19.0 RISK OF MAJOR ACCIDENTS AND NATURAL DISASTERS

19.1 INTRODUCTION

This chapter assesses the potential significant adverse effects of the proposed development deriving from its vulnerability to risk of Major Accidents and/or Natural Disasters during the construction, operation and decommissioning phases.

The assessment of the vulnerability of the proposed development to major accidents and natural disasters is carried out in compliance with the European Union (EU) Directive 2011/92/EU (as amended by Directive 2014/52/EU) (the EIA Directive), 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."*

Recital 15 of the EIA Directive states that for 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."*

Annex IV of the EIA Directive states, where appropriate, the assessment should:

> *"Include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies."*

The structure and assessment methodology of this chapter is guided by the Institute of Environmental Management and Assessment (IEMA) 'Major Accidents and Disasters in EIA: A Primer' guidance (IEMA, September 2020). The IEMA guidance defines a major accident as:

> *"An event (for instance, train derailment or major road traffic accident) that threatens immediate or delayed serious environmental effects to human health, welfare and/or the environment and requires the use of resources beyond those of the client or its appointed representatives (i.e. contractors) to manage."*

The IEMA guidance defines the likely significant effects (in relation to a major accident and/or natural disasters assessment) as something that:

> *'...could include the loss of life, permanent injury and temporary or permanent destruction of an environmental receptor which cannot be restored through minor clean-up and restoration.'*

19.1.1 Statement of Authority

This chapter was prepared by Ian Heanue of TOBIN. Ian holds a BEng in Energy Engineering and has considerable experience in project managing commercial developments. Ian has authored a number of Major Accidents and Natural Disasters chapters for EIARs on various renewable energy projects.

This chapter has been reviewed by Orla Fitzpatrick, Technical Director in TOBIN's Environment and Planning Division. Orla is a chartered environmentalist with 22 years of experience and holds a BSc in Geophysical Science and a M.Sc. in Environmental Consultancy. Orla has considerable experience as technical approver of environmental deliverables for major infrastructure projects, including Major Accident and Natural Disaster chapters.

19.1.2 Legislation, Policy, and Guidance

The legislation, policy and guidance used to inform the assessment of risk of major accidents and natural disasters is listed below.

Legislation

- Safety, Health and Welfare at Work (Construction) Regulations 2013 (S.I. No. 291 of 2013) (as amended);
- No. 10 of 2005 – Safety, Health and Welfare at Work Act 2005;
- No. 46 of 2015 - Climate Action and Low Carbon Development Act 2015 (as amended); and,
- S.I. No. 209 of 2015 - Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (the "COMAH Regulations").

Policy

- Longford County Development Plan 2021 – 2027;
- Longford County Major Emergency Plan – 2021; and,
- Roscommon County Development Plan 2022 – 2028.

Guidance

- Department of Environment, Heritage and Local Government (2010) A Guide to Risk Assessment in Major Emergency Management;
- IEMA 2020 – Major Accidents and Disasters in EIA: A Primer;
- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports;
- Department of Environment, Community and Local Government (DECLG), (August 2018); Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment); and,
- European Commission (2017) Environmental Impact Assessment of Projects – Guidance on the preparation of Environmental Impact Assessment Reports.

19.1.3 Study Area

The study area for the Major Accidents and Natural Disasters assessment is land within the proposed development boundary, as shown in Figure 1-1 of Chapter 1 (Introduction). This incorporates the proposed wind farm site, and the turbine delivery route (TDR) works areas. The proposed wind farm site covers an area of approximately 1,900 hectares (ha).

19.2 ASSESSMENT METHODOLOGY

The assessment of effect methodology is risk based and identifies potential unplanned risk events that the proposed development may be vulnerable to or may occur due to the proposed development. There are three stages involved in determining such events adapted from A Guide to Risk Assessment in Major Emergency Management (DoEHLG 2010) and the Major Accidents and Disasters in EIA: A Primer guidance (IEMA, September 2020):

- Stage 1: Identification & Screening – Identifies potential unplanned risk events that the proposed development may be vulnerable to or that may occur due to the proposed development;
- Stage 2: Classification - Following the initial identification and screening process, major accidents and/or natural disasters were evaluated with regard to the likelihood of occurrence and the potential impact; and,
- Stage 3: Assessment – This stage provides a greater understanding of the likelihood and consequence of events that have been carried forward into the EIA and defines a post mitigation risk score.

Stage 1: Screening

This is a high-level exercise listing all risk events (unplanned) that the proposed development may be vulnerable to, or the proposed wind farm may cause. In accordance with the EC (2017) document; EIA of Projects – Guidance on the preparation of the EIAR guidance, risks are identified in respect of the proposed developments potential to cause accidents and/or natural disasters, and vulnerability to potential disasters/accidents.

A list of risks has been developed through the identification of reasonably foreseeable risks in consultation with relevant contributors to this report. The identification of risks has focused on non-standard but plausible incidents that could occur at or as a result of the proposed wind farm during the construction, operation, and decommissioning phases.

The list of identified risks were subject to a screening exercise to identify if the risks meet the criteria of a major accident or natural disaster as defined in the IEMA (2020) guidelines (see Table 19-1).

Table 19-1 Definition of a Major Accident and Disaster (IEMA 2020 - Major Accidents and Disasters in EIA: A Primer)

Key Term	Definition
Major Accident	Events that threaten the immediate or delayed serious environmental affects to human health, welfare and/or the environment and require the use of resources beyond those of the client or its appointed representatives to manage. Whilst malicious intent is not accidental, the outcome (e.g., train derailment) may be the same and therefore many mitigation measures will apply to both deliberate and accidental events.
Disaster	May be a natural hazard (e.g., earthquake) or a man-made/external hazard (e.g., act of terrorism) with the potential to cause an event or situation that meets the definition of a major accident.

Where appropriate, risks were also screened out of the assessment according to the following criteria in line with the Major Accidents and Disasters in EIA: A Primer guidance (IEMA, September 2020):

- Where risk events are not applicable to a particular geographic location (e.g., volcanic and earthquake activity in Ireland); and,
- Risks that have already been assessed in other areas of this report, for example, flood risk.

Stage 2: Classification

Following the initial identification and screening process, any remaining major accident and/or natural disaster events were evaluated with regard to the likelihood of occurrence and the potential impact. These classifications and ratings are taken from the DoEHLG (2010) guidelines, as presented in Tables 19-2 and 19-3. The EPA Guidelines (EPA 2022) state that the risk assessment must be based on a 'worst case' approach. Therefore, the consequent rating assumes that all proposed mitigation measures and safety procedures have failed to prevent a major accident and/or natural disaster.

The classification and rating of both the likelihood and the consequence/impact are provided in Table 19-2 and Table 19-3.

Table 19-2 Classification of Likelihood (DoEHLG 2010)

Rating	Classification	Likelihood
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 communications; 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 organisations 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.

Table 19-3 Classification of Consequence (DoEHLG 2010)

Rating	Classification	Impact	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 Euros. • 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 Euros. • 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 Euros. • 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 Euros. • 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 2,000 evacuated. • Very heavy contamination, widespread effects of extended duration. • >25M Euros. • Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

Stage 3: Assessment

In accordance with the DoEHLG's (2010) guidelines, the evaluated major accidents and/or natural disasters from Stage 2 were subject to a risk-based assessment to determine the level of significance of each risk for each scenario. These have been grouped according to three categories described below and presented visually in Table 19-4.

- The red zone represents '**high risk** scenarios'; having an evaluated score of 15 to 25.
- The amber zone represents '**medium risk** scenarios'; having an evaluated score of 8 to 12.
- The green zone represents '**low risk** scenarios'; having an evaluated score of 1 to 6.

Table 19-4 Impact Assessment Risk Matrix (DoEHLG 2010)

Likelihood Rating	5 – Very Likely	5	10	15	20	25
	4 – Likely	4	8	12	16	20
	3 – Unlikely	3	6	9	12	15
	2 – Very unlikely	2	4	6	8	10
	1 – Extremely unlikely	1	2	3	4	5
		1 – Minor	2 – Limited	3 – Serious	4 – Very Serious	5 – Catastrophic
		Consequence Rating				

The IEMA (2020) guidelines recommends that the major accidents and/or natural disasters assessment focuses on low likelihood but potentially high consequence events. Therefore, for the purposes of this assessment and to also bring this in line with DoEHLG's (2010) guidance, it has been assumed that the Red Zone is high likelihood/high consequence, and the Amber Zone is medium likelihood/high consequence.

All major accidents and/or natural disasters that fall within the Amber or Red Zones ('Medium' or 'High' risk scenarios) were considered to present a risk of significant effects following EPA Guidelines (EPA 2022). These risks were, if applicable, brought forward for further consideration and were reassessed with mitigation measures being applied.

19.3 EXISTING ENVIRONMENT

19.3.1 Overview of Area

The proposed wind farm site (as presented in Figure 1-2 of this EIAR) mainly lies between the towns and villages of Lanesborough, Derraghan, Keenagh and Killashee while the main urban centre in the region, Longford Town, is 9 km to the northeast from its nearest point.

The land use/activities on the proposed wind farm site are predominantly the decommissioning of peat extraction activities and works areas (administration offices, machinery maintenance and storage, stores, canteen) and environmental monitoring as required under the Integrated

Pollution Control (IPC) Licence P0504-01 from the Environmental Protection Agency (EPA). Condition 10 of the IPC licence instructs the Bord na Móna to produce draft peatland rehabilitation plans for each bog of the Mountdillion Bog Group, within which the proposed development is located. The main land type at the wind farm site comprises of bare cutaway peat with some areas of naturally re-vegetating bare peat, raised bog, conifer plantation and other artificial lakes and ponds.

The surrounding landscape is predominantly low-lying agricultural land with areas of cutover/cutaway peatland and commercial forestry. The most significant features in the surrounding landscape are '*Bawn Mountain*', located approximately 8 km to the east and Sliabh Bawn, located 8 km to the northwest of the proposed wind farm site.

The topography of the proposed wind farm site is relatively flat with elevations ranging from 34 mAOD (Above Ordnance Datum) to 59 mAOD. The general topography is higher (43 to 59 mAOD) at Lough Bannow Bog and between 34 and 46 mAOD in the Derryadd and Derryaroge Bogs. Further details are included in Chapter 9 (Lands, Soils and Geology).

It is assumed that the large wind farm components will be delivered via the M6 motorway in the proximity of Athlone. Through extensive surveys carried out by Pell Frischmann (2023) ("Derryadd Wind Farm Abnormal Indivisible Load Route Survey"), see appendix 15-3, it was established that the optimum delivery route from the M6 to the site for the abnormally large loads would be as follows;

- Exit the M6 at Junction 12 and travel north on N61 for approximately 48 kms to Roscommon;
- Turn right on the N61 in Roscommon at the Circle K roundabout, and continue straight through the Roscommon Mart Roundabout on the N61;
- Turn right of the N61 onto the N63 at the Lidl Roundabout in Roscommon;
- Travel east on the N63 for approximately 15 kms to Lanesborough; and,
- Turn right onto R392 and travel southeast for approximately 6.5 km to proposed site access.

A summary of the baseline environment is provided in this section, focusing on aspects relevant to the risk of major accidents and natural disasters.

19.3.2 COMAH (Seveso) Establishments

The Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (the "COMAH Regulations"), implement the Seveso III Directive (2012/18/EU). The purpose of the COMAH Regulations is to lay down rules for the prevention of major accidents involving dangerous substances. Seveso sites are defined as Industrial sites that, because of the presence of dangerous substances in sufficient quantities, are regulated under the Seveso III Directive.

COMAH (Control of Major Accidents and Hazards) (Seveso) establishments are designated as such as they pose an identified risk to public and environmental health and safety and are regulated by the Health and Safety Authority (HSA). COMAH establishments are categorised in two tiers – Upper Tier and Lower Tier, depending on their activity.

The proposed development is not subject to the Control of Major Accident Hazards (COMAH) Regulations.

Additionally, there are no Upper or Lower Tier COMAH establishments located within 30 km of the proposed wind farm site, the closest Upper Tier COMAH establishment in Co. Westmeath, is ECOLAB Irl located approximately 34 km from the proposed wind farm site and the closest Lower Tier COMAH establishment, Aurivo Dairy Ingredients Ltd., in Co. Roscommon, is located over 47 km from the proposed wind farm site.

Works along the proposed TDR route will be short-term and temporary in nature and as such no interactions with COMAH sites are anticipated.

19.3.3 Major Infrastructure and Built Services

A detailed assessment of major infrastructure, built services and waste services in relation to the proposed wind farm site has been carried out in Chapter 16 (Material Assets - Telecoms, Aviation & Other).

The nearest significant aviation installations to the proposed wind farm site are Ireland West International Airport (approximately 61 km), the privately-owned Aerodrome at Abbeyshrule (Approximately 14 km) and the Irish Aviation Authority (IAA) Radar Station at Dublin Airport Approximately 107 km). The Irish Air Corps (IAC) also have a low-level flying route along the N4 national primary road (3 NM restricted area on either side of the N4) approximately 4.1 km east of the proposed wind farm site. The wind farm is not within the restricted area of the Irish Air Corps (IAC). Additional detail regarding the existing aviation environment can be found in Appendix 16-1 (Derryadd Wind Farm Aviation Review Statement).

The telecommunications assessment in Chapter 16 (Material Assets - Telecoms, Aviation & Other) found there are nineteen radio links in the vicinity of the proposed wind farm site. A description of each of these radio links are provided in Table 16-2 of Chapter 16 (Material Assets - Telecoms, Aviation & Other). Additional detail regarding the existing telecommunications environment can be found in Appendix 16-2 (Derryadd Wind Farm Telecommunications Impact Assessment).

The existing Lanesborough-Richmond 110_kV overhead electricity lines run within the proposed wind farm site. It is also possible that there might be some underground electricity cables discovered during the proposed works, particularly near public roads and houses or farmyards. Prior to any work commencing, an extensive GPR scan for hidden services will be carried out. Uisce Éireann, formally known as Irish Water, provided input during consultation and specified that they do not have any site-specific concerns relating to water supply networks (see appendix 1-5 of the EIAR for a full schedule of consultation responses).

19.3.4 Hydrological

A detailed assessment of hydrology and hydrogeology in relation to the proposed wind farm site has been carried out in Chapter 10 (Hydrology and Hydrogeology).

On a regional scale, the proposed wind farm site and its environs is in the Shannon Hydrometric Area and Catchment. The delineation of the sub-catchments and general area of confluence is shown in Figure 10-2 'Regional Catchment Delineation' in Chapter 10. The proposed wind farm site is located within the Shannon International River Basin District (SHIRBD). The river waterbody types located within the proposed wind farm site are primarily small, low lying

streams/drainage channels which flow to the River Shannon. There are four WFD river water bodies and one WFD artificial waterbody either intersecting or flowing in the vicinity of the proposed wind farm site. The hydrological pathway from the proposed wind fam site also includes one WFD lake water body – the Ree.

All surface water from the proposed development ultimately discharge to the River Shannon and Lough Ree. The River Shannon is located >2km downgradient of the proposed wind farm site.

The proposed wind farm is located within a former peat extraction site, in the Mountdillon Bog Group in Co. Longford. Main drainage channels are present throughout the wind farm site, which is currently operated under IPC licence P0504-01 Mountdillon Bog Group (Refer to Appendices 7.1, 7.1a & 7.1b for the IPC licence information). The existing drainage channels store water and transmit it to main drains and ultimately to the settlement ponds. Final settlement occurs in the settlement ponds before discharging to the adjacent drains and streams.

A Flood Risk Assessment has been carried out as part of the proposed wind farm, see Appendix 7-3. A summary of the key findings of the FRA are included here:

Substantial areas of the proposed wind farm site and surrounding area have been artificially drained to enable peat extraction. The carefully maintained network of drainage ditches effectively drain the proposed wind farm site and surrounding area.

The Catchment-based Flood Risk Assessment and Management Study (CFRAMS) coastal flood maps do not indicate any coastal flood risk at the site due to the inland location, approximately 80 km from Galway Bay, 90 km from Sligo Bay, and 105 km from the Irish Sea. The site is above 36 mOD Malin. The Geological Survey Groundwater Flooding Probability Maps (Figure 3-6, Appendix 7-3) do not predict groundwater flooding within the site.

In long rainfall events and during the wintertime pluvial flooding has been observed to occur across parts of all three bogs. The GSI maps of the extent of historical flooding seen in 2015 – 2016, See Appendix 7-3. These maps show areas seen to have been wet during winter 2015-2016.

The CFRAM mapping does not show any expected impact inside the site boundary. The National Indicative Flood Mapping (NIFM) indicates two areas potentially at risk on Derryadd bog in the 1% and 0.1% AEP events, and a further location potentially at risk on Derryaroge bog in the 0.1% AEP event. The fluvial flooding shown in the NIFM represents flooding of the site due to high water levels in the surrounding rivers. It should be noted that since the drainage from the southern part of Derryadd bog is pumped over the surrounding bank it is unlikely that river water can flood over the bank and into the bog. The presence of pumping would not have been known or incorporated in the preparation of the NIFM.

Based on the FRA analysis, the proposed substation is not located in a flood prone area (Flood Zone A or B) based on the flood risk assessment. This dataset suggests that fluvial flooding does not occur at the substation located or proposed turbine locations. Based on the information available and a site-specific risk assessment it is not considered a flood risk – Refer to Appendix

7-3. There is no evidence of historic groundwater flooding at the proposed wind farm. The internal site access roads in Derryaroge bog cross through an area identified on the flood maps as Flood Zone B so the development is appropriate.

19.3.5 Peat Stability

The peat stability assessment was carried out to determine the stability of peat slopes and to identify areas that are suitable for development. The findings of the peat assessment showed that the site has an acceptable margin of safety and is suitable for the proposed development.

Consultation with published GSI maps (2025) and observations from site investigations indicate that a large proportion of the site consists of cut-over raised peat. The site investigations included a site walkover to review the ground conditions, peat probing, trial pits, and rotary core drillings as outlined in Chapter 9 (Lands, Soils and Geology). Peat is mapped across the proposed wind farm site, aside from several areas of glacial till adjacent to the proposed wind farm site (see figures 9-36 - 9-38 of chapter 9). There are also pockets of glacial till within the proposed wind farm site boundary predominantly in the area where T01, T02, T03, and T04 are proposed, there is a pocket north of T11, and another pocket to the west of T16 and T17. Peat thickness encountered by intrusive investigations across the site varies from 0 m to a maximum thickness of 6.2 m, with an average of 1.38 m recorded. In total, 47% of recorded peat thicknesses were under 1 m, and 77% were under 2 m. Peat depths in excess of 2 m were encountered within the southern part of the proposed wind farm site, concentrated around the vicinity of T19, T20, and T22. The deepest areas of peat (depth 6.2 m) were recorded in isolated locations at the east of T01 and T02 at a location where no infrastructure is proposed and at discrete locations east of the proposed internal floated site access road between T08 and T14.

A desk study, site walkovers, ground investigation campaigns, stability analyses, and a risk assessment were carried out to assess the risks posed by peat failures within the proposed wind farm site. The risks were assessed following the principles in Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments (Scottish Executive, 2017).

The stability analysis aims to determine the stability, i.e., the Factor of Safety (FoS) of the peat slopes. The FoS provides a direct measure of the degree of stability of a peat slope. A FoS of less than 1.0 indicates that a slope is unstable; an acceptable FoS for slopes is 1.3 or greater. The results of the factor of safety analysis, indicate that the site is stable and safe for the construction and operation of the proposed development (see Appendix 9-3 Peat Stability Risk Assessment). The FoS analysis highlighted the localised areas of low factor of safety along the steep faces of the existing drainage and peat harvesting working at the site. These linear features of the areas are not considered to be a landslide or bog burst risk but are indicative of potential localised instability risks which can be easily managed during construction. Management and reinstatement of these localise instability risks are outlined in the associated Peat and Spoil Management Plan (PSMP), see Appendix 9-2.

A risk assessment was carried out considering the FoS value calculated in the stability analysis and other factors that could influence peat stability, considering how damaging a peat slide would be to this particular site's environment. The results of the stability risk assessment suggest that the proposed development has a negligible to low stability risk.

The site was found to have both acceptable factors of safety and levels of risk against peat instability. No immediate peat hazard has been identified during the desk study, the site reconnaissance and stability factor analysis. For this reason, no peat stability construction buffer zones are highlighted within or adjacent to the proposed wind farm site.

19.4 ASSESSMENT OF RISK

19.4.1 Stage 1 Risk Screening

Table 19-5 below presents the initial list of risk events considered to meet the criteria of a potential major accident and/or natural disaster and therefore requires further assessment. Risks were screened at this stage using the criteria in Section 19.2 above and either screened in for further assessment or screened out from the process.

Table 19-5 Stage 1 Screening Risk Register

Risk ID	Phases	Risk Event and Consequence	Possible Cause(s)	Further Assessment (Y/N)	Justification
A	Construction / Decommissioning	Striking strategic infrastructure resulting in damage, disruption to services and injuries (electrical shock, gas explosion etc).	Interaction with unknown strategic underground services (such as power, water, gas & telecommunications); faulty equipment or procedures; contractor error.	Y	During the construction phase, there is a risk of encountering strategic infrastructure which could result in significant prolonged disruptions. This risk has been screened in for further consideration. There is also a risk of encountering electrical infrastructure which could result in fatality or injuries.
B	Construction / Operation	Contamination of groundwater or surface water. This is associated with construction and/or operational maintenance works.	Heavy rain during construction activities; Mobilisation of contamination during construction activities such as excavation, hydrocarbon release (fuel spillage), seepage, stockpiled material providing a point source of exposed sediment, and erosion; Damage to fuel storage tanks onsite.	N	This has been considered within Chapter 9 (Lands, Soils and Geology) and Chapter 10 (Hydrology and Hydrogeology). As described in the chapters, good site practice by means of regular checks on plant, and diligent housekeeping of machinery will reduce the potential of hydrocarbon release on site to an acceptable level. In addition, a fuel and oil management plan has been prepared as part of the CEMP which includes spill control and response procedures.
C	Construction	Major traffic accidents resulting from construction phase traffic, temporary construction traffic management measures or associated with the delivery of Abnormal indivisible loads (AIL) along the turbine delivery route.	Heavy vehicles (HV) navigating through narrow roads. Driver error - not abiding by potential re-routing or management measures.	Y	Potential for major accident due to increase in traffic and HVs using construction and turbine delivery routes, and site access points. This risk has been screened in for further consideration.

Risk ID	Phases	Risk Event and Consequence	Possible Cause(s)	Further Assessment (Y/N)	Justification
D	Construction / Operation / Decommissioning	Landslide / Movement of peat within the site during construction.	Mismanagement of excavated material on site. Severe weather conditions include high winds, storms, and flooding.	N	This has been considered within Chapter 9 (Lands, Soils and Geology) and Chapter 18 (Climate) and the PSRA (Appendix 9-3). The findings of the peat stability assessment showed that the proposed wind farm site has an acceptable factor of safety, is suitable for the proposed development and is considered to be at low risk of peat failure.
E	Construction	Flooding of the site during construction works, resulting in trench collapses.	Periods of heavy prolonged rainfall, increased flood risk due to climate change.	N	The potential for flooding has been considered within the Flood Risk Assessment (Appendix 7-3) and both Chapter 10 (Hydrology and Hydrogeology) in Section 10.3 and Chapter 18 (Climate), as described in Section 18.4. The assessment concluded that the key infrastructure including the substation and BESS site are not at risk from extreme flooding and will not contribute to extreme flooding and that the proposed infrastructure will not be significantly affected by climate change. Additional measures will be in place during construction to control pluvial flooding in construction areas (dewatering and the creation of additional settlement ponds).
F	Construction / Operational	Collision risk resulting in damage to infrastructure and/or injuries.	Low flying aircrafts	N	Aviation has been considered, as discussed in Chapter 16 (Material Assets - Telecomms, Aviation & Other) and Appendix 16-1 (Derryadd Wind Farm Aviation Review

Risk ID	Phases	Risk Event and Consequence	Possible Cause(s)	Further Assessment (Y/N)	Justification
					Statement). As such, this risk is not considered further within this chapter.
G	Construction / Operational / Decommissioning	Incident at Seveso site involving the release of dangerous substances.	Fire / explosion or an infrastructure failure at a Seveso site	N	The Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (the "COMAH Regulations"), implement the Seveso III Directive (2012/18/EU). The purpose of the COMAH Regulations is to lay down rules for the prevention of major accidents involving dangerous substances. Seveso sites are defined as Industrial sites that, because of the presence of dangerous substances in sufficient quantities, are regulated under the Seveso III Directive. The proposed wind farm is not located within 30 km of a Seveso site.
H	Construction / Operational	Collapse / damage of structures/infrastructure.	Earthquake	N	The cause of this risk (earthquake of magnitude >5 capable of causing damage) is not considered applicable to this geographic location as discussed above in Section 19.2. As such, this risk is not considered further within this chapter.
I	Construction / Operational / Decommissioning	Collapse / damage of turbine structures / infrastructure at substation	HV collision / Operator error / Material failure	Y	There is potential for a major accident with a building / structure collapse including the potential for injuries. This risk has been screened in for further consideration.

Risk ID	Phases	Risk Event and Consequence	Possible Cause(s)	Further Assessment (Y/N)	Justification
J	Construction / Operational	Fire at wind turbines, Substation and BESS during construction / operation phase resulting in damage to infrastructure and/or injuries	Lightning strike / Equipment failure.	Y	Potential for injury, damage to infrastructure. This risk has been screened in for further consideration.
K	Operational	Ice falling from wind turbine blades	Injury from flying ice from wind turbine blades	Y	Potential for injury, and damage to infrastructure. This risk has been screened in for further consideration.
L	Construction	Contamination of soils and groundwater. This is associated with construction methodology for horizontal directional drilling	Frac-out of drilling fluids to the surface during horizontal directional drilling (HDD)	Y	There is potential for drilling fluid spills using this construction method. This risk has been screened in for further consideration.

Risks **A, C, I, J, K & L** were considered to meet the potential of a major accident and/or natural disaster and would require further assessment relative to the proposed development.

From the above screening process, risks **B, D, E, F, G & H** were screened out based on the criteria outlined in Section 19.2.

19.4.2 Stage 2 Risk Classification

Table 19-6 presents risks **A, C, I, J, K & L** that were brought forward for further consideration. In Stage 2 these risks are assigned a consequence and likelihood rating to determine their risk score. Risks adequately covered by another assessment or that are not applicable in terms of geographic location (e.g. volcanic and greater magnitude earthquake activity in Ireland) were screened out and not brought forward to this stage.

Table 19-6 Risk Classification

Risk ID	Risk Event	Phase Impacted	Overview of Mitigation	Likelihood	Rating	Consequence	Rating	Resulting Risk Score
A	Striking strategic infrastructure resulting in damage, disruption to services and in injuries (electrical shock).	Construction	A confirmatory survey of all existing services will be carried out prior to construction to verify the assumptions in Chapter 16 (Material assets - Telecomms, Aviation & Other) and identify the precise locations of any services. Liaising with the service providers will occur prior to construction where such services are identified. Digging around existing services, if present, will be carried out by hand to minimise the potential for accidental damage. Where the works would directly impact on an asset, diversion strategies would be developed and agreed with asset Owners. A CEMP (Appendix 3-2) has been prepared to present the minimum standard required by the Contractor for the proposed management and administration of site activities for the construction phase of the proposed development, to ensure that all construction activities are undertaken in an environmentally responsible manner. The CEMP will be a live document which will be updated post-consent as it will include method statements and work programmes that provide more detailed phasing of work based on the methodologies described in Chapter 3 (Description of the Proposed Development). The CEMP also includes an Emergency Response Plan.	**Very - Unlikely**	**2**	**Serious**	**3**	**6 - Low**
C	Major traffic accidents resulting from construction	Construction	Road traffic accidents will be mitigated by the Traffic Management Plan (TMP) developed as part of the EIAR assessment (Appendix 15-2). The TMP Outlines minimum road safety measures to be undertaken at site	**Unlikely**	**3**	**Limited**	**2**	**6 - Low**

Risk ID	Risk Event	Phase Impacted	Overview of Mitigation	Likelihood	Rating	Consequence	Rating	Resulting Risk Score
	phase traffic, temporary construction traffic management measures or associated with the delivery of Abnormal indivisible loads (AIL) along the turbine delivery route.		access / egress locations, during the works and including approaches to such access / egress locations. The Contractor shall prepare/develop a Construction Stage Traffic Management Plan (CSTMP) which will take account of the commitments imposed within the TMP and further develop such measures with agreement from the Roads authorities prior to works commencing on site.					
I	Collapse / damage of turbine structures / infrastructure at substation	Construction / Operational	Extensive and detailed ground investigation will be undertaken by the appointed Contractor to inform the detailed design and appropriate construction technologies and plant to be deployed. Contractors with a proven track record in delivering work of the scope required by the works will be appointed. An outline Emergency Response Plan has been prepared as part of the CEMP (Refer to Appendix 3-2), which will be further developed during construction and on operation of the proposed development.	**Very - Unlikely**	**2**	**Serious**	**3**	**6**
J	Fire at wind turbines, Substation and BESS during construction / operation phase resulting in damage to	Construction / Operational	The fire risk will be managed by including mitigation as part of the detailed design. A fire risk assessment will be undertaken as part of the detailed site design. All buildings will be designed and constructed to meet the requirements of Part B (Fire Safety) of the Building Regulations 2012 (S.I. No. 138 of 2012). Lightning protection systems are part of the design measures for conventional wind turbine blades.	**Very - Unlikely**	**2**	**Limited**	**2**	**4 - Low**

Risk ID	Risk Event	Phase Impacted	Overview of Mitigation	Likelihood	Rating	Consequence	Rating	Resulting Risk Score
	infrastructure and/or injuries							
K	Ice falling from wind turbine blades	Operational	Modern Wind Turbine Generators have incorporated an advanced blade anti-icing solution into their design. The Anti-Icing system uses electro-thermal heating elements embedded in the blade material to prevent ice build-up and allow turbines to function in cold climates.	**Very Unlikely**	**2**	**Limited**	**2**	**4 - Low**
L	Contamination of soils and groundwater. This is associated with construction methodology for horizontal directional drilling	Construction	The drilling rig and fluid handling units located on one side of the crossing will be stored on double bunded 0.5mm PVC bunds which will contain any accidental fluid spills and storm water run-off. Entry and exit pits (1m x 1m x 2m) will be excavated; the excavated material will be temporarily stored within the works area and used for reinstatement or disposed of to a licensed facility. A 1m x 1m x 2m steel box will be placed in each pit. This box will capture any drilling fluid returns from the borehole.	**Very Unlikely**	**2**	**Limited**	**2**	**4 - Low**

From examining the risks presented in Table 19-6, risks **A, C, I, J, K & L** were all considered as being below the threshold of significance set for this assessment (Green Zone or 'Low' risk event of Table 19-4) as shown in Table 19-7 below.

Table 19-7 Risk Assessment Evaluation

Likelihood Rating						
	5 – Very Likely					
	4 – Likely					
	3 – Unlikely		C			
	2 – Very unlikely		J, K, L	A, I,		
	1 – Extremely unlikely					
		1 – Minor	2 – Limited	3 – Serious	4 – Very Serious	5 – Catastrophic
		Consequence Rating				

Since no risks fall within the Amber and Red Zones ('Medium' and 'High' risk scenarios of Table 19-4) further consideration and assessment of additional mitigation measures are not required. For this proposed development, all identified potential risks are managed to an acceptable level, therefore no further assessment is required.

Monitoring is proposed during the construction, operation, and decommissioning phases of the proposed development to capture any change with the potential to result in an increased risk of major accident and/or natural disaster.

All monitoring proposals relating to the pre-construction and construction phases of the proposed development were set out in various sections of the EIAR, and NIS. The CEMP (Appendix 3 – 2) groups together all of the monitoring proposals presented in the EIAR and NIS. The monitoring proposals are presented in tabular format to provide an easy to audit list that can be checked and reported on during the course of the proposed development.

The operator of the proposed development will continue to assess the risk of major accidents and/or disasters on site on an on-going basis during operation. The maintenance programme, record of reported incidents, as well as general site activities will be monitored on an on-going basis to ensure risk of major accidents does not increase over time.

19.5 RESIDUAL ASSESSMENT

This chapter has assessed the potential risk of major accidents and natural disasters from the construction, operation and decommissioning phases of the proposed development. In accordance with the DoEHLG guidance (Table 19-4), the risk of a major accident and/or natural disaster is considered 'Low'.

There is low potential for significant natural disasters to occur at the proposed wind farm site. Ireland is a geologically stable country with a mild temperate climate. It is considered with the implementation of the mitigation measures already detailed in Chapters 6 to Chapter 18 in this

EIAR, as referenced in Table 19-6, and the measure outlined in the CEMP are implemented and adhere to there will not be significant residual effects associated with the construction, operation and decommissioning of the proposed development.

19.6 CUMULATIVE ASSESSMENT

A list of projects with the potential to cause cumulative effects has been developed as part of this EIAR and included within Chapter 5 (Policy, Planning and Development). A detailed review of these projects has been undertaken to understand if any potential for further impact exists when considered cumulatively with the proposed wind farm construction, operation and decommissioning. Following the assessment of the potential for any further impact when considered cumulative with any or all of the plans and projects set out in set out in Chapter 5 (Policy, Planning and Development), the review concluded that the proposed wind farm, with mitigation measures in place, was found to have no potential for significant cumulative effects associated with the potential for the proposed project to be impacted by major accidents or natural disasters or the proposed developments potential to cause major accidents or natural disasters.

19.7 SUMMARY

This chapter has assessed the potential risks the proposed wind farm may be vulnerable to or that may occur due to the proposed wind farm during the construction, operation, and decommissioning phases.

The assessment began by identifying potential unplanned risk events that the proposed wind farm may be vulnerable to or that may occur due to the proposed development. The list of identified risks were subject to a screening exercise to identify if the risks meet the criteria of a major accident and/or natural disaster as defined in the IEMA (2020) guidelines. Where appropriate, risks were screened out of the assessment where risk events had already been assessed in other areas of this EIAR or where risk events are not applicable to a particular geographic location.

Following the initial identification and screening process, any remaining major accident and/or natural disaster events were evaluated with regard to the likelihood of occurrence and the potential effect with mitigation measures applied. The evaluated major accidents and/or natural disasters were assessed and then grouped into one of the three zones, red, amber, and green zones, which represent high, medium, and low risk scenarios respectively.

Examining the risks and the associated mitigation measures, all risks were considered as being below the threshold of significance set for this assessment (Green Zone or 'Low' risk event), and found to be managed to an acceptable level, therefore no further assessment is required.

With the implementation of the mitigation measures already detailed in Chapters 6 to Chapter 18 of this EIAR, and outlined in the CEMP there will not be significant residual effects associated with the proposed wind farm of major accidents and/or natural disasters.

No difficulties were encountered during the writing of this Chapter.

19.8 REFERENCES

The Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations")

Department of Environment, Heritage and Local Government (2010). A Guide to Risk Assessment in Major Emergency Management

Department of Environment, Community and Local Government (DECLG), Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment (August 2018)

ESB Networks Code of Practice for Avoiding Danger from Overhead Electricity Lines (May 2019)

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

Environmental Protection Agency (EPA), Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (May 2022) (hereafter referred to as the EPA Guidelines)

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

EPA, EPA Geoportal - EPA Maps (2024)

Institute of Environmental Management & Assessment (IEMA) (2020). Major Accidents and Disasters in EIA: A Primer. September 2020.

Scottish-Executive, (2017). Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments.