effect associated with active travel. This issue is therefore scoped out. During operation, perceived risks from the HRW facility may affect the use of play facilities in the locality, with resulting health effects. To avoid duplication, any community concern on this issue is addressed under the Air Quality section in relation to understanding of risk.
Open space, leisure and play	**Construction, operation and decommissioning:** No disruption of open space, leisure or play facilities is expected during construction. During operation, no actual significant risks to population health are expected that would influence use of open space, leisure or play facilities. The potential for community concerns about the HRW facility to affect the use of play facilities in the locality is noted. To avoid duplication, any community concern on this issue is addressed under the Air Quality section in relation to understanding of risk.

Wider Determinants of Health	Justification (including Consideration of Embedded Mitigation Measures)
Social Environment	
Housing	**Construction, operation and decommissioning:** Housing related issues are scoped out. No new housing is proposed. The construction, operational and decommissioning workforces would have housing requirements, but it is expected that a high proportion would be resident in the local/regional area. The Proposed Development is not anticipated to change full-time-equivalent jobs. Any shift in accommodation requirements would be met through usual capacity within the region.
Transport modes, access and connections	**Operation and maintenance:** Risk associated with the transport of HRW on public roads to the facility is scoped out on the basis that transportation would comply with all the requirements of the regulations relating to hazardous material being transported. The main regulations include The Carriage of Dangerous Good by Road Act 1998 (no. 43 of 1988); The Carriage of Dangerous Good by Road Regulations, 2007 (S.I. No. 288/289 of 2007); S.I. No. 147 of 1998 – Waste Management (Movement of Hazardous Waste) Regulations, 1998; The Waste Management (Collection Permit) Regulations, 2007 (S.I. No. 820 of 2007). Rules aimed at improving safety in the transportation of all types of dangerous goods have been agreed internationally for different modes of transport. Carriage of Dangerous Goods by Road Regulations and other similar international rules regarding the transfer of dangerous goods by other modes of transport follow UN (United Nations) modal regulations and EU directives. These have adopted largely similar rules built on a dangerous goods classification system which is based on 9 different classes of dangerous substances, some of which occur in healthcare waste.
Relocation	**Construction, operation and decommissioning:** Construction, decommissioning and operational activities would not involve compulsory land purchases of homes or community facilities. This issue is scoped out.
Community safety	**Construction, operation and decommissioning:** The project workforce requires skilled technical roles. There are not anticipated to be community safety or security issues associated with worker behaviour. The Proposed Development and its contractors would operate appropriate safeguarding and modern slavery policies. Issues to do with community safety relating to air and water quality are discussed under their respective sections in **Section 11.4**. The potential for widespread actual or perceived crime that could affect population health is unlikely. This issue is scoped out. The risk to the public from accidental injury, e.g., falls, is scoped out.
Social participation, interaction and support	**Construction, operation and decommissioning:** The Proposed Development will not directly affect land used for community interaction (e.g. meeting places, village greens, community centres, etc. that promote community voluntary, social, cultural or spiritual participation). This issue is scoped out. Any indirect impacts on access to such spaces is addressed under the “Transport modes, access and connection” health determinant in **Section 11.4**.
Community identity, culture, resilience, and influence	**Construction, operation and decommissioning:** The extent to which the Proposed Development could affect community identity is limited as the HRW facility is currently a hazardous waste management facility in an area of commercial uses, which is not in proximity to residential areas. This issue is therefore scoped out.
Economic Environment	
Education and training	**Construction, operation and decommissioning:** A large influx for workers, including those bringing families, is not expected, so changes to educational capacity or quality are unlikely and are scoped out. Whilst the Proposed Development could support upskilling and career development in relation to its workforces, this is not on a scale with the potential for significant population level health effects. This issue is therefore scoped out.

Wider Determinants of Health	Justification (including Consideration of Embedded Mitigation Measures)
Employment and income	**Construction, operation and decommissioning:** Whilst the Proposed Development provides opportunities for temporary construction employment, these are not on a scale with the potential for significant population level health effects. Consideration has been given to the potential population health effects (direct and indirect) of employment, including opportunities to enhance benefits for local and vulnerable groups. This issue is therefore scoped out. The Proposed Development would operate appropriate employment equality policies but is not expected to influence how employment affects family structures and relationships in local populations. Occupational working conditions include particular risks, which are appropriately managed through health and safety policies and practices including Enva's EHS management systems and the Health and Safety Act of Ireland, 2021. All personnel involved in operations would undergo the required training on safety and health including the associated license conditions; Enva's EHS management systems; manual handling; emergency drills and spill control; fire safety and evacuations; biological and chemical hazards; safety data sheets; first aid at appropriate levels; vaccinations; needle stick first aid; regulations for classification, labelling and packaging of substances and mixtures (CLP) and agreement concerning the international carriage of dangerous goods by road (ADR) at appropriate levels; PPE; and slips, trips and falls. The site is also licenced under the EPA IED license which requires environmental microbiological monitoring to be conducted at regular intervals. The environmental microbiological monitoring is anticipated to ensure the ongoing safety of employees as well. These issues are therefore scoped out. The Proposed Development will displace the existing contaminated soil management facility and the packaged hazardous chemicals transfer facility at the site. However, these facilities and their workforces are relocated to other offsite facilities operated by Enva. Any potential unemployment or adverse economic implications of displacement are therefore scoped out.
Bio-physical Environment	
Climate change and adaptation	**Construction, operation and decommissioning:** Embodied carbon and climate altering pollutant emissions during construction, operation and decommissioning are not of a scale to have the potential for population level effects associated with climate change. This issue is scoped out.
Water quality or availability	**Construction and decommissioning:** As detailed in **Chapter 15 – Water**, the Proposed Development would ensure that there is no significant impact on nearby sensitive receptors. Pollution risk issues are therefore scoped out on the basis of the anticipated effectiveness of measures detailed in **Chapter 15 – Water**. Effects to public drinking water infrastructure are scoped out on the basis that disruption of the existing water utilities network would be avoided.
Land quality	**Construction, operation and decommissioning:** The Proposed Development buildings are on a fully paved hardstanding site. Construction, decommissioning works, as well as materials handling and storage arrangements associated with the proposed changes is such as to ensure that the soil environment remains protected and in accordance with existing planning conditions. Occupational risk would be managed in line with health and safety legislation, including standard best practice protective equipment and management measures. Operational activities are not anticipated to result in public exposures to contaminated soils as no soil movement or disruption is anticipated and any pollution linkage pathways to soils are avoided by the building fabric. Linkages via air (dust) or water are discussed under those topics in **Section 11.4**, including that regulated management procedures are expected to keep all exposures within levels set for public protection. On this basis, land pollution risk issues are scoped out.
Radiation	**Construction, operation and decommissioning:** Non-ionising electro-magnetic field (EMF) effects are scoped out on the basis that the Proposed Development does not include major electrical infrastructure such as powerlines and substations and would not generate electrical energy for re-use. Public understanding of risk in relation to operational EMF is also scoped out on this basis. Ionising radiation sources or waste are not part of the current scope of the Proposed Development and have not been assessed here. This issue is therefore scoped out.

Wider Determinants of Health	Justification (including Consideration of Embedded Mitigation Measures)
Institutional and Built Environment	
Health and social care services	**Construction, operation and decommissioning:** Effects on health and social care are scoped out. The project workforce are assumed to be residents of the local and regional area, who would access healthcare under their existing entitlements (e.g. medical card) or payment schemes. Occupational health and safety risks (such as risk of infection) is mitigated through the adherence to HRW management guidelines and the use of appropriate PPE. The Proposed Development would operate appropriate occupational health services. It is not expected that a high proportion of workers would move to the area with dependants requiring social care. Health protection measures such as screening and immunisations are expected to continue from the workers' usual place of residence. Similarly routine dental appointments are assumed to be with the worker's dental practice close to their usual place of residence. Other health services are not expected to be affected as largescale in-migration is not anticipated. The risk of zoonotic infection is noted reflecting that the facility would handle both medical and veterinary waste. As noted in the literature, the key to minimisation of risk and effective management of HRW is segregation and identification of waste mainly through colour coding (Dr. Meghala, 2013). This is being achieved by hospitals through employment of Infection Control Nurses whose role is to educate staff in the classification, segregation, and packaging of health risk waste with adherence to the appropriate packaging and storage guidelines of health risk waste. Segregation posters are displayed prominently throughout healthcare facilities and refresher training is part of staff's ongoing training. Appropriate levels of treatment of waste through disinfection by steam are also employed following the CDC Guidelines for Disinfection and Sterilisation in Healthcare Facilities giving careful attention to temperature and time as two factors that ensure effectiveness of treatment. This issue is therefore scoped out. The issue of communicable illness, including in relation to COVID-19 is noted but scoped out. The Proposed Development would operate appropriate measures to safeguard the project workforce in line with Government guidance of the day.
Built environment	**Construction, operation and decommissioning:** All construction and demolition works are anticipated to be internal, therefore no disruption to utilities (including existing power or communication cables) is anticipated. The HRW facility is located in a business centre, 300 m away from residential areas and surrounded by other commercial businesses providing a sufficient and appropriate buffer to residential areas. The Proposed Development also provides safe waste management practices to avoid nuisance or hazards. Public health implications are not anticipated and are therefore scoped out.
Wider societal infrastructure and resources	**Construction, operation and decommissioning:** The Proposed Development facilitates the safe and efficient treatment and transfer of HRW, but in itself would not generate further public health or social benefits through wider infrastructure that warrants assessment. This issue is scoped out.

11.2.5 Assessment Criteria and Significance

11.2.5.1 General Approach

This section sets out the methods for assessment of any likely significant population health effects of the Proposed Development. The methodology outlined in this section follows the IEMA 2022 and IPH 2021 guidance, which sets out best practice for the consideration of health in EIA. The IPH guidance was informed by the international consensus publication between impact assessment and public health practitioners, the IAIA/EUPHA Reference Paper 2020.

The generic scheme-wide approach to the assessment methodology is set out in **Chapter 1 - Introduction** of the EIAR. This section sets how the generic approach is refined to address the specific needs of the EIA health assessment. Namely criteria for sensitivity, magnitude and significance that inform a professional judgment and reasoned conclusion as to the public health implications of the Proposed Development.

Regard has been had to the EPA (2022) *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports*. The guidelines provide generic definitions for significance, but also notes that when more specific definitions exist within a specialised factor or topic, these should be used in preference to the generalised definitions. In the case of Human Health, specific definitions are set out by IPH (2021) and IEMA 2022 guidance (Pyper, Lamming, et al., 2022; Pyper, Waples, et al., 2022). This assessment follows the definitions and approach set out in these guidance documents relevant to determining health sensitivity, health magnitude and health significance in an EIA context.

Where significant adverse population health effects are identified, including for vulnerable groups, then mitigation has been proposed to avoid or reduce the effects. Mitigation is secured as part of the Proposed Development design or development consent. In line with good practice the Proposed Development takes a proportionate approach to identifying opportunities to enhance beneficial population health effects, including for vulnerable groups.

Cumulative effects are considered, including inter-related effects of the Proposed Development. This analysis considers how the same geographic or vulnerable group populations may be affected by more than one change in relevant health determinants, for example the combined effects of changes in air quality and noise on population health outcomes.

Where proportionate, the need for monitoring has been considered, including relevant governance.

11.2.5.2 Determinants of Health, Risk Factors and Health Outcomes

The chapter uses the World Health Organization (WHO) definition of health, which states that health is a "*state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity*"(World Health Organization, 1948) (World Health Organization, 1948).

The chapter also uses the WHO definition for mental health, which is a "*state in which every individual realises his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to her or his community*" (World Health Organization, 2022).

Health and wellbeing are influenced by a range of factors, termed the 'wider determinants of health'. Determinants of health span environmental, social, behavioural, economic and institutional factors. Determinants therefore reflect a mix of influences from society and environment on population and individual health.

Impacts of the Proposed Development that result in a change in determinants have the potential to cause beneficial or adverse effects on health, either directly or indirectly. The degree to which these determinants influence health varies, given the degree of personal choice, location, mobility and exposure.

A change in a determinant of health does not equate directly to a change in population health. Rather the change in a determinant alters risk factors for certain health outcomes. The assessment considers the degree and distribution of change in these pathways. The analysis of health pathways focuses on the risk factors and health outcomes that are most relevant to the determinants of health affected by the Proposed Development. As there are both complex and wide-ranging links between determinants of health, risk factors and health outcomes, it would not be proportionate or informative for an assessment to consider every interaction.

Typically, the change in a risk factor may need to be large, sustained and widespread within a population for there to be a significant influence on public health outcomes.

11.2.5.3 Population Health Approach and Vulnerable Groups

In line with IEMA 2022 guidance, a population health approach has been taken, informed by discussion of receptors within the other technical chapters of the EIAR.

For each determinant of health, the human health chapter identifies relevant inequalities through consideration of the differential effect to the 'general population' of the relevant Study Area and effects to the 'vulnerable population group' of that Study Area. The vulnerable population group being comprised of relevant sensitivities for that determinant of health. The following population groups have been considered:

- The 'general population' including residents, visitors, workers, service providers, and service users; and
- The 'vulnerable group population'.

The methods draw on the list of vulnerable population groups set out in IEMA 2022, Table 9.2 and IPH Part 3, Table 09. The following six broad population groups are used to inform a consistent narrative on potential health inequalities across the assessment. People falling into more than one group may be especially sensitive:

- **Young age:** Children and young people (including pregnant women and unborn children).
- **Old age:** Older people (particularly frail elderly).
- **Low income:** People on low income, who are economically inactive or unemployed/workless.
- **Poor health:** People with existing poor health; those with existing long-term physical or mental health conditions or disability that substantially affects their ability to carry out normal day-to-day activities.
- **Social disadvantage:** People who suffer discrimination or other social disadvantage, including relevant protected characteristics under the Irish Human Rights and Equality Commission Act 2014[1] or groups who may experience low social status or social isolation for other reasons.
- **Access and geographical factors:** People experiencing barriers in access to services, amenities and facilities and people living in areas known to exhibit high deprivation or poor economic and/or health indicators.

The following general characterisations of how the 'general population' may differ from 'vulnerable group populations' were considered when scoring sensitivity. These statements are not duplicated in each assessment and apply (as relevant) to the issues discussed for both construction and operation.

- In terms of life stage, the general population can be characterised as including a high proportion of people who are independent, as well as those who are providing some care. By contrast, the vulnerable group population can be characterised as including a high proportion of people who are providing a lot of care, as well as those who are dependant.
- The general population can be characterised as experiencing low deprivation. However, the professional judgment is that the vulnerable group population experiences high deprivation (including where this is due to pockets of higher deprivation within low deprivation areas).
- The general population can be characterised as broadly comprised of people with good health status. Vulnerable groups, however, tend to include those parts of the population reporting bad or very bad health status.
- The general population tends to include a large majority of people who characterise their day-to-day activities as not limited. The vulnerable group population tends to represent those who rate their day-to-day activities as limited a little or limited a lot.
- Based on a professional judgement the general population's resilience (capacity to adapt to change) can be characterised as high whilst the vulnerable group population can be characterised as having limited resilience.
- Regarding the usage of affected infrastructure or facilities, the professional judgement is that the general population are more likely to have many alternatives to resources shared with the Proposed Development (e.g., shared routes or community assets). For the vulnerable group population, the professional judgement is that they are more likely to have a reliance on shared resources.
- The general population includes the proportion of the community whose outlook on the Proposed Development includes support and ambivalence. The vulnerable group population includes the proportion of the community who are uncertain or concerned about the Proposed Development.

11.2.5.4 Temporal Scope

The temporal scope of the assessment is consistent with the period over which the Proposed Development will be carried out and therefore covers the construction and operational periods. It is anticipated that construction will take place over approximately 18 week period. The assessment does not place an end date on the operations of the Proposed Development.

[1] For example, disadvantage by reference to the following factors: gender; civil status; family status; sexual orientation; religious belief; age; disability; race, including colour, nationality, ethnic or national origin; or membership of the Traveller community.

The following temporal scope definitions set out in the EPA (2022) guidelines provide consistency of terminology:

- Momentary Effects are those lasting from seconds to minutes.
- Brief Effects are those lasting less than a day.
- Temporary Effects are those lasting less than a year.
- Short-term Effects are those lasting one to seven years.
- Medium-term Effects are those lasting seven to fifteen years.
- Long-term Effects are those lasting fifteen to sixty years.
- Permanent Effects are those lasting over sixty years.

11.2.5.5 Determining Effect Significance

The assessment of EIA health significance is an informed expert judgement about what is important, desirable or acceptable for public health with regards to changes triggered by the Proposed Development. These judgements are: value-dependant (underpinned by scientific data, but also informed by professional perspectives); and are context-dependent (judgements reflect relevant social, economic and political factors for the population) (European Commission et al., 2017).

The determination of significance has two stages:

- Firstly, the sensitivity of the receptor affected, and the magnitude of the effect upon it are characterised. This establishes whether there is a relevant population and a relevant change to consider; and
- Secondly, a professional judgement is made as to whether the expected change in a population's health outcomes would be significant in public health terms. This judgement is explained using an evidence-based narrative setting out reasoned conclusions.

Table 11.4, **Table 11.5** and **Table 11.7**, together summarise the assessment methodology that has been adopted. This approach shows how the general EIA methods of using sensitivity and magnitude to inform a judgement of significance, are applied for human health. The approach uses professional judgement, drawing on consistent and transparent criteria for sensitivity and magnitude. It also references relevant contextual evidence to explain what significance means for human health in public health terms.

The EIA human health assessment uses qualitative analysis following the IEMA 2022 guidance approach. This draws on qualitative and quantitative inputs from other EIAR topic chapters. This reflects the consensus position amongst public health and impact assessment practitioners that qualitative analysis is the most appropriate methodology for assessing wider determinants of health proportionately, consistently and transparently.

The EIA health chapter conclusions are both EIA scores, such as major, moderate, minor or negligible; and a narrative explaining this score with reference to evidence, local context and any inequalities.

Terms in bold in **Table 11.4**, **Table 11.5** and **Table 11.7** indicate terms that qualitatively describe levels within criteria that are discussed across the scoring options. For example, high, moderate, low or very low levels of deprivation. These are the terms from the guidance that are used within the assessment narrative. While a judgment is made based on most relevant criteria, it is likely in any given analysis that some criteria will span score categories.

Table 11.4: Health Sensitivity Methodology Criteria

Category/ Score	Indicative criteria
High	**High** levels of deprivation (including pockets of deprivation); reliance on resources shared (between the population and the project); existing wide inequalities between the most and least healthy; a community whose outlook is predominantly anxiety or concern; people who are prevented from undertaking daily activities; dependants; people with very poor health status; and/or people with a very low capacity to adapt.
Medium	**Moderate** levels of deprivation; few alternatives to shared resources; existing widening inequalities between the most and least healthy; a community whose outlook is predominantly uncertainty with some concern; people who are highly limited from undertaking daily activities; people providing or requiring a lot of care; people with poor health status; and/or people with a limited capacity to adapt.
Low	**Low** levels of deprivation; many alternatives to shared resources; existing narrowing inequalities between the most and least healthy; a community whose outlook is predominantly ambivalence with some concern; people who are slightly limited from undertaking daily activities; people providing or requiring some care; people with fair health status; and/or people with a high capacity to adapt.
Very low	**Very low** levels of deprivation; no shared resources; existing narrow inequalities between the most and least healthy; a community whose outlook is predominantly support with some concern; people who are not limited from undertaking daily activities; people who are independent (not a carer or dependant); people with good health status; and/or people with a very high capacity to adapt.

Table 11-5: Health Magnitude Methodology Criteria

Category/ Score	Indicative criteria
High	**High** exposure or scale; long-term duration; continuous frequency; severity predominantly related to mortality or changes in morbidity (physical or mental health) for very severe illness/injury outcomes; majority of population affected; permanent change; substantial service quality implications.
Medium	**Low** exposure or medium scale; medium-term duration; frequent events; severity predominantly related to moderate changes in morbidity or major change in quality-of-life; large minority of population affected; gradual reversal; small service quality implications.
Low	**Very low** exposure or small scale; short-term duration; occasional events; severity predominantly related to minor change in morbidity or moderate change in quality-of-life; small minority of population affected; rapid reversal; slight service quality implications.
Negligible	**Negligible** exposure or scale; very short-term duration; one-off frequency; severity predominantly relates to a minor change in quality-of-life; very few people affected; immediate reversal once activity complete; no service quality implication.

Table 11-6: Assessment Matrix (Indicative)

Magnitude of Impact	Sensitivity			
	High	**Medium**	**Low**	**Very low**
High	Major	Moderate or Major	Moderate or Minor	Minor or Negligible
Medium	Moderate or Major	Moderate	Minor	Minor or Negligible
Low	Moderate or Minor	Minor	Minor	Negligible
Negligible	Minor or Negligible	Minor or Negligible	Negligible	Negligible

Where the matrix offers more than one significance option, professional judgement is used to decide which option is most appropriate.

Table 11.7: Health Significance Methodology Criteria

Category/ Score	Indicative criteria
Major (significant)	The narrative explains that this is significant for public health because (select as appropriate): • Changes, due to the project, have a **substantial** effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size (magnitude and sensitivity scores), and as informed by consultation themes among stakeholders, particularly public health stakeholders, that show **consensus** on the importance of the effect. • Change, due to the project, could result in a regulatory threshold or statutory standard being **crossed** (if applicable). • There is likely to be a **substantial** change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a **causal** relationship between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant Study Area are of **specific** relevance to the determinant of health or population group affected by the project.
Moderate (significant)	The narrative explains that this is significant for public health because (select as appropriate): • Changes, due to the project, have an **influential** effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by referencing relevant policy and effect size, and as informed by consultation themes among stakeholders, which may show **mixed views**. • Change, due to the project, could result in a regulatory threshold or statutory standard being **approached** (if applicable). • There is likely to be a **small** change in the health baseline of the population, including as evidenced by the effect size and scientific literature showing there is a **clear** relationship between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant Study Area are of **general** relevance to the determinant of health or population group affected by the project.
Minor (not significant)	The narrative explains that this is not significant for public health because (select as appropriate): • Changes, due to the project, have a **marginal** effect on the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size of limited policy influence and/or that **no** relevant consultation themes emerge among stakeholders. • Change, due to the project, would be **well within** a regulatory threshold or statutory standard (if applicable); but could result in a guideline being crossed (if applicable). • There is likely to be a **slight** change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is only a **suggestive** relationship between changes that would result from the project and changes to health outcomes.

Category/ Score	Indicative criteria
	• In addition, health priorities for the relevant Study Area are of **low** relevance to the determinant of health or population group affected by the project.
Negligible (not significant)	The narrative explains that this is not significant for public health because (select as appropriate): • Changes, due to the project, are **not related** to the ability to deliver current health policy and/or the ability to narrow health inequalities, including as evidenced by effect size or lack of relevant policy, and as informed by the project having **no responses** on this issue among stakeholders. • Change, due to the project, would **not affect** a regulatory threshold, statutory standard or guideline (if applicable). • There is likely to be a **very limited** change in the health baseline of the population, including as evidenced by the effect size and/or scientific literature showing there is an **unsupported** relationship between changes that would result from the project and changes to health outcomes. • In addition, health priorities for the relevant Study Area are **not** relevant to the determinant of health or population group affected by the project.

Population health effects that are scored major or moderate are considered significant.

Ultimately a likely significant health effect is one that should be brought to the attention of the determining authority, as the effect of the Proposed Development is judged to provide, or be contrary to providing, a high level of protection to population health. This may include reasoned conclusions in relation to health protection, health improvement and/or improving services.

Where significant adverse effects are identified, mitigation is considered to reduce the significance of such effects. Similarly, enhancements are considered where significant and proportionate opportunities to benefit population health are identified.

11.2.6 Data Limitations

This assessment is based on publicly available statistics and evidence sources. No new primary research or bespoke analysis of non-public data was undertaken for the assessment.

Baseline data includes indicators where the available public data is pre-Covid-19, or that have yet to show the full impacts of the pandemic for public health. The baseline is considered sufficient and robust in evidencing that there are vulnerable population groups with high sensitivity in the Study Area. New data would be unlikely to change that conclusion as a ‘high’ sensitivity is already assigned to vulnerable groups, and any new data would not change this.

The health assessment partially draws from and builds upon, the technical outputs from the other technical chapters of the EIAR. As a consequence, the assumptions and limitations of those assessments also apply to any information used in this chapter (e.g., for modelling work undertaken). It is, however, considered that the information available provides a suitable basis for assessment.

11.3 Description of the Existing Environment (Baseline Scenario)

11.3.1 Baseline Environment

Different communities have varying susceptibilities to health impacts and benefits as a result of social and demographic structure, behaviour and relative economic circumstances.

The aim of the following information is primarily to put into context the local health circumstance of the communities surrounding the Proposed Development, drawing from available statistics. Where possible, data has been collected for the electoral division (ED), to compare against the national (Ireland) average.

The baseline is then applied as a reference point for judging changes due to the Proposed Development. It aids in identifying, informing and refining healthy urban design features tailored to support local community health needs, and the delivery of public health objectives/priorities.

It should be noted that the description of the whole population does not exclude the probability that there will be some individuals or groups of people who do not conform to the overall profile.

The following indicators are presented and have informed conclusions on population health sensitivity. These indicators link to relevant health outcomes, however public health indicators are not available for all health outcomes considered by this assessment. Whilst small area data is the most informative for project level effects, the available indicators do not all have this resolution. The summary provided is proportionate and appropriate for impact assessment purposes.

Demography, Deprivation and Socio-economic Indicators

Table 11.8: Demographic Indicators for Newcastle ED Compared with the Republic of Ireland

Statistic	Newcastle ED	Ireland
Percentage Aged Under 15	26.3 %	19.7 %
Percentage Aged 15-64	61.4 %	65.3 %
Percentage Aged 65+	12.3 %	15.1 %

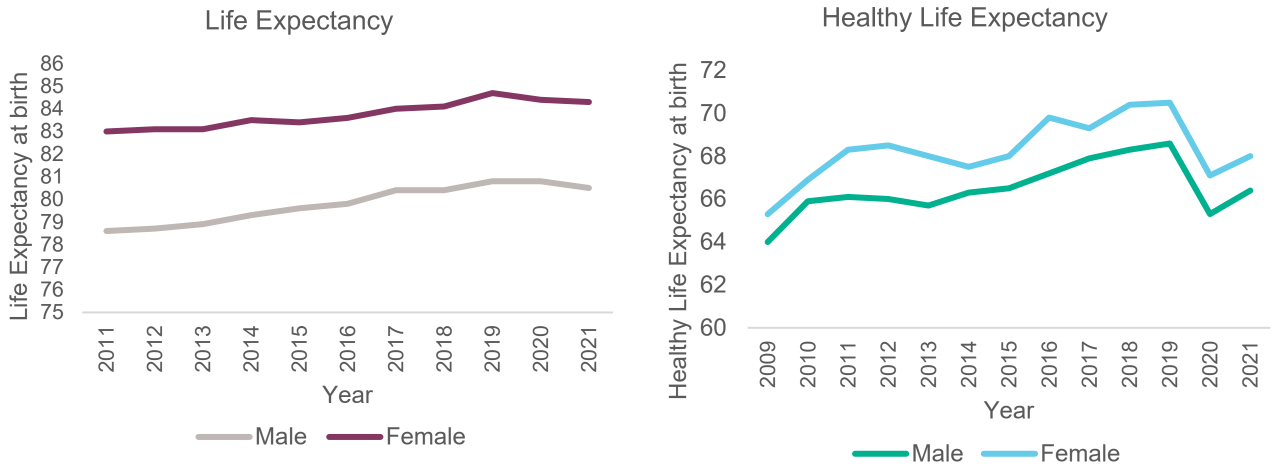
Source: (Central Statistics Office, 2022)

Demographic indicators show that the local Study Area has a higher proportion of the population aged 0-15 (26.3 %) than the national average of 19.7 %. The proportion of the population aged 65+ years (12.3 %) is lower than the average of the Republic of Ireland (15.1 %) and the population aged 15-64 is lower (61.4 %), than the national average (65.3 %) (Central Statistics Office, 2022).

Deprivation indices for the Republic of Ireland show pockets of deprivation in the electoral division of Newcastle with 3 out of 12 small areas which make the ED rated as ‘Marginally Below Average’. The site-specific small area 267107002 where the Proposed Development is located is classified as ‘Marginally above average’, however some of the closest neighbouring small areas show elevated levels of deprivation including Commons Little (267107009) and Cornerpark (267107008). These are reflective of the closest residential areas to the Proposed Development. Variable levels of deprivation are shown in South Dublin, with multiple areas of elevated deprivation ranging from ‘marginally below average’ to ‘extremely disadvantaged’ (Pobal, 2023). According to the Trinity National Deprivation Index 2016, South Dublin has high levels of inequality between the least deprived and the most deprived (Teljeur et al., 2019).

Physical and Mental Health Indicators

In relation to life expectancy, the number of years a person is expected to live at birth in the Republic of Ireland was 80.5 for males and 84.3 for females in 2021. Life expectancy statistics are only available at the national level for the Republic of Ireland. Following trends over the years, life expectancy in Ireland is increasing with male life expectancy consistently lower than female life expectancy (**Figure 11-1**) (Eurostat, 2023a).



Source: (EuroStat, 2023)

Figure 11-1: Life Expectancy and Healthy Life Expectancy within Ireland Between 2009 and 2021

Healthy life expectancy, i.e. the number of years a person can expect to be in 'full health', has been generally increasing over the past decade for both males and females (**Figure 11-1**) (Eurostat, 2023b). However, there is a decrease in healthy life expectancy for both males and females in 2020, which is likely attributable to the Covid-19 pandemic. In 2021, healthy life expectancy in Ireland was 80.5 for males 84.3 for females, showing a return to the previously increasing trend.

Overall, regarding the **general health** of the population in Newcastle ED, 54.2 % of the population report to be in 'very good' health status, 28.7 % in 'good' health status, 7.8 % in 'fair' health status, 1.5 % reporting 'bad' health status and 0.2 % having 'very bad' health status. These rates are slightly better than for South Dublin and Ireland comparators, see **Figure 11-2**.

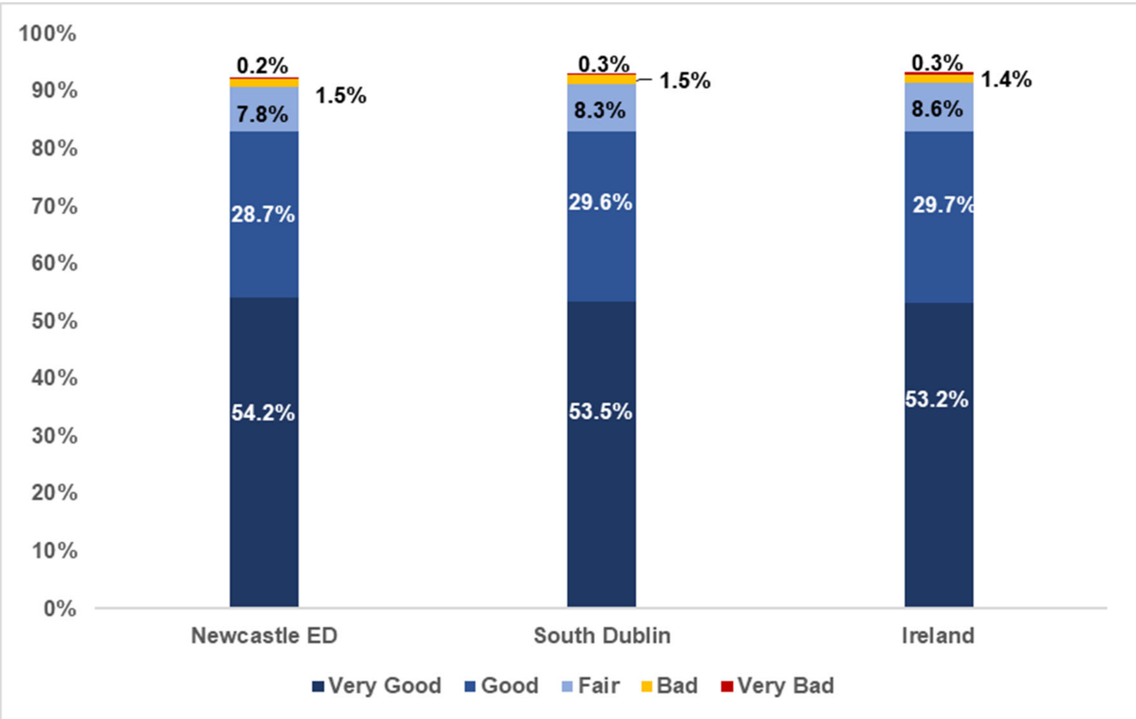


Figure 11-2: Self-Reported Health Averages for the Site-Specific Area Compared to National Averages (CSO, 2022)

In terms of cause-specific mortality rates, data are only reported at the regional and national levels, therefore data for Dublin is presented as being representative of the project area. Mortality rates from cancer, circulatory and respiratory diseases are all lower in Dublin compared to the national averages. Since 2012, deaths attributable to cancer and circulatory diseases have been fluctuating in both Dublin and the Republic of Ireland with mortality rates for Dublin consistently below the national average (**Figure 11-3**) (Central Statistics Office, 2021).

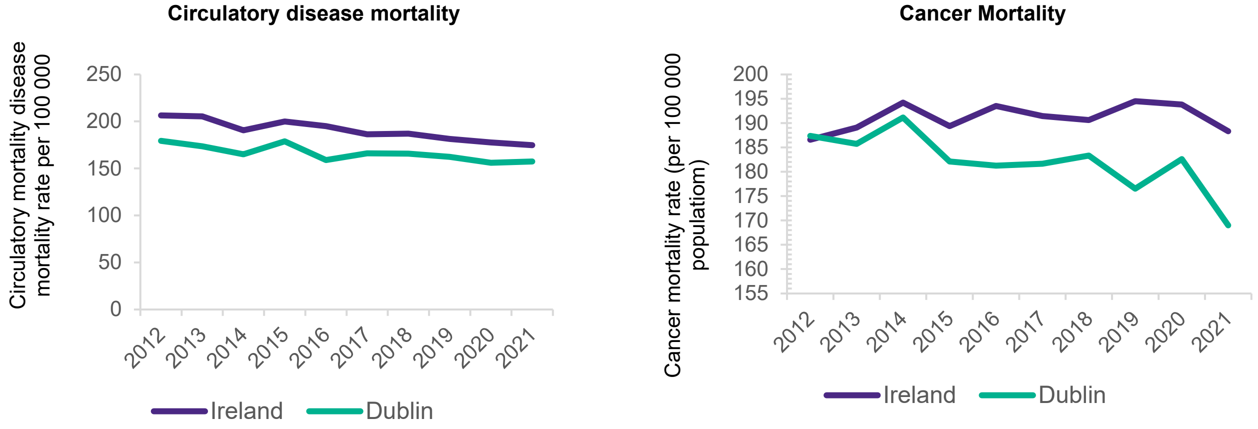


Figure 11-3: Cancer and Circulatory Disease in Dublin Compared to the Republic of Ireland

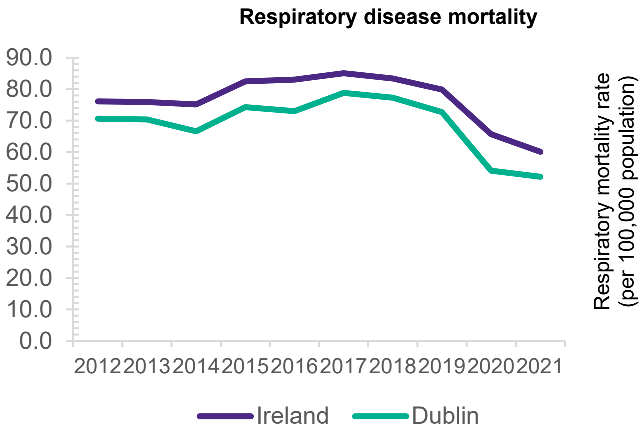


Figure 11-4: Respiratory-Disease Mortality Rates in Dublin Compared to the Republic of Ireland

Figure 11-4 shows deaths attributable to respiratory diseases in Dublin have been constantly below the national average from 2012 to 2021.

As a mental health indicator, self-reported mental health status is only reported at the regional and national levels. Regionally, the population in the Study Area performs similar to the national comparator. In 2019, the percentage of people that reported to have experienced moderately severe to severe depression is 2 % in both the region of Dublin and the Republic of Ireland (Central Statistics Office, 2019).

Suicide rates and other mortality rates attributable to mental health issues suggest high localised sensitivity to mental health pressures in the Study Area. In 2019, the standardised suicide rate was 4.7 per 100 000 population for females and 17.6 per 100 000 for males. The rate of deaths attributable to mental and behavioural disorders are shown to be relatively higher in Dublin compared to the Republic of Ireland. (Central Statistics Office, 2021).

11.3.2 Evolution of the Environment in the Absence of the Proposed Development

Longer term trends and interventions in population health may influence the future baseline. Health and social care, public health initiatives and government policies aim to reduce inequalities and improve quality of life. The historic success of such interventions is increasingly challenged by national trends such as an aging population, rising levels of obesity and the COVID-19 pandemic. The implications of COVID-19 for public health will take years to be reflected within statistical data releases, but it is expected that the pandemic will have exacerbated public health challenges. The pandemic disproportionately affected vulnerable groups, including due to age and ill-health.

Climate change may also exacerbate physical and mental health risk factors, particularly around flooding and extremes of temperature. The baseline indicates that the population of Newcastle ED has relatively low deprivation and would be expected to therefore be relatively resilient to climate change stresses. Typically, low resource groups, e.g., in areas of high deprivation, are most sensitive to the adverse health effects of climate change.

To reflect these trends the assessment scores all vulnerable groups as having high sensitivity for all determinants of health. This appropriately captures any increase in sensitivity within the future baseline.

It would not be proportionate (or consistent with the qualitative assessment approach taken) to quantitatively model the population's future health. This reflects the complexities of interactions between the wider determinants of health, as well as the potential for macro-economic changes in the next decade that are hard to predict. Any prediction would have such wide error margins that it would greatly limit the value of the exercise.

11.4 Description of Likely Significant Effects

11.4.1 Construction Phase

The duration of the construction works for the Proposed Development would be approximately 18 weeks.

11.4.1.1 Air Quality

This section discusses changes to air quality during construction of the Proposed Development, and related effects on population health. Construction of the Proposed Development has the potential to result in dust effects from demolition and construction activities and construction compounds, as well as vehicle emissions from construction traffic. The discussion of dust effects has had regard to the context of the current site managing hazardous wastes and location of the Proposed Development within an area of historical and current industrial activity, as discussed in **Chapter 16 - Land, Soil, Geology and Hydrogeology**. In this regard, the assessment has taken into account the potential for dusts to include mobilisation of trace historic contaminants.

This section has been informed by **Chapter 10 - Air Quality and Climate** and **Chapter 16 - Land, Soil, Geology and Hydrogeology**, which sets out relevant assessment findings and mitigation measures that have been taken into account.

Potential effects on human health are considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is dust and air pollutants (particularly Nitrogen Dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$) from construction emissions.
- The theoretical pathway is diffusion through the air.
- Receptors are residents and long-term occupiers of nearby properties and community buildings and visitors and employees of other businesses in the business park.

Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

The population groups relevant to this assessment are:

- The 'site-specific' geographic population of Newcastle ED.
- The sub-population vulnerable due to:
    - Young age vulnerability (children and young people).
    - Old age vulnerability (older people).

– Poor health vulnerability (people with existing poor respiratory or cardiovascular health).

– Access and geographical vulnerability (people for whom close proximity to the Proposed Development increases sensitivity).

The scientific literature identifies the following general points relevant to potential exposures and health outcomes. Construction activities that produce dust relate to the coarser fractions of PM_{10} and potential nuisance from dust deposition on property.

Environmental air pollution is associated with increased risk of respiratory and cardiovascular diseases. The adverse effects on health of PM and NO_2 indicates that the effects occur at air pollution concentrations lower than those in guidelines (WHO, 2021).

For construction dusts, the main health outcomes are likely to relate to exacerbation of existing conditions, such as asthma or chronic obstructive pulmonary disease (i.e. airway inflammation by coarse PM) and to reductions in wellbeing associated with annoyance or reduced amenity. Whilst other outcomes (e.g. cardiovascular events or toxicological response) may be relevant in the event of brief high concentrations, such elevated exposures are expected to be avoided though the embedded standard good practice mitigation discussed in **Chapter 10 - Air Quality and Climate**, **Section 10.7** and **Chapter 16 - Land, Soil, Geology and Hydrogeology, Section 16.7**.

The assessment has identified population groups that may be particularly sensitive to air quality effects. For example, young children are particularly susceptible to air pollution because of their developing lungs, high breathing rates per bodyweight, and amount of time spent exercising outdoors. Other vulnerable groups include the sick (e.g., people with type 2 diabetes), the elderly, and pregnant women.

Sensitivity of the Population

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group have been taken into account and are listed in **Section 11.2.5.3** of this report. The general population comprise those members of the community who live, work and study at a distance where high levels of dispersion and deposition would greatly limit the effects any change in exposure due to the Proposed Development. Furthermore, most people enjoy *good respiratory health* (e.g. do not have asthma) and are not a life stage (e.g., infant or frail elderly) with particular sensitivity to air quality.

The sensitivity of the vulnerable group population is **high**. This reflects that the sub-population includes a high representation of *dependants*, including children, elderly and those receiving care due to poor health. For example, existing respiratory conditions including asthma and chronic obstructive pulmonary disease and type 2 diabetes would increase sensitivity. People likely to be most affected by the Proposed Development are those living, visiting or working close to the construction works (see receptors listed in **Chapter 10 - Air Quality and Climate**).

Magnitude of Impact

Chapter 10 - Air Quality and Climate concludes:

- Following implementation of the dust minimisation plan and ongoing monitoring, the impact of construction dust from the Proposed Development on the community is considered **negligible**.
- As the construction traffic volumes predicted with the Proposed Development are not considered significant, the resultant air quality impact from construction traffic is **negligible**.

Chapter 16 - Land, Soil, Geology and Hydrogeology concludes:

- Following implementation of the mitigation measures outlined, all impacts will be reduced to **imperceptible**.

From the public health perspective, the magnitude of change due to the Proposed Development is **low**. As reported in **Chapter 10 - Air Quality and Climate**, construction activity and construction compound dust impacts on the identified sensitive receptors are predicted to be of *temporary duration*. A comprehensive set of mitigation measures and dust monitoring would be implemented during the construction phase, to further minimise construction dust impacts. For residential areas, the construction works are occurring in a business park surrounded by industrial and commercial buildings which would provide screening from the Proposed Development. Occasionally, weather conditions may coincide with construction activities to generate higher levels of dust. This can cause temporary annoyance, and for people with existing poor health, higher levels of coarse dust in the air can exacerbate some conditions (e.g., asthma). Coarse PM is larger and heavier and so it is deposited more quickly. This means that the concentration of coarse PM in the air reduces rapidly as it gets further from the source. The potential for nuisance-type dust effects is therefore expected to be *occasional* and limited in extent. This includes community members visiting the business park such as children visiting play facilities. At these levels it is unlikely that there would be discernible changes in the risk of developing a new health condition or of exacerbating an existing condition. Such changes would be *temporary*, with a *very minor* influence on *quality of life* and/or *morbidity* risk for respiratory and cardiovascular conditions for a *very few* people. Most effects would *rapidly* reverse, with *no* discernible influence for healthcare services.

Significance of Effect

For the health assessment, the construction air quality effects are considered **minor adverse** (**not significant)**. The **minor adverse** (rather than negligible) score represents a conservative assessment finding given scientific uncertainty (and emerging evidence) about non-threshold health effects of NO_2, and $PM_{2.5}$. The score takes into account WHO advisory guidelines and also reflects that air pollution is a specific local public health priority. The level of change in the health baseline due to the Proposed Development is likely to be *very limited*, with at most a *marginal effect* on the delivery of health policy and inequalities. This is a public health acknowledgement of the very small incremental contribution to air pollution that the Proposed Development would make, but also recognition that at the Proposed Development level this should not be considered a significant effect on population health or health inequalities.

11.4.1.2 Noise and Vibration

This section discusses changes in noise exposure during construction of the Proposed Development.

This reflects that activities at the site and along the highway network would generate noise. The scale, timing or character of the noise is taken into account in determining the potential for adverse effects on population health and wellbeing.

As outlined in **Chapter 5 - Description of the Construction Phase**, all construction work would be during daytime (8:00 AM to 7:00 PM Monday to Friday and 8:00 AM to 4:00 PM on Saturdays). There is potential for noise to temporarily arise from construction works and movement of construction related vehicles.

The scientific literature identifies the following general points relevant to potential exposures and health outcomes. The literature highlights cardiovascular effects, annoyance and sleep disturbance (and consequences arising from inadequate rest) as being the main pathways by which population health may be affected (Peris & Fenech, 2020; WHO, 2018). The literature also notes the potential for chronic noise to have a detrimental effect on learning outcomes (e.g. noise distracting and affecting communication within classrooms) (Peris & Fenech, 2020). Whilst the literature supports there being thresholds at which effects (such as annoyance and sleep disturbance) are likely, it also acknowledges the subjective nature of responses to noise. In this regard noise effects can be considered to have non-threshold effects, with characteristics other than sound levels also determining the influence on health outcomes (WHO, 2018). The assessment had regard to the population groups identified in the literature that may be particularly sensitive. For example, children, the elderly, the chronically ill, people with a hearing impairment, shift-workers and people with mental illness (e.g., schizophrenia or autism).

This section has been informed by **Chapter 9 - Noise & Vibration**, which sets out relevant assessment findings and mitigation measures that have been taken into account.

Potential effects on human health are considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is noise generated by construction activities.
- The theoretical pathway is pressure waves through the air.
- Receptors are residents and long-term occupiers of nearby properties and community buildings and visitors to and employees of other businesses in the business park.

Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

The population groups relevant to this assessment are:

- The ‘site-specific’ geographic population of Newcastle ED.

- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people).
  - Old age vulnerability (older people).
  - Poor health vulnerability (people with existing poor physical or mental health).
  - Low-income vulnerability (people living in deprivation, including those on low incomes may have fewer resources to adapt, e.g. seek respite or install insulation furthermore, those who are economically inactive may spend more time in affected dwellings).
  - Access and geographical vulnerability (people for whom close proximity to the proposed changes increases sensitivity).

The assessment covers these populations within two groups. The general population for the geographic area, notably Newcastle ED village residents, and the vulnerable sub-population for this area. The latter is comprised of the vulnerabilities listed above. The differentiation of these two groups, allows a discussion of any potentially **significant** health inequalities and the targeting of any mitigation.

Sensitivity of the Population

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **Section 11.2.5.3** of this report. The general population comprise those members of the community in *good* physical and mental health and with resources that enable a *high capacity* to adapt to change. Additionally, most people live, work or study at a distance from the affected parts of the local road network where construction noise and vibration would be unlikely to be a source of concern.

The sensitivity of the vulnerable group population is **high**. This reflects that the sub-population includes a high representation of *dependants*, both children, elderly and those receiving care due to poor health. This sub-population may experience existing *widening* inequalities due to living in areas with increased noise and elevated deprivation, with *limited capacity* to adapt to changes. Vulnerability particularly relates to those living close to the construction activities and construction compounds, including those spending more time in affected dwellings, e.g. due to low economic activity, shift work or *poor* health. People who are *concerned* or have high degrees of *uncertainty* about construction noise and its effect on their wellbeing may be more sensitive to changes in noise.

Magnitude of Impact

Chapter 9 - Noise and Vibration concludes the impact from construction works at the nearest noise sensitive locations to be low.

As reported in **Chapter 9 - Noise and Vibration**, construction of the Proposed Development would involve activities at the site that would generate noise such as demolition works, construction works and vehicle movements. Construction noise is predicted to be within limits set to be protective of health and the environment.

From the public health perspective, the magnitude of change due to the proposed works is **low**. For population health the *small* scale of change in noise levels is likely to predominantly relate to a *minor* change in quality of life for a *small minority* of the community and a *very minor* change in cardiovascular and mental wellbeing morbidity for the *very few people* closest to construction activities. The changes would be of *temporary* duration and relate to *frequent* construction related noise exposures. Prolonged periods of construction noise at daytime disruption of educational activities at schools are not anticipated.

Significance of Effect

Noise and vibration impacts from construction activities and construction traffic would be mitigated through the use of appropriate construction hours and best practice measures as detailed in **Chapter 9 - Noise and Vibration.**

Construction noise impacts of the Proposed Development are considered to result in a **minor adverse** (**not significant**) effect on population health. This assessment conclusion reflects that although the scientific literature indicates a *clear association* between elevated and sustained noise disturbance and reduced health outcome, the changes would result in a *very limited* effect in the health baseline of the site-specific population. The temporary and localised construction noise effects are not expected to affect health inequalities. The level of effect is not expected to affect the ability to deliver local or national health policy.

11.4.1.3 Transport Modes, Access and Connections

This section considers how construction affects public health through changes in road safety and accessibility, including travel times for road users and emergency services.

This section has been informed by **Chapter 7 - Traffic and Transport**, which sets out relevant assessment findings and mitigation measures that have been considered.

Potential effects on human health are considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is the presence of construction vehicles.
- The theoretical pathway is changes in driver delay, as well as accidents and safety. Where these occur, which is not the case here, these factors also have the potential to influence emergency response times.
- Receptors are local road users, including visitors to and employees of other businesses on the business park.

Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

The population groups relevant to this assessment are:

- The 'site-specific' geographic population of Newcastle ED
- The 'local' population of South Dublin .
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people as potentially more vulnerable road users).
  - Old age vulnerability (older people as potentially more vulnerable road users)
  - Poor health vulnerability (people with existing poor physical and mental health in relation to health trip journey times)
  - Low-income vulnerability (people living in deprivation, including those on low incomes for who travel costs or alternatives may be limiting)
  - Access and geographical vulnerability (people who experience existing access barriers or who rely on the affected routes, including healthcare and other amenities).

The scientific literature identifies the following general points relevant to potential exposures and health outcomes. For road safety, health effects may be associated with the severity or frequency of road traffic incidents (Dai et al., 2018). For accessibility, health effects may be associated with emergency response times or non-emergency treatment outcomes associated with delays or non-attendance. For active/sustainable travel, health effects may relate to physical health (e.g. cardiovascular health) and mental health conditions (e.g. stress, anxiety or depression) associated with obesity and levels of physical activity (Winters et al., 2017).

The assessment has had regard to the population groups identified in the literature that may be particularly sensitive. For example, children, pregnant women and cyclists (particularly older cyclists) are generally more vulnerable in terms of road safety. People with lower socio-economic status typically face more transportation barriers in accessing health care.

Sensitivity of the Population

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **Section 11.2.5.3**. This reflects that most people in the local area (South Dublin) would have many alternative routes in the road network to the affected sections. It also includes those who would only make *occasional* use of the roads to be used by vehicles travelling to and from the facility. The general population comprise those members of the community with a *high* capacity to adapt to changes in access, including changes in healthcare access, for example due to greater resources and *good* physical and mental health.

The sensitivity of the vulnerable group population is **high**. The vulnerable sub-population includes dependants, such as children, elderly and those receiving care due to poor health. This sub-population may have *fewer resources* and *less capacity* to adapt to changes. The population may therefore be more *reliant* on the affected routes with greater likelihood that any disruption or disturbance could affect safety or access to health supporting services. Vulnerability is linked to mode of travel, including pedestrians and cyclists being more sensitive to road safety changes. It also relates to age (young people and older people) being more vulnerable to accident severity, as well as to those who are *reliant* on services accessed on affected sections of the road network (e.g., traveling to schools). Vulnerability may be increased in areas of higher deprivation. Deprived populations may already face more access barriers compared to the general population and therefore be more sensitive to access changes. Low incomes may compound access barriers by *limiting* the ability to adapt. Vulnerability also includes those accessing health services (emergency or non-emergency) at times and locations affected by congestion. Ambulance services (and the recipients of their care) are particularly sensitive to delays in response times (time taken to arrive and stabilise the patient). People in poor or very poor health may be more frequent users of healthcare service and therefore be more sensitive to access changes.

Magnitude of Impact

Chapter 7 - Traffic and Transport concludes:

- Across the network, it is considered that the scale of magnitude is low due to the low percentage impact of the construction HGVs and staff vehicle trips compared to the background traffic flows in 2024. As the construction phase has a fixed duration, any effects would be temporary and the effects slight or less.

As reported in **Chapter 7 - Traffic and Transport,** a Construction Traffic Management Plan (CTMP) is to be prepared which outlines measures to be implemented by the appointed contractor during the construction phase in order to reduce impacts on local communities and residents adjacent to the Proposed Development and wider road network.

From the public health perspective, the magnitude of change due to the Proposed Development is **low**. This reflects that:

- In relation to road safety the scale of change in accidents would be **small to negligible,** with the duration of such change *temporary*. The frequency of any incidents would be *one-off* or *occasional*, with severity related to a *very minor* change in risk of injury or mortality (though with outcome reversal *gradual* or *permanent*). The expectation is that *very few* people would be affected, with *no or slight* implications for healthcare services.
- In relation to health-related travel times and accessibility the scale of change in delays could be *low* and *temporary*. The frequency with which health related journeys may be affected is likely to be *occasional* for most people though for a *few people*, severity could relate to a *small* change in risk for morbidity or mortality associated with time critical treatment. Ambulance services (and the recipients of their care) are particularly sensitive to delays in response times (time taken to arrive and stabilise the patient, the priority given to ambulances travelling under blue lights would be expected to reduce any changes in journey times. Mitigation in terms of early and ongoing information sharing with emergency and healthcare services are discussed below. Due to the temporary nature of the work and ability for people to adapt to known planned roadworks, the delays are not expected to change decisions to access other social infrastructure such as outdoor spaces, shops, employment, and educational facilities.

Significance of Effect

The significance of the population health effect for this determinant of health is **minor adverse** (**not significant**). The conclusion reflects that transport effects of construction are likely to have a *very limited* influence on the population health baseline in relation to road safety and journey times. Such changes are unlikely to be influential for delivery of local health policy and are unlikely to widen health inequalities through differential or disproportionate effects to vulnerable groups.

11.4.2 Operational Phase

11.4.2.1 Air Quality

This section discusses changes to local air quality during operation of the Proposed Development, and related effects on population health. **Chapter 4 - Description of the Proposed Development, Section 4.4.3**. confirms that stringent air emissions limits will be enforced by the EPA and be independently monitored.

Consideration has been given to physical, mental health and wellbeing effects from both actual and perceived risks associated with air pollutants, including bio-aerosols. Whilst odour generated from current site activities are already managed and controlled under the existing site licence, there is a change in the type of waste, so odour as an issue is also considered.

The health chapter is informed by the air quality modelling undertaken for the project. Statutory limits, i.e. health protection standards, are used as a benchmark. The potential for non-threshold health effects of some air pollutants is discussed and taken into account.

Operation of the Proposed Development has the potential to result in emissions from:

- the gas boiler driving steam generation.
- the disinfection process.
- vehicles delivering and collecting waste.

This section has been informed by **Chapter 10 - Air Quality and Climate**, which sets out relevant assessment findings and mitigation measures that have been taken into account.

Potential effects on human health are considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is air pollutants associated with the HRW process or its project vehicles (particularly NO_2, PM_{10} and $PM_{2.5}$, but also bio-aerosols and particulates or aerosols relating to odour);
- The theoretical pathway is diffusion or transmission through the air; and
- Receptors are residents and long-term occupiers of nearby properties and community buildings and visitors to, and employees of, other businesses in the business park.

Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

The population groups relevant to this assessment are:

- The 'site-specific' geographic population of Newcastle ED; and
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people).
  - Old age vulnerability (older people).
  - Poor health vulnerability (people with existing poor respiratory or cardiovascular health).
  - Access and geographical vulnerability (people for whom close proximity to the Proposed Development increases sensitivity).

The scientific literature identifies the following general points relevant to potential exposures and health outcomes. The scientific literature indicates that there is an association between air quality emissions and health and wellbeing effects. The link is primarily between particulate matter and health effects (particularly for $PM_{2.5}$), but also NO_2. The health effects of exposure to air quality emissions are summarised in **Section 11.4.1.1.**

Bioaerosol is a general term for microorganisms, or fragments of microorganisms, such as fungi and bacteria suspended in the air. Bioaerosols can be naturally occurring at low levels as part of natural ecosystems. The physiological effects of bioaerosol pollutants depend on their size, concentration, physiochemical properties and size distribution. Prolonged exposure to high levels of bioaerosols have mostly been associated with respiratory ill health (Herr CEW et al., 2003). However, the composition of bioaerosols is complex and their comprehensive toxicity is difficult to assess (Humbal et al., 2018).

Odours associated with bioaerosols are not inherently detrimental to human health. Odour is the attribute detectable by the nose on sniffing certain volatile substances. The characteristics of the odours substance make them perceptible to the human sense of smell. The term odour relates to the stimuli from a chemical compound that is made more volatile in the air. Odour is a person's perception of that sensation, and an interpretation may be made what the odour means, including the perception of what risk a particular odour may indicate.

The way risks are understood has important influences on health behaviour (Ferrer & Klein, 2015). Awareness of risk can affect mental, physical and emotional wellbeing. Perceptions of risk leading to stress are associated with ill health (e.g. headaches or hypertension) and can be exacerbated when there is uncertainty (Luria et al., 2009). The ultimate goal of dialogue between regulators and communities is to produce an informed public (Sinisi, 2004). Trust, credibility, competence, fairness and empathy are of great importance (Sinisi, 2004) and the routine monitoring and clear communication of results can greatly increase trust, empower people and reduce fear (WHO, 2013).

The assessment has identified population groups that may be particularly sensitive to air quality effects. For example, young children are particularly susceptible to air pollution because of their developing lungs, high breathing rates per bodyweight, and amount of time spent exercising outdoors. Other vulnerable groups include the sick (e.g. people with type 2 diabetes), the elderly, and pregnant women.

Sensitivity of the Population

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **Section 11.2.5.3**. The general population comprise those members of the community who live, work and study at a distance where high levels of dispersion and deposition would greatly limit the effects of any change in exposure due to the Proposed Development. Furthermore, most people enjoy *good* respiratory health (e.g., do not have asthma) and are not at a life stage (e.g., infant or frail elderly) with particular sensitivity to air quality. This also represents the general population who would not perceive particular risks associated with the Proposed Development and who report good mental health and wellbeing.

The sensitivity of the vulnerable group population is **high**. This reflects that the sub-population includes a high representation of *dependants*, including children, elderly and those receiving care due to poor health. For example, existing respiratory conditions including asthma and chronic obstructive pulmonary disease and type 2 diabetes would increase sensitivity. This sub-population also includes those people who perceive risks associated with the Proposed Development, or who have existing poor mental health. People likely to be most affected due to their proximity to the Proposed Development are those either living within Newcastle ED village that would experience increases in traffic flow or visitors to, and employees of other businesses in the business park.

Magnitude of Impact

Chapter 10 – Air Quality and Climate concludes that all emissions under proposed operation of the facility would be in compliance with the ambient air quality standards and will not lead to a substantive risk of odour nuisance.

As reported in **Chapter 10 – Air Quality and Climate**, the facility is licensed by the EPA and is required to comply with the management, mitigation and monitoring regimes including developing an Odour Management Plan (OMP) to prevent, address and control odour at the facility. Other measures carried out during operation of the Proposed Development to minimise the release of pollutants from the HRW facility include: use of negative air pressure extraction hoods to capture residual air at various points in the process; high efficiency particulate air (HEPA) filter to capture pollen, dirt, moisture, bacteria, and viruses; and activated carbon filtration to remove any trace odour before air is released to atmosphere. Independent monitoring would also be conducted at pre-determined intervals.

From the public health perspective, the magnitude of change due to the Proposed Development is **low**. As reported in **Chapter 10 – Air Quality and Climate**, the relevant ambient ground level concentrations (GLCs) are below the relevant air quality guidelines for emissions for each volatile organic compound assessed. The Proposed Development would comply with measures to mitigate odour impact, as described in **Chapter 10 – Air Quality and Climate**. Based on the effectiveness of such measures, any health effect due to operational activities would relate to a **negligible to very low** change in exposure to air pollutants, which may occur on a *frequent basis* over the *long-term*. Additional exposure due to the Proposed Development would represent an incremental addition to the existing baseline conditions resulting in a *very minor* change in morbidity and mortality related population health risk, e.g., associated with respiratory and cardiovascular health outcomes. Any health effect due to a very slight change in risk factors is likely limited to a *small minority* of the Study Area population and the effect on routine health service planning is likely **negligible**.

Regard has also been given to the magnitude of the population health effects associated with potential community concern associated with understanding of risk. The potential effect is in the context of the facility operating over the *long-term*. Community responses are likely to vary between individuals, with *occasional to frequent* concern and are likely to change over time, for example in response to the facility's track record of compliance with regulatory health protection standards. As a conservative assessment the scale of change is considered *medium.* The expected severity of any health outcome relates predominantly to a *minor* change in mental health related morbidity for a *very few* people within the population. Such individual level effects are unlikely to have implications for health service capacity. For many people there is likely to be a *rapid reversal* of effects should their concerns be responded to and resolved to their satisfaction. From the public health perspective, the magnitude of change due to the Proposed Development is **low**.

Significance of Effect

For the health assessment, operational air quality effect is considered to be **minor adverse** (**not significant)**. This assessment conclusion reflects that whilst the scientific literature establishes a *causal* effect relationship between changes in air quality and health outcomes, the actual risk of air pollutants including potential infectious particles and unpleasant odours emitted from the HRW facility are predicted to be *well within* statutory and regulatory standards set for health protection. With the design elements that disinfect and filter, management practices that maintain equipment and standards, and waste sector regulatory regimes that monitor compliance, the changes in air quality would be expected to result in no more than a **very slight adverse** effect in the health baseline of the local population. The conclusion also reflects the scientific understanding of the impact of uncertainty or concern about environmental risks on mental health, and noting this, the professional judgement is that there could be **very limited adverse** change in mental health baseline for the surrounding population. At most the change due to the Proposed Development may have a *marginal* influence on population health inequalities.

11.4.2.2 Water Quality

This section discusses changes to local water quality during operation of the Proposed Development, and related effects on population health. Operation of the Proposed Development will discharge low levels of wastewater in accordance with the conditions of an EPA licence. The discharge of wastewater is associated with, the HRW management process washing/disinfection of bins and management of condensate into public sewers. These emissions would be subject to relevant permits including an EPA Industrial Emissions Directive (IED) license and a South Dublin County Council discharge licence. Discharge compliance limits are set out in **Chapter 4 - Description of the Proposed Development, Section 4.4.2**.

This section has been informed by **Chapter 15 - Water**, which sets out relevant assessment findings and mitigation measures that have been taken into account.

Potential effects on human health are considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is HRW treatment process.
- The theoretical pathway is transmission through public sewers. No pathway to drinking water is identified.
- Receptors are residents and long-term occupiers of nearby properties and community buildings.

While likelihood is low, there are potential pathways to the population, such as during sewer flooding and overflow discharge events. There can also be aerosols from wastewater treatment works. In all cases exposure risks would be very low but are considered here to confirm the public health implications.

The population groups relevant to this assessment are:

- The ‘site-specific’ geographic population of Newcastle ED.
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people).
  - Old age vulnerability (older people).
  - Poor health vulnerability (people with existing poor respiratory or cardiovascular health).
  - Access and geographical vulnerability (people for whom close proximity to Proposed Development change increases sensitivity).

The assessment covers these populations within two groups. The general population of Newcastle ED, and the vulnerable sub-population for this area. The latter is a comprised of the vulnerabilities listed above. The differentiation of these two groups, allows a discussion of any potentially significant health inequalities and the targeting of any mitigation.

Sensitivity of the Population

The sensitivity of the general population is **low.** Common factors that differentiate the sensitivity of the general population and the vulnerable population have been taken into account and are listed in **Section 11.2.5.3.** This reflects that most people would not come into contact with waste waters discharged into public sewers, including the potential for any unintended sewer contamination of surface or groundwater during flood events. The general population also includes those who are in good health and less likely to be adversely affected by contaminants. This also includes people with *high capacity to adapt* including greater resources to respond to change.

The sensitivity of the vulnerable group population is **high**. Vulnerability in this case relates to people more sensitive due to life stage or health status. For example, children and young people may spend more time outdoors and due to developmental stage or relative body size have increased risks from a given toxin exposure. Increased sensitivity to exposure may also apply to older people and those with existing poor health (e.g., long-term illness). These groups would be more sensitive to accidental brief exposure to any ground or waterborne pollutants. Children, older people, people with *existing* poor health and people on low incomes are also more sensitive to health outcomes associated secondary infection risks if water, including wastewater, leak or flood damage is not appropriately remediated.

Magnitude of Impact

From the public health perspective, it is concluded that the magnitude of the change due to the Proposed Development is **low**. Both ground and water contaminants pose a very low exposure risk to the community, whether by direct contact, waterborne or airborne (aerosol) pathways. Wastewater from the proposed HRW activities would be made to sewer following wastewater treatment and with appropriate monitoring in accordance with the facility EPA IED licence. In relation to more conventional pollutants, **Chapter 15 - Water** notes that localised accidental spillages on the site have the potential to contaminate the surface water runoff. **Chapter 15 - Water** concludes that all effects will be reduced to imperceptible levels with the implementation of mitigation measures. Any exposure would be *brief* and of *one-off frequency*. Additional population level exposure to ground or water contaminants due to the Proposed Development would represent a *very minor change* in morbidity related population health risk, e.g., associated with very low dose temporary toxicological exposures. Any health effect from a pollution incident would likely be limited to a small minority of the Study Area population, with at most a *slight* effect on routine health service planning. As noted in **Chapter 15 - Water**, there is no known water abstraction infrastructure in the vicinity of, or downstream of the site, indicating population effects to water supplies are unlikely.

Significance of Effect

The professional judgement is that the significance of the population health effect would be up to **minor adverse** (**not significant**). The conclusion reflects minimal risk to public drinking water supplies, with water quality expected to be maintained well within regulatory thresholds. Although the scientific literature establishes causal pathways by which health outcomes could theoretically be affected, in practice mitigation and design measures means there are very limited potential pathways by which any contaminants released by the Proposed Development could affect population health to a meaningful degree. Any change in the health baseline due to the Proposed Development is likely to be *very limited*, with at most a *marginal* effect on health inequalities and delivery of health policy. The **minor adverse** (rather than negligible) score represents a conservative assessment finding.

11.4.2.3 Noise and Vibration

This section discusses changes in noise exposure during operation of the Proposed Development; particularly night-time noise that may be detrimental to population health where sleep is disturbed to a high degree. Changes in the distribution of day-time noise are also considered. During operation, there is potential for noise to rise from the shredder, air blast cooler, boiler, conveyor belts and fans; vehicle movements and bin movements.

This section has been informed by **Chapter 9 - Noise and Vibration**, which sets out relevant assessment findings and mitigation measures that have been taken into account.

Potential effects on human health are considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is noise generated by additional road traffic, as well as noise from operational plant;
- The theoretical pathway is pressure waves through the air; and

- Receptors are residents and long-term occupiers of nearby properties and community buildings and visitors and employees of other businesses in the business park.

Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

The population groups relevant to this assessment are:

- The 'site-specific' geographic population of Newcastle ED.
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people).
  - Old age vulnerability (older people).
  - Poor health vulnerability (people with existing poor physical or mental health).
  - Low-income vulnerability (people living in deprivation, including those on low incomes may have fewer resources to adapt, e.g., seek respite or install insulation; furthermore, those who are economically inactive may spend more time in affected dwellings).
  - Access and geographical vulnerability (people for whom close proximity to Proposed Development change increases sensitivity).

The assessment covers these populations within two groups. The general population for the geographic area, notably residents of Newcastle ED, and the vulnerable group population for the area. The latter is a sub-population comprised of the vulnerabilities listed above. The differentiation of these two groups, allows a discussion of any potentially significant health inequalities and the targeting of any mitigation.

The scientific literature identifies the following general points relevant to potential exposures and health outcomes. The literature highlights cardiovascular effects, annoyance and sleep disturbance (and consequences arising from inadequate rest) as being the main pathways by which population health may be affected (Peris & Fenech, 2020; WHO, 2018). The literature also notes the potential for chronic noise to have a detrimental effect on learning outcomes (e.g. noise distracting and affecting communication within classrooms) (Peris & Fenech, 2020). Whilst the literature supports there being thresholds at which effects (such as annoyance and sleep disturbance) are likely, it also acknowledges the subjective nature of responses to noise. In this regard noise effects can be considered to have non-threshold effects, with characteristics other than sound levels also determining the influence on health outcomes (WHO, 2018). The assessment had regard to the population groups identified in the literature that may be particularly sensitive. For example, children, the elderly, the chronically ill, people with a hearing impairment, shift-workers and people with mental illness (e.g., schizophrenia or autism).

Sensitivity of the Population

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **Section 11.2.5.3**. The general population comprise those members of the community in *good* physical and mental health and with resources that enable a *high* capacity to adapt to change. Additionally, most people live, work or study at a distance from the site and affected parts of the local road network where changes in transport noise are unlikely to be a source of concern.

The sensitivity of the vulnerable group population is **high**. This reflects that the sub-population includes a high representation of *dependants*, both children, elderly and those receiving care due to poor health. This sub-population may experience existing *widening* inequalities due to living in areas with increasing operational noise and *moderate* deprivation, with *limited* capacity to adapt to changes. Vulnerability particularly relates to those working close to the HRW facility. People who are *concerned* or have high degrees of *uncertainty* about HRW operational noise and its effect on their wellbeing may be more sensitive to changes in noise.

Magnitude of Impact

Chapter 9 - Noise and Vibration concludes that impacts would be **not significant** from the operation of the proposed shredder and air blast cooler. The noise complies with the numerical noise limits as well as meeting the criteria regarding the absence of a clearly audible tonal or impulsive character. The impact of off-site traffic noise on the nearest noise sensitive locations is assessed to be **imperceptible**.

From the public health perspective, the magnitude of change due to the Proposed Development is **low**. In terms of population health, the *small* change in noise levels, including for traffic, are likely to predominantly relate to a **very minor** change in cardiovascular and mental wellbeing morbidity for a *small minority* of the population of Newcastle ED. Any exposure from the on-site plant is expected to be at a level that is **negligible to very low**. This reflects that the site is located in the middle of an industrial estate with various buildings providing screening from residential receptors. Visitors to the business park and employees of other nearby business may be exposed to operational noise. Where such changes occur are experienced *frequently* over the *long-term*, they may be associated with a *minor* influence on quality of life or morbidity risk for a *very few* people. For most people working at or visiting the business park effects would be distant or transitory, with no influence on population health outcomes. *No* health service implications are expected.

Significance of Effect

The effects are considered to be of **minor adverse** (**not significant**). Effect is characterised as being adverse in direction, direct, and long-term. Although the scientific literature indicates a clear association between elevated and sustained noise and vibration disturbance and reduced health outcomes, the changes would result in a *very limited* effect in the health baseline of the population. The distribution of effects is not expected to affect health inequalities. The level of effect is not expected to affect the ability to deliver local or national health policy.

11.4.2.4 Transport Modes, Access and Connections

Operational changes to transport flow rates are considered in this section. Consideration is given to the potential for significant population health effects due to changes in: health-related travel times and accessibility; and road safety.

This section has been informed by **Chapter 7 - Traffic and Transport**, which sets out relevant assessment findings and mitigation measures that have been taken into account. **Chapter 7 - Traffic and Transport** concludes the overall effect on the road network is **imperceptible**, which is **not significant** in EIA terms.

For accessibility, health effects may be associated with emergency response times or non-emergency treatment outcomes associated with delays or non-attendance. For road safety, health effects may be associated with the severity or frequency of road traffic incidents.

Potential effects on human health are considered plausible because there is a theoretical source-pathway-receptor relationship:

- The source is vehicles on the road network;
- The theoretical pathway is changes in driver delay and accidents and safety. These factors also influence emergency response times.
- Receptors are local road users, including those using motor vehicles as well as pedestrians and cyclists, as well as emergency services using the road network.

Furthermore, the potential effect is probable as no highly unusual conditions are required for the source-pathway-receptor linkage.

The population groups relevant to this assessment are:

- The ‘site-specific’ geographic population of Newcastle ED;
- The ‘local’ population of South Dublin; and
- The sub-population vulnerable due to:
  - Young age vulnerability (children and young people as potentially more vulnerable road users);
  - Old age vulnerability (older people as potentially more vulnerable road users);
  - Poor health vulnerability (people with existing poor physical and mental health in relation to health trip journey times); and
  - Low-income vulnerability (people living in deprivation, including those on low incomes for who travel costs or alternatives may be limiting)
  - Access and geographical vulnerability (people who experience existing access barriers or who rely on the affected routes, including healthcare and other amenities).

The assessment covers these populations within two groups. The general population for the geographic area, notably residents of Newcastle ED, and the vulnerable group population for the area. The latter is a sub-population comprised of the vulnerabilities listed above. The differentiation of these two groups, allows a discussion of any potentially significant health inequalities and the targeting of any mitigation.

The scientific literature identifies the following general points relevant to potential exposures and health outcomes. For road safety, health effects may be associated with the severity or frequency of road traffic incidents (Dai et al., 2018). For accessibility, health effects may be associated with emergency response times or non-emergency treatment outcomes associated with delays or non-attendance. For active/sustainable travel, health effects may relate to physical health (e.g. cardiovascular health) and mental health conditions (e.g., stress, anxiety or depression) associated with obesity and levels of physical activity (Winters et al., 2017).

Transportation barriers are important to healthcare access, particularly for those with lower incomes. Transportation barriers lead to rescheduled or missed appointments, delayed care, and missed or delayed medication use. These consequences may lead to poorer management of chronic illness and thus poorer health outcomes (Syed et al., 2013). The literature does not identify particular thresholds for effects. The assessment has had regard to the population groups identified in the literature that may be particularly sensitive. For example, children, pregnant women and cyclists (particularly older cyclists) are generally more vulnerable in terms of road safety. People with lower socio-economic status typically face more transportation barriers in accessing health care.

Sensitivity of the Population

The sensitivity of the general population is **low**. Common factors that differentiate the sensitivity of the general population and the vulnerable group population have been taken into account and are listed in **Section 11.2.5.3**. This reflects that most people in the local area (South Dublin) would only make *occasional* use of the affected section of the road network. It also includes those for whom the road network affords *alternative* routes. The general population comprise those members of the community with a *high* capacity to adapt to changes in access, including changes in healthcare access, for example due to greater resources and good physical and mental health.

The sensitivity of the vulnerable group population is **high**. Vulnerability in this case is linked to mode of travel, including pedestrians and cyclists being more sensitive to road safety changes; age (young people and older people) being more vulnerable to accident severity; those *reliant* on services accessed on affected sections of the road network (e.g., traveling to schools); and those in areas of greater deprivation. Deprived populations may already face more access barriers compared to general population and therefore be more sensitive to access changes. Low incomes may compound access barriers by *limiting* adaptive response. Vulnerability also includes those accessing health services (emergency or non-emergency) at times and locations affected by congestion. Ambulance services (and the recipients of their care) are particularly sensitive to delays in response times (time taken to arrive and stabilise the patient). Ambulances are generally less affected by congestion due to the priority given to them travelling under blue lights, but journey times may benefit from the road improvements. People in *poor or very poor* health may be more frequent users of healthcare service and therefore be more sensitive to access changes.

Magnitude of Impact

From the public health perspective, the magnitude of change due to the Proposed Development is **low**.

In relation to health-related travel times and accessibility the scale of change in delays is expected to be **small to negligible**, with the duration of such change *long-term* for the operational phase. The frequency with which health related journeys may be affected is likely to be *occasional* for most people, though for a *few people*, severity could relate to a small change in risk for morbidity or mortality. Ambulance services (and the recipients of their care) are particularly sensitive to delays in response times (time taken to arrive and stabilise the patient and the priority given to ambulances travelling under blue lights would be expected to reduce any changes in journey times).

In relation to road safety, a **small to negligible** scale of change in road traffic would have a corresponding very small increase in accident risk (simply as a function of traffic volumes). Such events would remain *occasional* over the *long-term* for the operational phase. Severity relates to a *very minor change* in risk of injury or mortality (with outcome reversal gradual or permanent). *Very few people* would be affected, with no or slight implications for healthcare services.

Significance of Effect

The significance of the population health effect for this determinant of health is **minor adverse** (**not significant**). The professional judgment is that there would, at most, be a **slight adverse** change in the population health baseline. This conclusion reflects that road safety and access to health supporting services are public health priorities and there is causal association that is supported by the scientific literature. However, the level of change due to the Proposed Development is small and is appropriately *mitigated* by standard good practice measures that minimise disruption and disturbance. The change is **unlikely** to result in significant differential or disproportionate effects between the general population (low sensitivity) and the vulnerable sub-population (high sensitivity). Consequently, *no widening* of health inequalities would be expected, and no influence is expected on the ability to deliver local or national health policy.

11.4.3 Decommissioning Phase

Similar effects are expected for decommissioning as for construction and therefore these are not assessed separately. A Closure, Restoration and Aftercare Management Plan (CRAMP) will be used to determine the known environmental liabilities associated with the closure and decommissioning of the Proposed Development. Provision would be made to manage any environmental liabilities identified.

The decommissioning of the HRW facility is in total expected to take place over approximately 8 weeks.

11.5 Cumulative Impact Assessment

A Cumulative Impact Assessment (CIA) has been undertaken for human health; see **Chapter 20 - Cumulative Effects**.

11.6 Interactions

The interaction of human health effects with other disciplines are given in **Chapter 19 - Interactions between Environmental Factors**.

11.7 Mitigation Measures

11.7.1 Air Quality

No further mitigation is proposed.

11.7.2 Water Quality

No further mitigation is proposed.

11.7.3 Noise

No further mitigation is proposed.

11.7.4 Transport Modes, Access and Connections

No further mitigation is proposed.

11.8 Residual Impacts

11.8.1 Construction Phase

11.8.1.1 Air Quality

The population health effect remains, **minor adverse (not significant)**.

11.8.1.2 Noise and Vibration

The population health effect remains, **minor adverse (not significant)**.

11.8.1.3 Transport Modes, Access and Connections

The population health effect remains, **minor adverse (not significant)**.

11.8.2 Operational Phase

11.8.2.1 Air Quality

The population health effect remains, **minor adverse (not significant)**.

11.8.2.2 Water Quality

The population health effect remains, **minor adverse (not significant)**.

11.8.2.3 Noise and Vibration

The population health effect remains, **minor adverse (not significant)**.

11.8.2.4 Transport Modes, Access and Connections

The population health effect remains, **minor adverse (not significant)**.

11.8.3 Decommissioning Phase

As for the construction phase.

11.9 Monitoring

11.9.1 Construction Phase

No further monitoring is proposed.

11.9.2 Operational Phase

No further monitoring is proposed.

11.9.3 Decommissioning Phase

No further monitoring is proposed.

11.10 Schedule of Environmental Commitments

A summary of the environmental commitments, with regard to this chapter is set out at **Chapter 21 - Schedule of Environmental Commitments**.

11.11 Chapter References

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CHAPTER 12
LANDSCAPE AND VISUAL

Contents

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12 LANDSCAPE AND VISUAL

12.1 Introduction

This chapter considers the potential effects of the Proposed Development during the construction, operational and decommissioning phases on the surrounding landscape and visual amenity. It comprises a short assessment which considers the proposed change in the context of the surrounding landscape comprised of a built-up industrial estate. The objective of this assessment is to:

- Describe the landscape and visual baseline within a defined Study Area; and
- Assess the likely potential effects of the proposed change on the surrounding landscape and visual amenity.

12.2 Methodology

These sections outline the key legislation, policy and guidance as relevant to the landscape and visual amenity.

12.2.1 Legislation, Policy and Guidance

12.2.1.1 Legislation

Legislation relating to Landscape and Visual Impact Assessment is provided for under the Planning and Development Act 2000, and Planning Regulations, 2001 (as amended). Under this primary legislation, 'Landscape' has the same meaning as in Article 1 of the ELC (Section 2(1), Interpretation) (Government of Ireland, 2010).

Under the Act, planning authorities have a duty to include objectives in the development plan for the preservation of the character of the landscape and they also have powers to designate areas of special amenity and landscape conservation areas. The Proposed Development is located within the area covered by the South Dublin County Development Plan (SDCDP).

It is noted that the Landscape and Visual Impact Assessment (LVIA) methodology, follows the process outlined the *Landscape Character Assessment (LCA)* and *Landscape and Visual Impact Assessment (LVIA) for Specified Linear Infrastructure Projects: Overarching Technical Document* (TII Publication PE-ENV-01101, December 2020), published by Transport Infrastructure Ireland (TII). Whilst the assessment process is primarily concerned with assessing the visual impacts on Protected Views as identified in the SDCDP, the assessment also includes an assessment of predicted visual impacts from viewpoints that have been selected to be representative of a range of views that are experienced by a variety of receptors within the Study Area.

12.2.1.2 Policy

Policy of relevance in the SDCDP 2022-2028 is as follows:

- **Policy NCBH14:** Landscapes in the SDCDP states 'Preserve and enhance the character of the County's landscapes, particularly areas that have been deemed to have a medium to high Landscape Value or medium to high Landscape Sensitivity and to ensure that landscape considerations are an important factor in the management of development.'
- **NCBH14 Objective 1** states 'To protect and enhance the unique landscape character of the County by ensuring that development retains, protects and, where necessary, enhances the appearance and character of the landscape, taking full cognisance of the Landscape Character Assessment of South Dublin County (2021).'

- **Policy NCBH15** Views and Prospects states 'Preserve Views and Prospects and the amenities of places and features of natural beauty or interest including those located within and outside the County.'
- Land use zonings of relevance are as follows.
- **Zoning Objective OS** states 'To preserve and provide for open space and recreational amenities.'
- **Zoning Objective RU** states 'To protect and improve rural amenity and to provide for the development of agriculture.'
- **Zoning Objective HA (LV, DV, DM)** states 'To protect and enhance the outstanding natural character and amenity of the Liffey Valley, Dodder Valley and Dublin Mountains areas.'

12.2.1.3 Guidance

The methodology and approach to the assessment and the production of visualisation which accompany it, have been carried out in accordance with the guidance described in the following documents:

- Landscape Institute and Institute of Environmental Management and Assessment's Guidelines for Landscape and Visual Impact Assessment, 3rd Edition, (2013), hereinafter referred to as GLVIA 3; and
- Technical Guidance Note 06/19 Visual Representation of Development Proposals (The Landscape Institute, 2019).

12.2.2 Zone of Influence

A Zone of Influence (ZoI) or Study Area is identified in the baseline below.

12.2.3 Sources of Information to Inform the Assessment

Baseline conditions have been identified and assessed through analysis of the key sources of information outlined in **Table 12.1**.

Table 12.1: Summary of Key Datasets and Data Sources Used

Title	Source	Year
Discovery Series mapping and detailed vector maps	Ordnance Survey Ireland (OSi)	2023
Aerial / Orthophotography	OSi	2019
GeoDirectory property information	GeoDirectory	2023

In addition, a site visit was undertaken on 6th March 2023 to assess the existing environment, to establish the existing landscape and visual resource and to identify sensitive receptors, i.e. residential properties, scenic viewpoints. Site visits were also used to consider the potential effects on landscape character and visual impacts arising because of the Proposed Development.

12.2.4 Key Parameters for Assessment

The likely landscape and visual effects of the Proposed Development have been assessed by considering the changes that would occur to the existing landscape and visual amenity as a result of the introduction of the Proposed Development. The assessment of effects is arrived at by combining judgements concerning the sensitivity of the landscape or visual receptor (person) with judgements concerning the predicted magnitude of impact resulting from the proposed change.

12.2.5 Assessment Criteria and Significance

The methodology for the assessment of effects on landscape and visual amenity is guided by published best practice guidance set out in the Landscape Institute and Institute of Environmental Management and Assessment's *Guidelines for Landscape and Visual Impact Assessment*, 3rd Edition, (2013) hereinafter referred to as GLVIA 3. It is important to note that significance is determined on a case by case basis using professional judgement with the methodology below as a guide and this approach accords with the guidance in GLVIA 3.

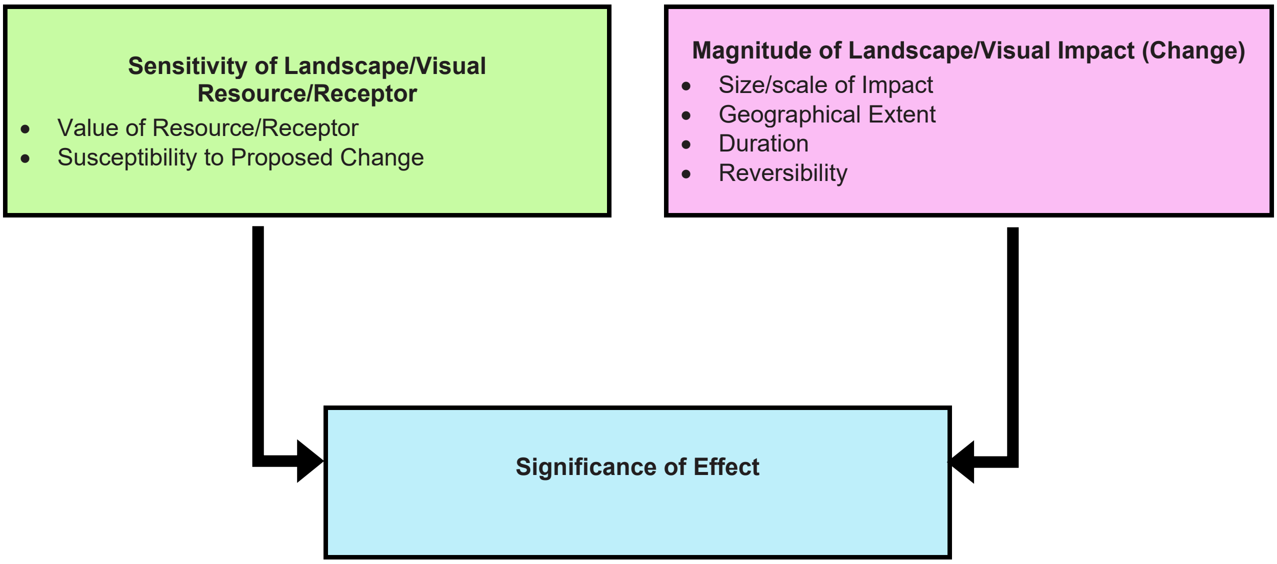


Figure 12-1: Assessment Criteria

The significance of effects on landscape, views and visual amenity have been judged according to a six-point scale: Profound, Major, Moderate, Minor, Negligible or None as presented in **Table 12.2**, which contains a description of the significance of effect criteria.

Table 12.2: Significance of Effect Criteria

Significance of Effect	Landscape Receptor	Visual Receptor
Profound	Where proposed changes would be uncharacteristic and/or would significantly alter a landscape of exceptional landscape quality (e.g., internationally designated landscapes), or key elements known to the wider public of nationally designated landscapes (where there is no or limited potential for substitution nationally).	Where proposed changes would be uncharacteristic and/or would significantly alter a view of remarkable scenic quality, within internationally designated landscapes or key features or elements of nationally designated landscapes that are well known to the wider public.
Major	Where proposed changes would be uncharacteristic and/or would significantly alter a valued aspect of (or a high quality) landscape.	Where proposed changes would be uncharacteristic and/or would significantly alter a valued view or a view of high scenic quality.
Moderate	Where proposed changes would be noticeably out of scale or at odds with the character of an area.	Where proposed changes to views would be noticeably out of scale or at odds with the existing view.
Minor	Where proposed changes would be at slight variance with the character of an area.	Where proposed changes to views, although discernible, would only be at slight variance with the existing view.
Negligible	Where proposed changes would have an indiscernible effect on the character of an area.	Where proposed changes would have a barely noticeable effect on views/visual amenity.
None	Where the Proposed Development would not alter the landscape character of the area.	Where the Proposed Development would retain existing views.

For the purposes of this assessment, those effects indicated as being profound or major are regarded as being significant in terms of the LVIA methodology. This is a typical approach for landscape and visual impact assessments adapted from GLVIA 3, which may differ from other environmental disciplines. Effects of moderate and lesser significance have been identified within the assessment, though are not considered significant in terms of the LVIA methodology (**Table 12.3**).

Table 12.3: Matrix Used for the Assessment of the Significance of the Effect

Sensitivity of Receptors	Magnitude of Effect: No Change	Negligible	Small	Medium	Large
Negligible	None	Negligible	Negligible	Negligible	Minor
Low	None	Negligible or Minor	Negligible	Minor	Minor or Moderate
Medium	None	Negligible or Minor	Minor	Moderate	Moderate or Major
High	None	Minor	Minor or Moderate	Moderate or Major	Major or Profound
Very High	None	Minor	Moderate or Major	Major or Profound	Profound

12.2.6 Data Limitations

This chapter of the Environmental Impact Assessment Report (EIAR) has been prepared based upon the best available information and in accordance with current best practice and relevant guidelines. There were no technical difficulties or otherwise encountered in the preparation of this chapter of the EIAR.

12.3 Description of the Existing Environment (Baseline Scenario)

12.3.1 Baseline Environment

A Study Area as indicated in **Figure 12-2** was identified with reference to desk study data and field survey for the purpose of assessing effects on landscape and visual amenity. The study area was identified to capture potential effects and took account of the nature and scale of the proposed change along with the industrialised context.

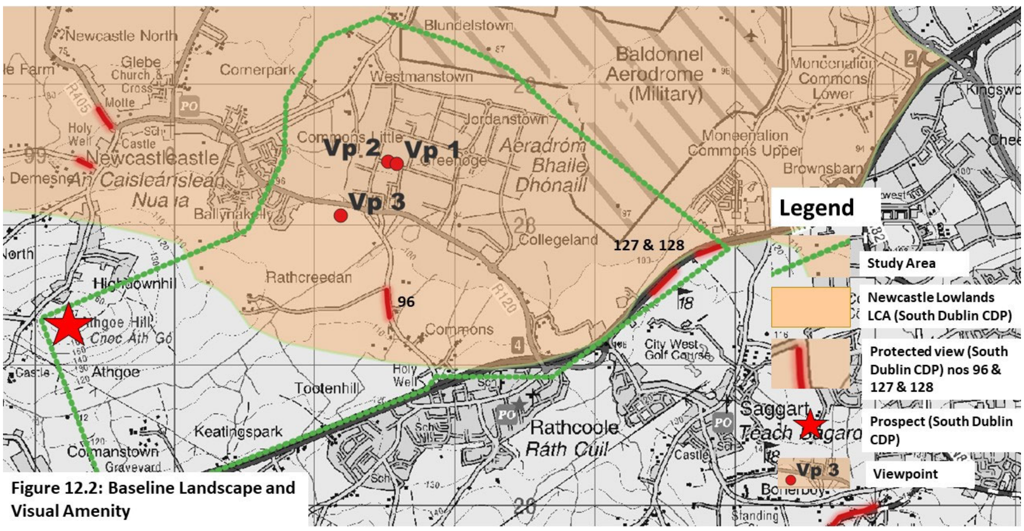


Figure 12-2: Baseline Landscape and Visual Amenity

12.3.1.1 Landscape Baseline

The site for the Proposed Development comprises an existing industrial facility located within the Greenogue Business Park, for which, the zoning objective EE – '*To provide for enterprise and employment related uses*' applies according to the SDCDP. The site for the Proposed Development features an area of hardstanding and two industrial buildings, Building 1 measuring 72.0 m long x 27.0 m wide and approximately 12.2 m high and Building 2 measuring 121.0 m long x 31.0 m wide and approximately 9.7-10.7 m high. A smaller office building (Building 3) measuring 20 m x 10 m and approximately 7.6 m high is located at the southern end of Building 1. The site is bounded on almost all sides with mature hedgerow vegetation. The Griffeen River, lined with mature hedgerow vegetation extends adjacent to the northern boundary of the site.

The industrialised landscape of Greenogue Business Park

The site is surrounded by the industrialised landscape associated with Greenogue Business Park. This comprises an extensive built up area featuring industrial buildings of similar height and scale to those (Building 1 and 2) located within the site. This industrialised landscape is considered to be of no particular landscape value and is assessed to be of negligible sensitivity in accordance with the methodology above.

The Newcastle Lowlands (SDCDP)

The site and surrounding industrialised landscape of Greenogue Business Park is located within the Newcastle Lowlands landscape character area according to the published landscape character assessment. This surrounding landscape features large expanses of rolling farmland with a large scale field pattern along with individual small settlements such as that at Newcastle and Rathcoole. The Casement Aerodrome (Baldonnel) is located immediately east of the Greenogue Business Park. The N7 crosses this landscape south of the site. The lands surrounding the site and the wider Greenogue Business Park carries the zoning objective RU – 'To protect and improve rural amenity and to provide for the development of agriculture' according to the SDCDP.

The key characteristics of the Newcastle Lowlands as published in the landscape character assessment are as follows:

- '*Low-lying and gently undulating agricultural lands over limestone.*
- *Established communication corridors include the Grand Canal and railway corridor traverse east to west and two aerodromes at Weston and Baldonnel.*
- *Agricultural land-use primarily pasture and tillage.*
- *Increasing influence of urban activities closer to the motorways, national roads and regional roads.*
- *Long history of historic settlement and human activity with medieval landscape complex associated with Newcastle village and surrounds.*
- *Number of demesnes associated with former country houses and institutions including reuse of older country houses at sites such as Peamount and Baldonnel.*'

The Newcastle Lowlands is categorised as being of medium to high value and medium sensitivity (both landscape and visual) according to the published landscape character assessment.

12.3.1.2 Visual Baseline

The visual baseline comprises views and prospects to be preserved in the SDCDP along with views identified for the purpose of this assessment.

Views / Prospects to be Preserved (SDCDP)

The views / prospects to be preserved that occur within the Study Area are tabulated below in **Table 12.4** along with a description of the existing view for those that are publicly accessible. These views are indicated in **Figure 12-2**.

Table 12.4: Existing Visual Amenity at Views / Prospects to be Preserved (SDCDP)

ID	Location	Viewer Types	Description of Existing Views
View 96	Near Rathcreedan	Commuters on foot or travelling by car	Views are available of the minor road in the foreground bounded by hedgerow vegetation on the eastern side. Views of the wider farmed landscape towards Athgoe Hill on the western side of this minor road are available. Intermittent glimpse views of the landscape to the east are available along with individual and clusters of dwellings and built structures.
View 127 and 128	N7 Road near City West	Commuters travelling by car	Views are available of industrial buildings in the foreground against the backdrop of the wider farmed landscape. The industrial buildings are dominant in the existing view attained at speed along the N7 Road.
Prospect 1	Athgoe Hill	Private – no public access	Views may be available from this elevated location towards the Greenogue Business Park.

Existing Visual Amenity at Selected Viewpoint Locations

In addition to views and prospects to be preserved in the SDCDP, referenced above, visual receptors with existing views of the application site and / or potential views of the Proposed Development mainly comprise commuters on foot or road users in close proximity to the existing Enva Facility. The baseline visual amenity representing these viewer types at specific viewpoint locations is captured in **Table 12.5**. The location of each of the viewpoints is indicated on **Figure 12-2**.

Table 12.5: Existing Visual Amenity at Selected Viewpoint Locations

ID	Location	Viewer Types	Description of Existing View
VP 1	Grants Drive	Commuters on foot or travelling by car	Short range views are available of the existing Enva Facility, in particular the existing Building 1 and the existing office (Building 3) with the car park and cars in the foreground.
VP 2	Grants Drive	Commuters on foot or travelling by car	Short range views are available of the existing Enva Facility, in particular Building 1 and the existing office (Building 3) with boundary fence and hedgerow vegetation in the foreground. These views are attained with the portacabin and car parking of the adjacent industrial facility in the foreground.
VP 3	Newcastle Cemetery	Visitors to cemetery / open space	Views are available in the distance of the R120 road and traffic and the existing Greenogue Business Park, in particular a large industrial building associated with a vehicle test centre. These views are available through gaps in the boundary vegetation at the cemetery and with a pastoral field in the foreground.

Photographs of the existing views are presented below.

Plate 12-1: Viewpoint 1 Grants Drive

Plate 12-2: Viewpoint 2 Grants Drive

Plate 12-3: Viewpoint 3 Newcastle Cemetery

12.3.2 Evolution of the Environment in the Absence of the Proposed Development

In a ‘do-nothing’ scenario the site would not be redeveloped, and the baseline would be unchanged. Thee would be no change in the current visual environment.

12.4 Description of Likely Significant Effects

This section sets out the likely significance effects for the construction phase, operational phase and decommissioning phase.

12.4.1 Construction Phase

Chapter 5 - Description of the Construction Phase describes the construction methods proposed in detail, with construction works anticipated to be approximately 18 weeks in duration. Construction phase works will be visible to a varied extent depending upon the individual construction activities being undertaken at any given time.

Construction phase effects relate generally to the following activities that are common across the Proposed Development:

- Site clearance activities.
- Temporary working areas.
- Construction machinery and plant movements within the Enva site and the surrounding road network.
- Demolition of existing steel-clad office at the southern end of Building 1.

12.4.2 Operational Phase

12.4.2.1 Landscape and Visual Effect

The main sources of landscape and visual effects will be derived from the following:

- Construction of a new roofed enclosure approximately 130 m^2 (dimensions 6.6 m wide x 19.9 m long and 6.2 m high) located on the east face of the Building 1 for storage of clean bins.
- Security hut (4.3 m^2) and 2.7 m in height at the main entrance to the facility.
- Construction of a new structure of approximately 191 m^2 and 9.1 m in height for bulk trailers.
- Introduction of a stack to the roofline of Building 1. The stack will measure 300 mm diameter and will protrude a maximum of 2 m from the eastern edge of the roof. A steam plume associated with this new stack may be visible on an intermittent basis. An access platform for stack sampling will also be developed.
- A walkway linking the carpark area over the office/Building 2, and down the side of Building 1. This walkway may need a low barrier to protect pedestrians.

Effects on Landscape and Landscape Character

The proposed changes will directly affect the landscape of the Enva facility comprised of hard standings, industrial buildings and structures. There will be no loss of landscape elements of value including trees and woodland and there will be no direct effect to the Griffeen River on the northern boundary of the site. A negligible magnitude of effect to this landscape is considered to arise during operation to this industrialised landscape of negligible sensitivity resulting in a **negligible** and **not significant** adverse effect.

Industrialised Landscape of Greenogue Business Park

The proposed change will result in direct effects on the built up industrialised landscape of the Greenogue Business Park. The site for the Proposed Development is located nearer to the centre of the industrialised landscape. A negligible / no change magnitude of effect to this landscape is considered to arise during operation to this industrialised landscape of negligible sensitivity resulting in a **negligible** and **not significant** adverse effect. The scale of the proposed change is so limited as to be almost indistinguishable from the surrounding built up industrial area. The proposed changes are considered to have an indiscernible effect on the industrialised landscape of the Greenogue Business Park.

The Newcastle Lowlands (SDCDP)

The proposed change will not result in effects on The Newcastle Lowlands due to screening by intervening industrial buildings within the Greenogue Business Park. A no change magnitude of effect to this landscape is considered to arise during operation to The Newcastle Lowlands of medium sensitivity resulting in a **none** and **not significant** adverse effect.

12.4.2.2 Effects on Visual Amenity

Views / Prospects to be Preserved (SDCDP)

Effects on visual receptors at views / prospects to be preserved (SDCDP) are tabulated in **Table 12.6**.

Table 12.6: Effects on Viewers at Selected Viewpoint Locations during Operation

ID	Location	Viewer Types	Description of Proposed View	Sensitivity	Magnitude of Impact	Significance of Visual Effects
View 96	Near Rathcreedan	Commuters on foot or travelling by car	The Proposed Development will be screened from view by intervening vegetation and built structures.	Low	No change	**None and not significant adverse effect.**
View 127 and 128	N7 Road near City West	Commuters on foot or travelling by car	The Proposed Development will be screened from view primarily by industrial buildings in the foreground.	Low	No change	**None and not significant adverse effect.**
Prospect 1	Athgoe Hill	Private – no public access	The Proposed Development is expected to be largely screened from view and scarcely discernible at a distance of over 2.5 km.	High	Negligible	**Minor and not significant adverse effect.**

Visual Receptors at Specific Viewpoint Locations

Effects on visual receptors with existing views towards the application site and / or potential views of the Proposed Development are tabulated in **Table 12.7**.

Table 12.7: Effects on Viewers at Selected Viewpoint Locations during Operation

ID	Location	Viewer Types	Description of Proposed View	Sensitivity	Magnitude	Significance
Vp 1	Grants Drive	Commuters on foot or travelling by car	Short range views will be available of the existing Enva Facility and Building 1, along with the relocated replacement office (Building 3) with the existing car park in the foreground. Part of the proposed walkway and barrier linking existing Buildings 1 and 2 will also be visible. The proposed stack on Building 1 will be visible as a small element. Although the visual change will be clearly noticeable to the viewer, these changes will not be substantially out of character with the baseline.	Low	Small	**Minor and not significant adverse effect**
Vp 2	Grants Drive	Commuters on foot or travelling by car	Short range views will be available of the existing Enva Facility, in particular Building 1 and the relocated replacement office (Building 3) with boundary fence and hedgerow vegetation in the foreground. These views are attained with	Low	Small	**Minor and not significant adverse effect**

ID	Location	Viewer Types	Description of Proposed View	Sensitivity	Magnitude	Significance
			the portacabin and car parking of the adjacent industrial facility in the foreground. The proposed stack on Building 1 will be visible as a small element. Although the visual change will be clearly noticeable to the viewer, these changes will not be substantially out of character with the baseline.			
Vp 3	Newcastle Cemetery	Visitors to cemetery / open space	The proposed change is expected to be scarcely visible, largely screened from view by large scale buildings and structures in the foreground associated with the existing Greenogue Business Park, in particular a large industrial building associated with a vehicle test centre.	Low	Negligible	**Negligible and not significant adverse effect**

12.4.3 Decommissioning Phase

During the decommissioning stage, the building, albeit decontaminated and all processing completed, would remain in situ and the effects on landscape and visual amenity would be broadly similar to that during the operational phase.

12.5 Cumulative Impact Assessment

The cumulative impacts are addressed in **Chapter 20 – Cumulative Effects**.

12.6 Interactions

Interactions are addressed in **Chapter 19 - Interactions Between Environmental Factors.** There are no potential impact interactions between the environmental topic of Landscape and Visual and the other environmental topics.

12.7 Mitigation Measures

12.7.1 Construction Phase

There are no proposed landscape and visual mitigation measures. Therefore, the residual effects are the same as those reported above.

12.7.2 Operational Phase

There are no proposed landscape and visual mitigation measures. Therefore, the residual effects are the same as those reported above.

12.7.3 Decommissioning Phase

There are no proposed landscape and visual mitigation measures. Therefore, the residual effects are the same as those reported above.

12.8 Residual Impacts

Residual effects are the same as those reported above during the operational phase for landscape and visual amenity.

12.9 Monitoring

12.9.1 Construction Phase

No visual monitoring is proposed.

12.9.2 Operational Phase

No visual monitoring is proposed.

12.9.3 Decommissioning Phase

No visual monitoring is proposed.

12.10 Schedule of Environmental Commitments

A summary of the environmental commitments, with regard to this chapter is set out at **Chapter 21 - Schedule of Environmental Commitments**.

12.11 Chapter References

The Landscape Institute with the Institute of Environmental Management and Assessment (2013) Guidelines for Landscape and Visual Impact Assessment, Third Edition, Routledge

The Landscape Institute (September 2019) TGN 06/19 – Visual representation of development proposals.

CHAPTER 13
CULTURAL HERITAGE

Contents

Tables

Figures

13 CULTURAL HERITAGE

13.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) considers and assesses the cultural heritage (comprising archaeological, architectural, and cultural heritage) environment within the Proposed Development site at Greenogue Business Park. It identifies, describes and presents an assessment of the likely significant effects of the Proposed Development on cultural heritage during the construction, operational and decommissioning phases of the Proposed Development. The assessment presented is based on the information provided in **Chapter 4 - Description of the Proposed Development** and **Chapter 5 - Description of the Construction Phase**.

13.2 Methodology

13.2.1 Legislation, Policy and Guidance

The following sections outline the key legislation, policy, and guidelines that were considered and consulted for the purposes of the assessment.

13.2.1.1 Legislation

- Architectural Heritage (National Inventory) and Historic Monuments (Miscellaneous Provisions) Act, 1999.
- Heritage Act, 1995 (as amended).
- National Monuments Act, 1930 to 2014.
- Planning and Development Act 2000 (as amended).

13.2.1.2 Policy

- Code of Practice for Archaeology agreed between the Minister for Arts, Heritage, Regional, Rural and Gaeltacht Affairs and Transport Infrastructure Ireland, 2017.
- Council of Europe (1985). Convention for the Protection of the Architectural Heritage of Europe (ratified by Ireland 1997), 'Granada Convention'.
- Council of Europe (1992). European Convention on the Protection of the Archaeological Heritage (ratified by Ireland 1992), 'Valletta Convention'.
- Council of Europe (2005). Framework Convention on the Value of Cultural Heritage for Society, 'Faro Convention'.
- International Council on Monuments and Sites (ICOMOS) Xi'an Declaration on the Conservation of the Setting of Heritage Structures, Sites and Areas, 2005.
- The United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Convention, 1972.

13.2.1.3 Guidance

- Cultural Heritage Impact Assessment for TII Projects – Overarching Technical Document (Working draft).
- Department of Arts, Heritage, Gaeltacht and the Islands (1999). Framework and Principles for the Protection of the Archaeological Heritage.
- European Commission (2017). Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report.
- Historic England (2017). The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning Note 3 (Second Edition).

- National Roads Authority (NRA) (2005). Guidelines for the Assessment of Archaeological Heritage Impact of National Road Schemes.
- The Heritage Council (2013). Historic Landscape Characterisation in Ireland: Best Practice Guidance.

13.2.2 Zone of Influence

The Proposed Development is located in the townland of 'Greenoge' (the modern place name, in contrast, is commonly 'Greenogue'*)*, in the parish of Rathcoole and barony of Newcastle. The medieval villages of Newcastle and Rathcoole are located approximately 940 m west and approximately 1.5 km south of the Proposed Development, respectively.

The Proposed Development lies within Greenogue Business Park, characterised by industrial and commercial development. The wider landscape is, in places, still somewhat rural in character and land use varies from arable cultivation to residential and industrial, with Casement Aerodrome (Baldonnel) to the north-east.

The zone of influence (ZoI) for Cultural Heritage includes the site of the Proposed Development and the surrounding area within a radius of 1 km. Recorded archaeological monuments within 1 km can serve as a good indicator of previously unidentified sites of archaeological potential in the area. A 1 km radius also allows for the identification of designated architectural heritage sites (Record of Protected Structures (RPS) / National Inventory of Architectural Heritage (NIAH)) to inform the built heritage assessment. The 1 km radius also allows for the assessment of potential indirect impacts on Cultural Heritage features, e.g., potential impact on setting.

13.2.3 Sources of Information to Inform the Assessment

The assessment is based on a desk study. The Proposed Development is a brownfield site, with no archaeological or architectural heritage sites in its vicinity, and its current state was confirmed using aerial imagery. The desk study availed of the following sources:

- The National Monuments, Preservation Orders and Register of Historic Monuments lists were sourced directly from the Department of Housing, Local Government and Heritage (DHLGH).
- 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 RMP 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, DHLGH), 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.
- RPS and Architectural Conservation Areas (ACAs), South Dublin County Development Plan (SDCDP) 2022-2028.
- The NIAH Building Survey and Garden Survey (DHLGH) highlight a representative sample of architectural heritage in the county and raise awareness of the wealth of same. The NIAH surveys can be reviewed online at www.buildingsofireland.ie.
- The topographical files of the National Museum of Ireland.
- National Folklore Collection (www.duchas.ie).
- Cartographical sources, OSi Historic Mapping Archive, including early editions of the Ordnance Survey (OS) maps and other historical mapping (such as Down Survey 1656 Map and Taylor's Map of the County of Dublin 1760).
- Excavations Bulletins and Excavations Database (1970-2021).
- Aerial imagery (Google Earth 2001–2021, Bing 2013; OSi 1995, 2000, 2006.

Other documentary sources (as listed in the references at the end of this chapter).

13.2.4 Key Parameters for Assessment

Potential impacts on the cultural heritage environment can be described in three categories: direct physical impacts; indirect physical impacts; and impacts on setting.

Direct Physical Impacts

Direct physical impacts describe those development activities that directly cause damage to the fabric of a heritage asset. Typically, these activities are related to construction works, e.g., they could include excavation of foundations, earthmoving / site preparation creation of access roads and the excavation of service trenches. Further direct physical impacts are unlikely to be experienced during the operational life of the Proposed Development.

Indirect Physical Impacts

Indirect physical impacts describe those processes, triggered by development activity, which lead to the degradation of heritage assets.

Impacts on Setting

Impacts on setting of heritage assets describes how the presence of a development changes the surroundings of a cultural heritage asset in such a way that it affects (positively or negatively) the heritage significance of that asset. Visual impacts are most commonly encountered but other environmental factors such as noise, light or air quality can be relevant in some cases.

13.2.5 Assessment Criteria and Significance

Cultural heritage sites 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 effects 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 potential magnitude of impact with respect to the sensitivity / value of the asset, the overall significance of the effect is then classified as not significant, imperceptible, slight, moderate, significant, very significant, or profound.

A glossary of impact assessment terms, including the criteria for the assessment of effect significance, is contained in **Appendix 13.1**.

13.2.6 Data Limitations

This chapter of the EIAR has been prepared based upon the best available information and in accordance with current best practice and relevant guidelines.

There were no technical difficulties or otherwise encountered in the preparation of this chapter of the EIAR.

13.2.7 Consultation

No consultation has been undertaken to date. Consultation will carried out in advance of the submission. The EIAR will be submitted to the key stakeholders identified by ABP.

13.3 Description of the Existing Environment (Baseline Scenario)

13.3.1 Baseline Environment

13.3.1.1 Archaeological and Historical Background

Prehistory (c. 7000 BC – AD 400)

The earliest form of archaeological activity in this area dates to the Bronze Age (c. 2300-500 BC). A ring-ditch (SMR DU021-103) identified on aerial imagery in 1991 as a cropmark is located approximately 865 m south-east of the Proposed Development, in Greenogue Business Park. The site has since been built-upon. The term ring-ditch refers to the circular or annular shape in plan of a ditch ('ring-ditch'), sometimes surrounded by a low concentric bank ('ring-bank') or enclosing a low interior mound ('ring-barrow'). Ring-ditches are usually associated with pits filled with cremated human burial remains. They seem often to be distributed along river valleys, frequently in topographical locations that mimic their shape or accent their prominence, e.g., on hillslope spurs or 'false crests' near to the summit of hills. They date primarily to the Bronze and Iron Age.

Two fulachtaí fia were uncovered approximately 910-930 m to the west of the Proposed Development in advance of the construction of the Newcastle Manor residential estate (Licence Nos 01E1068 & 03E0369, Excavations Bulletin Refs 2001:246 & 2003:459; SMR DU021-095). Fulachtaí fia are generally accepted to be ancient cooking places, consisting of a water-filled trough into which fire-heated stones were placed to heat the water for cooking. The used, and often burnt and fragmented, stones were removed and accumulated in a low kidney or horseshoe-shaped mound around the sides of the trough. They are usually located close to a water source (marshy areas, streams, or springs) and their presence is often indicative of Bronze Age (and sometimes Iron Age) seasonal communal activity in river valleys and boggy ground. They often appear in groups and are represented by small grass-covered mounds of burnt stone ('burnt mounds') or spreads of burnt stone ('burnt spreads') where the field has been ploughed and the mound levelled.

Further investigation at Newcastle Manor identified habitation activity. (Licence No. 04E1427, Bulletin Ref. 2004:0469), approximately 840 m to the west of the Proposed Development. The remains, considering their proximity to the fulachtaí fia, have been interpreted as possible further signs of prehistoric occupation of this area.

In addition, there are two possible Bronze Age burial sites in the surroundings of the Proposed Development. One is situated within Greenoge itself (RMP DU021-028), at the southernmost end of the townland, approximately 1.2 km to the south of the Proposed Development. The other is a tumulus site at Rathcreedan (DU021-027), probably a prehistoric burial mound located approximately. 1.1 km to the south-west.

There is evidence for prehistoric burial or funerary activity in a large area between Ballynakelly and Rathcreedan townlands, approximately 1.1 km south-southwest of the Proposed Development (Licence No. 07E0245, Bulletin Ref. 2007:431). The remains comprised a 7 m-wide ring-ditch, an urn burial, three pits containing cremation burials and several other possible cremation pits were recorded. A fragmented Middle Bronze Age urn was recovered from a cremation pit. A saddle quern was also recovered from a pit located in proximity to the ring-ditch. A large pit or well of probable Bronze Age date was also excavated and it is in this context that an exceptionally well-preserved Middle Bronze Age palstave and numerous enigmatic bundles of straw were deposited.

Early Medieval Period (c. AD 400 – AD 1200)

The Early Medieval period saw the development of a mixed-farming economy managed by kings, nobles, and free farmers. The principal settlement type during this period was the ringfort or rath, the most common monument type in Ireland, with at least 30,000 examples recorded. They consist of a circular or sub-circular area (although irregular shapes have been noted recently through the excavation of such features) defined by an earthen bank or by a stone wall with an external ditch. These enclosures were essentially habitation sites or farmsteads, which vary in both size and morphology; from simple univallate enclosures measuring 30 m diameter to larger bivallate or trivallate sites in strategic locations. They were not simple isolated homesteads, however, and should be considered within their contemporary settlement landscape, which would have consisted of unenclosed settlements, farms, and fields, routeways and natural resources (Stout, 2000). Typically, ringforts are sited on good, well-drained soils, usually over the 100 m contour, close to a water source, and often located in proximity to routeways (ridges, eskers, morraines).

There are relatively few ringforts in Dublin, possibly due to the high concentration of Anglo-Norman settlement in the country, with consequent tillage, which could have resulted in sites being ploughed out and no longer being recognisable above ground. Often, the only indication of the former presence of such structures may be preserved in placenames with elements such as *Dún*, *Rath* or *Cashel*, as in Rathcoole and Rathcreedan.

Enclosures can sometimes prove to be denuded ringforts and two enclosures are located within a kilometre radius, including one discovered after archaeological investigations in advance of a residential development in Ballynakelly townland, approximately 995 m to the west of the Proposed Development. The excavated enclosure in Ballynakelly (Licence No. 06E0176, Bulletin Ref. 2006:564) is a complex monument, square in shape with rounded corners and measuring approximately 70 by 90 m. The main period of occupation was during the early medieval period. A number of associated features were identified, including a possible storage pit, some smaller pits, four possible post-holes, curvilinear gullies, and a kiln. Occupation of the enclosure appears to have continued in later medieval times, as evidenced by a large comma-shaped kiln, agricultural furrows, and an area of gullies and metalled surfaces in the north-west corner of the site. A single human extended burial was excavated and a round pit that contained the carefully positioned and neatly stone-covered skeleton of a small dog was identified. Artefacts included five iron knifes that are consistent with a type dating to the early medieval period and a number of unidentifiable iron objects. Large quantities of disarticulated animal bone were recovered from the ditches. À second enclosure is recorded approximately 1 km south-west of the Proposed Development (SMR DU021-105). It is a D-shaped enclosure identified as a cropmark on aerial photographs in 2005, to the southeast of Newcastle village. There is evidence for a double ditch along the north-west side and an entrance causeway to the north-northwest.

Medieval and Post-Medieval Period (c. AD 1200 – AD 1700)

In addition to the continued occupation of the enclosure in Ballynakelly, as discussed above, later settlement in the wider area is evidenced by a moated site (SMR DU021-104), located approximately 1 km south-west of the Proposed Development. The monument is shown on aerial photography as a rectangular cropmark indicating an enclosure defined on three sides by a broad fosse; the north-eastern side is defined by a small stream. This enclosure is recorded as a rectangular field on the first edition OS six-inch map; however, the broad fosse suggests that this may be an archaeological monument (as described in the SMR file).

In the wider area, the medieval landscape is composed by ecclesiastical sites such as those at Kilmactalway (DU021-003), approximately 2 km north of the Proposed Development, castle sites such as Colmanstown (DU020-011), approximately 3 km south-west, and medieval villages like Rathcoole (DU021-030) and Newcastle (DU020-003). Although outside the ZoI, these important places – particularly the manors – would have exerted influence over their surrounding landscapes, including the site of the Proposed Development.

Newcastle (RMP DU020-003)

Newcastle was one of four villages in this area that became royal manors after the Anglo-Norman invasion. As its name suggests, it was probably fortified, although little remains of the medieval fabric of the village, apart from the long narrow burgage plots typical of Anglo-Norman settlements. Archaeological excavation carried out between Ballynakelly and Rathcreedan uncovered the presence of medieval pottery throughout the site and the nature of the features identified during the investigations suggest at least a low level of agricultural activity being carried out in the possibly open fields beyond the well-defined burgage plots of Newcastle village during the medieval period (Licence No. 07E0245, Bulletin Ref. 2007:431).

Unlike the other manors in the area, which were leased out, Newcastle was retained by the crown for its own revenue, and there are references in 1260 to tenants complaining of high rents charged by the middlemen who managed the town. The lands near the town were referred to in early charters as Lymerhin or Leuan, from which the name Newcastle Lyons is probably derived (Ball 1905). Its fortifications appear to have protected it from the raids and attacks to which Rathcoole and Saggart were frequently subjected.

It is not clear where the castles of Newcastle were located. Ball (1905) mentions there being six castles in the vicinity, including one at Colmanstown to the west of Newcastle (DU020-011001), built by the Locke family, who are buried in the nearby church. One of the castles referred to may be that at Athgoe (DU020-008), also to the west of the town and 3.2 km south-west of the Proposed Development. The RMP contains a reference to a possible tower house site in the village itself (DU021-017002) and another tower house (RMP DU20-003004) located towards the south-western end of the village, marked on the current edition OS six-inch map as ‘Castle (in Ruins)’. This may have been the castle or residence belonging to William Carrick or a castle to which a hall was attached belonging to the Russell family. Both are recorded in Berry’s *Register of Wills* (quoted by Ball 1905). Lewis (1837) describes the town as having the ruins of three castles and a church with a fine eastern window, dating from the 15th century.

The 17th century appears to have been a relatively prosperous time for Newcastle, with a courthouse being built and a garrison being stationed in the town. It was incorporated as a borough in 1612 and was granted a charter by James I the following year. The town shrank somewhat during the period of the Commonwealth in the mid-17th century, during which time it was described as having seven castles, but a population of only 115 (Down Survey 1659).

The church of Newcastle (DU020-003002) was dedicated to St Finian, who established a monastery there in the 6th century. It is a divided nave and chancel church, apparently built in the 15th century, with a two-storey battlemented tower at its west end. There may have been an older church on the site, as a Romanesque head, believed locally to be a portrait of St Finian, is set into the south wall and probably came from an earlier structure. The eastern window mentioned by Lewis was removed and replaced in the nave during renovations and rebuilding by the Church of Ireland in 1724. An early Christian cross slab (DU020-003003) in the graveyard has a ringed cross on one side and a simple cross on the other. There is also a holy well (DU020-003005) dedicated to the saint, now in rather poor condition (Harbison 1975).

Rathcoole (RMP DU021-030)

The place name of Rathcoole, *Rath Chumhaill*, is probably derived from the presence of the site of a rath, allegedly constructed by the father of legendary Fionn Mac Cumhaill, a story included by Eugene O'Curry in his *Letters* for the Ordnance Survey (OS), when he found what was believed to be the remains of a rath near the village (Ball 1905). After the Anglo-Norman conquest, the lands of Rathcoole became the property of the See of Dublin and, during the 13th century, the town formed a small manor that belonged to the archbishop of Dublin, where the principal building of the time was a water mill. The majority of land within the manor was under grass, and the lands mentioned by Ball (1905) include '*the water meadows, the grenouille mead* [frog meadow], *the middle and north flagges or rushy lands, the midway, the haggard, the curragh and the ox close, as well as common pasture on the mountains of Slievethoul*.'

After the Bruce invasion, Rathcoole, like other outlying villages, suffered sporadic attacks from the native Irish, and a considerable amount of land in the area was returned in 1326 as being worth nothing due to the proximity of the unfriendly tribes. In the next few centuries, Rathcoole gained importance, and many fortified houses were built in the area. The town was ruled by a provost and was maintained in a condition of defence as an outpost position of the Pale. During the rebellion of Viscount Baltinglass in 1580, however, the Irish, under the command of Fiach McHugh, burned Rathcoole, and this act was repeated twenty years later, with Christopher Peyton, who owned the village, writing 'his poor town lay in waste and unmanned, being pillaged by the rebels and burnt by the soldiers' (Calendar of Irish State Papers).

In 1642, Sir Thomas Armstrong was forced to leave Rathcoole by two thousand insurgents; this success was, however, short-lived and, after the ensuing battle, a garrison was established in Rathcoole in 1648. Under its protection, the village prospered and is stated to have had 'many good habitable houses and cabins and two old castles.' The village appears to have deteriorated in the 18th century, when John Loveday and Philip Luckombe observed 'wretched cabins made of mud and thatched with straw' (Loveday 1732) and that 'the village of Rathcoole…composed of clay huts awkwardly built and irregularly disposed' (Luckombe 1732). During this time, a large house was built for the accommodation of one of the schools founded by the Mercer family, possibly the 'College' shown on Rocque's 1760 map of Dublin.

The church at Rathcoole occupies the site of an earlier church, which was assigned in the 13th century to the dean of St Patrick's Cathedral. The present church does not appear to incorporate any features of architectural significance, although it is possible that the remains of the 13th-century church survive below the ground or are incorporated within the fabric of the existing church (Bradley 1998).

13.3.1.2 Cartographic Sources

Pre-Ordnance Survey Maps

William Petty's Down Survey map of the Barony of Newcastle and Uppercross from *c*. 1656 names *'Greenoch'* (Greenoge) between the medieval villages of Rathcoole, on *'the high way to the Naas'*, and *'the towne of Newcastle & Old Castle'* (**Figure 13-1**). The townland is indicated as comprising arable, pasture, and meadow.

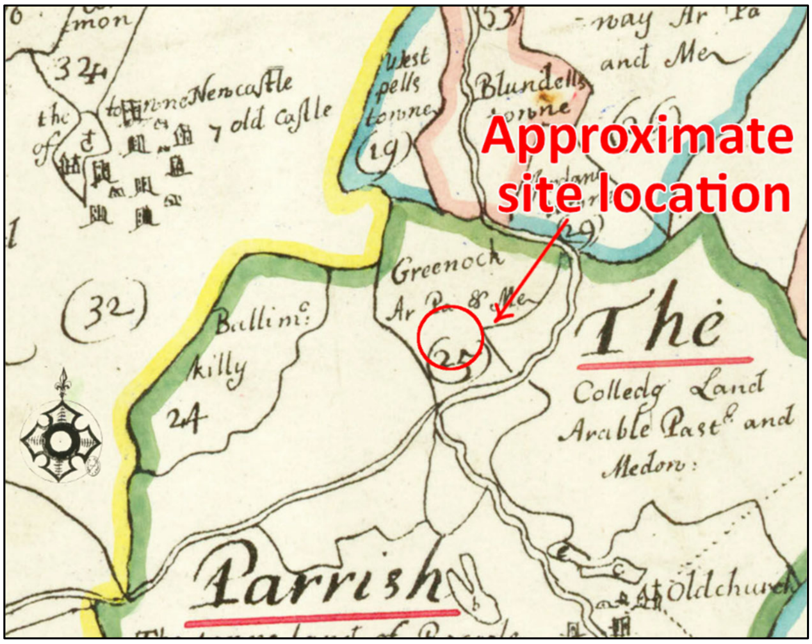


Figure 13-1: Down Survey Map (c. 1656) of the Barony of Newcastle with Approximate Location of the Proposed Development (in red)

In the following century, Rocque's map of Dublin County (1760) shows the area around Greenoge as open farmland, punctuated by small settlement (**Figure 3-2**). The buildings at Greenoge (spelled 'Grenoge') are shown next to a stream and while they are indicated as 'mill' on the OS six-inch map (see below), they are not named as such here. This stream eventually joins the River Camac further downstream. The corn mill at Rathcreedan ('Ragheredan') is named. Churches are shown at Rathcoole, Newcastle, Kilbride, and Kilmactalway (the last two noted as being 'in ruins') and a castle is shown at Newcastle.

Figure 13-2: John Rocque's Map of County Dublin (1760) with Approximate Location of the Proposed Development (in red)

Pockets of the farmland indicated on the Down Survey and on Rocque were common ground, an English term that referred to commonly held grazing land and that was subsequently preserved in townland names. Commons were usually located near towns or villages, in this case, the villages of Rathcoole and Newcastle. The Commons of Newcastle were not highlighted on Petty's Down Survey (see above) but are shown by Rocque, stretching eastward from a point close to the village to the Greenoge townland boundary.

On Taylor's Map of the Environs of Dublin (1816) the townland of *Grenoge* (Greenoge) is characterised by its buildings, the aforementioned stream, and predominantly by a woodland, which appears to cover a large area of the townland. The large tract of common ground associated with Newcastle is also indicated (**Figure 13-4**).

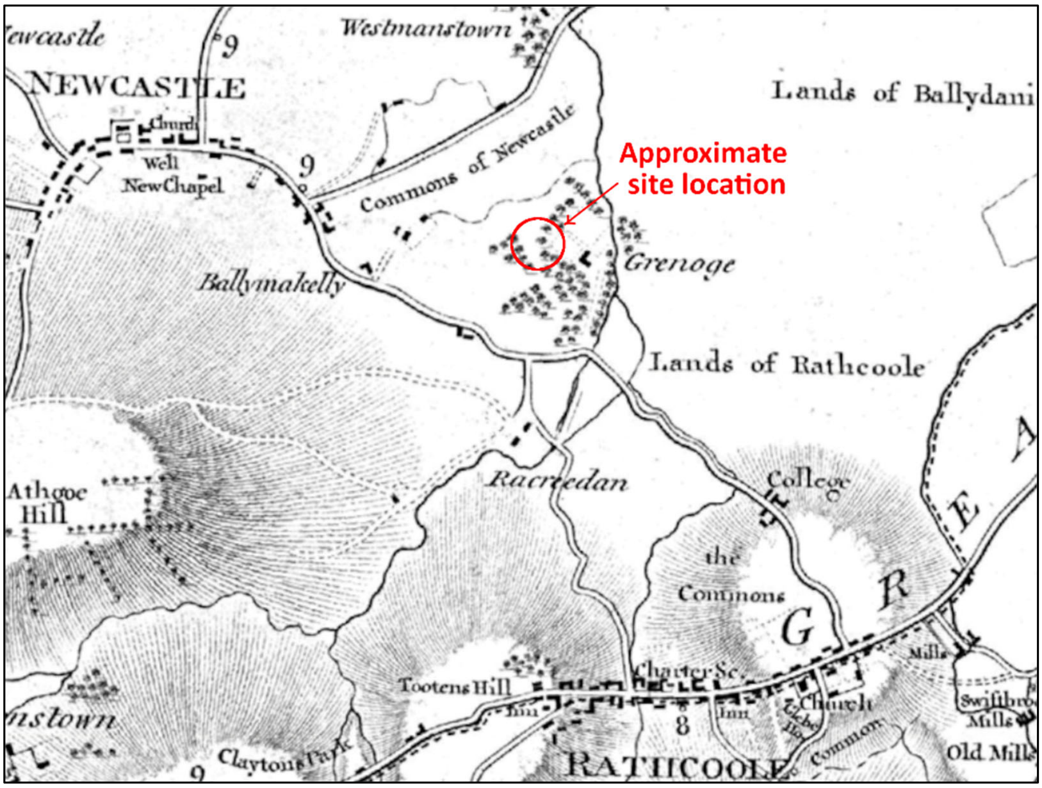


Figure 13-3: Taylor's Map of the Environs of Dublin (1816) with Approximate Location of the Proposed Development (in red)

Ordnance Survey Maps (19th / early 20th century)

The 1837 Ordnance Survey first edition six-inch map of the area shows the townland of Greenoge much as it is on recent editions, with field boundaries as they are today (**Figure 13-4**). College Lane (R120) to the south of the Proposed Development is depicted following its present course. There are two main features within the townland. The more southerly of these is a quarry, located to the east of the corn mill indicated by Rocque at Rathcreedan. The second is the Greenoge Corn Mill. This is shown as a substantial complex of buildings with a milldam, a millpond, and an orchard and gardens, reached from the road by a long, tree-lined avenue.

At the time of the Ordnance Survey 25-inch map (1909), the most significant change is that both the mill and the quarry are annotated as 'disused', as on the revised edition of the six-inch map dated 1911 (**Figure 13-5**). Nothing of the complex survives today except for a small section of the mill race that once ran from the south to the mill, beyond the Proposed Development outside Greenogue Business Park to the south.

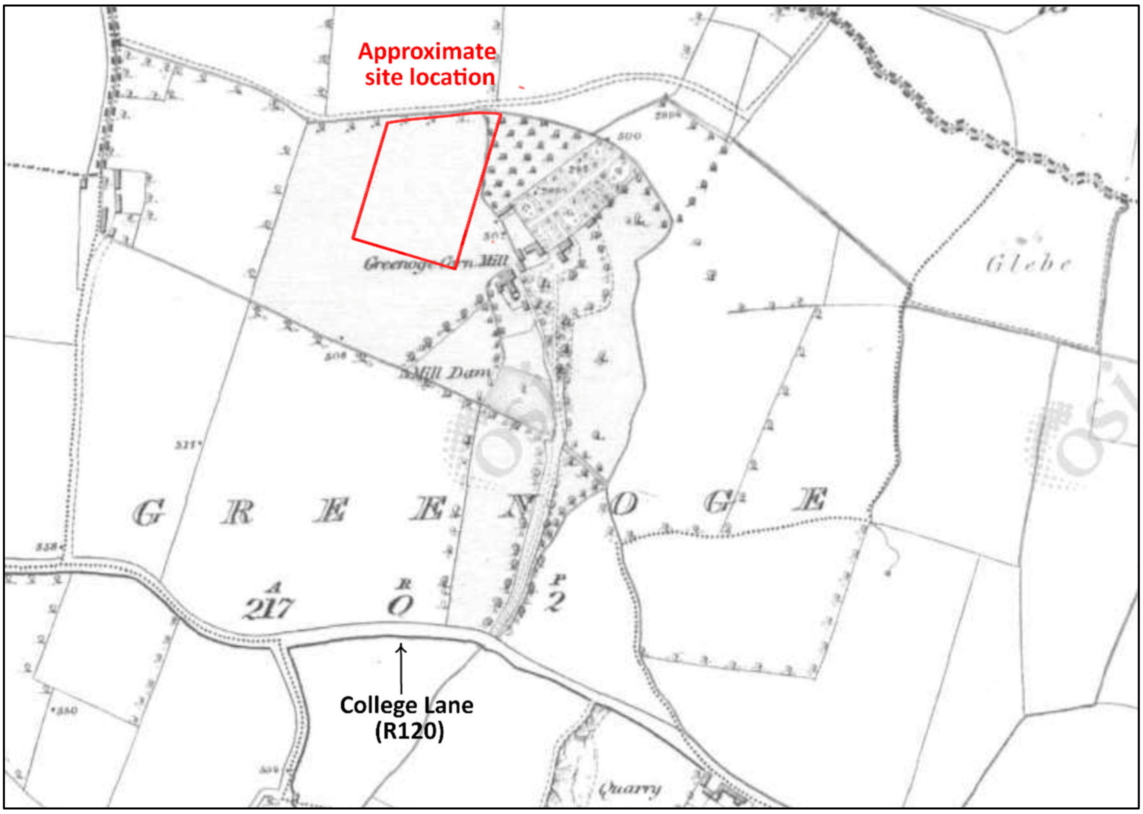
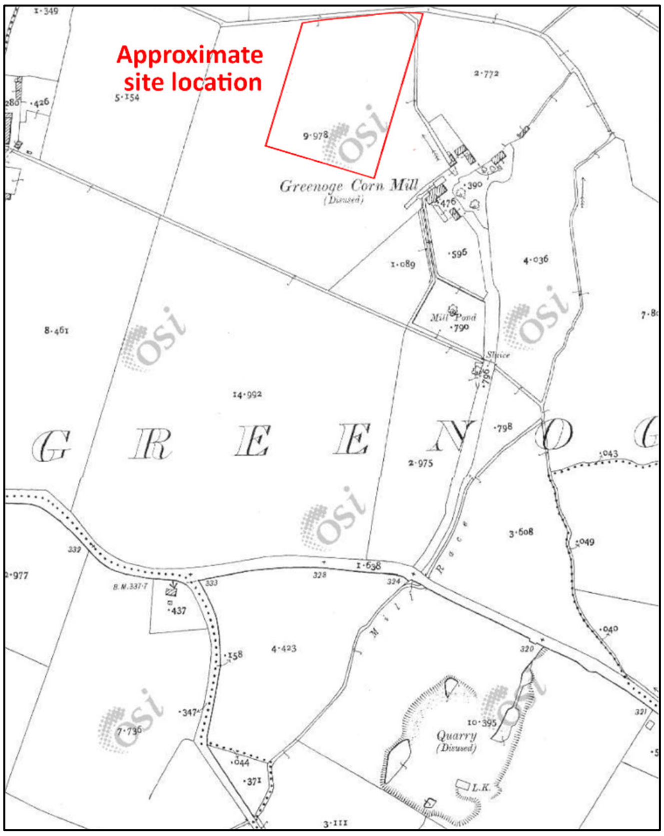


Figure 13-4: Ordnance Survey first edition six-inch map (1837) with approximate location of the Proposed Development (in red)



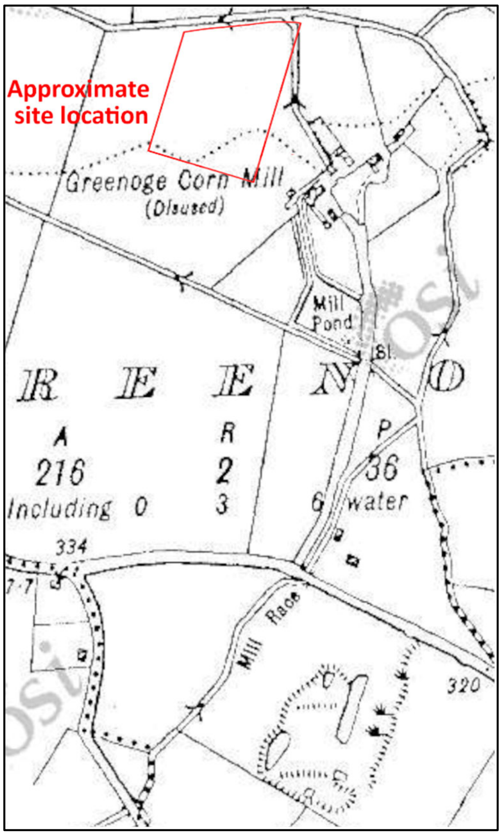


Figure 13-5: Left: OS 25-Inch Map (1909); Right: Revised Six-Inch Map (1911) with Approximate Location of the Proposed Development (in Red)

13.3.1.3 Aerial Imagery

Current aerial imagery demonstrates the brownfield nature of the site, showing the two large buildings occupying the site amidst the surrounding industrial and commercial units of the business park. On Google Earth (March 2022) the cropmark of enclosure DU021-107 is visible to the north-east of the Proposed Development (**Figure 13-6**).

Figure 13-6: Aerial Imagery (Google Earth 03.2022) with Proposed Development Location

13.3.1.4 Topographical Files of the National Museum of Ireland (NMI)

There are no stray finds recorded in the Topographical files of the NMI within the Proposed Development nor within 1 km radius.

13.3.1.5 Previous Archaeological Investigations

There are no previous archaeological investigations carried out within the Proposed Development. The closest is located approximately 220 m to the south, in the townland of Greenoge, where a possible burnt stone and ash spread was excavated in 2000 in advance of the construction of the Saggart / Rathcoole and Newcastle Drainage scheme: the feature proved to be non-archaeological in nature (Licence No. 00E0317). Several archaeological investigations were carried out within 1 km of the Proposed Development, mostly in the townland of Newcastle, indicating prehistoric, early medieval and medieval activity in this landscape. These findings in the wider area are detailed in **Table 13.1** are discussed in the context of the archaeological and historical background in **Section 1.3.3.1.1**.

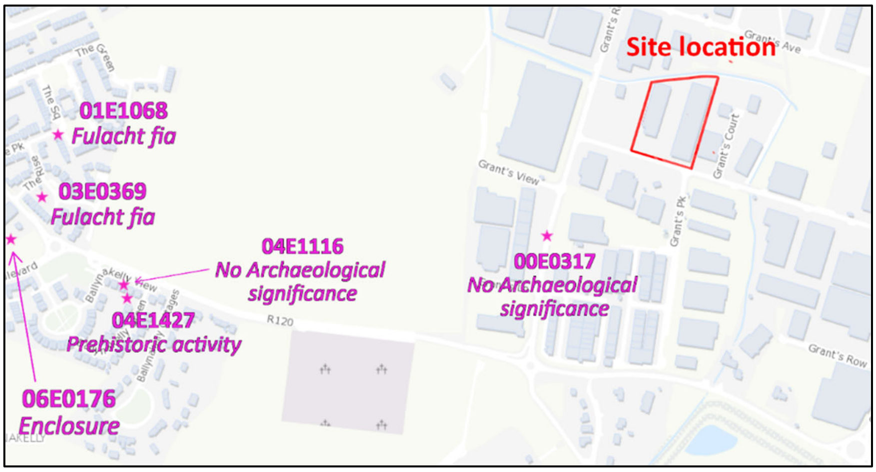


Figure 13-7: Previous Archaeological Investigations within 1 km of the Proposed Development (in Red)

Table 13.1: Previous Archaeological Investigations Carried Out Within a 1 km Radius

Licence No	Results	Description	Distance
00E0317 (Bulletin Ref. 2000:0301)	No archaeology recovered	Testing was undertaken for South Dublin County Council in advance of construction of the Saggart/Rathcoole and Newcastle Drainage Scheme. A trench was excavated to investigate a possible burnt spread, which proved to be non-archaeological.	220 m
04E1116 (Bulletin Ref. 2004:0628)	Post-medieval: no archaeological significance	Testing in advance of a proposed residential development outside Newcastle village. Four trenches were excavated. Five features were discovered and partially recorded on site. They appear to represent post-medieval agricultural features and are of no archaeological significance.	840 m
04E1427 (Bulletin Ref. 2004:0469)	Possible prehistoric activity	Geophysical survey, testing and excavation. Excavation identified four ditches, four pits, two slot-trenches and an intercutting area of activity possibly indicating habitation. The presence of two similarly aligned ditches was confirmed through the test excavation programme. There was no evidence for the deposition of human remains within the possible inner enclosure, a defining characteristic of an early medieval ecclesiastical enclosure (although the fragmentary nature of the animal bone retrieved should be borne in mind). An excavation in the same townland north of the R120, immediately opposite this location (Excavations 2003:459, Licence No. 03E0369), displayed all the components of a small *fulacht fia*. This evidence for Bronze Age activity in relative proximity may be indicative of a focus of prehistoric activity to the east of the medieval urban settlement that constitutes Newcastle.	840 m
01E1068 & 03E0369 (Bulletin Ref. 2001:246 & 2003:459)	*Fulacht fia*	Excavations took place on a small burnt-mound site in 2003. The feature was originally identified through geophysical analysis in 2001 (Excavations 2001, No. 346, 01E1068). The area of the excavation was 4 m by 4 m and revealed five archaeological features. The site had suffered slight impact in the past, which explains why the majority of these features relate to the burnt-mound firing material. A narrow trough was revealed 1.2 m in length and approximately 0.8 m in width. The limited amount of firing material suggested that this *fulacht fiadh* functioned over a relatively short period of time, with its trough gradually silting up through lack of use. No artefacts were recovered.	913 m
06E0176 (Bulletin Ref. 2006:564)	Enclosure	Geophysical survey, testing and excavation. The double-ditched enclosure measured approximately. 70 m by 90 m. The inner enclosure being concentric to the outer enclosure at a distance of up to 35 m. The enclosures were an unusual shape, almost square with rounded corners. The area between the inner and outer enclosure was divided by shallow linear and curvilinear ditches into smaller field enclosures. No definite evidence of domestic habitation was identified in the interior, but a number of features associated with habitation were identified, including a large pit, possibly a storage pit. A number of curvilinear gullies were also excavated, along with a number of smaller pits and four possible post-holes, and a kiln. Later medieval activity was identified on the site in the form of a large comma-shaped kiln, agricultural furrows and an area of gullies and metalled surfaces in the north-west corner of the site. A single human extended burial was excavated in the south-east of the site between the inner and outer ditch. This burial was heavily disturbed by later agricultural activity. A plough furrow truncated the skeleton and the grave-cut. A round pit that contained the carefully positioned and neatly stone-covered skeleton of a small dog was identified. Artefacts included five iron knifes that are consistent with a type dating to the Early Christian period and a number of unidentifiable iron objects. Large quantities of disarticulated animal bone were recovered from the ditches.	995 m

13.3.1.6 Placename Evidence

Townland names were written down by the OS surveyors in the 1830s and 1840s, when the entire country was mapped for the first time. While most place names were anglicised or translated by the surveyors relatively accurately, some were corrupted virtually beyond recognition. Nonetheless, a variety of place names, whether of Irish, Viking, Anglo-Norman, English or, in very rare cases, Anglo-Saxon origin, appear throughout Ireland, and 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 townlands in and around Greenoge range from anglicised forms of Irish names to what appear to be introduced English-language forms. The English names include several that appear to contain personal names, including Jordanstown, Blundelstown and Westmanstown, likely references to local landowners. Other English-origin placenames include Commons, which, as alluded to in **Section 1.3.3.1.2**, refers to commonly held grazing land.

Among the Irish names, there are three references to churches. They include Kilmactalway, Kilbride and Kilcarbery, all of which contain the word *cill*, or church. Kilbride refers to St Bridget, while the other two appear to refer to more obscure saints. There are also references to archaeological monuments, such as Rathcreedan, similar to Rathcoole, which contains the word *rath*, or ringfort.

Greenoge is derived from *griain*, the sun, and means a sunny place or 'the little sunny spot' (Ball 1905).

13.3.1.7 Designated Sites

National Monuments

There are no National Monuments within the Proposed Development nor within a 1 km radius.

Recorded Monuments (RMP / SMR sites)

There are no recorded archaeological sites within the Proposed Development and none in proximity to it. There are only four sites within 1 km that may be indicators of settlement activity in the surrounding landscape (**Figure 13-8**). The closest site is approximately 865 m south-east, the site of a ring-ditch (SMR DU021-103) now built upon in Greenogue Business Park. The other three sites are a fulacht fia, moated site, and enclosure (SMR sites DU021-095, -104, -105), all of which are approximately a kilometre from the Proposed Development.

The recorded archaeological sites within 1 km of the proposed development are discussed in the context of the archaeological and historical background in **Section13.3.1.1**.

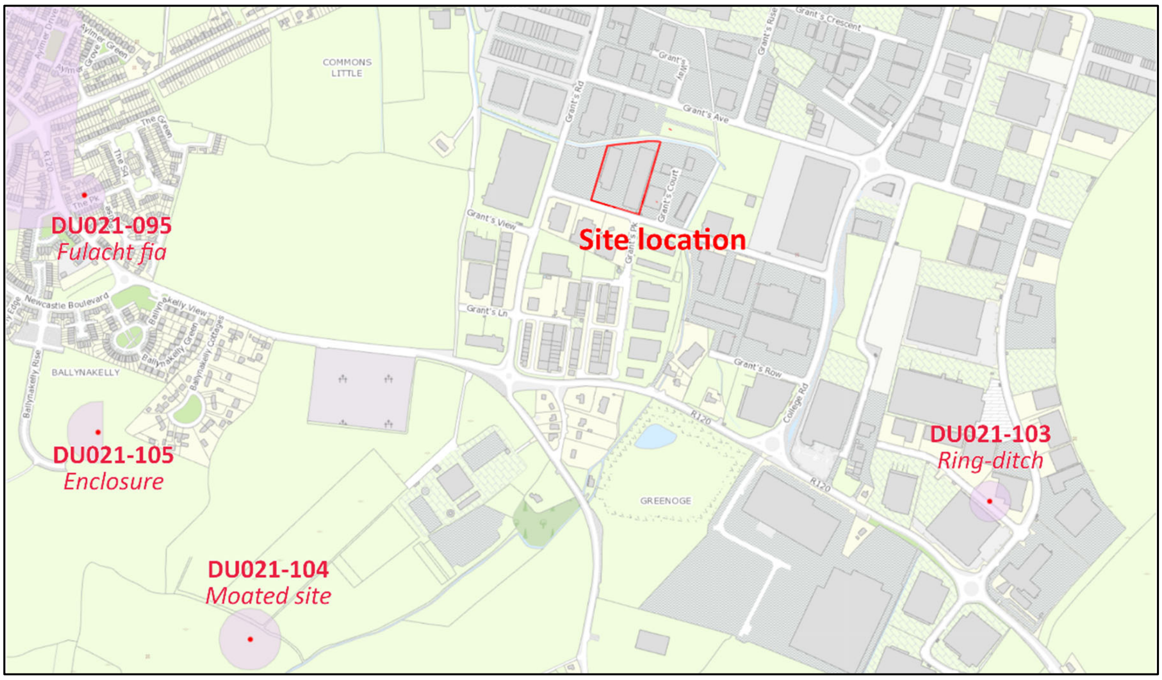


Figure 13-8: RMP Sites within 1 km of the Proposed Development

Protected Structures and National Inventory of Architectural Heritage (NIAH) Sites

There are no protected structures listed in the County Development Plan nor buildings registered in the NIAH within the Proposed Development or within a 1 km radius.

Three NIAH sites are located within 1 km, to the west of the Proposed Development, on the outskirts of Newcastle village: Ballynakelly House, a detached six-bay two-storey farmhouse c.1900 (Reg. No. 11213005); a water pump c. 1860 (Reg. No. 11213003); and a post-box c. 1960 (Reg. No. 11213002). Ballynakelly House is no longer standing, its site now lies within a modern residential estate.

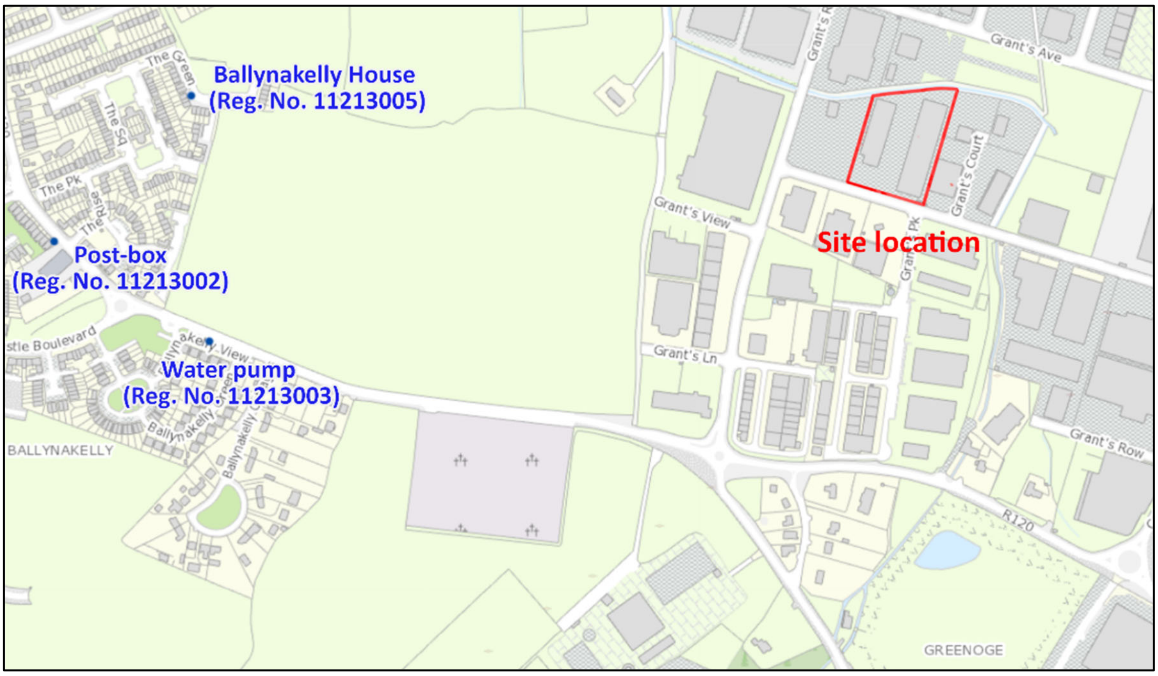


Figure 13-9: NIAH Sites within 1 km

13.3.2 Evolution of the Environment in the Absence of the Proposed Development

In a 'do-nothing' scenario the site would not be redeveloped, and the baseline would be unchanged, therefore there would be no adverse impacts to any as yet undiscovered subsurface archaeological deposits, features or finds that may have survived on this brownfield site.

13.4 Description of Likely Significant Effects

13.4.1 Construction Phase

There will be no effect on any designated Cultural Heritage assets, the closest of which is the site of a ring-ditch (SMR DU021-103) approximately 865 m to the south-east, now built over within Greenogue Business Park.

While there is known prehistoric, early medieval and medieval activity in the wider area, previous archaeological investigation within Greenogue Business Park, approximately 220 m south-west, did not find anything of archaeological interest.

The potential for the discovery of previously unknown subsurface archaeological deposits, features, or finds within the site has been significantly reduced by previous disturbance within this brownfield site, which is currently occupied by the Enva facility. In addition, ground-disturbance works for the Proposed Development will be relatively limited, as it involves a modification to the existing facility rather than a redevelopment of the site. As a result, it is considered that there will be **no potential effect** on archaeological heritage and no other effects were identified in relation to cultural heritage.

13.4.2 Operational Phase

No operational phase effects were identified.

13.4.3 Decommissioning Phase

No decommissioning phase effects were identified.

13.5 Cumulative Impact Assessment

No cumulative effects were identified in relation cultural heritage.

13.6 Interactions

No interactions were identified.

13.7 Mitigation Measures

13.7.1 Construction Phase

As no construction phase effects were identified, no mitigation is required.

13.7.2 Operational Phase

As no operational phase effects were identified, no mitigation is required.

13.7.3 Decommissioning Phase

As no decommissioning phase effects were identified, no mitigation is required.

13.8 Residual Impacts

No residual effects were identified.

13.9 Monitoring

13.9.1 Construction Phase

No monitoring measures are required during construction phase.

13.9.2 Operational Phase

No monitoring measures are required during operational phase.

13.9.3 Decommissioning Phase

As no decommissioning phase effects were identified, no mitigation is required.

13.10 Schedule of Environmental Commitments

A summary of the environmental commitments, with regard to this chapter is set out at **Chapter 21 - Schedule of Environmental Commitments**.

13.11 Chapter References

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CHAPTER 14
BIODIVERSITY

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14 BIODIVERSITY

14.1 Introduction

This chapter of the EIAR identifies, describes and presents an assessment of the likely significant effects of the Proposed Development on Biodiversity during the construction, operational and decommissioning phases. The assessment presented is based on the information provided in **Chapter 4 - Description of the Proposed Development** and **Chapter 5 - Description of Construction Phase**. The assessment presented is further informed by the following EIAR chapters:

- Chapter 12: Landscape and Visual.
- Chapter 15: Water.
- Chapter 16: Land, Soils, Geology and Hydrogeology.

There are also clear linkages between the EIA and AA processes. This chapter should therefore be read in conjunction with the Stage 1 – AA Screening for the Proposed Development which has been prepared with reference to European sites; this is available under separate cover as part of the overall application for development consent to An Bord Pleanála (ABP).

These parallel but separate processes commonly overlap, but also differ in key respects. While the EIA and AA must clearly be distinguished in terms of their respective scope and conclusions, the processes have been carried out concurrently and draw on common data and information. The key findings of the AA are reflected in the relevant section(s) of this chapter of the EIAR.

14.2 Methodology

14.2.1 Legislation, Policy and Guidance

The key legislation and guidance referenced in the preparation of the EIAR is outlined in **Chapter 1 - Introduction**. Specific to biodiversity, the principal legislation, policy and guidance relevant to the assessment is set out in the following sections.

14.2.1.1 Legislation

EU Legislation

EIA Directive - Council Directive 2011/92/EU as amended by 2014/52/EU and the transposing Irish legislation, the European Union (Planning and Development) (EIA) Regulations 2018 (S.I. No. 296 of 2018), requires a description of the likely significant effects of the Proposed Development on the environment including reference to biodiversity, flora and fauna as part of the EIAR. This EIA requirement is not limited to the assessment of protected habitats and species as is the case under the Habitats Directive and Birds Directive which requires a separate and distinct assessment process under the EU Habitats Directive.

EU Habitats Directive - Council Directive 92/43/EEC (1992), has been transposed into Irish law by Part XAB of the Planning and Development Act, 2000 (as amended) and the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477/2011) as amended (‘the Habitats Regulations’). In Ireland, these sites are designated as European sites and include Special Areas of Conservation (SACs), established under the Habitats Directive 92/43/EEC for the protection of habitats and species.

EU Bird Directive - Council Directive 2009/147/EC provides strict protection of protected bird species in Ireland, these sites are designated as European sites and include Special Protection Areas (SPA), established under the EU Birds Directive (79/409/EEC, as codified by 2009/147/EC) for birds.

National Legislation

The Wildlife Act 1976 (as amended) and the Wildlife Amendment Act 2000 are the principal national legislation providing for the strict protection of wildlife and the control of some activities that may adversely affect wildlife. The aims of the Wildlife Act, 1976 (as amended) are to provide for the protection and conservation of wild fauna and flora, to conserve a representative sample of important ecosystems, to provide for the development and protection of game resources, to regulate their exploitation, and to provide the services necessary to accomplish such aims. Such species, where relevant, are considered as sensitive ecological receptors in this report.

Along with the Wildlife Act 1976 (as amended), the European Union (Birds and Natural Habitats) (Amendment) Regulations 2021 (S.I. 293/2021) is one of the most important pieces of legislation underpinning biodiversity and nature conservation in Ireland. The European Communities (Birds and Natural Habitats) Regulations 2011 transpose the Habitats Directive and the Birds Directive. The 2011 regulations seek to conserve species of wild birds and require the designation of a network of habitats for birds, based on scientific criteria. These designated sites are known as SPAs. The regulations also require the designation of SACs for the protection of certain habitats and species of plants and animals (other than birds).

The Flora (Protection) Order (FPO), 2022 provides protection to a wide variety of protected plant species in Ireland including vascular plants, mosses, liverworts, lichens and stoneworts. Under the FPO 2022 it is illegal to cut, uproot or damage species listed in any way or to alter, damage or interfere in any way with their habitats. Such species, where relevant are considered as sensitive ecological receptors in this report.

14.2.1.2 Policy

The *National Biodiversity Action Plan (NBAP) 2017-2021* (Department of Culture, Heritage and the Gaeltacht (DCHG), 2017) is a framework for the conservation and protection of biodiversity in Ireland. The main objective of the plan is to conserve and restore biodiversity and ecosystem services. The importance of conservation, the management of protected areas and species and the sustainable use of biodiversity has been identified as an action under several objectives in the NBAP. The objectives recognise the shared responsibility for the conservation of biodiversity and the sustainable use of its components, by all sectors.

The *draft NBAP 2023-2027* (Department of Housing, Local Government and Heritage (DHLGH), 2022) is currently in preparation and underwent public consultation in 2022. Ireland's fourth NBAP will set the national biodiversity agenda for the period 2023-2027 and aims to deliver the transformative changes required to the ways in which we value and protect nature. At present, the plan emphasises the same aims and objectives as detailed in the 2017-2021 NBAP.

The *South Dublin County Development Plan (SDCDP) 2022-2028,* (SDCC, 2022) sets out the framework to guide future development within South Dublin County, with an aim to progress to a more sustainable development pattern for South Dublin in the immediate and long-term future up to 2040 and beyond. It contains a range of policies relevant to establishing support and protection of environmental sensitivities for South Dublin and its environs.

The South Dublin County Council's *Biodiversity Action Plan 2020-2026*, *Connecting with Nature*, (SDCC, 2020) was prepared as a response to national obligations under the *NBAP 2017-2021* and under European policy under the EU's *Biodiversity Strategy for 2030*. The plan outlines a series of objectives and actions that aim to achieve the protection and enhancement of the County's biodiversity, while aiming to ensure that the County's residents, businesses and visitors continue to enjoy and benefit from the many services that nature provides.

The relevant policies and how these have been considered in this EIAR chapter are summarised in **Table 14.1**.

Table 14.1: Summary of Policy Framework Provisions Relevant to Biodiversity

Summary of Relevant Policy Framework	How and Where Considered in this EIAR Chapter
National Biodiversity Action Plan (NBAP) 2017-2021 (DCHG, 2017): The shared responsibility of all Public Authorities and private sector bodies for biodiversity and the sustainable use of its components through strategies, planning, mitigation measures, appropriate offsetting and/or investment in Blue-Green infrastructure.	The potential effects of the construction and operational phases of the Proposed Development on biodiversity have been assessed and are outlined in in **Sections 14.4** to **14.8**. Mitigation measures are included in **Section 14.7**.
South Dublin County Development Plan 2022-2028 (SDCC, 2022): The SDCDP aims to protect, conserve and enhance biodiversity and ecological connectivity such as to avoid any negative impacts on the natural environment. Several policies outline this and state that the impact of new developments on biodiversity, the Natura 2000 network, species and habitats is to be minimised and require measures for the protection and enhancement of biodiversity in planning proposals.	The potential effects of the construction and operational phases of the Proposed Development on biodiversity have been assessed (with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC) and are outlined in **Sections 14.4** to **14.8**. Mitigation measures are included in **Section 14.7**. An AA Screening has also been prepared for the Proposed Development.
South Dublin County Council's ***Biodiversity Action Plan 2020-2026*** (2020): Priority actions and objectives are orientated around conserving priorities habitats and species in need of attention and the action required to secure their future.	The baseline environment is outlined in **Section 14.3**. Effects of the construction and operational phases of the Proposed Development on biodiversity (with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC), have been assessed in **Sections 14.4** to **14.8**.

14.2.1.3 Guidance

The methodology and associated impact assessment was conducted with regard to the general guidance regarding the undertaking of an EIA, as presented in **Chapter 1 - Introduction**, and the following key topic-specific guidance:

- Chartered Institute of Ecology and Environmental Management (CIEEM) (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland. Terrestrial, Freshwater, Coastal and Marine. Version 1.2. Updated April 2022.
- Environmental Protection Agency (EPA) (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports.
- Guidelines for Assessment of Ecological Impacts of National Roads Schemes, Revision 2 (NRA, 2009).

For the purposes of this impact assessment process on biodiversity, the CIEEM (2018) guidelines have been used for the basis of the assessment. The process takes cognisance of the EPA (2022) guidelines and incorporates NRA (2009) guidelines for the ecological valuation and geographic context.

14.2.2 Zone of Influence

The Biodiversity Study Area (see **Figure 14-1**) is determined by the zone of influence (ZoI) of the Proposed Development. The ZoI for a Proposed Development (or "*spatial extent of the impact*" as described in Annex III(3) of the EIA Directive) is the area over which habitats, species, and/or ecosystems (i.e. ecological features) may be subject to significant impacts as a result of the Proposed Development and associated activities.

The ZoI is likely to extend beyond the boundary of a development, for example where there are hydrological links extending beyond the site boundaries. Activities associated with the construction, operational and maintenance and decommissioning phases should be separately identified (where relevant) (CIEEM, 2018).

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

It is also important to acknowledge, as per EPA guidance (EPA, 2022) "… *that the absence of a designation or documented feature (e.g,. ecological) does not mean that no such feature exists within the site"*. As such, a ZoI should be identified for all features potentially occurring within the site of the Proposed Development, in addition to any known to occur. As recommended by CIEEM (2018), professionally accredited or published studies were used to determine ZoI for this Proposed Development, where available.

Through the incorporation of relevant ZoIs for the Proposed Development, the Biodiversity Study Area. **Figure 14-1** is determined to extend outside the footprint of the Proposed Development, to include the following ecological features as set out in **Table 14.2**.

Table 14.2: Study Area and Zone of Influence for Different Ecological Features

Ecological Features	Study Area for Desk Study	Zone of Influence Identified
Sites designated for nature conservation (as outlined in **Section 14.3**)	Catchment Management Unit (CMU)	All sites with connectivity to the Proposed Development
Habitats, rare, threatened and protected flora, and invasive alien plant species (IAPS)	5 km	Redline boundary of the Proposed Development and relevant adjoining habitats
Otter (*Lutra lutra*)	5 km	Up to 150 m buffer from the redline boundary of the Proposed Development
Badger (*Meles meles*)	5 km	Up to 150 m buffer from the redline boundary of the Proposed Development
Bats	5 km	Redline boundary of the Proposed Development and adjoining habitats
Birds	5 km	Redline boundary of the Proposed Development and relevant adjoining habitats
Invertebrates	5 km	Redline boundary of the Proposed Development and relevant adjoining habitats
Other mammals	5 km	Redline boundary of the Proposed Development and relevant adjoining habitats

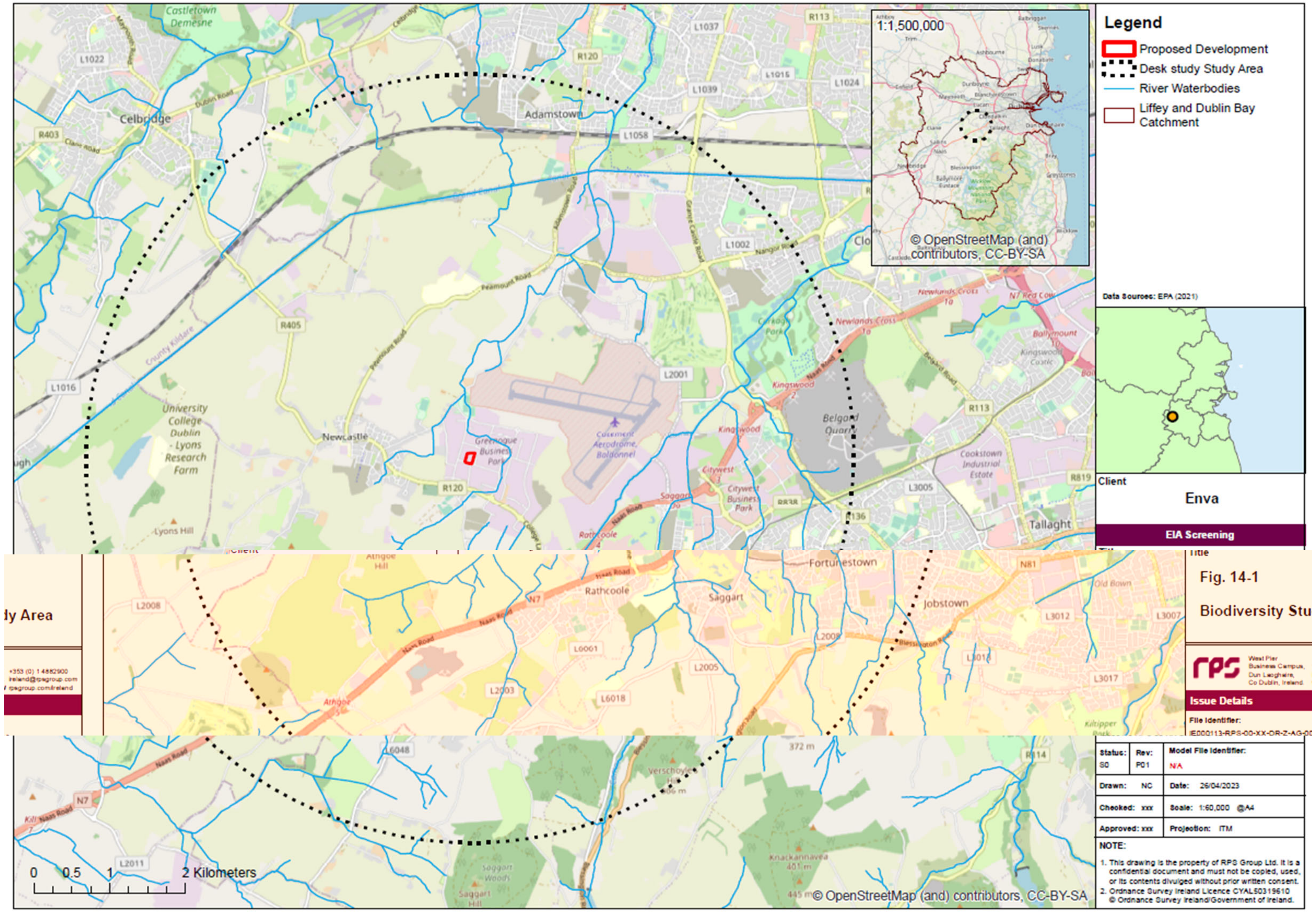

Figure 14-1: Biodiversity Study Area

14.2.3 Sources of Information to Inform the Assessment

Information on ecological receptors within the Biodiversity Study Area was collected through a combination of detailed desktop review of existing studies and datasets and a site visit.

14.2.3.1 Desktop Study

Information on biodiversity within the Biodiversity Study Area was collected through a detailed desktop review of existing studies and datasets. These are summarised in **Table 14.3**. The National Biodiversity Data Centres (NBDC) online database was searched for records of invasive species, protected flora (including under the FPO 2022) and protected fauna under the EU Habitats Directive (92/43/EEC), Birds Directive (2009/147/EC) and Wildlife Acts (1976 as amended) within a 5 km radius of the Proposed Development.

Table 14.3: Summary of Key Desktop Reports

Title	Year	Author/Source
Surface and ground water quality status, and river catchment boundaries	2023	EPA
NPWS designated areas spatial data	2023	NPWS
Distribution records for protected species and habitats (including suitability index for bats) held online by the NBDC, NPWS, and Heritage Council.	2013-2023	NBDC NPWS Heritage Council Lundy *et al.*, (2011).
Checklists of protected and threatened species in Ireland	2019	Nelson *et al.*, (2019).
Red Lists	1988, 2006, 2009, 2010, 2011, 2016, 2019, 2021	Curtis and Gough (1988); Fitzpatrick *et al.*, (2006); Marnell *et al.*, (2009); Regan *et al.*, (2010); King *et al.*, (2011); Clarke *et al.*, (2016); Wyse Jackson *et al.*, (2016); Marnell *et al.*, (2019); Gilbert *et al.*, (2021).
Status of EU Protected Habitats and Species in Ireland, Volume 1, 2, and 3	2019a 2019b 2019c	NPWS
National Biodiversity Action Plan 2017-2021	2017	DCHG
SDCDP 2022-2028	2022	SDCC
SDCC Biodiversity Action Plan 2020-2026	2020	SDCC
Protected Sites in Ireland	2019d	NPWS

14.2.3.2 Field Study

In order to inform the assessment, a site visit was conducted on 06 April 2023. The visit comprised a general ecological walkover of the site as well as an assessment of the stream along the northern boundary of the site. The field study was undertaken using professional interpretation and the application of relevant guidance, systems and methods including the following:

- Habitat classification to Fossitt (2000).
- Assessment of potential for species listed in FPO and Red Lists (Wyse Jackson *et al.*, 2016; Lockhart *et al.*, 2012).
- Identification of Third Schedule Species of European Communities (Birds and Natural Habitats) Regulations 2011 (as amended)).

- Suitability assessments for roosting bats completed with cognisance of the Bat Surveys for Professional Ecologists: Good Practice Guidelines (Collins, 2016).
- Assessment for evidence, field signs or suitable habitats for mammals (e.g., badger and otter).

14.2.4 Key Parameters for Assessment

The ecological receptors for which impacts and effects are considered are:

- Sites designated for nature conservation.
- Habitats, rare, threatened and protected flora, and IAPS.
- Protected terrestrial mammals (i.e., otter, badger and bats).
- Birds.
- Invertebrates.
- Other mammals.

The activities that have potential to result in likely significant effects on ecological receptors during the construction and operational phases of the Proposed Development are outlined in the following sections.

14.2.4.1 Construction Phase

The key activities and possible impacts with potential to result in likely significant effects on ecological receptors during the construction phase, if not properly managed, are:

- Site clearance, enabling works and demolition of the existing office space on the gable side of the building facing Grants Drive (Building 3).
- Earthworks, foundation works and construction activities including the installation of new prefabricated office, bulk trailer parking area, bin storage shed/shelter, internal plant and equipment, and associated services.
- Disturbance from noise, vibration, lighting and human presence, due to the presence of construction staff on site, the movement of vehicles and construction materials and operation of plant and machinery.
- Surface water run-off during construction, with potential to carry suspended silt or contaminants into local watercourses and associated habitat deterioration effects upon terrestrial habitats.
- Excavation works for the reconfiguration of surface water drainage system on site, with potential for changes to groundwater quality, yield and/or flow paths.
- Air pollution during construction with the potential to generate dust and air-borne contaminants which may negatively affect local terrestrial and aquatic environments (i.e., smothering effects).
- Habitat destruction, fragmentation or deterioration arising from construction activities, which may negatively affect sensitive ecological receptors in both the terrestrial and aquatic environment.

14.2.4.2 Operational Phase

The key activities and impacts with potential to result in likely significant effects on ecological receptors during the operational phase, if not properly managed, are:

- Operation of the Proposed Development and activities including accidental spillages of chemicals and other contaminants that may result in short term and localised changes in the water quality in the watercourse under high intensity rainfall events and exceeding the capabilities of the existing mitigation measures.
- Disturbance including noise, vibration and human presence during the operational phase due to the presence of operational staff on site, the movement of vehicles, operation of plant and machinery, and lighting associated with the operation of the Proposed Development.

14.2.4.3 Decommissioning Phase

The key activities and impacts with potential to result in likely significant effects on ecological receptors during the decommissioning phase, if not properly managed, are:

- Disturbance from noise, vibration, lighting and human presence, due to the presence of decommissioning staff on site, the movement of vehicles and materials and operation of plant and machinery.
- Surface water run-off during decommissioning, with potential to carry suspended silt or contaminants into local watercourses and associated habitat deterioration effects upon terrestrial habitats.
- Air pollution during decommissioning with the potential to generate dust and air-borne contaminants which may negatively affect local terrestrial and aquatic environments (i.e., smothering effects).
- Habitat destruction, fragmentation or deterioration arising from decommissioning activities, which may negatively affect sensitive ecological receptors in both the terrestrial and aquatic environment.

14.2.4.4 Impacts Scoped Out of the Assessment

Based on the baseline environment and the Proposed Development description outlined in **Chapter 4: Description of the Proposed Development**, a number of impacts are proposed to be scoped out of the assessment for biodiversity. These impacts are outlined, together with a justification for scoping them out, in **Table 14.4**.

Table 14.4: Impacts Scoped Out of the Assessment on Biodiversity

Potential Impact	Justification
Impacts on groundwater and the hydrogeological environment	These impacts are addressed in **Chapter 16: Land, Soils, Geology and Hydrogeology**

14.2.5 Assessment Criteria and Significance

The assessment on biodiversity has followed the EIA methodology set out in **Chapter 1: Introduction** and the topic-specific guidance documents outlined above in **Section14.2**.

14.2.5.1 Important Ecological Features

Having defined the relevant baseline conditions within the Biodiversity Study Area, ecological features therein are valued and Important Ecological Features (IEFs) identified, in advance of commencing the assessment of potential impacts and effects on IEFs.

The methodology used to value ecological features is in accordance with the geographic frames of reference outlined by the NRA (2009) (see **Volume III**, **Appendix 14.1: Biodiversity Supporting Information**).

It is possible that features which are, in and of themselves, of negligible ecological value (e.g., improved grassland of negligible floristic value) may be of high value in the resource they provide to other features (e.g. a significant resource of invertebrates breeding in the grasslands, which are an important food source for local badgers). In some cases, therefore, habitats and species of negligible value may nevertheless be considered of greater importance due to their value to protected species.

IEFs, as termed in CIEEM (2018), are defined here as those ecological features which are valued at Local Importance (Higher Value) or above. Ecological features below this value have been scoped out of further ecological impact assessment, as any potential impact is deemed to be of Local Importance (Lower Value) or negligible.

14.2.5.2 Ecological Impact Assessment Process

The ecological impact assessment process, as described by CIEEM (2018), involves:

- Identifying and characterising impacts and their effects.
- Incorporating measures to avoid and mitigate negative impacts and effects.
- Assessing the significance of any residual effects after mitigation.
- Identifying appropriate compensation measures to offset significant residual effects.
- Identifying opportunities for ecological enhancement.

The assessment comprises the review of the baseline data gathered and the identification of IEFs with features valued on the basis of available information/guidance and using professional judgement.

14.2.5.3 Description of Impacts

Impacts on IEFs are characterised with the following qualitative terms, as defined in CIEEM (2018):

- **Positive or Negative (adverse):** Positive and negative (adverse) impacts and effects were determined according to whether the change is in accordance with nature conservation objectives (COs) and policy:
  - Positive – a change that improves the quality of the environment (e.g., by increasing species diversity, extending habitat or improving water quality). This may also include halting or slowing an existing decline in the quality of the environment.
  - Negative (adverse) – a change which reduces the quality of the environment (e.g., destruction of habitat, removal of foraging habitat, habitat fragmentation, pollution).
- **Extent:** The extent is the spatial or geographical area over which the impact/effect may occur under a suitably representative range of conditions (e.g., noise transmission under water).
- **Magnitude:** Magnitude refers to size, amount, intensity and volume. It was quantified if possible and expressed in absolute or relative terms (e.g., the amount of habitat lost, percentage change to habitat area, percentage decline in a species population).
- **Duration:** Duration was defined in relation to ecological characteristics (such as the lifecycle of a species) as well as human timeframes. For example, five years, which might seem short-term in the human context or that of other long-lived species, would span at least five generations of some invertebrate species.
- **Frequency and Timing:** The number of times an activity occurs will influence the resulting effect. For example, a single person walking a dog will have very limited impact on nearby waders using wetland habitat, but numerous walkers will subject the waders to frequent disturbance and could affect feeding success, leading to displacement of the birds and knock-on effects on their ability to survive. The timing of an activity or change may result in an impact if it coincides with critical life-stages or seasons (e.g., bird nesting season).
- **Reversibility:** An irreversible effect is one from which recovery is not possible within a reasonable timescale or there is no reasonable chance of action being taken to reverse it. A reversible effect is one from which spontaneous recovery is possible or which may be counteracted by mitigation.

There may be any number of possible impacts on IEFs arising from a development. However, it is only necessary to describe in detail the impacts that are likely to be significant. Impacts that are either unlikely to occur, or if they did occur are unlikely to be significant, are scoped out. If in doubt, the precautionary principle is applied, and the potential impact will be assessed.

When assessing the significance of an effect and for the purposes of this assessment, the significance of an effect is simply any effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. For the purposes of ecological impact assessment, a 'significant effect' is defined as an effect that either supports or undermines the biodiversity conservation for the IEF (CIEEM, 2018). These significant effects are qualified with reference to an appropriate geographical scale e.g., for plants this would be within metres of its location but for birds this could be considerably further such as downstream to coastal or estuarine sites.

The approach to determining significance does not utilise a matrix of degrees of impact significance (such as EPA (2022)), but instead follows the industry standard for ecological impact significance (CIEEM, 2018) where impacts/effects are determined to be 'significant' or 'not significant.'

14.2.6 Data Limitations

14.2.6.1 Desk Study

Sources of desk study information are neither exhaustive nor necessarily easily available, and an extensive effort was made to obtain ecological data in the public domain to inform the description of the baseline environment and its assessment. Additional information, not in the public domain, is likely to exist, but could not be obtained or assessed here. This limitation is acknowledged and incorporated into the assessment and is deemed to not affect the certainty or predictability of the assessment.

14.2.6.2 Field Study

The receiving environment (i.e., baseline condition) may naturally vary through seasons and between years (NRA, 2008). All reasonable effort has been made to address this (e.g., combined use of desk and field survey data), and the limitation is acknowledged. Once incorporated into the assessment the limitation is deemed to not affect the certainty or predictability of the assessment.

14.3 Description of the Existing Environment (Baseline Scenario)

14.3.1 Baseline Environment

This section outlines the biodiversity baseline characterisation as informed by desktop studies and site visits. A full list of protected and rare species and invasive alien species returned from the NBDC desk study search is provided in **Appendix 14.1**.

14.3.1.1 Designated Sites for Nature Conservation

The site of the Proposed Development is not located within or adjacent to any nationally or internationally designated sites for nature conservation.

The Proposed Development is located within the Liffey and Dublin Bay (ID: 09) surface water catchment, which supports connectivity to ten SACs (Rye Water Valley/Carton SAC, Glenasmole Valley SAC, Wicklow Mountains SAC, Red Bog, Kildare SAC, Mouds Bog SAC, South Dublin Bay SAC, North Dublin Bay SAC, Howth Head SAC, Baldoyle Bay SAC and Malahide Estuary SAC) and seven SPAs (Wicklow Mountains SPA, Poulaphouca Reservoir SPA, South Dublin Bay and River Tolka Estuary SPA, North Bull Island SPA, Howth Head Coast SPA, Baldoyle Bay SPA and Malahide Estuary SPA).

There are no Natural Heritage Areas (NHAs), National Parks, Nature Reserves, Ramsar wetland sites or OSPAR Marine Protected Areas (MPAs) within the Biodiversity Study Area deemed relevant to the Proposed Development. The closest proposed Natural Heritage Areas (pNHAs) to the Proposed Development are the Grand Canal pNHA, Slade of Saggart and Crooksling Glen pNHA and Lugmore Glen pNHA, located approximately 3.3 km north, 4 km south-east and 5.4 km south east of the Proposed Development, respectively. The Brittas Ponds Wildfowl Sanctuary (WFS-18) is located approximately 5.9 km south of the Proposed Development.

There is potential for hydrological connectivity with downstream coastal European sites, pNHAs, Ramsar sites, Nature Reserves and Wildfowl Sanctuaries via the surface water network, which flows in an easterly direction towards the Dublin Bay coastal waterbody (IE_EA_090_0000). However, given the scale and nature of the proposed works, the distance between these sites and the Proposed Development (all greater than 18 km from the site) and the dispersive nature of open coastal waters, the potential for likely significant effects on these sites is ruled out and therefore they are excluded from further assessment. A number of protected sites were also excluded from further assessment given their distance from the Proposed Development site, their location upstream within the surface water catchment or their separation through groundwater bodies (i.e., no hydrological pathways).

Designated sites within the Biodiversity Study Area deemed relevant to the Proposed Development are shown in **Figure 14-2** and are detailed in **Table 14.5**.

Table 14.5: Relevant Designated Sites for Nature and their Interest Features

Designated Site (code)	Closest Distance (km) to Proposed Development	Relevant Qualifying Interest (QI)/Special Conservation Interest (SCI) (*Priority SAC Habitat) or Ecological Features of Interest
European sites (SACs and SPAs)		
Rye Water Valley/ Carton SAC (001398) COs- Specific Version 1.0 [22/12/21] (NPWS, 2021a)	Approx. 7 km north west	• Petrifying springs with tufa formation (Cratoneurion)* [7220] • Narrow-mouthed whorl snail (*Vertigo angustior*) [1014] • Desmoulin's whorl snail (*Vertigo moulinsiana*) [1016]
Glenasmole Valley SAC (001209) COs- Specific Version 1.0 [10/12/21] (NPWS, 2021b)	Approx. 8.5 km south east	• Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco Brometalia*) (* important orchid sites)* [6210] • *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*) [6410] • Petrifying springs with tufa formation (Cratoneurion)* [7220]
Wicklow Mountains SAC (002122) COs- Specific Version 1.0 [31/07/17] (NPWS, 2017)	Approx. 9 km south east	• Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*) [3110] • Natural dystrophic lakes and ponds [3160] • Northern Atlantic wet heaths with *Erica tetralix* [4010] • European dry heaths [4030] • Alpine and Boreal heaths [4060] • Calaminarian grasslands of the *Violetalia calaminariae* [6130] • Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230] • Blanket bogs (* if active bog) [7130] • Siliceous scree of the montane to snow levels (*Androsacetalia alpinae* and *Galeopsietalia ladani*) [8110] • Calcareous rocky slopes with chasmophytic vegetation [8210] • Siliceous rocky slopes with chasmophytic vegetation [8220] • Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles [91A0] • Otter (*Lutra lutra*) [1355]
Red Bog, Kildare SAC (000397) COs- Specific Version 1.0 [17/07/19] (NPWS, 2019e)	Approx. 11.9 km south west	• Transition mires and quaking bogs [7140]
Wicklow Mountains SPA (004040) First Order Site-specific COs – Version 1.0 [12/10/22] (NPWS, 2022b)	Approx.13 km south east	• Merlin (*Falco columbarius*) [A098] • Peregrine (*Falco peregrinus*) [A103]
Poulaphuca Reservoir SPA (004063) First Order Site-specific COs – Version 1.0 [12/10/22] (NPWS, 2022a)	Approx.13 km south east	• Greylag goose (*Anser anser*) [A043] • Lesser black-backed gull (*Larus fuscus*) [A183]

Designated Site (code)	Closest Distance (km) to Proposed Development	Relevant Qualifying Interest (QI)/Special Conservation Interest (SCI) (*Priority SAC Habitat) or Ecological Features of Interest
National Sites (NHA, pNHA, National Park, Nature Reserves, Wildfowl Sanctuaries)		
Grand Canal pNHA (002104)	Approx. 3.3 km north	• A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. • 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. • Otter spraints are found along the towpath, particularly where the canal passes over a river or stream. • The common newt breeds in the ponds on the bank at Gollierstown in Co. Dublin. • The rare and legally protected opposite-leaved pondweed (*Groenlandia densa*) (FPO 2022) is present at a number of sites in the eastern section of the main line.
Slade of Saggart and Crooksling Glen pNHA (000211)	Approx. 4 km south east	• This site includes a good example of a wooded river valley and a small wetland system. The northern half of the site comprises a river valley with steep tree-covered sides, while the southern side is flatter and contains two small lakes, the Brittas Ponds. • The trees are mostly of planted origin with fine specimens of beech (*Fagus sylvatica*), ash (*Fraxinus excelsior*), oak (*Quercus* spp.) and birch (*Betula* spp.) occurring. The ground flora is well developed. • Higher up the valley, in Crooksling Glen the vegetation becomes more natural with shrubs and trees such as guelder-rose (*Viburnum opulus*), whitebeam (*Sorbus hibernica*) and goat willow (*Salix caprea*). • Yellow archangel (*Lamiastrum galeobdolon*), a Red Data Book species, has been recorded from this site. • South of Crooksling Glen are Brittas Ponds, a Wildfowl Sanctuary, that supports a variety of wildfowl, including teal, mallard, pochard and tufted duck. The ponds themselves are of interest for the aquatic plants they support (including shoreweed (*Littorella uniflora*), a rare plant in Dublin) and the marginal areas of freshwater marsh and wet grassland vegetation found.
Brittas Ponds Wildfowl Sanctuary (WFS-18)	Approx. 5.9 km south	• Game birds rest and feed here. • Shoreweed (*Littorella uniflora*), a rare aquatic plant, is found here.
Liffey Valley pNHA (000128)	Approx. 6.5 km north	• This site is part of the Liffey Valley Amenity Areas Order 1990. • Important site because of the diversity of habitats within the site, ranging from aquatic to terrestrial including mixed deciduous woodland, marsh habitat and rough grassland. • A number of rare and threatened plant species have been recorded from the site - green figwort (*Scrophularia umbrosa*) (Irish Red Data Book), hairy St. John's-wort (*Hypericum hirsutum*) (FPO 2022) and yellow archangel (*Lamiastrum galeobdolon*) (Irish Red Data Book).
Rye Water Valley/Carton pNHA (001398)	Approx. 7.3 km north	• Several rare and threatened plant and animal species and the presence of petrifying springs, a habitat type listed on Annex I of the E.U. Habitats Directive. • Protected and threatened species found here include salmon (*Salmo salar*), white-clawed crayfish (*Austropotamobius pallipes*), narrow-mouthed whorl snail (*Vertigo angustior*) and Desmoulin's whorl snail (*Vertigo moulinsiana*), hairy St. John's-wort (*Hypericum hirsutum*), green figwort (*Scrophularia umbrosa*), blue fleabane (*Erigeron acer*) and kingfisher (*Alcedo atthis*).

Designated Site (code)	Closest Distance (km) to Proposed Development	Relevant Qualifying Interest (QI)/Special Conservation Interest (SCI) (*Priority SAC Habitat) or Ecological Features of Interest
Glenasmole Valley pNHA (001209)	Approx. 8.2 km south east	• Non-calcareous bedrock are partly covered by scrub and woodland, and on the less precipitous parts, by herb-rich grassland. • Seepage through deposits, brings to the surface water rich in bases, local patches of calcareous fen and, in places, petrifying springs.
Royal Canal pNHA (002103)	Approx. 8.2 km north	• A number of different habitats are found within the canal boundaries - hedgerow, tall herbs, calcareous grassland, reed fringe, open water, scrub and woodland. • 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. • Evidence of otter, an Annex II species, is often seen along the towpath, particularly where the canal crosses a river or stream. • The rare and legally protected opposite-leaved pondweed (*Groenlandia densa*) (FPO 2022) is present at one site in Dublin along the canal.
Red Bog, Kildare pNHA (000397)	Approx. 11.5 km south west	• Transition mires and quaking bogs [7140]
Poulaphuca Reservoir pNHA (000731)	Approx. 12.6 km south	• Wetland habitat. Wet grassland areas occur in sheltered bays around the lake with diverse plant species. • A range of waterfowl species occur and is an internationally important site for greylag goose. The reservoir also attracts roosting gulls most notably the lesser black-backed gull.

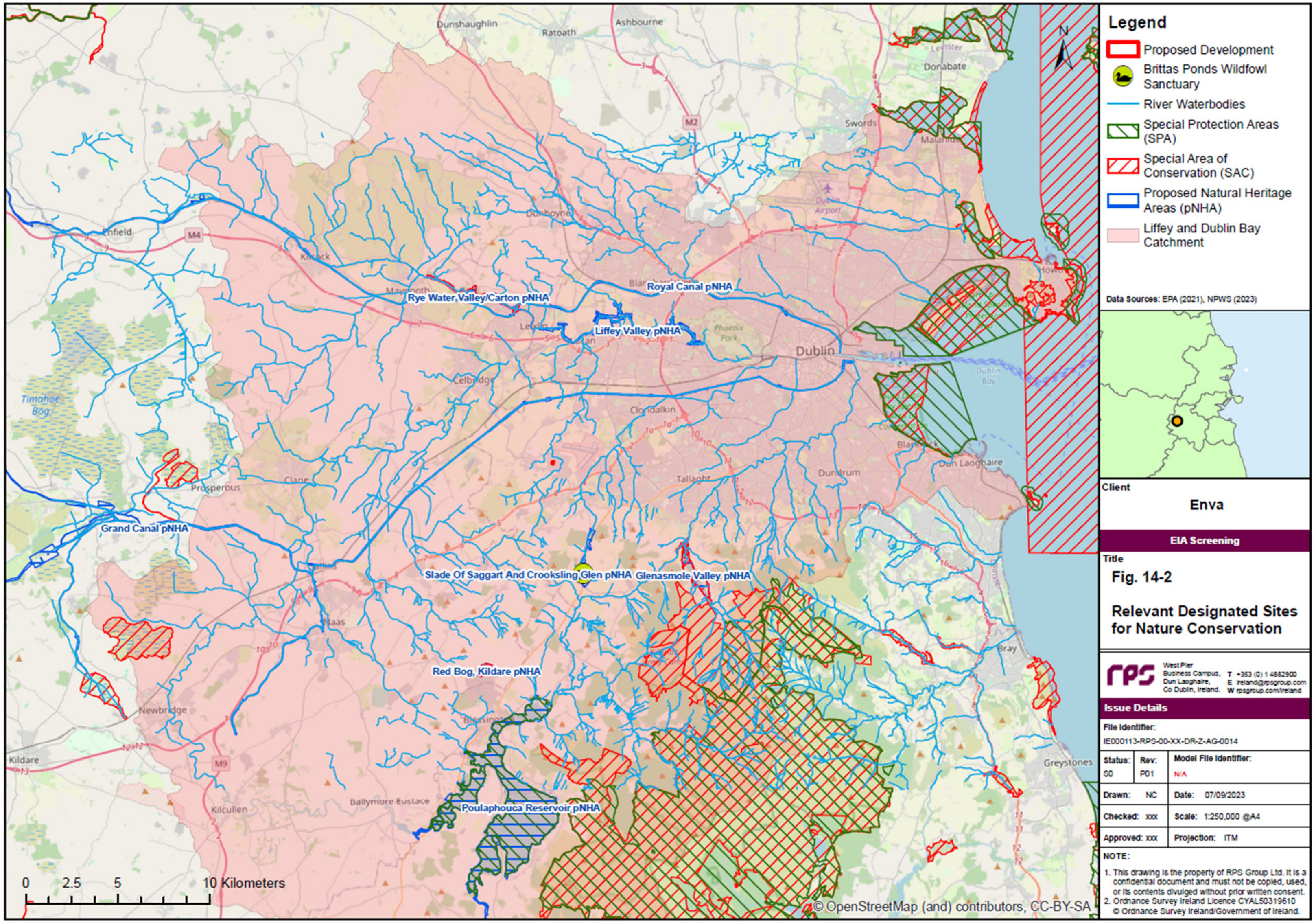

Figure 14-2: Relevant Designated Sites for Nature Conservation

14.3.1.2 Waterbodies

Surface Water/Stormwater

Since 2000, the Water Framework Directive (WFD, 2000/60/EC) has directed water management in the EU. The WFD requires that all Member States implement the necessary measures to prevent deterioration of the status of all waterbodies (surface waters, including rivers, lakes, transitional and coastal waters, as well as groundwater) and to protect, enhance and restore all waters with the aim of achieving at least 'good' WFD status.

Under the *River Basin Management Plan for Ireland* (2018-2021), the Proposed Development at Greenogue Business Park is located within the Liffey and Dublin Bay catchment (Code: 09) and Liffey_SC_090 sub-catchment of the Eastern River Basin District. The business park is intersected by the Griffeen River (River Waterbody Code IE_EA_09L012100 (LIFFEY_170), EPA Code 09G01), which flows north of the site. This river is culverted beneath the Grand Canal and reaches the river Liffey approximately 7 km downstream at Lucan Village. The waterbody is classified as having 'poor' status and deemed to be 'at risk' in the 2016-2021 WFD monitoring period.

The Proposed Development site is covered by hardstanding. Surface water drainage on site is managed by being first passed through a settlement tank which allows heavier stones and debris to 'settle' in the tank before being passed through an oil interceptor. The oil interceptor is used to capture any floating oil or fuel and retain it so that only clean surface water is released through the discharge point (SW3) to the Griffeen River to the north. The discharge point (SW3) is visually inspected daily, and this water is also tested for a range of pollutants as specified in the site's licence. Should issues be identified, the facility has the capability to shut off the discharge to the surface water (i.e., Griffeen River), via open/close valves.

Stormwater from the site is released into the municipal storm water network within the business park and ultimately to the Griffeen River.

Wastewater is only discharged to the sewer following confirmation that the discharge has met the requirements of the site's EPA licence. Treated trade effluent (produced from the facility's activities/ processes) and domestic effluent (i.e., sanitary wastewater) are discharged to the local authority sewer line where it mixes with other trade and domestic effluent before being processed at the County Council's wastewater treatment plant.

Groundwater

The site overlies the Dublin (IE_EA_G_008) groundwater body (GWB). This GWB is classified as having 'good' status in the 2016-2021 WFD monitoring period and discharges directly into the Dublin Bay (IE_EA_090_0000) coastal water body.

Groundwater is monitored on-site via three groundwater monitoring wells. These are monitored as per the site's EPA licence and on occasion by the EPA) during the year (see **Chapter 16 - Land, Soils, Geology and Hydrogeology** for further details).

Contaminated soils have been stored in the warehouse proposed to house the HRW processing plant for more than 15 years. There has been no processing of the soils in the warehouse; it is a storage operation only. The floor of the warehouse is comprised of a 300 ml concrete/steel mix. The warehouse is also fully bunded, with a 'physical lip' bund to allow for the holding of any leachate that may be produced during the storage process. The warehouse floor is regularly inspected and any sitting leachate on the warehouse floor removed by a vacuum tanker. It is proposed that as part of the Proposed Development, the whole building would be washed down and inspected, and any minor repairs will be undertaken. The current regime groundwater monitoring regime will be maintained during the operation of the HRW management facility.

14.3.1.3 Habitats

Key habitats and species were identified and registered through a desk study and site visit. The primary land use (CORINE, 2018) in the vicinity of the Proposed Development is '*Artificial Surfaces' - Industrial, commercial and transport units - Industrial and commercial* units', which is typically a habitat of negligible ecological value. A summary of each identified habitat, classified according to Fossitt (2000), is provided within this section.

BL3 Buildings and Artificial Surfaces

This anthropogenic habitat represents all hard, made surfaces and is associated with existing buildings and infrastructure. Flora is rarely a feature of well-maintained hard surfaces, although small pioneer herbs and /or bryophytes/lichens can become established on suitable situations or where patches of soil accumulate in sheltered crevices.

Given the nature and location of the Enva site within the Greenogue Business Park, this is the dominant habitat throughout the Proposed Development site. The main operations buildings (Building 1 & Building 2) are separated by a concreted marshalling yard which provides for storage, vehicle movement and access to the buildings. An ancillary support office (Building 3) adjoins Building 1. A surfaced car parking area is located between the office space and Grants Drive, and to the west of the facility entrance. A tank farm is located at the northernmost part of the facility. The ‘buildings and artificial surfaces’ habitat holds little to no floristic or ecological value.

WL1 Hedgerows

A hedgerow and clear strip, up to 2 m wide, is maintained and managed along the inside perimeter of the site of the Proposed Development. This habitat is dominated by native hedgerow species, hawthorn (*Crataegus monogyna*), with some occurrences of dogwood (*Cornus sanguinea*), elder (*Sambucus nigra*) and sycamore (*Acer pseudoplatanus*). Some non-native and ornamental species were also noted within the hedgerow, including cherry laurel (*Prunus laurocerasus*), Himalayan honeysuckle (*Leycesteria formosa*), butterfly-bush (*Buddleja davidii*), laurustinus (*Viburnum tinus*), cotoneaster (*Cotoneaster* spp.) and griselinia (*Griselinia* spp.). Invasive species deemed relevant to the Proposed Development are discussed below in **Section 14.3.1.6**.

A number of low-level species are also present within the hedgerow, including grasses, brambles (*Rubus fruticosus agg.*), ivy (*Hedera helix*), cleavers (*Galium aparine*), common nettles (*Urtica dioica*) and dandelions (*Taraxacum* spp.). Native wildflowers identified within this habitat include wild violets (*Viola* spp.), herb-robert (*Geranium robertianum*) and bush vetch (*Vicia sepium*).

FW2 Depositing Lowland River

The Proposed Development site is bounded to the north by the Griffeen River, into which treated stormwater from the Enva site is released through a discharge point (SW3). The hedgerow and existing pathway north of the site of the Proposed Development provide a buffer between the Enva facility and the waterbody. The stream has been modified through the business park and the riverbed largely comprises coarse substrates which are embedded as a result of calcification, with gravel substrates elsewhere. Where it bounds the Proposed Development, the stream is characterised primarily by overhanging scrub and trees, soft soils and exposed tree roots along the northern bankside. The southern bankside is steep and reinforced with stone. Bankside vegetation noted during the field survey includes pendulous sedge (*Carex pendula*), fool’s-water-cress (*Apium nodiflorum*), marsh marigold (*Caltha palustris*), grasses and Himalayan honeysuckle. There was little instream vegetation noted during the field survey.

14.3.1.4 Protected Flora

No protected flora (i.e., FPO and Annex II species protected under the Habitats Directive) or flora species of conservation concern (i.e., red lists for vascular plants and bryophytes), were noted from the field study.

One flora species of conservation concern, common gromwell (*Lithospermum officinale*) was noted from the desk study of the Biodiversity Study Area. This species is assessed as ‘near threatened’ on the Irish Red List of Vascular Plants (Wyse Jackson *et al.*, 2016). Common gromwell grows on limey soils in grassland, hedgerows and the edges of woodlands, as well as on rocky ground, scree and quarries[1]. This species has not been identified within the Greenogue Business Park and the closest record for this species is approximately 4.5 km north-west of the Proposed Development adjacent to the Grand Canal.

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[1] Available online at NatureScot: https://www.naturespot.org.uk/species/common-gromwell Accessed April 2023.

14.3.1.5 Protected Fauna

A full list of protected fauna returned from the NBDC desk study is provided in **Table 14-1** of **Appendix 14.1**.

Terrestrial Mammals

A search of the NBDC database found records of five terrestrial mammals within the Biodiversity Study Area, namely; Eurasian badger, Irish hare (*Lepus timidus* subsp. *hibernicus*), west European hedgehog (*Erinaceus europaeus*), soprano pipistrelle (*Pipistrellus pygmaeus*) and Daubenton's bat (*Myotis daubentonii*). Each of these mammals are protected under the Wildlife Act 1976 (as amended), whilst the two bat species are also protected under Annex IV of the Habitats Directive (92/43/EEC). Given the presence of hedgerows, treelines and the Griffeen River within the Greenogue Business Park, there is potential for bat species (including others not recorded in the desk study) to utilise these habitats for commuting and foraging purposes.

The desk study returned no records of European otter within the Biodiversity Study Area. Otter is an Annex II species and included in the Natura 2000 network and is also listed within Annex IV of the Habitats Directive whereby a strict protection regime must be applied to the species throughout their range. Otter are also protected under the Wildlife Act (1976) and Wildlife (Amendment) Act 2000. The Griffeen River, which is the River Liffey's largest tributary, is known to support otter along its course. Therefore, the field survey included a search for habitat features associated with otters along the bankside of the Griffeen River. No evidence of otter activity, such as possible holts, slides, couches or resting sites, were found along the section of the Griffeen River surveyed.

Birds

A search of the NBDC database found records of 14 protected bird species within 5 km of the Proposed Development, nine of which are Amber Listed and two of which are Red Listed Birds of Conservation Concern in Ireland (BoCCI) (Gilbert *et al.*, 2021). One recorded species, little egret (*Egretta gazetta*), is listed on Annex I of the EU Birds Directive (2009/147/EC). Six SCI bird species (designated within SPAs) were recorded, namely; black-headed gull (*Larus ridibundus*), common coot (*Fulica atra*), grey heron (*Ardea cinerea*), little grebe (*Tachybaptus ruficollis*), mallard (*Anas platyrhynchos*) and tufted duck (*Aythya fuligula*).

The closest European sites that are designated for SCI bird species are Poulaphuca Reservoir SPA and Wicklow Mountains SPA, which are both located approximately 13 km south-east of the Proposed Development. As outlined in the AA Screening prepared for the Proposed Development, neither direct or indirect impacts on SCI birds (or their supporting habitats) are predicted.

The majority of habitats within the footprint and immediate vicinity of the Proposed Development site do not offer significant supporting value for bird species, for nesting, refuge or foraging purposes. The construction phase of the Proposed Development will not involve any removal of vegetation or interference with the existing hedgerow surrounding the Enva facility. This hedgerow may provide suitable habitat for a small number of nesting birds.

Amphibians and Reptiles

The Common frog (*Rana temporaria*) was the only amphibian noted in the desk study. This species is native to Ireland and uses a broad range of habitats including lakes and ponds, grassland and marsh, wet heath, peatlands, woodland and scrub, dune slacks, machair, and riparian habitats[2]. No common frog (spawn/tadpole/froglet/adult) were encountered during the field study and limited suitable habitat for this species was identified. No reptiles (i.e. common lizard (*Zootoca vivipara*)) were noted in the desk study and their suitable habitats (woods/scrub with basking sites on south facing slopes) were not recorded during the field study. These species are considered unlikely to occur within the site of the Proposed Development.

Terrestrial Invertebrates

Four terrestrial invertebrate species of conservation concern were noted in the desk study. These included wood white butterfly (*Leptidea sp.*), large red tailed bumble bee (*Bombus lapidarius*) and moss carder-bee

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[2] Available online at NBDC: https://species.biodiversityireland.ie/ Accessed April 2023.

(*Bombus* (Thoracombus) *muscorum*), which are assessed as 'near threatened' on the Irish Red Lists and Gooden's nomad bee (*Nomada goodeniana*) which is assessed as 'endangered' (Regan *et al.*, 2010; Fitzpatrick *et al.*, 2006). Given that the majority of the Proposed Development site comprises artificial buildings and surfaces of negligible ecological value, there is limited potential for habitats of protected invertebrate species to occur.

Aquatic Invertebrates

Records of freshwater white-clawed crayfish (*Austropotamobius pallipes*) were also noted from the desk study. This invertebrate species is protected in Ireland under Annex II and V of the Habitats Directive (92/43/EEC) and the Wildlife Act 1976 (as amended). The white-clawed crayfish can be found in rivers, streams and lakes in Ireland, particularly in those with a calcareous influence. It has a preference for hard substrates and requires suitable refuge habitat, which may be in vegetation, boulders or man-made features[2]. Ecological studies[3] undertaken in 2018 for the Clonburris Strategic Development Zone project found populations of freshwater white-clawed crayfish in the Grand Canal and the Griffeen River. This species is also known to occur within the River Liffey downstream of the Proposed Development.

During the field study, the Griffeen River north of the Proposed Development site was surveyed to assess the potential for suitable freshwater white-clawed crayfish habitat. This river is known to support white-clawed crayfish along its course. The banksides of the stream are characterised by reinforced stone banks, exposed tree roots and overhanging vegetation. Gaps were noted between and underneath the bank reinforcement and tree roots, which have the potential to offer suitable habitat for white-clawed crayfish to seek refuge and hide. The assessment concluded that this section of the river has 'fair' crayfish habitat, i.e. it is possible that the stream section could support the species in question.

14.3.1.6 Invasive Alien Plants and Animals

During the site visit, four IAPS were identified within the hedgerow surrounding the Enva facility, namely Himalayan honeysuckle, sycamore, cherry laurel and butterfly-bush. However, none of these species are listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended, non-native species subject to restrictions under *Regulations 49 and 50*). For the purposes of this assessment, only species listed on the Third Schedule have been considered in the report owing to the legislative requirement to prevent their spread.

Six IAPS listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011, as amended, were returned from the data search (see **Table 14.6**). Fringed waterlily (*Nymphoides peltate)* which inhabits inland surface waters[2], was recorded in 2016 in Brownsbarn South Ponds Citywest, approximately 3.5 km south-east of the facility. Giant hogweed (*Heracleum mantegazzianum)*, which inhabits mires, bogs, and fens; grasslands and landscapes dominated by forbs, mosses or lichens; woodland, forest and other wooded land; constructed, industrial or other artificial habitats; regularly or recently cultivated agricultural, horticultural or domestic habitat[2], was recorded in 2021 in a roadside ditch east of Newcastle, approximately 600 m north of the site. Indian balsam (*Impatiens glandulifera),* which inhabits mires, bogs, and fens; heath, scrubland & tundra; woodland, forest, and other wooded land; regularly or recently cultivated agricultural, horticultural, or domestic habitat[1] was recorded in 2021 in Corkagh Desmesne approximately 4 km north-east of the Enva facility. Japanese knotweed (*Fallopia japonica),* which inhabits mires, bogs, and fens; heath, scrubland, and tundra; woodland, forest and other wooded land; regularly or recently cultivated agricultural, horticultural or domestic habitat; inland unvegetated or sparsely vegetated habitats; constructed, industrial or other artificial habitats[2], was recorded in 2019 in Bianconi Avenue, Citywest, approximately 3 km east of the site. Nuttall's waterweed (*Elodea nuttallii)*, which inhabits inland surface waters and estuaries[1], was recorded in 2020 at Gollierstown, Dublin approximately 3.5 km north of the facility. The waterweed was recorded within the Grand Canal, which is hydrologically separated from the Proposed Development site. Three-cornered garlic (*Allium triquetrum),* which inhabits regularly or recently cultivated agricultural, horticultural, or domestic habitat; constructed, industrial or other artificial habitats[2], was recorded in 2021 in Corkagh Desmesne approximately 4.5 km north-east of the Enva facility site. All IAPS are deemed to be outside of the ZoI of the Enva facility.

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[3] Forest, Environmental Research and Services (Fers) Ltd. (2018) Ecological Survey of Clonburris Strategic Development Zone, Clondalkin, Co. Dublin.

Two invasive alien animal species scheduled to the European Communities (Birds and Natural Habitats Regulations) 2011, as amended, were returned from the data search (see **Table 14.6**). Brown rat (*Rattus norvegicus)* was most recently recorded in 2015 in Kingswood, Clondalkin, which is approximately 2.7 km east of the Enva facility. There are four records of eastern grey squirrel (*Sciurus carolinensis)* within 5 km of the site, with the most recent record in 2016, located approximately 4.5 km north-east at Corkagh Park. Through professional experience, grey squirrels are locally common throughout Dublin and surrounding counties. Site survey evidence recorded no evidence of invasive alien animal species within the site of the Proposed Development.

Table 14.6: Invasive Alien Species, Scheduled to the European Communities (Bird and Natural Habitat Regulations) 2011-2015, Returned from the Desk Study

Species Name	Relevant Legislation*	Record Count	Date of Last Record
Invasive alien plants			
Fringed water-lily (*Nymphoides peltata*)	✓	2	15/06/2016
Giant hogweed (*Heracleum mantegazzianum*)	✓	3	22/06/2021
Indian balsam (*Impatiens glandulifera*)	✓	1	24/08/2021
Japanese knotweed (*Fallopia japonica)*	✓	1	11/09/2019
Nuttall's waterweed (*Elodea nuttallii*)	✓	2	18/07/2020
Three-cornered garlic (*Allium triquetrum)*	✓	2	07/05/2022
Invasive alien animals			
Brown rat (*Rattus norvegicus*)	✓	1	09/10/2015
Eastern grey squirrel (*Sciurus carolinensis)*	✓	4	11/10/2016
** Third schedule of the European Communities (Birds and Natural Habitats Regulations) 2011, as amended*			

Note 1: None of these invasive alien species were recorded on the site of the Proposed Development. All records are deemed to be outside of the ZoI of the Enva facility.

14.3.1.7 Important Ecological Features

All ecological features identified within the ZoI (described above) for the Proposed Development have been identified and assessed as to whether they are considered IEFs to be scoped into the impact assessment. IEFs are defined as "*habitats, species and ecosystems, including ecosystem function and processes that may be affected, with reference to a geographical context in which they are considered important*" (CIEEM, 2018).

The valuation of the ecological features within the ZoI of the Proposed Development is detailed in **Table 14.7**. The valuation of ecological features is informed by the geographic scales outlined in the *Guidelines for Assessment of Ecological Impacts of National Roads Schemes, Revision 2* (NRA, 2009) (see **Volume III**, **appendix 14.1 - Biodiversity Supporting Information**). The IEFs were scoped into the impact assessment based on their ecological valuation combined with whether or not they are at risk of significant negative impact from the Proposed Development.

Table 14.7: Summary Valuation of Ecological Features within the ZoI of the Proposed Development

Group	Ecological Features	Highest Ecological Valuation within ZoI Note 1	At Risk of Potential Significant Negative Impact from the Proposed Development	Important Ecological Features (Scoped into Impact Assessment)
Designated Sites for Nature Conservation	Rye Water Valley/ Carton SAC, Glenasmole Valley SAC, Wicklow Mountains SAC, Red Bog, Kildare SAC	**International Importance** due to their designation as SACs as part of the Natura 2000 network of designated sites.	No. No direct or indirect impacts to these designated sites are predicted since: • There are no pathways or connectivity, hydrological or otherwise, between the Proposed Development and these SACs. • Given the nature and scale of the Proposed Development, and the lack of connectivity to these sites, there is no potential for negative impacts on the QI habitats and species for which these sites are designated. Therefore, these SACs are not considered IEFs and are excluded from further assessment.	No
	Poulaphuca Reservoir SPA, Wicklow Mountains SPA	**International Importance** due to their designation as SPAs as part of the Natura 2000 network of designated sites.	No. No direct or indirect impacts to these designated sites are predicted since: • There are no pathways or connectivity, hydrological or otherwise, between the Proposed Development and these SPAs. • The Proposed Development site and the surrounding environment does not provide any habitats of significant supporting value for the SCI birds of these SPAs, for foraging, roosting or breeding purposes. As such, ex-situ impacts on SCI birds are not predicted. Therefore, these SPAs are not considered IEFs and are excluded from further assessment.	No
	Grand Canal pNHA, Liffey Valley pNHA	**National Importance** due to their designation as pNHAs in Ireland.	No. While there is apparent hydrological connectivity between the Proposed Development and these sites, no direct or indirect impacts are predicted since: • The Griffeen River is culverted beneath the Grand Canal. As this culvert is fully lined, hydrological connectivity between the Proposed Development and the Grand Canal pNHA is ruled out. • The Griffeen River flows into the River Liffey (and Liffey Valley pNHA) approximately 6.5 km north of the Proposed Development. This site is of conservation interest for its diversity of habitats including mixed deciduous woodland, marsh habitat and rough grassland as well as a number of rare and threatened plant species. Given the nature and scale of the Proposed Development and degree of hydrological separation, there is no potential for significant negative impacts on this site or its ecological features of interest. Therefore, these pNHAs are not considered IEFs and are excluded from further assessment.	No

Group	Ecological Features	Highest Ecological Valuation within ZoI Note 1	At Risk of Potential Significant Negative Impact from the Proposed Development	Important Ecological Features (Scoped into Impact Assessment)
	Slade of Saggart and Crooksling Glen pNHA, Rye Water Valley/Carton pNHA, Glenasmole Valley pNHA, Royal Canal pNHA, Red Bog, Kildare pNHA, Poulaphuca Reservoir pNHA	**National Importance** due to their designation as pNHAs in Ireland.	No. No direct or indirect impacts and effects to these designated sites are predicted since: • There are no pathways or connectivity, hydrological or otherwise, between the Proposed Development and these pNHAs. • Given the nature and scale of the Proposed Development, and the lack of connectivity to these sites, there is no potential for negative impacts on the ecological features of interest of these sites. Therefore, these pNHAs are not considered IEFs and are excluded from further assessment.	No
	Brittas Ponds Wildfowl Sanctuary	**National Importance** due to its designation as a Wildfowl Sanctuary in Ireland.	No. Direct or indirect impacts and effects to this site are not predicted since: • There are no pathways or connectivity, hydrological or otherwise, between the Proposed Development and this site. • The Proposed Development site and the surrounding environment does not provide any habitats of significant supporting value for wildfowl species, for foraging, roosting or breeding purposes. As such, ex-situ impacts on wildfowl are not predicted. Therefore, this site is not considered an IEF and is excluded from further assessment.	No
Habitats and Flora	BL3 Buildings and artificial surfaces	Negligible Value	No. This artificial habitat is deemed to be of negligible ecological value. Therefore, this site is not considered an IEF and is excluded from further assessment.	No
	WL1 Hedgerows	**Local Importance (Lower Value)** as this is a small area of semi-natural habitat which is of limited local importance for wildlife.	No. Direct or indirect impacts and effects to this habitat are not predicted since: • The Proposed Development will not involve any removal of vegetation or interference with the existing hedgerow surrounding the Enva facility. As such, direct impacts of biodiversity loss, fragmentation and alteration are ruled out. • Given the nature and location of the Proposed Development site, this hedgerow habitat is not deemed to be an essential ecological corridor between features of higher ecological value. Therefore, this habitat is not considered an IEF and is excluded from further assessment. Potential impacts on species which may commute, forage or nest within this habitat are considered separately below.	No

Group	Ecological Features	Highest Ecological Valuation within ZoI Note 1	At Risk of Potential Significant Negative Impact from the Proposed Development	Important Ecological Features (Scoped into Impact Assessment)
	FW2 Depositing lowland river	**Local Importance (Higher Value)** as this habitat provides hydrological connectivity to other ecological features and potential supporting habitat for protected species.	Yes. Potential direct and indirect impacts effects to this habitat have been identified as: • Biodiversity loss, fragmentation, and alteration. • Pollution to water and/or air. Therefore, this habitat is considered an IEF and will be taken forward to assessment of significant effects. Potential impacts on species which may commute, forage or breed within this habitat are considered separately below.	**Yes**
	Protected Flora/Species of Conservation Concern	**Local Importance (Lower Value)** due to conservation status but not a deemed a resident or regularly occuring population.	No. Direct or indirect impacts and effects to this site are not predicted since: • No protected flora or species of conservation concern were identified within the Proposed Development site. • No pathway or connectivity has been identified between the Proposed Development and the single record of flora of conservation concern in the desk study, i.e., common gromwell, which is located approximately 4.5 km north-west of the Proposed Development site. Therefore, this feature is not considered an IEF and is excluded from further assessment.	No
	Invasive Alien Plants	**Local Importance (Lower Value)** due to the lack of records of Third Schedule IAPS within the footprint of the Proposed Development and surrounding environment.	No. Direct or indirect impacts and effects to this ecological feature are not predicted since: • The footprint of the Proposed Development is not located within any locations where IAPS listed on the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations, 2011 occur. Invasive plants identified within the hedgerow surrounding the site are not Third Schedule species. As the Proposed Development will not involve any removal of vegetation or interference with the existing hedgerow surrounding the site, these IAPS will not be disturbed. • The closest desk study record of Third Schedule IAPS to the Proposed Development site is giant hogweed, which was recorded in a roadside ditch east of Newcastle, approximately 600 m north of the site. Therefore, this feature is not considered an IEF and is excluded from further assessment.	No

Group	Ecological Features	Highest Ecological Valuation within ZoI Note 1	At Risk of Potential Significant Negative Impact from the Proposed Development	Important Ecological Features (Scoped into Impact Assessment)
Fauna	Bats (roosting)	**Local Importance (Lower Value)** due to the presence of two common and widespread bat species recorded in the baseline assessment.	No. Direct or indirect impacts and effects to this ecological feature are not predicted since: • The Proposed Development will not involve any removal of vegetation or interference with the existing hedgerow on site. • The hedgerows surrounding the site and existing operational buildings do not contain any features with suitability for roosting bats. Despite their national protection under the Wildlife Acts, this IEF is valued as Local (lower) value given the records of two common and widespread species within the baseline assessment, which do not represent resident or regularly occurring populations of national importance. Therefore, this feature is not considered an IEF and is excluded from further assessment.	No
	Bats (commuting and foraging)	**Local Importance (Higher Value)** due to the presence of two common and widespread bat species recorded in the baseline assessment and potential commuting and foraging habitat within the vicinity of the Proposed Development.	Yes. Potential direct and indirect impacts effects to this ecological feature have been identified, as: • Disturbance from noise, vibration, lighting, and human presence. Despite their national protection under the Wildlife Acts, this feature is valued as Local (higher) value given the records of two common and widespread species within the baseline assessment, which do not represent resident or regularly occurring populations of national importance. However, the precautionary principle has been applied as the hedgerows surrounding the Proposed Development site, along the Griffeen River and wider environment within the business park may provide suitable commuting and foraging habitat for bats. Therefore, this feature is considered an IEF and will be taken forward to assessment of significant effects.	**Yes**
	Badger (breeding, commuting and foraging)	**Local Importance (Lower Value)** due to its presence recorded in the baseline assessment.	No. Direct or indirect impacts and effects to this ecological feature are not predicted since: • The Proposed Development is located within a business park where the primary land use is artificial surfaces (industrial and commercial units). The surrounding environment does not offer any habitats of significant supporting value for badger. • There was no evidence of badger or habitat suitability noted within the site during the field study.	No

Group	Ecological Features	Highest Ecological Valuation within ZoI Note 1	At Risk of Potential Significant Negative Impact from the Proposed Development	Important Ecological Features (Scoped into Impact Assessment)
			• Given the nature, scale and location of the construction works, there is no potential for disturbance or habitat impacts on badger. Despite its national protection under the Wildlife Acts, badger are valued as Local (lower) value given the lack of suitable habitat within the vicinity of the Proposed Development and the low number of records the baseline assessment (see **Appendix 14.1**), which do not represent resident or regularly occurring populations of national importance. Therefore, this feature is not considered an IEF and is excluded from further assessment.	
	Otter (breeding)	**Local Importance (Higher Value)** as otter are known to utilise the Griffeen River which provides connectivity to features of higher ecological value.	Yes. Potential direct and indirect impacts effects to this ecological feature have been identified, as: • Biodiversity loss, fragmentation, and alteration. • Disturbance from noise, vibration, lighting, and human presence. • Pollution to water and/or air. Despite their international protection under the EU Habitats Directive and national protection under the Wildlife Acts, otter are valued as Local (higher) value. This species was not recorded in the desk study and evidence of otter was not found in the field study. However, the precautionary principle has been applied as the Griffeen River is known to support otter along its course and there is potential for otter to breed along this watercourse. The Griffeen River also provides connectivity to features of higher value such as downstream designated sites for which otter is an ecological feature of interest. Therefore, this feature is considered an IEF and will be taken forward to assessment of significant effects.	**Yes**
	Otter (commuting and foraging)	**Local Importance (Higher Value)** as otter are known to utilise the Griffeen River which provides connectivity to features of higher ecological value.	Yes. Potential direct and indirect impacts effects to this ecological feature have been identified, as: • Biodiversity loss, fragmentation, and alteration. • Disturbance from noise, vibration, lighting, and human presence. • Pollution to water and/or air. Despite their international protection under the EU Habitats Directive and national protection under the Wildlife Acts, otters are valued as Local (higher) value. This species was not recorded in the desk study and evidence of otter was not found in the field study. However, the precautionary principle has been applied as the Griffeen River is known to support otter along its course and otter are assumed to commute and/or forage along this watercourse. The	**Yes**

Group	Ecological Features	Highest Ecological Valuation within ZoI Note 1	At Risk of Potential Significant Negative Impact from the Proposed Development	Important Ecological Features (Scoped into Impact Assessment)
			Griffeen River also provides connectivity to features of higher value such as downstream designated sites for which otter is an ecological feature of interest. Therefore, this feature is considered an IEF and will be taken forward to assessment of significant effects.	
	Other protected mammals (hedgehog, pygmy shrew, pine marten, Irish stoat, red squirrel, Irish hare, and deer species)	**Local Importance (Lower Value)** due to records of protected mammals in the baseline assessment.	No. Direct or indirect impacts and effects to this ecological feature are not predicted since: • The Proposed Development is located within a business park where the primary land use is artificial surfaces (industrial and commercial units). The surrounding environment does not offer any habitats of significant supporting value for these protected mammals. • Although records of Irish hare and hedgehog were returned from the data search, no evidence of populations were identified during the field survey. • Given the nature, scale and location of the proposed construction works, there is no potential for disturbance or habitat impacts on these protected mammals. Despite their national protection under the Wildlife Acts, and international protection under the EU Habitats Directive with regards to pine marten and Irish hare, these protected mammals are valued as Local (lower) value due to the lack of suitable habitat within the vicinity of the Proposed Development and the low number of records the baseline assessment (see **Appendix 14.1**), which do not represent resident or regularly occurring populations of national or international importance. Therefore, this feature is not considered an IEF and is excluded from further assessment.	No
	Birds (breeding)	**Local (Higher Value)** due to records of several protected bird species in the baseline assessment and potential nesting habitat within the vicinity of the Proposed Development.	Yes. Potential direct and indirect impacts and effects to these features have been identified, as: • Disturbance from noise, vibration, lighting, and human presence. Despite the international protection of several breeding bird species under the EU Birds Directive and designated as SCIs within SPAs of the Natura 2000 network, breeding birds are valued as Local (higher) value given the assemblage of breeding birds recorded in the baseline assessment, which do not represent resident or regularly occurring populations of national or international importance. However, the precautionary principle has been applied as the hedgerows surrounding the Proposed Development site and	**Yes**

Group	Ecological Features	Highest Ecological Valuation within ZoI Note 1	At Risk of Potential Significant Negative Impact from the Proposed Development	Important Ecological Features (Scoped into Impact Assessment)
			wider environment within the business park may provide suitable habitat for nesting birds. Therefore, this feature is considered an IEF and will be taken forward to assessment of significant effects.	
	Birds (overwintering)	**Local (Lower Value)** due to records of protected overwintering bird species in the baseline assessment.	No. Direct or indirect impacts and effects to this ecological feature are not predicted since: • The majority of overwintering birds recorded in the desk study are seabirds and wetland waterbirds. • The Proposed Development is located within a business park where the primary land use is artificial surfaces (industrial and commercial units). The surrounding environment does not offer significant supporting value for overwintering bird species, for foraging or refuge purposes. • Given the nature, scale and location of the proposed construction works, there is no potential for disturbance or habitat impacts on overwintering birds. Despite the international protection of several overwintering bird species under the EU Birds Directive and designated as SCIs within SPAs of the Natura 2000 network, overwintering birds are valued as Local (lower) value due to the lack of suitable habitat within the vicinity of the Proposed Development and the assemblage of overwintering birds recorded in the baseline assessment, which do not represent resident or regularly occurring populations of national or international importance. Therefore, this feature is not considered an IEF and is excluded from further assessment.	No
	Protected Amphibians and Reptiles	**Local Importance (Lower Value)** due to records of a protected amphibian (common frog) in the baseline assessment.	No. Direct or indirect impacts and effects to this ecological feature are not predicted since: • The Proposed Development is located within a business park where the primary land use is artificial surfaces (industrial and commercial units). The surrounding environment does not offer any habitats of significant supporting value for protected amphibians (e.g., common frog and smooth new) and reptiles (common lizard). • Although records of common frog were returned from the data search, no evidence of populations or suitable habitat were identified during the field survey.	No

Group	Ecological Features	Highest Ecological Valuation within ZoI Note 1	At Risk of Potential Significant Negative Impact from the Proposed Development	Important Ecological Features (Scoped into Impact Assessment)
			• Given the nature, scale and location of the proposed construction works, there is no potential for disturbance or habitat impacts on protected amphibians or reptiles. Despite their national protection under the Wildlife Acts, and international protection under the EU Habitats Directive with regards to pine marten and Irish hare, these protected mammals are valued as Local (lower) value due to the lack of suitable habitat within the vicinity of the Proposed Development and the low number of records in the baseline assessment (see **Appendix 14.1**), which do not represent resident or regularly occurring populations of national or international importance. Therefore, this feature is not considered an IEF and is excluded from further assessment.	
	Terrestrial Invertebrates	**Local Importance (Lower Value)** due to records of protected invertebrates in the baseline assessment.	No. Direct or indirect impacts and effects to this ecological feature are not predicted since: • The Proposed Development will not involve any removal of vegetation or interference with the existing hedgerow on site, which may be suitable for foraging and breeding behaviour for a wide range of common terrestrial invertebrates. As such, impacts of disturbance and biodiversity loss, fragmentation and alteration are ruled out. Therefore, this feature is not considered an IEF and is excluded from further assessment.	No
	Aquatic Invertebrates (i.e. freshwater white-clawed crayfish)	**Local (Higher Value)** due to records of this species in the baseline assessment and potential habitat identified during the field survey.	Yes. Potential direct and indirect impacts and effects to this features have been identified, as: • Biodiversity loss, fragmentation, and alteration. • Pollution to water and/or air. Despite its national protection under the Wildlife Acts, and international protection under the EU Habitats Directive, white-clawed crayfish is valued as Local (Higher) value due to the low number of records in the baseline assessment (see **Appendix 14.1**), which do not represent resident or regularly occurring populations of national or international importance. However, the precautionary principle has been applied as the field study recorded 'fair' crayfish habitat, while white-clawed crayfish have been recorded within the Griffeen River on previous ecological surveys. This species is also known to occur within the River Liffey downstream of the Proposed Development.	**Yes**

Group	Ecological Features	Highest Ecological Valuation within ZoI Note 1	At Risk of Potential Significant Negative Impact from the Proposed Development	Important Ecological Features (Scoped into Impact Assessment)
			Therefore, this feature is considered an IEF and will be taken forward to assessment of significant effects.	
	Invasive Alien Animals	**Local Importance (Lower Value)** due to the lack of records of invasive animal species within the footprint of the Proposed Development and surrounding environment.	No. Direct or indirect impacts and effects to this ecological feature are not predicted since: • The desk study did not return any records of invasive alien animal species within the footprint or immediate surrounding environment of the Proposed Development. • The closest desk study records of invasive alien animal species scheduled to the European Communities (Bird and Natural Habitat Regulations) 2011-2015, to the Proposed Development site are brown rat and grey squirrel, which were recorded approximately 2.7 km and 4.5 km from the site, respectively. These are common and widespread invasive species in Ireland and the Proposed Development will not interact with or cause their further spread. Therefore, this feature is not considered an IEF and is excluded from further assessment.	No

Note 1: Based on level of legal protection (NRA, 2009). Note that some features, despite their protection under the national legislation, are given a lower value based upon an assessment of their population on a local level.

The ecological valuation concluded that the following ecological features were deemed to be IEF and should be assessed:

- FW2 Depositing lowland river.
- Bats (commuting and foraging).
- Otter (breeding).
- Otter (commuting and foraging).
- Birds (breeding).
- Freshwater white-clawed crayfish.

14.3.2 Evolution of the Environment in the Absence of the Proposed Development

In the event that the Proposed Development does not go forward, an assessment of the future baseline conditions has been carried out and is described within this section. **Table 14.8** outlines the likely evolution of the environment (i.e., the IEFs) in the absence of the Proposed Development.

Table 14.8: Likely Evolution of the Environment in the Absence of the Proposed Development

Important Ecological Features		Likely Evolution of the Baseline in the Absence of the Proposed Development
Habitats & Flora	FW2 Depositing lowland river	Habitats within the ZoI of the Proposed Development would likely remain as described in the baseline section of this report into the medium-term future. Any current pressures and threats affecting these habitats would remain in the absence of the Proposed Development, should they exist.
Fauna	Bats (commuting and foraging)	Fauna within the ZoI of the Proposed Development would likely remain as described in the baseline section of this report into the medium-term future. Any current pressures and threats affecting these species would remain in the absence of the Proposed Development, should they exist.
	Otter (breeding)	
	Otter (commuting and foraging)	
	Birds (breeding)	
	Invertebrates (aquatic i.e., freshwater white-clawed crayfish)	

14.4 Description of Likely Significant Effects

The assessment of significant effects has been made with reference to the description of the Proposed Development set out in **Chapter 4: Description of the Proposed Development** and based against IEFs identified from the baseline described in **Section 14.3**. The assessment has been completed initially without consideration of any avoidance, minimisation, mitigation or compensation measures other than those 'built-in' to the design of the Proposed Development (e.g. reconfiguration of the existing surface water drainage system). A description of the potential significant effects on biodiversity caused by each identified impact during the construction, operational and decommissioning phases are presented in **Sections 14.4.1** to **14.4.3** below.

14.4.1 Construction Phase

The impacts considered during the construction phase, as outlined in **Section 14.2.4** are:

- Disturbance from noise, vibration, lighting and human presence, due to the presence of construction staff on site, the movement of vehicles and construction materials and operation of plant and machinery.

- Surface water run-off during construction, with potential to carry suspended silt or contaminants into local watercourses under high intensity rainfall events and associated habitat deterioration effects upon terrestrial habitats.
- Air pollution during construction with the potential to generate localised dust and air-borne contaminants which may negatively affect local terrestrial and aquatic environments (i.e., smothering effects).
- Habitat destruction, fragmentation or deterioration arising from construction activities, which may negatively affect sensitive ecological receptors in both the terrestrial and aquatic environment.

The following sections provide an assessment of the likely significant effects during the construction phase on each of the IEFs identified in **Table 14.7** above.

14.4.1.1 FW2 Depositing lowland river

For the IEF habitat FW2 depositing lowland river the impacts of biodiversity loss, fragmentation, and alteration and pollution to water and/or air, during the construction phase of the Proposed Development have been assessed.

Pollution to water during construction would, if not adequately managed and under high intensity rainfall events result from direct effects such as surface water run-off carrying suspended silt into local watercourses. Pollution to water is also closely linked to biodiversity degradation, and alteration, whereby an impact on water quality can affect stream habitat and freshwater macroinvertebrates. These impacts have been assessed in combination here. The extent of the effect is the Griffeen River. Given that an accidental pollution event cannot be predicted, the magnitude of the effect cannot be measured and therefore, the precautionary principle has been applied based on the pollutants likely to be onsite during the construction phase. The duration of the effect will be linked with the construction timeframe associated with works within the vicinity of the Griffeen River and is considered to be short-term. The timing of the construction works may influence the magnitude (i.e. works during high rainfall events would have higher potential magnitude than periods of no rainfall). This effect is considered to be reversible after construction works are completed. As discussed in **Section 14.3.1.2**, the Griffeen River is currently classified as having ‘poor’ status and deemed to be ‘at risk’ under the WFD monitoring programme. It is not considered that there is a risk of the Proposed Development contributing significantly to the current poor status of the Griffeen River and therefore the predicted impact is assessed as **slight adverse**, short-term and reversible on this IEF. Precautionary additional mitigation, as set out in **Section 14.7.1,** is proposed to address this impact and its effects.

Pollution to air during construction may result in indirect effects from activities creating dust or particulate matter. Connectivity via airborne pathways to this IEF may then result in physical smothering of vegetation and the deposition of particles on the water surface. Smothering and deposition can affect vegetative function and survival, and particle deposition on the surface of the water may contribute to increased pollutants and sedimentation. The extent of the effect is considered to be up to 100 m from the source of impact (TII, 2011). Given that an air pollution event cannot be predicted, the magnitude of the effect cannot be measured but is considered to be a 50% reduction in habitat quality within 100 m of dust-generating construction activities such as excavations/earthworks. Although the magnitude cannot be measured, the excavation/earthworks proposed are considered temporary, small scale and localised in nature, any potential effects are considered **negligible**. The duration of the effect will be linked with the construction timeframe associated with works within vicinity of the Griffeen River and is considered to be short-term. The timing of the construction works may influence the magnitude (e.g., weather conditions such as wind and rain). This effect is considered to be reversible after construction works are completed. Due to the magnitude of the effect and the small scale, short-term and localised nature of the works, the effects of air pollution during the construction phase of the Proposed Development are predicted to be **not significant**.

14.4.1.2 Bats (commuting and foraging)

For the IEF bats (commuting and foraging), the impact of disturbance from noise, vibration, lighting, and human presence during the construction phase of the Proposed Development have been assessed.

Disturbance from noise, vibration, lighting, and human presence, in the form of reduced commuting and foraging, during construction may result from potential disturbance of commuting and foraging bats within the vicinity of the Proposed Development, which is connected via direct physical and airborne pathway to the IEF. Disturbance to bats may be caused by excavations, earthworks, machinery, vehicles and personnel causing high levels of noise and vibration during construction. The extent of the effect is the entire construction works area within the Proposed Development. The magnitude of the effect is considered to be low based on the baseline assessment, which identified records of two common and widespread bat species within the biodiversity study area. There is potential for bats to be present within the vicinity of the Proposed Development during the construction phase, but these individuals do not represent resident or regularly occurring populations of national or international importance. The duration of the effect will not extend further than the construction timeframe associated with works and is considered to be short-term. The timing of the construction works will influence the magnitude (i.e., works carried out in the summer months and at night-time are more likely to affect commuting and foraging bats). However, as outlined in **Chapter 5: Description of the Construction Phase**, the construction works will be undertaken within normal construction working hours (i.e., daylight hours) and no night-time works are proposed. Given the nocturnal nature of bats, disturbance from noise, vibration, lighting, and human presence during construction is not predicted. Therefore, the effect of disturbance from noise, vibration, lighting, and human presence on bats during the construction phase of the Proposed Development is predicted to be **not significant**.

14.4.1.3 Otter (breeding, commuting and foraging)

For the IEF of otter (breeding, commuting and foraging), the impacts of biodiversity loss, fragmentation, and alteration, disturbance from noise, vibration, lighting, and human presence and pollution to water and/or air during the construction phase of the Proposed Development have been assessed.

The impacts of pollution to water and/or air and biodiversity loss, fragmentation, and alteration on otter (breeding, commuting and foraging) during the construction phase are linked to the impacts on the Griffeen River as discussed above (**Section 14.4.1.1**). A reduction in water quality in the Griffeen River resulting from pollution from construction activities may have an adverse effect on aquatic organisms and subsequent adverse effect on commuting and foraging otter within the watercourse. While the effect of water pollution during the construction phase of the Proposed Development is predicted to result in a slight adverse effect on the depositing lowland river itself, this is predicted to be short-term and reversible. Given the high mobility and large home ranges of otter (c. 2-20 km) (VWT, 2022), they are likely to be able to accommodate such localised changes in water quality, prey distribution and abundance. Therefore, the effects of pollution to water and/or air and biodiversity loss, fragmentation, and alteration on otter during the construction phase of the Proposed Development are predicted to be **not significant**.

Disturbance from noise, vibration, lighting, and human presence, in the form of reduced commuting and foraging and/or reduced breeding success, during construction may result from potential disturbance of otter within the vicinity of the Proposed Development (i.e., Griffeen River), which is connected via direct physical and airborne pathway to the IEF. Disturbance to otter may be caused by excavations, earthworks, machinery, vehicles and personnel causing high levels of noise and vibration during construction. The extent of the effect is the entire construction works area within the Proposed Development and up to 150 m (in both directions) along the Griffeen River. The magnitude of the effect is considered to be low based on the lack of records or field evidence of otter within the biodiversity study area. There is potential for otter to be present within the vicinity of the Proposed Development during the construction phase, but these individuals do not represent resident or regularly occurring populations of national or international importance. The duration of the effect will not extend further than the construction timeframe associated with works and is considered to be short-term. However, as outlined in **Chapter 5: Description of the Construction Phase**, the construction works will be undertaken within normal construction working hours (i.e., daylight hours) and no night-time works are proposed. Given the typically nocturnal nature of otter, disturbance from noise, vibration, lighting, and human presence during construction is not predicted. Therefore, the effect of disturbance from noise, vibration, lighting, and human presence on otter during the construction phase of the Proposed Development is predicted to be **not significant**.

14.4.1.4 Birds (breeding)

For the IEF of birds (breeding), the impact of disturbance from noise, vibration, lighting, and human presence during the construction phase of the Proposed Development has been assessed.

Disturbance from noise, vibration, lighting, and human presence, in the form of reduced breeding success, during construction may result from potential disturbance of nesting birds within the vicinity of the Proposed Development (i.e., hedgerows), which is connected via direct physical and airborne pathway to the IEFs. The extent of the effect is the entire construction works area within the Proposed Development and relevant adjoining habitats (i.e., hedgerows). The magnitude of the effect is considered to be low based on the availability of suitable nesting habitat and low number of breeding birds recorded in the baseline assessment, which do not represent resident or regularly occurring populations of national or international importance. The duration of the effect will not extend further than the construction timeframe associated with works and is considered to be short-term. The timing of the construction works will influence the magnitude (i.e., works between 1st March and 31st August, inclusive, are more likely to disturb breeding birds). This effect is considered to be reversible after construction works are completed. Due to the low magnitude of the effect and the short-term duration of the construction works, the effect of disturbance from noise, vibration, lighting, and human presence on breeding birds during the construction phase of the Proposed Development are predicted to be **not significant**.

14.4.1.5 Freshwater white-clawed crayfish

For the IEF of freshwater white-clawed crayfish, the impacts of biodiversity loss, fragmentation, and alteration and pollution to water and/or air during the construction phase of the Proposed Development have been assessed.

The impacts of pollution to water and/or air and biodiversity loss, fragmentation, and alteration on freshwater white-clawed crayfish during the construction phase are linked to the impacts on the Griffeen River as discussed above (**Section 14.4.1.1**). Pollution to water during construction would, if not adequately controlled, result from direct effects such as surface water run-off carrying suspended silt or contaminants into local watercourses. Pollution to water is also closely linked to biodiversity degradation, and alteration, whereby an impact on water quality can affect stream habitat and freshwater macroinvertebrates. These impacts have been assessed in combination here. One of the principal requirements for the survival of freshwater white-clawed crayfish within a watercourse is good water quality (Peay, 2003). White-clawed crayfish are considered to be extremely vulnerable to pollution events (industrial, domestic and agricultural) (Reynolds, 1998; Holdich, 2003). These invertebrates are not usually found in habitats where substrates are covered in mud or silt, although they may cross such areas while foraging (Holdich, 2000; 2003). Increased sediment can result in decreased dissolved oxygen concentrations and create unsuitable conditions for crayfish. The delicate gills of crayfish are also easily clogged by sediment and this may cause physio-pathological changes in the long term (Peay, 2000). Therefore, a reduction in water quality in the Griffeen River resulting from pollution from construction activities may have an adverse effect on freshwater white-clawed crayfish. The extent of the effect is the Griffeen River. Given that the population of crayfish in the Griffeen River is unknown, the magnitude of the effect cannot be measured. The precautionary principle has therefore been applied as the field study recorded ‘fair’ crayfish habitat within the surveyed section of the Griffeen River, and this species is known to occur elsewhere within this watercourse and in the River Liffey downstream. The duration of the effect will be linked with the construction timeframe associated with works within the vicinity of the Griffeen River and is considered to be short-term. The timing of the construction works may influence the magnitude (i.e. works during high rainfall events would have higher potential magnitude than periods of no rainfall). This effect is considered to be reversible after construction works are completed. As outlined above in the assessment of effects on the Griffeen River, it is not considered that there is a risk of the Proposed Development contributing significantly to the current poor status of the Griffeen River and therefore the effects of pollution to water and/or air and biodiversity loss, fragmentation, and alteration during the construction phase of the Proposed Development is predicted to result in a **slight adverse**, short-term, and reversible effect on freshwater white-clawed crayfish. Precautionary additional mitigation, as set out in **Section 17.7.1**, is proposed to address this impact and its effects.

14.4.2 Operational Phase

The potential impacts during the operational phase, as outlined in **Section 14.2.4** are:

- Surface water run-off carrying suspended silt or contaminants into local watercourses, arising from operation of the Proposed Development and activities including vehicle and material movements.
- Disturbance from increased noise, vibration, lighting and human presence, due to the presence of operational staff on site, the movement of vehicles, operation of plant and machinery, and lighting associated with the operation of the Proposed Development.

The following sections provide an assessment of the likely significant effects during the operational phase on each of the IEFs identified in **Table 14.7** above.

14.4.2.1 FW2 Depositing lowland river

For the IEF habitat FW2 depositing lowland river the impacts of biodiversity loss, fragmentation, and alteration and pollution to water and/or air, during the operational phase of the Proposed Development has been assessed.

Pollution to water during operation would, if not adequately controlled, resulting from stormwater and rainwater carrying chemicals and other contaminants from the Proposed Development into local watercourses during rainfall events of high intensity. Pollution to water is also closely linked to biodiversity degradation, and alteration, whereby an impact on water quality can affect stream habitat and freshwater macroinvertebrates. These impacts have been assessed in combination here. The extent of the effect is the Griffeen River. The magnitude of the effect is considered to be low based on the design of the Proposed Development, which includes for stormwater management during the operation phase. As outlined in **Chapter 4: Description of the Proposed Development**, the existing surface water drainage system within the Enva site will be reconfigured to include the relocation of existing drains and the installation of a new surface water drain to collect the roof and yard run-off. Stormwater and rainwater are collected and managed appropriately on site through a settlement tank, which allows heavier stones and debris to 'settle' in the tank before being passed through an oil interceptor. Clean surface water is then released through the existing discharge point (SW3) into the Griffeen River. All emission to water will be subject to EPA IED licence and SDCC discharge licence and stormwater emission limit values (e.g., for mineral oils, suspended solids etc.) will be complied with. The discharge point is visually inspected on a daily basis, and the water is regularly tested for a range of pollutants as specified in the environmental licence. Where issues are identified, the surface water discharge point can be shut off via open/close valves. Foul water from the Proposed Development site is also subject to wastewater treatment and is subsequently discharged to sewer at an existing EPA-licensed foul sewer drainage point, with appropriate monitoring (e.g., for biological oxygen demand (BOD), chemical oxygen demand (COD), pH etc.) in accordance with the facility EPA IED licence.

The duration of the effect extends to the entire operational timeframe associated with the Proposed Development and is considered to be long-term. Seasonal changes during operation may influence the magnitude of effects (i.e. high rainfall events may give rise to more stormwater run-off). As discussed in **Section 14.3.1.2**, the Griffeen River is currently classified as having 'poor' status and deemed to be 'at risk' under the WFD monitoring programme. However, given the existing surface water and foul water control measures already in operation at the Enva facility, and compliance with the facility EPA IED licence and SDCC discharge licence, the risk of surface water run-off resulting in pollution to water during the operational phase is limited to the occurrence of a high intensity rainfall event which will exceed infiltration rate of the existing management measures. Therefore, despite the existing poor status of the Griffeen River, given the low magnitude of the effect and the design of the Proposed Development surface water and foul water management system, the effects of biodiversity loss, fragmentation, and alteration and pollution to water and/or air on this IEF during the operational phase of the Proposed Development are predicted to be **not significant**.

14.4.2.2 Bats (commuting and foraging)

For the IEF of bats (commuting and foraging), the impact of increased disturbance from noise, vibration, lighting, and human presence during the operational phase of the Proposed Development have been assessed.

Disturbance from increased noise, vibration, lighting, and human presence, in the form of reduced commuting and foraging, during operation may result from potential disturbance of commuting and foraging bats within the vicinity of the Proposed Development, which is connected via direct physical and airborne pathway to the IEF. Disturbance to bats may be caused by the day-to-day operation of the Enva facility, including the operation and movement of machinery, vehicles and personnel causing high levels of noise and vibration during the operational phase. However, the potential for additional disturbance from new operational activities above the baseline level which already exists at the Enva facility is low. The extent of the effect is the entire operational area of the Proposed Development and habitats directly adjacent to the site. The magnitude of the effect is considered to be low based on the baseline assessment, which identified records of two common and widespread bat species within the biodiversity study area. There is potential for bats to be present within the vicinity of the Proposed Development during the operational phase, but these individuals do not represent resident or regularly occurring populations of national or international importance. The duration of the effect extends to the entire operational timeframe associated with the Proposed Development and is considered to be long-term. As outlined in **Chapter 4: Description of the**

Proposed Development, the Enva facility will require 24-hour traffic movements and operation to service the health sector including large hospitals which operate 24/7. Therefore, given the nocturnal nature of bats, there is potential for disturbance from noise, vibration, lighting and human presence to impact upon bats during night-time operational activities. Internal noise sources consist of equipment, processes, plant/machinery, and heating and ventilation systems. The plant items with the greatest potential for noise impact during the operational phase are the shredder and the air blast cooler. As outlined in **Chapter 9: Noise and Vibration**, there is no significant noise impact. In addition, the design of the facility is such that noise from within the building is not radiated externally, and therefore is not predicted to disturb bats. The primary external noise sources during the operational phase are from vehicle movements at the facility during night-time hours. Due to the low magnitude of the effect, the effects of disturbance from noise, vibration and human presence on bats, arising primarily from vehicle movements during the operational phase of the Proposed Development, are predicted to be **not significant.**

The design of the Proposed Development includes for changes to the existing internal and external lighting arrangements on site. Artificial lighting of commuting and foraging routes can be extremely disturbing to bats, as it can increase the chances of predation and affect their feeding behaviour. Artificial lighting has been shown to be particularly harmful if located along river corridors, near woodland edges and near hedgerows (BCT, 2018). There is potential for light spill onto the surrounding hedgerows and Griffeen River resulting in adverse effects of disturbance on bats commuting and foraging within these habitats, particularly if external lighting is located at the northern boundary of the Proposed Development site. As outlined in **Chapter 4: Description of the Proposed Development**, most of the proposed lighting changes are internal and no additional lighting has been proposed along the northern boundary of the site, so the risk of light spill into the adjacent habitat used by commuting and foraging bats is low. However, the existing lighting arrangements in the yard are proposed to be reviewed considering the new operation and additional changes to lighting may be required based on this review. Despite the low magnitude of the effect, the precautionary principle is applied with regards to the proposed lighting. Therefore, in the absence of mitigation measures, the effect of disturbance on bats from artificial lighting during the operational phase of the Proposed Development is predicted to result in a **slight adverse**, long-term, and irreversible effect on this IEF. Precautionary additional mitigation, as set out in **Section 14.7.1**, is proposed to address this impact and its effects.

14.4.2.3 Otter (breeding, commuting and foraging)

For the IEF of otter (breeding, commuting and foraging), the impacts of biodiversity loss, fragmentation, and alteration, disturbance from increased noise, vibration, lighting, and human presence and pollution to water and/or air during the operational phase of the Proposed Development have been assessed.

The impacts of pollution to water and/or air and biodiversity loss, fragmentation, and alteration on otter (breeding, commuting and foraging) during the operational phase are linked to the impacts on the Griffeen River as discussed above (**Section 14.4.2.1**). A reduction in water quality in the Griffeen River resulting from pollution during operation may have an adverse effect on aquatic organisms and subsequent adverse effect on commuting and foraging otter within the watercourse. However, as outlined above in the assessment of effects on the Griffeen River, the effects of biodiversity loss, fragmentation, and alteration and pollution to water and/or air on this watercourse during the operational phase of the Proposed Development are predicted to be **not significant**. In the unlikely event that a pollution event occurs during operation and results in a degradation of water quality, otter are likely to be able to accommodate such localised changes in water quality, prey distribution and abundance given their high mobility and large home ranges (c. 2-20 km) (VWT, 2022). Therefore, the effects of biodiversity loss, fragmentation, and alteration and pollution to water and/or air on otter during the operational phase of the Proposed Development are predicted to be **not significant**.

Disturbance from increased noise, vibration, lighting, and human presence, in the form of reduced commuting and foraging and/or reduced breeding success, during operation may result from potential disturbance of otter within the vicinity of the Proposed Development (i.e., Griffeen River), which is connected via direct physical and airborne pathway to the IEFs. Disturbance to otter may be caused by the day-to-day operation of the Enva facility, including the operation and movement of machinery, vehicles and personnel causing high levels of noise and vibration during the operational phase. However, the potential for additional disturbance from new operational activities above the baseline level which already exists at the Enva facility is low. The extent of the effect is the entire operational area of the Proposed Development and habitats directly adjacent to the site. The magnitude of the effect is considered to be low based on the lack of records or field evidence of otter within the biodiversity study area. There is potential for otter to be present within the vicinity of the Proposed Development during the operational phase, but these individuals do not represent resident or regularly occurring populations of national or international importance. The duration of the effect extends to the entire operational timeframe associated with the Proposed Development and is considered to be long-term. As outlined in **Chapter 4 - Description of the Proposed Development**, the Enva facility will require 24-hour traffic movements and operation to service the health sector including large hospitals which operate 24/7. Therefore, given the typically nocturnal nature of otter, there is potential for disturbance from noise, vibration, lighting and human presence to impact upon otter during night-time operational activities. Internal noise sources consist of equipment, processes, plant/machinery, and heating and ventilation systems. The plant items with the greatest potential for noise impact during the operational phase are the shredder and the air blast cooler. As outlined in **Chapter 9 - Noise and Vibration**, no significant noise impact is predicted. In addition, the design of the facility is such that noise from within the building is not radiated externally, and therefore is not predicted to disturb otter. The primary external noise sources during the operational phase are from vehicle movements at the facility during night-time hours. Due to the low magnitude of the effect, the effects of disturbance from noise, vibration and human presence on otter, arising primarily from vehicle movements during the operational phase of the Proposed Development, are predicted to be **not significant.**

The design of the Proposed Development includes for changes to the existing internal and external lighting arrangements on site. Light spill onto river corridors during hours of darkness could potentially lead to disturbance of otter, through illuminating previously undisturbed areas of riverine and riparian habitats. There is potential for light spill onto the Griffeen River corridor resulting in adverse effects of disturbance on otter breeding, commuting or foraging along this watercourse, particularly if external lighting is located at the northern boundary of the Proposed Development site. As outlined in **Chapter 4 - Description of the Proposed Development**, most of the proposed lighting changes are internal and no additional lighting has been proposed along the northern boundary of the site, so the risk of light spill into the adjacent habitat used by commuting and foraging otter is low. However, the existing lighting arrangements in the yard are proposed to be reviewed considering the new operation and additional changes to lighting may be required based on this review. Despite the low magnitude of the effect, the precautionary principle is applied with regards to the proposed lighting. Therefore, in the absence of mitigation measures, the effect of disturbance on otter from artificial lighting during the operational phase of the Proposed Development is predicted to result in a **slight adverse**, long-term, and irreversible effect on this IEF. Precautionary additional mitigation, as set out in **Section 14.7.1**, is proposed to address this impact and its effects.

14.4.2.4 Birds (breeding)

For the IEF of birds (breeding), the impact of disturbance from increased noise, vibration, lighting, and human presence during the operational phase of the Proposed Development has been assessed.

Disturbance from increased noise, vibration, lighting, and human presence, in the form of reduced breeding success, during operation may result from potential disturbance of nesting birds within the vicinity of the Proposed Development (i.e., hedgerow), which is connected via direct physical and airborne pathway to the IEFs. Disturbance to birds may be caused by the day-to-day operation of the Enva facility, including the operation and movement of machinery, vehicles and personnel causing high levels of noise and vibration during the operational phase. However, the potential for additional disturbance from new operational activities above the baseline level which already exists at the Enva facility is low. The extent of the effect is the entire operational area of the Proposed Development and habitats directly adjacent to the site. The magnitude of the effect is considered to be low based on the availability of suitable nesting habitat and low number of breeding birds recorded in the desktop study. The duration of the effect extends to the entire operational timeframe associated with the Proposed Development and is considered to be long-term. Internal noise sources consist of equipment, processes, plant/machinery, and heating and ventilation systems. However, the design of the facility is such that noise from within the building is not radiated externally, and therefore is not predicted to disturb breeding birds. The primary external noise sources during the operational phase are from vehicle movements at the facility during night-time hours. The design of the Proposed Development includes for changes to the existing internal and external lighting arrangements on site and there is potential for light spill onto the surrounding hedgerows resulting in adverse effects of disturbance on roosting passerines at night. However, the hedgerows on site are not considered to be of significant value for breeding or roosting birds so the potential for disturbance is limited. Due to the low magnitude of the effect, the effects of disturbance from noise, vibration, lighting and human presence on this IEF during the operational phase of the Proposed Development are predicted to be **not significant.**

14.4.2.5 Freshwater white-clawed crayfish

For the IEF of freshwater white-clawed crayfish, the impacts of biodiversity loss, fragmentation, and alteration and pollution to water and/or air during the operational phase of the Proposed Development have been assessed.

The impacts of pollution to water and/or air and biodiversity loss, fragmentation, and alteration on freshwater white-clawed crayfish during the operational phase are linked to the impacts on the Griffeen River as discussed above (**Section 14.4.2.1**). Pollution to water would, if not adequately controlled result from direct effects such as surface water run-off carrying suspended silt or contaminants into local watercourses. Pollution to water is also closely linked to biodiversity degradation, and alteration, whereby an impact on water quality can affect stream habitat and freshwater macroinvertebrates. These impacts have been assessed in combination here. A reduction in water quality in the Griffeen River resulting from pollution during operation may have an adverse effect on freshwater white-clawed crayfish due to their vulnerability to pollution events and their requirement for good water quality to survive. However, as outlined above in the assessment of effects on the Griffeen River, given the existing surface water and foul water control measures already in operation at the Enva facility, and compliance with the facility EPA IED licence and SDCC discharge licence, the risk of surface water run-off resulting in pollution to water during the operational phase is very limited. The effects of biodiversity loss, fragmentation, and alteration and pollution to water and/or air on the Griffeen River during the operational phase of the Proposed Development are predicted to be not significant. Therefore, the effects of biodiversity loss, fragmentation, and alteration and pollution to water and/or air on freshwater white-clawed crayfish during the operational phase of the Proposed Development are predicted to be **not significant**.

14.4.3 Decommissioning Phase

Decommissioning of the Proposed Development following closure would involve; either the processing of any untreated wastes onsite or the transfer of such wastes to other facilities for processing, removal of all treated HRW and waste containers, dismantling, disinfection, and removal of the treatment plant and decontamination of the building if required. The potential impacts that would occur if there were no mitigation, during the decommissioning phase, as outlined in **Section 14.2.4.3** are:

- Disturbance from noise, vibration, lighting and human presence, due to the presence of decommissioning staff on site, the movement of vehicles and materials and operation of plant and machinery.
- Surface water run-off during decommissioning, with potential to carry suspended silt or contaminants into local watercourses and associated habitat deterioration effects upon terrestrial habitats.
- Air pollution during decommissioning with the potential to generate dust and air-borne contaminants which may negatively affect local terrestrial and aquatic environments (i.e. smothering effects).
- Habitat destruction, fragmentation or deterioration arising from decommissioning activities, which may negatively affect sensitive ecological receptors in both the terrestrial and aquatic environment.

The following sections outline the likely significant effects during the decommissioning phase on each of the IEFs identified in **Table 14.7** above.

14.4.3.1 FW2 Depositing Lowland River

For the IEF habitat FW2 depositing lowland river the impacts of biodiversity loss, fragmentation, and alteration and pollution to water and/or air, during the decommissioning phase of the Proposed Development have been assessed.

Activities involved in the decommissioning of the Proposed Development (outlined in **Section 14.4.3** above) would would, if not adequately controlled and under high intensity rainfall events may have the potential to result in localised pollution to water and/or air and subsequent biodiversity loss, fragmentation, and alteration similar to those outlined in the construction phase (**Section 14.4.1**). However, such activities and associated impacts would be smaller in scale due to the reduced nature and duration of the works required to decommission the Enva facility. Therefore, the effect of water pollution during the decommissioning phase of the Proposed Development is predicted to result in a **slight adverse**, short-term, and reversible effect on this IEF. Measures, as set out in **Section 14.7.1**, will be required to mitigate this effect.

The effects of air pollution during the decommissioning phase of the Proposed Development are predicted to be **not significant**.

14.4.3.2 Bats (commuting and foraging)

For the IEF bats (commuting and foraging), the impact of disturbance from noise, vibration, lighting, and human presence during the decommissioning phase of the Proposed Development have been assessed.

Activities involved in the decommissioning of the Proposed Development (outlined in **Section 14.4.3** above) would have the potential to result in disturbance to bats from noise, vibration, lighting, and human presence similar to those outlined in the construction phase (**Section 14.4.1**). However, such activities and associated impacts would be smaller in scale due to the reduced nature and duration of the works required to decommission the Enva facility. Therefore, the effect of disturbance from noise, vibration, lighting, and human presence on bats during the decommissioning phase of the Proposed Development is predicted to be **not significant**.

14.4.3.3 Otter (breeding, commuting and foraging)

For the IEF of otter (breeding, commuting and foraging), the impacts of biodiversity loss, fragmentation, and alteration, disturbance from noise, vibration, lighting, and human presence and pollution to water and/or air during the decommissioning phase of the Proposed Development have been assessed.

Activities involved in the decommissioning of the Proposed Development (outlined in **Section 14.4.3** above) would have the potential to result in pollution to water and/or air, associated biodiversity loss, fragmentation, and alteration, and disturbance to otter from noise, vibration, lighting, and human presence similar to those outlined in the construction phase (**Section 14.4.1**). However, such activities and associated impacts would be smaller in scale due to the reduced nature and duration of the works required to decommission the Enva facility. Therefore, the effects of pollution to water and/or air, biodiversity loss, fragmentation, and alteration and disturbance from noise, vibration, lighting and human presence on otter during the decommissioning phase of the Proposed Development are predicted to be **not significant**.

14.4.3.4 Birds (breeding)

For the IEF of birds (breeding), the impact of disturbance from noise, vibration, lighting, and human presence during the decommissioning phase of the Proposed Development has been assessed.

Activities involved in the decommissioning of the Proposed Development (outlined in **Section 14.4.3** above) would have the potential to result in disturbance to birds from noise, vibration, lighting, and human presence similar to those outlined in the construction phase (**Section 14.4.1**). However, such activities and associated impacts would be smaller in scale due to the reduced nature and duration of the works required to decommission the Enva facility. Therefore, the effect of disturbance from noise, vibration, lighting, and human presence on birds during the decommissioning phase of the Proposed Development is predicted to be **not significant.**

14.4.3.5 Freshwater white-clawed crayfish

For the IEF of freshwater white-clawed crayfish, the impacts of biodiversity loss, fragmentation, and alteration and pollution to water and/or air during the decommissioning phase of the Proposed Development have been assessed.

Activities involved in the decommissioning of the Proposed Development (outlined in **Section 14.4.3** above) would, if not adequately controlled, have the potential to result in pollution to water and/or air and biodiversity loss, fragmentation, and alteration impacts to freshwater white-clawed crayfish similar to those outlined in the construction phase (**Section 14.4.1**). However, such activities and associated impacts would be smaller in scale due to the reduced nature and duration of the works required to decommission the Enva facility. Therefore, the effects of pollution to water and/or air and biodiversity loss, fragmentation, and alteration during the decommissioning phase of the Proposed Development is predicted to result in a **slight adverse**, short-term, and reversible effect on this IEF. Measures, as set out in **Section 14.7.1**, will be required to mitigate this effect.

14.5 Cumulative Impact Assessment

A cumulative impact assessment (CIA) has been undertaken for biodiversity; see **Chapter 20 - Cumulative Effects**.

14.6 Interactions

Interactions between environmental topics with Biodiversity has been addressed in **Chapter 19 – Interactions Between the Environmental Factors.**

14.7 Mitigation Measures

14.7.1 Construction Phase

14.7.1.1 FW2 Depositing lowland river

Taking recognition also of the measures outlined in **Chapter 15: Water**, the following mitigation is proposed to avoid/minimise impact on the FW2 depositing lowland river during the construction phase:

Pollution Prevention Control Measures

The following mitigation is for the general protection of watercourses (i.e., the Griffeen River):

- Stockpiling of construction materials shall be strictly prohibited within 15 m of any ditch or water-laden channel.
- Hazardous materials including chemicals, solvents, paints, hydrocarbons and/or lubricants used during construction, shall be stored on hardstand and within a suitably designed bunded area in accordance with established guidelines.
- No re-fuelling of equipment/ plant or the addition of hydraulic oil or lubricants to vehicles/ equipment shall take place on site.
- Waste materials shall be stored in designated areas that are isolated from surface water drains and watercourses. Waste materials shall be carefully managed including covering stockpiles during rainfall. Skips shall be closed or covered to prevent materials being blown or washed away.
- All machinery shall be routinely checked to ensure no leakage of oils or lubricants occurs during the construction phase. Any spillages will be immediately contained, and the contaminated soil/material shall be taken to a licensed facility for disposal.
- Wash down water from exposed aggregate surfaces, cast-in-place concrete and from concrete trucks shall be trapped on-site to allow sediment to settle out before clarified water is released to a drain system.
- No waste will be buried, burned, or dumped on-site or in lands adjacent to the site.
- Plant and equipment shall be maintained in place and in working order for the duration of the works.
- Only emergency maintenance and repair shall be carried out on site. Emergency procedures and spill kits shall be readily available and all relevant personnel will be familiar with emergency procedures.
- An appropriate emergency response shall be in place for any spillage of chemicals to ensure they are immediately contained.
- Any contaminated soil excavated shall be taken to a licensed facility for management.

For the protection of watercourses associated with surface water run-off, the following measures shall be employed:

- As outlined in **Chapter 5: Description of the Construction Phase,** the construction methodology has been developed in order to ensure there will not be any uncontrolled run-off or spillages.
- Management of material deposition areas will prevent siltation of watercourse systems through run-off during rainstorms. Collector ditches shall be put in place surrounding material stockpiles to contain run-off and direct it to the settlement ponds / silt traps before discharge to an adjacent watercourse.
- Excavated materials shall be carefully managed in accordance with the TII Specification for Road Work, to prevent any potential negative impact on the receiving environment and the excess material shall be taken directly to an appropriately licenced facility avoiding contact with any open surface water drains.
- Excavated material shall not be left uncovered to avoid run-off of silty water and trial pits shall be backfilled at the earliest convenience to avoid leaving stockpiles exposed.
- Where works are required within 15 m of a watercourse feature, a suitably qualified ecologist shall assess and verify that appropriate demarcation and signage is in place before works commence. Demarcation shall be physically marked out using post and rail/post and rope/bunting, or equivalent, and be signposted to identify an ecological sensitivity.

Control and Response to Environmental Incidents and Accidents

In the case of environmental incidents or accidents occurring during the construction phase of the Proposed Development, the following measures will be applied:

- The Contractor shall be required to have spill kits available on-site and hydrocarbon absorbent materials to deal with any accidental spillages.
- Throughout the construction phase the Contractor shall ensure that all site personnel are made aware of the importance of the freshwater environments and the requirement to avoid pollution of all types.
- All hazardous materials on site shall be stored within secondary containment (bunding) designed to retain at least 110% of the total storage contents.

14.7.1.2 Freshwater white-clawed crayfish

Measures proposed to mitigate the predicted effects of pollution to water and/or air and biodiversity loss, fragmentation, and alteration on freshwater white-clawed crayfish during construction are as outlined in **Section 14.7.1.1** above.

14.7.1.3 Non-IEF Mitigation

While impacts on the following IEFs were assessed to be not significant and therefore specific mitigation measures are not required, the following measures are proposed to avoid/minimise any impact on these IEFs during the construction phase:

Birds (breeding)

- The Proposed Development will not involve any removal of vegetation or interference with the existing hedgerow surrounding the Enva facility. However, should any vegetation removal become a requirement during the construction phase, the removal of existing vegetation shall avoid the bird nesting season (1st March and 31st August, inclusive).
- If any active nests are discovered on site, then work in the immediate vicinity of the nest should cease and an appropriate buffer zone (≥5 m) should be established which should be left in place until it has been confirmed that the chicks have fledged.
- All vegetation within the works area shall be kept clear of machinery and materials shall not be stored against them as per the recommendations in BS5837 (2012) – Trees in Relation to Design, Demolition and Construction.

14.7.2 Operational Phase

14.7.2.1 Bats (commuting and foraging)

The following mitigation is proposed to avoid/minimise the impact of disturbance from artificial lighting on commuting and foraging bats during the operational phase:

- All artificial lighting installed on site shall be directional lighting (i.e. lighting which only shines on the required working area and not adjacent habitats) in order to prevent overspill onto the Griffeen River corridor and surrounding hedgerows. This will be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area within the Proposed Development site only.

14.7.2.2 Otter (breeding, commuting and foraging)

Measures proposed to mitigate the predicted effects of disturbance from artificial lighting on otter during the operational phase are as outlined in **Section 14.7.2.1**.

14.7.2.3 Non-IEF Mitigation

While impacts on the following IEFs were assessed to be not significant and therefore specific mitigation measures are not required, the following measures are proposed to avoid/minimise any impact on these IEFs during the operational phase:

Birds (breeding)

- In line with the proposed mitigation measures with regards to artificial lighting as outlined above for bats and otter, the proposed lighting should avoid light spill onto the hedgerows surrounding the Proposed Development site to avoid/minimise disturbance on nesting birds.

14.7.3 Decommissioning Phase

Measures proposed to mitigate the predicted effects of pollution to water and/or air and biodiversity loss, fragmentation, and alteration on FW2 depositing lowland river and freshwater white-clawed crayfish during the decommissioning phase are as outlined for the construction phase in **Sections 14.7.1.1** and **14.7.1.2** above. Non-IEF mitigation measures proposed to avoid/minimise impacts on birds (breeding) during the decommissioning phase are as outlined for the construction phase in **Section 14.7.1.3**.

14.8 Residual Impacts

Residual effects are those which will remain after the proposed mitigation measures have been incorporated and implemented. The residual effects after the incorporation of the mitigation measures (see **Section 14.7** above) are outlined in **Table 14.9** below.

Table 14.9: Residual Effects on IEFs

IEF	Description of Impact	Significance of Effect	Mitigation Proposed	Residual Effect
FW2 Depositing lowland river	Biodiversity loss, fragmentation, and alteration; Pollution to water	Slight adverse (construction) Slight adverse (decommissioning)	Yes	No residual effect
	Pollution to air	Not Significant	No	No residual effect
Bats (commuting and foraging)	Disturbance from noise, vibration, lighting, and human presence	Slight adverse (operational lighting only)	Yes	No residual effect

IEF	Description of Impact	Significance of Effect	Mitigation Proposed	Residual Effect
Otter (breeding, commuting and foraging)	Biodiversity loss, fragmentation, and alteration; Pollution to water	Not Significant	No	No residual effect
	Disturbance from noise, vibration, lighting, and human presence	Slight adverse (operational lighting only)	Yes	No residual effect
	Pollution to air	Not Significant	No	No residual effect
Birds (breeding)	Disturbance from noise, vibration, lighting, and human presence	Not significant	No	No residual effect
Invertebrates (aquatic i.e. freshwater white-clawed crayfish)	Biodiversity loss, fragmentation, and alteration	Slight adverse (construction) Slight adverse (decommissioning)	Yes	No residual effect
	llution to water and/or air	Slight adverse (construction) Slight adverse (decommissioning)	Yes	No residual effect

14.9 Monitoring

14.9.1 Construction Phase

No construction phase monitoring to test the predictions made within the impact assessment is considered necessary.

14.9.2 Operational Phase

No operational phase monitoring to test the predictions made within the impact assessment is considered necessary.

14.9.3 Decommissioning Phase

No decommissioning phase monitoring to test the predictions made within the impact assessment is considered necessary.

14.10 Schedule of Environmental Commitments

A summary of the environmental commitments, with regard to this chapter is set out at **Chapter 21 - Schedule of Environmental Commitments**.

14.11 Chapter References

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CHAPTER 15:
WATER

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15 WATER

15.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes and presents an assessment of the likely significant effects of the Proposed Development on water quality, flooding, hydrology and drainage issues during the construction, operational and decommissioning phases of the Proposed Development. The assessment presented is based on the information provided in **Chapter 4 - Description of the Proposed Development** and **Chapter 5 - Description of the Construction Phase.** The assessment presented is further informed by the following EIAR chapters:

Chapter 14 - Biodiversity

Chapter 16 - Land & Soil, Geology & Hydrogeology

15.2 Methodology

The water impact assessment has followed the overall methodology and guidance relating to the EIA process and preparation as set out in **Section 1.3.3** of **Chapter 1 - Introduction**.

15.2.1 Legislation, Policy and Guidance

15.2.1.1 Legislation

The following legislative and policy documents were considered during the preparation of this chapter:

- Water Framework Directive (WFD) 2000/60/EC;
- Floods Directive 2007/60/EC;
- Urban Waste Water Treatment Directive [UWWTD] 91/271/EEC;
- European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009), as amended;
- European Communities Environmental Objectives (Groundwater) Regulations, 2010 (S.I. No. 9 of 2010), as amended;
- European Communities (Quality of Salmonid Waters) Regulations 1988 (S.I. No. 293 of 1988);
- European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003), as amended;
- Local Government (Water Pollution) Acts 1977 to 1990, as amended;
- European Communities (Technical Specifications for the Chemical Analysis and Monitoring of Water Status) Regulations 2011 (S.I. No. 489 of 2011);
- European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2010 (S.I. No. 610 of 2010), as amended;
- Second Cycle River Basin Management Plan 2018-2021 (DHLGH, 2021); and
- Draft Third Cycle River Basin Management Plan 2022-2027 (DHLGH, 2022).

15.2.1.3 Policy

Consideration has been given to the following relevant policy documents in the preparation of this chapter:

- South Dublin County Council (2022) South Dublin County Development Plan 2022-2028 (SDCDP);
- The 3rd National Biodiversity Action Plan 2017-2021 (DCHG, 2017) is a framework for the conservation and protection of biodiversity in Ireland and the 4th draft National Biodiversity Action Plan (NBAP) which will set the national biodiversity agenda for the period 2023-2027; and
- The 2nd cycle River Basin Management Plan (RBMP) and the draft 3rd cycle RBMP set out the measures necessary to protect and restore water quality in Ireland. The overall aim is to ensure that Ireland's natural waters are sustainably managed and that freshwater resources are protected so as to maintain and improve Ireland's water environment.

15.2.1.4 Guidance

The following guidance was considered during the preparation of this chapter:

- IFI (2016) Guidelines on Protection of Fisheries during Construction Works in and Adjacent to Waters;
- DoEHLG (2009) The Planning System and Flood Risk Assessment Guidelines for the Planning Authorities; and,
- NRA (2008) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.

15.2.2 Zone of Influence

The surface water Zone of Influence (ZOI) as shown in **Figure 15-1**, extends outside the footprint of the Proposed Development to include potential hydrologically connected surface pathways from the development boundary to the adjacent receiving waterways. This area includes out of bank flow paths within Greenogue Business Park, the Baldonnel Stream and Griffeen River. To further examine the potential impacts on surface water, a wider study area extends downstream along the length of the Griffeen River to the junction with the River Liffey. This allows improved understanding of the context of the baseline condition of the Griffeen River through incorporation of additional biological sampling locations and the Lucan hydrometric gauge

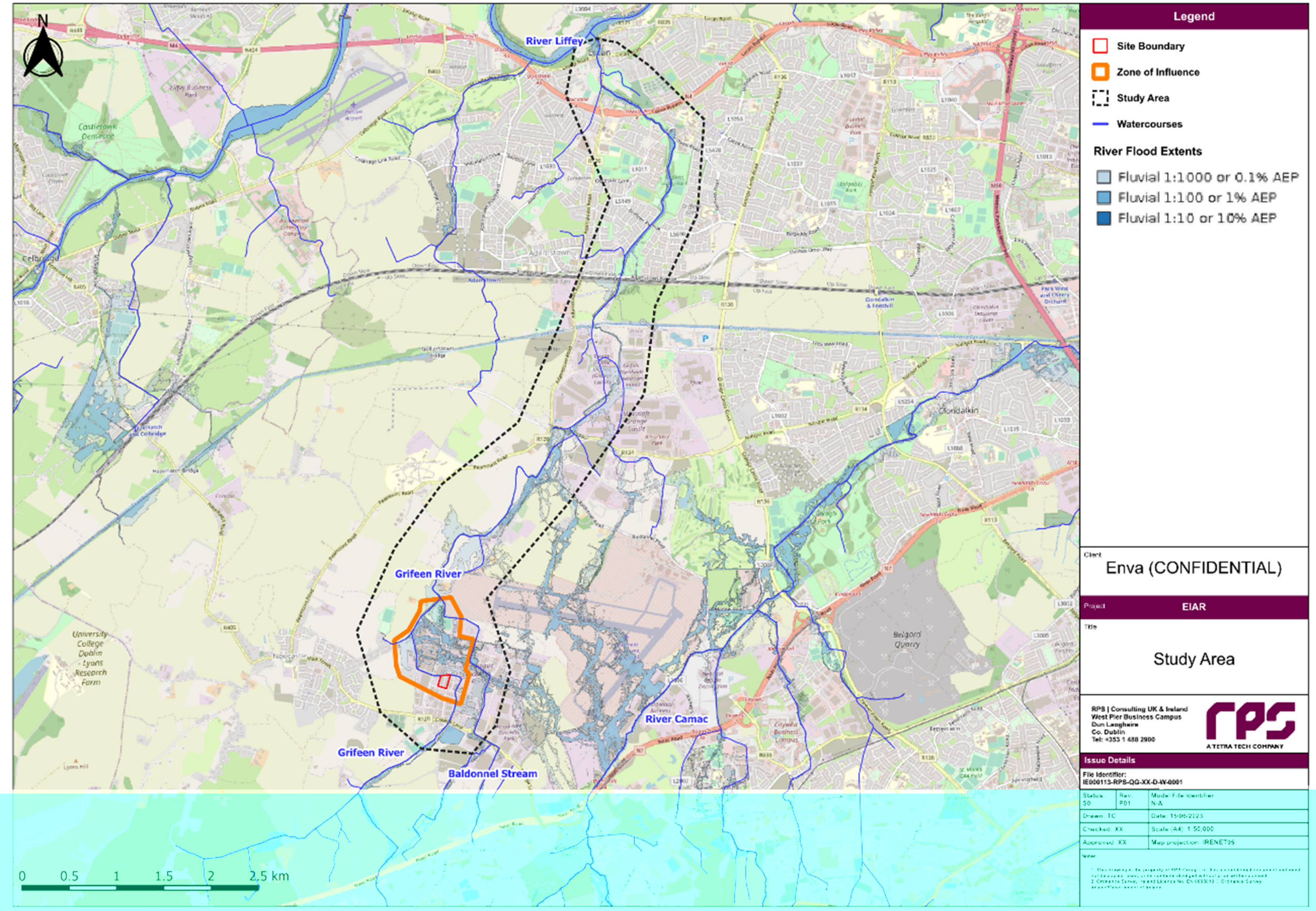

Figure 15.1: Surface Water Zone of Influence

15.2.3 Sources of Information to Inform the Assessment

Information on hydrological receptors within the Study Area was collected in May 2023 through a detailed desktop review of existing studies and datasets as summarised in **Table 15.1** below.

Table 15.1: Summary of Relevant Desktop Reports

Databases	Source
Surface Waters: Surface watercourses in the Study Area and their respective water quality status Water Framework Directive data Drinking water quality	https://gis.epa.ie/EPAMaps/ www.catchments.ie www.water.ie
Flooding: Office of Public Works (OPW) Flood Hazard Mapping Website OPW Catchment Flood Risk Assessment Management Study (CFRAMS) predicted flood maps Geological Survey Ireland (GSI) Groundwater Flood Data Viewer	www.floodinfo.ie www.dcenr.maps.arcgis.com
Ordnance Survey Ireland aerial photographs and historical mapping	https://www.osi.ie/
Historic rainfall and evapotranspiration data	www.met.ie
National Parks and Wildlife Services (NPWS) and designated sites	http://webgis.npws.ie/npwsviewer/
Discharge licence reports	www.epa.ie/licensing
South Dublin County Development Plan 2022-2028 (SDCDP), South Dublin County Council (SDCC), 2022.	https://www.sdcc.ie/en/devplan2022/adopted-plan/
Gauging station data	www.waterlevel.ie
Catchment characteristics – Flood Studies Update	http://opw.hydronet.com/

15.2.4 Key Parameters for Assessment

The following key parameters were examined as those having the potential to result in likely significant effects on an identified receptor or receptor group:

- Surface Water Quality (WQ);
- Drinking Water Resources (DWR);
- Flood Risk (FR); and
- Fluvial Geomorphology (FG).

An overview of potential impacts considered in relation to the above parameters during the construction, operational and decommissioning phases is contained in **Table 15.2**.

Table 15.2: Potential Impacts Considered in Assessment

Parameter	C	O	D	Potential Impact
WQ, FG	✓		✓	Activities within the Proposed Development may increase the risk of sediment discharge to watercourses.
WQ	✓	✓	✓	Impact to watercourses due to accidental spillages of chemicals/contaminated waste.

*C = Construction Phase, O = Operational Phase, D = Decommissioning Phase

15.2.4.1 Impacts Scoped Out of the Assessment

Based on the baseline environment and the Proposed Development description outlined in **Chapter 4**, several impacts are proposed to be scoped out of the assessment for Water. These impacts are outlined, together with a justification for scoping them out, in **Table 15.3**.

Table 15.3: Impacts Scoped Out of the Assessment on Water

Potential Impact	Justification
Recreational use of water.	These impacts are addressed in **Chapter 8: Population.**
Impacts on aquatic ecology and biodiversity.	These impacts are addressed in **Chapter 14: Biodiversity**
Impacts on Drinking Water Resources.	There is no known water abstraction infrastructure in the vicinity of, or downstream of the site.
Increased surface water discharge from site leading to localised increased flows and flooding in the receiving surface waters.	The development will not result in a change to overall hardstanding/impermeable surfaces within the site and will continue to use the existing site drainage and stormwater attenuation tank, discharging at the existing maximum rate of 6l/s/ha into the Griffeen River. There will be no increase in surface water runoff because of the development.
Flood Risk including obstruction and contamination of overland floodwaters.	The site is located in Flood Zone C with a low risk of flooding. Recent development has reduced the risk of overland floodwaters from the River Camac towards the site. All new development within Greenogue Business Park are required to comply with Greater Dublin Drainage Strategy (GDSDS) and SDCC Sustainable Urban Drainage System (SuDS) policies including an allowance for climate change, thereby mitigating future overland flood risk.
Impacts on groundwater and the hydrogeological environment.	These impacts are addressed in **Chapter 16: Land & Soil, Geology & Hydrogeology.**

15.2.5 Assessment Criteria and Significance

The criteria for determining the significance of effects is a two-stage process that involves defining the sensitivity of the receptors and the magnitude of the predicted impacts.

The importance/sensitivity of hydrology attributes (rating criteria) is defined in accordance with the NRA Guidelines (NRA, 2008) which is the most relevant for assessment of river catchments in Ireland. These are listed in **Table 15.4**.

Table 15.4: Rating Criteria for Importance/Sensitivity of Hydrology Attributes

Importance/ Sensitivity	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 or national scale	River, wetland or surface water body ecosystem protected by national legislation – NHA status. Regionally important potable water source supplying >2500 homes Quality Class A (Biotic Index Q4, Q5). Flood plain protecting more than 50 residential or commercial properties from flooding. Nationally important amenity site for wide range of leisure activities.

Importance/ Sensitivity	Criteria	Typical Examples
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.

The magnitude of effect is defined in accordance with the criteria provided in the NRA Guidelines (NRA, 2008) as outlined in **Table 15-15**. These impacts may be positive, neutral, or negative/adverse. The significance of potential effects are then described in terms of the descriptions adapted from the EPA Guidelines (EPA, 2022) as outlined in **Table 15.16**.

Table 15.5: Rating Criteria for the 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 >100 mm 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 attribute or loss of part of attribute	Increase in predicted peak flood level >50 mm Partial loss of fishery Calculated risk of serious pollution incident >1% annually Partial reduction in amenity value
Small Adverse	Results in minor impact on integrity of attribute or loss of small part of attribute	Increase in predicted peak flood level >10 mm 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 >10 mm 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 >50 mm 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 >100 mm

Table 15.6: Definition of Terms Relating to the Significance of Impact Levels

Significance of Impact	Description
Imperceptible	An impact capable of measurement but without noticeable consequences
Slight	An impact that alters the character of the environment without affecting its sensitivities
Moderate	An impact that alters the character of the environment in a manner that is consistent with existing or emerging trends
Significant	An impact, which by its character, magnitude, duration, or intensity, alters a sensitive aspect of the environment
Profound	An impact which obliterates all previous sensitive characteristics

The significance of the impacts on hydrology attributes is determined by correlating the importance/ sensitivity of the receptor with the magnitude of the impact. The method employed for this assessment is presented in **Table 15.7**. For the purposes of this assessment, any impacts with a significance level of slight or less have been concluded to be not significant in EIA terms.

Table 15.7: Matrix used for the Rating of the Significance of Environmental Impact

		Magnitude of Impact			
		Negligible	**Small**	**Moderate**	**Large**
Importance/ Sensitivity of Attribute	**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

15.2.6 Data Limitations

This chapter of the EIAR has been prepared based upon the best available information and in accordance with current best practice and relevant guidelines.

There were no technical difficulties or otherwise encountered in the preparation of this chapter of the EIAR. However, the following limitations are noted.

- CFRAM flood maps provide underlying data for flood risk and may not include recent development.
- 09002 Lucan (Griffeen) Hydrometric Gauge is located approximately 8.2 km downstream of the site, upstream of the junction with the River Liffey. There is considerable additional contributing catchment area between the site and the gauge. Total Catchment to gauge 35 km^2. The gauge is owned by SDCC and Data Provider is the EPA.
- Operation and Management of Attenuation Basin upstream of Newcastle-Rathcoole Road.

15.3 Description of the Existing Environment (Baseline Scenario)

15.3.1 Baseline Environment

The baseline environment described in this section includes hydrological features and connections to the area surrounding the Proposed Development site.

15.3.1.1 River Catchments

There are three watercourses in the vicinity of the site. The Proposed Development is located within Greenogue Business Park adjacent to the Griffeen River, a tributary of the River Liffey (Hydrometric Area 09) as shown in **Figure 15-2**.

The Baldonnel Stream also flows through the business park approximately 400 m to the east of the site. The Baldonnel Stream joins the Griffeen River downstream of Peamount United Football Club on the northern fringe of the Business Park.

The Griffeen River and the Baldonnel Stream both flow in a north-westerly direction through Greenogue Business Park. Both watercourses pass through a number of culverts/bridges within the Business Park and have been altered from their natural alignments by commercial and industrial development.

The River Camac, which originates in the Dublin mountains, is another tributary of the River Liffey. It flows in a northerly direction and crosses under the N7 motorway between Rathcoole and Saggart, approximately 1.8 km south east of the site.

15.3.1.1.1 Griffeen River

The Griffeen River enters Greenogue Business Park from the south, where there is a storage pond on the upstream side of the R120 (Rathcoole – Newcastle Road) designed to attenuate flows. The offline storage pond operates from a longitudinal concrete spillway and has a capacity of approximately 100,000 m^3. As flows increase within the watercourse, water levels overtop the spillway and enter the storage area. A 900 mm diameter concrete culvert with attached sluice is manually set to control the flow threshold for diversion of water into the storage area. A 300 mm diameter culvert forms the outlet from the basin back into the Griffeen River upstream of the R120. The watercourse has been heavily realigned and straightened through Greenogue Business Park, with significant lengths of rock lined banks and numerous culverted crossings.

The Griffeen River splits at Aylmer Road, with Cornerpark Stream flowing to the west and the Griffeen River continuing in a northerly direction along the western side of Aylmer Road.

15.3.1.1.2 Baldonnel Stream

The Baldonnel Stream flows in a northerly direction through the business park before flowing north-west to join the Griffeen River downstream of Peamount United Football Club. Similarly, to the Griffeen River, it is a heavily modified watercourse which has been extensively straightened throughout the business park. It has numerous culverted crossings and reaches of rock-lined banks.

15.3.1.1.3 River Camac

The River Camac is located approximately 1.8 km south-east of the site. It is a much larger watershed than the Griffeen River catchment and is currently subject to the ongoing River Camac Flood Alleviation Scheme by SDCC and the OPW.

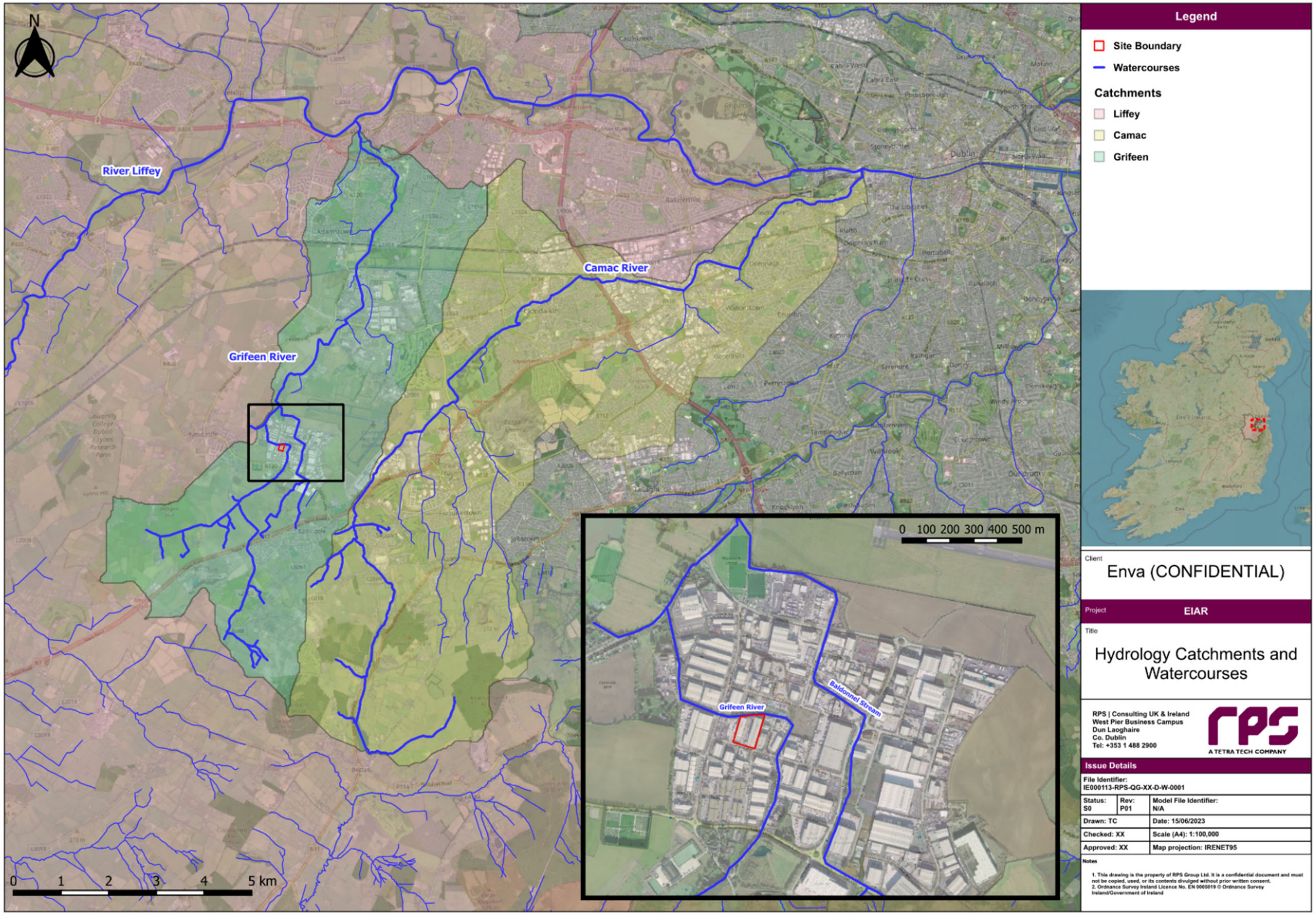

Figure 15.2: Hydrologic Catchments and Watercourses

15.3.1.2 Flood Risk Identification

The Eastern CFRAM study is the most detailed flood mapping undertaken in the Dublin region. It commenced in June 2011 with most final flood maps issued during 2006. The study involved detailed hydraulic modelling of rivers and their tributaries.

The Baldonnel Stream and the Griffeen River were modelled under the CFRAM study as part of the Baldonnel Area of Further Assessment. The study provided flood mapping for the 10%, 1% and 0.1% Annual Exceedance Probability (AEP) flood events of the Greenogue Business Park as shown in **Figure 15-3**.

CFRAM mapping shows cross-catchment flows from the River Camac enter into Greenogue Business Park from the east, flow through the park in a north-west direction combining with the Baldonnel Stream. The overland flow from the Baldonnel/Camac watercourses follows the natural fall in topography across the park.

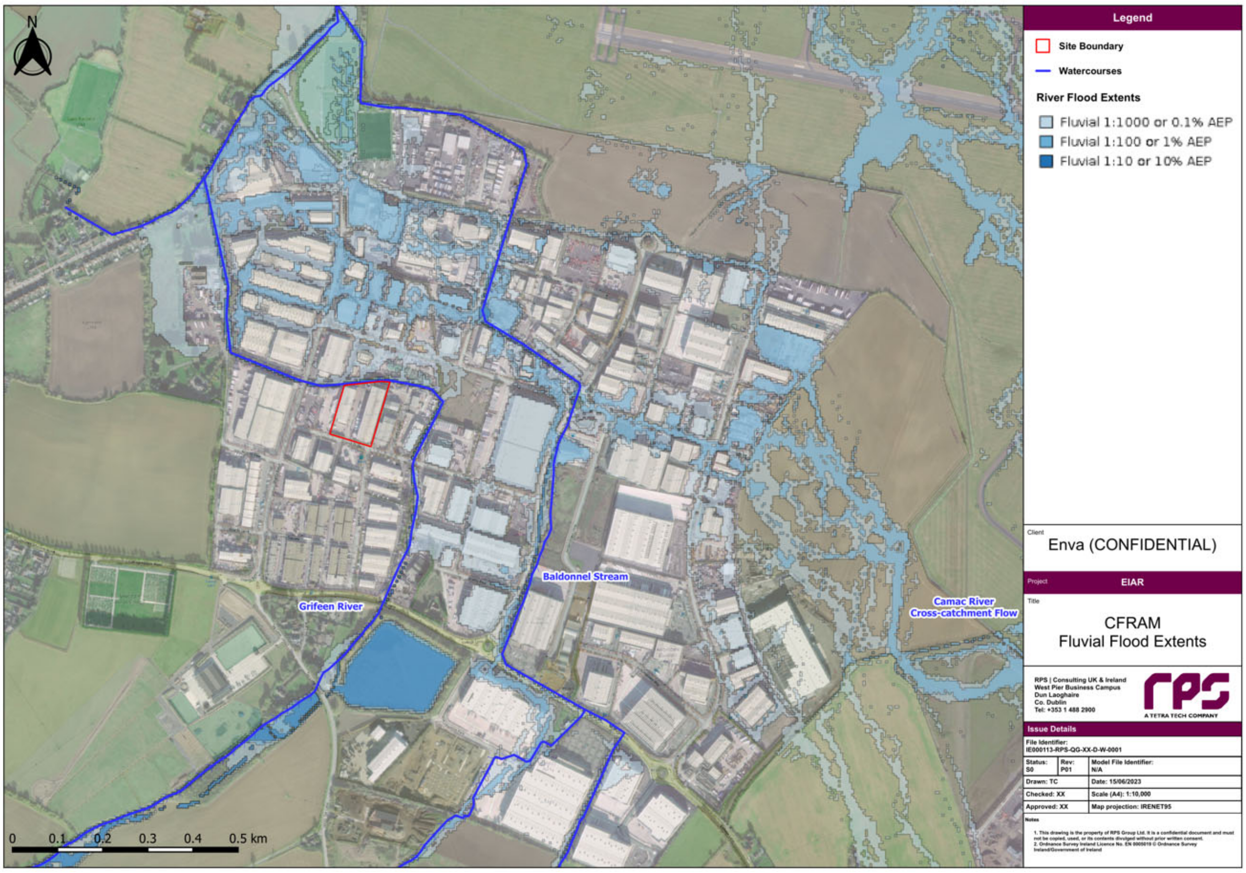

Figure 15.3: CFRAM Fluvial Flood Extents (Present Day)

The site is located outside of the fluvial flood extents for events up to and including the 0.1% AEP flood event, classifying the site as Flood Zone C in accordance with Section 2.23 of *The Planning System and Flood Risk Management Guidelines for Planning Authorities* (DoEHLG 2009) with a low probability of flooding.

Mountpark Baldonnel Phase 2 was granted permission for development on 23rd November 2020 (Planning Reference SD2A/0215) has also substantially reduced the flood risk to Greenogue Business Park by intercepting and storing overland flow from the River Camac, reducing the predicted flood extents shown in the CFRAM mapping.

Historic and predictive surface water flooding mapping prepared by GSI Spatial Resources[1] demonstrates that surface water flooding is likely upstream and downstream of the site as shown in **Figure 15-4**. However, there is no identified surface water flooding within Greenogue Business Park or the vicinity of the site.

Figure 15.4: Surface Water Flooding

15.3.1.3 Water Framework Directive

The EU WFD is the principal framework for managing the water resources of the entire European Union. The key objectives of the WFD are to:

- Prevent deterioration of the status of all surface and groundwater bodies;
- Protect, enhance and restore all bodies of surface and groundwater to achieve good status by 2027 at the latest; and
- Mitigate the effects of flooding.

It proposes to achieve these objectives by establishing river basin districts (RBD) in which environmental objectives will be set, including targets for surface waters. The Second Cycle River Basin Management Plan covers the period 2018-2021; the Third Cycle RBMP is in draft and undergoing consultation and covers the period 2022-2027.

The European Communities Environmental Objectives (Surface Waters) Regulations, 2009 (SI No. 272 of 2009) sets out environmental quality standards (EQSs) which may be used to classify surface water status. These are based on biological quality elements, physicochemical conditions supporting biological elements, priority substances and priority hazardous substances. Surface waters must achieve at least Good ecological status and Good chemical status.

[1] https://dcenr.maps.arcgis.com/apps/MapSeries/index.html?appid=a30af518e87a4c0ab2fbde2aaac3c228

The ecological status falls into either High, Good, Moderate, Poor or Bad. The ecological status is determined by biological factors, supporting water quality conditions and supporting hydrology and morphology.

Hydrology and morphology address the river flow and level and other physical conditions of the water channel such as the bed shape and substrate.

The chemical status of surface waters is either pass or fail depending on the levels or concentrations of priority substances and chemicals including heavy metals, pesticides, and hydrocarbons compared with European EQSs set to protect aquatic life.

A risk category is also assigned by the EPA based on whether or not a water body is meeting its WFD objectives. A water body is considered to be *Not at Risk* when it is achieving its environmental objectives and there is no evidence indicating a trend towards status decline. A water body *At Risk* is either not achieving its environmental objectives or is trending towards a decline in status; these water bodies are prioritised for the implementation of measures under the RBMP. Where a water body is placed under *Review*, it may show either an improving or a deteriorating trend, but more evidence is needed before it can be considered either *Not at Risk* or *At Risk* respectively. In some cases, there is not yet enough evidence to determine the risk.

15.3.1.4 WFD Status and Risk

WFD status is reported by the EPA to the EC as part of six-year reporting cycles. The overall ecological status of the water bodies in the Study Area are reported by the EPA from the Third Cycle WFD data, which are based on monitoring data for the six-year period 2013-2018. The latest EPA monitoring data have WFD ecological status for the period 2016-2021.

Where water bodies have been classed as being *At Risk*, by water quality or survey data, significant pressures and associated impacts have been identified by the EPA. The ecological status and risk category of the water bodies within the Study Area are summarised in **Table 15.8**. The Second Cycle WFD data, based on monitoring data from 2010-2015, are included for reference.

The Liffey 170 catchment, which contains the Griffeen River, is at Poor Ecological status for the 2016-2021 period and listed as *At Risk* in the WFD third cycle.

The EPA reports that the significant pressures in the Liffey_170 catchment are:

- Domestic Waste Water; and
- Urban Waste Water.

Table 15.8: Summary of Water Body WFD Ecological Status

Water Body	Second WFD Cycle (2010-2015)		Third WFD Cycle (2013-2018)		Third WFD Cycle (2016-2021)	
	Status	Risk	Status	Risk	Status	Risk
Liffey_170	Moderate	At Risk	Moderate	Review	Poor	At Risk

15.3.1.6 Surface Water Quality

The classification for biological water quality represented in **Table 15.9** assigns a Q-value based on the macroinvertebrate community composition. The four sample locations identified in **Table 15.10** and located in **Figure 15.5** have been used for assessment of the watercourse within the vicinity of, or downstream of the site. The recorded Q-values are presented in **Table 15-11**, with the most recent assessment concluding that unsatisfactory poor ecological conditions continue in Lucan in June 2022.

Biotic indices ("Q Values") reflect average water quality at any location as follows:

Table 15.9: Biotic indices ("Q Values")

Q Value*	WFD Status	Pollution Status	Condition**
Q5, Q4-5	High	Unpolluted	Satisfactory
Q4	Good	Unpolluted	Satisfactory
Q3-4	Moderate	Slightly Polluted	Unsatisfactory
Q3, Q2-3	Poor	Moderately Polluted	Unsatisfactory
Q2, Q1-2	Bad	Seriously Polluted	Unsatisfactory

* These Values are based primarily on the relative proportions of pollution sensitive to tolerant macroinvertebrates (the young stages of insects primarily but also snails, worms, shrimps etc.) resident at a river site. The intermediate values (Q1-2, 2-3, 3-4 etc.) denote transitional conditions. The scheme mainly reflects the effects of organic pollution (i.e. de-oxygenation and eutrophication) but where a toxic effect is apparent or suspected the suffix '0' is added to the biotic index (e.g. Q1/0, 2/0 or 3/0). An asterisk after the Q value (e.g. Q3*) indicates something worthy of special attention, typically heavy siltation of the substratum.

** "Condition" refers to the likelihood of interference with beneficial or potential beneficial uses.

Table 15.10: Q-Values Assessment Locations

Watercourse	Station Code	Location	Easting	Northing
Liffey_170	RS09G010100	College Road	201865	228043
Liffey_170	RS09G010200	First Bridge East of Milltown	302760	230973
Liffey_170	RS09G010500	Esker Bridge	303951	234305
Liffey_170	RS09G010600	Lucan Village (Gauging Station)	303248	235201

Table 15.11: Q Values and WFD Status

Station Code	1984	1988	1991	2019	2022
RS09G010100	-	-	2-3 (Poor)	-	-
RS09G010200	3-4 (Moderate)	-	3 (Poor)	-	-
RS09G010500	2-3 (Poor)	-	3 (Poor)	-	-
RS09G010600	3-4 (Moderate)	3 (Poor)	2-3 (Poor)	3 (Poor)	3 (Poor)

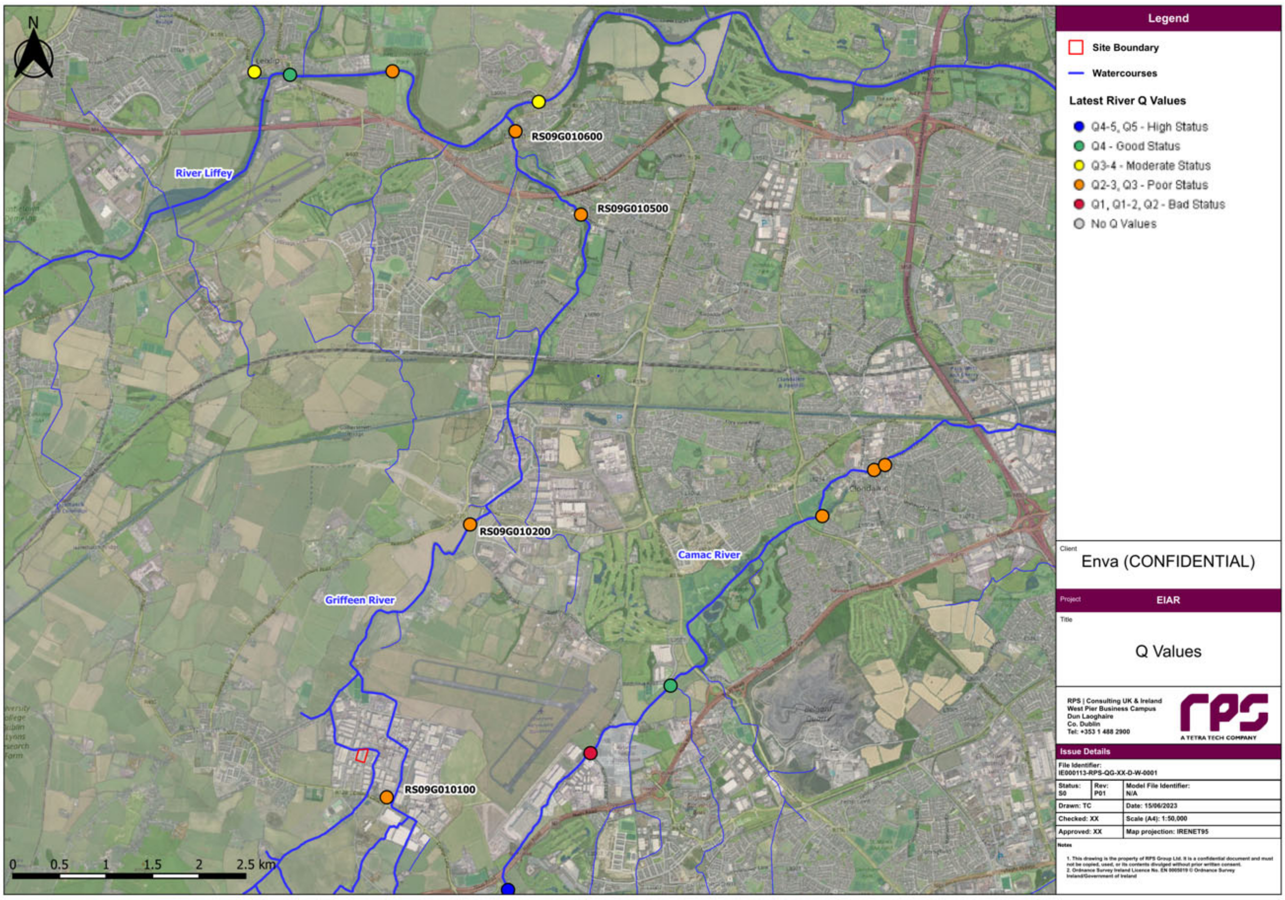

Figure 15.5: EPA Water Quality Sampling Locations

15.3.1.6.1 Water Supply Sources

There is no known water abstraction infrastructure in the vicinity of, or downstream of the site.

15.3.1.6.2 Wastewater Discharges

There are no known licenced discharges from wastewater treatment plants (WWTPs) within the Study Area.

All domestic wastewater within the facility is collected in the effluent sewer which is connected to the main sewer which services the Greenogue Business Park

Inside all of the facility buildings surface runoff from tipping floors and storage areas, wastewater from cleaning activities and fire water from firefighting activities is collected by the effluent collection sewers and gullies. These effluent collection sewers direct the effluent to a collection sump in each building from which it discharges to the main sewer. The individual foul water collection sumps in each building are provided with cut-off valves to allow for the separate containment of any spillage within each of the buildings.

Wastewater from the proposed activities will arise from the following and will be discharged into sewer.

- The HRW management process:
- Washing of bins (will contain a biodegradable detergent used to decontaminate the bins): and
- From management of condensate.

Steam treatment will neutralise infectious liquids within the proposed HRW treatment plant prior to discharge into the foul water network where it will combine with the treated output from the existing bulk liquid waste treatment facility in Building 2 on-site. Water quality of wastewater discharge from the site is routinely checked and sampled for BOD, COD, pH, suspended solids in accordance with the EPA IED license.

15.3.1.6.3 Section 4 Discharges

Discharge licences are issued under Section 4 of the Local Government Water Pollution Act 1977, as amended in 1990, in respect of the discharge of trade effluent to surface water or groundwater. Licences set conditions so the discharge is treated and controlled in a manner that protects the receiving environment**.** There are no Section 4 discharge licences within proximity of the site.

15.3.1.6.4 Existing Storm Sewer Discharges

The site is an existing Industrial Emissions Licensing facility with the EPA (W0192, Class 11.6).

The main types of surface water generated at the facility are as follows:

- Surface runoff from all external concrete hardstanding areas. The composition of this runoff is generally the same as surface water runoff from roads.
- Stormwater from the roofs of the facility buildings.

Surface water runoff is managed within the facility. The surface water is discharged to the river at the northern boundary of the site. A grit trap, oil interceptor and water attenuation tank are provided on-site.

The water attenuation tank for the site has a retention capacity of 600,000 litres, allowing for an attenuation rate of 6 litres/second/hectare from the facility.

The water attenuation tank is fitted with a cut-off valve which may be operated both manually and remotely. This allows for the retention of all surface water on site in the unlikely event of an accidental spillage on site.

Stormwater from the existing facility is managed prior to release by being first passed through a settlement tank which allows heavier stones and debris to 'settle' in the tank before being passed through an oil interceptor. The oil interceptor is used to capture any floating oil or fuel (e.g., from vehicles) and retain it so that only relatively clean surface water is released through the discharge point. This discharge point is called SW3, and it is visually inspected once per day. This water is also tested for a range of pollutants as specified in the environmental licence for the site.

Stormwater from the facility is released into the following water body the Griffeen River.

Visual inspections are carried out on a daily basis, the results of which are logged as part of the environmental management programme. Where issues are identified, the facility has the capability to shut off the discharge to the surface water (i.e., Griffeen river), via open/close valves.

15.3.1.6.5 Other Facilities

There are two other current EPA licensed facilities within Greenogue Business Park. 2 no. waste licences (W0237-01, W0288-01) were also identified, however one is ceased and the other withdrawn. These are therefore screened out of the assessment.

Industrial Emissions Licenses

W0188-01 – Starrus Eco Holdings Limited (Greenogue) - Class 11.4(b)(ii)

Recovery, or a mix of recovery and disposal, of non-hazardous waste with a capacity exceeding 75 tonnes per day involving pre-treatment of waste for incineration or co-incineration.

W0185-01 – Enva Rilta Environmental - Class 11.2(d)

Disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day involving repackaging prior to submission to any of the other activities listed in paragraph 11.2 or 11.3 (disposal or recovery of hazardous waste with a capacity exceeding 10 tonnes per day OR Disposal or recovery of waste in waste incineration plants or in waste co-incineration plants).

Figure 15.6: Surface Water Emissions

Licensed Facility	Surface Water Emissions
W0188-01	The proposed surface water runoff drainage system incorporates a flow attenuation tank which comprises a large concrete underground tank. The applicant proposes to discharge all surface water runoff from roof buildings, parking areas, areas with vehicle movement, the weighbridge and skip storage area to the surface water sewer drainage system. All the surface water runoff shall be discharged via a silt trap and a Class I full retention interceptor. The applicant states that the hydrocarbon interceptor serving the attenuation tank will be relocated downstream of the outfall from the tank in compliance with SDCC. The applicant states that the drainage channels will be provided with silt traps before the connection point to the attenuation tank. The applicant is required to install and maintain silt traps and a Class I full retention oil interceptor prior to discharge to surface water. The surface water runoff from any area(s) with waste storage/handling including the weighbridge shall be discharged to the wastewater drainage system. Therefore, no cumulative impacts are expected during the construction or operation of the Proposed Development, and this licensed facility.
W0185-01	There is no direct discharge to surface water. The surface water drainage system is divided into two catchments: 1. Roof drainage: Discharges drain directly to the stormwater sewer. 2. Runoff from paved areas: Collected in drains and gullies and drains via a bypass interceptor to the stormwater sewer. Both routes pass through a discharge control system by means of an attenuation tank and flow control device. All foul discharges will be to the foul sewer servicing Greenogue Business Park, terminating at Ringsend Wastewater Treatment Plant. Therefore, no cumulative impacts are expected during the construction or operation of the Proposed Development, and this licensed facility.

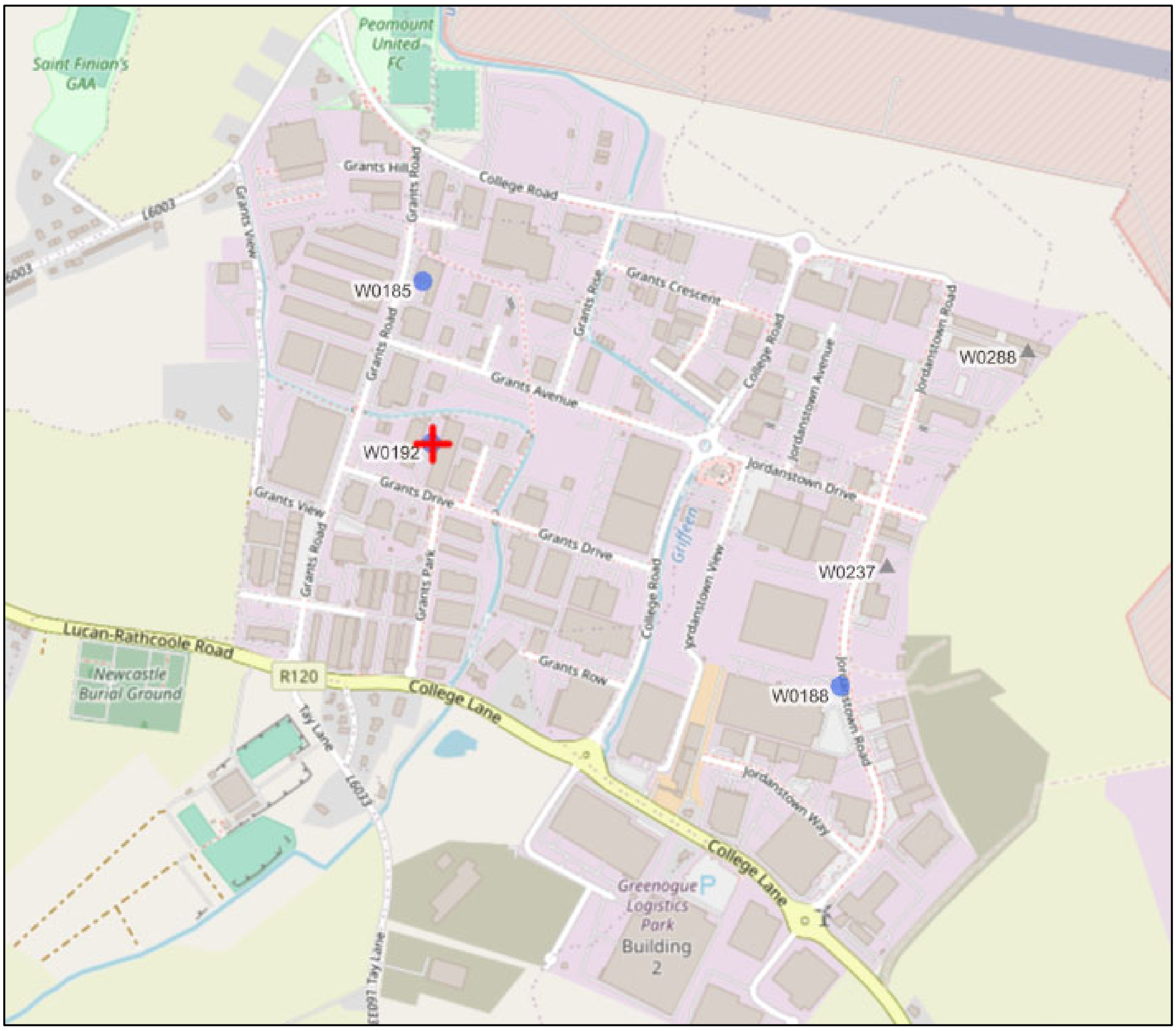

Figure 15.7: EPA Licensed Facilities

15.3.1.7 Drainage Systems

Greenogue Business Park is a heavily industrialised business park which has undergone rapid growth and development in the last 10 years. In accordance with the SDCDP, all drainage systems are required to comply with GDSDS through implementation of SuDS measures. Drainage systems within the park are therefore typically treated through silt traps and hydrocarbon interceptors and attenuated prior to discharge into either Baldonnel Stream or Griffeen River.

There is one Urban Waste Water Stormwater Overflow (TPEFF0700D0034SW257) at Grants View into the Griffeen River downstream of the site.

15.3.1.8 Water-dependent Ecological Receptors

The site of the Proposed Development is not located within or adjacent to any nationally or internationally designated sites for nature conservation.

The Proposed Development is located within the Liffey and Dublin Bay (ID: 09) surface water catchment, which supports connectivity to ten SACs.

There are no Natural Heritage Areas (NHAs), National Parks, Nature Reserves, Ramsar wetland sites or OSPAR Marine Protected Areas (MPAs) within the biodiversity study area deemed relevant to the Proposed Development.

There is potential for hydrological connectivity with downstream coastal European Sites, pNHAs, Ramsar sites, Nature Reserves and Wildfowl Sanctuaries via the surface water network, which flows in an easterly direction towards the Dublin Bay coastal waterbody (IE_EA_090_0000). However, given the scale and nature of the proposed works, the distance between these sites and the Proposed Development (all greater than 18 km from the site) and the dispersive nature of open coastal waters, the potential for likely significant effects on these sites is ruled out and therefore they are excluded from further assessment. A number of protected sites were also excluded from further assessment given their distance from the Proposed Development site, their location upstream within the surface water catchment or their separation through groundwater bodies (i.e. no hydrological pathways).

More information on water-dependant ecological receptors can be found in **Chapter 14 - Biodiversity**.

15.3.2 Evolution of the Environment in the Absence of the Proposed Development

Under the site’s current condition, operations will continue in accordance with the current EPA licence (W0192-03). The site is currently operational and is primarily covered in hard standing/Made Ground. Stormwater and rainwater are captured and managed appropriately through an interceptor prior to discharge. Any drainage from site operations is made to sewer following wastewater treatment and with appropriate monitoring in accordance with the facility’s EPA Licence.

In the absence of the Proposed Development, the current surface water within the Study Area is not expected to change and will remain as described in the baseline description of this report (**Section 15.3**).

15.4 Description of Likely Significant Effects

As identified in **Section 15.2.4** there are two identified likely significant effects of the Proposed Development on the surrounding hydrological and surface water environment, as set out below:

- Activities within the Proposed Development may increase the risk of sediment discharge to watercourses.
- Impact to watercourses due to accidental spillages of chemicals/ hazardous waste.

In establishing the baseline scenario in **Section 15.3** the Griffeen River Catchment (Liffey_170) is determined to be in moderately polluted, poor condition with notable significant pressures from domestic and urban water discharges. As such the importance/sensitivity of hydrology attributes in accordance with **Table 15.4**Table 15.4 would be considered **Medium** due to a biotic index value Q3.

15.4.1 Construction Phase

The key civil engineering works for the Proposed Development which will have potential for impact on the surface water receiving environment during construction, as outlined in **Section 15.2.4** are:

- Demolition of the existing office space (366 m^2) on the gable side of the building facing Grants Drive.

  The existing office space on the gable side of the building facing Grants Drive (Building 3) is to be demolished. This building comprises block and steel cladding with associated office fixtures and fittings.
- Removal of existing hazardous soil management and hazardous waste transfer operations located in Divisions 1 and 2 of Building 1, along with associated fixtures and fittings. Decontamination of these divisions may be required and will be determined during the decommissioning phase.
- Modifications to integrate wastewater into the *existing* wastewater management system;
- Modifications to integrate stormwater into the *existing* stormwater management system;

Limited shallow excavation works will also be required for the reconfiguration of the surface water drainage system to include the relocation of existing drains and the installation of a new surface water drain to collect the roof run-off.

On completion of the drainage works, the yard and floor area excavated will be reinstated.

The full construction phase details are available in **Chapter 5 - Description of the Construction Phase**.

15.4.1.1 Sediment Runoff

Silt-laden water can arise from exposed ground and interaction with loose soil/rubble during demolition and construction. There is limited excavation, soil disruption or stockpiled soil/building rubble expected during the Construction Phase. The existing surface water site drainage network will retain functionality throughout the construction phase, including settlement of sediment within the attenuation tank prior to restricted release to the Griffeen River at a maximum rate of 6 l/s/ha. However, in the event of a period of high intensity rainfall, it is possible that rainfall intensity may exceed infiltration rate into the drainage network resulting in overland run-off into the Griffeen River. Short-term effects on surface water quality can occur through the silt laden surface water runoff.

The magnitude of the effect on hydrology attributes resulting from increased sediment runoff would likely be **Small Adverse** as it could result in a minor effect on integrity of the localised Griffeen River reach through slight reduction in amenity value.

In accordance with **Table 15.7**Table 15.7, the combination of a **Small Adverse** impact on a **Medium Sensitivity** attribute would result in an environmental effect of **Slight Significance,** i.e., an effect that alters the character of the environment without affecting its sensitivities.

15.4.1.2 Accidental Emissions and Release of Potentially Hazardous Substances

Accidental spillages of chemicals or other contaminants during demolition and construction can result in contamination of surface water if materials are not stored and used in an environmentally safe manner.

Most of the traffic movement associated with the Proposed Development will be over the existing roads though there is potential for accidental spillage from site machinery during the construction phase.

The existing surface water site drainage network will retain functionality throughout the construction phase, including a hydrocarbon interceptor to treat water prior to release into the Griffeen River and a stop valve to prevent contaminated discharge from the site into the river. However, in the event of a period of high intensity rainfall, it is possible that rainfall intensity may exceed infiltration rate into the drainage network resulting in potentially contaminated run-off into the Griffeen River. Though likely diluted in the volume of rainfall, short-term effects on surface water quality could occur through the contaminated surface water runoff.

The magnitude of the effect on hydrology attributes resulting from accidental emissions or spillage would likely be **Small Adverse** as it could result in a minor effect on integrity of the localised Griffeen River reach through slight reduction in amenity value.

In accordance with **Table 15.7**, the combination of a **Small Adverse** impact on a **Medium Sensitivity** attribute would result in an environmental effect of **Slight Significance,** i.e,, an effect that alters the character of the environment without affecting its sensitivities.

15.4.2 Operational Phase

15.4.2.1 Accidental Emissions and Release of Potentially Hazardous Substances

Accidental spillages of chemicals or other contaminants during normal operation of the facility could result in contamination of surface water in the local reach of the Griffeen River. However, the surface water site drainage network includes a hydrocarbon interceptor to treat water prior to release into the Griffeen River and a stop valve to prevent contaminated discharge from the site into the river. In the event of a period of high intensity rainfall, it is possible that rainfall intensity may exceed infiltration rate into the drainage network resulting in potentially contaminated run-off into the Griffeen River. Though likely diluted in the volume of rainfall, short-term effects on surface water quality could occur through the contaminated surface water runoff.

The existing facility layout provides for the following:

- Containment of each facility to prevent pollution to either soil or water.
- All operations take place within fully enclosed buildings,
- The separate control of foul and surface waters on site.
- Sufficient room for vehicle parking and landscaping of the site.

The significant majority of HRW will be textile base material with minimal liquids, limiting any potential interaction with the surface water environment.

Therefore, the magnitude of the effect on hydrology attributes resulting from accidental emissions or spillage would likely be **Small Adverse** as it could result in a minor effect on integrity of the localised Griffeen River reach through slight reduction in amenity value.

In accordance with **Table 15.7**, the combination of a **Small Adverse** impact on a **Medium Sensitivity** attribute would result in an environmental effect of **Slight Significance,** i.e,, an effect that alters the character of the environment without affecting its sensitivities.

15.4.3 Decommissioning Phase

The decommissioning of the Proposed Development is described in **Section 5.1.1.7** of **Chapter 5 - Description of the Construction Phase** and will involve the removal of waste containers and the dismantling of the treatment plant. The decommissioning phase will involve site clearance and dismantling works which will be limited in time and scale due to the light industrial nature of the Proposed Development. Dismantling works has the potential to lead to accidental emissions and release of potentially hazardous substances that can affect the quality of surface water runoff and sediment load.

15.4.3.1 Sediment Runoff

Silt-laden water can arise from exposed ground and interaction with loose soil/rubble during demolition and construction. There is limited excavation, soil disruption or stockpiled soil/building rubble expected during the Construction Phase. The existing surface water site drainage network will retain functionality throughout the construction phase, including settlement of sediment within the attenuation tank prior to restricted release to the Griffeen River at a maximum rate of 6 l/s/ha. However, in the event of a period of high intensity rainfall, it is possible that rainfall intensity may exceed infiltration rate into the drainage network resulting in overland run-off into the Griffeen River. Short-term effects on surface water quality can occur through the silt laden surface water runoff.

The magnitude of the effect on hydrology attributes resulting from increased sediment runoff would likely be **Small Adverse** as it could result in a minor effect on integrity of the localised Griffeen River reach through slight reduction in amenity value.

In accordance with **Table 15.7**, the combination of a **Small Adverse** impact on a **Medium Sensitivity** attribute would result in an environmental effect of **Slight Significance** i.e, an effect that alters the character of the environment without affecting its sensitivities.

15.4.3.2 Accidental Emissions and Release of Potentially Hazardous Substances

Accidental spillages of chemicals or other contaminants during demolition can result in contamination of surface water if materials are not stored and used in an environmentally safe manner.

Most of the traffic movement associated with the Proposed Development will be over the existing roads though there is potential for accidental spillage from site machinery during demolition.

The magnitude of the effect on hydrology attributes resulting from accidental contamination of surface runoff would likely be **Moderate/Large Adverse** as it could affect the integrity of the localised Griffeen River reach through partial/extensive reduction in amenity value.

In accordance with **Table 15.7**, the combination of a **Large Adverse** impact on a **Medium Sensitivity** attribute could result in a **Significant** environmental effect, i.e., an effect which by its character, magnitude, duration, or intensity, alters a sensitive aspect of the environment.

15.4.4 WFD Considerations

The key objectives of the WFD are to:

- Prevent deterioration of the status of all surface and groundwater bodies;
- Protect, enhance, and restore all bodies of surface and groundwater to achieve good status by 2027 at the latest; and,
- Mitigate the effects of flooding.

The Proposed Development takes cognisance of the WFD objectives through implementation of mitigation measures which support the objectives listed above.

No in-stream works will be undertaken, and the existing riparian zone will remain in its current condition. All surface water discharged from the site will be treated in accordance with the site's Industrial Emissions Licence and monitored on a regular basis to prevent deterioration of the status of the Griffeen River.

The site is in Flood Zone C, with a low probability of flood risk. Pluvial flood risk and surface water runoff is managed through collection within the site drainage network, attenuation tank and controlled discharge via a hydrocarbon interceptor and shut-off valve in case of potential contamination.

15.5 Cumulative Impact Assessment

A Cumulative Impact Assessment (CIA) has been undertaken for water; see **Chapter 20 - Cumulative Effects**.

15.6 Interactions

The interaction of water effects with other disciplines are given in **Chapter 19 - Interactions between Environmental Factors**.

15.7 Mitigation Measures

15.7.1 Construction Phase

15.7.1.1 Sediment Run-off

Taking recognition also of **Chapter 14 - Biodiversity** and **Chapter 16 - Land & Soil, Geology & Hydrogeology**, the following mitigation measures will be implemented to control surface water runoff:

- All vehicles which present a risk of spillage of unconsolidated sediment or building rubble, while either delivering or removing materials, will be loaded in such a way as to prevent spillage.
- Stockpiles containing loose soils or building rubble will remain on-site for the shortest period of time as possible.
- The Contractor will monitor weather forecasts for heavy rain and where required, certain works likely to produce sediment or particulate matter will cease, in order to minimise unconsolidated material mixing with surface water runoff;
- Excavation/demolition works will not be completed during periods of prolonged or heavy rain (i.e. Met Éireann orange rain warning);
- Silt fencing shall be installed for all work within 15 m of the Griffeen River. Silt fencing shall consist of a maintainable geotextile membrane (equivalent to Terrastop™ Premium; 250 micron; 45 l/m2/sec). Installation, maintenance, and removal shall follow the manufacturers' specifications. The geotextile membrane will be inspected at least once a week and following any period of heavy rainfall (i.e., Met Éireann orange rain warning); and,
- Sediment accumulation within the attenuation tank shall be monitored and removed as necessary.

15.7.1.2 Accidental Emissions and Release of Potentially Hazardous Substances

In addition to the Pollution Prevention Control Measures in **Section 14.7.1** of **Chapter 14 - Biodiversity,** the following mitigation measures will be implemented during construction phase to manage accidental emissions and release of potential hazardous substance.

- The hydrocarbon interceptor prior to discharge into the Griffeen River shall be routinely monitored, emptied and cleaned, as necessary;
- In the event of accidental emissions contaminating surface water run-off from the site, the stop valve on the stormwater drainage network shall be closed, preventing discharge from the site into the Griffeen River. Contaminated water contained within the attenuation tank will be pumped out and removed from site for treatment. The attenuation tanks will be cleaned of any remaining contaminant residue;
- An Environmental Incident and Emergency Response Plan will be established by the Contractor to deal with incidents or accidents during construction that may give rise to pollution in watercourses proximal to the works. This will include means of containment in the event of accidental spillage of hydrocarbons or other pollutants; and,
- Safe handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the Proposed Development.

As outlined in **Chapter 5 - Description of the Construction Phase,** the construction methodology has been developed in order to ensure there will be no uncontrolled runoff or spillages;

15.7.2 Operational Phase

15.7.2.1 Sediment Runoff

Stormwater from the existing facility is managed prior to release by being first passed through the attenuation tank which allows heavier stones and debris to 'settle' in the tank before being discharged to the Griffeen River.

Sediment accumulation within the attenuation tank shall be monitored and removed as necessary.

15.7.2.2 Accidental Emissions and Release of Potentially Hazardous Substances

The hydrocarbon interceptor prior to discharge into the Griffeen River shall be routinely monitored, emptied and cleaned, as necessary. The discharge from the surface water attenuation tank to the Griffeen River is monitored on a regular basis. In the unlikely event that a deterioration of surface water quality being discharged is detected, or if there is an external spillage on site, a cut-off valve at the outlet from the attenuation tank will activate either remotely or manually and all surface water will be contained in the attenuation tank. This system allows for the retention of all surface water on-site until the spill event is investigated and remediated. It is also possible to provide emergency pumping from the attenuation tank to the foul water sewer in the event of a continued spillage.

The HRW facility will require 24-hour traffic movements and operation requiring staff to be on-site 24/7. Local emergency services will be informed of contact numbers for key personnel. All waste handling and management of spillages will be undertaken in accordance with the Waste Management Awareness Handbook (HSE 2012).

15.7.3 Decommissioning Phase

15.7.3.1 Sediment Runoff

Mitigation measures proposed for the construction phase will be implemented for decommissioning where relevant.

15.7.3.2 Accidental Emissions and Release of Potentially Hazardous Substances

Mitigation measures proposed for the construction phase will be implemented for decommissioning where relevant.

15.8 Residual Impacts

The significance of all effects identified in **Section 15.5** will be reduced to imperceptible with the implementation of the mitigation measures outlined in **Section 15.8**.

15.9 Monitoring

All environmental monitoring is carried out under the conditions of the waste license for the facility issued by the EPA – Waste license 192-03. Emission Limit Values have been set by the EPA for the parameters to be monitored in Schedule C of the licence. Exceeding these values will be judged by the EPA or SDCC to be a non-compliance with the Waste Licence.

The monitoring programme was developed on the basis of the Waster License 192-1 issued by the EPA in 2004. Routine monitoring at the site commenced following acceptance of the waste to the facility in December 2004. Monthly, quarterly and annual reports are issued to the EPA detailing all of the monitoring on site as required under Schedule E of the waste license.

As part of the Waste Licence an Annual Environmental Report (AER) is formulated that collates and reports all monitoring data each year. A comparative assessment is made with the data from previous years. This report is also to be submitted to the EPA.

The primary aims of this monitoring programme are to comply with the legislation and the requirements of the EPA and to monitor the quality of the environment in the vicinity of the site and identify any adverse impacts from the development of the facility.

15.9.1 Construction Phase

The following monitoring measures are proposed in relation to the surface water environment during the construction phase:

15.9.1.1 Sediment Run-off

- Excavations in Made Ground will be monitored by an appropriately qualified person to ensure that any contaminated material is identified, segregated and disposed of appropriately;
- Records shall be kept on the quantity, nature/type and quality of all waste leaving the construction site including individual waste and typical construction site waste;
- Monitoring of sediment control measures summarised in **Section 15.8.1.1**; and
- The Contractor will monitor weather forecasts for heavy rain and where required, certain works and in particular excavations/earthworks will cease in order to minimise exposed soil entering surface water runoff.

15.9.1.2 Surface Water Monitoring

The elements of the surface water monitoring programme are as follows:

- 3 no. surface water sampling locations upstream, downstream and at the midpoint of the licensed water discharge point.
- The surface water sampling locations are sampled in accordance with the industry standard protocols and guidelines prepared by the EPA. Samples are handled and transported in accordance with the same accepted protocols.

- The surface water sampling locations are sampled at quarterly intervals and will continue to be so unless otherwise agreed with the Agency, to establish any potential effects on surface water quality.
- The samples recovered from surface water sampling locations are analysed for the list of parameters given in the Industrial Emissions Directive. These parameters included pH, Chemical Oxygen Demand, Suspended Solids and Mineral Oils.

The results of the analysis are collated, tabulated and reported including interpretation and comparison with the previous monitoring event's data. This information presented in the AER, which is also submitted to the EPA.

15.9.2 Operational Phase

Surface water monitoring as per the construction phase will continue through the operation phase of the site.

The results of the analysis are collated, tabulated and reported including interpretation and comparison with the previous monitoring event's data. This information presented in the AER, which is also submitted to the EPA.

15.9.3 Decommissioning Phase

In the event of the facility closing down, surface water monitoring will continue at six-month intervals until a closure license has been issued by the EPA. After care and monitoring of the facility once it has closed down would be agreed as part of the closing license.

15.10 Schedule of Environmental Commitments

A summary of the environmental commitments, with regard to this chapter is set out at **Chapter 21 - Schedule of Environmental Commitments**.

15.11 Chapter References

Ciria (2015) The SuDS Manual. Department for Environment Food and Rural Affairs (UK)

DoEHLG (2009) The Planning System and Flood Risk Management Guidelines for Planning Authorities.

EPA (2022) Guidelines on the information to be contained in Environmental Impact Assessment Reports.

HSE (2012) Waste Management Awareness Handbook, Health Service Executive

NDP (2005) Greater Dublin Strategic Drainage Study, Dublin Drainage.

NRA (2008): Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes, National Roads Authority.

SDCC (2022) South Dublin County Development Plan 2022-2028. South Dublin County Council.

CHAPTER 16:
LAND, SOIL, GEOLOGY AND HYDROGEOLOGY

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16 LAND, SOIL, GEOLOGY AND HYDROGEOLOGY

16.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes and presents an assessment of the likely significant effects of the Proposed Development on Soils, Geology and Hydrogeology during both the construction, operational and decommissioning phases of the Proposed Development. The assessment presented is based on the information provided in **Chapter 4 - Description of the Proposed Development** and **Chapter 5 - Description of the Construction Phase**. The assessment presented is further informed by the following EIAR chapters:

- **Chapter 14 - Biodiversity:** Impact pathways for biodiversity;
- **Chapter 15 - Water:** Direct or indirect effects on the groundwater environment depending on the degree of interaction between surface water and groundwater; and
- **Chapter 17 - Material Assets:** Indirect impact on surrounding agriculture and land use.

16.2 Methodology

16.2.1 Legislation, Policy and Guidance

16.2.1.1 Legislation

European Legislation

In addition to the Environmental Impact Assessment (EIA) Directive and Habitats Directive (see **Chapter 2 - Background and Need for the Proposed Development** and **Chapter 14 - Biodiversity**), the following European legislation has been considered during the preparation of this chapter:

- Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014, amending Directives 2011/92/EC as regards the consideration of environmental sensitivity of soil, land and water as an assessment of the soils, geological and hydrogeological environment.
- Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration (daughter to 2000/60/EC) (Groundwater Daughter Directive).
- Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive).
- Directive (2007/60/EC) of the European Parliament and of the Council of 23 October 2007 on the assessment and management of floods risk and the requirement to identify areas that may be susceptible to groundwater flooding through both hazard and risk maps.

The implementation of the Water Framework Directive (WFD) has resulted in the repeal and/or replacement of other European legislation of relevance to consideration of the water environment. Most notably, this includes the following:

- The Groundwater Directive (80/68/EEC), repealed in 2013.
- The Dangerous Substances Directive (76/464/EEC) repealed in 2013.

National Legislation

The following national legislation has been considered during the preparation of this chapter:

- Local Government (Water Pollution) Acts 1977 to 1990, as amended including by the Water Services Act, 2007.
- Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010), as amended.

- Environmental Objectives (Groundwater) (Amendment) Regulations 2016 (S.I. No. 366 of 2016).
- European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003), as amended.
- Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009), as amended.
- Drinking Water Regulations 2014 (S.I. No. 122 of 2014), as amended.

16.2.1.2 Policy

The Proposed Development is located in the administrative area of South Dublin County Council (SDCC) and the South Dublin County Development Plan (SDCDP) 2022-2028 has been considered in the preparation of this chapter.

16.2.1.3 Guidance

The impact assessment has had regard to the general guidance regarding the undertaking of an EIA as presented in **Section 1.4** of **Chapter 1 - Introduction** and the following topic specific guidance in relation to land, soils, geology and hydrogeology:

- Guidance on Land Contamination Risk Management (Environment Agency UK. 2020).
- Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites (EPA, 2013).
- Guidance on the Authorisation of Discharges to Groundwater (EPA, 2011).
- Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (TII, 2009).
- Geology in Environmental Impact Statements – A Guide (IGI, 2002).
- Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements (IGI, 2013).

16.2.2 Zone of Influence

The land, soils, geology and hydrogeology study area (**Figure 16-1**) extends outside the footprint of the Proposed Development to include a 1 km buffer zone from the development boundary to examine the potential impacts on adjacent soils and land. To further examine the potential impacts on groundwater, a wider zone of influence (ZoI) for bedrock aquifers and groundwater bodies was also considered to incorporate the extent of the area underlain by the Dublin Groundwater Body (GWB) within 2 km of the Proposed Development in accordance with Institute of Geologists of Ireland (IGI) Guidelines. The ZoI also covers the bedrock aquifers traversed which have value in the local area for abstraction purposes. These aquifers are addressed in the baseline section of this chapter.

16.2.3 Sources of Information to Inform the Assessment

A thorough desk-based search of available baseline information was undertaken to identify the key geological and hydrogeological characteristics and/or sensitivities. Verified online information, published and unpublished literature were utilised for the impact assessment and scientific literature was consulted where appropriate.

The following publicly available sources were utilised:

- Environmental Protection Agency (EPA) Catchments and online resources that include Hydronet (EPA Hydronet) and HydroTool (EPA HydroTool) and Geographic Information System (GIS) maps. Available at https://epawebapp.epa.ie/hydronet/#Water%20Levels and https://gis.epa.ie/EPAMaps/. Accessed February 2023.
- EPA Catchments. Available at https://www.catchments.ie/. Accessed February 2023.
- GeoHive geospatial data hub. Available at https://www.geohive.ie/. Accessed February 2023.

- Geological Survey of Ireland (GSI) data, maps, reports and research. Available at https://www.gsi.ie/. Accessed February 2023.
- Google Maps. Available at https://www.google.ie/maps/. Accessed February 2023.
- South Dublin County Council Planning Portal. Available at https://planning.agileapplications.ie/southdublin. Accessed June 2023.
- National Parks & Wildlife Service maps, data, reports and research. Available at https://www.npws.ie/. Accessed February 2023.

The baseline characterisation has also been informed by the documents uploaded by the applicant and the EPA under the EPA Industrial Emissions Licence (Industrial Emissions Directive (IED) Licence W0192-03) including:

- EIS - Integrated Waste Management Facility, Greenogue Business Park, Rilta Environmental Ltd (2007)
- 2020 Annual Environmental Report, Rilta Environmental Ltd. (Enva)
- 2021 Annual Environmental Report, Rilta Environmental Ltd. (Enva)
- 2022 Annual Environmental Report, Rilta Environmental Ltd. (Enva)

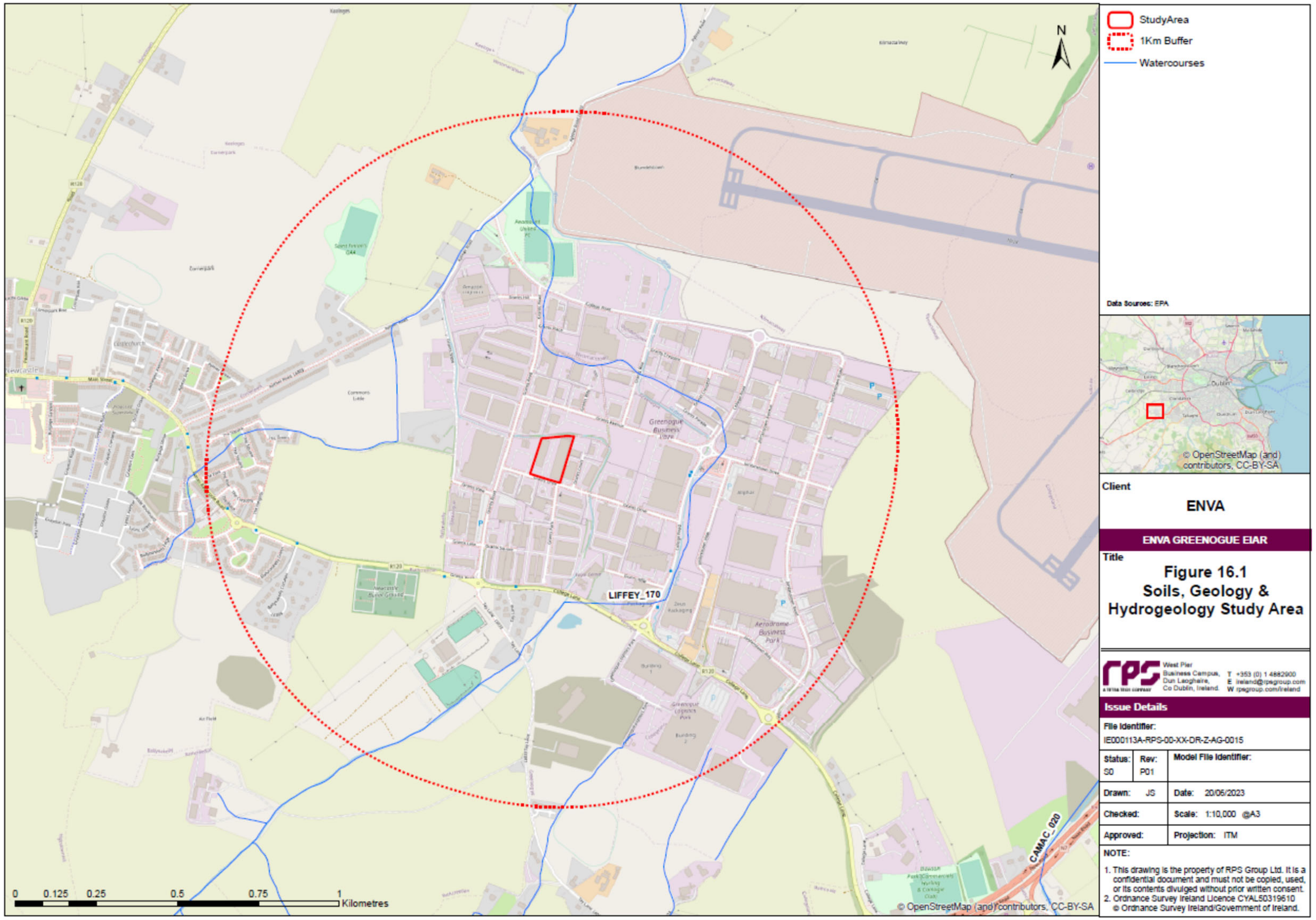

Figure 16-1: Soils, Geology and Hydrogeology Study Area

16.2.4 Key Parameters for Assessment

A description of the construction works is provided in **Chapter 5 - Description of the Construction Phase**. The key activities that have potential to result in likely significant effects on soils, geology and hydrogeology are outlined below:

- Enabling works - Site clearance and demolition of the existing office space on the gable side of the building facing Grants Drive (Building 3).
- Earthworks, foundation works, paving and construction activities including the installation of new prefabricated office, bulk trailer parking area, bin storage shed, internal plant and equipment and associated services.
- Surface water runoff during construction, with potential to cause erosion of soils and carry suspended silt or contaminants into local soils and groundwater bodies.
- Accidental emissions and release of potentially hazardous substances during construction that may affect the quality of soils and/or groundwater, most notably associated with cement, concrete materials (high alkalinity runoff) and temporary oils particularly where below ground excavations are required.
- Excavation works for the reconfiguration of surface water drainage system on site, with potential for changes to groundwater quality, yield and/or flow paths.
- Operation of the Proposed Development and activities including maintenance operations that may give rise to occasional accidental emissions and release of potentially hazardous substances i.e. primarily the storage of disinfectants, that may affect the quality of groundwater and/or soils.

16.2.5 Impacts Scoped Out of the Assessment

Based on the baseline environment and the Proposed Development description outlined in **Chapter 4 - Description of the Proposed Development** and **Chapter 5 - Description of the Construction Phase** a number of impacts are proposed to be scoped out of the assessment for land, soils, geology and hydrogeology. These impacts are outlined, together with a justification for scoping them out, in **Table 16.1**.

Table 16.1: Impacts Scoped Out of the Assessment on Land, Soils, Geology and Hydrogeology

Potential Impact	Justification
Impacts on surface water and the hydrological environment	These impacts are addressed in **Chapter 15 - Water**

16.2.6 Assessment Criteria and Significance

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 geological and hydrogeological attributes (rating criteria) is defined in accordance with Transport Infrastructure Ireland (TII) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes (2009). With the exception of the exclusion of the terms 'not significant' and 'very significant' , this guidance uses the same significance terminology as the EPA and includes intermediate steps for rating site importance (**Table 16.2**) and magnitude of impact (**Table 16.3)**, and then significance of impact (**Table 16.4**). For the purposes of this assessment, a rating of moderate and above is considered significant in EIA terms.

Table 16.2: Rating Criteria for Site Importance of Geology and Hydrogeology Attributes (TII, 2009)

Importance	Criteria	Typical Examples	
		Soils and Geology	Hydrogeology
Extremely High	Attribute has a high quality or value on an international scale.	-	Groundwater supports river, wetland or surface waterbody ecosystem protected by European Union (EU) legislation e.g. Special Area of Conservation (SAC) or Special Protected Area (SPA) status.
Very High	Attribute has a high quality or value on a regional scale	Geological feature rare on a regional or national scale (NHA).	Regionally Important Aquifer with multiple wellfields.
High	Attribute has a high quality or value on a local scale.	Large existing quarry or pit.	Groundwater supports river, wetland or surface waterbody ecosystem protected by national legislation – NHA status.
Medium	Attribute has a medium quality or value on a local scale.	Proven economically extractable mineral resource.	Regionally important potable water source supplying >2,500 homes.
Low	Attribute has a low quality or value on a local scale.	Contaminated soil on site with previous heavy industrial usage.	Inner source protection area for regionally important water source.

Table 16.3: Rating Criteria for Magnitude of Impact on Geological and Hydrogeological Attributes (TII, 2009)

Importance	Criteria	Typical Examples	
		Geology	Hydrogeology
Large Adverse	Results in loss of attribute.	Loss of high proportion of future quarry or pit reserves. Irreversible loss of high proportion of local high fertility soils. Removal of entirety of geological heritage features. Requirement to excavate / remediate entire waste site.	Removal of large proportion of aquifer. Changes to aquifer or unsaturated zone resulting in extensive change to existing water supply springs and wells, river baseflow or ecosystems. Potential high risk of pollution to groundwater from routine runoff. Calculated risk of serious pollution incident >2 % annually.
Moderate Adverse	Results in impact on integrity of attribute or loss of part of attribute.	Loss of moderate proportion of future quarry or pit reserves. Removal of part of geological heritage feature. Irreversible loss of moderate proportion of local high fertility soils. Requirement to excavate / remediate significant proportion of waste site. Requirement to excavate and replace moderate proportion of peat, organic soils and/or soft mineral soils.	Removal of moderate proportion of aquifer. Changes to aquifer or unsaturated zone resulting in moderate change to existing water supply springs and wells, river baseflow or ecosystems. Potential medium risk of pollution to groundwater from routine runoff. Calculated risk of serious pollution incident >1 % annually.

Importance	Criteria	Typical Examples	
		Geology	Hydrogeology
Small Adverse	Results in minor impact on integrity of attribute of loss of small part of attribute.	Loss of small proportion of future quarry or pit reserves. Removal of small part of geological heritage feature. Irreversible loss of small proportion of local high fertility soils and/or high proportion of local low fertility soils. Requirement to excavate / remediate small proportion of waste site. Requirement to excavate and replace small proportion of peat, organic soils and/or soft mineral soils.	Removal of small proportion of aquifer. Changes to aquifer or unsaturated zone resulting in minor change to water supply springs and wells, river baseflow or ecosystems. Potential low risk of pollution to groundwater from routine runoff. Calculated risk of serious pollution incident >0.5 % annually.
Negligible	Results in an impact on attribute but not of sufficient magnitude to affect either use or integrity.	No measurable changes in attributes.	Calculated risk of serious pollution incident <0.5 % annually.
Minor Beneficial	Results in minor improvement of attribute quality.	Minor enhancement of geological heritage feature.	
Moderate Beneficial	Results in moderate improvement of attribute quality.	Moderate enhancement of geological heritage feature.	
Major Beneficial	Results in major improvement of attribute quality.	Major enhancement of geological heritage feature.	

Table 16.4: Rating of Significant Environmental Impacts (TII, 2009)

		Magnitude of Potential Impact			
Importance		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

16.2.7 Data Limitations

This chapter of the EIAR has been prepared based upon the best available information and in accordance with current best practice and relevant guidelines.

There were no technical difficulties or otherwise encountered in the preparation of this chapter of the EIAR. Previous, available site-specific ground investigation and geotechnical reports were reviewed as part of this assessment, and relevant details included as appropriate throughout.

16.3 Description of the Existing Environment (Baseline Scenario)

This chapter describes the topography, soils, geology and hydrogeology baseline for the Proposed Development. The existing land, soils, geology and hydrogeology have been interpreted from a review of the publicly available information, set out in **Section16.2.3** above and from a review of previous site investigations. Where applicable the importance of a particular attribute in terms of the Proposed Development is addressed. The environmental receptors are outlined in **Section 16.3.6**.

16.3.1 Topography, Hydrology & Regional Geomorphology

The Proposed Development is situated in the Greenogue Business Park in a relatively low lying region of South West Co. Dublin.

Under the WFD River Basin Management Plan for Ireland (2018-2021), the Proposed Development is located within the Liffey and Dublin Bay catchment (Code: 09) and Liffey_SC_090 sub-catchment of the Eastern River Basin District. The business park is intersected by the Griffeen River (River Waterbody Code IE_EA_09L012100 (LIFFEY_170), EPA Code 09G01), which flows north of the site.

The topography of the Business Park shallowly rises from the north to the south, towards Athgoe Hill and the N7 national road. The site is relatively flat and the elevation is approximately 87.5 mOD (metres above Ordnance Datum). The geomorphological environment surrounding the Proposed Development comprises flat to undulating glacial sediments.

16.3.2 Land Use

Greenogue Business Park is a commercial and industrial area on the outskirts of Dublin city, in South Dublin County Council. The park is designated as an Enterprise zone and offers commercial space solutions, including office, industrial and warehousing units to businesses of all sizes. The Proposed Development is operated by Enva who run a hazardous waste transfer/recovery facility within the Greenogue Business Park. The site is managed in accordance with the requirements of an existing EPA IED licence (IED Licence W0192-03).

The EPA's CORINE 2018 landcover map consists of an inventory of land cover under various classes. Greenogue Business Park is classified as land occupied by Artificial Surfaces - Industrial, commercial and transport units.

The closest residential property is greater than 300 m to the west of the Proposed Development. The site is surrounded by numerous commercial premises within the Greenogue and Aerodrome Business Parks. Local Services / Amenity (social infrastructure) includes a wide range of services and facilities including health, education, community, recreational and sports facilities that contribute to the quality of life. **Section 8.3.1** of **Chapter 8 – Population** details further land use in terms of settlement patterns, residential and local community amenities.

16.3.3 Soils and Geology

16.3.3.1 Teagasc Soils (Soils)

The Teagasc Soil (Soils) types within the study area are displayed in **Figure 16-2**.

From a review of aerial photography it is noted that artificial surfaces/Made Ground associated with existing buildings, car park and infrastructure seal the natural soils and subsoils in Greenogue Business Park.

According to Teagasc soils mapping, the regional soils underlying the Made Ground vary over a short distance. The west of the site underlying Building 1 and Building 3 consists of poorly drained, mainly basic mineral soils (BminPD) of the surface water and groundwater gleys soil group. The soils underlying Building 2 in the east of the site consists of deep well drained mainly basic mineral soils (BminDW) of the grey Brown Podzolics and Brown Earths (medium-high base status) soil group.

The importance of 'Made Ground' in terms of drainage properties is considered to be of low quality and therefore this attribute is considered to be of low importance.

16.3.3.2 Quaternary Sediments (Subsoils)

The Quaternary sediments (subsoils) underlying the study area are displayed in **Figure 16-3.**

According to the GSI, the majority of the Greenogue Business Park (including the Proposed Development) is underlain by Till derived from Limestones (TLs). The subsoils consist of unsorted glacial sediment derived from the underlying limestone. Limestone tills are generally classified as deep well drained soils, therefore, it is considered that this attribute is of high significance (Importance) on a local scale.

16.3.3.3 Soft and/or Unstable Ground

There are no soft or cohesive deposits such as alluvium or gravels identified in the vicinity of the Proposed Development. Based on review of the GSI's Landslide Susceptibility mapping, the study area is rated as having 'low' landslide susceptibility. There are no records of landslides held by the GSI within the study area. Landslide potential is therefore low to minimal.

16.3.3.4 Bedrock Geology

The regional bedrock geology is displayed in **Figure 16-4**.

According to the GSI, the Greenogue Business Park (including the Proposed Development) is underlain by the Lucan Formation formed during the Carboniferous Period. The formation comprises dark grey to black, fine-grained, occasionally cherty, micritic limestones that weather paler, usually to pale grey. There are rare dark coarser grained calcarenitic limestones, sometimes graded, and interbedded dark-grey calcar. Bedrock outcropping is mapped outside the south eastern boundary of Greenogue Business Park at the site of a historic quarry. Depth to bedrock across the study area is expected to be <3 mbgl (metres below ground level) at the east of the study area and increasing to >10 mbgl moving from east to west across the study area. Beneath the site bedrock is expected to be at least >3 mbgl beneath Building 2 and at least >5 mbgl beneath Building 1 and 3. Bedrock is not expected to be encountered during excavation works at the site.

No karst features have been mapped within 2 km of the Proposed Development.

16.3.3.5 Mineral/ Aggregate Deposits

Based on review of the GSI Spatial viewer, there are no mineral localities within the study area. There are however a number of historic pits and quarries within 1 km of the Proposed Development. **Table 16.5** presents a summary of the historic gravel pits and quarries within the study area.

Table 16.5: Historic Gravel Pits and Quarries within the Study Area

Status	Location	Description
Historic Quarry	South boundary of Greenogue Business Park	Early to Mid 20th Century Quarry
Historic Quarry	South-western boundary of Greenogue Business Park	Early to Mid 20th Century Quarry
Historic Quarry	1.2 km to the north-east of the Proposed Development (Kilmactalway)	Early to Mid 20th Century Quarry
Historic Quarry	0.8 km to the north of the Proposed Development (Blundelstown)	-
Historic Quarry	0.63 km to the north-east of the Proposed Development (Kilmactalway)	-

Crushed rock Aggregate potential is rated as 'moderate' at the west of the study area increasing to 'high' at the east with isolated areas of 'very high' corresponding to the historic quarries and pits identified above.

The GSI Aggregate potential rating within the study area and its relative importance in terms of its economic importance is considered to be medium.

16.3.3.6 Contaminated Land

Various sources of information including historic mapping, aerial photography, Teagasc soil mapping, CORINE landcover mapping, EPA datasets and the SI information specific to the Proposed Development were reviewed to assess the potential for contaminated land within the study area.

There are no legacy landfills recorded within the study area. There are 2 no. waste licence facilities located within the study area; Enviro Star Solution (W0288) at Unit 21 and Ormond Organics (W0237) at Unit 643, both located in Greenogue Business Park. There are 2 no. other Industrial Emissions Licensing (IEL) facilities located within Greenogue Business Park; Rilta Environmental (W0185), a Waste Transfer Station at Block 14A1 (both also owned by Enva) and Starrus Eco holdings (W0188) at Unit 14B.

Section 17.4.1.2 of **Chapter 17 - Material Assets** lists all the commercial and industrial facilities in the immediate vicinity of and near the Enva site.

Historic industries within the study area, evident from 6 inch historic mapping area included Greenogue Corn Mill and associated Mill pond which was located <100 m to the east of the Proposed Development. Aerial photography dating back to 1995 show the initial development of Greenogue Business Park and its expansion northwards into the surrounding undeveloped land can be seen in subsequent imagery. The Proposed Development is present in imagery dating between 2004-2006.

Section 16.3.3 details a number of historic pits and quarries within the study area.

The presence of Made Ground at the site has the potential to contain waste components and contaminated soils which have been stored in the warehouse proposed to house the Health Risk Waste (HRW) processing plant for more than 15 years. However, there has been no ‘processing’ of the soils waste in the warehouse; it is a storage operation only. The floor of the warehouse is comprised of a 300 mm concrete/steel mix. The warehouse is also fully bunded, with a ‘physical lip’ bund to allow for the holding of any leachate that may be produced during the storage process. The warehouse floor is regularly inspected and any sitting leachate on the warehouse floor removed by a vacuum tanker. To this point there has been no contamination attributed to the soil storage process.

Given the presence of Made Ground and the location of the Proposed Development within an area of historical and current industrial activity, the degree or extent of soil contamination is considered to be moderate-high on a local scale, therefore this attribute is of medium-high importance.

16.3.3.7 Geological Heritage Areas

The GSI online database indicates that the Newcastle Buried Channel Audited County Geological Site (CGS) (IGH12) is located 800 m west of the Proposed Development. The CGS consists of a deep buried channel in the Carboniferous Limestone. The CGS is not visible at the surface, however, boreholes and geophysical evidence has been gathered to delineate the channel in the region mapped by the GSI as a CGS.

The site is currently designated a CGS but may be recommended for Geological Natural Heritage Area (NHA) status. Geological heritage Areas are considered to be attributes of high importance.

Due to limited nature of excavations at the site bedrock is not expected to be encountered therefore no impact to the CGS is envisaged and no further consideration is required for the CGS.

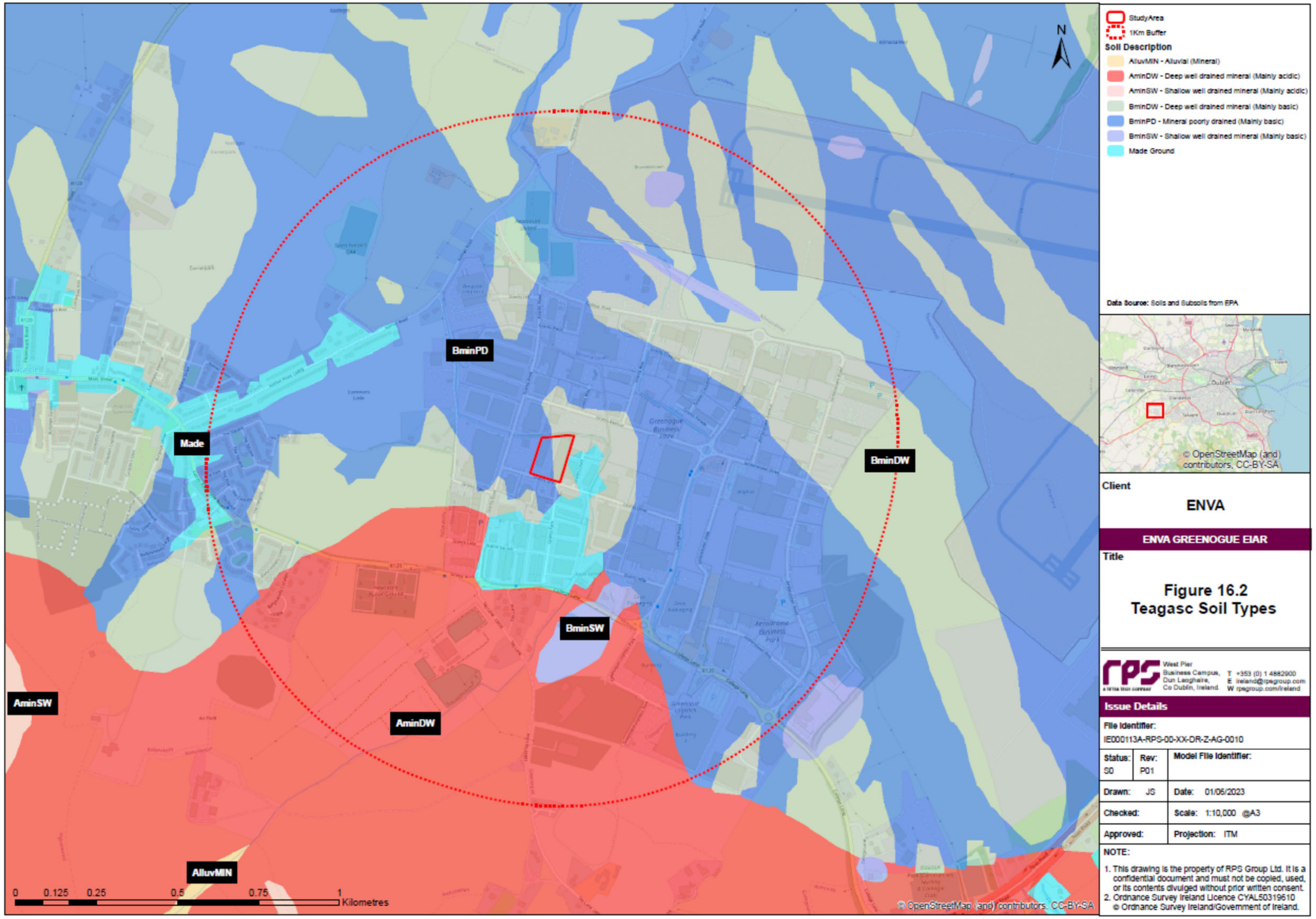

Figure 16-2: Teagasc Soil Types

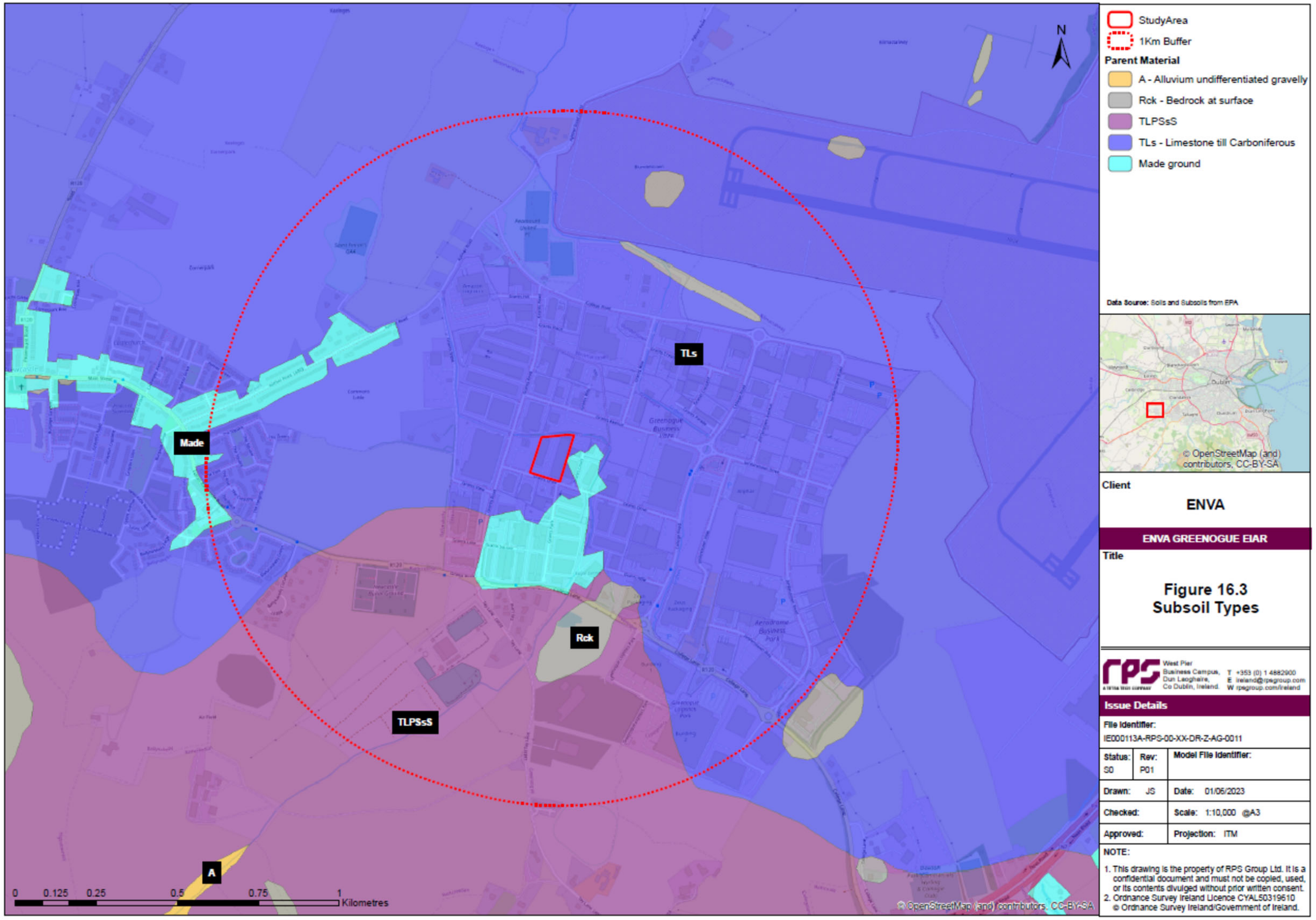

Figure 16-3: Subsoil Types

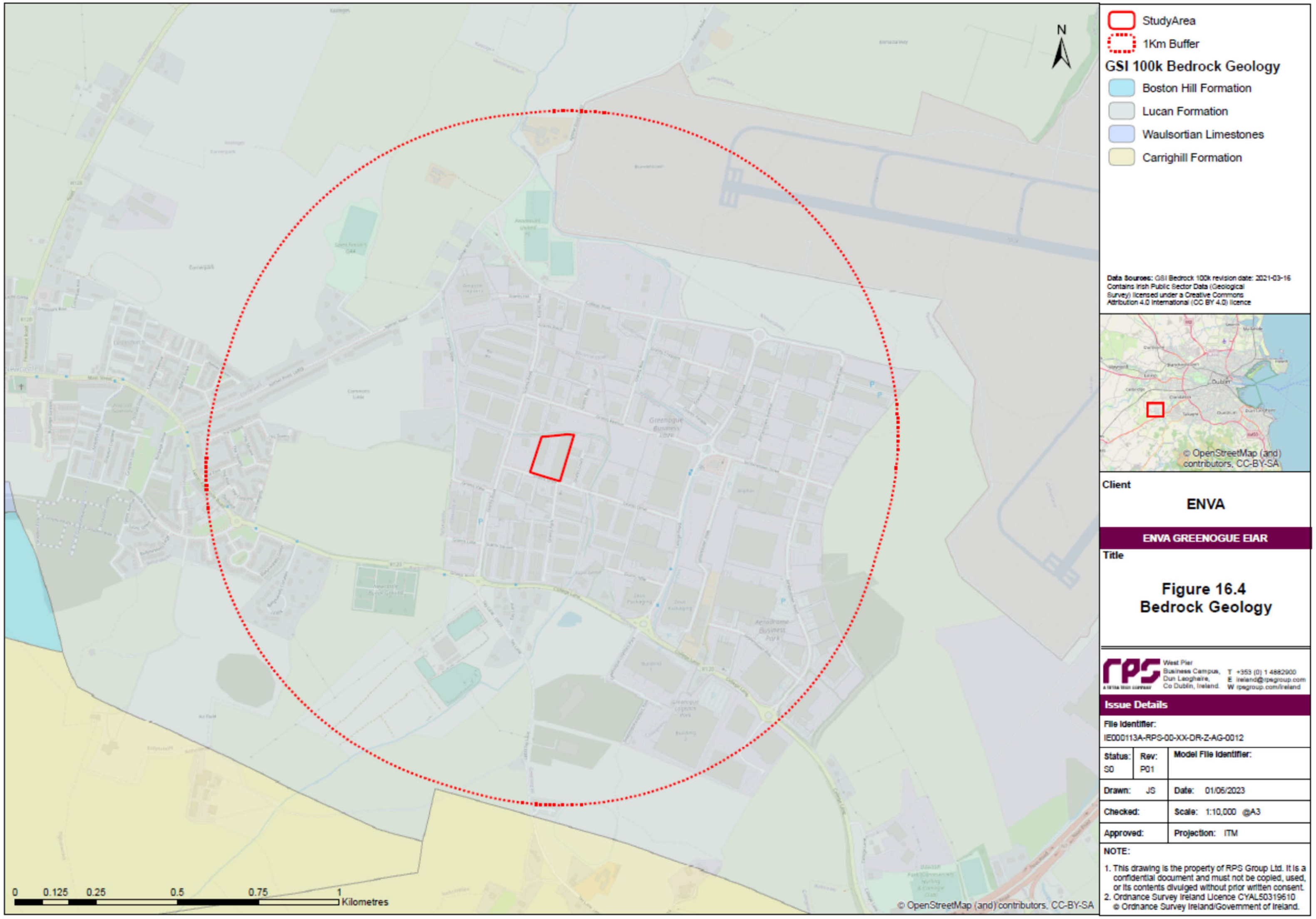

Figure 16-4: Bedrock Geology

16.3.4 Hydrogeology

16.3.4.1 Groundwater Vulnerability

In accordance with the WFD, it is necessary to understand the groundwater vulnerability of the study area, which is defined as the tendency and likelihood for general contaminants to reach the water table after introduction at the ground surface. The GSI Vulnerability Mapping Guidelines are outlined in **Table 16.6**. Groundwater vulnerability classifications are based on the type and thickness of subsoils and the presence of karst features.

Table 16.6: GSI Vulnerability Mapping Guidelines

Vulnerability Rating	Hydrogeological Conditions				
	Subsoil Permeability (Type and Thickness)			Unsaturated Zone	Karst Features
	High Permeability (Sand/Gravel)	Moderate Permeability (e.g. sandy subsoil)	Low Permeability (e.g. clayey subsoil, clay, peat)	(Sand/Gravel Aquifers Only)	(<30 m Radius)
Extreme (E)	0 – 3.0 m	0 – 3.0 m	0 – 3.0 m	0 – 3.0 m	-
High (H)	>3.0 m	3.0 – 10.0 m	3.0 – 5.0 m	>3.0 m	N/A
Moderate (M)	N/A	>10.0 m	5.0 – 10.0 m	N/A	N/A
Low (L)	N/A	N/A	>10.0 m	N/A	N/A

The groundwater vulnerability designation in the vicinity of the Proposed Development is shown in **Figure 16-5** and ranges from largely 'moderate' at the west of the study area increasing to high and Extreme moving from west to east.

The area of Building 1 and Building 3 in the west of the Proposed Development is classed as an area of moderate groundwater vulnerability, indicating a depth to bedrock of at least >5 mgbl. Building 2 in the east of the Proposed Development is classed as an area of high groundwater vulnerability, indicating a depth to bedrock of 3-5 mbgl.

The GSI's Geotechnical Viewer provides some depth to bedrock information from its database of previous reports of site investigation works undertaken in the study area. Borehole data records depth to bedrock between 2.6-5.3 mbgl at the east of the study area in line with the mapped groundwater vulnerability classification for the east of the study area.

16.3.4.2 Aquifer Designation

The GSI provide a general hydrogeological classification based on the geological setting. The GSI aquifer categories are intended to describe both resource potential (regionally or locally important, or poorly productive) and groundwater flow type and attenuation potential (through fissures, karst conduits or intergranular).

The aquifer types in the vicinity of the Proposed Development are displayed in **Figure 16-6.** The bedrock underlying the Greenogue Business Park (including the Proposed Development) is classed as a Locally Important Aquifer which is Moderately Productive only in Local Zones (LI).

According to the GSI, LI aquifers are described as aquifers with limited and relatively poorly connected network of fractures, fissures and joints, giving a low fissure permeability which tends to decrease further with depth. A shallow zone of higher permeability may exist within the top few metres of more fractured/weathered rock, and higher permeability may also occur along fault zones. These zones may be able to provide larger 'locally important' supplies of water. In general, the lack of connection between the limited fissures results in relatively poor aquifer storage and flow paths that may only extend a few hundred metres.

Locally Important Aquifers are considered to be of medium Importance in terms of the groundwater resources of a region.

16.3.4.3 Groundwater Recharge

The Greenogue Business Park will act as a cement cap on the limestone bedrock, which prevents the area from receiving recharge as reflected by GSI Groundwater recharge mapping across the study area which indicates generally low recharge rates ranging between 51-100 mm/year to 101-150 mm/year.

Due to the low permeability and poor storage capacity of the underlying aquifer it has a low 'recharge acceptance'. Some recharge in the upper, more fractured/weathered zone is likely to flow along the relatively short flow paths and rapidly discharge to streams, small springs and seeps. Groundwater discharge to streams ('baseflow') can significantly decrease in the drier summer months.

Surrounding the Business Park, diffuse recharge will occur via rainfall percolating through the subsoil. The proportion of the effective rainfall that recharges the aquifer is largely determined by the thickness and permeability of the soil and subsoil, and by the slope. Due to the generally low permeability of the aquifers - GSI recharge data caps recharge at 200 mm/year for Locally Important Aquifer within this GWB due to the fact they have low transmissivity and storage - a high proportion of the recharge will then discharge rapidly to surface watercourses via the upper layers of the aquifer. The GWB will discharge directly to the Irish Sea along the coast.

16.3.4.4 Groundwater Quality and Levels

There are no publicly available historical groundwater level or groundwater quality data to review from the study area.

The closest active EPA Groundwater Level monitoring station is located outside of the study area, approximately 12 km north-west in Maynooth. The closest available groundwater chemistry data are from Ryewater, Co. Meath, approximately 16 km to the north-west of the study area.

The general groundwater flow direction in this aquifer is towards the coast and also towards Dublin City. This aquifer is not expected to maintain regional groundwater flow paths. Groundwater circulation from recharge to discharge points will more commonly take place over a distance of less than a kilometre. The majority of groundwater flow will be a rapid flow into the upper weathered zone but flow in conduits is commonly recorded at depths of 30 to 50 mbgl (meters below ground level).

The site currently has a groundwater monitoring programme in place. Groundwater is monitored on-site via three groundwater monitoring wells to comply with the conditions of its EPA licence and also on random occasions throughout the year by the EPA. The monitoring is conducted in accordance with Schedule C and Condition 6 of the EPA Licence (W0192-03). The monitoring found that groundwater flows in a west/north-westerly direction across the site.

Groundwater monitoring results over the last 5 years indicates the presence of groundwater pollution. The groundwater pollutants that were identified are the following:

- Electrical conductivity;
- Total petroleum hydrocarbons;
- Nickel;
- Chloride;
- Sodium; and
- MTBE (Methyl tert-butyl ether).

In 2020 additional groundwater monitoring wells were drilled on and off site in an effort to better understand groundwater quality and to determine the source and pathway of contaminants.

The 2021 Annual Environmental Report (AER) for the site states that the source of the groundwater pollutants is unclear but is believed to be historic. The following are extracts from the 2021 AER:

> *Several programmes which are still ongoing have been initiated by the company to identify the cause and to determine if the levels recorded are as a result of recent or historic activity or if they are migrating onto the site from elsewhere. These studies are still ongoing. The cause of the localised groundwater pollution remains unclear. An external, independent environmental consultancy firm has been contracted to assess the site and its structures to identify the location of the pollutants. To date several assessments have been carried out. Additional groundwater monitoring was carried out in wells on and*

off site in an effort to better understand the groundwater quality. Based on the data collated, MTBE is still present in the groundwater but the contaminant levels are continuing to decrease over time.

A programme of monitored natural attenuation is underway; this is a process of allowing nature to rectify the situation without human interference. In conjunction with this, Enva is liaising with the EPA on these ongoing projects and is continuing ongoing monitoring of the pollutant levels on a regular basis to determine progress'.

BlueRock Environmental currently undertake quarterly groundwater monitoring at the Greenogue Facility on behalf of Enva. The following conclusions were drawn as part of the Q4 2022 quarterly monitoring report:

- No positive detections of any contaminants of concern detected within the River Griffeen. In addition, the levels of MTBE within groundwater have been steadily reducing within all wells since the initial impact in 2018.
- Current levels of MBTE were detected marginally above the GTV's in EPA in recently installed shallow observation wells OB01 with levels recorded at 10.1 µg/l, respectively. The GTV for MTBE is 10 µg/l. The levels continue to decrease over time.
- The source of the MTBE detections remains unclear; however, based on the spread of MTBE levels in groundwater and ground flow direction, the most likely source is located in the vicinity of the Bay05 building.
- A level of 10,220 µg/l and a level of 690 µg/l of TPH was recorded in OB06 during the Q4 2022 and Q3 2022 sampling events, respectively. No previous elevated levels of TPH were found in OB06. The source of the detections was potentially attributed to surface water ingress to the well. Following resealing and purging of the well, further monitoring within OB6 during December 2022 recorded hydrocarbon levels <10 µg/l.

The findings of monitoring carried out in 2022 and summarised in the 2022 AER for the site does not provide any additional information regarding the progress of the investigations. It reports breaches of groundwater trigger levels which it relates to historic contamination at the site but that contaminant levels are decreasing and that the source is believed to be historic and that 'MTBE has steadily reduced within all wells to the current date (Q4'22)'.

Section 16.3.4.6 above addresses the storage of contaminated soils at the site in terms of potential for groundwater contamination.

16.3.4.5 WFD Groundwater Bodies and Quality Status

GWB have been designated for the purpose of the WFD. GWB are subdivisions of large geographical areas of aquifers that allow more effective management to protect groundwater and linked surface water or groundwater dependent features. The WFD requires that all Member States implement the necessary measures to prevent deterioration of the status of all waterbodies (surface waters including rivers, lakes, transitional and coastal, as well as groundwater) and to protect, enhance and restore all waters with the aim of achieving at least 'Good' Status. The EPA WFD status classifications and risk of not achieving status are assigned to these waterbodies as a whole; degradation in water quality in one section of the waterbody could result in a lower status of the entire waterbody

The Dublin GWB underlies the Proposed Development. This GWB is located in the Greater Dublin City area and extends south-west towards Kildare and its current WFD Status for 2016 – 2021 is 'Good'.

The risk of the GWB refers to the risk for each waterbody of failing to meet its WFD objectives by 2027. The risk of not meeting WFD objectives has been determined by the EPA through assessment of monitoring data, data on the pressures and data on the measures that have been implemented. Waterbodies that are At Risk are prioritised for the implementation of measures in the National River Basin Management Plans. The risk assessment was completed in 2020 by the EPA Catchments Unit in conjunction with other public bodies and was primarily based on monitoring data up to the end of 2018.

The status of the GWB refers to status results based on the assessment of groundwater chemical and quantitative figures in Ireland. This is drawn from representative monitoring points selected specifically for the WFD groundwater monitoring programme. The WFD Status (2016-2021) of the Dublin GWB is classed as Good, the GWB risk is currently under review.

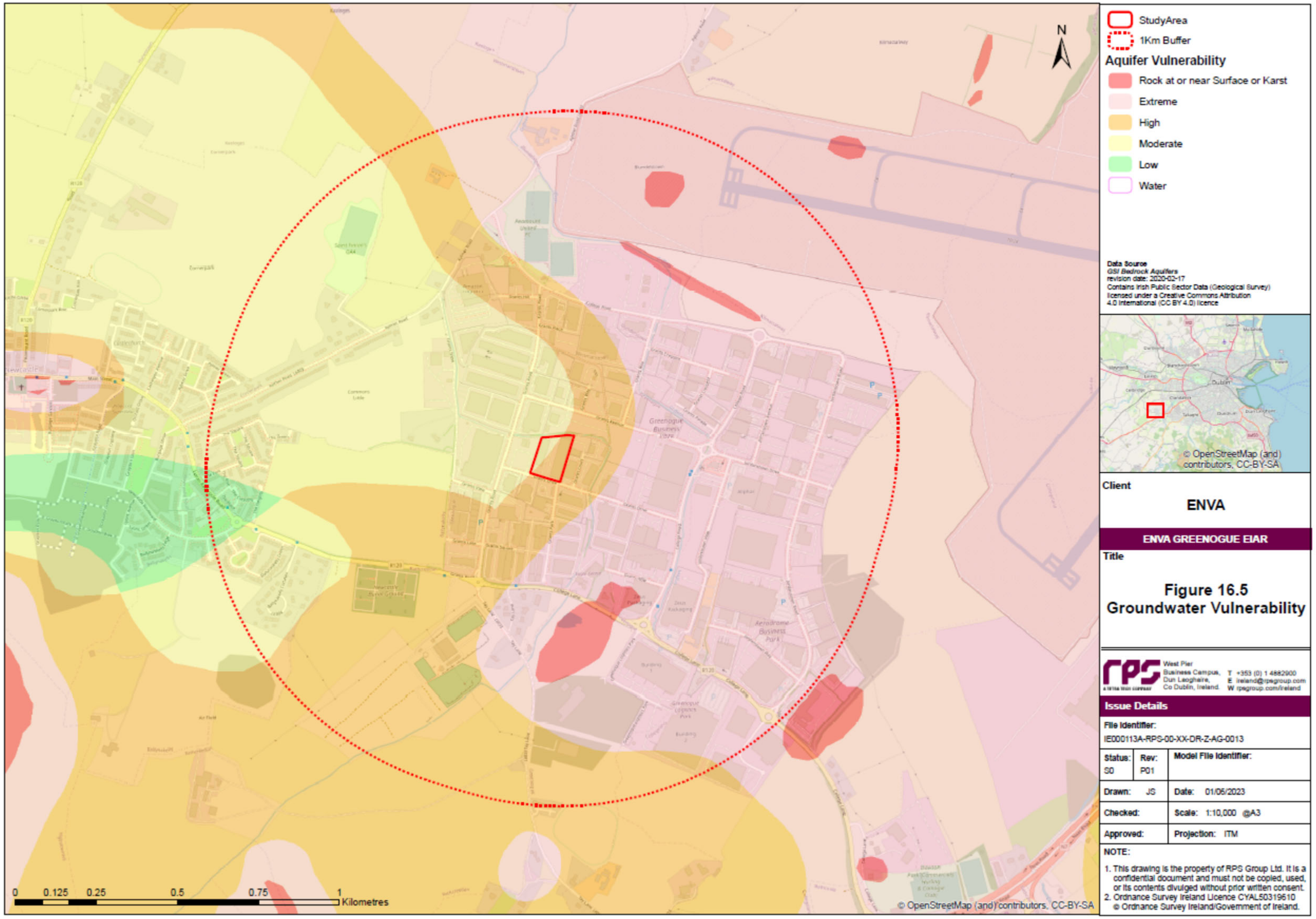

Figure 16-5: Groundwater Vulnerability

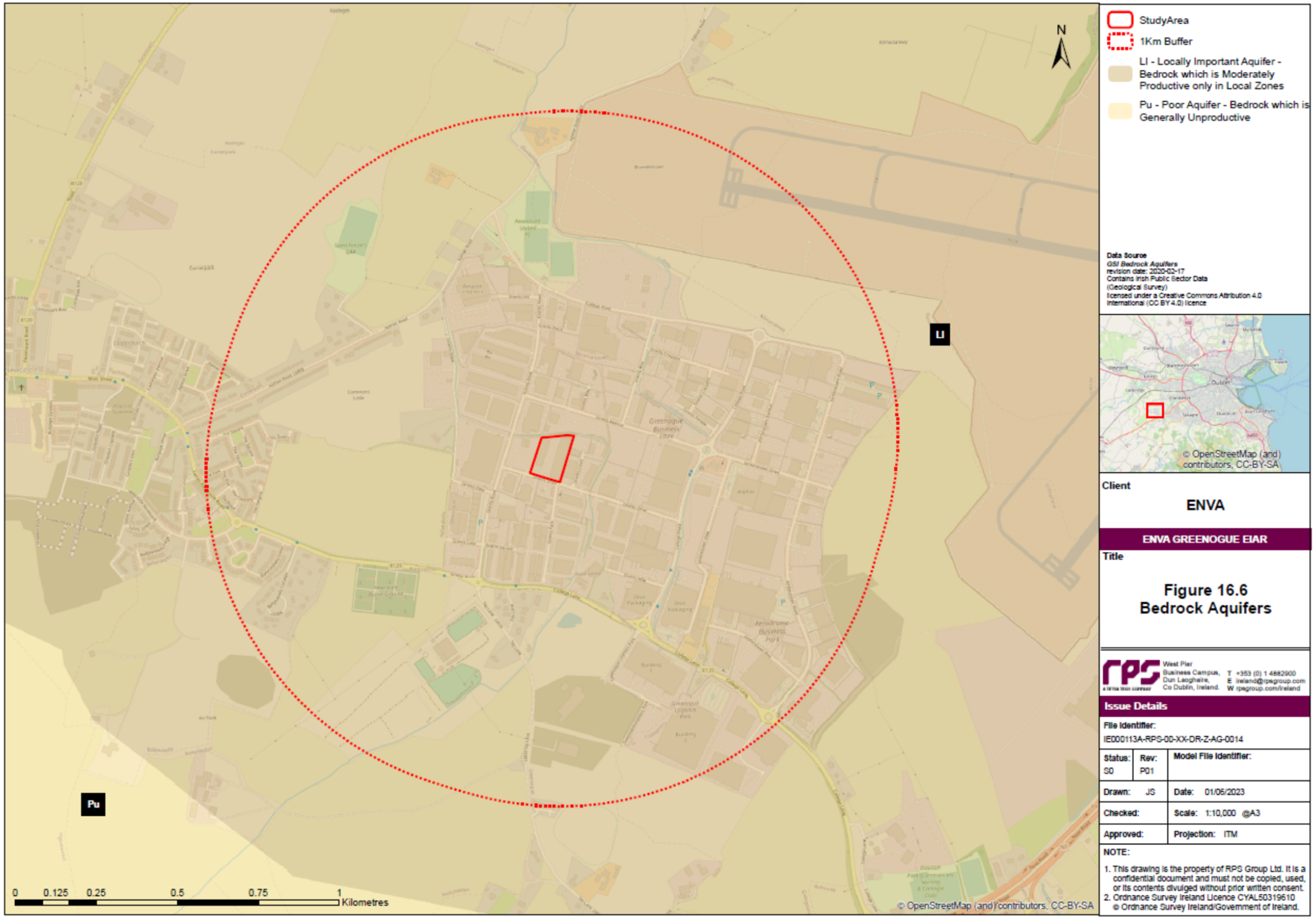

Figure 16-6: Aquifer Designation

16.3.4.6 Public and Private Water Supplies

The GSI maintains a database of groundwater boreholes and wells within Ireland which records details such as depth of the borehole, well use, and yield class. There are no GSI listed wells within 2 km of the Proposed Development.

There is potential for private wells to exist in the area not listed by the GSI, however this is considered unlikely due to the poor productivity of the underling aquifer.

According to GSI’s Groundwater Data Viewer, there are no Public Supply Source Protection Areas or Group Scheme Preliminary Source Protection Areas mapped by the GSI within 2 km of the Proposed Development.

16.3.4.7 Designated Sites

The site of the Proposed Development is not located within or adjacent to any nationally or internationally designated sites for nature conservation. Details of designated sites with connectivity to the Liffey and Dublin Bay surface water catchment is presented in **Section 14.3.1.1** of **Chapter 14 - Biodiversity**.

A review of GeoHive Environmental Sensitivity Mapping identified no Annex I Groundwater Dependant Terrestrial Ecosystem (GWDTE) in the vicinity of the study area.

16.3.5 Environmental Receptors

The environmental receptors considered relevant to the assessment presented in this chapter and their respective Importance are summarised in **Table 16.7**.

Table 16.7: Importance of Environmental Receptors

Receptor	Key Receptor Attributes	Distance from the Proposed Development	Receptor Importance
Soil	The site comprises an artificial cover of paved surface (Made Ground) which has a low quality in terms of drainage properties and value on a local scale.	Underlying the Proposed Development.	Low
Subsoil	The Limestone tills are generally well draining across the study area	Underlying the Proposed Development.	High
Contaminated Land	The potential exists for contaminated material to be present in Made Ground	Underlying the Proposed Development.	Medium-high
Lucan Formation	The economic importance of the Lucan Formation is considered to be medium on a local scale	Underlying the Proposed Development.	Medium
Geological Heritage	Geological heritage Areas are considered to be attributes of high importance	800 m to the west of the Proposed Development.	High
Bedrock Aquifers	Locally Important Aquifer. This attribute has a medium quality or value in terms of groundwater resource potential on a local scale.	Underlying the Proposed Development.	Medium

16.3.6 Evolution of the Environment in the Absence of the Proposed Development

Under the site’s current condition, operations will continue in accordance with the current EPA licence (W0192-03). The site is currently operational and is primarily covered in hard standing/Made Ground. Stormwater and rainwater are captured and managed appropriately through an interceptor prior to discharge. Any drainage from site operations is made to sewer following wastewater treatment and with appropriate monitoring in accordance with the facility’s EPA Licence. Groundwater is monitored on-site via three groundwater monitoring wells to comply with the conditions of its licence.

In the absence of the Proposed Development, the current geological and hydrogeological regime within the study area is not expected to change and will remain as described in the baseline description of this report (**Section 16.3**).

16.4 Description of Likely Significant Effects

16.4.1 Construction Phase

The key civil engineering works for the Proposed Development which will have potential for impact on the soils, geology and hydrogeology receiving environment during construction, as outlined in **Section 16.2.4** above are:

- Site clearance and enabling works;
- Demolition of the existing office structure (366m²) to be replaced with 2 no. bulk trailer loading structure;
- Foundation works to support installation of new prefabricated office, bulk trailer parking area, bin storage shed, internal plant and equipment, and associated services;
- The installation of a temporary works compound and associated infrastructure;
- Provision of new footpath to link the car park to the office and to the marshalling yard;
- Limited shallow excavation works required for the reconfiguration of the surface water drainage system (relocation of existing drains) and the installation off a new surface water drain to collect roof runoff; and
- Reconfiguration of the existing parking surfaces involving the repainting of parking bays..

The full construction phase details are available in **Chapter 5 - Description of the Construction Phase**.

The following sections provide an assessment of the likely significant effects during the construction phase (including demolition) on the geological and hydrogeological environment.

16.4.1.1 Accidental Emissions and Release of Potentially Hazardous Substances

Accidental spillages of chemicals or other contaminants during demolition and construction can result in localised contamination of soils and groundwater underlying the site if materials are not stored and used in an environmentally safe manner. This includes the disturbance of unknown contamination leading to the contamination of soil and groundwater during the demolition and construction phase. There can be a risk of release of potentially hazardous substances from imported material which has not been appropriately screened.

There is potential for accidental spillage from site machinery during the demolition and construction phase. The limited volume of stored chemicals has the potential to impact soil quality if not stored correctly during the construction stage.

Without mitigation, localised accidental spillages of hazardous chemicals on the site have the potential to contaminate the underlying soils by exposure, dewatering, or construction related spillages, resulting in a short-term, small adverse effect of **moderate/slight significance** on soils. It is expected that the natural subsoil would provide adequate attenuation and filtration before reaching the groundwater, therefore the effect on groundwater is considered to be **negligible** and of **imperceptible significance** on groundwater.

16.4.1.2 Soil Erosion

The construction phase will result in the removal of subsoils for shallow excavations for installation of drains and foundations. The removal of subsoils during excavation works is a direct and permanent impact. This is an unavoidable consequence of the construction phase. Damage to soil quality/integrity can result from compaction and sealing of soils during construction and site enabling works as a result loading and reloading and from increased vehicular activity on site. Earthworks surfaces are subject to erosion if left exposed over a long period of time.

The attributed importance of soils within the Made Ground is considered to be low and high within the limestone tills as they are, in general, classified as deep well drained soils. The impact of soils in terms of damage to soils from erosion, compaction and sealing is considered to be a small adverse permanent effect of **moderate/ slight significance** on the soils of the area.

16.4.1.3 Loss of Potential Aggregate Reserve

In terms of loss of soil reserves, this will be limited to the footprint of the construction area and therefore is insufficient on a local scale to affect the potential of the quaternary and geological environment as a future quarry or pit reserve. Therefore, this effect on soils of the study area is considered to be **negligible** and of **imperceptible significance**.

16.4.1.4 Potential for Encountering Contamination

The site is located in an area of historical and current industrial activity, therefore, site clearance and excavation works within Made Ground have the potential to encounter contaminated material from former industrial activities. If not handled correctly, the excavation and handling of potentially contaminated Made Ground or contaminated soil can result in the mobilisation of contaminants impacting on soil and groundwater quality. Dependant on the contaminant of concern; these impacts can include leachate of contaminants to clean soils and groundwater, surface water runoff from exposed contaminated Made Ground as well as a risk to human health due to direct contact and from volatile or semi-volatile vapours.

Removal of the contaminated soils from the warehouse proposed to house HRW waste has the potential to mobilise contaminants if not handled correctly such as potential for cross contamination or spillage of material.

If encountered, the excavation of potentially contaminated Made Ground would have a temporary negative effect on the soils, geology and hydrogeology of the study area. These can range from **slight to significantly negative** impacts depending on the nature of the contamination and the sensitivity of the receiving environment. Given that the potential to encounter contaminated ground is considered medium-high the resulting impact would be considered to be a short-term, small adverse impact of **moderate/slight significance** on soils. At the Proposed Development, it is expected that the natural subsoil beneath the Made Ground would provide adequate attenuation and filtration before reaching the groundwater therefore the effect on groundwater is considered to be **negligible** and of **imperceptible significance**.

16.4.1.5 Infiltration of Surface Runoff

Silt-laden water can arise from exposed ground and interaction with loose soil/rubble during demolition and construction. Earthworks surfaces will be exposed during the excavation of overburden for foundation construction. Short-term effects on groundwater quality can occur through the infiltration of silt laden surface water runoff through thin overburden deposits or exposed surfaces within or adjacent to construction areas. There is limited excavation, soil disruption or stockpiled soil/building rubble expected during the Construction Phase and existing surface water site drainage network will retain functionality throughout the construction phase.

Stockpiling will be limited on site due to the small volume of soil to be excavated, however, where soils are to be stored on site, stockpiles with side slopes can create another source of sediment laden runoff. Once the slopes are built up, rainfall landing on the slope and runoff from the top of the stockpile can travel uncontrolled down the slope, potentially at high velocities causing suspension of soil particles from the surface of the slope.

Where groundwater is at or close to the surface this impact is considered to be a small adverse, temporary effect on the groundwater environment during the construction phase of **slight significance**.at the Proposed Development, it is expected that the natural subsoil beneath the Made Ground would provide adequate attenuation and filtration before reaching the groundwater therefore the effect on groundwater is considered to be **negligible** and of **imperceptible significance**.

16.4.2 Operational Phase

The following section provides an assessment of the likely significant effects during the operational phase on the geological and hydrogeological environment.

16.4.2.1 Accidental Emissions and Release of Potentially Hazardous Substances.

The operational phase (which includes maintenance operations) has the potential to lead to occasional accidental emissions and release of potentially hazardous substances that can affect the quality of groundwater and/or soils. Such spillages, however, are envisaged to be minor and easily controlled due to the nature of the facility as an EPA licenced controlled environment. Without mitigation this effect is considered to be a short-term, small adverse impact of **moderate/ slight significance** on soils and groundwater.

16.4.3 Decommissioning Phase

The decommissioning of the Proposed Development is described in **Section 5.1.1.7 Site Closure** of **Chapter 5 - Description of the Construction Phase** and will involve the removal of waste containers and the dismantling of the treatment plant. The decommissioning phase will involve site clearance and dismantling works which will be limited in time and scale due to the light industrial nature of the Proposed Development. Dismantling works has the potential to lead to minor accidental emissions and release of potentially hazardous substances that can affect the quality of groundwater and/or soils, if left uncontrolled. Without mitigation this effect is considered to be a short-term, small adverse impact of **slight significance** on soils and groundwater.

Table 16.8: Proposed Development and Potential Construction Stage Effects

Predicted Impact	Receptor /Attribute	Attribute Importance	Magnitude	Significance
Soils and Geology				
Accidental Emissions and Release of Potentially Hazardous Substances				
During concrete pouring and use of chemicals during demolition and construction.	Predominantly Made Ground or deep well drained soils.	Made Ground - Low Limestone Tills - High	Small adverse	**Moderate/Slight**
Soil Erosion				
Excavations in Made Ground for foundations & site enabling works, provision of new footpath & reconfiguration of surface water drainage system.	Predominantly Made Ground or deep well drained soils.	Made Ground - Low. Limestone Tills - High	Small adverse	**Moderate/Slight**
Loss of Soils Reserves				
Site clearance works and excavations for foundations and reconfiguration of surface water drainage system.	Predominantly Made Ground or deep well drained soils.	Made Ground - Low. Limestone Tills - High	Negligible	**Imperceptible**
Potential for Encountering Contamination				
Site clearance and excavation works within the Made Ground.	Predominantly Made Ground	Medium-High	Small adverse	**Moderate/Slight**
Groundwater				
Accidental Emissions and Release of Potentially Hazardous Substances				
During concrete pouring and use of chemicals during demolition and construction.	Locally Important aquifer	Medium	Negligible	**Imperceptible**
Infiltration of Surface Runoff				
Silt laden runoff from exposed ground and soil stockpiles during site enabling works, excavations, materials storage for associated infrastructure requirements	Locally Important aquifer	Medium	Negligible	**Imperceptible**
Potential for Encountering Contamination				
Site clearance and excavation works within the Made Ground.	Locally Important aquifer	Medium	Negligible	**Imperceptible**

16.5 Cumulative Impact Assessment

A Cumulative Impact Assessment (CIA) has been undertaken for soils, geology and hydrogeology; see **Chapter 20 - Cumulative Effects.**

16.6 Interactions

Interactions between environmental topics with Land, Soil, Geology and Hydrogeology has been addressed in **Chapter 19 – Interactions Between the Environmental Factors.**

16.7 Mitigation Measures

16.7.1 Construction Phase

16.7.1.1 Accidental Emissions and Release of Potentially Hazardous Substances

Refer to **Section 14.7.1** of **Chapter 14 - Biodiversity** and **Section 15.8.1.2** of **Chapter 15 - Water** for the mitigation measures that will be implemented during construction to manage accidental emissions and release of potential hazardous substance.

16.7.1.2 Infiltration of Surface Runoff

Refer to **Section 14.7.1** of **Chapter 14 - Biodiversity** and **Section 15.8.1.1 of Chapter 15 - Water** for the mitigation measures that will be implemented to control surface water runoff.

16.7.1.3 Loss or Damage of Soil Reserve

- Subsoil removal is an unavoidable consequence of the construction works. A primary objective of the design of the works will be to minimise excavations and the volumes of soil to be removed.
- Limited volumes of waste arisings are anticipated as a result of the construction activities. Where surplus soil cannot be reused it will be segregated and removed off site for treatment, recycling or disposal at an authorised waste management facility off site. The Waste Management Plan will address the analysis of waste arisings, methods proposed for the prevention, reuse and recycling of wastes and material handling procedures.
- Ensuring that a CEMP is in place will mitigate any risks associated with the removal of superficial deposits thus reducing these impacts to an **imperceptible** level.

16.7.1.4 Potential for Encountering Contamination

The appointed contractor will be responsible for regular testing of excavated soils to monitor the suitability of the soil for reuse. The volume of soils excavated and stockpiled will be minor but if contamination is encountered suitable measures will be put in place to avoid mobilising the contamination based on best practice for contaminated land management. Samples of ground suspected of contamination will be tested for contamination by the appointed contractor during the ground investigation enabling works. The management of the small volume of surplus excavated material or temporarily stored material will be determined by the classification of the material and will be stored in such a manner as to prevent disturbance of any existing contamination that may be present in the material itself or at the site compound.

No groundwater contamination has been attributed to the contaminated soils that have been stored in the warehouse (warehouse proposed to house the HRW processing plant) for more than 15 years. In the event of the HRW being located in this warehouse, the whole building would be washed down and inspected. Any minor repairs will be undertaken, but currently it is not expected that any extra groundwater monitoring, outside the current regime, would be required.

16.7.2 Operational Phase

Mitigation measures proposed for the construction phase will be implemented for maintenance operations, where relevant.

The site already includes designed in measures including a hydrocarbon interceptor and monitoring of stormwater and foul water in accordance with the facility EPA IED licence. Foul water discharge must comply with the EPA IED Licence Emission Limit Values (ELVs). Consideration will be given as to whether any adjustment is required to these ELVs to manage wastewater from the HRW process.

No further operational phase mitigation measures are proposed.

16.7.3 Decommissioning Phase

Mitigation measures proposed for the construction phase will be implemented for decommissioning where relevant.

16.8 Residual Effects

The significance of all impacts identified in **Section 16.4** will be reduced to **imperceptible** with the implementation of the mitigation measures outlined in **Section 16.5**.

16.9 Monitoring

16.9.1 Construction Phase

16.9.1.1 Sediment Runoff

Refer to **Section 15.11.1.1** of **Chapter 15 - Water** for the measures proposed for the monitoring of sediment run off during the construction phase.

16.9.1.2 Groundwater Monitoring

The elements of the groundwater monitoring programme are as follows:

- 3 no. groundwater sampling locations 1 no. upgradient borehole and 2 no. downgradient boreholes in terms of groundwater flow at the site.
- The groundwater sampling locations are sampled in accordance with the industry standard protocols and guidelines prepared by the EPA. Samples are handled and transported in accordance with the same accepted protocols.
- The groundwater sampling locations are sampled at quarterly intervals and will continue to be so unless otherwise agreed with the Agency, to establish any potential effects on groundwater quality.
- The samples recovered from ground water sampling locations are analysed for the list of parameters given in the Industrial Emissions Directive. These parameters included pH, Electrical Conductivity, Arsenic, Mercury, MTBE, BTEX, PAH's and Mineral Oils.

The results of the analysis are collated, tabulated and reported including interpretation and comparison with the previous monitoring event's data. This information presented in the AER, which is also submitted to the EPA.

16.9.2 Operational Phase

Based on the conclusions of the impact assessment and residual effects, monitoring of soils or additional groundwater monitoring outside of the current groundwater monitoring programme is not considered necessary.

The site is regulated by an IED Licence monitored by the EPA. A review of the licence will be carried out to account for changes arising to the overall site on foot of the Proposed Development.

16.9.3 Decommissioning Phase

In the event of the facility closing down, groundwater monitoring will continue at quarterly intervals until a closure license has been issued by the EPA. After care and monitoring of the facility once it has closed down would be agreed as part of the closing license.

16.10 Schedule of Environmental Commitments

A summary of the environmental commitments, with regard to this chapter is set out at **Chapter 21 - Schedule of Environmental Commitments**.

16.11 Chapter References

CIRIA (2001) *Control of water pollution from construction sites - Guidance for consultants and contractors (C532).*

EC (2006) *Thematic Strategy for Soil Protection [SEC(2006)620] [SEC(2006)1165] /* COM/2006/0231 final.*

Enterprise Ireland (2017) *Best Practice Guide BPGCS005 – Oil Storage Guidelines .*

Environment Agency UK (2020) *Guidance on Land Contamination Risk Management (LCRM).*

Environment Agency UK (2004) *The Model Procedures for the Management of Land Contamination (CLR 11).*

EPA (2013) *Guidance on the Management of Contaminated Land and Groundwater at EPA Licensed Sites.*

EPA (2008) *A Framework for the Assessment of Groundwater-Dependent Terrestrial Ecosystems under the Water Framework Directive;*

EPA (2011) *Guidance on the Authorisation of Discharges to Groundwater;*

EPA (2022) *Guidelines on Information to be contained in Environmental Impact Assessment Reports;*

DoHPLG (2018-2021) *River Basin Management Plan for Ireland;*

Goldman, S.J., Jackson, K. and Bursztynsky, T.A. (1986) *Erosion and Sediment Control Handbook. McGraw-Hill.*

GSI (2004). *Dublin GWB: Summary of Initial Characterisation;*

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

IGI (2002) *Geology in Environmental Impact Statements – A Guide. Institute of Geologists of Ireland.*

IGSL (1985) *Report on Site Investigation for Saggart to Leixlip Trunk Watermain.*

NRA (2009) *Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes.*

NRA (2008) *Environmental Impact Assessment of National Road Schemes – A Practical Guide.*

NRA (2008) *Guidelines for the Crossing of Watercourses During the Construction of National Road Schemes.*

CHAPTER 17

MATERIAL ASSETS

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17 MATERIAL ASSETS

17.1 Introduction

This chapter assesses the impacts to Material Assets, waste and resources associated with the Proposed Development. Impacts to built services, land use, roads and waste management could arise during the construction, operational and decommissioning phases of the Proposed Development.

The Proposed Development has been examined to identify those that have the potential impacts to Material Assets. Where applicable, a series of suitable mitigation measures have been listed.

This chapter of the Environmental Impact Assessment Report (EIAR) identifies and describes the potential waste and resource impacts associated with the proposed Project in accordance with the EIA Directive (EU Directive 2011/92/EU as amended by Directive 2014/52/EU). The assessment examines the potential impacts during the construction and operational phases of the proposed Project. This chapter considers the waste likely to arise from the site demolition, construction and operation works. It outlines how any waste materials arising from the proposed Project will be managed in accordance with the principles of the waste hierarchy as outlined in the European Communities Revised Waste Framework Directive i.e., prevention, reduction, preparing for reuse, recycling, other recoveries, and, as the least preferred option, disposal (which includes landfilling and incineration without energy recovery). The chapter has also been prepared with and should be read in conjunction with the following chapters of the EIAR:

- **Chapter 4 - Project Description**
- **Chapter 5 - Construction Strategy**
- **Chapter 7 - Traffic and Transportation**
- **Chapter 10 – Climate**

17.2 Legislation, Policy, and Guidance

17.2.1 Legislation

The key legislation and guidance referenced in the preparation of the EIAR is outlined in **Chapter 1 - Introduction**. Specific to Material Assets, the principal legislation, policy, and guidance relevant to the assessment is set out in this section.

For the purposes of this chapter the effects on the current land use and property (both on site and the surrounds) and utilities have been assessed.

Material assets are defined within the EPA *Guidelines on the information to be contained in Environmental Impact Assessment Reports* (EPA, 2022) as "*Material assets is taken to mean built services and infrastructure. Traffic is included because in effect traffic consumes transport infrastructure. Sealing of agricultural land and effects on mining or quarrying potential come under the factors of land and soils.*" This is addressed in **Chapter 7 - Traffic and Transportation**. and **Chapter 16 - Soils, Geology and Hydrogeology**.

In accordance with the EPA *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (2022), waste management is also to be addressed a part of Material Assets. This chapter thus also outlines how materials and waste arising from the Proposed Development will be managed in accordance with the principles of the waste hierarchy as outlined in the European Waste Framework Directive (Directive 2008/98/EC as amended, including by Directive 2018/851/EU), as transposed into Irish Law by the European Communities (Waste Directive) Regulations 2011 (SI No. 126 of 2011), as amended by the European Union (Waste Directive) (Amendment) Regulations 2016 (SI No. 315 of 2016) and the European Union (Waste Directive) Regulations 2020 (SI No. 323 of 2020) i.e. prevention, reduction, preparing for reuse, recycling, other recoveries, and, as the least preferred option, disposal (which includes landfilling and incineration without energy recovery).

Any surplus excavated material will be removed off-site either as a waste or, where appropriate, as a by-product. Where the material is to be reused on another site as a by-product (not as a waste), this will be done in accordance with Article 27 of the European Communities (Waste Directive) Regulations 2011 (S.I. No. 126 of 2011) (as amended) and having regard for the Circular Economy and Miscellaneous Provisions Act 2022 and any such legislative requirements that may be required later.

If the material is deemed to be a waste, removal and reuse/recycling/recovery/disposal of the material will be carried out in accordance with the Waste Management Act 1996 (as amended), the Waste Management (Collection Permit) Regulations 2007 (S.I. No. 820 of 2007) (as amended) and the Waste Management (Facility Permit & Registration) Regulations 2007 (S.I. No. 821 of 2007) (as amended). Factors such as the volume of waste requiring management will dictate whether a Certificate of Registration (COR), permit or licence is required by the receiving facility.

Relevant European and national legislation is listed in **Section 17.12** of this document.

17.2.2 Policy and Guidance

Relevant policy and guidance documents that have informed the methodology and impact assessment are listed in **Section 17.12**.

17.2.3 Legislative and Policy Context

The principal objective of sustainable waste and resource management is to use material resources more efficiently, to re-use, recycle and recover material and to reduce the amount of waste requiring final disposal. The value of products, material and resources is maintained in the economy for as long as possible such that the generation of waste is minimised. To achieve resource efficiency there is a need to move from a traditional linear economy to a circular economy.

Where residual waste is generated, it should be dealt with in a way that follows the waste hierarchy, as illustrated in **Figure 17-1** and set out in the Waste Framework Directive 2008/98/EC. It is the intention that this would actively contribute to the economic, social, and environmental goals of sustainable development.

Figure 17-1: **European Waste Hierarchy**

Waste prevention is seen by the European Commission as the key factor in any waste management approach. If the arisings of waste can be reduced in the first place, or the use of dangerous substances in products reduced, then disposal automatically becomes simpler. Waste prevention is linked with improving manufacturing methods and influencing consumers to demand greener products and less packaging.

If waste prevention cannot be achieved, recovery of as many of the materials as possible should be encouraged. The European Commission has defined several specific 'waste streams' for priority attention, the aim being to reduce their overall environmental impact. This includes packaging waste, end-of-life vehicles, batteries, electrical and electronic waste. EU directives require Member States to introduce legislation on waste collection, reuse, recycling, and disposal of these waste streams.

Where possible, waste that cannot be recycled or reused should be recovered by incineration with energy recovery, with landfill or incineration without energy recovery used only as a last resort.

In March 2020, the European Commission adopted a new Circular Economy Action Plan - one of the main building blocks of the European Green Deal, Europe's new agenda for sustainable growth. The Circular Economy Action Plan identifies buildings and construction as a key area where there are opportunities for resource efficiency and circularity.

The Department of the Environment, Climate and Communications (DECC) published the Irish Waste Action Plan for a Circular Economy in September 2020. An illustration showing how a circular economy operates is included in the action plan and is reproduced in **Figure 17-2**. The Plan outlines the commitment in the new Programme for Government to implement a new National Waste Action Plan providing new waste policy and giving direction to waste planning and management in Ireland.

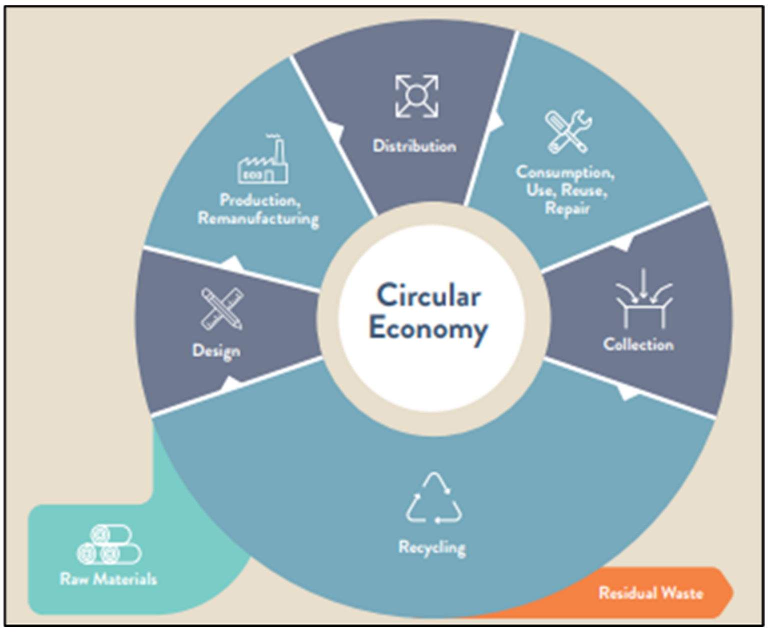

Figure 17-2: The Circular Economy (source: DEEC 2020)

The Irish Waste Action Plan for a Circular Economy contains over two hundred measures across various waste areas including Circular Economy, Municipal Waste, Consumer Protection and Citizen Engagement, Plastics and Packaging, Construction and Demolition, Textiles, Green Public Procurement and Waste Enforcement.

Waste management in Ireland therefore takes place in accordance with a defined policy and legislative framework. A review of relevant legislation, policy and best practice guidance has been undertaken to inform the impact assessment and recommended mitigation.

The key components of EU, national and local policy, legislation, and guidance relevant to the proposed Project are summarised as follows:

- Prevention of waste is the preferred option such that any surplus materials generated are reused within the proposed Project. This means that products, materials, and resources are maintained at their highest value in the economy for as long as possible, the generation of waste is minimised, and the principles of circular economy are implemented.
- Where construction waste is generated, it should be source separated to facilitate reuse, recycling and maximise diversion of waste from landfill.
- Where operational waste is generated, it should be source separated to facilitate reuse, recycling and maximise diversion, including biodegradable waste, from landfill.
- Where waste cannot be prevented, reused, or recycled it should be transported and disposed of in accordance with the Waste Management Acts 1996 to 2016 as amended; and
- Waste may only be transferred from site by a waste collection permit holder and delivered to an authorised waste facility, i.e., a facility which holds a Certificate of Registration, Waste Facility Permit or Waste Licence.

17.3 Methodology

To ensure a robust assessment, this chapter separately addresses matters of resource use, Material Assets, and waste management.

17.3.1 Assessment Approach

The scope of the evaluation of Material Assets and waste management is based on a detailed desktop review of relevant existing data sources, including online and published resources, guidance documents, legislation, information contained within the EIAR, information provided by the applicant and EPA, OSI (Tailte Éireann) and Local Authority information.

As part of the desktop study to inform the assessment, the following information sources have been consulted and reviewed in relation to the assessment of Material Assets:

- Planning data for the Proposed Development, accessed March 2023.
- South Dublin County Development Plan (SDCDP) 2022-2028 (SDCC, 2022), accessed April 2023.
- Aerial Photography, accessed April 2023.
- Google EarthTM imagery, accessed April 2023.
- Existing project mapping, accessed April 2023.
- Utility providers (ESB Networks, Irish Water and GNI), accessed May 2023.
- EPA Licence Database for Information on current and past licenced waste and industrial (IE/IPC) facilities and landfills. www.epa.ie/our-services/licensing/licencesearch Accessed May 2023.
- Eastern Midlands Region Waste Management Plan (EMRWMP) 2015-2021 (under review; new plan due in Q1 2024) National and regional measures to ensure the best overall outcome by applying the waste hierarchy to the management of waste streams. Accessed July 2023. www.mywaste.ie/pre-draft-consultation

All data sources were consulted in September 2023 except where otherwise stated.

In addition, information on resource use was obtained from a review of Chapter addressing Project Description: Construction Strategy, Land and Soils and Climate. Also, information on resource use was obtained from discussions with the project team.

Consideration is also given to the likelihood for significant effect arising, having regard to the nature of the receiving environment and the nature and extent of the proposed activities and development at the site.

No modelling software/tools were used in the resource and waste management and Material Assets assessment included in this EIAR.

17.3.2 Zone of Influence

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 assets because of the Proposed Development.

The assessment focused on Material Assets along the haulage route which includes junction 4 of the N7 national road, R120 regional road, College Road, and Grants Drive. The assessment also focuses on a larger study area including a 3 km area surrounding the site, which considers the land, roadways, housing, and commercial properties that may be impacted by associated traffic.

Land Use

There are no guidelines or criteria to define the zone of influence (ZoI) for the assessment of utilities. The ZoI has, therefore, been defined for the purpose of the assessment confines of the site.

Utilities

There are no guidelines or criteria to define the zone of influence (ZoI) for the assessment of utilities. The ZoI has therefore been defined for the purpose of the assessment as the area in which there is potential for direct and indirect impact on utilities because of the Proposed Development. To ensure a robust assessment and given the ecological sensitivities in the area, the ZoI for the utilities is set at 5 km from the Proposed Development.

Waste Management

The IEMA (2020) Guidelines propose two study areas for within which baseline data for materials and waste can be defined. The IEMA Guidelines state that the definition of a study area will depend on both the location of a development, the types of materials required and waste to be generated. Where materials and wastes can be sourced and managed locally, the study area may be proportionately / correspondingly small. Where sourcing and management of materials and waste is required at regional, national and/or international level, the study area would be likely to be defined accordingly. The two study areas are proposed by IEMA (2020) for materials and waste are:

1. *“The development study area comprises the scheme or project footprint (the red line boundary or limits of deviation), and any areas required for temporary access, site compounds, working platforms and other enabling activities.;”*
2. *“The expansive study area extends to the availability of construction materials, and capacity of waste management infrastructure and remaining landfill void, within a defined (for example, a mineral and waste planning) region, or – as appropriate – across multiple regions.”*

The ZoI for the resource and waste management element of the Proposed Development comprises of two functional areas described as follows:

- **Regionally:** The planning authority for the project area is South Dublin, which is part of the Eastern Midlands Region waste management region. The study area includes the location of feasible waste management facilities within the Eastern and Midlands Region that are suitable to accommodate waste materials arising from the construction, operation, and maintenance of the Proposed Development. It includes areas of availability of construction materials required to construct the main elements of the project.
- The **Proposed Development:** The materials/waste generated within the lands made available for the footprint of the Proposed Development - the construction footprint/project boundary.

17.3.3 Key Parameters for Assessment

The key parameters to be assessed in this chapter are utilities, resource use and waste emissions arising.

Sustainable Use of Resources

Sustainable use of resources for the proposed Project are considered in terms of their source, transport to site and use of sustainable materials.

Waste

Waste emissions arising from the proposed Project are considered in terms of quantities and types of materials arising, the disposal route to recycling and/or recovery and/or landfill and/or energy recovery.

Utilities and Services

Utilities and services located in proximity to the site were identified using:

- Mapping.
- Aerial photography.
- Site visit.
- Existing available information from site operator.
- Utility providers (ESB Networks, Irish Water and GNI).

Figure 17.3 outlines the existing water, electricity, telecoms, and gas network infrastructure.

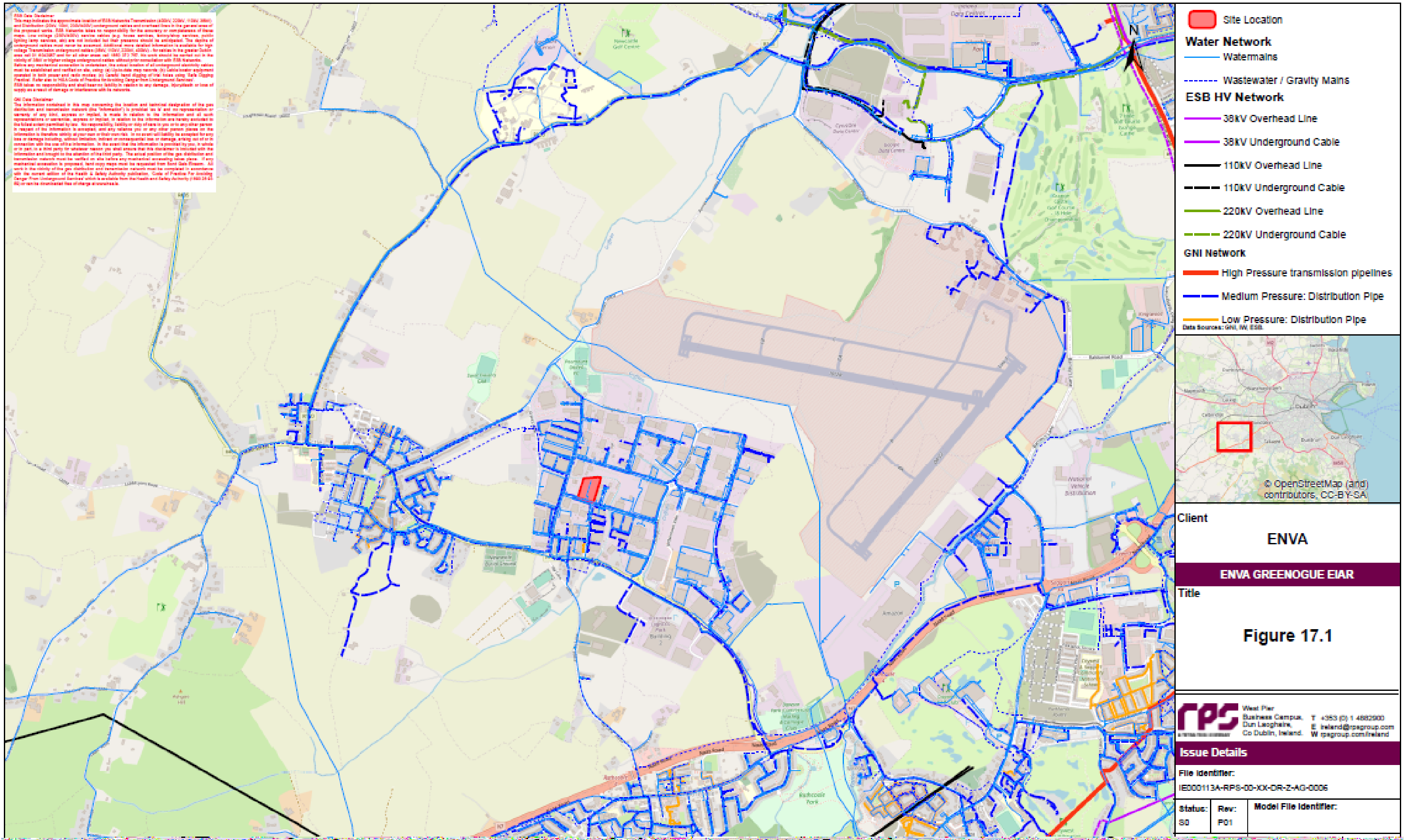

Figure 17-3: Utilities Map for the Area Surrounding the Proposed Development

17.3.4 Assessment Criteria and Significance of Waste

The criteria for determining the significance of the effects in terms of resources and waste management comprises a two-stage process which involves defining the magnitude of the impacts and the sensitivity of the receptors. This section describes the criteria applied within this chapter to assign values to the magnitude of potential impacts and the sensitivity of the receptors.

IEMA have developed guidance for the assessment of materials and waste in EIA to aid practitioners in assessing the impacts and effects of consuming materials, and from generating and disposing of waste, in a consistent manner. The IEMA Guide to Materials and Waste in Environmental Assessment (2020) sets out the relevant sensitive receptors in terms of Materials and Waste impacts:

- *"Materials are, in their own right, sensitive receptors. Consuming materials impacts upon their immediate and (in the case of primary materials) long-term availability; this results in the depletion of natural resources and adversely impacts the environment."*
- *"For waste, the sensitive receptor is landfill capacity. Landfill is a finite resource, and hence – through the ongoing disposal of waste – there is a continued need to expand existing and develop new facilities. This requires the depletion of natural and other resources which, in turn, adversely impacts the environment."*

For the purposes of this assessment the sensitive receptors for waste are based on the IEMA definitions and are those options at the base of the waste hierarchy i.e., landfill capacity as well as other less-desirable forms of waste management such as incineration. The sensitivity of landfill void capacity is, therefore, assessed by examining the current trends in landfill / incinerator capacity and depletion according to the criteria outlined in **Table 17.1** and **Table 17.2**. The estimated amounts of waste arising from the proposed Project during the construction and operational phases are then compared to the remaining void capacity. Further, the IEMA guide states: "… *it is considered that infrastructure that is used to process and recover arisings (and hence divert them from landfill) is a beneficiary of waste feedstock and has the ability to reduce adverse impacts. Such facilities are therefore an influencing factor in the reduction of the magnitude of waste impacts on landfill void capacity, rather than being a sensitive receptor in their own right."*

Table 17.1: Definition of Terms Relating to the Sensitivity of Receptors (IEMA, 2020)

Negligible	Low	Medium	High	Very High
*Across construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) inert and **non-hazardous** void capacity is expected to…*				
...remain unchanged or is expected to increase through a committed change in capacity.	...reduces minimally: by <1% as a result of wastes forecast	...reduces noticeably: by 1-5% as a result of wastes forecast.	...reduces considerably: by 6-10% as a result of wastes forecast.	... reduces very considerably (by >10%); end during construction or operation; is already known to be unavailable; or, would require new capacity or infrastructure to be put in place to meet forecast demand.
*Across the construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) **hazardous** void capacity is expected to…*				
...remains unchanged or is expected to increase through a committed change in capacity.	...reduces minimally: by <0.1% because of wastes forecast.	...reduces noticeably: by 0.1-0.5% because of wastes forecast.	...reduces considerably: by 0.5-1% because of wastes forecast.	...reduces very considerably (by >1%); end during construction or operation; is already known to be unavailable; or would require new capacity or infrastructure to be put in place to meet forecast demand.

The criteria for defining magnitude in this chapter is outlined in table following.

Table 17.2: Definition of Terms Relating to the Magnitude of an Impact (IEMA, 2020)

No Change	Negligible	Minor	Moderate	Major
Inert and non-hazardous waste				
Zero waste generation and disposal from the proposed Project.	Waste generated by the proposed Project will reduce regional* landfill void capacity baselineby <1%.	Waste generated by the proposed Project will reduce regional* landfill void capacity baseline# by 1-5%.	Waste generated by the proposed Project will reduce regional* landfill void capacity baseline# by 6-10%.	Waste generated by the proposed Project will reduce regional* landfill void capacity baseline# by >10%.
Hazardous waste				
Zero waste generation and disposal from the proposed Project.	Waste generated by the proposed Project will reduce national landfill void capacity baseline # by <0.1%	Waste generated by the proposed Project will reduce national landfill void capacity baseline # by <0.1-0.5%	Waste generated by the proposed Project will reduce national landfill void capacity baseline # by <0.5-1%	Waste generated by the proposed Project will reduce national landfill void capacity baseline # by >1%

**or where justified, national. # Forecast as the worst-case scenario, during a defined construction and/or operational phase.*

The significance of the effect on sensitive receptors is determined by correlating the magnitude of the impact and the sensitivity of the receptor, outlined in **Table 17.3**. Where a range of significance of effect is predicted, the final assessment for each impact is based upon expert judgement. The definitions for significance in **Table 17.3** are as defined in the EPA Guidelines (2022), with 'moderate' and 'major' using the EPA definitions of 'significant' and 'very significant' respectively. For the purposes of this assessment, any effects with a significance level of slight or less have been concluded to be not significant in terms of the assessment:

- ***Profound****: An effect which obliterates sensitive characteristics.*
- **Major**: An effect which, by its character, magnitude, duration, or intensity significantly alters most of a sensitive aspect of the environment.
- **Moderate**: An effect that alters the character of the environment in a manner that is consistent with existing and emerging baseline trends.
- **Slight**: An effect which causes noticeable changes in the character of the environment without affecting its sensitivities; and
- **Imperceptible**: An effect capable of measurement but without significant consequences.

Table 17.3: Matrix Used for the Assessment of the Significance of the Effect

		Magnitude of Impact				
		No Change	**Negligible**	**Minor**	**Moderate**	**Major**
Sensitivity of Receptor	**Negligible**	Imperceptible	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight
	Low	Imperceptible	Imperceptible or slight	Imperceptible or slight	Slight	Slight or moderate
	Medium	Imperceptible	Imperceptible or slight	Slight	Moderate	Moderate or major
	High	Imperceptible	Slight	Slight or moderate	Moderate or major	Major or Profound
	Very High	Imperceptible	Slight	Moderate or Major	Major or Profound	Profound

17.3.5 Capacities of Waste to Energy Facilities and Landfills

This section lists the capacities of waste to energy facilities and landfills in Ireland, as set out in Draft National Waste Management Plan for a Circular Economy. It does this to allow comparison of these capacities with the expected arisings from the proposed development as required by the IEMA methodology.

Table 17.4 shows capacities and throughput for thermal recovery facilities in Ireland.

Table 17.4: Thermal Recovery Facilities in Ireland

Authorised Waste-to-Energy Facilities	Authorised Annual Capacity (April 2022)	2020 Waste Accepted (tonnes)
Thermal Treatment		
Indaver Ireland Ltd. (W0167-03)	220,000	210,235
Dublin Waste to Energy Ltd. (W0232-01)	600,000	599,915
Thermal Treatment (Co-incineration)		
Breedon Cement Ireland Ltd. (Kinnegad) (P0487-07)	105,000	223,500 [1]
Irish Cement Ltd. (Platin) (P0030-06)	220,000 [2]	
Mannok Cement Ltd. (Ballyconnell) (P0378-03)	127,875	
Total	**1,272,875**	**1,033,650**
A further 401,000 tonnes of capacity is proposed, but not yet developed, for various thermal recovery facilities in Ireland.		

The table following summarises the active municipal waste landfill facilities operating in the State and the quantity of waste accepted in 2019. These landfills primarily accept residual non-hazardous waste from municipal sources (commercial and household customers), residues from thermal treatment (e.g., non-hazardous bottom ash, some of which is accepted for recovery) and processing of MSW (e.g., bio-stabilised organic fines). The continued demand for landfill for the disposal of residual municipal waste currently exceeds the available capacity on an annual basis.

Table 17.5: Operational Municipal Waste Landfills in Ireland

Facility	Location	Annual Licensed Disposal Capacity (tonnes)	Disposed 2019 (tonnes)
Operational Landfills accepting Municipal Waste			
Knockharley Landfill (W0146-02) [3]	Meath	175,000 [4]	65,992
Ballynagran Residual Landfill (W0165-02)	Wicklow	150,000 [5]	202,994
Drehid Waste Management Facility (W0201-03)	Kildare	120,000	111,454
Corranure Landfill (W0077-04)	Cavan	45,000 [6]	0

[1] Estimated waste treated at all consented cement plants combined in 2019 (equating to 64% of consented capacity in 2019).

[2] Note that this is the total SRF capacity available for coprocessing under P0030-06. A further 75,000 tonnes coprocessing capacity is available for other non-municipal waste streams including solvents, tyres, wood, plastics, etc.

[3] This facility is authorised by EPA to process Waste intake at the installation is limited to a total of 440,000 tonnes per annum. This includes a maximum total of 150,000 tonnes per mum of incinerator bottom ash (IBA) and a maximum total per annum of 5,000 tonnes of stable, non-reactive hazardous waste (SNRHW).

[4] Includes a further 25,000 tonnes C&D for recovery.

[5] Includes a further 28,000 tonnes C&D for recovery, restoration, and site development works.

[6] Corranure Landfill in Cavan only accepts material to complete cell capping.

17.4 Description of the Existing Environment (Baseline Scenario)

17.4.1 Baseline Environment

17.4.1.1 Land Use and Property

The site of the project is located at 402 Grants Drive, Greenogue Business Park, Greenogue, Rathcoole, Co. Dublin. The is located approximately 15 km southwest of Dublin City Centre and 1.7 km north of the N7 road. The site covers approximately 1.1 ha and is bound to the north by the Griffeen River, to the south by Grants Drive, to the east the site is bound by an adjoining commercial holding which is primarily used for vehicle parking. The west of the site is bound by 2 adjoining commercial holdings, primarily used for vehicle parking. A strip of landscaping, approximately 2 m wide, is maintained and managed along the inside perimeter of the overall site. The overall site comprises 2 main buildings (Building 1 & Building 2) within which house three waste treatment processes and an ancillary support office (Building 3) which is located to the south of Building 1. Enva is the sole occupant of the site, and controls access to the facility with security arrangements including gates, fencing and personnel monitoring.

Commercial and Industrial Development

The site is situated in the Greenogue Business Park, with a mixture of commercial, industrial and transport activities such as manufacturing companies, logistics, distribution centres, and research and development facilities. Greenogue Business Park also features amenities for the convenience of tenants, including on-site car parking, and cafes. In the immediate vicinity of the Enva facility (within the 5 km ZoI), the following operations are undertaken:

- Goggin's Transport Company Ltd., a logistics organisation operates immediately west.
- Star Window Furnishings Ltd. operates immediately east.
- Grants Drive is located immediately south, and the following businesses operate out of Unit 403 on the south side of Grants Drive: JAS Warehouse; Euro Oil; Mertonbury Ltd.; Goggin's transport with LPR; Dealer Marketing Limited; DC Poultry Ltd. and Linen Direct Limited.
- The following businesses operate out of Beechwood Building immediately north: Allied Point of Sale; ECON Polyurethanes; Finance Services; ICON Building Products; Total Event Rental; Freightspeed Auto Solutions and Dupan Bakery Equipment.

The site is approximately 2 km northeast of Casement Aerodrome, headquarters and airfield of the Irish Air Corps. Casement is primarily used for training military pilots as well as supporting the operations of the Irish Air Corps. It is also used for governmental and civilian purposes, such as air ambulance services and search and rescue missions. Peamount hospital is approx. 2.5 km to the north of the site along the R120 regional road.

There are sites near the Enva site that are EPA licenced. The following is a list of those sites:

- The Enva owned and operated facility trading as "Rilta Environmental Limited Waste Transfer Station" (W0185-01) Waste Licence, approximately 250 m north of the site.
- Pfizer Ireland Pharmaceuticals (P0652-01) Integrated Pollution Control Licence, approximately 4.2 km northeast of the site.
- BBALP Limited (P0275-01), Industrial Emissions Licence, approximately 2.5 km south of the site.
- Takeda Ireland Limited (P0693-01-02) Integrated Pollution Prevention Control Licence, approximately 4 km north of the site.

The sites located near the Enva site authorised by Local Authorities include the following:

- J C O'Reilly Hire Ltd. (NWCPO-21-12662-01), approximately 2.1 km south of the site.
- All Trades Response Group Ltd. (NWCPO-18-12076-01), approximately 270 m northeast of the site.
- Global Rail Services Ltd (NWCPO-16-11728-02), approximately 400 m north of the site.
- Richard Smith Transport, (NWCPO-01-00412-02), approximately 80 m east of the site.

- CSC Environmental Services Ltd (NWCPO-01-00594-03), approximately 500 m east of the site.
- L Behan Aggregates & Recycling Ltd. (NWCPO-13-11273-02), approximately 3.1 km southwest of the site.
- GMC Grab Hire Ltd (NWCPO-19-12272-01), approximately 3.1 km southwest of the site.

There are two B&Bs and three hotels within 2 km of the site. These include: Cornerpark Lodge Hotel; Golden Dawn B&B; Banner House B&B; CityArk Hotel; Citywest Hotel.

Settlements and Housing

The average population density is higher than the national average based on 2022 data*, and significantly lower than that of South Dublin. There are no residential properties within 300 m of the site. Most residential properties are centred in Newcastle, whose centre is 1km from the site. Two-storey, semi-detached housing is the dominant housing typology. Social and community services within 1 km include Greenogue equestrian centre, Peamount United Football Club and St. Finian's GAA club. Due to the existing land uses in the immediate environment of the site, there are limited amenities in the immediate vicinity.

Agriculture

Much of the area surrounding the Greenogue Business Park is utilised for agricultural practices including tillage and pasture. Numerous farm buildings are dispersed throughout the area, and it is evident from aerial photography that several farms are situated around the business park. The nearest farm which is approximately 300 m from the Proposed Development is tillage.

17.4.1.2 Utilities

Power and Fuel

The site is connected to Gas Network Ireland's (GNI) grid for natural gas and ESB Networks grid for electricity. Power and fuel at the site are currently derived from natural gas and electricity. In the mid-2020 a diesel burning boiler (used to generate process steam) was decommissioned and replaced by a natural gas fired boiler. As a result, process diesel consumption was eliminated, but natural gas increased by 209%. The increase in energy consumption is due to the addition of new plant equipment in 2018, this also aided in the increase of energy consumption in 2021 on site. The overall figure for electricity and natural gas is 5,478 GJ for 2022. This is a slight increase from 2021. The energy consumption on site is primarily due to the natural gas fired boiler (used to generate process steam) along with new plant equipment in packaging division. **Table 17.6** summarises heat and electricity used at the site in 2020, 2021 and 2022.

Table 17.6: Energy Used (Heat and Electricity)

Energy Used (GJ)	2022	2021	2020
Electricity	2,262	-	-
Fossil Fuels	3,216	5,168	2,554
Renewable Energy	0	0	0
Total Energy Used	5,478	5,168	2,554

Enva has set environmental goals it aims to achieve by the end of 2024. These goals aim to reduce environmental pollution and their impact on the environment. **Table 17.7** outlines the environmental goals set out by Enva in the Annual Environmental Report (AER) 2022.

Table 17.7: Enva Environmental Goals

Environmental Goal	Target Date	Progress
Convert over to water-based paints	Dec 2023	Water based paints are now in use for most paint types used in the Packaging Division for painting reconditioned 200-litre metal drums. Water based paint usage now accounts for approximately 75% of all on-site paint usage. Various water-based colour options are now available. This increases our capability to offer our customers more environmentally friendly options. Work is ongoing to achieve our target of 100% water-based paints. This is proving a significant challenge, but Enva is committed to this goal.
Reduce tonnage of domestic waste going to landfill – Carbon Footprint	In Progress	Increase tonnage of waste going to compost and recycling. Recycling tonnages increased by 31% in 2022 compared to 2021 figures. Compost figures decreased by 53% in 2022 compared to 2021 figures. Enva will continue to encourage staff to compost food waste in the designated bins on site
Decrease lighting, heating, and water consumption by 15% each based on 2020 consumption figures.	Dec 2024	There was an 4% decrease in electricity consumption when compared to 2021 data. The volume of natural gas consumed increased slightly by 16% in 2022, when compared to 2021 figures. In 2020 we installed a natural gas boiler to cope with the increased demand for gas, due to an increase in plant usage at our packaging division. This continues to be our main source of gas usage on site today. The volume of water consumed in 2022 decreased by 3% when compared to 2021 figures. This is credited to improved monitoring of water consumption and continuous improvements in process management.
Establish Energy Projects to ensure the efficient use of energy on site.	Dec 2024	Submetering Project – We installed sub meters on site (Dec 2022) to target areas that use a lot of energy. An energy performance indicator was implemented in 2022, in which we report monthly energy KPI's. (In progress). The replacement of all lights on site to LED was completed in May 2022. Installing photo-volt panels on roofs to provide clean renewable energy on site, planning completed, delivery due to commence in 2023. (Dec 2023). Motor & pumps to be upgraded focusing on the packaging & treatment Divisions. (Dec 2024). Use of re-processed fuel oil from Enva Portlaoise (W0184-02) to operate the steam raising boiler on site. (Dec 2024)

Telecommunications

There is an existing broadband and telecommunications connection at the Enva facility. There is also mobile phone coverage available at the site and in the local area.

Water

The site is already connected to Irish Water main. The volume of water used in 2022 decreased by 3% when compared to 2021 figures. This may be attributed to improved awareness and monitoring of water consumption on site. This decrease follows a 3.5% between 2021 and 2020. The previous reduction was attributed to a decrease of staff on site due to the Covid 19 pandemic. A lot of the workforce worked from home in 2021. **Table 17.8** summarises water consumption at the site in 2020, 2021 and 2022.

Table 17.8: Water Used 2020, 2021 and 2022

Water Used (m^3/annum)	2022	2021	2020
Public Supply	7,416	7,677	7,948
Recycled Wate	0	0	0
Rainwater	0	0	0
Total Water Used	7,416	7,677	7,948

Wastewater

Wastewater generated on-site is processed through on-site water treatment plant prior to being discharged to the local authority / Irish Water sewerage line, where it mixes with other wastewater before being processed at the county council wastewater treatment plant.

The option chosen is dependent upon the chemical makeup of the effluent and the resulting analysis of it by an on-site laboratory. Through a series of testing procedures, the on-site laboratory determines if the effluent is suitable for discharge (i.e., if on-site treatment processes have removed any harmful constituents of the effluent). Foul water discharge to sewer must comply with the ELVs and other requirements specified in the EPA IED Licence.

17.4.1.3 Waste Management

Condition 4.a of the current planning approval (Planning Application reference SD09A/0050) requires Enva to comply with the EPA IED licence. Condition 4.b of the planning approval (Reg. Ref. SD09A/0050) limits total site intake to 111,000 tonnes per annum.

The waste quantities authorised by the IED Licence, are amended by Technical Amendment A which changed the wording of Note 3 to read*: The limitation on individual hazardous and non-hazardous waste types may be varied with the agreement of the Agency subject to the total annual waste quantity remaining the same*.

The quantity of waste that may be accepted at the facility is dictated by the EPA IED Licence W0192-03 at 111,000 tonnes per annum.

Note four to this table in the IED Licence states that: *“Hazardous waste types as detailed in attachment H.1 after review application for this licence Reg number W 0192 -03 or as may be otherwise detailed in advance by the Agency.”* The hazardous waste types as detailed in attachment H.1.

Within Table A.2 of the IED Licence, the composition of “Other” is to be as specified in Attachment H1 of the IED Licence application. See **Appendix A** of this report for detail of these streams.

Table 17.9 sets out the permitted waste acceptance at the waste facility as set out in the IED Licence final determination (subsequently amended by Technical Amendment A).

Table 17.9: Waste Currently Permitted at the Enva Facility

Waste Type	Maximum Tonnes per annum	Enva Notes
Non-Hazardous Wastes		
Commercial Waste	500	The limitation on individual hazardous and non-hazardous waste types may be varied with the agreement of the Agency subject to the total annual waste quantity remaining the same.
Construction and Demolition Waste	500	
Industrial Sludge	1,000	
Other Industrial Waste	3,000	
Non-Hazardous Waste Total	5,000	
Hazardous Waste		
130503* Interceptor Sludges	10,000	The limitation on individual hazardous and non-hazardous waste types may be varied with the agreement of the Agency subject to the total annual waste quantity remaining the same.
160708* Wastes Containing Oil	2,000	
161001* Aqueous Liquid Waste Containing Dangerous Substances	1,500	
170503* Soil and Stones Containing Dangerous Substances	60,000	
170601* & 170605* Insulation Materials and Construction Materials Containing Asbestos	8100	
Other (Specified in Attachment H1 of the IED Licence Application)	24,400	
Hazardous Waste Total	106,000	
Grand Total	**111,000**	

Waste Accepted

Table 17.10 provides a summary of waste accepted in 2022 and the percentage increase or decrease on the previous year. It also details the tonnage of this waste accepted that was for disposal or recovery.

Table 17.10: Waste Accepted at the Enva Site in Greenogue in 2022

Type	Quantity (tonnes)	% Increase/ Decrease on Previous Year	% Recovery
Hazardous	39,499	10% increase	51%
Non-Hazardous	43,069	36% increase	47%
Inert	0	n/a	n/a
Total Tonnes	82,518	29% increase	

Waste Generated

Table 17-11 provides a summary of waste generated in 2022 and the percentage increase or decrease on the previous year.

Table 17.11: Waste Generated at the Enva Site in Greenogue in 2022

Type	Quantity (tonnes)	% Increase/ Decrease on Previous Year	% Recovery
Hazardous	8,902	10% increase	100%
Non-Hazardous	78,905	27% increase	30%
Inert	0	n/a	n/a
Total Tonnes	87,807	22% increase	

17.4.2 Evolution of the Environment in the Absence of the Proposed Development

The 'Do-Nothing' scenario refers to a scenario whereby the site would continue to operate as a hazardous waste transfer/recovery facility. This scenario will result in a neutral impact for Material Assets relative to base and a positive impact relative to the Proposed Development for the following reasons:

- The site would remain in its current use. The absence of any major construction on site would eliminate the potential for additional construction traffic.
- Existing traffic levels generated by site staff and vehicles transporting waste, including heavy and light goods vehicles, will remain unchanged and are not expected to have any impact on the local road network.
- The site will continue to operate as a hazardous waste transfer/recovery facility which hold an existing Industrial Emissions Licence (IED), processing and management of wastewater would remain unchanged.
- The consumption of water and electricity during the construction and operational phases of the Proposed Development would be reduced under the 'do-nothing' scenario.

In the absence of the Proposed Development, no significant change to the future baseline scenario is anticipated other than that which may occur due to other developments and potential replacement/additional equipment at the Enva facility. Due to the industrial nature of the site's location, it is possible that other surrounding facilities may propose similar operational or structural changes in the future which could result in increased construction, operational traffic.

17.5 Description of Likely Significant Effects

The following sections consider the potential impact of the Proposed Scheme on material assts during the construction and operational phases. The construction assessment considers potential impacts due to construction activities and construction-related traffic. The operational phase assesses the potential impact locally and regionally due to traffic emissions. The ‘Do-Nothing’ scenario outlining the likely evolution without the development has been presented in **Section 17.4**.

17.5.1 Construction Phase

The construction phase of the Proposed Development will consist of the installation of a prefabricated office located near the entrance to the facility. Construction of the new bulk trailer parking area, as well as construction of a clean bin storage shed adjacent to Building 1 and associated works. Construction works for the project is estimated to be c. 18 weeks.

The impacts of the Proposed development on Material Assets during the construction phase are set out below.

17.5.1.1 Land Use and Property

The Proposed Development complies with the statutory land use zoning of the business park. All construction works shall take place within an existing waste facility. No direct change in land use arises from the Proposed Development.

Given the existing land use in the immediate context of the site, construction of the Proposed Development is likely to have a temporary and **not significant'** effect on land use and settlement patterns.

17.5.1.2 Utilities

The site is currently connected to the gas, electrical and water grids as well as telecommunication and sewerage infrastructure. Modifications to the existing utility connections will be necessary to accommodate the HRW treatment equipment and the new office building. However, these works will not disrupt utility infrastructure.

Construction of the Proposed Development is likely to have a temporary and **not significant** effect on utilities.

Power and Fuel

Given the extent of works of the proposed works as outlined in **Section 17.5.1.4**, the construction phase will have a temporary and ’**imperceptible**’ effect on the national electrical and gas networks grids. Impacts may be reduced still further of processed fuel oil is used to generate heat in future.

Telecommunications

Adjustments to the current broadband and telecommunication infrastructure within the site will be required to connect them to the new office building to the network. The impact to telecommunications during the construction phase is temporary and ‘**not significant**.’

Water

During the construction phase, the site will require a water supply for dust suppression, wheel washing, canteen, shower, and toilet facilities. Water consumption and modification to water infrastructure during the construction phase is temporary and ‘**not significant**.’

Wastewater

During the construction phase of the project the processing and management of wastewater will remain unchanged. Adjustments to wastewater management infrastructure within the site will be required to accommodate HRW treatment equipment and bin washers. It is not anticipated that there will be an increase in the volume of wastewater being released during the construction phase. The impact to wastewater management infrastructure is temporary and **imperceptible and not significant**.

17.5.1.3 Roads and Traffic

During the construction phase there will a slight increase in the volume of traffic entering and exiting the site at peak times compared to the current baseline. This increase is attributed to the delivery of construction materials and the transfer of waste offsite. However, the impact of construction activities on the road network is '**imperceptible**.' Haulage routes and traffic impacts are described in **Chapter 7 - Traffic & Transportation,** which provides a more detailed assessment of the potential impacts that the Proposed Development will have on the traffic and transportation infrastructure relevant to the proposal.

During the construction phase, there may be a temporary, but **not significant effect** on the local road network due to increased activity at the site due to the construction of new buildings and installation of plant.

17.5.1.4 Waste Management

Waste will arise from construction and demolition activities. Demolition activities will comprise of the demolition of the existing single-story office (Building 3). This building comprises block and steel cladding with associated office fixtures, fittings, and services. This space will be replaced a 225 m^2 steel frame, steel-clad enclosure providing space for two bulk trailers. These trailers will be parked and loaded (via a conveyor system) with treated material for removal offsite. This enclosure will be approximately the same height (approximately 6 m) as the existing office.

A new office will be built at a new location inside and west of the main entrance to the facility. The existing weighbridge will remain in its current position.

A new, roofed, bin enclosure approximately 90 m^2 will be added to the west of building 1 for storage of clean bins.

An opening will be created in the wall between Building 1 and the bulking trailer loading structure to create an access point to allow a fully enclosed conveyer system to pass disinfected waste through to be deposited into the bulking up trailers.

An air emissions point (stack) will be added – the location and height are to be finalised, with an indicative maximum height of 2 m from roofline proposed.

A pedestrian walkway will be placed to link the car park to the office and to the marshalling yard. This will allow site pedestrian movement of staff.

Various internal works shall be undertaken within the existing divisions of Building 1, including the installation of plant.

Limited volumes of waste arisings anticipated for construction activities. The exact volumes will be defined during the design process for the planning application. Given the scale of the proposed changes to site, low levels of waste are expected to be generated during the construction and demolition. **Table 17.12** outlines the waste materials likely to be generated during the construction phase of the project.

Table 17.12: List of Anticipated Construction and Demolition Waste

Code	Description	Total (tonnes)
20 01 08	Biodegradable kitchen and canteen waste	
20 03 01	Mixed municipal waste	
17 01 01	Concrete	450
17 01 02	Bricks	19
17 02 01	Wood	
17 02 02	Glass	0.4
17 02 03	Plastic	
17 04 07	Mixed metals	11.4

Code	Description	Total (tonnes)
17 05 04	Soil and stone	150
17 08 02	Gypsum-based construction materials other than those mentioned in 17 08 01	3.4
17 09 04	Mixed construction and demolition waste other than those mentioned in 17 09 01, 17 09 02 and 17 09 03	
20 01 21*	Fluorescent tubes and other mercury-containing waste	0.003

Other materials that may arise include:

- Other construction and demolition wastes (including mixed wastes) containing hazardous substances.
- Insulation materials.
- WEEE streams.

All waste generated on site will be segregated at sourced and removed by a licensed waste collector(s). All wastes generated by the servicing and maintenance of plant will be immediately removed from site by the service contractor.

The significance of effects resulting from demolition and construction works are temporary and '**not significant**.'

17.5.2 Operational Phase

The impacts of the Proposed development on Material Assets during the operational phase are set out below.

17.5.2.1 Land Use and Property

During the operational phase of the Proposed Development the site will continue to operate as a hazardous waste transfer/recovery facility. Operations at the Proposed Development will continue to be confined to within the existing footprint of the site. The impact to land use is long term and **imperceptible.**

17.5.2.2 Utilities

Power and Fuel

The operational phase of the Proposed Development will generate an estimated additional onsite demand of 10,738 GJ per annum, excluding new office building operations. This represents a 196% of increase in onsite energy consumption.

However, of the 24,000 tonnes for treatment, only the 2,278 tonnes of HRW (this tonnage of HRW was exported in 2022 based on NTFSO data) is additional to the HRW currently being treated in Ireland. The remainder of the HRW (21,722 tonnes) is already being treated elsewhere in Ireland (all of it in Dublin). Only the share of energy required to treat the 2,278 tonnes will generate additional energy demand in Ireland.

Thus, the treatment of the 21,722 tonnes of HRW at the proposed Enva development will be met with a reduction in energy use between the other HRW management facilities in Dublin.

This proposed development is likely to have a long term and **imperceptible** impact on the national electrical and gas networks grids.

Power and fuel consumption will continue to be recorded and reported to the EPA in the applicant's Annual Environmental Report.

Telecommunications

During the operational phase, the implementation of HRW treatment equipment is likely to lead to an increase in telecommunications demand. This can be attributed to the need for connectivity to facilitate the control and monitoring functions. While this increase in demand is likely to have an impact on telecommunications performance, the increase is considered to be a long term and '**imperceptible**' effect.

Water

The average water consumption between 2020, 2021 and 2022 was 7,813 m^3. An additional water demand will be required during the operational phase – quantified at up to 7,178 m^3 per annum. The 92% increase in water consumption is attributed to the water-intensive plant and equipment required for treating HRW and the bins used for transportation. A continuous supply of steam is required to raise the temperature within the thermal treatment screw to decontaminate the shredded HRW during operation. The bin washers will be in constant use to meet the proposed demand of 24,000 tonnes of HRW. This also contributes to the high-water consumption during the operational phase.

As with the power and fuel mentioned above, a portion of the additional onsite water consumption is already being consumed elsewhere in Dublin. Only the share of water consumption associated with the incremental 2,278 tonnes may be new to Dublin.

The increase in water consumption during the operational phase is considered to be a long term and **not significant**.

Wastewater

Wastewater from the proposed activities will arise from the bin washers. This will contain a biodegradable detergent used to decontaminate the bins, which will minimise impact.

Wastewater produced by the Proposed Development during the operational phase will only be discharged to the sewer following confirmation that the discharge has met the requirements of the site's licence. Analysis, including independent analysis, of wastewater will be conducted in compliance with EPA licence specifications as required by the then current iteration of the IED licence.

An additional 20 m^3/day of wastewater will be generated at the site during the operational phase of the Proposed Development. The impact to the wastewater network is anticipated to be long term and **imperceptible**.

17.5.2.3 Roads and Traffic

During the operational phase, the volume of traffic to the site will increase by an additional 97 HV movements per day. These HV movements will be distributed across the day due to the continuous operation of the facility. This will result in a long-term impact for both local communities and the road network. This effect has been considered and classified by the Traffic chapter: overall, the effect on the road network is considered imperceptible, which is not significant in EIA terms.

The change from the current situation of export of HRW for thermal disinfection followed by re-import for waste-to-energy treatment will decrease the net miles travelled by the HRW.

17.5.2.4 Waste Management – Operational Waste

Operational waste will include ongoing waste streams from equipment maintenance and office and canteen operations. The HEPA filters will generate waste as spent filters, inside a housing, that will be managed in a specialist off-site management facility.

These waste streams are anticipated to be similar in type to those arising from equipment maintenance and office and canteen operations already generated onsite. A portion of these existing waste streams will be displaced by the new operations meaning that there will be a small incremental change in quality and quantity arising. These will be limited in quantity and will be segregated and managed by existing waste management practices operated by Enva.

Consequently, the impact of operational waste is long term and imperceptible.

17.5.2.5 Waste Management – Process Waste

Enva proposes to manage up to 24,000 tonnes of HRW per annum during the operational phase of the Proposed Development. The types of HRW proposed for management at the facility are set out in **Table 17.13**. The table also indicates whether the HRW is to be disinfected onsite or stored prior to transfer offsite. Some of the materials listed in **Table 17.13** are not authorised by the current EPA IED licence for the facility. A review of the IED licence by the EPA will be required to permit the proposed changes. The proportions of each type of HRW have not yet determined.

Table 17.13: List of Waste Types Proposed for Acceptance at the HRW Facility.

18 WASTES FROM HUMAN OR ANIMAL HEALTH CARE AND/ OR RELATED RESEARCH		Process Proposed	Approved in IED Licence? [7]
18 01 Wastes Natal Care, Diagnosis, Treatment, Human Diseases			
18 01 01	Sharps (except 18 01 03)	Disinfect	Yes
18 01 02	Body parts and organs including blood bags and blood preserves (except 18 01 03)	Transfer	No
18 01 03*	Wastes whose collection and disposal is subject to special requirements to prevent infection	Disinfect	No
18 01 04	Wastes whose collection and disposal is not subject to special requirements to prevent infection (for example dressings, plaster casts, linen, disposable clothing, and diapers)	Disinfect	No
18 01 06*	Chemicals consisting of or containing dangerous substances	Transfer	Yes
18 01 07	Chemicals other than those mentioned in 18 01 06	Transfer	No
18 01 08*	Cytotoxic and cytostatic medicines	Transfer	No
18 01 09	Medicines other than those mentioned in 18 01 08	Transfer	Yes
18 01 10*	Amalgam waste from dental care	Transfer	No
18 02 Wastes Research, Diagnosis, Treatment, or Prevention of Animal Disease			
18 02 01	Sharps except (18 02 02)	Disinfect	
18 02 02*	Wastes whose collection and disposal is subject to special requirements to prevent infection	Disinfect	Yes
18 02 03	Wastes whose collection and disposal is not subject to special requirements to prevent infection	Disinfect	No
18 02 05*	Chemicals consisting of or containing dangerous substances	Transfer	Yes
18 02 06	Chemicals other than those mentioned in 18 02 05	Transfer	Yes
18 02 07*	Cytotoxic and cytostatic medicines	Transfer	Yes
18 02 08	Medicines other than those mentioned in 18 02 07	Transfer	Yes

Enva does not propose to change the 111,000 gross annual tonnage intake limits. The annual intake of other waste at the facility will be reduced by 24,000 tonnes, meaning that the gross annual tonnage intake at the facility will remain unchanged at 111,000 tonnes.

The HRW wastes to be treated by the facility will be shredded and steam disinfected prior to transport offsite for thermal recovery. A second, small, stream of incoming HRW will be stored and bulked up for export to specialised treatment abroad.

There will be miscellaneous operational waste streams resulting from the maintenance of equipment on site, primarily quantities of oils and greases and other similar depleted consumables. These wastes will be removed offsite for appropriate management by an authorised waste collector.

[7] Approved means the stream is listed in Attachment H1 of Waste Licence review and is approved for Storage D15 & R13.

100% of the wastes accepted for disinfection will be moved offsite to energy recovery. Due to the bin emptying, shredding and steam application and agitation in the thermal screw, there will be a change in volume compared to the HRW intake. This volume reduction is estimated at 80%.

The gross annual tonnage intake of waste managed at the Proposed Development during the operational phase will remain constant because the 24,000 tonnes of HRW will displace 24,000 tonnes of contaminated soils that are currently managed at the facility.

The proposed facility will allow all the HRW to be treated within the state in keeping with the proximity principle.

The proposed development will generate an estimated 22,800 tonnes of treated HRW for thermal treatment with heat recovery. The remaining 1,200 tonnes will be managed by export for processing in other countries. It is important to note that none of this HRW is not new or "additional" to the current national treatment system. All of it is already being processed in-country through thermal treatment after undergoing heat disinfection either in Ireland or exported for disinfection and reimported for thermal treatment. This HRW, which is currently exported is estimated using NWCPO register data[8] in 2022 at 2,278 tonnes. These 2,278 tonnes are included in the 8,997 tonnes of '*Shredded and disinfected clinical waste. Non-hazardous flock*' imported to Ireland in 2022 and would not be additional to the thermal treatment capacity in Ireland.

This represents 0% range of the combined national 1,265,000 tonnes of national treatment capacity (820,000 tonnes of national Waste-to-Energy capacity[9] and the 445,000 tonnes capacity at operational municipal waste landfills in Ireland[10]). Using the IEMA assessment methodology set out in Section 17.3.4. "Across the construction and/or operation phases, the baseline/future baseline (i.e., without development) of regional (or where justified, national) landfill void (and WTE) capacity is expected to reduce by less than 1% as a result of wastes forecast". Long-term impact is less than 1% and is assessed as **imperceptible, not significant**.

17.5.3 Decommissioning Phase

Decommissioning of the facility following closure is expected to take approximately 8 weeks. It will include:

- Either the processing of any remaining untreated wastes onsite or the transfer of such wastes to other facilities for processing.
- Removal of all treated HRW and waste containers.
- The dismantling, disinfection, and removal of the treatment plant.
- Decontamination of the building if required.

Because of the light industrial nature of the proposed development, extensive or long-term aftercare is not expected to be required to allow the future reuse of the facility for other industrial or commercial activities.

The activities associated with decommissioning of this infrastructure would result in potential impacts on Material Assets similar in nature to those outlined for the construction phase, which are assessed to be temporary and '**not significant**.'

17.6 Cumulative Impact Assessment

A Cumulative Impact Assessment (CIA) has been undertaken for soils, geology, and hydrogeology; see **Chapter 20 - Cumulative Effects**

[8] www.dublincity.ie/residential/environment/national-tfs-office/ntfso-waste-shipment-registers

[9] Waste-to-Energy capacity additional to these 820,000 tonnes at Carranstown and Ringsend is available via co-incineration capacity at Cement facilities and additional treatment capacity may become available via extended capacity or new facilities.

[10] As listed in the Draft National Waste Management Plan for a Circular Economy.

17.7 Interactions

Interactions between environmental topics with Land, Soil, Geology and Hydrogeology has been addressed in **Chapter 19 – Interactions Between the Environmental Factors.**

17.8 Mitigation Measures

All mitigation measures implemented will be in accordance with the facility IED licence and the facility planning approval.

17.8.1 Construction Phase

The appointed Contractor will prepare a Resource and Waste Management Plan (RWMP) to deliver the mitigation presented in this chapter of the EIAR. The RWMP will be prepared in accordance with the Best Practice Guidelines for the Preparation of Resources & Waste Management Plans for Construction and Demolition Projects (EPA, 2021).

The RWMP will, as a minimum, address the following aspects of the Proposed Scheme:

- Analysis of the waste arising/material surpluses.
- Methods proposed for the prevention, reuse, and recycling of wastes.
- Material handling procedures.
- Proposals for disposal of waste at appropriately licensed facilities only.
- Proposals for education and a workforce and plan dissemination programme.

A Resource and Waste Manager will be nominated who will have overall responsibility for the implementation of all waste processes. In conjunction with this, a clear responsibility structure will be introduced for the construction staff/contractor to ensure issues encountered are raised at an appropriate level and acted upon. This is essential in ensuring that all waste is effectively managed.

The Contractor will be obliged to implement and maintain the measures and actions contained within in the EIAR during the construction phase. Measures to be implemented on site will include:

- **Source Segregation:** Source separating wastes into dry mixed recyclables, biodegradable, and residual wastes. Clear labelling of waste bins, containers, skip containers and storage areas, including waste stream colour coding.
- **Waste Auditing:** Good record keeping being conducted by the contractor including quantities (tonnes) and type of waste and materials leaving the site. The name, address and authorisation details of all facilities and locations to which waste and materials are delivered will be recorded along with the quantity of waste in tonnes delivered to each facility. Records will show material, which is recovered, and which is disposed.
- **Appropriate Storage:** Paints, sealants, and hazardous chemicals etc. will be stored in secure, bunded locations. Hazardous waste arisings will be separately stored and labelled, handled in accordance with the 'Carriage of Dangerous Goods by Road Regulations' and dispatched to an appropriately licensed sister Enva facility.
- **Efficient Removal:** Waste generated on site will be removed as soon as practicable following generation for delivery to an authorised waste facility.

Any waste arising from the construction phase of the Proposed Development will be deposited at an appropriate facility in accordance with the current waste policy. This is necessary so that all waste is disposed of to the best possible facility type to adhere to the circular economy, resource management opportunities and to reach the highest steps of the waste hierarchy.

If unforeseen waste or hazardous material is encountered during the Proposed Development, such as during demolition or excavation works, the appropriate authorities will be notified, and the material will be deposited at an appropriate waste facility.

Staff will be trained in how to identify contamination and how to manage it if encountered. Identification will include visual checks for unusual discolouration, oil sheens, anthropogenic materials, and checks for olfactory clues such as hydrocarbon or other odours. Suspect contaminated material will be sampled and analysed at laboratory as appropriate.

Records will be kept on the quantity nature/type and quality of all waste leaving the site.

By-product notifications (under Article 27 of the EC Waste Directive Regulations 2011) provide an opportunity for reuse of surplus clean soil and stone material arising from construction activity. At the time of construction, options for Article 27 by-product status or similar will be reviewed by South Dublin County Council (SDCC) and the appointed contractor, subject to waste management and planning requirements being fully met. Such opportunities offer potential to further reduce indirect effects of waste management resulting from the transport of materials from site, notably traffic, noise, and air emissions from transport-related haulage.

Exported materials, particularly soils, will be carefully managed to restrict the spread of invasive alien plant species (IAPS); refer to **Chapter 14 - Biodiversity** for further information on the management of IAPS.

A Construction Environmental Management Plan (CEMP) will be prepared. This document will include the mitigation from the EIAR including the specific mitigation applying to resource and waste management. Once appointed, the Contractor will take responsibility for the CEMP and delivery of the mitigation and management measures on the ground. The CEMP will have regard to the Best Practice Guidelines for the Preparation of Resources & Waste Management Plans for Construction and Demolition Projects (EPA, 2021). The contractor will be obliged to implement and maintain the measures and actions contained within in the EIAR during the construction phase.

17.8.2 Operational Phase

During the operational phase of the Proposed Development any potential for odour emissions from the proposed handling and processing of HRW will be appropriately managed in accordance with an odour management plan. Wastes will be delivered to the site in enclosed vehicles to ensure that there are no fugitive odours during transport and during waste reception. HRW will be transported in sealed UN-approved packaging in accordance with the ADR regulations. Process waste will be treated within the main Processing Building. This building will be managed to prevent fugitive emissions and all headspace air will be treated using appropriate technology such as scrubbers and carbon filter or biofilters and discharged through an appropriately designed emission stack. Further details of odour mitigation measures are described in **Chapter 10 - Air Quality and Climate.**

Mitigation measures relating to the local road network and site related haulage is identified in **Chapter 7 - Traffic and Transportation**.

Mitigation measures relating to noise management are identified in **Chapter 9 - Noise and Vibration**.

In addition, under the Commission Implementing Decision (EU) 2018/1147 of 10th August 2018 establishing best available techniques (BAT) conclusions for waste treatment, there are a series of best practice requirements that must also be implemented and imposed in the licence from the EPA. A number of these relate to Material Assets and these are listed as follows:

- BAT 11. BAT is to monitor the annual consumption of water, energy, and raw materials as well as the annual generation of residues and wastewater, with a frequency of at least once per year.
- BAT 19. To optimise water consumption, to reduce the volume of wastewater generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below:
    - Water management.
    - Water recirculation.
    - Impermeable surface.
    - Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels.
    - Roofing of waste storage and treatment areas.
    - Segregation of water streams.
    - Adequate drainage infrastructure.
    - Design and maintenance provisions to allow detection and repair of leaks.
    - Appropriate buffer storage capacity.

Enva has been granted planning permission to install photovoltaic solar panels at Building 2 adjacent to the Proposed Development. The large surface area of the roof provides an opportunity to help reduce the electricity demand during the operational phase. Due to the continuous 24-hour operation of the Proposed Development, and consequent energy demand, the site is very suitable for solar panels, as it can fully utilise the energy generated.

17.8.3 Decommissioning Phase

The activities associated with decommissioning of this infrastructure may result in potential impacts to Material Assets similar in nature to those outlined for the construction phase but on a much smaller scale. Mitigation measure as detailed for the construction phase will be implemented during the decommissioning phase to minimise any potential adverse effects to air quality and climate. As a result, the residual impact on Material Assets is assessed as temporary and **not significant**.

17.9 Residual Impact

The Proposed Development is required to help meet the HRW processing needs of our healthcare sector. The development will add a second supplier of HRW treatment services to the current single provider in Ireland, thereby further strengthening the resilience and preparedness of the system.

These are no predicted significant residual impacts on Material Assets during the construction, operational or decommissioning phases of the Proposed Development.

17.10 Monitoring

Monitoring is proposed for the construction and operational phases as set out in the following sections.

17.10.1 Construction Phase

Monitoring will be undertaken and recorded by the contractor as follows:

- Records will be kept of all truck movements relating to the removal of site clearance materials, and construction soil. The records will include quantity, nature/ type and quality of the material, and the excavation and disposal locations.
- Records will be kept on the quantity, nature/ type and quality of all waste leaving the construction site including individual waste and typical construction site waste.
- Segregation of construction site waste will be carefully monitored with waste audits taking place at regular intervals.

17.10.2 Operational Phase

No monitoring or reinstatement measures are recommended for Material Assets beyond the requirements for monitoring already established in the site's Licence.

17.10.3 Decommissioning Phase

The activities associated with decommissioning of this infrastructure would result in potential impacts on Material Assets is similar in nature to those outlined for the construction phase but on a much smaller scale. The same degree and types of monitoring undertaken for the construction phase will be conducted during the decommissioning phase.

17.11 Schedule of Environmental Commitments

A summary of the environmental commitments, with regard to this chapter is set out at **Chapter 21 - Schedule of Environmental Commitments**.

17.12 Chapter References

Waste and resource references

DECC (2021) *Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less'.*

DECC (2020) *A Waste Action Plan for a Circular Economy - Ireland's National Waste Policy 2020-2025. Dublin: Department of Environment, Climate and Communications*.

Eastern Midland Regional Waste Authority (2015), *Eastern Midlands Region Waste Management Plan 2015-2021.*

Draft National Waste Management Plan for a circular economy, to be published Q1 2024.

EPA (2021) *Best Practice Guidelines for the Preparation of Resources & Waste Management Plans for Construction and Demolition Projects.*

EPA (2021) *National Hazardous Waste Management Plan 2021-2027.*

European Commission (2020) *A new Circular Economy Action Plan for a cleaner and more competitive Europe.*

EIA references

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

Highways England (2019) Design Manual for Roads and Bridges (DMRB) – HE-DMRB-SE LA 110 – Material assets and waste (formerly IAN 153/11)

European and National Legislation

European Legislation

Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste.

Council Regulation (EU) 2017/997 of 8 June 2017 (Re. Hazardous Waste).

Commission Directive (EU) 2015/1127 amending Annex II to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives.

Commission Regulation (EU) No 1357/2014 of 18 December 2014 replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste and repealing certain Directives Text with EEA relevance.

EU Directive 2011/92/EU as amended by Directive 2014/52/EU on the assessment of the effects of certain public and private projects on the environment ("the EIA Directive").

EU Waste Framework Directive (2008/98/EC).

National Legislation

European Union (Waste Directive) Regulations 2020 (S.I. No. 323 of 2020).

European Union (Waste Directive) Regulations 2011, (S.I. No. 126 of 2011) (as amended, including the European Union (Waste Management) (Environmental Impact Assessment) Regulations 2020 (S.I. No. 130/2020)).

European Communities (Waste Directive) (No. 2) Regulations 2011 (S.I. No. 323 of 2011).

Waste Management Act 1996 (as amended and substituted).

Guidance

The Institute of Environmental Management & Assessment (IEMA) (March 2020) *Guide to: Materials and Waste in Environmental Impact Assessment.*

HAS and EPA (2017) *Guidance for the Management of Household Hazardous Waste at Civic Amenity Sites.*

EPA (2018) *Waste Classification – List of Waste and Determining if Waste is Hazardous or Non- Hazardous.*

Department of Environment and Heritage Local Government (2006) *Best Practice Guidelines on Preparation of Waste Management Plans for Construction and Demolition Projects.*

Construction Industry Research and Information Association (CIRIA 1997). *Document 133 Waste Minimisation in Construction.*

Policy

Relevant EU, national and local government policy documents that were reviewed and that have informed the assessment include:

Dublin City Development Plan 2022-2028.

South Dublin County Development Plan 2022-2028.

Eastern-Midlands Waste Regional Office – Eastern Midlands Region Waste Management Plan 2015-2021 (EMWRO, 2015) (To be replaced by National Waste Management Plan, currently in preparation, and due for publication Q1 2024).

DECC, 2021 *Department of the Environment, Climate and Communications - Whole of Government Circular Economy Strategy 2022-2023 'Living More, Using Less'*

EPA, 2021 *Environmental Protection Agency - National Hazardous Waste Management Plan 2021-2027.*

EPA, 2021 *Environmental Protection Agency - Circular Economy Programme 2021-2027 'The Driving Force for Ireland's Move to a Circular Economy'*

DECC, 2020 *Department of the Environment, Climate and Communications - Waste Action Plan for a Circular Economy: Ireland's National Waste Policy 2020-2025* (DECC, 2020).

EC, 2020 *European Commission - A new Circular Economy Action Plan - For a cleaner and more competitive Europe*.

CHAPTER 18

RISK OF MAJOR ACCIDENTS AND/OR DISASTERS

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Tables

18 RISK OF MAJOR ACCIDENTS AND/OR DISASTERS

18.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) presents the assessment of the expected effects deriving from the risks of major accidents and/or disasters. The assessment is considered under two main scenarios:

1. Where the Proposed Development may cause a major accident and/or disaster.
2. Where the Proposed Development is vulnerable to hazards resulting from a major accident and/or disaster.

Coordination with and input from the relevant Environmental Impact Assessment (EIA) experts and their respective discipline chapters of this EIAR and supporting documents has informed this chapter, including:

- **Chapter 4:** Description of the Proposed Development
- **Chapter 5:** Description of the Construction Phase
- **Chapter 6:** Consultation
- **Chapter 7:** Traffic and Transportation
- **Chapter 8:** Population
- **Chapter 9:** Noise and Vibration
- **Chapter 10:** Air Quality and Climate
- **Chapter 11:** Human Health
- **Chapter 14:** Biodiversity
- **Chapter 15:** Water
- **Chapter 16:** Land, Soils, Geology and Hydrogeology
- **Chapter 17:** Material Assets

18.2 Methodology

18.2.1 Legislation and Guidance

Article 3 of the EIA Directive (as amended) requires the assessment of expected effects of major accidents and/or disasters within EIA. Article 3(2) of the Directive states that the:

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

Annex IV (information for the EIAR) of the 2014 EIA Directive requires:

> "*A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned.*"

The 2014 EIA Directive also states:

> "I*n order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment.*"

The Major Accidents (Seveso III) Directive (2012/18/EU) is an EU Directive that seeks to prevent major industrial accidents involving dangerous substances and to limit the consequences of such accidents on people and the environment. In Ireland, the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the 'Control of Major Accident Hazards Involving Dangerous Substances (COMAH) Regulations'), implements the Seveso III Directive. The directive addresses Seveso sites, where hazardous substances are produced, used or stored. Any Seveso sites in proximity to the Proposed Development are considered in **Section 18.3**.

Consideration has been given to the following relevant policy documents in the preparation of this chapter:

- National Risk Assessment for Ireland 2021/2022 (National Risk Assessment 2023 is currently under draft).
- National Risk Assessment for Ireland 2020.
- South Dublin County Development Plan (SDCDP) 2022-2028.
- South Dublin County Council Climate Change Plan 2019-2024.
- South Dublin County Council: Major Emergency Plan 2016.

There is no specific national guidance with regard to the assessment of major accidents and/or disasters for the purposes of EIA however the topic is included in the more general national EIA guidance, notably:

- *Guidelines on the Information to be Contained in Environmental Impact Assessment Reports* (EPA, 2022) which state: "*To address unforeseen or unplanned effects the Directive further requires that the EIAR takes account of the vulnerability of the project to risk of major accidents and/or disasters relevant to the project concerned and that the EIAR therefore explicitly addresses this issue. The extent to which the effects of major accidents and / or disasters are examined in the EIAR should be guided by an assessment of the likelihood of their occurrence (risk).*" (section 3.7.3 of EPA, 2022)
- *Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment* (August 2018) which 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.*"
  - "*The vulnerability of the project to potential disasters/accidents, including the risk to the project of both disasters (e.g. flooding) and man-made disasters (e.g. technological disasters).*"

The Guidelines also require that an EIAR include: "… *the expected effects arising from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project. Where appropriate, the description of expected significant effects should include details of the preparedness for and proposed response to such emergencies.*"

In the absence of a specific approach in national guidance, the approach used to carry out the risk assessment for this EIAR is based on that outlined in the following UK publication:

- Institute of Environmental Management and Assessment (IEMA) Major Accidents and Disasters in EIA: A Primer (IEMA, 2020).
- A Framework for Major Emergency Management. Guidance Document, Department of Housing local Government and Heritage (Department of Housing, Local Government and Heritage, 2021).

18.2.2 Zone of Influence

For the purposes of the risk assessment, the study area includes the extent of the Zone of Influence (ZoI) as defined in each of the specialist **Chapters 7 – 17**. Consideration has also been given to sites, i.e., SEVESO sites, also known as COMAH establishments, that have potential for major accident hazard under the COMAH Regulations 2015 (S.I. No. 209 of 2015). Within the EIA Directive 2014/52/EU, the Proposed Development's potential to cause accidents and/or disasters focuses on the impact to human health, cultural heritage and the environment. Environmental receptors are identified as those listed within Article 3 of the EIA Directive.

18.2.3 Sources of Information to inform the Assessment

In addition to review of the chapters and assessments, information was also derived from a desktop review of existing studies and datasets as summarised in **Table 18.1**.

Table 18.1: Summary of Key Desktop Reports

Title	Source	Year
National Risk Assessment for Ireland 2021/2022	Irish Government	2021
SDCDP 2022-2028	South Dublin County Council	2022
South Dublin County Council's Climate Action Strategy 2019-2024	South Dublin County Council	2019
South Dublin County Council Major Emergency Plan 2016	South Dublin County Council	2016
GSI Spatial Resources Database	Geological Survey Ireland	2023

18.2.4 Key Parameters for Assessment

The assessment of potential for risk of major accident/disaster has been based on the design and activities associated with the construction and operational, decommissioning phases of the Proposed Development as described in detail in **Chapter 4: Description of the Proposed Development** and **Chapter 5: Description of the Construction Phase**.

As noted in **Section18.1**, the assessment considers the potential for the Proposed Development to cause a major accident and/or disaster and the potential for the Proposed Development to be vulnerable to hazards resulting in a major accident and/or disaster.

18.2.5 Assessment Criteria and Significance

This assessment broadly applies the approach set out in *Major Accidents and Disasters in EIA: A Primer* (IEMA, 2020). Unlike other assessments within the EIAR, the assessment does not deal with likely effects. The scope of this assessment focuses on potential sudden events of low likelihood, which may reasonably occur, resulting in major negative impacts on receptors. This approach directs the assessment to focus on "low likelihood but potentially high consequence events" such as a major spill, explosion, fire etc. Smaller incidents (spills, sediment loss etc.) are addressed elsewhere in this EIAR in the relevant topic chapters. This chapter focuses on major events only.

Additionally, other chapters of the EIAR, which typically apply the standard definitions provided within the EPA 2022 Guidelines, which describe 'significance' as "*…a concept that can have different meanings for different topics.*" In the context of Major Accidents and Disasters, the understanding of what constitutes a 'significant' effect or impact differs. The IEMA (2020) approach defines a "*significant environmental effect*" as one which "*could include the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration*" and this definition has been adopted for the purposes of this assessment.

18.2.5.1 Assessment Methodology

In accordance with the approach presented in the IEMA Primer (IEMA, 2020), this assessment follows three stages (screening, scoping, assessment) as follows:

Stage 1 Screening: The IEMA Primer (2020) states that "*during screening it should be sufficient to identify if a development has a vulnerability to major accidents and / or disasters and to consider whether a development could lead to a significant effect.*"

Stage 2 Scoping: Scoping is undertaken to determine in more detail whether there is potential for significant effects as a result of major accidents and/or disasters associated with the Proposed Development. If the Proposed Development is screened in for the assessment of impacts in relation to major accidents and/or disasters at Stage 1, Stage 2 aims to provide a more detailed determination as to whether there is potential for significant effects.

The IEMA Primer (2020) further states that the assessment of impacts in relation to major accidents and/or disasters may be scoped out if it can be shown that:

- "*There is no source-pathway-receptor linkage of a hazard that could trigger a major accident and/or disaster or potential for the scheme to lead to a significant environmental effect"*
- *"All possible major accidents and/or disasters are adequately covered elsewhere in the assessment or covered by existing design measures or compliance with legislation and best practice.*"

The Primer further notes that:

"*A major accidents and/or disasters assessment will be relevant to some developments more than others, and for many developments it is likely to be scoped out of the assessment*".

Stage 3 Assessment: The assessment stage provides further understanding on the likelihood of a risk event occurring and identifies the requirement for further mitigation. If hazard types are screened in at Stage 2, they are brought forward to Stage 3 for detailed consideration of the potential for significant impacts to occur. The following exercises are carried out in the Stage 3 Assessment:

- Setting out the baseline: Hazard identification and receptor tagging.
- Assessment:
  - Identifying reasonable worst-case impact.
  - Selecting the grouped risk events that need further assessment.
  - Understanding the likelihood of a risk event occurring.
  - Mitigation: Identifying the requirements for secondary mitigation.

18.2.5.2 Risk Classification Approach

Following the steps undertaken in Stage 1 and Stage 2, the potential risk of identified hazards brought forward to the Stage 3 assessment are then evaluated using criteria outlined in **Table 18.2** (likelihood of occurrence), **Table 18.3** (consequence of impact) and **Table 18.4** (risk assessment), which have been adapted from the following:

- A National Risk Assessment for Ireland 2021/22 (DoD, 2021).
- Major Accidents and Disasters in EIA: A Primer (IEMA 2020)

Table 18.2: Classification of Likelihood of Occurrence

Rating	Classification	Description
1	**Extremely Unlikely**	100 or more years between occurrences
2	**Very Unlikely**	51-100 years between occurrences
3	**Unlikely**	11-50 years between occurrences
4	**Likely**	1-10 years between occurrences
5	**Very Likely**	Ongoing/Less than one year between occurrences

Table 18.3: Consequence of Impact

Rating	Classification of Potential Impact (Department of Defence, 2021)	Significance of Effects (EPA, 2022)	Description
1	**Very Low Impact**	Slight	• **People:** Deaths less than 1 in 250,000 OR critical injuries/ illness less than 1 in 250,000 OR Serious injuries less than 1 in 100,000 OR minor injuries of the national population. • **Environment:** Simple, localised contamination only. • **Economic:** Up to 1% of national annual budget. • **Social:** Limited disruption to community.
2	**Low Impact**	Moderate	• **People:** Deaths greater than 1 in 250,000 people OR Critical injuries/illness greater than 1 in 250,000 OR Serious injuries greater than 1 in 1 100,000 of the national population. • **Environment:** Simple, regional contamination, effects of short duration. • **Economic:** Greater than 1% of the national annual budget. • **Social:** Community is functioning but with considerable inconvenience.
3	**Moderate**	Significant	• **People:** Deaths greater than 1 in 100,000 people OR Critical injuries/illness greater than 1 in 100,000 OR Serious injuries greater than 1 in 40,000 of the national population. • **Environment:** Heavy contamination, localised effects of extended duration. • **Economic:** Greater than 2% of the national annual budget. • **Social:** Community is functioning poorly.
4	**High Impact**	Very Significant	• **People:** Deaths greater than 1 in 40,000 people for OR Critical injuries/illness greater than 1 in 40,000 OR Serious injuries greater than 1 in 20,000 in the national population. • **Environment:** Heavy contamination, widespread effects of extended duration. • **Economic:** Greater than 4% of the national annual budget. • **Social:** Community only partially functioning.
5	**Very High Impact**	Profound	• **People:** Deaths greater than 1 in 20,000 people OR Critical injuries/illness greater than 1 in 20,000 of the national population. • **Environment:** Very heavy contamination, widespread effects of extended duration. • **Economic:** Greater than 8% of the national annual budget. • **Social:** Community is unable to function without significant support.

Hazards scoped in at Stage 2 are evaluated and categorised using a risk matrix, developed using the approach and information outlined in both the national risk assessment documents, provisions outlined in the IEMA Primer, and the Environmental Protection Agency (EPA) Guidelines. This matrix is used to determine the level of significance of each risk for each hazard scenario.

Risks have been grouped in three categories outlined in **Table 18.4**; red refers to 'High Risk' scenarios that have an assessment score between 15 and 25, orange refers to 'Medium Risk' scenarios that score between 8 and 12, and green refers to 'Low Risk' scenarios scoring between 1 and 6.

Table 18.4: Risk Matrix (IEMA, 2020)

		Consequences of Impacts				
Likelihood		1-Slight	2-Moderate	3-Significant	4- Very Significant	5-Profound
	5- Very Likely	5	10	15	20	25
	4-Likely	4	8	12	16	20
	3-Unlikely	3	6	9	12	16
	2-Very Unlikely	2	4	6	8	10
	1-Extremely Unlikely	1	2	3	4	5

18.3 Risk Assessment

18.3.1 Stage 1 – Screening

The Proposed Development has been screened in for the consideration of major accidents and/or disasters. This is based on the nature and scale of the Proposed Development, the construction and operational activities, and the sensitivity of the receiving environment. It is conceivable (although highly unlikely) that:

- The Proposed Development could result in a major accident and/or disaster.
- The Proposed Development could interact with other (non-project related) sources of hazards or events that could conceivably make it vulnerable to a major accident and/or disaster.
- Should an external (non-project related) major accident and/or disaster occur, the Proposed Development could conceivably exacerbate the risk of significant (negative) impacts associated with same.

18.3.2 Stage 2 – Scoping

A scoping exercise was undertaken to determine in more detail whether there was potential for significant effects as a result of major accidents and/or disasters associated with the Proposed Development. As a starting point, the broad categories in the National Risk Assessment for Ireland 2023 were considered (including strategic headings of Geopolitical, Economic, Societal, Environmental and Technological risks), along with project-specific risks and hazards noted throughout the specialist **Chapters 7 – 17** in the EIAR. Based on the long list of categories and events identified, a number were then scoped out for the following reasons:

a. The potential for the Proposed Development to cause a significant environmental impact was minimal.

b. There was sufficient mitigation considered through design and/or there is recognised minimum design standards which have been applied to the design element to consider the hazard not significant.

c. Hazards without a relevant environmental receptor were discounted as they lacked a source-pathway-receptor linkage.

d. The hazard was otherwise assessed within relevant sections of the EIAR and/or associated documentation.

Hazards considered to have potential significant environmental impact, with a source-pathway-receptor linkage to an environmental receptor were carried to Stage 3 – Assessment.

Table 18.5 and **Table 18.6** identify the sources of hazard for the Proposed Development at construction and operation phase respectively. The hazards that have potential to give rise to major accidents and disasters are considered for Stage 3 – Assessment and further mitigation as relevant in **Section 18.4**.

Table 18.5: Stage 2 – Scoping Assessment for Major Accidents and/or Disasters: Construction Phase

Hazard Type	Scoping Assessment	Potential Receptors	Scoping Outcome
Major Construction Road Traffic Accident	• There is not considered a risk from the Proposed Development to cause a major road traffic accident in Rathcoole town or along haulage routes during the construction phase as a result of minor increased levels of construction traffic and Heavy Good Vehicles (HGVs) on motorways, urban and rural roads. • The Proposed Development is not considered vulnerable to major construction road traffic accidents.	• Population • Human Health	**Scoped Out:** The increased level of traffic generated during the construction phase is deemed negligible and is unlikely to result in increased risks in major accidents or disasters during the construction phase (See **Chapter 7: Traffic and Transport**). Moreover, the traffic hazards at construction phase have been assessed and mitigated in **Chapter 7: Traffic and Transport**. The following mitigation has been included: • A Construction Traffic Management Plan (CTMP) will be prepared and prior to any construction taking place and adhered to throughout the course of the construction phase.
Impact on Critical Utilities / Infrastructure	Works will be required both directly to and in the vicinity of existing utilities. The Proposed Development includes for local telecommunication service adjustments, in order to connect the Proposed Development to telecommunication and broadband services. • Minor excavations have potential to cause damage to critical Infrastructure.	• Population • Human Health • Material Assets	**Scoped Out:** The hazards relating to critical utilities and infrastructure during the construction phase are detailed in **Chapter 17: Material Assets** and **Chapter 7: Traffic and Transport**. Due to the small scale of the Proposed Development power and water demand during the construction phase will be **not significant**, thus there will be no impact on the power and water demand of the surrounding area. Moreover, the increase in traffic during the construction phase will be **imperceptible**.
Accidents at Seveso Sites / COMAH Establishments	Brenntag Chemicals Distribution (Ireland) Ltd. is a COMAH establishment which distributes chemicals and ingredients. The Proposed Development is located in an existing business park with a range of business types in operation. The closest SEVESO site is Brenntag Chemicals Distribution (Ireland) Ltd, Unit 405, Greenogue Business Park, Rathcoole, Dublin 24, approx. 50m to the east of the Proposed Development. This is a lower tier premise. The proposed changes to the Enva facility do not have the potential to cause an accident at the SEVESO site, and there is no mitigation by design measures that can reduce the risk of an accident at a SEVESO sites. • The proposed changes to the Enva facility do not have the potential to cause an accident at the SEVESO site.	• Population • Air Quality • Human Health • Material Assets	**Scoped Out:** The proposed changes to the Enva facility does not have the potential to cause an accident at the SEVESO site. Adequate communication with sites in the vicinity (i.e., Brenntag Chemicals Distribution Ltd.), and for which they are within the consultation distance of during the construction phase.

Hazard Type	Scoping Assessment	Potential Receptors	Scoping Outcome
Release of Hazardous Material into Surface and Groundwater Bodies, Water Supplies and Sensitive Ecological Receptors	• There is a risk from the Proposed Development to cause an accident in terms of works near surface and groundwater bodies, and sensitive ecological receptors, during the construction phase. Works near water pose a risk to the environment, namely from accidental spillage or release of contaminated materials. • The magnitude of the effect on hydrology attributes resulting from accidental contamination of surface runoff would likely be **Slight Adverse** as it could affect the integrity of the localised Griffeen River. • The combination of a Large Adverse impact on a Medium Sensitivity attribute could result in a **significant** effect	• Biodiversity • Water	**Scoped Out:** The accidental spillages during construction phase have been assessed and mitigated through design. The following design measures has been included, where appropriate: • Throughout all stages of the construction phase the Contractor will ensure that all site personnel are made aware of the importance of the freshwater environments and the requirement to avoid pollution of all types. • Safe handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the Proposed Development. • In the event of accidental emissions contaminating surface water run-off from the site, the stop valve on the stormwater drainage network shall be closed, preventing discharge from the site into the Griffeen River. Contaminated water contained within the attenuation tank will be pumped out and removed from site for treatment. The attenuation tanks will be cleaned of any remaining contaminant residue. • Re-fuelling of equipment/ plant and the addition of hydraulic oil or lubricants to vehicles/ equipment shall only take place within designated areas and not within 1 m of any watercourse or surface water feature. Spill containment (i.e. drip trays) shall be used, and spill kits shall be kept available and used if necessary. • Only emergency breakdown maintenance shall be carried out on site. Emergency procedures and spill kits will be readily available and all relevant personnel will be familiar with emergency procedures. • Waste oils and hydraulic fluids shall be collected in leak-proof containers and taken to a licensed facility for disposal or recycling. – All hazardous materials on site shall be stored within secondary containment designed to retain at least 110% of the total storage contents. • Waste materials shall be stored in designated areas that are isolated from surface water drains and watercourses. Waste materials will be carefully managed including covering

Hazard Type	Scoping Assessment	Potential Receptors	Scoping Outcome
			stockpiles during rainfall. Skips shall be closed or covered to prevent materials being blown or washed away. • All machinery will be routinely checked to ensure no leakage of oils or lubricants occurs during the construction phase. Any spillages will be immediately contained, and the contaminated soil/material shall be taken to a licensed facility for disposal. • Wash down water from exposed aggregate surfaces, cast-in-place concrete and from concrete trucks will be trapped on-site to allow sediment to settle out before clarified water is released to a drain system. • Foul water discharge from the HRW process will be monitored in accordance with the facilities EPA IED License and must comply with the Emission Limit Values. This processed water will be discharged to sewer at the existing EPA-licensed foul sewer drainage point. • Stormwater will be captured and managed appropriately through a hydrocarbon interceptor prior to discharge. An appropriate emergency response will be in place for any accidental spillage of fuels, lubricants of hydraulic oils to ensure they are immediately contained. The measures in place include: • The Contractor will be required to have available on-site spill kits and hydrocarbon absorbent materials to deal with any accidental spillages. • In the event of an accidental spillage, containment in the event of accidental spillage of hydrocarbons or other pollutants will be conducted.
Flood Events	• The Proposed Development is not expected to contribute to the risk of flooding during construction as it will be constructed in an already hard standing area and is located outside of the fluvial flood extents for events up to and including the 0.1% Annual Exceedance Probability (AEP) flood event.	• Population • Human Health • Biodiversity • Water	**Scoped Out:** Flood risk at construction phase has been assessed within **Chapter 15 - Water.** It was assessed that the site has a low probability of flooding.
Extreme Cold Weather – Snow and Ice	• There is considered to be no risk from the Proposed Development to exacerbate cold weather events during the construction phase. • The Proposed Development is not considered vulnerable to cold weather events during construction.	• Population • Human Health	**Scoped Out:** With regard to extreme weather events such as severe snowfall, blizzard and hailstorm events, or prolonged cold weather events, the Proposed Development has been designed to operate under a range of environmental conditions in accordance with all relevant local authority.

Hazard Type	Scoping Assessment	Potential Receptors	Scoping Outcome
	• The Proposed Development has potential for the weather to have negative impacts onto the wellbeing and safety of the construction workers.		The proposed changes to development will be designed, constructed, and operated in accordance with the following health and safety regulations and guidelines (or as updated): • Safety, Health & Welfare at Work (Construction) Regulations 2006 to 2013. • Safety, Health, and Welfare at Work (Construction) (Amendment) Regulations 2019 (S.I. No. 129 of 2019). • Safety, Health & Welfare at Work Act 2005. • Safety, Health & Welfare at Work (General Application) Regulations 2007 to 2016. The measures included are sufficient to reduce the risks to appropriate levels for the nature of the Proposed Development.
Geopolitical	• There is considered to be no risk from the Proposed Development to cause or exacerbate geopolitical risks which could result in major accident and/or disaster. • The Proposed Development is not considered vulnerable to external geopolitical risks which could result in major accident and/or disaster.	• Population • Human Health • Material Assets	**Scoped Out:** No pathway for impact in terms of major accident and/or disaster identified for the Proposed Development.
Social / Economic	• There is considered to be no risk from the Proposed Development to exacerbate social/ economic risks. • The Proposed Development is not considered vulnerable to external social/economic risks which could result in major accident and/or disaster.	• Population • Human Health • Material Assets	**Scoped Out:** No pathway for impact in terms of major accident and/or disaster identified for the Proposed Development.
Aviation Collision	The Outer Public Safety Zone (PSZ) forms a triangle at each end of the Casement Aerodrome's runway measuring 2,000m in length and 100 m either side of the runway ends. The Proposed Development is located approximately over 850 m outside of this PSZ. From this distance, the Proposed Development will not interfere with aviation activities (South Dublin County Council, 2022) . • There is considered to be no risk from the Proposed Development to aviation strike risks.	• Human Health • Population • Material Assets	**Scoped Out:** No pathway for impact in terms of major accident and/or disaster identified for the Proposed Development.

Table 18.6: Stage 2 – Scoping Assessment for Major Accidents and/or Disasters: Operational Phase

Hazard Type	Scoping Assessment	Potential Receptors	Scoping Outcome
Major Road Traffic Accident	There is considered to be no risk from the Proposed Development in terms of major road traffic accidents during the operational phase. Across the network it is considered that the scale of magnitude is negligible to low due to the insignificant percentage impact of the operational staff vehicle trips compared to the background traffic flow levels.	• Population • Human Health	**Scoped Out:** No significant traffic and transport impacts are anticipated during the operational phase of the Proposed Development and as such, no mitigation measures are required. However, it is recommended that best practice measures to minimise operational traffic and transport impacts are implemented. The measures included are sufficient to reduce the risks to appropriate levels for the nature of the Proposed Development.
Impact on Critical Utilities / Infrastructure	The Proposed Development will have a high water and power demand where it is projected to experience a 92% and 196% increase, respectively from the baseline. From the 24,000 tonnes of HRW requiring treatment, only the 2,278 tonnes of HRW is additional to the HRW currently being treated in Ireland. The remainder of the HRW (21,722 tonnes) is already being treated elsewhere in Ireland. Only 2,278 tonnes of HRW will generate additional energy demand in Ireland. The net national increases in power and water are expected to be marginal. • The increase in water consumption during the operational phase is considered to be a long term and **not significant**. • The increase in telecommunication demand during the operational phase is considered to be a long term and **imperceptible**. • The increase in water consumption during the operational phase is considered to be a long term and **not significant**.	• Population • Human Health • Material Assets	**Scoped Out:** The hazards relating to critical utilities infrastructure during the operational phase have been detailed in **Chapter 17: Material Assets**. • Best Available Techniques (BAT) 11 will monitor the annual consumption of wate, energy and raw materials as well as the annual generation of residues and wastewater, with a frequency of at least once per year. • BAT 19. To optimise water consumption, to reduce the volume of wastewater generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques given below: – Water management. – Water recirculation. – Impermeable surface. – Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels. – Roofing of waste storage and treatment areas. – Segregation of water streams. – Adequate drainage infrastructure. – Design and maintenance provisions to allow detection and repair of leaks. – Appropriate buffer storage capacity. • Enva has been granted planning permission to install photovoltaic solar panels at Building 2 adjacent to the Proposed Development. The large surface area of the roof provides an opportunity to help reduce the electricity demand during the operational phase.

Hazard Type	Scoping Assessment	Potential Receptors	Scoping Outcome
			The measures included are sufficient to reduce the risks to appropriate levels for the nature of the Proposed Development.
Sewer flooding and overflow discharge events	• There is the potential for the population to be exposed to wastewater originating from the Proposed Development including aerosols during sewer flood and overflow discharge events.	• Human Health • Population • Material Assets	**Scoped Out:** Any exposure of the population would be brief and of a one-off frequency. Mitigation and design measures mean that there are very limited potential pathways by which any contaminants released by the Proposed Development could affect population health to a meaningful degree.
Accidents at Seveso Sites / COMAH Establishments	See 'Accidents at SEVESO Sites / COMAH Establishments' in **Table 18.5** for description of SEVESO site. • The Proposed Development is unlikely to exacerbate the effects of an accident occurring to the nearby COMAH establishment.	• Human Health • Population • Biodiversity • Material Assets	**Scoped Out:** The proposed changes to the Enva facility do not have the potential to cause an accident at the SEVESO site.
Release of Hazardous Material into Surface and Groundwater Bodies, Water Supplies and Sensitive Ecological Receptors	• The magnitude of the effect on hydrology attributes resulting from accidental contamination of surface runoff would likely be **Slight Adverse** as it could affect the integrity of the localised Griffeen River. • The combination of a Large Adverse effect on a Medium Sensitivity attribute could result in a **Significant effect**	• Population • Human Health • Biodiversity • Water • Land, Soil and Hydrogeology	**Scoped Out:** Potential for accidental spill of non-treated waste during processing is extremely unlikely. There will be no contaminated liquid HRW discharge. Where appropriate, measures will be put in place to ensure that this does not occur include the following: • Construction mitigation measures proposed will be implemented during the operation phase as appropriate. • Foul water discharge must currently comply with the EPA IED Licence Emission Limit Values (ELVs). • Best practice bin management will be in place through the operation phase and conveyor belts will be covered to contain any potential spills. Ongoing monitoring will ensure compliance with EPA licence conditions. • The petrol interceptor prior to discharge into the Griffeen River shall be routinely monitored, cleaned and replaced as necessary. • The discharge from the surface water attenuation tank to the Griffeen River is monitored on a regular basis. • In the unlikely event that a deterioration of surface water quality being discharged is detected, or if there is an external spillage on site, a cut-off valve at the outlet from the attenuation tank will activate either remotely or manually and all surface water will be contained in the attenuation tank. • In the event of continued spill, an emergency pumping from the attenuation tank to the foul water sewer can be provided. With these measures being put in place, the likelihood of accidental spills during the operation phase would be envisioned to be very

Hazard Type	Scoping Assessment	Potential Receptors	Scoping Outcome
			unlikely to extremely unlikely. In the unlikely event of a spill, the ERP will improve response time thus reducing the significance to imperceptible.
Flood Events	• The Proposed Development is not expected to exacerbate the risk of flooding during operation as it will be constructed in an already hard standing area and is located outside of the fluvial flood extents for events up to and including the 0.1% AEP flood event.	• Population • Human Health • Biodiversity • Water	**Scoped Out:** It is assessed that risk of flooding is unlikely (See **Table 18.5**).
Extreme Cold Weather – Snow and Ice	• There is considered to be no risk from the Proposed Development to exacerbate cold weather events during the construction phase. • The Proposed Development is not considered vulnerable to cold weather events during construction.	• Population • Human Health	**Scoped Out:** With regard to extreme weather events such as severe snowfall, blizzard and hailstorm events, or prolonged cold weather events, the Proposed Development has been designed to operate under a range of environmental conditions in accordance with all relevant local authorities.
Geopolitical	• There is considered to be no risk from the Proposed Development to cause or exacerbate geopolitical risks which could result in major accident and/or disaster. • The Proposed Development is not considered vulnerable to external geopolitical risks which could result in major accident and/or disaster.	• Population • Human Health • Material Assets	**Scoped Out:** No pathway for impact in terms of major accident and/or disaster identified for the Proposed Development.
Social / Economic	There is considered to be no risk from the Proposed Development to exacerbate social/ economic risks. • The Proposed Development is not considered vulnerable to external social/ economic risks which could result in major accident and/or disaster.	• Population • Human Health • Material Assets	**Scoped Out:** No pathway for impact in terms of major accident and/or disaster identified for the Proposed Development.
Aviation Collision	'Aviation Collision' in **Table 18.5**.	See 'Aviation Collision' in **Table 18.5**	**Scoped Out:** See 'Aviation Collision' in **Table 18.5**.

Table 18.7: Stage 2 – Scoping Assessment for Major Accidents and/or Disasters: Decommissioning Phase

Hazard Type	Scoping Assessment	Potential Receptors	Scoping Outcome
Major Road Traffic Accident	There is considered to be no risk from the Proposed Development to cause a major road traffic accident in Rathcoole town or along haulage routes during the decommission phase as a result of minor increased levels of traffic and HGVs on motorways, urban and rural roads. • The Proposed Development is not considered vulnerable to major construction road traffic accidents.	• Population • Human Health	**Scoped Out:** The increased level of traffic generated during the decommissioning phase is deemed **negligible** and is unlikely to result in increased risks of major accidents or disasters during the decommissioning phase (See **Chapter 7: Traffic and Transport**).
Impact on Critical Utilities / Infrastructure	There is not considered a risk from the Proposed Development to cause a major impact on Critical Utilities / Infrastructure due to the light industrial nature of the Proposed Development.	• Population • Human Health • Material Assets	**Scoped Out:** See 'Impact on Critical Utilities / Infrastructure' in **Table 18.5.** Risks to critical utilities are assessed as having the same effects as stated in the Construction Phase but on a smaller scale.
Accidents at Seveso Sites / COMAH Establishments	See 'Accidents at Seveso Sites / COMAH Establishments' in **Table 18.5** for description of Seveso site. • The proposed changes to the Enva facility do not have the potential to cause an accident at the Seveso site, and there is no mitigation by design measures that can reduce the risk of an accident at a Seveso site.	• Population • Air Quality • Human Health • Material Assets	**Scoped Out:**. The proposed changes to the Enva facility do not have the potential to cause an accident at the SEVESO site.
Release of Pollutants into Surface and Groundwater Bodies	• Dismantling works has the potential to lead to minor accidental emissions and release of potentially hazardous substances that can affect the quality of groundwater and/or soils, if left uncontrolled. • The magnitude of the effect on hydrology attributes resulting from accidental contamination of surface runoff would likely be **Moderate/Large Adverse** as it could affect the integrity of the localised Griffeen River. The combination of a Large Adverse impact on a Medium Sensitivity attribute could result in a **significant effect.**	• Human Health • Biodiversity • Water	**Scoped Out:** Mitigation measures proposed for the construction phase will be implemented for decommissioning where relevant (See **Table 18.5**). It is envisaged that these mitigation measures will be sufficient in reducing this effect to **imperceptible**, thus a major risk and/ or accident can be ruled out.
Extreme Cold Weather – Snow and Ice	• There is considered to be no risk from the Proposed Development to exacerbate cold weather events during the decommissioning phase. • The Proposed Development is not considered vulnerable to cold weather events during decommissioning phase.	• Population • Human Health	**Scoped Out:** See Extreme Cold Weather – Snow and Ice in **Table 18.5** for rationale. Decommissioning Phase pose the same risks, however, due to reduced timeframe compared to the Construction Phase envisaged, the significance of risk is reduced.

Hazard Type	Scoping Assessment	Potential Receptors	Scoping Outcome
	• The Proposed Development has potential for the weather to have negative impacts onto the wellbeing and safety of the construction workers.		
Geopolitical	• There is considered to be no risk from the Proposed Development to cause or exacerbate geopolitical risks which could result in major accident and/or disaster. • The Proposed Development is not considered vulnerable to external geopolitical risks which could result in major accident and/or disaster.	• Population • Human Health • Material Assets	**Scoped Out:** No pathway for impact in terms of major accident and/or disaster identified for the Proposed Development.
Social / Economic	There is considered to be no risk from the Proposed Development to exacerbate social/economic risks. • The Proposed Development is not considered vulnerable to external social/economic risks which could result in major accident and/or disaster.	• Population • Human Health • Material Assets	**Scoped Out:** No pathway for impact in terms of major accident and/or disaster identified for the Proposed Development.
Structure Collapse During Dismantling	• There is a risk from the Proposed Development to cause an accident in terms of building collapse during decommissioning phase. • The Proposed Development is not considered vulnerable due to the light industrial nature of the Proposed Development.	• Human Health • Biodiversity • Water	**Scoped Out:** Potential for collapse of Proposed Development during dismantling may result in minor to serious injuries to construction workers. Without mitigation measures implemented, it would be envisaged that **very low impacts** of **slight significance** would occur at the worst-case scenario. Health and safety measures, guidelines, and standards will be adhered to through the Decommissioning Phase.

18.3.3 Stage 3 – Assessment

Due to the scale of the Proposed Development coupled with the mitigation measures put in place, it can be concluded that it would be very to extremely unlikely for any risk of major accident and/or disaster to occur. Moreover, with the monitoring measures and ERP, response times to any accident would be remediated promptly, thus reducing significance to a **very low impact.**

18.4 Mitigation Measures

18.4.1 Construction Phase

To reduce the likelihood and significance of any major disasters occurring as a result of the Proposed Development, the following measures will be put in place:

18.4.1.1 Road Traffic Accident

See **Chapter 7 – Traffic and Transport** for mitigation measures for risks of road traffic accidents.

18.4.1.2 Accidental Spillage

Refer to construction mitigation measures given in **Chapter 14 – Biodiversity** and **Chapter 15 - Water** for the management of accidental emissions and release of potential hazardous substance.

18.4.1.3 Extreme Cold Weather

The legislation will be adhered to includes:

- Safety, Health & Welfare at Work (Construction) Regulations 2006 to 2013.
- Safety, Health, and Welfare at Work (Construction) (Amendment) Regulations 2019 (S.I. No. 129 of 2019).
- Safety, Health & Welfare at Work Act 2005.
- Safety, Health & Welfare at Work (General Application) Regulations 2007 to 2016.

18.4.2 Operational Phase

18.4.2.1 Critical Utilities / Infrastructure

Refer to **Section 17.9.2** of **Chapter 17 – Material Assets** for the mitigation measures that will be implemented during operational phase to manage disturbance to critical utilities and infrastructure.

18.4.2.2 Accidental Spillage

Refer to construction mitigation measures given in **Chapter 14 – Biodiversity, Chapter 15 - Water** and **Chapter 16 – Land, Soil, Geology and Hydrogeology** for the management of accidental emissions and release of potential hazardous substance.

18.4.3 Decommissioning Phase

Refer to **Chapter 15 – Water** and **Chapter 17 – Material Assets** for the mitigation measures that will be implemented during operational phase to manage disturbance to critical utilities and infrastructure.

18.5 Residual Effects

Following mitigation measures, it's predicted that the risk of major accidents or disasters arising as a result of the Proposed Development will be very unlikely to extremely unlikely across all of the phases. If they were to occur, they would impose **very low impacts** and would be short-term in nature. The Emergency Response Plan will improve response times and so limiting the magnitude of the potential impact.

18.6 Monitoring

18.6.1 Construction Phase

Refer to and **Chapter 15: Water** and **Chapter 16 – Land, Soil, Geology and Hydrogeology** for the monitoring measures that will be implemented during construction.

18.6.2 Operational Phase

Refer to **Chapter 16 – Land, Soil, Geology and Hydrogeology** for the monitoring measures that will be implemented during construction.

18.6.3 Decommissioning Phase

Refer to and **Chapter 16 – Land, Soil, Geology and Hydrogeology** for the monitoring measures that will be implemented during construction.

18.7 References

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CHAPTER 19
INTERACTIONS BETWEEN ENVIRONMENTAL FACTORS

Contents

Tables

19 INTERACTIONS BETWEEN THE ENVIRONMENTAL FACTORS

19.1 Introduction

Close coordination and discussion between the wider Environmental Impact Assessment (EIA) competent experts has informed the assessment of interactions of the individual environmental factors as described in **Chapters 7 – 17.** This chapter aims to ensure that interactions are identified and adequately assessed and, where necessary, additional mitigation proposed.

19.2 Methodology

19.2.1 Legislation, Policy, and Guidance

19.2.1.1 Legislation

The consideration of interactions derives from the provisions of the EIA Directive 2011/92/EU as amended by Directive 2014/52/EU ('the EIA Directive'). Article 3(1)(e) of the EIA Directive requires, inter alia, that the EIAR shall identify, describe, and assess in an appropriate manner, the direct and indirect significant effects of a project **including the interaction of environmental factors**.

19.2.1.2 Policy

There is no specific policy in relation to the consideration of interactions between environmental factors. Relevant policy for each environmental topic is set out in the policy sections of **Chapters 7 - 17**.

19.2.1.3 Guidance

The methodology and associated impact assessment has had regard to the general guidance regarding the undertaking of an EIA (as presented in **Section 1.5.1** of **Chapter 1 - Introduction**) and the following topic-specific guidance on interactions:

- Guidelines on the information to be Contained in Environmental Impact Assessment Reports (EPA, 2022); and
- Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions European Commission, (EC, 1999).

The EIAR coordinator has facilitated data exchange and the subsequent assessment reviews by the relevant competent experts to inform the assessment of interaction of effects. This was undertaken throughout the impact assessment process.

19.2.2 Zone of Influence

The study area is defined by the zones of influences (ZoI) of each of the individual environmental topic assessments, which are set out in the relevant topic EIAR **Chapters 7 - 17**.

19.2.3 Assessment Approach

The assessment approach included:

- Identification of the potential for interactions between different environmental factors /topic areas which form part of the EIA over the life cycle of the Proposed Development in a matrix format, including consideration of cumulative effects. The determination of interactions included consultation between the designers, environmental competent experts, and EIA coordinator. It also considers the potential for mitigation measures prescribed in respect of one particular environmental factor to give rise to unintended negative impacts in respect of one or more other factor(s), as appropriate; and
- Preparation of a summary of the interactions between different environmental topics which have been identified and addressed in this EIAR.

19.3 Description of Likely Significant Effect

19.3.1 Interactions Matrix

The potential impact interactions between the environmental factors/ topic areas are identified in **Table 19-1**. The effects matrix identifies the factors in the left-hand column, which have the potential to impact on other factors listed in the top row of the matrix. Where a tick ('✓') is present, this indicates that the Proposed Development has the potential to result in an interaction between the two environmental factors. Where there is no potential for an interaction between factors, this is indicated by a hyphen '–' in the matrix. 'C' denotes the construction phase, and 'O' denotes the operational phase and D demotes the decommissioning phase of the Proposed Development.

The purpose of the matrix is to identify the likely interactive effects of significance. A description of the interactive effect is provided in **Section 19.3.2**, along with a reference to where the assessment has been completed in **Chapters 7 - 17**.

Table 19.1: Interactive Effects Summary Matrix

	Traffic & Transport			Population			Noise & Vibration			Air Quality & Climate			Human Health			Landscape & Visual			Cultural Heritage			Biodiversity			Water			Land, Soils, Geology & Hydrogeology			Material Assets		
	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D	C	O	D
Traffic & Transport																																	
Population	✓	✓	✓																														
Noise & Vibration	✓	✓	✓	✓	✓	✓																											
Air Quality & Climate	✓	✓	✓	✓	✓	✓	-	-	-																								
Human Health	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓																					
Landscape & Visual	-	-	-	✓	✓	✓	-	-	-	-	-	-	-	-	-																		
Cultural Heritage	-	-	-	✓	-	✓	-	-	-	-	-	-	-	-	-	-	-	-															
Biodiversity	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-												
Water	-	-	-	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓									
Land, Soils, Geology & Hydrogeology	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓						
Material Assets	✓	✓	✓	-	-	-	✓	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓			

Note: *'C' denotes construction phase, 'O' denotes operational phase and 'D' denotes decommissioning phase.*

19.3.2 Description of Interactions

19.3.2.1 Traffic and Transport

As identified in **Table 19.1**, interactions between Traffic and Transport and other environmental factors include:

Traffic and Transport and Population

During the construction phase there is the potential for impacts from Traffic and Transport on Population due to the addition of construction vehicles entering (48 no.) and exiting (48 no.) the site daily (See **Section 7.4.1**). Any effects on population from Traffic and Transport from the construction phase will be temporary and any effects will be **imperceptible**. No direct or indirect effect has been identified which will impact on the enjoyment of residences or community amenities by the local population arising from the Proposed Development.

The Proposed Development is expected to generate up to an additional 97 no. vehicle movements during a typical day during the Operational Phase. As the development is located in an existing business park there are no predicted direct effects on residential properties. The additional traffic associated with the Proposed Development will have a **negligible effect** on existing residential amenity. Any impact on people's enjoyment of their homes will be **imperceptible**.

Population will also interact with Traffic and Transport during the decommissioning phase. The activities associated with decommissioning of this infrastructure would result in potential impacts on Traffic and Transport similar in nature to those outlined for the construction phase but on a much smaller scale and therefore **no significant effects** are anticipated.

Traffic and Transport and Noise and Vibration

The generation of traffic during all phases of the Proposed Development has the potential to result in noise and vibration as a result of traffic increases on the local road network and vehicular movements. The effects of Noise and Vibration as a result of Traffic and Transportation have been assessed in **Chapter 9 - Noise and Vibration**.

For the operational phase, when the predicted additional traffic flow from the Proposed Development is added to the existing traffic flow, noise level shows a negligible increase (< 1 dB) in predicted traffic noise levels from the R120. Overall, the impact of off-site traffic noise on the nearest Noise Sensitive Locations is assessed to be **imperceptible**.

The impact of the facility's decommissioning phase on the nearest Noise Sensitive Locations is assessed to be **not significant**.

Traffic and Transport and Air Quality and Climate

The generation of traffic during all phases of the Proposed Development has the potential to emit emissions to the atmosphere. The effects of transport emissions on Air Quality and Climate during all phases of the Proposed Development have been assessed in **Chapter 10 - Air Quality and Climate**.

Overall, the temporary effect of Traffic and Transport on the local road network during the construction phase is i**mperceptible**.

During the operational phase there will a minor increase of traffic volumes entering and exiting the site at peak times compared to the current baseline. The effect on the road network is considered to **imperceptible**.

The activities associated with decommissioning of this infrastructure would result in potential impacts on air quality and climate similar in nature to those outlined for the construction phase but on a much smaller scale.

Traffic and Transport and Material Assets

The traffic movements to transfer waste offsite have been included in the traffic volumes and considered as part of the Traffic Impact Assessment (**Chapter 7 - Traffic and Transportation**).

During the construction phase there will a slight increase in the volume of traffic entering and exiting the site at peak times compared to the current baseline. This increase is attributed to the delivery of construction materials and the transfer of waste offsite. However, the impact of construction activities on the road network is **imperceptible**.

It is likely that there will be a minimal change to traffic volumes due to vehicles entering and exiting the site whilst the site is operational. Deliveries to the Proposed Development will be distributed across the day. This effect has been classified by **Chapter 7 - Traffic and Transport**. In addition, the removal of the export for thermal disinfection followed by re-import for waste-to-energy treatment will reduce net miles travelled by the HRW.

The activities associated with decommissioning of this infrastructure would result in potential impacts on Material Assets similar in nature to those outlined for the construction phase, which are assessed to be temporary and **not significant.**

19.3.2.2 Population

As identified in **Table 19.1**, interactions between Population and other environmental factors are set out below.

Population and Traffic and Transport

See **Section 19.3.2.1** above for a description of the interactions between Population and Traffic and Transportation.

Population and Noise and Vibration

Overall, the impact of the proposed construction works on the nearest Noise Sensitive Locations is assessed as **not significant**. During the operational phase the main sources of noise include the shredder and the blast cooler and the impact on the nearest NSL is deemed as **not significant**.

Population and Air Quality and Climate

The temporary effect on the local road network during the construction and decommissioning phase is deemed to be i**mperceptible**. Air quality impacts from the Proposed Development are also classed as **negligible**. At the operational phase of the Proposed Development, any impact on people's enjoyment of their homes will be **imperceptible**.

Population and Landscape and Visual

Chapter 12 – Landscape and Visual concluded that there will be no significant effect on landscapes, views or visual receptors during the construction, operational and decommissioning phases of the Proposed Development. There will no significant interaction with the population.

Population and Cultural Heritage

As per **Chapter 13 – Cultural Heritage**, the Proposed Development will have no significant effect on cultural heritage and there will thus be no interaction between Cultural Heritage and Population.

Population and Water

In the event of a period of high intensity rainfall, there is a potential for short-term effects on water quality. However, as concluded in **Section 19.3.2.5,** it is not expected that the combination of effects would interact in a way that would impact on population.

19.3.2.3 Noise and Vibration

As identified in **Table 19.1**, interactions between Noise and Vibration and other environmental factors include the following.

Noise and Vibration and Traffic and Transport

See **Section 19.3.2.1** above for a description of the interactions between Noise and Vibration and Traffic and Transportation.

Noise and Vibration and Population

See **Section 19.3.2.2** above for a description of the interactions between Population and Noise and Vibration.

Noise and Vibration and Biodiversity

There is potential for interactions between Noise and Vibration and Biodiversity during the construction and decommissioning phases, related to excavations and earthworks, the movement of vehicles and construction materials, operation of plant and machinery and presence of construction staff on site. There is also potential for disturbance from noise and vibration arising from operational activities. Such noise and vibration could result in disturbance to fauna in the areas within, and in proximity to the Proposed Development's boundary, including otters, birds, and bats. However, the assessment of Biodiversity outlined in **Chapter 14 - Biodiversity** did not identify any significant effects to any fauna as a result of the Proposed Development.

Noise and Vibration and Material Assets

There will be an increase in novel noise during the construction of the Proposed Development. Any impact on people's enjoyment of their homes will be **imperceptible**.

19.3.2.4 Air Quality and Climate

As identified in **Table 19-1**, interactions between Air Quality and Climate and other environmental factors include:

Air Quality and Climate and Traffic and Transport

See **Section 19.3.2.1** above for a description of the interactions between Air Quality and Climate and Traffic and Transport.

Air Quality and Climate and Population

See **Section 19.3.2.2** above for a description of the interactions between Air Quality and Climate and Population.

Air Quality and Climate and Biodiversity

Air pollution during construction has the potential to generate dust and air-borne contaminants which may negatively affect local terrestrial and aquatic environments (i.e. smothering effects). Airborne pathways to the sensitive biodiversity receptors were assessed in **Chapter 14 – Biodiversity.** However as outlined in the assessment (**Section 14.4)**, the effects of air pollution on biodiversity are predicted to be **not significant**.

Air Quality and Climate and Material Assets

During the construction phase, the activity of construction machinery and traffic can generate dust in the immediate vicinity of the Proposed Development and areas along the haulage routes. Best practice measures for dust suppression will be implemented and **no significant** effects are anticipated.

19.3.2.5 Human Health

Inter-relationships are the impacts and associated effects of different aspects of the Proposed Development on the same receptor relevant to human health. These are as follows.

- Project lifetime effects: Assessment of the scope for effects that occur throughout more than one phase of the development (construction, operation, and decommissioning), to interact to potentially create a more significant effect on a receptor than if just assessed in isolation in these three phases (e.g., construction noise effects, operational substation noise, and decommissioning disturbance).
- Receptor led effects: Assessment of the scope for all effects (including inter-relationships between environmental topics) to interact, spatially and temporally, to create inter-related effects on a receptor. As an example, all effects on human health, such as changes in access, changes in community identity, changes in employment and benefits from renewable energy security, may interact to produce a different, or greater effect on a given population than when the effects are considered in isolation. Receptor-led effects may be short term, temporary or transient effects, or incorporate longer term effects.

The population health effects identified and assessed in **Chapter 11 - Human Health** have the potential to interact with each other. The areas of potential interaction between effects for a given geographic population are presented in **Table 19.2**. Vulnerable group effects are expected across all geographic populations, so are not listed separately.

Table 19-2: Interaction Between Health Determinants by Geographic Populations

	Site- Specific	County	Regional	National
	Newcastle ED	**South Dublin**	**Dublin**	**Republic of Ireland**
Air Quality	P			
Water Quality	P			
Noise and Vibration	P			
Traffic and Transport	P	P		
Key:	Positive (green)	Positive as a component within wider area assessment (light green)	Negative (blue)	Negative and positive (orange)

Construction and decommissioning activities may create effects for air quality, noise, and transport access particularly for populations near the Proposed Development site. During operation, there is potential for the site-specific population to be affected by multiple determinants, including air quality; water quality; noise; transport modes, access, and connections. At a population level it is not expected that the combination of effects would interact in a way that would reinforce health outcomes or exacerbate health inequalities. No greater effect is therefore likely.

19.3.2.6 Landscape and Visual

Landscape and Visual has the potential to interact with Population. As described in **Section 19.3.2.2**, such interactions are not significant

19.3.2.7 Cultural Heritage

Cultural Heritage has the potential to interact with Population as described in **Section 19.3.2.2,** there are no significant interactions.

19.3.2.8 Biodiversity

As identified in **Table 19-1**, interactions between Biodiversity and other environmental factors include the following:

Biodiversity and Noise and Vibration

See **Section 19.3.2.3** above for a description of the interactions between Biodiversity and Noise and Vibration.

Biodiversity and Air Quality and Climate

See **Section 19.3.2.4** above for a description of the interactions between Biodiversity and Air Quality and Climate.

Biodiversity and Water

During all phases of the Proposed Development, there is potential for interactive effects between Biodiversity and Water, particularly aquatic habitats, and species. The Griffeen River flows north of the site and flows into the River Liffey approximately 7 km downstream.

There are existing surface water and foul water management systems in place at the facility. During construction and decommissioning, there is potential that rainfall intensity may exceed infiltration rate into the drainage network resulting in overland silt laden/contaminated (hydrocarbon) runoff into the Griffeen River. This would cause short-term effects on surface water quality resulting in an environmental effect of **slight significance**. The Griffeen River is currently classified as having ‘poor’ status and deemed to be ‘at risk’ under the WFD monitoring programme. It is not considered that there is a risk of the Proposed Development contributing significantly to the current poor status of the Griffeen River and therefore the predicted impact is assessed as **slight adverse**. Potential effects to otter were deemed to be not significant.

During the operational phase there is potential for accidental spillages of chemicals or other contaminants which could reach the Griffeen River. The significant majority of HRW will be textile based material with minimal liquids, limiting any potential interaction with the surface water environment. Therefore, the magnitude of the effect on hydrology attributes resulting from accidental emissions or spillage would likely be of **slight significance.** The biodiversity assessment notes that the operational phase effects on the Griffeen River from the Proposed Development are predicted to be **not significant**. Potential effects to otter were deemed to be **not significant**.

Biodiversity and Land, Soils, Geology and Hydrogeology

As discussed under Biodiversity and Air Quality and Climate above air pollution has the potential to generate dust and air-borne contaminants which may negatively affect local terrestrial and aquatic environments, any effects of air pollution on biodiversity are predicted to be **not significant**.

Impacts on groundwater and the hydrogeological environment were scoped out of the biodiversity assessment.

Biodiversity and Material Assets

During the construction phase, the activity of traffic can generate dust along the haulage routes. Best practice measures for dust suppression will be implemented and **no significant** effects are anticipated.

19.3.2.9 Water

The following disciplines have the potential to interact with surface water as follows:

Water and Population

See **Section 19.3.2.2** above for a description of the interactions between Water and Population.

Water and Biodiversity

See **Section 19.3.2.8** above for a description of the interactions between Water and Biodiversity.

Water and Soils, Geology and Hydrogeology

Soils associated with the earthworks part of the construction phase have the potential to interact with Water. As set out under the heading of Biodiversity and Water above there are existing surface water and foul water management systems in place at the facility.

During construction and decommissioning phases there is a low potential that rainfall intensity may exceed infiltration rate into the drainage network resulting in overland silt laden/contaminated (hydrocarbon) runoff into the Griffeen River. This would cause short-term effects on surface water quality resulting in an environmental effect of **slight significance**.

Water and Material Assets (Waste & Utilities)

The site is in Flood Zone C, with a low probability of flood risk. Pluvial flood risk and surface water runoff is managed through collection within the site drainage network, attenuation tank and controlled discharge via a petrol interceptor and shut-off valve in case of potential contamination.

19.3.2.10 Land, Soils, Geology and Hydrogeology

The following disciplines have the potential to interact with Land, Soils, Geology and Hydrogeology:

Land, Soils, Geology and Hydrogeology and Biodiversity

See **Section 19.3.2.8** above for a description of the interactions between Land, Soils, Geology and Hydrogeology and Biodiversity.

Land, Soils, Geology and Hydrogeology and Water

See **Section 19.3.2.9** above for a description of the interactions between Land, Soils, Geology and Hydrogeology and Water.

Land, Soils, Geology and Hydrogeology and Material Assets

Waste material, in the form of soil will be generated during construction activities. Although it is not expected that significant volumes of waste soil will arise as a result of the construction activities. Where waste soil material is generated and where it cannot be reused, it will be stockpiled before being tested and classified and transported to a soil recovery facility.

19.3.2.11 Material Assets

Material Assets and Traffic and Transport

See **Section 19.3.2.1** above for a description of the interactions between Material Assets and Traffic and Transportation.

Material Assets and Noise and Vibration

See **Section 19.3.2.3** above for a description of the interactions between Material Assets and Noise and Vibration.

Material Assets and Air Quality and Climate

See **Section 19.3.2.4** above for a description of the interactions between Material Assets and Air Quality and Climate.

Material Assets and Biodiversity

See **Section 19.3.2.8** above for a description of the interactions between Material Assets and Biodiversity.

Material Assets and Water

See **Section 19.3.2.9** above for a description of the interactions between Material Assets and Water.

Material Assets and Land, soils, Geology and Hydrogeology

See **Section 19.3.2.10** above for a description of the interactions between Material Assets and Land, soils, Geology and Hydrogeology.

19.4 Mitigation

Where any potential interactive negative impacts have been identified in the above, a full suite of appropriate mitigation measures has already been included in the relevant sections (**Chapters 7 – 17**) of this EIAR. The implementation of these mitigation measures will reduce or remove the potential for these effects. Information on potential residual impacts and the significance of effects, is also presented in each relevant chapter. No additional mitigation measures have been identified.

CHAPTER 20
CUMULATIVE EFFECTS

Contents

Tables

20 CUMULATIVE EFFECTS

20.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) presents the approach and methodology undertaken for the assessment of potential cumulative effects for Proposed Development with other existing and/or approved projects/developments, during the construction, operational and decommissioning phases.

20.2 Methodology

20.2.1 Legislation and Guidance

Cumulative effects are defined as per the EPA Guidelines (EPA, 2022a) as: “the addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.”

The EIA Directive (2014/52/EU) mandates that an account is provided for “‘the interaction between any of the foregoing aspects.”

Article 3 of the EIA Directive as amended by Directive 2014/52/EU requires that “the effects referred to in paragraph 1 on the factors set out therein shall include the expected effects deriving from the vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned”.

Article 3 (1) of the EIA Directive as amended by Directive 2014/52/EU requires that “*the environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors: (a) population and human health; (b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC; (c) land, soil, water, air and climate; (d) material assets, cultural heritage and the landscape; (e) the interaction between the factors referred to in points (a) to (d).*

The interaction of effects within the Proposed Development in respect to each of the environmental factors, listed in Article 3(1) of the EIA Directive, have been identified and addressed in detail in the respective chapters in this EIAR. This chapter, however, presents a summary of each assessment of the interaction (inter-relationship) of impacts, from the Proposed Development, between the various environmental factors.

Annex IV (5)(e) of the EIA Directive as amended by Directive 2014/52/EU requires that the EIAR shall contain “*a description of the likely significant effects of the project on the environment resulting from, inter alia:(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;*

Furthermore, Annex IV (5) states that the EIAR shall contain: “*the description of the likely significant effects on the factors specified in Article 3(1) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the project. This description should take into account the environmental protection objectives established at Union or Member State level which are relevant to the project*”.

Furthermore, Annex IV (8) (Information Referred to in Article 5(1) (Information for the EIAR) of the EIA Directive as amended by Directive 2014/52/EU states that the EIAR shall contain “*a description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council1or Council Directive 2009/71/Eurato* m^2 *or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.*”

The following guidelines and publications were considered in undertaking the CIA:

- "*Guidelines on the Assessment of Indirect and Cumulative Impacts as well as Impact interactions*" (EC, 1999).

20.2.2 Zone of Influence

The Zone of Influences (ZoI) set out in each of the specialist disciplines (**Chapter 7 – 17**) was used to identify the cumulative effects ZoI relevant for the Proposed Development. This distance buffer was set by the discipline with the largest ZoI. Material assets had the largest ZoI which extended up to 5 km from the redline boundary of the Proposed Development. Projects occurring within 5 km from the redline boundary of the Proposed Development were identified for the purpose of assessing cumulative impacts.

20.2.3 Sources of Information to Inform the Assessment

The initial step of the CIA (Stage 1) was to identify the developments seeking planning permission that may interact to produce a cumulative impact. These interactions may arise during the construction or operational phases. Existing projects and developments, where relevant, have been considered as part of the chapter baselines in **Chapters 7 – 17**.

In May 2023, RPS undertook a desk study to source publicly available information on projects within the defined ZoI using internet searches, planning databases and other available sources to identify other projects falling within the ZoI. This search included sources such as search was conducted using My Plan map viewer (DHLGH, 2023a), the EIA Portal map viewer (DHLGH, 2023b) and planning application map viewer. The search was limited to the five-year period prior to this assessment and excluded 'incomplete', 'withdrawn', and 'refused' applications, as well as those under 'retention' as it is assumed this category included existing developments. A five-year time frame is deemed the most appropriate period for planning searches as permissions granted more than five years ago would generally be constructed, partially constructed, or are under construction when the Proposed Development is implemented and are unlikely to result in cumulative impacts.

Furthermore, a search of the Board's website was completed to identify any relevant applications during May 2022. The search included Strategic Infrastructure Development (SID), Strategic Housing Development (SHD), and Part 8 applications in the past five years within the Proposed Development's largest ZOI.

Searches for EPA licence applications and licenced facilities (EPA, 2022b) were also undertaken during May 2022. To inform potential cumulative impact assessment on land, soils, biodiversity and water, all EPA facilities and applications within the area defined by the water catchment and groundwater body were also searched. If listed as 'Licensed' then the facility would be considered as part of the baseline, if relevant rather than the given rise to cumulative impacts. Where the licensed status ('LicensedSta') is listed as 'Applied', these facilities should be examined further for hydrological connectivity or other pathway for cumulative impact.

20.2.4 Key Parameters for Assessment

20.2.4.1 Cumulative Impact Assessment Stage 1

The key parameters to determine whether projects screen in or out include:

- Their nature and scale (i.e. are unlikely to result in cumulative impacts with the Proposed Development): once-off housing, farm sheds/ buildings, house/ building extensions/ renovations.
- Projects with the following application status were not considered: 'incomplete', 'withdrawn', and 'refused' applications, as well as 'retained' application as these are likely to have already been built.
- Projects that are defined as having 'planning' status were assumed to have potential for temporal overlap and were considered for cumulative impacts as the construction timeline is 'unknown'.
- Projects where any appealed decision was refused were considered.
- Any EPA licence which expires before 2023 was excluded on the basis of no temporal overlap with the assumed construction programme for the Proposed Development.

Approximate distances to the Proposed Development were also provided for each project, to better understand any spatial overlap. Confidence in the status of the permissions was also noted, as there may have been uncertainty as to whether a development had been constructed, or where construction may have been delayed beyond the timeframes/ durations noted in the planning permission/ project Environmental Impact Assessment (EIA).

20.2.4.2 Cumulative Impact Assessment Stage 2

Stage 2 involves each of the topic specialist carrying out a screening exercise on the list of plans, projects and activities compiled during the stage 1. This has been carried out in accordance with a set of defined screening criteria (grounds for screening in or out) in order to identify which plans, projects and activities compiled should be considered in the assessment of cumulative effects (stage 3). The criteria are explained in **Table 20.1**. **Volume III, Appendix 20.2** provides a list of all Stage 2 projects and plans screened in for each topic and the projects screening in for assessment in Stage 3.

Table 20.1: Screening Criteria for Cumulative Impact Assessment

Criteria	Criteria- Explanation	Screening Decision (In/Out)
Included as Part of the Topic Baseline	As the project has been considered as part of the relevant chapter baseline, it has already been assessed/considered and hence is not considered within the CIA.	Screened out
Part of the Baseline but has an Ongoing Impact	As the project has been considered as part of the relevant chapter baseline, it has already been assessed. However, the project has ongoing impacts (e.g. operational effects) and is therefore considered relevant to the CIA.	Screened in
Potential Cumulative Impact Exists	An effect and pathway have been identified either within the construction, operational and decommissioning phase of the project that may cause a combined impact with the Proposed Development	Screened in
Potential Cumulative Impact Exists	An effect and pathway have been identified either within the construction, operational and decommissioning phase of the project that may cause a combined impact with the Proposed Development.	Screened in
No Conceptual or Physical Effect Receptor Pathway	No source, pathway or effect was identified between the Proposed Development and the project.	Screened out
Low Data Confidence	The data provided by the project do not provide enough evidence or lacks adequate information for an assessment of cumulative effects to be completed.	Screened out
No Temporal Overlap	The project is defined by a different time frame and does not overlap with the time frame of the Proposed Development.	Screened out
Project has been Withdrawn from Development or Operation	A withdrawn application is no longer relevant to be subject to assessment.	Screened out

Data Confidence

Data confidence is taken into account when screening projects, plans and activities into or out of the CIA. The premise here is that projects, plans and activities with a low level of detail publicly available cannot meaningfully contribute to a CIA and, as such, are screened out. Decisions upon whether to screen a project, plan or activity in or out at this stage are taken on a topic-by-topic basis. This allows certain projects, plans and activities to be screened in for certain topics where sufficient detail is present, while the same project, plan or activity may be screened out for another topic.

In order to categorise data confidence for the purposes of this EIAR, a three-point scale has been employed (**Table 20.2**). This scale aims to provide a transparent basis upon which projects, plans and activities may be screened in or out at this step.

For the purposes of screening, projects with high or medium data confidence have been automatically screened into the CIA. Projects, plans and activities with low data confidence have been screened out of the assessment. This category includes projects, plans and activities that the Proposed Development team is aware may take place in the future, but have no information on how the plan or project will be executed and therefore cannot be considered within the CIA.

Table 20.2: Criteria for the Allocation of Data Confidence

Data Confidence	Criteria
High	• Projects, plans and activities with an EIAR or other equivalently detailed planning document, containing sufficient topic-specific detail for an adequately detailed CIA to be undertaken on a quantitative or semi-quantitative manner. • Peer reviewed and/or industry standard third party quantitative, semi-quantitative or qualitative data. • Detailed project parameters for other projects being proposed by the developer and third-party project details published in the public domain and confirmed as being accurate by the developer.
Moderate	• Projects, plans and activities with an EIAR or other equivalently detailed planning document, containing a moderate level of detail that still allows a CIA to be undertaken on a qualitative basis. • Third-party data supplied to or obtained by the developer that has not been subject to peer review and cannot be quality controlled by the developer. • Peer reviewed and grey literature that is considered relevant, but either old, and hence potentially not as representative of the current situation, or of insufficient detail in order to accurately inform assessment in its own right.
Low	• Projects, plans and activities with a lack of robust information and where details of implementation are scarce or likely to change before any potential consent/approval. • Projects, plans and activities that may be developed in future, but for which no specific information is currently available.

Conceptual Overlap

For a cumulative effect to occur, it must be established that a cumulative impact has the potential to affect the receptor(s) directly or indirectly in question. In EIA terms, this is described as an impact-receptor-pathway and is hereafter referred to as a conceptual overlap. An example of a conceptual overlap can be seen where increased suspended sediment concentrations arising from a nearby project and from the Proposed Development (impact) affect the same population of fish or marine mammals (receptor). Conversely, a conceptual overlap cannot be demonstrated between activities such as the operation of surface water infrastructure and roosting bats. It is in cases such as this second example where projects, plans and activities are screened out at this stage.

Each project, plan and activity on the Stage 1 list has been considered on a topic-by-topic basis in order to evaluate the potential for conceptual overlaps to exist. Projects, plans and activities that clearly do not have such an overlap are screened out of the assessment. In cases where a conceptual overlap is not clear-cut, the project, plan and activity in question has been screened into the CIA in order to maintain the maximum design scenario approach. These projects are then further considered in the relevant topic chapters.

Physical Overlap

The ability for impacts arising from the Proposed Development to overlap with those from other projects, plans and activities has been assessed on a receptor basis for each topic. This means that, in most examples, an overlap of the physical extents of the impacts arising from projects, plans and activities must be established for a cumulative impact to arise. For example, a cumulative sedimentation impact or accidental chemical spill impact to be established between the Proposed Development and another project, it must be established that the extent of sediment or pollutant release from both projects has the potential to overlap and may affect a receptor at a single physical place. Exceptions to this exist for certain mobile receptors that may move between, and be subject to, two or more separate physical extents of impact from two or more projects.

Temporal Overlap

For a cumulative effect to arise from two or more projects, a temporal overlap of impacts arising from each must be established. Some impacts are active only during certain phases of development, such as piling noise during construction. Such a consideration is particularly important for receptors such as aquatic biodiversity, where the overlap of impacts during construction, such as noise from the piling activities or demolition of an existing wall, may be important. The anticipated construction periods for projects, plans and activities within the Stage 1 list have been obtained from their relevant planning documents (e.g. Scoping Reports, EIARs etc.). The details provided represent the current understanding of programmes of development though it is recognised that these programmes may be subject to change. In order to consider worst case, where information on construction timeframes is unknown or not certain, it has been assumed that construction programmes will overlap.

For the purposes of the Proposed Development CIA, all projects, plans and activities that were built and operational at the time of the Proposed Development data collection (field surveys etc.) have been screened out of the relevant EIA topic CIA. This is because the effects of these projects have already been captured within the Proposed Development site-specific surveys, and hence their effects have already been accounted for within the baseline assessment. The exclusion of built and operational projects that were in place at the time of data collection/survey in this way avoids the double counting that would occur if projects were to be included within both the baseline and the CIA. The exception to this is where projects have an ongoing impact, and this is addressed by the screening criterion 'part of the baseline but has an ongoing impact'.

20.2.4.3 Assessment Criteria and Significance

The assessment on biodiversity has followed the EIA methodology set out in **Chapter 1 - Introduction** and the topic-specific guidance documents outlined above in **Section 20.2**.

20.3 Description of Cumulative Effects

20.3.1 CIA Stage 1

See **Appendix 20.1** for the list of projects screened in.

20.3.2 CIA Stage 2

See **Appendix 20.2** for the list of CIA Stage 2 projects.

20.3.3 CIA Stage 3

A CIA has been undertaken to consider potential for cumulative impact of the Proposed Development with other approved development plans. Each project has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/temporal scales involved. The assessment has considered cumulative sources and impact pathways as outlined below.

20.3.3.1 Traffic & Transportation

Projects were screened-in to the CIA were located within the ZoI of the Proposed Development or where projects have the scope to potentially alter the traffic volumes and/or flows assessed in this chapter for the determination of traffic impact. It was assessed that potential for cumulative effects with the Proposed Development is considered **not significant**. It was identified that access to Crean & McHugh Holdings Unlimited Company's industrial warehouse (PR3) and Lucy McCarthy's hay shed building and ancillary yard (PR4) facilities will reduce traffic in the updated arrangement where before they would have accessed it through the Greenoge roundabout instead.

20.3.3.2 Population

Projects were screened-in to the population CIA where they discernibly impact directly on demographics and local population levels, land use and settlement patterns, residential and local community amenity and economic activity and employment. The projects that were screened-in for the Population CIA are listed in **Table 20.3**.

Table 20.3: Projects Screened-in for Potential Cumulative Effects on Population

Project Code	Project Location	Project Type	Potential for Cumulative Effect
PR 5	Aerodrome Business Park, Site Q2, Jordanstown Road, Collegeland, Rathcoole, Co. Dublin	Warehouse with ancillary three storey office and staff facilities and associated development with a gross floor area of 14,649 m^2.	The 100+ jobs generated by the permitted development at the operational stage.
PR 7	Greenogue Business Park, Site 601 & 605, Jordanstown Road & Jordanstown Ave, Rathcoole, Co. Dublin	2 warehouses with ancillary three storey office and staff facilities and associated development. Unit 601 will have a gross floor area of 4,922 m^2. Unit 605 will have a gross floor area of 8,036 m^2.	The 100+ jobs generated by the permitted development at the operational stage.
PR 9	College Lane, Greenogue, Rathcoole, Co. Dublin	Amendments principally comprising of an overall increase in the commercial floor area by 15,479 m^2 from the permitted 13,95 m^2 to 29,438 m^2.	The 100+ jobs generated by the permitted development at the operational stage.
PR 10	College Lane, Greenogue, Rathcoole, Co. Dublin	Provision of a warehouse unit with ancillary three storey office and staff facilities and associated development with a gross floor area of 13,959 m^2.	The 100+ jobs generated by the permitted development at the operational stage.
PR13	College Lane, Greenogue, Rathcoole, Co. Dublin	Construction of 3 warehouses with ancillary office and staff facilities and associated development as follows: Unit 1 will have a gross floor area of 5,619 m^2); Unit 2 will have a gross floor area of 6,724 m^2); and Unit 3 will have a gross floor area of 10,095 m^2.	The 100+ jobs generated by the permitted development at the operational stage.
PR15	Block R, Jordanstown Road, Aerodrome Business Park, Rathcoole, Co. Dublin	Construction of 1 warehouse with ancillary office and staff facilities and associated development. The warehouse will have a gross floor area of 22,966 m^2.	The 100+ jobs generated by the permitted development at the operational stage.
PR 18	Townlands of Moneenalion Commons Upper, Brownsbarn and Collegeland, Baldonnell Business Park, Dublin 22	Construction 2 logistics/warehouse units (Unit F and Unit G amounting to 15,168 m^2 GIA in total) south west of Mountpark Baldonnell	The 100+ jobs generated by the permitted development at the operational stage.

The main pathway for cumulative effect is considered to be an increase in residential / working populations. For the projects screened-in, it is considered that there are **no predicted construction phase cumulative impacts**.

However, for all of the projects considered above, the operational phases support population growth and economic activity. Owing to their nature and scale, the potential for cumulative effects with the Proposed Development is considered **not significant**.

20.3.3.3 Noise & Vibration

Projects were screened-in to the CIA were located within the zone of influence (ZoI) of the Proposed Development or where projects have the scope to potentially alter the traffic volumes and/or flows assessed in for the determination of Noise and Vibration impact.

To ensure a robust assessment, the ZoI for the CIA noise/ vibration impacts for this project was set at 600 m from the Proposed Development. The potential for significant adverse effects as a result of in-combination noise and vibration is **not significant**.

20.3.3.4 Air Quality & Climate

Air Quality

The projects that were screened-in to the Air Quality CIA are listed in **Table 20.4**. Projects were screened-in to the CIA are located within the zone of influence (ZoI) of the Proposed Development.

Table 20.4: Projects Screened-in for Potential Cumulative Effects on Air Quality

Project Code	Project Location	Project Type	Potential for Cumulative Effect
PR2	Unit J5-J8, Greenogue Business Park, Grants Road, Rathcoole, Dublin 24	Energy (Solar Panels)	Potential - pathway for air quality effects during construction phase – within 500 m of the ZoI for the Proposed Development
PR3	Block 509, Grants Avenue, Greenogue Business Park, Rathcoole, Co. Dublin	Industrial	
PR4	Rathcreedan, Rathcoole, Co. Dublin	Agricultural	

For the projects listed in **Table 20.4,** to ensure a robust assessment, the ZoI for the construction phase dust impacts were set at 500 m from the Proposed Development. Each of these projects, while modest in scale, lie within the ZoI and therefore have the potential for cumulative adverse dust impacts during construction. Impacts may be increased if works are undertaken simultaneously or elongation of impacts if works are undertaken concurrently along with the Proposed Development. However, with the proposed mitigation outlined for the Proposed Development, the potential for significant adverse dust effects is **unlikely and not significant**.

Climate

The projects that were screened-in to the Climate CIA are listed in **Table 20.5**. Each project has been considered on a case-by-case basis for screening in or out of this chapter's assessment based upon data confidence, effect-receptor pathways and the spatial/ temporal scales involved. Projects have been screened-in to the CIA where there is potential for significant impacts (positive or negative) to greenhouse gas emissions are assessed in this chapter for determination of climate impact. It is noted at the outset that all projects/developments will generate greenhouse gases from construction (via materials, operations and transport) and therefore there is a cumulative net adverse impact for climate from the construction of all projects on the CIA list. The more significant projects that have been considered for the Climate CIA are listed in **Table 20.5**.

Table 20.5: Projects Screened-in for Potential Cumulative Effects on Climate

Project Code	Project Location	Project Type	Potential for Cumulative Effect
PR2	Unit J5-J8, Greenogue Business Park, Grants Road, Rathcoole, Dublin 24	Energy (Solar Panels)	Potential construction phase impacts – significant material inputs required and, therefore, potential for cumulative adverse impact from embodied carbon in materials and construction methods. However, contributes to the reduction of GHG emissions from the energy generation sector and potentially a net positive climate impact over the lifetime of the project.
PR17	Moneenalion Commons Upper, Brownsbarn and Collegeland, Baldonnell Business Park, Dublin 22	Logistics Warehouse	Potential for adverse impact through construction from the use of materials and operational though the transport and handling of waste.
PR18	Townlands of Moneenalion Commons Upper, Brownsbarn and Collegeland, Baldonnell Business Park, Dublin 22		

Enva Ireland's Ltd 410 solar panel project (PR1) will generate some GHG emissions through construction but not to the scale of the projects PR 2 to PR 12. In addition to the construction impacts predicted by Proposed Development, this is considered a significant adverse climate effect. However, during the operational phases, each of these projects will aid in the mitigation of GHG emissions from the energy sector as a whole through renewable infrastructure and will help deliver on the Electricity Sectoral Carbon Budget with a net beneficial impact for each project. Cumulatively, these renewable energy projects will be required to deliver the predicted carbon reduction for the EV fleet for the transport sector resulting in a cumulative beneficial climate impact in line with CAP23.

For project Heavey Bowden Label Print Limited's 228 photovoltaic solar panels (PR2), it is considered there are limited construction impacts as the site infrastructure is largely in place, but some adverse impacts are predicted during the operational phase from the transport and handling of waste materials. Cumulatively this project with the Proposed Development will have a have an impact on the climate. However, the cumulative impacts are unlikely to be significant. For projects Lucy McCarthy's hay shed building (PR 4) this project requires significant inputs of materials with a potentially high embodied carbon including concretes, aggregates and/or steel and therefore have the potential for the generation of GHG emissions at construction stage. Logistic warehouses can have significant energy requirements. However, energy efficient practices can help to reduce consumption. Cumulatively this project with the Proposed Development will have an impact on the climate. The cumulative impacts are **unlikely to be significant**.

20.3.3.5 Human Health

The cumulative health assessment extends the analysis of each determinant of health. Following IEMA 2022 guidance, sensitivity of the relevant populations is unchanged from the main assessment in **Chapter 12 - Human Health** (Pyper, et al., 2022). Magnitude is however appraised in light of the combined effect of multiple projects.

As set out in IEMA 2022 guidance for human health, a combined public health effect is most likely where a population is affected by multiple determinants of health and a large proportion of the same individuals within that population experience the combination of effects.

A high degree of spatial proximity is required for there to be the potential for cumulative effects for localised changes in determinants of health, e.g., dust from a construction site. In contrast, where there are more far-reaching effects in a determinant of health, e.g., job creation or noise along shared transport corridors, there is greater opportunity for cumulative interactions between projects.

For each of the determinants in the main assessment the cumulative assessment considers the potential for pathways to the same population from other large-scale developments that are similar in location and timing. The assessment is qualitative, following the approach set out in **Section 20.2**, and considers the potential for combined magnitudes of effect to the same populations. The cumulative assessment is informed by the conclusions of the other technical disciplines in this chapter that are relevant to health.

The potential for cumulative population health effects with the following projects have been considered.

Table 20.6: Proposed Projects Screened as Potentially Having Cumulative Effects on Human Health with the Proposed Development

Project Code	Project Location	Project Type	Potential for Cumulative Effect
PR12	Ballynakelly, Newcastle, Co. Dublin	Residential	Potential pathway to effect human health through air, water quality, noise/ vibrations and transport as outlined in the below sections.
PR 20	Main Street, Newcastle, Co. Dublin	Residential	
PR 22	Main Street, Rathcoole, Co. Dublin	Residential	
PR 23	Mill Road, Saggart, County Dublin	Residential	
PR 26	Fortunestown Lane, Garters Lane and Bianconi Avenue, Saggart, Co. Dublin	Residential	
PR 28	Fortunestown Lane, Saggart, Co Dublin	Residential	
PR 53	Newcastle South and Ballynakelly, Newcastle, Co. Dublin.	Residential	
PR 54	Newcastle South, Newcastle, Co. Dublin.	Residential & Community	

Air Quality

Construction and Operational Phase

As stated in **Section 20.3.3.4** (Air Quality and Climate) of this chapter, with the proposed mitigation outlined for the Proposed Development, the potential for significant adverse cumulative dust effects is **unlikely and not significant**. This refers to the combined effect driven by the interaction of the Proposed Development with other developments which contribute to the reduction in air quality.

The population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are therefore not new or materially different to those listed for the project assessment in **Chapter 11 - Human Health**, **Section 11.4**. This conclusion applies to all project phases.

Water Quality

Operational Phase

As stated in **Section 20.3.3.9** (Water) of this chapter, cumulative effects are unlikely from the identified projects and therefore the potential for significant adverse effects as a result of in-combination water effects is **not significant**.

The population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are not new or materially different to those listed for the project assessment in **Chapter 11 - Human Health**, **Section 11.4**. This conclusion applies to all project phases.

Noise and Vibration

Construction and Operational Phase

As stated in **Section 20.3.3.3** (Noise and Vibration) of this chapter, the potential for significant adverse effects as a result of in-combination noise and vibration is **not significant**. It is noted that the combined effect is driven by the interaction of the Proposed Development with other developments contributing to a cumulative impact on noise and vibration.

The population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are not new or materially different to those listed for the project assessment in **Chapter 11 - Human Health**, **Section 11.4**. This conclusion applies to all project phases.

Transport Modes, Access and Connections

Construction and Operational phase

Section 20.3.3.1 concludes that the potential for cumulative effects with the Proposed Development is considered **not significant**.

The population groups, sensitivity, magnitude and significance conclusions relevant to the cumulative health assessment are not new or materially different to those listed for the project assessment in **Chapter 11 - Human Health**, **Section 11.4**. This conclusion applies to all project phases.

20.3.3.6 Landscape & Visual

Two projects screened in as having a potential cumulative impact with the Proposed Development due to the overall **negligible to nil** effect the Proposed Development imposes onto the surrounding landscape. Moreover, the Proposed Development will be largely screened with surrounding buildings and surrounding vegetation. Effects on the surrounding industrial landscape will be **negligible / no change** and thus the potential for significant adverse effects as a result of in-combination landscape and visual effects is **not significant**.

20.3.3.7 Cultural Heritage

Considering the limited scale of the Proposed Development, projects and plans within a 250 m buffer zone of the Proposed Development were assessed for a cumulative impact in combination with the Proposed Development on Cultural Heritage. Enva Ireland Ltd.'s 410 Solar Panel Project (PR1) is the only project that lies within the cultural heritage ZOI (there is spatial overlap) whereas all the other projects are located more than 250 m away from the Proposed Development. This project was assessed as having **no cumulative effect** on cultural heritage in relation to the Proposed Development, therefore there will be no potential for cumulative effects with other projects.

20.3.3.8 Biodiversity

Considering the limited scale of the Proposed Development, projects and plans within a 2 km buffer zone of the Proposed Development were assessed for a cumulative impact in combination with the Proposed Development on Biodiversity. The assessment focused on the design, location and the key proposed construction works of the project under review.

Table 20.7: Projects Screened-in for Potential Cumulative Effects on Biodiversity

Project Code	Project Location	Project Type	Potential for Cumulative Effect
PR6	Tay Lane, Greenogue, Rathcoole, Co. Dublin	Waste	Surface water effects (potential dust and sediment runoff and/or chemical spills) if unmitigated - both have hydrological connectivity to Griffeen River. Disturbance to local bat population during operation & through removal of linear habitats. Potential for cumulative disturbance with Enva facility due to additional operational lighting.
PR8	College Lane, Greenogue, Rathcoole, Co. Dublin	Industrial & Waste	Surface water effects (potential dust and sediment runoff and/or chemical spills) if unmitigated - both have hydrological connectivity to Griffeen River. Disturbance to local bat population during operation & through removal of linear habitats. Potential for cumulative

Project Code	Project Location	Project Type	Potential for Cumulative Effect
			disturbance with Enva facility due to additional operational lighting.
PR15	Block R, Jordanstown Road, Aerodrome Business Park, Rathcoole, Co. Dublin	Industrial	Disturbance to local population of commuting and foraging bats through proposed lighting. Potential for cumulative disturbance with Enva facility due to additional operational lighting.
PR16	Main Street Upper, Newcastle, Co Dublin	Commercial	Disturbance to local bat population through removal of linear habitats from PR16. Combined lighting disturbance from the Proposed Development coupled with this proposed project removal of roosting habitat, there is potential for cumulative disturbance to local bat populations.
PR53	Newcastle South and Ballynakelly, Newcastle, Co. Dublin.	Strategic Housing Development - Application	Surface water effects (potential dust and sediment runoff and/or spills of oil, fuel or other contaminants) during construction phase, if temporal overlap between projects - both have hydrological connectivity to tributaries of River Liffey. Disturbance to local bat population through removal of linear habitats from PR53. Combined lighting disturbance from the Proposed Development coupled with this proposed project removal of roosting habitat, there is potential for cumulative disturbance to local bat populations.
PR54	Newcastle South, Newcastle, Co. Dublin.	Strategic Housing Development - Application	Surface water effects (potential dust and sediment runoff and/or chemical spills) if unmitigated - both have hydrological connectivity to tributaries of River Liffey. Disturbance to local bat population through removal of linear habitats from PR54. Combined lighting disturbance from the Proposed Development coupled with this proposed project removal of roosting habitat, there is potential for cumulative disturbance to local bat populations.

Ten proposed projects were assessed as having potential cumulative impact along with the Proposed Development. These include Electrical Waste Management Ltd.'s alteration to a proposed Waste Metal Transfer Facility (PR 6), Jordanstown Properties Limited's warehouse unit (PR 8), Nocsy 2 Ltd.'s construction of 3 warehouses (PR 13), Exeter Ireland Property IV C Ltd.'s warehouse with ancillary office (PR 16), Lidl Ireland GmbH's construction of a supermarket (PR 16), Pavement Homes Ltd 's 22 dwelling houses (PR 20), South Dublin County Council's construction of 406 no. residential units (PR 53) and South Dublin County Council's 280 no. residential units (PR 54).

It was identified that Electrical Waste Management Ltd.'s alteration to a proposed Waste Metal Transfer Facility (PR 6), Jordanstown Properties Limited's warehouse unit (PR 9), South Dublin County Council's construction of 406 no. residential units (PR 53) and South Dublin County Council's 280 no. residential units (PR 54) could potentially cause cumulative surface water effects (potential dust and sediment runoff and/or chemical spills) during construction phase, if there is temporal overlap between projects. **Cumulative effects were ruled out** for this because the EIAR sets out mitigation measures for surface water management during construction and operation.

Moreover, Horse Sport Ireland's additional Electrical Waste Management Ltd.'s alteration to a proposed Waste Metal Transfer Facility (PR6), Jordanstown Properties Limited's warehouse unit (PR8), Nocsy 2 Ltd.'s construction of 3 warehouses (PR 13), Exeter Ireland Property IV C Ltd.'s warehouse with ancillary office (PR15) and Lidl Ireland GmbH's construction of a supermarket (PR16) were assessed as potentially causing disturbance to local commuting and foraging bats. The proposed projects have been **screened out** as the mitigation measures outlined in the design is sufficient at avoiding these cumulative effects.

Therefore, the potential for significant adverse effects as a result of in-combination biodiversity effects is **not significant** for Biodiversity.

20.3.3.9 Water

Considering the limited scale of the Proposed Development, projects and plans within a 1 km buffer zone of the Proposed Development were assessed for a cumulative impact in combination with the Proposed Development on Surface Water. The assessment focused on the design, location and the key proposed construction works of the project under review. Particular attention was given to larger projects where EIARs or AA Screening Reports accompanied planning applications.

The residual impacts on surface water due to the Proposed Development are expected to be reduced to **imperceptible** significance as a result of the construction of the Proposed Development.

It is considered that cumulative effects are unlikely from the identified projects. Each site will have embedded mitigation through their site-specific management for the protection of surface water quality. Similarly operational cumulative effects are not envisaged through embedded mitigation for spill control and compliance with site environmental management systems.

The potential for significant adverse effects as a result of in-combination water effects is **not significant**.

20.3.3.10 Land, Soil, Geology and Hydrogeology

Considering the limited scale of the Proposed Development, projects and plans within a 1 km buffer zone of the Proposed Development were assessed for a cumulative impact in combination with the Proposed Development on land, soils, geology and hydrogeology. The assessment focused on the design, location and the key proposed construction works of the project under review. Particular attention was given to larger projects where EIARs or AA Screening Reports accompanied planning applications.

The residual impacts on land, soil, geology and hydrogeology due to the Proposed Development are expected to be reduced to **imperceptible** significance as a result of the construction of the Proposed Development.

From a land, soils, geology & hydrogeology perspective most of the proposed projects will result in the loss of a small quantity of soil however this loss is still considered small on a local scale, therefore, the potential for significant adverse effects as a result of in-combination land, soil, geology and hydrogeology effects is **not significant**.

20.3.3.11 Material Assets

The projects listed in **Appendix 20.1** have been assessed. The projects that were screened-in to the Material Asset CIA are listed in **Appendix 20.2**. Projects were screened-in to the CIA where they were located within the ZoI of the Proposed Development.

Table 20.8: Projects Screened-in for Potential Cumulative Effects on Material Assets

Project Code	Project Location	Project Type	Potential Cumulative Effects
PR 35	Cooldown Commons, Fortunestown Lane, Citywest, Dublin 24.	Strategic Housing Development	Potential for cumulative effect on water and power consumption during the operational phase.
PR 37	Boherboy, Saggart Road, Co. Dublin	Strategic Housing Development	
PR 55	Mill Road, Saggart, Co. Dublin.	Strategic Housing Development	
PR 56	Garters Lane, Saggart, Co. Dublin	Strategic Housing Development	

To ensure a robust assessment, the ZoI was set at 5 km from the Proposed Development. The potential for cumulative impacts is assessed in the following sections.

Power

Construction Phase

The construction phase of the Proposed Development will result in an increase in energy consumption. The impact on the grid is likely to be increased if construction phase of the Proposed Development coincides with projects within the ZoI. However, given the scale and short-term nature of the works, the potential for significant cumulative adverse impacts with approved projects is **unlikely and not significant**.

Operational Phase

The energy demand of the Proposed Development during the operational phase is anticipated to be high. This is due to the use of energy intense plant and equipment required to treat HRW and bins used in the transportation of HRW. Planning permission for solar panels (SD22A/0326) has been granted at Enva building adjacent to the Proposed Development.

Treated HRW will be consigned to thermal treatment by Wate to Energy (WtE), which will generate heat and electricity. This will help to meet some of the energy requirements and reduce demand on the national grid during the operational phase.

The potential for adverse cumulative effects from the Proposed Development and the projects listed in **Table 20.8 is unlikely and not significant**.

Water

Construction Phase

The relatively modest scale of the proposed changes to the site, water consumption during the construction phase is not expected to be substantial. The potential impacts could be amplified if construction activities for the Proposed Development proceed simultaneously or concurrently along with the project listed in **Table 20.8**. However, with the proposed mitigation outlined for the Proposed Development, the potential for significant adverse effects is **unlikely and not significant**.

Operational Phase

The additional water requirements during the operational phase are attributed to the plant and equipment required to continuously treat HRW and bins used for transportation. The proposed mitigation measures outlined for the Proposed Development will help to reduce demand. The potential for significant adverse effects is **unlikely and not significant**.

Waste Management

Construction Phase

Given the scale of the proposed changes to site, it is anticipated that the construction phase of the Proposed Development will generate relatively small quantities of waste. The potential impacts to waste management system if works on the Proposed Development are undertaken concurrently along with granted projects within the ZoI. However, with the proposed mitigation outlined for the Proposed Development, the potential for significant adverse effects is **unlikely and not significant**.

Operational Phase

The site is currently a waste transfer/recovery facility that is authorised by planning approval ref. SD07A/0260 as amended and by the EPA IED Licence (IED licence no. 192-03) to process throughput of 106,000 tonnes of hazardous waste per annum, and 5,000 tonnes per annum of non-hazardous waste. Enva does not propose to change the 111 000 gross annual tonnage intake limits. The gross annual tonnage intake at the facility will remain unchanged at 111 000 tonnes. The annual intake of other waste at the facility will be reduced by 24 000 tonnes of hazardous waste, to facilitate the intake of HRW.

Given that the site currently accepts hazardous waste, and the volume of waste will remain unchanged, it is therefore considered that there will be **no significant cumulative impacts** arising from the Proposed Development with other approved projects.

20.4 Chapter References

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CHAPTER 21
SCHEDULE OF ENVIRONMENTAL COMMITMENTS

Contents

Tables

21 SCHEDULE OF ENVIRONMENTAL COMMITMENTS

This chapter of the Environmental Impact Assessment Report (EIAR) collates all the mitigation and monitoring commitments (environmental commitments) provided within **Chapters 7-17**.

Full details of the various commitments should be obtained by reference to the individual chapters. All mitigation measures, controls, procedures, monitoring, and other requirements described in the EIAR and NIS and any other conditions attached to approvals granted by the Board will be implemented in full.

21.1 Traffic and Transport

The environmental impacts and associated commitments provided in **Chapter 7 - Traffic & Transport**, are summarised in **Table 21.1**.

Table 21.1: Traffic & Transport Assessment Environmental Commitments

Potential Impact	C/O/D[1] Phases	Impact Significance	Mitigation Measures
Additional traffic on road networks during construction	C	Imperceptible – not significant	**Construction Phase:** • Development of a Construction Traffic Management Plan (CTMP).
Additional traffic on road networks during operations	O	Imperceptible – not significant	**Operational Phase:** • Recommended that best practice measures to minimise operational traffic and transport impacts are implemented. • Enva will also promote the use of sustainable transport modes.
Impact on Junction Capacity	O	Imperceptible – not significant	
Additional traffic on road networks during decommissioning	D	Imperceptible – not significant	**Decommissioning Phase:** • Implement traffic control measures according to good practice at the time of decommissioning taking into consideration any changes in the local road network.

21.2 Population

The environmental commitments provided in **Chapter 8 - Population**, are summarised in **Table 21.2**.

Table 21.2: Population Assessment Environmental Commitments

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
Impact on land use and settlement	C	Not significant	No additional mitigation measures or monitoring measures proposed.
Residential and local community amenity	C	Imperceptible - not significant	
Economic activity and employment	C	Positive temporary – not significant	
Demographics and local population	C	Imperceptible – not significant	

[1] Note: C = construction phase, O = operational phase and D = decommissioning phase.

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
Impact on land use and settlement	O	Permanent long term positive – not significant	
Residential and local community amenity	O	Imperceptible – not significant	
Economic activity and employment	O	Neutral long term imperceptible – not significant	
Impact on land use and settlement	D	Permanent – not significant	
Residential and local community amenity	D	Imperceptible - not significant	
Employment	D	Temporary and slight impact	
Demographics and local population	D	Imperceptible - not significant	

21.3 Noise & Vibrations

The environmental commitments provided in **Chapter 9 – Noise & Vibrations**, are summarised in **Table 21.3**.

Table 21.3: Noise & Vibrations Assessment Environmental Commitments

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
Noise impacts associated with structures demolition	C	Not significant	**Construction & Decommissioning Phases:** Implement best practice for management of noise: • Noisy works shall be scheduled to normal working hours. • Quiet working methods (e.g., using plant with lower noise emission levels) shall be used. • Working methods that minimise vibration generation particularly with regard to demolition activities and piling shall be adopted. • Plant such as pumps and generators used on or near NSLs will be contained within an acoustic enclosure. • 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). • All noise producing equipment will comply with S.I. No 632 of 2001 European Communities (Noise Emission by Equipment for Use Outdoors) Regulations 2001 and S.I. No. 241/2006 - European Communities (Noise Emission by Equipment for Use Outdoors) (Amendment) Regulations 2006. • Measures outlined in “Environmental Good Practice Site Guide” 2005 compiled by CIRIA and the UK Environmental Agency and the
Noise impacts associated with building construction	C	Not significant	
Noise due to processing of untreated waste, transfer of waste to other facilities, removal of waste containers, dismantling, disinfection of and removal of plant, decontamination of building.	D	Not significant	

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
			"London Good Practice Guide: Noise & Vibration Control for Demolition and Construction" 2016 will be applied as appropriate. • All plant shall be properly maintained, (mechanisms properly lubricated, faulty silencers replaced, worn bearings replaced, cutting tools sharpened etc.). • Acoustic covers to engines shall be closed when in use or idling. • The unnecessary revving of engines shall be avoided, and equipment shall be switched off when not in use. • Starting-up plant and vehicles sequentially shall be used rather than at the same time. • Drop heights of materials shall be minimised. • Regular briefings shall be provided for all site-based personnel so that noise and vibration issues (including the requirement to employ Best Practicable Means at all locations at all times) are understood and that generic and site-specific mitigation measures are explained and adhered to. • Unloading shall be carried out within the worksite rather than on adjacent roads or layby. • Phasing of materials deliveries shall be controlled on a 'just in time' basis to minimise noise and congestion on roads around the site. • Records of any noise complaints relating to the construction operations will be investigated as soon as possible and reported to the County Council. • No specific requirements for noise and vibration monitoring have been identified for the construction phase.
Noise generated from the Shredder	O	Not significant	**Operational Phase** • Roller doors shall be closed during operation of internal equipment, where practicable. • Drop heights of materials shall be minimised. • The unnecessary revving of engines shall be avoided, and equipment shall be switched off when not in use. • Equipment shall be properly maintained and inspected regularly. • There is no additional noise monitoring proposed for the operational phase of the Proposed Development outside of that which is required by EPA Licence W0192-03. Similarly, no vibration monitoring is proposed.
Noise generated from the air blast cooler	O	Not significant	
Tonality and impulsivity	O	Not audible – not significant	
Traffic noise	O	Imperceptible – not significant	

21.4 Air Quality and Climate

The environmental commitments provided in **Chapter 10 – Air Quality & Climate**, are summarised in **Table 2.14**.

Table 21.4: Air Quality Assessment Environmental Commitments

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
Construction dust	C	Negligible – not significant.	**Construction Phase:** • Any temporary site compound will be located at a distance greater than 100 m from the three properties at the southwest of the site. • Similarly, no stockpiling or material storage maybe undertaken within 100 m from the three properties at the southwest of the site (except the construction of the landscaping berms). • Site roads shall be regularly cleaned and maintained as appropriate. Any constructed hard surface roads shall be swept to remove mud and aggregate materials from their surface while any un-surfaced roads shall 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). • All Heavy Goods Vehicles (HGVs) and other site vehicles exiting the site will be managed to ensure that mud and other wastes are not tracked onto the roads. • Public roads outside the site shall be regularly inspected for cleanliness and cleaned as necessary. • Material handling systems and site stockpiling of materials shall be designed and laid out to minimise exposure to wind. • The number of handling operations will be kept to a minimum by ensuring dusty material isn't moved or handled unnecessarily. • Fencing will be erected in areas anticipated to generate dust. Fencing around stockpiles should be approximately the same size as the stockpile being protected. • Water misting or sprays shall be used as required if particularly dusty activities are necessary during dry or windy periods. • All movements of potentially dusty material to and from the site will be dampened or covered, as appropriate, to mitigate the potential for fugitive dusts along the haul route. • 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 on to the public road. • Monthly monitoring of dust deposition levels shall be undertaken for the duration of construction for comparison with the guideline of 350 mg/ m2/day (for non-hazardous dusts). This monitoring should be carried out at a

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
			minimum of four locations at sensitive receptors around the proposed works. • Where dust levels are measured to be above this guideline of 350 mg/ m^2/day, the mitigation measures in the area must be reviewed and improved to ensure that dust deposition is reduced to below 350 mg/ m^2/day. Should high dust levels continue to occur following these improvements, the contractor shall provide alternative mitigation measures and/or will modify the construction works taking place.
Traffic emissions	C	Not significant	• Implementation of a CTMP which will be prepared in advance of the works and will outline measures to minimise congestion and queuing, reduce distances of deliveries and eliminate unnecessary loads. • The use of a designated delivery route for all materials to/from the site via the N7 and R120. • Drivers will be required that all vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.
Greenhouse gas emissions	C	Slight adverse	• Consultation with a wider variety of internal and external stakeholders to ensure all relevant information is included in the development of the plans. • Turning off vehicular engines (and mobile plant) 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 plant will perform the most efficiently. • 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 the construction phase. • An Energy Management system will be implemented for the duration of the works. This will include the following measures: – 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 the construction compound fitted with suitable vents. – The use of low energy equipment and ‘power saving’ functions on all personal computers (PCs) and monitors in the site offices. – The use of low flow showers and tap fittings.
Air quality and climate impacts due to processing of untreated waste, transfer of waste to other facilities, removal of waste containers, dismantling, disinfection of and removal of plant, decontamination of building.	D	As per construction phase.	

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
Traffic emissions	O	Imperceptible - not significant	**Operational Phase:** • The use of a designated delivery route for all materials to/from the site via the N7 and R120. • Drivers will be required that all vehicles are suitably maintained to ensure that emissions of engine generated pollutants are kept to a minimum.
Odour emissions	O	Not significant	• The Proposed Development is required to comply with the management, mitigation and monitoring regimes set out in AG9. In particular, AG9 requires the development of an Odour Management Plan (OMP) • AG9 specific mitigation has been applied to the Proposed Development to mitigate odour impact: • BAT is to periodically monitor odour emissions and odour emissions can be monitored using: – EN standards (e.g., dynamic olfactometry according to EN 13725 in order to determine the odour concentration or EN 16841-1 or -2 in order to determine the odour exposure). – When applying alternative methods for which no EN standards are available (e.g., estimation of odour impact), International Organisation of Standardisation (ISO), national or other international standards that ensure the provision of data of an equivalent scientific quality. • BAT 12. In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to set up, implement and regularly review an OMP, as part of the environmental management system, that includes all of the following elements: – A protocol containing actions and timelines. – A protocol containing actions and timelines. – A protocol for conducting odour monitoring as set out in BAT 10. – A protocol for response to identified odour incidents, e.g., complaints. – An odour prevention and reduction programme designed to identify the source(s); to characterise the contributions of the sources; and to implement prevention and/or reduction measures. • BAT 13. In order to prevent or, where that is not practicable, to reduce odour emissions, BAT is to use one or a combination of the techniques given below: – Minimise the residence time of (potentially) odorous waste in storage or in handling systems, in particular under anaerobic conditions. Using chemicals to destroy or to reduce the formation of odorous compounds (e.g., to oxidise or to precipitate hydrogen sulphide).

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
			• BAT 14. In order to prevent or, where that is not practicable, to reduce diffuse emissions to air, in particular of dust, organic compounds and odour, BAT is to use an appropriate combination of the techniques given below: – Storing, treating and handling waste and material that may generate diffuse emissions in enclosed buildings and/or enclosed equipment (e.g., conveyor belts). – Maintaining the enclosed equipment or buildings under an adequate pressure. – Collecting and directing the emissions to an appropriate abatement system via an air extraction system and/or air suction systems close to the emission sources. • BAT 31. In order to reduce emissions to air of organic compounds, BAT is to apply BAT 14d and to use one or a combination of the techniques given below: – Absorption – Biofilter – Thermal oxidation – Wet scrubbing • Periodic monitoring of odour from the emission stacks to ensure that the emissions comply with the levels presented within this EIAR. • Periodic monitoring of volume flow and any other characteristics from the emission stacks.
Potential risk of microbial exposure due to bio-aerosols	O	Not significant	• This air that will be drawn into the bin emptying/shredder hopper area be routed through high-efficiency particulate absorbing (HEPA) filters. – The filters will be changed at appropriate intervals and dispatched to an appropriately licenced incinerator. – The air is then directed through condensers to remove moisture before being passed through activated carbon filters before it is released to the atmosphere through a stack. Stringent air emissions limits will be enforced by the Environmental Protection Agency (EPA).
Greenhouse gas emissions	O	Slight effect	• 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 the construction compound 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 showers and tap fittings.

21.5 Human Health

The environmental commitments provided in **Chapter 11 – Human Health**, are summarised in **Table 21.5**.

Table 21.5: Human Health Assessment Environmental Commitments

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
Human health effects associated with air quality impacts during operation.	C	Minor adverse – not significant	No additional mitigation measures or monitoring measures proposed.
Human health impacts associated with noise and vibration impacts	C	Minor adverse – not significant	
Population health and safety impacts associated with construction transport	C	Minor adverse – not significant	
Human health impacts associated with air quality impacts during operation.	O	Minor adverse – not significant	
Human health impacts associated with water quality impacts during operation	O	Minor adverse – not significant	
Human health impacts associated with noise and vibration impacts during operation	O	Minor adverse – not significant	
Human health impacts associated with transport impacts during operation	O	Minor adverse – not significant	
Human health impacts due to processing of untreated waste, transfer of waste to other facilities, removal of waste containers, dismantling, disinfection of and removal of plant, decontamination of building.	D	Minor adverse – not significant	

21.6 Landscape & Visual

The environmental commitments provided in **Chapter 12 – Landscape & Visual**, are summarised in **Table 21.6**.

Table 21.6: Landscape & Visual Assessment Environmental Commitments

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
Visibility of construction activities	C	Not significant	No additional mitigation measures or monitoring measures proposed.
Effects on landscape and landscape character	O	Negligible – not significant	
Effects on landscape character of Greenogue Business Park	O	Negligible – not significant	
Effect on Newcastle Lowlands	O	None – not significant	
Effect on views / prospects to be preserved	O	None to minor – not significant	
Effects on visual receptors	O	Negligible to minor – not significant	
Visual and landscape impacts associated with decommissioning phase	D	As per the operational phase	

21.7 Cultural Heritage

The environmental commitments provided in **Chapter 13 – Cultural Heritage**, are summarised in **Table 21.7**.

Table 21.7: Cultural Heritage Assessment Environmental Commitments

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
No effects on cultural heritage identified.	C	No impacts identified	No additional mitigation measures or monitoring measures required.
No effects on cultural heritage identified.	O	No impacts identified	
No effects on cultural heritage identified.	D	No impacts identified	

21.8 Biodiversity

The environmental commitments provided in **Chapter 14 – Biodiversity**, are summarised in **Table 21.8**.

Table 21.8: Biodiversity Assessment Environmental Commitments

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
Biodiversity loss, fragmentation, alteration and pollution to water to depositing lowland river (FW2) and freshwater white-clawed crayfish	C&D	Slight adverse	**Construction & Decommissioning Phases:** • Stockpiling of construction materials shall be strictly prohibited within 15 m of any ditch or water-laden channel. • Hazardous materials including chemicals, solvents, paints, hydrocarbons and/or lubricants used during construction, shall be stored on hardstand and within a suitably designed bunded area in accordance with established guidelines. • No re-fuelling of equipment/ plant or the addition of hydraulic oil or lubricants to vehicles/ equipment shall take place on site. • Waste materials shall be stored in designated areas that are isolated from surface water drains and watercourses. Waste materials shall be carefully managed including covering stockpiles during rainfall. Skips shall be closed or covered to prevent materials being blown or washed away. • All machinery shall be routinely checked to ensure no leakage of oils or lubricants occurs during the construction phase. Any spillages will be immediately contained, and the contaminated soil/material shall be taken to a licensed facility for disposal. • Wash down water from exposed aggregate surfaces, cast-in-place concrete and from concrete trucks shall be trapped on-site to allow sediment to settle out before clarified water is released to a drain system. • No waste will be buried, burned, or dumped on-site or in lands adjacent to the site. • Plant and equipment shall be maintained in place and in working order for the duration of the works. • Only emergency maintenance and repair shall be carried out on site. Emergency procedures and spill kits shall be readily available and all relevant personnel will be familiar with emergency procedures. • An appropriate emergency response shall be in place for any spillage of chemicals to ensure they are immediately contained. • Any contaminated soil excavated shall be taken to a licensed facility for management. • Management of material deposition areas will prevent siltation of watercourse systems through run-off during rainstorms. Collector ditches shall be put in place surrounding material stockpiles to contain run-off and direct it to the settlement ponds / silt traps before discharge to an adjacent watercourse.

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
			• Excavated materials shall be carefully managed in accordance with the TII Specification for Road Work, to prevent any potential negative impact on the receiving environment and the excess material shall be taken directly to an appropriately licenced facility avoiding contact with any open surface water drains. • Excavated material shall not be left uncovered to avoid run-off of silty water and trial pits shall be backfilled at the earliest convenience to avoid leaving stockpiles exposed. • Where works are required within 15 m of a watercourse feature, a suitably qualified ecologist shall assess and verify that appropriate demarcation and signage is in place before works commence. Demarcation shall be physically marked out using post and rail/post and rope/bunting, or equivalent, and be signposted to identify an ecological sensitivity. • The Contractor shall be required to have spill kits available on-site and hydrocarbon absorbent materials to deal with any accidental spillages. • Throughout the construction and decommissioning phases, the Contractor shall ensure that all site personnel are made aware of the importance of the freshwater environments and the requirement to avoid pollution of all types. • All hazardous materials on site shall be stored within secondary containment (bunding) designed to retain at least 110% of the total storage contents.
Disturbance from artificial lighting to bats (commuting and foraging) and otter (breeding, commuting and foraging)	O	Slight adverse	**Operational Phase:** • All artificial lighting installed on site shall be directional lighting (i.e., lighting which only shines on the required working area and not adjacent habitats) in order to prevent overspill onto the Griffeen River corridor and surrounding hedgerows. This will be achieved by the design of the luminaire and by using accessories such as hoods, cowls, louvers and shields to direct the light to the intended area within the Proposed Development site only.
Non-IEF Mitigation			
Disturbance from noise, vibration, lighting, and human presence to birds (breeding)	C & D	Not significant	**Construction & Decommissioning Phase:** • The Proposed Development will not involve any removal of vegetation or interference with the existing hedgerow surrounding the Enva facility. However, should any vegetation removal become a requirement during the construction phase, the removal of existing vegetation shall avoid the bird nesting season (1st March and 31st August, inclusive).

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
			• If any active nests are discovered on site, then work in the immediate vicinity of the nest should cease and an appropriate buffer zone (≥5 m) should be established which should be left in place until it has been confirmed that the chicks have fledged. • All vegetation within the works area shall be kept clear of machinery and materials shall not be stored against them as per the recommendations in BS5837 (2012) – Trees in Relation to Design, Demolition and Construction.
Disturbance from artificial lighting to birds (breeding)	O	Not significant	**Operational Phase:** • In line with the proposed mitigation measures with regards to artificial lighting as outlined above for bats and otter, the proposed lighting should avoid light spill onto the hedgerows surrounding the Proposed Development site to avoid/minimise disturbance on nesting birds

21.9 Water

The environmental commitments provided in **Chapter 15 – Water**, are summarised in **Table 21.9**.

Table 21.9: Water Assessment Environmental Commitments

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
Sediment discharge to watercourses.	C&D	**Slight significance**	**Construction and Decommissioning Phases** • All vehicles which present a risk of spillage of unconsolidated sediment or building rubble, while either delivering or removing materials, will be loaded in such a way as to prevent spillage. • Stockpiles containing loose soils or building rubble will remain on-site for the shortest period of time as possible. • The Contractor will monitor weather forecasts for heavy rain and where required, certain works likely to produce sediment or particulate matter will cease, in order to minimise unconsolidated material mixing with surface water runoff. • Excavation/demolition works will not be completed during periods of prolonged or heavy rain (i.e., Met Éireann orange rain warning). • Silt fencing shall be installed for all work within 15 m of the Griffeen River. Silt fencing shall consist of a maintainable geotextile membrane (equivalent to Terrastop™ Premium; 250 micron; 45 l/m2/sec). Installation, maintenance, and removal shall follow the manufacturers' specifications. The geotextile membrane will be inspected at least once a week and following any period of heavy rainfall (i.e., Met Éireann orange rain warning).

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
			• Sediment accumulation within the attenuation tank shall be monitored and removed as necessary. • Excavations in made ground will be monitored by an appropriately qualified person to ensure that any contaminated material is identified, segregated and disposed of appropriately. • Records shall be kept on the quantity, nature/type and quality of all waste leaving the construction site including individual waste and typical construction site waste. • The Contractor will monitor weather forecasts for heavy rain and where required, certain works and in particular excavations/earthworks will cease in order to minimise exposed soil entering surface water runoff. • In the event of the facility closing down, surface water monitoring will continue at six-month intervals until a closure license has been issued by the EPA. After care and monitoring of the facility once it has closed down would be agreed as part of the closing license.
Accidental spillages of chemicals or other contaminants	C&D	**Slight significance**	**Construction and Decommissioning Phases** • The hydrocarbon interceptor prior to discharge into the Griffeen River shall be routinely monitored, emptied and cleaned, as necessary. • In the event of accidental emissions contaminating surface water runoff from the site, the stop valve on the stormwater drainage network shall be closed, preventing discharge from the site into the Griffeen River. Contaminated water contained within the attenuation tank will be pumped out and removed from site for treatment. The attenuation tanks will be cleaned of any remaining contaminant residue. • An Environmental Incident and Emergency Response Plan will be established by the Contractor to deal with incidents or accidents during construction that may give rise to pollution in watercourses proximal to the works. This will include means of containment in the event of accidental spillage of hydrocarbons or other pollutants. • Safe handling of all potentially hazardous materials will be emphasised to all construction personnel employed during this phase of the Proposed Development. • 3 no. surface water sampling locations upstream, downstream and at the midpoint of the licensed water discharge point. • The surface water sampling locations are sampled in accordance with the industry standard protocols and guidelines prepared by the EPA. Samples are handled and transported in accordance with the same accepted protocols.

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
			• The surface water sampling locations are sampled at quarterly intervals and will continue to be so unless otherwise agreed with the Agency, to establish any potential effects on surface water quality. • The samples recovered from surface water sampling locations are analysed for the list of parameters given in the Industrial Emissions Directive. These parameters included pH, Chemical Oxygen Demand, Suspended Solids and Mineral Oils.
Accidental spillages of chemicals or other contaminants	O	**Slight significance**	**Operational Phase** • Stormwater from the existing facility is managed prior to release by being first passed through the attenuation tank which allows heavier stones and debris to 'settle' in the tank before being discharged to the Griffeen River. • Sediment accumulation within the attenuation tank shall be monitored and removed as necessary. • The hydrocarbon interceptor prior to discharge into the Griffeen River shall be routinely monitored, emptied and cleaned, as necessary. The discharge from the surface water attenuation tank to the Griffeen River is monitored on a regular basis. In the unlikely event that a deterioration of surface water quality being discharged is detected, or if there is an external spillage on site, a cut-off valve at the outlet from the attenuation tank will activate either remotely or manually and all surface water will be contained in the attenuation tank. This system allows for the retention of all surface water on-site until the spill event is investigated and remediated. It is also possible to provide emergency pumping from the attenuation tank to the foul water sewer in the event of a continued spillage. • The HRW facility will require 24-hour traffic movements and operation requiring staff to be on-site 24/7. Local emergency services will be informed of contact numbers for key personnel. All waste handling and management of spillages will be undertaken in accordance with the Waste Management Awareness Handbook (HSE 2012). • Surface water monitoring as per the construction phase will continue through the operation phase of the site. • The results of the analysis are collated, tabulated and reported including interpretation and comparison with the previous monitoring event's data. This information presented in the AER, which is also submitted to the EPA.

21.10 Land, Soil, Geology & Hydrogeology

The environmental commitments provided in **Chapter 16 – Land, Soil, Geology and Hydrogeology**, are summarised in **Table 21.10**.

Table 21.10: Land, Soil, Geology & Hydrogeology Assessment Environmental Commitments

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
Contamination of soils due to accidental emission and release of potentially hazardous substances.	C	**Moderate/Slight significance**	**Construction** • Refer to mitigation measures for the management of Biodiversity (**Section 21.8**) and Water (**Section 21.9**) impacts.
Contamination of groundwater due to accidental emission and release of potentially hazardous substances	C	**Imperceptible – not significant**	
Soil erosion	C	**Moderate/Slight significance**	
Infiltration of surface runoff	C	**Imperceptible – not significant**	
Loss of potential soil reserve	C	**Imperceptible – not significant**	• Subsoil removal is an unavoidable consequence of the construction works. A primary objective of the design of the works will be to minimise excavations and the volumes of soil to be removed. • Limited volumes of waste arisings are anticipated as a result of the construction activities. Where surplus soil cannot be reused it will be segregated and removed off site for treatment, recycling or disposal at an authorised waste management facility off site. The Waste Management Plan will address the analysis of waste arisings, methods proposed for the prevention, reuse and recycling of wastes and material handling procedures. • Ensuring that a CEMP is in place will mitigate any risks associated with the removal of superficial deposits thus reducing these impacts to an imperceptible level.
Impact on soils due to the potential for encountering contaminated ground	C	**Moderate/Slight significance**	• Regular testing of excavated soils. • Use of contaminated land management techniques to avoid mobilisation of contaminants. • Classification of material and appropriate storage. • Removal off site for treatment, recycling or disposal at an authorised waste management facility off site.
Impact on groundwater due to the potential for encountering contaminated ground	C	**Imperceptible – not significant**	
Impact on soils and groundwater due to accidental emission and release of potentially hazardous substances	O	**Moderate/Slight significance**	**Operational Phase** • Mitigation measures proposed for the construction phase will be implemented for maintenance operations, where relevant. • The site already includes designed in measures including a hydrocarbon interceptor and monitoring of stormwater and foul water in accordance with the facility EPA IED licence.

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
			Foul water discharge must currently comply with the EPA IED Licence Emission Limit Values (ELVs). Consideration will be given as to whether any adjustment is required to these ELVs to manage wastewater from the HRW process. • No further operational phase mitigation measures are proposed.
Impact on soils and groundwater due to accidental emission and release of potentially hazardous substances	D	**Slight significance**	**Decommissioning Phase** • Mitigation measures proposed for the construction phase will be implemented.

21.11 Material Assets

The environmental commitments provided in **Chapter 17 – Material Assets**, are summarised in **Table 21.11**.

Table 21.11: Material Assets Assessment Environmental Commitments

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
Impact on land use, utilities and waste management during construction phase	C	**Not significant**	**Construction** • Develop and implement a Resource and Waste Management Plan
Impact on land use, utilities, and waste management during construction phase	O	**Imperceptible - not significant**	**Operational Phase** • Best practice requirements: – BAT 11. BAT is to monitor the annual consumption of water, energy, and raw materials as well as the annual generation of residues and wastewater, with a frequency of at least once per year. – BAT 19. To optimise water consumption, to reduce the volume of wastewater generated and to prevent or, where that is not practicable, to reduce emissions to soil and water, BAT is to use an appropriate combination of the techniques: ○ Water management. ○ Water recirculation. ○ Impermeable surface. ○ Techniques to reduce the likelihood and impact of overflows and failures from tanks and vessels. ○ Roofing of waste storage and treatment areas. ○ Segregation of water streams. ○ Adequate drainage infrastructure. ○ Design and maintenance provisions to allow detection and repair of leaks. ○ Appropriate buffer storage capacity.

Potential Impact	C/O/D Phases	Impact Significance	Mitigation Measures
			• Develop and implement a Resource Waste Management Plan

21.12 Risk of Major Accidents and/or Disasters

The environmental commitments provided in **Chapter 18 – Risks of Major Accidents and/or Disasters**, are summarised in **Table 21.12**

Table 21.12: Major Accidents and Disasters Environmental Commitments

Potential Impact	C/O/D Phases	Mitigation Measures
Risk of road traffic accident	C	**Construction** • Refer to mitigation measures for Traffic and Transport (**Section 21.1**).
Accidental spillage	C	• Refer to mitigation measures for the management of Biodiversity (**Section 21.8**) and water (**Section 21.9**).
Extreme cold weather	C	The legislation will be adhered to includes: • Safety, Health & Welfare at Work (Construction) Regulations 2006 to 2013. • Safety, Health, and Welfare at Work (Construction) (Amendment) Regulations 2019 (S.I. No. 129 of 2019). • Safety, Health & Welfare at Work Act 2005. • Safety, Health & Welfare at Work (General Application) Regulations 2007 to 2016.
Disruption to critical utilities and infrastructure	O	Refer to mitigation measures for Material Assets (**Section 21.11**).
Accidental spillage	O	Refer to mitigation measures for the management of Biodiversity (**Section 21.8**), Water (**Section 21.9**) impacts and Land, Soil, Geology and Hydrogeology (**Section 21.12**).
Impact on critical utilities and infrastructure during decommissioning	D	• Implement mitigation measures as for construction phase.