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## 17.0 INTERACTION OF THE FOREGOING

### 17.1 INTRODUCTION

The potential effects of the proposed development and the measures proposed to mitigate these effects have been outlined in this EIAR. However, in any development with the potential for environmental effect there is also the potential for interaction between effects of the different environmental aspects.

The result of these interactions may either exacerbate the magnitude of the effect or may in fact ameliorate it. As part of the requirements of an EIAR, the interaction of the effects on the surrounding environment needs to be addressed.

Table 17-1 below outlines the different environmental aspects which have potential to interact as a result of the proposed development. Interactions have been clearly identified in the early stages of the project and where the potential exists for interaction between environmental impacts, the EIAR specialists have taken the interactions into account when making their assessment. Potential interactions (both positive and negative) have been considered for the construction, operation and decommissioning phases of each of the different environmental aspects.



Table 17-1: Interaction between Environmental Aspects (positive and negative)

Interaction Matrix	Biodiversity	Ornithology	Land, Soils & Geology	Hydrology & Hydrogeology	Landscape & Visual	Shadow Flicker	MA-Telecoms & Aviation	Air Quality & Climate	Noise & Vibration	Traffic & Transport	Cultural Heritage	Population & Human Health
Biodiversity	Black	Light Blue	✓	✓				✓	✓			
Ornithology	Light Blue	Black	✓	✓				✓	✓			
Land, Soils & Geology	Light Blue	Light Blue	Black	✓				✓			✓	✓
Hydrology & Hydrogeology	Light Blue	Light Blue	Light Blue	Black								✓
Landscape & Visual	Light Blue	Light Blue	Light Blue	Light Blue	Black						✓	✓
Shadow Flicker	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Black						✓
MA-Telecoms. & Aviation	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Black					✓
Air Quality & Climate	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Black		✓		✓
Noise & Vibration	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Black	✓		✓
Traffic & Transport	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Black		✓
Cultural Heritage	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Black	
Population & Human Health	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Light Blue	Black



## 17.2 DISCUSSION OF INTERACTIONS

In addition to Table 17-1, the following section summarises the primary interrelationships of aspects of the environment with the potential for significant effects as a result of the proposed development.

### *17.2.1 Population and Human Health*

Population and Human Health will interact with other environmental aspects including landscape and visual impacts, shadow flicker impacts, telecommunications impacts, air quality and climate, noise impacts and traffic impacts, associated with the proposed development.

#### **Interactions of Population and Human Health and Landscape & Visual Impacts**

There will be no significant interaction between Population and Human Health and landscape and visual impacts during the construction phase of the development.

The landscape and visual impact of the development during the operational phase may be considered to be one of the potentially significant environmental impacts for this type of development. Based on the visual effect assessment undertaken for this development, it is concluded that the proposed Castlebanny Wind Farm will result in long term, but not permanent, visual effects that are readily reversible upon decommissioning. Such effects are not considered to be significant. Overall, visual effect significance will generally be in the mid to low range and only occasionally higher at some local receptors.

With respect to cumulative effect, the proposed wind farm will most commonly be viewed in isolation from within the lowland context of the study area. Overall, it is considered that the proposal will contribute to wind energy development becoming a more characteristic feature of this midlands context, but it is not considered to give rise to a significant cumulative effect.

Decommissioning stage landscape and visual effects will be similar in nature to construction stage effects, albeit in reverse. Such effects will be temporary in duration. As such, there will be no significant interaction between Population and Human Health and landscape and visual impacts during the decommissioning phase of the development.

#### **Interactions of Population and Human Health and Shadow Flicker**

There will be no significant interaction between Population and Human Health and shadow flicker during the construction phase of the development.

As described in Chapter 10, the shadow flicker assessment concluded that the >750m design setback from sensitive receptors measure, along with the implementation of screening and turbine shutdown mitigation measures, will ensure that there are no post-mitigation impacts of shadow flicker on the local community during the operational phase of the proposed project.

There will be no significant interaction between Population and Human Health and shadow flicker during the decommissioning phase of the development.



### **Interactions of Population and Human Health and Material Assets: Telecommunications and Aviation**

There will be no significant interaction between Population and Human Health and Material Assets: Telecommunications and Aviation during the construction phase of the development.

During the operational phase, generating electricity from wind energy has the potential to interfere with the quality of radio waves and microwaves used for communication purposes; including TV signals, radio signals, aircraft landing, navigation systems and microwave links. As outlined in Chapter 11, a comprehensive list of operators were contacted in relation to potential electromagnetic interference.

Following consultation with the telecommunication service providers, some potential impacts were highlighted. These potential issues were incorporated into the project design, and it was found that the proposed development will not have any impact on the existing communication links in the area.

During the consultation exercise with aviation stakeholders, it was found that there was a potential for impacts to the operations of Waterford Airport, and also there might be potential impacts in relation to local flight operations. An investigation was commissioned from Pager Power to assess any potential impacts at Waterford Airport, and this found that there were no significant impacts anticipated. A report issued by Captain Fintan Richard Ryan has provided evidence that the proposed project will have no significant negative impact on local flight operations.

There will be no significant interaction between Population and Human Health and Material Assets: Telecommunications and Aviation during the decommissioning phase of the development.

### **Interactions of Population and Human Health, Air Quality, Climate, Land, Soils and Geology and Hydrology and Hydrogeology**

During the construction phase of the development, there is potential for short-term interaction between Population and Human Health, air quality, climate, hydrology/hydrogeology and land, soils and geology.

This interaction is primarily associated with the disturbance of ground within the proposed development site which may result in suspended solids in watercourses and dust emissions. Suspended solids, unmitigated, may enter nearby watercourses and be transported off site by construction vehicles. Dust emissions, unmitigated, may impact on air quality. These potential impacts, along with detailed mitigation measures are discussed in detail within Chapters 7 (Land, Soils and Geology), 8 (Hydrology and Hydrogeology) and 9 (Air Quality) of the EIAR to reduce the potential direct and indirect impact on Population and Human Health from the proposed construction works. With mitigation, these works will have no significant impacts on Population and Human Health.

As the operation of the proposed development will provide renewable electricity to the grid and reduce the reliance on fossil fuels, the interaction between the development and climate is positive. Furthermore, a reduction in the use of fossil fuels will improve air quality.

The decommissioning phase of the development will result in generally similar impacts as the construction phase, albeit to a significantly smaller extent as much of the infrastructure will



remain in-situ. There will also be a reduction of the electricity being produced from a renewable energy source nationally i.e. the reverse of the positive impact of the operational phase of the development on climate and air quality.

**Interactions of Population and Human Health and Noise Impacts**

Wind farms generate noise in the vicinity of the development during both their construction and operational phases. There is no occupied dwelling located within 750m of the nearest proposed turbine. Noise and vibration impacts have been considered in Chapter 13 of the EIAR and it has been found that during both the construction and operational phases of the proposed development, these impacts are predicted to be within the relevant guidance limits for all properties. Likewise, any works required during the decommissioning of the proposed development will not result in a significant noise impact on nearby sensitive receptors.

**Interactions of Population and Human Health and Traffic Impacts**

Public perception of the construction phase will be influenced primarily from the impact of traffic movement. When taken in context with the existing traffic flows in the area, the construction of the proposed development will result in varying (both temporally and in relation to each road) impacts on the surrounding road network as discussed in detail in Chapter 16 (Traffic & Transportation). Any increase will be short-term in nature (expected duration of construction phase is approximately 24 months) and once the wind farm is operational, traffic movements to and from the site will be imperceptible.

*17.2.2 Landscape and Visual Impact*

**Interactions of Landscape and Visual and Population and Human Health**

There will be no significant interaction between Landscape and Visual Impacts and Population and Human Health during the construction phase of the development.

As noted above, the landscape and visual impact of the operational development may be considered to be one of the potentially significant environmental impacts for this type of development.

Taking into account all of the evidence from the photomontages and the zone of theoretical visibility (ZTV) for the proposed development, the addition of 21 no. wind turbines will have varying levels of visibility locally, but in general will not result in a significant level of landscape and visual impact on the wider region. The proposal for the wind farm to provide an amenity area directly and support amenity projects being undertaken in the area as part of the community benefit scheme will have a positive impact on tourism and health in the area. Potential Impacts on Tourism are discussed in Chapter 5 of the EIAR (Population and Human Health), which finds there will be no significant negative impact on tourism as a result of the proposed project.

**Interactions of Landscape and Visual and Cultural Heritage**

There will be no significant interaction between Landscape and Visual Impacts and Cultural Heritage during the construction phase of the development.

Negative landscape and visual impact on Cultural Heritage resources can arise during the operational phase of a wind farm with respect to archaeological features and their setting in the landscape. There will be no significant negative impacts on any of the main archaeological



features and attractions in the region as discussed in Chapter 13 (Landscape and Visual Impacts) and Chapter 15 (Cultural Heritage).

There will be no significant interaction between Landscape and Visual Impacts and Cultural Heritage during the decommissioning phase of the development, as works will be curtailed to the location of the infrastructure proposed for the development which has been designed with consideration for archaeological features in the vicinity of the project.

### *17.2.3 Biodiversity*

#### **Interactions of Biodiversity, Lands, Soils & Geology and Hydrology & Hydrogeology**

Exposing soils during the construction phase has the potential, if not properly managed, to cause sedimentation of nearby watercourses. It is envisaged that the excavation of turbine foundations and the construction of internal site access tracks could potentially lead to increased suspended solids in surface water run-off. However, mitigation measures will be put in place to control siltation occurring during the construction phase and ensure protection of the aquatic environment. Excavation and removal of soils for the construction of permanent features such as hardstands and access tracks may potentially lead to habitat loss. However, the total area for the proposed ground works and infrastructure comprises only 2.5% of the wind farm site area.

There is also the potential, if not properly managed, for a negative interaction between the site drainage regime and aquatic ecology during the construction phase of the proposed development. Suitable mitigation measures (as discussed in the CEMP and Chapter 18 (Schedule of Mitigation)) will be put in place to control erosion and sedimentation of receiving waters. During the construction and operational phases of the development, the existing on-site drainage scheme and the surface water management plan for the development will ensure that there is no negative interaction between Lands, Soil and Geology, Hydrology and Hydrogeology and Biodiversity by controlling the runoff of water from the site (at greenfield run off rates) and via controlled and carefully designed surface water attenuation ponds.

Mitigation measures will be implemented during the decommissioning phase of the development, similar to the construction and operational phase, to ensure that there is no significant interaction between Lands, Soil and Geology, Hydrology and Hydrogeology and Biodiversity.

#### **Interactions of Biodiversity, Noise and Vibration and Traffic and Transport**

There is potential for interaction between biodiversity, noise and vibration and traffic and transport during the construction, operational and decommissioning phases of the development. However, as noted above, noise and vibration impacts during these phases of the proposed development are predicted to be within the relevant guidance limits, and for the construction and decommissioning phases will be short-term in nature.

Detailed baseline surveys of the biodiversity in the local and regional area of the proposed development have been undertaken and, as a result of the incorporation of the findings of the surveys into the project design and site layout plan, construction works will be carried out at a significant distance from protected areas of biodiversity. Traffic using the site during the construction, operational and decommissioning phases of the development will be restricted to the use of the designated internal access tracks. Potential direct and indirect effects on Natura



2000 sites have also been considered in the AA Screening Report and NIS that accompany this application and mitigation measures proposed, where appropriate.

### **Interactions of Biodiversity, Air Quality & Climate**

There is potential for interaction between biodiversity, and Air Quality & Climate during the construction and decommissioning phases of the proposed project. There is a potential for localised dust to be a nuisance for biodiversity in any given area. Any such impact would be localised and short-term, with mitigation described in Chapter 14 (Air Quality & Climate) to be used to minimise this. During the operational phase, the project will contribute to reducing greenhouse gas emissions, thereby reducing the potential for climate change. This will have a slight indirect positive impact with respect to biodiversity in this regard.

#### ***17.2.4 Ornithology***

### **Interactions of Ornithology, Lands, Soils & Geology and Hydrology & Hydrogeology**

Exposing soils during the construction phase has the potential, if not properly managed, to cause sedimentation of nearby watercourses as described above. This might negatively impact the prey species of birds downstream of the site. However, mitigation measures will be put in place to control siltation occurring during the construction phase and ensure protection of the aquatic environment. Excavation and removal of soils for the construction of permanent features such as hardstands and access tracks may potentially lead to habitat loss and disturbance of birds. However, the total area for the proposed ground works and infrastructure comprises only 2.5% of the wind farm site area.

Mitigation measures will be implemented during the decommissioning phase of the development, similar to the construction and operational phase, to ensure that there is no significant interaction between Lands, Soil and Geology, Hydrology and Hydrogeology and Ornithology.

### **Interactions of Ornithology, Noise and Vibration and Traffic and Transport**

There is potential for interaction between Ornithology, noise and vibration and traffic and transport during the construction phase of the development. However, as noted above, noise and vibration impacts during both the construction and operational phases (and the decommissioning phase) of the proposed development are predicted to be within the relevant guidance limits, and for the construction and decommissioning phases will be short-term in nature.

Potential direct and indirect effects on Natura 2000 sites have also been considered in the AA Screening Report and NIS that accompany this application and mitigation measures proposed, where appropriate.

### **Interactions of Ornithology, Air Quality & Climate**

There is potential for interaction between Ornithology, and Air Quality & Climate during the construction and decommissioning phases of the proposed project. There is a potential for localised dust to be a nuisance for birds in any given area. Any such impact would be localised and short-term, with mitigation described in Chapter 14 (Air Quality & Climate) to be used to minimise this. During the operational phase, the project will contribute to reducing greenhouse





gas emissions, thereby reducing the potential for climate change. This will have a slight indirect positive impact with respect to ornithology in this regard.

### *17.2.5 Traffic and Transport*

#### **Interactions of Traffic and Transport and Air Quality and Climate**

There will be no significant interaction between Traffic and Transport and Air Quality and Climate during the construction and decommissioning phases of the development, with the exception of exhaust emissions from construction vehicles. This is a short-term, temporary impact and is addressed in the CEMP, Appendix 2.4.

As the potential traffic associated with the operational phase of the proposed development will be very low, there will be no significant interaction between Traffic and Transport and Air Quality and Climate.

#### **Interactions of Traffic and Transport and Noise & Vibration**

There will be an interaction between Traffic and Transport and Noise & Vibration during the construction and decommissioning phase of the development, as construction vehicles will result in increased noise and vibration along transport routes as they travel to and from the site. This is addressed in the Chapter 12 (Noise & Vibration).

As the potential traffic associated with the operational phase of the proposed development will be very low, there will be no significant interaction between Traffic and Transport and Noise & Vibration.

### *17.2.6 Cultural Heritage*

#### **Interactions of Cultural Heritage and Lands, Soils & Geology**

For the proposed development, the design of the wind farm incorporated the results of historical and project-specific archaeological surveys within the application area. No sites with statutory protection will be directly impacted by the proposed development. The construction works (ground disturbance) associated with the proposed development will be monitored by a suitably qualified archaeologist working under licence. The potential impacts to Cultural Heritage are discussed in detail in Chapter 15 (Cultural Heritage), which finds there will be no significant negative impacts.

### *17.2.7 Land, Soils and Geology*

#### **Interactions of Land, Soils & Geology and Hydrology and Hydrogeology**

As spoil and stone are transported and moved around the site, there is a potential for silt runoff to negatively effect water quality. This is discussed in Chapter 9 (Hydrology & Hydrogeology).

### *17.2.8 Positive Interaction of Elements*

In addition to the interactions noted above, the proposed Castlebanny Wind Farm development has the potential to have positive impacts on the receiving environment, as follows:



### Short Term

- Creation of up to 100 jobs directly employed during the construction phase and the use of local materials and goods, with additional indirect jobs.

### Long Term

- Creation of a secure and sustainable energy resource;
- Creation of 2-3 full time high quality technical jobs in operation and maintenance;
- Provision of a significant local leisure amenity area and allocation of a community benefit fund;
- The provision of a valuable new use (consisting of wind energy production) of the current land which comprises forestry and agriculture; and
- A positive effect on both air quality and climate.

Furthermore, the development of wind farms is regarded by many to enhance the reputation of a region as an environmentally friendly place to visit (public and tourist attitudes to wind farms are discussed in Chapter 5 (Population and Human Health)). Any possible short-term impact is strongly counterbalanced by the benefits to society of clean, renewable energy.

Where a potential impact as a result of the proposed development has been noted during the environmental impact assessment, relevant and appropriate mitigation measures have been identified and proposed. A detailed chapter highlighting the specific mitigation measures proposed for the development is included in this EIAR (Chapter 18 – Schedule of Mitigation Measures).

## 17.3 CONCLUSION

All environmental factors are interrelated to some extent. However, the most common interactions are between Population and Human Health and visual perception, noise, air quality and ecological resources. Having studied the interaction of potential impacts during the construction, operational and decommissioning phases it has been determined that no amplification effect is anticipated. The proposed development will have some positive impacts on an international, national, regional and local level, particularly in terms of helping to achieve renewable energy targets. It is important to note that the physical, environmental and landscape and visual impacts are almost entirely reversible upon decommissioning of the development.

