DESIGNING AND DELIVERING
A SUSTAINABLE FUTURE

EIAR FOR THE DEVELOPMENT OF A HEALTHCARE WASTE MANAGEMENT FACILITY AT BLARNEY BUSINESS PARK

Volume 2- Main Body of the EIAR
Chapter 18 – Inter-relationships and Interactions

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18. INTER-RELATIONSHIPS AND INTERACTIONS

18.1 Introduction

This chapter has been developed to identify potential inter-relationships and interactions between environmental aspects addressed in this EIAR (i.e., interactions between one environmental aspect and another environmental aspect which can result in an environmental impact).

The previous chapters have described the potential impact of the proposed development under a variety of different environmental topic headings. An assessment of impact inter-relationships and interactions is already embedded in these chapters. The purpose of this chapter is to take a more holistic and comprehensive view of the inter-relations and interactions between different aspects of the project and topics discussed in other chapters. This ensures that there is adequate coverage in this EIAR of the potential for the development to cause overall effects and cumulative impacts. This process examines whether interactions between the different effects themselves may cause impacts that are greater than those discussed individually. As such, this chapter responds to the requirement of the legislation governing the EIA process for the inter-relationship or interaction between the various environmental aspects and impacts to be fully considered, described and assessed.

This chapter considers the identified potential impact interactions between the following environmental aspects/EIAR topic chapters:

- Chapter 7 - Population and Human Health
- Chapter 8 - Biodiversity
- Chapter 9 - Soils, Geology and Hydrogeology
- Chapter 10 - Hydrology and Surface Water
- Chapter 11 - Air Quality
- Chapter 12 - Climate
- Chapter 13 - Noise and Vibration
- Chapter 14 - Traffic and Transportation
- Chapter 15 - Archaeological, Architectural and Cultural Heritage
- Chapter 16 - Landscape and Visual Impacts
- Chapter 17 – Material Assets - Utilities and Waste

A description of potential impacts associated with the construction, operation, and decommissioning phases of the proposed development, in the absence of mitigation, is provided in the EIAR Topic Chapters listed above.

A description of Residual Impacts associated with the construction, operation, and decommissioning phases of the proposed development, with the adoption of mitigation considered, is also provided in the EIAR Topic chapters listed above.

For a project of this nature, there is also the potential for interaction amongst these impacts that may not be perceived when examined individually. Therefore, it is necessary to consider the relationships between the impacts.

Impact interactions and inter-relationships have been identified and are discussed in this chapter.

18.2 Statement of Authority

This chapter of the EIAR was prepared by Richard Deeney. Richard is Principal Environmental Scientist who works in the Circular Economy and Environment group at Fehily Timoney at FT. He has ca. 13 years of experience. He is vastly experienced in the coordination and completion of planning applications; EIA, including EIA Screening, EIA Scoping and the production of Environmental Impact Assessment Reports (EIARs); Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) of plans and programmes; IE/IPC/Waste Licensing and Compliance; and Sustainability and Climate Action consultancy. He leads an Environmental Science team that delivers projects in these areas. He is an expert project manager who has led and successfully delivered a wide range of strategic and complex projects. He has expertise in assessing the effects of plans and projects on a wide breadth of environmental topics. Richard was responsible for peer review of the assessment contained in this chapter.

18.3 Evaluation of Impact Inter-relationships and Interactions

Table 18-1 provides a matrix indicating the key interactions and inter-relationships between the environmental aspects discussed previously in this EIAR.

18.3.1 Population and Human Health

Potential Population and Human Health interactions are summarised under the following sections.

Biodiversity

Impacts upon biodiversity elements (i.e., eco-systems, habitats and species), may, in turn, affect recreational value attained by humans experiencing nature. It has been concluded that the proposed development will not have any adverse effect on biodiversity, flora or fauna, however.

Soils, Geology and Hydrogeology

The proposed development could potential generate impacts on soils, geology and hydrogeology in absence of proper design (e.g., through discharge of contaminated stormwater, fuel/oil spills). These impacts may affect the quality status of affected ground and groundwater which in turn can affect the health of humans who source their drinking water from the potentially affected groundwaters.

Comprehensive 'avoidance by design' measures form part of the proposed development, however. With the adoption of these measures, the proposed development will have no effect on soils, geology or hydrogeology utilised by people.

Hydrology and Surface Water

The proposed development could potential generate impacts on hydrology and surface water in absence of proper design (e.g., through discharge of contaminated stormwater, fuel/oil spills). These impacts may affect the quality status of affected surface wates which in turn can affect the health of humans who utilise these surface water s(e.g., for fishing, bathing, drinking water etc.).

Comprehensive 'avoidance by design' measures form part of the proposed development, however. With the adoption of these measures, the proposed development will have no effect on surface waters utilised by people.

The proposed development will not impinge on the Water Framework Directive objectives at receiving surface waters. As there will be no deterioration in the quality status of the receiving surface waters due to the proposed development, including the Shean Upper Stream, the Blarney River and Lough Mahon, human users of these surface waters will experience no diminution of recreation or amenity value gained from them.

Air Quality

The construction and operational phases of the proposed development have the potential to negatively impact air quality.

Dust generated during construction and operational phase activities may cause nuisance to sensitive human receptors in the vicinity of the development site.

Emissions generated during the operational phase of the proposed development may cause nuisance and disturbance for sensitive human receptors in the local area.

Chapter 11 – Air Quality in Volume 2 of this EIAR has concluded that there will be no significant adverse effects on nearby sensitive receptors due to dust or emissions associated with the proposed development, however.

Air dispersion modelling indicates that potential air pollutants associated with the proposed development are predicted to be in compliance with the relevant air quality standards, which are set for the protection of human health.

Comprehensive dust mitigation measures will be adopted during the construction phase to prevent negative dust impacts affecting humans. No site-specific mitigation measures are proposed for the operational phase as effects are predicted to be not significant.

Climate

The effects of the proposed development on climate change may result in indirect effects on people due to an increase in climate-related events such as storms, droughts, floods etc.

Chapter 12 – Climate in Volume 2 of this EIAR has concluded that the proposed development will not have any significant adverse effect on climate. It has been concluded that climate change events will have an imperceptible effect on the proposed development.

Noise and Vibration

Noise generation during the construction and operational phases of the proposed development has the potential to negatively impact upon sensitive human receptors in the vicinity of the proposed development site.

Noise prediction modelling has been carried out under Chapter 13 – Noise and Vibration in Volume 2 of this EIAR to assess potential noise impacts on sensitive human receptors associated with the construction and operational phases of the proposed development. It was concluded that the predicted noise levels from site noise emissions will be below the ambient noise levels measured at the four noise monitoring locations during the baseline noise survey. Therefore, it is likely that existing road traffic noise will mask the noise from the proposed development. However, the proposed development will introduce a new noise source in the soundscape which may be audible at certain locations during certain conditions (e.g. at locations close to the site during periods of low traffic).

The predicted noise levels at sensitive human receptors due to the carrying out of construction phase activities do not exceed relevant construction noise limits, which have been set for the protection of human receptors.

The predicted noise levels at sensitive human receptors due to the carrying out of operational phase activities do not exceed relevant EPA prescribed noise limits for day, evening or night, which have been set for the protection of human receptors.

Noise associated with the construction and operational phases of the proposed development will therefore not have any significant negative effects on humans present at noise sensitive receptors in the vicinity of the development site, with the adoption of the embedded mitigation measures (i.e., sound insulated wall and roof panels, fast acting roller shutter doors and site speed limits).

Traffic and Transportation

The proposed development will generate traffic during both the construction and operational phases of the proposed development.

Increased traffic movements have the potential to impact on the structural integrity of the road, cause increased congestion, present increased health and safety risks (associated with road traffic accidents) and generate excessive noise at sensitive human receptors. Such impacts may negatively affect the experience of road users and create increased health and safety risks to road users. Chapter 14 - Traffic and Transportation in Volume 2 of this EIAR has concluded, however, that the construction related traffic is of such magnitude as likely not to be noticeable to existing road users.

The traffic generated by the operational phase of the proposed development is modest, with an average of 30 no. HGV trips per day and limited staff vehicle movements. Given the site location and the established business park uses accessed by the same roads and the low volume of additional road traffic, no significant effects on human health, amenity, or safety is anticipated.

Consequently, the residual effect on road user experience and health and safety risk on the local road network will not be significant.

Archaeological, Architectural and Cultural Heritage

Potential interactions between Population and Human Health and Archaeological, Architectural and Cultural Heritage may arise in the event of the Archaeological, Architectural and Cultural Heritage environment being negatively affected, which may impact the population and their enjoyment of this resource. Chapter 15 – Archaeological, Architectural and Cultural Heritage concluded that the construction works are limited and small-scale in nature and the construction, operational and decommissioning phases of the proposed development will have no significant negative impact on Archaeological, Architectural and Cultural Heritage given the magnitude of construction works associated with the proposed development and the absence of Archaeological, Architectural and Cultural Heritage features at the development site or in the surrounding which could be affected by the proposed development. It should be noted that no excavation activities will occur during construction of the proposed development.

18.3.2 Biodiversity

Potential Biodiversity interactions are summarised under the following sections.

Soils, Geology and Hydrogeology

Effects on soils or groundwater have the potential to have effects on biodiversity (e.g., Groundwater Dependent Terrestrial Eco-systems).

Comprehensive ‘avoidance by design’ measures form part of the proposed development, however. With the adoption of these measures, the proposed development will have no effect on soils, geology or hydrogeology/

Hydrology and Surface Water

Effects on surface waters have the potential to have effects on biodiversity (e.g., aquatic ecology).

Comprehensive 'avoidance by design' measures form part of the proposed development, however. With the adoption of these measures, the proposed development will have no effect on surface waters.

Air Quality

Dust emissions associated with the construction and operational phases of the proposed development have the potential to negatively impact ambient air quality which in turn can result in a negative impact on ecological receptors in the vicinity of the site.

The level of risk associated with each activity of the proposed development (i.e., Construction and Trackout) is discussed in Chapter 11 - Air Quality in Volume 2 of this EIAR. It has been determined that the risk of dust-related impacts is negligible to low risk.

It has been determined in Chapter 11 – Air Quality in Volume 2 of this EIAR that there are no sensitive ecological receptors that meet the criteria of the IAQM guidelines within the study area and there is no pathway for effects on biodiversity within or adjacent to the development site. The impact of emissions from the facility on ambient ground level concentrations was assessed within designated conservation areas such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs), and Natural Heritage Areas (NHAs), and proposed Natural Heritage Areas (pNHAs) using air dispersion modelling. Process contributions (PCs) of NO_X at ecological receptors were compared to the relevant critical level and it was concluded that there are no PCs greater than 1% of the relevant critical level at any of the modelled ecological receptors, therefore the effect of NO_X emissions from the facility on sensitive ecological receptors is considered to be not significant.

A comprehensive set of construction phase dust mitigation measures are in place to prevent the generation of dust which may affect ecological receptors. No site-specific mitigation measures are proposed for the operational phase as impacts are predicted to be not significant.

Climate

Climate impacts associated with the construction and operational phases of the proposed development have the potential to negatively impact local climate which in turn can result in a negative impact on ecological receptors in the vicinity of the site, such as deterioration in water quality due to flooding, prolonged dry weather/drought, altered freshwater temperatures leading to algal blooms, and reduced dissolved oxygen levels in water.

Chapter 12 – Climate in Volume 2 of this EIAR has specified appropriate mitigation measures and has concluded that the proposed development will not have any significant adverse impact in terms of climate change and therefore will not give rise to significant negative effects on biodiversity.

Noise and Vibration

Noise emissions associated with the proposed development may negatively impact ecological receptors in the vicinity of the development site.

Chapter 8 - Biodiversity in Volume 2 of this EIAR has concluded that, considering the limited and small-scale nature of the works, there are no pathways for significant negative effects on bird or mammal species during the construction phase of the proposed development.

Chapter 8 - Biodiversity in Volume 2 of this EIAR has concluded that the predicted noise levels are below the recommended thresholds to avoid significant negative effects at ecological receptors, however, the proposed development will introduce a new noise source in the soundscape which may be audible at certain locations during certain conditions, thus the operational phase of the proposed development is expected to have a neutral, not significant effect on ecological receptors.

18.3.3 Soils, Geology and Hydrogeology

Potential Soils, Geology and Hydrogeology interactions are summarised under the following sections.

Population and Human Health

A description of the interactions between Soils, Geology and Hydrogeology and Population and Human Health is discussed in Section 18.3.1.

Biodiversity

A description of the interactions between Soils, Geology and Hydrogeology and Biodiversity is discussed in Section 18.3.2.

Hydrology and Surface Water

There is potential interaction between soils, and hydrological and hydrogeological water regimes. Effects on soils, geology and groundwater can be transmitted to connected surface waters, and vice versa.

Comprehensive 'avoidance by design' measures form part of the proposed development, however. With the adoption of these measures, the proposed development will have no effect on soils, geology and groundwater or surface waters.

18.3.4 Hydrology and Surface Water

Potential Hydrology and Surface Water interactions are summarised under the following sections.

Population and Human Health

A description of the interactions between Hydrology and Surface Water and Population and Human Health is discussed in Section 18.3.1.

Biodiversity

A description of the interactions between Hydrology and Surface Water and Biodiversity is discussed in Section 18.3.2.

Soils, Geology and Hydrogeology

A description of the interactions between Hydrology and Surface Water and Soils, Geology and Hydrogeology is discussed in Section 18.3.3.

18.3.5 Air Quality

Potential Air Quality interactions are summarised under the following sections.

Population and Human Health

A description of the interactions between Air Quality and Population and Human Health is discussed in Section 18.3.1.

Biodiversity

A description of the interactions between Air Quality and Biodiversity is discussed in Section 18.3.2.

Climate

Air Quality and Climate have interactions as the emissions from the use of fossil fuels during the construction and operational phases of the proposed development generate both air quality and climate impacts. There is no impact on climate due to air quality, however, the sources of impacts on air quality and climate are strongly linked.

Chapter 11 – Air Quality in Volume 2 of this EIAR has specified appropriate measures and has determined that pollutant concentrations associated with the proposed development will be in compliance with the relevant limit values and emissions from the proposed development will not have any significant adverse effects on air quality. Chapter 12 – Climate in Volume 2 of this EIAR has specified appropriate mitigation measures and has determined that no significant negative effects are likely arising from GHG emissions associated with the proposed development.

Traffic and Transportation

Interactions between Air Quality and Traffic and Transportation can be significant due to increased traffic movements and reduced engine efficiency, i.e. due to congestion, the emissions of vehicles increase. Chapter 11 – Air Quality in Volume 2 of this EIAR determined that the impact of the interactions between Traffic and Air Quality are linked but there is no potential for significant effects from traffic on air quality during the construction or operational phases – given the predicted levels of traffic associated with the proposed development

18.3.6 Climate

Potential Climate interactions are summarised under the following sections.

Population and Human Health

A description of the interactions between Climate and Population and Human Health is discussed in Section 18.3.1.

Biodiversity

A description of the interactions between Climate and Biodiversity is discussed in Section 18.3.2.

Air Quality

A description of the interactions between Climate and Air Quality is discussed in Section 18.3.5.

Traffic and Transportation

Interactions between Climate and Traffic and Transportation can be significant due to increased traffic movements and reduced engine efficiency, i.e. due to congestion and increased no. of sources, the emissions of vehicles increase. However, due to the relatively low traffic volumes and the modern vehicle fleet expected to serve the facility, the effects of the traffic associated with the proposed development on climate is not foreseen to be significant.

18.3.7 Noise and Vibration

Potential Noise and Vibration interactions are summarised under the following sections.

Population and Human Health

A description of the interactions between Noise and Vibration and Population and Human Health is discussed in Section 18.3.1.

Biodiversity

A description of the interactions between Noise and Vibration and Biodiversity is discussed in Section 18.3.2.

Traffic and Transportation

HGV traffic can be a source of intermittent noise, particularly during acceleration, braking, or turning manoeuvres. However, traffic is expected to be spread throughout the day, with no significant clustering or peak-hour intensity. The significance of potential noise impacts from increased traffic associated with the proposed development have been assessed in Chapter 13 - Noise and Vibration in Volume 2 of this EIAR and are not predicted to exceed relevant thresholds or result in significant negative environmental effects.

18.3.8 Traffic and Transportation

Potential Traffic and Transportation interactions are summarised under the following sections.

Population and Human Health

A description of the interactions between Traffic and Transportation and Population and Human Health is discussed in Section 18.3.1.

Air Quality

A description of the interactions between Traffic and Transportation and Air Quality is discussed in Section 18.3.5.

Climate

A description of the interactions between Traffic and Transportation and Climate is discussed in Section 18.3.6

Noise and Vibration

A description of the interactions between Traffic and Transportation and Noise and Vibration is discussed in Section 18.3.7.

18.3.9 Archaeological, Architectural and Cultural Heritage

Potential Archaeological, Architectural and Cultural Heritage interactions are summarised under the following sections.

Population and Human Health

A description of the interactions between Archaeological, Architectural and Cultural Heritage and Population and Human Health is discussed in Section 18.3.1.

Landscape and Visual Impact

Effects on landscape character or visual amenity can result in adverse effects on heritage features dependent on their settings.

Chapter 16 - Landscape and Visual Impact in Volume 2 of this EIAR has concluded the following:

- The construction, operational and decommissioning phases of proposed development will have imperceptible effects on the receiving landscape character and visual amenity.
- The proposed development will not significantly alter landscape character or amenity by its character, or magnitude, having regard to the baseline environment in which the proposed development is located.

The proposed development does not have any potential to affect landscape character or visual amenity, or any sensitive settings which interact with heritage features.

18.3.10 Landscape and Visual Impact

Potential Landscape and Visual Impact interactions are summarised under the following sections.

Archaeological, Architectural and Cultural Heritage

A description of the interactions between Landscape and Visual Impact and Archaeological, Architectural and Cultural Heritage is discussed in Section 18.3.9.

18.3.11 Material Assets - Utilities and Waste

Population and Human Health

Impacts on utilities may indirectly affect human receptors. For example, overloading an electrical supply system or wastewater treatment plant may result in a diminution of these assets, which in turn my affect other human receptors reliant on them.

The residual negative effects of the proposed development on utilities are **Imperceptible** to **Slight.** The proposed development will not have any significant effect on material assets which people depend on.

The significance of potential positive effects on waste management infrastructure due to facility operations is characterised as **Very Significant** and **Long-term**. These effects will be transmitted to people.

Biodiversity

Impacts on utilities may indirectly affect ecological receptors. For example, overloading a wastewater treatment plant may result in reductions in treatment efficacy and indirect effects on downstream surface waters and aquatic ecology.

The residual negative effects of the proposed development on utilities are **Imperceptible** to **Slight.** The proposed development will not have any significant effect on material assets which provide environmental protection.

Hydrology and Surface Water

Impacts on utilities may indirectly affect surface waters. For example, overloading a wastewater treatment plant may result in reductions in treatment efficacy and indirect effects on downstream surface water quality.

The residual negative effects of the proposed development on utilities are **Imperceptible** to **Slight.** The proposed development will not have any significant effect on material assets which provide environmental protection.

Climate

Impacts on climate may indirectly interact with material assets (e.g. climate-related extreme events such as storms, drought, floods, may affect functioning of utilities – electricity supply systems, water supply etc.)

The proposed development will not have any significant effect on climate. Climate change will not have any significant effect on the proposed development.

The proposed facility will promote good waste management and the circular economy. These benefits will result in climate benefits. This has been discussed in more detail in Chapter 11 – Climate, in Volume 2 of the EIAR.

Table 18-1: Summary of the Key Interactions and Inter-relationships between the Environmental Aspects of the Proposed Development

	Population and Human Health	Biodiversity	Soils, Geology and Hydrogeology	Hydrology and Surface Water	Air Quality	Climate	Noise and Vibration	Traffic and Transportation	Archaeological, Architectural and Cultural Heritage	Landscape and Visual Impact	Material Assets - Utilities and Waste
Population and Human Health		■	■	■	■	■	■	■	■		■
Biodiversity	■		■	■	■	■	■				■
Soils, Geology and Hydrogeology	■	■		■	■	■			■		
Hydrology and Surface Water	■	■	■								■
Air Quality	■	■	■			■		■			
Climate	■	■			■			■			■
Noise and Vibration	■	■						■			
Traffic and Transportation	■				■	■	■				
Archaeological, Architectural and Cultural Heritage	■		■							■	
Landscape and Visual									■		
Material Assets - Utilities and Waste	■	■		■		■					

Note: Green highlighting indicates a potential inter-relation/interaction.

18.4 Conclusions

The proposed development has the potential to impact on various environmental topics, as detailed throughout this EIAR.

There are potential inter-relationships and interactions between these environmental topics, which may cause an environmental impact that is not perceptible when a topic is considered on its own, exclusively.

The impact inter-relationship and interaction assessments undertaken within each environmental topic chapter of this EIAR and within this dedicated chapter have concluded that environmental topic interactions will not result in any significant residual, adverse environmental effects, with the adoption of the design and mitigation measures specified throughout this EIAR.

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