18. MAJOR ACCIDENTS AND NATURAL DISASTERS

18.1 INTRODUCTION

This chapter assesses the likely significant adverse effects of the proposed project on the environment deriving from its vulnerability to major accidents and/or natural disasters, as well as the potential of the proposed project itself to cause major accidents and/or natural disasters during the construction, operation and decommissioning phases.

The assessment 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."*

This chapter has also been carried out in compliance with Schedule 6 paragraph 2(h) of the Planning and Development Regulations 2001 (as amended) which requires:

> *"a description of the expected significant adverse effects on the environment of the proposed development deriving from its vulnerability to risks of major accidents and/or disasters which are relevant to it. Relevant information available and obtained through risk assessments pursuant to European Union legislation such as the Seveso III Directive or the Nuclear Safety Directive or relevant assessments carried out pursuant to national legislation may be used for this purpose, provided that the requirements of the Environmental Impact Assessment Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for, and proposed response to, emergencies arising from such events."*

The structure and assessment methodology of this chapter follows the Institute of Sustainability and Environmental Professionals (ISEP) 'Major Accidents and Disasters in EIA: A Primer' guidance (IEMA, 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.'*

Any permutations within the proposed project (see Chapter 2) have been considered within this assessment and will not affect the potential risks discussed below and subsequent significance of the predicted effects.

18.1.1 Statement of Authority

This chapter was co-authored by Lydia Gurley and Dr. John Staunton of TOBIN. Lydia Gurley is an Assistant Project Manager with TOBIN and has a BSc (Hons) and MSc in Chemistry, complemented by postgraduate training in Offshore Renewable Energy and micro-credentials in Project Management and GIS. Lydia brings two years of project-management experience relevant to the planning and development of renewable energy projects. John Staunton is an Associate Project Manager and Environmental Scientist in TOBIN and has 18 years' postgraduate experience in both research and environmental consultancy, with 12 in the latter. John holds a BSc and PhD in Environmental Science, an advanced diploma in Planning and Environmental Law and is a Chartered Environmentalist. He has considerable experience in project managing wind energy developments, including Castlebanny Wind Farm, Cloghercor Wind Farm and Scart Mountain Wind Farm). In addition he has extensive experience authoring EIAR chapters, including the assessment of major accidents and natural disasters.

This chapter has been reviewed by Orla Fitzpatrick, Technical Director in TOBIN. Orla has over 20 years' experience working in the delivery of EIA projects in environmental consultancy. She is a Chartered Environmentalist and has considerable experience as technical approver of environmental deliverables for major infrastructure projects. Orla has technically approved the Major Accident and Natural Disaster chapters for a number of renewable energy projects including Ballyfasy Wind Farm, Scart Mountain Wind Farm and Lissinagroagh Wind Farm.

18.1.2 Limitations Encountered in Compiling Information

No limitations or difficulties were encountered while writing this chapter.

18.2 Assessment Methodology

The impact assessment methodology is risk based and identified potential unplanned risk events that the proposed project may be vulnerable to or that may occur due to the proposed project. There are three stages involved in determining such events, adopted from 'A Guide to Risk Assessment in Major Emergency Management' (DoHEHLG 2010) and the major accidents and disasters in EIA: A Primer Guidance (IEMA, September 2020), as listed:

- Stage 1: Screening/Identification – identifying potential unplanned risk events that the proposed project may be vulnerable to or that may occur as a result of the proposed project.

- 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.

18.2.1 Legislation, Policy and Guidance

The legislation, policy and guidance that was used to inform the assessment of the likely significant effects on the environment deriving from 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);
- S.I. No. 209 of 2015 - Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015 (the "COMAH Regulations").

Policy

- Mayo County Development Plan 2022 – 2028;
- Mayo County Council Major Emergency Plan, January 2021;

Guidance

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

18.2.1.1 EIA Directive

The EIA guidance document: EIA Guidance – EIA report (2017) identified key considerations in relation to major accidents and natural disaster risks and identified that EIARs should address issues such as:

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

This chapter has considered each of the above points within this chapter as highlighted in Table 18-1.

Table 18-1: Key considerations as Described in EIA Directive

Key considerations	Location Within This Chapter
What can go wrong with a project?	Risk assessment of all potential major accidents and natural disasters is carried out in Section 18.4. Risks that are described and assessed elsewhere in the EIAR are discussed in Section 18.3.
What adverse consequences might occur to human health and to the environment?	Potential adverse consequences discussed in Table 18-5.
What is the range of magnitude of adverse consequences?	Section 18.4.2 classifies and assesses each of the risks considered within this chapter. In Table 18-6 a consequence rating is assigned to each potential risk which describes the magnitude of adverse consequences. Where risks have been assessed elsewhere in the EIAR and are summarised within Section 18.3, the key findings and magnitude of adverse consequences of these risks are discussed within this section and in the relevant EIAR chapter.
How likely are the consequences?	Section 18.4.2 and Table 18-6 assigns a likelihood rating to each potential risk. Where risks have been assessed elsewhere in the EIAR and are summarised within Section 18.3, the likelihood of these risks are discussed within this section and in the relevant EIAR chapter.
What is the Project's state of preparedness in case of an accident/disaster?	Mitigation measures are discussed within Table 18-6 to describe the proposed project's state of preparedness.
Is there a plan for an emergency situation?	The CEMP (see Appendix 2-2) details the Emergency Response Plan of the proposed project, this is discussed further within Table 18-6.

18.2.2 Stage 1: Screening

The screening stage of the assessment is a high-level exercise listing all risk events (unplanned) that the proposed project may be vulnerable to or that may be caused by the proposed project.

In accordance with the EC (2017) guidance document; risks are identified in respect of the proposed projects

- potential to cause accidents and/or natural disasters,
- and vulnerability to potential natural disasters/accidents.

The list of risks has been developed through the identification of reasonably foreseeable risks in consultation with relevant contributors to 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 project during the construction, operation, and decommissioning phases.

The list of identified risks was subject to a screening exercise to determine if the risks meet the criteria of a major accident or natural disaster as defined by the IEMA 2020 guidelines as described below.

The IEMA (2020) provide the following definitions for a major accident and disaster.

> Major Accidents are *"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."*
>
> A 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 Natural Disasters in EIA: A Primer guidance' (IEMA, September 2020):

- The risk event is not applicable to a particular geographic location (e.g. volcanic or earthquake activity in Ireland); and
- Risks that have already been assessed in other areas of this EIAR, for example flood risk.

18.2.3 Stage 2: Classification

Following the screening stage any remaining major accident and/or natural disaster events were evaluated with regard to the likelihood of occurrence and the potential impact. The classification and rating of both the likelihood and impact are provided in Table 18-2 and 18-3. These classifications and ratings are taken from DoHELG (2010) A Guide to Risk Assessment in Major Emergency Management. The assessment adopts a precautionary approach and considers the potential consequences of credible major accident and natural disaster events. In assigning risk ratings, account has been taken of the embedded mitigation measures, operational controls and safety procedures that are integral to the design, construction and operation of the proposed project.

Table 18-2: Classification of Likelihood (adapted[1] from DoEHLG 2010 guidance).

Rating	Classification	Likelihood
1	Extremely unlikely	May occur only in exceptional circumstances; once every 500 or more years.
2	Very unlikely	Is not expected to occur; and/or no recorded incidents or anecdotal evidence; and/ or very few incidents in associated organisations, facilities or 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 18-3: Classification of Consequence (adapted from DoEHLG (2010) guidance).

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. • <0.5 M 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. • 0.5-3 M 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. • 3-10 M Euros.

[1] Adapted to present the information clearly for the reader in this context, using a table format relevant to the focus of this chapter.

			• 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. • 10-25 M 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. • >25 M Euros. • Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

18.2.4 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. The risk matrix, described in DoEHLG's (2010) guidelines indicates the critical nature of each risk. Each risk from the risk matrix is described below and presented visually as Table 18-4.

The risk matrix consists of three zones;

- 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 18-4: Impact Assessment Matrix (adapted from DoEHLG (2010) guidance)

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 recommend 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 likely significant effects following EPA Guidelines (EPA 2022).

18.2.5 Study Area

The study area for the major accidents and natural disasters assessment is the proposed project extent, as shown in Figure 1-1 of Chapter 1. This incorporates the proposed wind farm including one on-site control building with a private 33 kV grid connection to a proposed new loop-in 110 kV substation and works areas along the turbine delivery route.

18.3 Receiving Environment

A summary of the baseline environment focusing on aspects relevant to the risk of major accidents and natural disasters is provided below. This section summarises relevant details from assessments carried out within the EIAR. As noted in the IEMA guidance, the baseline description for this Chapter may include " existing sources of risk assessment or other relevant studies" as such descriptions of relevant assessments carried out within other sections of this EIAR are summarised below in relation to the risk of a major accident and/or natural disaster.

18.3.1 Meteorological

Ireland has a temperate, oceanic climate that results in typically mild winters and summers. Compared to other countries at similar latitudes Ireland does not experience the same extremes of temperature, largely due to the influence of the Atlantic Ocean on Ireland's climate. The hills and mountains of Ireland provide shelter from strong winds and oceanic influence[2].

Ireland's geographical location means it is less vulnerable to extreme natural hazards and disasters such as tsunamis or earthquakes. In recent years however, the occurrence of severe weather events has increased. Such weather events may include extreme heat or cold, heavy rainfall, snow, extreme winds which have the potential to disrupt project activity.

The nearest representative weather monitoring station collating detailed weather records and providing recent 30-year averages is Knock airport meteorological station, County Mayo, which is located approximately 48 km north-east of the wind farm site. Meteorological data from the Knock station is available in 30-year averages[3]. The most recent 30-year average (1991-2020) provides an overview of the typical conditions experienced. January is the coldest month of the year, with an average temperature of 6.4 degrees Celsius. August is the warmest month with an average temperature of 15 degrees Celsius. November has the highest average monthly rainfall at 139.6 mm per month on average, compared to the lowest month May with an average of 70.8 mm of rainfall per month.

[2] Climate of Ireland - Met Éireann - The Irish Meteorological Service accessed 17/02/26.
[3] 30 Year Averages - Met Éireann - The Irish Meteorological Service accessed 17/02/26.

Latest Research from the EPA and Met Éireann regarding New Climate Projections (2020)[4] for Ireland indicate the predicted changes in Ireland's climate (mid-century projections 2040-2061), including:

- *"Temperatures are projected to increase by 1–1.6°C compared with the reference period (1981–2000), with an east-west gradient and with the largest increases in the east;*
- *Warming will be enhanced at the extremes, with summer daytime and winter night-time temperatures projected to increase by 1–2.4°C;*
- *The number of frost and ice days will decrease by approximately 50%;*
- *Summer heatwave events are expected to occur more frequently;*
- *Precipitation is expected to become more variable, with substantial projected increases in the occurrence of both dry periods and heavy precipitation events;*
- *Snowfall is projected to decrease substantially across the country;*
- *Specific humidity is projected to increase substantially, while relative humidity is projected to increase slightly for all seasons except summer;*
- *Mean 10 m wind speeds are projected to decrease for all seasons;*
- *An overall reduction of ~10% in the numbers of storms affecting Ireland, with an eastward extension of the more severe wind storms over Ireland and the UK".*

18.3.1.1 Climate Hazards

Chapter 15 of this EIAR considers the likely significant effects of future climate change in Section 15.8.3.

A detailed Climate Change Risk Assessment (CCRA) of the construction phase was scoped out (see Section 15.6.2.1) and consideration has been given to the proposed project's vulnerability to the following climate change hazards with best practice mitigation measures proposed in Section 15.9.2:

- Flood Risk due to increased precipitation, and intense periods of rainfall. This includes fluvial and pluvial flooding;
- Increased temperatures potentially causing drought, wildfires and prolonged periods of hot weather;
- Reduced temperatures resulting in ice or snow; and
- Major Storm Damage – including wind damage.

A CCRA has been carried out with respect to the operational phase of the proposed project. Likely significant effects of climate change on the proposed project include:

- Flooding;
- Extreme Wind, Fog, Lightning and Hail;
- Wildfires;
- Landslides;
- Extreme Temperatures (Heat & Cold).

The risk assessment assesses the likelihood and consequence of potential effects occurring and then provides an evaluation of the significance of the effect and considers the implementation

[4] https://www.met.ie/epa-climate-projections-2020 accessed 19/02/26.

of mitigation measures. All risks discussed within the CCRA are considered to have a low potential for risk to the proposed project, which are overall not significant.

Chapters 14 and 15 (Air Quality and Climate) discuss mitigation relevant to climate hazards such as lightning strikes.

18.3.2 Hydrology

18.3.2.1 Flood Risk

A Flood Risk Assessment (FRA) has been carried out as part of the EIAR, see Appendix 9-2. A summary of the key findings of the FRA are included here.

Fluvial Flooding

Based on a comprehensive review of available datasets and detailed hydraulic assessment, the overall fluvial flood risk to the proposed project is considered to be low to negligible.

The OPW Preliminary Flood Risk Assessment (PFRA) mapping indicates that the study area is not located within any indicative fluvial flood extents, with the nearest mapped extent approximately 380 m from the proposed wind farm site. This position is further supported by the more recent and higher-resolution National Indicative Fluvial Mapping (NIFM), which confirms that both the wind farm site and the proposed 110 kV substation remain outside the 1% AEP and 0.1% AEP fluvial flood extents, including under the Mid-Range Future Scenario (climate change allowance).

In addition to the national-scale mapping, a site-specific hydraulic assessment of the Shancloon Stream, which flows adjacent to the proposed substation, was undertaken to better define local fluvial flood risk. This assessment demonstrates that the channel has sufficient capacity to convey the 1 in 1000-year (0.1% AEP) event with climate change allowance, with calculated channel capacities (3.1 m^3/s to 4.2 m^3/s) significantly exceeding the design flow (1.5 m^3/s). This confirms that the stream is not predicted to overtop or break its banks and therefore poses no fluvial flood risk to the substation. In addition, the proposed replacement culvert at the farm track crossing will be designed to convey the applicable design flow, including climate change allowance, without increasing flood risk upstream or downstream.

Coastal Flooding

The proposed project is not at risk of coastal flooding due to its distance inland from coastal waters.

Groundwater Flooding

Based on a review of Geological Survey Ireland (GSI) subsurface mapping of karst features, groundwater flood susceptibility mapping, the PFRA study and field surveys, there is no evidence to indicate that the proposed project site is susceptible to groundwater flooding.

Accordingly, the risk of groundwater flooding to the proposed project is considered to be negligible.

Pluvial Flooding

Based on the PFRA dataset, limited areas of potential pluvial flooding have been identified within the proposed wind farm site; however, these are localised and do not affect the suitability of the site for the proposed project. The PFRA was intended as a high-level screening assessment based on available information to identify Areas for Further Assessment (AFAs), rather than a detailed flood modelling exercise. The detailed Flood Risk Assessment (Appendix 9-2 of this EIAR) confirms that, with the proposed drainage measures and engineered infrastructure design, the risk of pluvial flooding is low and the development will not result in an increase in flood risk elsewhere.

18.3.3 Land, Soils and Geology

The proposed wind farm site is located on rolling terrain characterised by alternating low-lying and elevated areas. It is characterised by shallow glacial deposits (tills) overlying grey bioclastic limestone of the Oakport Limestone Formation. Areas of shallow rock exposure are noted on site and create some local variations in the landscape. Areas of rock outcrop were avoided as part of the proposed wind farm design.

There are no geological heritage sites or active quarries/aggregate sites identified within the proposed wind farm site, nor along the proposed GCR or along the temporary works areas of the TDR. There is an active quarry directly adjacent to the proposed wind farm site which is proposed to be connected via a temporary access track during the construction phase.

No peat was identified on the proposed wind farm site or TDR works areas, with some peaty soil identified within the proposed 110 kV substation area. No risk in relation to peat stability is anticipated during the construction/operation of the proposed project.

18.3.4 COMAH (Seveso) Establishments

The Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (the "COMAH Regulations"), implements 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 (Seveso) establishments are designated as such 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 project will not come under the COMAH Regulations, as there will be no requirement for the storage or use of dangerous substances during the construction, operation or decommissioning phases.

Additionally, there are no Upper or Lower Tier COMAH establishments located in very close proximity of the proposed wind farm site, the closest Upper Tier COMAH establishment is Circle K Galway Terminal Co. Galway, located approximately 26.5 km to the south of the proposed wind farm site. The closest Lower Tier COMAH establishment is Calor Teoranta

located on Claremorris Bulk Station, Ballindine Road, Co. Mayo, located approximately 25 km to the north-east the proposed wind farm site.

There are no COMAH establishments located in close proximity to the proposed GCR. The nearest establishments to the GCR, as described above, are approximately 23 km north and 21 km south respectively.

There is no COMAH establishment in the area around the proposed TDR works areas with the nearest being the Circle K Galway Terminal, located over 2 km from the works location on the Tuam road.

18.3.5 Major Infrastructure and Built Services

A detailed assessment of major infrastructure, built services and waste services in relation to the proposed project has been carried out in Chapter 11 of this EIAR.

18.3.5.1 Aviation

The nearest significant airport to the proposed project is Knock Airport, located approximately 48 km north-east of the proposed wind farm site, while Galway Airport, a licensed aerodrome which is currently non-operational, is located approximately 26 km to the south-east. Consultation with key aviation stakeholders has taken place (see Chapter 11 and Appendix 11-3 of this EIAR).

18.3.5.2 Telecommunication Infrastructure

Some telecommunications assets are located adjacent to the proposed wind farm site. A detailed assessment of existing telecommunication links in proximity to the proposed wind farm site is included as Appendix 11-1.

Additionally, the proposed GCR and TDR works are not expected to have the potential to affect telecommunication links. However, there is always the potential that there may be some localised underground telecoms cables / assets within the road network.

18.3.5.3Major Infrastructure and Built Services

All strategic infrastructure has been mapped in relation to the proposed project and considered within the material assets assessment (see Chapter 11).

It is not anticipated that any significant underground utilities will be encountered during the construction of the proposed project, with the exception of the works within public road corridors, such as the locations of the works areas along the TDR or associated with the proposed GCR. The locations of the Glencorrib Group Water Scheme infrastructure were confirmed during consultation with some services located within the proposed wind farm site and alongside the R334.

A review of available utility information identified a gas service in the vicinity of the TDR works area on the Tuam Road (R336) in Galway City. In addition, a number of underground water pipes have been identified, primarily along the R334 and the GCR corridor, following consultation with Uisce Éireann and the local group water scheme. These services have been considered in this EIAR.

A 38 kV overhead line (OHL) traverses the proposed wind farm site, and a 110 kV OHL traverses the GCR near the proposed 110 kV substation location, to which the proposed loop-in connection will be made. A number of low voltage distribution OHLs are located within and adjacent to the proposed project. These have all been considered within the design of the proposed wind farm along with other constraints. Appropriate setbacks have been left from the 38 kV and 110 kV lines to major infrastructure (turbines, substation, etc.).

While all strategic infrastructure has been mapped and considered within the EIAR there is a possibility of some infrastructure, particularly underground infrastructure, being discovered during the proposed works, particularly near public roads and houses or farmyards. As such, the potential risk of a major accident and/or natural disaster in relation to strategic infrastructure is considered within the assessment in this chapter. Chapter 11 provides further details relating to existing services and infrastructure.

18.4 Assessment of Effects

18.4.1 Future Baseline Scenario

With respect to major accidents and/or natural disasters, the 'Future Baseline' scenario assumes that the proposed project does not proceed. In this scenario, it is predicted that there will be no changes to the lands associated with the proposed project, which would continue to be used predominantly for agricultural purposes.

The risk associated with climate change related issues (e.g. flood risk) would continue to change over time. The site would continue to be used as is and surrounding roads continue to operate as they currently do. There would be no change in the local utility infrastructure (gas/water/electricity) which would continue to operate and require normal maintenance on occasion. Therefore, there would be a Neutral effect (**not-significant**) on risk of major accidents and/or natural disasters under the Future Baseline Scenario.

18.4.2 Stage 1: Screening

The list of risk events considered to meet the criteria of a potential major accident and/or natural disaster and therefore requires further assessment are listed in Table 18-5.

Risks were screened at this stage using the criteria from Section 18.2 and either screened in for further assessment or screened out from the process.

Table 18-5: Major Accidents and Natural Disasters – Stage 1 Risk Register

Risk ID	Phase	Risk Event and Consequence	Possible Cause(s)	For Further Assessment (Y/N)	Justification
A	Construction	Striking strategic infrastructure resulting in damage, disruption to services and / or fatalities / injuries.	Interaction with unknown strategic underground services (such as power, water & telecommunications); faulty equipment or procedures; contractor error.	Y	During the construction phase there is risk of encountering strategic infrastructure which could result in significant prolonged disruptions. There is also a possibility that faulty equipment or human error might cause an incident. This risk has been screened in for further consideration.
B	Construction	Contamination of ground or surface water. This is associated with construction works.	Heavy rain during construction activities; Mobilisation of contamination during construction activities such as excavation, fuel spillage, seepage, stockpiled material providing a point source of exposed sediment, erosion.	Y	Construction activities have the potential to result in contamination of surface water, groundwater, soils and associated receptors (including drinking water) through accidental fuel or oil spills, concrete washout, sediment mobilisation, excavation dewatering and other construction-related activities. Chapters 8 and 9 identify credible source-pathway-receptor linkages between construction activities, the limestone aquifer, local drainage network, watercourses and downstream receptors. Although significant effects are not predicted following implementation of embedded mitigation and construction controls, the potential consequences of an uncontrolled pollution event warrant further consideration within this Major Accidents and Natural Disasters assessment. This risk is therefore screened in for further assessment.



C	Construction	Major traffic accidents resulting from construction phase traffic or temporary construction traffic management measures	Heavy vehicles (HVs) 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 routes and site access points. This risk has been screened in for further consideration.
D	Construction / Operational / Decommissioning	Movement of soils within the site during construction / Landslide	Mismanagement of excavated material on site. Severe weather conditions- storm, flooding	N	This has been considered within Chapter 8, as described above in Section 18.3.3. The findings of the land, soils, geology assessment found there to be no significant risks as peat is not present on the wind farm site (only some peaty topsoil at the proposed 110 kV substation which, when excavated, will either be disposed of at a permitted facility or else used for local landscaping on site). Soil management will follow the Soil Management Plan within the CEMP (Appendix 2-2). The proposed site drainage and infrastructure has been designed to allow for severe weather conditions and there are no steep slopes on the proposed project site. The proposed mitigation in the CEMP (Appendix 2-2) will be implemented to manage any potential risks.
E	Construction / Operational / Decommissioning	Flooding of site during construction, operational and decommissioning phase.	Periods of heavy prolonged rainfall. Climate change.	N	The potential for flooding risk has been considered within the Flood Risk Assessment (Appendix 9-2) and Chapter 9 Hydrology and Hydrogeology, as described in Section 18.3.2. The assessment concluded that the key infrastructure including the substation site is not at risk from extreme flooding, will not contribute to extreme flooding and that the proposed infrastructure will not be significantly

					affected by climate change. Therefore, this risk is not considered further within this assessment.
F	Construction/ Operational/ Decommissioning	Collision risk resulting in damage to infrastructure and/or injuries	Low flying planes	N	Aviation has been considered within Chapter 11 Material Assets and Appendix 11-3, as discussed in Section 18.3.5.1 and effects on aviation are not anticipated. As such, this risk is not considered further within this chapter.
G	Construction/ Operational	Incident at nearby Seveso site involving release of dangerous substances.	Fire / explosion or an infrastructure failure at a Seveso site	N	As discussed above in Section 18.3.4 the proposed project is not a COMAH installation and no interaction is anticipated between a COMAH site and the proposed project. As such, this risk is not considered further within this chapter.
H	Operational	Collapse / damage of structures/infrastructure.	Earthquake	N	The cause of this risk (earthquake) is not considered applicable to this geographic location as discussed above in Section 18.3.1. As such, this risk is not considered further within this chapter.
I	Construction / Operational / Decommissioning	Risks related to climate change such as increased frequency and strength of storms, heightened flood and fire risk, risk of extreme temperatures.	Climate change	N	The potential for climate change associated risks has been considered within Chapter 15 as described in 18.3.1.1. The Climate Change Risk Assessment (CCRA) relates specifically to the operational phase of the proposed project and concluded that the identified climate risks have a low potential for significant effects.
J	Operational	Collapse / damage of turbine structures / infrastructure at substation	Extreme weather; Equipment failure; vehicle collision	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.

K	Operational	Fire at wind turbines, proposed 110 kV substation, on-site control building, during construction / operation phase resulting in damage to infrastructure and/or injuries	Lightning strike; Equipment failure; wildfire.	N	There is potential for lightning strike resulting in damage to infrastructure and/or injuries. Chapter 15 details mitigation in relation to lightning strikes. Modern turbines are designed to minimise the risk of fire sources and spread and turbines are also fitted with SCADA vibration and temperature sensors that will shut down the turbines in the event of excess heat build-up if a mechanical failure occurs. Similarly, the proposed 110 kV substation and on-site control building will be designed and constructed in accordance with applicable electrical and fire safety standards and will incorporate appropriate lightning protection, electrical protection and fire prevention measures. As discussed above in Section 18.3.1.1, the likelihood of a fire event resulting in a major accident is considered low and, therefore, this risk has been screened out from further assessment.
L	Operational	Ice falling from wind turbine blades	Injury from flying ice from wind turbine blades	Y	Potential for injury, damage to infrastructure. This risk has been screened in for further consideration.
M	Construction / Operational / Decommissioning	Deliberate malicious damage to infrastructure resulting in injury, disruption of operations or environmental damage.	Sabotage, vandalism, arson, unauthorised access.	N	Security measures including site access controls, fencing, locked access points and operational management procedures will reduce the likelihood of such an event. While minor acts of vandalism may occur, there is no reasonable pathway for such events to result in a major accident or disaster as defined by IEMA (2020). The risk is therefore screened out.

Risks D, E, F, G, H, I, K and M were not brought forward for further consideration as discussed in Table 18-5.

Risks A, B, C, J, and L were considered to meet the criteria for assessment a major accident and/or natural disaster and require further assessment in relation to the proposed project.

18.4.3 Stage 2: Classification and Assessment

Table 18-6 considers risks A, B, C, J, and L that were brought forward for further consideration.

The design of the proposed project incorporates mitigation measures. Following consideration of these measures the risks were assigned a consequence and likelihood rating to determine their risk score.

Table 18-6: Major Accidents and Disasters – Risk Classification Considering Mitigation

Risk ID	Phase	Risk Event and Consequence	Possible Cause(s)	Overview of Mitigation	Likelihood Rating	Consequence Rating	Risk Score
A	Construction	Striking strategic infrastructure resulting in damage, disruption to services and / or fatalities / injuries.	Interaction with unknown strategic underground services (such as power, water & telecommunications); faulty equipment or procedures; contractor error.	Strategic infrastructure is generally not known to be found on the proposed project site, with the exception of the OHL, and the mitigation contained in the CEMP (Appendix 2-2) will minimise any risks for issues with this. This includes having detailed desk studies and field surveys carried out for underground services at all works areas. As discussed above, Chapter 11 also concludes that there are no likely significant effects during the construction, operation or decommissioning phases. Please refer to Chapter 11 and the CEMP (Appendix 2-2) for associated mitigation.	2	3	6
B	Construction	Contamination of ground, groundwater and surface water resulting in environmental damage and potential effects on downstream receptors	Accidental fuel or oil spill; concrete or cementitious material release; sediment mobilisation from excavations; construction dewatering; failure of temporary pollution controls during extreme rainfall events	Extensive mitigation has been incorporated into the project design and construction methodology to protect both groundwater and surface water quality. Measures include implementation of the CEMP (Appendix 2-2), Surface Water Management Plan (Appendix 2-6), Sustainable Drainage Systems (SuDS), settlement ponds, interceptor drains, hydrocarbon storage within bunded areas, spill response procedures, groundwater and surface water monitoring, and the Karst Management Protocol (Appendix 8-1). The site investigation, groundwater monitoring and geophysical surveys have informed the project design and the integrated conceptual hydrogeological model, which identifies and assesses potential source-pathway-receptor linkages. Construction activities are localised and temporary in nature and no direct discharge to groundwater or surface waters is proposed. Watercourse crossing works will be managed through specific construction methodologies including HDD, temporary flow diversions and controlled dewatering where required. The risk of a significant pollution event is therefore substantially reduced.	2	3	6

C	Construction	Major traffic accidents resulting from construction phase traffic or temporary construction traffic management measures	HVs navigating through narrow roads. Driver error - not abiding by potential re-routing or management measures.	The risk of major accidents and/or natural disasters resulting from a road traffic accident associated with the proposed project will be reduced by the development and implementation of a construction phase Traffic Management Plan (TMP) (see Appendix 17-1) as described in Chapter 17, Traffic and Transportation. The Traffic Management Plan is a live document (i.e. subject to review and updates pre-construction) and will be developed through the detailed design and construction phase with ongoing consultation with the Local Authority, An Garda Síochána, Emergency Services and other stakeholders.	2	3	6
J	Operational	Collapse / damage of turbine structures / infrastructure at substation	Severe weather/ Equipment failure/ Vehicle collision.	Extensive intrusive and geophysical ground investigations have been undertaken across the proposed project. The investigations confirmed that the main infrastructure (including turbines) locations are generally underlain by competent limestone at shallow depth, with strong to very strong bedrock encountered and no significant subsurface voids or open cavities identified. The investigations indicate that localised weathering and karstification do not present a significant geotechnical constraint to the proposed project. Turbine locations have been selected having regard to the identified ground conditions and foundations will be designed in accordance with the confirmed geotechnical parameters for each location. A karst protocol (Appendix 8-1) will be followed in the event that any unforeseen voids are found. Vehicle management will use best practice as per the CEMP (Appendix 2-2) to minimise the risk of collisions with infrastructure, and the infrastructure will be robust to prevent failure if a collision was to occur. Contractors with a proven track record in delivering work of the scope required by the works will be appointed. In relation to extreme winds, the turbines shall be designed to the appropriate standards to account for the relevant wind loadings. Auto shut off technology is installed within the turbines if wind	2	3	6

				speed is too high (i.e. above 32 m/s or similar, as per manufacturer's instructions) and has the potential to damage the turbines. Given the nature of their use, the turbines are designed to be placed in high wind environments and therefore significant research has gone into their ability to withstand extreme wind loadings. The nearest dwelling to any of the proposed turbine locations is 600 m (i.e. four times the proposed tip height), therefore the risk to residential receptors from turbine collapse is not considered significant. The proposed tip height of the turbines is 150 m, therefore all residential dwellings are significantly removed from any area of a potential turbine collapse. The Emergency Response Plan of the proposed project is detailed within the CEMP (see Appendix 2-2).			
L	Operational	Ice falling from wind turbine blades	Injury from flying ice from wind turbine blades	The Draft Revised 2019 WEDGs refer to the very remote possibility of injury to people (or animals) from flying fragments of ice or from a damaged blade but note that most blades are composite structures with no bolts or separate components and that most turbines are fitted with anti-vibration sensors, which will detect any imbalance caused by icing of the blades and prevent start-up. Turbines will be fitted with ice detection systems. These will stop the turbine from operating, preventing ice throw. While temperatures remain low, the turbine will not restart unless a visual check has been carried out.	2	2	4

The results from the evaluation of risk, have been summarised/categorised in Table 18-7.

Table 18-7: Risk Assessment Evaluation

Likelihood Rating	5 – Very Likely					
	4 – Likely					
	3 – Unlikely					
	2 - Very Unlikely		**L**	**A, B, C, J**		
	1 – Extremely Unlikely					
		1 – Minor	2 – Limited	3 – Serious	4 – Very Serious	5 - Catastrophic
		Consequence Rating				

From assessing the potential risks and mitigation measures presented in Table 18-6, Risks A, B, C, J and L all fall within the green zone and were considered low risk scenarios broadly acceptable with mitigation measures as such the proposed project is not at risk from or at risk to cause a major accident and/or natural disaster. The likelihood of these events occurring is low and, should they occur, **no likely significant effects** are predicted. Therefore, no likely significant adverse effects associated with major accidents or natural disasters are anticipated during the construction, operational or decommissioning phases of the proposed project.

This chapter presents a completed risk assessment of major accidents and natural disasters relevant to the proposed project. The assessment concludes that no likely significant effects have been identified in relation to major accidents or natural disasters. Should the project proceed, risk management will continue as a live process throughout the detailed design, construction, operational, and decommissioning phases, with existing plans subject to ongoing review and updates.

18.5 Residual Effects

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

During the construction phase, the implementation of embedded mitigation measures and management controls, including those contained within the CEMP (Appendix 2-2), SWMP (Appendix 2-6) and Traffic Management Plan (Appendix 17-1), will reduce the likelihood of major accident events occurring. Any residual effects would be **imperceptible**, **temporary** and **not significant**.

During the operational phase, the proposed project will incorporate embedded design measures, safety systems, inspection and maintenance procedures and emergency response

measures. Any residual effects associated with major accident or natural disaster events would be of imperceptible to low magnitude, long-term duration, but with a low likelihood of occurrence, and are therefore considered not significant.

During the decommissioning phase, residual effects would be similar to those identified for the construction phase. With the implementation of appropriate environmental management, traffic management and health and safety procedures, any residual effects would be of imperceptible to low magnitude, temporary duration and not significant.

With implementation of the mitigation measures already detailed in Chapters 5 - 17 in this EIAR (see Table 18-6), **no likely significant residual effects** associated with major accidents or natural disasters are predicted for the proposed project.

18.6 Cumulative Assessment

In the assessment of cumulative effects, any other existing, permitted or proposed developments in the surrounding area have been considered where they have the potential to generate in-combination or cumulative effects with the proposed project (see Chapter 1 of this EIAR for a full description of developments considered).

Based on the overall low risk associated with the proposed project described in this chapter of the EIAR, other plans/projects considered within the cumulative assessment, and the implementation of proposed mitigation measures for the proposed project and other projects, there is a very low potential for an increase to the cumulative risk of a major accident and/or natural disaster occurring in relation to these projects. Specific risks are considered below.

Construction Phase

There is a slight, increased chance of traffic accidents in to the event that the proposed project and the other projects considered cumulatively (including the recently refused Shancloon Wind Farm which is still open to a possible judicial review so is being assessed here) are constructed, particularly if the construction phases overlap. However, following the implementation of appropriate mitigation as described in Chapter 17 and the TMP (see Appendix 17-1) **no significant** effects are predicted.

Operational Phase

The risk of potential traffic accidents is considered to be very low during the operational phase. There is an imperceptible increase in cumulative fire risk associated with the proposed project and the Shancloon Wind Farm where both are operational together.

There are no other potential cumulative effects identified for any part of the proposed project (including the route of the proposed GCR, or along the temporary works areas of proposed TDR). This is based upon the low risk of major accidents or natural disasters associated with the proposed project and a review of the projects in the surrounding area.

18.7 Conclusion

This chapter has assessed the vulnerability of the proposed project to major accidents and natural disasters, as well as the potential of the proposed project itself to cause potential major

accidents and/or natural disasters during the construction, operation and decommissioning phases. Where likely significant effects have been identified, mitigation will be implemented in full and has been incorporated into the assessment.

Table 18-7 summarises any residual effects following the application of mitigation measures. Following the assessment with mitigation measures, the risks fall within the green zone and were considered low risk scenarios. All permutations within the proposed range of turbine dimensions have been assessed within this EIAR.

With all mitigation measures implemented there are **no likely significant residual or cumulative effects** from or to the proposed project in relation to the risk of major accidents and/or natural disasters during the construction, operational or decommissioning phase.

18.8 REFERENCES

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

Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015) (as amended)

Department of Defence (2020) – A National Risk Assessment for Ireland

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

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

Environmental Protection Agency (2022) – Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

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

European Union (EU) Directive 2011/92/EU (as amended by Directive 2014/52/EU) – The EIA Directive

Mayo County Council (2021) Mayo County Development Plan 2022 – 2028

Mayo County Council (2021) Mayo County Council Major Emergency Plan, January 2021

Institute of Environmental Management and Assessment (IEMA) (2020) – 'Major Accidents and Disasters in EIA: A Primer' guidance

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

Safety, Health and Welfare at Work Act 2005 (No. 10 of 2005)