17. MAJOR ACCIDENTS AND NATURAL DISASTERS

17.1 INTRODUCTION

This chapter assesses the potential 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 Environmental Management and Assessment (IEMA) '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, (Description of the Proposed Project)) have been considered within this assessment and will not affect the potential risks discussed below and subsequent significance of the predicted effects.

17.1.1 Statement of Authority

This chapter was prepared by Oonagh Fleming of TOBIN. Oonagh Fleming is an Assistant Project Manager in TOBIN. Oonagh holds a B.A. in Geography and Sociology. She has over two years' experience as an environmental consultant and has considerable experience in carrying out associated impact assessments including in preparing assessments in relation to major accidents and natural disasters.

This chapter has been reviewed by Orla Fitzpatrick Technical Director in TOBIN. Orla has twenty years' experience working in the delivery of EIA projects in environmental consultancy. She holds a BSc in Geophysics and MSc in Environmental Consultancy and has considerable experience as technical approver of environmental deliverables for major infrastructure projects.

17.1.2 Legislation, Policy and Guidance

The legislation, policy and guidance that was used to inform the assessment of the potential 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

- Kilkenny County Development Plan 2021 – 2027;
- HSE South East (Area 5) Emergency Plan (Covering Geographical Areas of Counties Carlow, Kilkenny, South Tipperary, Waterford and Wexford), November 2019.

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).

17.1.2.1 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 17-1.

Table 17-1: 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 17.4. Risks that are described and assessed elsewhere in the EIAR are discussed in Section 17.3.
What adverse consequences might occur to human health and to the environment?	Potential adverse consequences discussed in Table 17-5.
What is the range of magnitude of adverse consequences?	Section 17.4.2 classifies and assesses each of the risks considered within this chapter. In Table 17-6 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 17.3, 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 17.4.2 and Table 17-6 assigns a likelihood rating to each potential risk. Where risks have been assessed elsewhere in the EIAR and are summarised within Section 17.3, 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 17-6 to describe the proposed project's state of preparedness.
Is there a plan for an emergency situation?	The CEMP (see Appendix 2-6) details the Emergency Response Plan of the proposed project, this is discussed further within Table 17-6.

17.2 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.

Potential hazards listed in the HSE Emergency Management: Area 5 Emergency Plan with relevance to the proposed project have been considered within this assessment.

17.2.1 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 maintenance, 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.

17.2.2 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 17-2 and 17-3. These classifications and ratings are taken from DoHELG (2010) A Guide to Risk Assessment in

Major Emergency Management. 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 the major accident and/or natural disaster.

Table 17-2: 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.

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

Table 17-3: 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. • 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.

17.2.3 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 17-4.

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 17-4: 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 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).

17.2.4 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 (Introduction). This incorporates the proposed wind farm site, the two electrical grid connection options and turbine delivery route works areas. The proposed wind farm site study area covers an area of approximately 348.14 hectares (ha).

17.3 Baseline 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.

17.3.1 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 Irelands climate. The hills and mountains of Ireland provide shelter from strong winds and the 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 Cork Airport meteorological station, County Cork, which is located approximately 110 km south-east of the site. Meteorological data from the Cork Airport station is available in 30-year averages[3]. The most recent 30-year average (1991-2020) provides an overview of the typical conditions experienced. December is the coldest month of the year, with an average temperate of 6.2 degrees Celsius. August is the warmest month with an average temperature of 15 degrees Celsius. December has the highest average monthly rainfall at 136.6 mm per month on average, compared to the lowest month May with an average of 80.8 mm of rainfall per month.

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".*

[2] Climate of Ireland - Met Éireann - The Irish Meteorological Service accessed 03/05/25.
[3] 30 Year Averages - Met Éireann - The Irish Meteorological Service accessed 03/05/25.
[4] https://www.met.ie/epa-climate-projections-2020 accessed 03/05/25.

17.3.1.1 Climate Hazards

Chapter 14 (Air Quality and Climate) of this EIAR considers the potential impacts of future climate change in Section 14.2.6.3.

A detailed Climate Change Risk Assessment (CCRA) of the construction phase was scoped out (see Section 14.3.4.2) 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 14.1.10:

- 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 project.
Potential impacts 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 impacts occurring and then provides an evaluation of the significance of the impact and considers the implementation 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.

Chapter 14 (Air Quality and Climate) discusses mitigation relevant to climate hazards such lightning strikes.

17.3.2 Hydrology

17.3.2.1.1 Flood Risk

A Flood Risk Assessment (FRA) has been carried out as part of the EIAR, see Appendix 9-3. A summary of the key findings of the FRA are included here.

Fluvial Flooding

It is expected that the fluvial flood risk to the site is minimal. Lidar data was utilised around the two areas which were liable to fluvial flooding. Lidar analysis confirmed that Turbines 5 and 8 have appropriate freeboards of 2 m and 8 m respectively and are not within the flood extents. While their access roads fall within Flood Zone B, this is acceptable under planning guidelines, and appropriate watercourse crossings will be secured through Section 50 applications to mitigate any flood risk. Turbine 2 which is located 300 m west of the Smartcastle Stream has a current ground level of 168 mOD and the area of the Smartscastle Stream closest to it has an approximate current ground level of 166 m OD, this gives a freeboard of 2 m to the turbine.

Although there are two areas prone to fluvial flooding along GCO One, the underground cables along GCO One will be positioned predominantly within the local road network or horizontally directional drilled under watercourses. There are no flood risk areas along GCO Two.

Coastal Flooding

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

Groundwater Flooding

There is no evidence to suggest groundwater as a potential source of flood risk to the proposed wind farm site.

Pluvial Flooding

The OPW's National Preliminary Flood Risk Assessment (PFRA) Overview Report from March 2012 mapping shows two areas with potential pluvial flooding near Turbines 3 and 7 within the proposed wind farm site. Lidar data indicates no local depressions, and the flood-prone areas slope toward nearby streams, so ponding is unlikely. The site's landscaping and topography will provide safe overflow paths to prevent water buildup even during extreme events or drainage blockages. Surface water will be managed by a stormwater drainage system based on SuDS principles, controlling runoff to rates typical of agricultural land. Therefore, it is estimated that risk of pluvial flooding associated with the proposed wind farm is unlikely.

Based on the results of this flood risk assessment, it is estimated that the risk of flooding to the proposed wind farm, substation, and all associated works will be minimal.

17.3.2.1.2 Contamination

Potential risk related to contamination is discussed within Chapter 9 (Hydrology and Hydrogeology). Detailed mitigation is provided within Chapter 9 (Hydrology and Hydrogeology), the Construction Environmental Management Plan (see Appendix 2-6) and the Surface Water Management Plan (see Appendix 2-8), as a result of mitigation described there is no risk associated with contamination.

17.3.3 Land, Soils and Geology

The proposed wind farm site is located in an upland area with limited peat soils underlain by glacial soils that in turn overly sandstones.

There are no significant geological resources or geological heritage sites are known at the proposed wind farm site, GCO One and Two or along the works areas of the TDR.

No peat was identified on site. No risk in relation to peat stability is anticipated during the construction/operation of the proposed project (see Chapter 8 Land, Soils and Geology).

Potential risk related to contamination is discussed within Chapter 8 (Land, Soils and Geology). Detailed mitigation is provided within Chapter 8 (Land, Soils and Geology) and the CEMP (see Appendix 2-6).

17.3.4 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 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 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 Nitrofert Ltd.,Raheen Port, New Ross, Co. Wexford located approximately 7 km from the proposed wind farm site and the closest Lower Tier COMAH establishment, Goulding Chemicals Ltd., Stokestown, New Ross, Co. Wexford is located approximately 7 km from the proposed wind farm site, from the closest point.

There are no COMAH establishments located in proximity to the proposed GCO One or Two. The above locations are also the closest in proximity to GCO One and Two. GCO One and Two are located approximately 9 km and 7 km from both COMAH establishments mentioned above, respectively.

The closest COMAH establishment to the proposed TDR works areas is Trans-Stock Warehousing and Cold Storage Ltd, Christendom, Ferrybank, Co. Waterford. It is located approximately 3 km from the proposed TDR works areas at the Slieverue Roundabout on the N29. However, works along the proposed TDR will be short-term and temporary in nature and as such no interactions with COMAH sites are anticipated.

17.3.5 Major Infrastructure and Built Services

A detailed assessment of major infrastructure, built services and waste services in relation the proposed project has been carried out in Chapter 11 (Material Assets).

17.3.5.1 Aviation

The nearest significant airport to the proposed project is Waterford Airport, located approximately 20 km south of the proposed wind farm site, while Cork Airport is located approximately 100 km to the southwest. Consultation with key aviation stakeholders has taken place (see Chapter 11 (Material Assets) and Appendix 11-1 of this EIAR).

17.3.5.2 Telecommunication Infrastructure

No underground telecommunications assets were found within or near the proposed wind farm site.

As such, the proposed GCOs and proposed TDR are not expected to have the potential to impact telecommunication links. However, there is always the potential that there may be some localised underground telecoms cables / assets within the road network.

17.3.5.3Major Infrastructure and Built Services

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

It is not anticipated that any significant underground utilities will be encountered during the construction of the proposed project, with the exception of the locations within public road corridors, such as the locations of the works areas along the TDR or associated with the proposed GCOs.

The works footprint does not overlap with the gas pipelines in the vicinity of the proposed project.

No underground water pipes have been identified within the footprint of the works area for the proposed project.

No ESB infrastructure was identified within the area of the proposed wind farm site, except for a 110 kV high voltage (HV) overhead line (OHL) (that includes a wooden pole set) which crosses through the east proposed wind farm site at the location of the proposed GCO Two connection (see Figure 1-1, of Chapter 1 (Introduction)) this has been considered within the design of the proposed wind farm.

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 accidents and/or natural disaster in relation to strategic infrastructure is considered within the assessment in this chapter. Chapter 11 (Material Assets) details associated mitigation and concludes that there are no likely significant effects during the construction, operation or decommissioning phases.

17.4 POTENTIAL EFFECTS

17.4.1 Do-Nothing Scenario

With respect to major accidents and/or disasters, the 'Do Nothing' scenario means that there are no changes to the lands associated with the proposed project site, which comprises largely agricultural with areas of coniferous forestry occurring. The risk associated with climate change related issues 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. Therefore, there would be a Neutral impact on risk of major accidents and/or disasters under the 'Do Nothing' Scenario.

17.4.2 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 17-5.

Risks were screened at this stage using the criteria from Section 17.2 and either screened in for further assessment or screened out from the process.

Table 17-5: Major Accidents and Natural Disasters – Stage 1 Risk Register

Risk ID	Stage	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.	N	During the construction phase there is risk of encountering strategic infrastructure which could result in significant prolonged disruptions. As discussed above, Chapter 11 Material Assets concludes that there are no likely significant effects during the construction, operation or decommissioning phases. Please refer to Chapter 11 for associated mitigation.
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.	N	There is potential for contamination during the construction phase. This risk has been discussed in Section 17.3.2.1.2, it was found that there is no significant risks, post mitigation. and as such is screened out.
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 peat 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 17.3.3. The findings of the land, soils, geology assessment found there to be no significant risks, post mitigation.
E	Construction / Operational / Decommissioning	Flooding of site during construction, operational and decommissioning stage.	Periods of heavy prolonged rainfall. Climate change.	N	The potential for flooding risk has been considered within the Flood Risk Assessment and Chapter 9 Hydrology and Hydrogeology, as described in 17.3.2. 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	Collision risk resulting in damage to infrastructure and/or injuries	Low flying planes	N	Aviation has been considered within Chapter 11 Material Assets, as discussed in Section 17.3.5.1 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 17.3.4 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 17.3.1. 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 risk, risk of extreme temperatures.	Climate change	N	The potential for climate change associated risks has been considered within Chapter 14 (Air Quality and Climate) as described in 17.3.1.1. The assessment concluded that the risks considered within the CCRA were deemed to have a low potential for risk.
J	Operational	Collapse / damage of turbine structures / infrastructure at substation	HVs 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 during construction / operation phase resulting in damage to infrastructure and/or injuries	Lightning strike; Equipment failure.	N	There is potential for lightning strike resulting in damage to infrastructure and/or injuries. Chapter 14 details mitigation in relation to lightning strikes. This is considered to have a low potential for risk as discussed above in section 17.3.1.1 as such this risk has been screened out.
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.

Risks A, B, D, E, F, G, H, I and K were not brought forward for further consideration as discussed in Table 17-5.

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

17.4.3 Stage 2: Classification and Assessment

Table 17-6 considers risks 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 17-6: Major Accidents and Disasters – Risk Classification Considering Mitigation

Risk ID	Stage	Risk Event and Consequence	Possible Cause(s)	Overview of Mitigation	Likelihood Rating	Consequence Rating	Risk Score
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 16-2) as described in Chapter 16, 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.	3	2	6
J	Operational	Collapse / damage of turbine structures / infrastructure at substation	HVs collision; Severe weather.	Extensive and detailed confirmatory 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. 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 speed is too high (i.e. above 26 m/s) 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 There are no dwellings located within 720 m of the proposed turbine locations, therefore the risk to residential receptors	2	3	6

				from turbine collapse is not considered significant. The proposed tip height of the turbines is between 170 m-180 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 CMEP (see Appendix 2-6).			
L	Operational	Ice falling from wind turbine blades	Injury from flying ice from wind turbine blades	The Draft 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. Modern Wind Turbine Generators have incorporated an advanced blade anti-icing solution to 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.	2	2	4

The results from the evaluation of risk, have been summarised/categorised in Table 17-7.

Table 17-7: Risk Assessment Evaluation

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

From assessing the potential risks and mitigation measures presented in Table 17-4, Risks 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.

This chapter presents a completed risk assessment of major accidents and natural disasters relevant to the proposed project. 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.

17.5 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'.

With implementation of the mitigation measures already detailed in Chapters 6 - 18 in this EIAR (see Table 17-5), there will not be significant residual effects associated with the proposed project.

17.6 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 (Introduction) of this EIAR for a full description of developments considered).

Based on the low risk associated with the proposed project described in this chapter of the EIAR, the separation distance and the low level of connectivity of forestry parcels between the proposed project and other projects considered within the cumulative assessment, and the implementation of proposed mitigation measures for the proposed project and the other

projects, there is a very low potential for an increase to the 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 relation to proposed Castlebanny Wind Farm, particularly if the construction phases overlap. However, following the implementation of appropriate mitigation as described in Section 17.7.1, Chapter 16 (Traffic and Transportation) and the TMP (see Appendix 16-1) no significant effects are predicted.

Operational Phase

There is a slight increased risk of fire due to lightning strikes in relation to the adjacent Ballymartin and Smithstown Wind Farm however, considering the low likelihood of occurrence and the implementation of appropriate mitigation measures in relation to the risk of fire at the proposed substation or wind turbines there is no significant cumulative effects predicted in relation to these risks.

The risk of potential traffic accidents is considered to be very low during the operational phase.

There are no potential cumulative effects identified for any part of the proposed project (including the route of the proposed GCOs, or along the 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.

17.7 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 significant effects have been identified, mitigation will be implemented in full and has been incorporated into the assessment.

Table 17-7 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 is no 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.

17.8 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

HSE South East (Area 5) Emergency Plan – Covering Geographical Areas of Counties Carlow, Kilkenny, South Tipperary, Waterford and Wexford, November 2019

IEMA (2020) – Major Accidents and Disasters in EIA: A Primer

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

Kilkenny County Development Plan 2021–2027

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)