AtkinsRéalis

Environmental Impact Assessment Report (EIAR) Volume 2 – Chapter 19 – Risk of Major Accidents and Disasters

Uisce Éireann

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BALLINA AND LOUGH TALT WATER SUPPLY UPGRADE

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Abbreviations

Abbreviation	Term
BPT	Break Pressure Tank
BPS	Booster Pumping Station
CEMP	Construction Environmental Management Plan
CLP	Classification, Labelling and Packaging
COMAH	Control of Major Accident Hazards
CFRAM	Catchment Flood Risk Assessment and Management
DoEHLG	Department of the Environment, Heritage, and Local Government
EIAR	Environmental Impact Assessment Report
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
FRA	Flood Risk Assessment
GSI	Geological Survey of Ireland
GWB	Groundwater Body
H	High (groundwater vulnerability)
HDD	Horizontal Directional Drilling
HSA	Health and Safety Authority
IEL	Industrial Emissions Licence
IEMA	Institute of Environmental Management and Assessment
Lg	Locally Important
Lm/Ll	Locally important aquifers (moderate productivity)
NFIM	National Indicative Fluvial Maps
OPW	Office of Public Works
Pl	Poor (aquifer productivity)
Rkc	Regionally important karstified aquifer
RWPS	Raw Water Pumping Station
SOPs	Standard Operating Procedures
RWI&PS	Raw Water Intake and Pumping Station
RWS&PS	Raw Water Storage and Pumping Station
WTP	Water Treatment Plant
WSZ	Water Supply Zone
WFD	Water Framework Directive
X	Rock Near Surface / Karst (groundwater vulnerability category)

Glossary

Term	Definition
Cascade Effect	A secondary effect whereby a major accident or disaster affecting one environmental receptor leads to consequential effects on other environmental factors.
Chemical Delivery Apron	A dedicated hardstanding area designed to capture and contain spills that may occur during the delivery of treatment chemicals.
Construction Environmental Management Plan	A site-specific management document that sets out environmental protection measures, pollution prevention procedures, emergency response actions and monitoring requirements during construction.
Disaster	A natural hazard or external man-made hazard with the potential to cause an event that meets the definition of a major accident. Examples include flooding, extreme weather, landslides, earthquakes or industrial accidents.
Drilling Fluid Breakout	An unintended release of drilling fluid to the ground surface or a waterbody during Horizontal Directional Drilling (HDD) operations.
Emergency Response Plan	A documented procedure outlining responsibilities, communications and actions required to manage incidents, accidents or emergency situations.
Flood Resilience	The capacity of infrastructure to withstand, recover from or continue operating during and after a flood event.
Horizontal Directional Drilling	A trenchless construction technique used to install pipelines beneath watercourses, roads and other sensitive features while minimising surface disturbance.
Hydraulically Connected Receptors	Surface water bodies, wetlands or groundwater systems linked through water movement pathways and therefore potentially vulnerable to contaminant migration.
Karstified Aquifer	A limestone aquifer characterised by fissures, fractures and solution channels that can facilitate rapid groundwater flow and contaminant transport.
Leak Detection System	An engineered monitoring system designed to identify and alert operators to the loss of containment from storage tanks, pipework or process systems.
Major Accident	An event that threatens immediate or delayed serious adverse effects on human health, welfare, property, critical infrastructure or the environment and requires a significant emergency response.
Major Accidents and Disasters	The assessment of risks associated with major accidents and disasters relevant to a proposed development under the EIA Directive.
Pathway	The route through which a pollutant, hazard or accident consequence can reach a receptor.
Pollution Incident	An accidental release of contaminants, chemicals, fuels, sediments or other substances that could adversely affect environmental receptors.
Receptor	A person, habitat, species, water body, soil resource, property or infrastructure that could be affected by a major accident or disaster.
Residual Risk	The level of risk remaining after implementation of all embedded design measures, mitigation measures and management controls.
Risk Assessment	A systematic process used to identify hazards, evaluate consequences and likelihood, and determine the significance of risks associated with major accidents and disasters.

Term	Definition
Source–Pathway–Receptor Linkage	A conceptual risk assessment model that identifies how a hazard source may affect a receptor through an identifiable environmental pathway.
Standard Operating Procedure	A documented procedure outlining the safe operation, handling, monitoring and emergency response requirements for equipment, processes or chemicals.
Stormwater Management Infrastructure	Drainage systems, settlement ponds, interceptors and other engineered measures designed to manage runoff and reduce pollution risks during extreme rainfall events.
Treatment Barrier	A stage in the water treatment process that reduces, removes or controls contaminants and contributes to drinking water protection.
Vulnerability	The susceptibility of a development, environmental receptor or infrastructure to adverse effects arising from a major accident or disaster, taking account of exposure, sensitivity and resilience.
Water-Compatible Development	Development that is considered appropriate within flood risk areas owing to its nature and operational characteristics, in accordance with national flood risk management guidance.

19. Risk of Major Accidents and Disasters

19.1 Introduction

This chapter assesses the potential effects arising from the vulnerability of the Proposed Development to major accidents and/or disasters. The assessment relates to the Ballina and Lough Talt Water Supply Upgrade, which spans north County Mayo and south County Sligo. It has been carried out in accordance with the requirements of Directive 2011/92/EU, as amended by Directive 2014/52/EU.

The assessment identifies and evaluates events that could give rise to significant adverse effects on human health, the environment, or property during the construction, operation and, where relevant, decommissioning phases. The assessment considers both internal risks (such as fires, explosions, or structure failures) and external hazards (such as extreme weather events, flooding, or nearby industrial accidents).

This chapter was prepared by Tashfeen M Hammad ud din, an Environmental Consultant in the Environmental Risk section of AWN Consulting. He holds a BSc. in Environmental Sciences and MSc. in Sustainable environmental management from University of Greenwich, United Kingdom, and MSc in Physics from University of Galway, Ireland. He has 3 years' experience providing consultancy services in the area of Quantitative Risk Assessment. He also has experience working on Major Accidents and Disasters chapters, Safety reports, ATEX assessment, Chemical risk assessments, Fire water risk assessments for operators such as medical devices manufacturing, chemical storage sites, and data centres.

This chapter was reviewed by Matthew Michie, a Senior Risk Consultant with AWN. He has an MChem (Hons) in Chemistry from the University of Liverpool and an MSc in Physical Chemistry from Michigan State University. Matthew has 6 years' experience in providing consultancy services to operators (Hospitals, Chemical sites, Distilleries, Refineries, Food Producers and Power Plants) requiring greenhouse gas support; managing EU Emissions Trading System (ETS) emissions. Matthew has 5 years' experience in providing consultancy services to the operators of lower and upper tier Seveso III establishments including the preparation of Land Use Planning assessments, Significant Modifications assessments, Safety Reports and consequence modelling and quantitative risk assessment for major accident hazards.

The evaluation is carried out in accordance with the requirements of the Directive (EU) 2011/92 as amended by Directive (EU) 2014/52 and relevant national best practice guidance, ensuring that appropriate mitigation and emergency response measures are identified to prevent, control, or respond effectively to any foreseeable major accidents or disasters scenarios. A full description of the Proposed Development is provided in Chapter 3 – Project Description. Elements of the baseline environment, pollution pathways, mitigation measures, and residual effects are addressed in more detail in the relevant specialist chapters. These include Chapter 6 –Population and Human Health, Chapter 7 – Biodiversity, Chapter 9 – Land, Soils and Geology, and Chapter 10 – Hydrology and Hydrogeology.

Below is an overview of the key relevant details of the Proposed Development. The information presented in these sections is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full set of planning application documents. For a more comprehensive description of the Proposed Development, please refer to Chapter 3 – Project Description of the EIAR. Chapter 3 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant documents in order to define the Proposed Development.

The Proposed Development comprises a regionally significant water infrastructure project located within North County Mayo and South County Sligo. The project entails a combination of upgrades to existing infrastructure and the provision of new assets to enhance the capacity, reliability, and resilience of the public water supply network. The works include the upgrade of the existing Wherrew Raw Water Intake and Pumping Station (RWI&PS) and the upgrading of the Lisglennon Water Treatment Plant (WTP). In addition, new infrastructure will be delivered, including

a booster pumping station (BPS) at Bonniconlon, a treated water reservoir at the existing Bonniconlon reservoir, and a break pressure tank (BPT) at Windy Gap. The existing Lough Talt WTP in County Sligo will also be repurposed to accommodate a treated water storage reservoir. The overall scheme incorporates the installation of a new treated water trunk main to hydraulically connect Lisglennon WTP with Lough Talt WTP. These elements will operate as an integrated system, combining existing, upgraded, and new infrastructure. The scheme is designed to provide a robust and secure potable water supply to the receiving environment, serving key population centres. An overview of the Proposed Development is presented in Figure 19-1.

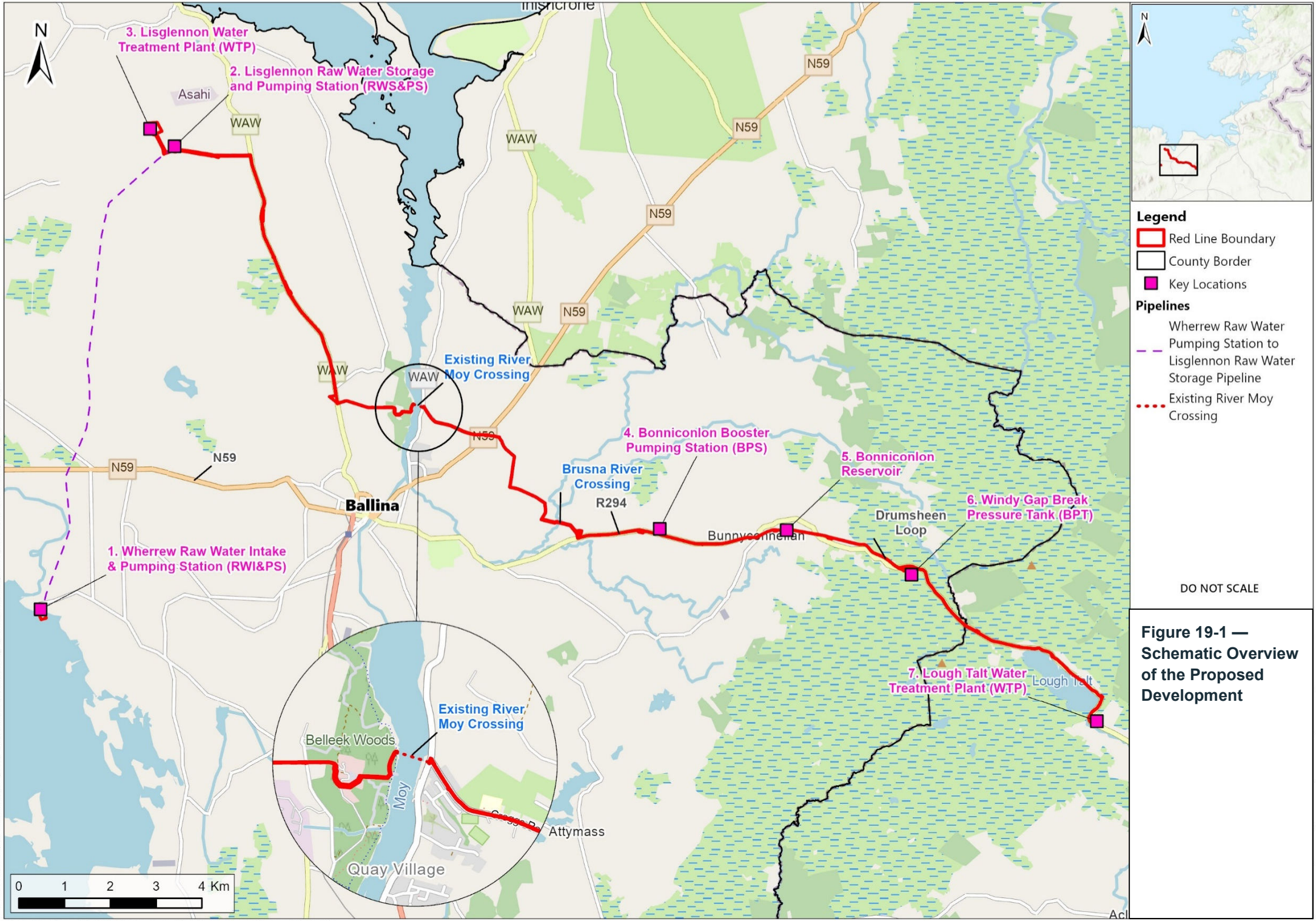


Figure 19-1 — Schematic Overview of the Proposed Development

19.2 Methodology

19.2.1 Legislation Context

The following relevant legislation, policy, and best practice guidance has informed the preparation of this chapter:

- Directive 2011/92/EU as amended by Directive 2014/52/EU (the EIA Directive);
- European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018);
- Planning and Development Regulations 2001 (S.I. No. 600 of 2001) (as amended, with specific reference to Schedule 6);
- Environmental Protection Agency (EPA) 'Guidelines on the Information to be contained in Environmental Impact Assessment Reports' (2022);
- Health and Safety Authority (HSA) 'Guidance on Technical Land-Use Planning Advice' for planning authorities and COMAH establishment operators (2023);
- Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (COMAH / Seveso III Regulations);
- Building Regulations 1997 to 2024 (with specific reference to Part A (Structure) Amendment Regulations 2012);
- Safety, Health and Welfare at Work (Construction) Regulations 2013 (as amended) (S.I. No. 291 of 2013); and
- A Framework for Major Emergency Management: Guidance Document 10 (DECLG, 2015).

The EPA Guidelines, 2022, state that:

"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). This may be supported by general risk assessment methods or by systematic risk assessments required under other legislation e.g. a COMAH (Control of Major Accident Hazards involving Dangerous Substances) assessment.

The potential for a project to cause risks to human health, cultural heritage or the environment due to its vulnerability to external accidents or disasters is considered where such risks are significant, e.g. the potential effects of floods on sites with sensitive facilities. Where such risks are significant then the specific assessment of those risks in the form of a Seveso Assessment (where relevant) or Flood Risk Assessment may be required."

19.2.2 Major Accident

For the purpose of this assessment, the definition of a 'Major Accident' is taken from the guidelines on Major Accidents and Disasters within EIA published by the Institute of Environmental Management and Assessment (IEMA, 2020).

"A major accident is an event (for instance, train derailment or major road traffic accident) that threatens immediate or delayed serious environmental effects to human health, welfare and / or the environment and requires the use of resources beyond those of the client or its appointed representatives (i.e., contractors) to manage. Major accidents can be caused by disasters resulting from both man-made and natural hazards. A disaster is a man-made / external hazard (such as an act of terrorism) or a natural hazard (such as an earthquake) with the potential to cause an event or situation that meets the definition of a major accident. In general, major accidents and / or disasters should be considered as part of an assessment where the development has the potential to cause the loss of life, permanent injury and/or temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration."

For the purpose of this assessment, the definition of a 'Disaster' is as follows (IEMA, 2020):

"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."

For the purposes of this assessment, the definition of 'Vulnerability' is as follows (IEMA, 2020):

"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."

19.2.3 Risk Assessment Methodology

The analysis of the predicted effects of the Proposed Development, with respect to major accidents and disasters, on human health and the environment during construction and operation are presented in this Chapter. The risk assessment identifies and assesses risks using a qualitative/semi-qualitative approach. It quantifies risks focusing on potentially significant adverse effects of the project on the environment, deriving from its vulnerability to risks of relevant major accidents and/or disasters. The approach to identifying and quantifying risks associated with the Proposed Development by means of a site-specific risk assessment is derived from the EPA Guidelines on the Preparation of an EIAR (EPA, 2022) and all other documents outlined above.

Assessment methods quantify and predict the magnitude and significance of effects. The methods employed for assessment and evaluation of the environmental topics for this Chapter are based on:

1. The European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) transpose the requirements of the 2014 EIA Directive (Directive 2014/52/EU) into Irish law by amending Schedule 6 of the Planning and Development Regulations 2001. In accordance with these regulations, an EIAR must contain:

   "a description of the expected significant adverse effects on the environment of the Proposed Development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment 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, emergencies arising from such events."
2. A geospatial analysis was undertaken to identify relevant planning permissions/applications and Seveso establishments within a 5 km radius of the Proposed Development, to inform the assessment of cumulative major accident risk.
3. Flood Risk Assessment following The Planning System and Flood Risk Management Guidelines for Planning Authorities published by the OPW in 2009 (OPW Guidelines).

The criterion for categorising impact is derived from the EPA's Guidance on Assessing and Costing Environmental Liabilities (2014). In this guidance, the risk assessment methodology commences with the establishment of risk classification criteria followed by risk analysis based on these criteria. Risk classification tables are required in order to evaluate and rank the risks compared with each other. They form the basis for rating the likelihood of an event occurring and the consequence of impact if the event occurs. The approach used in this assessment is summarised as follows and has been derived from relevant guidance as described above:

- Identification of hazardous substances which could be present over the lifecycle of the Proposed Development, including flammable substances, materials harmful to the environment and materials harmful to human health;
- Consideration of the quantities and storage arrangements associated with these substances and the prospective area operations at the Proposed Development involving these materials;
- Identification of potential Major accidents and disasters risk events associated with these materials and operations. Assessment of the vulnerability of the Proposed Development to disasters as a result of, for example, location, infrastructure, climatic conditions, and geological events;
- Where credible Risk Events and Disasters are identified, the reasonable worst-case consequence of each Risk Event is assessed in qualitative terms, based on factors including receptors which could be affected, and mitigation measures already in place (see Table 19-1); and
- The likelihood and consequence ratings are combined to form a risk score for risk evaluation (see Table 19-2).

Table 19-1 — Risk Classification – Likelihood

Rating	Category	Description
1	Very low	Very low chance of hazard occurring
2	Low	Low chance of hazard occurring
3	Medium	Medium chance of hazard occurring
4	High	High chance of hazard occurring
5	Very high	Very high chance of hazard occurring

Table 19-2 — Risk Classification – Consequence

Rating	Category	Description
1	Trivial	Small number of people affected, no fatalities. No contamination to environment.
2	Minor	Single fatality: limited number of people affected; a few serious injuries. Localised contamination effects of short duration.
3	Moderate	Significant number of people in affected area impacted with multiple fatalities. Contamination effects widespread or of extended duration.
4	Major	5 to 50 fatalities, up to 100 serious injuries Heavy contamination, localised effects, or extended duration.
5	Massive	Large numbers of people impacted with a significant number of fatalities (>50), injuries in the hundreds Very heavy contamination, widespread effects of extended duration.

The risks are then ranked according to their own risk score (1-25) in a colour coded matrix table which allows risks to be easily displayed and prioritised. The colour codes are as follows and indicated in Table 19-3 below:

- Red – high level risks requiring priority action (overall risk scores of 15-25);
- Yellow – medium-level risks requiring action, but not as critical as red-coded risks (overall risk scores of 8-12); and
- Green (light and dark) – low-level risks requiring continuing awareness and monitoring on a regular basis (overall risk scores of 1-6).

Table 19-3 — Example Risk Matrix

Likelihood	Consequence: Trivial	Minor	Moderate	Major	Massive
Very High	Low	Medium	High	High	High
High	Low	Medium	Medium	High	High
Medium	Low	Low	Medium	Medium	High
Low	Low	Low	Low	Medium	Medium
Very Low	Low	Low	Low	Low	Low

19.2.4 Background to Control of Major Accident Hazards Involving Dangerous Substances (COMAH) Regulations

The Seveso III Directive (2012/18/EU) requires Member States to apply land-use or other relevant policies to ensure that appropriate distances are maintained between residential areas, areas of substantial public use and the environment, including areas of particular natural interest and sensitivity and hazardous establishments. For existing establishments, Member States are required to implement, if necessary, additional technical measures so that the risk to persons or the environment is maintained at an acceptable level.

The purpose of the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations (S.I. 209 of 2015) (COMAH Regulations) is to transpose the Seveso Directive into Irish law and lay down rules for the prevention of major accidents involving dangerous substances, and to seek to limit as far as possible the consequences for human health and the environment of such accidents, with the overall objective of providing a high level of protection in a consistent and effective manner.

The Health and Safety Authority (HSA) is the Competent Authority in Ireland as defined by the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015, (COMAH Regulations 2015) which implement the Seveso III Directive in Ireland. The HSA is responsible for ensuring that the effects of facilities which fall within the remit of this legislation are taken into account with respect to land use planning. This is achieved through the provision of technical advice to planning authorities.

The COMAH Regulations do not apply to the Proposed Development as the Proposed Development will not store significant quantities of hazardous materials which are in excess of the defined COMAH thresholds set out in Schedule 1 of the COMAH Regulations.

19.2.5 Forecasting Methods and Difficulties Encountered

No difficulties were encountered in completing this chapter.

19.3 Receiving Environment

The EIA Directive requires the following to be described relating to the baseline scenario:

“A description of the relevant aspects of the current state of the environment (baseline scenario).”

The Proposed Development is a regionally significant infrastructure scheme covering north County Mayo and south County Sligo. A detailed description of the physical characteristics and context of the application site and the surrounding/wider area is provided in Chapter 3 of this EIAR.

19.3.1 Nearby Industrial and Waste Licensed Sites

Table 19-4 details the sites which operate under Directive 2010/75/EU (the Industrial Emissions Directive) licences from the Environmental Protection Agency, within a 5 km radius of the Proposed Development. A 5 km radius has been selected because sites beyond this distance are unlikely to have any meaningful interaction with or effect on the Proposed Development.

Table 19-4 — Industrial Emissions License Sites within 5 km of Proposed Development

Registration number	Name	Category	License Type	Distance (km)
P0243	Henniges Elastomers Ireland GmbH	Industry	IEL	1.6
P0360	Thomas Archer (Ballina) Limited	Industry	IEL	1.8
P0566	SSE Generation Ireland Limited (Killala)	Industry	IEL	0.8
P0958	Mayo Renewable Power Limited	Industry	IEL	0.8
P1077	Mayo Renewable Limited	Industry	IEL	0.8
W0067	Mayo County Council	Industry	IEL	0.2

There is only one EPA-licensed waste facility in 5 km radius: Rathroeen Landfill, Ballina (W0067-01).

There are no constraints to the Proposed Development from licenced sites near the Proposed Development.

19.3.2 Nearby Seveso Establishments

Seveso establishments have a “consultation distance” which is defined as “a distance or area relating to an establishment, within which there are potentially significant consequences for human health or the environment from a major accident at the establishment” (COMAH Regulations).

Table 19-5 — Seveso Sites within 5 km of Proposed Development

Site	Tier	Distance from Proposed Development
Ballina Beverages (European Refreshments)	Upper	300 m
Brooklands Gas Ltd.	Lower	3.3 km

There are two COMAH sites within a 5 km radius of the Proposed Development. The Proposed Development does not fall under the following:

‘a transport route, location of public use and residential area where the siting, modifications or developments may be the source of, or increase the risk or consequences of, a major accident based on “S.I. No. 209/2015 - Chemicals Act ‘

The nature of the Proposed Development does not constitute a development type that would introduce additional risk pathways or increase the consequences of a major accident in accordance with the COMAH Regulations (S.I. No. 209 of 2015). Therefore, a detailed land-use planning assessment is not required. Potential risks arising from the adjacent Seveso establishment will be addressed, where relevant, through the statutory consultation process and the planning authority’s assessment of land use compatibility.

19.3.3 Seismic Activity

In Ireland, seismic activity is recorded by the Irish National Seismic Network. The Geophysics Section of the School of Cosmic Physics, Dublin Institute for Advanced Studies, has been recording seismic events in Ireland since 1978 (www.dias.ie). This network consists of several seismometers that are located throughout Ireland. Figure 19-2 illustrates historical and recorded seismic events since 1980.

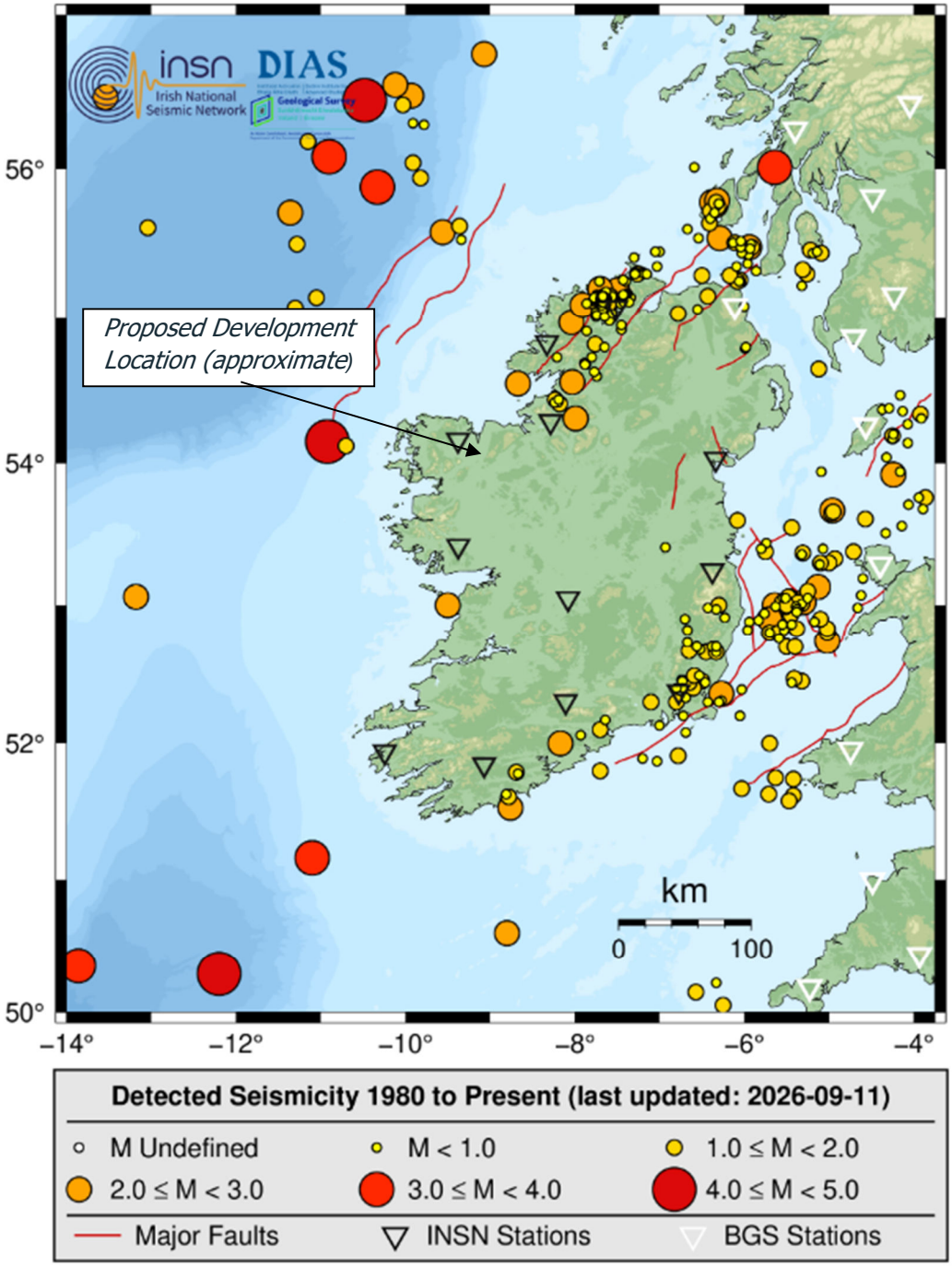


Figure 19-2 — Ireland Seismic Activity Map

Seismic activity and earthquake risk in Ireland are generally considered to be low. This is because Ireland is located on the western edge of the Eurasian Plate, which is a tectonic plate that is not known for its seismic activity. However, earthquakes can still occur in Ireland, although they are typically small and have little impact.

It can be seen in Figure 19-2 that there is no seismic activity recorded in the vicinity of the Proposed Development. Therefore, the likelihood of a seismic event affecting the project is considered negligible. As such, the risk is not significant.

19.3.4 Flood Risk

A Flood Risk Assessment (FRA) has been prepared for the Proposed Development in accordance with *The Planning System and Flood Risk Management Guidelines for Planning Authorities* (DoEHLG and OPW, 2009). The FRA considered all relevant potential sources of flooding, including fluvial, coastal/tidal, pluvial, groundwater, artificial drainage and infrastructure-related flooding, using OPW CFRAM and NFIM mapping, Geological Survey Ireland datasets, historic flood records, site-specific topographical information and relevant county development plan flood risk assessments. The key findings of the FRA are as follows:

- Lisglennon RWS&PS, Lisglennon WTP, Windy Gap BPT, Lough Talt WTP and Bonniconlon Reservoir are located within Flood Zone C and are not subject to significant mapped fluvial, coastal/tidal or groundwater flood risk.
- Bonniconlon BPS is located on elevated ground. Flood Zone A and B extents associated with the Srafaungal Stream approach the site boundary but do not extend into the proposed operational area.
- The majority of the pipeline corridor is within Flood Zone C. A section of Pipeline C at Creggs Road lies within Flood Zone A and mapped coastal/estuarial flood extents; however, the infrastructure is buried, sealed and water-compatible, and the FRA concludes that the identified flood risk can be appropriately managed.
- At Wherrew RWI&PS, the main pumping station compound is located within Flood Zone C, while the intake works and lower lakeshore area extend into Flood Zones A and B. A Stage 2 FRA was therefore undertaken for the intake works.
- The Stage 2 FRA for Wherrew RWI&PS adopted a design flood level of 11.58 mOD including 500 mm freeboard. The proposed intake platform may be submerged during an extreme flood event; however, the intake is designed as a water-compatible and submersible asset capable of operating safely under flooded conditions.

Overall, the FRA concludes that flood risk associated with the Proposed Development can be appropriately managed through the location and design of the infrastructure and the identified flood-resilience and drainage measures. While parts of the Proposed Development are exposed to mapped flood risk, principally the Wherrew intake works and the section of Pipeline C at Creggs Road, these elements are water-compatible and have been designed to remain resilient under the identified flood conditions. Accordingly, flooding is not considered likely to result in a significant major accident or disaster effect associated with the Proposed Development.

19.3.5 Landslides

The Geological Survey Ireland (GSI) landslide susceptibility mapping indicates that the majority of the Study Area is classified as having Low or Low Inferred landslide susceptibility. Higher susceptibility classes (Moderately Low, Moderately High and High) occur in the eastern part of the Study Area, including areas surrounding the proposed Windy Gap BPT, Pipeline E – Windy Gap BPT to Lough Talt WTP and the existing Lough Talt WTP, where ground elevations range from approximately 180 m to 202 m. Although nine historic landslide events have been recorded within the wider Study Area, these events were localised in nature and no evidence of extensive or regionally significant instability has been identified within or immediately adjacent to the Proposed Development. Taking account of the scale and nature of the operational infrastructure, together with the findings of the Soils and Geology assessment, significant effects associated with landslide or slope instability are not anticipated. Consequently, the potential for a landslide-related major accident affecting the Proposed Development is considered limited. This is discussed in detail in Chapter 9 – Land, Soils and Geology.

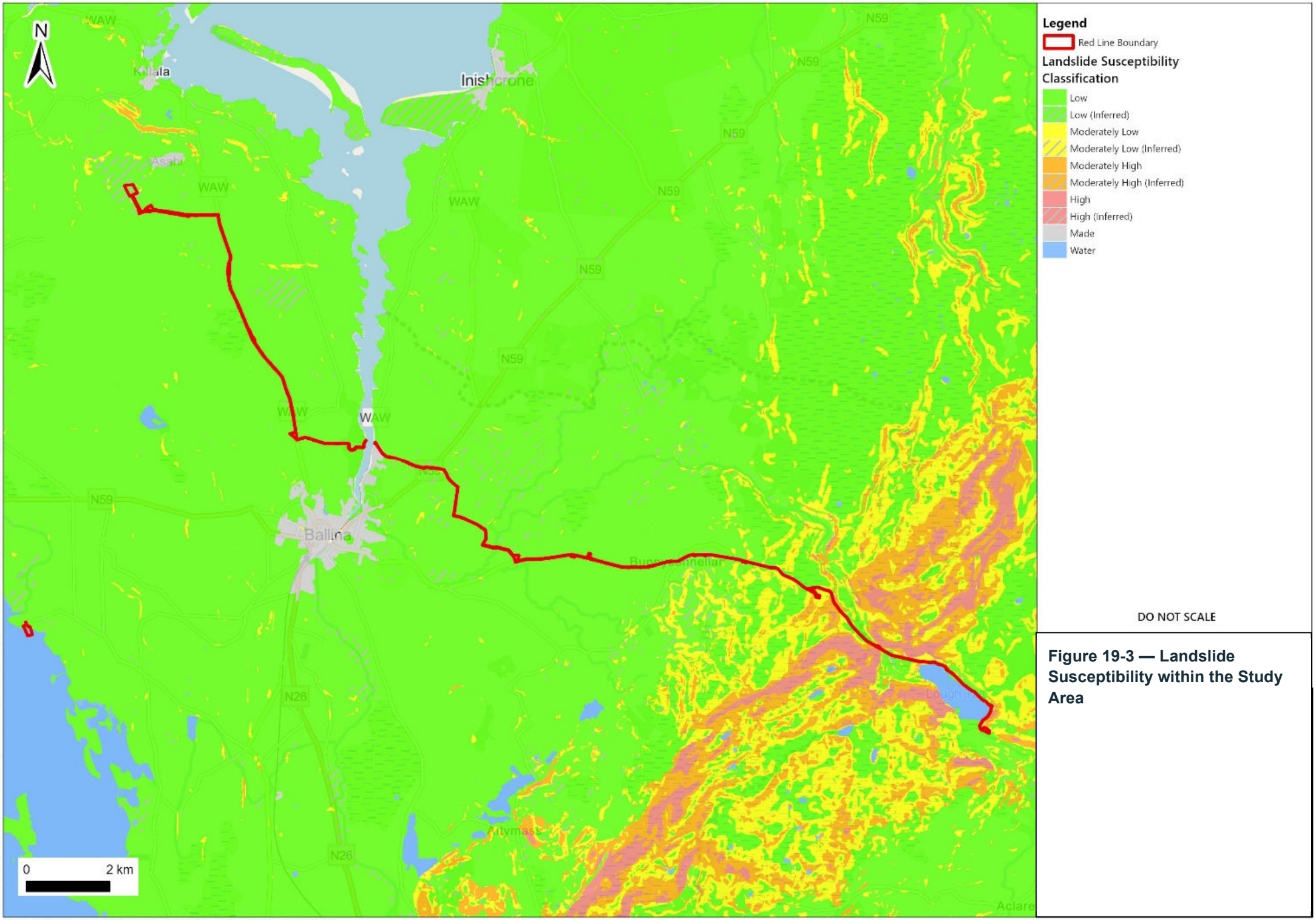


Figure 19-3 — Landslide Susceptibility within the Study Area

19.3.6 Hydrogeology

Chapter 10 details the full description of the receiving hydrological environment.

Surface Water and Sensitive Receptors

The study area contains several sensitive hydrological receptors within a 2 km zone, including the River Moy SAC, Lough Conn, Lough Talt, Lough Cullin, and the Moy Estuary. Some of these water bodies are classified as “At risk” under the Water Framework Directive, indicating heightened sensitivity to contamination.

In the context of a major accident (e.g. significant fuel or chemical spill), there is potential for off-site effects, particularly where works are located near watercourses, at crossings, or within hydraulically connected areas. However, all such risks will be managed through implementation of standard construction mitigation measures and a Construction Environmental Management Plan (CEMP), including spill prevention and response procedures.

Aquifer Sensitivity

The site is underlain by a combination of locally important gravel aquifers and a regionally important karstified limestone aquifer. The karstified aquifer is of higher sensitivity due to its potential for rapid groundwater flow and pollutant transport via fractures and conduits. Areas of high groundwater vulnerability are also mapped across parts of the site.

In the event of a major accidental release, there is a theoretical risk of rapid contaminant migration within these more vulnerable zones. However, given the absence of nearby groundwater abstraction supplies and the implementation of standard mitigation controls, the likelihood of significant off-site effects on groundwater receptors is low.

Water Supplies and Designated Sites

There are no recorded groundwater source protection zones within or immediately adjacent to the development.

Summary of Hydrological Risk in Major Accident Context

While sensitive surface water and groundwater receptors are present, the overall vulnerability to major accidents is moderated by the absence of groundwater abstractions and the limited scale and duration of construction activities. The primary risk pathway relates to accidental spills entering surface waters or highly vulnerable groundwater zones.

With adherence to standard best practice mitigation measures and the CEMP, including robust spill prevention, containment and emergency response procedures, the potential for significant off-site hydrological or hydrogeological effects arising from a major accident is low.

19.4 Characteristics of the Proposed Development

The purpose of this section is to provide an overview of the key relevant details of the construction and operational phase of the Proposed Development. The information presented in this section is informed by the project design, but it is not a complete description of the Proposed Development. Therefore, it should be read in conjunction with the full project package (see Chapter 3 – Project Description).

Chapter 3 provides a detailed overview of the lifecycle of the project, including reference to the architectural and civil engineering, drawings, plans, reports, and other relevant documents in order to define the Proposed Development.

19.4.1 Hazardous Materials

19.4.1.1 Construction Phase

Flammable Gas Cylinders

Construction and maintenance activities may require welding which can be carried out using compressed gases such as acetylene. There is the potential for a release of flammable gas, including an explosive depressurisation event, for example due to accidental damage to a gas cylinder, pressure regulator, or associated pipework. The released gas could be ignited, resulting in a fire or explosion. The potential risks of which could include harm to persons due to thermal radiation and damage to property and the environment.

Concrete

There is the potential for an accidental release of concrete into the soil, or surface water during the construction activities. Concrete is not classified hazardous in accordance with the Chemical, Label and Packaging (CLP) Regulations (EC No. 1272/2008); however, concrete paste is alkaline (pH 10-14); therefore the potential effects if concrete enters the environment via a release to water, include:

- Raising the pH causing harm to aquatic ecosystems; and
- Causing sedimentation on aquatic beds, which could harm flora and fauna.

Fuel Storage

Small quantities of diesel will be present on-site for use in construction vehicles. All site vehicles used will be refuelled in bunded and adequately sealed and covered areas in the construction compound area.

While diesel is classified as an ignition category 3 substance with low flammability risk under land-use planning criteria, it poses potential risks to the natural environment due to its toxicity to aquatic life and soil. However, in terms of Major Accidents and Disasters, the risk of a major environmental accident is dictated by the source-pathway-receptor model.

Due to the small quantities of diesel stored on-site, combined with the mandatory containment measures (bunding, sealed surfaces, and covered areas), there is no viable pathway for an accidental release to reach and significantly impact sensitive environmental receptors (such as local watercourses or groundwater aquifers). Therefore, there is no potential for a spill of diesel to meet the threshold or criteria for a major environmental accident or disaster, and it is officially scoped out from further assessment.

Horizontal Directional Drilling (HDD)

There are approx. 30 surface water feature crossings which have been identified along the pipeline route, comprising 18 EPA-identified watercourses and 12 field drains. Where a risk of impact to aquatic life or habitats has been identified (Chapter 7 – Biodiversity), the watercourse will be crossed using trenchless techniques. The pipeline crosses the Glenree River (also known as the Brusna River), which will be crossed via trenchless techniques, most likely Horizontal Directional Drilling (HDD). No work will be carried out at River Moy, as existing crossing beneath River Moy will be utilised. Trenchless techniques, including HDD, pipe jacking or similar methods, will be used where required to avoid effects on sensitive watercourses. HDD will be used at 12-13 trenchless crossings.

Mitigation measures will be similar for all river trenchless crossings. The launch pit and reception pit for the HDD drilling will be set back and there will be no direct interaction with the watercourse.

The HDD process will generate silt laden waters, muds, and drilling spoils predominantly within the launch pit itself and there is the potential, particularly during periods of heavy rainfall, for silt laden surface water runoff from the works area to reach the river resulting in a deterioration of the water quality. There is also the potential for hydrocarbons from the drilling equipment (e.g. fuels or oils) to be within surface water runoff from the HDD works area.

In order to avoid potential effects on the water quality from HDD related activities, surface water protection measures will be implemented as follows;

- Silt fencing, to stop the stripped soil, bentonite and drilled cuttings that are flushed back by drilling fluid to surface.
- Spill containment systems for fuels, lubricants and hydraulic fluids for equipment used at the works area, as well as any solvents and oils so as to avoid spillage.
- General pollution control, no discharges to the river.

19.4.1.2 Operational Stage

Chemicals Used in Lisglennon Water Treatment Plant

Chemical bulk storage tanks (BSTs) will be installed and their volumes are shown in Table 19-6.

Chemical delivery aprons are provided to capture and contain any spills at the delivery point, directing the collected liquids to a dedicated drainage system for secure retention and subsequent removal or neutralisation. All bulk liquid storage tanks are contained within bunds sized to 110% of the largest tank capacity, and leak-detection alarms will be installed to provide early warning of any release. The same containment, drainage and monitoring provisions apply to day-use and makeup tanks. In addition, written Standard Operating Procedures (SOPs) will be prepared for each chemical, referencing the relevant Safety Data Sheets and detailing handling, transfer, spill response, and decontamination measures.

Table 19-6 — Chemicals stored at Lisglennon Water Treatment Plant

Liquid chemicals	Amount	Min storage time
Sulphuric Acid	78 m^3	30 days
Aluminium Sulphate	2 x 40 m^3	30 days
Sodium Hypochlorite	2 x 3000 L tanks (existing) 1 x 3000 L tank (proposed) 1 x 1000 L day tank Total 10000 L (10 m^3)	30 days
Hydrofluorosilicic Acid (fluoridation)	10 m^3 c.*a.* 4 m^3 usage in 30 days	30 days
Calcium Carbonate	19,062 kg	30 days
Polymer	400 kg	30 days

Fuel Storage

Small quantities of diesel will be present on-site for use in back-up generators. At Wherrew only a temporary generator connection point is provided and the generator/fuel are brought to site when required. Bonniconlon BPS will have a permanent standby 400 kVA diesel generator with an integrated fuel tank of approximately 800–1,000 L and the generator will be bunded and designed with appropriate containment measures.

Diesel has environmental hazards. Diesel is classified as an ignition category 3 substance, following the criteria in the Guidance on Technical Land Use Planning (HSA, 2023); therefore, it has an ignition probability of 0. Therefore, there is no potential for flammable hazards associated with diesel and it is therefore scoped out from further assessment.

Due to the limited quantities of diesel stored, a standalone loss of containment or fire involving diesel is not considered capable of meeting the definition of a major accident. Therefore, diesel storage is not assessed as a standalone major accident scenario; however, it is considered, where relevant, as a potential contributing source within the broader operational fire and accidental pollution scenarios assessed in Section 19.5.2.

19.5 Potential Effects of the Proposed Development

The baseline environment, pollution pathways, relevant mitigation measures, and residual effects have been assessed in greater detail within the corresponding specialist chapters; Chapter 7 – Biodiversity, Chapter 9 – Land, Soils and Geology, Chapter 10 – Water and Hydrology, and Chapter 6 – Population and Human Health.

19.5.1 Construction Phase

General construction activities will include ground preparation, excavation and the construction of structures, requiring the use of construction vehicles, mobile plant and associated equipment. Vehicle collisions, reversing incidents and overturning are recognised as routine construction hazards and, in isolation, would not constitute a major accident or disaster.

However, such incidents could escalate into a major accident scenario where they result in the loss of containment of fuel, chemicals or other hazardous substances, or cause significant damage to existing operational infrastructure, with the potential for serious consequences to people, the environment or continuity of essential services. Therefore, these escalation scenarios are considered within the major accidents and disasters assessment.

A site-specific Construction Environmental Management Plan (CEMP) will be produced, covering the construction and commissioning of the Proposed Development. The CEMP will be prepared to ensure compliance with relevant health and safety legislation including the Safety, Health, and Welfare at Work Act (2005), environmental legislation and the planning conditions. The CEMP will set out the environmental controls, mitigation measures and emergency response procedures to be implemented by the Contractor throughout the construction phase.

The following potential major accident and disaster scenarios associated with the construction phase of the Proposed Development have been identified for assessment. These scenarios have been screened in on the basis that, should they occur at sufficient scale or severity, they have the potential to result in serious consequences to human health and safety, biodiversity, water quality, property or critical infrastructure, and/or to cause significant disruption to existing infrastructure or services. They therefore fall within the definitions of major accidents and disasters set out earlier in this chapter.

The assessment also considers, where relevant, the potential for an incident affecting an individual asset or construction activity to result in wider or cascading effects on interconnected infrastructure or services.

- Extreme heat or cold weather resulting in structural damage and/or pollution to soils, groundwater or surface waters;
- Storm events resulting in structural damage and/or pollution to groundwater and surface waters
- Flooding;
- Flash fire, Explosion or Jet fire following compressed gas cylinder release (e.g. acetylene for welding);
- Release of concrete paste to surrounding environment;
- Release of silt laden waters, muds, drilling spoils, hydrocarbons from the drilling equipment, stripped soil, bentonite, and drilled cuttings during HDD;
- Fire risk associated with infrastructure (e.g. treatment facilities, pump stations, generators, fuel storage);

- Traffic incident collisions onsite and offsite with vehicles involved in construction of the Proposed Development. Collisions with other road users, pedestrians, cyclists due to an increase in construction traffic entering and leaving site, driver negligence or failure of vehicular operations on site roads;
- Loss of critical Infrastructure/ failure of water supply system. Equipment or infrastructure failure of pipelines, WTPs or storage facilities; and
- An accident during the installation of the intake pipe and intake screen within Lough Conn and installation of the Break Pressure Tank at the Windy Gap BPT site.

The impact and likelihood of the identified major accident and disaster scenarios are assessed in Table 19-7. The assessment considers credible worst-case scenarios and the residual risk following implementation of the embedded safety and mitigation measures. Based on the consequence and likelihood ratings presented in Table 19-7, none of the identified scenarios result in a residual risk that would give rise to likely significant adverse effects on the Proposed Development or on off-site receptors during the construction phase. Accordingly, the residual risks associated with major accidents and disasters during construction are considered to be not significant.

Table 19-7 — Assessment of Major Accidents and Disasters for Construction Phase

Risk ID	Major Accident	Impact	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score
C1	Extreme heat or cold weather resulting in structural damage and/or pollution to soils, groundwater, or surface waters	Human health, biodiversity, soils and geology, hydrology, and hydrogeology	2	Extreme temperatures could affect temporary works, exposed ground, stockpiles, drainage systems and construction materials, potentially resulting in structural damage, sediment mobilisation or contaminated runoff reaching surrounding soils, watercourses or lakes. Temporary drainage, settlement and dewatering arrangements would limit the extent and duration of any resulting pollution event.	1	Construction will be exposed to seasonal temperature variations; however, activities will be managed through the CEMP and temporary works procedures. Weather conditions and forecasts will be reviewed and construction activities will cease where extreme conditions could compromise safe working or environmental controls. Works will recommence following an appropriate assessment of site and weather conditions.	2
C2	Storm events resulting in structural damage and/or pollution to groundwater and surface waters	Human health, biodiversity, soils and geology, hydrology, and hydrogeology	2	Storm events could affect excavations, temporary works, pipeline trenches, cofferdams, construction compounds and dewatering activities, potentially resulting in erosion, sediment release or mobilisation of pollutants to surrounding watercourses and sensitive receptors. Settlement tanks, stormwater management infrastructure and other drainage controls would limit the quantity and duration of contaminated runoff reaching receptors.	1	The likelihood of a storm event escalating into a major accident is reduced through weather monitoring, implementation of the CEMP and management of temporary works and drainage systems. Construction activities will cease during severe storm conditions where necessary and recommence following assessment of site conditions and weather forecasts.	2

Risk ID	Major Accident	Impact	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score
C3	Flooding	Human health, biodiversity, soils and geology, hydrology, and hydrogeology	2	Flooding could affect excavations, temporary works, compounds and pipeline construction, potentially causing damage to plant or temporary infrastructure and generating sediment-laden or contaminated runoff. Where project elements are located within areas of elevated flood probability, critical infrastructure is elevated and drainage/dewatering measures provide resilience and limit the extent of any resulting effects.	1	The FRA identifies limited areas of flood risk, with most project elements located in Flood Zone C. Temporary water management and dewatering arrangements will be maintained during construction, reducing the likelihood that a flood event would result in failure of construction infrastructure or escalation to a major accident.	2
C4	Flash fire, Explosion or Jet fire following compressed gas cylinder release (e.g. acetylene for welding)	Human Health	3	A release and ignition of compressed flammable gas could result in thermal radiation or explosion effects, causing injury to construction personnel and damage to plant, equipment or partially constructed infrastructure. The Site Emergency Response Plan would provide for appropriate response and escalation procedures, limiting the duration and extent of the consequences.	1	Gas cylinders will be stored and used in accordance with appropriate industry procedures, including external well-ventilated storage when not in use and appropriately certified equipment during use. Activity-specific method statements and risk assessments will be prepared, reducing the likelihood of cylinder damage, loss of containment or ignition.	3
C5	Release of Concrete paste to surrounding environment	Biodiversity, soils and geology, hydrology, and hydrogeology	2	An uncontrolled release of wet concrete or concrete washings could result in elevated pH and contamination of soils, drainage	1	Concrete handling and washout will be managed through the CEMP and designated construction procedures. Controlled working	2

Risk ID	Major Accident	Impact	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score
				systems, watercourses or lake waters, with potential effects on aquatic receptors. Where concrete works occur near sensitive aquatic environments, works will be undertaken within controlled or drained areas and associated settlement/containment arrangements would limit the quantity of material capable of reaching environmental receptors.		areas, appropriate storage and pollution-prevention practices will reduce the likelihood of an uncontrolled release occurring.	
C6	Release of silt laden waters, muds, drilling spoils, hydrocarbons from the drilling equipment, stripped soil, bentonite, and drilled cuttings during Horizontal Directional Drilling	Biodiversity, Hydrology and hydrogeology, soil, and geology	2	A release of drilling fluids, bentonite, cuttings, hydrocarbons or spoil could affect water quality and aquatic habitats at sensitive watercourse crossings. Contingency arrangements, spill-response materials and the positioning of launch and reception pits away from watercourses where practicable would limit the scale and duration of any release reaching environmental receptors.	1	HDD activities will be limited to specific crossings and undertaken using a dedicated drilling-fluid management approach. Drilling pressures will be monitored and surrounding areas inspected for evidence of drilling-fluid breakout. These preventative controls reduce the likelihood of a significant accidental release occurring.	2
C7	Fire risk associated with infrastructure (e.g. treatment facilities, pump stations, generators, fuel storage)	Human health, biodiversity, soils and geology, hydrology, and hydrogeology	2	A fire could result in injury to personnel, damage to plant or partially completed infrastructure, temporary disruption to construction	1	Fuels and chemicals will be stored within designated areas with controlled access and routine inspection. Refuelling arrangements, secure storage,	2

Risk ID	Major Accident	Impact	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score
				activities and pollution associated with fuels, chemicals or contaminated firewater runoff. Bunding and containment of fuels and chemicals, together with emergency response arrangements, would limit the potential quantity of hazardous material released and the duration of any environmental effects.		inspection and maintenance procedures and construction management controls will reduce the likelihood of conditions developing that could initiate or sustain a significant fire.	
C8	Traffic incident collisions onsite and offsite with vehicles involved in construction of development. Collisions with other road users, pedestrians, cyclists due to increase in construction traffic entering and leaving site, driver negligence or failure of vehicular operations on site roads.	Human health	3	collision A collision involving construction vehicles, HGVs or plant could result in injury to workers, motorists, pedestrians or cyclists, together with damage to vehicles, plant or road infrastructure. In a higher-consequence event, damage to vehicles carrying fuel or hazardous materials could result in an associated release. Emergency response and traffic management arrangements would assist in limiting secondary consequences following an incident.	1	Construction traffic will be managed through the Traffic Management Plan, agreed access arrangements and temporary traffic management measures, which may include stop/go systems, temporary signals, lane closures, road closures and signed diversions. These measures reduce opportunities for conflict between construction traffic and other road users.	3
C9	Loss of critical infrastructure failure of water supply system. Equipment or infrastructure failure	Human health	3	Accidental damage to operational pipelines, pumping stations, treatment infrastructure or storage facilities could	1	Existing water-supply assets will be protected during construction, with phased works, temporary abstraction arrangements, retained	3

Risk ID	Major Accident	Impact	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score
	of pipelines, water treatment plants or storage facilities			interrupt abstraction, treatment, transfer or storage and reduce water-supply resilience. Retained infrastructure, temporary abstraction arrangements, bypasses and operational flexibility would limit the extent and duration of any resulting service interruption.		pipelines, bypass arrangements and progressive commissioning of new assets before transfer of flows. These measures reduce the likelihood of construction activities causing a significant failure of operational infrastructure.	
C10	An accident during the installation of the intake pipe and intake screen within Lough Conn and installation of the BPT at the Windy Gap	Human health, biodiversity, soils and geology, hydrology, and hydrogeology	3	An accident during lakebed preparation, pipe launch, flotation, sinking or placement at Lough Conn, or during construction at Windy Gap, could result in sediment release, deterioration in water quality or disturbance to sensitive aquatic and water-dependent habitats. Sediment containment, dewatering, water-quality protection measures and engineered containment at Windy Gap would limit the magnitude and persistence of any resulting environmental effects.	1	Installation will be undertaken using controlled construction methodologies, supported by environmental monitoring, sediment-management measures, dewatering controls and defined construction procedures. These controls reduce the likelihood of an installation incident resulting in a significant release or effect on Lough Conn SAC or nearby water-dependent habitats.	3

19.5.2 Operational Phase

The following potential major accident and disaster scenarios associated with the Proposed Development have been identified for assessment. These scenarios have been screened in on the basis that, should they occur at sufficient scale or severity, they have the potential to result in serious consequences to human health and safety, biodiversity, water quality, property or critical infrastructure, and/or to cause significant disruption to the operation of the Proposed Development or the wider water supply system. Therefore, they fall within the definitions of major accidents and disasters set out earlier in this chapter.

The assessment also considers the potential for individual asset failures to result in wider or cascading effects across the interconnected water supply system, where relevant.

- Flooding due to rain and storm events;
- Extreme weather (e.g. heat, cold, wind and storms) resulting in structural damage and/or pollution to soils, groundwater, or surface waters;
- Pollution of water courses, discharge or spillage of fuel or chemicals used in water treatment due to equipment or infrastructure failure or industrial accident, Employee negligence, burst pipes, flooding of site;
- Risk of inlet pipe collision, at Wherrew RWI&PS site, with boats and impact of aquatic life;
- Risks from Seveso sites in proximity of the Proposed Development;
- Fire risk associated with infrastructure (e.g. treatment facilities, pump stations, generators, fuel storage);
- Traffic incident collisions onsite and offsite with vehicles involved in deliveries to the development. Collisions with other road users, pedestrians, cyclists due to increase in traffic entering and leaving site, driver negligence or failure of vehicular operations;
- Loss of critical Infrastructure/ failure of water supply system. Equipment or infrastructure failure of pipelines, water treatment plants or storage facilities; and
- Contamination of treated drinking water (e.g. treatment failure, dosing error).

The impact and likelihood of the identified major accident and disaster scenarios are assessed in Table 19-8. The assessment considers credible worst-case scenarios and the residual risk following implementation of the embedded safety and mitigation measures.

Based on the consequence and likelihood ratings presented in Table 19-8, none of the identified scenarios result in a residual risk that would give rise to likely significant adverse effects on the Proposed Development or on off-site receptors during the operational phase. The embedded safety, prevention and mitigation measures reduce both the likelihood of a major accident occurring and, where an event does occur, the potential consequences. Accordingly, the residual risks associated with major accidents and disasters are considered to be not significant.

Table 19-8 — Assessment of Major Accidents and Disasters for Operational Phase

Risk ID	Major Accident	Impact	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score
O1	Flooding due to rain and storm events	Human health, biodiversity, soils and geology, hydrology, and hydrogeology	2	Flooding could affect operational infrastructure including pumping stations, treatment facilities, reservoirs and pipelines, potentially disrupting water treatment or transfer operations. Where infrastructure is located within areas of elevated flood probability, critical operational elements are positioned above predicted flood levels, limiting the extent of flood-related damage and disruption.	1	The FRA found that most infrastructure is located within Flood Zone C. Where assets are located in areas of elevated flood probability, key infrastructure incorporates elevated or flood-resilient design and appropriate climate-change freeboard. These design provisions reduce the likelihood of flooding causing failure of critical operational assets.	2
O2	Extreme weather (e.g. heat, cold, wind and storms) resulting in structural damage and/or pollution to soils, groundwater, or surface waters	Human health, biodiversity, soils and geology, hydrology, and hydrogeology	2	Extreme heat, cold, wind or storm conditions could damage operational assets, interrupt infrastructure or result in the release of fuels, chemicals or untreated water. Permanent drainage, stormwater and containment systems would limit the extent and duration of any resulting environmental release.	1	Operational infrastructure is designed for long-term exposure to prevailing environmental conditions and will be subject to routine inspection and preventative maintenance. Monitoring and maintenance arrangements reduce the likelihood of weather-related deterioration or damage escalating into a major accident.	2
O3	Pollution of water courses, discharge or spillage of fuel or chemicals used in water treatment due to equipment or infrastructure failure or industrial accident,	Human health, biodiversity, soils and geology, hydrology, and hydrogeology	3	An accidental release of treatment chemicals or fuel could affect surface water, groundwater, soil or ecological receptors. Bulk chemical storage is bunded and chemical delivery and drainage arrangements provide	1	Loss of containment is made less likely through controlled chemical delivery and transfer arrangements, leak detection, routine inspection, preventative maintenance and	3

Risk ID	Major Accident	Impact	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score
	Employee negligence, burst pipes, flooding of site;			secondary containment, limiting the volume capable of migrating from the immediate release area and therefore limiting the extent and duration of environmental effects.		operating procedures for chemical handling and transfer. These measures reduce the probability of an uncontrolled release occurring.	
O4	Risk of inlet pipe at Wherrew raw water intake (RWI&PS) collision with boats and impact of aquatic life	Human health, biodiversity, hydrology, and hydrogeology	2	A vessel collision could damage the abstraction pipe or intake structure, potentially interrupting abstraction operations and affecting aquatic receptors. The screened intake and dedicated fish-protection arrangements would limit effects on aquatic fauna should damage or disruption occur.	1	The intake location will be identified by three cardinal markers to aid navigation and reduce the potential for accidental vessel interaction. The submerged/protected nature of the infrastructure and operational monitoring further reduce the likelihood of a damaging collision occurring.	2
O5	Risks from Seveso sites in proximity of Proposed Development	Human health, biodiversity, soils and geology, hydrology, and hydrogeology	1	A major accident at a nearby COMAH establishment could potentially affect human health, environmental receptors or infrastructure. However, the element of the Proposed Development within the relevant vicinity comprises buried treated-water infrastructure conveying a non-hazardous substance and does not introduce a significant population or vulnerable receptor concentration that would materially increase the consequences of an external major accident.	1	The Proposed Development does not introduce hazardous operations capable of initiating an accident at a nearby COMAH establishment and does not involve activities that would increase the probability of an accident occurring at those establishments.	1
O6	Fire risk associated with infrastructure (e.g. treatment facilities, pump	Human health, biodiversity, soils and	3	A fire involving treatment facilities, generators, fuel or chemical storage could damage operational assets, interrupt water-supply functions and	1	Fuels and chemicals will be managed within dedicated storage areas with controlled access, inspection,	3

Risk ID	Major Accident	Impact	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score
	stations, generators, fuel storage)	geology, hydrology, and hydrogeology		cause secondary environmental pollution from fuels, chemicals or contaminated firewater. Bunding, containment systems and emergency response measures would limit the quantity of hazardous material released and the extent and duration of secondary effects.		preventative maintenance and defined operating procedures. These controls reduce the likelihood of loss of containment, ignition or other conditions capable of developing into a significant fire.	
O7	Traffic incident collisions onsite and offsite with vehicles involved in deliveries to the development. Collisions with other road users, pedestrians, cyclists due to increase in traffic entering and leaving site, driver negligence or failure of vehicular operations	Human health	2	A collision associated with staff movements, maintenance visits, chemical deliveries or sludge collections could result in injury to road users, pedestrians, cyclists or staff and damage to vehicles or infrastructure. Where a vehicle is carrying chemicals or fuel, a collision could also result in a secondary release; existing emergency and containment procedures would limit subsequent effects.	1	Operational traffic volumes are substantially lower than construction traffic and principally comprise routine maintenance and periodic deliveries. Use of established site entrances and operational access procedures reduces the likelihood of vehicle conflict.	2
O8	Loss of critical Infrastructure/ failure of water supply system. Equipment or infrastructure failure of pipelines, water treatment plants or storage facilities	Human health, biodiversity, soils and geology, hydrology, and hydrogeology	3	Failure of a treatment plant, pumping station, storage reservoir or major pipeline could interrupt abstraction, treatment, storage or distribution and reduce the resilience of the water-supply network. Retained assets, duplicate process units, storage reservoirs, duty/standby arrangements, backup power and operational flexibility would limit the duration and geographical extent of any service disruption.	1	Routine inspection, preventative maintenance, continuous monitoring of flows and pressures, telemetry, duty/standby equipment and backup-power arrangements reduce the likelihood of a single equipment or infrastructure failure escalating into a significant network-wide failure.	3

Risk ID	Major Accident	Impact	Consequence Rating	Basis of Consequence	Likelihood Rating	Basis of Likelihood	Risk Score
O9	Contamination of treated drinking water (e.g. treatment failure, dosing error)	Human health, biodiversity, soils and geology, hydrology, and hydrogeology	2	Failure of treatment or chemical dosing could adversely affect the quality of water supplied to consumers. The treatment process incorporates multiple sequential treatment barriers and storage capacity, which would limit the potential for a single process failure to result in contaminated water being supplied and reduce the potential scale of any effect.	1	Continuous instrumentation, automated monitoring and control, sampling, operational checks, preventative maintenance and routine inspection of chemical-dosing systems reduce the likelihood of treatment or dosing failure occurring or remaining undetected.	2

19.5.3 Do Nothing Scenario

The EIA Directive requires the following to be described relating to the future receiving environment (the 'Do Nothing' scenario):

"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."

Under a 'do-nothing' scenario there is no known or anticipated change to the major accidents and disasters risk at the Proposed Development site.

19.6 Cumulative Effects of the Proposed Development

The Proposed Development lies within the consultation distance of an upper-tier Seveso establishment (Ballina Beverages /European Refreshments, approximately 300 m). The only element of the scheme that falls within this consultation distance is the buried treated-water trunk main; the principal operational assets (treatment works, pumping stations and reservoirs) are located outside the 5 km study area.

The trunk main is a robust, buried asset conveying treated potable water, which is non-hazardous by nature. Considering the location of the Proposed Development relative to the nearby Seveso establishment, and the buried and protected nature of the trunk main together with the non-hazardous nature of its contents, there is no credible pathway by which the Proposed Development would materially increase the likelihood or consequences of a major accident at the Seveso establishment.

There are no other projects within 5 km that would interact with the Proposed Development in a way that could meaningfully increase the likelihood or severity of a major accident or disaster. As a result, no significant cumulative major-accident effects have been identified. Both during construction and operation, cumulative effects from major accidents and disasters are considered imperceptible and neutral, and the residual cumulative effects are therefore assessed as imperceptible and neutral.

19.7 Mitigation Measures

There are mitigation measures identified in the EIAR Chapter 3 Project Description and in the Natura Impact Assessment. The Proposed Development has been designed in line with good industry practice, and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design and in accordance with planning and legislative requirements. As no likely significant effects were identified, no additional mitigation measures are proposed.

19.8 Residual Effects of the Proposed Development

Residual effects are the final predicted effects following the implementation of proposed mitigation measures. Following implementation of the embedded mitigation measures, the residual effects associated with major accidents and disasters are assessed as not significant.

19.9 Interactions

In accordance with Section 2.7.6 of the EPA Guidelines (2022), this section considers the interactions between the identified major accident and disaster risks and other environmental factors. The assessment recognises that a major accident may result in secondary or cascading effects across multiple environmental receptors and therefore considers both the interaction pathway and the embedded mitigation measures incorporated into the Proposed Development.

19.9.1 Population and Human Health

The principal risks with the potential to interact with Population and Human Health include fire or explosion associated with compressed gas cylinders during construction, traffic collisions involving construction or operational vehicles, contamination of treated drinking water arising from treatment failures or dosing errors, flooding or extreme weather affecting critical infrastructure, and the failure of key water supply assets such as treatment facilities, pumping stations, reservoirs or trunk mains. These events could result in injury to workers, members of the public, road users, or consumers dependent on the public water supply network. In particular, disruption to water treatment, storage or distribution infrastructure could adversely affect drinking water security and the resilience of water supply services to communities. Similarly, contamination of treated water through process failure could create a direct human health pathway through the potable water supply system.

The Proposed Development incorporates a range of embedded mitigation and resilience measures designed to prevent or minimise these interactions. Construction activities will be undertaken in accordance with site-specific health and safety procedures, detailed risk assessments, method statements and a Site Emergency Response Plan. Traffic-related risks will be managed through implementation of a Traffic Management Plan, temporary traffic controls and agreed site access arrangements. Operationally, the water treatment system incorporates multiple treatment barriers, continuous instrumentation, automated monitoring and control systems, routine sampling, operational checks and preventative maintenance programmes to minimise the risk of treated water contamination. The design also includes redundancy and resilience measures such as duty/standby pumps, backup power generation, retained infrastructure, storage reservoirs, and routine inspections, thereby reducing the likelihood that infrastructure failure, flooding or extreme weather events could interrupt water supply services or result in adverse effects on human health. (see chapter 3 Project Description and chapter 6 Population and Human Health for details).

19.9.2 Land, Soils and Geology

Major accident scenarios capable of interacting with land, soils and geology primarily include accidental releases of concrete, fuels, lubricants, drilling fluids, bentonite and spoil materials during construction activities, as well as pollution incidents arising from extreme weather events, flooding, infrastructure failures or chemical releases. Such events have the potential to contaminate soils, alter soil chemistry, affect geological materials, and facilitate the migration of contaminants through vulnerable ground conditions. The interaction is particularly relevant where excavations, temporary works, dewatering activities, HDD crossings, construction compounds and chemical handling operations are undertaken, creating potential pathways for contaminants to enter soil and underlying geological strata.

Embedded controls substantially reduce the likelihood of significant soil or geological effects. The Construction Environmental Management Plan (CEMP) will provide for pollution prevention procedures, spill response measures, sediment management controls, dewatering management and environmental monitoring. HDD activities will be

undertaken using drilling fluid management procedures, pressure monitoring, inspection regimes and contingency measures for drilling fluid breakout. Spill containment systems will be provided for fuels, lubricants and hydraulic fluids, while designated refuelling and storage areas will be bunded, sealed and covered. Wet concrete works near sensitive receptors will be undertaken within controlled construction environments using cofferdams, drained work areas, settlement systems and pollution prevention measures. During operation, treatment chemicals will be stored within bunded compounds supported by leak detection systems, controlled delivery areas and documented operational procedures, thereby preventing accidental releases from affecting soils and geological receptors. (see chapter 3 Project Description and chapter 9 Land, Soils and Geology for details)

19.9.3 Surface Water and Hydrogeology

Surface water and hydrogeological receptors represent one of the most sensitive interaction pathways identified within the assessment. Potential major accident scenarios include releases of silt-laden runoff, drilling fluids, bentonite, hydrocarbons, concrete, fuels or treatment chemicals; flooding of operational infrastructure; and accidental incidents associated with intake installation works in Lough Conn and infrastructure located near water-dependent habitats. These events could result in deterioration of water quality within sensitive receptors including Lough Conn, Lough Talt, Lough Cullin and associated watercourses. In hydrogeological terms, accidental releases could infiltrate highly vulnerable groundwater zones, resulting in contaminant transport through groundwater pathways. Chemical spills arising from operational water treatment facilities could similarly affect both surface waters and groundwater if containment systems were absent.

The design incorporates extensive water protection measures to interrupt these pathways. Construction-phase controls include settlement tanks, silt fencing, sediment management measures, cofferdams, dewatering controls, pollution prevention procedures and emergency spill response arrangements implemented through the CEMP. For HDD crossings, launch and reception pits will be located away from watercourses where practicable, with drilling pressure monitoring, inspection programmes and contingency procedures in place. No direct works will occur at the River Moy crossing, as the existing crossing infrastructure will be utilised. During intake installation works at Lough Conn and construction works at Windy Gap, controlled construction methodologies, sediment control measures, water quality protection procedures, containment systems, leak collection drains and inspection chambers will minimise the potential for releases. Operationally, chemical storage systems incorporate bunding, dedicated delivery aprons, leak detection alarms, controlled drainage arrangements and Standard Operating Procedures covering handling, transfer and spill response, ensuring that accidental releases are contained before reaching surface water or groundwater receptors. (see chapter 3 Project Description and chapter 10 Water and Hydrology for details)

19.9.4 Biodiversity

Biodiversity receptors are particularly sensitive to Major accidents and Disaster events due to the strong ecological connectivity between aquatic habitats, water quality and designated conservation sites. Accidental releases of concrete, fuels, drilling fluids, sediments, hydrocarbons or treatment chemicals could adversely affect aquatic habitats, fish populations, aquatic flora and designated ecological sites such as Lough Conn and Lough Talt. Similarly, accidents during abstraction pipe installation within Lough Conn, HDD operations beneath sensitive watercourses, flooding events or infrastructure failures could result in habitat degradation, elevated sedimentation, reduction in water quality or ecological disturbance. During operation, damage to the intake structure or failure of chemical containment systems could create pathways for effects on aquatic ecosystems and protected species.

A comprehensive suite of ecological protection measures has been embedded within the project design. Construction activities near sensitive water environments will be controlled through implementation of the CEMP, sediment management measures, pollution prevention controls, spill containment systems and water quality protection procedures. HDD crossings will utilise trenchless methodologies specifically to avoid direct disturbance of sensitive watercourses and aquatic habitats. Intake installation works within Lough Conn will be undertaken using controlled construction methods supported by sediment containment measures and environmental monitoring. During operation, the Wherrew intake incorporates dedicated fish protection measures including intake screening, rotating fish screens,

fish return systems, acoustic hoods and monitoring infrastructure to minimise effects on aquatic fauna. Vessel collision risk is reduced through the provision of cardinal markers identifying the intake location. In addition, all chemical storage and handling systems are designed with bunding, containment, leak detection and emergency response arrangements, significantly reducing the potential for accidental releases to affect designated ecological receptors or important aquatic habitats (see Chapter 3 – Project Description and Chapter 7 – Biodiversity for details).

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