20.0 INTERACTIONS OF THE FOREGOING

20.1 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 factors.

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 20-1 below outlines the different environmental factors which have potential to interact as a result of the proposed development. Potential interactions (both positive and negative) have been considered for the construction, operation and decommissioning phases of each of the different environmental factors.

20.1.1 Statement of Authority

This chapter of the EIAR has been prepared by Serena Byrne and reviewed by Ian Heanue of TOBIN Consulting Engineers.

Serena Byrne is a project scientist at TOBIN Consulting Engineers, with over 12 years' multidisciplinary experience in engineering and environmental consulting, including EIA co-ordination, and assistance and preparation of EIAR deliverables. She holds a MSc in Environmental Sustainability from University College Dublin.

This chapter has been reviewed by Ian Heanue, Project Manager and Energy Engineer in TOBIN. Ian holds a BEng in Energy Engineering and has over 7 years' experience in project management.

Interaction Matrix (√ = Interaction)	Population and Human Health	Biodiversity	Ornithology	Land, Soils & Geology	Hydrology & Hydro-geology	Air Quality	Noise & Vibration	Landscape & Visual	Archaeology, Architectural & Cultural Heritage	Traffic & Transportation	Material Assets: Aviation, Telecoms & Other	Shadow Flicker	Climate
Population and Human Health				√	√	√	√	√	√	√	√	√	
Biodiversity				√	√	√	√			√			
Ornithology				√	√	√	√			√			
Land, Soils & Geology	√	√	√		√	√			√				√
Hydrology & Hydrogeology	√	√	√	√		√							√
Air Quality	√	√	√	√	√					√			√
Noise & Vibration	√	√	√							√			
Landscape & Visual	√								√				

Interaction Matrix (√ = Interaction)	Population and Human Health	Biodiversity	Ornithology	Land, Soils & Geology	Hydrology & Hydro-geology	Air Quality	Noise & Vibration	Landscape & Visual	Archaeology, Architectural & Cultural Heritage	Traffic & Transportation	Material Assets: Aviation, Telecoms & Other	Shadow Flicker	Climate
Archaeology, Architectural & Cultural Heritage	√			√				√					
Traffic & Transportation	√	√	√			√	√						√
Material Assets: Aviation, Telecoms & Other	√												√
Shadow Flicker	√												
Climate				√	√	√				√	√		

Table 20-1 Interaction Between Environmental Factors

20.2 DISCUSSION OF INTERACTIONS

In addition to Table 20-1, the following section summarises the primary interrelationships of the environment factors with the potential for significant effects as a result of the proposed development.

Potential interactions of environmental factors associated with the proposed development has been considered through the technical assessments of this EIAR (Chapters 6 to 19), and therefore any interactions are covered by the below summary.

Where no significant interactions have been identified within the technical assessments, this has been noted and the typical potential interactions between environmental factors has been outlined.

20.2.1 Population and Human Health

No significant interactions with other environmental factors were identified in the Population and Human Health assessment.

The following interactions with Population and Human Health have been identified as having the potential to occur during the Construction, Operation and / or Decommissioning Phases of the proposed development.

20.2.1.1 Interactions of Population and Human Health, Land, Soils and Geology, Hydrology and Hydrogeology, and Air Quality

There is potential for short-term interaction between the environmental factors of Population and Human Health, Land, Soils and Geology, Hydrology and Hydrogeology, and Air Quality during the construction phase.

This is primarily associated with the excavation / disturbance of ground where required (e.g. borrow pits) during construction, which if not properly managed or mitigated, has the potential to generate dust emissions to air and wastewater with suspended solids, potentially increasing run-off to surface waters and/or being transported off site by construction vehicles. The decommissioning phase will result similar effects as the construction phase, albeit to a lesser extent. During the operational phase maintenance will be carried out as required. These works have the potential to result in the mobilisation of suspended solids from shallow excavations, and fuel and lubricating oils from machinery and equipment.

These potential effects, along with proposed mitigation measures, are discussed in detail within Chapters 9 (Land, Soils and Geology), 10 (Hydrology and Hydrogeology), and Chapter 11 (Air Quality) of the EIAR, which will reduce the potential direct and indirect effect on Population and Human Health from activity associated with the proposed development.

Therefore, with mitigation, the potential effects from the interactions between Population and Human Health, Land, Soils and Geology, Hydrology and Hydrogeology, and Air Quality are considered not significant.

20.2.1.2 Interactions of Population and Human Health and Shadow Flicker

During the operational phase there is potential for interaction between Population and Human Health and Shadow Flicker (primarily related to the residential amenity).

However, it should be noted that Bord na Móna is committed to minimising any adverse effects from the proposed wind farm on the local community, as described in Chapter 17 (Material Assets: Shadow Flicker) of this EIAR. The implementation of mitigation measures, to screen shadow flicker effects from sensitive receptors and/or implement wind turbine control measures in accordance with a defined Turbine Shutdown Scheme, will ensure that any residual shadow flicker effects from the wind farm will be limited to less than 30 minutes per day (2006 Wind Energy Development Guidelines (WEDGs)) at all shadow flicker receptors. These measures will be utilised at the proposed wind farm to prevent incidences of shadow flicker at any house if required. The Proposed Derryadd Wind Farm could be brought in line with the requirements of the Draft Revised WEDGs 2019 should they come into force while the planning application is being considered by An Bord Pleanála.

As described in Chapter 17 (Material Assets: Shadow Flicker), during commissioning of the proposed wind farm, the shadow flicker effect on the identified receptors will be slight over a temporary period and will have a momentary to brief effect with respect to the duration. There are no potential effects relating to shadow flicker during the rest of the construction phase and the decommissioning phase, as shadow flicker can only occur when the turbine blades are installed and rotating.

Once operational (operation phase) and the proposed mitigation measures are considered, the residual effect of shadow flicker on the identified receptors will be not significant and long-term, with any individual occurrence being a momentary effect with respect to the duration (maximum 30 minutes).

Therefore, with mitigation, the potential effects from the interaction between Population and Human Health and Shadow Flicker are considered not significant.

20.2.1.3 Interactions of Population and Human Health and Material Assets (Aviation / Telecommunications)

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). Any interference that might occur with local communications and radio/tv signals would have potential interactions with residential amenity for those affected, in the event that they could not use their phone/radio/tv.

As outlined in Chapter 16 (Material Assets: Aviation, Telecommunications and Other), consultation was undertaken with relevant aviation and telecommunications operators in relation to potential interference. Furthermore, field surveys and desktop surveys and analysis were undertaken.

An assessment of the aviation infrastructure in the study area indicates that there will be no significant potential effects to aviation during the operational phase as a result of the proposed development. With the implementation of the mitigation measures set out in Chapter 16 (Material Assets: Aviation, Telecommunications and Other), the proposed development will have no residual effects.

In terms of telecommunications, radio links have been mapped relative to the proposed wind farm site to effectively constrain turbine locations during the design stage, and turbine locations have been chosen to provide sufficient clearance so as not to impact on radio links.

No effect on telecommunications is anticipated during the operational phase due to the distance between the proposed turbine locations and the existing links in the area, and the requirement to not cause any impact to end users of telecommunication services by way of restoring the service. As such, no residual effect is predicted. In the event that a link/cable/end user had service interrupted, there may be a brief effect until it is fixed, however it will be the developer's responsibility to fix any such issue as soon as possible.

Overall, with mitigation, potential effects from the interaction between Population and Human Health and Material Assets (aviation / telecommunications) are considered not significant.

20.2.1.4 Interactions of Population and Human Health and Noise and Vibration

During the construction, operational, and decommissioning phases the proposed development will generate noise. Noise and vibration effects have been considered in Chapter 12 (Noise and Vibration) of the EIAR. Any potential noise effects will have the potential to negatively interact with Population (i.e., residential amenity) and human health.

During the construction and operational phases of the proposed wind farm, the likely predicted noise and vibration effects will be below the relevant guidance limits and/or thresholds, as identified within Chapter 12 (Noise and Vibration), and are not anticipated to give rise to significant effects.

The decommissioning phase will result similar effects as the construction phase, albeit to a lesser extent. As per the construction phase, any works required during the decommissioning of the proposed development will have the potential to give rise to noise. The likely predicted noise and vibration impacts during the decommissioning phase are below the limits and/or thresholds identified within Chapter 12 (Noise and Vibration).

Overall, with mitigation, potential effects from the interaction between Population and Human Health and Noise and Vibration are considered not significant.

20.2.1.5 Interactions of Population and Human Health and Landscape and Visual Effects

Any landscape and visual effects associated with the proposed wind farm would have the potential to interact with Population and Human Health, primarily in terms of residential amenity. The Landscape and Visual Impact Assessment (LVIA) is outlined in Chapter 13 of this EIAR. Landscape Effects and Visual Effects are summarised in Sections 13.10.1 and 13.10.2, respectively, of Chapter 13.

The proposed wind farm site is deemed to be appropriately designed in respect of its receiving landscape context, which is consistent with the 'Flat Peatland' landscape type in the Wind Energy Development Guidelines (WEDGs) (2006 and Draft 2019).

In terms of Landscape effects, Chapter 13 (LVIA) concluded that it is considered that the proposed wind farm will not give rise to significant landscape effects within either the central or wider study area. This reflects the fact that it has been located and designed in accordance with relevant local and national level policy documents.

In terms of visual effects, Chapter 13 (LVIA) concluded that based on the visual effect assessment undertaken, it is not considered that the proposed wind farm will result in any significant visual effects.

No specific mitigation measures proposed in relation to landscape or visual effects.

Overall, potential effects from the interaction between Population and Human Health and Landscape and Visual aspects are considered not significant.

20.2.1.6 Interactions of Population and Human Health and Traffic and Transportation

Effects on the surrounding road network are discussed in detail in Chapter 15 (Traffic and Transport). Traffic and transport have the potential to interact with Population and Human Health primarily through the generation of noise and dust emissions (i.e., impacting on local residential amenity).

Any increase in traffic volumes has the potential to create noise and dust nuisance, thereby having the potential to interact with residential amenity and human health for those living in the area. In terms of noise, Chapter 12 (Noise and Vibration)) concluded that there will be no significant noise impacts associated with the additional traffic generated during the construction phase.

In terms of dust nuisance, Chapter 11 (Air Quality) states that following the application of mitigation measures outlined within Chapter 11 and the Construction Environmental Management Plan (CEMP) (Appendix 3-2) an imperceptible short-term negative effect on air quality through dust generation and exhaust emissions is anticipated during the construction phase.

Once the wind farm is operational, traffic volumes associated with the wind farm site, primarily associated with maintenance personnel and public use of the amenity car parks, will be very low. Decommissioning phase Traffic and Transport effects will be similar in nature to construction phase effects, albeit to a lesser extent, and temporary to short-term in duration.

Overall, potential effects from the interaction between Population and Human Health and Traffic and Transport are considered not significant.

The interaction of Noise and Vibration and Traffic and Transport is discussed in further detail in Section 20.2.7.3 below.

20.2.2 Biodiversity

No significant interactions with other environmental factors were identified in the Biodiversity assessment.

The following interactions with Biodiversity have been identified as having the potential to occur during the Construction, Operation and/or Decommissioning Phases of the proposed development.

20.2.2.1 Interactions of Biodiversity, Air Quality, Lands, Soils and Geology, and Hydrology and Hydrogeology

Activity during the construction phase, primarily relating to excavation, ground works, movement and storage of spoil, site drainage, and use and storage of contaminants onsite, has the potential, if not properly managed or mitigated for, to impact on nearby habitats and aquatic environments, resulting in a potential interaction between Biodiversity, Air Quality, Land, Soils and Geology, and Hydrology and Hydrogeology.

These potential effects, along with proposed mitigation measures, are discussed in detail within Chapters 9 (Land, Soils and Geology), 10 (Hydrology and Hydrogeology), and Chapter 11 (Air

Quality) of the EIAR, which will reduce the potential direct and indirect effect on Biodiversity from activity associated with the proposed development.

Therefore, with mitigation, the potential effects from the interactions between Biodiversity, Land, Soils and Geology, and Hydrology and Hydrogeology are considered not significant.

20.2.2.2 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 proposed development. Traffic and site activity during the construction and decommissioning phases could give rise to noise that could be a nuisance for fauna.

However, as noted above, noise and vibration effects during the construction, operational and decommissioning phases of the proposed development are predicted to be within the relevant guidance limits and/or thresholds, as identified within Chapter 12 (Noise and Vibration). Furthermore, any effects for the construction and decommissioning phases will be short-term in nature. Traffic / vehicle movements associated with operational phase will be minimal.

Overall, with mitigation, potential effects from the interaction between Biodiversity and Noise and Vibration and Traffic and Transport are considered not significant.

20.2.3 Ornithology

No significant interactions with other environmental factors were identified in the Ornithology assessment.

The following interactions with Ornithology have been identified as having the potential to occur during the Construction, Operation and/or Decommissioning Phases of the proposed development.

20.2.3.1 Interactions of Ornithology, Lands, Soils and Geology, and Hydrology and Hydrogeology

Exposing soils, vehicle and machinery movements, and use and storage of contaminants onsite during the construction phase has the potential, if not properly managed or mitigated for, to cause sedimentation and/or contamination of nearby watercourses (as described above) which could lead to indirect effects on birds and their prey species through the disturbance and deterioration of the aquatic habitat quality. However, mitigation measures will be put in place during the construction phase and ensure protection of the aquatic environment.

All mitigation measures outlined in Chapter 7 (Biodiversity), Chapter 8 (Ornithology), Chapter 9 (Land, Soils, and Geology), and Chapter 10 (Hydrogeology and Hydrology) of this EIAR, which address the protection of surface and groundwater bodies, will be implemented during the proposed construction works. These measures have been compiled in the CEMP, and will also apply to ornithological receptors, ensuring the protection of habitats. Mitigation includes pollution control measures and sediment and erosion control measures.

Therefore, with mitigation, the potential effects from the interaction between Ornithology, Land, Soils and Geology, and Hydrology and Hydrogeology are considered not significant.

20.2.3.2 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 proposed development. However, as noted above, noise and vibration effects during the construction, operational and decommissioning phases of the proposed development are predicted to be within the relevant guidance limits and/or thresholds, as identified within Chapter 12 (Noise and Vibration). Nevertheless, disturbance and/or displacement effects on birds for the construction and decommissioning phases of moderate significance have been identified for some species, despite being of short-term duration. Appropriate mitigation is then proposed, which will reduce the significance of this effect. Traffic / vehicle movements associated with operational phase will be minimal.

Therefore, with mitigation, the potential effects from the interaction between Ornithology, Noise and Vibration and Traffic and Transport during the construction and decommissioning phases are considered not significant.

20.2.3.3 Interactions of Ornithology and Air Quality

There is potential for interaction between Ornithology and Air Quality, during the construction and decommissioning phases of the proposed development associated with localised dust causing nuisance for birds in in the vicinity of the proposed development. Mitigation described in Chapter 11 (Air Quality) will be used to minimise this.

Therefore, with mitigation, the potential effects from the interaction between Ornithology and Air Quality during the construction, operational and decommissioning phases are considered not significant.

20.2.4 Land, Soils and Geology

No significant interactions with other environmental factors were identified in the Land, Soils and Geology assessment.

The following interactions with Land, Soils and Geology have been identified as having the potential to occur during the Construction, Operation and Decommissioning Phases of the proposed development.

20.2.4.1 Interactions of Land, Soils and Geology and Hydrology and Hydrogeology

During the construction phase, excavations associated with installation of infrastructure and the construction of internal site roads could potentially lead to increased suspended solids in surface water run-off.

However, with mitigation (as discussed in Chapter 10 (Hydrology and Hydrogeology)), the potential effects from the interaction between Land, Soils and Geology and Hydrology and Hydrogeology during the construction phase on are considered not significant.

20.2.4.2 Interactions of Lands, Soils and Geology and Archaeology, Architecture and Cultural Heritage

There is potential for interaction between Land, soils and Geology and Archaeology, Architecture and Cultural Heritage where excavations / removal of material is taking place, and any unrecorded subsurface archaeological artefacts or sites, if present, are encountered. Chapter 14 (Archaeology, Architecture and Cultural Heritage) states that the field walkover of

the proposed wind farm site (where accessible) recorded no features and/or finds of archaeological significance on the surface of the peat or within the drains (where visible). It is possible however that previously unrecorded sub-surface archaeology survives below ground level, either within the peat or at the level of the underlying natural subsoil. Ground disturbance associated with the proposed wind farm site will have a likely direct effect (negative) on unrecorded sub-surface archaeology, however the potential effect cannot be measured.

Chapter 14 (Archaeology, Architecture and Cultural Heritage) states there will be no significant residual effects during construction, operational and decommissioning phases on the archaeological, architectural and cultural heritage resource within the proposed wind farm site after mitigation measures have taken place.

Furthermore, the design of the proposed wind farm will have incorporated the results of historical and proposed development-specific archaeological surveys within the application area. The construction works (ground disturbance) associated with the proposed development will be monitored by a suitably qualified archaeologist working under licence.

Therefore, with mitigation, the potential effects from the interaction between Land, Soils and Geology and Archaeology and Cultural Heritage are considered not significant.

20.2.5 Hydrology and Hydrogeology

No significant interactions with other environmental factors were identified in Hydrology and Hydrogeology assessment (Chapter 10 (Hydrology and Hydrogeology)).

Interactions with Hydrology and Hydrogeology that have been identified as having the potential to occur during the Construction, Operation and/or Decommissioning Phases of the proposed development have been discussed in the following sections of this chapter:

- 20.2.1.1 Interactions of Population and Human Health, Land, Soils and Geology, Hydrology and Hydrogeology and Air Quality;
- 20.2.2.1 Interactions of Biodiversity, Air Quality, Lands, Soils and Geology, and Hydrology and Hydrogeology
- 20.2.3.1 Interactions of Ornithology, Lands, Soils and Geology and Hydrology and Hydrogeology;
- 20.2.4.1 Interactions of Land, Soils and Geology and Hydrology and Hydrogeology; and
- 20.2.13.1 Interactions of Climate and Land, Soils, Geology and Hydrology and Hydrogeology.

20.2.6 Air Quality

No significant interactions with other environmental factors were identified in Air Quality assessment (Chapter 11 (Air Quality)).

The following interactions with Air Quality have been identified as having the potential to occur during the Construction, Operation and Decommissioning Phases of the proposed development have been discussed in the following sections of this chapter:

- 20.2.1.1 Interactions of Population and Human Health, Land, Soils and Geology, Hydrology and Hydrogeology, and Air Quality
- 20.2.1.6 Interactions of Population and Human Health and Traffic and Transportation;
- 20.2.2.1 Interactions of Biodiversity, Air Quality, Lands, Soils and Geology, and Hydrology and Hydrogeology;
- 20.2.3.3 Interactions of Ornithology and Air Quality; and

- 20.2.13.2 Interactions of Climate and Air Quality.

20.2.7 Noise and Vibration

The potential interaction between noise and vibration and other specialist chapters in the EIAR is primarily limited to Chapter 6 (Population & Human Health), Chapter 7 (Biodiversity), Chapter 8 (Ornithology),and Chapter 15 (Traffic and Transport). The Noise and Vibration assessment (Chapter 12 (Noise and Vibration)) has been prepared in consideration of and in conjunction with the relevant elements of these chapters. For example, noise and vibration impacts associated with the proposed development have been fully considered within this Chapter 12 (Noise and Vibration) of this EIAR. However, commentary on the impact assessment and related noise levels are also summarised specifically with respect to potential human health and biodiversity impacts in Chapter 6 (Population and Human Health) and Chapter 7 (Biodiversity). The traffic flow projections associated with the development provided in Chapter 15 (Traffic and Transport) has been utilised in the calculations undertaken as part of the Noise and Vibration assessment (see Section 12.6.2.7 of Chapter 12 (Noise and Vibration)).

20.2.7.1 Interactions of Noise and Vibration and Population and Human Health

Interaction of Noise and Vibration and Population and Human Health has been discussed under Section 20.2.1.4 above.

Overall, with mitigation, potential effects from the interaction between Noise and Vibration and Population and Human Health are considered not significant.

20.2.7.2 Interactions of Noise and Vibration and Biodiversity and Ornithology

Interaction of Noise and Vibration and Biodiversity and Ornithology has been discussed under Sections 20.2.2 and 20.2.3.2 respectively, above.

Overall, with mitigation, potential effects from the interaction between Noise and Vibration, Traffic and Transport and Biodiversity are considered not significant.

20.2.7.3 Interactions of Noise and Vibration and Traffic and Transport

There is potential for interaction between Traffic and Transport and Noise and Vibration during the construction and decommissioning phase of the proposed development, as construction vehicles will result in increased noise and vibration along transport routes as they travel to and from the site.

Chapter 12 (Noise and Vibration) has assessed the potential noise impacts associated with construction traffic on the local road network. This assessment was informed by the information presented in Chapter 15 (Traffic and Transport). Changes in the traffic noise levels associated with the construction traffic for 'peak' and 'average' construction were calculated based on information in Chapter 15 (Traffic and Transport).

The peak percentage increase along any of the construction haul routes due to construction generated traffic is 3%. Assuming 5% of the baseline traffic flows are heavy goods vehicles (HV) and 100% of construction traffic are HV (worst case) the calculated maximum increase based on the peak construction traffic flow would be 1.5 dB.

With reference to the Highways England (now National Highways) Design Manual for Roads and Bridges Sustainability & Environment Appraisal LA 111 Noise and Vibration (Revision 2)

(DMRB) magnitude of impact (as set out in Table 12-2 of Chapter 12 (Noise and Vibration)), the potential impacts are classified as a minor impact change. Therefore, it is concluded that there will be no significant noise impacts associated with the additional traffic generated during the construction phase.

The potential traffic associated with the operational phase of the proposed development will be very low, and will primarily be associated with visiting maintenance personnel and users of the amenity car parks. As such, no significant interaction between Traffic and Transport and Noise and Vibration is anticipated during the operational phase.

Overall, with mitigation, potential effects from the interaction between Noise and Vibration and Traffic and Transport are considered not significant.

As mentioned, interaction of Noise and Vibration, Traffic and Transport and Biodiversity has been discussed under Section 20.2.2 above.

20.2.8 Landscape and Visual

The proposed development involves features and activities that have the potential to generate physical changes to the landscape and visual environment (both physical and perceptual), which will also incur wider environmental impacts. This includes aspects relating to vegetation loss, construction of access roads, and the presence of construction and maintenance plant on the site. Likewise, there are aspects (such as noise) that have the potential to influence experiential aspects of landscape character.

Whilst these aspects will generate a degree of change to the landscape and visual environment, the main interactions relate to the construction and presence of the turbines and other vertical infrastructure due to their visibility. The main interactions, as set out in Chapter 13 (LVIA) of this EIAR, are considered to relate to Population and Human Health, and Cultural Heritage.

20.2.8.1 Interaction of Landscape and Visual and Population and Human Health

Landscape and Visual impacts arising from the construction, operation, and decommissioning of the wind turbines are considered in the LVIA with respect to the effect on perceived landscape character, views and on the general visual amenity experienced by people, including local residents. Proportionately, the operational effects of the turbines are considered to give rise to the most notable landscape and visual effects given the long-term nature of the change, and a greater focus is placed on them. However, whilst they have the potential to be prominent, the turbines will be seen in the context of a modified landscape, and it is noted that the findings of the assessment did not identify any significant impacts in relation to receptors in the Central or Wider Study Area. The findings of the LVIA have contributed to the Population and Human Health assessment.

Overall, with mitigation, potential effects from the interaction between Landscape and Visual aspects and Population and Human Health are considered not significant.

20.2.8.2 Interaction of Landscape and Visual and Cultural Heritage

Common receptors were considered in relation to landscape character and the setting of heritage features as well as views from heritage features visited by the public and for whom views of the landscape are a contributing factor to the experience. Whilst the turbines have the potential to be visible, they will be seen in the context of an extensively modified landscape. From Corlea Trackway, which is an important heritage feature and tourism feature, the turbines

would be prominently visible and have been attributed a Substantial-moderate and Negative visual effect. However, this is not deemed to be a significant effect in EIA terms and the findings of the LVIA have contributed to the Cultural Heritage assessment.

Overall, with mitigation, potential effects from the interaction between Landscape and Visual aspects and Cultural Heritage are considered not significant.

20.2.9 Archaeology, Architecture and Cultural Heritage

No significant interactions with other environmental factors were identified in Archaeology, Architecture and Cultural Heritage assessment.

The following interactions with Archaeology, Architecture and Cultural Heritage have been identified as having the potential to occur during the Construction, Operation and Decommissioning Phases of the proposed development.

20.2.9.1 Interactions of Archaeology and Land, Soils, and Geology

Interaction of Archaeology and Land, Soils and Geology has been discussed under 20.2.4 above.

With mitigation, the potential effects from the interaction between Archaeology and Cultural Heritage and Land, Soils and Geology are considered not significant.

20.2.9.2 Interactions of Archaeology, Architecture and Cultural Heritage, Landscape and Visual and Population and Human Health

There is potential for interaction between Archaeology, Architecture and Cultural Heritage, Landscape and Visual, and Population and Human Health, in terms of setting / visual impact on cultural heritage assets. Chapter 14 (Archaeology, Architecture and Cultural Heritage) states there will be a visual (indirect) effect on the setting of cultural heritage features within the wider cultural heritage environment. No world heritage sites or those on a tentative list are located within 20 km of the proposed windfarm site. Numerous recorded monuments, RPS and NIAH structures recorded within 2 km of the proposed wind farm site have some screening surrounding, therefore the proposed wind farm site will have a 'neutral, long-term, imperceptible effect of no significance' on setting. Chapter 13 (Landscape and Visual Impact Assessment) of this EIAR indicates there will be a potential 'indirect, long-term, substantial moderate effect' on the Corlea Trackway Visitor centre (LVIA AH3, AH3a).

Chapter 14 (Archaeology, Architecture and Cultural Heritage) states, there will be no significant residual effects during construction and operational phases on the archaeological, architectural and cultural heritage resource within the proposed wind farm site after mitigation measures have taken place. There will be no significant residual effects on the archaeological, architectural and cultural heritage environment during the short-term decommissioning of the proposed development. Any potential direct effects will already have been resolved through mitigation measures during the construction phase. During the decommissioning phase, any effects on setting in the wider landscape will have been reversed.

Therefore, with mitigation, the potential effects from the interaction described between Archaeology, Architecture and Cultural Heritage and Population and Human Health are considered not significant.

20.2.10 Traffic and Transport

No significant interactions with other environmental factors were identified in Traffic and Transport assessment (Chapter 15 (Traffic and Transport)).

Interaction of Traffic and Transport and Population and Human Health, Biodiversity, Ornithology, Noise and Vibration, and Climate, has been discussed under Sections 20.2.1, 20.2.2, 20.2.3, 20.2.7, and 20.2.13 of this chapter respectively.

20.2.11 Material Assets: Aviation, Telecommunications and Other

No significant interactions with other environmental factors were identified in the Chapter 16 (Material Assets: Telecommunications, Aviation and Other) assessment.

Interaction of Material Assets: Telecommunications, Aviation and Other and Population and Human Health has been discussed under section 20.2.1 above.

20.2.12 Material Assets: Shadow Flicker

No significant interactions with other environmental factors were identified in the Shadow Flicker assessment (Chapter 17 (Material Assets: Shadow Flicker)).

Interaction of Material Assets: Shadow Flicker and Population and Human Health has been discussed under section 20.2.1 above.

20.2.13 Climate

Climate has the potential to interact with a number of other environmental factors. The following interactions with Climate have been identified (as per Chapter 18 (Climate) of this EIAR) as having the potential to occur during the Construction, Operation and Decommissioning Phases of the proposed development.

20.2.13.1 Interactions of Climate and Land, Soils, and Geology, and Hydrology and Hydrogeology

The impact of flood risk has been assessed, and the surface water drainage network will be designed to cater for increased rainfall in future years as a result of climate change. The effect of the interactions between climate and land, soils, geology and hydrology are direct, short-term, negative and imperceptible during the construction phase and direct, long-term, negative and imperceptible during the operational phase, which is overall not significant in EIA terms.

20.2.13.2 Interactions of Climate and Air Quality

Air quality and climate have interactions due to the emissions from the burning of fossil fuels and vehicle emissions during the construction, operational and decommissioning phases generating both air quality and climate impacts. Due to the minimal traffic associated with the proposed development once operational traffic emissions are considered not significant. There is no impact on climate due to air quality. However, the sources of impacts on air quality and climate are strongly linked.

Therefore, with mitigation, potential effects from the interaction between Climate and Air Quality are considered not significant.

20.2.13.3 Interactions of Climate and Traffic and Transport

During the construction and operational phase, there is the potential for interactions between climate and traffic. Vehicles accessing the site will result in emissions of CO_2, a greenhouse gas. The effects of the proposed development on climate are assessed by reviewing the change in annual average daily traffic on roads close to the site. In this assessment, the effects of the interactions between traffic and climate are considered to be direct, short-term, negative and not significant during the construction phase and direct, long-term, negative and not significant during the operational phase, which is overall not significant in EIA terms.

20.2.13.4 Interactions of Climate and Material Assets (Waste Management)

Waste management measures will be put in place to minimise the amount of waste entering landfill, which has higher associated embodied carbon emissions than other waste management such as recycling.

The effect of the interactions between waste and climate are considered to be direct, short-term, negative and not significant during the construction phase and direct, long-term, negative and not significant during the operational phase, which is overall not significant in EIA terms. Waste management is addressed in Chapter 16 (Material Assets: Telecommunications, Aviation and Other) of this EIAR.

20.3 POSITIVE INTERACTION OF ELEMENTS

In addition to the interactions noted above, the proposed development has the potential to have positive effects on the receiving environment and positive interactions between environmental factors, including:

- The new land use, consisting of wind energy production, within the site of the proposed wind farm, will provide renewable electricity to the grid, reduce the reliance on fossil fuels and contribute to a reduction in emissions impacting climate change. This would result in a positive interaction between Material Assets (i.e., energy infrastructure), Air Quality, Climate, Population and Human Health, and Biodiversity;
- Jobs generated by the proposed development and use of local services and facilities by project personnel during all phases of the proposed development will result in a positive interaction between Material Assets (i.e. electrical infrastructure) and Population and Human Health (in terms of local economy, employment and socioeconomics); and,
- The community benefit fund and provision of the amenity access tracks and carparks will have a positive interaction between Material Assets (i.e., energy infrastructure) and Population and Human Health (in terms of local socioeconomics, residential amenity, and tourism); see Chapter 6 (Population and Human Health)for additional detail. Furthermore, the development of wind farms and associated community benefit and amenity facilities can be considered as an enhancement to an area or region, and as an environmentally friendly place to visit. As the proposed development will support projects being undertaken in the area as part of the community benefit fund, which has the potential to have an associated positive impact on tourism and health in the area (public and tourist attitudes to wind farms, amenity, and community benefit are discussed in Chapter 6 (Population and Human Health)).

20.4 MAJOR ACCIDENTS AND NATURAL DISASTERS

As described in Chapter 19 (Major Accidents and Natural Disasters) of this EIAR, there is potential for the proposed development to be a source of hazard or interact with other sources of hazard that could result in a major accident and/or disaster during its construction and operation.

Chapter 19 (Major Accidents and Natural Disasters) has assessed the potential risk of major accidents and natural disasters from the construction, operation and decommissioning phases of the proposed development. In accordance with the DoEHLG guidance (as per Table 19-4 of Chapter 19), the risk of a major accident and/or natural disaster is considered 'Low'.

There is low potential for significant natural disasters to occur at the proposed wind farm site. Ireland is a geologically stable country with a mild temperate climate.

Monitoring is proposed during the construction, operation, and decommissioning phases of the proposed development to capture any change with the potential to result in an increased risk of major accident and/or natural disaster.

All monitoring proposals relating to the pre-construction and construction phases of the proposed development were set out in various sections of the EIAR, and NIS. The CEMP (see Appendix 3-2 of this EIAR) groups together all of the monitoring proposals presented in the EIAR and NIS, which can be checked and reported on during the course of the proposed development.

The operator of the proposed development will continue to assess the risk of major accidents and/or disasters on site on an on-going basis during operation. The maintenance programme, record of reported incidents, as well as general site activities will be monitored on an on-going basis to ensure risk of major accidents does not increase over time.

It is considered with the implementation of the mitigation measures already detailed in Chapters 6 to Chapter 19 in this EIAR (as referenced in Chapter 21 (Schedule of Mitigation Measures), and the measures outlined in the CEMP are implemented and adhere to there will not be significant residual effects associated with the construction, operation and decommissioning of the proposed development.

20.5 CONCLUSION

All environmental factors are interrelated to some extent. However, the most common potential interactions occur between the environmental factors of population and human health, land, soils and geology, hydrology and hydrogeology, landscape and visual, noise, air quality, climate, and biodiversity.

Review of the potential effects associated with interaction of environmental factors during the construction, operational and decommissioning phases has determined that significant amplification of effects is not anticipated, and no additional interactions further to those described in this chapter are predicted.

The proposed development will have some positive effects on an international, national, regional and local level, particularly in terms of helping to achieve renewable energy targets and domestic energy security, through the use of the community benefit fund to support local initiatives, and provision of amenity access tracks and carparks.

Overall, the assessment of the potential interactions described has found they are not predicted give rise to significant effects.