KEADBY
NEXT GENERATION
POWER STATION
Hydrogen-enabled flexible power

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22. Summary of Likely Significant Residual Effects

22.1. Introduction

22.1.1. **ES Volume I Chapters 8** to **21** of this ES (**Application Document Ref. 6.2**) 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 before mitigation (i.e. moderate and major effects), and their associated effect when considered together with identified mitigation measures and residual effects (after mitigation).

22.2. Significant Environmental Effects and Proposed Mitigation Measures

22.2.1. **Table 22.1** 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 **ES Volume I Chapters 8 to 21 (Application Document Ref. 6.2).**

22.2.2. For each topic, the reasonable worst-case parameters are assessed, including the construction programme scenario and design parameters. Further details on maximum design parameters (or the 'Rochdale Envelope') are set out in **ES Volume I Chapter 4:** The Proposed Development (**Application Document Ref. 6.2**). The specific worst-case for each assessment is described in **ES Volume I Chapters 8 to 21** (**Application Document Ref. 6.2**) as appropriate. Effects have been assessed for the construction, operation (including maintenance) and decommissioning scenarios.

22.2.3. As outlined in **ES Volume I Chapter 2**: Assessment Methodology (**Application Document Ref. 6.2**), 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

[1] Assessment of significance in **ES Volume I Chapter 19**: Major Accidents and Disasters **(Application Document Ref. 6.2)** differs from the majority of topics and follows current (IEMA 2020) guidance for assessing potential likely significant effects.

major) effect has been reduced to a 'not significant' effect following mitigation.

22.2.4. 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
- long term (Lt) – effects occurring beyond the operation of the Proposed Development, for example the permanent loss of habitat 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 does not continue 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 22.1: 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	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 9: Noise and Vibration					
Construction	If construction works were to 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 the residential Noise Sensitive Receptor (NSR) 1 (Vazon Bridge) during the civil works and	Adverse **(significant)**	Any construction activities required to take place outside core construction working hours will be managed to ensure they do not exceed the significant observed adverse effect level (SOAEL) threshold values or relevant limit to be agreed with North Lincolnshire Council (NLC). This is secured by	Adverse **(not 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)
	plant installation on the Main Site.		Requirement in the **Draft DCO** (**Application Document Ref. 3.1**). Construction noise mitigation will be controlled by the final Construction Environmental Management Plan (CEMP) which is secured by Requirement in the **Draft DCO** (**Application Document Ref. 3.1).** An **Outline CEMP** is provided with the Application (**Application Document Ref. 7.4**).		
Construction	Vibration effects on sensitive receptors from Canal Water Abstraction cofferdam installation (humans,	**Significant**	Piling works will be restricted to daytime working hours to ensure residential NSR are	**Not 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)
	buildings and masonry walls within the Stainforth and Keadby Canal)		unaffected outside core working hours. For the piling works, use of resonance-free vibratory drivers and non-vibratory methods of compaction may be used where required and construction vibration mitigation will be controlled by the final CEMP. which will be secured by Requirement of the **Draft DCO** (**Application Document Ref. 3.1).** An **Outline CEMP** is provided with the Application (**Application Document Ref. 7.4**).		
Operation	Based on the worst-case assessment of the CCGT	Adverse (**significant**)	Sound mitigation to be applied within detailed design	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)
	operating without additional mitigation, the noise effect would be significant: • during the daytime at NSR1 – Vazon Bridge, NSR2 – Hawthorn House, NSR3 – Keadby Village, NSR 4 – Mariner's Arms flats, NSR6 – 9 Queen's Crescent, NSR8 – North Pilfrey Farm and NSR9 – Ealand Poultry Farm; • during the night-time at NSR2 – Hawthorn House, NSR3 – Keadby Village, NSR 4 – Mariner's Arms flats, NSR6 – 9 Queen's		to reduce relevant noise at source. During detailed design, an operational noise control scheme (including agreed noise limits) will be prepared, secured by a Requirement in the **Draft DCO** (**Application Document Ref 3.1**), which will demonstrate use of Best Available Techniques (BAT) for the control of noise for the Environmental Permit.		

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)
	Crescent, NSR8 – North Pilfrey Farm, NSR9 – Ealand Poultry Farm and NSR11 – South Pilfrey Farm.				
Decommissioning	No significant effects are predicted to occur.				
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.				
Chapter 11: Biodiversity and Nature Conservation					
Construction	~~Construction of Canal Water Abstraction infrastructure could potentially result in the loss of two likely veteran and two likely ancient goat willow trees of national nature conservation value. This habitat type is classed as irreplaceable habitat, as such their loss is permanent and cannot be fully compensated.~~ No significant effects are predicted to occur.~~Major adverse (**significant**)~~ ~~Efforts will be made during detailed design to avoid the loss of those trees if possible.~~				

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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)
	~~A compensation strategy is outlined in the Arboricultural Assessment (part of the **Outline Landscape and Biodiversity Mitigation and Enhancement Plan (LBMEP) Report** (**Application Document Ref. 5.10**)). The final strategy will need to be submitted and approved prior to commencement of works within Works Area 5 (**Works Plans (Application Document Ref 2.3).** The submission and agreement of the final strategy is secured by Requirement in the **Draft DCO** (**Application Document Ref. 3.1**).~~ ~~At this stage, given the potential for two likely veteran and likely ancient trees to be removed, the residual risk remains as **significant.**~~ ~~Lt, P, D~~				
Operation	No significant ~~residual~~ effects are predicted to occur.				
Decommissioning	No significant ~~residual~~ effects are predicted to occur.				
Chapter 12: Water Environment and Flood Risk					
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 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.				
Chapter 14: Landscape and Visual Amenity					
Construction, operation and decommissioning	No significant effects on landscape character are predicted to occur.				
Construction	Impact on visual amenity for residents at Viewpoint 1 (Chapel Lane West, Keadby) and Viewpoint 2 (Gate Keepers Residence, Vazon Bridge, Keadby), users of the canal and towpath at Viewpoint 2 and PRoW users at Viewpoint 4	Moderate adverse (**significant**)	Opportunities for mitigation of visual amenity effects are limited due to the size and scale of the Proposed Development and the plant and machinery required to construct it.	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)
	(PRoW (KEAD9, KEAD10), north of Keadby) due to the presence of plant and equipment associated with construction activities		An integrated design approach which considers massing and the disposition of taller structures within the Main Site to minimise potential wall effects could reduce visual impacts. The final siting, layout, scale and external appearance (e.g., colour materials, surface finishes) will not be finalised until detailed design but implementation of detailed design parameters secured by a Requirement in the **Draft DCO** (**Application Document Ref. 3.1**). The **Outline LBMEP** (**Application Document Ref.**		
Opening (start of operation)	Impact on visual amenity to residents at Viewpoint 1 and Viewpoint 2, users of the canal and towpath at Viewpoint 2 and PRoW users at Viewpoint 4 due to physical presence of the Proposed Development	Moderate adverse (**significant**)		Moderate adverse (**significant**)	Lt/T/D
Operation (15 years post opening)	Impact on visual amenity to residents at Viewpoint 1 and Viewpoint 2, users of the canal and towpath at Viewpoint 2 and PRoW users at Viewpoint 4 due to	Moderate adverse (**significant**)		Moderate adverse (**significant**)	Lt/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)
	physical presence of the Proposed Development		**5.10**) presents proposal for habitat reinstatement, creation and enhancement although such proposals would not reduce the significance of effects on visual amenity at these locations.		
Decommissioning	Impact on visual amenity to residents at Viewpoint 1 and Viewpoint 2, users of the canal and towpath at Viewpoint 2 and PRoW users at Viewpoint 4 due to presence of plant and equipment associated with demolition activities	Moderate adverse (**significant**)		Moderate adverse (**significant**)	St/T/D
Chapter 15: Cultural Heritage					
Construction	Loss of organic (peaty) deposits [MLS27193] as well as a potential earlier land surface below the peat deposits [MLS27196] which have a potential to contain	Moderate adverse (**significant**)	Mitigation in the form of geoarchaeological analysis and reporting is being undertaken in specified areas in agreement with NLC to provide mitigation	Minor adverse (**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)
	well-preserved paleoenvironmental data and artifacts across the Main Site and proposed Construction Laydown Area to the south of the Stainforth and Keadby Canal.		in the form of preservation by record. Additional mitigation in the form of archaeological monitoring during groundworks within specified areas of the Proposed Development has also been agreed with NLC. The scope of the mitigation measures is provided in the **Outline Written Scheme of Investigation (WSI)** provided as part of the DCO Application (**Application Document Ref. 7.7**). This mitigation is proposed to be secured by Requirement of the **Draft**		
Construction	Loss of palaeoenvironmental remains within the assets [MLS27193 and MLS27196] from the construction of the Main Site and proposed Construction Laydown Area to the south of the Stainforth and Keadby Canal.	Moderate adverse (**significant**).		Minor adverse (**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)
			DCO (**Application Document Ref. 3.1**).		
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				
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 (**significant**)	None	Major beneficial (**significant**)	St/T/D
Operation	No significant residual effects are predicted to occur.				
Decommissioning	No significant residual 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 17: Population and Human Health					
Construction	Community identity and social participation – SSE's established community liaison officer, Community Liaison Forum and Community Fund will continue to provide a means for the Applicant to continue sustained and meaningful engagement with the community during construction.	Moderate beneficial (**significant**)	None	Moderate beneficial (**significant**)	St/P/D
Operation	Community identity and social participation - SSE's established community liaison officer, Community Liaison Forum and Community Fund will	Moderate beneficial (**significant**)	None	Moderate beneficial (**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)
	continue to provide a means for the Applicant to continue sustained and meaningful engagement with the community during operation.				
Decommissioning	No significant effects are predicted to occur.				
Chapter 18: Climate Change and Sustainability					
Construction	No significant effects are predicted to occur.				
Operation	Potential for significant adverse GHG emissions in the worst case operational assessment scenarios, which consider the unlikely scenario that there is insufficient hydrogen supply to enable 100% hydrogen fired operation at any point	Up to moderate adverse (**significant**) Note all operational assessment scenarios that assume 100% hydrogen firing occurs at some	Whilst the Proposed Development will help stimulate the hydrogen economy, supported by Government policy, the availability of hydrogen is outside of the Applicant's control.	Up to moderate adverse (**significant**) Note all operational assessment scenarios that assume 100% hydrogen firing occurs at some	Lt/P/In

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)
	during the operation of the Proposed Development. This scenario is unlikely because Government policy supports low carbon hydrogen production and hydrogen to power.	point in the operational life are concluded to result in minor adverse (not significant) effects.		point in the operational life are concluded to result in minor adverse (**not significant**) effects.	
Decommissioning	No significant effects are predicted to occur.				
Chapter 19: 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.				
Chapter 20: Waste and Materials					
Construction	No significant effects are predicted to occur.				
Operation	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)
Decommissioning	No significant effects are predicted to occur.				
Chapter 21: Cumulative and Combined Effects					
Construction	No significant effects are predicted to occur.				
Operation	No significant effects are predicted to occur.				
Decommissioning	No significant effects are predicted to occur.				

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