MWP

Chapter 15 Interaction of the Foregoing

Ballynisky Wind Farm

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15. Interaction of the Foregoing

15.1 Introduction

This **Environmental Impact Assessment Report (EIAR)** has presented the environmental assessments of the proposed development under each required environmental factor. Where relevant, the interaction between the factors, which is the interactions between specific environmental aspects and effects, are already addressed within each of the individual assessment topic areas or chapters of this **EIAR**.

This chapter of the **EIAR** evaluates the potential interaction of impacts, which the proposed development may have on the receiving environment and sensitive receptors.

15.1.1 Scope and Methodology of Assessment

Article 3 of EIA Directive 2011/92/EU, as amended by Directive 2014/52/EU, stipulates that:

> "*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)*".

The purpose of this chapter is to draw attention to important interactions and interdependencies between one factor or topic and another. Consequently, this chapter now highlights those interactions of the environmental aspects and topics previously detailed and assessed throughout this **EIAR**. The potential for interactions between one aspect of the environment and another can result in direct or indirect effects, which may be positive or adverse. This chapter is completed based on a desktop review and by provision of a matrix to present the main interactions. The assessments and results have previously been presented in the preceding chapters of this **EIAR**.

15.2 Identification of Environmental Impacts

While all environmental aspects can be inter-related to some extent, the following outlines the key interactions identified between each of the various environmental subject areas considered in this **EIAR** for the construction, operational and decommissioning phases of the proposed development.

Where the potential for significant effects has been identified, the impacts have been avoided or reduced by mitigation measures, as outlined throughout the chapters of the **EIAR**.

A matrix has been generated to summarise the relevant interactions between specific environmental factors identified for the proposed development. The matrix is presented in **Table 15-1**. It contains each of the environmental factors or aspects, which were considered as part of this environmental impact assessment, on both axes. These interactions have been identified for the construction, operation and decommissioning phases of the proposed development.

Full details of the significance of the effects and the relevant interactions of the environmental aspects along with any proposed mitigation are discussed within each of the individual preceding Chapters.

15.2.1 Population and Human Health

During the construction phase there is potential for interactions between population and human health, traffic and transport, water, air quality, material assets, landscape and visual, land and soils, and noise and vibration. The construction phase of the proposed development has the potential to create noise and dust, which could create a temporary disturbance for occupants of nearby dwellings. The interactive effects are **likely** to be **short term** and **insignificant**.

During the operational phase there is potential for some long-term interactions between population and human health and landscape and visual effects, shadow flicker, and noise and vibration effects. At the same time the development will have positive effects on air quality, climate change and energy security. The interactive effects are **likely** to be **long term** and **insignificant**.

During the decommissioning phase there is potential for insignificant adverse effects on population and human health in relation to traffic and transport, and noise and vibration which could create a temporary disturbance for occupants of nearby dwellings. However, the removal of the wind turbines will have long term moderate positive effects on the visual landscape and noise (for occupants of nearby dwellings). The interactive effects are **likely** to be **short** and **long term** and **insignificant**.

The effects associated with each individual aspect are addressed in the relevant chapters.

15.2.2 Biodiversity and Ornithology

Changes associated with biodiversity such as the removal of habitats, planting of new vegetation and landscaping works has the potential to cause interactions with other aspects of the environment. During the construction stage there is potential for interaction between biodiversity and other aspects of the environment including land and soils, water, air quality and climate, noise and vibration and traffic and transportation. The effects of water quality, land and soils, air quality and climate and disturbance from noise/vibration and traffic effects were taken into consideration in the assessment of biodiversity effects (i.e. there will be some habitat loss and disturbance to fauna and birds during excavation of certain works areas). With the proposed mitigation measures in place, the interactive effects are considered **short term** and **insignificant**.

During operation there is potential for turbines to interact with ornithology and to a lesser extent during decommissioning. The operation of the turbines is unlikely to cause significant displacement effects for bird species. The proposed development includes rigorous ornithological monitoring (in line with best practice) at pre-construction, construction, operational and decommissioning phases. There are no interactive effects during the operational phase.

Overall, the impacts of decommissioning a wind farm are potentially similar to construction impacts and will comprise temporary disturbance such as noise associated with decommissioning of turbines and on-site machinery and increased traffic. The interaction of biodiversity and water quality, and land and soils effects will not occur during the decommissioning phase.

The potential impacts, associated effects, and mitigation measures are described in full in **Chapter 06 Biodiversity** and **Chapter 07 Ornithology**, which includes biodiversity enhancement measures for the site. With the proposed mitigation, the adverse interactions of biodiversity and ornithology, land and soils, water, air quality and climate, noise and vibration and traffic and transport are **not likely** to result in **significant effects** on biodiversity and ornithology.

15.2.3 Water

During the construction and decommissioning phases, there is potential for the effects associated with surface water and ground water to interact with population and human health (due to water quality), land and soils (soil erosion and contamination) and biodiversity (aquatic habitats). The interactive effects are **likely** to be **short term** and **insignificant**.

The potential effects associated with surface water and ground water due to the construction operational, and decommissioning phases of the proposed development are addressed individually and in detail, in particular in relation to suitable mitigation measures to minimise impacts, within the preceding individual chapters.

In addition, a **Construction Environmental Management Plan (CEMP)** has been completed as part of the **EIAR** to manage run-off, particularly of sediment laden water, as a means of protecting water quality and aquatic habitats.

15.2.4 Land and Soils

The excavation, stockpiling and movement of soil for the proposed development has the potential to interact with air quality in terms of increased dust emissions during the construction and decommissioning phases. There is also potential for related impacts on surface and ground water (sediment release), biodiversity, landscape, noise and vibration and traffic and transportation. The associated effects and interactions for each aspect are addressed individually in the preceding chapters.

Soil and rock will be excavated to accommodate the footprint of the turbines, access tracks, substation and the grid connection. Interaction will occur with traffic and transport to import the materials required for the proposed development. A potential adverse effect on surface water can arise from construction works. The proposed development will be developed in line with the drainage proposals for surface water management detailed in the **CEMP** as part of the civil works to ensure adequate protection of water courses during the construction phase.

These adverse interactions of biodiversity and ornithology, water, landscape, noise and vibration and traffic and transport are **likely** to result in **short term** and **insignificant** effects during the construction phase.

During the operational phase, direct interaction of land and soils with other environmental factors will be limited. The permanent land use change to accommodate turbines, access tracks and associated infrastructure will interact with landscape and biodiversity; however, these effects are **likely** to be **long-term** and **insignificant**.

15.2.5 Noise and Vibration

Noise effects will occur during the construction phase of the proposed development as a result of increased levels of site associated traffic and excavations during the construction phase. Noise and Vibration has the potential to impact on population and human health, biodiversity and traffic and transportation which are addressed individually and in detail within the preceding chapters. Appropriate noise mitigation measures and best practice methodologies provided in the **CEMP** will be implemented during the construction phase.

These adverse interactions of biodiversity and ornithology, land and soils, water, air quality and climate, noise and vibration and traffic and transport effects are **likely** to result in **insignificant** effects.

During the operational phase, the only noise effects will be associated with the turbine operations and maintenance traffic. This noise will have **long-term insignificant** effect on population and human health (for nearby residents) and biodiversity. The interactive effects are **likely** to be **long-term** and **insignificant**.

During the decommissioning phase, there will be some slight noise effects associated with the deconstruction and removal of the turbines. This will have interactive effects with population and human health and biodiversity. The interactive effects are **likely** to be **short** and **insignificant**.

15.2.6 Landscape and Visual

During the construction phase, there is potential for short term insignificant adverse effects on population and human health in relation to landscape and visual effects related to the construction works, machinery and traffic. The interactive effects are **likely** to be **short term** and **moderate**.

During the operational phase, the proposed turbines will be prominent in some views from very close to the site. Overall, the development will be visible from a number of different viewpoints and the significance of effects will range from **slight** to **significant**. This effect would **likely** have **slight adverse** interactive effects on population and human health. These interactive **long-term** effects are **unlikely** to be **significant**.

During the decommissioning phase there is potential for **moderate positive long-term** effects on population and human health in relation to landscape and visual effects due to the removal of the turbines for all those able to see the turbines in the landscape. At the same time there is potential for **short term adverse** effects on population and human health from the visual effects associated with increased traffic during the removal of the turbines. The interactive effects are **likely** to be **short and long term** and **insignificant**.

15.2.7 Cultural Heritage and Archaeology

The excavation of soils during construction has the potential to interact with archaeology and cultural heritage, as well as with land and soils. As cultural heritage forms part of landscape character, indirect effects may also influence the landscape and visual environment. These effects are not significant and the interaction of these effects is **likely** to result in **insignificant, short term** interactive effects.

During the operational phase, indirect interactions with landscape and visual will be long-term and may include visual impacts on designated features with above-ground elements. These effects are considered **insignificant** and will be reversible at decommissioning.

Decommissioning will result in a **long-term, moderate positive** interactive effect on landscape character due to the removal of the wind turbines.

15.2.8 Air and Climate

There is potential for emissions to air during the construction phase in the forms of temporary fugitive dust and vehicle movements that potentially have adverse effects on population and human health, biodiversity, traffic and land and soils.

There is a positive interaction on air and climate in the operational stage with material assets as the proposed development comprises renewable energy infrastructure. The wind farm will reduce the need for fossil fuels to generate electricity so will have a positive effect by reducing CO_2 emissions.

The potential and predicted effects of emissions associated with the construction and operational phases of the proposed development are addressed in **Chapter 10 Air Quality and Climate**.

The adverse interactions of air quality/climate, population and human health, traffic/transport and land and soils effects are likely to result in **insignificant, adverse effects** during construction. The same interactions during the decommissioning phase will be lower as no significant earth works are envisaged. The only air quality effects during the decommissioning phase will be associated with the use of vehicles and machinery in the short term, and a reduction in renewable energy production and associated greenhouse gas reductions in the long term (assuming the wind farm is decommissioned and not repowered). Any repowering proposals would be subject to a new planning application.

15.2.9 Material Assets

The use of roads and services during construction will give rise to increased traffic including abnormal loads for delivery of turbine components and is likely to create some short term inconvenience to road users (with traffic and population and human health effects). A Construction phase Traffic Management Plan will be implemented to manage traffic coming to and from the site. Grid connection construction phase works are likely to create some short-term inconvenience and slight adverse effects to road users (with traffic, air quality and population and human health effects). The interactive effects are **likely** to be **short** and **insignificant**.

Energy production during the operational phase of the proposed development will **likely** have a **positive**, **slight** and **long-term** effect on the existing grid capacity and electrical infrastructure. This will likely have **positive**, **slight** and **long-term** interactive effects on population and human health, as well as adaptation of climate change.

During the decommissioning phase, the removal of the turbines will have minor adverse traffic effects that may inconvenience local road users. It is likely that the grid route under the public road will be left in the ground as removing is expected to have more adverse effects than leaving them in situ. A decision on this issue would be made during the planning phase for decommissioning, these adverse interactions of the decommissioning phase on material assets such as traffic and transport and population and human health are **not likely** to result in **significant effects**.

15.2.10 Traffic and Transport

During the construction phase, there is potential for adverse interactive effects between traffic and transport and population and human health, air quality, material assets, landscape and visual, and noise and vibration. These effects have an insignificant potential to pollute and create temporary disturbance for occupants of nearby dwellings. The interactive effects are **likely** to be **short term** and **insignificant**.

During the operational phase, there is potential for long term imperceptible adverse interactive effects on population and human health, landscape and visual, and noise and vibration effects. The interactive effects are **likely** to be **long term** and **insignificant**.

During the decommissioning phase, there is potential for insignificant adverse effects on population and human health and noise and vibration which could create a temporary disturbance for occupants of nearby dwellings. The interactive effects are **likely** to be **short term** and **insignificant**.

15.3 Summary

A matrix has been generated to summarise the relevant interactions and interdependencies between specific environmental aspects and a significance rating has been given. The matrix is presented in **Table 15-1**. It contains each of the environmental topics, which were considered as part of this environmental impact assessment, on both axes. These interactions have been identified for the construction [C], operation [O] and decommissioning [D] phases of the proposed development. Full details of the significance of the effects and the relevant interactions of the environmental aspects along with any proposed mitigation are discussed within each of the individual preceding chapters.

A number of interactions have been identified in the **EIAR**. These are set out below and have been addressed in the relevant chapters.

Table 15-1: Matrix of Impacts

	Population and Human Health incl. Shad. Flicker	Biodiversity and Ornithology	Water	Land and Soils	Noise and Vibration	Landscape and Visual	Cultural Heritage	Air Quality and Climate	Material Assets (incl. traffic)	Traffic and Transport
Population and Human Health incl. Shadow Flicker			C	C	C/O/D	C/O/D		C/O	C	C/D
Biodiversity and Ornithology			C	C	C/O/D			C/O	C	
Water	C/D	C/D		C/D						
Land and Soils	C/D	C/D	C			C	C	C		C
Noise and Vibration	C/O/D	C/O							C/O/D	C/D
Landscape & Visual	C/O			C			O			
Cultural Heritage				C		C/O/D				
Air Quality and Climate	C/O	C		C					C/O	
Material Assets	C/O	C						C/O		C
Traffic and Transport	C/D	C/D			C/D	C/D		C/D	C/D	

	Insignificant Interaction
	Significant Interaction
	No Interaction

C	Construction Phase Impact
O	Operation Phase Impact
D	Decommissioning