Contents

17 Major Accidents and Disasters

17.1 Introduction

This chapter describes likely effects on the environment arising from the vulnerability of the proposed development to risks of major accidents and/or disasters.

The assessment of the vulnerability of the proposed development to major accidents and disasters is carried out in compliance with the EIA Directive that entered into force on 16 May 2017 (EC, 2014) which states the need to assess:

"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 natural disasters which are relevant to the project concerned."

The underlying objective of this assessment is to ensure that appropriate precautionary actions are taken for those projects which *"because of their vulnerability to major accidents and/or natural disasters, are likely to have significant adverse effects on the environment"*.

Based on the requirements of the EIA Directive, this chapter seeks to determine:

- The relevant major accidents and/or disasters, if any, that the proposed development could be vulnerable to;
- The potential for these major accidents and/or disasters to result in likely significant adverse environmental effect(s); and
- The measures that are in place, or need to be in place, to prevent or mitigate the likely significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies.

The proposed development (encompassing the onshore elements in Ireland only) will comprise of the following:

The proposed development (encompassing the onshore elements in Ireland only) will comprise:

- **Landfall Compound** – a temporary landfall compound at Baginbun, where the high voltage direct current (HVDC) cable will be installed underground, below the beach and cliff at Baginbun Beach, by horizontal directional drilling (HDD);
- **HVDC Cables** – two HVDC electricity cables with a nominal capacity of 500 megawatts (MW), installed underground from the landfall at Baginbun to the converter station, including jointing bays and ground level marker posts at intervals along the route;
- **Converter Station** – a converter station situated close to the existing Eirgrid 220kV Great Island substation in Wexford;

- **Tail Station** - a 220kV Loughtown substation located beside the converter station. The Loughtown tail station connects the HVAC 220kV cable into the 220kV grid via the existing Eirgrid Great Island substation;
- **MV Substation** – an ESB MV substation building located outside the converter station and tail station perimeter fences but within the landholding. This substation will provide the MV and LV connections required for the development;
- **Converter Station Construction Compound** - temporary compound for the construction of the converter station and tail station at Great Island;
- **Cable Contractor Compounds** – three temporary cable contractor compounds will be required (i) at the landfall site close to Baginbun Beach (ii) at the proposed converter station and (iii) one along the onshore route in the townland of Lewistown;
- **HDD Compounds** – temporary HDD contractor compounds are required. One will be located close to the cable contractor compound at Baginbun Beach with another HDD compound located at either side of the Campile River Estuary crossing;
- **High Voltage Alternating Current (HVAC) Cables** – one 220 kV HVAC electricity cable circuit consisting of three cables, installed underground connecting the converter station via the Loughtown tail station to the existing EirGrid Great Island substation;
- **Fibre Optic Cables** – fibre optic cables for operation and control purposes, laid underground with the HVDC and HVAC cables;
- **Community Gain Roadside Car Parking near Baginbun Beach** – in consultation with Wexford County Council, circa 54 roadside car parking spaces will be constructed; and
- **Community Gain in Ramsgrange Village** – in consultation with Wexford County Council, extension to existing footpaths, four new streetlights and a speed activated sign at Ramsgrange.

A more detailed description is provided in **Chapter 3** *Proposed Development*.

This chapter has been prepared by Simon Grennan and Dan Garvey of Arup. A description of the authors' qualifications and experience is presented in **Appendix 1.1**.

17.2 Assessment Methodology

17.2.1 General

Major accidents and/or disasters are unplanned events that have the potential to affect and be affected by the proposed development. These include accidents during construction and operation caused by operational failure and/or natural hazards.

The scope and methodology of this assessment is centred on GIL's intention that the proposed development will be designed, built and operated in line with best international current practice and in compliance with the relevant

health and safety standards. As such, major accidents associated with the proposed development would be very unlikely.

Notwithstanding the above, a risk analysis-based methodology that covers the identification, likelihood and consequence of major accidents and/or disasters has been used for this assessment. The scope and methodology presented in the following sections is based on the provisions of the EIA Directive, the Draft EPA Guidelines and guidance documents and other published risk assessment methodologies, described in **Section 17.2.2** below, and professional judgement**.**

17.2.2 Guidance and Legislation

17.2.2.1 Legislative Requirements

The following paragraphs set out the requirements of the EIA Directive in relation to major accidents and/or disasters.

Recital 15 of the EIA Directive states that:

"In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and/or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and/or disasters, the risk of those accidents and/or disasters occurring and the implications for the likelihood of significant adverse effects on the environment. In order to avoid duplications, it should be possible to use any relevant information available and obtained through risk assessments carried out pursuant to Union legislation, such as Directive 2012/18/EU of the European Parliament and the Council (EC, 2012) *and Council Directive 2009/71/Euratom* (EC, 2009)*, or through relevant assessments carried out pursuant to national legislation provided that the requirements of this Directive are met."*

Note: Directive 2012/18/EU is the directive on the control of major-accident hazards involving dangerous substances, referred to as the COMAH or Seveso 3 Directive.

Article 3 of the EIA Directive requires that the EIAR shall identify, describe and assess in the appropriate manner, the direct and indirect significant effects on population and human health, biodiversity, land, soil, water, air and climate, material assets, cultural heritage and landscape deriving from (amongst other things) the "*vulnerability of the project to risks of major accidents and/or disasters that are relevant to the project concerned*".

Specifically, the information relevant to major accidents and/or disasters to be included is set out in Section 8 of Annex IV of the EIA Directive as follows:

"(8) 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 or Council Directive 2009/71/Euratom 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".

17.2.2.2Guidance Documents

Guidance documents and published plans have been reviewed and considered in order to inform this assessment, as described in the following sections.

Environmental Impact Assessment of Projects – Guidance on the preparation of the Environmental Impact Assessment Report (European Commission, 2017)

The European Commission Guidance outlines the legislative requirements and key considerations which should be considered in the preparation of EIARs with respect to accident and disaster risks.

The Guidance lists the following issues which EIARs should address:

- What can go wrong with a Project?
- What adverse consequences might occur to human health and to the environment?
- How likely are these consequences?
- What is the Project's state of preparedness in case of an accident/disaster?
- Is there a plan for an emergency situation?

Draft EPA Guidelines (EPA, 2017)

The draft EPA guidelines refer to major accidents and/or disasters in several sections including:

- Characteristics of the Project – The draft EPA guidelines state under Section 3.5.2 that the project characteristics should include "*a description of the Risk of Accidents – having regard to substances or technologies used.*"
- Impact assessment - The draft EPA guidelines state under Section 3.7.1 that the impact assessment should, in accordance with Annex IV (5) of the EIA Directive, include *"the risks to human health, cultural heritage or the environment (for example due to accidents or disasters)."*
- Likelihood of Impacts - The draft EPA guidelines state the following 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). This may be supported by general risk assessment methods or by systematic risk assessments required under other regulations e.g. a COMAH (Control of Major Accident Hazards involving Dangerous Substances) assessment."

Guidance on Assessing and Costing Environmental Liabilities (EPA, 2014)

The EPA guidance document above presents a systematic approach for assessing and costing environmental liabilities associated with closure, restoration/aftercare and incidents. This guidance is targeted at activities falling under the various EPA authorisation regimes including the Industrial Emissions Directive (IED), Integrated Pollution Control (IPC), waste, Wastewater Discharge (WWD) and Dumping at Sea (DaS).

This document provides guidance on the identification and quantification of risks, focusing on unplanned, but possible and plausible events that may occur during the construction and operational phases of licensed facilities and/or activities. Specifically, guidance is also provided on a range of risk assessment and evaluation techniques in Section 3.3 of the EPA guidance document.

A Framework for Major Emergency Management Guidance Document 1-A Guide to Risk Assessment in Major Emergency Management (Government of Ireland, 2010)

The Department of the Environment, Heritage and Local Government (now the Department of Housing, Planning and Local Government), published a guidance note in January 2010 on best practice in risk assessment for major emergency management.

This Guidance sets out a risk assessment procedure that should be applied and documented by the principal response agencies as a basis for major emergency management. The risk assessment procedure underpins work in the later stages of the emergency management cycle. A significant benefit of the risk assessment process is that it can help establish confidence in the Major Emergency Management system, by showing it to be both realistic and logical.

The document provides guidance on the various stages of the risk assessment process and how it should be employed to inform mitigation and detailed planning during major emergency situations. Part 1 of the guidance defines criteria for classifying impact and likelihood scenarios in order to support the risk assessment process, as well as a process for recording the risk assessment.

A National Risk Assessment for Ireland 2017 (Department of Defence, 2017)

The most recent National Risk Assessment forms a critical subset of the strategic process ('National Risk Assessment: Overview of Strategic Risks') undertaken by the Government on an annual basis to assess national risks. The purpose of the assessment is to identify national hazards across a broad range of emergencies, to assess the likelihood and effect of these risks and to inform actions at national level aimed at mitigating such risks, including the allocation of resources. Categorisation of the Baseline Environment

A desk-based study has been undertaken to establish the baseline environment relevant to the risk assessment, as this will influence both the likelihood and the effect of a major accident and/or disaster.

Establishing the local and regional context, prior to completion of the risk assessment, enables a better understanding of the vulnerability and resilience of the area to emergency situations, and of the potential for the surrounding environment to pose a risk of a major accident or disaster, which could affect the proposed development. **Section** Error! Reference source not found. provides an overview of the baseline environment that has been considered for this assessment.

17.2.3 Impact Assessment Methodology

17.2.3.1General

As discussed above, the scope and methodology of this assessment is based on GIL's intention that the proposed development will be designed, built and operated in line with best international current practice and, as such, the vulnerability of the proposed development to risks of major accidents and/or disasters is considered to be low.

Certain potential unplanned events, such as pollution incidents to ground and watercourses and flooding events, are addressed in detail in the relevant environmental assessment chapters. These include **Chapter 12** *Soils, Geology and Hydrogeology* and **Chapter 13** *Water and Hydrology*.

17.2.3.2Risk Assessment Methodology

Overview

The site-specific risk assessment identifies and quantifies risks focusing on unplanned, plausible incidents occurring during the construction, operation and decommissioning of the proposed development. The following steps were undertaken as part of the site-specific risk assessment:

- Identification of potential risks;
- Risk classification - likelihood and consequence assessment; and
- Risk evaluation.

Identification of Potential Risks

In accordance with the EC Guidance, potential risks are identified in respect of:

(1) Potential vulnerability to major accident or disaster; and

(2) Potential to cause major accidents and/or disasters.

The identification of potential risks has focused on non-standard but plausible incidents, which could occur at the proposed development during construction, operation and decommissioning, and which could cause a non-trivial impact on the environment. Similarly, if an off-site event could cause the proposed development to have a non-trivial impact on the environment, this was also classified as a plausible risk.

Risk Classification

Classification of Likelihood

Once the potential risks were identified, the likelihood of occurrence of each was assessed. The effectiveness of safety procedures and pollution prevention measures was considered when estimating the likelihood of an identified potential incident occurring. **Table 17.1** indicates the likelihood ratings that have been applied.

The approach adopted has assumed a 'risk likelihood' where one or more aspects of the likelihood description are met. Any risk to the proposed development, for which the probability of it occurring is lower than "extremely unlikely" has been excluded from the assessment.

Table 17.1: Risk Classification Table – Likelihood

Ranking	Likelihood	Description
1	Extremely Unlikely	May occur only in exceptional circumstances; once every 500 or more years
2	Very Unlikely	Is not expected to occur; and/or 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; may occur once every 100-500 years.
3	Unlikely	May occur at some time; and/or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisation's worldwide; some opportunity, reason or means to occur; may occur once per 10-100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years
5	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

Classification of Consequence

The consequence rating assigned to each potential risk has assumed that mitigation measures and/or safety procedures have failed to prevent an effect on the environment. The consequence rating of the effect, if the incident occurs, is indicated in **Table 17.2**.

The consequence of a potential risk to the proposed development has been determined where one or more aspects of the consequence description are met i.e. potential risks that have no consequence have been excluded from the assessment.

Table 17.2: Risk Classification Table – Consequence

Ranking	Consequence	Effect	Description
1	Minor	Life, Health, Welfare Environment Infrastructure Social	Small number of people affected; no fatalities and small number of minor injuries with first aid treatment. No contamination, localised effects <€0.5M Minor localised disruption to community services or infrastructure (<6 hours).
2	Limited	Life, Health, Welfare Environment Infrastructure Social	Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required. Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements. Simple contamination, localised effects of short duration €0.5-3M Normal community functioning with some inconvenience.
3	Serious	Life, Health, Welfare Environment Infrastructure Social	Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support. Simple contamination, widespread effects or extended duration €3-10M Community only partially functioning, some services available.
4	Very Serious	Life, Health, Welfare Environment Infrastructure Social	5 to 50 fatalities, up to 100 serious injuries, up to 2000 evacuated Heavy contamination, localised effects or extended duration €10-25M Community functioning poorly, minimal services available
5	Catastrophic	Life, Health, Welfare Environment Infrastructure Social	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated. Very heavy contamination, widespread effects of extended duration.

Ranking	Consequence	Effect	Description
			>€25M Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

Risk Evaluation

Once classified, the likelihood and consequence ratings have been multiplied to establish a 'risk score' to support the evaluation of risks by means of a risk matrix.

The risk matrix (as outlined in **Table 17.3)** indicates the critical nature of each risk. The risk matrix has been applied to evaluate each of the risks associated with the proposed development. The risk matrix is colour coded to provide a broad indication of the critical nature of each risk:

- The red zone represents 'high risks';
- The amber zone represents 'medium risks'; and
- The green zone represents 'low risks'.

Table 17.3: Risk Matrix

Likelihood	Very likely	5					
	Likely	4					
	Unlikely	3					
	Very unlikely	2					
	Extremely Unlikely	1					
			Minor	Limited	Serious	Very Serious	Catastrophic
			1	2	3	4	5
			Consequence Rating				

17.3 Baseline Environment

17.3.1 Disasters

Ireland's geographic position means natural disasters such as earthquakes or tsunamis, which might pose a risk to developments of this nature and scale in other locations, are less likely to occur and less likely to be of significant magnitude. In recent times there has been an increase in the number of severe weather events in Ireland, particularly those leading to flash flooding, snow, lower than usual temperatures and strong winds.

With regard to disasters, severe weather conditions pose a plausible potential risk to the proposed development.

17.3.2 Major Accidents Hazard

The SSE Generation Ireland Limited (Great Island) power station, located adjacent to the proposed converter station and tail station, is the only industrial site close to the proposed development, which is subject to an Industrial Emissions Directive licence, licence reference P0606-03.

The SSE Generation Ireland facility is also designated as a 'lower tier Seveso site' in accordance with Council Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances (EC, 2012). This classification as a 'lower tier Seveso site' identifies this facility as an industrial establishment where dangerous substances are stored in large quantities. Documents on the EPA website indicate that the SSE Generation Ireland site is classified as 'lower tier Seveso site' due to the on-site storage of 10,000m^3 of diesel (also called distillate). The documents submitted to the EPA include the quantified risk assessment (QRA), prepared in 2009, which SSE Generation Ireland had also submitted to the HSA.

Section 2.1 of the SSE QRA states that "*The principal hazardous materials with the potential to cause major accidents or MATTE[1]s that will be present at the site are distillate and natural gas.*" Other hazardous substances are present but loss of containment of these substances was not considered to give rise to a potential major accident hazard.

Individual risk of fatality (per year) contours were calculated and presented in the QRA, Section 6.3.

The zones, in which the individual risks of fatality (per year) are $1x10^{-7}$ and $1x10^{-6}$, extended over a small portion of the converter station and tail station site, in the south western corner. The individual risk of fatality (per year) $1x10^{-7}$ zone extends over the south western edge of the landscaping berm. No staff associated with the operation or decommissioning of the proposed development would be normally present in this area of the converter station site. The workers, landscaping the area covered by the $1x10^{-7}$ and $1x10^{-6}$ zones, would be there for a few days at most.

The cable contractor's compound, material storage compound and the main contractor's compound lie outside the individual risk of fatality (per year) $1x10^{-7}$ zone.

The HVAC cable, where it enters the SSE site enters the individual risk of fatality (per year) $1x10^{-7}$ and $1x10^{-6}$ zones and then the $1x10^{-5}$ zone, where it skirts the tank farm's northern boundary and turns northwards to enter the EirGrid 220kV substation. ($1x10^{-7}$, $1x10^{-6}$ and $1x10^{-5}$ are one in ten million, one in one million and one in one hundred thousand probabilities, respectively.) Refer to **Figure 17.1**, which shows the "individual risk of fatality contours for people outdoors", sourced from the QRA submitted by SSE Generation Ireland to the EPA as part of its licence application in 2009. The proposed development has been superimposed on this graphic. The construction of this portion of the HVAC cable and the connection to the EirGrid Substation will take circa three months. Once construction is complete, this portion of the proposed development will be unmanned.

[1] Major accident to the environment

As the potential risk of an effect on a human being at the proposed development from an incident on the SSE Generation Ireland site has a likelihood of less than "extremely unlikely", this hazard is not included in the risk assessment.

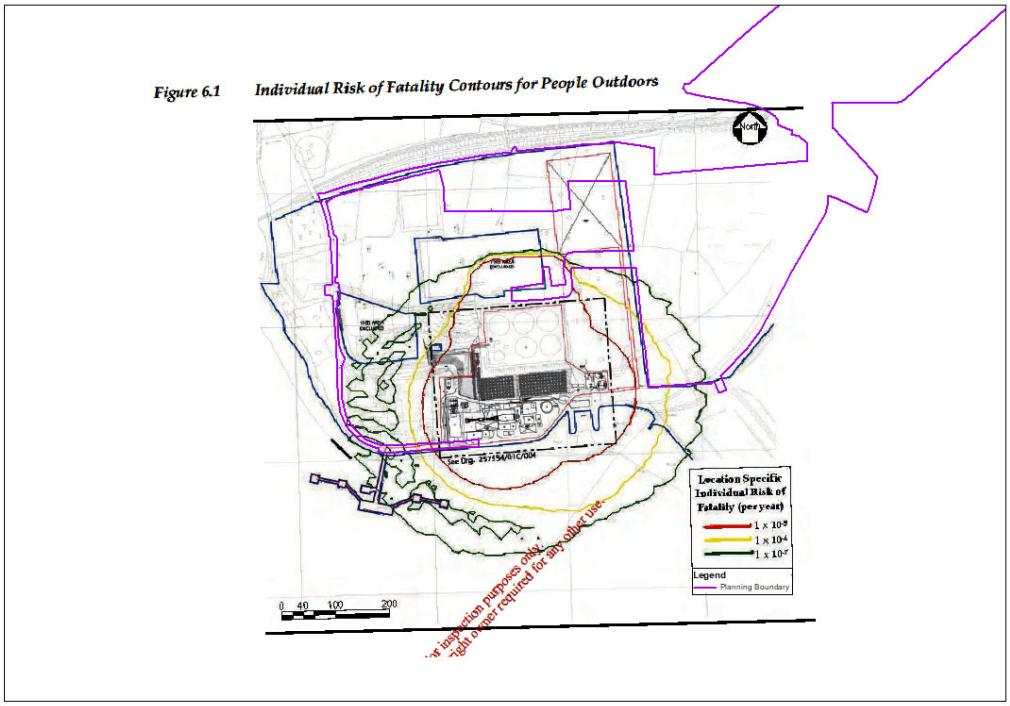

Figure 17.1 Individual Risk of Fatality Contours for People Outdoors Source for background: SSE Generation QRA 2009

Section 8.2 of the SSE QRA concluded that the environmental risks were considered to arise from spills of distillate being released into the marine environment from failures during unloading and catastrophic failure of a storage tank.

The ground level tank farm on the SSE site, in which the distillate is stored, is at circa 20mOD and the ground rises to the closest part of the proposed development, which is the HVAC connection to the EirGrid substation. A ridge, rising to 30mOD, lies between the SSE tank farm and the converter station and tail station site. Consequently, it is considered that the SSE Generation Ireland plant does not pose a plausible potential risk of a distillate spill affecting the proposed development. This hazard is not included in the risk assessment.

17.3.3 High Pressure Natural Gas Pipeline Hazard

An underground high-pressure natural gas pipeline runs in an approximately north-south direction in the SSE site, close to the converter station and tail station site's western perimeter fence. The gas pipeline is operated by Gas Networks Ireland.

According to the EIS prepared for the pipeline, the nominal diameter is 400mm. The pipeline wall material is high strength steel with a nominal wall thickness of 7.1mm, which increases to 14.27mm, at certain locations.

The pipeline was designed to Irish Standard I.S. 328:2003 Code of Practice for Gas Transmission Pipelines and Pipeline Installations. The design pressure is 85 barg. The pipeline is laid in a trench with a minimum cover of 1.2m.

The Commission for Regulation of Utilities (CRU) has the statutory function to regulate gas undertakings, including Gas Networks Ireland, with respect to safety. The CRU has published a Gas Safety Framework. As part of the framework, all natural gas undertakings must hold a licence from the CRU. The licence application includes the submission of a safety case. The safety case must outline how the undertaking manages the risks associated with its activity. The safety case must be accepted by the CRU and resubmitted where a material change takes place. Safety cases must also be assessed every five years by an independent reviewer.

CRU's publication *Safety Case Guidelines for Natural Gas & LPG Licensed Undertakings (CRU/18/254)* ,11 December 2018, sets out the requirements for a safety case. The safety case must include a risk assessment and must demonstrate that the residual risks are As Low As Reasonably Practicable (ALARP). The CRU has issued guidelines for the application of the ALARP principle to petroleum, natural gas and LPG activities and pipelines.

The ALARP principle requires that Risk Tolerability Limits are defined. Section 4 of the guidelines provide guidance on these limits for both workers and members of the public as follows:

- Individual risk per annum (for workers and members of the public); and
- Societal risk per annum (in the form of an FN Curve for members of the public, excluding workers).

Different individual risk limits are set for workers and the general public as follows:

	Upper tolerable limit (fatalities per year) (risk is tolerable if ALARP)	Lower tolerable limit (fatalities per year)
Worker	10^{-3}	10^{-6}
Public	10^{-4}	10^{-6}

In the guidelines, societal risk is represented by a *frequency number (FN) Curve*, which is a plot of cumulative frequency (likelihood) of all events with N or more fatalities. The guidelines include a table based on the FN curve. Upper and lower risk tolerability limits are stated for fatalities 1 to 9, 10 to 19, 50 to 99, 100 to 999 and 1000 or more persons, for 1.6km of pipeline length. The highest upper risk tolerability limit (fatalities per year), for between 1 and 9 fatalities, is $1x10^{-3}$. This is a lower probability than the "extremely unlikely" threshold of once in every 500 years, set for the risk assessment. Consequently, the normal operation of the pipeline is not included in the risk assessment.

However, the cable will be laid under the pipeline and this activity is included in risk assessment, as it is not part of the normal operation of the pipeline and is considered to represent a greater potential hazard.

17.3.4 Great Island Energy Storage System

The Great Island Energy Storage System has planning permission on a 1.5ha site adjacent to the converter station's northern boundary. An environmental report, prepared by Meridiem Renewables, was submitted with the planning application for that project.

The environmental report contained a description of the energy storage system and, on page 41, the containment measures and suppression measures in the event of a fire. The energy storage system will contain lithium ion battery packs. The energy storage system is contained and will not release any wastes, residues or odours. The lithium ion battery packs will not contain free liquid electrolyte and will not present a liquid release hazard. The cells or batteries will not contain metallic lithium or other heavy metals. Any released electrolyte liquid is likely to evaporate rapidly. The evaporated electrolyte will be flammable and corrosive. The battery containers will contain internal fire suppression systems capable of suppressing a lithium ion fire.

The batteries will be sealed and have a thermal management system containing coolants and refrigerants.

Fire tests on an external energy storage system without fire suppression have been conducted, which demonstrated that there is considerable time for an emergency response. Additionally, there were no projectiles, explosions or bursts observed and there were no liquids or hazardous waste spills.

Based on the information provided in the energy storage system environmental report and given the separation distance of 35m to 40m of the converter station buildings from the energy storage system site boundary, it is considered that the energy storage project does not represent a major accident hazard to the proposed development. Consequently, the operation of the energy storage system is not included in the risk assessment.

17.3.5 Other Potential Offsite Hazards

No plausible other offsite hazards have been identified.

The footprint of the Converter Station and Tail Station is set at an elevation of 23.00mOD. As this is more than 20m above sea level, the risk of tidal inundation due to a storm surge, an exceptional estuary flooding event, or tsunami is not considered plausible.

The cable trench will cross under a small stream, the Kilmannock stream, and under the Campile River Estuary. High water levels or flooding of these watercourses would have no effect on the cable, once construction is completed.

As stated in **Chapter 12**, *Land, Soils, Geology and Hydrogeology*, **Section** 12.3.3.5, the GSI database shows no recorded landslide events within the study area. During the site visits, small scale cliff instability and minor landslides, mainly in the thin overburden, were noted on the cliffs at Baginbun Beach. The cable will be installed well below the cliff and beach. There is no plausible risk to the proposed development due to landslides or ground instability.

17.3.6 Vulnerability of Surrounding Area

The sensitivity and vulnerability of the environment, in the area surrounding the proposed development to an incident on the site of the proposed development, is addressed in Chapters 7 to 16 of this EIAR.

17.4 Potential Effects

In the text below, all references to the converter station include the Loughtown tail station.

17.4.1 Do-Nothing Scenario

If the proposed development does not proceed, the number of construction workers or operation and maintenance workers in the various working areas, as well as the number of people in the vicinity of these areas for amenity and recreational purposes, while construction or operation is underway, will remain as it they are currently. There will also be no change to current activities in the area of the proposed works. In the absence of an increased number of people utilising the areas, or a change in the activities, there will be no increase in the likelihood of major accidents occurring, or indeed the consequences should a major accident occur. There will be no change to the likelihood or consequences of a disaster.

As such, the 'Do-nothing' scenario in this instance is representative of a situation where the likelihood of major accident and/or disaster occurring will remain the same as it is currently.

17.4.2 Construction Phase

Six potential risks specific to the construction phase of the proposed development have been identified. These are outlined in the construction phase risk register in **Table 17.4**.

Table 17.4: Risk Register – Construction Phase

Risk ID	Potential Risk	Possible cause
C1	Flooding of working areas causing silt run-off to nearby receptors (e.g. watercourses)	- Extreme weather – periods of very heavy rainfall.
C2	Spill or long-term seepage of pollutants into nearby receptors (e.g. watercourse, groundwater, soil)	- Spill or leak; - Extreme weather causing damage to containment structure (rain, wind); - Employee negligence.
C3	Fire and/or explosion, with a secondary impact of fire water/foam/powder reaching nearby receptors (e.g. watercourse, groundwater, soil)	- Spill or leak of flammable or explosive substance; - Electrical fault or faulty equipment; - Vehicle collision; - Employee negligence.

Risk ID	Potential Risk	Possible cause
C4	Fire and/or explosion, with a secondary impact of fire water/foam/powder reaching nearby receptors (e.g. watercourse, groundwater, soil)	- Gas leak caused by puncture of gas pipeline, while the HVAC cable is being installed under it.
C5	Vehicle collision (involving construction traffic or at temporary on-road works	- Driver error; - Object on road; - Failure of temporary traffic safety measures.
C6	Electrical shock	- Faulty equipment, workmanship or procedures

17.4.3 Operational Phase

Five potential risks specific to the operational phase of the proposed development have been identified. These are outlined in the operational phase risk register in **Table 17.5**.

Table 17.5: Risk Register – Operational Phase

Risk ID	Potential Risk	Possible cause
Op1	Fire and/or explosion, with a secondary impact of fire suppressant powder reaching nearby receptors (e.g. watercourse, groundwater, soil)	- Equipment or infrastructure failure; - Employee negligence.
Op2	Collapse/damage to structures/infrastructure at converter station site	- Earthquake; - Vehicular collision; - Severe weather.
Op3	Vehicle collision (involving maintenance traffic on public road)	- Driver error; - Object on road.
Op4	Electrical shock	- Faulty equipment, workmanship or procedures.
Op5	Cable or joint/termination failure	- Internal fault; - Third party damage.

17.4.4 Decommissioning Phase

Five potential risks specific to the decommissioning phase of the proposed development have been identified. These are outlined in the decommissioning phase risk register in **Table 17.6**.

Table 17.6: Risk Register – Decommissioning Phase

Risk ID	Potential Risk	Possible cause
D1	Flooding of working areas, causing silt run-off to nearby receptors (e.g. watercourse)	- Extreme weather – periods of very heavy rainfall.
D2	Spill of pollutants into nearby receptors (e.g. watercourse, groundwater, soil)	- Spill or leaks; - Extreme weather (rain, wind); - Employee negligence.
D3	Fire and/or explosion, with a secondary effect of fire suppressant water/foam/powder reaching nearby receptors (e.g. watercourse, groundwater, soil)	- Spill or leak of flammable or explosive substance; - Electrical fault or faulty equipment; - Vehicle collision; - Employee negligence.
D4	Vehicle collision (involving decommissioning traffic or at temporary on-road works)	- Third party driver error; - Object on road.
D5	Electrical shock	- Faulty equipment, workmanship or procedures.

17.4.5 Risk Assessment

The potential risks identified in **Sections 17.4.2, 17.4.3** and **17.4.4** have been assessed and the resulting risk analysis is presented in **Table 17.7**.

The risk register is based upon possible risks associated with the proposed development. The consequence rating assigned to each potential risk assumes that the proposed mitigation measures and safety procedures have failed to prevent the effect on the environment.

Table 17.7: Risk assessment

Risk ID	Potential Risk	Possible cause	Environmental effect	Likelihood Rating (1-5)	Basis of Likelihood	Consequence Rating (1-5)	Basis of Consequence	Risk Score (Consequence x Likelihood)
Construction								
C1	Flooding of working areas, causing silt run-off to nearby receptors (e.g. watercourse)	- Extreme weather – periods of heavy rainfall.	-Sedimentation of nearby watercourses; - Damage to, or depletion of aquatic habitats and species.	2	Taking into consideration the elevation of the converter station site and the lack of historic flooding events within the footprint of the proposed development, flooding of working areas caused by an extreme weather event during the construction phase is considered very unlikely. Substantial work areas at the converter station site will only be in an unpaved/not top-soiled and grassed condition, and thus vulnerable to substantial silt run-off, for less than one year. The HDD compounds will only be vulnerable for four to six weeks. HDD compounds near the Campile River Estuary and Baginbun Beach are located at a higher elevation than areas at flood risk from the river and sea. Silt control measures will be in place, which will be able to cope with most weather events.	2	Flooding of the working areas along the cable route during the construction phase would result in a limited consequence in that there would be a limited number of people affected with localised effects of short duration. Further, there would be normal community functioning in the surrounding areas with just some inconvenience. No members of the public would be affected by flooding at the converter station and tail station site. The most vulnerable environmental receptor is the Campile River Estuary. Any run-off, which escape the control measures would spill onto grassland and very little, if any would get to the estuary. In such severe weather, the River would be laden with silt from the catchment.	4
C2	Spill or long-term seepage of pollutants into nearby receptors (e.g. watercourse, groundwater, soil)	- Spill or leaks; - Extreme weather (rain, wind); - Employee negligence.	- Contamination of nearby watercourses; - Damage to, or depletion of aquatic habitats and species; - Contamination of groundwater resource; - Contamination of soils, which would have to be remediated or removed as waste.	2	Spills of pollutants due to an extreme weather event during the construction phase is considered very unlikely. As outlined in **Section 4.9.3**, any containers of potential polluting materials such as fuels and oils will be stored in a bunded area that is located a minimum distance of 10m away from any watercourse. Full details on the mitigation measures proposed to prevent spills and release of pollutants are presented in **Chapter 4** *Construction Strategy*, **Chapter 12** *Land, Soils and Hydrogeology*, **Chapter 13** *Water and Hydrology*. As explained in the CEMP, employees will be trained in pollution prevention and control.	1	In the unlikely event of pollutants being discharged into nearby watercourses or the groundwater, the contamination would have localised effects of short duration. There would be a limited number of people affected, and there would be normal community functioning in the surrounding areas with just some inconvenience. Should contamination of soil occur, a limited effect is predicted, the contamination would have a localised effect of short duration, which could be remediated.	2
C3	Fire and/or explosion, with a secondary effect of fire water/foam/powder reaching nearby receptors (e.g. watercourse, groundwater, soil)	- Spill or leak of flammable or explosive substance; - Electrical fault or faulty equipment; - Vehicle collision; - Employee negligence.	- Damage to, or depletion of habitats and species (incl. aquatic habitats and species); - Contamination of groundwater resource;	2	A fire and/or explosion during the construction phase is considered very unlikely as the quantities of flammable or explosive materials on site, which could leak or spill, during the construction phase will be very limited, and will be confined to the construction compounds and converter station site. In any areas with electrical equipment, or hydrocarbons, water will not be used for firefighting.	3	Should a fire and/or explosion occur, a significant number of people in close proximity to the area could be affected. Contamination of groundwater and/or a watercourse could occur, but the quantities of firefighting materials will not be large. Should contamination of soil occur, the contamination would be localised effects of short duration, which could be remediated.	6

Risk ID	Potential Risk	Possible cause	Environmental effect	Likelihood Rating (1-5)	Basis of Likelihood	Consequence Rating (1-5)	Basis of Consequence	Risk Score (Consequence x Likelihood)
			- Effects on ambient air quality; Contamination of soils, which would have to be remediated or removed as waste. - Injury/illness/loss of life; - Generation of waste, as damaged buildings and equipment would have to be disposed of; - Visual impact of fire damaged building and equipment; - Possible damage to fabric of heritage features.		As outlined in **Chapter 4** *Construction Strategy*, GIL will ensure that all contractor's staff have been trained in safe working procedures, that safe installation and environmental procedures are implemented and that all health and safety legislation and good working practices are followed. Appropriate site personnel will be trained as first aiders. As outlined in **Chapter 4** *Construction Strategy*, GIL will ensure that all fire safety requirements are provided for in co-ordination with the local County Council and Greenlink Interconnector Limited. Appropriate site personnel will be trained as first aiders and fire marshals. The contractor will be required to maintain an emergency response plan which will cover all foreseeable risks including fire. In preparing this plan the contractor will be required to liaise with the emergency services.			
C4	Fire and/or explosion, with a secondary effect of fire water/foam/powder reaching nearby receptors (e.g. watercourse, groundwater, soil)	- Gas leak caused by puncture of gas pipeline, while the HVAC cable is being installed under it.	- Damage to, or depletion of habitats and species (incl. aquatic habitats and species); - Contamination of groundwater resource; - Effects on ambient air quality; Contamination of soils, which would have to be remediated or removed as waste. - Injury/illness/loss of life;	1	A puncture of the gas pipeline is considered to be extremely unlikely. The pipeline is constructed of high strength steel. To construct the cable trench in the vicinity of the gas pipeline, the pipeline location will be identified by hand-digging to the top of the pipeline. The method of crossing under the pipeline will be with a mini-HDD which will drill a borehole under the pipeline with good clearance from the HDD bore to the pipeline. A Gas Networks Ireland inspector will be present for the duration of the pipeline crossing works, to ensure that adherence to Gas Networks Ireland procedure. Natural gas is lighter than air and would dissipate very quickly from a puncture, with very limited opportunity for a concentration between the upper and lower explosive limits to develop and persist.	2	The quantity of gas which would leak from any plausible rupture of the pipeline would be very small.	2

Risk ID	Potential Risk	Possible cause	Environmental effect	Likelihood Rating (1-5)	Basis of Likelihood	Consequence Rating (1-5)	Basis of Consequence	Risk Score (Consequence x Likelihood)
			- Generation of waste, as damaged buildings and equipment would have to be disposed of; - Visual impact of fire damaged building and equipment; - Possible damage to fabric of heritage features.					
C5	Vehicle collision (involving construction traffic or at temporary on-road works)	- Driver error; - Object on road; - Failure of temporary road safety measures.	- Injury/loss of life. - Contamination of surface or groundwater, or soils, which would have to be removed as waste	3	A major road traffic accident during the construction phase is considered unlikely. A construction traffic management plan is included as **Appendix 6.1.** This will be a live document which will be updated/added to as construction progresses. It will be implemented for the duration of the proposed works. Refer to **Chapter 6** *Traffic and Transportation* for details.	2	Should a major road traffic accident occur, a limited effect is predicted in that a limited number of people would be affected. Further, should this event occur, there would be normal community functioning in the surrounding areas with just some inconvenience. A traffic accident could cause limited pollution of soil or an adjacent watercourse. Should contamination of soil occur, a limited effect is predicted in that the incident could be classified as simple contamination with localised effects of short duration, which could be remediated.	6
C6	Electrical shock	- Faulty equipment, workmanship or procedures	- Injury/loss of life.	2	The risk of electrical shock during the construction phase is considered very unlikely. As outlined in **Chapter 4** *Construction Strategy*, the contractor will be required to ensure that all staff have been trained in safe working procedures, that safe installation and environmental procedures are implemented and that all health and safety legislation and good working practices are followed. Appropriate site personnel will be trained as first aiders.	2	Should an electrical shock occur, a limited effect is predicted in that a limited number of people would be affected.	4
Operation								
Op1	Fire and/or explosion, with a secondary effect of fire suppressant powder reaching nearby receptors (e.g. watercourse, groundwater, soil)	- Equipment or infrastructure failure; - Employee negligence.	- Damage to, or depletion of habitats and species (incl. aquatic habitats and species);	2	A fire and/or explosion during the operational phase is considered very unlikely. The potential risk relates primarily to the converter station and tail station. Such an event is extremely unlikely along the cable route.	3	Should a fire and/or explosion occur, very few people will be affected as, the numbers on site will be small but could be more than one fatality. Should this event occur it would likely result in simple contamination with limited effect and duration. Should contamination of soil occur, there would be localised effects of short duration, which could be remediated.	6

Risk ID	Potential Risk	Possible cause	Environmental effect	Likelihood Rating (1-5)	Basis of Likelihood	Consequence Rating (1-5)	Basis of Consequence	Risk Score (Consequence x Likelihood)
			- Effects on ambient air quality Contamination of soils, which would have to be remediated or removed as waste. - Injury/illness/loss of life; - Generation of waste, as damaged buildings and equipment would have to be disposed of; - Visual impact of fire damaged building and equipment; - Possible damage to fabric of heritage features.		Prior to the commissioning of Greenlink, the contractor will be required to ensure that all fire safety and detection equipment and systems have been designed and installed to best industry practice. During commissioning all systems will be validated. It is noted that fire suppression systems at the converter station will be non-water based. Operations staff and inspection and maintenance staff will be fully been trained in safe working procedures, that safe installation and environmental procedures are implemented and that all health and safety legislation and good working practices are followed. Appropriate site personnel will be trained as first aiders.		Should contamination of surface water within the site occur, this would be contained within the drainage system, tested, and disposed of appropriately without causing pollution to surface waters.	
Op2	Collapse/damage to structures/ infrastructure at converter station sites	- Earthquake; - Vehicular collision; - Severe weather.	- Injury/loss of life.	1	According to the Irish National Seismic Network (INSN), earthquakes measuring ~2 on the Richter Scale are 'normal' in terms of seismicity in Ireland. These are known as microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. With events of this magnitude buildings in Ireland are extremely unlikely to be damaged or collapse due to seismic activity. Having regard to on-site speed restrictions and infrequent vehicular movements at the converter station sites, it is not predicted that any collision of vehicles with the structures on site would result in significant damage/collapse. It is considered extremely unlikely that severe weather would cause significant damage or collapse of the structures on site, even allowing for climate change effects.	2	In the event of a structural damage, a limited effect would occur in that a very small number of people would be affected with a few serious injuries with hospitalisation and medical treatment likely to be required. For normal operations there will only be two people on site during the operational phase.	2

Risk ID	Potential Risk	Possible cause	Environmental effect	Likelihood Rating (1-5)	Basis of Likelihood	Consequence Rating (1-5)	Basis of Consequence	Risk Score (Consequence x Likelihood)
Op3	Vehicle collision (involving maintenance traffic on public road)	- Driver error; - Object on road.	- Injury/loss of life.	2	The risk of a major road traffic accident during the operational phase is considered very unlikely. A very small number of vehicles will access the converter station site and onshore cable route to facilitate servicing/maintenance of equipment /infrastructure during the operational phase. As such, it can be determined that there is a very limited opportunity, reason or means for a vehicle collision to occur on the public road at some time.	1	Should a road traffic accident occur, a minor effect is predicted. Having regard to on-site speed limits and vehicular movements, a small number of people would be affected, with no fatalities and a small number of minor injuries with first aid treatment only likely to be required. A traffic accident could cause limited pollution of soil or an adjacent watercourse. Should contamination of soil occur, a limited effect is predicted in that the incident could be classified as simple contamination with localised effects of short duration, which could be remediated.	2
Op4	Electrical shock	- Faulty equipment, workmanship or procedures.	- Illness/loss of life;	1	The risk of electrical shock during the operation of the proposed development is considered very unlikely. The potential risk relates primarily to the converter station and tail station. Such an event is extremely unlikely along the cable route. Prior to the commissioning of Greenlink, the contractor will be required to ensure that all equipment and systems have been designed and installed to best industry practice. During commissioning all systems will be validated. Operations staff and inspection and maintenance staff will be fully trained in safe working procedures, that safe installation and environmental procedures are implemented and that all health and safety legislation and good working practices are followed. Appropriate site personnel will be trained as first aiders.	1	Very limited workforce exposed to the hazard. Only 2 staff will normally be in the converter station during operation. inspection and maintenance crews will be small.	1
Op5	Cable or joint/termination failure	- Internal fault; - Third party damage.	- Injury/loss of life.	2	The risk of electrical shock the during the operational phase is considered very unlikely. Cable/joint failure due to an internal fault is very rare. The most likely cause for a cable failure would be due to third party damage. Considering both internal and external faults it has been estimated that the failure rate for the Greenlink circuit would be approximately 1 or 2 faults over the 40-year lifetime for the complete circuit length (i.e. from Ireland to Wales). During a cable/joint fault there is a risk that the ground voltage (i.e. earth potential) could increase. This rise in earth potential could be	2	Should an electrical shock occur, a limited effect is predicted in that a limited number of people would be affected.	4

Risk ID	Potential Risk	Possible cause	Environmental effect	Likelihood Rating (1-5)	Basis of Likelihood	Consequence Rating (1-5)	Basis of Consequence	Risk Score (Consequence x Likelihood)
					transferred to the ground surface and could result in a step potential (i.e. a voltage difference between the feet of a person or animal) and result in an electric shock to a person standing above (or very local) to the fault. With DC cables the risk of a dangerous step potential occurring is low since the fault currents for a HVDC systems are far lower than AC systems. Also, most of the fault current tends to return to the source via the cable sheath (which is the path of least impedance) and fault current passing through the local earth is low. Hence, the risk of accidents during operation due to faults on the cable/joints are very low. Electrical failure of the cable termination could also cause an accident. The termination that shall be used for the Greenlink project shall be the polymeric type which are explosion resistant. These terminations shall be enclosed in an area away from public access. Hence, the risk of accidents during operation due to faults on the terminations are very low. The cables will be marked with warning tape, placed above the cables in the trench, and the cable route will be marked with above ground marker posts, in accordance with best industry practice. The road authority will have drawings showing the cable location in the public roads and the landowners will be furnished with similar drawings for the off-road sections of cable.			
Decommissioning								
D1	Flooding of working areas, causing silt run-off to nearby receptors (e.g. watercourse)	- Extreme weather – periods of heavy rainfall.	- Sedimentation of nearby watercourses; - Damage to, or depletion of aquatic habitats and species.	1	Flooding of working areas caused by an extreme weather event during the decommissioning phase is considered extremely unlikely, even allowing for climate change effects. Substantial work areas at the converter station site will only be in an unpaved/not top-soiled and grassed condition, and thus vulnerable to substantial silt run-off, for three or four months. Silt control measures will be in place, which will be able to cope with most weather events.	2	No members of the public would be affected by flooding at the converter station and tail station site during decommissioning. Any run-off, which escape the control measures would spill onto grassland on site.	2

Risk ID	Potential Risk	Possible cause	Environmental effect	Likelihood Rating (1-5)	Basis of Likelihood	Consequence Rating (1-5)	Basis of Consequence	Risk Score (Consequence x Likelihood)
D2	Spill of pollutants into nearby receptors (e.g. watercourse, groundwater, soil)	- Spill or leaks; - Extreme weather (rain, wind); - Employee negligence.	- Contamination of nearby watercourses; - Damage to, or depletion of aquatic habitats and species; - Contamination of groundwater resource; - Contamination of soils, which would have to be remediated or removed as waste.	2	Spills of pollutants due to an extreme weather event during the decommissioning phase is considered very unlikely, even allowing for climate change effects. Materials management during the decommissioning phase will be similar to that described in **Section 4.9** in **Chapter 4**, *Construction Strategy*, for the construction phase. The mitigation measures to prevent spills and leaks during the decommissioning phase will be similar to those described in **Section 4.9.3** for the construction phase. Any containers of potential polluting materials such as fuels and oils will be stored in a bunded area that is located a minimum distance of 10m away from any watercourse. Full details on the mitigation measures proposed to prevent spills and release of pollutants are presented in **Chapter 4** *Construction Strategy*, **Chapter 12** *Land, Soils and Hydrogeology*, **Chapter 13** *Water and Hydrology*. A decommissioning environmental management plan will be prepared for the decommissioning phase, similar to the CEMP. Employees will be trained in pollution prevention and control.	1	In the unlikely event of pollutants being discharged into nearby watercourses or the groundwater, the contamination would have localised effects of short duration. There would be a limited number of people affected, and there would be normal community functioning in the surrounding areas with just some inconvenience. Should contamination of soil occur, a limited effect is predicted, the contamination would have a localised effect of short duration, which could be remediated.	2
D3	Fire and/or explosion, with a secondary effect of fire suppressant water/foam/powder reaching nearby receptors (e.g. watercourse, groundwater, soil)	- Spill or leak of flammable or explosive substance; - Electrical fault or faulty equipment; - Vehicle collision; - Employee negligence.	- Damage to, or depletion of habitats and species (incl. aquatic habitats and species); - Contamination of groundwater resource; - Effects on ambient air quality; Contamination of soils, which would have to be remediated or removed as waste.	2	A fire and/or explosion during the decommissioning phase is considered very unlikely. The quantities of flammable or explosive materials on site, which could leak or spill, during the decommissioning phase will be very limited, and will be confined to the converter station site. In any areas with electrical equipment, or hydrocarbons, water will not be used for firefighting. The workforce on the converter station site will be limited and very little works will be undertaken along the cable route. The decommissioning contractor will be required to ensure that all staff have been trained in safe working procedures, that safe demolition and environmental procedures are implemented and	2	Should a fire and/or explosion occur, a limited number of people in close proximity to the area could be affected. Contamination of groundwater and/or a watercourse could occur, but the quantities of firefighting materials will not be large. Should contamination of soil occur, the contamination would be localised effects of short duration, which could be remediated.	4

Risk ID	Potential Risk	Possible cause	Environmental effect	Likelihood Rating (1-5)	Basis of Likelihood	Consequence Rating (1-5)	Basis of Consequence	Risk Score (Consequence x Likelihood)
			- Injury/illness/loss of life; - Generation of waste, as damaged buildings and equipment would have to be disposed of; - Visual impact of fire damaged building and equipment; - Possible damage to fabric of heritage features.		that all health and safety legislation and good working practices are followed. Appropriate site personnel will be trained as first aiders. The decommissioning contractor will be required to ensure that all fire safety requirements are provided for in co-ordination with the local County Council and Greenlink Interconnector Limited. Appropriate site personnel will be trained as first aiders and fire marshals. The decommissioning contractor will be required to maintain an emergency response plan which will cover all foreseeable risks including fire. In preparing this plan the decommissioning contractor will be required to liaise with the emergency services.			
D4	Vehicle collision (involving decommissioning traffic or at temporary on-road works a)	- Third party driver error; - Object on road;	- Injury/loss of life; - Contamination of surface or groundwater, or soils, which would have to be removed as waste.	2	A major road traffic accident during the decommissioning phase is considered very unlikely. The workforce in the decommissioning phase will be no more than 20 or 30. A detailed traffic management plan will be prepared by the decommissioning contractor for each on-road working area in advance of any works taking place and will be implemented for the duration of the proposed works. Refer to **Chapter 6** *Traffic and Transportation* for details.	2	Should a major road traffic accident occur, it is predicted that a limited number of people would be affected. There would be normal community functioning in the surrounding areas with just some inconvenience. A traffic accident could cause limited pollution of soil or an adjacent watercourse. Should contamination of soil occur, a limited effect is predicted in that the incident could be classified as simple contamination with localised effects of short duration, which could be remediated.	4
D5	Electrical shock	- Faulty equipment, workmanship or procedures	- Injury/loss of life.	2	The risk of electrical shock during decommissioning phase is considered very unlikely. The workforce in the decommissioning phase will be no more than 20 or 30. The decommissioning contractor will be required to ensure that all staff have been trained in safe working procedures, that safe demolition and environmental procedures are implemented and that all health and safety legislation and good working practices are followed. Appropriate site personnel will be trained as first aiders.	2	Should an electrical shock occur, a very limited effect is predicted in that a limited number of people would be affected.	4

17.4.6 Risk Scores and Risk Matrix

The risk assessment in **Table 17.8** categorises each of the potential risks by their 'risk score.'

Table 17.8: Risk scores

Risk ID	Potential Risks	Likelihood Rating	Consequence Rating	Risk Score
C1	Flooding of working areas, causing silt run-off to nearby receptors (e.g. watercourse)	2	2	4
C2	Spill or long-term seepage of pollutants into nearby receptors (e.g. watercourse, groundwater, soil)	2	1	2
C3	Fire and/or explosion, with a secondary effect of fire water/foam/powder reaching nearby receptors (e.g. watercourse, groundwater, soil)	2	3	6
C4	Fire and/or explosion, with a secondary effect of fire water/foam/powder reaching nearby receptors (e.g. watercourse, groundwater, soil)	1	2	2
C5	Vehicle collision (involving construction traffic or at temporary on-road works)	3	2	6
C6	Electrical shock	2	2	4
Op1	Fire and/or explosion, with a secondary effect of fire suppressant powder reaching nearby receptors (e.g. watercourse, groundwater, soil)	2	3	6
Op2	Collapse/damage to structures/ infrastructure at converter station sites	1	2	2
Op3	Vehicle collision (involving maintenance traffic on public road)	2	1	2
Op4	Electrical shock	1	1	1
Op5	Cable or joint/termination failure	2	2	4
D1	Flooding of working areas, causing silt run-off to nearby receptors (e.g. watercourse)	1	2	2
D2	Spill of pollutants into nearby receptors (e.g. watercourse, groundwater, soil)	2	1	2

Risk ID	Potential Risks	Likelihood Rating	Consequence Rating	Risk Score
D3	Fire and/or explosion, with a secondary effect of fire suppressant water/foam/powder reaching nearby receptors (e.g. watercourse, groundwater, soil)	2	2	4
D4	Vehicle collision (involving decommissioning traffic or at temporary on-road works a)	2	2	4
D5	Electrical shock	2	2	4

A corresponding risk matrix is provided in **Table 17.9**, which is colour coded to provide an indication of the critical nature of each risk. The red zone represents high risks, the amber zone represents medium risks and the green zone represents low risks.

As outlined in **Table 17.9**, all of the potential risks identified during the construction, operation and decommissioning of the proposed development can be classified as low risk.

The scenarios with the highest risk score were a vehicle collision (involving construction traffic or at temporary on-road works), during the construction phase, and a fire and/or explosion, with a secondary effect of fire suppressant powder reaching nearby receptors, during the construction and operational phases.

Table 17.9: Risk Matrix

Likelihood Rating							
	Very likely	5					
	Likely	4					
	Unlikely	3		C5			
	Very unlikely	2	C2, Op3, D2	C1, C6, Op5, D3, D4, D5	C3, Op1		
	Extremely Unlikely	1	Op4	C4, Op2, D1			
			Minor	Limited	Serious	Very Serious	Catastrophic
			1	2	3	4	5
			Consequence Rating				

17.4.7 Conclusion with Respect to Major accidents and Disasters

No plausible major accidents or disaster hazards were identified, to which the proposed development will be vulnerable. No plausible potential risks were identified which would result in the proposed development causing a major accident or disaster on or outside the site of the proposed development.

17.5 Mitigation Measures and Monitoring

No plausible major accidents or disaster hazards were identified. Consequently, no mitigation to prevent such an incident and no monitoring is required. Low risk incidents were identified. Mitigation of the effects of the low risks with the highest risk scores, and monitoring of the mitigation measures, are described in this section.

17.5.1 Mitigation

17.5.1.1 Construction Phase

The proposed development will be designed and built in line with best international current practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design.

As outlined in **Section 17.4**, the scenarios with the highest risk score in terms of a major accident and/or disaster during the construction phase was identified as fire and/or explosion, with a secondary effect of fire water/foam/powder reaching nearby receptors, and a vehicle collision (involving construction traffic or at temporary on-road works).

The mitigation measures, which will limit the likelihood and consequence of a fire or explosion, will include:

- The storage of fuels and oils in contained and appropriately sized bunded areas will mitigate, by prevention, the risk of fire/explosion resulting from the potential spillage of fuels or oils.
- Portable fire extinguishers will be available for use at each of the onshore working areas.
- The proposed development will 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 construction phase.
- The contractor will be required to ensure that all fire safety requirements are provided for in co-ordination with Wexford County Council and Greenlink Interconnector Limited. Appropriate site personnel will be trained as first aiders and fire marshals. The contractor will also be required to maintain an emergency response plan which will cover all foreseeable risks i.e. fire. In preparing this plan the contractor will be required to liaise with the emergency response services.

The mitigation measures, which will limit the likelihood and consequence of a vehicle collision, include a construction traffic management plan which is included as **Appendix 6.1**. This will be a live document which will be updated/added to as construction progresses and will be implemented for the duration of the proposed works. Refer to **Chapter 6** *Traffic and Transportation* for details.

17.5.1.2Operational Phase

The proposed development will be designed and built in line with best international current practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design.

As outlined in **Section 17.4**, the scenario with the highest risk score during the operational phase was a fire and/or explosion, with a secondary effect of fire suppressant powder reaching nearby receptors.

The mitigation measures, which will limit the likelihood and consequence of a fire or explosion, will be as described below.

The proposed development will comply with BS 9999 *Fire safety in the design, management and use of buildings*.

In compliance with the local regulations for all Grid and Primary Substation buildings, a Fire Risk Assessment of the risks to which relevant persons will be exposed will be carried out during the detailed design stage of the project and updated throughout the project. The Fire Risk Assessment and the Fire Plan will be developed in conjunction with the Wexford Fire Brigade representative.

Fire Plan

The Fire Plan will be specific to the converter station buildings and the tail station building and will detail the pre-planned procedures in place for use in the event of a fire. Again, this will be developed in conjunction with the Wexford Fire Brigade.

Personnel Escape

Building elements will be designed for the following fire resistance periods:

Converter Building	2 hour minimum*
Control Room Building	2 hour minimum*
Tail Station Building	2 hour minimum*

* subject to Fire Risk Assessment and development of an acceptable Fire Plan.

Internal rooms (as defined in the Building Regulations Technical Guidance Documents) and other significant areas will have two exits signposted.

Personnel escape distances will be configured to meet the Building Regulations.

Direction signs to the nearest escape will be marked by photoluminescent signs about 50mm diameter fixed to the floor.

Fire Mitigation Measures

Fire detection and alarm will be designed to BS 5839 Fire Detection and Alarm Systems for Buildings to meet enhanced P2 system with detectors mounted on selected beam soffits.

The buildings will be equipped with firefighting equipment that may aide safe evacuation in the event of a fire.

Fire suppression systems will be fitted to all enclosed areas with equipment/plant containing oil unless it can be demonstrated at detailed design stage that it is safe not to do so.

Fire mitigation measures will be considered to minimise fire fuel material – e.g. the installation of steel doors rather than the use of wood where possible.

The building cladding and insulation used will comply with BS8414 regarding combustibility testing.

Cable routes and other holes through walls and floors will be designed to be capable of being fire sealed after installation of all equipment/plant and cables.

The voltage source converter (VSC) valves and its associated equipment will use non-combustible or minimally combustibles materials. This will extend to the control room and equipment and wiring installed there.

Aspirating Smoke and Arc Detection System

Smoke detection will be provided throughout the converter building.

In the valve hall and control room specifically, independent and accurate aspirating smoke detection systems will be provided, as well as smoke detectors. Smoke detectors will also be provided in the DC indoor switchgear room.

In addition, arc detectors will be installed in several locations within the valve hall.

The smoke and arc detection system will be laid out to improve identification of the source of problems. The detectors will be installed in such a way as to not send any alarm signals during maintenance.

As such, the risk of fire/explosion occurring at the proposed development resulting in a major accident and/or disaster during either the construction phase was given a risk score of 9, and during the operational phase was given a risk score of 6. This indicates a scenario that is '*unlikely*' to occur but would have '*serious*' consequences in construction should it do so, representing a '*medium risk scenario*.' The lower consequence rating in operation is a function of the planned zero-water fire suppression systems that will be employed on the site.

Prior to the commissioning of Greenlink, the contractor will be required to ensure that all fire safety requirements are provided for in co-ordination with Wexford County Council and Greenlink Interconnector Limited.

In addition to the fire suppression systems, fire extinguishers will be available for use at the converter station site.

The proposed development will be subject to a fire safety risk assessment which will assist in the identification of any major risks of fire, and mitigation of the same during the operational phase.

Further, a maintenance programme will be implemented for the proposed development. The purpose of the maintenance programme is to ensure that all critical equipment throughout the proposed development is operating

correctly, therefore reducing the risk of major accidents and/or disasters on site.

17.5.1.3 Decommissioning Phase

The mitigation measures, described for the construction phase, updated to reflect best practice at the time, will be implemented for the decommissioning phase.

17.5.2 Monitoring

17.5.2.1 Construction Phase

As outlined in **Chapter 4** *Construction Strategy*, a Construction Environmental Management Plan (CEMP) has been prepared, and this will be implemented and monitored during the works. The CEMP will be a live document and will work to ensure that potential risks to human health and the environment are monitored, as necessary. Refer to **Appendix 4.1**.

17.5.2.2 Operational Phase

Automatic smoke and arc detection systems will be installed and will be in operation throughout the life of the facility.

17.5.2.3 Decommissioning Phase

The monitoring measures, described above for the construction phase, updated to reflect best practice at the time, will be implemented for the decommissioning phase.

17.6 Residual Effects

No plausible major accidents or disaster hazards were identified, to which the proposed development will be vulnerable. No plausible potential risks were identified which would result in the proposed development causing a major accident or disaster on or outside the site of the proposed development.

17.7 Cumulative and Transboundary Effects

17.7.1 Cumulative Effects

The proposed development forms part of the Greenlink project, which also includes offshore elements, and works in the United Kingdom. The only potential for cumulative, transboundary or interactive effects with the wider project occurs at the landfall site near Baginbun Beach. The potential effects at this location have been fully documented in **Chapter 18** *Cumulative, Transboundary and Interactive Effects*.

No plausible potential major accidents and disasters have been identified, to which the entire project would be vulnerable. No incidents have been

identified, which would result in the overall project causing a major accident or disaster on or outside the site of the project.

The proposed development may also give rise to cumulative effects with regard to other proposed developments, either consented or currently under construction. One project has been identified which is of sufficient scale to have the potential to give rise to cumulative effects. This is the Great Island – Kilkenny 110kV Line Uprate Project. Note that the existing SSE Generation Ireland Limited (Great Island) power station and the Great Island Energy Storage System, which has planning permission, form part of the baseline for this assessment, so is not addressed further here.

No plausible potential major accidents and disasters have been identified, to which the proposed development together with the above project will be vulnerable. No incidents have been identified, which would result in the proposed development, together with the above project, causing a major accident or disaster on or outside the site of the project.

17.7.2 Transboundary Effects

Considering the nature and location of the proposed development as described in **Chapter 3** and **Chapter 4** no transboundary effects are predicted.

17.8 Impact Assessment Summary

Receptor	Potential Effects	Mitigation	Monitoring	Residual Effects
Environment	No major accident or disaster identified; no potential effects predicted	No major accident or disaster identified; no mitigation required	No major accident or disaster identified, none required	**None predicted**

17.9 Conclusion

As is stated above, with the implementation of the proposed mitigation measures and monitoring, no plausible major accidents or disaster hazards were identified, to which the proposed development will be vulnerable. No plausible potential risks were identified which would result in the proposed development causing a major accident or disaster on or outside the site of the proposed development during construction, operation or decommissioning.

17.10 References

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