

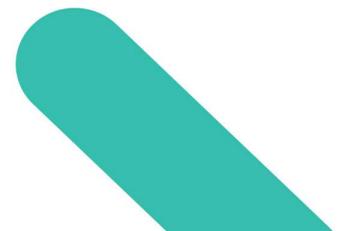
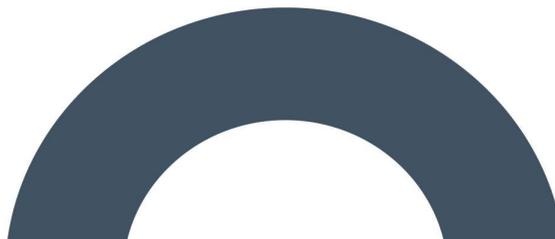
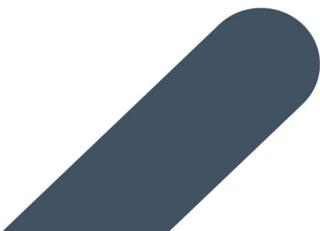
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# Environmental Impact Assessment Report (EIAR)

## Carrig Renewables Wind Farm

Chapter 16 – Vulnerability of the Project to Major  
Accidents and Natural Disasters

Tipperary Planning Authority - Inspection Purposes Only!



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## 16. MAJOR ACCIDENTS AND NATURAL DISASTERS

### 16.1 Introduction

This section of the Environmental Impact Assessment Report (EIAR) describes the likely significant adverse effects on the environment arising from the vulnerability of the Proposed Development as detailed in Chapter 4 to risks of major accidents and/or natural disasters, as well as the potential of the Proposed Development 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 Development to major accidents and natural disasters, as well as the risk of the Proposed Development itself causing accidents or disasters is carried out in compliance with the EIA Directive (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 Development

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

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

- The relevant major accidents and/or natural disasters, if any, that the Proposed Development could be vulnerable to or could cause;
- 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 Development 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 Development'.

#### 16.1.1 Statement of Authority

This section of the EIAR has been prepared by Jonny Fearon and reviewed by Eoin McCarthy, of MKO. Jonny is an Environmental Scientist with over a years of consultancy experience with MKO and has been involved in a number of wind energy EIAR applications. Jonny holds a BSc (Hons) in Environmental Science and a MSc in Environmental Leadership. Eoin McCarthy (B.Sc. Env.), is a Senior Environmental Scientist and Project Manager with MKO. Eoin holds B.Sc. (Hons) in Environmental Science from NUI, Galway. Eoin has over 11 years' experience in the preparation of EIARs for wind energy developments.

## 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
- Regional Planning Guidelines for the Midland Region 2010-2022
- Regional Spatial and Economic Strategy (RSES) 2019-2031, adopted by the Eastern and Midland Regional Assembly (EMRA) in June 2019 and published by the Southern Regional Assembly (SRA) on 31<sup>st</sup> January 2020.
- Tipperary County Development Plan 2022-2028
- Offaly County Development Plan 2021-2027
- Tipperary County Council Website, Offaly County Council Website, and
- Fáilte Ireland

Major accidents or natural disasters are hazards which have the potential to affect the Proposed Development and lead to environmental effects directly and indirectly. These include accidents during construction, operation and decommissioning of the Proposed Development 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, soil, water, air, climate and material assets, cultural heritage and the landscape.

### 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 (2014/52/EU):

- The vulnerability of the Proposed Development to potential accidents and disasters
- The Proposed Development 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 Section 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

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

- European Commission. (2017). Environmental Impact Assessment of Projects – Guidance on the preparation of Environmental Impact Assessment Reports
- Environmental Protection Agency (2022), Guidelines on the Information to be Contained in Environmental Impact Assessment Reports
- Department of Environment, Heritage and Local Government (2010) *A Guide to Risk Assessment in Major Emergency Management*
- Environmental Protection Agency (2014) Guidance on Assessing and Costing Environmental Liabilities
- Department of Defence (2020) A National Risk Assessment for Ireland
- Offaly County Council – Major Emergency Plan (2019)
- Tipperary County Council – Major Emergency Plan

Co. Offaly falls under the scope of the Midlands Major Emergency Region (MMEM) and Co. Tipperary falls under the Mid-West Major Emergency Region (MWEM).

### 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

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 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 Development and causing environmental damage.

There is low potential for significant natural disasters to occur at the Proposed Development. 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 Development 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 and so there are no potential effects from this source.

The Proposed Development has low potential to cause natural disasters or major accidents. As detailed in Section 8.3.3 in Chapter 8 of this EIAR, the published soil map ([www.epa.ie](http://www.epa.ie)) for the area shows that the wind farm site is dominated by Cut Peat (Basin Peats) with some basic deep well drained mineral soil on the east and southwest. All proposed wind farm site infrastructure is mapped to be underlain by Cut Peat. Similarly, the GSI subsoil mapping ([www.gsi.ie](http://www.gsi.ie)) shows that the wind farm site is underlain predominantly by Cutover Raised Peat along with till derived from limestones. A localised pocket of gravels derived from limestones is mapped to the west of proposed turbine location T5. All proposed wind farm site infrastructure is mapped to be underlain by Cutover Raised Peat with the exception of a short section of proposed access road on the southwest of the wind farm which is mapped as limestone tills. The proposed grid connection underground electrical cabling route is located predominantly within the public road network. Soils along the grid connection route are mapped largely as basic deep well drained mineral soils and cutover peat ([www.epa.ie](http://www.epa.ie)). The EPA also map the presence of pockets of basic shallow well drained mineral soils.

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 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 Development. The approach to identifying and quantifying risks associated with the Proposed Development by means of a site-specific risk assessment is derived from the EPA 'Guidance on Assessing and Costing Environmental Liabilities' document<sup>1</sup>. The following steps were taken as part of the site-specific risk assessment:

- Risk Identification
- Risk Classification, likelihood, and consequence, and
- Risk Evaluation

##### 16.2.4.2.1 Risk Identification

Risks have been reviewed through the identification of reasonably foreseeable risks in consultation with relevant contributors to this EIAR. The identification of risks has focused on non-standard but plausible incidents that could occur at the Proposed Development during construction, operation, and decommissioning.

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

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

<sup>1</sup> 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](https://www.epa.ie/publications/compliance-enforcement/licensees/reporting/financial-provisions/EPA_OEE-Guidance-and-Assessing-WEB.pdf)

16.2.4.2.2 **Risk Classification**

**Classification of Likelihood**

After identifying the potential risks, the likelihood of occurrence of each risk has been assessed. An analysis of safety procedures and proposed environmental controls was considered when estimating likelihood of identified potential risks occurring. Table 16-1 defines the likelihood ratings that have been applied.

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

Table 16-1 Classification of Likelihood (Source: DoEHLG, 2010)

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

**Classification of Consequence**

The consequence rating assigned to each risk has assumed that all proposed mitigation measures and/or safety procedures have failed to prevent the major accident and/or disaster. Furthermore, the Tipperary County Council Major Emergency Plan and Offaly County Council Major Emergency Plan, will work to reduce the consequence of any major accident or disaster. The consequence of the impact if the event occurs has been assigned as described in Table 16-2.

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

Table 16-2 Classification of Impact (Source: DoEHLG, 2010)

Ranking	Likelihood	Impact	Description
1	Minor	Life, Health, Welfare Environment Infrastructure Social	Small number of people affected; no fatalities and small number of minor injuries with first aid treatment.  No contamination, localised effects <€0.5M  Minor localised disruption to community services or infrastructure (<6 hours).
2	Limited	Life, Health, Welfare Environment Infrastructure Social	Single fatality; limited number of people affected; a few serious injuries with hospitalisation and medical treatment required.  Localised displacement of a small number of people for 6-24 hours. Personal support satisfied through local arrangements.  Simple contamination, localised effects of short duration  €0.5-3M  Normal community functioning with some inconvenience.
3	Serious	Life, Health, Welfare Environment Infrastructure Social	Significant number of people in affected area impacted with multiple fatalities (<5), multiple serious or extensive injuries (20), significant hospitalisation.  Large number of people displaced for 6-24 hours or possibly beyond; up to 500 evacuated.  External resources required for personal support.  Simple contamination, widespread effects or extended duration  €3-10M  Community only partially functioning, some services available.
4	Very Serious	Life, Health, Welfare Environment Infrastructure Social	5 to 50 fatalities, up to 100 serious injuries, up to 2000 evacuated.  Heavy contamination, localised effects or extended duration  €10-25M

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

### Risk Evaluation

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

The risk matrix sourced from the DoEHLG *Guide to Risk Assessment in Major Emergency Management* and as outlined in Table 16-3 indicates the critical nature of each risk. This risk matrix has therefore been applied to evaluate each of the risks associated with the Proposed Development. The risk matrix is colour coded to provide a broad indication of the critical nature of each risk:

- The red zone represents 'high risk scenarios':
- The amber zone represents 'medium risk scenarios', and
- The green zone represents 'low risk scenarios.'

Table 16-3 Classification of Impact (Source: DoEHLG, 2010)

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

## 16.3 Baseline Conditions

The functional areas of Offaly and Tipperary County Councils fall under the MMEM and the MWEM respectively. The Major Emergency Plan prepared by Tipperary County Council (2014) outlines the following potential major emergency scenario in the county (Tipperary):

1. **Urban Flooding/ Flooding:** Applicable to urban areas within the functional areas of Tipperary County Council.
2. **Aircraft Collision/Loss:** Relevant to all air strips or aircraft within the functional area of Tipperary County Council.
3. **Water Contamination:** Tipperary County Council Functional Areas.
4. **Credible scenario incidents at Merck Sharp & Dohme:** Applicable to Ballydine area Co. Tipperary.
5. **Fire/Major Crowd Safety and Civil Disorder:** Tipperary County Council Functional Areas.
6. **Major Road Traffic Accident/ Hazardous Material (Hazmat):** M7 Motorway, National Primary Routes, Iarnród Eireann.
7. **Natural Gas Explosion along the main Cork-Dublin Gas Line:** Applicable to sections of the line that reach Co. Tipperary.
8. **Loss of Critical IT Infrastructure:** Tipperary County Council Functional Area.
9. **Rail Incident:** Applicable to Irish Rail infrastructure such as the Cork to Dublin Line within Tipperary County Council Functional Area.

The Major Emergency Plan prepared by Offaly County Council (2019) outlines the following potential major emergency scenario in the county (Offaly):

1. **Flooding** - Applicable to urban areas within the functional areas of Offaly County Council.
2. **Major Road Traffic Accident** – M6 motorway, National Primary Routes, Iarnród Eireann.
3. **Chemical Incident at any industrial premises** - At present, there is one Upper Tier SEVESO Site in County Offaly.
4. **Major Fire** - Offaly County Council Functional Areas.
5. **Civil disorder at large events** - Offaly County Council Functional Areas.
6. **Adverse weather conditions** - Offaly County Council Functional Areas.

### 16.3.1 Risks to the Proposed Development (Tipperary)

The risks, outlined in the Tipperary Major Emergency Plan, which are most relevant to this assessment are described below:

#### Flooding/ Urban Flooding

The Proposed Development is not located within an urban area; therefore, the urban flooding scenario is not applicable.

As detailed in Chapter 9 and the accompanying Appendix 9-1 Flood Risk Assessment (FRA), detailed site-specific flood modelling was carried out at the Proposed Development. Based on the information gained through the flood modelling, the areas of the Proposed Development at risk of flooding were identified.

Through an iterative process of flood modelling and the design of the infrastructure locations around the modelled flood zones, the layout of the Proposed Development has been optimized. The only remaining

infrastructure within a modelled flood zone is a section of proposed new road (approx. 50m) near the site entrance that is located inside a 100-year and 1000-year flood zone. The proposed wind farm access roads can be categorised as “Less Vulnerable Development” and the proposed development will have no impact on flood risk elsewhere in the locality and this largely due to the avoidance of fluvial flood zones for all sensitive aspects of the proposed infrastructure.

Furthermore, the Proposed Development will be constructed with its own drainage system which will provide additional surface water attenuation. The overall risk of flooding posed at the proposed 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 Water of this EIAR for further details.

### Aircraft Collision/ Loss

The Proposed Development will not utilise air strips or aircraft for the delivery of turbine components. Delivery of turbines and their associated components will be via the national and local road network.

The Proposed Development has the potential to affect aviation due to the erection of manmade structure in excess of 45 metres that may constitute an obstacle to air navigation. These impacts are addressed in detail in Section 15.2.4.2.3 in Chapter 15 of this EIAR: Material Assets. The scoping response from the Irish Aviation Authority (IAA) set out that in the event of planning consent being granted, the applicant should be conditioned to contact the IAA to (1) agree an aeronautical obstacle warning light scheme for the wind development, (2) provide as-constructed coordinates in WGS84 format together with ground and blade tip height elevations at each wind turbine location and (3) notify the IAA of intention to commence crane operations with at least 30 days prior notification of their erection. The coordinates and elevations for built turbines will be supplied to the IAA, as is standard practice for wind farm developments. The IAA noted the requested that the Birr Airfield is engaged with due to the proximity of the aerodrome to the Proposed Development. A scoping request was submitted to the Ormod Flying Club (Birr Aerodrome licensee) however, no comments were returned to date.

### Water Contamination

The Proposed Development has the potential to cause contamination and pollution of groundwater and surface water from potential release of hydrocarbons, earthworks and excavations on Site. These impacts are addressed in detail in the Chapter 9 of this EIAR: Water and are not related to either the vulnerability of the Proposed Development to natural disasters or major accidents nor the potential for the Proposed Development to cause natural disasters or accidents. The release of wastewater at the Proposed Development and along the grid connection underground electrical cabling route can pose a risk to down gradient groundwater wells, groundwater quality and surface water quality. Proven and effective methods to mitigate against these potential impacts have been outlined above which 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 16.4.1.5.

### Credible scenario incidents at Merck Sharp & Dohme

The European Communities Control of Major Accident Hazards Involving Dangerous Substance Regulations, 2000, applies to sites where certain quantities of specified dangerous substances are present. These sites (SEVESO Sites) are classified as upper tier and lower tier. At present, there is one upper tier SEVESO Site within County Tipperary and no lower tier site. The upper tier site is Merck Sharp & Dohme located at Ballydine, Co. Tipperary, approximately 83km south of the Proposed Development. This site develops and supplies the active ingredients and final formulated product for a range of medicines. Given the separation distance, it is considered that neither the Proposed Development nor the SEVESO site have the opportunity to negatively impact the other.

### Fire / Major Crowd Safety and Civil Disorder

The likelihood of fire occurring at the Proposed Development is anticipated to be 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.

Major crowd safety and civil disorder are not relevant to the Proposed Development. Access to the Proposed Development will only be permitted for authorised operation and maintenance personnel and relevant local landowners only during the construction, operational and decommissioning phases.

### Major Road Traffic Accident/ Severe Weather and Loss of Critical Transport Infrastructure

The Proposed Development will utilise the existing road network during the construction phase. Construction related traffic will originate from the delivery of materials to Site and transport of employees to, from and throughout the Site.

It is proposed that large wind turbine components will be delivered to the site of the Proposed Development, under Garda escort.

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 Proposed Development, 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 Section 15.1 Traffic and Transport in Chapter 15 of this EIAR: Material Assets, the localised traffic disruptions as a result of other proposed works will be mitigated through the use of 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)*'.

There is potential for hazardous materials in the form of hydrocarbons to be transported to and used on site. Mitigation measures as best practise 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 will be no potential for hazardous material release during the operational phase of the Proposed Development.

### Natural Gas Explosion along the main Cork-Dublin Line

The Cork to Dublin Gas line runs from Cork to Waterford, Carlow, Kildare and terminates in Dublin. Offshoots of the line from Cork northwards to Mitchelstown and into Tipperary town, Cahir and Cashel, all of which are between 75km and 60km from the Proposed Development. As such, it is considered that neither the Proposed Development nor the gas line have the opportunity to negatively impact the other.

### Loss of Critical IT Infrastructure

EirGrid operates and develops Ireland's electricity grid. This includes interconnecting to neighbouring grids and running the wholesale electricity market. The grid safely brings power from generators such as wind farms to the ESB network that supplies homes and business in Ireland. It also brings power directly to large energy users. There are two types of electricity generation: synchronous generation and non-synchronous generation. Synchronous generation produces the same amount of electricity all the time e.g., fossil fuels. Non-synchronous generation produces a varying amount of electricity depending on the energy available. Eirgrid operate the grid from National Control Centres (NCCs) in Dublin and

Belfast, matching electricity production to customer demand, switching from synchronous to non-synchronous where required to ensure no power outages. Therefore, any technical fault at the Proposed Development would not impact the local or national energy supply.

### Rail Incident

The Limerick-to-Dublin rail line runs approximately 12km south of the Proposed Development in a northeast to southwest orientation. The Proposed Development will not physically interact with the railway infrastructure.

## 16.3.2 Risks to the Proposed Development (Offaly)

The risks, outlined in the Offaly Major Emergency Plan, which are most relevant to this assessment are described below:

### Flooding

The Proposed Development is not located within an urban area; therefore, the urban flooding scenario is not applicable.

As detailed in Chapter 9 and the accompanying Appendix 9-1 Flood Risk Assessment (FRA), detailed site-specific flood modelling was carried out at the Proposed Development. Based on the information gained through the flood modelling, the areas of the Proposed Development at risk of flooding were identified.

Through an iterative process of flood modelling and the design of the infrastructure locations around the modelled flood zones, the layout of the Proposed Development has been optimized. The only remaining infrastructure within a modelled flood zone is a section of proposed new road (approx. 50m) near the site entrance that is located inside a 100-year and 1000-year flood zone. The proposed wind farm access roads can be categorised as “Less Vulnerable Development” and the proposed development will have no impact on flood risk elsewhere in the locality and this largely due to the avoidance of fluvial flood zones for all sensitive aspects of the proposed infrastructure.

Furthermore, the Proposed Development will be constructed with its own drainage system which will provide additional surface water attenuation. The overall risk of flooding posed at the proposed 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 Water of this EIAR for further details.

### Major Road Traffic Accident

The Proposed Development will utilise the existing road network during the construction phase. Construction related traffic will originate from the delivery of materials to the Proposed Development site and transport of employees to, from and throughout the Proposed Development site.

It is proposed that large wind turbine components will be delivered to the site of the Proposed Development, under Garda escort.

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 Proposed Development, 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 Section 15.1 Traffic and Transport in Chapter 15 of this EIAR: Material Assets, the localised traffic disruptions as a result of other proposed works will be mitigated through the use of

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)'.

There is potential for hazardous materials in the form of hydrocarbons to be transported to and used on site. Mitigation measures as best practise 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 will be no potential for hazardous material release during the operational phase of the Proposed Development.

### Chemical Incident at any industrial premises

The European Communities Control of Major Accident Hazards Involving Dangerous Substance Regulations, 2000, applies to sites where certain quantities of specified dangerous substances are present. These sites (SEVESO Sites) are classified as upper tier and lower tier. At present, there is one upper tier SEVESO Site within County Tipperary and no lower tier site. The upper tier site is Merck Sharp & Dohme located at Tullamore, Co. Offaly, approximately 41km northeast of the Proposed Development. This site develops and supplies the active ingredients and final formulated product for a range of medicines. Given the separation distance, it is considered that neither the Proposed Development nor the SEVESO site have the opportunity to negatively impact the other.

### Major Fire

The likelihood of fire occurring at the Proposed Development is anticipated to be 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.

### Civil disorder at large events

Major crowd safety and civil disorder are not relevant to the Proposed Development. Access to the Proposed Development will be to authorised personnel and local landowners only during the construction, and decommissioning phases. Access to the Proposed Development will be to authorised personnel and the public.

### Adverse weather conditions

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 Proposed Development, 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 Section 15.1 Traffic and Transport in Chapter 15 of this EIAR: Material Assets, the localised traffic disruptions as a result of other proposed works will be mitigated through the use of 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)'.

## 16.4 Risk Assessment

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

These risks have been assessed in accordance with the relevant classification as outlined in Table 16-1 and 16-2.

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 i.e., pre-mitigation.

### 16.4.1 Likely Significant Effects

#### 16.4.1.1 Do-Nothing Scenario

If the Proposed Development were not to proceed, the existing uses for the Proposed Development site of small-scale agricultural farming practices, turbary harvesting and forestry would continue, and public road corridor, public open space, discontinuous urban fabric and agriculture along the grid connection route.

If the Proposed Development were not to proceed, the opportunity to capture a significant part of County Tipperary’s and Ireland’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.

The opportunity to generate local employment and investment would also be lost. This loss of employment and investment would negatively impact the local economy.

#### 16.4.1.2 Identification of Effects During Construction

A risk register has been developed which contains all potentially relevant risks identified during the construction phase of the Proposed Development. Seven risks specific to the construction of the Proposed Development have been identified and are presented in Table 16-4.

Table 16-4 Risk Register - Construction Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
A	<b>Critical Infrastructure Emergencies</b> 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	<b>Severe Weather</b> Risk to construction activity on site	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds

C	<p><b>Flooding</b></p> <p>Risk of flooding in areas surrounding the Site impacting the construction phase and leading to environmental emissions</p>	<p>Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds</p>
<p>Potential to cause accidents and / or disasters.</p>		
D	<p><b>Utility emergencies</b></p> <p>Risk of construction activity along the Grid Connection underground electrical cabling route</p>	<p>Construction activity along grid and road network impacting on local services and utilities</p>
E	<p><b>Traffic Incident</b></p> <p>Collisions onsite and offsite with vehicles involved in construction of Proposed Development</p>	<p>Driver negligence or failure of vehicular operations on site roads.</p> <p>Traffic Management not implemented</p>
F	<p><b>Contamination</b></p> <p>Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater.</p> <p>Discharge due to horizontal directional drilling (HDD) frack out on grid connection works area.</p>	<p>Accidental fuel spillage during delivery to site.</p> <p>Failure of fuel storage tank or tanks in plant and machinery and vehicles leading to uncontrolled emissions.</p> <p>Drainage and seepage water resulting from accident during infrastructure excavation;</p> <p>Stockpiled excavated material becoming unstable and providing a point source of exposed sediment;</p> <p>Excavation works during the construction of the Proposed Development which may result in entrainment of sediment from the excavations during construction; and,</p> <p>Frack Out associated with HDD along Grid Connection underground electrical cabling route which may result in sediment release to surface water.</p>
G	<p><b>Fire / Gas Explosion</b></p>	<p>Equipment or infrastructure failure;</p> <p>Electrical problems; and</p> <p>Employee negligence.</p>

### 16.4.1.3 Identification of Effect During Operation

Four risks specific to the operation of the Proposed Development have been identified and are presented in Table 16-5.

Table 16-5 Risk Register – Operational Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
H	<b>Severe Weather</b> Risk to operational activity on site, blade or turbine damage	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds.
I	<b>Contamination</b> 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.  Spill or leak of oil during operational maintenance.
Potential to cause accidents and /or disasters.		
J	<b>Fire / Gas Explosion</b>	Equipment or infrastructure failure;  Electrical problems; and  Employee negligence.
K	<b>Collapse / damage to structures</b>	Earthquake, extreme weather events; and  Vehicular collisions due to driver negligence on public roads.
L	<b>Traffic Incident</b> Collisions onsite and offsite with vehicles involved in operation of Proposed Development	Driver negligence or failure of vehicular operations on site roads.  Traffic Management not implemented

#### 16.4.1.4 Identification of Effect During Decommissioning

Four risks specific to the decommissioning of the Proposed Development have been identified and are presented in Table 16-6.

Table 16-6 Risk Register – Decommissioning Phase

Risk ID	Potential Risk	Possible Cause
Potential vulnerability to disaster risks		
M	<b>Severe Weather</b> Risk to decommissioning activity on Site leading to environmental emissions	Extreme weather- periods of heavy rainfall, taking into account climate change and strong winds.
N	<b>Flooding of site</b> Risk of flooding in areas surrounding the Site 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.		
O	<b>Traffic Incident</b> Collisions onsite and offsite with vehicles involved in construction of Proposed Development	Driver negligence or failure of vehicular operations on site roads. Traffic Management not implemented.
P	<b>Contamination</b> Discharge or spillage of fuel, chemical solvents into watercourse or percolated to groundwater	Accidental fuel spillage during delivery to site. 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 16-1 and Table 16-2) and the resulting risk analysis is given in Table 16-7.

The risk register is based upon possible risks associated the Proposed Development. As outlined in Section 16.2.4.2, 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.



### 16.4.1.5 Assessment of Effect – Summary

Table 16-7 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)
<b>Construction Phase</b>								
A	<b>Critical Infrastructure Emergencies</b>	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life;	1	The risk of traffic accident during turbine delivery and severe weather conditions impacting the identified road network is 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’.	1
B	<b>Severe Weather</b>	Extreme weather-	Illness or loss of life;	2	The risk of severe weather is unlikely	1	The risk of severe weather conditions during the	2



Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		periods of heavy rainfall, taking into account climate change and strong winds	Damage to, or depletion of aquatic habitats and species;		<p>when considering the assessment in Chapter 11 and weather conditions recorded over the last 30 years within the area.</p> <p>The works programme for the groundworks part of the construction phase of the Proposed Development will take account of weather forecasts and predicted rainfall in particular and construction will be paused if required.</p>		<p>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'.</p> <p>Severe weather may cause increased mobilisation of sediment which will be controlled via the Proposed Development design and mitigation measures.</p>	
C	<b>Flooding</b>	Extreme weather-periods of heavy rainfall, taking into account climate	<p>Illness or loss of life;</p> <p>Groundwater Flooding</p>	2	As outlined in Chapter 9 Water, due to the flat topography of the wind farm site, and with the implementation of the proposed	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'.	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	Flooding to surrounding properties  Damage to, or depletion of aquatic habitats and species;		mitigation measures, that the risk of a peat failure at the Proposed Development Site is negligible/none.		Flooding has the potential to cause increased sediment mobilisation however flooding is not anticipated and should any flooding occur it would be localised.	
D	Utility emergencies	Construction activity along road network during grid connection installation impacting on local services and utilities	Illness or loss of life;  Disruption to services	2	Confirmatory surveys will be carried out by the Contractor to ensure that the grid connection is designed to take into consideration any services and utilities with the road network.	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
E	Traffic Incident	Driver negligence or failure of vehicular operations on Site roads	Injury or loss of life.	3	Construction vehicles, HGVs and staff vehicles will be present within the site of the Proposed Development during the construction	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)
		(Proposed Development access roads and public road network in which grid connection is proposed).  Traffic Management not implemented			<p>phase. They will access the site via the public road network and will therefore interact with local road users.</p> <p>As such, it can be determined that there is some ‘opportunity, reason or means’ for a vehicle collision during the construction of the Proposed Development, ‘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.</p>		minor injuries with first aid treatment.’	
F	<b>Contamination –</b>	Fuel spillage during	Release of suspended	2	As outlined in Chapter 4, fuel will	2	The risk of a fuel spillage or impact on surround drainage	4



Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
	<p><b>Fuel storage and handling</b></p> <p><b>-General Construction</b></p>	<p>delivery to the Proposed Development Site.</p> <p>Failure of fuel storage tank or tanks in plant and machinery and vehicles.</p> <p>Drainage and seepage water resulting from infrastructure excavation;</p> <p>Stockpiled excavated material providing a point source of exposed sediment;</p>	<p>solids to groundwater.</p> <p>Contamination of local drinking water supplies and groundwater aquifers.</p> <p>Groundwater and surface water emissions from construction activities including trench excavations and HDD (frack out)</p>		<p>be stored on-the Proposed Development site but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the Proposed Development.</p> <p>Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage mitigation measures as detailed in Chapter 9.</p> <p>Detailed mitigation measures and methodologies for the control of emissions from grid connection works as described in the</p>		<p>during the construction will result in a limited consequence in that there would be 'a limited number of people affected' with 'localised effects of short duration' on environmental receptors through the use of bunded containment areas during construction.</p> <p>The grid connection route is located in the existing road network which is of low value environmental receptor.</p> <p>HDD is planned for a limited number of locations and will be controlled to prevent significant environmental effects should frack out occur.</p> <p>The potential residual environmental effects are described in detail in Chapter 8 which concludes that there will be no significant environmental effects.</p>	



Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Works during the construction of the Proposed Development which may result in entrainment of sediment from the excavations or HDD locations;			EIAR. Standard and specific mitigation to prevent accidents and indirect effects of accidents are included in the Proposed Development design and will be implemented.			
G	Fire / Gas Explosion	Equipment or infrastructure failure;  Fuel spillage/storage  Electrical problems; and	Illness or loss of life;  Damage to, or depletion of habitats and species; and  Impacts on ambient air quality.	2	As outlined in Chapter 4, fuel will not be stored on-site post construction therefore fuel is not considered to be a significant fire risk.  In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the development	2	Should a fire/explosion occur at the Site, a limited consequence in that there would be ‘a limited number of people affected’ with ‘localised effects of short duration’ on people and environmental receptors due to the nature of the Proposed Development and the lack of infrastructure or fuel storage during operation that would result in any such incident.	4



Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		Employee negligence			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.		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 Tipperary and Offaly County Council Major Emergency Plans will work to reduce the consequence (both on people and the environment) of potential fire/explosions at the Proposed Development.	
<b>Operational Phase</b>								
H	<b>Severe Weather</b>	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 unlikely when considering the assessment in Chapter 11 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
I	<b>Contamination</b>	A vehicular incident on	Damage to, or depletion of	2	As outlined in Chapter 4, fuel will	1	The risk of a fuel spillage or impact on surround drainage	2



Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
		the public road or Proposed Development road network involving fuel, wastewater or sewage transportation in the operational phase.	<p>aquatic habitats and species</p> <p>Contamination of local drinking water supplies and groundwater aquifers.</p>		be stored on-the Proposed Development site but in a bunded area to ensure containment and prevent spillages of fuel. No fuels, chemicals or solvents will be stored outside of the confines of the Site		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 8 which concludes that there will be no significant environmental effects.	
J	<b>Fire / Gas Explosion</b>	<p>Equipment or infrastructure failure;</p> <p>Fuel spillage/storage</p> <p>Electrical problems; and</p> <p>Employee negligence</p>	<p>Illness or loss of life;</p> <p>Damage to, or depletion of habitats and species; and</p> <p>Impacts on ambient air quality.</p>	2	<p>As outlined in Chapter 4, fuel will not be stored on-site post construction therefore fuel is not considered to be a significant fire risk.</p> <p>In accordance with Chapter 19 of the Safety, Health and Welfare at Work Act 2005 (the 2005 Act), the Proposed Development shall</p>	2	Should a fire/explosion occur at the site, a limited consequence in that there would be ‘a limited number of people affected’ with ‘localised effects of short duration’ on people and environmental receptors due to the nature of the Proposed Development and the lack of infrastructure or fuel storage during operation that would result in any such incident. There will be ‘normal community functioning’ in the area with ‘some inconvenience’ The	4



Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					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.		‘generic command, control & co-ordination systems’ as well as the ‘common elements of response’ detailed in the Tipperary and Offaly County Council Major Emergency Plans will work to reduce the consequence (both on people and the environment) of potential fire/explosions at the site.	
K	<b>Collapse / damage to structures</b>	Earthquakes, extreme weather events; and  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	1	The risk of infrastructure collapse during the operational phase will result in a minor consequence in that ‘small number of people would be affected’ and no real likelihood of any impact on any environmental receptors.	1



Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					<p>damaged or collapse due to seismic activity.</p> <p>Having regard to public speed limits within the Proposed Development, it is not predicted that any collision of vehicles and any infrastructure would result in significant damage/collapse.</p>			
L	<b>Traffic Incident</b>	<p>Driver negligence or failure of vehicular operations on Proposed Development roads.</p> <p>Traffic Management not implemented</p>	Injury or loss of life.	3	<p>Construction vehicles, HGVs and staff vehicles will be present within the site of the Proposed Development during the construction phase. They will access the site via the public road network and will therefore interact with local road users.</p>	1	<p>A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.'</p>	3



Risk ID	Potential Risk	Possible Cause	Environmental Effect	Likelihood Rating	Basis of Likelihood	Consequence Rating	Basis of Consequence	Risk Score (Consequence x Likelihood)
					<p>As such, it can be determined that there is some 'opportunity, reason or means' for a vehicle collision during the construction of the Proposed Development, 'at some time.'</p> <p>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.</p>			

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Decommissioning Phase								
M	<b>Severe Weather</b>	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life;  Damage to, or depletion of aquatic habitats and species;	2	The risk of severe weather is unlikely when considering the assessment in Chapter 11 and weather conditions recorded over the last 30 years within the area.  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’.  Decommissioning will not require significant excavations works. There is no real likelihood of any impact on any environmental receptors	2
N	<b>Flooding</b>	Extreme weather-periods of heavy rainfall, taking into account climate change and strong winds	Illness or loss of life;  Groundwater Flooding  Flooding to surrounding properties  Damage to, or depletion of	2	As outlined in Chapter 9 Water, due to the small scale of the Proposed Development footprint, the naturally high runoff rates and with the implementation of the proposed mitigation measures, the increased flood	1	The risk of flooding during the decommissioning phase will result in a minor consequence in that ‘small number of people would be affected’ should a severe weather occur, with ‘no fatalities and a small number of minor injuries with first aid treatment’.	2



			aquatic habitats and species;		risk associated with the Proposed Development is negligible/none.			
O	<b>Traffic Incident</b>	Driver negligence or failure of vehicular operations on site roads.  Traffic Management not implemented	Injury or loss of life.	3	A limited number of vehicles will be permitted on the Proposed Development as part of the decommissioning phase  As such, it can be determined that there is some ‘opportunity, reason or means’ for a vehicle collision to occur on site, ‘at some time.’ An unlikely risk is therefore predicted.	1	A minor consequence is predicted. Having regard to on-site speed limits and vehicular movements, a ‘small number of people would be affected’ should a vehicular collision occur, with ‘no fatalities and small number of minor injuries with first aid treatment.’	3
P	<b>Contamination</b>	Fuel spillage during delivery to site.  Failure of fuel storage tank or tanks in plant and	Damage to, or depletion of aquatic habitats and species  Discharge to groundwater	2	As outlined in Chapter 4, fuel will be stored on-the Proposed Development but in a bunded area to ensure containment and prevent spillages of fuel. No fuels,	2	The risk of a fuel spillage or impact on surrounding drainage during the decommissioning 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	4



		machinery and vehicles.			chemicals or solvents will be stored outside of the confines of the Proposed Development  Setback distances from sensitive hydrological features means that adequate room is maintained for the proposed drainage measures as detailed in Chapter 9		during decommissioning. The potential residual environmental effects are described in detail in Chapter 9 which concludes that there will be no significant environmental effects.	
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The risk assessment for each of the potential risks identified are consolidated in Table 16-8 which provides their ‘risk score.’ A corresponding risk matrix is provided in Table 16-9, 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 16-8 Risk Scores

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

Table 16-9 Risk Matrix

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

Table 16-9 presents the potential risks identified during the construction, operation and decommissioning of the Proposed Development all of which can be classified as ‘low risk’ scenarios.

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

#### 16.4.1.6 Contamination During Construction, Operation and Decommissioning

There is a potential risk of contamination from site activities during the construction, operational and decommissioning phases from potential release of hydrocarbons. The risk of contamination was given a risk score of 4 on a very precautionary basis. However, as outlined in Chapter 9, Section 9.5, measures 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 ‘limited’ consequences should it do so, representing a ‘low-risk scenario’ during the construction and decommissioning phases.

The conclusions in the relevant chapters of the EIAR conclude that there will be no significant residual effects associated with this potential impact.

#### 16.4.1.7 Fire/Explosion During Construction, Operation and Decommissioning

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

## 16.4.2 Mitigation Measures

As outlined in Section 16.4.1, the scenario with the highest risk score in terms of the occurrence of major accident and/or disaster during construction was identified as ‘Contamination’ of the Proposed Development site and risk of ‘Fire/Explosion’ during operation.

The Proposed Development 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*’, a Risk Management Plan will be prepared and implemented on site to ensure an effective response to disasters or the risk of accidents. The plan will include sufficient preparedness and emergency planning measures.

### 16.4.2.1 Mitigation – Contamination During Construction, Operation and Decommissioning

Potential effects associated with contamination during construction, operation and decommissioning are addressed fully in Chapter 9 Hydrology. The mitigation measures outlined in Chapter 9 to protect environmental receptors as well as the procedures and measures described in the Construction and Environmental Management Plan (CEMP) will ensure that the risk from these sources is low.

A CEMP has been prepared for the Proposed Development and is included in Appendix 4-3 of this EIAR. Upon a grant of planning permission for the Proposed Development, the CEMP will be updated 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.

### 16.4.2.2 Mitigation – Fire/Explosion During Operation

The Proposed Development 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 2014, which will assist in the identification of any major risks of fire on site, and mitigation of the same during operation.

As outlined in Section 4.3 of the EIAR, a detailed CEMP will be prepared prior to the commencement of any works. 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.

## 16.4.3 Residual Effects

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

It is considered that when the above mitigation is implemented, and all mitigation detailed in the EIAR is implemented, there will not be significant residual effect(s) associated with the construction, operation and decommissioning of the Proposed Development.

#### 16.4.4 Monitoring

##### 16.4.4.1 Monitoring During Construction

As outlined in Section 4.3 of the EIAR, a detailed CEMP will be prepared prior to the commencement of any works. 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.

##### 16.4.4.2 Monitoring During Operation

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

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

##### 16.4.4.3 Monitoring During Decommissioning

As outlined in Section 4.11 of the EIAR, a Decommissioning Plan has been prepared (Appendix 4-5) the final detail of which will be agreed with the local authority prior to any decommissioning. The Decommissioning Plan will be updated prior to the end of the operational period in line with decommissioning methodologies that may exist at the time and will be agreed with the competent authority at that time.

#### 16.4.5 Cumulative Impact Assessment

A search in relation to plans and projects that may have the potential to result in a cumulative impact with the Proposed Development on the environment was carried out as part of the EIAR. The Proposed Development has been considered, in combination with existing, permitted and proposed projects and plans (wind energy or otherwise), as set out in Section 2.8 in Chapter 2 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 set out in Chapter 2, Section 2.8, the Proposed Development, with mitigation measures in place, was found to have no potential for significant in-combination or cumulative effects associated with the potential for the project to be impacted by major accidents or natural disasters or the Proposed Developments potential to cause major accidents or natural disasters. This is based on the low risk associated with the Proposed Development described in this Chapter of the EIAR and a review of the nature of the surrounding land uses and projects existing or intended in the surrounding area.

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## APPENDIX 2

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