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INTRODUCTION

- 16.1 Article 3 of Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending ('EIA Directive') stipulates that,
- 'The environmental impact assessment shall identify, describe and assess in an appropriate manner, in the light of each individual case, the direct and indirect significant effects of a project on the following factors: (a) population and human health; (b) biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC and Directive 2009/147/EC; (c) land, soil, water, air and climate; (d) material assets, cultural heritage and the landscape; (e) the interaction between the factors referred to in points (a) to (d).'*
- 16.2 The preceding **Chapters 4 to 15** of this EIAR identify the potential significant environmental effects that may occur in terms of Population and Human Health, Biodiversity (Flora and Fauna), Land, Soils and Geology, Water (Hydrology and Hydrogeology), Air, Climate, Noise, Material Assets (Roads and Traffic, Telecommunications and Aviation), Cultural Heritage (Archaeological, Architectural and Cultural Heritage), Landscape and Visual, Traffic and Major Accidents and Disasters as a result of the proposed development as described in Chapter 2 of this EIAR. However, for any development with the potential for significant environmental effects there is also the potential for interaction between these effects. The result of interactive effects may exacerbate the magnitude of the effects or improve them or have a neutral effect.
- 16.3 In accordance with the requirements of the EIA Directive, this EIAR sets out assessments of the likely significant environmental effects and impacts of the entire project under a range of environmental topic areas. Where relevant, the interaction between various environmental topic areas, are already addressed within each of the individual assessment or chapters of this EIAR. For example, there are clear overlaps between the land, soils and geology assessment and the hydrological conditions at the site. The purpose of this chapter is to draw attention to significant interactions and interdependencies between one topic and another where they may otherwise be missed.

INTERACTION OF ENVIRONMENTAL FACTORS

- 16.4 The interaction between environmental factors, or inter-related effects, are the potential interactions between impacts on a receptor, or a group of receptors, which can result in potential direct or indirect effects, which may be positive or negative. The interaction can occur in a way that results in a combined effect of greater significance than the effect on the receptor in the absence of the interaction.
- 16.5 **Table 16.1** provides a matrix to present the main interactions and interdependencies between specific environmental factors given the findings of the preceding chapters of the EIAR. A supporting commentary is provided below, which explains the main interactions of note between the environmental topic areas in the context of the application site / Proposed Development.
- 16.6 The matrix contains each of the environmental topics, which were considered as part of this EIAR, on both axes. These interactions have been identified for both the construction [C] operational [O] and decommissioning [D] phases, of the Proposed Development. Potential interactions during decommissioning will be similar to those of the construction phase.

16.7 Full details of the significance of the effects and the relevant interactions of the environmental aspects along with any proposed mitigation are discussed within each of the individual preceding Chapters which included:

- Chapter 4 Population and Human Health
- Chapter 5 Biodiversity
- Chapter 6 Land, Soils and Geology
- Chapter 7 Water
- Chapter 8 Air
- Chapter 9 Climate
- Chapter 10 Noise
- Chapter 11 Material Assets
- Chapter 12 Cultural Heritage
- Chapter 13 Landscape
- Chapter 14 Traffic
- Chapter 15 Major Accidents and Disasters

16.8 The most dynamic interaction and interdependencies relate to the connection between human beings and biodiversity receptors, and their potential exposure to receptor pathways such as soils, water / hydrology, air and noise. Changes in site run-off from changes and removal of soil cover can result in effects or changes on hydrology, both in terms of water quality and hydraulic regime, which may result in secondary ecological effects on vegetation patterns and habitats and species. The relationship and effects of these aspects have been fully considered with EIAR Volume II and are summarised in this chapter.

16.9 The key interactions fall under the topics of:

- Population and Human Health;
- Biodiversity
- Land, Soils and Geology
- Water
- Air
- Climate
- Noise
- Material Assets
- Cultural Heritage
- Landscape
- Traffic; and
- Major Accidents and Disasters

Population and Human Health

Interaction with Water

16.10 Potential accidental leakages or spillages of contaminants during the construction and operation phases could impact on ground and surface water receptors that could provide a potential pathway to cause impacts- such as illness and disease- to the human population via surface water bodies and/or private water supply wells down hydraulic gradient of the application site. **Chapter 7** of Volume II of this EIAR has assessed the likely significant effects and describes mitigation measures

that will be implemented to ensure that potential risks are minimised and there are no predicted likely significant effects, including inter-related effects, from water pollution.

Interaction with Air Quality

- 16.11 Plant and machinery used during the construction phase have the potential to cause a short-term nuisance through dust emissions. During operation, the importation of biomass to site by HGVs and combustion from activities on site have may potential have a small negative impact, which is not likely to be significant.
- 16.12 It is commonly agreed that air quality is expected to improve in the future; this is in response to the introduction of policy and legislation, and availability of cleaner technologies / fuels. The assessment reported in EIAR Volume II, **Chapter 8** focuses on the near-term as part of establishing a worst-case assessment scenario. The agreed consensus is that air quality conditions thereon in (i.e. throughout the operational lifespan of the Proposed Development) will improve and not exceed the worst-case criteria assessed.

Interaction with Climate

- 16.13 The Proposed Development will facilitate a move away from fossil fuels it may have an overall positive impact on air quality and the climate, therefore the outcomes of the air quality assessment remain valid for any potential inter-related effects, i.e. not likely to be significant.

Interaction with Noise

- 16.14 Plant and machinery used during the construction phase have the potential to cause a short-term nuisance through noise emissions. Once operational however, noise levels will return to pre-construction levels. The assessment reported in Volume II, **Chapter 10** concluded that construction noise due to the Proposed Development will be a temporary, short-term and not significant effect at all noise sensitive receptors, including those receptors that are considered to be of high sensitivity (residential properties, schools and healthcare buildings). Any operational effects, including inter-related effects, are not likely to be significant.

Interaction with Traffic and Material Assets

- 16.15 **Chapter 14** of Volume II of this EIAR presents how the construction phase of the Proposed Development will give rise to increased traffic associated with the arrival and departure of construction staff and with the delivery of building materials. This is likely to create some short-term inconvenience for other road users. A Construction Traffic Management Plan will be implemented to manage traffic coming to and from the Site and minimise disturbance to local residents. The operation stage is predicted to increase traffic levels long-term, but effects on driver severance and delay, community severance and delay and vulnerable users and road safety are assessed as not likely to be significant in Chapter 14.
- 16.16 The underground and overhead utility services in the local area (e.g. water, electricity, phone and gas supply) have been studied to ensure that supply to local residents will be protected during all stages of the Proposed Development, therefore any effects, including potential inter-related effects, due to disruption on use of utilities, water resources or people and local enterprises are not likely to be significant.
- 16.17 In terms of waste generation, management systems will be established prior to the commencement of the Proposed Development to control and manage all potential waste streams, to avoid waste

generation where possible and to maximise re-use or re-cycling opportunities and any potentially contaminative will be stored on site in designated (bunded) storage areas and will be collected and recycled or disposed of at authorised off-site waste facilities by authorised waste contractors. Any effects on people and local enterprises, including potential inter-related effects, are not likely to be significant.

Biodiversity

Interaction with Water

- 16.18 Potential impacts on water quality were assessed further in **Chapter 7** of Volume II of this EIAR, however it was determined that there would be no likely significant effects, including inter-related effects, on water quality and surrounding ecological receptors as a result of the Proposed Development.

Interaction with Air Quality and Climate

- 16.19 It is acknowledged that noise, visual and air quality effects could overlap at an ecologically sensitive location such as a designated area. Potential impacts on air quality were assessed further in Chapter 8 of Volume II of this EIAR, including any potential inter-related effects, and it was determined that there would be no likely significant effects on air quality and surrounding ecological receptors as a result of the Proposed Development.

Interaction with Noise

- 16.20 Noise from construction works will likely result in some avoidance behaviour by fauna. This is addressed in **Chapter 5** of Volume II of this EIAR. There may be disturbance and avoidance behaviour during the construction / demolition works, however this will be temporary and short term and not likely to be significant. Overall, the inter-related effects will not be of greater than the effect on the receptor in the absence of the interaction, as mitigation measures will be implemented.

Interaction with Cultural Heritage and Landscape

- 16.21 Proposed tree planting in will impact a potential enclosure identified during fieldwork in November 2023 and described in Section 12.56. Archaeological monitoring is proposed under licence from the National Monuments Service to allow the preservation by record of any archaeological material identified, therefore any inter-related effect will not be of greater than the effect on the receptor for in the absence of the interaction, i.e. not significant. There will be no other direct or indirect effects, including inter-related effects, on any known items of archaeology, architecture, cultural heritage or landscape or visual receptors in the application area or the vicinity.

Land, Soil and Geology

Interaction with Water

- 16.22 There is the potential for direct impacts on surface and groundwater quality arising from the development works at the site. The construction stage activities at the site will have the potential to increase the loading of suspended sediment and other potentially contaminating substances in surface water runoff. Impacting the adjacent Anner River and Lower River Suir SAC. Accidental

spillages or leaks at the site during construction have the potential to migrate to the nearby Anner River.

- 16.23 There is the potential for any accidental spillages to vertically migrate to the underlying locally important karstified aquifer. The moderately permeable subsoils and karstified bedrock will facilitate the movement of potentially contaminating materials to the groundwater body below.
- 16.24 There is the potential for direct impacts on surface water and indirect impacts on groundwater arising from the continuance of current activities at the site during the operational stage. There is the potential for suspended solids or fuel spillages in surface water runoff from the site areas to cause a reduction in water quality in the receiving water. Accidental spillages or leaks and elevated suspended solids at the site, particularly SW1, have the potential to impact the Anner River and Lower River Suir SAC.
- 16.25 There is currently no abstraction from or discharge to groundwater at the site. The current activities at the site will remain unchanged after the replacement works and the operational stage of the Proposed Development can be considered as equivalent to the existing operational activities. There is a potential impact on groundwater quality from accidental fuel spillages and COPC storage and refuelling at the site. Accidental spillages or leaks and elevated suspended solids at the site have the potential to impact on the underlying locally important aquifer.
- 16.26 The potential impacts of the Proposed Development upon land, soil and geology have been identified and assessed, and, with the implementation of the proposed mitigation measures, it is considered that the potential effects, including inter-related effects, of an accidental fuel spill on land, soil or geology will be not significant both during construction and the operation of the site.
- 16.27 The potential effects, including inter-related effects, of the Proposed Development upon the Anner River, the groundwater and supply of local wells, the groundwater quality of industrial wells and the groundwater quality of the karstified aquifer are assessed as not significant in Volume II, **Chapter 7** of the EIAR during construction and operation.

Water

Interaction with Biodiversity

- 16.28 There is the potential for an indirect effect on the ecological status of designated areas as a result of emissions to surface water and / or groundwater during this stage.

Interaction with Land, Soils and Geology

- 16.29 As identified in **Chapter 7** (Water) of this EIAR, the movement and removal spoil during the construction phase has the potential to have a significant, negative effect on water quality through potentially silt-laden runoff from the proposed works areas. Mitigation measures to ensure there are no significant, negative effects on water quality are presented in Chapter 7.

Air

Interaction with Biodiversity

- 16.30 It is acknowledged that noise, visual and air quality effects could overlap at an ecologically sensitive location such as a designated area. Potential impacts on air quality were assessed further in **Chapter 8** of Volume II of this EIAR, including any potential inter-related effects, and it was determined that

there would be no likely significant effects on air quality and surrounding ecological receptors as a result of the Proposed Development.

Interaction with Population and Human Health

- 16.31 Plant and machinery used during the construction phase have the potential to cause a short-term nuisance through dust emissions. During operation, the importation of biomass to site by HGVs and combustion from activities on site have may potential have a small negative impact, which is not likely to be significant.
- 16.32 It is commonly agreed that air quality is expected to improve in the future; this in response to the introduction of policy and legislation, and availability of cleaner technologies / fuels. The assessment reported in EIAR Volume II, **Chapter 8** focuses on the near-term as part of establishing a worst-case assessment scenario. The agreed consensus is that air quality conditions thereon in (i.e. throughout the operational lifespan of the Proposed Development) will improve and not exceed the worst-case criteria assessed.

Climate

Interaction with Population and Human Health

- 16.33 **Chapter 9** (Climate) assesses the likely effects of the Proposed Development on the Climate through an assessment of the Proposed Development's whole life Greenhouse Gases (GHG) and considers the resilience of the Proposed Development to future changes in climate. impact of plant and machinery primarily used during the operational phases. The focus of the assessment is the future, when it is anticipated that changes from the existing climate will occur, and these may pose risks in relation to the operational functions of The Proposed Development and its users.

Interaction with Water

- 16.34 The assessment of climate risks identified, with their risk rating and significance regarding hotter summers, wetter winters / extreme rainfall, drier summer's drought and wind and storms and their impact on Buildings, Human users, Habitats and Biodiversity have no significant effects on The Proposed Development due to future climate change.

Noise

Interaction with Traffic

- 16.35 The main interaction for noise is the potential for traffic as a source of noise due to the impact construction may have on sensitive receptors, which in this case relate to residential properties near to the road. The maximum traffic increase predicted for the proposed development is 20 vehicular movements per day. This is less than 25% of the current number of daily vehicle movements along the A836 and hence, the traffic noise effects are considered to be negligible and not significant in terms of the EIA Regulations.
- 16.36 Noise impacts on the local population, as presented in paragraph 16.12, and biodiversity, as presented in paragraph 16.20, are also identified as interactions.

Interactions with Cultural Heritage

- 16.37 Due to the possibility of the survival of previously unknown subsurface archaeological deposits or finds within undeveloped wooded part of Development Area 2 and the replant area to the north of the site, topsoil-stripping could impact unknown archaeological asset. Any archaeological material identified during archaeological monitoring will be preserved by record under licence from the National Monuments Service, therefore the inter-related effect will not be of greater than the effect on the receptor in the absence of the interaction.

Material Assets

Interactions with Traffic

- 16.38 As indicated in **Chapter 11** (Material Assets) of this EIAR, the proposed development, construction and operation phases will generate traffic movements over the existing public local road network, local road L2506 in particular and the N24. Mitigation measures ensure that the assessment contained in **Chapter 14** (Traffic), it is considered that there will be no significant impact on access and traffic.

Interactions with Water

- 16.39 Surface Water Management will largely remain unchanged except for three areas of additional hard standing to facilitate the development of both energy plants and fuel infrastructure. A detailed assessment of surface water and groundwater risks and measures to mitigate potential impacts are outlined in **Chapter 7** (Hydrology and Hydrogeology) of this EIAR. Overall, it is not considered that the operation of the proposed development will give rise to significant effects on utilities and infrastructure.

Interaction with Air

- 16.40 The proposed development will not give rise to any additional emissions to those already experienced as part of the existing operation. As outlined in **Chapters 8, 10 and 14** of this EIAR, a number of mitigation measures are proposed to control and minimise impacts at the properties closest to the application site.

Cultural Heritage

Interactions with Population and Human Health

- 16.41 The existing development has no effect on the setting of Ringfort – rath RMP TS083-010. There are also potential impacts arising from development within undeveloped wooded part of Development Area 2 and the proposed replant area has the potential to impact a potential enclosure due to the possibility of the survival of previously unknown subsurface archaeological deposits or finds. Topsoil-stripping in these areas will be archaeologically monitored under licence from the National Monuments Service. Any archaeological material identified during archaeological monitoring should be preserved by record under licence from the National Monuments Service. The proposed development will not have any effect on the setting of this monument and therefore the application is not considered to have any cumulative effects on cultural heritage.

Landscape

Interactions with Population and Human Health

- 16.42 The proposed development has the potential for visual impact due to the construction works on sensitive receptors, which in this case relate to residential properties near to the road. The landscape assessment found that there would be no landscape effects on any landscape receptors within the study area (i.e. levels of effects not considered to be significant).

Traffic

Interactions with Material Assets

- 16.43 The likely significant effects on the environment from the proposed development that relate to site traffic and transport have been determined by considering the magnitude of change in traffic movements and the sensitivity of the receptors which would be affected by these changes. This has been undertaken in accordance with the IEMA Guidelines and standard good practice, based on the experience of the assessor. The assessment contained in **Chapter 14** (Traffic), it is considered that there will be no significant impact on access and traffic.

Interactions with Dust

- 16.44 As indicated in **Chapter 8** (Air) of this EIAR, the proposed development, construction and operation phases will generate traffic movements over the existing public local road network. Mitigation measures ensure that the assessment contained in Chapter 8, impacts due to dust and dirt have been classified as negligible due to the increase in HGVs, and would affect low to medium sensitivity receptors, the potential effect would be minor and not significant in terms of the EIA Directive.

Interactions with Noise

- 16.45 The main interaction for noise is the potential for traffic as a source of noise due to the impact construction may have on sensitive receptors, which in this case relate to residential properties near to the road. The maximum traffic increase predicted for the proposed development is 20 vehicular movements per day. This is less than 25% of the current number of daily vehicle movements along the A836 and hence, the traffic noise effects are considered to be negligible and not significant in terms of the EIA Regulations. The full environmental effects of noise and vibration are covered in **Chapter 10: Noise**.

Major Accidents and Disasters

Interactions with Population and Human Health

- 16.46 Within the CEMP, an Emergency Response Plan (ERP) is included, which outlines the procedures to be followed in the event of emergencies related to health and safety or environmental protection. The ERP delineates the required response actions and the responsibilities of all personnel during emergency situations. For further information, please refer to **Chapter 2** and **Appendix 2.1** of the EIAR.

Interactions with Water

- 16.47 The risk of flooding is addressed in **Chapter 7** (Water), which concludes that the Medite Facility lies within Flood Zone C, and thus currently has a low probability of flooding. Therefore the risk of flooding as a result of the Proposed Development is low. In the event of extreme weather conditions, the existing surface water drainage system will continue to manage and treat storm water to avoid significant impact on the Proposed Development's infrastructure.
- 16.48 Chapter 7 of this EIAR provides details of the nearest documented flood events to the application site, which are both noted as recurring events within 0.4km of it. Flooding at these two locations is recorded as being caused by an increase in run-off from the adjacent lands leading to flooding of the roads after heavy rainfall, often rendering them partially impassable. It is not expected that flooding at these locations will affect the Medite facility.
- 16.49 The risk of flooding during the construction phase will result in a minor consequence in that 'small number of people would be affected' (given low workforce numbers involved and low number of immediate neighbours) should a severe weather occur, with 'no fatalities and a small number of minor injuries with first aid treatment'.
- 16.50 An emergency response plan is set out within the Construction Environmental Management Plan (CEMP) included in **Appendix 2.1** found in Volume III of this EIAR. Proposed mitigation measures for flood risk are set out in Chapter 7.

Interactions with Material Assets

- 16.51 In relation to the risk of explosions, it has been noted in Chapter 11: Material Assets that mapping information obtained from Gas Networks Ireland indicates that there is a medium pressure distribution gas pipe present within the application site (see **Appendix 11-3**). Mapping indicates the gas network as running along the L2506 and the unnamed public road, both to the south of the application site. The pipe enters the plant from the south and currently the gas being piped into the factory is used for one of the thermal fluid heaters in the existing Production Line 1.

Interactions with Traffic

- 16.52 Chapter 14: Traffic of this EIAR states that these levels would remain well within the design capacity of the local road network and no significant effects on road safety are anticipated. A **Construction Traffic Management Plan** will be submitted to and agreed with the Planning Authority in consultation with the Transport Infrastructure Ireland, prior to the commencement of development. With the implementation of such a plan, containing measures such as scheduling of deliveries, and deployment of banksmen for the movement of HGVs the risk for catastrophic events from traffic accidents is considered very low.
- 16.53 A minor consequence is predicted. Having regard to the limited area and lack of opportunity for speed, a 'small number of people would be affected' should a vehicular collision occur, with 'no fatalities and small number of minor injuries with first aid treatment.' No wider disruption to communities.

Table 16-1 Interactions of the Foregoing

| | Population & Human Health | Biodiversity | Land, Soils and Geology | Water | Air | Climate | Noise | Material Assets | Cultural Heritage | Landscape | Traffic | Major Accidents & Disasters |
|-----------------------------|---------------------------|--------------|-------------------------|-------|-----|---------|-------|-----------------|-------------------|-----------|---------|-----------------------------|
| Population & Human Health | | | | c/o | c/o | o | c | | | | c | c/o |
| Biodiversity | | | | o | | | c | c | | c | | |
| Land, Soils and Geology | | | | c/o | | | | | | c | | |
| Water | c/o | o | c/o | | | | | | | | | |
| Air | c/o | | | | | | | c/o | | | c/o | |
| Climate | o | | | | | | | | | | | |
| Noise | c | c | | | | | | | | | c/o | c/o |
| Material Assets | | c | | | c/o | | | | | | c/o | c/o |
| Cultural Heritage | | | | | | | | | | c | | |
| Landscape | | c | c | | | | | | c | | | |
| Traffic | c | | | | c/o | | c/o | c/o | | | | |
| Major Accidents & Disasters | c/o | | | | | | c/o | c/o | | | | |

Construction [C]

Operational [O]