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20.0 SUMMARY OF LIKELY SIGNIFICANT RESIDUAL EFFECTS

20.1 Introduction

20.1.1 **Chapters 8 to 19** of this Preliminary Environmental Information (PEI) Report have considered the potential environmental impacts and effects of the Proposed Development. This chapter provides a summary of those adverse and beneficial environmental effects that are considered to be significant (i.e. moderate and major effects).

20.2 Significant Environmental Effects and Proposed Mitigation Measures

20.2.1 Table 20.1 summarises the significant environmental effects of the Proposed Development that have been identified, following implementation of the embedded mitigation or impact avoidance measures included in the design of the Proposed Development (as detailed in **Chapters 8 to 19**, where relevant). Table 20.1 also summarises any additional mitigation measures that have been identified in the technical assessments contained in the PEI Report.

20.2.2 For each topic, the reasonable worst case scenario is assessed, including the construction programme scenario and design parameters. Further details on the reasonable worst case (or 'the Rochdale Envelope') are set out in **Chapter 4:** The Proposed Development and **Chapter 5:** Construction Programme and Management (PEI Report Volume I). The specific worst-case for each assessment is described in **Chapters 8 to 19**) as appropriate. Effects have been assessed for the construction, operation (including maintenance) and decommissioning scenarios.

20.2.3 The conclusions of this PEI Report are based on current assessment outcomes and work is ongoing to refine the Proposed Development and further reduce potential significant adverse environmental effects, where reasonably practicable.

20.2.4 As outlined in **Chapter 2**: Assessment Methodology (PEI Report Volume I), for the purposes of this EIA an effect is considered to be 'significant' if it is assessed to be moderate (adverse or beneficial) or major (adverse or beneficial)[1]. Minor and negligible effects are only referenced in this chapter where a 'significant' (moderate or major) effect has been reduced to a 'not significant' effect following mitigation.

20.2.5 To provide further clarification on the nature of the effects, each has been identified for the purposes of this summary as:

- short term (St) – effects occurring only over a short period of time, e.g. an effect that only lasts for the duration of the construction period, or one that lasts for only part of the operational phase;
- medium term (Mt) – effects occurring for the duration of the Proposed Development's operation, but which cease when operations cease; or

[1] Assessment of significance in **Chapter 18**: Major Accidents and Disasters (PEI Report Volume I) differs from the majority of topics and follows current (IEMA 2020) guidance for assessing potential likely significant effects.

- long term (Lt) – effects occurring beyond the operation of the Proposed Development, for example the permanent loss of semi-improved grassland associated with the Proposed Development;
- temporary (T) – effects that are not permanent because the effect would no longer occur if the impact was removed within the relevant timescale (for example the visual amenity impact of construction structures would be described as St, T as the impact goes when the structures are removed);
- permanent (P) – effects that are permanent and cannot be readily reversed within the relevant timescale (for example an environmental feature that is lost and cannot be replaced until after decommissioning would be Mt, P. In the event that it could not be replaced at all, this would be Lt, P); and
- direct (D) – effects that result from a direct impact, for example, the loss of ecological habitat; or
- indirect (In) – also known as secondary effects, effects that result indirectly, for example, increased traffic could indirectly impact on air quality.

Table 20.1: Summary of Likely Significant Residual Effects

Development stage	Environmental Effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 8: Air Quality					
Construction	No significant effects are predicted to occur.				
Operation	Maximum N-amines Annual mean and Worst-case Receptor N-amine Annual Mean (human health impacts)	Whilst the majority of pollutant species released result in negligible adverse impacts at human health receptors, a significant adverse effect from amine degradation products (N-amines) is predicted. Up to moderate adverse	At this stage only a conservative screening assessment of these species has been carried out, and further evaluation is ongoing to refine the assumptions used and to prepare a more detailed assessment including identify whether additional mitigation is required	Up to moderate adverse on the basis of screening – re-evaluation of the classification of effect following detailed modelling.	Mt/T/D
Operation	Worst case receptor NH_3 annual mean (ecological impacts)	Moderate/major adverse	At three SSSI receptors, NH_3 impacts slightly exceed the level at which they could be considered to be insignificant.	Moderate/ major adverse – subject to further engagement.	Mt/T/D

Development stage	Environmental Effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
			These sites already have existing NH_3 concentrations that exceed the critical level; therefore, the predicted impact has been assessed as major adverse. Engagement with stakeholders including Natural England is proposed to determine whether bryophyte and lichen species are present at these sites and therefore whether the lower critical level is relevant.		
Operation	Worst case receptor NO_x daily mean (as the 100th percentile) (ecological impacts)	Moderate adverse – however, exceedance of daily critical level unlikely, so assessed as not significant	None	Minor adverse (Not significant)	Mt/T/D

Development stage	Environmental Effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Decommissioning	No significant effects are predicted to occur.				
Chapter 9: Noise and Vibration					
Construction	If construction works take place continuously over night-time periods, assuming the same intensity of working as for the daytime, there would be the potential for adverse noise effects on some noise sensitive receptors (NSR). During construction on the Main Site and Electrical Connection to 132kv Substation option.	Moderate/ Major adverse (significant) during night-time periods.	Construction noise mitigation will be controlled by the Construction Environmental Management Plan (CEMP) which will be secured through a Requirement of the draft DCO. A Framework CEMP will be included within the DCO Application. Construction works occurring at night-time would be planned, managed and mitigated appropriately so as not to exceed the Significant Observed Adverse Effect Level (SOAEL) threshold values or relevant	Minor adverse (not significant)	St/T/D
Construction	Potential for adverse noise effects on some NSR during construction works on the Water Connection Corridors.	Up to Major adverse (daytime) at single NSR4. Up to Moderate/ Major adverse (significant) (night-time).		Up to Minor adverse (not significant), on the basis that BS 5228 and guidance on Best Practice Measures (section 11.5 of **Chapter 9**: Noise and Vibration) is applied.	St/T/D

Development stage	Environmental Effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
			noise limit to be agreed. It is proposed that this would be secured by a Requirement in the draft DCO.		
Operation	Based on the worst-case assessment, the impact magnitude ranges from very low to medium/ high at the ten NSR locations.	Effects between negligible/ minor adverse (not significant) to moderate/ major adverse (significant) could occur at NSR, in the absence of mitigation.	Reduction of sound power levels (SWL)/ breakout noise from key plant/ buildings required. Potential mitigation measures considered will focus on reducing noise at source from the CCP compressor, CCP absorber and turbine intake. Further assessment of indicative mitigated scenarios in the final ES is proposed to demonstrate the sound levels achieve the daytime and night-time LOAEL	On the basis that through detailed design, effects can be mitigated to no greater than minor adverse (not significant) during daytime and night-time, assuming that the threshold BS 4142 criterion of no greater than +5 dB is achieved at all NSR with the final site layout and technology at detailed design.	Lt, P, D

Development stage	Environmental Effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
			criterion of rating level no greater than +5 dB above the defined representative background sound level at each NSR. It is proposed that operational noise would be secured by a Requirement in the draft DCO. During operation, use of Best Available Techniques (BAT) for the control of noise for the Environmental Permit		
Decommissioning	Effects as construction with a potential significant effect at NSR4.				
Chapter 10: Traffic and Transport					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				

Development stage	Environmental Effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 11: Biodiversity and Nature Conservation					
Construction	No significant effects are predicted to occur.				
Operation	Refer to **Chapter 8**: Air Quality in relation to effects at habitats sites. No other significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 12: Water Environment					
Construction	No significant effects are predicted to occur.				
Operation	Physical Effects to Waterbodies: Loss of Sections of Existing Drains	Up to Moderate Adverse (significant)	Clarification on treatment of existing drains within detailed design. Explore habitat creation opportunities, including use of sustainable urban drainage systems (SuDS).	Slight Adverse (not significant)	Lt/P/D
Decommissioning	No significant effects are predicted to occur.				
Chapter 13: Geology, Hydrogeology and Land Contamination					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				

Development stage	Environmental Effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 14: Landscape and Visual Amenity					
Construction	Adverse visual amenity effects for residents at Viewpoint 1 (Chapel Lane West, Keadby), Viewpoint 2 (Gate Keepers Residence, Keadby) and Viewpoint 3 (PRoW KEAD9 and KEAD10), during construction activities.	Moderate adverse (significant)	No potential mitigation due to scale of structures. The design of the Project will aim to minimise adverse effects through optimised design and layout as well as appropriate use of materials and finishes. A Landscape and Biodiversity Management and Enhancement Plan (LBMEP) will be prepared to accompany the DCO application which will present proposals for planting, although such planting would not reduce visual	Moderate adverse (significant)	St/T/D

Development stage	Environmental Effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
			effects at these locations.		
Opening	As construction	Moderate adverse (significant)	None; as construction.	Moderate adverse (significant)	Lt/T/D
Operation	As construction	Moderate adverse (significant)	None; as construction.	Moderate adverse (significant)	Lt/P/D
Decommissioning	As construction	Moderate adverse (significant)	None; as construction.	Moderate adverse (significant)	Lt/P/D
Chapter 15: Cultural Heritage					
Construction	Removal or damage of archaeological deposits and palaeoenvironmental evidence during construction, including where piling of foundations or earthworks in the Water Connection Corridors (depending on option chosen) are required.	Assuming worst-case (assets are of medium to high value) and impact magnitude is up to medium, effect would be moderate adverse (significant)	Where mitigation is required, this is envisaged to comprise either preservation in situ (where reasonably practicable through detailed design). If this is not reasonably practicable, excavation would provide mitigation in the form of preservation by record. An initial programme of	It is anticipated that with appropriate mitigation, residual effects are likely to be not significant.	Lt/P/D

Development stage	Environmental Effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
			archaeological evaluation is proposed to determine the full extent of the mitigation strategy for the archaeological resource prior to submission of the DCO.		
Construction	Views from the Isle of Axholme Area of Special Historic Landscape Interest of the proposed junction improvement works and permanent cabin together with distant views of the Proposed Development Main Site.	Moderate adverse (significant)	Due to its relatively small size, it is possible to effectively screen the structure in views from the Isle of Axholme Area, or to provide bespoke design solutions for the cabin to minimize harm.	Minor adverse (not significant)	Lt/P/D
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				

Development stage	Environmental Effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 16: Socio-economics					
Construction	The effect of direct, indirect and induced employment created by the construction phase of the Proposed Development on the Scunthorpe Travel to Work Area (TTWA) and associated economy.	Major beneficial short-term significant) effect	Opportunities to enhance this benefit will be explored further as the EIA progresses, as informed by the ongoing refinement of proposals and the outcome of consultation.	Major beneficial short-term significant) effect	St/T/D
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 17: Climate Change and Sustainability					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 18: Major Accidents and Disasters					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				

Development stage	Environmental Effect (following development design and impact avoidance measures)	Classification of effect prior to mitigation	Mitigation/ enhancement (if identified)	Classification of residual effect after mitigation	Nature of effect(s) (Lt/ Mt/ St and P/ T and D/ In)
Chapter 19: Cumulative and Combined Effects					
Construction	Effects to be assessed at ES stage				
Operation	Effects to be assessed at ES stage				
Decommissioning	Effects to be assessed at ES stage				

Note: Lt = long term, Mt = medium term, St = short term, P = permanent, T = temporary, D = direct and In = indirect.