

Proposed Gathabawn Windfarm

Environmental Impact Assessment Report

Chapter 19: Vulnerability of the Project to Major Accidents, Natural Disasters and Climate Change

September 2026

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EIAR 19 Vulnerability to Major Accidents, Natural Disasters, Climate Change

EIAR 19.1 Vulnerability to Major Accidents

It is apparent from the EIA Directive that 'major accident' mainly applies to notified Seveso establishments which operate under the Chemicals Act (Control of Major Accident Hazards involving Dangerous Substances) Regulations 2015.

There are no Seveso sites in proximity to the Whole Gathabawn Windfarm Project, the nearest being Grassland Fertilizers on the outskirts of Kilkenny City, which is c.15km from the windfarm site. Therefore, it is considered that the Whole Gathabawn Windfarm Project **is not vulnerable to Major Accidents** due to separation distances from the nearest Seveso site.

Furthermore, the Gathabawn Windfarm itself will not cause a Major Accident from the use of Dangerous Substances during construction, operation or decommissioning, because of the minimal volumes of such substances which will be used on site - limited to petrol and diesel used by vehicles; oils and grease/lubricants required by the wind turbines and at the control buildings and substations during operation; and very small amounts of SF₆ gas which will be used for the switch gear inside the Parksgrove Substation and at the existing EirGrid Ballyragget Substation during operation.

EIAR 19.2 Vulnerability to Natural Disasters

According to the Climate Action Plan 2025, "In 2024, the world has again experienced record global temperatures. Climate extremes have become the norm for many regions with impacts for human health, wellbeing, nature and biodiversity of grave concern".

The vulnerability of the Whole Gathabawn Windfarm Project to extreme weather and natural disasters such as flooding and land-slippage, is examined below. The likelihood, consequences, and overall risk in relation to natural disasters and climate change is rated according to the guidelines 'A Guide to Risk Assessment in Major Emergency Management' (DoEHLG 2010). The climate change risk assessment in the *Climate Guidance for National Roads, Light Rail, and Rural Cycleways (Offline & Greenways) - Overarching Technical Document PE_ENV-01104* (TII, 2022) has also been taken into account.

EIAR 19.2.1 Likelihood of the Project being affected by Natural Disaster/Climate Change

Rising global temperatures, which are also observed here in Ireland, increases the risk of more extreme weather events, including extreme winds, temperatures and rainfall. Furthermore, heavy rainfall increases the risk of flooding and landslide. The likelihood of extreme weather and or natural disasters occurring is examined hereunder in accordance with the DoEHLG Guidance, per:

Likelihood		
Ranking	Classification	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;

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Likelihood		
Ranking	Classification	Description
		and / or little opportunity, reason or means to occur; May occur once every 100-500 years.
3	Unlikely	May occur at some time; and /or few, infrequent, random recorded incidents or little anecdotal evidence; some incidents in associated or comparable organisations worldwide; some opportunity, reason or means to occur; may occur once per 10-100 years.
4	Likely	Likely to or may occur; regular recorded incidents and strong anecdotal evidence and will probably occur once per 1-10 years.
5	Very Likely	Very likely to occur; high level of recorded incidents and/or strong anecdotal evidence. Will probably occur more than once a year.

EIAR 19.2.1.1 Climate Change Context

According to Met Éireann's Annual Climate Statement for 2025 (Met Éireann, 2026) the latest Irish climate change projections indicate further warming in the future. This temperature change means the likelihood of extreme weather events occurring has increased. Irish rainfall patterns are expected to change, with an increase in both dry periods and heavy rainfall events. Climate change is adding fuel to storms due to warmer waters and more moisture in the atmosphere and studies show that storms we've experienced in the past (e.g. Ophelia, Éowyn) will become more powerful, larger, and more destructive in a warmer world.

EIAR 19.2.1.2 Extreme Weather –Storms

According to the Met Éireann Storm Centre, in January 2025 (Met Éireann, 2025a), Storm Éowyn brought the strongest winds ever recorded in Ireland with gusts up to 184 km/h breaking an 80-year old record. Éowyn joins the list of storms that have observed Hurricane Force 12 wind speeds on land in Ireland, such as the 'Night of the Big Wind' storm in January 1839 (estimated wind speeds of 100 knots, Debbie in September 1961 (gusts up to 181 km/h), and more recently Darwin in February 2014 (gusts up to 159 km/h). During Éowyn, Ireland observed its highest sustained and gust wind speeds on record (142km/h and 184 km/h respectively).

Vulnerability of the Proposed Gathabawn Windfarm: The turbines to be installed at Gathabawn Windfarm will be designed in accordance with the IEC 61400 standard to ensure the structures are appropriately engineered against damage from hazards (including high winds) during the planned lifetime of the structures. Before installation, turbine manufacturers also carry out computerised wind flow models of the windfarm site to ensure turbulence and fatigue loading is not exceeded. The Beaufort Scale classes a Force 12 storm with speeds in excess of 32m/s (or in excess of 117km/h) as Hurricane Force. The wind turbines which will be installed at the Gathabawn Windfarm site will be designed to withstand at least 60 m/s (215km/h).

Vulnerability of the Candidate Gathabawn Grid Connection: The underground cabling, electrical apparatus and equipment will not be affected by wind storms because the cables will be underground under access roads, while the type of electrical apparatus and equipment which will be installed at the substation will be designed to withstand exposure in the open countryside.

Therefore the likelihood of the Gathabawn Windfarm project being affected by wind storms is considered to be **Extremely Unlikely**.

EIAR 19.2.1.3 Extreme Weather – Temperature Variations

Hot days where air temperatures are greater than 30.0°C do not occur every year and only in June, July and August. According to the Met Éireann Summer Centre (Met Éireann, 2026), the Spring / Summer 2026 was notable for the following reasons:

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- July 2026: Recorded as the second hottest July since 1900, the driest on record, and exceptionally sunny. Multiple stations reported heatwaves lasting up to 13 days (such as Moore Park, Co. Cork).
- June 2026: Ranked as the 4th warmest June in 127 years with an average temperature 1.65 °C above the long-term average, though rainfall was above average for parts of the west and north.
- May 2026: Featured a dramatic heat dome that broke historical May maximum temperature records across multiple counties (including reaching 30.8 °C at Kilkenny in Greenshill).
- Spring 2026: Ranked as the 3rd warmest spring since 1900 overall.

The coldest winter in almost 50 years occurred in 2009/2010, followed by a severe cold spell the following Winter in November and December 2010 where night-time temperatures dropped below -10°C (Met Éireann, 2011). The lowest night-time temperature recorded during this severe cold spell was at Mount Juliet, County Kilkenny (-16°C). Storm Emma (Beast from the East) also brought significant snowfall in February/March 2018.

Vulnerability of the Proposed Gathabawn Windfarm: In relation to extremes of temperature, the turbines to be installed at Gathabawn Windfarm will be designed in accordance with the IEC 61400 standard to ensure the structures are appropriately engineered against damage from hazards (including temperature) during the planned lifetime of the structures. The Gathabawn turbines will be designed to operate within temperature ranges between -20°C and +50°C. The turbines can be fitted with a de-icing system which will thaw ice from the blades using fans installed inside each blade root.

Vulnerability of the Candidate Gathabawn Grid Connection: The type of electrical apparatus and equipment to be installed at Parksgrove Substation will be designed to withstand temperature variability.

Overall, the likelihood of the Whole Gathabawn Windfarm Project being affected by temperature extremes is considered to be **Extremely Unlikely**.

EIAR 19.2.1.4 Extreme Weather – Flooding and Rainfall

According to the Flood Risk Management Plan for the Nore Basin (OPW, 2018), historically the following locations have experienced significant flooding issues: Kilkenny, Thomastown and Inistioge, all of which are at substantial distances downstream of the Whole Project. Within the sub-catchments associated with the project, flooding has also occurred at Ballyragget and at Freshford.

Vulnerability of the Proposed Gathabawn Windfarm: Examination of the Office of Public Works & Flood Relief mapped fluvial (river), pluvial (rainfall) or groundwater flooding zones as per the <http://www.floodinfo.ie/> website, shows that the Proposed Gathabawn Windfarm site is not located within any mapped fluvial, pluvial or groundwater flooding zone, and there is not vulnerable to flooding due to the elevated nature of the location and the minimal amount of water on the site.

Extreme rainfall events at a location have the potential to damage infrastructure through high volumes of rainwater runoff. The windfarm drainage system will prevent rainwater runoff from collecting or ponding on the upslope side of windfarm infrastructure by collecting this upslope runoff and directing it via the site drainage network to the downslope side at regular intervals via cross drains and outfall weirs. The design of windfarm site roads and hardstanding areas will ensure that rain falling onto the footprint of the windfarm will be directed into the downslope drainage network and attenuated to reduce the erosion potential of the runoff through the provision of check dams, swales and settlement ponds as part of the drainage network, and by releasing the runoff to surrounding land at regular intervals via outfall weirs. The settlement ponds at outfall locations have been sized according to the size of the area they will be receiving water from and are large enough to accommodate a 10-year return rainfall event. The windfarm drainage system will be installed

during the construction phase and remain in place and regularly maintained for the operational lifetime of the windfarm. Therefore, it is considered that the proposed Gathabawn Windfarm will not cause flooding.

Vulnerability of the Candidate Gathabawn Grid Connection: The Parksgrove Substation is not located within any mapped flood area, and due to the use of aggregate within the compound and the underground nature of the cabling, it is considered that the Candidate Gathabawn Grid Connection will not cause flooding to occur.

While the Candidate Gathabawn Grid Connection does pass through a mapped flood zone at two locations: (i) to the north of Ballyragget town where the Parksgrove-Moatpark Underground Cabling crosses the River Nore and its floodplain, and (ii) where the Ballyring-Parksgrove Underground Cabling is routed across the Lisdowney Stream and through its floodplain. These parts of the Candidate Gathabawn Grid Connection relate to underground cabling and as these cables will be installed underground, within protective ducts in a trench surrounded by concrete, it is considered that once constructed, that they will not be vulnerable to flooding or saturated soils. At the River Nore, the ducts for the cables will be installed several meters under the bed of the River Nore, using horizontal directional drilling technique. The drill pits will be located outside of the flood extent, as will the joint bays for this section of Underground Cabling. At the Lisdowney Stream crossing, due to a requirement for instream works and the fisheries suitability of the Lisdowney Stream - the instream construction works will be carried out during the months of July, August and September – as required by Inland Fisheries Ireland. Furthermore, the jointing chambers along the Ballyring-Parksgrove Underground Cabling will be located outside of the flood extents along the Lisdowney Stream. Mitigation measures include a commitment to schedule works in the area of both of these crossings to take place during July to September, and during a period when there is no risk of flooding.

In summary, it is considered that the likelihood of the proposed Gathabawn Windfarm or the operational Candidate Gathabawn Grid Connection being affected by flooding or extreme rainfall events or causing flooding to occur, is considered to be Extremely Unlikely. When the timing measure is implemented, it is considered that the likelihood of the Candidate Gathabawn Grid Connection construction works being affected by flooding or extreme rainfall events or causing flooding to occur is **Extremely Unlikely**.

EIAR 19.2.1.5 Natural Disaster - Landslide

Ireland's location, terrain and climate result in landslides occurring mainly in areas with steep slopes where rock meets the surface and peat covers the terrain.

Vulnerability of the Proposed Gathabawn Windfarm: Site visits and ground investigations, which included trial holes and boreholes found that **no part of the Proposed Gathabawn Windfarm is located within an area of peat**. An examination of the GSI Landslide Susceptibility Mapping (www.gsi.ie/en-ie/data-and-maps/Pages/Geohazards.aspx#landslides) found that the majority of the turbines and windfarm site roads are located in locally flat areas with Low GSI landslide susceptibility. No turbines are located within a High Risk Area. While there is one area with a high risk of landslide within the windfarm site, (located c.175m from T4 in the Ballylehaun Area), this area comprises one of the Biodiversity Area at the site, where the existing native wood will be protected and maintained, and a connecting corridor of trees and shrubs will be planted to join this wood with the small wood in the Gales Hill Nature Reserve to the north. This connectivity corridor is located along the High Risk area, no excavation works or changes to ground levels will occur in this zone. The authors of the Geotechnical Stability report (appended to Chapter 7 Soils) determined that there was no likelihood of landslide at the windfarm site, including at the Biodiversity Area in the Ballylehaun Area.

Furthermore, no landslide events have occurred at the Gathabawn Windfarm. Just one historic landslide event within 10km of the windfarm site, located at Cullahill Mountain c.1.5km from the closest proposed Gathabawn Windfarm turbine. Overall, the likelihood of the Gathabawn Windfarm project being affected by landslip is considered to be Extremely Unlikely.

Vulnerability of the Candidate Gathabawn Grid Connection: The Parksgrove Substation and Parksgrove-Moatpark Underground Cabling are both located within an area identified as Low Risk of landslide. The Ballyring-Parksgrove Underground Cabling is also predominantly in areas identified as having a Low Risk of landslide. However, there is a 30m section of the cable route which passes through an area of high risk for c.30m. As the cables will be installed in underground trenches which will backfilled with the material removed during the initial excavation, and the works location reinstated to match the original slopes and topography, it is considered by the authors of the Geotechnical Stability report that the construction of the Ballyring-Parksgrove Underground Cabling along this 30m section of the route is **Very Unlikely** to cause landslip.

EIAR 19.2.2 Consequences of Extreme Weather & Natural Disasters Occurring

The expected consequences arising from extreme weather, flooding or landslip in relation to human health and the local environment, should the event occur, is described here.

- Due to the low number of personnel working on-site at any one location, the consequences of extreme weather, flooding or land slippage, if they did occur, is considered to be **Minor**.
- Due to the relatively low number of people living or working locally, the consequences of extreme weather, flooding or land slippage, if they did occur, is considered to be **Minor**.
- Due to the potential for simple contamination and localised effects of short duration in downstream watercourses, the consequences to water quality due to land slippage or flooding, is considered to be **Limited**.

EIAR 19.2.3 Overall Risk

When the likelihood and the consequence of a potential flooding or land slippage disaster occurring is applied to the risk matrix from the DoEHLG 2010 guidelines, a broad indication of the critical nature of each risk can be determined.

In relation to on-site personnel, other people living and working in the locality, and downstream water quality, an extreme weather, flooding or land slippage event would be classed a '**normal emergency**' - based on a likelihood rating of *Extremely Unlikely* and a consequence rating of *Minor/Limited*.

In summary, due to the Whole Gathabawn Windfarm Project not being vulnerable to Major Accidents, along with the inherent stability of the Proposed Gathabawn Windfarm and Candidate Gathabawn Grid Connection sites; the absence of peat; the absence of watercourses within the construction footprint of the windfarm and the timing of watercourse crossings along the Candidate Grid Connection; the absence of vulnerability to climate change, the design standards associated with the turbines, substation and grid connection components, the undergrounding of cabling at shallow depths – **disasters as a result of severe storms, extreme temperatures, land slippage or flooding/heavy rainfall events are considered extremely unlikely to occur**, no particular mitigation measures are required for Major Accidents; Natural Disasters and Climate Change.

Furthermore, it is considered that the presence of the Whole Project will not increase the likelihood of a disaster occurring.

EIAR 19.2.4 Mitigation Measures to avoid/reduce Vulnerability to Natural Disasters

Although mitigation measures are not required for the project to manage vulnerability or risk associated with natural disasters, it is noted that the following measures, most of which form part of the project design or part of the suite of environmental protection measures for the windfarm development, will contribute to the reduction in risk in relation to natural disasters and climate change.

EIAR 19.2.4.1 Mitigation by Design

The following design aspects of the Whole Gathabawn Windfarm Project will avoid or reduce the likelihood of the Project being affected by extreme weather, flooding or landslip events:

Proposed Gathabawn Windfarm

- Compliance of the wind turbines with the latest IEC 61400 standard;
- Location of the wind turbines, windfarm site roads and control buildings away from flood extents;
- Undergrounding of windfarm electricity cables. The electricity will be transported by underground cables placed in sealed ducts, protecting them from extreme weather and flooding;
- Turbine foundations constructed on bedrock or other competent material, overlain with and surrounded by a hardstanding area;
- Design of construction areas to ensure cut and fill slopes are provided at a minimum of 1:1.5, and detailed design reviewed by geotechnical engineer;
- Absence of sensitive hydrology features (i.e. watercourses) in the Ballylehaun or Ballyring Areas;
- Absence of peat at the proposed Gathabawn Windfarm site
- Installation of windfarm drainage network, to include upslope and downslope drains, along with cross drains, outfall weirs, check dams, swales and settlement ponds;
- Unsuitable material excavated from windfarm site roads and turbine hardstanding locations will be used to backfill borrow pits;

Candidate Gathabawn Grid Connection

- Timing of instream works at the Lisdowney Stream and HDD works at the River Nore to occur during the months of July, August or September, and during a period of low flood risk.
- Underground nature of the cabling,
- Location of Parksgrove Substation outside of a floodplain and outside of flood extents;

EIAR 19.2.4.2 Mitigation by management

Mitigation by management relates to supervision and scheduling of works, and to practices which will be implemented in order to avoid/reduce the risk of the Whole Gathabawn Windfarm Project being affected by extreme weather, flooding or landslip events. These measures will include;

Mitigation by Management & Practices to reduce risk to by extreme weather, flooding or landslip events

- Construction Environmental Management Plan
- Sediment & Erosion / Storm Water Control Plan
- Environmental Manager
- Project Ecologist
- Ground Stability Measures

- Management of excavated material
- Runoff and Sediment Control, Windfarm Drainage System
- Monitoring of Silt Fencing & Drainage Structures
- Weather monitoring
- Emergency Response Procedures

The provision for Emergency Response Procedures is included in the Environmental Management Plan (EMP) for the Whole Gathabawn Windfarm Project. The Emergency Response Procedures will include site-appropriate actions to be taken in the event of significant downstream surface water pollution.

Environmental Awareness Training will also be provided to ensure that all of the appointed Contractors site personnel have the appropriate knowledge to successfully implement the environmental management measures set out in the EMP. The main objective of the training will be to make sure that site personnel are aware of the relevant Environmental Commitments, the Environmental Protection Measures and that site personnel are aware of the steps to take in an environmental emergency situation.

In relation to unrelated disasters in the locality: Should a disaster occur, unrelated to the Whole Gathabawn Windfarm Project and not affecting the windfarm or the grid connection, but occurring within in the locality – the implementation of the site drainage network, the use of weather forecasting, the monitoring of the construction works by the Environmental Clerk of Works, the monitoring of the operating windfarm by the Asset Manager and the monitoring of the Parksgrove Substation by Eirgrid, the provision of point of contact details to key stakeholders, and the ability to control the operational turbines and substations remotely, will ensure that the Project will not make the consequences of the unrelated event worse.

EIAR 19.3 Reference List for Description of the Development

Gov.ie (n.d.) *A framework for major emergency management*, available: <https://www.gov.ie/en/collection/ca182-a-framework-for-major-emergency-management/>

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