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ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED FAHY BEG WIND FARM, CO. CLARE

VOLUME 2 – MAIN EIAR

CHAPTER 17 – INTERACTIONS OF THE FOREGOING

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17 INTERACTIONS OF THE FOREGOING

17.1 Introduction

The requirement for the identification of interactions between the various aspects of the environment as detailed throughout the EIAR is set out in Article 3(1) of the amended EIA Directive 2011/92/EU as amended by the Directive 2014/52/EU, which states the following:

“The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors:

- a) population and human health;
- b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC;
- c) land, soil, water, air and climate;
- d) material assets, cultural heritage and the landscape;
- e) **the** interaction between the factors referred to in points (a) to (d).”

In the preparation of this chapter, regard was had to the Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact interactions (European Commission, 1999), the EPA’s Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (2022), and the European Commission’s Guidance on the Preparation of the Environmental Impact Assessment Report (2017).

This Chapter considers the potential for interactions and inter-relationships between one aspect of the environment and another which can result in an impact being either positive or negative, as well as having varying significance. The chapter considers potential significant environmental effects that may occur in terms of the interaction and inter-relationships of Air Quality & Climate, Noise & Vibration, Biodiversity, Land, Soils & Geology, Hydrology & Water Quality, Population & Human Health, Material Assets, Shadow Flicker, Traffic & Transportation, Archaeology, Architectural & Cultural heritage, Landscape & Visual and Telecommunications & Aviation, as a result of the proposed project as described in Chapter 3 of this EIAR.

Direct, indirect, cumulative and interactive impacts were considered during the siting of the proposed turbines and associated infrastructure in order to minimise impacts on the environmental aspects mentioned above. The interactions and inter-relationships of the potential impacts as set out throughout this EIAR are detailed in this Chapter. Table 17-1 herein provides a matrix detailing the key interactions and inter-relationships between the key environmental aspects of the proposed project, including the wind farm, grid connection route (GCR) and turbine delivery route (TDR).

Table 17-2 provides further details and examples of the diverse range of interaction and inter-relationships between the key environmental aspects.

Each individual chapter of the EIAR has had regard to interactions between different potential impacts. For example, Hydrology & Water Quality has had regard to potential impacts on Biodiversity; and Land, Soils and Geology has had regard to potential impacts on both Biodiversity, Hydrology & Water Quality and Traffic & Transportation.



The project is made up of three distinct elements as listed below and referred to throughout this Chapter.

- The wind farm site (**referred to in this EIAR as 'the Site'**);
- The grid connection route (**referred to in this EIAR as the 'GCR'**);
- The turbine delivery route (**referred to in this EIAR as the 'TDR'**).

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Table 17-1: Matrix of Interaction Between key Environmental Aspects

	Air Quality & Climate	Noise & Vibration	Biodiversity	Land, Soils & Geology	Hydrology & Water Quality	Population, Human Health & Material Assets	Shadow Flicker	Traffic & Transport	Archaeological, Architectural & Cultural Heritage	Landscape & Visual	Telecommunications & Aviation
Air Quality & Climate											
Noise & Vibration											
Biodiversity											
Land, Soils & Geology											
Hydrology & Water Quality											
Population, Human Health & Material Assets											
Shadow Flicker											
Traffic & Transport											
Archaeological, Architectural & Cultural Heritage											
Landscape & Visual											
Telecommunications & Aviation											

 = interaction or inter-relationship
 = no interaction or inter-relationship



Table 17-2: Description of Interactions Between Key Environmental Aspects

INTERACTION	DESCRIPTION
Land, Soils & Geology Air Quality & Climate Traffic & Transportation Population & Human Health	<p>During the construction phase of the proposed project there is potential for impact to human health as a result of construction activities. Dust arising from earthworks, tree felling activities, trench excavation along GCR, construction of the new and upgrade of existing access tracks, the temporary storage of excavated materials, the movement of construction vehicles, loading and unloading of aggregates/materials and the movement of material can lead to the migration of dust. Dust emissions arise when particulate matter becomes airborne making it available to be carried downwind from the source. Dust emissions can lead to elevated PM10 and PM2.5 concentrations impacting on air quality and potentially impacting on human health at nearby dwellings. This is further exacerbated by the increase in traffic movements associated with the construction phase which can spread dust.</p> <p>This potential impact is unlikely to occur at the Site due to the setback of the proposed construction site from nearby dwellings. There is greater potential for this impact to occur along the GCR where installation works will be located in close proximity to dwellings. Due to the rolling nature of the proposed grid route works, this will have a short-term, temporary and slight impact on nearby dwellings. Mitigation measures have been set out in Chapter 6: Air Quality & Climate, Chapter 9: Land, Soils & Geology, Chapter 11: Population, Human Health & Material Assets and Chapter 13: Traffic & Transportation to avoid the impact of dust on nearby residential properties. Mitigation measures include the use of a specific haul route, diversions and speed limits to limit the spread of dust and the implementation of a dust control plan where construction works will be in proximity to residential properties.</p>
Land, Soils & Geology Air Quality & Climate Biodiversity Traffic & Transport	<p>During the construction and decommissioning phase of the proposed project, there is potential for impact to biodiversity due to vegetation effects (soiling of vegetation from dust) as a result of construction activity which can occur up to 25m from sources and soiling effects which can occur up to 100m from sources. This is likely to occur as a result of excavation and the migration of dust, which can be exacerbated by traffic movements. This can impact on air quality, plant species and habitat. Mitigation has been set out in Chapter 6: Air Quality & Climate, Chapter 8: Biodiversity, Chapter 9: Land, Soils & Geology and Chapter 13: Traffic & Transportation in order to reduce potential soiling and vegetation affects including the covering of loads which may be sources of dust migration. A designated haul route and appropriate storage of soils in accordance with the soils management plan will be utilised to control this potential impact.</p>



INTERACTION	DESCRIPTION
Noise & Vibration Land, Soils & Geology Air Quality & Climate Traffic & Transportation Population & Human Health	<p>During the construction phase of the proposed project, the construction works, in combination with the projected increase in traffic, has the potential to impact on human health and residential amenity by causing noise and dust nuisance at nearby dwellings. Project noise levels at the Site are not expected to exceed limits and the setback distance from the Site to nearby dwellings will avoid impact from soiling effects. The use of a designated haul route will control the spread of dust and noise as a result of the increased traffic movements. The proposed GCR works will result in elevated noise levels at nearby dwellings and will be above the guideline limits in some instances. Mitigation measures include the use of temporary barriers or screens to reduce noise impact and the use of a dust control plan to mitigate against the dispersal of dust. Vehicles and machinery in proximity to dwellings will not wait outside residential properties when idle to reduce impact of noise. Due to the rolling nature of these works, the impact is expected to be significant, brief/temporary and localised. Potential impacts along the turbine delivery route (TDR) may occur due to the construction of temporary accommodation works to facilitate the delivery of large turbine components. Mitigation is set out in Chapter 6: Air Quality & Climate, Chapter 7: Noise & Vibration, Chapter 9: Land, Soils & Geology and Chapter 13: Traffic & Transportation to reduce the potential impact these construction activities may have on residential amenity and human health.</p>
Hydrology & Water Quality Land, Soils & Geology Biodiversity Traffic & Transportation	<p>The construction phase of the proposed project has potential to impact on water quality, aquatic biodiversity and habitats as a result of excavation and tree felling. This can result in the deterioration of water quality due to sediment and nutrient release to watercourses and has potential to impact on European sites hydrologically connected to the project, including the Site, GCR and TDR. Furthermore, the potential for spillage of hydrocarbons from refuelling or from malfunctioning machinery also has potential to impact on water quality and aquatic biodiversity. Excavation works associated with the installation of the GCR may result in suspended solids reaching watercourse, affecting water quality and biodiversity. Suspended solids also have the potential to reach watercourses by being transported from the construction site to the public road on the wheels of construction traffic. This has potential to migrate to roadside drains. Mitigation measures have been set out in Chapter 8: Biodiversity, Chapter 9: Land, Soils & Geology, Chapter 10: Hydrology & Water Quality and Chapter 13: Traffic and Transportation, in order to reduce potential impact on watercourses and biodiversity. This includes the use of silt fencing, the avoidance of excavations in adverse weather conditions using a road sweeper to maintain public roads during construction activities and the use of bunded hydrocarbon stores and refuelling trucks. Mitigation by design has also been included in the project. The setback of proposed works from watercourses will reduce potential sediments from reaching water courses and the use a clear-span bridge at the main watercourse crossing at the Site and use of horizontal directional drilling on the public road along the GCR will avoid instream works.</p>



INTERACTION	DESCRIPTION
Land, Soils and Geology Hydrology & Water Quality Population & Human Health	<p>Construction activities associated with the proposed project have potential to result in the erosion of exposed soil which can lead to sediment and nutrient concentrations in surface water run-off. This has potential to impact on ground water and the water of the aquifer beneath the Site and GCR area. Similarly, the potential for spillage of hydrocarbons used on site has potential to impact on ground water quality. This has potential to impact on drinking water of nearby wells which can impact on human health. Mitigation measures are set out in Chapter 9: Land, Soils & Geology and Chapter 10: Hydrology & Water Quality to avoid potential impact on ground water. Furthermore, there are no recorded groundwater supply wells in proximity to the turbine locations where potential for impact to ground water is highest. Excavations associated with the substations, tracks, compound and grid connection will not extend into the underlying bedrock aquifer.</p>
Land, Soils and Geology Hydrology & Water Quality Traffic & Transportation Population & Human Health	<p>The activities associated with the construction and decommissioning of the proposed project have potential to result in soil compaction due to use of heavy machinery and construction traffic at the Site. Soil compaction can reduce the infiltration of runoff and may result in areas of standing water which pose potential health and safety issues to construction workers and the general public. There is potential for silt to be carried from the construction site to the public road on the wheels of construction traffic which can cause the soiling of the public road, reducing skid resistance and causing a potential traffic hazard. Mitigation measures have been set out in Chapter 9: Land, Soils & Geology, Chapter 10: Hydrology & Water Quality, Chapter 11: Population, Human Health & Material Assets and Chapter 13: Traffic & Transportation in order to reduce the potential for the migration of soil to the public road, reduce potential for soil compaction, reduce the occurrence of standing water and maintain best practice health and safety standards on-site and off-site during construction.</p>
Hydrology & Water Quality Biodiversity	<p>During the construction and decommissioning phases of the proposed project, sanitary waste and material waste accumulated at the Site has potential to impact on water quality and biodiversity if mishandled or disposed of inappropriately. As set out in the Construction Environmental Management Plan (CEMP) included in Appendix 3.1, all on-site waste will be stored appropriately and disposed of at a licensed waste facility.</p>
Population & Human Health (Land Use) Biodiversity Material Assets	<p>The construction of the project will result in the felling of 14.2 hectares of commercial forestry. This will result in a change of land use from agriculture and commercial forestry to renewable energy, a loss in habitat which will impact on biodiversity and a loss in renewable material assets (trees). The impact on biodiversity is expected to be slight to imperceptible following mitigation and the impact on material assets will be neutral due to the requirement to provide replant lands elsewhere.</p>



INTERACTION	DESCRIPTION
Land, Soil & Geology, Noise & Vibration, Biodiversity Hydrology & Water Quality	<p>During the construction phase there is potential for impact to biodiversity including bird species during felling, vegetation clearance and movement of soil and operating machinery. These activities will generate noise with potential to displace species and impact on foraging and nesting habitats at the Wind Farm, Grid Route and TDR. Secondary habitat degradation may occur through a deterioration in water quality as a result of earthworks. Prior to mitigation, potential impacts on avifauna are considered temporary and moderate to imperceptible and potential impacts on aquatic species and habitats are considered temporary and significant during the construction period. Mitigation measures have been set out in Chapter 9: Land, Soils & Geology and Chapter 10: Hydrology & Water Quality in order to avoid impact on water quality and aquatic species and habitat. Mitigation measures have been set out in Chapter 8: Biodiversity to avoid impact on species and habitats including avifauna and mammals during construction. Measures include all felling and clearing of vegetation will be carried out outside of the breeding season for birds, badgers and red squirrel, where possible, and night-time works will be limited to avoid impact on bats. A buffer zone between turbines and tree lines will be applied to minimize risk to bat populations. Pre-construction confirmatory monitoring surveys will be undertaken, and an Ecological Clerk of Works will be present to oversee the construction works and vegetation clearing. Mitigation measures have been set out in Chapter 7: Noise & Vibration to reduce noise where possible during the construction phase of the project. Following implementation of mitigation measures, the potential impact to species and habitat as a result of this potential interaction is considered non-significant and temporary.</p>
Air Quality & Climate Population & Human Health Material Assets	<p>The operational phase of the proposed project will result in the production of clean sustainable electricity which will offset the burning of fossil fuels and carbon emissions, resulting in positive benefit to air quality. This will result in an overall benefit to human health. The renewable electricity generated will provide greater energy security to the national grid, reducing the nation's dependency on fossil fuel and reducing the costs associated with fossil fuel importation. Therefore, this will have a positive impact on both material assets and a positive impact on air quality, displacing c. 52,980 tonnes of CO2 emissions per annum which would otherwise be released to the atmosphere as a result of the burning of fossil fuels. This will also benefit in reducing climate change.</p>
Noise & Vibration Landscape & Visual Shadow Flicker Population & Human Health	<p>The operation phase of the proposed project has potential to impact on residential amenity and human health as a result of a combination of noise, visual impact and the effects of shadow flicker on nearby residential receptors. These impacts have been considered in Chapter 7: Noise & Vibration, Chapter 11: Population, Human Health & Material Assets, Chapter 12: Shadow Flicker and Chapter 15: Landscape & Visual. Mitigation has been set out where relevant. The predicted noise limits will fall within the guideline noise limits at the Site apart from one noise sensitive location at particular wind speeds. Mitigation will be put in place which includes noise reduction modes for specific turbines during these conditions. The occurrence of shadow flicker will be eliminated through the use of shadow flicker detection systems on each wind turbine which will identify the conditions where shadow flicker can occur and cease operation until the conditions for shadow flicker are no longer present. A significant setback distance has been applied between the proposed turbines and nearby residential dwellings. The closest</p>



INTERACTION	DESCRIPTION
	dwelling to the turbine locations is approximately 900m from turbine T4. This provision aims to provide adequate setback in order to maintain residential amenity at nearby dwellings. The setback also aims to reduce noise and potential occurrences of shadow flicker impact.
Population & Human Health (Recreation, Amenity & Tourism) Landscape & Visual Archaeological, Architectural & Cultural Heritage	The operational phase of the proposed development has potential to impact on landscape and cultural heritage which may have an effect on tourism in the area. As outlined in Chapter 14: Archaeological, Architectural & Cultural Heritage, there are no state care national monuments located in proximity to the Site. Similarly, there are no major tourism attractions in proximity to the Site as detailed in Chapter 11. The operational phase of the proposed development will result in no predicted direct impacts on the known archaeological, architectural and cultural heritage resources. Furthermore with the successful implementation of the construction phase mitigation, there will be no predicted direct impacts on any such potential unrecorded archaeological sites during the construction phase. Additionally, in terms of indirect impacts on sites located within 1km of the proposed site during the operational phase along with their combined distances from the Site, the likely magnitude of indirect impacts on their alignments and settings are likely to be negligible to low with imperceptible to slight significance of impacts. No residual impacts on architectural heritage and undesignated cultural heritage resources are predicted to arise following decommissioning of the wind farm. Furthermore, no residual impacts on the cultural heritage resource are predicted to arise from the grid connection route or turbine delivery route. As further outlined in Chapter 11: Population, Human Health & Material Assets, Fahy Beg wind farm development does not have a significant impact on Tourism as concluded from studies conducted by Fáilte Ireland. Therefore, the impacts associated with landscape and visuals during the operational phase of the proposed development will not have a significant impact on Population & Human Health (Recreation, Amenity & Tourism) and Archaeological, Architectural & Cultural Heritage.

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INTERACTION	DESCRIPTION
Land, Soils and Geology Hydrology & Water Quality Population & Human Health Material Assets Biodiversity Architectural & Cultural Heritage	<p>The potential susceptibility of the proposed project to major accidents and natural disasters is considered in Chapter 11: Population, Human Health & Material Assets. This assessment considers the proposed project’s vulnerability to major accidents and natural disasters, potential adverse impacts on human health and the environment, the magnitude of potential impacts, the likelihood of potential impacts and considers the preparedness of the project in case of accident, disaster or emergency. Fahy Beg Wind Farm’s potential susceptibility to major accidents and natural disaster is considered negligible.</p> <p>These events have potential to impact on soils and geology, hydrological regimes, water quality, human health and safety of construction workers, forestry workers and the general public, material assets including property and renewable energy projects, roads, infrastructure and natural resources, biodiversity and archaeological monuments.</p> <p>Regarding biodiversity, the main possible impacts are considered to be the release of sediment and pollutants into watercourses, which could negatively impact upon aquatic habitats and species.</p> <p>Slope stability has been considered in Chapter 9: Land, Soils and Geology. The proposed development and proposed infrastructure locations are generally located within areas of ‘Low’ to ‘Moderate High’ susceptibility, with localised areas classified as ‘High’ in the northernmost extent of the site. Mitigation measures to reduce impacts on geology, hydrogeology and slope stability, has meant that the infrastructure has been primarily located within areas of thinner soft ground and lower slope.</p> <p>Flood risk is considered in Chapter 10: Hydrology & Water Quality and had regard to the potential impact flooding might have on slope stability. The flood risk assessment concluded that the proposed development will not result in a significant alteration to the existing hydrological regime and will not result in significant increase in run-off. This was also assessed with a 20% increase predicted run-off flow to account for potential future climate change.</p> <p>Safety mitigation measures have been built into the design of the proposed development to avoid potential for fire and avoid potential for the spreading of fire as set put in Chapter 11: Population, Human Health & material Assets, including significant setback between infrastructure and tree lines, and significant setback of the proposed wind farm from nearby residential and agricultural structures.</p>

17.2 Conclusions

The proposed Fahy Beg Wind Farm project has potential to impact on various environmental aspects as detailed throughout this EIAR. As outlined in this Chapter, there are interactions and inter-relationships between these aspects as described above. The EIAR has considered these interactions and inter-relationships throughout the assessment, firstly through the design of the wind farm site, grid connection route and turbine delivery route, to avoid impacts where possible and also in the definition of suitable mitigation measures to minimise potential impacts. It is therefore considered that the potential for significant impacts associated with the interactions of environmental effects outlined in this chapter will be avoided due to the implementation of mitigation measures as detailed throughout this EIAR.



17.3 References

European Commission (1999), Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions. Office for Official Publications of the European Communities, May 1999

Environmental Protection Agency (2022), Guidelines on the Information to be Contained in Environmental Impact Assessment Reports. EPA

European Commission (2017), Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report. Publications Office of the European Union

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