H2Teesside Project

Environmental Statement

Volume III – Appendices

Appendix 19A: Climate Change Resilience Assessment

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The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended)

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 - Regulation 5(2)(a)

Rev: 0

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19A.0 CLIMATE CHANGE RESILIENCE ASSESSMENT

19A.1 Climate Change Resilience Assessment

Table 19A-1: Climate Change Resilience Assessment

CLIMATE HAZARD TYPE	DESCRIPTION OF POTENTIAL IMPACT	RECEPTORS	PLANNED CONTROLS/ADAPTATION MEASURES	LIKELIHOOD OF IMPACT OCCURRING	CONSEQUENCE OF IMPACT OCCURRING	RESILIENCE RISK LEVEL	ADDITIONAL MITIGATION MEASURES REQUIRED
CONSTRUCTION PHASE							
Increase in annual temperature	See – Increase in summer temperature	All	Refer to section - Increase in summer temperature	Very Unlikely	Very Low	Negligible	None
Increase in summer temperature	Overheating of electrical equipment	Construction plant and vehicles	Detailed in the Framework CEMP (EN070009/APP/5.12). The contractor will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions.	Very Unlikely	Very Low	Negligible	None
	Increased heat stress/heat exhaustion for workers. Poorer air quality from dust,	Staff, visitors on-site	As above	Unlikely	Medium	Minor	None

CLIMATE HAZARD TYPE	DESCRIPTION OF POTENTIAL IMPACT	RECEPTORS	PLANNED CONTROLS/ADAPTATION MEASURES	LIKELIHOOD OF IMPACT OCCURRING	CONSEQUENCE OF IMPACT OCCURRING	RESILIENCE RISK LEVEL	ADDITIONAL MITIGATION MEASURES REQUIRED
	wildfires. Commuting issues from wildfires.						
Increase in winter temperature	None considered	All	None considered	Very Unlikely	Very Low	Negligible	None
Increase in annual rainfall	None considered	All	None considered	Very Unlikely	Very Low	Negligible	None
Decrease in summer rainfall	None considered	All	None considered	Very Unlikely	Very Low	Negligible	None
Increase in winter rainfall	Viability of and access to sites (such as heavy rain resulting in surface water flooding of local roads, sources of power supply or inundation of sites)	Assets, facilities, roads	Detailed in the Framework CEMP (EN070009/APP/5.12). Measures will likely include: - Storage of topsoil and other construction materials stored outside of the 1 in 100-year	Possible	Medium	Moderate	None

CLIMATE HAZARD TYPE	DESCRIPTION OF POTENTIAL IMPACT	RECEPTORS	PLANNED CONTROLS/ADAPTATION MEASURES	LIKELIHOOD OF IMPACT OCCURRING	CONSEQUENCE OF IMPACT OCCURRING	RESILIENCE RISK LEVEL	ADDITIONAL MITIGATION MEASURES REQUIRED
			floodplain to protect materials from high rainfall and flooding events; - Suitable storage and bunding of pollutants to protect from high rainfall events. This will be further supported by the Water Management Plan and an Emergency Response Plan, which will form part of the Final CEMP(s), secured via Requirement in the Draft DCO (EN070009/APP/4.1); - Temporary Construction Compounds will be laid with permeable membranes to protect the Site from high rainfall and flooding events; and - The Contractor will monitor weather forecasts and receive Environment Agency flood alerts and plan works accordingly, protecting works and resources from any extreme weather conditions (storms, flooding).More details on the management of				

CLIMATE HAZARD TYPE	DESCRIPTION OF POTENTIAL IMPACT	RECEPTORS	PLANNED CONTROLS/ADAPTATION MEASURES	LIKELIHOOD OF IMPACT OCCURRING	CONSEQUENCE OF IMPACT OCCURRING	RESILIENCE RISK LEVEL	ADDITIONAL MITIGATION MEASURES REQUIRED
			work during construction will be available in the Emergency Response Plan.				
Increase in heatwaves	See – Increase in summer temperatures	Assets, facilities, roads	Refer to section – Increase in summer temperatures	Unlikely	Low	Minor	None
	See – Increase in summer temperatures	Staff, visitors on-site	Refer to section – Increase in summer temperatures	Unlikely	Medium	Minor	None
Increase in severity and frequency of droughts	None considered	All	None considered	Very Unlikely	Very Low	Negligible	None
Increase in storm intensity	Damage to structures/equipment resulting in repair costs, reduced functionality and/or unacceptable safety risks	Assets, facilities, roads	Detailed in the Framework CEMP (EN070009/APP/5.12). The Contractor will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions.	Unlikely	Low	Minor	None

CLIMATE HAZARD TYPE	DESCRIPTION OF POTENTIAL IMPACT	RECEPTORS	PLANNED CONTROLS/ADAPTATION MEASURES	LIKELIHOOD OF IMPACT OCCURRING	CONSEQUENCE OF IMPACT OCCURRING	RESILIENCE RISK LEVEL	ADDITIONAL MITIGATION MEASURES REQUIRED
Sea level rise	See – Increase to winter rainfall	Assets, facilities, roads	Refer to section – Increase to winter rainfall	Very Unlikely	Medium	Negligible	None
OPERATIONAL PHASE							
Increase in annual temperature	See – Increase in summer temperature	All	Refer to section – Increase in summer temperature	Very Unlikely	Very Low	Negligible	None
Increase in summer temperature	Overheating of electrical equipment, heat damage, deformation, cracking and thermal expansion of building surfaces and pavements.	Assets, facilities, roads	- Cabling will be buried underground, insulating against overheating during heatwaves; and - All buildings will be designed to UK standards and specifications (UK Government, 2010).	Possible	Medium	Moderate	None
	Impacts on the thermal comfort of building users. Increase in ambient	Staff, visitors on-site	- Detailed design of air conditioning units for offices would include an allowance for future rise in ambient temperature; and	Unlikely	Medium	Minor	None

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	temperature of buildings, leading to higher air conditioning requirements. Poorer air quality from dust, wildfires. Commuting issues resulting from wildfires.		- All buildings would be designed to UK standards and specifications.				
	Reduced efficiency of Production Facility and operational plant.	Function of facility	The power plant is designed to operate over a large range of ambient conditions and the plant efficiency difference is less than 1% in all temperatures. Temperature change unlikely to have noticeable impact.	Possible	Low	Minor	None
Increase in winter temperature	None considered	All	None considered	Very Unlikely	Very Low	Negligible	None
Increase in annual rainfall	None considered	All	None considered	Very Unlikely	Very Low	Negligible	None

CLIMATE HAZARD TYPE	DESCRIPTION OF POTENTIAL IMPACT	RECEPTORS	PLANNED CONTROLS/ADAPTATION MEASURES	LIKELIHOOD OF IMPACT OCCURRING	CONSEQUENCE OF IMPACT OCCURRING	RESILIENCE RISK LEVEL	ADDITIONAL MITIGATION MEASURES REQUIRED
Decrease in summer rainfall	- Water shortages; - Drying out of pavement structures; - Deterioration of structures or foundations due to decrease in soil moisture levels; and - Insufficient water for plant cooling.	Assets, facilities, roads	- Alternative water sources in times of drought, reducing chances of shortages for plant function; - Integration of water circuits – steam can be extracted, condensed and re-used; - Buildings would utilise water efficient fixtures; and - All buildings would be designed to UK standards and specifications.	Possible	Medium	Moderate	None
Increase to winter rainfall	- Surface water flooding and standing waters; - Deterioration of structures or foundations due to increase in soil moisture levels; - Damage to building surfaces/ exposed utilities from increased	Built terrestrial assets, staff facilities and access routes to sites. Staff, contractors and visitors.	- Installation of a suitable sustainable surface water drainage network and management system (SuDS) to protect to Site from high rainfall events. Supported by a Surface Water Maintenance and Management Plan; - Flood Resistance and Resilience Measures (raised ground levels, SuDS, flood defence barriers) to be implemented scenarios	Unlikely	Medium	Minor	None

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	drying/wetting and increased frost penetration; and - Damage to infrastructure through coastal erosion, storm surge and coastal destabilisation.		including increases in extreme rainfall, flood flow and flash flooding; and - All buildings would be designed to UK standards and specifications. - Further details on the Flood defence strategy, including the Flood Risk Assessment can be found in Chapter 9: Surface Water, Flood Risk and Water Resources (ES Volume I, EN070009/APP/6.2) and Appendix 9A (ES Volume III, EN070009/APP/6.4).				
Increase in heatwaves	See – Increase in summer temperature	Assets, facilities, roads	Refer to section – Increase in summer temperature	Unlikely	Medium	Minor	None
	See – Increase in summer temperature	Staff, visitors on-site	Refer to section – Increase in summer temperature	Unlikely	Medium	Minor	None
	See – Increase in summer temperature	Function of facility	Refer to section – Increase in summer temperature	Possible	Low	Minor	None

CLIMATE HAZARD TYPE	DESCRIPTION OF POTENTIAL IMPACT	RECEPTORS	PLANNED CONTROLS/ADAPTATION MEASURES	LIKELIHOOD OF IMPACT OCCURRING	CONSEQUENCE OF IMPACT OCCURRING	RESILIENCE RISK LEVEL	ADDITIONAL MITIGATION MEASURES REQUIRED
Increase in droughts	See – Decrease in summer rainfall	All	Refer to section – Decrease in summer rainfall	Very Unlikely	Very Low	Negligible	None
	Damage to structures/equipment and resulting in repairs costs, reduced functionality and/or unacceptable safety risks	Assets, facilities, roads	The Flood Risk Assessment (Appendix 9A (ES Volume III, EN070009/APP/6.4)) will consider climate change scenarios including increases in extreme rainfall, flood flow and flash flooding; and - All buildings will be designed to UK standards and specifications.	Very Unlikely	Very High	Negligible	None
Sea level rise	See – Increase to winter rainfall	Assets, facilities, roads, Staff, contractors and visitors	Refer to section – Increase to winter rainfall	Unlikely	Medium	Minor	None
DECOMMISSIONING PHASE							

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Increase in annual temperature	See – Increase in summer temperature	All	Will be detailed in the DEMP - measures will be similar to those in the CEMP adapted for latest good practice at the time	Very Unlikely	Very Low	Negligible	None
Increase in summer temperature	Overheating of electrical equipment	Deco. Plant and equipment	Will be detailed in the DEMP - measures will be similar to those detailed in the Final CEMP(s) adapted for latest good practice at the time.	Very Unlikely	Very Low	Negligible	None
Increase in winter temperature	None considered	All	None considered	Very Unlikely	Very Low	Negligible	None
Increase in annual rainfall	See – Increase in winter rainfall	All	Refer to section – Increase in winter rainfall	Very Unlikely	Very Low	Negligible	None
Decrease in summer rainfall	None considered	All	None considered	Very Unlikely	Very Low	Negligible	None

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Increase to winter rainfall	Viability of and access to sites (such as heavy rain resulting in surface water flooding of local roads, sources of power supply or inundation of sties).	Assets, facilities, roads	Will be detailed in the DEMP - measures will be similar to those detailed in the Final CEMP(s) adapted for latest good practice at the time.	Possible	Medium	Moderate	None
Increase to heat waves	See – Increase in summer temperature	Deco. Plant and equipment	Refer to section - Increase in summer temperature	Very Unlikely	Very Low	Negligible	None
Increase in droughts	None considered	All	None considered	Very Unlikely	Very Low	Negligible	None
Increase in storm intensity	Damage to structures/equipment, resulting in repair costs, reduced functionality and/or unacceptable safety risks	Assets, facilities, roads	Will be detailed in DEMP, Will be detailed in the DEMP - measures will be similar to those detailed in the Final CEMP(s) adapted for latest good practice at the time.	Unlikely	Low	Minor	None

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Sea level rise	See – Increase in winter rainfall	Assets, facilities, roads	Refer to section - Increase in winter rainfall	Unlikely	Medium	Minor	None

19A.2 References

- UK Government (2010). *The Building Regulations 2010 Drainage and Waste Disposal: Approved Document H.*