16 MAJOR ACCIDENTS AND NATURAL DISASTERS

16.1 INTRODUCTION

This Chapter of the Environmental Impact Assessment Report (EIAR) describes the likely significant effects on the environment arising from the vulnerability of the proposed Tirawley Wind Farm (the "Proposed Development") as detailed in **Chapter 2: Development Description** to risks of major accidents and/or natural disasters. It has been completed in accordance with the guidance set out by the Environmental Protection Agency (EPA) in 'Guidelines on Information to be contained in Environmental Impact Statements' (EPA, 2022) and the European Commission in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU, as amended by 2014/52/EU)[1], namely 'Guidance on the preparation of the Environmental Impact Assessment Report'.

The assessment of the vulnerability of the Proposed Development to major accidents and natural disasters is carried out in compliance with the EIA Directive and Planning and Development Regulations 2001 (as amended) which states the need to assess:
"the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or natural disasters which are relevant to the project concerned."

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

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

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

[1] European Commission, Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014L0052 [Accessed 24/04/2026]

16.1.1 Statement of Authority

This chapter has been prepared by Mr. Michael Garvey with the assistance of Mr. Darren Timlin of Jennings O'Donovan & Partners Limited (JOD) and reviewed by Mr. David Kiely.

Michael holds a B.Eng in Civil Engineering and a diploma in Project management. He is an experienced Chartered Professional Engineer (Ontario - Engineers Canada) with over 15 years of client-side and contractor/consultant experience on various Major Multi-Discipline Infrastructure Projects. Experienced in all stages of project life cycles from inception to operations. Projects varied from Design/Build, EPC, EPCM and P3 projects in Ireland, Australia and North America.

Mr. Darren Timlin is a Graduate Environmental Scientist and holds a Bachelor (Hons.) Degree in Environmental Science from the Atlantic Technological University. Darren has 3 years' experience drafting EIAR's and Screening Reports, Appropriate Assessments for Wind Farms, Hydrogen Plants and Power Generation Plants. He forms part of the Environmental team responsible for preparing the EIAR Chapters. Darren has experience drafting EIAR's and Screening Reports, Appropriate Assessments for Wind Farms, Hydrogen Plants and Power Generation Plants. He has experience in the use of Arc GIS Pro and Auto CAD 2D.

The Chapter has been reviewed by Mr. David Kiely of JOD. Mr. Kiely has 43 years' experience in the civil engineering and environmental sector. He has obtained a bachelor's degree in civil engineering and a Masters in Environmental Protection, has overseen the construction of over 50 wind farms and has carried out numerous soils and geology assessments for EIAR's. He has been responsible in the overall preparation of more than 60 EIA Reports (EIARs).

16.2 ASSESSMENT METHODOLOGY

The following sources of information and literature pertinent to the area were used in the preparation of this section:

- Central Statistics Office (CSO) Census of Ireland, https://www.cso.ie/en/index.html
- Regional Spatial and Economic Strategy (RSES) 2020-2032, published by the Northern and Western Regional Assembly on 24 January 2020 https://www.nwra.ie/rses/
- Mayo County Development Plan 2022 – 2028, https://www.mayo.ie/planning/county-development-plans/2022-2028
- Mayo County Council Website, https://www.mayo.ie
- Fáilte Ireland, https://www.failteireland.ie/

- Gas Networks Ireland, Dial before you Dig, https://www.gasnetworks.ie/home/safety/dial-before-you-dig/
- Health Service Executive (HSE), Major Emergency Plans, https://www.hse.ie/eng/services/list/3/emergencymanangement/area-mep/
- Health Service Executive (HSE), SEVESO Sites, https://www.hse.ie/eng/services/list/3/emergencymanangement/seveso/
- Geological Survey Ireland (GSI), Landslide Susceptibility Map, https://www.gsi.ie/en-ie/data-and-maps/Pages/Geohazards.aspx#landslides
- Office of Public Works (OPW), National Indicative Fluvial Mapping (NIFM) River Flood Extents – High-End Future Scenarios, https://data.gov.ie/dataset/nifm-river-flood-extents-high-end-future-scenario
- Office of Public Works (OPW), Flood Probability Mapping, https://www.floodinfo.ie/map/floodmaps/
- Office of Public Works (OPW), Flood Risk Management, https://www.floodinfo.ie/map/floodplans/

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

16.2.1 Legislative Context

16.2.1.1 Legislation

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

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

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

"(8) A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and

obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies".

16.2.1.2 Guidance Documents

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

- European Commission (2017) Environmental Impact Assessment of Projects – Guidance on the preparation of Environmental Impact Assessment Reports
- Environmental Protection Agency (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- Department of Environment, Heritage and Local Government (2010) A Guide to Risk Assessment in Major Emergency Management
- Environmental Protection Agency (2014) Guidance on Assessing and Costing Environmental Liabilities
- Department of Defence (2023) A National Risk Assessment for Ireland
- Mayo County Council (2021) Major Emergency Plan
- HSE Emergency Management Area 2 Crisis Management Team Major Emergency Plan (2024)

16.2.2 Categorisation of the Baseline Environment

A desk-study has been completed to establish the baseline environment for which the proposed risk assessment is being carried out. This will influence both the likelihood and the effect of a major accident or natural disaster. Local and regional context has been established prior to undertaking the risk assessment to develop an understanding of the vulnerability and resilience of the area to emergency situations.

Further detail on the baseline environment is provided in **Section 16.3**.

16.2.3 Effect Assessment Methodology

16.2.3.1 Introduction

This assessment is focused on an understanding that the Proposed Development will be designed, built and operated in line with the methodologies and measures prescribed in this

EIAR. Therefore, the overall vulnerability of the Proposed Development to risks of major accidents and natural disasters is considered low.

An assessment of potential accidents and disaster scenarios such as pollution incidents to ground and watercourses as well as assessment of flooding events and peat instability are described in detail in the relevant EIAR assessment chapters (Refer to **Chapters 8: Soils and Geology** and **Chapter 9: Hydrology and Hydrogeology** for further details).

16.2.3.2 Site-Specific Risk Assessment Methodology

A site-specific risk assessment identifies and quantifies risks focusing on unplanned, but possible and plausible events occurring during the construction, operation and decommissioning of the Proposed Development. The approach to identifying and quantifying risks associated with the Proposed Development by means of a site-specific risk assessment is derived from the EPA 'Guidance on Assessing and Costing Environmental Liabilities' document[2]. The following steps were taken as part of the site-specific risk assessment:

- Risk identification
- Risk classification,
- Likelihood and consequence; and
- Risk evaluation

16.2.3.2.1 Risk Identification

Risks have been reviewed through the identification of reasonably foreseeable risks in consultation with relevant contributors to this EIAR (Please see **Chapter 1: Introduction** for *Curriculum Vitae* of contributors). The identification of risks has focused on non-standard but plausible incidents that could occur at or as a result of the Proposed Development during construction, operation and decommissioning phases.

In accordance with the European Commission EIAR Guidance, risks are identified in respect of the projects:

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

[2] EPA (2014) Guidance on assessing and costing environmental liabilities. Available at: https://www.epa.ie/publications/compliance--enforcement/licensees/reporting/financial-provisions/EPA_OEE-Guidance-and-Assessing-WEB.pdf [Accessed: 17/09/2025]

16.2.3.2.2 Risk Classification

Classification of Likelihood

After identifying the potential risks, the likelihood of occurrence of each risk has been assessed. An analysis of safety procedures and proposed environmental controls was considered when estimating likelihood of identified potential risks occurring. **Table 16.1** defines the likelihood ratings that have been applied.

The approach adopted has assumed a 'risk likelihood' where one or more aspects of the likelihood description are met.

Table 16.1: Classification of Likelihood (Source: DoEHLG, 2010)

Ranking	Likelihood	Description
1	Extremely Unlikely	May occur only in exceptional circumstances; once every 500 or more years.
2	Very Unlikely	Is not expected to occur; and/or no recorded incidents or anecdotal evidence; and/or very few incidents in associated organisations, facilities or communities; and / or little opportunity, reason or means to occur; may occur once every 100-500 years.
3	Unlikely	May occur at some time; and /or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisation's worldwide; some opportunity, reason or means to occur; may occur once per 10-100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years.
5	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

Classification of Consequence

The consequence rating assigned to each risk has assumed that all proposed mitigation measures and/or safety procedures have failed to prevent the major accident and/or disaster. The Mayo County Council Major Emergency Plan (2021), if implemented as intended, would work to reduce the consequence of any major accident or disaster. The

consequence of the effect if the event occurs has been assigned as described in **Table 16.2**.

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

Table 16.2: Classification of Impact (Source: DoEHLG, 2010)

Ranking	Likelihood	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 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 Normal community functioning with some inconvenience
3	Serious	Life, Health, Welfare Environment	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.

Ranking	Likelihood	Impact	Description
		Infrastructure Social	Simple contamination, widespread effects or extended duration €3-10 M 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 Community functioning poorly, minimal services available
5	Catastrophic	Life, Health, Welfare Environment Infrastructure Social	Large numbers of people impacted with significant numbers of fatalities (>50), injuries in the hundreds, more than 2000 evacuated. Very heavy contamination, widespread effects of extended duration. >€25 M Serious damage to infrastructure causing significant disruption to, or loss of, key services for prolonged period. Community unable to function without significant support.

Risk Evaluation

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

The risk matrix sourced from the DoEHLG Guide to Risk Assessment in Major Emergency Management (and as outlined in **Table 16.3**) indicates the critical nature of each risk. This risk matrix has therefore been applied to evaluate each of the risks associated with the Proposed Development. The risk matrix is colour coded to provide a broad indication of the critical nature of each risk:

- The red zone represents 'high risk scenarios'
- The amber zone represents 'medium risk scenarios'

- The green zone represents 'low risk scenarios'

Table 16.3: Classification of Impact (Source: DoEHLG, 2010)

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

16.3 PROPOSED DEVELOPMENT HAZARD ANALYSIS

The Health Service Executive (HSE) Emergency Management: Emergency Plans outline several hazard categories which may have the potential to lead to a major emergency. The hazard categories include Natural, Transportation, Technological and Civil. The hazard categories, types and subtypes, and their relevance to the Proposed Development, are listed below in **Table 16.4**.

Table 16.4 below was modelled on available Emergency Plans namely Area 2 (Galway, Mayo, and Roscommon).

Table 16.4: HSE Emergency Plan hazard types (HSE, 2024)[3]

Category	Type	Subtype	Relevance to the Proposed Development
Natural Hazards			
Meteorological	Storm / Gale Both coastal and inland areas can be	Both coastal and inland areas can be affected by high winds	Poor driving conditions Loss of infrastructure Flooding Falling Trees

[3]https://www.hse.ie/eng/services/list/3/emergencymanangement/area-mep/hse-emergency-management-area-2-emergency-plan.pdf [Accessed: 24/04/2026]

Category	Type	Subtype	Relevance to the Proposed Development
	affected by high winds		
	Heavy Snow	Blizzards	Poor Driving conditions Loss of infrastructure
	Severe Cold / Frost extremes of Temperature	Icy Roads/Impassable Roads Hypothermia Freezing of Supply Network	Poor Driving Conditions Public Health Risk Lack of Road Grit
	Thunder & Lightening		Loss of Infrastructure
	Dense/ Persistent Fog	Road Traffic collisions	Poor driving conditions
	Heat Wave /Drought		Public Health Risk Water Shortage
Hydrological	Flooding	Coastal / Inland	Potential for flooding via on-site rivers
	Heavy Rain		May lead to flooding in Low Lying areas or areas with poor drainage
Geological	Landslide		Peat Instability
	Forest / Wilderness fire - Air Pollution		Some of Proposed Development site and some of surrounding area is forested.
Transportation Hazards			
Aviation	Aircraft Collision /Loss	Mid Air and Land	Not Applicable
Rail	Mainline		Not Applicable
	Bridge		Not Applicable
Road	Multiple Road Traffic Collision		Public Roads via which construction staff and materials access the Proposed Development site.
	Hazmat		Fuel Transport to/from

Category	Type	Subtype	Relevance to the Proposed Development
			the Proposed Development site
	Bridge	Bridge collapse	Not Applicable. Refer to structural report **Chapter 17: Traffic & Transport, Appendix 17.3** Palmerstown Bridge Structural Assessment Report
Water	Inland Water ways	Pleasure Craft/Cruises Pollution from above	Not Applicable
	Coastal	Car Ferry/ passenger Ferries	Not Applicable
Technological Hazards			
Aviation	Aircraft Collision	Mid Air and Land	Potential for Collision/ Loss
Road	Multiple Road Traffic Collision	-	Public Roads via which construction staff and materials access the site.
	Hazmat	-	Fuel Transport to/from site
	Bridge	-	Narrow bridge (Palmers Bridge)
Industrial Accidents	Explosions		Damage to Infrastructure Personal Injuries/ fatalities
	Petrochemical Fires		Personal Injuries, severe burns/ fatalities Air Pollution
	Industrial Fires	LPG Tank Fire	Not Applicable
	Gas Emission		Not Applicable
	Fluid/ Fuel Emission	Pipeline leak Fire water run off	Refuelling onsite
Explosions	Domestic	Natural Gas explosion	Not Applicable
	Bomb		Not Applicable
	LPG		Not Applicable
	Pipeline		Not Applicable
Fires	Buildings	BESS	Air Pollution
Building Collapse	Buildings	Operations Buildings	Damage to Infrastructure Personal Injuries/ fatalities
Hazardous substance		Accident at site	Not Applicable
		Transportation accident	Hazmat on roads
		Weapons	Not Applicable

Category	Type	Subtype	Relevance to the Proposed Development
	Biological	Leak/Weapons	Not Applicable
	Radiological	"Dirty Bomb"	Not Applicable
		Industrial Accident	Damage to Infrastructure Personal Injuries/ fatalities
		Health facilities	Not Applicable
Pollution/ Contamination	Air/Water Pollution		Fire water run off Sediment-laden Water Run Off Fuel/hydrocarbon spill/leak
Civil Hazards			
Civil Disorder/Disturbances	Protesting		Potential for protesting
	Rioting		Potential result from protesting
Major Crowd Safety	(Movement, crushing etc.)	Pop Concerts Sports Events Fireworks displays Air shows	Not Applicable
Loss of Critical Infrastructure	Energy and Power Supply	Electricity	Connection to national grid
		Natural Gas	Not Applicable
		Fuel Oil	Not Applicable
		Communications	Telecom operators, mobile phone networks
Food Situation Crisis		Food/ Contamination/ Drought	Not Applicable
Water Supply		Shortage/ Contamination Freezing /Flooding	Not Applicable
Epidemics and pandemic		Communicable diseases	Not Applicable
Animal Disease		Foot & Mouth/Avian Influenza	Not Applicable
Terrorism	Bombs	Car-bombs	Not Applicable
		Bombs in buildings	Not Applicable
		Fire-bombing	Not Applicable
	CBRNE		Not Applicable
	Disruption	Bomb scares	Not Applicable

The risks which are most relevant to this assessment are described in the sections that follow.

16.3.1 Meteorological

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The dominant influence on Ireland's climate is the Atlantic Ocean. Consequently, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitude. The hills and mountains, many of which are near the coasts, provide shelter from strong winds and from the direct oceanic influence.

The Met Éireann weather station at Belmullet is the nearest weather and climate monitoring station to the Proposed Development that has meteorological data recorded for the 30- year period from 1992 to 2023. The monitoring station is located approximately 44 km west of the Proposed Development. Meteorological data recorded at Belmullet over the 30-year period from 1992 - 2023 is shown in **Chapter 10: Air and Climate**. The wettest months are October November and December. April is usually the driest followed by June. July and August are the warmest months with a mean daily temperature of 14.9-15.0° Celsius (C) and January is the coldest with a mean daily temperature of 6.6°C. The average annual temperature is 10.5°C.

The works programme for the construction stage of the Proposed Development will take account of weather forecasts and work will be suspended in the case of extreme weather events, as outlined in the **CEMP, Appendix 2.1, Management Plan 3 – Surface Water Management Plan**.

The following forecasting and weather warning systems are available and will be used on a daily basis at the site to direct proposed construction activities:

- General Forecasts: Available on a national, regional and county level from the Met Eireann website (www.met.ie/forecasts). These provide general information on weather patterns including rainfall, wind speed and direction but do not provide any quantitative rainfall estimates.
- Weather Warning or Advisories: Met Éireann's main suite of warnings are issued by the duty forecaster between 10 am and midday and are updated as necessary as new information becomes available. In general, warnings will not be issued more than 60-hours ahead of the expected adverse weather but advisories on potential hazards are issued up to a week in advance. The three warning categories are:
  - Yellow: Not unusual weather. Localised danger.
  - Orange: Infrequent. Dangerous/disruptive.
  - Red: Rare. Extremely Dangerous/destructive.

- MeteoAlarm: Alerts to the possible occurrence of severe weather for the next 2 days. Less useful than general forecasts as only available on a provincial scale.
- 3-hour Rainfall Maps: Forecast quantitative rainfall amounts for the next 3 hours but does not account for possible heavy localised events.
- Rainfall Radar Images: Images covering the entire country are freely available from the Met Eireann website (www.met.ie/latest/rainfall_radar.asp). The images are a composite of radar data from Shannon and Dublin airports and give a picture of current rainfall extent and intensity. Images show a quantitative measure of recent rainfall. A 3-hour record is given and is updated every 15 minutes. Radar images are not predictive.
- Consultancy Service: Met Eireann provide a 24-hour telephone consultancy service. The forecaster will provide interpretation of weather data and give the best available forecast for the area of interest.

16.3.2 Hydrological

As detailed in **Chapter 9: Hydrology and Hydrogeology,** A Flood Risk Assessment of the Wind Farm Site has been carried out by Hydro Environmental Services (HES), the findings of which are presented in full in **Appendix 9.1** and are summarised below.

To identify those areas as being at risk of flooding, the OPW's Past Flood Events Maps, the National Indicative Fluvial Mapping, CFRAM River Flood Extents, historical mapping (i.e. 6" and 25" base maps) and the GSI Groundwater Flood Maps were consulted. These flood maps are available to view at www.floodinfo.ie.

Identifiable text on local available historical 6" or 25" mapping does not identify any lands that are "liable to flood" in the immediate area of the Wind Farm Site.

The OPW Past Flood Events Maps have no records of recurring or historic flood instances within the Wind Farm Site (**Figure 9.5**). The closest mapped recurring flood event (Flood ID: 10231) to the Wind Farm Site is recorded in the Lackan Strand area, ~1 km east of turbine AT16 and the proposed onsite spoil deposition area located at the abandoned quarry. Regarding this flood event, the local area engineers report (available at www.floodinfo.ie) states that a local road here floods regularly due to high tides.

The GSI Winter 2015/2016 Surface Water Flood Map shows surface water flood extents for this winter flood event. This flood event is recognised as being the largest flood event on

record in many areas across the country. The flood map for this event does not record any flood zones along the streams and watercourses which drain the Wind Farm Site.

No CFRAM fluvial or coastal mapping has been completed for the area of the Wind Farm Site. The closest mapped CFRAM fluvial flood zones are located at Ballina and Crossmolina. The closest CFRAM coastal flood zones are mapped on the River Moy Estuary.

The National Indicative Flood Mapping (NIFM) for the Present-Day Scenario (Error! R eference source not found.) shows flooding along the Heathfield, Carn and Cloonalaghan rivers in the vicinity and downstream of the Wind Farm Site. However, these flood zones do not encroach upon the Wind Farm Site which is entirely mapped in Fluvial Flood Zone C (Low Risk).

The closest mapped NIFM fluvial flood zones are located along the Cloonalaghan River ~20-30m from the Wind Farm Site. The infrastructure proposed in this area comprises of an internal Wind Farm Site grid cable connection between wind turbines AT02, AT03 and AT04 and the proposed onsite substation. The proposed internal grid cable connection crossing is located upstream of the NIFM modelled fluvial flood zones. Nevertheless, the works proposed comprise solely of temporary excavations and horizontal directional drilling under the Cloonalaghan River and there will be no displacement of waters or increase in downstream flood risk.

The Mid-Range and High-End scenarios model potential flood zones associated with climate change and an increase in rainfall of 20% and 30% respectively. These modelled flood zones do not differ significantly from the Present-Day Scenario discussed above.

Furthermore, the Wind Farm Site is not mapped within any historic or modelled groundwater flood zones.

Pluvial flooding may pose a risk in some flat areas of the Wind Farm Site which are overlain by poorly permeable soil and peat. Many of these areas are forested and drainage is facilitated by a series of forestry drains. In addition, much of the Wind Farm Site is located on sloping ground and water is likely to runoff and enter nearby watercourses. However, following periods of intense or prolonged rainfall, local surface water ponding may occur. Despite this the overall risk of pluvial flooding is considered to be low.

In general, the risk of flooding at the Wind Farm Site is low due to the elevated and sloping nature of the land and the high density of streams and drainage features.

16.3.3 Peat Stability

A comprehensive and robust Peat Stability Hazard and Landslide Risk Assessment (PLHRA) was undertaken for the Proposed Development by Whiteford Geoservices Ltd. The findings of which are presented in full in **Appendix 8.1** and are summarised below.

The Peat Stability and Landslide Risk Assessment was used to inform the design process including the siting of all proposed main infrastructure locations and drainage control measures. The Peat Stability Assessment was informed by the Scottish Government's 2017 guidance document, Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Generation Developments. Intrusive ground investigation works were carried out as part of the Peat Stability Assessment included peat depth probing, shear strength testing, ground auguring/coring and trial pitting. The extensive suite of ground investigations and the robust peat stability assessment ensure that the risk of such an event occurring during the construction, operation or decommissioning at the Proposed Development is minimised.

Peat covering the Redline Boundary area of the main site lies in the range of 0.00 – 0.50 m in thickness. Peat thickness of 0.50 m or less are considered negligible and further stability assessment is not required. Only 13.9 % of the Wind Farm Site recorded peat thickness in excess of 0.50 m. The median peat depth recorded was 0.33 m, with a mean depth over the main site of 0.36 m. The Wind Farm Site layout has been designed in so far as possible to avoid areas of moderately deep peat. The GSI maintains a Landslide Susceptibility Map for Ireland. These records indicate no significant historic soils and rock movement within the Proposed Development boundary, although such events are recorded within the region. GSI landslide susceptibility mapping also shows that the site has a predominately low to moderately low landslide susceptibility, although small discrete areas of high susceptibility are also present within the Redline Boundary. The closest recorded landslide events are approximately 6.3 km north-west and 6.0 km southwest of the Redline Boundary.

Peat landslide risk analysis has indicated a Negligible Hazard of instability in relation to the proposed turbine locations, associated infrastructure and proposed Site Access Tracks, should all mitigation measures and recommendations be adhered to, and as such the Project should have no adverse effect on the soils, geology or surface water aspects in the vicinity of the proposed Tirawley Wind Farm development. Providing the mitigation

measures outlined in this report are fully implemented and best practice is followed onsite, it is expected that effects associated with the development of the Wind Farm Site will not be significant. It is recommended that suitable monitoring programmes are implemented in order to ensure that there is rigid adherence both to the CEMP and to the mitigation measures outlined here during construction, operation and decommissioning of the Wind Farm.

Please see **Chapter 8: Soils and Geology** and **Appendix 8.1** for more details.

16.3.4 Traffic

The Proposed Development will utilise the existing road network during the construction phase, with some upgrading required of nodes on the Turbine Delivery Route (TDR). An additional c. 1.5 m width will be added to the existing c. 3 m road network within the Wind Farm Site and the one number private road on the TDR where necessary. Construction related traffic will originate from the delivery of materials to the site, removal of surplus excavated material from site and transport of employees to, from and throughout the site. The localised traffic disruptions will be mitigated through the use of industry standard traffic management measures. Please see **Chapter 17: Traffic and Transport** and **Appendix 2.1** for details.

A Traffic Management Plan (**Appendix 2.1**) is provided specifying details relating to traffic management. Prior to the commencement of the construction phase of the Proposed Development, a detailed Traffic Management Plan will be prepared by the Contractor for agreement with the relevant local authorities and An Garda Síochána. The Traffic Management Plan includes recommendations for the following:

- Traffic Management Co-ordinator
- Delivery Programme
- Information to locals
- Pre and Post-Construction Condition Survey
- Liaison with Local Authorities
- Temporary Alterations
- Travel plan for construction workers
- Temporary traffic signs
- Traffic Management Operatives (TMOs) will be present at all site access points during peak delivery times.
- Delivery times of large turbine components.

- All vehicles using or while operating within the Wind Farm Site shall either have roof mounted flashing beacons or will use their hazard lights.

Please see **Chapter 17: Traffic and Transportation** and **Traffic Management Plan** (**Appendix 2.1**) for further details.

16.3.5 Industrial Accident

The Proposed Development is not connected to or in the vicinity of any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations (SEVESO sites), therefore no significant effects associated with major industrial accidents involving dangerous substances are anticipated. Gas explosions, petrochemical fires and fires from fuel emissions, leakages and spillages could occur causing personal injury, structural damage and forest fires.

The Proposed Development includes a 110 kV Gas Insulated Switchgear (GIS) onsite substation. In accordance with EU Regulation 2024/573 and EirGrid Functional Specifications, the insulating medium for 110 kV switchgear shall be SF_6 free unless a specific derogation is approved. Where SF_6 or alternative fluorinated gases (F-gases) are utilised, the equipment is designed to be hermetically sealed with a tested leakage rate of less than 0.1% and a maximum annual leakage rate not exceeding 0.1% per annum per compartment. All equipment will be clearly labelled with the specific gas type and quantity (kg). While SF_6 is non-toxic, it is an asphyxiant and heavier than air, which could present a safety hazard in cable basements or low-lying areas if oxygen is displaced. To mitigate this vulnerability, mandatory mechanical ventilation systems are required for installations with cable basements, alongside the use of personal oxygen monitoring devices and specialised PPE—including Powered Air Purifying Respirator (PAPR) units and chemical suits—to handle potential arcing by-products in the event of a fault. Due to these strict containment, monitoring, and recovery protocols required by EirGrid and EU law, the risk of a major accident resulting from gas emissions at the substation is classified as a low-risk scenario.

The Battery Energy Storage System (BESS) compound is located immediately to the east of the substation and includes 20 no. container units with up to 150 MW storage capacity. Battery storage sites are a potential source of fire and explosion risk during the operational phase of their lifetime.

Prior to construction of the Proposed development, a Fire Service review will be conducted. Compliance with the fire safety certificate requirements and any conditions set out therein,

will be adhered to. Conditions will take into account the number of residences in the vicinity of the Site and the intervening distance. A Fire Safety Assessment and Advise Report was completed for the Proposed Development. Please see **Appendix 16.1: Fire Safety Assessment and Advise Report.** An Emergency Response Plan has also been drafted and BESS included. Please see **Appendix 2.1. Management Plan 1 Emergency Response Procedure.**

16.3.6 Loss of Critical Infrastructure

EirGrid operates and develops Ireland's electricity grid. This includes interconnecting to neighbouring grids and running the wholesale electricity market. The grid safely brings power from generators such as wind farms to the ESB network that supplies homes and business in Ireland. It also brings power directly to large energy users. There are two types of electricity generation: synchronous generation and non-synchronous generation. Synchronous generation produces the same amount of electricity all the time e.g., fossil fuels. Non-synchronous generation produces varying amounts of electricity depending on the energy available. EirGrid operate the grid from National Control Centres in Dublin and Belfast, matching electricity production to customer demand, switching from synchronous to non- synchronous where required to ensure no power outages. Therefore, any technical fault at the Proposed Development would not affect the local or national energy supply.

The Proposed Development is anticipated to connect to the existing Tawnaghmore 110 kV Substation.

There are no gas mains located within the Proposed Developments Redline Boundary. There is therefore no potential for effect on the national gas network. Gas Networks Ireland website Dial Before you Dig[4] was consulted, illustrating there are no existing services along the Grid Connection Route. Figures were generated using Dial Before You Dig at the Tawnaghmore Substation (**Figure 13.1**), Palmerstown Bridge (**Figure 13.2**) and Site Entrances to the Wind Farm Site (**Figure 13.3 – Figure 13.8**). Areas along the Construction Haul Route where gas infrastructure is present does not require any works and will remain undisturbed. **Figure 16.1** depicts Gas Networks Irelands[5] existing services in the wider area. The Proposed Development is located approximately 8.9 km from the closet GNI pipeline.

[4] https://www.gasnetworks.ie/home/safety/dial-before-you-dig/dbyd/ [Accessed 24/04/2026]
[5] https://www.gasnetworks.ie/corporate/company/our-network/pipeline-map/ [Accessed 24/04/2026]

16.3.7 Contamination

The Proposed Development has the potential to cause contamination and pollution of groundwater and surface water from potential release of hydrocarbons, earthworks and excavations onsite. A CEMP (**Appendix 2.1**) has been prepared in conjunction with the EIAR and the Natura Impact Statement which accompanies the planning application for the Proposed Development.

Section 3 of the CEMP sets out details of the environmental controls to be implemented onsite. The CEMP provided details onsite drainage measures, peat stability monitoring measures, waste management and pollution prevention measures for refuelling and managing hazardous materials and cement-based products. The CEMP also sets out the Emergency Response Procedure (ERP) (**Management Plan 1**) to be adopted in the event of an emergency including contamination, health and safety and environmental protection. The CEMP provides details on all mitigation and monitoring measures to be actioned prior to construction, during the construction, operation and decommissioning phase. The CEMP will be subject to ongoing review through regular environmental auditing and site inspections during the construction phase. This will confirm the efficacy and implementation of all mitigation measures and commitments identified in the application documentation. Please see **Chapter 2: Development Description** and **Appendix 2.1 Construction Environmental Management Plan (CEMP)** for further details.

16.3.8 Health and Safety

During construction of the Proposed Development, all staff will be made aware of and adhere to the Health & Safety Authority's 'Guidelines on the Procurement, Design and Management Requirements of the Safety, Health and Welfare at Work (Construction) Regulations 2013'. This will encompass the use of all necessary Personal Protective Equipment and adherence to the site Health and Safety Plan. An ERP (**Management Plan 1**, **Appendix 2.1**) will be implemented and adhered to on site. The ERP provides details of procedures to be adopted in the event of an emergency in terms of site health and safety and environmental protection.

16.3.9 Turbine Safety

Turbines pose no threat to the health and safety of the general public. The Department of the Environment, Heritage and Local Government (DoEHLG)'s 'Wind Energy Development Guidelines for Planning Authorities 2006' state that there are no specific safety considerations in relation to the operation of wind turbines. Fencing or other restrictions are

not necessary for safety considerations. People or animals can safely walk up to the base of the turbines.

The guidelines acknowledge a very remote possibility of injury from flying ice fragments or damaged blade material but note that modern blades are composite structures without bolts or separate components, which minimizes this danger. Ice buildup on turbines is unlikely to cause problems, as turbines are equipped with anti-vibration sensors that detect imbalances caused by icing and prevent operation until de-iced. Turbine blades are made of non-conducting materials (fibre-reinforced polymer or unsaturated polyester) to prevent lightning strikes, and lightning protection conduits are integrated into their construction, with conduction cables earthed near the turbine base.

Turbine blades are manufactured of glass reinforced plastic which will prevent any likelihood of an increase in lightning strikes within the Wind Farm Site or the local area. Lightning protection conduits will be integral to the construction of the turbines. Lightning conduction cables, encased in protection conduits, will follow the electrical cable run, from the nacelle to the base of the turbine. The conduction cables will be earthed adjacent to the turbine base. The earthing system will be installed during the construction of the turbine foundations. In very high wind speeds (typically Beaufort Storm Force 10 or greater), turbines will shut down to prevent excessive wear and tear or damage to components.

Further details on turbine safety are presented in the **Chapter 5: Population and Human Health, Section 5.3.6.9.**

16.3.10 Electromagnetic Interference

The provision of underground electric cables of the capacity proposed is common practice throughout the country and installation to the required specification does not give rise to any specific health concerns.

The extremely low frequency (ELF) electric and magnetic fields (EMF) associated with the operation of the proposed cables fully comply with the international guidelines for ELF-EMF set by the International Commission on Non-Ionizing Radiation Protection (ICNIRP), a formal advisory agency to the World Health Organisation, as well as the EU guidelines for human exposure to EMF. Accordingly, there will be no operational effect on properties (residential or other uses), construction staff, operational & maintenance staff or recreational users of the site as the ICNIRP guidelines will not be exceeded at any distances even directly above the cables.

The ESB document 'EMF & You' (ESB, 2017)[6] provides further practical information on EMF.

Further details on the potential effects of electromagnetic interference are presented in the **Chapter 5: Population and Human Health, Section 5.3.6.3.**

16.4 RISK ASSESSMENT

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

These risks have been assessed in accordance with the relevant classification as outlined in **Table 16.1** and **Table 16.2**.

The consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

16.4.1 Likely Significant Effects

16.4.1.1 *Do-Nothing Scenario*

If the Proposed Development is not constructed (the "Do-Nothing" alternative), the opportunity to generate and supply renewable energy to the national grid would be lost. The existing land use, primarily commercial forestry and agriculture, or alternative farming and forestry practices, would continue to define the baseline environment.

16.4.1.2 Assessment of Effects During Construction

Six risks specific to the construction of the Proposed Development have been identified and are presented in **Table 16.5**.

[6] EMF & You: Information about Electric & Magnetic Fields and the electricity network in Ireland Available at: https://esb.ie/docs/default-source/default-document-library/emf-public-information_booklet_v9.pdf?sfvrsn=0. [Accessed: 24/04/2026]

Table 16.5: Risk Register - Construction Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
A	**Severe Weather** Risk to construction activity within the Redline Boundary	Extreme weather- periods of heavy rainfall, considering climate change and strong winds
B	**Flooding** High levels of surface water within the Redline Boundary	Extreme weather- periods of heavy rainfall, considering climate change and strong winds
C	**Peat Stability** Movement of peat within the Wind Farm Site during construction	Mismanagement of excavated material on site Severe weather conditions- storm, flooding
Potential to cause accidents and / or disasters		
D	**Traffic Incident** Collisions onsite and offsite with vehicles involved in all construction aspects of the Proposed Development	Driver negligence or failure of vehicular operations public roads or Site Access Tracks Traffic Management Plan not implemented
E	**Contamination** Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater during all construction activity with the Redline Boundary	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles. Drainage and seepage water resulting from infrastructure excavation; Stockpiled excavated material providing a point source of exposed sediment; Construction of the cable trench resulting in entrainment of sediment from the excavations during construction; and, Erosion of sediment from emplaced site drainage channels.
F	Industrial Accident- Fire, gas explosion during all construction activity with the Redline Boundary	Equipment or infrastructure failure (onsite 110 kV GIS Station) Substation; Electrical problems; and Employee negligence.

16.4.1.3 Assessment of Effect During Operation

Six risks specific to the operation of the Proposed Development have been identified and are presented in **Table 16.6**.

Table 16.6: Risk Register – Operational Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
G	**Contamination** Discharge or spillage of fuel, chemical solvents, sewage or wastewater into watercourse or percolated to groundwater	An accident on public roads or Site Access Tracks involving site service vehicles carrying fuel, chemicals, wastewater or sewage transportation in the operational phase.
Potential to cause accidents and / or disasters		
H	**Industrial Accident – Fire / Gas Explosion**	Equipment or infrastructure failure; Electrical problems; and Employee negligence.
I	**Collapse/ damage to structures**	Earthquakes; and Vehicular collisions due to driver negligence on public roads.
J	**Traffic Incident** Collisions onsite and offsite with vehicles involved in operation of Proposed Development	Driver negligence or failure of vehicular operations on public roads and Site Access Tracks. Traffic Management not implemented
K	**Industrial Accident Fire/ Gas explosion**	Petrochemical Fires causing personal injury, structural damage and forest fires.
L	**Loss of Critical Infrastructure**	Electrical fault at substation

16.4.1.4 Assessment of Effect During Decommissioning

Six risks specific to the decommissioning of the Proposed Development have been identified and are presented in **Table 16.7**.

Table 16.7: Risk Register – Decommissioning Phase

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

These risks have been assessed in accordance with the relevant classification (Refer to **Table 16.1** and **Table 16.2**) and the resulting risk analysis is given in **Table 16.8**.

The risk register is based upon possible risks associated the Proposed Development. As outlined in **Section 16.3**, the consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

16.4.1.5 Assessment of Effect – Summary

Table 16.8: Risk Assessment

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
Construction Phase								
A	Severe Weather	Extreme weather- periods of heavy rainfall, considering climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse Damage to, or depletion of aquatic habitats and species;	3	The risk of severe weather is unlikely when considering the assessment in **Chapter 10: Air and Climate** and weather conditions recorded over the last 30 years within the area.	1	The risk of severe weather conditions during the construction phase will result in a minor consequence in that a small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. No contamination, localised effects.	3
B	Flooding	Extreme weather- periods	Illness or loss of life;	2	The risk of flooding is considered very unlikely when	1	The risk of flooding during the construction	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		of heavy rainfall, considering climate change and strong winds	Sedimentation of nearby watercourse; Damage to, or depletion of aquatic habitats and species;		taking into account the baseline assessment in **Chapter 9: Hydrology and Hydrogeology.** The NIFM for the Present Day Scenario shows flooding along the Heathfield, Carn and Cloonalaghan Rivers. The vast majority of the Wind Farm Site is mapped Fluvial Flood Zone C (Low Risk). The closest mapped NIFM fluvial flood zones are located along the Carn River, approximately 20-30 meters from the Wind Farm Site. The infrastructure proposed in this area consists of an internal Wind Farm Site grid cable		phase will result in a minor consequence in that a 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment' No contamination of environment (e.g., watercourses), localised effects.	

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					connection between wind turbine AT04 and the proposed onsite substation. This proposed internal grid cable connection crossing is located upstream of the NIFM modeled fluvial flood zones. The works proposed within this flood zone primarily involve temporary excavations and horizontal directional drilling under the Carn River, and as such, there will be no displacement of waters or increase in downstream flood risk. The Wind Farm Site is not mapped within any historic or modeled groundwater flood zones. In general, the risk of			

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					flooding at the Wind Farm Site is low due to the elevated and sloping nature of the land and the high density of streams and drainage features			
C	Peat Stability	Mismanagement of excavated material onsite Extreme weather conditions	Movement of peat within the Proposed Development; Sedimentation of nearby watercourse; Damage to, or depletion of aquatic habitats and species;	2	The Proposed Development has been designed to minimise the potential for peat instability and failure. Refer to Appendix **8.1: Peat Stability and Landslide Risk Assessment**	2	The risk of peat instability during the construction phase will result in a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration'. Contamination of environment (e.g., watercourses), localised effects of short duration.	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
D	Traffic Incident	Driver negligence or failure of vehicular operations on Site Access Tracks. Traffic Management not implemented or not adhered	Injury or loss of life.	3	A limited number of vehicles will be permitted on the site as part of the construction phase. As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur onsite, 'at some time.' An unlikely risk is therefore predicted.	1	A minor consequence is predicted. Having regard to onsite speed limits and vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.'	3
E	Contamination	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles.	Damage to, or depletion of aquatic habitats and species Release of suspended solids to surface watercourses and could result	2	As outlined in **Chapter 2: Development Description** and the **Appendix 2.1 CEMP**, where fuel must be stored onsite but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents	2	The risk of a fuel spillage or effect on surround drainage during the construction phase will result in a limited consequence in that there would be 'a limited number of people affected' with 'localised	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Drainage and seepage water resulting from infrastructure excavation; Stockpiled excavated material providing a point source of exposed sediment; Construction of the Proposed Development resulting in entrainment of sediment from the excavations during	in an increase in the suspended sediment load, resulting in increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies		will be stored outside of the confines of the site. Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures as detailed in **Chapter 9: Hydrology and Hydrogeology.**		effects of short duration' through the use of bunded containment areas and proposed drainage mitigation measures during construction. Contamination of environment (e.g., watercourses), localised effects of short duration.	

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		construction; and, Erosion of sediment from emplaced site drainage channels						
F	Industrial Accident - Fire/Gas explosion	Equipment or infrastructure failure; Fuel spillage/storage Electrical problems; and Employee negligence	Illness or loss of life; Damage to, or depletion of habitats and species; and Effects on ambient air quality.	2	As outlined in **Chapter 2: Development Description** and **Appendix 2.1: CEMP**, fuel will not be stored onsite post construction, therefore fuel is not considered to be a significant fire risk. There are no Gas Networks within the vicinity of the Proposed Development. Therefore, there is low risk of explosion. In accordance with Chapter 19 of the Safety, Health and	2	Should a fire/explosion occur at the site, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' due to the nature of the Proposed Development and the lack of infrastructure or fuel storage during operation that would result in any such incident. There will	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					Welfare at Work Act 2005 (the 2005 Act), the development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire onsite e.g., wind turbines, substation, vandalism.		be 'normal community functioning' in the area with 'some inconvenience'. Simple contamination of environment (e.g., watercourses), localised effects of short duration.	
Operational Phase								
G	Contamination	A vehicular incident, refuelling incident, wastewater or sewage transportation in the operational phase	Damage to, or depletion of aquatic habitats and species. Release of suspended solids to surface watercourses could result in an increase in	2	As outlined in **Chapter 2: Development Description** and **Appendix 2.1: CEMP**, fuel will be stored onsite but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the site	2	The risk of a fuel spillage or effect on surrounding drainage during the operational stage will result in a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' through the use of	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
			the suspended sediment load. Increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies		Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage measures as detailed in **Chapter 9: Hydrology and Hydrogeology**.		bunded containment areas during operation. Simple contamination of environment (e.g., watercourses), localised effects of short duration.	
H	Industrial Accident - Fire/Gas explosion	Equipment or infrastructure failure; Fuel spillage/storage Electrical problems; and Employee negligence	Illness or loss of life; Damage to, or depletion of habitats and species; and Effects on ambient air quality.	2	As outlined in **Chapter 2: Development Description**, fuel will not be stored onsite post construction therefore fuel is not considered to be a significant fire risk. Gas will not be used onsite; therefore, it is not considered a fire/explosion risk. Gas used in the GIS Substation is Sulfur	2	Should a fire/explosion occur at the site, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' due to the nature of the Proposed Development and the lack of infrastructure or fuel storage during operation	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					Hexafluoride, in its pure form it is not explosive. In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire onsite e.g. wind turbines, substation, vandalism		that would result in any such incident. There will be 'normal community functioning' in the area with 'some inconvenience' Simple contamination of environment (e.g., watercourses), localised effects of short duration.	
I	Collapse/ damage to structures	Landslide/ Earthquake; and Extreme weather conditions such as flooding and storms.	Injury or loss of life. Movement of peat within the site; Sedimentation of nearby watercourse;	2	According to the Irish National Seismic Network, earthquakes measuring ~2 on the Richter Scale are "normal" in terms of seismicity in Ireland. These are known as microearthquakes; they are not commonly felt by people and are generally recorded	1	The risk of infrastructure collapse or damage to structures during the construction phase will result in a minor consequence in that a 'small number of people would be affected, with 'no fatalities and a small	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Vehicular collisions due to driver negligence Mismanagement of excavated material onsite	Damage to, or depletion of aquatic habitats and species;		only on local seismographs. As such, buildings in Ireland are extremely unlikely to be damaged or collapse due to seismic activity. Having regard to public speed limits within the site, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse. The Proposed Development has been designed to take into account any issues on peat or spoil stability		number of minor injuries with first aid treatment' No contamination of environment (e.g., watercourses), localised effects.	
J	Traffic Incident	Driver negligence or failure of vehicular operations on	Injury or loss of life.	3	A limited number of vehicles will be permitted on the site as part of the operation phase As such, it can be determined that there is some	1	A minor consequence is predicted. Having regard to onsite speed limits and vehicular movements, a 'small	3

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Site Access Tracks. Traffic Management not implemented			'opportunity, reason or means' for a vehicle collision to occur onsite, 'at some time.'		number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.'	
K	Loss of Critical Infrastructure	Equipment or infrastructure failure; Electrical problems; and Employee negligence Landslide/ Earthquake; and extreme weather conditions such	Injury or loss of life	1	EirGrid operate the grid from National Control Centres matching electricity production to customer demand, switching from synchronous to non- synchronous where required to ensure no power outages. The Proposed Development will be connected to a single bay at Tawnaghmore 110 kV substation and any shortages or failures will not effect other	2	Should a power failure occur at the Tawnaghmore 110 kV substation, it will result in a limited number of people affected- localised effects of short duration	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		as flooding and storms.			connections to the same substation			
Decommissioning Phase								
L	Severe Weather	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse Damage to, or depletion of aquatic habitats and species.	2	The risk of severe weather is unlikely when considering the assessment in **Chapter 10: Air and Climate** and weather conditions recorded over the last 30 years within the area.	1	The risk of severe weather conditions during the decommissioning phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. No contamination of environment (e.g., watercourses), localised effects.	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
M	Flooding	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life; Sedimentation of nearby watercourse Damage to, or depletion of aquatic habitats and species;	2	The risk of flooding is considered very unlikely when taking into account the baseline assessment in **Chapter 9: Hydrology and Hydrogeology** and due to no recurring or historic flood incidents recorded within the Wind Farm Site or along the Grid Connection route.	1	The risk of flooding during the decommissioning phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. No contamination of environment (e.g., watercourses), localised effects.	2
N	Traffic Incident	Driver negligence or failure of vehicular operations on	Injury or loss of life.	3	A limited number of vehicles will be permitted on the site as part of the decommissioning phase	1	A minor consequence is predicted. Having regard to onsite speed limits and vehicular movements, a 'small	3

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Site Access Roads. Traffic Management not implemented			As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur onsite, 'at some time.' An unlikely risk is therefore predicted.		number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.'	
O	Contamination	Fuel spillage during delivery to site. Failure of fuel storage tank or tanks in plant and machinery and vehicles. Drainage and seepage water resulting from infrastructure removal.	Damage to, or depletion of aquatic habitats and species Release of suspended solids to surface watercourses and could result in an increase in the suspended sediment load, resulting in increased	2	As outlined in **Chapter 2: Development Description** and **Appendix 2.1 CEMP,** fuel will be stored onsite but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the site. Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed	2	The risk of a fuel spillage or effect on surrounding drainage during the operational phase will result in a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' through the use of bunded containment areas during operation.	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Erosion of sediment from site drainage channels.	turbidity which in turn could affect the water quality and fish stocks of downstream water bodies.		drainage measures as detailed in **Chapter 9: Hydrology and Hydrogeology.**		Simple contamination of environment (e.g., watercourses), localised effects of short duration.	
P	Industrial Accident-Fire/gas explosion	Equipment or infrastructure failure; Fuel spillage/storage Electrical problems; and Employee negligence	Injury or loss of life Structural damage Forest fires Air Pollution Damage to, or depletion of habitats and species Contamination	2	As outlined in **Chapter 2: Development Description** and **Appendix 2.1 CEMP**, fuel will not be stored onsite post construction therefore fuel is not considered to be a significant fire risk. In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire onsite.	2	Should a fire/explosion occur at the site, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' due to the nature of the Proposed Development and the lack of infrastructure or fuel storage during operation that would result in any such incident. There will be 'normal community	4

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

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					connections to the same substation			

The risk assessment for each of the potential risks identified are consolidated in **Table 16.9** which provides their 'risk score.' A corresponding risk matrix is provided in **Table 16.10**, which is colour coded to provide an indication of the critical nature of each risk. As outlined in **Table 16.3**, the red zone represents 'high risk' scenarios', the amber zone represents 'medium risk scenarios and the green zone represents 'low risk scenarios.

Table 16.9: Risk Scores

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

Table 16.10: Risk Matrix

		Consequence Rating				
		1.Minor	*2.Limited*	*3. Serious*	*4.Very Serious*	*5.Catastrophic*
Likelihood Rating	5.Very Likely					
	4. Likely					
	3. Unlikely	A D J N				
	2. Very Unlikely	B I L M	C E F G H O P			
	1.Extremely Unlikely		K Q			

Table 16.10, presents the potential risks identified during the construction, operation and decommissioning of the Proposed Development all or which can be classified as 'low risk scenarios.'

The scenario with the highest risk score in terms of a major accident and/or natural disaster during the construction, operation and decommissioning phase of the Proposed Development is identified below:

Peat Stability During Construction

There is a potential risk of peat instability during the construction of the Proposed Development. The risk of peat instability was given a risk score of 4. The risk of peat instability has been minimised through the careful design of the Proposed Development and will be further limited through the implementation of the best practice construction control measures outlined in **Chapter 8: Soils and Geology** and **Appendix 8.1**.

The Peat landslide risk analysis has indicated a NEGLIGIBLE HAZARD of instability in relation to the proposed turbine locations and proposed access tracks, should all mitigation measures and recommendations be adhered to, and as such the project should have no adverse effect on the soils, geology or surface water aspects in the vicinity of the proposed Tirawley Wind Farm development.

Contamination During Construction, Operation and Decommissioning

There is a potential risk of contamination from site activities during the construction, operational and decommissioning phases from potential release of hydrocarbons. The risk of contamination was given a risk score of 4. However, as outlined in **Chapter 2:**

Development Description and **Chapter 9: Hydrology and Hydrogeology**, measures are proposed and will be put in place to reduce the risk of accidental spillage, contamination and pollution to groundwater, surface water and associated ecosystems, and to terrestrial ecology.

The risk of contamination is 'very unlikely' to occur and will have 'limited' consequences should it do so, representing a 'low-risk scenario' during the construction, operation and decommissioning phases.

Industrial Accident - Fire/Gas Explosion During Construction, Operation and Decommissioning

There is a potential risk of fire/explosion at the Proposed Development. However, as outlined in **Section 16.2.1**, the scope of this assessment has been based on the understanding that the Proposed Development will be designed, built and operated in line with current best practice. Further, in accordance with Chapter 19 of the Safety, Health and Welfare at Work Acts 2005 to 2014, the Proposed Development shall be subject to a fire safety risk assessment which will assist in the identification of any major risks of fire onsite e.g., wind turbines, substation, vandalism.

Therefore, the risk of fire/explosion occurring at the Proposed Development resulting in a major accident and/or disaster was given a risk score of 4. This indicates a scenario that is 'very unlikely' to occur and having 'limited' consequences should it do so, representing a 'low-risk scenario' during the operational phase.

16.4.2 Mitigation Measures

As outlined in **Section 16.4.1**, the scenario with the highest risk score in terms of the occurrence of major accident and/or disaster was identified as 'Contamination' of the Proposed Development, risk of 'Industrial Accident - Fire/Gas Explosion' during the construction, operation and decommissioning phases and Peat Stability during construction.

The Proposed Development has been designed in accordance with the best practice measures described in detail in this EIAR and, as such, mitigation against the risk of major accidents and/or disasters is embedded through the design.

In the unlikely event of a fire at a turbine, operations building, at the substation or BESS, all personnel onsite will meet at a designated fire point and emergency services will be contacted. Mayo County Council is the fire authority providing a fire and emergency rescue

service to the functional area of Mayo County Council. For operations of an emergency nature under Section 26 of the Fire Services Act 1981, refer to Mayo County Major Emergency Plan[7].

As discussed, the application for the Proposed Development is accompanied by a CEMP (**Appendix 2.1**) which sets out details of the environmental controls to be implemented onsite. The CEMP sets out the ERP (**Appendix 2.1, Management Plan 1**) to be adopted in the event of an emergency including contamination, health and safety and environmental protection. The CEMP sets out the Peat and Soil Management Plan (**Appendix 2.1 Management Plan 4**) which provides an assessment of the issue of handling surplus excavated material at the site of the proposed Tirawley Wind Farm. The CEMP provides details on all mitigation and monitoring measures to be actioned prior to construction, during the construction, operation and decommissioning phase. The CEMP will be subject to ongoing review through regular environmental auditing and site inspections. This will confirm the efficacy and implementation of all mitigation measures and commitments identified in the application documentation.

The CEMP (**Appendix 2.1**) includes an EMP (**Management Plan 1**). It provides details of procedures to be adopted in the event of an emergency relating to health & safety or environmental protection. The EMP includes details on the response required and the responsibilities of all personnel in the event of an emergency.

16.4.3 Residual Effects

The risk of a major accident and/or disaster during the construction of the Proposed Development is considered 'low' in accordance with the 'Guide to Risk Assessment in Major Emergency Management' (DoEHLG, 2010).

It is considered that when the mitigation and monitoring measures outlined in the CEMP (**Appendix 2.1**) are implemented and adhered to there will not be significant residual effect(s) associated with the construction, operation and decommissioning of the Proposed Development.

[7] Mayo County Council (2021), Major Emergency Plan, https://www.mayo.ie/getmedia/7ebcdbb3-45ab-4dfe-8043-b24fd2c18d6c/Major-Emergency-Plan-2021.pdf [Accessed: 24/04/2026]

16.4.4 Assessment of Cumulative Effects

16.4.4.1 Cumulative Effect Assessment

A search in relation to projects that may have the potential to result in a cumulative effect with the Proposed Development on the environment was carried out as part of the EIAR (**Appendix 1.2** and **1.5**). The Proposed Development has been considered, cumulatively with these projects.

Following a detailed assessment of the potential for any further effect when considered cumulatively with any or all of the projects, the Proposed Development, with mitigation measures in place, was found to have no potential for significant cumulative increase in the effect of the Proposed Development to major accidents and/or natural disasters.