

Chapter 17 - Interactions of the Foregoing

Slieveacurry Renewable
Energy Development, Co.
Clare

Environmental Impact Assessment
Report (EIAR)



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17. INTERACTIONS OF THE FOREGOING

17.1 Introduction

The preceding Chapters 5 to 16 of this Environmental Impact Assessment Report (EIAR) identify the potential significant environmental effects that may occur in terms of Population and Human Health, Biodiversity (Flora and Fauna), Ornithology (Birds), Land, Soils and Geology, Hydrology & Hydrogeology (Water), Air Quality, Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage, Material Assets (Roads and Traffic, Telecommunications, Aviation, Utilities and Waste Management), and Vulnerability to/from Major Accidents and Natural Disasters as a result of the Proposed Project, as described in Chapter 4: Description of the Proposed Project of this EIAR. All of the potential significant effects of the Proposed Project and the measures proposed to mitigate them have been outlined in the preceding chapters of this EIAR. Mitigation measures and best practice measures for the construction, operation and decommissioning of the Proposed Project are detailed in the accompanying Construction and Environmental Management Plan (CEMP) (Appendix 4-5). 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 ameliorate them or have a neutral effect.

A matrix is presented in Table 17-1 below to identify potential interactions between the various aspects of the environment already assessed in this EIAR. The matrix highlights the occurrence of potential positive 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 but of a lesser magnitude. In Section 17.2 below, the potential interactions between each environmental component have been discussed in order of the relevant chapters of the EIAR. Once a potential interaction between two environmental components has been discussed, for example, Population & Human Health and Water, the interaction will not be discussed again in the following relevant section, therefore there is no Water and Population & Human Health section.

Table 17-1 Interaction Matrix: Potential for Interacting Impacts

	Phase	Population and Human Health	Biodiversity	Ornithology	Land, Soils and Geology	Hydrology and Hydrogeology	Air Quality	Climate	Noise and Vibration	Landscape and Visual	Cultural Heritage	Material Assets	Major Accidents & Vulnerability to Natural Disasters
Population and Human Health	C	Black	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey
	O	Black	White	White	White	White	White	White	White	White	White	White	White
Biodiversity	C	Light Blue	Black	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey
	O	Light Blue	Black	White	White	White	White	White	White	White	White	White	White
Ornithology	C	Light Blue	Pink	Black	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey
	O	Light Blue	Light Green	Black	White	White	White	White	White	White	White	White	White
Land, Soils and Geology	C	Pink	Pink	Pink	Black	Grey	Grey	Grey	Grey	Grey	Grey	Grey	Grey
	O	Pink	Light Green	Light Green	Black	White	White	White	White	White	White	White	White
Hydrology and Hydrogeology	C	Pink	Pink	Pink	Pink	Black	Grey	Grey	Grey	Grey	Grey	Grey	Grey
	O	Pink	Pink	Pink	Pink	Black	White	White	White	White	White	White	White
Air Quality	C	Pink	Pink	Pink	Pink	Light Blue	Black	Grey	Grey	Grey	Grey	Grey	Grey
	O	Light Green	Light Green	Light Green	Light Blue	Light Blue	Black	White	White	White	White	White	White
Climate	C	Pink	Pink	Pink	Pink	Light Blue	Light Blue	Black	Grey	Grey	Grey	Grey	Grey
	O	Light Green	Light Green	Light Green	Light Blue	Light Blue	Light Blue	Black	White	White	White	White	White
Noise and Vibration	C	Pink	Pink	Pink	Light Blue	Grey	Grey	Light Blue	Black	Grey	Grey	Grey	Grey
	O	Pink	Light Blue	Light Blue	Light Blue	White	White	Light Blue	Black	White	White	White	White
Landscape and Visual	C	Pink	Light Blue	Light Blue	Pink	Grey	Grey	Light Blue	Light Blue	Black	Grey	Grey	Grey
	O	Pink	Light Blue	Light Blue	Light Blue	White	White	Light Blue	Light Blue	Black	White	White	White
Cultural Heritage	C	Light Blue	Light Blue	Light Blue	Pink	Grey	Grey	Light Blue	Light Blue	Pink	Black	Grey	Grey
	O	Light Blue	Light Blue	Light Blue	Light Blue	White	White	Light Blue	Light Blue	Pink	Black	White	White
Material Assets	C	Pink	Light Blue	Light Blue	Light Blue	Light Blue	Pink	Pink	Light Blue	Light Blue	Light Blue	Black	Grey
	O	Light Green	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Green	Light Blue	Light Blue	Light Blue	Black	White

Major Accidents and Vulnerability to Natural Disasters	C												
	O												

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

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

Where any potential negative effects have been identified during the assessment process, these impacts have been avoided or reduced by design and the proposed mitigations measures, as presented throughout the EIAR.

17.1.1 Statement of Authority

This section of the EIAR has been completed by Brandon Taylor with input from Muireann Van Nieuwenhove and Ciarán Fitzgerald and reviewed by Órla Murphy and Sean Creedon, of MKO.

Brandon Taylor is a Project Environmental Scientist with over three years of private consultancy experience. Brandon holds a BSc (Hons) in Geography from McGill University, and a MSc (Hons) in Coastal & Marine Environments from the University of Galway. Brandon’s key skills include scientific research and report writing, particularly in the context of local communities and their interactions with environmental stressors, and geospatial analysis and the application of GIS and remote sensing tools across fields of renewable energy development, coastal zone management and education and scientific communication. Since joining MKO, Brandon has been involved in the design and environmental impact assessment of multiple large-scale onshore wind energy developments across Ireland, contributing to and managing the production of EIA reports.

Muireann Van Nieuwenhove is a Graduate Environmental Scientist with MKO. Muireann holds a first-class honour Master’s degree in Environment, Society and Development from University of Galway. As part of MKO’s environmental renewables team Muireann is involved with the production of EIARs for a variety of wind energy projects. Muireann’s areas of expertise include environmental policy, high quality report writing, and geographic information systems.

Ciarán Fitzgerald is an Environmental Scientist who has been working with MKO since June 2024. Ciarán holds a B.Sc. (Honours) in Marine Science from the National University of Ireland Galway and a First-Class Honours PG. Dip in Geographic Information Systems from University College Cork. Ciarán works as part of the Environmental Renewables team as well as a larger multidisciplinary team. Ciarán’s role involves undertaking tasks such as report writing, EIAR chapter writing, and QGIS mapping. Prior to joining MKO, Ciarán spent time aboard the research vessel “Celtic Explorer,” working as part of a team undertaking chemical water data, pelagic species abundance and sorting, bathymetric GIS mapping, data collection, and report writing. Ciarán’s key strengths lie in GIS mapping and communication. Since joining the company, Ciarán has been involved in a range of projects, including onshore wind, offshore wind, and solar, contributing by reviewing EIAR chapters

and assisting with project development. Ciarán holds a membership from the Institute of Sustainability and Environmental Professionals (ISEP).

Órla Murphy is a Senior Environmental Scientist with McCarthy O'Sullivan Ltd. with over 10 years of experience in private consultancy. Órla holds BSc (Hons) in Geography from Queens University Belfast & a MSc in Environmental Protection and Management from the University of Edinburgh. Prior to taking up her position with McCarthy Keville O'Sullivan in January 2018, Órla worked as an Environmental Project Assistant with ITP Energised in Scotland. Órla's key strengths and areas of expertise are in Environmental Protection and Management, EIA, Project Management, Renewable Energy and Peatland Management, where she has carried out research projects and site work relating to restoration and management of peatland sites in both Scotland and Northern Ireland. On joining MKO, Órla has been involved on a range of renewable energy infrastructure projects. In her role as a project manager, Órla works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs. Within MKO, Órla plays a role in the management of and sharing of knowledge with junior members of staff and works as part of a large multi-disciplinary team to produce EIA Reports.

This report has also been reviewed by Sean Creedon (B.Sc., M.Sc.). Sean has 23 years' experience in planning and environmental impact elements within all stages of wind farm project delivery.

17.2 Impact Interactions

17.2.1 Population and Human Health

Population and Human Health and Land, Soils & Geology

Construction Phase

During the construction phase the use of plant machinery on site during excavation works and the movement of peat and spoil may result in the potential for soil and ground contamination. With the implementation of mitigation and monitoring measures detailed in Section 8.7.2 of Chapter 8 (Lands, Soils & Geology) and the CEMP (Appendix 4-5), the potential for residual effects associated with soil or ground contamination during the construction phase and subsequent health effects are negative, imperceptible, direct, short-term, unlikely effect on peat and subsoils and bedrock.

Operational Phase

A wind farm and associated grid infrastructure is not a recognised source of pollution and so the potential for effects during the operational phase are imperceptible. With the implementation of mitigation and monitoring measures detailed in Section 8.7.3 of Ch. 8: Lands, Soils & Geology and the CEMP (Appendix 4-5), the potential for residual effects associated with soil or ground contamination during the operational phases and subsequent health effects are negative, imperceptible, indirect, long-term, and unlikely.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, the identified interaction is Not Significant.

Population and Human Health and Hydrology and Hydrogeology

Potential health effects arise mainly through the potential for surface and groundwater contamination which may have negative effects on public and private water supplies, see Section 5.4.2.2.4 of Chapter 5: Population & Human Health.

Construction Phase

There are no underground water or sewage networks within the permanent built infrastructure footprint of the Proposed Project. Public water supply surface water abstractions in this area include Lough Naminna (Inagh Kilmaley Group Water Scheme) and Doo Lough. A search of private well locations on Geological Survey Ireland (GSI) well database (www.gsi.ie) reveal several wells in the surrounding lands at the Proposed Wind Farm Site, however they have poor locational accuracies as shown on Figure 9-7 in Chapter 9 of this EIAR. These wells are reported as having domestic and agricultural uses. Where available the yields of these wells are typically reported as being poor, ranging from 13.4 to 21.8m³/day (i.e. poorly productive bedrock). There are no wells with a locational accuracy of ≤50m mapped by the GSI within 1km of the Proposed Wind Farm Site.

Due to the nature of the Proposed Grid Connection Site 33kV underground cabling being mainly within existing private access tracks and public road and the shallow nature of the works, no assessment on potential wells located along the proposed 33kV underground cabling (public road or private land sections) was carried out due to the lack of potential effects. See Section 9.3.15.2 of Chapter 9: Hydrology and Hydrogeology for further detail.

The Proposed Project design and mitigation measures detailed in Chapter 9: Hydrology and Hydrogeology and the CEMP (Appendix 4-5) ensures that the potential for effects on the water environment are not significant. A comprehensive suite of surface water mitigation measures and controls are outlined in Chapter 9: Hydrology and Hydrogeology to ensure protection of all downstream receiving waters. Mitigation measures will ensure that surface runoff from the permanent built infrastructure footprint of the Proposed Project will be of a high quality and will therefore not impact on the quality of downstream surface water bodies, no impact on group water schemes, wells and therefore, no subsequent health effects. With the implementation of the drainage design and all mitigation measures listed in Chapter 9: Water (separation distances, prevailing geology, topography and groundwater flow directions), it is considered that the residual effects on water quality will be indirect, negative, imperceptible, short-term and unlikely.

Operational Phase

During the operational phase, all permanent drainage controls will be in place and the disturbance of ground and excavation works will be complete. Only minor maintenance works may be completed and would be very infrequent. It is not envisaged that any significant refuelling works will be undertaken on site during the operational phase. There will be a temporary imperceptible negative impact on human health due to water quality.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, the identified interaction is Not Significant.

Population and Human Health, and Air Quality

Construction Phase

During the construction phase the excavation and movement of peat and spoil during the construction phase of the Proposed Project is likely to create dust and exhaust emissions and result in the emission of air pollutants which will result in a short-term, slight, negative effect on local air quality. Mitigation measures to reduce dust and exhaust emissions generated during the construction phase of the Proposed Project are presented in Chapter 10: Air Quality.

Operational Phase

During the operational phase, the Proposed Project will generate additional traffic to the area in the form of light goods vehicles (LGVs) visiting the Site 1-2 times per day for inspections and maintenance, giving rise to a long-term imperceptible negative impact on air quality. However, the Proposed Project has the potential to supply 54MW of electricity to the national grid during the operational phase, offsetting the use of fossil fuels within the electricity sector. This has a long-term moderate positive effect on national electricity supply and the offsetting of fossil fuel consumption, thereby resulting in a reduction in harmful emissions that can be damaging to human health. This will have a long-term moderate positive effect on human health.

By providing an alternative to electricity derived from coal, oil or gas-fired power stations during the operational phase, the Proposed Project will result in emission savings of carbon dioxide (CO₂), oxides of nitrogen (NO_x), and sulphur dioxide (SO₂). The production of renewable energy from the Proposed Project will have a long-term, moderate, positive impact on air quality.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, the identified interaction is Not Significant.

Population and Human Health, and Climate

Construction Phase

The construction of the Proposed Project will have a long-term, imperceptible, negative effect on climate and will be restricted to the duration of the construction phase. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent imperceptible negative effect on Climate and therefore Population and Human Health.

Operational Phase

The Proposed Project, when in operation, will reduce the input of carbon intensive energy into the national grid and reduce the amount of greenhouse gas emissions being released to the atmosphere. Harnessing more energy by means of renewable sources will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment. The rated output of 6MW per turbine for the Proposed Project would mean that the proposed 9 no. wind turbines would have a combined generating capacity of 54MW.

For the purposes of this EIAR it is assumed that the wind turbine model installed as part of the Proposed Project will have an output of 6MW. Therefore, on this basis, the proposed 9 no. wind turbines would have a combined generating capacity of 54 MW displacing approximately 34,791 tonnes of carbon emissions per annum from the largely carbon-based traditional energy mix, the detail of

which is presented in Section 11.4.3. This will have a long-term moderate positive effect on climate and therefore a long-term moderate positive effect on health.

The Proposed Project has the potential to supply 54MW of electricity to the national grid during the operational phase, offsetting the use of fossil fuels within the electricity sector. This has a long-term moderate positive effect on national electricity supply and the offsetting of fossil fuel consumption, thereby resulting in a reduction in harmful emissions that can be damaging to human health.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, there identified interaction is Not Significant.

Population and Human Health and Noise and Vibration

Construction Phase

As identified in Chapter 5: Population & Human Health of this EIAR, the construction phase will generate an increase in noise levels in the vicinity of the Site which has the potential to cause a nuisance to sensitive receptors in the area. The contractor undertaking the construction of the works will be obliged to take specific noise abatement measures and comply with the recommendations of British Standard BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites – Noise* and all mitigation measures, as detail in Chapter 12: Noise & Vibration and the CEMP, will be implemented. The construction phase will likely create a short-term slight to moderate negative effect on human health due to the nuisance caused by construction plant and vehicle noise emissions.

Operational Phase

As detailed in Chapter 12: Noise & Vibration, the predicted noise emissions during the operational phase, once the appropriate mitigation measures are implemented, will be long-term negative and not significant. Furthermore, as noise emissions from turbines are controllable via inbuilt technologies, the Proposed Project will be able to comply with the Guidelines (DoEHLG, 2006) and future iterations should they come into effect before a decision is made on this application. Likewise, the proposed turbines will be capable of achieving compliance with noise conditions imposed should the Proposed Project receive a grant of planning permission.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, the identified interaction is Not Significant.

Population and Human Health, and Landscape and Visual

Construction Phase

The construction phase of the Proposed Project will see the temporary introduction of construction machinery and the erection of wind turbines into a natural but already modified landscape. The erection of the proposed 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 construction activities may potentially cause temporary impacts on the landscape such as the creation of temporary structures, dust, soil erosion and alterations to drainage. It is considered that the construction phase will have a 'Moderate', 'Short-term', 'Negative' effect in terms of direct landscape effects.

Operational Phase

Chapter 13: Landscape and Visual of this EIAR comprises the landscape and visual impact assessment of the Proposed Project. As detailed in this chapter, the landscape character of the Proposed Wind Farm site will undergo major changes in the landscape by the introduction of vertical man-made structures and ancillary infrastructure. As outlined in Section 13.7.3.1.1 of Chapter 13, these changes amount to long-term landscape effects of 'Moderate' upon the physical fabric of the landscape of the Site. These direct landscape effects will be highly localised to the footprint of the Proposed Wind Farm Site. Effects on the perceptual and aesthetic character of the Proposed Wind Farm Site are also deemed to be of 'Moderate' significance.

The likely significant visual effects arising from local residential amenity was assessed from four viewpoints in very close proximity to the Proposed Turbines (VP03, VP10, VP16 and VP17). Residual visual effects were found to be 'Moderate'. Given the adherence to the 4x tip height set-back distance to protect visual amenity, on balance, effects on residential receptors are mitigated and are therefore not significant.

Decommissioning Phase

Turbine foundations would remain in place underground and would be covered with earth and allowed to revegetate. This naturalisation process shall revert the landscape of the Proposed Wind Farm site back to a condition similar to the current landscape baseline. Removal of the proposed turbines and ancillary infrastructure (except the proposed substation extension) from the Proposed Wind Farm Site during decommissioning will result in 'Short-Term', 'Slight', 'Negative' visual effects.

On this basis, the identified interaction is Not Significant.

Population, and Human Health and Material Assets

Construction Phase

During the construction phase the Proposed 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 as well as dust and exhaust emissions. A Traffic Management Plan will be implemented prior to construction to minimise all disruption, as described in Chapter 15: Material Assets and the CEMP (Appendix 4-5). Once the TMP is implemented for the construction phase of the Proposed Project, there will be a short-term slight negative residual effect on local road users.

Operational Phase

During the operational phase, impacts on the surrounding local highway network will be imperceptible. With the implementation of measures detailed in Chapter 5: Population & Human Health and the CEMP (Appendix 4-5) dust and exhaust emission will be contained and the potential for impact on health will be imperceptible.

As detailed in Chapter 15: Material Assets, the Proposed Project will have a no impacts on telecommunications and aviation assets during the operational phase.

During the operational phase, there will be no impacts or associated effects on built services or telecommunications associated with the Proposed Project. The Proposed Project will have a long-term imperceptible neutral residual effect on aviation assets during the operational phase.

The Proposed Project has the potential to supply 54MW of electricity to the national grid during the operational phase, offsetting the use of fossil fuels within the electricity sector. This has a long-term moderate positive effect on national electricity supply and the offsetting of fossil fuel consumption, thereby resulting in a reduction in harmful emissions that can be damaging to human health.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration,

On this basis, the identified interaction is Not Significant.

17.2.2 **Biodiversity**

Biodiversity, and Ornithology

Construction Phase

Site activities during the construction phase of the Proposed Project may have the potential to give rise to disturbance and deterioration of habitat to birds and their prey species. An overview of survey data is included in Appendix 7-3 (Summary Tables) with detailed maps provided in Appendix 7-4 (Survey Data). Survey data and maps relating to roost sites are provided in Appendix 7-5 (Confidential Survey Data). Potential impacts on Key Ornithological Receptors (KORs) are included in Section 7.4.2 of Ch. 7: Ornithology. Potential effects during the construction phase range only from imperceptible to slight, negative and long term during the construction phase.

Operational Phase

A Biodiversity Management and Enhancement Plan (BMEP) is included in this EIAR (see Appendix 6-4). It is proposed to enhance and manage 34.6 ha of peatland habitats, which will involve felling of forestry. The BMEP works will have a positive, slight, direct, permanent likely effect on the land environment which will have a subsequent indirect slight positive long term impact on birds.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration

On this basis, the identified interaction is Not Significant.

Biodiversity and Land, Soils & Geology

Construction Phase

The removal of forestry and the excavation of peat and spoil during the construction phase of the Proposed Project is likely to result in the disturbance of flora and fauna in and adjacent to the permanent built infrastructure footprint of the Proposed Project thereby, potentially causing a long term, slight, negative effect on flora and fauna. These potential impacts have been assessed in Chapter 6: Biodiversity of this EIAR, and excavated peat and spoil will be contained on site in the designated

peat and spoil management areas or used for landscaping (Appendix 4-2 contains the Peat and Spoil Management Plan).

It is proposed to enhance and manage 13 areas totalling approx. 172.7 ha within the Site selected for biodiversity enhancement measures as part of the Proposed Project and to enhance the Site for species and habitats known to occur within the Site. This includes an array of habitats such as Hen Harrier habitat, Marsh Fritillary habitat, Peatland and Blanket Bog habitats as well as linear habitats. The aforementioned are discussed in detail in Appendix 6-4 Biodiversity Management and Enhancement Plan (BMEP). The felling of 123 ha of forestry is proposed as one of the biodiversity enhancement measures, as is the planting of hedgerows. The proposed BMEP works represents 13.7% of the Site.

Some of these proposals will disturb local peat, soil and subsoil deposits and increase the likelihood of erosion of peat and subsoils. However, due to the largely non-invasive nature of the works the potential for effects on the soils and geological environment are limited. The works will have a positive effect on the land environment. Please see Chapter 6: Biodiversity and Appendix 6-4 BMEP for details.

Operational Phase

The BMEP works will have a positive, slight, direct, permanent likely effect on the land environment. Please see Ch. 6: Biodiversity and Appendix 6-4 Biodiversity Management and Enhancement Plan (BMEP) for details.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase to a lesser extent and lesser duration, with the exception of the implementation of the BMEP works which are intended to be permanent.

On this basis, the identified interaction is Not Significant.

Biodiversity and Hydrology and Hydrogeology

Construction Phase

Site activities during the construction phase of the Proposed Project may have the potential to give rise to water pollution, and consequential indirect effects (such as disturbance and deterioration of habitat quality) on flora and fauna that use that water within the same catchment. These potential impacts have been assessed in Chapter 6: Biodiversity and Chapter 9: Hydrology and Hydrogeology and the relevant mitigation measures outlined in these chapters and the CEMP (Appendix 4-5) will be in place to avoid any water pollution and subsequent effect on flora and fauna.

As part of the Proposed Project, BMEP measures as identified in Appendix 6-4, some of these proposals will disturb local peat, soil and subsoil deposits and increase the likelihood of erosion of peat and subsoils. However, due to the largely non-invasive nature of the works the potential for effects on the water environment are limited. Following the mitigation measures identified in Chapter 9: Hydrology and Hydrogeology, the residual effects will have a negative, temporary, direct, imperceptible, likely effect on downstream surface water quality.

Operational Phase

The potential for increased surface water runoff is the primary potential impact during the operational phase of the Proposed Wind Farm. It should be noted that no significant habitat for salmonids, lamprey, macroinvertebrates, European eel, or other aquatic species was recorded within the Project Footprint and all new major infrastructure such as turbine bases are located over 50 metres from the watercourses within the Site. The potential for significant effects on aquatic species is restricted to

indirect effects on their habitat resulting from water pollution. This is considered to have possible negative effect on biodiversity.

Operational Phase

A Biodiversity Management and Enhancement Plan is included as part of the Proposed Project, as identified in Appendix 6-4. Some of these proposals will disturb local peat, soil and subsoil deposits and increase the likelihood of erosion of peat and subsoils. It is proposed to enhance and manage 34.6 ha of peatland habitats, which will involve felling of forestry. The BMEP works will have a positive effect on biodiversity which will also have a have a positive, slight, direct, permanent likely effect on the land environment.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration

On this basis, the identified interaction is Not Significant.

Biodiversity and Air Quality

Construction Phase

During the construction phase of the Proposed Project, increased vehicular and dust emissions within and around the Site have the potential to be a nuisance to flora and fauna, thereby having a short-term, slight, negative effect. The mitigation measures outlined in Chapter 10: Air Quality and the CEMP (Appendix 4-5) of the EIAR will ensure that the potential for negative effects is reduced or eliminated.

Operational Phase

During the operational phase, the potential for effects on biodiversity from vehicular and dust emissions are imperceptible, however the overall displacement of fossil fuel emissions resulting from the operation of the Proposed Project will have a long-term moderate positive effect on air quality for biodiversity.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, the identified interaction is Not Significant.

Biodiversity and Climate

Construction Phase

The construction of the Proposed Project will result in greenhouse gas emissions associated with tree felling, production of Proposed Project built infrastructure and construction materials, and operation of vehicles and plant. As well, the permanent built infrastructure footprint of the Proposed Project will result in the loss of carbon fixing vegetation within the Site. The impact on biodiversity will be negative and slight only given the quantity of greenhouse gases that will be emitted to the atmosphere and will be restricted to the duration of the construction phase. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent imperceptible, negative effect on the climate and therefore biodiversity. This is assessed further in

Chapter 11: Climate of this EIAR, and mitigation measures are presented to minimise any potential effects.

Operational Phase

During operational phase, the Proposed Project will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year operational lifespan due to the provision of clean renewable energy to the national grid, consequently, in combination with other renewable energy projects, the Proposed Project will have a long term, moderate positive effect on flora and fauna.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, the identified interaction is Not Significant.

Biodiversity and Noise & Vibration

Construction Phase

Site activity during the construction phase could give rise to noise that could be a nuisance for fauna, which use the Site. Best practice mitigation measures are included in Chapter 6: Biodiversity and Chapter 12: Noise & Vibration and the CEMP (Appendix 4-5) to minimise the potential negative effect of noise generated during the construction phase on biodiversity. Taking into account the mitigation measures the effect of noise on biodiversity is considered to be negative, slight and short term.

Operational Phase

The limited onsite noise activity generated by the Proposed Project during the operational phase will have an imperceptible effect on biodiversity.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration

On this basis, the identified interaction is Not Significant.

17.2.3 **Ornithology**

Ornithology and Land, Soils & Geology

Construction Phase

The removal of peat and soil, during construction phase of the Proposed Project is likely to result in some disturbance of flora and fauna, including birds, in the areas surrounding the Proposed Project works area. During the construction there will be a short-term to long-term, slight, negative effect on birds. The relevant mitigation measures outlined in Chapter 7: Birds, Chapter 8: Lands, Soils & Geology and the CEMP (Appendix 4-5) will be in place to avoid any potential significant effect on birds.

Operational Phase

A Hen Harrier habitat enhancement plan is included as part of the Proposed Project, as identified in Appendix 6-4. Some of these proposals will disturb local peat, soil and subsoil deposits and increase the likelihood of erosion of peat and subsoils.

Additionally, it is proposed to enhance and manage 34.6 ha of peatland habitats, which will involve felling of forestry. The BMEP works will ensure no significant negative effects on KORS which will also have a have a positive, slight, direct, permanent likely effect on the land environment.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration

On this basis, the identified interaction is Not Significant.

Ornithology and Hydrology and Hydrogeology

Construction Phase

Site activities during the construction phase of the Proposed Project may have the potential to give rise to some water pollution, and short term indirect effects on birds and their prey species (such as disturbance and deterioration of habitat quality) that use that water within the same catchment. The residual effect is negative, imperceptible, indirect, short term, likely effect on down gradient rivers, water quality, and dependant ecosystems. With the implementation of mitigation and monitoring measures outlined in Chapter 7: Birds, Chapter 9: Hydrology and Hydrogeology and the CEMP (Appendix 4-5), the effects during the construction from site activities will be Not Significant.

Operational Phase

As part of the Proposed Project BMEP measures as identified in Appendix 6-4, some of these proposals will disturb local peat, soil and subsoils. The potential for increased surface water runoff is the primary potential impact during the operational phase of the Proposed Project. Progressive replacement of the vegetated surface with impermeable surfaces will decrease the permeability of the ground within the Site footprint (i.e., turbine bases, hardstandings, and to a lesser extent the new access roads) and substation extension. This is considered to have a possible negative effect on birds. Site activities during the operational phase of the Proposed Project will be Not Significant.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration

On this basis, the identified interaction is Not Significant.

Ornithology and Air Quality

Construction Phase

During the construction phase of the Proposed Project, increased vehicular and dust emissions within and around the Site have the potential to be a nuisance to birds, thereby having a short-term, slight, negative effect. The mitigation measures outlined in Chapter 10: Air Quality and the CEMP (Appendix 4-5) of the EIAR will ensure that the potential for negative effects is reduced or eliminated.

Operational Phase

During the operational phase, the potential for effects on birds from vehicular and dust emissions are imperceptible, however the overall displacement of fossil fuel emissions resulting from the operation of the Proposed Project will have a long-term moderate positive effect on air quality for ornithology.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration

On this basis, the identified interaction is Not Significant.

Ornithology and Climate

Construction Phase

The construction of the Proposed Project will result in greenhouse gas emissions associated with tree felling, production of Proposed Project infrastructure and construction materials, and operation of vehicles and plant. As well, the permanent built infrastructure footprint of the Proposed Project will result in the loss of carbon fixing vegetation within the Proposed Wind Farm site. This impact on birds' ranges from a negative slight to imperceptible effect, given the quantity of greenhouse gases that will be emitted to the atmosphere and will be restricted to the duration of the construction phase. As discussed above in Section 17.2.1, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent imperceptible negative effect on Climate.

Operational Phase

During operational phase, the Proposed Project will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year operational lifespan due to the provision of clean renewable energy to the national grid, consequently, in combination with other renewable energy projects, the Proposed Project will have a long term, moderate positive effect on flora and fauna.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, the identified interaction is Not Significant.

Ornithology and Noise & Vibration

Construction Phase

Site activity during the construction phase could give rise to noise that could be a nuisance for birds, thereby having a short-term, slight, negative effect which use the Site. Best practice mitigation measures are included in Chapter 7: Birds and Chapter 12: Noise & Vibration and the CEMP (Appendix 4-5) to minimise the potential negative effect of noise generated during the construction phase.

Operational Phase

The limited onsite noise activity generated by the Proposed Project during the operational phase will have an imperceptible effect on ornithology.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration

On this basis, the identified interaction is Not Significant.

17.2.4 Land, Soils and Geology

Land, Soils & Geology, and Hydrology and Hydrogeology

Construction Phase

As identified in Chapter 9, 144 ha of commercial forestry will be felled to accommodate the Proposed Project.

This has the potential to have indirect, negative, temporary, likely effect on surface water. Proven forestry best practice measures to mitigate the risk of releases of sediment have been proposed to ensure that the deforestation activities have no potential impact on the status, ecology or hydro-morphology of downstream waters. The residual effect of the Proposed Wind Farm Site will be negative, imperceptible, indirect, temporary, likely effect on downstream water quality and aquatic habitats.

Operational Phase

As identified in Chapter 8: Lands, Soils & Geology of this EIAR, the erosion of soil/subsoil can have the effect of reducing the overall volume of soil/subsoil at the Site, with the potential for some eroded subsoils to reach watercourses, leading to water quality issues such as high turbidity. This has the potential to have a slight short term negative effect on water quality. Mitigation measures to ensure there are not significant, negative effects on water quality are presented in Chapter 8: Lands, Soils & Geology, Chapter 9: Water, and the CEMP (Appendix 4-5).

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, the identified interaction is Not Significant.

Land, Soils & Geology and Air Quality

Construction Phase

The excavation works and transportation of vehicles to/from and around the Site will give rise to dust, which is considered a short-term, slight, negative impact on air quality. Mitigation measures outlined in Chapter 10: Air Quality will reduce the potential for negative effects on land, soils, and geology, including includes dust suppression measures which is further outlined in the CEMP (Appendix 4-5).

Operational Phase

No anticipated interactive effect.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, the identified interaction is Not Significant.

Land, Soils & Geology and Climate

Construction Phase

Bogs and peatlands are known to store large amounts of carbon. Due to the waterlogged nature of these habitats, stored carbon is not broken down and released into the atmosphere. The construction of wind farms on bog and peat habitats may affect the natural hydrological regime, thus exposing and drying out the peat and allowing the decomposition of carbon. This will result in some potential long-term imperceptible negative effects due to the removal of carbon fixing vegetation and habitat, however, that has been avoided where possible by the design and layout of the Proposed Project. As discussed in Section 4.4.1 of the BMEP, the restoration of 36.4ha of peatland habitat will help to offset some of the removal of carbon fixing vegetation.

Operational Phase

No interactive impact anticipated

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration

On this basis, the identified interaction is Not Significant.

Land, Soils & Geology and Landscape & Visual

Construction Phase

The removal of spoil and the subsequent replacement with crushed stone for the construction of the site roads and hardstanding areas within the Proposed Wind Farm Site has the potential to alter the local landscape. The visual effect of this change is expected to be short-term, negative and slight.

Operational Phase

No interactive impact anticipated

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration

On this basis, the identified interaction is Not Significant.

Land, Soils & Geology and Cultural Heritage

Construction Phase

The construction of the Proposed Project will not result in any direct, negative effects on the recorded archaeological, architectural or cultural heritage resource as none of these sites are located within the footprint of the development that require excavations and ground works. However, the removal of peat and spoil during the construction phase is likely to have a permanent, slight, negative effect on any previously unrecorded sub-surface archaeological site and/or artefacts after mitigation is applied. Mitigation measures outlined in Chapter 14: Cultural Heritage will reduce the potential for negative effects on unrecorded sites and artefacts during excavations.

Operational Phase

During the operational phase, there is no potential for impacts on cultural heritage from a land soils and geology perspective as there will be no groundworks excavations associated with this phase.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration

On this basis, the identified interaction is Not Significant.

17.2.5 **Air Quality**

Air Quality and Material Assets

Construction Phase

The transportation of vehicles to/from and around the Proposed Project will give rise to dust emissions which is considered a short-term, slight, negative impact on air quality. Following implementation of mitigation measures as outlined in Chapter 10: Air Quality, Chapter 15: Material Assets and the CEMP (Appendix 4-5) there will be a short-term, imperceptible, negative effect on air quality due to transportation movements.

Operational Phase

The effects on air quality due to dust emission will be negligible during the operation phase given that there will only be an average of approximately 1 to 2 trips made to the Proposed Wind Farm Site by car or light goods vehicle per day, with no regular visits required for the Proposed Grid Connection Site. The effects of the maintenance traffic on air quality will therefore be imperceptible and long term.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, the identified interaction is Not Significant.

17.2.6 Climate

Climate and Material Assets

Construction Phase

The construction of the Proposed Project will result in greenhouse gas emissions associated with tree felling, production of Proposed Project infrastructure and construction materials, and operation of vehicles and plant. As well, the excavation of the built infrastructure footprint will result in the loss of carbon fixing vegetation within the Proposed Wind Farm Site. This negative impact will be imperceptible, given the quantity of greenhouse gases that will be emitted to the atmosphere and will be restricted to the duration of the construction phase. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent imperceptible negative effect on Climate and therefore material assets. This is assessed further in Chapter 11: Climate of this EIAR, and mitigation measures are presented to minimise any potential effects.

Operational Phase

During the operational phase, the Proposed Project will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year lifespan of the Proposed Project. The Proposed Project has the potential to supply 54MW of electricity to the national grid during the operational phase, offsetting the use of fossil fuels within the electricity sector. This has a long-term moderate positive effect on national electricity supply and the offsetting of fossil fuel consumption, thereby resulting in a reduction in harmful emissions that can be damaging to human health. Therefore, while there will be greenhouse gas emissions associated with the operation of the Proposed Project, this will be offset by the operation of the Proposed Project which will offset 34,791 tonnes of carbon dioxide per annum or 1,217,690 tonnes over its operational life from traditional carbon-based electricity generation. Subsequently, this will cause a long-term moderate positive effect on Climate as a result of reduced greenhouse gas emissions.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, the identified interaction is Not Significant.

17.2.7 Landscape and Visual

Landscape & Visual and Cultural Heritage

Construction Phase

The construction activities may potentially cause temporary impacts on the landscape setting of recorded sites and monuments in the wider area through the creation of temporary structures, dust, soil erosion and alterations to drainage. It is considered that the changes in landscape construction phase will have a slight, short-term, negative effect in terms of direct landscape effects.

Operational Phase

As described in Chapter 13: Landscape & Visual of this EIAR, the Proposed Turbines have the potential to change the landscape setting of recorded sites and monuments in the wider area. However, it is concluded that any potential, indirect, visual effect of the proposed turbines on sites and monuments range from not significant to moderate. In reality, the effect will be less severe due to natural screening, boundaries, buildings and vegetation, which will alleviate if not remove the impact on setting altogether. Furthermore, some monuments may not be readily visible in the landscape which further ameliorates potential effects on setting. Additionally, many of these monuments are located on private land which are not formally accessible to the public.

Decommissioning Phase

Any interactive impact and consequential effect that occurs during the decommissioning phase will be similar to that which occurs during the construction phase, however to a lesser extent and lesser duration.

On this basis, the identified interaction is Not Significant.

17.2.8 Vulnerability to Natural Disasters

Construction, Operation and Decommissioning Phase

As described in Chapter 16: Major Accidents and Natural Disasters, major accidents or natural disasters are hazards which have the potential to affect the Proposed Project and lead to environmental effects both directly and indirectly. These include accidents during construction, operation and decommissioning of the Proposed Project 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, biodiversity, ornithology, land, soil and geology, hydrology and hydrogeology, air quality, climate, landscape and visual, cultural heritage, and material assets. The risk of a major accident and/or disaster during the construction of the Proposed Project 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 Project are Not Significant.

17.3 Mitigation and Residual Effects

Where any potential interactive negative effects 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 and are detailed in the CEMP (Appendix 4-5). The implementation of these mitigation



measures will reduce or remove the potential for there to be effects. Information on potential residual effects and the significance of effects, is also presented in each relevant chapter. On this basis the effects arising from the identified interactions are not significant.