Planning and Environmental Consultants

Environmental Impact Assessment Report

Taurbeg Wind Farm Extension of Operational Life

Chapter 17 - Interaction of the Foregoing

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17. INTERACTION OF THE FOREGOING

17.1 Introduction

The preceding Chapters 5 to 16 of this Environmental Impact Assessment Report (EIAR) identify the potential significant environmental effects that may occur in terms of Population and Human Health, Biodiversity (including Birds), Land, Soils and Geology, Hydrology and Hydrogeology (Water), Air Quality, Climate, Noise and Vibration, Archaeological, Architectural and Cultural Heritage, Landscape and Visual, Material Assets (including Traffic and Transport, Telecommunications and Aviation, Other Utilities) and Vulnerability to/from Major Accidents and Natural Disasters as a result of the Proposed Project as described in Chapter 4 of this EIAR. All of the potential significant effects of the Proposed Project and the measures proposed to mitigate them have been outlined in the preceding chapters of this EIAR. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these potential significant effects. The result of interactive effects may exacerbate the magnitude of the effects or improve them or have a neutral effect.

A matrix is presented in Table 17-1 and 17-2 below to identify potential interactions of impacts between the various aspects of the environment already assessed in this EIAR. The matrix presented in Table 17-1 highlights the potential for the occurrence of positive, neutral or negative effects during the extended operational phase (O) and the Decommissioning phase (D) of the Proposed Lifetime Extension. The matrix presented in Table 17-2 highlights the potential for the occurrence of positive, neutral or negative effects during the Proposed Offsetting Measures.

It is considered that the potential effects during the decommissioning phase will be similar to typical wind farm construction phase effects, but of a lesser magnitude which has been assessed within their respective chapters, and these have been included in the interaction's matrix below. The matrix is symmetric, with each environmental component addressed in the chapters of this EIAR being placed on both axes of a matrix, and therefore, each potential interaction is identified twice.

The potential for interaction of impacts has been assessed throughout this EIAR, as part of the impact assessment process. While the work on all parts of the EIAR was not carried out by MKO, the entire project and all the work of all sub-consultants was managed and coordinated by the company. This EIAR was edited and collated by MKO as an integrated report of findings from the impact assessment process, by all relevant experts, and impacts that potentially interact have been assessed in detail in the individual chapters of the EIAR above and summarised in Section 17.2 and 17.3 below.

Where any potential negative impacts have been identified during the assessment process, these impacts have been avoided or reduced by design and the proposed mitigation measures, as presented throughout the EIAR and highlighted in Section 17.2 and 17.3 below.

17.1.1 Statement of Authority

This chapter of the EIAR was completed by Michéal Cahill and reviewed by Eoin McCarthy, both of whom work for MKO. Michéal Cahill is a Graduate Environmental Scientist with MKO with over a years' experience in environmental consulting.

Michéal holds a first-class honours degree in Environmental Science at University of Galway and was awarded the Professor Emer Colleran Medal for his academic achievements. Michéal has previous experience in the preparation of Environmental Impact Assessment Reports for both offshore and onshore wind farm projects. Michéals key strengths and areas of expertise are in environmental impact assessment, the preparation and writing of high-quality reports, proficiency in geographic information systems, ecological assessment and risk assessment. As an environmental scientist within MKOs

environmental renewables team, Michéal is involved in the preparation and revision of a variety of reports for a range of energy infrastructure projects.

Eoin holds a B.Sc. (Hons) in Environmental Science from NUI, Galway and has 14 years' experience in Environmental consulting. In his role as project manager, Eoin works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments as well as sub-contractors from various fields in the preparation and production of EIARs.

17.2 Interaction Matrix – Proposed Lifetime Extension

Table 17-1 Interaction Matrix: Potential for Interacting Impacts – Proposed Lifetime Extension

	Phase	Population and Human Health	Biodiversity	Ornithology	Land, Soils and Geology	Hydrology & Hydrogeology	Air Quality	Climate	Noise and Vibration	Cultural Heritage	Landscape and Visual	Material Assets	Vulnerability to Natural Disasters
Population and Human Health	O												
	D												
Biodiversity	O												
	D												
Ornithology	O												
	D												
Land, Soils and Geology	O												
	D												
Hydrology & Hydrogeology	O												
	D												
Air Quality	O												

	Phase	Population and Human Health	Biodiversity	Ornithology	Land, Soils and Geology	Hydrology & Hydrogeology	Air Quality	Climate	Noise and Vibration	Cultural Heritage	Landscape and Visual	Material Assets	Vulnerability to Natural Disasters
	D												
Climate	O												
	D												
Noise and Vibration	O												
	D												
Cultural Heritage	O												
	D												
Landscape and Visual	O												
	D												
Material Assets	O												
	D												
Vulnerability to Natural Disasters	O												
	D												

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

17.3 Impact Interactions – Proposed Lifetime Extension

17.3.1 Population and Human Health

Population and Human Health, Land, Soils and Geology and Air Quality

No groundworks are proposed during the extended operational phase. Site vehicles used for daily visits and occasional site maintenance will be run on fuels and plant will use hydraulic oils. No interaction of effects are anticipated between land soils and geology and population and human health during the extended operational phase. A medium term, slight, positive effect is predicted as a result of the production of clean, renewable energy from the Proposed Lifetime extension as the Taurbeg Wind Farm will continue to offset harmful greenhouse gas emissions emitted by fossil fuel powered sources.

The potential for excavation and movement of soils during the decommissioning phase of the Proposed Lifetime Extension may lead to generation of dust emissions which, consequently, have the potential to have a Temporary, Imperceptible, Negative Effect on local air quality and human health. Mitigation measures to reduce dust emissions generated during the decommissioning phase of the Proposed Lifetime Extension are presented in the Decommissioning Plan as outlined in Appendix 4-3 and Chapter 10: Air Quality.

Population and Human Health, and Hydrology and Hydrogeology

As described in Chapter 9: Hydrology and Hydrogeology of this EIAR, the extended operational phase does not involve any alterations to the site drainage or other on-site infrastructure and will not give rise to significant impacts to the water environment. No effects are anticipated on the Hydrology and Hydrogeology at the Existing Taurbeg Wind Farm. As such, no effects on human health due to water quality are anticipated during the Proposed Lifetime Extension.

The future decommissioning phase of the Proposed Lifetime Extension, in 2036, has the potential to give rise to some limited water pollution as a result of likely on-site activities (earthworks, use of hydrocarbons for plant and machinery), and any water pollution could have a potential significant negative effect on the health of other users of that water within the same catchment. Mitigation measures are presented in Chapter 9 of this EIAR, as well as Appendix 4-3, Decommissioning Plan, to minimise the potential of any such issues occurring. No Significant Effects on the hydrological and hydrogeological environment are envisaged during the decommissioning stage of the Proposed Lifetime Extension.

Population and Human Health, Air Quality and Climate

The Proposed Lifetime Extension will generate energy from a renewable source. This energy generated will offset energy and the associated emission of greenhouse gases from electricity-generating stations dependent on fossil fuels, thereby having a positive effect on climate and Air Quality. The Proposed Lifetime Extension will assist in reducing carbon dioxide (CO_2) emissions that would otherwise arise if the same energy were otherwise to be generated by conventional fossil fuel plants. This is a long-term significant positive effect on climate and air quality. As a result, the Proposed Lifetime Extension will have a medium-term, slight, positive effect on human health by reducing the dependence on fossil fuels and harmful greenhouse gasses when compared to the 'do-nothing' scenario (i.e. decommissioning of the existing Taurbeg Wind Farm in 2026).

While there will be greenhouse gas emissions associated with the decommissioning of the Existing Taurbeg Wind Farm, this will take place under the Electricity sector emissions ceiling and will can be

considered as offset by the operation of the Proposed Lifetime Extension within its operational life. This will have a short term, imperceptible negative effect on human health due to increased greenhouse gas emissions.

Population and Human Health and Noise & Vibration

During the extended operational phase, the turbines have the potential to generate noise but as identified in Chapter 12: Noise, the potential effects of these turbines on residential amenity is not anticipated to be significant. The potential worst effects at the nearest noise sensitive locations are medium term, imperceptible and neutral in nature. Mitigation measures and best practices to be adopted concerning noise are presented in Chapter 12.

The decommissioning of the Existing Taurbeg Wind Farm will give rise to noise emissions via plant and machinery use for decommissioning works and transport purposes. These operations will similarly have some effect on nearby noise sensitive receptors for the duration of the works. After mitigation measures are implemented, these in-combination effects are expected to have negative, not significant and short term effects on population and human health

Population and Human Health, and Landscape and Visual

No significant changes to the wind turbines have been carried out since the wind farm was commissioned or are proposed as part of the Proposed Lifetime Extension. The existing Taurbeg Wind Farm has been in operation for approximately 19 years and therefore forms part of the existing landscape setting. The existing wind farm and substation will remain aligned with the future landscape and visual designations and policies guiding the development of Co. Cork. Overall, the Proposed Lifetime Extension is deemed to have medium-term, slight, landscape effects. The scale, siting and design of the turbines is considered appropriate, as the turbines do not detract from the scenic amenity views and are readily absorbed into the surrounding landscape. From multiple viewpoints the existing Taurbeg Wind Farm combines with the Knockacummer and Glentane Wind Farms into an extensive linear array of turbines upon upland ridges. The landscape and visual impact assessment of the Proposed Lifetime Extension, included in Chapter 13 of this EIAR, provides Photographic visualisations which were used to assess the visual effects arising from Taurbeg Wind Farm from 6 No. viewpoint locations. The significance of the residual visual effect was not considered to be “Profound” or “Very Significant” or “Significant” at any of the 6 viewpoint locations. Receptors around Viewpoint (VP) 6 are deemed to have moderate medium-term residual visual effects on account of a few residential receptors having views overlooking the valley in the direction of the existing Taurbeg turbines. However, there are very few residential receptors experiencing visual effects as shown in viewpoint 6 and the turbines are well setback at a distance of 3km. Receptors represented by VPs 1, 2, 3, 4 and 5 are deemed to have slight medium-term residual visual effects as a result of the Proposed Lifetime Extension. These viewpoints are located on roads that provide access to more scenic amenities, and where some residential receptors have limited visibility of the existing Taurbeg Wind Farm due to mature boundary vegetation, undulating topography and the distance that these VPs are from the existing Taurbeg Wind Farm. The visual impact of the extended operational phase is not expected to have any significant impacts on residential amenity.

Whilst the removal of the turbines and ancillary infrastructure from the Site will result in a short-term, slight, negative visual effect, this is not anticipated to have any significant effects on population and human health.

Population and Human Health, and Material Assets

Chapter 15: Material Assets of this EIAR discusses how the extended operational and decommissioning phases of the existing Taurbeg Wind Farm will impact traffic volumes. The extended operational phase will have medium-term, imperceptible, neutral effect on traffic and transportation and will not give rise to any significant effects upon the local road network or road users. As such a medium term,

imperceptible, neutral effect on residential amenity is anticipated to occur during the Proposed Lifetime Extension.

The decommissioning phase of the existing Taurbeg Wind Farm will likely result in a residual impact to other road users that is short-Term, slight, negative in effect. As noted in Section 4.7 of Chapter 4: Description of the Project, reinstatement proposals for a wind farm are typically made far in advance, so within the proposed 10-year extension of operation of the site, technological advances and preferred approaches to reinstatement are likely to change. Therefore, in order to prevent limiting options too far in advance of actual decommissioning, the final decommissioning plan will be agreed with the Local Authority at least three months prior to decommissioning of the Taurbeg Wind Farm.

17.3.2 Biodiversity (including Birds)

Biodiversity, and Land, Soils and Geology

No excavations, groundworks or other disturbance to land or soils are included as part of the Proposed Lifetime Extension. Therefore, no disturbance to biodiversity related to land, soils or geology is likely during the Proposed Lifetime Extension.

The decommissioning phase of the Taurbeg Wind Farm may involve limited excavations and groundworks around the turbines, in order to return the site to beneficial use as agricultural land. Chapter 6: Biodiversity (including Birds) provides a full assessment of the likely effects and impacts upon habitats including designated sites, bats and other mammals and concludes that the Proposed Lifetime Extension is unlikely to give rise to significant effects on the ecological receptors.

Biodiversity and Hydrology and Hydrogeology

The decommissioning phase of the Taurbeg Wind Farm may cause potential habitat degradation due to sediment runoff and/ or hydrocarbon loss to waterbodies which is associated with turbine hardstand backfilling, increased vehicle use on site and increased traffic congestion. The implementation of mitigation measures to ensure there are no significant negative effects on hydrology are outlined in Chapters 6 and 9.

The limited site maintenance activities that will take place during the extended operational phase do not include any changes to the existing site drainage. With implementation of the mitigation measures outlined in Chapters 6 and Chapter 9 of this EIAR, no impacts to birds from the water environment are envisaged during the extended operational phase.

Site activities during the future decommissioning phase have the potential to give rise to some water pollution, and consequential indirect effects on birds and their prey species (such as disturbance and deterioration of habitat quality) that use waterbodies within the same catchment. Mitigation measures (as per Chapter 6) if implemented will ensure there are no significant effects on birds or their habitat. Further measures would also be included in a decommissioning plan to be agreed with the local authority in advance of works.

Biodiversity, and Air and Climate

The Proposed Lifetime Extension will help offset carbon emissions from fossil fuel-based electricity generation plants, which will help contribute to a slower increase in the rate of global warming and a reduction in air pollution. Consequently, this is likely, in combination with other renewable energy projects, to have a Medium-Term moderate Positive Effect on biodiversity.

During the decommissioning phase of the Taurbeg Wind Farm, increased vehicular and dust emissions within and around the site have the potential to be a nuisance for biodiversity thereby having a

Temporary, Slight, Negative Effect. The mitigation measures outlined in Chapter 6 of the EIAR will ensure that the potential for negative effects is reduced or eliminated.

Biodiversity, and Noise and Vibration

No potential impacts upon biodiversity from noise and vibration arising during the Proposed Lifetime Extension were identified in Chapter 6 of the EIAR.

Site activity during the decommissioning phase could give rise to noise that could be a nuisance for biodiversity (including birds), thereby having a temporary, slight, negative effect. Best practice mitigation measures are included in Chapter 6 and Chapter 10 to minimise the potential negative effect of noise generated during the decommissioning phase on biodiversity.

Biodiversity, and Landscape & Visual

No significant impacts are likely upon vegetation within the Site and surrounding area during the Proposed Lifetime Extension. As the existing wind farm have been in operation since March 2006, they have now considered to have become part of the normal landscape of the wider area. No significant visual effects are likely during the operational phase.

During the decommissioning phase of the Taurbeg Wind Farm, concrete foundations will not be removed from the ground as it is considered to be the least preferred option in terms of having potential effects on the environment. Therefore, the turbine foundations will be backfilled, covered with soil material and re-seeded resulting in a more environmentally prudent option. The backfilling and reseeding of the turbine foundations will have a permanent, moderate, positive effect on both biodiversity and landscape and visual.

17.3.3 Land, Soils and Geology

Land, Soils and Geology, and Hydrology and Hydrogeology

The Proposed Lifetime Extension will not include any groundworks (e.g. excavations) or other activities likely to result in ground disturbance or pollution, which may give rise to impacts upon the water environment. Occasional site road maintenance will be required as part of the Proposed Lifetime Extension which may result in a negative, imperceptible indirect effect on the water environment. Chapter 8 and 9 of the EIAR concluded that no significant effects to the subsurface environment will occur during the extension of the operational phase.

As identified in Chapter 8: Land Soils & Geology and Chapter 9: Hydrology and Hydrogeology of this EIAR groundworks such as soil compaction during the decommissioning phase has the potential to have an effect on water quality through potentially silt-laden runoff from the proposed works areas, however, it is anticipated that the disassembly and removal of the turbines will not have an impact on the hydrological/hydrogeological environment. Mitigation measures to ensure there are no significant, negative effects on water quality are presented in Chapters 8 & 9.

Land, Soils and Geology, and Cultural Heritage

No disturbance to the subsurface (soils and geology) is proposed as part of the Proposed Lifetime Extension. Chapter 14: Cultural Heritage concluded that as no groundworks will take place during the operational phase, no direct or indirect effects on archaeology, architecture and cultural heritage are identified.

There are no recorded archaeological monuments within the site, however, there are 12 recorded monuments within the study area, including one record which has since been made redundant

As detailed in Section 4.7 in Chapter 4 and in the Decommissioning Plan included as Appendix 4-3, upon decommissioning of Taurbeg Wind Farm , the wind turbines will be disassembled in reverse order to how they were erected. All above-ground turbine components will be separated and removed off-site for reuse or recycling. It is proposed to leave turbine foundations in place underground and to cover them with earth and reseed as appropriate. It is proposed that site roadways will be left in situ, as appropriate, to facilitate on-going access and forestry uses.

Given that minimal works will be required at the decommissioning phase, and it is proposed that the site roads be left in situ, no potential direct effects to the archaeological, architectural or cultural heritage resource are identified and no mitigation is proposed.

Land, Soils and Geology and Landscape and Visual

There are no likely significant changes on lands, soils and geology during the operational phase that could result in associated landscape and visual impacts.

The turbine hardstands and site roads will be left in-situ following the decommissioning of Taurbeg Wind Farm, nullifying the need for large excavations at the Site. Localised groundworks and excavations that may occur during the decommissioning phase are largely concerned with restoration of the site into a natural, vegetated state. Bearing this in mind, it is not anticipated that there will be interaction between land, soils and geology and landscape and visual.

Land, Soils and Geology and Climate

There are no earthworks proposed as part of the extended operation phase and therefore no significant effects are predicted.

During the decommissioning phase it is proposed to leave turbine foundations in place underground and to cover them with soil and reseed as appropriate. Plant and machinery used during the excavation of any material on site will use fossil fuels, which is predicted to have an imperceptible, short-term, negative effect on climate.

Land, Soils and Geology and Noise and Vibration

There are no earthworks proposed as part of the extended operation phase and therefore no significant effects are predicted on noise and vibration.

During the decommissioning phase it is proposed to leave turbine foundations in place underground and to cover them with soil and reseed as appropriate. Plant and machinery used during excavation works have the potential to produce noise and vibration.

17.3.4 Air

Air and Material Assets

Chapter 15: Material Assets of the EIAR assesses the traffic effects of the Proposed Lifetime Extension and found that typically, no more than 1-2 trips per month to the site are made by car or light goods vehicle. As per Chapter 10: Air Quality of the EIAR, there will be no significant direct or indirect effects to air quality associated with the Proposed Lifetime Extension. There will therefore be a Medium-term, Imperceptible, Negative Effect on air quality.

During the decommissioning phase, the movement of construction vehicles (e.g. cranes and heavy plant) both within, and to and from the site, has the potential to give rise to dust and exhaust emissions. This is assessed further in Chapters 10 and 15 of this EIAR, and mitigation measures are presented to

minimise any potential effects. The effects on air quality during the decommissioning phase due to the movement of construction vehicles to and from the Site will are short-term, imperceptible, negative Effects.

17.3.5 Landscape and Visual

Landscape and Visual, and Cultural Heritage

As described in Chapter 14: Cultural Heritage of this EIAR, as the Proposed Lifetime Extension is an extension of the operational lifetime of the existing Taurbeg Wind Farm, this will not change on the existing archaeological, architectural and cultural heritage resource, either within the site bounds or in the wider area. It is considered that no direct, nor indirect effects would occur at the extended operational phase. It is concluded in Chapter 14 that no built heritage structures will be impacted either directly or indirectly by the Proposed Lifetime Extension, since nothing additional to the existing baseline environment is being proposed as part of the Proposed Lifetime Extension.

As the existing wind farm is extant and forms part of the receiving environment, no cumulative effects are predicted on the cultural heritage resource with regards the Proposed Lifetime Extension, when considered with proposed surrounding developments. Given that no national monuments occur on the Site, and that many of the monuments are not readily visible, or on private lands, the Proposed Lifetime Extension will not hinder cultural heritage. A decommissioning plan will be agreed with the local authority at least three months prior to decommissioning of the Taurbeg Wind Farm. No significant landscape or visual effects on the existing cultural heritage features are likely to occur should the wind turbines and associated infrastructure be removed during the decommissioning phase.

17.3.6 Noise and Vibration

Noise and Vibration and Material Assets

No change to the baseline noise and vibration levels are predicted as a result of the extended operational phase when considering the material assets. A neutral, medium-term, imperceptible effect is predicted. During the decommissioning phase machinery and plant will travel to and from the site for all decommissioning works.

17.3.7 Major Accidents and Natural Disasters

As described in Chapter 16 of the EIAR, major accidents or natural disasters are hazards which have the potential to affect the existing Taurbeg Wind Farm and lead to environmental effects both directly and indirectly. These include accidents during the extended operation and decommissioning of Taurbeg Wind Farm caused by operational failure and/or natural hazards. The assessment of the potential for significant accidents or disasters is conducted in connection with the information that must be included in the EIAR. This includes aspects such as population and human health, biodiversity, land and soil, hydrology and hydrogeology, air quality, climate, material assets, cultural heritage, and landscape.

When the mitigation measures outlined in Chapter 16 of this EIAR are implemented, and all mitigation detailed throughout the entire EIAR is implemented, the residual effect(s) associated with the extended operation and decommissioning of Taurbeg Wind Farm are not significant.

17.4 Interaction Matrix – Proposed Offsetting Measures

Table 17-2 Interaction Matrix: Potential for Interacting Impacts – Proposed Offsetting Measure

	Population and Human Health	Biodiversity	Ornithology	Land, Soils and Geology	Hydrology & Hydrogeology	Air Quality	Climate	Noise and Vibration	Cultural Heritage	Landscape and Visual	Material Assets	Vulnerability to Natural Disasters
Population and Human Health												
Biodiversity												
Ornithology												
Land, Soils and Geology												
Hydrology & Hydrogeology												
Air Quality												
Climate												
Noise and Vibration												
Cultural Heritage												

Landscape and Visual												
Material Assets												
Vulnerability to Natural Disasters												

Legend:

No Interacting Effect:

Positive Effect:

Neutral Effect:

Negative Effect:

17.5 Impact Interactions – Proposed Offsetting Lands

17.5.1 Population and Human Health

Population and Human Health, Land, Soils and Geology and Hydrology and Hydrogeology

The Peat Stability Risk Assessment of the Proposed Offsetting Lands was predominantly found to have an acceptable margin of safety, with some areas deemed to be of higher risk due to local topography. It is considered that these areas do not present a significant peat slide risk. With the implementation of mitigation measures outlined in Chapter 8 of this EIAR, it is considered that the Proposed Offsetting Measures will have a temporary, slight, negative effects on population and human health when considering sediment runoff and possible soil disturbance during deforestation works. There are no direct effects anticipated between population and human health and lands soils and geology.

Population and Human Health, Air and Climate

As part of the Proposed Offsetting Measures, it is proposed to permanently remove 105.5 ha of forestry which will create suitable habitat for hen harrier. The deforestation of these trees will cause long-term, imperceptible negative effect on air quality and climate due to the removal of these trees, which act as a carbon sink. However, through removal of plantation forestry, over time the habitat will revert back to a heath/ scrub mosaic which will have an overall larger carbon sink capacity than that of the commercial forestry. Therefore, the effect on climate associated with the Proposed Offsetting Measures is long term, slight positive. Furthermore, there will be temporary, slight, negative effects associated with the dust and vehicular emissions associated with deforestation on air quality. As such, a temporary, slight negative effect on human health is anticipated to occur.

Population and Human Health, and Hydrology and Hydrogeology

As described in Chapter 9: Hydrology and Hydrogeology of this EIAR, the Proposed Offsetting Measures do not involve any alterations to the site drainage. The permanent removal of forestry poses a risk to surface water quality in downstream receptors due to the release of suspended sediments, hydrocarbons from machinery and nutrient enrichment. Sediment runoff and possible soil disturbance during deforestation works also pose a risk to hydrological features at the Proposed Offsetting Lands. However, after the proposed mitigation measures outlined in Chapter 8 and 9 are implemented, the residual effect on hydrology is considered to be temporary, imperceptible and negative. As such, a temporary, imperceptible negative effect on human health is anticipated to occur.

Population and Human Health, Noise & Vibration

The Proposed Offsetting Measures will have a temporary, not-significant, negative effect on noise and vibration levels at the Proposed Offsetting Lands. Operational machinery and deforestation within the site have the potential to create noise and vibration for the duration of deforestation operations, however, it must be noted that the Proposed Offsetting Lands are situated in a sparsely populated area. Furthermore, 105.5 ha of the Proposed Offsetting Lands currently comprise of coniferous forestry plantation, meaning that tree felling would be a regular process undertaken in the area. The deforestation at the Proposed Offsetting Lands will be permanent and not cyclically repeated as is currently the case. Therefore, the Proposed Offsetting Measures will have a temporary, not-significant, negative effect on residential amenity.

Population and Human Health, and Landscape and Visual

The Proposed Offsetting Lands are located in an area which has been highly modified by the forestry and agricultural industry from its baseline natural state and as such its landscape sensitivity is 'Low'. The character of the Proposed Offsetting Lands will be altered by the measures which include grassland management, planting wildlife crop, hedgerow management and permanent removal of forestry. The magnitude of change is deemed to 'Slight' and highly localised. Once the measures have been implemented, landscape effects on the Proposed Offsetting Lands themselves will be Positive, Long-Term and 'Not Significant'. As reported in Chapter 13 of this EIAR, the Proposed Offsetting Lands are located within an area designated as 'visually sensitive' in the KCDP, which is a large landscape area considered to be 'High' sensitivity. Furthermore, designated scenic route KY-SR-1 is located adjacent to the Proposed Offsetting Lands. A 'Negligible' magnitude of change to the 'visually sensitive' area, as well as the Designated scenic route. The overall residual visual effects arising from the proposed measures within the Proposed Offsetting Lands on residential amenity are deemed to be long-term, 'not significant' and positive.

Population and Human Health, and Material Assets

There will be some HGV movements generated during the deforestation works at the Proposed Offsetting Lands due to the removal of approximately 2000 tonnes of chipped wood from the site. This will require 100, 20 tonne loads that will be removed from the site at a rate of 5 HGV loads, or 10 HGV movements per day on 20 separate days. As a result, it is estimated that the impact of these movements on residential amenity will be negative, temporary and slight. Furthermore, due to the nature of the work being carried out at the Proposed Offsetting lands, there will be no direct, nor indirect impacts on telecommunications and aviation.

17.5.2 Biodiversity (including Birds)

Biodiversity, and Land, Soils and Geology, Hydrology

During deforestation operations, there is potential for the of erosion of peat and spoil due to the disturbance of soils and subsoils associated with vehicle and plant movements. There is also potential for accidental spillage of petroleum hydrocarbons of plant and machinery which are highly toxic to humans and biodiversity. These also have associated potential effects on the geological and aquatic environments. However, when factoring in the mitigation measures outlined in Chapter 8 of this EIAR, the impacts on biodiversity are deemed to be temporary, imperceptible and negative.

Biodiversity, and Air and Climate

As part of the Proposed Offsetting Measures, it is proposed to permanently remove 105.5ha of coniferous forestry. Consequently, this will cause some carbon emissions and remove the carbon sequestration properties associated with the trees at the site. This will have a temporary, slight, negative effect on climate and air quality. Subsequently, the bog habitat underlying the plantation forestry will be restored back to a heath/ scrub habitat over time following deforestation. This will have a positive impact on carbon sequestration and subsequent positive impact on biodiversity.

Biodiversity, and Noise and Vibration

There will likely be some disturbance to local flora and fauna in the area resulting from deforestation works associated with the Proposed Offsetting Measures. This is anticipated to be a temporary, slight negative effect on biodiversity.

Biodiversity, and Landscape & Visual

Once the Proposed Offsetting Measures are implemented, with the removal of forestry habitat, they will have a positive Long-Term landscape and visual effect on the upland landscape of Mount Eagle. The Proposed Offsetting Lands will be improved through grassland management, planting wildlife crop, hedgerow management and permanent removal of forestry to open up lands to Hen Harriers. The residual landscape and visual effects were deemed to 'Not Significant', with a positive impact being anticipated on biodiversity.

17.5.3 Land, Soils and Geology

Land, Soils and Geology, and Hydrology and Hydrogeology

As previously mentioned, the permanent removal of trees and operation of machinery within the Proposed Offsetting Lands bears the potential for erosion of peat and spoil due to the disturbance of soils and subsoils associated with vehicular and plant movements, release of suspended sediment attached to timber in stacking area, as well as potential petroleum hydrocarbon spills. The exposure of soil and subsoils due to vehicle tracking, compaction and skidding or forwarding extraction methods has the potential to provide a source of suspended sediment which can become entrained in surface water runoff and enter surface watercourses. When considered with the mitigation measures outlined in chapters 8 and 9 of this EIAR, it is deemed there will be a temporary, imperceptible, negative effect on hydrology.

Land, Soils and Geology, and Cultural Heritage

There are no protected monuments located within the Proposed Offsetting Lands and therefore it is predicted there is no potential for any significant interacting effects between lands soils and geology and cultural heritage. Furthermore, there are no excavation works associated with the Proposed Offsetting Lands, therefore no effect is anticipated on sub-surface archaeology.

Land, Soils and Geology, and Landscape and Visual

The overall aim of Proposed Offsetting Lands is to open up ~123.3ha of land to grassland / open heath habitats which are suitable for hen harrier. Currently these lands comprise of an agricultural field in the northwest (~17.7ha) and ~105.5ha of coniferous forestry. The agricultural field will be managed through grassland management, wildlife crop planting and hedgerow maintenance. Meanwhile the forested area will undergo deforestation. This will revert the Proposed Offsetting Lands into a more natural state than the current baseline environment, which has been highly modified by human activity. As such, the Proposed Offsetting Measures will have a positive effect on the land environment in these areas. Once the measures have been implemented, landscape effects on the Proposed Offsetting Lands themselves will be positive, long-term and 'Not Significant'.

17.5.4 Air and Climate

Air, Climate and Material Assets

Exhaust emissions associated with the Proposed Offsetting Measures will arise from machinery and vehicles that are required onsite for deforestation works. There will also be some HGV movements generated during the deforestation works at the Proposed Offsetting Lands due to the removal of approximately 2000 tonnes of chipped wood from the site. This will require 100, 20 tonne loads that will be removed from the site at a rate of 5 HGV loads, or 10 HGV movements per day on 20 separate days. Whilst the deforestation works and transportation will give rise to minor increases in dust and vehicle emissions, the implementation of the mitigation measures discussed in Chapter 10 and 11 of this

EIAR, and good management practices can prevent or minimise potential effects off-site. As such it is deemed that the Proposed Offsetting Measures will have a temporary, slight, negative effect on Climate and Air associated with vehicular operations and associated emissions.

17.5.5 Landscape and Visual

Landscape and Visual, and Cultural Heritage

As mentioned above, there are no protected monuments located within the Proposed Offsetting Lands. It is predicted that there will be no interacting effects between landscape and visual and cultural heritage features as a result of the Proposed Offsetting Measures.

17.5.6 Major Accidents and Natural Disasters

As described in Chapter 16 of the EIAR, major accidents or natural disasters are hazards which have the potential to affect the Proposed Offsetting Lands and lead to environmental effects both directly and indirectly. These include accidents during the deforestation and management of the area caused by operational failure and/or natural hazards. The assessment of the potential for significant accidents or disasters is conducted in connection with the information that must be included in the EIAR. This includes aspects such as population and human health, biodiversity, land and soil, hydrology and hydrogeology, air quality, climate, material assets, cultural heritage, and landscape. The risk of a major accident and/or disaster during the works at the Proposed Offsetting Lands is considered 'low' in accordance with the 'Guide to Risk Assessment in Major Emergency Management' (DoEHLG, 2010).

When the mitigation measures outlined in Chapter 16 of this EIAR are implemented, and all mitigation detailed throughout the entire EIAR is implemented, the residual effect(s) associated with the Proposed Offsetting Measures are not significant.

17.6 Mitigation and Residual Impacts

Where any potential interactive negative effects have been identified in the above, a full suite of appropriate mitigation measures has already been included in the relevant sections (Chapters 5-16) of the EIAR. These are also outlined in full in Chapter 16: Schedule of Mitigation Measures. The implementation of these mitigation measures will reduce or remove the potential for these effects. Information on potential residual impacts and the significance of effects, is also presented in each relevant chapter.