13. Interactions

13.1. Introduction

This chapter describes interactions between impacts on different environmental factors. All potential interactions have been addressed as required throughout the EIAR. During the scoping, baseline assessment and impact assessment stages of this report, contributors (as set out in Section 1.4 of the EIAR) have liaised with each other where relevant to ensure that all such potential interactions have been robustly addressed. A detailed description of the residential development is presented in Chapter 2 – Project Description.

13.2. Summary of Interactions

The interactions between each of the topics discussed within Chapter 3 to Chapter 12 of this EIAR have been considered in order to determine the potential direct and indirect environmental impacts, via. various pathways, which could arise as a result of the proposed residential development. This section of the EIAR has been prepared in accordance with Draft EPA '*Guidelines on the Information to be contained in Environmental Impact Assessment Reports'* (2017) which states the following;

> *'Some topics could be placed under more than one heading, for example where hydrogeology is a relevant topic it may be relevant under the heading of Aquatic Ecology as well as under Water or Ground Water. Another example would be amenity which may be relevant under 'The Population and Human Health' and 'The Landscape'. The requirement for the EIAR to consider 'Interactions' resolves this issue by ensuring that effects are cross-referenced between topics, thus reducing the need to duplicate coverage of such topics'*

A summary matrix showing significant interaction and interdependencies between environmental attributes specifically in relation to the proposed development is presented in Table 13.1. Each environmental topic considered within this EIAR is further discussed below, from Section 13.2.1 (Population and Human Health) to Section 13.2.10 (Material Assets).

Table 13.1 - Matrix Showing Interactions Between Environmental Attributes Considered in this EIAR

Interactions	Chapter 3 - Population & Human Health		Chapter 4 - Biodiversity		Chapter 5 - Landscape and Visual		Chapter 6 - Air Quality & Climate		Chapter 7 - Noise & Vibration		Chapter 8 - Traffic		Chapter 9 - Land, Soils & Geology		Chapter 10 - Water		Chapter 11 - Cultural Heritage		Chapter 12 - Material Assets	
	Con.	*Op.*	*Con.*	*Op.*	*Con.*	*Op.*	*Con.*	*Op.*	*Con.*	*Op.*	*Con.*	*Op.*	*Con.*	*Op.*	*Con.*	*Op.*	*Con.*	*Op.*	*Con.*	*Op.*
Chapter 3 - Population & Human Health			×	×	×	×	✓	✓	✓	✓	×	×	✓	✓	✓	✓	×	×	×	×
Chapter 4 - Biodiversity					✓	✓	✓	✓	✓	✓	×	×	×	×	✓	✓	×	×	×	×
Chapter 5 - Landscape and Visual							✓	✓	✓	✓	×	×	×	×	×	×	✓	✓	×	×
Chapter 6 - Air Quality & Climate									✓	✓	✓	✓	✓	✓	✓	✓	×	×	×	×
Chapter 7 - Noise & Vibration											✓	✓	×	×	×	×	×	×	×	×
Chapter 8 - Traffic													×	×	×	×	×	×	✓	✓
Chapter 9 - Land, Soils & Geology															✓	✓	×	×	✓	×
Chapter 10 - Water																	×	×	×	×
Chapter 11 - Cultural Heritage																			×	×
Chapter 12 - Material Assets																				

✓ Interaction
× No Interaction

Con.: Construction Phase
Op.: Operational Phase

13.2.1. Population and Human Health

Population and human health attributes interact with other environmental attributes as outlined in Chapter 3 of this EIAR and summarised as follows: -

- **Air Quality & Climate -** Potential impacts on the receiving air quality and climate environment could also result in associated human health impacts. However, the mitigation measures described in Chapter 3 – Population and Human Health, and those relevant in Chapter 6 – Air Quality & Climate will ensure that this will not occur.
- **Noise & Vibration -** Potential impacts on the receiving noise and vibration environment could also result in associated human health impacts. However, the mitigation measures described in Chapter 3 – Population and Human Health, and those relevant in Chapter 7 – Noise and Vibration will ensure that this will not occur.
- **Land, Soils & Geology -** Potential impacts on the receiving land, soils and geology environment could also result in associated human health impacts. However, the mitigation measures described in Chapter 3 – Population and Human Health, and those relevant in Chapter 9 – Land, Soils and Geology will ensure that this will not occur.
- **Water -** Potential impacts on the receiving hydrology and hydrogeology environment could also result in associated human health impacts. However, the mitigation measures described in Chapter 3 – Population and Human Health, and those relevant in Chapter 10 – Water will ensure that this will not occur.

13.2.2. Biodiversity

Biodiversity attributes interact with other environmental attributes as outlined in Chapter 4 of this EIAR and summarised as follows: -

- **Landscape & Visual -** The biodiversity of the receiving environment has informed the landscape design associated with the proposed development. The most significant proposed feature of this development in landscape terms would be the creation of a large open space which would form a central spine running east-west in order to accommodate a variety of landscape typologies and features including wetlands, woodland, hedgerows, wildflower meadow and orchard. An existing fragmented hedgerow which runs north south through the Site would be largely protected and augmented with additional tree and hedgerow species to create a strong linear green infrastructure intervention. Potential impacts on the receiving landscape and visual environment could also result in associated biodiversity impacts. However, the mitigation measures described in Chapter 4 – Biodiversity, and those relevant in Chapter 5 – Landscape and Visual will ensure that this will not occur.
- **Air Quality & Climate -** Potential impacts on the receiving air quality and climate environment could also result in associated biodiversity impacts. However, the mitigation measures described in Chapter 4 – Biodiversity, and those relevant in Chapter 6 – Air Quality & Climate will ensure that this will not occur.
- **Noise & Vibration -** Potential impacts on the receiving noise and vibration environment could also result in associated biodiversity impacts. However, the mitigation measures described in Chapter 4 – Biodiversity, and those relevant in Chapter 7 – Noise and Vibration will ensure that this will not occur.
- **Water –** Potential impacts on the receiving hydrology and hydrogeology environment could also result in associated biodiversity impacts. However, the mitigation measures described in Chapter 4 – Biodiversity, and those relevant in Chapter 10 – Water will ensure that this will not occur.

13.2.3. Landscape & Visual

Landscape and Visual attributes interact with other environmental attributes as outlined in Chapter 5 of this EIAR and summarised as follows: -

- **Biodiversity -** Potential impacts on the receiving biodiversity environment could also result in associated landscape and visual impacts. However, the mitigation measures described in Chapter 5 – Landscape & Visual, and those relevant in Chapter 4 – Biodiversity will ensure that this will not occur.
- **Cultural Heritage -** Potential impacts on the receiving cultural heritage environment could also result in associated landscape and visual impacts. However, the mitigation measures described

in Chapter 5 – Landscape & Visual, and those relevant in Chapter 11 – Cultural Heritage will ensure that this will not occur.

- **Noise & Vibration -** Potential noise & vibration impacts are generally most prevalent during construction phases. Whilst these would have no visual impacts, they can alter people's perception of the areas character. Refer to relevant sections, including mitigation measures, of Chapter 5 – Landscape & Visual, and to the mitigation measures described in Chapter 7 – Noise & Vibration.
- **Air Quality & Climate** - Potential air quality & climate impacts are generally most prevalent during construction phases. Whilst these would have no visual impacts, they can alter people's perception of the areas character. Refer to relevant sections, including mitigation measures, of Chapter 5 Landscape & Visual, and to the mitigation measures described in Chapter 6 – Air Quality and Climate.

13.2.4. Air Quality & Climate

Air Quality and Climate attributes interact with other environmental attributes as outlined in Chapter 6 of this EIAR and summarised as follows: -

- **Traffic -** The most significant interaction with respect to air quality and climate is with respect to traffic and transportation. A Traffic and Transportation Generation Report for the development during the operational phase for the opening and design years was carried out by WS Atkins Ireland Ltd. This information has been reviewed in order to assess the potential impact of the development. Refer to relevant sections, including mitigation measures, of Chapter 8 – Traffic, and to the mitigation measures described in Chapter 6 – Air Quality and Climate.
- **Population & Human Health** - Interactions between air quality and human beings can also be considered significant. An adverse impact due to air quality in either the construction or operational phase has the potential to cause health and dust nuisance issues. The mitigation measures that will be put in place on-Site will ensure that the impact of the development complies with all ambient air quality legislative limits and therefore the predicted impact is long term and neutral with respect to human beings. Refer to relevant sections, including mitigation measures, of Chapter 3 – Population and Human Health, and to the mitigation measures described in Chapter 6 – Air Quality and Climate.
- **Biodiversity / Water –** The construction and operation of the proposed development has the potential to generate emissions to atmosphere which have the potential to impact on sensitive flora, fauna and water. However, the impact of these emissions is predicted to be neutral for both the construction and operational phase. Construction phase mitigation measures will minimise dust emissions which have the potential to impact on flora, fauna and water. In the operational phase, impacts meet the criteria set down for ecologically sensitive Site and therefore the interactions between air quality and flora, fauna and water are neutral for both the construction and operational phase. Refer to relevant sections, including mitigation measures, of Chapter 4 – Biodiversity and Chapter 10 – Water, and to the mitigation measures described in Chapter 6 – Air Quality and Climate.
- **Noise & Vibration / Land, Soils & Geology -** With the appropriate mitigation measures in place it is predicted that any interactions on Soil, Geology and Noise are neutral. Refer to relevant sections, including mitigation measures, of Chapter 7 – Noise and Vibration and Chapter 9 – Land, Soils and Geology, and to the mitigation measures described in Chapter 6 – Air Quality and Climate.

13.2.5. Noise & Vibration

Noise and Vibration attributes interact with other environmental attributes as outlined in Chapter 7 of this EIAR and summarised as follows: -

- **Traffic -** Predicted increases in traffic flow have informed noise calculations to predict changes in noise levels for dwellings located on the adjacent and adjoining roads as part of the Operational Noise Assessment. Refer to relevant sections, including mitigation measures, of Chapter 8 – Traffic, and to the mitigation measures described in Chapter 7 – Noise and Vibration.
- **Population & Human Health -** Human health impacts could arise as a result of noise impacts. The potential impacts on noise quality from a human health perspective are fully addressed in Chapter 3 – Population and Human Health. The mitigation measures described in Chapter 7 –

Noise and Vibration, and those relevant in Chapter 3 – Population and Human Health will ensure that such impacts will not occur.

13.2.6. Traffic

Traffic interacts with a wide range of environmental parameters and therefore impacts upon a number of disciplines. All interactions with traffic during both Construction and Operational Phases have been identified in the relevant Chapters and where appropriate, mitigation measures have been applied. The following provides a summary of the identified interactions:

- **Air Quality & Climate -** During the construction stage, on Site construction works will contribute to a temporary decrease in air quality. In the development operational stage traffic generation associate with the development will contribute to increased traffic volumes on the surrounding network which in turn will decrease air quality. Further details in relation to direct impacts are addressed in Chapter 6 – Air Quality and Climate. However, the mitigation measures described in Chapter 8 – Traffic, and those relevant in Chapter 6 – Air Quality and Climate will ensure that this will not occur.
- **Noise & Vibration -** During the construction stage, development of the Site will result in a short level increase of construction traffic related noise and vibration. In the development operational stage, traffic generation associated with the development will contribute to increased noise levels on the surrounding local road network. Further details in relation to direct impacts are addressed in Chapter 7 – Noise and Vibration. However, the mitigation measures described in Chapter 8 – Traffic, and those relevant in Chapter 7 – Noise and Vibration will ensure that this will not occur.
- **Material Assets -** Traffic is one of the environmental attributes typically assessed under Material Assets. For the purposes of this EIAR a full Traffic Impact Assessment has been undertaken and is presented in Chapter 8 – Traffic, along with all relevant mitigation measures.

13.2.7. Land, Soils & Geology

Land, Soils and Geology attributes interact with other environmental attributes as outlined in Chapter 9 of this EIAR and summarised as follows: -

- **Population & Human Health** – Potential impacts on the receiving population and human health environment could also result in associated land, soils and geology impacts. However, the mitigation measures described in Chapter 9 – Land, Soils and Geology, and those relevant in Chapter 3 – Population and Human Health will ensure that this will not occur.
- **Water** - Potential impacts on the receiving water environment could also result in associated land, soils and geology impacts. However, the mitigation measures described in Chapter 9 – Land, Soils and Geology, and those relevant in Chapter 10 – Water will ensure that this will not occur.
- **Material Assets -** Waste management strategies during the construction phase of the proposed development have been informed by the receiving land, soils and geology environment. Refer to Chapter 9 – Land, Soils and Geology, and relevant sections including mitigation measures described in Chapter 12 – Material Assets.

13.2.8. Water

Water attributes interact with other environmental attributes as outlined in Chapter 10 of this EIAR and summarised as follows: -

- **Population & Human Health** - Potential impacts on the receiving hydrology and hydrogeology environment could also impact on human health. However, the mitigation measures described in Chapter 10 – Water, and those relevant in Chapter 3 – Population and Human Health will ensure that this will not occur.
- **Biodiversity** - Potential impacts on the receiving hydrology and hydrogeology environment could also impact on biodiversity conditions present. However, the mitigation measures described in Chapter 10 – Water, and those relevant in Chapter 4 – Biodiversity will ensure that this will not occur.
- **Air Quality & Climate** - Potential impacts on the receiving hydrology and hydrogeology environment could also impact on air quality conditions present. However, the mitigation measures described in Chapter 10 – Water, and those relevant in Chapter 6 - Air Quality & Climate will ensure that this will not occur.

- **Land, Soils & Geology -** Potential impacts on the receiving hydrology and hydrogeology environment could also impact on land, soils and geology conditions present. However, the mitigation measures described in Chapter 10 – Water, and those relevant in Chapter 9 – Land, Soils & Geology will ensure that this will not occur.

13.2.9. Cultural Heritage

Based on the findings of the assessment presented in Chapter 11 – Cultural Heritage, *'there are currently no known potential impacts from interactions with other environmental attributes'*. However, the receiving cultural heritage environment has been duly considered within Chapter 5 – Landscape & Visual. Refer to relevant sections including any relevant mitigation measures described in Chapter 5 – Landscape & Visual.

13.2.10. Material Assets

Material Assets attributes interact with other environmental attributes as outlined in Chapter 12 of this EIAR and summarised as follows: -

- **Land, Soils & Geology -** Waste management strategies during the construction phase of the proposed development have been informed by the receiving land, soils and geology environment. Refer to Chapter 9 – Land, Soils and Geology, and relevant sections including mitigation measures described in Chapter 12 – Material Assets.
- **Roads & Traffic** - Traffic is one of the environmental attributes typically assessed under Material Assets. For the purposes of this EIAR a full Traffic Impact Assessment has been undertaken and is presented in Chapter 8 – Traffic, along with all relevant mitigation measures.