16. INTERACTION OF EFFECTS

16.1 Introduction

The preceding chapters 5 – 15 of this EIAR identify the potential significant environmental effects that may occur in terms of Population and Human Heath, Biodiversity (Flora and Fauna), Land, Soils and Geology, Water (Hydrology and Hydrogeology), Air, Climate, Noise and Vibration, Landscape and Visual, Cultural Heritage (Archaeological, Architectural and Cultural Heritage) and Material Assets (Roads and Traffic, and Built Services), as a result of the Proposed Development as described in Chapter 4 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 for interactive effects may exacerbate the magnitude of the effects or improve them or have a neutral effect.

The 'Proposed Development' considered for the purposes of this EIAR consists of a Large-Scale Residential Development (LRD) in Knocknacarra, Co. Galway.

A matrix is presented as Table 16-1 below to identify the potential interaction of impacts between the various aspects of the environment assessed throughout this EIAR. The matrix highlights the potential for the occurrence of positive, neutral or negative effects during both the construction (C) and operational (O) phases. 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. In Section 16.2 below, the potential interactions between each environmental component have been discussed in order of the relevant chapters of the EIAR. Once a potential interaction between two environmental components has been discussed, i.e., Population & Human Health and Hydrology & Hydrogeology, the interaction will not be discussed again in the following relevant section, i.e., Hydrology & Hydrogeology and Population & Human Health in the Hydrology & Hydrogeology section.

Table 16-1 Interaction Matrix: Potential for Interacting Impacts

	Phase	Population and Human Health	Biodiversity, Flora and Fauna	Land, Soils and Geology	Water	Air and Climate	Noise and Vibration	Landscape and Visual	Cultural Heritage	Material Assets
Population and Human Health	C									
	O									
Biodiversity, Flora and Fauna	C									
	O									
Land, Soils and Geology	C									
	O									
Water	C									
	O									
Air and Climate	C									
	O									
Noise and Vibration	C									
	O									
Landscape and Visual	C									
	O									
Cultural Heritage	C									
	O									
Material Assets	C									
	O									

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

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 Environmental Impact Assessment Report (EIAR) was not carried out by MKO, the entire project and 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 16.2 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 16.2 below.

16.1.1 Statement of Authority

This section of the EIAR has been prepared by Tom Madden and reviewed by Eoin O Sullivan, both of MKO. Tom is a Project Environmental Scientist and has over five years working in various Environmental Consultancies throughout Ireland. He holds a BSc (Hons) in Environmental Science from the University of Limerick. Eoin is a Project Director at MKO with over 15 years of experience in the assessment of a wide range of energy and infrastructure related projects and working in the fields of environmental and human health risk assessment, waste management, waste policy and permitting. Eoin has wide experience in the project management of large-scale infrastructural projects and brownfield developments which includes all aspects of geo-environmental and geotechnical investigation. Eoin is a Chartered Member of the Chartered Institute of Water and Environmental Management and Chartered Environmentalist with the Society of Environment.

16.2 Impact Interactions

16.2.1 Population and Human Health

Population & Human Health and Hydrology & Hydrogeology

Any impacts associated with any development on water has the potential to impact on human health, in particular where water abstraction sources are present. The Proposed Development has limited potential to give rise to water pollution as a result of a site activities due to the construction methodologies being used and the proposed mitigation measures which are outlined in Chapter 8 of this EIAR and also in the accompanying Construction Environmental Management Plan (CEMP). Also, there are no water abstraction points in the vicinity of the site.

Population & Human Health and Air & Climate, Noise and Vibration

As identified in Chapter 4 of this EIAR, the construction phase has the potential to create a short-term, negative effect on human health due to the nuisance caused by construction plant and vehicle noise emissions, should the mitigation measures outlined in Chapter 9, 10 and 11, Air, Climate and Noise & Vibration not be implemented.

During the operational phase the Proposed Development has the potential to generate noise but as identified in Chapter 11 Noise & Vibration, the potential effects on population and human health are imperceptible.

Population & Human Health and Landscape and Visual

The construction of the Proposed Development will lead to the removal of areas of hedgerow and stone walls. The potential landscape and visual effects on the local population will result as the site changes from its existing state (greenfield and brownfield) to a construction site of considerable size. However, the Proposed Development includes a Green Corridor designed to provide ecological and recreational connectivity to these parks in a future receiving environment. This will lead to an overall positive effect on the local area.

16.2.2 Biodiversity

Biodiversity, Flora & Fauna and Land, Soils & Geology

The disturbance of soils within the Proposed Development area will result in habitat loss and some disturbance of fauna in the areas surrounding the works area. Where possible, the excavated soil will be used for reinstatement and landscaping works around the site.

Biodiversity, Flora & Fauna and Hydrology & Hydrogeology

Site activities have the potential to give rise to some water pollution (although this is limited), and consequential impacts on flora and fauna that rely on or use that water within the same catchment. These potential effects have been assessed in Chapter 6 and Chapter 8 of this EIAR, and the relevant measures will be in place to avoid any water pollution and subsequent effect on flora and fauna.

Biodiversity and Air

Site activity during the construction phase could give rise to dust that could be a nuisance to flora and fauna. The mitigation measures outlined in Chapter 9 of the EIAR will ensure that the potential for negative effects is reduced or eliminated.

Biodiversity and Climate

The construction phase of the Proposed Development will lead to emissions from plant and machinery use and transport (i.e. exhaust emissions). Following implementation of the mitigation measures presented in Chapter 10, residual effects of greenhouse gas emissions arising from the construction phase of the Proposed Development will have a short-term imperceptible negative effect on climate. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent imperceptible negative effect on climate. Climate change effects can lead to an increase in intense weather events, causing increased disturbance to biodiversity. The potential for interaction of biodiversity and climate effects is considered to be imperceptible due to the low quantity of greenhouse gases that will be emitted during construction of the Proposed Development.

Biodiversity, Flora & Fauna and Noise & Vibration

Site activity during the construction of the Proposed Development has the potential to give rise to noise and some vibration that could disturb fauna. This will occur only during the construction phases which will be short term. Mitigation measures have been provided in Chapter 11.

16.2.3 Land, Soils and Geology

Land, Soils & Geology and Hydrology & Hydrogeology

The movement and/or removal of soils, overburden, gravel and rock as part of the construction activities has the potential to have secondary impacts on water quality in the absence of mitigation. Mitigation measures are presented in Chapter 7 and Chapter 8.

Land, Soils and Geology and Air

The movement and/or removal of soils, overburden and rock as part of the construction activity has the potential to give rise to dust effects. Mitigation measures are presented in Chapter 9 to minimise the risk of any such issues.

Land, Soils and Geology and Cultural Heritage

The movement and/or removal of soils and overburden as part of the construction activity has the potential to cause damage or disturbance to features of archaeological potential which were previously undiscovered. Preconstruction archaeological testing has been proposed which will be carried out by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works, further archaeological mitigation may be required, such as preservation in-situ or by record. See Chapter 12 for further details of mitigation measures.

16.2.4 Climate

Climate and Material Assets

The construction phase of the Proposed Development will see a slight increase in traffic volumes. This will lead to a slight increase in emissions from construction plant and machinery use and transport (i.e. exhaust emissions). This is assessed further in Chapter 10 of this EIAR, and mitigation measures are presented to minimise any potential effects.

16.2.5 Air Quality

Air Quality and Material Assets

The movement of construction vehicles both within and to and from the site has the potential to give rise to dust nuisance effects during the construction phase. This is assessed further in Chapter 9 of this EIAR, and mitigation measures are presented to minimise any potential effects.

16.2.6 Landscape and Visual

Landscape and Visual and Cultural Heritage

As described in Chapter 12 of this EIAR, no direct or indirect effects to the recorded cultural heritage resource as a result of the Proposed Development have been identified. However, pre-commencement archaeological testing has been proposed to be undertaken by a suitably qualified archaeologist prior to the start of construction works.

16.3 Mitigation and Residual Impacts

Where any potential interactive negative impacts have been identified in the above, a full suite of appropriate mitigation measures have been included in the relevant sections (Chapters 5-15) of the EIAR. 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.