19 MAJOR ACCIDENTS AND NATURAL DISASTERS

19.1 INTRODUCTION

This section of the Environmental Impact Assessment Report (EIAR) describes the likely significant effects on the environment arising from the vulnerability of the proposed Kellystown Wind Farm (the "Project") as detailed in **Chapter 2: Description of the Proposed Development** 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 Assessment Reports' (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 Project to major accidents and natural disasters is carried out in compliance with the EIA Directive and Planning and Development Regulations 2001 (as amended) 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 Project 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 26/09/2024]

19.1.1 Statement of Authority

This section has been prepared by Environmental Scientists of Jennings O'Donovan & Partners Ltd; Mr. Padraig O'Dowd (M.Sc. Design Innovation (Design & Anthropology and Grad Dip. Design Thinking for Sustainability from University College Dublin), Mr. Ryan Mitchell (Bachelors' Degree in Animal Conservation and Biodiversity obtained from Greenwich University), Ms. Sarah Moore (MSc in Environmental Engineering from Queens University, Belfast, and a BSc in Environmental Science from University of Limerick) and Ms. Aisling Layden (PhD research in Global Lake Climatology and MSc in Environmental Sustainability from The University of Edinburgh). Technical input has been provided by Chetana Ramanna (Seismic engineer with WSP Ireland Consulting Limited; PhD in Probabilistic Seismic Hazard Analysis and Master's degree in Civil Engineering) and Peter Corrigan (Geotechnical Engineer). This report has been reviewed by Mr. David Kiely, Director of Jennings O'Donovan & Partners Ltd. Further details and biographies/CVs of the authors and reviewer of this chapter have been included in **Appendix 1.1**: Author Qualifications.

19.2 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) 2021-2031, published by the Eastern and Midlands Regional Assembly, https://www.emra.ie/rses/
- Louth County Development Plan 2021 – 2027, https://www.localenterprise.ie/Louth/Publications-Resources/County-Louth-Development-Plan/
- Met Éireann, Meteorological Climate data www.met.ie/climate/available-data/historical-data
- Louth County Council Website https://www.louthcoco.ie/
- Health Service Executive (HSE), SEVESO Sites https://www.hse.ie/eng/services/list/3/emergencymanangement/seveso/
- HSE, Major Emergency Plans https://www.hse.ie/eng/services/list/3/emergencymanangement/area-mep/
- Fáilte Ireland, https://www.failteireland.ie/
- Gas Network Ireland, Dial before you Dig, https://www.gasnetworks.ie/home/safety/dial-before-you-dig/
- 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 Scenario 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/
- 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 impacts on the environment. These include accidents during construction and operation caused by operational failure and/or natural hazards. The assessment of the risk of major accidents and/or disaster considers all factors defined in the EIA Directive that have been considered in this EIAR, i.e., population and human health, biodiversity, land, soil (peat stability), water, air and climate and material assets, cultural heritage and the landscape.

This chapter is an EIA of the Proposed Development on the above listed major accident factors. A full description of the Proposed Development is outlined in **Chapter 2: Description of the Proposed Development**, **Section 2.3** and includes one TDR (the Proposed TDR) and one GCR (the proposed GCR). Other viable GCR/TDRs have also been assessed as part of the EIAR. These routes; GCR option 2 and TDR option 2 and TDR option 3 do not form part of the planning application, yet these route options are fully assessed as documented in **Appendix 3.1**.

19.2.1 Legislative Context

19.2.1.1 Legislation

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

- The vulnerability of the proposed project to potential accidents and disasters.
- The proposed project's 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".

19.2.1.2 Guidance Documents

The following guidance documents have been complied 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
- Gas Networks Ireland Code of Practice for Working in the Vicinity of the Transmission Network, Procedure No: AO/PR/127 (Rev 3, date: May 2021)
- Gas Networks Ireland Guidelines (Safety advice for working in the vicinity of natural gas pipelines Guideline No: HSQE/GU/016 (Rev 2, date: November 2020)

19.2.2 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 impact of a major accident or natural disaster. Local and regional context has been established prior to undertaking the risk assessment to develop an understanding of the vulnerability and resilience of the area to emergency situations. The study area is presented in the context of the extent of the surrounding risk /hazard e.g, flood zones, SEVESO sites, landslides etc.

The baseline risks in the absence of the Proposed Development, were assessed by means of a desk-study, drawing on the following data:

- Meteorological Climate data www.met.ie/climate/available-data/historical-data

- HSE, SEVESO Sites https://www.hse.ie/eng/services/list/3/emergencymanangement/seveso/
- GNI, https://www.gasnetworks.ie/home/safety/dial-before-you-dig/
- GSI, Landslide Susceptibility Map https://www.gsi.ie/en-ie/data-and-maps/Pages/Geohazards.aspx#landslides
- OPW, National Indicative Fluvial Mapping (NIFM) River Flood Extents - High-End Future Scenario https://data.gov.ie/dataset/nifm-river-flood-extents-high-end-future-scenario
- OPW Flood Probability mapping https://www.floodinfo.ie/map/floodmaps/
- OPW Flood Risk Management, https://www.floodinfo.ie/map/floodplans/

The desk-study assesses the impact that the following hazards categories may have on the receiving environment; Natural Hazards, Transportation Hazards, Technological/ Industrial Hazards and Civil Hazards. The types of hazard within each categories and the relevance to the Baseline environment is shown in **Table 19.4**.

19.2.3 Impact Assessment Methodology

19.2.3.1 Introduction

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

An assessment of potential accidents and disaster scenarios such as pollution incidents to ground and watercourses, flooding and peat stability Risk assessment are assessed in detail in the relevant EIAR assessment chapters (**Chapters 10: Soils and Geology** and **Chapter 11: Hydrology and Hydrogeology**) and referred to in the relevant sections of this chapter.

19.2.3.2 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:

2 EPA (2014) Guidance on assessing and costing environmental liabilities. https://www.epa.ie/publications/compliance--enforcement/licensees/reporting/financial-provisions/EPA_OEE-Guidance-and-Assessing-WEB.pdf [Accessed 14/07/2024]

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

19.2.3.2.1 Risk Identification

Risks have been reviewed through the identification of reasonably foreseeable risks in consultation with relevant contributors to this EIAR. The identification of risks has focused on non-standard but plausible incidents that could occur at or as a result of the Project during construction, operation and Decommissioning phases.

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

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

19.2.3.2.2 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 19.1** 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 19.1: 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.

Ranking	Likelihood	Description
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 consequence of the impact if the event occurs has been assigned as described in **Table 19.2.**

The Major Emergency Plans as outlined in **Section 19.3** are emergency plans that help protect and prevent the occurrence of major accidents. If the emergency plans are implemented as intended, it would be expected that the consequence of any major accident or disaster, as described in **Table 19.2** would be reduced.

The consequence of a risk to/from the Project 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 19.2: Classification of Impact (Source: DoEHLG, 2010)

Ranking	Classification	Impact	Description
1	Minor	Life, Health, Welfare	Small number of people affected; no fatalities and small number of minor injuries with first aid treatment.
		Environment	No contamination, localised effects
		Infrastructure	<€0.5M
		Social	Minor localised disruption to community services or infrastructure (<6 hours).
2	Limited	Life, Health, Welfare	Single fatality: limited number of people affected; a few serious injuries with hospitalisation and medical treatment required.

Ranking	Classification	Impact	Description
			Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements.
		Environment	Simple contamination, localised effects of short duration
		Infrastructure	€0.5-3M
		Social	Normal community functioning with some inconvenience
3	Serious	Life, Health, Welfare	Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation. Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated. External resources required for personal support.
		Environment	Simple contamination, widespread effects or extended duration
		Infrastructure	€3-10M
		Social	Community only partially functioning, some services available.
4	Very Serious	Life, Health, Welfare	5 to 50 fatalities, up to 100 serious injuries, up to 2000 evacuated
		Environment	Heavy contamination, localised effects or extended duration
		Infrastructure	€10-25M
		Social	Community functioning poorly, minimal services available

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

Risk Evaluation

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 19.3**) 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 19.3: 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					

19.3 PROPOSED DEVELOPMENT HAZARD ANALYSIS

The Wind Farm Site is 8.3km north of Drogheda, 23.6km South of Dundalk and 50km North of Dublin. Located within the townlands of Brownstown, Cartanstown, Drumshallon, Gallstown, Groom, Kearneystown, Keeverstown, Piperstown, Rokeby, Stonehouse and Swinestown, the Wind Farm Site falls within two wind energy designation zones labelled **'Preferred'** and **"Open to Consideration"** in the Louth County Development Plan (CDP) 2021-2027.

The 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 19.4**.

As of August 2024, there is no Emergency Plan publicly available for Louth. **Table 19.4** below was modelled on available Emergency Plans[3] namely Area 1 (Donegal, Sligo, Leitrim, Cavan, and Monaghan), Area 2 (Galway, Mayo, and Roscommon), Area 3 (Clare, Limerick and North Tipperary), Area 5 (Carlow, Kilkenny, South Tipperary, Waterford and Wexford) and Area 6 (Dublin South, Dún Laoghaire and Wicklow).

The turbine component dimensions incorporated in the design flexibility (**Chapter 2: Description of the Proposed Development**, **Section 2.6.2** and **2.6.3**) will not impact the assessment of major accidents and natural disasters assessed within this chapter.

One TDR (the proposed TDR) and one GCR (the proposed GCR). Other viable GCR/TDRs have also been assessed as part of the EIAR. These routes; GCR option 2 and TDR option 2 and TDR option 3 do not form part of the planning application, yet these route options are fully assessed as documented in **Appendix 3.1**.

[3] HSE, Area – Major Emergency Plan, 2022 https://www.hse.ie/eng/services/list/3/emergencymanangement/area-mep/ [Accessed 20/08/24]

Table 19.4: HSE Emergency Plan hazard types

Category	Type	Subtype	Relevance to the Proposed Development
Natural Hazards			
Meteorological	Storm / Gale Both coastal and inland areas can be affected by high winds	Both coastal and inland areas can be affected by high winds	Poor driving conditions Loss of infrastructure Flooding Falling Trees
	Heavy Snow	Blizzards- 'Poor visibility	Poor Driving conditions
	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 Dense/ Persistent Fog Heat Wave /Drought	Road Traffic collisions	Loss of Infrastructure Poor driving conditions 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	-	Majority of Proposed Development Site and some of surrounding area is forested.
Transportation Hazards			
Aviation	Aircraft Collision /Loss	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	-	Not Applicable
Water	Inland Water ways	Pleasure Craft/Cruises Pollution from above	Not Applicable
	Coastal	Car Ferry/ passenger Ferries	Not Applicable

Category	Type	Subtype	Relevance to the Proposed Development
Technological Hazards			
Industrial Accidents	Explosions	-	Damage to Infrastructure Personal Injuries/ fatalities
	Petrochemical Fires	-	Personal Injuries, severe burns/ fatalities Air Pollution
	Industrial Fires	LPG Tank Fire	Not Applicable
	Gas Emission		Not Applicable
	Fluid/ Fuel Emission		Refuelling on site
Explosions	Domestic	Natural Gas explosion	Not Applicable
	Bomb	-	Not Applicable
	LPG	-	Not Applicable
	Pipeline	-	Gas pipeline close to infrastructure
Fires	Buildings	BESS	Air Pollution
Building Collapse	-	-	Not Applicable
Hazardous substance	-	Accident at site	Not Applicable
	-	Transportation accident	Hazmat on roads
	-	Weapons	Not Applicable
	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 Sediment-laden Water Run Off Fuel/hydrocarbon spill/leak
Civil Hazards			
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	-	Communicable diseases	Not Applicable

Category	Type	Subtype	Relevance to the Proposed Development
pandemic			
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.

19.3.1 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 experience 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 Dublin Airport is the nearest weather and climate monitoring station to the Proposed Development that has meteorological data recorded for the 30-year climate period (1994 to 2023). The monitoring station is located approximately 50km south of the Proposed Development. Meteorological hourly data recorded over a normal climatic 30-year period (from January 1994 to December 2023) aggregated into monthly data is used to evaluate the rainfall and temperature[4].

The wettest months are October and November, with a mean monthly rainfall of 82.8mm and 82.1mm respectively. July is the driest month, with a mean monthly rainfall of 51.2mm. July is also the warmest month with a mean monthly temperature of 15.2° Celsius (°C) and a mean monthly temperature range of 10.9°C to 19.5°C. January is the coldest month, with a mean monthly temperature of 5.2° Celsius and a mean monthly temperature range of 2.3°C to 8.1°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

[4] Met Éireann 2024, Historical data www.met.ie/climate/available-data/historical-data [Accessed 21/08/24]

events, as outlined in the **Construction Environmental Management Plan (CEMP), Appendix 2.1, Surface Water Management Plan, MP No. 3**.

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 Éireann 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 10am 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. Warnings are accessible from the Met Éireann website (www.met.ie/warnings-today.html). 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 Éireann 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 Éireann 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.

19.3.2 Hydrological

As detailed in **Chapter 11: Hydrology and Hydrogeology**, no recurring or historic flood incidents have been documented within the Wind Farn Site, along the Grid Connection Route, or the Turbine Delivery Route. The nearest recorded flooding was in Gallstown, Co.

Louth, on November 14, 2014, where two residential houses were affected by a flood event located 250m northeast.

According to OPW's Past Flood Events[5], there were no recurring flood incidents within the Wind Farn Site or immediately downstream. There is one recurring flood location in Carricknashanagh (ID-3084) approximately 1.2km downstream of the closest turbine (to the west of the site) and a second recurring flood location 800m to the east of the site or 1.7km southeast of the closest turbine (Galroostown ID-3087). These recurring flood locations are not presented as flood areas on the NIFM River Flood Extents for High End Future Scenario (HEFS)[6].

No areas within the main Wind Farm Site or within a 1km radius of the main Wind Farm Site are within a HEFS zone, for 0.1% (or 1 in 1000 year) annual exceedance probability (AEP) of fluvial flooding. There is one area within the Proposed Development (approximately 0.12 ha) that falls with a HEFS flood zone. The works planned within this area (overlapping area of the flood zone and the Redline Boundary) are limited to vegetation clearance along the west side of the R132 for TDR no.12. The Redline Boundary area to the east of the R132 where non-temporary road widening works are required are not within any flood zone.

HEFS has an embedded overage of 30% for both extreme depth rainfall and peak flood flows and a mean sea level rise of +1000 mm. Uncertainties in the predicted HEFS flood levels can arise due to uncertainties in topographic, bathymetric and other survey data and in meteorological, rainfall and flow data, assumptions made in the hydraulic / hydrodynamic models.

The nearest Flood Risk Management Areas are in Ardee and Annagassan, Co. Louth, located 10.5km and 8.7km north of the Wind Farm Site and Termonfeckin and Drogheda, Co. Louth, located 4.8km and 5.0km south of the Wind Farm Site[7]. The CFRAM[8] Study OPW Flood Risk Assessment Maps are now the primary reference for flood risk planning in Ireland and supersede the PFRAM maps. Based on the information gained through the flood identification process, no parts of the site are mapped within any fluvial flood zones.

[5] OPW, Flood Probability mapping Available at: https://www.floodinfo.ie/map/floodmaps/ [Accessed 26/09/2024]

[6] Office of Public Works (OPW), National Indicative Fluvial Mapping (NIFM) River Flood Extents - High-End Future Scenario https://data.gov.ie/dataset/nifm-river-flood-extents-high-end-future-scenario [Accessed 26/09/2024]

[7] OPW, Flood Management Area Maps https://www.floodinfo.ie/map/floodplans/?X=7158741.978427219&Y=-715970.6595715923&Z=10 [Accessed 21/08/24]

[8] CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011, and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.

Within the Redline Boundary, all proposed works (except for watercourse crossings) will be carried out at least 50m from any watercourse, with exception to the works required on TDR section no. 12 at the R162 / L-6274-0 Junction, where some vegetation/ hedgerow clearance is required, this will have a setback distance of 10m from any watercourse.

As the associated drainage - some of which is permanent for the lifetime of the Proposed Development, will be attenuated for greenfield run-off, the Proposed Development will not increase the risk of flooding elsewhere in the catchment. Based on this information, the Proposed Development complies with the appropriate policy guidelines for the area and is at no risk of flooding.

This potential risk of flooding associated with the Proposed Development during the construction, operation and Decommissioning phases is considered an adverse but imperceptible or negligible impact of the Proposed Development.

The Proposed Development will use the latest best practice guidance, as outlined in **Chapter 11: Hydrology and Hydrogeology** and **Appendix 11.2** to ensure that flood risk within or downstream of the Wind Farm Site is not increased as a function of the Proposed Development. The risk of the proposed Wind Farm contributing to downstream flooding is also very low, as the long-term plan for the site is to retain and slow down drainage water prior to release. Robust drainage measures on the site will include swales, silt traps, check dams, settlement ponds and buffered outfalls. Please refer to the **Chapter 11: Hydrology and Hydrogeology** and the **Appendix 11.2** Surface Water Management Plan for further details.

19.3.3 Peat Stability and Landslides

On the 12th of November 2020, a peat failure occurred on the site of the Meenbog Wind Farm, Co. Donegal as construction was being carried out on a floating road which was to provide access to a turbine hardstand and foundation. The failure occurred in an area comprising very weak peat upslope of the access road that was under construction.

Geotechnical and peat stability considerations are central to the design phase of the Proposed Development. Site Investigation (SI) works, a desktop study and walkover survey was undertaken by the geologist for the Wind Farm Site to provide a broad understanding of the prevailing ground conditions. A screening assessment for the hazard of peat instability was also carried out. As part of the walkover survey preliminary peat / organic soil thickness was recorded and a Preliminary Plot of Peat Slide Risk Hazard compiled. This

analysis determined that peat / sensitive organic soils are either not present within the zone likely to be affected by wind farm construction works or not of sufficient depth to cause peat instability.

A desk study was undertaken for the potential effects due to the Turbine Delivery Route and Grid Connection Route. The potential effects were considered not significant due to the nature and scale of the works associated with these elements. The effects associated with excavations for cable trenches are considered to be not significant. Some compaction of the underlying soils is expected, although this will slight. The effects associated with vehicle movements along the haul route is considered to be not significant.

Please see **Chapter 10: Soils and Geology** for more details.

As per **Chapter 10 Soils and Geology, Section 10.3.9**, the isolated area of cut-over peat on the Wind Farm Site coincides with slope gradients of <5 degrees to the horizontal and a landslide susceptibility of low / moderately low. The GSI records show that the closest recorded landslide event was approximately 6km[9], southwest of the site and was not related to peat instability.

19.3.4 Traffic

The Proposed Development will utilise the existing road network during the construction phase with some upgrading of one Turbine Delivery Route node (summarised in **Chapter 2: Description of the Proposed Development**). Construction related traffic will originate from the delivery of materials to site, removal of surplus excavated material from site and transport of employees to, from and throughout the site. The main traffic-related risks relevant to this assessment is the Risk to Pedestrians and Vulnerable Road Users. The construction of the wind farm site entrance and modifications to the public road network at various locations along the TDR and GCR will be carried out under a road opening license and traffic management plan which will accommodate pedestrians at the works locations. The effect of the works on pedestrian safety is therefore considered to be medium for a short-term duration. Pedestrian facilities may also be altered for short periods during the transportation of turbine components. During these periods alternative arrangements will be put in place for pedestrians.

[9] GSI, Landslides Susceptibility Mapping https://dcenr.maps.arcgis.com/apps/webappviewer/index.html?id=b68cf1e4a9044a5981f950e9b9c5625c [Assessed 21/08/24]

The assessment of all traffic-related potential effects are outlined in **Chapter 16: Traffic and Transport** and **CEMP** (**Appendix 2.1**).

A Traffic Management Plan, MP No. 7 to **CEMP** (**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 Coordinator
- Delivery Programme
- Information to locals
- A Pre and Post Construction Condition Survey
- Liaison with the relevant local authority
- Implementation of temporary alterations to road network at critical locations
- Identification of delivery routes
- Delivery times of large turbine components
- Travel plan for construction workers
- Additional measures
- Re-instatement works

Please see **Chapter 16: Traffic and Transport** and Traffic Management Plan, MP No. 7 to CEMP (**Appendix 2.1**) for further details.

In relation to air traffic (Aviation), there are no air traffic related issued relevant to this assessment. The Proposed Development does not impact on the required distance from aerodromes, clearance from obstacle limitation surfaces, and existing aerial activities and control areas, as described in detail in **Chapter 14: Material Assets** and in **Appendix 14.1** Aviation Analysis Report.

19.3.5 Industrial Accident

The Wind Farm Site is not near any SEVESO[10] sites regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations. Therefore, significant effects associated with major industrial accidents involving dangerous substances are not expected.

[10] SEVESO Site location, ArcGIS, https://www.arcgis.com/apps/webappviewer/index.html?id=a01b5a0a6ff24f10adff30beaa3b6fd0 [Accessed 15/08/2024]

The nearest upper-tier SEVESO site, Flogas, is located 8.5km south of the Wind Farm Site in Drogheda Marine Terminal, Co Louth. The nearest lower-tier SEVESO site, BAK Bulk Services, located 5.5km north at Red Barns, Drumcar Road, Dunleer, Co. Louth.

The Battery Energy Storage System (BESS) within the substation compound includes 4 no. battery storage bays of 8 no. battery units. 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. The nearest dwelling is 349m south of the proposed BESS.

The Wind Farm Site is situated west of a transmission gas pipeline, with the nearest turbine a distance of approximately 246m from the gas pipeline, as described in **Chapter 14: Material Assets**. Disruption to these lines could lead to gas explosions, fires from fuel emissions, leakages, and spillages, posing risks of personal injury and structural damage. Additionally, environmental impacts could occur due to leaks or emissions, affecting air and water quality in the area.

Kilsaran Quarry is located adjacent to the northern portion of the Wind Farm Site, outside of the Redline Boundary. The distance between the quarry boundary and proposed turbine locations ranges from approximately 170m to 1,030m. Due to the proximity of the quarry, safety concerns may arise from potential effects from the activities (blasting) carried out at the quarry. Excessive ground vibration from blasting occurs due to inefficient use of explosive energy. The unused energy generates seismic waves that move away from the blast area and diminish in strength with distance. These waves cause the ground surface to oscillate when they hit a free face.

To assess any potential effects of blasting on sensitive receptors (turbines), a comprehensive study was carried out by WSP Ireland Consulting Limited on behalf of the Developer (**Appendix 13.4**). This study assessed the effect of blasting within the quarry, on each of the 5 proposed turbine locations, by means of measuring the ground vibration and air over pressure. Ground vibration and air overpressure monitoring instruments were set up at the proposed turbine locations and the recorded data was used to develop site-specific

parameters for the vibration model. This study was carried out in three phases, with each phase assessing the effect of blasting at each of the turbine locations. The ground vibration and air overpressure analysis was carried out in accordance with procedures described in the BS ISO 4866:2010, BS 5228-2:2009 and BS 7385-2:1993. Ground vibration at sensitive receptors is measured as Peak Particle Velocity (PPV) in mm/s. It was determined that the PPV values recorded from three blasts were within the acceptable limits as specified in BS ISO 4866:2010, BS7385-2:1993, and BS5228-2:2009+A1:2014 for all proposed turbine locations. The methodology used to determine the air-blast overpressure and ground-borne vibration at a specified distance away from a blast is detailed in **Appendix 13.1** (Kellystown Wind Turbine Generators Ground Vibration and Air Overpressure Blast Monitoring Report).

The Ground Vibration and Air Overpressure blast monitoring concluded that at the locations of the proposed Wind Turbines, the PPV and PSPL values are projected to remain within threshold limits (100mm/sec and 180dB), confirming that they are situated at a safe distance. This zone is established with the understanding that the turbines will not experience any structural or cosmetic damage due to blasting activities. The blasts from the quarry will have no impact on the structural integrity of the wind turbines or the ground structure in which they are situated. Therefore, blasting at Kilsaran quarry has not been included as a risk.

19.3.6 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 non-synchronous to synchronous where required to ensure no power outages. Therefore, any technical fault at the Proposed Development would not impact the local or national energy supply.

The Proposed Development is anticipated to connect to the existing Drybridge 110kV Substation, Co. Louth.

There are several telecommunication operators in the area. Due to the consultation process and resulting design mitigation (removal of the 2 proposed turbines), there is no anticipated loss to critical telecommunication infrastructure during the construction, operation or Decommissioning phase of the Proposed Development. The potential effects of the Proposed Development on the telecommunication, the mitigation measures and the residual effects are described in detailed in **Chapter 14: Materials Assets**.

19.3.7 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 on site. A Construction Environment Management Plan (**Appendix 2.1**) has been prepared in conjunction with the Environmental Impact Assessment Report and the Natura Impact Statement which accompanies the planning application for the Proposed Development.

The CEMP provided details on site 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 Plan (**Management Plan No. 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: Description of the Proposed Development** and CEMP (**Appendix 2.1)** for further details.

19.3.8 Health andSafety

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 Emergency Response Plan (ERP) (**Appendix 2.1, Management Plan No. 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.

19.3.9 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 DoEHLG Guidelines state that there is a very remote possibility of injury to people from flying fragments of ice or from a damaged blade. However, most blades are composite structures with no bolts or separate components and the danger is therefore minimised. The build-up of ice on turbines is unlikely to present problems, when managed appropriately. This will be managed by fitting the wind turbines with anti-vibration sensors, which will detect any imbalance caused by icing of the blades. The sensors will cause the turbine to wait until the blades have been de-iced prior to beginning operation.

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.

19.3.10 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 impact 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)[11] provides further practical information on EMF. Further details on the potential impacts of electromagnetic interference to telecommunications and aviation are presented in the **Chapter 14: Material Assets**.

19.4 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 19.1** and **Table 19.2**.

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.

19.4.1 Likely Significant Effects

19.4.1.1 *Do-Nothing Scenario*

If the Project were not to proceed the Proposed Development would not be able to supply the electricity generated to the national grid. The opportunity to generate renewable energy and electrical supply to the national grid would be lost. The likely evolution of the baseline environment may be continued farming/ agricultural uses or alternative types of farming and forestry practices.

19.4.1.2 Assessment of Effects During Construction

A risk register has been developed which contains all potentially relevant risks identified during the construction phase of the Proposed Development. Six risks specific to the construction phase have been identified and are presented in **Table 19.5**.

[11] 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 21/08/24]

Table 19.5: 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 Project	Driver negligence or failure of vehicular operations on site Access Roads. Traffic Management Plan not implemented.
E	**Contamination** Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater during all construction activity within 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 within the Redline Boundary	Equipment or infrastructure failure; Electrical problems; and Employee negligence.

19.4.1.3 Assessment of Effect During Operation

Six risks specific to the operation of the Proposed Development have been identified and are presented in **Table 19.6**.

Table 19.6: 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 involving site service vehicles carrying wastewater/sewage, fuel or chemicals during 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 site Access Roads. 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

19.4.1.4 Assessment of Effect During Decommissioning

Six risks specific to the Decommissioning of the Proposed Development have been identified and are presented in **Table 19.7**.

Table 19.7: 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 site Access Roads. 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 19.1** and **Table 19.2**) and the resulting risk analysis is given in **Table 19.6**.

The risk register is based upon possible risks associated with the Proposed Development. As outlined in **Section 19.3**, 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.

19.4.1.5 Assessment of Effect – Summary

Table 19.8: Risk Assessment

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence 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 18: Air and Climate**. In this chapter, local weather conditions (temperature, rainfall and wind) recorded over the last 30 year climate period are presented and discussed	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 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 considering the baseline assessment in **Chapter 11: Hydrology and Hydrogeology** and due to no recurring or historic flood incidents being	1	The risk of flooding 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	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					recorded within the Wind Farm Site or along the Grid Connection route.		and a small number of minor injuries with first aid treatment'. No contamination of environment (e.g., watercourses), localised effects.	
C	Peat Stability and Landslides	Mismanagement of excavated material on site Extreme weather conditions	Movement of peat within the Wind Farm Site Sedimentation of nearby watercourse. Damage to, or depletion of aquatic habitats and species.	1	Peat is either not present within the zone likely to be affected by wind farm construction works or not of sufficient depth to cause peat instability. Refer to **Chapter 10: Soils and Geology**	1	The risk of peat instability during the construction phase will result in a minor consequence, as due to the levels of peat of on site, effects would be localised and no contamination of watercourse would be expected.	1
D	Traffic Incident	Driver negligence or failure of vehicular operations on Site Access Roads.	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	1	A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of	3

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Traffic Management not implemented or not adhered.			collision to occur on site, 'at some time.' Due to increased traffic on public roads travelling to/ from site, it can be determined that there is some 'opportunity, reason or means for a vehicle collision to occur off site, 'at some time.' An unlikely risk is therefore predicted.		minor injuries with first aid treatment.' The robust Traffic Management Plan including traffic systems (temporary traffic lights) and alternative pedestrian facilities.	
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 in an increase in the suspended sediment load, resulting in increased turbidity which	2	As outlined in **Chapter 2: Description of the Proposed Development** and the **CEMP** (**Appendix 2.1**), fuel will be stored on-site but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the site.	2	The risk of a fuel spillage or impact 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 effects of short duration' through the use of bunded containment areas and proposed drainage mitigation measures during construction.	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence 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 turn could affect the water quality and fish stocks of downstream water bodies		Where re-fuelling is carried out outside of bunded areas, e.g., for cranes, setback distances from sensitive hydrological features will be adhered to. Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures as detailed in **Chapter 11: Hydrology and Hydrogeology.**		Contamination of environment (e.g., watercourses), localised effects of short duration.	

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence 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 Fire in BESS facility	Illness or loss of life. Short-term displacement of people/ local residents Damage to, or depletion of habitats and species; and Impacts on ambient air quality.	2	As outlined in **Chapter 2: Description of the Proposed Development** and **the CEMP (Appendix 2.1**), fuel stored on-site will be in a bunded area to ensure containment and prevent spillages of fuel, 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 Proposed	2	Should a fire/ gas explosion occur and cause damage to the wind farm, the consequences may be considered serious. The potential exists for short-term evacuation or displacement of local residents, contamination due to collapsed infrastructure and large costs associated with assessing, making safe and re-instating the infrastructure.	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Employee negligence			Development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site e.g., wind turbines, substation, vandalism. The presence of a transmission gas pipeline line to the east of the proposed infrastructure has been carefully considered throughout the Project's development and design phase, refer to **Chapter 14: Material Assets.** No excavation works will take place within 10m of this gas network line. The requirements and conditions as per BESS fire			

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					safety certificate will be fully complied with.			
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 the suspended sediment load. Increased turbidity which in turn could affect the water quality and fish stocks of downstream water bodies	2	As outlined in **Chapter 2: Description of the Proposed Development**, fuel will not be stored on-site during operational phase. No chemicals or solvents will be stored on-site. Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage measures as detailed in **Chapter 11: Hydrology and Hydrogeology**.	2	The risk of a fuel spillage from on-site vehicle or impact 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 bunded containment areas during operation. Simple contamination of environment (e.g., watercourses), localised effects of short duration.	4
H	Industrial Accident -	Equipment or infrastructure failure.	Illness or loss of life.	2	As outlined in **Chapter 2: Description of the Proposed Development**, fuel will not be	2	Should a fire/ gas explosion occur or damage to the Wind Farm Site occur, the	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
	Fire/Gas explosion	Fuel spillage/storage Electrical problems; and Employee negligence	Short-term displacement of people/ local residents Damage to, or depletion of habitats and species; and Impacts on ambient air quality.		stored on-site post construction therefore fuel is not considered to be a significant fire risk. The presence of a transmission gas pipeline line to the east of the proposed infrastructure has been carefully considered throughout the project's development and design phase, refer to **Chapter 14 Material Assets.** As a confirmatory measure during the pre-construction a stage, GNI will be consulted to confirm the location of the gas pipeline and wayleave. A temporary fence will be erected to protect the wayleave during construction. The layout has been designed to avoid excavation work within any Wayleave where possible.		consequences may be considered serious. The potential exists for short-term evacuation or displacement of local residents, contamination due to collapsed infrastructure and large costs associated with assessing, making safe and re-instating the infrastructure.	

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					However, a small area of the met mast communications cable is located within the wayleave. Prior to construction GNI consent GNI in the form of a valid Excavation Permit. In accordance with Chapter 19 of the Safety, Health, and Welfare at Work Act 2005 (the 2005 Act), the development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site e.g. wind turbines, substation, vandalism.			

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
I	Collapse/ damage to structures	Landslide/ Earthquake; and Extreme weather conditions such as flooding and storms. Vehicular collisions due to driver negligence Mismanagement of excavated material on site	Injury or loss of life. Movement of peat within the site. Sedimentation of nearby watercourse. Damage to, or depletion of aquatic habitats and species;	2	According to the Irish National Seismic Network, earthquakes measuring ~2 on the Richter Scale is "normal" in terms of seismicity in Ireland. These are known as microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. As such, buildings in Ireland are extremely unlikely to be damaged or collapse due to seismic activity. Having regard to public speed limits within the site, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse.	1	The risk of infrastructure collapse or damage to structures during the operation phase may have minor consequence in that a 'small number of people would be affected' 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	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					Peat is not of sufficient depth to cause peat instability. Refer to **Chapter 10: Soils and Geology.**			
J	Traffic Incident	Driver negligence or failure of vehicular operations on Site Access Roads. Traffic Management not implemented	Injury or loss of life.	3	A limited number of vehicles will be permitted on the Wind Farm Site as part of the operation phase. As such, it can be determined that there is some 'opportunity, reason or means for a vehicle collision to occur on site, 'at some time.'	1	A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.' The impact on other roads users and traffic volumes off-site is minimal during operational phase	3
K	Loss of Critical Infrastructure	Equipment or infrastructure failure.	Injury or loss of life	1	EirGrid operate the grid from National Control Centres matching electricity production to customer demand, switching	2	Should a power failure occur at the Drybridge 110kV Substation, it will result in a limited number of	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Electrical problems; and Employee negligence Landslide/ Earthquake; and Extreme weather conditions such as flooding and storms.			from synchronous to non-synchronous where required to ensure no power outages. The Proposed Development will be connected to a single bay at Drybridge 110kV Substation and any shortages or failures will not impact other connections to the same substation.		people affected- localised effects of short duration.	
Decommissioning Phase								
L	Severe Weather	Extreme weather- periods of heavy rainfall, taking into account climate	Illness or loss of life. Sedimentation of nearby watercourse	2	The risk of severe weather is unlikely when considering the assessment in **Chapter 18: Air and Climate**. In this chapter, local weather conditions (temperature, rainfall and wind)	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	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		change and strong winds	Damage to, or depletion of aquatic habitats and species.		recorded over the last 30 year climate period are presented and discussed		severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. Simple contamination of environment (e.g., watercourses), localised effects of short duration.	
M	Flooding	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;	2	The risk of flooding is considered very unlikely when considering the baseline assessment in **Chapter 11: 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'.	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
							Simple contamination of environment (e.g., watercourses), localised effects of short duration.	
N	Traffic Incident	Driver negligence or failure of vehicular operations on Site Access Roads. Traffic Management not implemented	Injury or loss of life.	3	A limited number of vehicles will be permitted on the Wind Farm Site as part of the Decommissioning phase As such, it can be determined that there is some 'opportunity, reason or means for a vehicle collision to occur on site, 'at some time.' An unlikely risk is therefore predicted. Due to increased traffic on public roads travelling to/ from site, it can be determined that there is some 'opportunity, reason or means for a vehicle	1	A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.' A minor consequence is predicted, having regard to the robust Traffic Management Plan, which includes traffic systems (temporary traffic lights) and alternative pedestrian facilities.	3

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					collision to occur off site, 'at some time.' An unlikely risk is predicted.			
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. Erosion of sediment from site drainage channels.	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 turbidity which in turn could affect the water quality and fish stocks of downstream water bodies.	2	As outlined in **Chapter 2: Description of the Proposed Development** and **the CEMP** (**Appendix 2.1**), fuel will be stored on-site but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the Proposed Development site. Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage measures as detailed in **Chapter 11: Hydrology and Hydrogeology**.	2	The risk of a fuel spillage or impact on surrounding drainage during the Decommissioning 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 Decommissioning Simple contamination of environment (e.g., watercourses), localised effects of short duration.	4

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
P	Industrial Accident-Fire/gas explosion	Equipment or infrastructure failure. Fuel spillage/storage Electrical problems; and Employee negligence	Injury or loss of life Short-term displacement of people/ local residents Structural damage Forest fires Air Pollution Damage to, or depletion of habitats and species Contamination	2	As outlined in **Chapter 2: Project Description** and **Appendix 2.1 CEMP Decommissioning Plan**, fuel will be stored on-site but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the Proposed Development site. Only minor excavation works will be taking place during Decommissioning phase; along the internal cabling route joint bays will be excavated to access the cable ducts, which will be removed/ pulled using a winch. A 10m buffer in place along the gas network line. Gas line will have physical above	1	The risk of infrastructure collapse or damage to structures during the Decommissioning phase would have limited consequences, as the cost to infrastructure will be significantly lower than in the construction or operational phase. Simple contamination of environment (e.g., watercourses), localised effects of short duration. No fatalities and a small number of minor injuries with first aid treatment.	2

Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					ground markers. An unlikely risk is predicted. In accordance with Chapter 19 of the Safety, Health, and Welfare at Work Act 2005 (the 2005 Act), the development shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site.			
Q	Loss of Critical Infrastructure	Equipment or infrastructure failure. Electrical problems; and Employee negligence Landslide/ Earthquake; and	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 Drybridge 110kV Substation and any shortages or failures will not	2	Should a power failure occur at the Drybridge 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	Likeli-hood Rating	Basis of Likelihood	Conse-quence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Extreme weather conditions such as flooding and storms.			impact other connections to the same substation			

The risk assessment for each of the potential risks identified are consolidated in **Table 19.9** which provides their 'risk score.' A corresponding risk matrix is provided in **Table 19.10**, which is colour coded to provide an indication of the critical nature of each risk. As outlined in **Table 19.3**, the red zone represents 'high risk' scenarios', the amber zone represents 'medium risk scenarios and the green zone represents 'low risk scenarios.

Table 19.9: 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	1	1	1
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 19.10: 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	E F G H O P			
	1. Extremely Unlikely	C	K Q			

Table 19.10, 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:

Industrial Accident - Fire/Gas explosion

There is a potential risk of gas disruption due to the presence of a transmission gas pipeline line to the east of the proposed infrastructure. A risk score of 4 was attributed to this 'Industrial Accident', during the construction and the operational phase. During the construction phase, the gas line is most at risk due to the excavation works and earthworks required during this phase

The risk of a gas explosion 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. Further to the health and safety guidelines and regulations outlined in **Section 19.3.8**, GNI code of practice for Working in the Vicinity of the Transmission Network[12] and GNI Safety guideline for working in the Vicinity of Natural Gas Pipelines[13]

[12] GNI 2021, Code of Practice for Working in the Vicinity of the Transmission Network, Procedure No: AO/PR/127 Rev 3 https://www.gasnetworks.ie/docs/business/safety-in-the-business/GNI-Code-of-Practice-for-Working-in-Vicinity-of-Tx-Network-2021.pdf [Accessed 20/08/24]

[13] GNI 2020, Safety advice for working in the vicinity of natural gas pipelines Guideline No: HSQE/GU/016 Rev 2 Date: November 2020 https://www.gasnetworks.ie/docs/business/safety-in-the-business/Safety-Advice-for-working-in-the-vicinity-of-Gas-pipes-2021_.pdf [Accessed 20/08/24]

will be strictly adhered to. Electrical Interference Assessment will be undertaken pre-construction. As a confirmatory measure during the pre-construction stage, GNI will be consulted to confirm the location of the gas pipeline and wayleave. A temporary fence will be erected to protect the wayleave during construction. The layout has been designed to avoid excavation work within any wayleave where possible. However, a small area of the met mast communications cable is located within the wayleave. Prior to construction GNI consent is required in the form of a valid Excavation Permit.

During the Decommissioning phase, a lower risk score (2) was attributed to 'Industrial Accident', as this phase will take place over a short period (3-6 months), as per **Chapter 16: Traffic and Transport**) and excavation works will be minimal during this phase, therefore, there will be a reduced risk of any interactions with the gas pipeline.

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.

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: Description of the Proposed Development**, **Appendix 2.1**: Construction Environmental Management Plan (CEMP) and **Chapter 1: Hydrology and Hydrogeology**, measures are proposed and will be put in place to reduce the risk of accidental spillage and contamination of pollution risk to groundwater, surface water and associated ecosystems, and to terrestrial ecology.

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

19.4.2 Mitigation Measures

As outlined in **Section 19.4.1**, the scenario with the highest risk score in terms of the occurrence of major accident and/or disaster was identified as risk of 'Industrial Accident-Fire/Gas Explosion' or 'Contamination' during the construction, operation and Decommissioning phases.

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.

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 on site. The CEMP sets out the Emergency Response Procedure to be adopted in the event of an emergency including contamination, health and safety and environmental protection.

Fire water storage facilities in the area of the BESS have been included in the design of the Surface Water Management Plan (**Appendix 11.2** to **Chapter 11: Hydrology and Hydrogeology**. Also refer to drawing M02207-01_DNG_9 (**Appendix 11.2**) for drainage and fire water storage plan for the BESS and substation building.

In the unlikely event of a fire at a turbine, at the substation or Battery Energy Storage System (BESS), all personnel on site will meet at a designated fire point and emergency services will be contacted. Louth County Council is the fire authority providing a fire and emergency rescue service to the functional area of Louth County Council. For operations of an emergency nature under Section 26 of the Fire Services Act 1981, refer to Louth County council Fire and Rescue plan[14].

The CEMP provides details on all mitigation measures to be actioned prior to and during the construction phase. **Management Plan No. 6** (**Decommissioning Plan**) to the CEMP details on all mitigation measures to be actioned prior to and during the Decommissioning phase. The CEMP also provides details of all monitoring measures required, such as, monitoring of ground vibrations at turbine locations, as outlined in **Management Plan No. 8** (**Blast Management Plan**) to the CEMP and water quality monitoring as outlined in **Management Plan No. 2** (**Water Quality Management Plan**). 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 includes an Emergency Response Plan (**Management Plan No. 1**). It provides details of procedures to be adopted in the event of an emergency relating to health & safety

[14] Louth County Council, 2013 Lounty County Council Fire & Rescue Fire and Emergency Operations Plan Section 26, Fire Services Act, 1981 Available https://www.louthcoco.ie/en/services/fire_rescue_services/operational_fire_service/section_26.pdf [Accessed 29/10/2024]

or environmental protection. The Emergency Response Plan includes details on the response required and the responsibilities of all personnel in the event of an emergency during all phase of the Project. Please see **Appendix 2.1** for details.

19.4.3 Residual Effects

The risk of a major accident and/or disaster arsing during the construction, operation or Decommissioning phases 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 are implemented and adhered to, there will not be any significant residual effect(s) associated with the construction, operation and Decommissioning of the Proposed Development.

19.4.4 Assessment of Cumulative Effects

19.4.4.1 Cumulative Impact Assessment

A search in relation to projects that may have the potential to result in a cumulative impact with the Project on the environment was carried out as part of the EIAR (please see **Appendix 2.4: List of Projects for Cumulative Assessment**). The projects included in the cumulative assessment are large developments in the planning process (lodged or permitted) or in operation phase, within a 20km radius of the Proposed Development. The Proposed Development has been considered, cumulatively with these projects, namely Kilsaran Quarry, Proximity to Transmission gas pipelines and Aviation activity.

Kilsaran Quarry

The Kellystown wind farm is situated adjacent to a registered rock quarry called Kilsaran Quarry and is covering approximately 37.5 hectares. Permission has been granted (Planning Ref 22/190) to expand the quarry area by approximately 10 hectares to a final depth of in excess of 60 meters above sea level, aligning with the current permission. Operations at the quarry will persist at a rate of 750,000 tonnes per annum.

A monitoring programme for Kilsaran Quarry is in place as outlined in the planning conditions for Kilsaran Quarry (specified in the notification of grant of permission from Louth County Council, dated 27/11/2022) This monitoring programme includes noise and vibration, air quality and water quality testing and is summarized in **Section 5.3.7.4** (Noise and Vibration), **Section 5.3.7.5** (Air Quality) and **Section 5.3.7.6** (Water Contamination) of **Chapter 5: Population and Human Health**.

This monitoring program, as specified by Louth County Council, is subject to amendments as required, following an annual review. The quarry is subject to regular inspections and maintenance will be conducted to ensure compliance with vibration limits and to address any issues promptly, thereby safeguarding the amenities of the proposed vicinity. Mitigations to the cumulative effect of vibration include employing advanced blasting techniques to minimise vibrations, such as controlled blasting and the use of damping materials. Blasting operations shall take place only between 1100 hours and 1700 hours Monday to Friday and shall not take place on Saturdays, Sundays, or public holidays.

Additionally, Kilsaran Quarry has implemented a comprehensive communication plan to keep nearby residents informed about blasting activities and any potential impacts. The Developer of the Wind Farm Site will be included in this communications plan and will be notified of up-coming blasting. All works on site will cease on site 30mins prior to the blasting. All site personnel will move to the safe zone (Construction Compound) which is located 500m from the quarry and is outside the danger zone for rock-fly.

Ground vibration and air overpressure monitoring was carried out to ascertain the vibration and air overpressure effects on the Wind Farm Site (**Appendix 13.4, Ground Vibration and Air Overpressure Blast Report**). The Ground Vibration and Air Overpressure blast monitoring concluded that the blasts from the quarry will have no impact on the structural integrity of the wind turbines or the ground structure in which they are situated.

During the construction phase, temporary dust and exhaust emissions may increase due to construction vehicles and transport. A cumulative rise in dust emissions with a neighbouring quarry development is anticipated, along with an increase in vehicle exhaust emissions among the Proposed Development, neighbouring Kilsaran Quarry. However, the air quality impact during this period is expected to be **short-term** with a **slight negative** effect.

The following mitigation measures will be implemented:

- There is a comprehensive monitoring programme in place at Kilsaran Quarry, that is reviewed annually and monitors Noise and Vibration, Air Quality and Water Quality, as summarized below:
  - Noise shall not exceed 55 dBA (30 minutes LAR) when measured at the nearest noise sensitive receptor, between 08:00 hours and 18:00 hours Monday to Friday and 08:00 hours and 14:00 hours on Saturdays.
  - Noise shall not exceed 45dBA (15 minute LAR) at any other time.

  - Blasting operations (which generate the most noise) are only permitted to take place between 11:00 hours and 17:00 hours Monday to Friday.
  - Vibration levels resulting from blasting must not exceed a peak particle velocity of 12mm/second when measured in any three mutually orthogonal directions at any sensitive location.
  - Suppression of dust on site and on the Access Roads and cleaning of the public road
  - Monitoring of air emissions (including a monthly survey of dust and particulate emissions)
  - Dust levels at the site boundary shall not exceed 350 milligrams per square meter per day averaged overall continuous period of 30 days.
  - Monitoring of ground and surface water quality, levels and discharge and submission of monitoring results to the planning authority on a monthly basis.
- The Developer of the Wind Farm Site will be kept informed of the blasting schedule and blasting activities
- Advanced blasting techniques to minimise vibrations, such as controlled blasting and the use of damping materials are employed at the quarry
- All works on site will cease on site 30mins prior to the blasting. All site personnel will move to the safe zone (Construction Compound) which is located 500m from the quarry and is outside the danger zone for rock-fly.

Although cumulative effects of noise and dust from a wind farm could include air pollution, potential health impacts on nearby residents, and environmental degradation (as assessed in **Chapter 18: Air Quality and Climate**, **Chapter 5: Population and Human Health**, **Chapter 11: Hydrology and Hydrogeology** and **Chapter 10: Soils and Geology**), strict monitoring and mitigation control measures will ensure compliance with regulations and will mitigate negative impacts on the surrounding area's amenity and well-being. As such, there are no significant cumulative effects predicted in respect of the Project and Kilsaran Quarry.

Gas Networks Ireland

The presence of underground transmission gas pipeline directly east of the Wind Farm Site could potentially pose cumulative effects. For this existing gas pipeline, the maintenance of the gas infrastructure could potentially cause disruption to the surrounding environment (including the land used for the wind farm) in the form of leaks/ accidents/ explosions/ damage. Cumulative environmental and safety issues are unlikely to arise given the distance between the gas pipeline and the nearest turbine (246m) and the 10 m excavation along the pipeline.

Adherence to Health and Safety regulations outlined in **Section 19.3.8**, specific GNI Code of practices (Code of Practice for Working in the Vicinity of the Transmission Network, Procedure No: AO/PR/127) and GNI guidelines (Safety advice for working in the vicinity of natural gas pipelines Guideline No: HSQE/GU/016) will ensure that the Wind Farm Site does not impact upon the underground gas transmission pipeline.

An Electrical Interference Assessment will be undertaken pre-construction. As a confirmatory measure during the pre-construction stage, GNI will be consulted to confirm the location of the gas pipeline and wayleave. A temporary fence will be erected to protect the wayleave during construction. The layout has been designed to avoid excavation work within any wayleave where possible. However, a small area of the met mast communications cable is located within the wayleave. Prior to construction GNI consent will be obtained in the form of a valid Excavation Permit.

There is also the potential that if a gas leak occurred (unrelated to the Proposed Development), that air quality and human health may be affected. Although the extent of this event would not be exasperated by the Proposed Development, it could contribute to a slight cumulative effect on air quality and human health during the construction phase.

Aviation

The Proposed Development poses minimal cumulative effects on aviation operations due to its distance from aerodromes, its clearance from obstacle limitation surfaces, and its location relative to existing aerial activities and control areas, as described in detail in **Chapter 14: Material Assets** and in **Appendix 14.1** Aviation Analysis Report. As such, there are no significant cumulative effects predicted in respect of the Project.

19.4.5 Conclusion

A combination of the mitigation by design, the mitigation measures (outlined in full in the CEMP), the aviation analysis of the ICAO Aeronautical charts in the vicinity of the Wind Farm Site and the Ground Vibration and Air Overpressure Blast report it can be concluded that there is no potential for significant cumulative increase (to the Project or as a result of the Project) to risks such as 'Industrial Accident' or 'Loss of critical infrastructure'. Therefore, the overall vulnerability of the Project to risks of major accidents and natural disasters is considered low.