17. INTERACTION OF EFFECTS

17.1 Introduction

Chapters 5 to 16 of this EIAR identify the potential significant environmental effects that may occur in terms of Population and Human Health, Terrestrial Ecology and Freshwater Ecology, Land, Soils and Geology, Water (Hydrology and Hydrogeology), Air Quality and Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage (Archaeological, Architectural and Cultural Heritage) and Material Assets (Roads and Traffic, Telecommunications and Aviation), as a result of the Proposed Development as described in Chapter 4 of this EIAR. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or improve them or have a neutral effect.

A matrix is presented in Table 17-1 below to identify potential interactions of impacts between the various aspects of the environment already assessed in this EIAR. The matrix highlights the potential for the occurrence of positive, neutral or negative effects during both the construction (C) and operational (O) phases. It is considered that the potential effects during the decommissioning phase will be similar to the construction phase effects but of a lesser magnitude. The matrix is symmetric, with each environmental component addressed in the chapters of this EIAR being placed on both axes of a matrix, and therefore, each potential interaction is identified twice.

Table 17-1 Interaction Matrix: Potential for Interacting Impacts

	Phase	Population and Human Health	Biodiversity	Ornithology	Land, Soils and Geology	Hydrology & Hydrogeology	Air Quality	Climate	Noise and Vibration	Cultural Heritage	Landscape and Visual	Material Assets	Major Accidents & Natural Disasters
Population and Human Health	C												
	O												
Biodiversity	C												
	O												
Birds, Ornithology	C												
	O												
Land, Soils and Geology	C												
	O												
Hydrology & Hydrogeology	C												
	O												
Air Quality	C												
	O												
Climate	C												
	O												
Noise and Vibration	C												
	O												
Cultural Heritage	C												
	O												
Landscape and Visual	C												
	O												
Material Assets	C												
	O												

Vulnerability to Natural Disasters	C												
	O												

Legend: No Interacting Effect: Positive Effect:
Neutral Effect: Negative Effect:

The potential for interaction of impacts has been assessed, throughout this EIAR, as part of the Impact Assessment process. While the work on all parts of the Environmental Impact Assessment Report (EIAR) was not carried out by MKO, the entire project and all the work of all sub-consultants was managed and coordinated by the company. This EIAR was edited and collated by MKO as an integrated report of findings from the impact assessment process, by all relevant experts, and impacts that potentially interact have been assessed in detail in the individual chapters of the EIAR above and summarised in Section 17.2 below.

Where any potential negative impacts have been identified during the assessment process, these impacts have been avoided or reduced by design and the proposed mitigation measures, as presented throughout the EIAR and highlighted in Section 17.2 below.

17.1.1 Statement of Authority

This section of the EIAR has been prepared by Niamh McHugh and reviewed by Órla Murphy of MKO. Niamh is an Environmental Scientist who has been working with MKO since June 2021. Niamh possesses a BSc (Hons) in Environmental Science from the National University of Ireland, Galway. Niamh has been involved in the compilation and production of a number of EIARs, mainly in the field of Renewables. Órla is a Senior Environmental Scientist with over 8 years' experience in the environmental sector where she has acted as Project Manager for a number of EIAR applications for wind energy developments, compiling numerous chapters. Órla holds a BSc. in Geography and MSc. in Environmental Protection and Management.

17.2 Impact Interactions

17.2.1 Population and Human Health

Population and Human Health, Air Quality, Climate, Noise

As identified in Chapter 5 of this EIAR, the construction phase has the potential to create a short-term, negative effect on human health due to the nuisance caused by construction plant and vehicle noise emissions, should the mitigation measures outlined in Chapter 12 not be implemented.

During the operational phase the Proposed Development has the potential to generate noise but as identified in Chapter 12, the potential effects on population and human health are not significant.

During the operational phase, the energy generated by the Proposed Development will offset energy and the associated emission of greenhouse gases from electricity-generating stations dependent on fossil fuels, thereby having a positive effect on climate (i.e. slowing the rate of global warming). In doing so, there will be reduced effects from climate change on human health over the 'do-nothing' scenario and continuing reliance on generating energy using fossil fuels.

Population and Human Health and Air Quality

During the construction phase, the Proposed Development has the potential to create a short term, negative effect on human health via exhaust emissions as a result of construction vehicles/machinery and plant on the site and the transport of workers and materials to/from the site. As outlined in Chapter 10 (Air Quality), the potential effects on human health are short-term, slight, negative effects.

By providing an alternative to electricity derived from coal, oil or gas-fired power stations, the Proposed Development will result in emission savings of carbon dioxide (CO_2), oxides of nitrogen (NOx), and sulphur dioxide (SO_2). The production of renewable energy from the Proposed Development will have a long-term, significant, positive impact on air quality.

Population and Human Health and Climate

During the construction phase, the Proposed Development has the potential to create a short-term, negative effect on climate via exhaust emissions as a result of the use of construction vehicles/machinery and plant on the site and the transport of workers and materials to/from site. The potential impact will be short term and slight, and will be restricted to the duration of the construction phase.

During the operational phase, the energy generated by the Proposed Development will offset energy and the associated emission of greenhouse gases from electricity generating stations dependant on fossil fuels, thereby having a positive effect on the climate (i.e. slowing the rate of global warming). In doing so, there will be reduced effects from climate change on human health over the 'do-nothing' scenario and continuing reliance on generating energy using fossil fuels.

Population and Human Health, Land Soils and Geology

The excavation and movement of peat and spoil during the construction phase of the Proposed Development has the potential to create dust emissions which, consequently, have the potential to have a temporary, slight, negative effect on local air quality and human health. Mitigation measures to reduce dust emissions generated during the construction phase of the Proposed Development are presented in Chapter 10 and Chapter 8.

Population and Human Health and Water

As described in Chapter 9 of this EIAR, the construction phase of the Proposed Development has the potential to give rise to some water pollution as a result of site activities, and any water pollution could have a potential significant negative effect on the health of other users of that water within the same catchment. Mitigation measures are presented in Chapter 9 to minimise the potential of any such issues occurring.

Population and Human Health, and Material Assets

Chapter 15 of this EIAR discusses how the construction phase of the project will give rise to traffic movements of abnormal loads and increased traffic volumes on the local road network and, therefore, is likely to create some short-term inconvenience for other road users. The facilitation of the delivery of the turbine components to the site may also necessitate upgrade works (temporary removal of soil berms, vegetation, gates and fences) at a section of the old N22 National Road, which runs adjacent to the new section of the N22. An Outline Traffic Management Plan will be in place to minimise all disruption insofar as possible, as outlined in the Section 15.1 of this EIAR

Population and Human Health, and Landscape and Visual

The construction phase of the Proposed Development will see the temporary introduction of construction machinery and the erection of wind turbines into a natural, but already modified landscape. The removal of the existing turbines and the erection of the turbines in particular will change the existing landscape. Whether the long-term change in landscape created by the erection of the turbines is deemed to be positive or negative is a subjective matter. What appears to be a positive visual effect to one viewer could be deemed to be a negative effect by another viewer. The landscape and visual impact assessment of the Proposed Development, included as Chapter 13 of this EIAR, concludes that, from 17 viewpoints assessed, the visual effect will be 'Moderate' from five locations and ranges from 'Not Significant' to 'Slight' at the remaining locations. Therefore, it is considered, on the basis of the visual assessment undertaken, that the overall visual impact of the Proposed Development will not be significant.

17.2.2 Terrestrial Ecology

Terrestrial Ecology and Land, Soils and Geology

The removal of forestry, peat and spoil, during construction of the Proposed Development, is likely to result in some disturbance of birds and other flora and fauna in the areas surrounding the proposed works area thereby, potentially causing a long term, slight, negative effect on birds and other flora and fauna. Excavated peat and spoil will be used for the restoration of the proposed borrow pit or used for landscaping.

Terrestrial Ecology and Water

Site activities during the construction phase have the potential to give rise to some water pollution, and consequential indirect effects (such as disturbance and deterioration of habitat quality) on flora and fauna that use the water within the same catchment. The site activities during the construction phase, and continuing on for the operational phase, will give rise to additional localised drainage, which has the potential to have a significant, long term, negative effect on flora and their associated habitats should the appropriate measures not be implemented. These potential impacts have been assessed in Chapter 6 and Chapter 9 of this EIAR, and the relevant measures outlined in Chapter 9 will be in place to avoid any water pollution and subsequent effect on flora and fauna.

Terrestrial Ecology and Air Quality, Climate

During the construction phase of the Proposed Development, increased vehicular and dust emissions within and around the site have the potential to be a nuisance to birds and other flora and fauna, thereby having a temporary, slight, negative effect. The mitigation measures outlined in Chapter 10 of the EIAR will ensure that the potential for negative effects is reduced or eliminated.

During the operational phase, the Proposed Development will help offset carbon emissions from fossil fuel-based electricity generation plants, which will help contribute to a slower increase in the rate of global warming and a reduction in air pollution, and consequently, will, in combination with other renewable energy projects, have a long term, significant positive effect on birds and other flora and fauna.

Terrestrial Ecology and Noise and Vibration

Site activity during the construction phase could give rise to noise that could be a nuisance for fauna (including birds), thereby having a temporary, slight, negative effect. Best practice mitigation measures are included in Chapter 6 and Chapter 12 to minimise the potential negative effect of noise generated during the construction phase on fauna.

Terrestrial Ecology and Landscape

The removal of some vegetation within the Proposed Development footprint and surrounding areas is likely to result in a change to the visual landscape during the construction phase, which will become part of the normal landscape of the wider area for the duration of the operational phase. The visual effect of this change is considered to be long-term, localised and slight.

17.2.3 Freshwater Ecology

Freshwater Ecology and Land, Soils and Geology

The removal of forestry, peat and spoil, during construction of the Proposed Development, is likely to result in some deterioration of water quality in the surface watercourses surrounding the proposed works area thereby, potentially causing an indirect long term, slight, negative effect on freshwater ecology. The mitigation measures set out in Chapter 7 and Chapter 8 will be put in place during the pre-construction stage in order to prevent the deterioration of water quality and associated effects on freshwater ecology.

Freshwater Ecology and Water

Site activities during the construction phase have the potential to give rise to some water pollution, and consequential indirect effects on freshwater ecological species. The site activities during the construction phase, and continuing on for the operational phase, are likely to give rise to additional localised drainage, which has the potential to have a significant, negative effect on the habitats of aquatic species, however, this will be mitigated against by the implementation of the measures outlined in Chapter 9 of this EIAR. Mitigation measures as set out in both Chapter 7 and Chapter 9 of this EIAR will ensure that there are no direct emissions of sediment-laden run-off into surface watercourses which would lead to a deterioration of water quality, and subsequent negative effects on freshwater species.

Freshwater Ecology, Air Quality and Climate

During the construction phase of the Proposed Development, increased dust emissions within and around the site have the potential to be a nuisance for freshwater aquatic species should dust clouds form and enter surface watercourses, thereby having a temporary, slight, negative effect. The mitigation measures outlined in Chapter 10 of the EIAR will ensure that the potential for negative effects is reduced or eliminated.

During the operational phase, the Proposed Development will help offset carbon emissions from fossil fuel-based electricity generation plants, which will help contribute to a slower increase in the rate of global warming and, consequently, could in combination with other renewable energy projects, contribute to preventing the loss of freshwater aquatic species from Ireland as a result of climate change.

Freshwater Ecology and Noise and Vibration

Site activity during the construction phase could give rise to noise that could be a nuisance for freshwater species that use the surface watercourses within the site, therefore, causing a temporary, slight, negative effect on freshwater ecology. Best practice mitigation measures are included in Chapter 7 and Chapter 12 to minimise the potential negative effect of noise generated during the construction phase on freshwater ecology.

17.2.4 Land, Soils and Geology

Land, Soils and Geology and Water

As identified in Chapter 9 of this EIAR, the movement and removal of peat and spoil during the construction phase has the potential to have a significant, negative effect on water quality through potentially silt-laden runoff from the proposed works areas. Mitigation measures to ensure there are no significant, negative effects on water quality are presented in Chapter 9.

Land, Soils and Geology and Air Quality

During the construction phase, the Proposed Development will give rise to dust emissions through excavation of the land, construction of proposed infrastructure and through the transport of workers and materials to/from site. This will result in a short-term, slight, negative impact.

Land, Soils and Geology and Climate

The removal of peat habitat and tree felling as part of the construction phase of the Proposed Development has the potential to have a short-term, slight, negative effect on the climate.

Land, Soils and Geology and Archaeological, Architectural and Cultural Heritage

The removal of peat and spoil during the construction phase has the potential to have a permanent, significant, negative effect on previously unrecorded sub-surface archaeological site and artefacts. Mitigation measures outlined in Chapter 14 will reduce the potential for negative effects on unrecorded sites and artefacts during excavations.

Land, Soils and Geology and Landscape and Visual

The removal of peat and spoil and the subsequent replacement with crushed stone for the construction of site roads and hardstanding areas within the Proposed Development site has the potential to alter the local landscape. The visual effect of this change is expected to be long term, localised in nature and slight.

17.2.5 Air Quality

Air Quality and Material Assets

The movement of construction vehicles both within and to and from the Proposed Development site has the potential to give rise to dust nuisance effects during the construction phase. This is assessed further in Chapter 10 of this EIAR, and mitigation measures are presented to minimise and reduce any potential effects.

17.2.6 Climate

Climate and Material Assets

The construction phase of the Proposed Development will result in the transport of workers and materials to and from the site, and use of plant machinery. These activities will result in increased exhaust emissions in the local area and will have a short-term, slight, negative impact.

17.2.7 Landscape and Visual

Landscape and Visual and Cultural Heritage

As described in Chapter 13 of this EIAR, the Proposed Development has the potential to change the landscape setting of recorded sites and monuments in the wider area. However, it is concluded in Chapter 13 that any potential, indirect, visual effect of the Proposed Development on national and recorded monuments would not be significant.

17.2.8 Vulnerability to Natural Disasters

As described in Chapter 16 of this EIAR, major accidents or natural disasters are hazards which have potential to affect the Proposed Development and lead to environmental effects both 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 potential for significant accidents or disasters is conducted in connection with the information that must be included in the EIAR. This includes aspects such as population and human health, terrestrial ecology, , land and soil, hydrology and hydrogeology, air quality, climate, material assets, cultural heritage, and the landscape. and human health, biodiversity, land and soil, hydrology and hydrogeology, air quality, climate, material assets, cultural heritage, and the landscape. 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).

When the above mitigation is implemented, and all mitigation detailed in the EIAR is implemented, the residual effect(s) associated with the construction, operation and decommissioning of the Proposed Development are not significant.

17.3 Mitigation and Residual Impacts

Where any potential interactive negative impacts have been identified in the above, a full suite of appropriate mitigation measures has already been included in the relevant sections (Chapters 5-16) of the EIAR. The implementation of these mitigation measures will reduce or remove the potential for these effects. Information on potential residual impacts and the significance of effects, is also presented in each relevant chapter.