# Environmental Impact Assessment Report (EIAR)

## Killoshulan Wind Farm, Co. Killkenny

### Chapter 16 –Major Accidents and Natural Disasters

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## GLOSSARY OF TERMS

| Term | Definition |
|---|---|
| Catchment Flood Risk Assessment Management | The Catchment Flood Risk Assessment and Management Programme is Ireland's largest-ever national flood study, commissioned by the Office of Public Works to assess 80% of the country's primary flood risk, develop detailed flood management Plans with tailored strategies for 300 communities to meet EU Directive requirements |
| SEVESO Site | Industrial facilities storing potentially dangerous substances in high quantities under the EU SEVESO Directives |

## GLOSSARY OF ACRONYMS

| Acronym | Definition |
|---|---|
| KCCDP | Kilkenny City and County Development Plan |
| CEMP | Construction and Environmental Management Plan |
| CFRAM | Catchment Flood Risk Assessment and Management |
| EIAR | Environmental Impact Assessment Report |
| EPA | Environmental Protection Agency |
| ERP | Emergency Response Plan |
| FRA | Flood Risk Assessment |
| HGV | Heavy Goods Vehicles |
| INSN | Irish National Seismic Network |
| MEM | Major Emergency Management |
| NCCs | National Control Centres |
| NIFM | National Indicative Fluvial Flood Mapping |
| OHL | Overhead lines |
| OPW | Office of Public Works |
| RMP | Risk Management Plan |
| RSES | Regional Spatial and Economic Strategy |
| RWCS | Reasonable Worst Case Scenario |

# 16. MAJOR ACCIDENTS AND NATURAL DISASTERS

## 16.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) describes the likely significant adverse effects on the environment arising from the vulnerability of the Proposed Project (Proposed Wind Farm Site and Proposed Grid Connection) as detailed in Chapter 4 to risks of major accidents and/or natural disasters, as well as the potential of the Proposed Project itself to cause potential major accidents and/or natural disasters. It has been completed in accordance with the guidance set out by the Environmental Protection Agency (EPA) in *'Guidelines on Information to be contained in Environmental Impact Statements'* (EPA, 2022) and the European Commission in relation to Environmental Impact Assessment of Projects (Directive 2011/92/EU, as amended by 2014/52/EU), namely '*Guidance on the preparation of the Environmental Impact Assessment Report*'.

The assessment of the vulnerability of the Proposed Project to major accidents and natural disasters, as well as the risk of the Proposed Project itself causing accidents or disasters is carried out in compliance with the EIA Directive 2011/92/EU, as amended by 2014/52/EU, 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 the Proposed Project.

> *"because of their vulnerability to major accidents and/or natural disasters, are likely to have significant adverse effects on the environment".*

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

- The relevant major accidents and/or natural disasters, if any, that the Proposed Project could be vulnerable to;
- The potential for these major accidents and/or natural disasters to result in likely significant adverse environmental effect(s); and
- 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.

The full description of the Proposed Project is provided in Chapter 4 of this EIAR.

As detailed in Section 1.1.1 in Chapter 1, for the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Project', 'Proposed Wind Farm', the 'Proposed Grid Connection' and the 'Site'.

### 16.1.1 Study Area

In order to assess the potential effects arising from the Proposed Project on major accidents and natural disaster, the "**Major Accidents Study Area**" is defined to the spatial scope of the HSE South East (Area 5) Emergency Plan prepared by the South East Emergency Management Office (2019), which provides the strategic framework for emergency response and identify potential major emergency scenarios applicable to the study area. All aspects of the Proposed Project, i.e., the 'Proposed Wind Farm', 'Proposed Grid Connection' and the 'Site' are considered within the Major Accidents Study Area, with

the assessment further informed by the discipline-specific study areas established for the relevant EIAR disciplines.

From the Port of Cork (Ringaskiddy), the turbine component delivery vehicles will travel north via the N28 and N40 National Primary Roads before merging onto the M8 Motorway. At Junction 7 (Cashel), the vehicles will exit the M8 and travel northeast for approximately 28.7km on the R639. As no works are being proposed within Counties Cork, Limerick and Tipperary for the proposed turbine delivery route (TDR). Counties Cork, Limerick and Tipperary have been screened out of the Major Accidents Study Area for the purposes of the assessment.

Accordingly, consideration is given to the spatial extents and effects pathways defined in the following chapters, where relevant to major accidents and natural disaster outcomes:

- Chapter 5 Population and Human Health for effects on population and human health;
- Chapter 8 Land, Soils and Geology for effects on soil and ground contamination;
- Chapter 9 Hydrology and Hydrogeology for effects on water quality;
- Chapter 10 Air Quality for effects from dust and exhaust emissions;
- Chapter 11 Climate for effects from greenhouse gas emissions;
- Chapter 12 Noise and Vibration for effects from noise and vibration;
- Chapter 13 Landscape and Visual for effects on visual amenity, landscape character, and tourism; and
- Chapter 15 Material Assets for effects on telecommunications as well as traffic and transport; and

The major accidents and natural disaster assessment presented in Sections 16.4.1.2, 16.4.1.3 and 16.4.1.4 for the construction, operational and decommissioning phase respectively, integrates the results of these assessments to identify and evaluate potential effects on major accidents and natural disaster arising from the Proposed Project.

## 16.1.2 Scoping and Consultation

Section 2.7 of Chapter 2 Background to the Proposed Project of this EIAR describes the scoping and consultation exercise undertaken for the Proposed Project. General scoping was initially conducted in January 2022. Further general scoping was conducted in May 2026 due to time elapsed from when previous scoping was carried out, updates in local and national policy and legislation, updates in relevant EIAR guidance, changes in the environmental baseline and refinement of the Proposed Project layout and design.

Copies of all scoping responses are included in Appendix 2-1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 2-4 in Chapter 2 of this EIAR describes where the comments raised in the scoping responses received have been addressed in this assessment. Table 16-1 provides a list of the organisations consulted with regard to Major Accidents and Natural Disaster during the scoping process, and notes where scoping responses were received are detailed below.

*Table 16-1 Scoping Responses*

| Consultee | Date of Response 2022 | Date of Response 2026 |
|---|---|---|
| Health Service Executive | 04/10/2022 | Response received through Kilkenny County Council response on 07/07/2026 |
| Health and Safety Authority | No response received | Response received through Kilkenny County Council response on 07/07/2026 |

| | | |
|---|---|---|
| Department of Defence | Acknowledgment email on 23rd September 2022 and no formal response | Response received on 15th June 2026.<br>Please see Section 2.9.4.4 of Chapter 2 for further details. |
| EirGrid | No response received | No response received |
| Úisce Éireann | 22/06/2023 | Response received on 24th June 2026. |

### Health Service Executive

Scoping responses were received from National Environmental Health Service Executive (HSE) on 4th October 2022 and no direct response in 2026. In the 2022 response the HSE stated that the EIAR should examine all likely significant impacts and provide the following information for each:

- Description of the receiving environment;
- The nature and scale of the impact;
- An assessment of the significance of the impact;
- Proposed mitigation measures;
- Residual impacts.

In addition to any likely significant negative effects from the Proposed Project, any positive likely significant impacts should also be assessed.

Impacts from Major Accidents and Natural Disaster are assessed in Section 16.4.

### Kilkenny County Council

A Scoping response was received from Kilkenny County Council on the 7th of July, 2026. Kilkenny County Council requested consultation with the prescribed bodies of the Health Service Executive (HSE), Health and Safety Authority (HSA) and Environmental Protection Agency (EPA). Responses were received from the HSE and HSA.

**HSE**

The response from the HSE to Kilkenny County Council was the same response received by the Applicant.

**HSA**

In the response the HSA stated that since the Proposed Project appears to be outside the scope of the Chemicals Act (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2015 (S.I. 209 of 2015), the Authority has no observations to forward

### Department of Defence

Scoping responses were received from Department of Defence (DoD) on 23rd September 2022 and 15th June 2026.

The DoD identified that a matter of practice, it does not provide observations or advice in the scoping process, except where the relevant parties have been directed by a planning authority to seek the Department's views.

Having consulted with the Military authorities, the DoD provided the following observations:

- The M8 route is identified as an Irish Air Corps low level route. The location of structures higher than 45m above ground within 3NM of the route centreline of low level routes should be considered.
- The proposed wind farm may affect the Air Corps ability to access regional areas to the south especially in poor weather conditions.
- The cumulative effect of renewable energy developments has the potential to impede the Irish Air Corps operability.
- All turbines should be illuminated by Type C, Medium intensity, Fixed Red obstacle lighting with a minimum output of 2,000 candela to be visible in all directions of azimuth and to be operational H24/7 days a week. Obstacle lighting should be incandescent. If LED or other lighting types are used, should be a type visible to Night Vision equipment. Obstacle lighting must emit light at the near Infra-Red (IR) range of the electromagnetic spectrum, specifically at or near 850 nanometres (nm) of wavelength. Light intensity to be of similar value to that emitted in the visible spectrum of light.
- In the event of negative impacts on future military radar systems, the owner will engage with the Department of Defense and will provide suitable mitigations as soon as practical.

Cyrrus Ltd were engaged to carry out an Aviation Impact Assessment (AIA) for the Proposed Project in relation to potential aviation that were raised in the observation by the DoD. The AIA is included as Appendix 15-6 of this EIAR. The AIA provides a qualitative evaluation of the Proposed Project's potential to impact airspace, civil and military flight following the items outlined in the DoD's observation. As detailed in Appendix 15-6, the Cyrrus Ltd Aviation Impact Assessment considers potential effects on aviation and Irish Air Corps operations. The closest turbine would be approximately 1.8NM from the N8/M8 route, within the Irish Air Corps' requested 3NM buffer. The assessment concludes that this reduced separation would not result in significant effects under applicable Visual Flight Rules. Accordingly, no specific mitigation is considered necessary in relation to the 3NM buffer. The turbines and construction cranes will be notified to the relevant aviation authorities. An aviation obstacle-lighting scheme will be agreed with the Irish Aviation Authority, with lighting compatible with night-vision equipment. The Applicant will continue engaging with aviation authorities and address any unforeseen effects on military radar or operations.

### EirGrid

EirGrid did not issue a response to the initial documentation issued in 2022. When contacted again in May 2026, EirGrid did not provide a response.

### Uisce Éireann (Irish Water)

Scoping responses were received from Uisce Éireann on 22nd June 2023 and 24th June 2026. When contacted again in 2026, Uisce Éireann's observations related to the sewer network and water network to be considered in the scope of an Environmental Impact Assessment (EIA). Impacts on utilities including Uisce Éireann infrastructure are assessed in Section 15.3.1 of Chapter 15: Material Assets.

## 16.1.3 Statement of Authority

This section of the EIAR, has been prepared by Edward Ryan and reviewed by Jonny Fearon and Eoin McCarthy, all of MKO.

Edward is an Environmental Scientist with over 4 years of consultancy experience in the environmental sector and holds a MSc (hons) in Environmental Systems from Atlantic Technological University (previously GMIT). Catherine is a Project Manager and Climate Project Manager at MKO with over 4 years of consultancy experience in renewable energy projects.

Jonny Fearon is a Project Environmental Scientist with MKO having joined the company in March 2022. Jonny holds a BSc (Hons) Environmental Science, a MSc (Hons) in Environmental Leadership and a Specialist Diploma in Corporate Environmental Planning. Jonny's key strengths are GIS, data analysis, fieldwork and report writing. Since joining MKO, Jonny has been involved in a range of wind farm projects. In his role as an Project Environmental Scientist, Jonny works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs.

Eoin is a Project Director within the Environment Renewables team of MKO with over 15 years of environmental consultancy experience. Eoin holds a B.Sc. (Hons) in Environmental Science from NUI, Galway. Eoin took up his position with McCarthy Keville O'Sullivan in June 2011. Eoin's key strengths and areas of expertise are in project management, environmental impact assessment, wind energy site selection and feasibility assessment. Since joining MKO, Eoin has progressed from Graduate to Senior level and has been heavily involved on a significant range of energy infrastructure, tourism, waste permit, flood relief scheme and quarrying projects. He has overseen the design phase and applications of some of the largest wind energy projects in Ireland. In his role as project manager, Eoin works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs. Eoin is also involved in the development of project strategy for the projects that he manages. He has held the role of project manager and EIAR co-ordinator on over 1GW worth of wind energy projects. Within MKO Eoin plays a large role in the management of and sharing of knowledge with junior members of staff and works as part of a large multi-disciplinary team to produce EIA Reports.

# 16.2 Assessment Methodology

## 16.2.1 General

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

- Census of Ireland[1];
- Health Service Authority (HSE) advice for Health and Safety in the Renewable Sector[2];
- Fire and Emergency Operations Plan 2022-2026 - Kilkenny County Council Fire and Rescue Service
- HSE Emergency Management Area 5 Crisis Management Team Major Emergency Plan: Covering Geographical Areas of Counties Carlow, Kilkenny, South Tipperary, Waterford and Wexford (November 2019);
- Regional Planning Guidelines for the South-East Region 2010-2022
- Regional Spatial and Economic Strategy (RSES) 2020-2032, published and adopted by the Southern Regional Assembly (SRA) in January 2020;
- Rialtas na hÉireann 2024 National Risk Assessment: Overview of Strategic Risks;
- Kilkenny City and County Development Plan 2021-2027
- Kilkenny County Council Website, and
- Fáilte Ireland[3]

Major accidents or natural disasters are hazards which have the potential to affect the Proposed Project and lead to environmental effects directly and indirectly. These include accidents during construction,

[1] *Central Statistics Office* https://www.cso.ie/en/census/
[2] *Health Service Authority advice for Health and Safety in the Renewable Sector* https://www.hsa.ie/eng/your_industry/renewable_energy/
[3] *Fáilte Ireland* https://www.failteireland.ie/

operation and decommissioning of the Proposed Project caused by operational failure and/or natural hazards. The assessment of the risk of major accidents and/or disaster is considered in relation to the information required to be provided in the EIAR, i.e., population and human health, biodiversity, land, soils, water, air and climate, material assets and cultural heritage. This is addressed through determining the legislative context, categorising the baseline environment, and determining a methodology for the impact assessment of the vulnerability of the Proposed Project to risks of major accidents and/or natural disasters, as well as the potential of the Proposed Project itself to cause potential major accidents and/or natural disasters.

## 16.2.2 Legislative Context

### 16.2.2.1 Legislation

An assessment of the following key elements was undertaken in accordance with the EIA Directive 2011/92/EU, as amended by 2014/52/EU:

- 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 human health, cultural heritage and/or the environment.

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

> *"(8) A description of the expected significant adverse effects of the project on the environment deriving from the vulnerability of the project to risks of major accidents and/or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to Union legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or relevant assessments carried out pursuant to national legislation may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies".*

### 16.2.2.2 Guidance Documents

In addition to the guidance documents described in Chapter 1 Section 1.2, the following guidance documents have been consulted in the preparation of this section:

- A Guide to Regional Risk Assessment in Major Emergency Management (Department of Environment, Heritage and Local Government, 2024)[4];
- Department of Housing, Local Government and Heritage (2024*). A Framework for Major Emergency Management – A Guide to Regional Risk Assessment*[5]
- European Commission. (2017). Environmental Impact Assessment of Projects – Guidance on the preparation of Environmental Impact Assessment Reports[6].
- Guidance on Assessing and Costing Environmental Liabilities (Environmental Protection Agency, 2014)[7];

[4] *A Guide to Risk Assessment in Major Emergency Management (2024):* https://assets.gov.ie/static/documents/Guide_to_Regional_Risk_Assessment_September_2024.pdf
[5] *DoHLGH (2024) A Framework for Major Emergency Management – A Guide to Regional Risk Assessment. Available at:* https://assets.gov.ie/static/documents/Guide_to_Regional_Risk_Assessment_September_2024.pdf
[6] *EC (2017). Environmental Impact Assessment of Projects – Guidance on the preparation of Environmental Impact Assessment Reports. Available at:* https://albertslund.dk/media/4wyitnqv/eu_2017_environmental-impact-assessment-of-projects-guidance-on-the-preparation-of-the-environmental-impact-assessment-repo.pdf
[7] *Guidance on Assessing and Costing Environmental Liabilities (EPA, 2014):* https://www.epa.ie/publications/compliance--enforcement/licensees/reporting/financial-provisions/EPA_OEE-Guidance-and-Assessing-WEB.pdf

- Health Service Authority Advice for Health and Safety in the Renewable Sector[8];
- National Risk Assessment 2024: Overview of Strategic Risks (Government of Ireland, 2024)[9];
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (Environmental Protection Agency, 2022)[10];
- Fire and Emergency Operations Plan 2022-2026 - Kilkenny County Council Fire and Rescue Service
- HSE Emergency Management Area 5 Crisis Management Team Major Emergency Plan: Covering Geographical Areas of Counties Carlow, Kilkenny, South Tipperary, Waterford and Wexford (November 2019);

On a regional scale, County Kilkenny falls under the scope of the HSE South East (Area 5) Emergency Plan.

## 16.2.3 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.

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

## 16.2.4 Impact Assessment Methodology

### 16.2.4.1 Introduction

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

A wind farm is not a recognised source of pollution. It is not subject to Industrial Emissions Directive regulation or any other Environmental Protection Agency (EPA) environmental regulatory consent. Should a major accident or natural disaster occur the potential sources of pollution onsite during the construction, operational and decommissioning phases are limited and of low environmental risk. Sources of pollution with the potential to cause significant environmental pollution and associated negative effects such as bulk storage of hydrocarbons or chemicals, storage of wastes, management of flammable materials etc. are limited and so there is an inherent low level of environmental risk associated with major accident or natural disaster impacting the Proposed Project and causing environmental damage.

There is low potential for significant natural disasters to occur at the Proposed Project. Ireland is a geologically stable country with a mild temperate climate. The potential natural disasters that may occur are therefore limited to issues such as flooding and fire and are described in the Sections below.

Major industrial accidents involving dangerous substances pose a significant threat to humans and the environment; such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The Proposed Project is not regulated or connected to or close to any site regulated under the Control of Major Accident Hazards Involving

[8] *Health and Safety in the Renewable Secor (HSA, 2024): https://www.hsa.ie/your_industry/renewable_energy/*
[9] *Department of the Taoiseach (2024). National Risk Assessment 2024 – Overview of Strategic Risks. Available at: https://assets.gov.ie/static/documents/national-risk-assessment-2024-overview-of-strategic-risks.pdf*
[10] *EPA (2022) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.: https://www.epa.ie/publications/monitoring--assessment/assessment/EIAR_Guidelines_2022_Web.pdf*

Dangerous Substances Regulations i.e., SEVESO sites and so there are no potential effects from this source. The nearest SEVESO site to the Proposed Project (both the Proposed Wind Farm and Proposed Grid Connection) is Grassland Fertilizer Yard, Co. Kilkenny (Upper Tier SEVESO site) which is located approximately 15.6km southeast from the Proposed Wind Farm at its closest points (T1). Given the distance between the Proposed Project and the SEVESO sites the potential for interaction or impact is considered negligible.

The Proposed Wind Farm site has low potential to cause natural disasters or major accidents. As detailed in Section 8.3.3 in Chapter 8 of this EIAR, the EPA published soil map (www.epa.ie) and the GSI subsoil mapping (www.gsi.ie) shows the mapped distribution of subsoil deposits around the Proposed Wind Farm. The southern portion of the Proposed Wind Farm site is overlain by shallow well drained mineral soil (BminSW), while the northeastern portion is mapped as poorly drained mineral soil (AminPD) and the northwestern portion mapped as shallow well drained mineral (AminSW). The northeastern portion of the Proposed Wind Farm site is mapped mainly as Till derived from Namurian sandstones and shales (glacial tills), with bedrock subcrop or outcrop [non karstified] mapped on the northwest of the Proposed Wind Farm site at Spa Hill.

The GSI subsoils mapping (www.gsi.ie) shows subsoils are thin or absent on the southern portion of the Proposed Wind Farm, where karstified bedrock subcrop or outcrop is mainly mapped. According to GSI subsoils mapping, Proposed Turbine locations T1 to T4 are located on karstified bedrock subcrop or outcrop, Proposed Turbine T5 to T7 are located on bedrock subcrop or outcrop [non karstified], while turbines T8 to T10 are located on Namurian glacial tills (shales and sandstones). The proposed borrow pit location within the northern portion of the Proposed Wind Farm site is mapped as bedrock subcrop or outcrop [non karstified].

Karst bedrock potentially presents a risk on the southern portion of the Proposed Wind Farm site The findings of the Karst assessment indicate that the majority of the Proposed Wind Farm site can be rated as having a Low risk (i.e. turbines T5 to T10, borrow pit and associated access roads) due to it being underlain by mudstone/siltstone bedrock. Proposed Turbine location T3 is rated as Medium risk, while T1 and T2 are rated as High risk due to the presence of limestone evidence of karst features nearby. In the higher risk areas, mitigation measures (as detailed in Section 8.5.2.5) can be employed to reduce the risk of karst features. A Karst Assessment Report is included in Appendix 8-3 of this EIAR.

The Proposed 110kV Substation and Battery Energy Storage System (BESS) are located in an area mapped as Namurian glacial tills (shales and sandstones) with some localised alluvium.

The Proposed 110kV Underground Cabling route is located predominantly within the public road network. Approximately 1.5km of the Proposed 110kV Underground Cabling is within the Proposed Wind Farm internal road network, approximately 9.6km is proposed within Local Roads, 770m is proposed within National Roads (N77) and 653m proposed within private agricultural lands in Moatpark, Co. Kilkenny. The Proposed 110kV Underground Cabling route between the Proposed 110kV Substation and the existing Ballyragget 110kV substation, has variable subsoils mapped which comprise mainly Namurian tills with limestone tills and limestone gravels (fluvial deposits) within the Nore River valley near Ballyragget. The Proposed Grid Connection is within the curtilage of the public road network in these townlands and therefore there is no Karst risk along the Proposed 110kV Underground Cabling route.

Turbine delivery route accommodation areas along the R693 to the south of the Proposed Wind Farm site are mapped on limestone tills.

Any risks associated with flooding, impacts on infrastructure, accidents etc are addressed in the sections below.

Current EIA practice already includes an assessment of some potential accidents and disaster scenarios such as pollution incidents to ground and watercourses as well as assessment of flooding events. These

are described in detail below and in the relevant EIAR assessment chapters (Refer to Chapters 5 to 15 for further detail).

## 16.2.4.2 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 Project. The approach to identifying and quantifying risks associated with the Proposed Project by means of a site-specific risk assessment is derived from the DoEHLG '*A Framework for Major Emergency Management – A Guide to Regional Risk Assessment'* 2024 document[11] and the EPA '*Guidance on assessing and costing environmental liabilities*' 2014 document[12]. The following steps were taken as part of the site-specific risk assessment:

- Risk identification
- Risk, Analysis of likelihood and impact; and
- Risk evaluation

### 16.2.4.2.1 *Risk Identification*

Risks have been reviewed through the identification of reasonably foreseeable risks in consultation with the relevant contributors to this EIAR and relevant major emergency response plans (refer to *Statements of Authority* in Chapters 5 to 16 of this EIAR). The identification of risks has focused on non-standard but plausible incidents that could occur at or as a result of the Proposed Project during construction, operation and decommissioning.

In accordance with the European Commission EIAR Guidance[13], risks are identified in respect of these projects:

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

### 16.2.4.2.2 *Risk Analysis*

#### Identify the Reasonable Worst-Case Scenario

The Reasonable Worst-Case Scenario (RWCS) is defined in BS EN 31010:2010 p85/3 (noting that BS EN IEC 31010:2019 has been published) as "*The most serious credible outcomes consequences*" for each risk.

After identifying the potential risks and RWCS, the likelihood of occurrence of each risk has been assessed. An analysis of safety procedures and proposed environment controls was completed when estimating likelihood of identified potential risks occurring. Table 16-2 defines the likelihood criteria that have been applied.

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

[11] *DoHLGH (2024). A Framework for Major Emergency Management – A Guide to Regional Risk Assessment' Available at:* https://assets.gov.ie/static/documents/Guide_to_Regional_Risk_Assessment_September_2024.pdf
[12] *EPA (2014) Guidance on assessing and costing environmental liabilities. Available at* https://www.epa.ie/publications/compliance--enforcement/licensees/reporting/financial-provisions/EPA_OEE-Guidance-and-Assessing-WEB.pdf
[13] *European Commission, 2017. Guidance on the preparation of Environmental Impact Assessment Reports. Available at:* https://op.europa.eu/en/publication-detail/-/publication/2b399830-cb4b-11e7-a5d5-01aa75ed71a1

*Table 16-2 Classification of Likelihood (Source: DHLGH, 2024)*

| Ranking | Classification | Average Recurrence Interval |
|---|---|---|
| 1 | Extremely Unlikely | 100 or more years between occurrences. |
| 2 | Very Unlikely | 51-100 years between occurrences. |
| 3 | Unlikely | 11-50 years between occurrences. |
| 4 | Likely | 1-10 years between occurrences. |
| 5 | Very Likely | Ongoing /Less than one year between occurrences. |
| Ranking | Classification | Average Recurrence Interval* |

**Note: statistical [14] estimate of the average period of time between occurrences of an event of given scale*

## Classification of Impact

The impact rating assigned to each risk has been determined on a precautionary basis, assuming that all proposed mitigation measures and/or safety procedures within Section 16.4.3 below have failed to prevent the major accident and/or disaster. The consequence rating assigned in Table 16-3 therefore reflects the potential consequence of the event occurring before reliance is placed on external emergency response arrangements. The Fire and Emergency Operations Plan 2022-2026 Kilkenny County Council Fire and Rescue Service and the HSE South East (Area 5) Emergency Plan: Covering Geographical Areas of Counties Carlow, Kilkenny, South Tipperary, Waterford and Wexford, (November, 2019) is considered as part of the wider emergency preparedness and response context and would assist in reducing the actual consequences of a major accident or disaster, should one occur; however, they have not been used to reduce the impact ratings assigned in this assessment.

The impact of a risk to/from the Proposed Project has been determined where one or more aspects of the consequence of the impact description are met, i.e., risks that have no consequences have been excluded from the assessment. In determination of the consequence rating, the highest score under any of the impact categories (People, Environment, Essential Services or Social) is allocated, not the mean or aggregate.

[14] *Australian National Emergency Risk Assessment Guidelines (2020) Available at: https://knowledge.aidr.org.au/resources/handbook-nationalemergency-risk-assessment-guidelines/*

*Table 16-3 Classification of Impact (Source: DoHLGH, 2024)*

| Impact Category | People | Environment | Essential Services | Social |
|---|---|---|---|---|
| 1 Very Low Impact | Deaths less than 1 in 250,000 people for population of interest<br><br>OR<br><br>Critical injuries/illness less than 1 in 250,000<br><br>OR<br><br>Serious injuries less than 1 in 100,000<br><br>OR<br><br>Minor injuries only | Simple localised contamination | Very low disruption to the delivery of services essential for the maintenance of vital societal functions or economic activities | Limited disruption to community |
| 2 Low Impact | Deaths greater than 1 in 250,000 people for population of interest<br><br>OR<br><br>Critical injuries/illness greater than 1 in 250,000<br><br>OR<br><br>Serious injuries greater than 1 in 100,000 | Simple, regional contamination, effects of short duration | Low disruption to the delivery of services essential for the maintenance of vital societal functions or economic activities | Community functioning with considerable inconvenience |
| 3 Moderate Impact | Deaths greater than 1 in 100,000 people for population of interest | Heavy contamination localised effects of extended duration | Medium disruption to the delivery of services essential for the | Community functioning poorly |

| Impact Category | People | Environment | Essential Services | Social |
|---|---|---|---|---|
| | OR<br><br>Critical injuries/illness greater than 1 in 100,000<br><br>OR<br><br>Serious injuries greater than 1 in 40,000 | | maintenance of vital societal functions or economic activities | |
| 4 High Impact | Deaths greater than 1 in 100,000 people for population of interest<br><br>OR<br><br>Critical injuries/illness greater than 1 in 100,000<br>OR<br><br>Serious injuries greater than 1 in 40,000 | Heavy contamination, widespread effects or extended duration | High disruption to the delivery of services essential for the maintenance of vital societal functions or economic activities | Community only partially functioning |
| 5 Very High Impact | Deaths greater than 1 in 40,000 people for population of interest<br><br>OR<br><br>Critical injuries/illness greater than 1 in 40,000<br><br>OR<br><br>Serious injuries greater than 1 in 20,000 | Very heavy contamination, widespread effects of extended duration | Loss of delivery of services essential for the maintenance of vital societal functions or economic activities | Community unable to function without 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 the means of a risk matrix.

The risk matrix sourced from the DoHLGH (2024) '*A Framework for Major Emergency Management – A Guide to Regional Risk Assessment*' has been amended to align with the EPA (2014) *Guidance on assessing and costing environmental liabilities*' risk matrix (and as outlined in Table 16-4 below) indicates the critical nature of each risk. This risk matrix has then been applied to evaluate each of the risks associated with the Proposed Project. 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'; and
- The green zone represents 'low risk scenarios.'

*Table 16-4 Classification of Impact: Risk Matrix Zone (Source: EPA, 2014)*

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

## 16.3 Baseline Environment

The functional area of Kilkenny County Council falls under the South-East Major Emergency Region (MEM). The HSE South East (Area 5) Emergency Plan: Covering Geographical Areas of Counties Carlow, Kilkenny, South Tipperary, Waterford and Wexford, November 2019) outlines the following potential major emergency scenarios in the region:

1. ***Transport:***
    a. ***Major Road Traffic Accident:*** *Applicable to all road networks.*
    b. ***Major Rail Accident:*** *Applicable to all rail networks.*
    c. ***Air Accident/Incident:*** *Applicable to Waterford Regional Airport, Kilkenny Airfield, and flight paths.*
    d. ***Incident Involving Ship/Boat/Ferry Near Shore/Off Shore:*** *All coastal areas, ports, ferries, passenger craft and ships.*
2. ***Technological:***
    a. ***Fire/Explosion:*** *Applicable to all areas.*
    b. ***Release of Harmful Substances During Transportation:*** *Applicable to all areas*
    c. ***Fire/Explosion of Hazardous Materials (on site):*** *Applicable to large industrial sites including Seveso sites.*
    d. ***Large Building Collapse:*** *Applicable to urban centres in particular, and all areas with large buildings.*
    e. ***Environmental Pollution of Water/Land/Contaminated Drinking Water:*** *Applicable to all areas.*
3. ***Civil:***
    a. ***Emerging Viral Threats:*** *Applicable to all areas.*
    b. ***Terrorism:*** *Applicable to all areas.*
    c. ***Loss of Critical Infrastructure:*** *Applicable to all areas.*
    d. ***Public Events/Crowd Safety:*** *Applicable to public event/sporting events.*
    e. ***Animal Disease:*** *Applicable to all areas.*
4. ***Natural:***
    a. ***Meteorological Events – Storms, gales, Flooding, Freezing Temperatures, Tsunamis, Landslides:*** *Applicable to all areas.*

The risks which are most relevant to this assessment are described below

### 16.3.1 Transport

The Proposed Project will utilise the existing road network during the construction phase. Construction related traffic will comprise both turbine component and construction materials delivery and the subsequent return of empty vehicles, and daily construction staff movements to and from the Site.

It is proposed that large wind turbine components will be delivered to the Site, under Garda escort and mainly at night.

Potential impacts that may occur on the identified road networks could be caused by an accident during the delivery of the turbines, collisions onsite and offsite with vehicles involved in construction and operation of the Proposed Project, and damage to critical transport infrastructure caused by extreme weather i.e., periods of heavy rainfall, taking into account climate change and strong winds. As detailed in Chapter 15 Material Assets of this EIAR, the localised traffic disruptions due to other proposed works will be mitigated using industry standard traffic management measures. These traffic management measures will be designed in accordance with the Department of Transport's '*Guidance for the Control and Management of Traffic at Roadworks – Second Edition (2010)*'.

## 16.3.2 Technological

There are no large industrial sites within, or adjacent to the Site. The nearest Seveso site is Grassland Fertilizer Yard (Upper Tier SEVESO site) which is located in Palmerstown, Co. Kilkenny, approximately 15.6km southeast from the Proposed Wind Farm at its closest points (T1). The Site is also not located within an or adjacent to an urban centre.

The Proposed Project has the potential to cause contamination and pollution of soil and ground and surface water from potential release of hydrocarbons, earthworks and excavations during the construction phase. These impacts are addressed in detail in Chapter 8 Land Soil and Geology and Chapter 9 Hydrology and Hydrogeology of this EIAR and are not related to either the vulnerability of the Proposed Project to natural disasters or major accidents nor the potential for the Proposed Project to cause natural disasters or accidents. Accidental spillage during refuelling of construction plant with petroleum hydrocarbons is a pollution risk. The accumulation of small spills of fuels and lubricants during routine plant use can also be a significant pollution risk. Large spills or leaks have the potential to result in significant effects (i.e., contamination of subsoils and pollution of the underlying aquifer) on the geological and water environment. Best practise measures pertaining to hydrocarbon use and storage as detailed in Chapter 8 and the CEMP (Appendix 4-3) will minimise the potential for these impacts to occur. The release of wastewater at the Site could pose a risk to down gradient groundwater wells, groundwater quality and surface water quality. Proven and effective methods to mitigate against these potential impacts are detailed in Chapter 9 Hydrology and Hydrogeology and best practise measures during all phases of the development (CEMP Appendix 4-3), which minimise the potential for leaks and will break the potential pathways between any source and receptor therefore resulting in no residual effects. Indirect impacts associated with major accidents and / or natural disasters on contamination are considered further in Section 16.4.1.

There is potential for hazardous materials in the form of hydrocarbons to be transported to and used on site. Mitigation measures as best practice as detailed in Chapter 9 Hydrology and Hydrogeology and the CEMP (Appendix 4-3), respectively, will minimise the potential for leaks and will break the potential pathways between any source and receptor therefore resulting in no residual effects. The removal of hazardous materials will be done so by licenced operators for disposal at licensed waste facilities. There is limited potential for hazardous material release during the operational phase of the Proposed Project. On occasion, operational maintenance crew may need to dispose of hydrocarbon waste such as oil that may be required during turbine maintenance procedures. Any waste that does arise will be minimal and waste management will be carried out in accordance with '*Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects'* (2021) produced by the EPA.

The CEMP includes a Waste Management Plan (WMP) which outlines the best practice procedures during the decommissioning phases of the project. The WMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of decommission of the Proposed Project. Disposal of waste will be seen as a last resort. Please see the CEMP (Appendix 4-3) for best practice measures to prevent the creation of waste during the decommissioning phase. Please see Appendix 4-6 for the Decommissioning Plan.

The likelihood of fire occurring at the Proposed Project is low. The likelihood of fire occurring will be further lowered by the implementation of good site management practices during the construction, operational and decommissioning phases.

Appendix 4-4 of the EIAR sets out the Fire Risk Management and Emergency Response Plan for the proposed BESS, detailing mitigation measures, emergency procedures, and actions to protect people, emergency responders, and the environment in the event of a fire.

During construction of the Proposed Project, 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) which will be prepared prior to the construction phase and 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. Please see Chapter 4 Description and Appendix 4-3 CEMP for details.

The presence of karst features within the Site has the potential to result in ground instability, subsidence and localised ground collapse during the construction and operational phases of the Proposed Project. Karst features can be associated with underground cavities, voids and areas of weakened bedrock, which may pose a risk to the structural integrity of wind turbine foundations, hardstands, access roads and other associated infrastructure. The construction of infrastructure over such features has the potential to result in differential settlement or ground collapse, particularly where substantial loads are placed on unstable ground. Detailed desk studies, intrusive ground investigations and geophysical surveys have been undertaken to assess the potential for karst features within the Site, the details of which are provided in Appendix 8-3 of this EIAR.

The investigations identified karst features within the southern portion of the Site, including the site entrance road and the area encompassing T1 to T4. The remainder of the Site is not considered susceptible to the formation of karst features. The design of the Proposed Project has taken account of the underlying geology. Any surface depressions or suspected doline features identified within the footprint of turbine bases, hardstands, construction compounds, met mast foundations or access roads will be excavated and replaced with engineered fill and geogrid reinforcement. Where required, suitable structural foundation solutions, such as piling, will be implemented for turbine bases to ensure adequate ground stability. The construction of the main infrastructural elements of the Proposed Project will also be overseen by a suitably qualified geotechnical engineer or engineering geologist with experience in identifying surface karst features. These measures will minimise the potential for ground instability, subsidence or collapse during the construction and operational phases of the Proposed Project. Subject to the implementation of the proposed mitigation measures and confirmation of suitable foundation conditions, the risk of a major accident arising from the presence of karst features is considered to be low. The potential impacts associated with karst features and the proposed engineering measures are addressed in Chapter 8 Land, Soils and Geology of the EIAR.

### 16.3.3 Civil

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. EirGrid operates the grid from National Control Centres (NCCs) in Dublin and Belfast, matching electricity production to customer demand, switching from different electricity generators where required to ensure no power outages. Therefore, any technical fault at the Proposed Project is unlikely to significantly impact the local or national electricity supply.

The Proposed Project will connect to the national electricity grid via a 110kV underground electrical cabling connection from the Proposed 110kV Substation to the existing 110kV Ballyragget substation, in the townland of Moatpark, Co. Kilkenny. The two substations will be connected via 12.6km of underground electrical cabling primarily located in the public road network with approximately 1.5km of the Proposed 110kV Underground Cabling within the Proposed Wind Farm internal road network, approximately 9.6km proposed within Local Roads, 770m proposed within National Roads (N77) and 653m proposed within private agricultural lands in Moatpark, Co. Kilkenny. Full details of the Proposed Grid Connection are provided in Section 4.3.2 of Chapter 4 Description of the Proposed Project.

With the implementation of requested buffers identified in Chapter 15 Material Assets, the Proposed Project will have no impact on telecommunications networks as it will not physically interact with any of infrastructure of this nature.

The likelihood of a civil emergency, as described above, occurring at the Site is anticipated to be low. Major crowd safety and civil disorder are not relevant to the Site. Access will be to authorised personnel only during the construction, operational and decommissioning phases

### 16.3.4 Natural

Chapter 9 Hydrology and Hydrogeology of this EIAR provides detailed assessment regarding the susceptibility of the Proposed Project to flooding. A flood risk identification study was undertaken in Chapter 9 to identify existing potential flood risks associated with the Proposed Project, with a site-specific flood risk assessment (FRA) provided as Appendix 9-1. Based on the information provided in the stated documents, the areas of the Proposed Project at risk of flooding were identified.

No recurring or past flood incidents within the Site were identified from OPW's Past Flood Event Mapping.

The closest past flood event to the Proposed Wind Farm site is at The Loughans Turlough (Flood ID 742), located 2.7km to the southwest of the Proposed Wind Farm site. The flooding is reported as recurring and the source is the groundwater (i.e. turlough). This is located in the vicinity of the TDR temporary accommodation areas in the townlands of Balief Lower and Balief Upper, Co. Kilkenny. The closest recurring flood event to the Proposed Grid Connection is located along the River Nore at Ballyragget. This recurring flood event (Flood ID: 2813) is located ~1km downstream of the proposed HDD crossing under the River Nore.

Catchment Flood Risk Assessment and Management (CFRAM)[15] has not been completed for the area of the Proposed Wind Farm site. The nearest downstream CFRAM fluvial flood zones are mapped along the Nuenna River downstream of Freshford, ~2.4km to the southeast of the Proposed Wind Farm site. CFRAM flood zones are mapped along the River Nore at the Proposed 110kV Underground Cabling HDD crossing location. No CFRAM flood zones are mapped in the vicinity of the TDR accommodation areas. National Indicative Fluvial Mapping (NIFM) is available for Nuenna River at the Proposed Wind Farm site. The closest NIFM flood zone mapped along the Nuenna River ~400m south of the Proposed Wind Farm site. Some NIFM fluvial flood zones are mapped along the Proposed 110kV Underground Cabling route at 3 no. watercourse crossing locations and along public roads. These flood zones are associated with the Gorteenahilla and Lisdowney streams. No NIFM flood zones are mapped to overlap with the TDR accommodation areas.

Therefore, from a fluvial flood risk perspective, the Proposed Wind Farm site, including all Proposed Turbines, is located Flood Zone C and is at a low risk of fluvial flooding. Most of the Proposed 110kV Underground Cabling route is located in Flood Zone C. However, some sections of the route, in the vicinity of local watercourses are mapped in CFRAM and NIFM fluvial flood zones. Due to the nature of the Proposed 110kV Underground Cabling, this will have no effect during the operational phase of the Proposed Project.

Furthermore, the Proposed Project will be constructed with its own drainage system which will provide additional surface water attenuation. The overall risk of flooding posed at the Proposed Wind Farm site is assessed to be low, and all proposed infrastructure will be located at or above Flood Zone C elevations. Please refer to the Chapter 9 Hydrology and Hydrogeology and Appendix 9-1 Flood Risk Assessment of this EIAR for further details.

[15] *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.*

As detailed in Chapter 8 of this EIAR, there are no areas of peat within the Site (Proposed Wind Farm and Proposed Grid Connection), as per the published soils map (www.epa.ie) and published subsoils maps (www.gsi.ie), no peat has been logged or identified on the Site. The Site is not a peatland site and so there is low/no potential for peat slides or landslides.

### Storms

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The dominant influence on Ireland's climate is the Atlantic Ocean and Gulf Stream. Therefore, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitude.

Chapter 11 Climate of this EIAR provides a full description of the baseline environment in relation to weather. In terms of adverse weather conditions, in late 2023 and early 2024, Ireland experienced a very active storm season; the country was affected by 13-14 severe storms[16]. In the 2024/2025 storm season there were 6 no. named storms, with Storm Eowyn, occurring in January 2025, reaching hurricane force winds (maximum wind speed recorded as 184km/h). At the time of writing there have been 2 no. named storms in the 2025/2026 storm season.[17] These storm events are typically characterised by combinations of strong winds, intense rainfall, and localised flooding, which can act individually or cumulatively to increase the risk of major accidents or natural disasters at and around the Proposed Project. Climate change is impacting weather patterns in the Northern European region with a range of observable effects including increased wind speeds, increased precipitation, more extreme precipitation events, changes in wind direction and seasonal variations[18].

The climate change risk assessments included in the Kilkenny County Council Climate Action Plan[19] detail the major risks posed from climate change, being river flooding, pluvial flooding, severe windstorms, heatwaves, and drought. The changes in frequency in intensity of weather patterns as a result of climate change will continue to influence the wide range of functions caried out by Local Authorities. The identification of future risks is critical to enable the progression of adaptation and mitigation measures in the development and execution of plans and policies. Please see Section 11.3 of Chapter 11: Climate of the EIAR for further information on the baseline environment and future environment relative to climate change.

Potential impacts that may occur on the identified road networks could be caused by an accident during the delivery of the turbines, collisions onsite and offsite with vehicles involved in construction operation, and decommissioning of Proposed Project, and damage to critical transport infrastructure caused by extreme weather, i.e., periods of heavy rainfall, taking into account climate change and strong winds.

Please see Section 16.3.1.2 above for further information on potential impacts associated with major road traffic accidents

## 16.4 Risk Assessment

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

[16] *Met Éireann, 2024. Human-caused Climate Change Brings Increased Storm Rainfall. Available at: https://www.met.ie/human-caused-climate-change-brings-increased-storm-rainfall*
[17] *https://www.met.ie/climate/storm-centre*
[18] *IPCC, 2021. Climate Change 2021: The Physical Science Basis. Available at: https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf*
[19] *Kilkenny County Council, 2024. Climate Action Plan. Available at: https://kilkennycoco.ie/eng/services/environment/climate-action/kilkenny-county-council-climate-action-plan-2024-2029.pdf*

These risks have been assessed in accordance with the relevant classification as outlined in Table 16-2 and Table 16-3.

As outlined in Section 16.2.4.2.2, the consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

## 16.4.1 Likely Significant Effects

### 16.4.1.1 Do-Nothing Scenario

If the Proposed Project were not to proceed, the existing use of the Proposed Wind Farm for small-scale agricultural farming practices and forestry would continue, and public road corridor and small-scale agricultural farming practices along the Proposed Grid Connection.

The opportunity to capture part of County Kilkenny's valuable renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions if the Proposed Project was not to proceed. The opportunity to generate local employment and investment and to diversify the local economy would also be lost.

### 16.4.1.2 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 Project. Seven risks specific to the construction of the Proposed Project have been identified and are presented in Table 16-5.

*Table 16-5 Risk Register - Construction Phase*

| Risk ID | Potential Risk | Possible Cause |
|---|---|---|
| Potential vulnerability to disaster risks | | |
| A | **Critical Infrastructure Emergencies**<br><br>Risk of delivery of turbines and infrastructure to site. | Traffic accident during turbine delivery or extreme weather periods of heavy rainfall, taking into account climate change and strong winds |
| B | **Severe Weather**<br><br>Risk to construction activity on site | Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds |
| C | **Flooding**<br><br>Risk of flooding in areas surrounding the Proposed Project impacting the construction phase and leading to environmental emissions | Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds |
| D | **Karst Risk** | Surface karst features (predominantly dolines) present in the southern portion of the Site |

| | | |
|---|---|---|
| | localised ground collapse during the construction phase of the Proposed Project | |
| Potential to cause accidents and / or disasters. | | |
| E | **Utility emergencies**<br><br>Risk of construction activity along the Proposed 110kV Underground Cabling. | Construction activity along Proposed 110kV Underground Cabling and road network impacting on local services and utilities |
| F | **Traffic Incident**<br><br>Collisions onsite and offsite with vehicles involved in construction of Proposed Project. | Driver negligence or failure of vehicular operations on Proposed Project roads (Proposed Wind Farm access roads and public road network in which Proposed 110kV Underground Cabling is proposed).<br><br>Traffic Management not implemented |
| G | **Contamination**<br><br>Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater.<br><br>Discharge due to horizontal directional drilling (HDD) frack out on Proposed 110kV Underground Cabling works area. | Accidental fuel spillage during delivery to site.<br><br>Failure of fuel storage tank or tanks in plant and machinery and vehicles leading to uncontrolled emissions.<br><br>Drainage and seepage water resulting from accident during infrastructure excavation;<br><br>Stockpiled excavated material becoming unstable and providing a point source of exposed sediment;<br><br>Excavation works during the construction of the Proposed Project which may result in entrainment of sediment from the excavations during construction; and,<br><br>Frack Out associated with HDD along Proposed 110kV Underground Cabling route which may result in sediment release to surface water. |
| H | **Fire / Gas Explosion** | Equipment or infrastructure failure;<br><br>Electrical problems; and<br><br>Employee negligence. |
| I | **Collapse / damage to structures** | Earthquake, land slide, extreme weather events; and |

| | | |
|---|---|---|
| | | Vehicular collisions due to driver negligence on public roads.<br><br>Traffic Management not implemented |

### 16.4.1.3 Assessment of Effect During Operation

Six risks specific to the operation of the Proposed Project have been identified and are presented in Table 16-6.

*Table 16-6 Risk Register – Operational Phase*

| Risk ID | Potential Risk | Possible Cause |
|---|---|---|
| Potential vulnerability to disaster risks | | |
| J | **Severe Weather**<br><br>Risk to operational activity on site, blade or turbine damage | Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds. |
| K | **Flooding**<br><br>Risk of flooding in areas surrounding the Proposed Project impacting the construction phase and leading to environmental emissions | Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds |
| L | **Contamination**<br><br>Discharge or spillage of fuel, chemical solvents, sewage or wastewater into watercourse or percolated to groundwater | A vehicular incident on the public road involving fuel, wastewater or sewage transportation in the operational phase.<br><br>Spill or leak of oil during operational maintenance. |
| M | **Fire / Gas Explosion** | Equipment or infrastructure failure;<br><br>Electrical problems; and<br><br>Employee negligence. |
| Potential to cause accidents and / or disasters. | | |
| N | **Collapse / damage to structures** | Earthquake, land slide, extreme weather events; and<br><br>Vehicular collisions due to driver negligence on public roads. |
| O | **Traffic Incident**<br><br>Collisions onsite and offsite with vehicles involved in operation of Proposed Project. | Driver negligence or failure of vehicular operations on Proposed Wind Farm roads.<br><br>Traffic Management not implemented |

### 16.4.1.4 Identification of Effect During Decommissioning

Four risks specific to the decommissioning of the Proposed Project have been identified and are presented in Table 16-7.

*Table 16-7 Risk Register – Decommissioning Phase*

| Risk ID | Potential Risk | Possible Cause |
|---|---|---|
| Potential vulnerability to disaster risks | | |
| P | **Severe Weather**<br><br>Risk to decommissioning activity on the Proposed Project leading to environmental emissions | Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds. |
| Q | **Flooding**<br><br>Risk of flooding in areas surrounding the Proposed Project impacting the decommissioning phase and leading to environmental emissions | Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds. |
| Potential to cause accidents and / or disasters. | | |
| R | **Traffic Incident**<br><br>Collisions onsite and offsite with vehicles involved in construction of Proposed Project. | Driver negligence or failure of vehicular operations on Proposed Wind Farm roads.<br><br>Traffic Management not implemented. |
| S | **Contamination**<br><br>Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater | Accidental fuel spillage during delivery to the Proposed Project.<br><br>Failure of fuel storage tank or tanks in plant and machinery and vehicles leading to uncontrolled emissions. |

These risks have been assessed in accordance with the relevant classification (Refer to Table 16-2 and Table 16-3) and the resulting risk analysis is given in Table 16-8.

The risk register is based upon possible risks associated the Proposed Project. As outlined in Section 16.2.4.2.2, the consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

## 16.4.2 Risk Assessment Summary

The risk register is based upon possible risks associated the Proposed Project. As outlined in Section 16.2.4, the likelihood of occurrence of each risk incorporates any safety procedures and proposed environment controls. The consequence rating assigned to each potential risk assumes that all proposed mitigation measures and safety procedures have failed to prevent the major accident and/or disaster.

### 16.4.2.1.1 Assessment of Effect – Summary

*Table 16-8 Risk Assessment*

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| Construction Phase | | | | | | | | |
| A | **Critical Infrastructure Emergencies** | Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds | Illness or loss of life; | 2 | The risk of traffic accident during turbine delivery and severe weather conditions impacting the identified road network is very unlikely when considering the assessment in Chapter 11 Climate (weather conditions recorded over the last 30 years within the area) and Chapter 15.1 – Traffic Assessment (turbine delivery occurring during the night, Garda patrolled, etc) | 1 | The risk of a traffic accident due to severe weather conditions during the construction 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 |
| B | **Severe Weather** | Extreme weather-periods of heavy rainfall, taking into account climate | Illness or loss of life;<br><br>Damage to, or depletion of aquatic habitats and species; | 2 | The risk of severe weather is very unlikely when considering the assessment in Chapter 11 Climate and weather conditions recorded over the last 30 years within the area. | 1 | The risk of severe weather conditions during the construction phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, | 2 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | change and strong winds | | | The works programme for the groundworks part of the construction phase of the Proposed Project will take account of weather forecasts and predicted rainfall in particular and construction will be paused if required. | | with 'no fatalities and a small number of minor injuries with first aid treatment'.<br><br>Severe weather may cause increased mobilisation of sediment which will be controlled via the Proposed Project design and mitigation measures. | |
| C | **Flooding** | Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds | Illness or loss of life;<br><br>Groundwater Flooding<br><br>Flooding to surrounding properties.<br><br>Damage to, or depletion of aquatic habitats and species; | 2 | In relation to the Proposed Wind Farm the nearest flood incident is a recurring event mapped at the village of Freshford, approximately 4km southeast from the Proposed Wind Farm (Flood ID: 2814). The closest recurring flood event to the Proposed 110kV Underground Cabling is located along the River Nore at Ballyragget. This recurring flood event (Flood ID: 2813) is located approximately 1km downstream of the proposed crossing under the River Nore. A recurring flood events is also | 1 | The risk of flooding during the construction 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'.<br><br>Flooding has the potential to cause increased sediment mobilisation however flooding is not | 2 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | | | | mapped at the Loughans Turlough (Flood ID:742). This is located in the vicinity of the TDR works areas CFRAM mapping has not been completed for the area of the Proposed Wind Farm site. The nearest downstream CFRAM fluvial flood zones are mapped along the Nuenna River downstream of Freshford, approximately 2.4km to the southeast of the Proposed Wind Farm site. CFRAM flood zones are mapped along the River Nore at the Proposed 110kV Underground Cabling HDD crossing location. No CFRAM flood zones are mapped in the vicinity of the TDR work areas. | | anticipated and should any flooding occur, it would be localised. | |
| D | **Karst Risk** | Construction activity on site within the footprint of turbine bases, hardstands, construction compounds, | Illness or loss of life;<br><br>Contamination of local drinking water supplies and groundwater aquifers. | 2 | The Proposed Project has been designed to minimise the potential for ground instability, subsidence or localised ground collapse. Refer to **Appendix 8-3**: Karst Assessment Report | 2 | The risk of ground instability, subsidence or localised ground collapse during the construction phase will result in a limited consequence in that there would be 'a limited number of people | 4 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | met mast foundations or access roads | | | | | affected' with 'localised effects of short duration'.<br><br>Simple contamination of environment (e.g. watercourses, aquatic habitats and associated species), localised effects of short duration. | |
| E | **Utility emergencies** | Construction activity along road network during the Proposed 110kV Underground Cabling installation impacting on local services and utilities | Illness or loss of life;<br><br>Disruption to services | 2 | Confirmatory surveys will be carried out by the Contractor to ensure that the Proposed 110kV Underground Cabling is designed to take into consideration any services and utilities with the road network.<br><br>As such the risk of a utility emergency occurring during the construction of the Proposed 110kV Underground Cabling is considered very unlikely. | 1 | The risk of impact on utilities and services during the construction phase will result in a minor consequence in that 'small number of people would be affected, with 'no fatalities and a small number of minor injuries with first aid treatment'. | 2 |
| F | **Traffic Incident** | Driver negligence or failure of vehicular operations | Injury or loss of life. | 3 | Construction vehicles, HGVs and staff vehicles will be present within the Proposed Project during the construction phase. They will utilise existing third- | 1 | A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a 'small number of people | 3 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | on the Proposed Project roads (Proposed Wind Farm access roads and public road network in which Proposed 110kV Underground Cabling route is proposed).<br><br>Traffic Management not implemented | | | party forestry tracks and the public road network and will therefore interact with local road users.<br><br>As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision during the construction of the Proposed Project, 'at some time.' Throughout the construction phase, traffic management measures will be implemented as outlined in the Traffic Management Plan (Appendix 15-2). An unlikely risk is therefore predicted. | | would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.' | |
| G | **Contamination – Fuel storage and handling**<br><br>**-General Construction** | Fuel spillage during delivery to the Proposed Project. | Release of suspended solids to groundwater.<br><br>Contamination of local | 2 | As outlined in Chapter 4 Description of the Proposed Project, fuel will be stored onsite at the Proposed Wind Farm but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or | 2 | The risk of a fuel spillage or impact on surround drainage during the construction will result in a limited consequence in that there would be 'a limited number of people | 4 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | Failure of fuel storage tank or tanks in plant and machinery and vehicles.<br><br>Drainage and seepage water resulting from infrastructure excavation.<br><br>Stockpiled excavated material providing a point source of exposed sediment.<br><br>Works during the construction of the Proposed | drinking water supplies and groundwater aquifers.<br><br>Groundwater and surface water emissions from construction activities including trench excavations and HDD (frack out) | | solvents will be stored outside of the confines of the Proposed Wind Farm.<br><br>Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures as detailed in Chapter 9 Hydrology and Hydrogeology.<br><br>Detailed mitigation measures and methodologies for the control of emissions from Proposed 110kV Underground Cabling works as described in the EIAR. Standard and specific mitigation to prevent accidents and indirect effects of accidents are included in the Proposed Project design and will be implemented. | | affected' with 'localised effects of short duration' on environmental receptors through the use of bunded containment areas during construction.<br><br>The Proposed 110kV Underground Cabling is located in private agricultural land and in the existing road network which is of low value environmental receptor.<br><br>Horizontal Directional Drilling (HDD) is planned for a limited number of locations and will be controlled to prevent significant environmental effects should frack out occur.<br><br>The potential residual environmental effects are described in detail in Chapter 9 which concludes that there will | |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | Project which may result in entrainment of sediment from the excavations or HDD. | | | | | be no significant environmental effects. | |
| H | **Fire / Gas Explosion** | Equipment or infrastructure failure;<br><br>Fuel spillage/ storage<br><br>Electrical problems; and<br><br>Employee negligence | Illness or loss of life;<br><br>Damage to, or depletion of habitats and species; and<br><br>Impacts on ambient air quality. | 2 | As outlined in Chapter 4 Description of the Proposed Project, fuel will be stored on-the Proposed Wind Farm 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.<br><br>In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the Proposed Project shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on site, and mitigation of the same during operation. | 2 | Should a fire/explosion occur at the Proposed Project, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' on people and environmental receptors due to the nature of the Proposed Project and the lack of infrastructure or fuel storage during operation that would result in any such incident.<br><br>There will be 'normal community functioning' | 4 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | in the area with 'some inconvenience' The 'generic command, control & co-ordination systems' as well as the 'common elements of response' detailed in the Kilkenny Fire and Emergency Operations Plan 2022-2026 will work to reduce the consequence (both on people and the environment) of potential fire/explosions at the Proposed Project. | |
| I | **Collapse/ damage to structures** | Earthquakes, extreme weather events; and<br><br>Vehicular collisions due to driver negligence on public roads. | Injury or loss of life. | 1 | According to the Irish National Seismic Network (INSN), earthquakes measuring ~2 on the Richter Scale are "normal" in terms of seismicity in Ireland. These are known as microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. As such, buildings in Ireland are extremely unlikely | 2 | The risk of infrastructure collapse during the operational phase will result in a limited consequence in that 'a limited number of people affected' with 'localised effects of short duration' on people and environmental receptors due to the nature of the Proposed Project. | 2 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | | | | to be damaged or collapse due to seismic activity.<br><br>Due to the transport of abnormal loads, i.e., turbine components, there is potential for bridge and/or road infrastructure collapse during turbine delivery. This impact may be exacerbated by extreme weather i.e., severe wind storms and heavy precipitation resulting from climate change.<br><br>The Proposed Project will utilise the existing road network during the construction phase. It is proposed that large wind turbine components will be delivered to the Proposed Wind Farm under Garda escort.<br><br>Having regard to public speed limits within the surrounding area of the Proposed Project, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse. | | | |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | | | | The avoidance of bridges or structural collapse, and structural reinforcement of bridge infrastructure has been a key consideration of the Proposed Project design. | | | |
| Operational Phase | | | | | | | | |
| J | **Severe Weather** | Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds | Illness or loss of life; | 2 | The risk of severe weather is very unlikely when considering the assessment in Chapter 11 Climate and weather conditions recorded over the last 30 years within the area. | 1 | The risk of severe weather conditions during the decommissioning phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. | 2 |
| K | **Flooding** | Extreme weather-periods of heavy rainfall, taking into | Illness or loss of life;<br><br>Groundwater Flooding | 2 | As detailed in Appendix 9-1, a flood risk identification study was undertaken to identify existing potential flood risks associated with the Proposed Project. In relation to the Proposed Wind | 1 | The risk of flooding during the construction phase will result in a minor consequence in that 'small number of people would be affected' | 2 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | account climate change and strong winds | Flooding to surrounding properties<br><br>Damage to, or depletion of aquatic habitats and species; | | Farm the nearest flood incident is a recurring event mapped at the village of Freshford, approximately 4km southeast from the Proposed Wind Farm (Flood ID: 2814). The closest recurring flood event to the Proposed 110kV Underground Cabling is located along the River Nore at Ballyragget. This recurring flood event (Flood ID: 2813) is located approximately 1km downstream of the proposed crossing under the River Nore. A recurring flood events is also mapped at the Loughans Turlough (Flood ID:742). This is located in the vicinity of the TDR accommodation areas CFRAM mapping has not been completed for the area of the Proposed Wind Farm site. The nearest downstream CFRAM fluvial flood zones are mapped along the Nuenna River downstream of Freshford, approximately 2.4km to the southeast of the Proposed Wind Farm site. CFRAM flood zones are mapped along the River | | should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'.<br><br>Flooding has the potential to cause increased sediment mobilisation however flooding is not anticipated and should any flooding occur, it would be localised. | |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | | | | Nore at the Proposed 110kV Underground Cabling HDD crossing location. No CFRAM flood zones are mapped in the vicinity of the TDR work areas. | | | |
| L | **Contamination** | A vehicular incident on the public road or Proposed Wind Farm internal road network involving fuel, wastewater or sewage transportation in the operational phase. | Damage to, or depletion of aquatic habitats and species<br><br>Contamination of local drinking water supplies and groundwater aquifers. | 2 | As outlined in Chapter 4 Description of the Proposed Project, fuel will not be stored on-site post construction therefore contamination caused by fuel stored on site is not considered to be a significant contamination risk. However, due to the presence of maintenance and monitoring vehicles, fuel leakage from onsite vehicle during the operational phase may occur.<br><br>As such the likelihood of fuel leakages occurring is very unlikely. | 2 | The risk of a fuel spillage or impact on surround 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. The potential residual environmental effects are described in detail in Chapter 9 Hydrology and Hydrogeology which concludes that there will be no significant environmental effects. | 4 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| M | **Fire / Gas Explosion** | Equipment or infrastructure failure;<br><br>Fuel spillage/ storage<br><br>Electrical problems; and<br><br>Employee negligence | Illness or loss of life;<br><br>Damage to, or depletion of habitats and species; and<br><br>Impacts on ambient air quality. | 2 | As outlined in Chapter 4 Description of the Proposed Project, fuel will not be stored on-site post construction therefore fuel is not considered to be a significant fire risk.<br><br>In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the Proposed Project shall be subject to a fire safety risk assessment which would assist in the identification of any major risks of fire on-site, and mitigation of the same during operation. | 2 | Should a fire/explosion occur at the Proposed Project, a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' on people and environmental receptors due to the nature of the Proposed Project and the lack of infrastructure or fuel storage during operation that would result in any such incident. There will be 'normal community functioning' in the area with 'some inconvenience' The 'generic command, control & co-ordination systems' as well as the 'common elements of response' detailed in the Kilkenny Fire and Emergency Operations | 4 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Plan 2022-2026 will work to reduce the consequence (both on people and the environment) of potential fire/explosions at the Proposed Project site. The potential for a turbine fire to impact nearby residents is considered low due to the separation distances between turbines and the nearest dwellings. Any effects arising from a fire would be expected to remain localised to the immediate turbine area, and the risk to off-site receptors is therefore considered negligible.<br><br>Appendix 4-4 of the EIAR sets out the Fire Risk Management and Emergency Response Plan for the proposed BESS, detailing mitigation measures, emergency | |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | procedures, and actions to protect people, emergency responders, and the environment in the event of a fire | |
| N | **Collapse/ damage to structures** | Earthquakes, extreme weather events; and<br><br>Vehicular collisions due to driver negligence on public roads. | Injury or loss of life. | 1 | According to the Irish National Seismic Network (INSN), earthquakes measuring ~2 on the Richter Scale are "normal" in terms of seismicity in Ireland. These are known as microearthquakes; they are not commonly felt by people and are generally recorded only on local seismographs. As such, buildings in Ireland are extremely unlikely to be damaged or collapse due to seismic activity.<br><br>Having regard to public speed limits within the Proposed Wind Farm, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse.<br><br>As outlined in Chapter 11 of this EIAR, due to Ireland's latitudinal | 2 | The risk of infrastructure collapse during the operational phase will result in a limited consequence in that 'a limited number of people affected' with 'localised effects of short duration' on people and environmental receptors due to the nature of the Proposed Project. | 2 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | | | | position, the probability of extreme weather events posing a threat to the built environment are low. However, in the circumstance of such a weather event occurring at the site of the Proposed Project during the operational phase, the measures set out in the HSE South-East (Area 5) Major Emergency Plan will be followed.<br><br>Having regard to public speed limits within the Proposed Wind Farm site, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse. | | | |
| O | **Traffic Incident** | Driver negligence or failure of vehicular operations on the Proposed Wind Farm roads. | Injury or loss of life. | 3 | Construction vehicles, HGVs and staff vehicles will be present within and around the Proposed Project during the construction phase. They will access the Proposed Wind Farm via the public road network and will therefore interact with local road users. | 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 | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | Traffic Management not implemented | | | As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision during the construction of the Proposed Project, 'at some time.' Throughout the construction phase, traffic management measures will be implemented as outlined in the Traffic Management Plan (Appendix 15-2). An unlikely risk is therefore predicted. | | minor injuries with first aid treatment.' | |
| **Decommissioning Phase** | | | | | | | | |
| P | **Severe Weather** | Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds | Illness or loss of life;<br><br>Damage to, or depletion of aquatic habitats and species; | 2 | The risk of severe weather is very unlikely when considering the assessment in Chapter 11 Climate and weather conditions recorded over the last 30 years within the area.<br><br>Decommissioning works will be paused should a Status Red weather warning alert be issued by Met Eireann as is standard practice | 1 | The risk of severe weather conditions during the decommissioning phase will result in a minor consequence in that 'small number of people would be affected' should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'. | 2 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Decommissioning will not require significant excavations works. There is no real likelihood of any impact on any environmental receptors | |
| Q | **Flooding** | Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds | Illness or loss of life;<br><br>Groundwater Flooding<br><br>Flooding to surrounding properties<br><br>Damage to, or depletion of aquatic habitats and species; | 2 | As detailed in Appendix 9-1, a flood risk identification study was undertaken to identify existing potential flood risks associated with the Proposed Project. In relation to the Proposed Wind Farm the nearest flood incident is a recurring event mapped at the village of Freshford, approximately 4km southeast from the Proposed Wind Farm (Flood ID: 2814). The closest recurring flood event to the Proposed 110kV Underground Cabling is located along the River Nore at Ballyragget. This recurring flood event (Flood ID: 2813) is located approximately 1km downstream of the proposed crossing under the River Nore. A recurring flood events is also | 1 | The risk of flooding during the construction 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'.<br><br>Flooding has the potential to cause increased sediment mobilisation however flooding is not anticipated and should any flooding occur, it would be localised. | 2 |

| Risk ID | Potential Risk | Possible Cause | Environmental Effect | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | | | | mapped at the Loughans Turlough (Flood ID:742). This is located in the vicinity of the TDR works areas CFRAM mapping has not been completed for the area of the Proposed Wind Farm site. The nearest downstream CFRAM fluvial flood zones are mapped along the Nuenna River downstream of Freshford, approximately 2.4km to the southeast of the Proposed Wind Farm site. CFRAM flood zones are mapped along the River Nore at the Proposed 110kV Underground Cabling HDD crossing location. No CFRAM flood zones are mapped in the vicinity of the TDR work areas. | | | |
| R | **Traffic Incident** | Driver negligence or failure of vehicular operations on the Proposed Wind Farm roads. | Injury or loss of life. | 3 | A limited number of vehicles will be permitted on the Proposed Project as part of the decommissioning phase.<br><br>As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision to occur on the Proposed Project | 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 | Likelihood Rating | Basis of Likelihood | Consequence Rating | Basis of Consequence | Risk Score (Consequence x Likelihood) |
|---|---|---|---|---|---|---|---|---|
| | | Traffic Management not implemented | | | site, 'at some time.' An unlikely risk is therefore predicted. | | minor injuries with first aid treatment.' | |
| S | **Contamination** | Fuel spillage during delivery to the Proposed Project.<br><br>Failure of fuel storage tank or tanks in plant and machinery and vehicles. | Damage to, or depletion of aquatic habitats and species<br><br>Discharge to groundwater | 2 | As outlined in Chapter 4 Description of the Proposed Project, fuel will be stored on-the Proposed Project 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.<br><br>Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage measures as detailed in Chapter 9 | 2 | The risk of a fuel spillage or impact on surrounding drainage during decommissioning will result in a limited consequence where 'a limited number of people affected' with 'localised effects of short duration' through the use of bunded containment areas during decommissioning. The potential residual environmental effects are described in detail in Chapter 9 Hydrology and Hydrogeology which concludes that there will be no significant environmental effects. | 4 |

The risk assessment for each of the potential risks identified are consolidated in Table 16-9 which provides their risk score. A corresponding risk matrix is provided in Table 16-10, which is colour coded in order to provide an indication of the critical nature of each risk. As outlined in Section 16.2.4.2 the red zone represents 'high risk' scenarios, the amber zone represents 'medium risk' scenarios and the green zone represents 'low risk' scenarios.

*Table 16-9 Risk Scores*

| Risk ID | Potential Risk | Likelihood Rating | Consequence Rating | Risk Score |
|---|---|---|---|---|
| **Construction Phase** | | | | |
| A | Critical Infrastructure Emergencies | 2 | 1 | 2 |
| B | Severe Weather | 2 | 1 | 2 |
| C | Flooding | 2 | 1 | 2 |
| D | Karst Risk | 2 | 2 | 4 |
| E | Utility company emergencies | 2 | 1 | 2 |
| F | Traffic Incident | 3 | 1 | 3 |
| G | Contamination | 2 | 2 | 4 |
| H | Fire / Gas Explosion | 2 | 2 | 4 |
| I | Collapse/ damage to structures | 1 | 2 | 2 |
| **Operational Phase** | | | | |
| J | Severe Weather | 2 | 1 | 2 |
| K | Flooding | 2 | 1 | 2 |
| L | Contamination | 2 | 2 | 4 |
| M | Fire / Gas Explosion | 2 | 2 | 4 |
| N | Collapse/ damage to structures | 1 | 2 | 2 |
| O | Traffic Incident | 3 | 1 | 3 |
| **Decommissioning Phase** | | | | |
| P | Severe Weather | 2 | 1 | 2 |
| Q | Flooding | 2 | 1 | 2 |
| R | Traffic Incident | 3 | 1 | 3 |
| S | Contamination | 2 | 2 | 4 |

Table 16-10 presents the potential risks identified during the construction, operation and decommissioning of the Proposed Project, all of which can be classified as 'low-risk' scenarios. On this basis none of the assessed risks have the potential to have a significant effect on the environment. Therefore, the overall effect is Not Significant.

*Table 16-10 Risk Matrix*

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

The scenarios with the highest risk score (risk scores of 4 or higher) in terms of a major accident and/or natural disaster during the construction, operation and decommissioning phase of the Proposed Project are identified below. It should be noted specific mitigation measures are proposed for the lower risk score scenarios (risk score of 3 or below) and are described in detail in their relevant chapters.

## Contamination Events During Construction, Operation and Decommissioning

There is a potential risk of contamination from site activities during the construction, operation and decommissioning phases from potential release of hydrocarbons. Hydrocarbons, in the form of fuel, hydraulic fluids, lubricants, oils etc. may result from improper storage or activities such as refuelling. The risk of contamination was given a risk score of 4 on a precautionary basis. However, as outlined in Chapter 8 Land, Soils and Geology Section 8.5.2, and Chapter 9 Hydrology & Hydrogeology, Section 9.5.2, 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 and will have Low Impact when considering the RWCS, representing a 'low-risk scenario' during the construction, operation and decommissioning phases.

It is therefore considered that there will be temporary, moderate, negative effect, which is Not Significant associated with contamination events during the construction, operation and decommissioning of the Proposed Project.

## Major Fire During Construction, Operation and Decommissioning

There is a potential risk of fire at the Site. However, as outlined in Section 16.3.1.4, the scope of this assessment has been based on the understanding that the Proposed Project will be designed, built and operated in line with current best practices in wind energy development. Further, in accordance with

Chapter 18: Schedule of Mitigation and Monitoring Measures of the Safety, Health and Welfare at Work Acts 2005 to 2014, the Proposed Project shall be subject to a fire safety risk assessment which will assist in the identification of any major risks of fire on site.

Therefore, the risk of fire occurring at the Proposed Project resulting in a major accident and/or disaster was given a risk score of 4 on a precautionary basis. This indicates a scenario that is 'very unlikely' to occur and having 'Low Impact when considering the RWCS, representing a 'low-risk scenario' during the construction, operational and decommissioning phases.

It is therefore considered that there will be temporary, moderate, negative effect, which is Not Significant associated with major fire during the construction, operation and decommissioning of the Proposed Project.

### Karst Risk During Construction

There is a potential risk of ground instability, subsidence and localised ground collapse during the construction phase of the Proposed Project. The risk of ground instability was given a risk score of 4. The risk of ground instability has been minimised through the careful design of the Proposed Project and will be further limited through the implementation of the best practice construction control measures outlined in Appendix 8-3 of the EIAR.

The risk of ground instability is 'very unlikely' to occur and will have 'limited' consequences should it do so, representing a 'low-risk scenario' during the construction phase. The presence of karst features within the Site has the potential to result in ground instability, subsidence and localised ground collapse during the construction and operational phases of the Proposed Project. Karst features can be associated with underground cavities, voids and areas of weakened bedrock, which may pose a risk to the structural integrity of wind turbine foundations, hardstands, access roads and other associated infrastructure. The construction of infrastructure over such features has the potential to result in differential settlement or ground collapse, particularly where substantial loads are placed on unstable ground. Detailed desk studies, intrusive ground investigations and geophysical surveys have been undertaken to assess the potential for karst features within the Site, the details of which are provided in Appendix 8-3 of this EIAR.

The investigations identified karst features within the southern portion of the Site, including the site entrance road and the area encompassing T1 to T4. The remainder of the Site is not considered susceptible to the formation of karst features. The design of the Proposed Project has taken account of the underlying geology. Any surface depressions or suspected doline features identified within the footprint of turbine bases, hardstands, construction compounds, met mast foundations or access roads will be excavated and replaced with engineered fill and geogrid reinforcement. Where required, suitable structural foundation solutions, such as piling, will be implemented for turbine bases to ensure adequate ground stability. The construction of the main infrastructural elements of the Proposed Project will also be overseen by a suitably qualified geotechnical engineer or engineering geologist with experience in identifying surface karst features. These measures will minimise the potential for ground instability, subsidence or collapse during the construction and operational phases of the Proposed Project. Subject to the implementation of the proposed mitigation measures and confirmation of suitable foundation conditions, the risk of a major accident arising from the presence of karst features is considered to be low. The potential impacts associated with karst features and the proposed engineering measures are addressed in Chapter 8 Land, Soils and Geology of the EIAR

## 16.4.3 Mitigation Measures During Construction, Operation and Decommissioning

As outlined in Section 16.4.1 and Section 16.4.2, the scenarios with the highest risk scores in terms of the occurrence of major accident and/or disaster during construction, operation and decommissioning were identified as 'Contamination Events', 'Karst Risk' and 'Major Fire' risk.

The Proposed Project will be designed and built in line with current best practice and, as such, mitigation against the risk of major accidents and/or disasters will be embedded through the design. In accordance with the provision of the European Commission "*Guidance on the preparation of Environmental Impact Assessment Reports*"[20], a Risk Management Plan (RMP) will be prepared and implemented on the Site to ensure an effective response to disasters or the risk of accidents. The RMP will include sufficient preparedness and emergency planning measures.

### 16.4.3.1 Contamination Events

Potential effects associated with contamination during construction, operation and decommissioning are addressed fully in in Section 8.5 of Chapter 8: Land, Soils and Geology and Section 9.5 of Chapter 9: Hydrology & Hydrogeology. The mitigation measures outlined in Chapter 8 and Chapter 9 to protect environmental receptors as well as the procedures and measures described in the CEMP will ensure that the risk from these sources is low.

A CEMP has been prepared for the Proposed Project and is included in Appendix 4-3 of this EIAR. The above Major Accidents and Natural Disaster Risk Assessment forms the basis of the Emergency Response Plan (ERP) which is contained within the CEMP. Upon a grant of planning permission for the Proposed Project, the CEMP will be updated to reflect the conditions stipulated in the consent prior to the commencement of the development. The CEMP will be a live document, maintained by the contractor, that will work to ensure that potential risks of major accident and/or disaster are identified, avoided and mitigated, as necessary. Refer to Appendix 4-3 for the CEMP that sets out the minimum standards to be employed by the contractor.

All mitigation measures proposed as part of this project are also listed in Chapter 18: Schedule of Mitigation and Monitoring Measures.

### 16.4.3.2 Major Fire

The Proposed Project will also be subject to a fire safety risk assessment in accordance with Chapter 19 of the Safety, Health and Welfare at Work Acts 2005 to 2021, which will assist in the identification of any major risks of fire on the Site, and mitigation of the same during construction, operation and decommissioning. The ERP includes hazard identification procedures and mitigation measures which the site Supervisor/Construction Manager will carry out in case of a fire/explosion at the Site. Refer to Appendix 4-3 for an outline CEMP that sets out the minimum standards to be employed by the contractor.

Appendix 4-4 of the EIAR details the Fire Risk Management and Emergency Response Plan in relation to the Proposed Project. The Plan has been developed in relation to the effects on the environment and health and safety of the BESS following a fire emergency. The report outlines the mitigation design, procedures and actions to protect lives and safety of site and emergency services personnel, the protection of the environment, minimisation of damage and disruption and the return to normal operations. The report states the design factors which contribute to reducing the escalation in the

[20] *European Commission, 2017. Guidance on the preparation of Environmental Impact Assessment Reports. Available at:* https://op.europa.eu/en/publication-detail/-/publication/2b399830-cb4b-11e7-a5d5-01aa75ed71a1

severity of a potential incident, facilities for the emergency services and the safeguarding of the environment through fire water retention.

All mitigation measures proposed as part of this project are also listed in Chapter 18 Schedule of Mitigation & Monitoring Measures.

#### 16.4.3.3 Karst Risk

The potential risk associated with ground instability subsidence and localised ground collapse during the construction phase is addressed fully in in Section 8.5 of Chapter 8: Land, Soils and Geology and Section 9.5 of Chapter 9 Hydrology & Hydrogeology. The mitigation measures outlined in Chapter 8 and Chapter 9 to protect environmental receptors as well as the procedures and measures described in the Karst Assessment Report (Appendix 8-3) will ensure that the residual effect is considered negative, imperceptible to slight, direct, long term, unlikely effect.

A Karst Risk Assessment has been prepared for the Proposed Project and is included in Appendix 8-3 of this EIAR. A Karst Protocol has been developed and will be implemented during the construction phase to ensure that any potential karst features encountered are appropriately identified, investigated and mitigated. The protocol includes geotechnical supervision, inspection of excavation formation levels, additional ground investigations where required, and the implementation of suitable engineering solutions to ensure ground stability. Subject to the implementation of these measures, the risk of ground instability or localised collapse affecting the Proposed Project during the construction phase is considered to be low. Refer to the Karst Assessment Report in Appendix 8-3 for further details on the assessment, proposed mitigation measures and Karst Protocol.

All mitigation measures proposed as part of this project are also listed in Chapter 18 Schedule of Mitigation and Monitoring Measures.

## 16.4.4 Residual Effects

In accordance with the Risk Evaluation process outlined in Section 16.2.4.2.2, and considering the Risk Matrix in Table 16-9, the risk of a major accident and/or disaster during the construction, operation and decommissioning of the Proposed Project is considered 'low' in accordance with *'A Framework for Major Emergency Management – A Guide to Regional Risk Assessment' (DoEHLG* 2024)[21]

It is considered that when the mitigation and monitoring measures outlined in the CEMP are implemented and adhered to there the residual effects associated with the construction, operation and decommissioning of the Proposed Project will be unlikely, temporary, slight, negative effects, which are Not Significant.

## 16.4.5 Monitoring

### 16.4.5.1 Monitoring During Construction

The CEMP will be prepared/revised prior to the commencement of any works and will be a live document maintained by the contractor that will work to ensure that potential risks of major accident and/or disaster are identified, avoided and mitigated, as necessary. Refer to Appendix 4-3 for the CEMP that sets out the minimum standards to be employed by the contractor.

[21] *A Framework for Major Emergency Management – A Guide to Regional Risk Assessment' (DoEHLG 2024):* https://assets.gov.ie/static/documents/Guide_to_Regional_Risk_Assessment_September_2024.pdf

### 16.4.5.2 Monitoring During Operation

The operator of the Proposed Project will continue to assess the risk of major accidents and/or disasters on site on an ongoing basis during operation.

The maintenance programme, record of reported incidents, as well as general site activities will be monitored on an ongoing basis to ensure risk of major accidents does not increase over time.

### 16.4.5.3 Monitoring During Decommissioning

A Decommissioning Plan has been prepared (Appendix 4-6) the detail of which will be agreed with the local authority prior to any decommissioning. The Decommissioning Plan will be updated before the end of the 35-year operational period of the Proposed Wind Farm, in line with best practice decommissioning methodologies that are in place at the time of decommissioning and will be agreed with the competent authority prior to implementation. The Decommissioning Plan includes mitigation and monitoring measures that will be in place during the decommissioning phase. These can also be found in a Chapter 18: Schedule of Mitigation and Monitoring Measures which sets out all proposed Mitigation and Monitoring Measures for all three phases of the Proposed Project.

## 16.4.6 Assessment of Cumulative Effects

A search in relation to plans and projects that may have the potential to result in a cumulative impact with the Proposed Project on the environment has been carried out as part of the EIAR. The Proposed Project has been considered, in combination with existing, permitted and proposed projects and plans (wind energy or otherwise), as set out in Section 2.9 in Chapter 2 Background to the Proposed Project of this EIAR.

All elements of the Proposed Project were assessed in order to identify any cumulative effects.

A wind farm including all of its various components including cabling, substation, roads, turbines, etc., is not a recognised source of pollution. It is not subject to Industrial Emissions Directive regulation or any other EPA environmental regulatory consent. Should a major accident or natural disaster occur, the potential sources of pollution onsite during the construction, operational and decommissioning phases are limited and of low environmental risk. Sources of pollution with the potential to cause significant environmental pollution and associated negative effects such as bulk storage of hydrocarbons or chemicals, storage of wastes, management of flammable materials, etc., are limited, and so there is an inherent low level of environmental risk associated with major accident or natural disaster impacting the Proposed Project and causing environmental damage.

There is low potential for significant natural disasters to occur at the Site. Ireland is a geologically stable country with a mild temperate climate. The potential natural disasters that may occur are therefore limited and these have been assessed in the context of the whole project, cumulatively in this chapter and in the wider EIAR.

Major industrial accidents involving dangerous substances pose a significant threat to humans and the environment. Such accidents can give rise to serious injury to people or serious damage to the environment, both on and off the site of the accident. The Proposed Project is not regulated or connected to, or close to, any site regulated under the Control of Major Accident Hazards Involving Dangerous Substances Regulations, i.e., SEVESO sites. As described in Section 16.3.2, the nearest SEVESO site is Grassland Fertilizer Yard Kilkenny (Upper Tier SEVESO site) which is located approximately 15.6km southeast from the Proposed Wind Farm at its closest points (Turbine 01). Therefore, there are no potential effects from these sources. There is no likelihood of significant environmental effects cumulatively associated with major accidents.

A search in relation to plans and projects that may have the potential to result in a cumulative impact with the Proposed Project on the environment was carried out as part of the EIAR. The Proposed Project has been considered, in combination with existing, permitted and proposed developments and plans (wind energy or otherwise), as set out in Section 2.9 in Chapter 2 of this EIAR, along with Appendix 2-3 of this EIAR.

Following a detailed assessment of the potential for any further impact when considered in combination with any or all of the plans and projects set out in Chapter 2 Background to the Proposed Project, with mitigation measures in place, was found to have no potential for significant in-combination or cumulative increase in the vulnerability of the Proposed Project or adjacent areas to major accidents and/or natural disasters. This is based on the low risk associated with the Proposed Project described in this Chapter of the EIAR and a review of the nature of the adjacent land uses and projects existing or intended in the adjacent areas.