



Bracklyn Wind Farm

Chapter 14:  
Interactions of the Foregoing

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## 14.1 Introduction

This chapter summarises the critical results and conclusions of each individual chapter of this EIAR and identifies interactions between issues arising under separate factors which might otherwise not be noticed but which need to be assessed to ensure all likely significant effects are identified and assessed.

The interactions between effects on different environmental factors are also addressed, as relevant, throughout this EIAR by ensuring that effects are cross-referenced between topics, thus reducing the need to duplicate coverage of such topics. Close co-ordination and management within the EIA project team, and careful read-across editing, ensured that assessors were vigilant for complex interactions (direct, indirect, secondary and cumulative) and, where they are likely to arise, they are adequately identified and assessed. This included interactions between effects, and possible cumulative effects, arising from the mitigation measures proposed that could magnify effects through the interaction or accumulation of effects.

Reference should also be made to **Chapter 2** which provides an evaluation of reasonable project alternatives and **Chapter 3** which provides a detailed description of the proposed development. The design of the proposed development is an iterative process; the final proposed development integrates numerous 'mitigation by design' measures, and these *a priori* respond directly to many of the likely effects identified in this EIAR.

## 14.2 Interactions

It is general practice that interactions are shown by a means of a matrix, as set out in **Table 14.1** below, examining each aspect of the receiving environment which is considered in detail in the respective chapters of this EIAR, and cross-tabulated against all other aspects that have also been considered. This is accompanied by a brief text describing the interactions, including during the construction and operational phases.

Where an interaction is considered to be both likely and significant, it is given a reference number in the matrix and detail of the interaction is discussed below, including whether it is weak or strong, or whether the interaction is positive or negative. Where there is no number indicated in the matrix, it is assessed there is no likelihood for any significant effects by way of interaction between the environmental factors.

Interactions	Population and Human Health	Biodiversity	Land and Soils	Water	Air Quality & Climate	Landscape	Cultural Heritage	Noise & Vibration	Shadow Flicker	Material Assets
Population and Human Health						1		2	3	4
Biodiversity			5	6						
Land and Soils		5					7			
Water		6								
Air Quality & Climate										8
Landscape	1									
Cultural Heritage			7							9
Noise & Vibration	2									
Shadow Flicker	3									
Material Assets	4				8		9			

**Table 14.1: Matrix of Interactions**

**14.2.1 Interaction 1: Population & Human Health and Landscape**

The likely effects of the proposed development on landscape, and the interaction with population and human health, have been discussed in **Chapter 4** and **Chapter 9** of this EIAR. The proposed development has been assessed having regard to the sensitivity of the landscape, the degree of intrusion or dominance created by it and the degree to which is it visible in the landscape. Viewshed Reference Points (VRPs) consisting of views from key prospects and receptors were identified and a detailed analysis of each, accompanied by photomontages, is discussed in **Chapter 9**. Overall, it is concluded that while the proposed development will be prominent in the landscape, it is not assessed as likely to result in significant impacts on or interactions with population & human health.

**14.2.2 Interaction 2: Population & Human Health and Noise & Vibration**

During the construction phase, noise will be generated through a number of typical on-site construction stage activities which will be mitigated through appropriate mitigation and good construction practices. Likely effects will therefore be short-term and temporary in nature and a perceptible increase in noise, which is sufficient to cause a significant effect to local residential amenity, is not likely. No significant

vibration generating activities are proposed to be undertaken.

Noise predictions, for noise likely to be generated during the operational phase, have been carried out at all 78 no. receptors within 10-times overall tip height of the proposed turbines (1,850m) from each proposed turbine location. The noise prediction model confirms that the proposed development will not increase noise levels above the applicable noise limits as set out in the *Wind Energy Development Guidelines for Planning Authorities 2006* (see **Chapter 11**).

Noise which may be generated during the decommissioning phase will be similar to that of the construction phase.

Overall, it is concluded that while dwellings will likely experience an increase in existing noise levels, predicted noise levels will comply with the required limits and will not result in any likely impact on the local population and human health.

#### 14.2.3 Interaction 3: Population & Human Health and Shadow Flicker

Once the proposed development is operational, there is potential for shadow flicker to occur, depending on certain and highly infrequent conditions, as explained in detail in **Chapter 12**. All properties within 10-times overall tip height of the proposed turbines (1,850m) have been assessed for shadow flicker, with a total of 78 no. properties being identified and assessed.

While the generation of shadow flicker from the operation of the proposed development will interact with the local population, due to the occurrence of shadow flicker at dwellings (the occurrence of which is assessed to be within allowable limits), likely significant effects are not predicted such that it would adversely affect or interact with population levels & human health.

#### 14.2.4 Interaction 4: Population & Human Health and Materials Assets

In terms of population & human health and material assets, the only likely interaction relates to transport and access.

The proposed development will generate construction traffic during the initial construction stage. In terms of vehicle movements, it is estimated that approximately 6,066 trips (includes both in and out) of HGVs will be required, including abnormal loads transporting turbine components. Some minor levels of disruption may occur during public road upgrade works and the delivery of wind turbine components; however, traffic management measures will be agreed with the Planning Authority and implemented in full to ensure that any likely significant impacts are avoided.

The increase in traffic volumes on the surrounding road network will be temporary in nature as the expected duration of the construction phase is 12-18 months. Once turbines are in operation, traffic movements to and from the proposed development site will be infrequent, probably averaging 1-2 no. visits per week by a light commercial vehicle for maintenance purposes. All trips to and from the site will be undertaken in accordance with a traffic management plan, which will be prepared and agreed with the Local Authority. Overall, it is concluded that the proposed development will not result in any likely significant interactions between population and human health, and transport and access.

The proposed development will not result in any likely interactions between population and human health, and aviation. As requested by the IAA, aviation warning lights will be fitted to the wind turbines; the specific requirements of which will be agreed with the IAA prior to the commencement of construction.

Generating electricity from wind energy has the potential to interfere with the quality of radio waves and microwaves used for communication purposes e.g. analogue TV signals, radio signals, aircraft and navigation systems and microwave links. As discussed in **Chapter 13**, a range of bodies were consulted regarding the proposed development. To date, none of the organisations which were consulted have raised any significant concerns in relation to any likely significant interference or conflict with their existing operations as a result of the proposed development. 2rn have identified that local residents may be susceptible to some interference. However, mitigation measures have been proposed, including a protocol agreement with 2rn, to ensure the remediation of any likely significant effects, should they arise, which will effectively eliminate any likelihood for significant impacts or interactions.

The proposed development will not result in significant interactions between population & human health and renewable & non-renewable resources.

#### 14.2.5 Interaction 5: Biodiversity and Land & Soils

As outlined in **Chapter 6**, excavated ground exposed during the construction phase may lead to the sedimentation of nearby watercourses. Mitigation measures will be implemented such that there will be no likelihood of silt laden runoff having an adverse effect on water quality and aquatic ecology in surrounding water bodies. Mitigation measures proposed during construction will also ensure that the proposed development does not result in a likely significant negative effect on soils or the geological environment.

The excavation and removal of soils for the construction of permanent features will lead to habitat loss. However as discussed in **Chapter 5**, the proposed development is generally located within areas of intensively managed grassland and tillage adjacent to blocks of commercial conifer and broadleaved plantations, and is not located within an area of particular ecological sensitivity.

Overall the conclusion of the biodiversity study is that the residual effects on the important ecological receptors; including designated sites, habitats, flora and fauna; are not likely to be significant. Therefore, it is concluded that the proposed development will not result in a likely significant interaction between biodiversity and land & soils.

#### 14.2.6 Interaction 6: Biodiversity and Water

As outlined in **Chapter 7**, excavated ground exposed during the construction phase may, in the absence of mitigation, lead to the sedimentation of nearby watercourses and downstream effects on habitats and species. A suite of comprehensive mitigation measures is proposed which will be fully implemented in order to exclude the possibility for silt laden runoff to discharge to surface water features and to ensure that adverse effects on water quality and aquatic ecology do not occur.

The interaction between biodiversity and water is also closely related to the interaction between biodiversity and land and soils and this interaction should also be read in conjunction with **Interaction 5**.

In light of the assessment undertaken and the mitigation proposed, there is no likelihood of significant interactions between biodiversity and water.

#### 14.2.7 Interaction 7: Land & Soils and Cultural Heritage

The excavation of soils raises the possibility for previously unrecorded sub-surface

cultural heritage features to be discovered. To limit any likely adverse effects or significant interactions, as is normal practice on construction sites, a geophysical survey of excavations at turbine locations and crane hardstandings together with archaeological monitoring of all excavations will be undertaken under licence from the Department of Housing, Local Government and Heritage to ensure that any features uncovered are appropriately recorded and managed. Overall, therefore, it is concluded that the excavation of soils will not result in any likely significant interaction with cultural heritage.

#### 14.2.8 Interaction 8: Air Quality & Climate and Materials Assets

There will be no likely significant interaction between Material Assets (Transport & Access) and Air Quality and Climate. Exhaust emissions from construction vehicles will result in a negligible adverse effect on local air quality; however, this will not be perceptible to local residents. This is a short-term, temporary effect and is fully addressed at **Chapter 8**. As the likely traffic volumes associated with the operational phase of the proposed development will be very low; overall, it is assessed that there will be no likely significant interaction between Air Quality, Climate and Material Assets (Transport and Access).

#### 14.2.9 Interaction 9: Cultural Heritage and Materials Assets

As discussed in **Chapter 10**, there are no recorded archaeological, architectural or cultural heritage features within the direct footprint of the proposed upgrade works to the turbine component haul route. As a result there will be no likely significant impact on the recorded archaeological resource.

The removal of all topsoil and overburden within the proposed land take, including all junction improvement works identified in **Chapter 13** will be monitored under licence from the Department of Culture, Heritage and the Gaeltacht. Provision will be made for the full excavation and recording of any archaeological features or deposits that may be exposed. Overall, it is concluded that excavations, associated with the transportation of turbine components to the proposed development site will not result in any likely significant interactions with cultural heritage.

### 14.3 Summary of Interactions & Effects

All environmental factors are interrelated to some degree and the assessment of these interactions is an important requirement of the EIAR process. Having assessed the interaction of likely effects during the construction, operational and decommissioning phases; the interaction of effects is not assessed as likely to result in any effects that could magnify effects through the interaction or accumulation of effects. All interactions of effects are assessed and have been fully considered in the relevant chapters of this EIAR.

The proposed development will have result in positive international, national, regional and local level particularly in relation to population, human health, air quality and climate. During the operational phase, the development will result in a long term positive effect on both air quality and climate and, in turn, on human health. The generation of electricity from the proposed development will lead to a net saving in terms of greenhouse gas emissions. The total annual GHG emission savings will amount to approximately 47.908 tonnes of CO<sub>2</sub>eq which, over the proposed 30-year operational phase, is equivalent to 12% of the total predicted annual GHG emissions from the energy sector in 2020.

Overall, it is concluded that the impact of the proposed development on the

receiving environment is not likely to be significant. Likely effects from the proposed development vary in significance but are generally in the minor to negligible range. A number of positive impacts have also been identified such as community benefits; a reduction in the use of fossil fuels; and a significant contribution towards achieving Ireland's national and European targets for energy production from renewable sources.

The likely impacts which have been identified in this EIAR demonstrate that the proposed development will not result in any likely significant negative impact on the environment, and will result in a likely significant positive impact on the environment by providing additional capacity for the production of energy from renewable sources at an appropriate location.

