

Limerick WWTP Upgrade and Regional Bioresource Centre

ElAR Chapter 20 - Major Accidents and Natural Disasters

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Formerly JB Barry Partners who became part of Egis in 2023

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Glossary and Defined Terms

Acronym	Description
AA	Appropriate Assessment
AASR	Appropriate Assessment Screening Report
ACP	An Coimisiún Pleanála
AD	Anaerobic Digestion
AGS	Aerobic Granular Sludge
AER	Annual Environmental Report
BOD	Biochemical Oxygen Demand
BC	Bioresource Centre
C	Carbon
CAFÉ	Clean Air for Europe Directive
CHP	Combined Heat and Power
DIN	Dissolved Inorganic Nitrogen
ECJ	European Court of Justice
EIAR	Environmental Impact Assessment Report
ELV	Emission Limit Value
EPA	Environmental Protection Agency
ESB	Electrical Supply Board
EU	European Union
FOG	Fats Oils and Grease
FST	Final Settling Tank
GHG	Greenhouse Gas
HGV	Heavy Goods Vehicle
MAND	Major Accidents and Natural Disaster
MLPS	Main Lift Pumping Station
MCA	Multi-Criteria Analysis
MRP	Molybdate Reactive Phosphate
IDA	Industrial Development Agency
IFAS	Integrated Fixed-Film Activated Sludge
N	Nitrogen
NDP	National Development Plan
NHA	National Heritage Area
NIS	Natura Impact Statement
NPF	National Planning Framework
NSO	National Strategic Outcomes
NSS	National Spatial Strategy
NWSMP	National Wastewater Sludge Management Plan
P	Phosphorous
PE	Population Equivalent - The amount of wastewater received at a treatment plant (and its design capacity) is measured in units known as population equivalent (or PE). The wastewater received from all sources, e.g. industrial, tourism, commercial, residential, etc., is converted into these units, with one unit of PE representing the wastewater treatment load typically generated by a single person.
PFF	Pass Forward Flow
PFT	Picket Fence Thickener

Acronym	Description
pNHA	Proposed National Heritage Area
SEA	Strategic Environmental Assessment
SBR	Sequencing Batch Reactor
SHC	Sludge Hub Centre
SIA	Stable Isotope Analysis
SID	Strategic Infrastructure Development
Sludge	Solid by-products of wastewater
SPA	Special Protection Area
SS	Suspended Solids
UWWTD	Urban Wastewater Treatment Directive
WFD	Water Framework Directive
WWDA	Wastewater Discharge Authorisation
WWTP	Wastewater Treatment Plant
WSPS	Water Services Policy Statement
ZTV	Zone of Theoretical Visibility
PS	Pumping Station
QI	Qualifying Interest
RAS	Return Activated Sludge
RBC	Regional Bioresource Centre
RSES	Regional Spatial and Economic Strategy
SAC	Special Area of Conservation
TDS	Total Dry Solids
THP	Thermal Hydrolysis Process

Departments and Stakeholders

Acronym (where applicable)	Departments & Stakeholders
ACP	An Coimisiún Pleanála
DPER	Department of Public Expenditure and Reform
CACNaT	Department of Climate Action, Communication Networks and Transport
DCCAE	Department of Communications, Climate Action and Environment – Changed in 2020
DCHG	Department of Culture, Heritage and the Gaeltacht – Changed in 2020
DoF	Department of Finance
DHPLG	Department of Housing, Planning and Local Government – Changed in 2020
HLGaH	Department of Housing, Local Government and Heritage
EPA	Environmental Protection Agency
GSI	Geological Survey Ireland
GWS	Group Water Schemes
IFI	Inland Fisheries Ireland
IR	Irish Rail (Iarnród Éireann)
UÉ	Uisce Éireann
LCCC	Limerick City & County Council
LA	Local Authority
NMS	National Monuments Service
NPWS	National Parks & Wildlife Service
NRA	National Roads Authority
NTA	National Transport Authority
OPW	Office of Public Works
OSi	Ordnance Survey Ireland
SRA	Southern Regional Assembly

20 MAJOR ACCIDENTS AND NATURAL DISASTERS

20.1 Introduction

20.1.1 Purpose of this Report

This Chapter of the Environmental Impact Assessment Report (EIAR) assesses the potential significant impacts of the Limerick WWTP and RBC project (hereafter referred to as the 'Proposed Development') on the environment, deriving from its vulnerability to risks of major accidents and / or disasters during the Construction Phase and Operational Phase.

The assessment is based on a reasonably foreseeable worst-case scenario with respect to Major Accidents and Disasters (MANDs) arising from the Proposed Development as described in Chapter 3 (The Proposed Development) of this EIAR. The Proposed Development description is based on the design prepared to inform the planning stage of the Proposed Development and to allow for a robust assessment as part of the EIA process.

The underlying objective of considering the risk of MANDs is to ensure that appropriate precautionary measures are taken for those projects with a likelihood of creating '*significant environmental impacts*' (Environmental Protection Agency (EPA) 2022) and with a focus on '*low likelihood but potentially high consequence events*' in accordance with guidance provided by the Institute of Environmental Management and Assessment (IEMA, 2020) (hereafter referred to as the IEMA Primer). A further objective is to ensure that the EIAR identifies measures to mitigate harm that could arise from those unlikely scenarios and ensure that it addresses preparedness and response planning.

This Chapter outlines how the potential for MANDs (Recital 15 of Directive 2014/52/EU) relevant to the Proposed Development have been identified and how those risks will be managed and/or controlled. Based on the requirements of the EIA Directive, this Chapter considers:

- The relevant MANDs, if any, that the Proposed Development could be vulnerable to;
- The potential for these MANDs to result in likely significant adverse environmental effects on people and local communities, and the natural, built and historic environments; and
- The existing and proposed mitigation and management measures to prevent and mitigate the likely significant adverse effects of such events on the environment.

20.1.2 Outline Project Description

The Proposed Development will cater for future population growth and industrial development in the area, in line with population projections for Limerick as set out in the National Planning Framework (NPF) Implementation Roadmap and the Southern Region Regional Economic Spatial Strategy (RSES). It will provide 20% Headroom allowance, in line with Uisce Éireann guidelines for large urban settlements. It will also ensure the WWTP continues to comply with requirements of the EPA Wastewater Discharge License (WWDL), Urban Wastewater Treatment Regulations (UWWTR) and other relevant Uisce Éireann Guidelines.

The initial upgrade works will cater for the +10-year growth projections, increasing to 285,000 PE including a future industrial committed load of 27,500 PE. There will be provision made in the civil infrastructural development of the plant (tank sizing and pipework) for the +25-year growth projections of 325,000 PE. However, a planning review will be required before any uplift above 285,000 PE can be instated.

The work requirements are split between Limerick WWTP and Corcanree Pumping Station (PS), both of which are situated on the banks of Limerick Dock, where the Lower River Shannon confluences with the Shannon Estuary. The proximity of the sites to the river are shown in Figure 20-1.

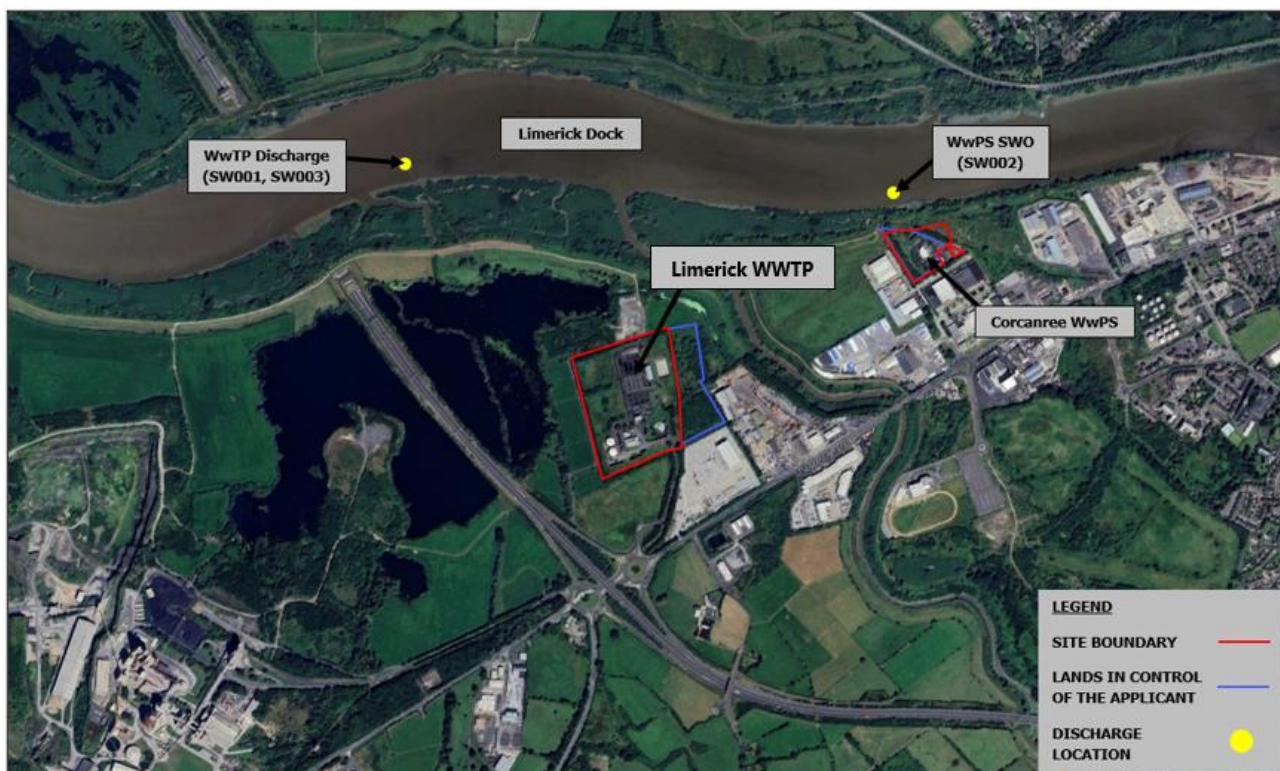


FIGURE 20-1 SITE LOCATION MAP

The WWTP will remain operational during the construction phase. All new structures will be constructed offline and connected during temporary shutdowns. The shutdowns will be planned in a manner that will not affect WWTP performance. Further information on the construction strategy and proposed works is included in Chapter 3 (The Proposed Development) and Chapter 4 (Construction Strategy).

Decommissioning of the Proposed Development is not envisaged at this time. Given the scale of the existing infrastructure, it is anticipated that Uisce Éireann will continue phased development to salvage and re-use as much of the installed infrastructure as possible as the demand in Limerick grows. Consolidating additional infrastructure at this location is considered beneficial and will help minimise future capital investment. The proposed layouts are designed to optimise land take and preserve capacity for future expansion. On this basis, decommissioning has been screened out.

20.1.3 Risk of Major Accidents and/or Disasters

Article 3 of 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 (hereafter referred to as the Environmental Impact Assessment (EIA) Directive) requires for the assessment of expected effects of major accidents and / or disasters within environmental impact assessment (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.'

In addition, Annex IV of the EIA Directive 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 Council (1) or Council Directive 2009/71/Euratom (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 Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the EPA Guidelines) (EPA, 2022) elaborate on risk assessment further under Section 3.7.3:

'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).'

Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major-accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EU (hereafter referred to as the Seveso III Directive) is also relevant to this assessment. S.I. No. 209/2015 – Chemical Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (hereafter referred to as the COMAH Regulations) transposed the Seveso III Directive into Irish law.

The Seveso III Directive and the COMAH Regulations outline the legal obligations for operators of industrial establishments where dangerous substances are stored. These establishments are referred to as Seveso sites and are classified as Upper Tier or Lower Tier establishments. As per Regulation 25 of the COMAH Regulations, Upper Tier establishments are required to submit information regarding their operations to the Health and Safety Authority (HSA). Each Seveso site has a consultation zone which is the 'area liable to be affected by a major accident' at the site (Department of the Environment, Community and Local Government (DECLG), 2021). Therefore, if a development falls within the specified consultation zone of a Seveso site, the HSA must be consulted.

20.1.4 Definitions

At the time of undertaking this assessment, no clear definition of the term 'major accident and / or disaster' has been outlined in the context of the EIA Directive. For the purpose of this assessment, the following definitions from the Institute of Environmental Management and Assessment (IEMA) Major Accidents and Disasters in EIA: A Primer (hereafter referred to as the IEMA Primer) (IEMA, 2020) have been adopted:

- Accident – something that happens by chance or without expectation;
- Disaster – a natural hazard (e.g. earthquake) or a man-made / external hazard (e.g. act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident;
- Major Accident – events that threaten immediate or delayed serious environmental effects to human health, welfare and / or the environment and require the use of resources beyond those of the client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g. train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events;
- Risk – the likelihood of an impact occurring, combined with the effect or consequence(s) of the impact on a receptor if it does occur;
- Risk event – an identified, unplanned event, which is considered relevant to the Proposed Development and has the potential to result in a major accident and / or disaster, subject to assessment of its potential to result in a significant adverse effect on an environmental receptor;
- Vulnerability – describes the potential for harm as a result of an event, for example due to sensitivity or value of receptors. In the context of the EIA Directive, the term refers to 'exposure and resilience' of the Proposed Development to the risk of a major accident and / or disaster. Vulnerability is influenced by sensitivity, adaptive capacity and magnitude of impact; and
- Significant environmental effect (in relation to a major accident and / or disaster assessment) – includes 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.

In the context of MANDs, the understanding of what constitutes as a 'Significant' effect differs from the criteria for significance under the EPA Guidelines (EPA, 2022). The IEMA Primer (2020) definition of significance has

been adopted for this assessment which defines a 'Significant Environmental Effect' as one that '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'.

The assessment of MANDs within this Chapter of the EIAR considers the occurrence of extreme and highly unlikely incidences. As such, it considers accident scenarios that would not reasonably be covered by the other topic assessments.

20.2 Methodology

The identification, control and management of risk is an integral part of the design and assessment process throughout all stages of a project lifecycle. The scope and methodology of this assessment is centred on the understanding that the Proposed Development will be designed, built and operated in line with best international current practices and guidelines. As a result, major accidents resulting from the Proposed Development will be very unlikely.

The elements of the Proposed Development that incorporate measures that are designed to eliminate, reduce, isolate, control or exploit the occurrence of major accidents have been described throughout this EIAR, where required. Measures to control risks associated with Construction Phase activities are incorporated into the Construction Environmental Management Plan (CEMP) in Appendix 4.1 in Volume 4 of this EIAR.

The assessment has considered the operational elements associated with the Regional Bioresource Centre, including anaerobic digestion, biogas generation, biogas storage and associated Combined Heat and Power (CHP) infrastructure. These elements have the potential, in the absence of appropriate design, operational and management controls, to give rise to major accident scenarios including fire, explosion or accidental gas release. The vulnerability of the Proposed Development to such events, and the potential for consequential environmental effects, has therefore been considered within the risk identification and assessment process. These risks are mitigated through embedded design measures, compliance with relevant design standards, operational controls, fire safety risk assessment, gas detection/alarm systems, emergency response procedures and ongoing maintenance and inspection regimes.

The methodology for this risk assessment is as follows:

- Identify major accidents and / or disasters (i.e. unplanned incidents) that the Proposed Development may be vulnerable to; and
- Assess the consequent impacts and significance of such incidents in relation to the environmental, social and economic receptors that may be affected.

Such risks may be present at the Construction Phase and / or Operational Phase of the Proposed Development.

20.2.1 Risk Assessment Methodology

This Section sets out how each assessment topic has been undertaken and highlights where input from other environmental disciplines has been included within the risk of major accidents and disasters assessment. In accordance with the approach presented in the IEMA Primer (IEMA, 2020), the assessment follows three stages (screening, scoping, assessment) as follows:

- Screening;
- Scoping; and
- Assessment.

20.2.1.1 Screening

The first stage of the assessment is to identify potential unplanned risks that the Proposed Development may be vulnerable to. 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."

An initial list of relevant hazards which may make the Proposed Development vulnerable to major accidents and / or disasters were sourced through consultation with relevant environmental specialists and the Project Team, and by consulting the guidelines and reference documentation, and grouped into “risk events”.

The list of potential risk events that could lead to major accidents and / or disasters was subjected to an initial screening assessment to identify those that meet the scoping criteria. Where appropriate, risk events were screened out of the assessment according to the following scoping criteria:

- Major accidents and / or disasters associated with Construction Phase and Operational Phase activities that fall within the scope of health and safety legislation and associated obligations;
- Major accidents and / or disasters as a result of Seveso sites, for which the Proposed Development does not fall within the specified consultation distance for that Seveso site and for which the Proposed Development has no significant interaction with access to the designated hospital(s) and fire stations identified on a Seveso site’s emergency plans;
- Risk events where no ‘source-pathway-receptor’ linkage exists to result in a major accident and / or disaster (i.e. an oil spill occurring at an oil depot that is not located near to a watercourse and for which there is no pathway from source to receptor);
- Major accidents and / or disasters where risk events are not applicable to that particular geographic location (e.g. volcanic activity, earthquakes and risk of nuclear accidents in Ireland);
- Risk events in relation to users of the Proposed Development infrastructure during the Operational Phase, as the scope of this assessment for the Operational Phase relates to the provision of infrastructure only and not to the use of that infrastructure;
- Risk events that possess low likelihood / low consequence, as they do not meet the criteria to be brought forward for further consideration (i.e. they do not meet the definition of a major accident and / or disaster), for example the risk of traffic accidents on the wider road network causing delays to Construction or Operational Phase vehicles;
- Risk events that possess high likelihood / high consequence, as these would be considered high risk and unacceptable for the development of the Proposed Development; and
- Risk events in relation to existing emergency access arrangements and response plans for facilities in the vicinity of the Proposed Development. Emergency accesses in the vicinity of the Proposed Development will be retained insofar as is possible throughout the Construction Phase. Where construction works for the Proposed Development will interface with emergency access arrangements, the appointed contractor will consult with the affected landowners / site operators and the emergency services to agree, where required, alternative emergency access arrangements and changes to response plans for the duration of the works.

20.2.1.2 Scoping

If the Proposed Development is screened in for an assessment of MAND at Stage 1, Stage 2 aims to provide a more detailed assessment as to the potential for significant effects. The IEMA Primer (2020) states that the assessment of impacts in relation to MAND 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 Proposed Development to lead to a significant environmental effect”; or
- 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”.

20.2.1.3 Stage 3 Assessment

The assessment stage provides further explanation on the likelihood of a risk event taking place and identifies the need for additional mitigation measures. Hazards that are screened in at Stage 2 are evaluated at Stage 3 for further consideration. The following measures form the Stage 3 assessment:

- Setting the baseline;
- Assessment; and
- Mitigation.

20.2.2 Study Area / Zone of Influence

For the purposes of this chapter, the Study Area includes the extent of the Proposed Development, as well as any haul routes to and from the Proposed Development during the Construction and Operational Phases.

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

20.2.3 Relevant Guidelines, Policy and Legislation

The development of the risk assessment methodology has been informed by the following guidelines:

- S.I. No. 291 of 2013 - Safety, Health and Welfare at Work (Construction) Regulations 2013 (as amended) (hereafter referred to as the Safety, Health and Welfare (Construction) Regulations);
- Safety, Health and Welfare at Work Act 2005 as amended (hereafter referred to as the Safety, Health and Welfare at Work Act);
- S.I. No. 138/2012 - Building Regulations (Part A Amendment) Regulations 2012 (as amended);
- S.I. No. 299/2007 - Safety, Health and Welfare at Work (General Application) Regulations 2007 as amended (hereafter referred to as the Safety, Health and Welfare at Work (General Application) Regulations);
- Environmental Protection Agency (EPA) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (hereafter referred to as the "EPA Guidelines (EPA, 2022)
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission , 2017)
- IEMA Primer (IEMA, 2020)
- A National Risk Assessment for Ireland 2020 (Department of Defence , 2021)
- A National Risk Assessment for Ireland 2023 (Government of Ireland, 2023)
- Climate Action Plan 2025 (Government of Ireland, 2025);
- Strategic Emergency Management National Structures and Framework (Department of Defence , 2017)
- Guidance on Assessing and Costing Environmental Liabilities (EPA, 2014)
- A Framework for Major Emergency Management. Guidance Document (DECLG , 2021)
- The Department of Environment, Heritage and Local Government (DEHLG) A Framework for Major Emergency Management. A Guide to Risk Assessment in Major Emergency Management (Department of Environment, Heritage and Local Government (DHLGH, 2021);
- Limerick Development Plan 2022 – 2028 (LCCC, 2022); and
- Major Emergency Plan for Limerick City and County Council (LCCC, 2014) has also informed the assessment.

The following project-specific documents have also informed the assessment:

- CEMP
- Flood Risk Assessment.

It is envisaged that construction will commence in Q1 2028, with an expected construction programme to reach completion in Q2 2031.

20.2.4 Appraisal Method for the Assessment of Impacts

FOLLOWING THE INITIAL SCREENING AND SCOPING PROCESS, THE MAJOR ACCIDENTS AND / OR DISASTERS RISK EVENTS THAT WERE BROUGHT TO THE STAGE 3 ASSESSMENT WERE EVALUATED BASED ON LIKELIHOOD OF OCCURRENCE

Table 20-1 and consequence of impact Table 20-2.

The rating criteria adopted for the assessment follows that used in A National Risk Assessment for Ireland 2020 (DHLGH, 2021) combined with guidance from IEMA Primer and guidelines provided in the EPA Guidelines. The EPA Guidelines state that the risk assessment must be based on a 'worst-case' approach. Therefore, the consequent rating assumes that all embedded design mitigation measures and safety procedures have failed to prevent the MANDs.

TABLE 20-1: CLASSIFICATION OF LIKELIHOOD (DOD 2021)

Rating	Classification	Impacts Description
1	Extremely Unlikely	May occur only in exceptional circumstances; once every 100 or more years.
2	Very Unlikely	Is not expected to occur; no recorded incidents or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communities; and/or little opportunity, reason or means to occur. 51 - 100 years between occurrences.
3	Unlikely	May occur at some time; and / or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisations worldwide; some opportunity, reason or means to occur. May occur once every 11 to 50 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence. Will probably occur once every one year to 10 years.
5	Very Likely	Very likely to occur; high level of recorded incidents and / or strong anecdotal evidence. Will probably be ongoing or occur more than once a year.

TABLE 20-2: CLASSIFICATION OF CONSEQUENCES

Rating	Classification 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 people for population of interest OR Critical injuries/illness less than 1 in 250,000 OR Serious injuries less than 1 in 100,000 OR Minor injuries only. Environment: Simple, localised contamination only. Economic: Up to 1% of Annual Budget. Social: Limited disruption to community
2	Low Impact	Moderate	People: Deaths greater than 1 in 250,000 people for population of interest OR Critical injuries/illness greater than 1 in 250,000 OR Serious injuries greater than 1 in 100,000. Environment: Simple, regional contamination, effects of short duration. Economic: Greater than 1% of Annual Budget. Social: Community is functioning but with considerable inconvenience.
3	Moderate Impact	Significant	People: Deaths greater than 1 in 100,000 people for population of interest OR Critical injuries/illness greater than 1 in 100,000 OR Serious injuries greater than 1 in 40,000. Environment: Heavy contamination, localised effects of extended duration. Economic: Greater than 2% of Annual Budget. Social: Community is functioning poorly.

Rating	Classification Potential Impact (Department of Defence, 2021)	Significance of Effects (EPA, 2022)	Description
4	High Impact	Very Significant	People: Deaths greater than 1 in 40,000 people for population of interest OR Critical injuries/illness greater than 1 in 40,000 OR Serious injuries greater than 1 in 20,000. Environment: Heavy contamination, widespread effects of extended duration. Economic: Greater than 4% of Annual Budget. Social: Community only partially functioning
5	Very High Impact	Profound	People: Deaths greater than 1 in 20,000 people for population of interest OR Critical injuries/illness greater than 1 in 20,000. Environment: Very heavy contamination, widespread effects of extended duration. Economic: Greater than 8% of Annual Budget. Social: Community is unable to function without significant support.

Risk Evaluation

The evaluated major accidents and / or disasters risk events that are scoped in at Stage 2 are compared to a risk matrix to determine the level of significance of each risk event. The resultant risk events are grouped according to three categories:

- **High Risk** – events that have an evaluation score of 15 to 25, as indicated by the Red Zones in Table 20-3;
- **Medium Risk** – events that have an evaluation score of 8 to 12, as indicated by the Amber Zone in Table 20-3; and
- **Low Risk** – events that have an evaluation score of 1 to 6, as indicated by the Green Zone in Table 20-3.

TABLE 20-3: LEVELS OF SIGNIFICANCE

Likelihood	5 - Very Likely	5	10	15	20	25
	4 - Likely	4	8	12	16	20
	3 - Unlikely	3	6	9	12	15
	2 - Very Unlikely	2	4	6	8	10
	1 - Extremely Unlikely	1	2	3	4	5
		1 - Slight	2 - Moderate	3 - Significant	4 - Very Significant	5 - Profound
Consequence of Impact						

As previously outlined, significant impacts resulting from major accidents and / or disasters are adverse impacts that *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* (IEMA 2020). Consequently, major accidents and / or disasters risk events that fall within the Amber or Red Zones ('Medium' or 'High' risk events) are considered to present risk of significant impacts and are brought forward for further consideration and assessment for mitigation

20.3 Baseline Environment

20.3.1 Current Baseline Environment

The following sections provide a broad overview of the existing conditions that may influence the vulnerability of the Proposed Development. It considers the proximity to Seveso Sites/COMAH Establishments, which are subject to stringent safety measures to prevent and mitigate accidents involving hazardous substances. Additionally, it examines the surrounding infrastructure, including utilities and waste facilities, to identify any potential impacts or risks. Natural hazards and climate conditions are also reviewed to understand their influence on the Proposed Development. This comprehensive approach ensures that all relevant factors are considered, facilitating informed decision-making for the project.

20.3.1.1 Seveso Sites/COMAH Establishment

The Major Accidents (Seveso III) Directive (2012/18/EU) aims to prevent significant industrial accidents involving hazardous substances and to mitigate the consequences of such accidents on human health and the environment. The COMAH Regulations 2015 mandate that operators of facilities storing, handling, or processing dangerous substances above specified thresholds implement necessary measures to avert major accidents and minimise their consequences. Facilities are classified as either upper tier or lower tier based on their inventory of dangerous substances, while those below the threshold are not subject to these regulations.

A review of Upper Tier and Lower Tier Seveso sites and their respective distances from the Proposed Development was undertaken. In Limerick, there are two No. Upper Tier Seveso Sites and three No. Lower Tier Seveso Sites.

Upper Tier

- Atlantic Fuels Supply Company, Foynes Harbour, Durnish, Co. Limerick, located west of Limerick WWTP site in a distance of 28.9km from the site boundary;
- Goulding Soil Nutrition, Morgan's South, Askeaton, Co. Limerick, west of Limerick WWTP site in a distance of 24.1km from the site boundary

Lower Tier

- Chemifloc Foynes Ltd located northwest of the Limerick WWTP in a distance of 15.5km from the site boundary;
- Analog Devices International located 2.5km south of Limerick WWTP site boundary; and
- Grasslands Agro Limited located in the Dock Road, south of Corcanree PS in a distance of 200m from site boundary.

Location of these Seveso Sites are provided in Figure 20-2 below.

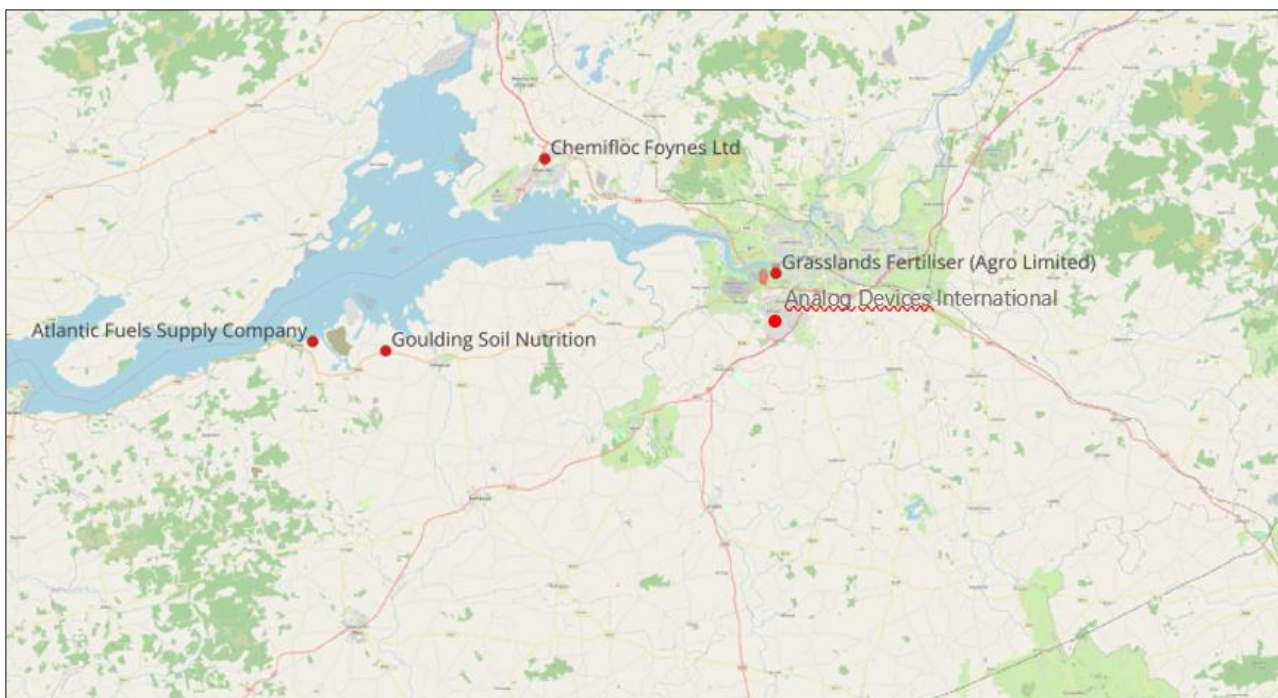


FIGURE 20-2 SEVESO SITES

The HSA provides advice, where appropriate, in respect of planning applications within the consultation distance of a Seveso site and the Planning Authority will be guided by advice provided by the HSA in addition to normal planning criteria. The Proposed Development does not fall within the consultation zone for any of the identified Seveso sites, and therefore the HSA will not be consulted by the Planning Authority as per the COMAH Regulations.

The nearest Upper COMAH establishment to the Proposed Development is Goulding Soil Nutrition, Askeaton. This establishment is located to the north-west of Askeaton and approximately 24.1km from the closest point of the Limerick WWTP. In terms of Lower Tier Sites, the closest establishment to the Proposed Development is Grasslands Agro Limited, which has a consultation distance of 200m from Corcanree PS site and within 700m of Limerick WWTP site.

A review of the Traffic Impact Assessment reported in Chapter 6 (Traffic & Transport) of this EIAR has also been undertaken to determine the potential for impacts on emergency response accesses to Seveso sites from their respective nearest hospital and fire stations. No significant impacts on emergency response times are anticipated.

20.3.1.2 Built Service Infrastructure

Infrastructure associated with utilities has been identified and confirmed through consultation, desktop reviews and site investigations. Known utilities within the extents of the Proposed Development include electricity, telecommunications, water mains and foul sewers. Utility providers have been consulted in relation to the Proposed Development and further detail is presented in Chapter 18 (Material Assets) of this EIAR.

20.3.1.3 Waste and Licenced Facilities

The existing facilities currently licenced by the EPA under Waste, Integrated Pollution Control (IPC) and Industrial Emissions (IE) licences across the Southern Waste Management Region are outlined in Chapter 17 (Resource and Waste Management) of this EIAR. None of which are impacted by the Proposed Development.

20.3.1.4 Contaminated Land and Unlicenced Sites

Ground Investigations conducted for the Proposed Development did not uncover the presence of contaminated land. However, exposure of locations of contamination and excavation of contaminated soil during construction phase may potentially lead to a risk to the surrounding environments or underlying soil if

not dealt with in an appropriated manner in accordance with the EPA guidance on land contamination. For further information on Contaminated land refer to Chapter 13 (Land & Soils) on Volume 2 of the EIAR.

20.3.1.5 Natural Hazards

Ireland's evolving climate system poses a risk to infrastructure and development across the country. The EPA Research Report No. 386 'The Status of Ireland's Climate, 2020' highlights the following changes with regards to Ireland's climate:

- The annual average surface air temperature in Ireland has increased by approximately 0.9°C over the last 120 years, with a rise in temperatures being observed in all seasons;
- 15 of the top 20 warmest years on record have occurred since 1990;
- Annual precipitation was 6% higher in the period 1989 to 2018, compared to the 30-year period 1961 to 1990 and the decade 2006 to 2015 was the wettest on record;
- Satellite observations indicate that the sea level around Ireland has risen by approximately 2-3mm/year since the early 1990s;
- The average sea surface temperature at Malin Head over the 10 years between 2009 and 2018 was 0.47°C above the 1981-2010 mean;
- River flows are generally increasing across the country. However, more recent data indicates that flows may be decreasing in the south and east of the country; and
- The area of forests and artificial surfaces has increased since 1990, while a decrease in wetland areas has been observed. The growing stock of forestry has increased by approximately 38% between 2006 to 2017, thereby increasing the amount of carbon sequestered.

Climate projections for the future indicate that observed climate trends will continue and intensify over the coming decades including the following:

- Changes in wind speeds and storm tracks;
- Increased likelihood of river and coastal flooding;
- Changes in distribution of plant and animal species and in the phenology (the timing of lifecycle events) of native species;
- Water stress for crops, pressure on water supply and adverse impacts on water quality; and
- Negative impacts on human health and wellbeing.

As indicated above, there has been an increase in the number of severe weather events across Ireland, particularly storms resulting in flash flood events. Refer also to Chapter 8 (Air Quality and Climate) for further detail on the impact of Ireland's evolving climate.

20.3.1.6 Flooding and Flood Risk

A Flood Risk Assessment has been carried out for the Proposed Development in accordance with 'The Planning System and Flood Risk Management Guidelines for Planning Authorities' published in November 2009. Sources of flood risk are identified and addressed in Chapter 16 (Water) of the EIAR, with a site-specific Flood Risk Assessment presented as Volume 4 - Appendix 16.2 of this EIAR.

The Flood Risk Assessment concluded that as the sites are located within a defended area and based on the residual risk of breaching that exists, a further assessment of the development proposed in the floodplain was deemed necessary for Corcanree PS.

The Shannon CFRAMS tidal flood extent maps indicates that Corcanree PS site lies within Flood Zone B. The national flooding website www.floodmaps.ie uncovered 1 No. record of historic flooding at the site (>20 years ago). The root cause of this flooding has since been rectified. There is no reliance on existing defences to protect the development. Ultimately, the risk of downstream flooding is not increased as a result of the Proposed Development.

There will be no increase in surface runoff arising from the proposed development. It is proposed to implement SuDS measures in order to limit the discharge from the site. The implementation of these SuDS measures will not increase the risk of flooding elsewhere.

20.4 Potential Impacts

20.4.1 Do Nothing Scenario

With respect to risk of major accidents and / or disasters, the 'Do Nothing' scenario means that there are no changes to existing infrastructure or utilities as a result of the Proposed Development. Therefore, there would be a Neutral impact on risk of major accidents and / or disasters under the 'Do Nothing' scenario.

20.4.2 Risk Evaluation

20.4.2.1 Stage 1 – Screening

The need to consider MAND has been screened in for the Proposed Development. This is based on the potential for the following scenarios:

- The Proposed Development could result in a MAND;
- The Proposed Development is vulnerable to hazards resulting from a MAND that are not related to the Proposed Development; and
- The Proposed Development could exacerbate the risk of significant adverse impacts, if a MAND that is not related to the Proposed Development were to occur.

20.4.2.2 Stage 2 – Scoping

To understand the potential for significant effects as a result of MAND associated with the Proposed Development, a scoping exercise was completed. A number of potential risk events were scoped out based on the following rationale:

- The potential for the Proposed Development to cause a significant environmental impact was minimal;
- The absence of a source-pathway-receptor linkage;
- Sufficient mitigation was included through design to render the hazard not significant; or
- The hazard was assessed and addressed in other EIAR Chapters and/or associated documentation.

Risk events that contain both a source-pathway-receptor linkage and have the potential to cause a significant environmental impact have been brought forward into the Stage 3 Assessment. The Scoping Assessment presented in Table 20-4 below outlines the potential risks for both the construction and operational phase of the Proposed Development.

TABLE 20-4: STAGE 2 – SCOPING ASSESSMENT

Event	Potential Receptors	Scoping Assessment
Construction Phase		
Accidents at Seveso Sites / COMAH Establishments	- Human Health - Population - Material Assets: Infrastructure & Utilities - Biodiversity	Scope In: Fire/explosion and equipment/infrastructure failure at Seveso Sites could result in an off-site environmental impact. The Project extents are within the consultation zone of Grassland Agro Limited, which is the defined area liable to be affected by a major accident. On this basis, there is evidence of a pathway linkage.
Biosecurity	Biodiversity	Scope In: There is a risk that Invasive Species are spread during construction works, particularly during site clearance works.
Collapse / Damage to Structures	- Human Health - Population - Material Assets: Infrastructure & Utilities - Water Environment	Scope In: The construction strategy for the proposed structures is vulnerable to extreme weather events which could result in an environmental pollution event or injury to construction personnel. There is also a risk that existing buildings / structures will be damaged as a result of the proposed works.
Extreme Weather Events (heavy rainfall events, storms, prolonged flooding)	- Human Health - Population - Material Assets: Infrastructure - Biodiversity - Water Environment	Scope In: Extreme flood events have the potential to flood the construction site, which stores construction material and equipment that are considered potential sources of contaminants. The project could also exacerbate the risk of flooding during construction by temporarily increasing hard standing in areas that are currently greenfield, increasing the potential for flood risk related impacts on human health.
Ground Collapse	- Human Health - Population - Material Assets: Infrastructure & Utilities - Land, Soils & Geology	Scope In: There is a risk of excavation works leading to subsidence of land / encountering unstable ground during construction.
Impact on Utilities	- Human Health - Population - Material Assets: Utilities	Scope In: During excavation works associated with the Proposed Development, there is a risk of striking and damaging existing infrastructure, including: - Water mains; - Low voltage overhead lines; - Medium voltage underground cables; and

Event	Potential Receptors	Scoping Assessment
		Low voltage underground cables. Service strikes pose varying levels of risk. For this reason, the consequences of striking or damaging existing utilities are assessed separately in Table 20-4.
Industrial Accident	- Human Health - Population - Material Assets: Infrastructure & Utilities	Scope Out: There is a risk of an explosion / fire occurring at adjacent facility containing flammable / hazardous substances (i.e. petrol station). As the proposed construction works are not located along the route to the local emergency services for these Seveso Sites, emergency access response times will not be delayed.
Major Road Traffic Accident	- Human Health - Population - Material Assets: Infrastructure & Utilities	Scope In: The additional HGVs increases the risk of a road traffic accident along haulage routes or the surrounding road network during the construction stage.
Release of Construction Related Debris to Waterbodies and Ecological Receptors	- Human Health - Population - Biodiversity - Water Environment	Scope In: There is a potential risk for accidental pollution and / or long-term seepage of pollutants into surrounding watercourses during construction. Potential scenarios include fuel spillage during tanker unloading / delivery operation or surface water run-off during construction.
Leakage and Spillage Incidents of Wastewater into Surface Waterbodies or Groundwater	- Human Health - Population - Biodiversity - Water Environment	Scope In: Failure of, or damage to, WWTP infrastructure or inlet works could potentially result in the discharge or spillage of untreated wastewater into the surrounding watercourses or groundwater table.
Tree Stability	- Human Health - Population - Material Assets: Infrastructure & Utilities - Biodiversity	Scope In: There is a risk of trees with unstable roots falling during surface and excavation works which creates potential for contact with overhead lines, buildings and site workers.
Operational Phase		
Accidents at Seveso Sites / COMAH Establishments	- Human Health - Population	Scope In: The Proposed Development is within the consultation zone of Grassland Agro Limited, indicating it is vulnerable to adverse impacts in the event of an accident at the nearby Seveso Site. In the event of an accident, Grassland

Event	Potential Receptors	Scoping Assessment
	Material Assets: Infrastructure & Utilities	Agro Limited will have an emergency response plan registered with the HSA. The Proposed Development will have no significant interaction with access to hospitals or fire stations.
Collapse / Damage to Structures	- Human Health - Population - Material Assets: Infrastructure & Utilities - Water Environment	Scope Out: The proposed structures are not considered vulnerable to failure as it has been designed in line with all relevant design standards. Design measures for structures are sufficient to reduce the risks to appropriate levels for the nature of the Proposed Development.
Extreme Weather Events	- Human Health - Population - Material Assets: Infrastructure & Utilities - Water Environment	Scope In: The Proposed Development is considered vulnerable to intense flood events due to the introduction of additional hardstanding and the loss of drainage via infiltration. Furthermore, this additional hardstanding also has the potential to exacerbate the existing fluvial flood extents during extreme weather events.
Ground Collapse	- Human Health - Population - Material Assets: Infrastructure & Utilities	Scope Out: The proposed earthworks have been mitigated by design in line with all relevant geotechnical standards.
Industrial Incident	- Human Health - Population - Material Assets: Infrastructure & Utilities	Scope Out: In the event of an explosion / fire occurring at adjacent facility containing flammable / hazardous substances (i.e. petrol station), the Proposed Development will have no significant interaction with access to hospitals or fire stations.
Major Road Traffic Accident	- Human Health - Population - Material Assets: Infrastructure & Utilities	Scope Out: HGV traffic is commonplace in this industrial area and HGVs associated with the Regional Bioresources Centre will contribute to existing traffic patterns rather than alter traffic on the surrounding road network.
Long-term Release of Pollutants to Waterbodies and Ecological Receptors	- Human Health - Population - Biodiversity - Water Environment	Scope In: Equipment failure, power failure or employee negligence could result in the seepage of pollutants including fuel or chemical solvents into surface waterbodies or the groundwater table, which could lead to a MAND for the aquatic environment.

Event	Potential Receptors	Scoping Assessment
Leakage and Spillage Incidents of Wastewater into Surface Waterbodies or Groundwater	- Human Health - Population - Biodiversity - Water Environment	Scope In: Failure of, or damage to, WWTP infrastructure or inlet works could potentially result in the discharge or spillage of untreated wastewater into the surrounding watercourses or groundwater table.
Fire / Explosion / Accidental Gas release	- Human Health - Population - Biodiversity - Water Environment	Scope In: Equipment failure, power failure or employee negligence could result in a fire, explosion or accidental gas release associated with the operation of the Regional Bioresource Centre, including anaerobic digestion, biogas generation, biogas storage and associated CHP infrastructure.

20.4.2.3 Stage 3 Assessment

Stage 3 of the assessment presents a more detailed evaluation of the risk events scoped in as part of the Stage 2 assessment. It is noted that some of these risks are closed out through design, without the need for secondary mitigation.

The key objective of this risk register is to identify whether additional mitigation and/or management measures are required (above those mitigation measures that have already been embedded in the current design) to manage the identified risks to the environment to be “as low as reasonably practicable” (ALARP). It is important to reiterate that this assessment will typically focus on *‘low likelihood but potentially high consequence events’* (IEMA, 2020).

Table 20-5 below presents an evaluation of the risk events and hazards based on their likelihood and resulting level of impact.

TABLE 20-5: STAGE 3 ASSESSMENT

Risk ID	Event	Likelihood	Rating	Consequence	Rating	Resulting Risk Category	Mitigation	Secondary Mitigation Required?
Construction Phase								
C1	Accidents at Seveso Sites / COMAH Establishments	V. Unlikely	2	Moderate Potential fatalities and injuries. Hazards associated with the explosion to neighbouring residents, businesses and activities. Potential to discharge deleterious material to adjacent watercourses	3	Low	In the event of an accident, the establishment will have an emergency response plan registered with the HSA. Consultation will be carried out by UÉ with Grasslands Agro and the HSA prior to works commencing.	No – dealt with through COMAH Establishment Emergency Response Plan, further mitigation or management plans are not required.
C2	Utilities – Risk of exposure to and release of untreated wastewater due to the strike of existing infrastructure during excavation	Unlikely	3	Low Potential injury Hazards associated with exposure to untreated wastewater (diseases etc.) Potential untreated wastewater to discharge to adjacent watercourses	2	Low	Chapter 18 (Material Assets) considers the hazards posed to critical infrastructure and details the proactive engagement with service providers that has been undertaken to reduce the risk associated with the Proposed Development. The Contractor will be required to continue ongoing engagement with service providers and local stakeholders throughout the construction phase.	No.
C3	Utilities – Risk of striking water mains supply	Unlikely	3	Low Potential injury for nearby personnel and potential displacement of local residences and	2	Low	Chapter 18 (Material Assets) considers the hazards posed to critical infrastructure and details the proactive engagement with service providers that has been undertaken to reduce the risk associated with the Proposed Development. The Contractor will be	No.

Risk ID	Event	Likelihood	Rating	Consequence	Rating	Resulting Risk Category	Mitigation	Secondary Mitigation Required?
				business in the event of flooding.			required to continue ongoing engagement with service providers and local stakeholders throughout the construction phase.	
C4	Utilities – Risk of striking and damaging low voltage overhead lines (such as telecoms, fibre optics etc.) that cross the Proposed Development	Unlikely	3	Low Localised disruption / inconvenience to community	2	Low	Chapter 18 (Material Assets) considers the hazards posed to critical infrastructure and details the proactive engagement with service providers that has been undertaken to reduce the risk associated with the Proposed Development. The Contractor will be required to continue ongoing engagement with service providers and local stakeholders throughout the construction phase.	No.
C5	Utilities – Risk of striking and damaging high voltage underground cables during excavation	Very Unlikely (Easiest cables to detect remotely and have warning marker tapes above them)	2	Moderate Potential fatalities and injuries Potential to lead to fire and associated effects Potential to disrupt electricity / telecoms supply	3	Low	Chapter 18 (Material Assets) considers the hazards posed to critical infrastructure and details the proactive engagement with service providers that has been undertaken to reduce the risk associated with the Proposed Development. The Contractor will be required to continue ongoing engagement with service providers and local stakeholders throughout the construction phase.	No.
C6	Utilities – Risk of striking and damaging low voltage underground cables (telecoms, fibre optic etc.) during excavation	Unlikely	3	Low Localised disruption / inconvenience to community	2	Low	Chapter 18 (Material Assets) considers the hazards posed to critical infrastructure and details the proactive engagement with service providers that has been undertaken to reduce the risk associated with the Proposed Development. The Contractor will be required to continue ongoing	No.

Risk ID	Event	Likelihood	Rating	Consequence	Rating	Resulting Risk Category	Mitigation	Secondary Mitigation Required?
							engagement with service providers and local stakeholders throughout the construction phase.	
C7	Tree Stability	Unlikely	3	Low Potential fatality and injuries Localised effects and short duration. Potential for some minor damage to local infrastructure	2	Low	All tree work is to follow the principles of <i>BS3998: 2010 Tree work– Recommendations</i> and must be carried out by suitably qualified and insured contractors. Should the requirement for tree works be identified, this will be discussed with a suitably qualified arboriculturist.	No.
C8	Ground Collapse	Unlikely	3	Low Potential fatality and injuries Localised effects and short duration.	2	Low	The geotechnical hazards have been assessed through a comprehensive site investigation and mitigated through design in line with best practice guidance. See Chapter 14 (Land & Soils) for further information.	No.
C9	Major Road Traffic Accident	Unlikely	3	Low Potential fatality and injuries Increased traffic to local road network infrastructure Spillage of contaminants such as fuels	2	Low	Construction phase traffic hazards have been assessed and addressed in Chapter 6 (Traffic & Transport) and mitigation has been proposed, including but not limited to the following measures: ■ A CTMP will be prepared and updated by the Contractor throughout the construction phase; ■ Appropriate signage will inform road users of the ongoing construction works; and ■ Dedicated haulage routes and access points are to be agreed.	No.
C10	Release of Construction Related Debris to	Unlikely	3	Moderate Potential to cause environmental	3	Medium	Refer to Chapter 12 (Biodiversity Marine), Chapter 13 (Biodiversity Terrestrial and Chapter 14 (Land & Soils)	Yes, a CEMP and EIRP have also been prepared and will be updated by the

Risk ID	Event	Likelihood	Rating	Consequence	Rating	Resulting Risk Category	Mitigation	Secondary Mitigation Required?
	Waterbodies and Ecological Receptors			damage to the aquatic environment and associated species and to ecologically designated areas			and Chapter 16 (Water) of this EIAR for full details on design and mitigation measures to be put in place, to prevent contamination events.	Contractor, having regard to best practice guidance. Refer to Section 20.5.2.1 of this report for further detail.
C11	Leakage and Spillage Incidents of Wastewater into Surface Waterbodies or Groundwater	Unlikely	3	Moderate Contamination with extended duration and potential to lead to more widespread effects	3	Medium	Refer to Chapter 13 (Biodiversity Terrestrial) and Chapter 14 (Land & Soils) and Chapter 16 (Water) of this EIAR for full details on design and mitigation measures to be put in place, to prevent contamination events.	Yes, a CEMP and EIRP have also been prepared and will be updated by the Contractor, having regard to best practice guidance. Refer to Section 20.5.2.1 of this report for further detail.
C12	Biosecurity - Risk of spread of invasive species during construction works, particularly during site clearance works	Unlikely	3	Moderate Contamination with extended duration and potential to lead to more widespread effects	3	Medium	Refer to Chapter 13 (Biodiversity Terrestrial) of this EIAR for full details on design and mitigation measures to be put in place to prevent the spread of non-native invasive plant species.	Yes, an Invasive Species Management Plan (ISMP) will be developed by the appointed contractor, in consultation with a suitably qualified ecologist, and will be based on the invasive species survey findings and any pre-construction survey updates. It will provide the strategy that will be adopted during the construction of the Proposed Development to manage and prevent the spread of non-native invasive plant species. See Section 20.5.2.1 for further detail on the information

Risk ID	Event	Likelihood	Rating	Consequence	Rating	Resulting Risk Category	Mitigation	Secondary Mitigation Required?
								to be included in the ISMP.
C13	Extreme Weather Event	Unlikely	3	Low Localised displacement of a small number of people and short duration and localised effects	2	Low	The flood risk to structures on a construction site can be mitigated through the design of the structure and programming of construction activities. This can be done by changing the construction sequence or programming activities to weather events, temporary mitigations such as sheet piling and cofferdams, sandbags, mobile barriers and plant, equipment and material mitigation. Refer to Chapter 4 (Construction Strategy) and Chapter 16 (Water) for further detail.	Yes, a CEMP and EIRP have also been prepared and will be updated by the Contractor, having regard to best practice guidance. A SWMP will be developed by the appointed contractor. Refer to Section 20.5.2.1 of this report for further detail.
C14	Collapse / Damage to Structures	Very Unlikely	2	Moderate Potential fatalities and injuries. Hazards associated with the damaged structures to on-site personnel.	3	Low	The Contractor shall prepare a plan for construction works detailing his sequences and methods of construction and include proposals to manage the risk of flooding of the works. Refer to Chapter 4 (Construction Strategy) and Chapter 16 (Water) for further detail	Yes, a CEMP and EIRP have also been prepared and will be updated by the Contractor, having regard to best practice guidance. Refer to Section 20.5.2.1 of this report for further detail.
Operational Phase								
O1	Extreme Weather Events	Unlikely	3	Low Potential for localised damage to infrastructure Localised disruption to infrastructure	2	Low	The Proposed Development has been designed to operate under a range of environmental conditions, in accordance with the relevant standards, including EN 1991-1-4 Eurocode 1: Actions on structures: general actions - Wind actions and EN 1991-1-5:2003 Eurocode 1 – Actions on structures: General actions – Thermal actions. Drainage design includes allowances for climate	No.

Risk ID	Event	Likelihood	Rating	Consequence	Rating	Resulting Risk Category	Mitigation	Secondary Mitigation Required?
							change ensuring that the Proposed Development is protected from significant flood events.	
O2	Long-term Release of Pollutants to Waterbodies and Ecological Receptors	Unlikely	3	Low Potential to cause localised environmental damage to the aquatic environment and associated species and to ecologically designated areas	2	Low	New surface water drainage networks will be provided as part of the project which collect surface water run-off from the internal road surfacing which shall pass through hydrocarbon interceptors separator prior to discharge to receiving waterbodies. Drainage design includes allowances for climate change ensuring that the Proposed Development is protected from significant flood events.	No.
O3	Leakage and Spillage Incidents of Wastewater into Surface Waterbodies or Groundwater	Unlikely	3	Low Potential fatality and injuries Localised effects and short duration.	2	Low	New surface water drainage networks will be provided as part of the project which collect surface water run-off from the internal road surfacing which shall pass through hydrocarbon interceptors separator prior to discharge to receiving waterbodies. Proposed dry swale will be lined, preventing percolation to ground water	No.
O4	Accidents at Seveso Sites / COMAH Establishments	V. Unlikely	2	Low Potential fatality and injuries Localised effects and short duration. Potential for localised damage to infrastructure.	2	Low	In the event of an accident, the establishment will have an emergency response plan registered with the HSA.	No – dealt with through COMAH Establishment Emergency Response Plan, further mitigation or management plans are not required.
O5	Fire / Explosion / Accidental Gas Release	V. Unlikely	2	Low Potential for localised damage to infrastructure	2	Low	The Proposed Development will be designed, built and operated in line with current best practice. Operational risks associated with anaerobic digestion,	No.

Risk ID	Event	Likelihood	Rating	Consequence	Rating	Resulting Risk Category	Mitigation	Secondary Mitigation Required?
				Localised disruption to infrastructure. Potential risk to site personnel, and potential environmental effects in the event of uncontrolled fire, Combustion emissions or accidental gas release.			biogas generation, biogas storage and CHP infrastructure will be managed through embedded design measures, process control systems, gas detection and alarm systems, emergency shutdown procedures, operational procedures, staff training and inspection. Furthermore, in accordance with Chapter 19 of the Safety, Health and Welfare at Work Acts 2005 to 2014, the Proposed Development shall be subject to a fire safety risk assessment which will assist in the identification of any major risks of fire on site, and mitigation of the same during the operational phase.	

Note - The ID tags "C" and "O" represents the Construction and Operation phase, respectively.

The results from the evaluation have been applied to Table 20-6.

TABLE 20-6: EVALUATION OF LEVELS OF SIGNIFICANCE IN THE ABSENCE OF MITIGATION

Likelihood	5 - Very Likely					
	4 - Likely					
	3 - Unlikely		[C2], [C3], [C6], [C7], [C8], [C9], [O1], [O2], [O3]	[C10], [C11], [C12]		
	2 - Very Unlikely		[C13], [O4], [O5]	[C1], [C4], [C5], [C14]		
	1 - Extremely Unlikely					
		1 - Slight	2 - Moderate	3 - Significant	4 - Very Significant	5 - Profound
Consequence of Impact						

From examining the plausible risks presented in Table 20-6, risks events in the Green Zone are considered to be below the threshold of significance set for the purposes of this assessment ('Low' risk event). For these risk events, a number of mitigation measures are incorporated in the proposed design. The assessment of the significance of the impacts indicated that no further mitigation measures and management plans are required to be in place to manage the identified risks to the environment to be as low as reasonably practicable (ALARP). As such these risk events are not considered as MANDs during both construction and operational phase.

No risks have been assessed to fall within the Red Zone ('High' risk scenario). Three Risk IDs fall within the Amber Zone ('Medium' risk event) and are therefore brought forward for further consideration and the adoption of secondary mitigation measures. These three Risk IDs fall within the Construction Phase. No Operational Phase risks fell within the Amber Zone and are therefore not considered further.

In the absence of secondary mitigation, the impact from these risks is considered significant short-term negative effect.

20.5 Mitigation Measures

20.5.1 Inherent Design

As indicated previously, the design of the Proposed Development has evolved through comprehensive design iteration, with particular emphasis on avoiding or reducing the potential for environmental impacts, where practicable, whilst ensuring the objectives of the Proposed Development are attained. The design of the Proposed Development has been developed in compliance with the relevant design standards which include provisions to reduce the likelihood of risk events occurring (e.g. structures have been designed to avoid the risk of collapse, new infrastructure has been designed to cater for increased rainfall events, etc.).

Regulation 15 of the Safety, Health and Welfare (Construction) Regulations places a duty on designers carrying out work related to the design of a project to take account of the 'General Principles of Prevention' as listed in Schedule 3 of the Safety, Health and Welfare at Work Act. In addition to the duties imposed by Regulation 15 of the Safety, Health and Welfare (Construction) Regulations, designers must comply with Section 17(2) of the Safety, Health and Welfare at Work Act which requires persons who design a project for construction work to ensure, so far as is reasonably practicable, that the project is designed and is capable of being constructed to be safe and without risk to health, can be maintained safely and without risk to health during use, and complies in all respects, as appropriate, with other relevant legislation. This includes S.I. No. 138/2012 - Building Regulations (Part A Amendment) Regulations 2012 (as amended) and, if the works being designed are intended for use as a workplace, the relevant parts of the Safety, Health and Welfare at Work (General Application) Regulations. In accordance with these requirements, the Project Team established a consistent and appropriate

means of assessing the risks that may arise from design decisions and of applying the General Principles of Prevention, mitigation measures that are to be embedded into the design of the Proposed Development.

20.5.2 Construction Phase

20.5.2.1 Plans and Procedures

By implementing plans focused on environmental protection, the Proposed Development can bolster its resilience against risk events. Several of the plans introduced as part of the Proposed Development to minimise or mitigate against environmental impacts during construction are also considered to reduce the potential risks associated with risk events.

The plans considered to assist in reducing the likelihood of risk events occurring are summarised below. Specific mitigation measures are also included in the relevant Chapters of this EIAR.

Construction Environmental Management Plan (CEMP)

A CEMP has been prepared to demonstrate how the proposed construction works can be undertaken in a logical, sensible and safe sequence with the incorporation of specific environmental control measures relevant to construction works of this nature. The CEMP has been prepared in accordance with the Construction Industry Research and Information Association (CIRIA) in the UK, Environmental Good Practice on Site Guide, 5th Edition C811 (CIRIA, 2023).

The CEMP is a working document and will be further developed by the Contractor following appointment and prior to commencing works on site. All of the content provided in this CEMP will be implemented in full by the appointed contractor and its finalisation will not affect the robustness and adequacy of the information presented and relied upon in this EIAR. The appointed contractor will ensure that the CEMP remains up to date for the duration of the construction period. The CEMP may need to be altered during the lifecycle of the construction period to take account of monitoring results, legislative changes, outcomes of third-party consultations etc. Additional appendices may be added to the CEMP to accommodate monitoring results, permits etc. However, the finalisation of the CEMP by the appointed contractor will not affect the robustness and adequacy of the information presented here and relied upon in this EIAR.

The CEMP summarises the overall environmental management strategy that could be adopted and implemented during the Construction Phase of the Proposed Development and must be read in conjunction with the construction details outlined in Chapter 4 (Construction Strategy) in this EIAR.

Details of mitigation measures proposed to address potential impacts arising from construction activities are described in Chapter 6 (Traffic & Transport) to Chapter 21 (Cumulative Effects & Environmental Interactions), as appropriate, and are summarised in Chapter 22 (Summary of Mitigation & Monitoring Measures) of this EIAR.

Construction Resource and Waste Management Plan

Construction Resource and Waste Management Plan will demonstrate how waste arising during the Construction Phase (including demolition works) of the Proposed Development will be managed and disposed of in a way that ensures compliance with the provisions of the Waste Management Act, 1996, as amended. The Construction Resource and Waste Management Plan (CRWMP) will be developed by the appointed contractor.

Construction Traffic Management Plan

A Preliminary Traffic Management Plan will be drafted by the Project Supervisor Design Process for the works in full consultation with Limerick City and County Council, An Garda Síochána, the Fire Service and the Ambulance service prior to the issuing of tender documents. When the works are awarded to a contractor, the Preliminary Traffic Management Plan will be developed by the Project Supervisor Construction Phase into a Detailed Traffic Management Plan in full consultation with the same stakeholders. All traffic management plans, including working times, will be agreed with and approved by Limerick City and County Council Transportation Department in advance of implementation.

The Construction Traffic Management Plan (CTMP) will be prepared to demonstrate the manner in which the interface between the public and construction-related traffic will be managed and how vehicular movement will be controlled. The CTMP will be a 'live document'. The primary objectives of the CTMP are to outline the minimum road safety measures to be undertaken at site access/egress locations during the Construction Phase, including approaches to such access/egress locations. The implementation and organisation of traffic management along the specified haul routes is a critical component of the works to be undertaken and will be given the highest priority during the Construction Phase of the Proposed Development. This will reduce the potential for any major accidents directly associated with the Proposed Development.

Invasive Species Management Plan

Non-native invasive plant species have been identified within and in proximity to the Proposed Development boundary during ecological surveys undertaken to inform the EIAR. The presence of these species presents a potential risk of spread during construction activities, particularly during vegetation clearance, excavation, soil movement, stockpiling and the movement of plant and machinery.

The ISMP will be developed by the appointed contractor, in consultation with a suitably qualified ecologist, and will be based on the invasive species survey findings and any pre-construction survey updates.

An Invasive Species Management Plan (ISMP) will provide the strategy that will be adopted during the construction of the Proposed Development in order to manage and prevent the spread of non-native invasive plant species. It will set out measures for the management and prevention of the spread of invasive species including, as appropriate, demarcation of affected areas, biosecurity controls, restrictions on movement of contaminated soils or plant material, cleaning protocols for plant and machinery, toolbox talks for site personnel, appropriate disposal routes for invasive plant material, and monitoring requirements.

Further details on the assessment of non-native invasive species, and associated mitigation measures are provided in Chapter 13 (Biodiversity Terrestrial) of this EIAR.

Surface Water Management

A Surface Water Management Plan (SWMP) will detail control and management measures for avoiding, preventing, or reducing any significant adverse impacts on the surface water environment during the Construction Phase of the Proposed Development. This plan will detail the procedures and technical practices for implementing effective sediment, erosion and pollution control that will be adopted during the Construction Phase of the Proposed Development. The SWMP will be developed by the appointed contractor as part of CEMP.

Environmental Incident Response

An Environmental Incident Response Plan (EIRP) will be prepared as part of the CEMP, demonstrating how, in the unlikely event of an incident, response efforts take place promptly, efficiently, and suitably for the particular circumstances. Developed by the appointed contractor, the management of the risk of major accidents and / or disasters occurring will continue throughout the planning, design and Construction Phase of the Proposed Development. The EIRP details procedures that could be undertaken in the event of a significant release of sediment into a watercourse, or a significant spillage of chemical, fuel or other hazardous substances (e.g., concrete), non-compliance incident with any permit or license, or other such risks that could lead to a pollution incident, including flood risks.

This assessment has considered the reasonably foreseeable worst-case consequences, and as such, risks are unlikely to be greater than those that have been assessed within this EIAR. However, activities on-site will be monitored and controlled to ensure that risk does not increase over time. The EIRP will be developed by the appointed contractor as part of CEMP.

20.5.2.2 Assessment of Mitigation Measures

In scenarios where a hazard remains that may potentially give rise to significant effects, consideration is given to the incorporation of secondary mitigation measures in order to mitigate the associated risk level(s) to be ALARP. An assessment of such potential scenarios with secondary mitigation measures in place is presented as Table 20-7 below.

TABLE 20-7: ASSESSMENT OF MANDS WITH SECONDARY MITIGATION MEASURES IN PLACE

Risk ID	Event	Pre-Mitigation Risk Score	Secondary Mitigation	Post Mitigation Likelihood	Post Mitigation Consequence	Resulting Risk Category	Is the Residual Impact ALARP?
Construction Phase							
C10	Release of Construction Related Debris to Waterbodies and Ecological Receptors	Medium	Please refer to Chapter 16 (Water) and Chapter 14 (Land & Soils) of this EIAR for full details on design and mitigation measures to be put in place, to prevent contamination events. A CEMP (Appendix 4.1) have also been prepared and will be updated by the Contractor, having regard to best practice guidance.	2	3	Low	Yes
C11	Leakage and Spillage Incidents of Wastewater into Surface Waterbodies or Groundwater	Medium	Please refer to Chapter 16 (Water) and Chapter 14 (Land & Soils) of this EIAR for full details on design and mitigation measures to be put in place, to prevent contamination events. A CEMP (Appendix 4.1) have also been prepared and will be updated by the Contractor, having regard to best practice guidance.	2	3	Low	Yes
C12	Biosecurity - Risk of spread of invasive species during construction works, particularly during site clearance works	Medium	Please refer to Chapter 13 (Biodiversity) for details the ISMP to be put in place, to prevent the spread of non-native invasive species.	2	3	Low	Yes

TABLE 20-8: EVALUATION OF POST MITIGATION LEVELS OF SIGNIFICANCE

Likelihood	5 - Very Likely					
	4 - Likely					
	3 - Unlikely					
	2 - Very Unlikely			[C10], [C11], [C12]		
	1 - Extremely Unlikely					
		1 - Slight	2 - Moderate	3 - Significant	4 – Very Significant	5 - Profound
Consequence of Impact						

20.5.3 Operational Phase

As outlined in Section 20.5.1, the Proposed Development will be designed and built in accordance with best international current practice and as a result, mitigation against the risk of MANDs will be embedded through the design.

In accordance with the provision of the European Commission Guidance, the on-site Risk Management Plan will be updated and implemented to ensure an effective response to MANDs. This plan will include sufficient preparedness and emergency planning measures.

Furthermore, the maintenance programme at the site will be updated and implemented to comply with the conditions of the Wastewater Discharge Authorisation required under the Wastewater Discharge (Authorisation) Regulations 2007 – 2016. The purpose of the maintenance programme is to ensure that all critical equipment at the WWTP and elsewhere throughout the Proposed Development is operating correctly, therefore reducing the risk of MANDs on-site.

Uisce Éireann and the operator of the Proposed Development will continue to monitor the risk of MANDs at the respective sites on an ongoing basis during operation. The maintenance programme, record of reported incidents, as well as general site activities will be monitored on an ongoing basis to ensure the potential risk of MANDs does not materially increase over time.

20.6 Residual Impacts

20.6.1 Construction Phase

The risk of a MAND during the construction phase of the Proposed Development was determined to be 'low' in accordance with the approach presented in the IEMA Primer (IEMA, 2020). Therefore, significant residual effects are not anticipated during the construction of the Proposed Development.

20.6.2 Operational Phase

The likelihood of a MAND occurring during the operational phase of the Proposed Development was also determined to be of 'low' risk based on the methodology outlined in the IEMA Primer (IEMA, 2020). Consequently, significant residual effects are not expected during the operation of the Proposed Development.

20.7 Cumulative Impacts and Interactions

Cumulative impacts and environmental interactions are assessed in Chapter 21 (Cumulative Effects and Interactions) in Volume 2 of this EIAR.

20.8 Difficulties encountered in Compiling Information

There were no difficulties encountered when completing this chapter.

20.9 References

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EPA, 2014. Guidance on assessing and costing environmental liabilities, s.l.: Environmental Protection Agency.

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IEMA, 2020. Major Accidents and Disaster in EIA: A Primer, UK: Institute of Environmental Management and Assessment.

LCCC, 2022. Limerick Development Plan 2022 – 2028. Limerick City & County Council.

LCCC, 2014. Major Emergency Plan for Limerick City and County Council. Limerick City & County Council.

Directives and Legislation

Directive 2012/18/EU of the European Parliament and of the Council of 4 July 2012 on the control of major accident hazards involving dangerous substances, amending and subsequently repealing Council Directive 96/82/EU.

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.

Number 10 of 1996 – Waste Management Act, 1996.

Number 10 of 2005 - Safety, Health, and Welfare at Work Act 2005.

S.I. No. 138/2012 - Building Regulations (Part A Amendment) Regulations 2012.

S.I. No. 209/2015 – Chemical Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015.

S.I. No. 291 of 2013 - Safety, Health, and Welfare at Work (Construction) Regulations 2013.

S.I. No. 299/2007 - Safety, Health, and Welfare at Work (General Application) Regulations 2007

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