

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

CONTENTS

INTRODUCTION	15-1
Statement of Authority	15-1
ASSESSMENT METHODOLOGY	15-1
LEGISLATIVE CONTEXT	15-2
Legislation	15-2
Assessment Methodology	15-4
VULNERABILITY OF THE PROJECT TO MAJOR ACCIDENTS AND NATURAL DISASTERS	15-11
Flooding (Meteorological and Hydrological)	15-12
Fire	15-13
Major Accidents Involving Dangerous Substances	15-13
Catastrophic Events.....	15-14
Landslides	15-15
Health and Safety	15-15
Turbine Safety	15-16
Electromagnetic Interference	15-16
Risk Assessment	15-16
Likely Significant Effects	15-17
Assessment of Effects During Construction	15-17
Risk Assessment	15-17
ASSESSMENT OF EFFECT DURING OPERATION	15-18
ASSESSMENT OF EFFECT DURING DECOMMISSIONING	15-19
ASSESSMENT OF EFFECT – SUMMARY	15-21
Mitigation Measures.....	15-41
Residual Effects.....	15-41
Cumulative Effects.....	15-41
CONCLUSION	15-42

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

TABLES

Table 15-1 Classification of Likelihood (Source: DoEHLG, 2010).....	15-5
Table 15-2 Classification of Consequence of Impact (Source: DoEHLG, 2010)	15-6
Table 15-3 Matrix for determining significance of effect (Source DoEHLG, 2010)	15-8
Table 15-4 HSE Emergency Plan Hazard Types (HSE, 2022)	15-9
Table 15-5 Risk Register - Construction Phase.....	15-17
Table 15-6 Risk Register – Operational Phase	15-19
Table 15-7 Risk Register – Decommissioning Phase.....	15-20
Table 15-8 Summary Assessment of Risks.....	15-21
Table 15-9 Consolidated Risk Score	15-38
Table 15-10 Risk Score Matrix	15-40

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

INTRODUCTION

- 15.1 This chapter of the Environmental Impact Assessment Report (EIAR) describes the likely significant effects on the environment arising from the vulnerability of the proposed project (the “Proposed Development”) as detailed in Chapter 2 to risks of major accidents and/or natural disasters.
- 15.2 It has been completed in accordance with the guidance set out by the Environmental Protection Agency (EPA) in ‘Guidelines on Information to be contained in Environmental Impact Statements’ (EPA, 2022) and the European Commission ‘Guidance on the preparation of the Environmental Impact Assessment Report’ (Directive 2011/92/EU, as amended by 2014/52/EU) (European Commission, 2017).
- 15.3 The assessment of the vulnerability of the Proposed Development to major accidents and natural disasters is carried out in compliance with the EIA Directive as amended 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.’*
- 15.4 Based on the requirements of the EIA Directive, this chapter seeks to determine:
- The relevant major accidents and/or natural disasters, if any, that the Proposed Development could be vulnerable to, including flooding, fire, dangerous substances, catastrophic events and landslides,
 - The potential for these major accidents and/or natural 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.

Statement of Authority

- 15.5 This chapter of the EIAR was prepared by Edward Goulding BA, MSc of SLR Consulting.
- Edward is a Graduate Planner with 2 years of experience. He holds a Bachelor of Arts degree in Geography, Planning and Environmental Policy from University College Dublin and a Master of Science in Planning and Development from Queens University Belfast.

ASSESSMENT METHODOLOGY

- 15.6 The following sources of information and literature pertinent to the area were used in the preparation of this Chapter:
- European Directive (2012/18/EU) – the “Seveso – III Directive”¹;
 - HSE Framework for Major Emergency Management;

¹ European Commission Seveso III https://environment.ec.europa.eu/topics/industrial-emissions-and-safety/industrial-accidents_en date accessed 20/6/2023

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

- S.I. No. 209 of 2015 Control of Major Accident Hazards involving Dangerous Substances “COMAH”²;
- ArcGIS Seveso site location map viewer³;
- The National Planning Framework 2040;
- The Regional Spatial and Economic Strategy for the Eastern and Midland Region;
- Meath County Development Plan 2021 – 2027;
- Westmeath County Development Plan 2021 – 2027;
- Meath County Council Website;
- Westmeath County Council Website; and
- Central Statistics Office (CSO).

15.7 Major accidents or natural disasters are hazards which have the potential to affect the Proposed Development and consequently have potential impacts on the environment. These include accidents during construction and operation caused by operational failure and/or natural hazards. The assessment of the risk of major accidents and/or disaster considers all factors defined in the EIA Directive that have been considered in this EIAR, i.e., population and human health, biodiversity, land, soil (peat stability), water, air and climate and material assets, cultural heritage and the landscape.

LEGISLATIVE CONTEXT

Legislation

15.8 An assessment of the following key elements was undertaken in accordance with the EIA Directive as amended:

- The vulnerability of the Proposed Development to potential accidents and disasters, and
- The Proposed Development’s potential to cause major accidents or disasters which pose a risk to the environment.

15.9 The information relevant to major accidents and/or disasters to be included in the EIAR is set out in paragraph 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

² European Union(Control of major accident hazards Involving dangerous substances)(Revocation) Regulations2015. https://www.hsa.ie/eng/Your_Industry/Chemicals/Legislation_Enforcement/COMAH/Sl_208_of_2015.pdf date accessed 20/6/2023

³ Seveso (upper and lower tier) map viewer: <https://www.arcgis.com/home/item.html?id=a01b5a0a6ff24f10adff30beaa3b6fd0>. Date Accessed 20/6/2023

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

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.'

Guidance Documents and Resources

15.10 The following have been consulted in the preparation of this section:

- European Commission (2017) Environmental Impact Assessment of Projects – Guidance on the preparation of Environmental Impact Assessment Reports;
- Department of Environment, Heritage and Local Government (2010) A Guide to Risk Assessment in Major Emergency Management;
- Environmental Protection Agency (2014) Guidance on Assessing and Costing Environmental Liabilities;
- Department of Defence (2020) A National Risk Assessment for Ireland;
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, August 2022);
- Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (Department of Housing, Planning and Local Government, August 2018);
- Notified Seveso Establishments on the HSA website⁴; and
- Seveso Site Locations, an ArcGIS library of mapped Seveso locations in the Republic of Ireland⁵.

Categorisation of the Baseline Environment

- 15.11 A desk-study based on site knowledge, online mapping and consideration of the resources identified above has been completed to establish the baseline environment for which the proposed risk assessment is being carried out. This will influence both the likelihood and the potential impact of a major accident or natural disaster. Local and regional context has been established prior to undertaking the risk assessment to develop an understanding of the vulnerability and resilience of the area to emergency situations.
- 15.12 A site walkover was carried out in April 2022 to establish the pattern of existing drainage and to record existing hydrology features of the Proposed Development Site. The site walkover involved an initial review of available information gathered in the desk study. During the site visit, the GPS coordinates, descriptions, and photographs of hydrology features were recorded to develop a better understanding of hydrology and drainage arrangements at the site.
- 15.13 As this is a site specific assessment, the Study Area for this assessment is comprised of the Proposed Development Site, taking into account the local wider context as relevant to the risk identified.
- 15.14 A visual inspection was conducted to identify any likely constraints or issues. The access arrangements were considered as part of the site visit. The results of the traffic survey are

⁴ https://www.hsa.ie/eng/your_industry/chemicals/legislation_enforcement/comah/list_of_establishments/

⁵ <https://www.arcgis.com/home/item.html?id=a01b5a0a6ff24f10adff30beaa3b6fd0>

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

provided in **Appendix 14-2** found in Volume III of this EIAR and a summary of the average weekday traffic is provided in **Table 14-2** of the Traffic chapter in the EIAR.

- 15.15 With regard to the control of major accident hazards involving dangerous substances, an examination of upper and lower tier Seveso Establishments in the surrounding region of the Proposed Development identified no Seveso Establishments in immediate proximity to the site (less than 5km). The nearest Seveso Establishments to the Site are the Tara Mines upper tier Seveso site approximately 20km to the east, the Ecolab Irl upper Seveso site approximately 28km to the southwest and the Irish Industrial Explosives upper Seveso site approximately 32km to the southeast.

Assessment Methodology

Introduction

- 15.16 This assessment is focused on an understanding that the Proposed Development will be designed, built and operated in line with the methodologies and measures prescribed in **Chapter 2** of this EIAR. Stringent health and safety and climate resilient design features are inbuilt to the project, hence it is considered that the overall vulnerability of the Proposed Development to risks of major accidents and natural disasters is considered low.
- 15.17 Other specialist chapters of the EIAR provide assessments of some potential accidents and disaster scenarios such as pollution incidents to ground and watercourses as well as assessment of flooding events (see **Chapter 7** Water) and peat instability (see **Chapter 6** Land, Soils and Geology). In relation to Human Health, please refer to **Chapter 4** Population and Human Health and **Chapter 13** Material Assets for further detail.

Site-Specific Risk Assessment Methodology

- 15.18 A site-specific risk assessment identifies and quantifies risks focusing on unplanned, but possible and plausible events occurring during the construction, operation and demolition of the Proposed Development. 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 'Guidance on Assessing and Costing Environmental Liabilities' document⁶. The following steps were taken as part of the site-specific risk assessment:
- Risk identification,
 - Risk classification, likelihood and consequence, and
 - Risk evaluation.

Risk Identification

- 15.19 Risks have been reviewed through the identification of reasonably foreseeable events in consultation with relevant contributors to this EIAR (refer to Statements of Authority in the technical chapters of this EIAR). The identification of risks has focused on non-standard but plausible incidents that could occur at, or as a result of, the Proposed Development during construction, operation and demolition.

⁶ EPA (2014) Guidance on assessing and costing environmental liabilities. Available at https://www.epa.ie/publications/compliance-enforcement/licenses/reporting/financial-provisions/EPA_OEE-Guidance-and-Assessing-WEB.pdf

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

15.20 In accordance with the European Commission EIAR Guidance, risks are identified in respect of the project's:

- 1 Potential to cause accidents and/or disasters, and
- 2 Vulnerability to potential disasters/accidents.

Risk Classification

Classification of Likelihood

15.21 After identifying the potential risks, the likelihood of occurrence of each risk has been assessed. An analysis of safety procedures and proposed environmental controls was considered when estimating likelihood of identified potential risks occurring. **Table 15-1** defines the likelihood ratings that have been applied.

15.22 The approach adopted has assumed a 'risk likelihood' where one or more aspects of the likelihood description are met, based on definitions set out in Department of Environment, Heritage and Local Government (2010) guidance.

Table 15-1 Classification of Likelihood (Source: DoEHLG, 2010)

Ranking	Likelihood	Description
1	Extremely Unlikely	May occur only in exceptional circumstances; once every 500 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

15.23 The consequence rating assigned to each risk has assumed that all proposed mitigation measures and/or safety procedures have failed to prevent the major accident and/or disaster. The consequence of the impact if the event occurs has been assigned as described in Table 15-2.

15.24 The consequence of a risk to/from the Proposed Development has been determined where one or more aspects of the consequence description are met, i.e., risks that have no consequence have been excluded from the assessment. Definitions of consequence ratings

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

are also based on Department of Environment, Heritage and Local Government (2010) guidance.

Table 15-2 Classification of Consequence of Impact (Source: DoEHLG, 2010)

Ranking	Likelihood	Impact	Description
1	Minor	Life, Health, Welfare	Small number of people affected; no fatalities and small number of minor injuries with first aid treatment.
		Environment	No contamination, localised effects.
		Infrastructure	<0.5M Euros
		Social	Minor localised disruption to community services or infrastructure (<6 hours).
2	Limited	Life, Health, Welfare	<ul style="list-style-type: none"> • 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.
		Environment	Simple contamination, localised effects of short duration.
		Infrastructure	0.5-3M Euros
		Social	Normal community functioning with some inconvenience.
3	Serious	Life, Health, Welfare	<ul style="list-style-type: none"> • 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.
		Environment	Simple contamination, widespread effects or extended duration
		Infrastructure	3-10M Euros
		Social	Community only partially functioning, some services available.
4	Very Serious	Life, Health, Welfare	5 to 50 fatalities, up to 100 serious injuries, up to 2000 evacuated.
		Environment	Heavy contamination, localised effects or extended duration.

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

		Infrastructure	10-25M Euros
		Social	Community functioning poorly, minimal services available.
5	Catastrophic	Life, Health, Welfare	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated.
		Environment	Very heavy contamination, widespread effects of extended duration.
		Infrastructure	>25M Euros
		Social	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

15.25 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.

15.26 The risk matrix, also sourced from the DoEHLG (2010) guidance and outlined in **Table 15-3** indicates the critical nature of each risk. This risk matrix has therefore 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 risk scenarios',
- The amber zone represents 'medium risk scenarios', and
- The green zone represents 'low risk scenarios'.

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Table 15-3 Matrix for determining significance of effect (Source DoEHLG, 2010)

		Consequence				
		1	2	3	4	5
		Minor	Limited	Serious	Very Serious	Catastrophic
Likelihood	5 Very Likely	Low	Moderate	High	High	High
	4 Likely	Low	Moderate	Moderate	High	High
	3 Unlikely	Low	Low	Moderate	Moderate	High
	2 Very Unlikely	Low	Low	Low	Moderate	Moderate
	1 Extremely Unlikely	Low	Low	Low	Low	Low
			Normal Emergency		Major Emergency	

15.27 The HSE has prepared Major Emergency Plans for areas of the State in accordance with the requirements set out in Section 4.4.1 of the National Framework for Major Emergency Management (2006). While the area within County Meath and Westmeath is not covered by any of the currently available Area Plans⁷, this assessment takes into consideration the general hazard categories utilised in the existing Area Plans. The hazard categories include Natural, Transportation, Technological and Civil. The hazard categories, types and subtypes, and their relevance to the Development, are listed below in **Table 15-4**.

⁷ <https://www.hse.ie/eng/services/list/3/emergencymanagement/area-mep/>

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Table 15-4 HSE Emergency Plan Hazard Types (HSE, 2022)

Category	Type	Subtype	Relevance to the Proposed Development
Natural Hazards			
Meteorological	Storm / Gale	Both coastal and inland areas can be affected by high winds	Poor driving conditions Damage to/loss of infrastructure Flooding Falling trees/infrastructure
		Heavy Snow	Blizzards – poor visibility
	Icy roads / impassable roads		Poor driving conditions
	Hypothermia		Not Applicable
	Freezing of supply network		Lack of road grit
	Severe Cold and Frost or extremes of temperature	Icy roads / impassable roads	Poor driving conditions Ice accumulation on turbines
		Hypothermia	Not Applicable
		Freezing of supply network	Lack of road grit
	Thunder and lightning	Road traffic collisions	Damage to/loss of infrastructure Poor driving conditions
	Dense and persistent fog		
	Heat wave / drought	Heat	Water shortage
	Hydrological	Flooding / heavy rain	Coastal / inland
Geological	Landslide	Landslide	Damage to infrastructure
	Forest / wilderness fire	Fire	Damage to adjacent forestry/infrastructure associated with Proposed Development
	Air pollution		
Transportation hazards			
Aviation	Aircraft collision / loss	Mid air and land	Threat to/from high structures in flight path
Roads	Multiple road traffic collisions	Roads	Potential for accidents along TDR and access roads
	Hazmat		Fuel transport to / from site
	Bridges		Not Applicable
Water	Inland waterways	Pleasure craft / cruises	Not applicable
	Coastal	Car ferry / passenger ferries	Not applicable

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Category	Type	Subtype	Relevance to the Proposed Development
Technological Hazards			
Industrial accidents	Explosions		Damage to infrastructure, personal injuries / fatalities
	Petrochemical fires		Personal injuries. Severe burns, fatalities, air pollution
	Industrial fires	LPG Tank Fire	Not Applicable
	Gas emission		Not Applicable
	Fluid / fuel emission		Refuelling on site
Explosions	Domestic		Not Applicable
	Bomb		Not Applicable
	LPG	LPG Tank Fire	Not Applicable
	Pipeline		Not Applicable
Fires	Electrical		Potential for spread outside site, air pollution
Building Collapse			Damage to/loss of infrastructure
Hazardous Substances	Biological	Accident at site	Not Applicable
		Transportation accident	Hazmat on roads
	Radiological	Weapons	Not Applicable
		Leak / weapons	Not Applicable
		“dirty bomb”	Not Applicable
		Industrial Accident	Damage to infrastructure Personal injuries / fatalities
	Health Facilities	Not Applicable	
Pollution / Contamination	Air / Water Pollution		
			Sediment laden water run off
			Fuel / hydrocarbon spill / leak
Civil Hazards			
Major Crowd Safety	Movement, Crushing	Pop concerts, sports, events, firework displays, air shows	Not Applicable
Loss of Critical Infrastructure	Energy and Power Supply	Electricity	Potential disturbance to national grid
		Natural gas	Not Applicable
		Fuel Oil	Not Applicable
		Communications	Potential disturbance to telecom operators, mobile phone networks

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Category	Type	Subtype	Relevance to the Proposed Development
Food Situation Crisis		Food contamination or drought	Not Applicable
Water Supply		Shortage / contamination, freezing or flooding	Not Applicable
Epidemics and pandemic		Communicable diseases	Not Applicable
Animal Disease		Foot & Mouth, Avian Influenza	Potential disturbance to access
Terrorism	Bombs Chemical, Biological, Radiological, Nuclear and high yield Explosives (CBRNE) disruption	Car bombs	Not Applicable
		Bombs in buildings	Not Applicable
		Fire bombing	Not Applicable
		Bomb scares	Not Applicable

VULNERABILITY OF THE PROJECT TO MAJOR ACCIDENTS AND NATURAL DISASTERS

15.28 EU Directive 2014/52/EU which amends Directive 2011/92/EU states the following in relation to vulnerability of a project to natural disaster:

'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.'

15.29 Based on the review of potential hazard types set out in **Table 15-4**, the following section considers the Proposed Development's vulnerability to major accidents and natural disasters, potential adverse impacts on human health and the environment, the magnitude of potential impacts, the likelihood of potential impacts and considers the preparedness of the Proposed Development in case of accident, disaster or emergency.

15.30 Should a major accident or natural disaster occur, the potential sources of pollution onsite during the construction, operational and demolition phases of the Proposed Development are limited. Usually, the primary sources with the potential to cause significant environmental pollution and associated negative effects on human health and the environment include the bulk storage of hydrocarbons, chemicals and wastes. In the case of the Proposed Development, the storage of materials of this kind are very limited.

15.31 There is limited potential for significant natural disasters to occur at Proposed Development as Ireland does not suffer from extreme temperatures like that of many countries at a similar latitude due to the dominant influence of the Gulf Stream. This provides Ireland with a mild

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

temperate climate. Potential sources of accidents and natural disasters that may occur are therefore limited to:

- Flooding;
- Fire (in particular summer forest fires);
- Major accidents involving dangerous substances;
- Catastrophic events;
- Landslides;
- Health and Safety;
- Turbine Safety; and
- Electromagnetic Interference.

Flooding (Meteorological and Hydrological)

- 15.32 In the event of extreme weather conditions there is potential for the Proposed Development to impact on hydrological networks in the surrounding environment due to increased surface water runoff as a result of additional impermeable surfaces introduced to the Site. This has potential to add to flood risk which may impact on human safety (including traffic), water quality, biodiversity, soil stability, material assets and archaeological or architectural heritage. If unmitigated, the magnitude of these consequences has potential to be significant resulting in potential injury or fatality, property damage, infrastructure damage and damage to ecosystems.
- 15.33 A Site-Specific Flood Risk Assessment (SSFRA) has been prepared for the Proposed Development and is provided in **Appendix 7-3** found in Volume III of this EIAR. According to National Indicative Fluvial Mapping (NIFM) produced by the Office of Public Works (OPW), part of the Proposed Development Site is situated within areas of identified flood risk. The Site is considered to be at low risk of pluvial and groundwater flooding.
- 15.34 Overall, the risk of flooding to the site is considered to be Low to None with mitigation measures in place, and runoff from the site will be limited to the pre-development levels following incorporation of the surface water management plan measures proposed in **Chapter 7** of the EIAR. The flood risk assessment and design of wind turbine development has taken account of climate change predictions.
- 15.35 A recent An Bord Pleanála judgement (case: PL09.306500) has indicated that turbines and access roads are considered to be water compatible development, making them suitable for locating within flood zones.
- 15.36 Therefore, it is unlikely that the Proposed Development will result in increased flood risk or represent development that is vulnerable to flood risk, and as such will not result in negative effects on human safety.
- 15.37 During the construction phase of the Proposed Development, emergency protocols will be in place in the unlikely occurrence of a flooding event.
- 15.38 An Emergency Response Plan is set out in the Construction Environmental Management Plan (CEMP) included in **Appendix 2-2** found in Volume III of this EIAR. As set out in **Chapter 6: Land, Soils and Geology**, earthworks will not be scheduled during forecast severe weather conditions in order to avoid potential effect on water quality and aquatic biodiversity due to potential run-off and soil erosion. Proposed mitigation measures for flood risk are set out in **Chapter 7**.

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Fire

- 15.39 In respect of fire, in May 2017 a major gorse/ground vegetation fire incident took place in proximity to the 169MW Galway Wind Park. This incident highlights fire as a potential impact for the Proposed Development, in particular, given that the majority of the site is adjacent to a mixture of agricultural land, primarily grazing, and forestry.
- 15.40 It should be noted that a significant number of wind farms are built within forestry in Ireland. In order to avoid impact from potential forest fires, a security management plan will be put in place to control the potential spread of forest fires. This will be achieved through the implementation of fire breaks within the lands and the training of staff in firefighting. Fire plans will be reviewed and updated where necessary and firefighting equipment will be checked annually.
- 15.41 In the event that electrical equipment catches fire at the Proposed Development, and is confined to the Proposed Development, there is potential for an impact on air quality due to additional CO₂ being released from the burning of material. Given that, in the unlikely event that this should occur it would be of such a short duration that it would be unlikely to have a perceptible impact on air quality. Health and safety management procedures will be in place to ensure that a potential fire would be extinguished well in advance of it spreading sufficiently to cause damage to human health or biodiversity.
- 15.42 In the remaining unlikely event that electrical equipment catches fire at the Proposed Development and spreads to the surrounding forested areas there is potential for an impact on human health and safety.
- 15.43 In line with IWEA Health and Safety Guidelines for the Onshore Wind Industry (2011), Emergency Response Plans will include emergency response procedures for initial actions in the event of a fire. Records will be kept for testing of fire alarms and drills and maintenance/inspection of fixed and portable firefighting equipment. Information will be provided to employees on fire safety and fire prevention, including risks of, and control measures to prevent, fire outbreak, evacuation procedures and those responsible for their implementation, and the use of firefighting equipment, in line with HSA guidance.
- 15.44 During the construction phase of the Proposed Development, an Emergency Response Plan will be in place as set out in the CEMP.

Major Accidents Involving Dangerous Substances

- 15.45 Major industrial accidents involving dangerous substances pose a significant risk to human health and to the environment both on and off the site of the accident. The Health and Safety Authority (HSA) of Ireland list all upper and lower tier SEVESO establishments throughout Ireland. The Proposed Development site is not close to any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations i.e. SEVESO site. The Meath and Westmeath County Development Plans indicate that the consultation radius distance from SEVESO sites will vary depending on the specifics of any proposed development. Being approximately 20km from the nearest SEVESO site, the Proposed Development Site is highly unlikely to be deemed in such a consultation zone. Consultation undertaken with Meath and Westmeath County Council has not highlighted any areas of concern in this regard.
- 15.46 The potential for any accidents arising from storage or use of fuels at the site is minimised through limited requirements (limited to the hydraulic oil required in turbine gearboxes and small-scale battery usage) and provision of 110% bund capacity to prevent spillages.

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Catastrophic Events

- 15.47 According to the Health and Safety Authority (HSA) operations at wind farms are still considered a workplace (albeit not permanently occupied). All persons who have control to any extent over the wind farm have duties to ensure, so far as reasonably practicable, that the wind farm does not pose a risk to those working there or to anyone not employed there but who may be affected by activities on the wind farm.
- 15.48 Each wind turbine, incorporating the tower, blades, gearbox and ancillary equipment in the tower and nacelle are considered to be machines under the European Machinery Directive [2006/42/EC]. The duties on designers and manufacturers of machinery are set out in the Machinery Directive, which has been transposed into national law by the 2008 European Communities (Machinery) Regulations [S.I.No.407/2008]. All wind turbines should be CE marked, which is in effect, a mark of assurance that the wind-turbine complies with the essential health and safety requirements (EHSRs) of EU supply law. In all cases, the manufacturer or the manufacturer's authorised representative must compile information in a technical file confirming how the machine complies with these requirements. The maintenance of turbines and ancillaries must only be carried out by competent, trained and qualified personnel. The system of work for operation and maintenance must be planned, organised, maintained and revised to ensure safety of personnel.
- 15.49 Potential catastrophic events associated with operational wind turbines include:
- Wind turbine toppling (due to foundation or tower failure);
 - Wind turbine rotational failure in extreme wind conditions (due to control system or rotor break failure); and
 - Fire.
- 15.50 The primary mitigation against a catastrophic event that may endanger the health and safety of the public implemented at design stage through adequate siting of wind turbines which provide sufficient set back distances from occupied buildings and other infrastructure to avoid the risk of impact in the event of wind turbine collapse.
- 15.51 The maximum proposed tip height for wind turbines at the development site is between 175m to 180m. No wind turbine is located within 700m of a residential dwelling. No turbines have been located within 2 x tip height of the proposed off-site substation in accordance with EirGrid general functional specifications. A minimum setback distance of 3.5 x rotor diameter has also been imposed between wind turbines and existing HV overhead lines in accordance with EirGrid general functional specifications.
- 15.52 Turbines have been sited with consideration for existing ground conditions to minimise the risk of turbine foundation failure, toppling and landslide. Intrusive site investigations have been carried out to confirm ground conditions at turbine locations as well as slope stability analysis for turbines located on sloped ground. Other design mitigation measures that have been employed for the siting of wind turbines include the following:
- Areas mapped by GSI as having a high susceptibility to landslides have been avoided;
 - Turbine locations have been assessed by site investigation and visually by geotechnical engineers prior to confirmation of final siting;
 - If turbines are located on sloped ground, particular care has been taken in design of road and hard standing alignments, cutting and filling and drainage; and
 - In general, areas of peat have been avoided for turbine locations. Peat probing has been carried out at the proposed turbines. Fen peat has been identified in the

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

area of turbine location T1 and T3 to the north, through both GSI mapping and peat probing carried out by SLR. A Peat Landslide Hazard & Risk Assessment (PLHRA) has also been undertaken to consider the potential risk of peat slides occurring at the Proposed Development Site. The PLHRA found that the risk of slope instability due to peat in the vicinity of T1 and T3 is low to negligible such that suitable controls and appropriate methodologies can be employed during construction and commissioning of the wind farm to mitigate against these risks. See **Chapter 6** on Land, Soil and Geology for more information on the recommended measures.

- 15.53 Wind turbines are fitted with sophisticated remote monitoring and control systems to manage rotational speed. Turbines also have the capability to shut down in storm conditions through adjustment of blade pitch. Turbines are also fitted with emergency power supply (EPS) units to provide backup power in the event of a loss of mains power supply that could impact the control system.
- 15.54 Wind turbines shall be fitted with fire suppression systems and will have emergency escape procedures in place for operational staff in the event of fire in a wind turbine. An emergency response plan is contained in the CEMP included as **Appendix 2-2** of this EIA.

Landslides

- 15.55 Landslides pose a risk to a range of environmental receptors including human safety (including traffic), hydrology and water quality, biodiversity, land, soil, geology and hydrogeology, material assets and archaeological and cultural heritage. These impacts can have a significant to profound impact on environmental sensitivities, depending on the scale of the landslide and the receiving environment.
- 15.56 **Chapter 6** considers the susceptibility of the Proposed Development to landslides. The GSI Landslide Susceptibility database indicates that the Proposed Development is generally located within an areas of 'Low' susceptibility.
- 15.57 More than 90% of the Site, including all proposed access tracks and turbine locations, are classified as low or low (inferred) for landslide susceptibility. There are some small zones classified as low c. 80-100m from proposed Turbine1. No temporary or permanent infrastructure is planned for either of these locations and it is therefore considered that the risk of instability in relation to these areas is negligible.
- 15.58 As set out above, the PLHRA found that the risk of slope instability due to peat in the vicinity of T1 and T3 is low to negligible such that suitable controls and appropriate methodologies can be employed during construction and commissioning of the wind farm to mitigate against these risks.
- 15.59 Mitigation by design has been incorporated into the Proposed Development to protect against potential landslide/slope failure, as set out in **Chapter 6**. Mitigation measures relating to flood risk which could have a bearing on potential landslides are detailed in **Chapter 7** on Water.
- 15.60 During the construction phase of the Proposed Development, an emergency response plan will be in place as set out in the CEMP in the unlikely event of a landslide/slope failure.

Health and Safety

- 15.61 During all stages of the Proposed Development, all staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013'. This includes the stipulation of safe transportation, use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan. An Emergency Response

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Plan (ERP) will be implemented and adhered to on site. The ERP provides details of procedures to be adopted in the event of an emergency in terms of site health and safety and environmental protection. Please see **Chapter 2** and the CEMP in **Appendix 2-2** for details.

Turbine Safety

- 15.62 Wind turbines do not pose any threats to the health and safety of the general public. According to the 'Wind Energy Development Guidelines for Planning Authorities' issued by the DoEHLG in 2006, there are no specific safety concerns related to the operation of wind turbines. Therefore, there is no need for fencing or other restrictions for safety purposes, and individuals and animals can safely approach the base of the turbines.
- 15.63 Although the DoEHLG Guidelines acknowledge a very remote possibility of injury to individuals from flying ice fragments or damaged blades, most turbine blades are composite structures without bolts or separate components, reducing the risk. The accumulation of ice on the turbines is unlikely to cause problems as the wind turbines will be equipped with anti-vibration sensors. These sensors will detect any imbalance resulting from ice formation on the blades and delay the turbine's operation until the blades have been de-iced.
- 15.64 The turbine blades will be constructed using glass reinforced plastic, which effectively prevents an increase in lightning strikes within the Proposed Development Site and the surrounding area. Lightning protection conduits will be an integral part of the turbine construction. Lightning conduction cables, enclosed in protective conduits, will follow the path of the electrical cables from the nacelle to the base of the turbine. These conduction cables will be properly grounded near the turbine base, and the earthing system will be installed during the construction of the turbine foundations.

Electromagnetic Interference

- 15.65 The installation of underground electric cables to connect the Proposed Development infrastructure to the national grid is a common practice across the country and adhering to the required specifications does not raise any specific health concerns. The extremely low frequency (ELF) electric and magnetic fields (EMF) associated with the operation of these cables fully comply with the international guidelines for ELF-EMF established by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), an official advisory body to the World Health Organisation. Additionally, the EMF exposure of the proposed cables meets the EU guidelines for human exposure to EMF. As a result, there will be no negative impact on properties (residential or otherwise), construction personnel, operational and maintenance staff, or recreational users of the site, as the ICNIRP guidelines will not be exceeded at any distances, including directly above the cables.
- 15.66 For further practical information on EMF, the ESB document 'EMF & You' (ESB, 2017) provides additional details. The potential impacts of the Proposed Development on telecommunications and aviation operations in the surrounding area are assessed in **Chapter 13**.

Risk Assessment

- 15.67 This section outlines the possible risks associated with the Proposed Development for the construction, operation and decommissioning phases.
- 15.68 These risks have been assessed in accordance with the relevant classification as outlined in **Table 15-1** and **Table 15-2**.

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

15.69 As outlined in the Assessment Methodology, the consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

Likely Significant Effects

Do-Nothing Scenario

- 15.70 In the event that the Proposed Development does not proceed, the existing land use will continue for agricultural and forestry purposes for the foreseeable future.
- 15.71 In the absence of renewable energy development, it is possible that there will be a continuance of excessive greenhouse gas emissions and reliance on consumption of fossil fuels for national energy supply. The opportunity to harness the wind energy capacity of County Meath and Westmeath would be lost, further constraining the State from achieving its renewable energy targets of 80% by 2030.
- 15.72 It is also envisaged that if the Proposed Development does not proceed, there will be no employment opportunities relating to the construction, operation and decommissioning of the Proposed Development, resulting in a failure to maximise economic activity in County Meath and Westmeath. No rates or development contributions will be made payable to either County Council by the developer and no Community Benefit Fund Scheme will be put in place in the locality.

Assessment of Effects During Construction

15.73 A risk register has been developed which contains all potentially relevant risks identified during the construction phase of the Proposed Development. Six risks (A – F) specific to the construction of the Proposed Development have been identified and are presented in Table 15-6.

Risk Assessment

15.74 This section outlines the possible risks associated with the Proposed Development for the construction, operation and decommissioning phases.

Table 15-5 Risk Register - Construction Phase

Risk ID	Potential Risk	Potential Cause
Potential Vulnerability to disaster risk		
A	Severe Weather Risk to construction activity on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
B	Flooding	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
C	Peat Stability Movement of peat within the site during construction	Mismanagement of excavated material on site Severe weather conditions- storm, flooding

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Potential to cause accidents and / or disaster		
D	<p>Traffic Incident</p> <p>Collisions onsite and offsite with vehicles involved in construction of Proposed Development</p>	<p>Driver negligence or failure of vehicular operations on site roads. Traffic Management Plan not implemented</p>
E	<p>Contamination</p> <p>Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater</p>	<p>Fuel spillage during delivery to site</p> <p>Failure of fuel storage tank or tanks in plant and machinery and vehicles</p> <p>Drainage and seepage water resulting from infrastructure excavation</p> <p>Stockpiled excavated material providing a point source of exposed sediment</p> <p>Construction of the Proposed Development cable trench resulting in entrainment of sediment from the excavations during construction</p> <p>Erosion of sediment from emplaced site drainage channels</p>
F	<p>Industrial Accident Fire, gas explosion</p>	<p>Equipment or infrastructure failure</p> <p>Electrical problems</p> <p>Employee negligence</p>

ASSESSMENT OF EFFECT DURING OPERATION

15.75 Nine risks specific to the operation of the Proposed Development have been identified and are presented in **Table 15-6**.

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Table 15-6 Risk Register – Operational Phase

Risk ID	Potential Risk	Potential Cause
Potential Vulnerability to disaster risk		
G	Severe Weather Risk to site operations	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
H	Flooding	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
I	Peat Stability Movement of peat within the site during operation	Failure of peat stabilisation methods
Potential to cause accidents and / or disasters		
J	Industrial Accident – Fire / Gas Explosion	Equipment or infrastructure failure; Electrical problems; and Employee negligence
K	Contamination Discharge or spillage of fuel, chemical solvents, sewage or wastewater into watercourse or percolated to groundwater	A vehicular incident on the public road involving fuel, wastewater or sewage transportation in the operational phase
L	Collapse/ damage to structures	Landslide/Earthquake
M	Traffic Incident Collisions onsite and offsite with vehicles involved in operation of Proposed Development	Driver negligence or failure of vehicular operations on site roads Traffic Management not implemented
N	Industrial Accident – Fire / Gas Explosion	Equipment or infrastructure failure; Electrical problems; and Employee negligence
O	Loss of Critical Infrastructure	Electrical fault at substation bay

ASSESSMENT OF EFFECT DURING DECOMMISSIONING

15.76 Risks specific to the decommissioning of the Proposed Development have been identified and are presented in **Table 15-7**.

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Table 15-7 Risk Register – Decommissioning Phase

Risk ID	Potential Risk	Potential Cause
Potential Vulnerability to disaster risk		
P	Severe Weather Risk to decommissioning activity on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
Q	Flooding of site High levels of surface water on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds
Potential to cause accidents and / or disasters		
R	Traffic Incident Collisions onsite and offsite with vehicles involved in construction of Proposed Development	Driver negligence or failure of vehicular operations on site roads Traffic Management not implemented
S	Contamination Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles Drainage and seepage water resulting from infrastructure excavation Erosion of sediment from emplaced site drainage channels.
T	Industrial Accident - Fire/Gas explosion	Petrochemical Fires causing personal injury, structural damage and forest fires
U	Loss of Critical Infrastructure	Electrical fault at substation bay

- 15.77 These risks have been assessed in accordance with the relevant classification (Refer to **Table 15-1** and **Table 15-2**) and the resulting risk analysis is given in the Assessment of Effect – Summary section below.
- 15.78 The risk register is based upon possible risks associated the Proposed Development. As outlined in the Assessment Methodology, the consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.
- 15.79 **Table 15-8** below summarises the risks for major accidents and disasters at each stage of the Proposed Development, identifying potential causes, effects, likelihoods and consequences, and each risk is quantified by a score based on the rationale set out in **Table 15-1** and **Table 15-2**.

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

ASSESSMENT OF EFFECT – SUMMARY

Table 15-8 Summary Assessment of Risks

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
Construction Phase								
A	Severe Weather	Extreme weather periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse Damage to, or depletion of aquatic habitats and species;	3	The risk of severe weather of the nature that could cause damage at the construction stage is unlikely considering the site specific vulnerabilities and weather conditions recorded over the last 30 years within the area.	1	The risk of severe weather conditions during the construction phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. No contamination, localised effects.	3

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
B	Flooding	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse Damage to, or depletion of aquatic habitats and species;	2	The risk of flooding is considered very unlikely when taking into assessment in Chapter 7 of the EIAR and due to no recurring or historic flood incidents being recorded within the Wind Farm site or along the Grid Connection route.	1	The risk of flooding during the construction phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment' No contamination of environment (e.g. watercourses), localised effects.	2
C	Peat Stability	Mismanagement of excavated material on site combined with extreme weather conditions	Movement of soils within the site; Sedimentation of nearby watercourse; Damage to, or depletion of aquatic habitats and species;	3	There is potential for movement of soils at some time while excavation works are being undertaken. There is no peat on the majority of the site	3	The risk of soil instability during the construction phase could result in a serious consequence in that there could be multiple serious injuries and simple contamination of environment (e.g. watercourses), localised effects of short duration.	9

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
D	Traffic Incident	<p>Driver negligence or failure of vehicular operations on site roads.</p> <p>Traffic Management not implemented or not adhered</p>	Injury or loss of life.	3	<p>A limited number of vehicles will be permitted on the site as part of the construction phase</p> <p>As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur on site, at some time.</p> <p>An unlikely risk is therefore predicted.</p>	1	A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.'	3
E	Contamination	<p>Fuel spillage during delivery to site.</p> <p>Failure of fuel storage tank or tanks in plant and machinery and vehicles.</p>	<p>Damage to, or depletion of aquatic habitats and species.</p> <p>Release of suspended solids to surface watercourses could result in an increase in the</p>	2	As outlined in Chapter 2 and the CEMP Appendix 2.2, fuel will be stored on-site but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the setback distances from sensitive	2	The risk of a fuel spillage or impact on surrounding drainage during the construction will result in a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' through the use of bunded containment areas and proposed	4

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		<p>Drainage and seepage water resulting from infrastructure excavation;</p> <p>Stockpiled excavated material providing a point source of exposed sediment;</p> <p>Construction of the Proposed Development resulting in entrainment of sediment from the excavations during construction; and, Erosion of sediment from emplaced site drainage channels</p>	<p>suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies</p>		<p>hydrological features means that adequate room is maintained for the proposed drainage mitigation measures as detailed in Chapter 7:Water.</p>		<p>drainage mitigation measures during construction.</p> <p>Simple contamination of environment (e.g. watercourses), localised effects of short duration.</p>	

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
F	Industrial Accident - Fire/Gas Explosion Fuel spillage/storage Electrical problems; and Employee negligence	Equipment or infrastructure failure; Damage to, or depletion of habitats and species; and impacts on ambient air quality.	Illness or loss of life;	2	As outlined in Chapter 2 and the CEMP, fuel will not be stored on-site post construction therefore fuel is not considered to be a significant fire risk. In accordance with the of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site.	2	Should a fire/explosion occur at the site, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' due to the nature of the project and the lack of infrastructure or fuel storage during operation that would result in any such incident. There will be 'normal community functioning' in the area with 'some inconvenience'. Simple contamination of environment (e.g. watercourses), localised effects of short duration.	4

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
Operational Phase								
G	Severe Weather	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	<p>Damage to infrastructure, which could impact on ground conditions</p> <p>Release of suspended solids to surface watercourses and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies.</p>	3	Severe weather of the scale that could cause damage to infrastructure associated with the Proposed Development could be expected to be random / infrequent	2	<p>The risk of severe weather conditions during the operation phase could result in a limited consequence in that a limited number would be affected and there could be infrastructure losses of the €0.5-3M order.</p> <p>Simple contamination of environment (e.g. watercourses), localised effects of short duration.</p>	6

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
H	Flooding	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Damage to infrastructure, which could in disturbances to site drainage	2	Severe weather of the scale that could cause damage to infrastructure associated with the Proposed Development could be expected to be very unlikely taking into account the information set out in Chapter 7 of this EIAR	2	The risk of flooding during the operation phase could result in a limited consequence in that a limited number would be affected and there could be infrastructure losses of the €0.5-3M order. Knock on effects on watercourses could cause localised effects of short duration.	4
I	Peat Stability	Failure of peat stabilisation methods	Unstable ground conditions, damage to infrastructure, which could in disturbances to site drainage	2	The Proposed Development has been designed to minimise the potential for soil movement and it is not expected to occur There is no peat on the majority of the site	3	The risk of soil instability could result in a serious consequence in that there could be multiple serious injuries and simple contamination of environment (e.g. watercourses) during the operational phase	6

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
J	Industrial Accident - Fire/Gas explosion	Equipment or infrastructure failure; Fuel spillage/storage Electrical problems; and Employee negligence	Illness or loss of life; Damage to, or depletion of habitats and species; and Impacts on ambient air quality.	2	As outlined in Chapter 2 and the CEMP Appendix 2.2, fuel will not be stored on-site post construction therefore fuel is not considered to be a significant fire risk. In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire onsite.	2	Should a fire/explosion occur at the site, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' due to the nature of the project and the lack of infrastructure or fuel storage during operation that would result in any such incident. There will be 'normal community functioning' in the area with 'some inconvenience' Simple contamination of environment (e.g. watercourses), localised effects of short duration.	4

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
K	Contamination	A vehicular incident on the public road involving fuel, wastewater or sewage transportation in the operational phase	<p>Damage to, or depletion of aquatic habitats and species.</p> <p>Release of suspended solids to surface watercourses could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies</p>	2	As outlined in Chapter 5 and the CEMP Appendix 2.2, fuel will be stored on-site but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures as detailed in Chapter 7:Water.	2	<p>The risk of a fuel spillage or impact on surrounding drainage during the construction will result in a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' through the use of bunded containment areas and proposed drainage mitigation measures during construction.</p> <p>Simple contamination of environment (e.g. watercourses), localised effects of short duration.</p>	4

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
L	Collapse/ damage to structures	<p>Landslide/ Earthquake; and Extreme weather conditions such as flooding and storms.</p> <p>Mismanagement of excavated material on site</p>	<p>Injury or loss of life.</p> <p>Sedimentation of nearby watercourse;</p> <p>Damage to, or depletion of aquatic habitats and species;</p>	2	<p>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. As such, buildings in Ireland are extremely unlikely to be damaged or collapse due to seismic activity. Having regard to public speed limits within the site, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse.</p>	3	The risk of soil instability could result in a serious consequence in that there could be multiple serious injuries and simple contamination of environment (e.g. watercourses) during the operational phase	6

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
M	Traffic Incident	Driver negligence or failure of vehicular operations on site roads. Traffic Management not Implemented	Injury or loss of life.	3	A limited number of vehicles will be permitted on the site as part of the operation phase. As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur on site, 'at some time.' An unlikely risk is therefore predicted.	1	A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.'	3
N	Industrial Accident – Fire / Gas Explosion	Equipment or infrastructure failure; Electrical problems; and Employee negligence	Illness or loss of life;	2	As outlined in Chapter 5 and the CEMP, fuel will not be stored on-site post construction therefore fuel is not considered to be a significant fire risk. In accordance with the of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site.	2	Should a fire/explosion occur at the site, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' due to the nature of the project and the lack of infrastructure or fuel storage during operation that would result in any such incident. There will be 'normal community functioning' in the area with 'some inconvenience'.	4

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
O	Loss of Critical Infrastructure	Equipment infrastructure failure; Electrical problems; and Employee negligence Landslide/ Earthquake; and Extreme weather conditions such as flooding and storms.	Injury or loss of life	1	Eirgrid operate the grid from National Control Centres matching electricity production to customer demand, switching from synchronous to non-synchronous where required to ensure no power outages. The Proposed Development will be connected to a single bay at the 110kV substation and any shortages or failures will not impact other connections to the same substation	2	Should a power failure occur at the 110kV substation, it will result in a limited number of people affected- localised effects of short duration	2

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
Decommissioning Phase								
P	Severe Weather	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourses; Damage to, or depletion of aquatic habitats and species;	3	The risk of severe weather is unlikely when considering the assessment in Chapter 6 and weather conditions recorded over the last 30 years within the area.	1	The risk of severe weather conditions during the decommissioning phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. No contamination of environment (e.g. watercourses), localised effects.	3

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
Q	Flooding	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse Damage to, or depletion of aquatic habitats and species;	2	The risk of flooding is considered very unlikely when taking into account the baseline assessment in Chapter 7 of the EIAR and due to no recurring or historic flood incidents are recorded within the Wind Farm site or along the Grid Connection route.	1	The risk of flooding during the decommissioning phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. No contamination of environment (e.g. watercourses), localised effects.	2
R	Traffic Incident	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented	Injury or loss of life.	3	A limited number of vehicles will be permitted on the site as part of the operation phase. As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur on site, 'at some time.' An unlikely risk is therefore predicted.	1	A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.'	3

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
S	Contamination	<p>Fuel spillage during delivery to site.</p> <p>Failure of fuel storage tank or tanks in plant and machinery and vehicles.</p> <p>Drainage and seepage water resulting from infrastructure removal;</p> <p>Erosion of sediment from site drainage channels.</p>	<p>Damage to, or depletion of aquatic habitats and species</p> <p>Release of suspended solids to surface watercourses and could result in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies</p>	2	<p>As outlined in Chapter 5, fuel will be stored on-site but in a bunded area to ensure containment and prevent spillages of fuel.</p> <p>No fuels, chemicals or solvents will be stored outside of the confines of the site</p> <p>Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage measures as detailed in Chapter 7.</p>	2	The risk of a fuel spillage or impact on surrounding drainage during the demolition stage will result in a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' through the use of bunded containment areas during operation. Simple contamination of environment (e.g. watercourses), localised effects of short duration.	4

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
T	Industrial Accident-Fire/gas explosion	Equipment or infrastructure failure; Fuel spillage/storage Electrical problems; and Employee negligence	Injury or loss of life Structural damage Forest fires Air Pollution Damage to, or depletion of habitats and species Contamination	2	As outlined in Chapter 2, fuel will not be stored on-site post construction therefore fuel is not considered to be a significant fire risk. In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site.	2	Should a fire/explosion occur at the site, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' due to the nature of the project and the lack of infrastructure or fuel storage during operation that would result in any such incident. There will be 'normal community functioning' in the area with 'some inconvenience'. Simple contamination of environment (e.g. watercourses), localised effects of short duration.	4

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
U	Loss of Critical Infrastructure	Equipment infrastructure failure; Electrical problems; and Employee negligence Landslide/ Earthquake; and Extreme weather conditions such as flooding and storms.	Injury or loss of life	1	Eirgrid operate the grid from National Control Centres matching electricity production to customer demand, switching from synchronous to non-synchronous where required to ensure no power outages. The Proposed Development will be connected to a single bay at the 110kV substation and any shortages or failures will not impact other connections to the same substation	2	Should a power failure occur at the 110kV substation, it will result in a limited number of people affected- localised effects of short duration	2

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

15.80 The risk assessment for each of the potential risks identified in the table above are consolidated in **Table 15-9** below, which provides an overall risk 'score', which is calculated by multiplying the likelihood rating by the consequence rating for each identified risk.

Table 15-9 Consolidated Risk Score

Risk ID	Potential Risk	Likelihood Rating	Consequence Rating	Risk Score
Construction Phase				
A	Severe Weather	3	1	3
B	Flooding	2	1	2
C	Peat Stability	3	3	9
D	Traffic Incident	3	1	3
E	Contamination	2	2	4
F	Industrial Accident	2	2	4
Operational Phase				
G	Severe Weather	3	2	6
H	Flooding	2	2	4
I	Peat Stability	2	3	6
J	Industrial Accident - Fire/Gas explosion	2	2	4
K	Contamination	2	2	4
L	Collapse/ damage to structures	2	3	6
M	Traffic Incident	3	1	3
N	Industrial Accident – Fire / Gas Explosion	2	2	4
O	Loss of Critical Infrastructure	1	2	2
Decommissioning Phase				
P	Severe Weather	3	1	3
Q	Flooding	2	1	2

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Risk ID	Potential Risk	Likelihood Rating	Consequence Rating	Risk Score
R	Traffic Incident	3	1	3
S	Contamination	2	2	4
T	Industrial Accident	2	2	4
U	Loss of Critical Infrastructure	1	2	2

15.81 A corresponding risk matrix is provided in **Table 15-10** overleaf, which is colour coded in order to provide an indication of the critical nature of each risk. In accordance with the assessment methodology set out earlier in this chapter, the red zone represents 'high risk scenarios', the amber zone represents 'medium risk scenarios' and the green zone represents 'low risk scenarios'.

15.82 The potential risks identified during the construction, operation and decommissioning of the Proposed Development can all be classified as 'low risk scenarios' apart from 'Peat Stability' during construction which is classified as a 'medium risk scenario'. The risk of a peat stability failure during construction was given a risk score of 9. This suggests a situation that is 'unlikely' to happen, and should it occur, it would have 'serious' consequences, depicting a 'medium risk scenario' throughout the construction stage.

Peat Stability During Construction and Operation

15.83 A wide range of targeted measures to ensure peat stability in the area of most risk (at T1 and T3) have been incorporated into the construction of the Proposed Development to ensure the risk is acceptable and that monitoring will be undertaken to ensure that corrective measures are taken immediately should any increase of risk be identified. The inbuilt design mitigation for the Proposed Development will be in place during the operational stage and construction activities will have involved excavation of peat and subsoil to create a suitable area for the foundation of the T1 and T3 bases. Therefore, the risk of peat stabilisation failure during the operation phase has been given a 'low risk scenario' given that it is very unlikely to occur.

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Table 15-10 Risk Score Matrix

		Consequence				
		1	2	3	4	5
		Minor	Limited	Serious	Very Serious	Catastrophic
Likelihood	5 Very Likely					
	4 Likely					
	3 Unlikely	A, D, M, P, R	G	C		
	2 Very Unlikely	B, O, Q	E, F, H, J, K, N, S, T	I, L		
	1 Extremely Unlikely		U			
			Normal Emergency		Major Emergency	

Collapse/Damage to Structures

- 15.84 There is a potential risk of collapse of, or damage to, infrastructure during the operation phase. The risk is considered to be very unlikely but the consequences would be serious (multiple serious injuries and simple contamination), and this is the reason for the relatively high assessment of the risk in terms of risk score.
- 15.85 However, the risk of the types of natural disasters such as earthquakes that could lead to such an accident is very low in Ireland and as set out above, design measures are proposed and will be put in place to reduce the risk site instability.
- 15.86 Therefore, the risk of fire/explosion occurring at the Proposed Development resulting in a major accident and/or disaster was given a risk score of 4. This indicates a scenario that is 'very unlikely' to occur and having 'limited' consequences should it do so, representing a 'low-risk scenario' during the operational phase.

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

Mitigation Measures

- 15.87 As stated above none of the potential risks for major accidents and disasters identified have been assessed as greater than 'low risk scenario'. The highest risk scenario regarding the occurrence of major accidents or disasters in the construction, operation, and decommissioning phases of the Proposed Development are identified as the risk of peat stability failure during construction and operation of the Proposed Development.
- 15.88 The design and construction of the Proposed Development adhere to the best practices outlined in this EIAR, incorporating mitigation measures to address the risk of major accidents or disasters.
- 15.89 The application for the Proposed Development includes a comprehensive Construction Environmental Management Plan (CEMP), which outlines the environmental controls to be implemented on-site. The CEMP specifies the Emergency Response Procedure to be followed in case of emergencies, encompassing contamination, health and safety, and environmental protection. It provides detailed information on all mitigation and monitoring measures to be implemented throughout the various phases of construction, operation, and decommissioning. The CEMP will undergo regular reviews through environmental audits and site inspections to ensure the effectiveness and implementation of all mitigation measures and commitments outlined in the application.
- 15.90 Within the CEMP, an Emergency Response Plan (ERP) is included, which outlines the procedures to be followed in the event of emergencies related to health and safety or environmental protection. The site ERP delineates the required response actions and the responsibilities of all personnel during emergency situations. For further information, please refer to **Chapter 2** and **Appendix 2-2** of the EIAR.
- 15.91 Operational monitoring measures relating to each of the environmental issues have also been identified within each of the respective chapters and will provide early warning systems to identify any corrective actions required to reduce risks in the unlikely event that risks would be raised.

Residual Effects

- 15.92 The likelihood of a significant accident or disaster occurring during the construction of the Proposed Development is deemed to be minimal, as determined by the "Guide to Risk Assessment in Major Emergency Management" (Department of Environment, Heritage and Local Government, 2010).
- 15.93 It is anticipated that the implementation and strict adherence to the mitigation and monitoring measures outlined in the Construction Environmental Management Plan (CEMP) will effectively eliminate any significant residual impacts related to the construction, operation, and decommissioning of the Proposed Development.

Cumulative Effects

- 15.94 For the assessment of cumulative effects, any other permitted or proposed and unbuilt projects in proximity to the site (wind energy or other) have been considered where they have the potential to generate an in-combination or cumulative impact with the Proposed Development.
- 15.95 A number of potential cumulative developments within 20km of the Proposed Development and the cumulative assessment have been identified and are set out in Chapter 2 of this EIAR.

MAJOR ACCIDENTS AND NATURAL DISASTERS 15

- 15.96 Given the distance of these cumulative projects from the Proposed Development Site, and the fact that extensive EIA consultation and assessment will also have been undertaken to mitigate against potential impacts, it is not considered that the Proposed Development will not have a cumulative impact should all be implemented.

CONCLUSION

- 15.97 It is assessed that the project carries no significant risk of causing major accidents or disasters, nor is it vulnerable to potential disasters or accidents, including both natural and man-made incidents.
- 15.98 Considering the temporary nature of the construction phase, the scale of the proposed project, and the implementation of environmental protection measures from the outset, the risk of disasters (such as severe weather events) or accidents (such as fuel spills, traffic incidents, or peat slides) is deemed to be low.
- 15.99 In the event of severe weather conditions, such as flooding during construction, work will be halted. The susceptibility to landslides is low as there is no peat present on site. The project design incorporates Mitigation by Avoidance.
- 15.100 During the operational phase of the wind farm, particularly in the context of climate change, there is the potential for increased storm events and severe weather. Wind turbines are designed to withstand specific wind parameters and will automatically shut down during high wind speeds.
- 15.101 Therefore, the potential effects of climate change on the operational development may involve temporary shutdowns (curtailment) during severe wind conditions, but this does not pose a likely risk of major accidents or disasters. As for the construction stage, the decommissioning poses similar risks in terms of major accidents and disasters. As the decommissioning stage will again be limited to a temporary period of time, it is considered that there is a low risk of major accidents or disaster.