Connah's Quay Low Carbon Power

Preliminary Environmental Information Report
Volume IV, Appendix 20-C: Climate Change Risk Assessment

Uniper

The Planning Act 2008
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
PINS Reference: EN010166
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Appendix 20-C: Climate Change Resilience Assessment

RISK IDENTIFICATION																	RISK ASSESSMENT						ADAPTATION MEASURES						
Risk ID	Climate variable	Risk statement															Planned Controls	Initial risk rating RCP4.5 (2020 - 2049)			Initial risk rating RCP8.5 (2040-2069)			Adaptation Measures	Residual risk rating RCP4.5 (2020 - 2049)			Residual risk rating RCP8.5 (2040 2069)		
		Description of impacts	Exhaust gas cooling and conditioning	CO_2 Cooling and compression plant	Cooling Towers	Effluent treatment plant	Chemical and waste storage tanks	Absorber tower(s) and associated	Ducting and pipework	Pylons	Construction Equipment	Internal access roads	Parking areas (including electric)	Electrical control room, administration	Workforce	e.g. controls planned within the current design that mitigate the identified risk	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating	e.g. additional design or operational measures that can be implemented to further reduce the climate risk	Likelihood	Consequence	Risk Rating	Likelihood	Consequence	Risk Rating
CONSTRUCTION																													
1	Extreme temperatures (heat)	Extreme heat event causes overheating of construction assets for example electrical and other equipment and material storage, batch concrete facilities.									•					•Construction equipment used will be designed to operate in the temperatures expected in North Wales. •The Contractor will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions.	Rare	Insignificant	Low		*N/A*		•Construction materials and equipment with superior properties that offer increased tolerance to fluctuating temperatures will be used, where required. •Develop register of vulnerable construction assets and inspect after a hot day.	Rare	Insignificant	Low		*N/A*	
2	Extreme temperature (heat)	Health and safety risks to the construction workforce during severe weather events including sunstroke and dehydration.													•	•The Contractor will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions.	Unlikely	Minor	Low		*N/A*		•Ensure all outdoor workers have access to indoor facilities, air conditioning, breaks in shaded areas and water breaks. •Cease outdoor and no essential work if working conditions are too dangerous, and could result in injury to workers.	Unlikely	Minor	Low		*N/A*	
3	Wildfires	Increased heatwaves and dry periods increase the potential for wildfires, causing damage to the construction site. This could be exacerbated by any combustible materials at the site. E.g. generator fuel	•													•The Contractor will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions.	Rare	Major	High		*N/A*		• Develop a fire management plan,and an early warning and detection system	Rare	Moderate	Medium		*N/A*	
4	Extreme temperatures (cold)	Prolonged periods of extreme cold can cause construction delays, as concrete may take longer to set, which can slow down foundation laying, brickwork, and slabs. Machines may be prone to malfunction in colder temperatures, and road accidents (and other health-related risks such as pneumonia) may occur, which can affect the health and safety of construction workers.									•	•	•		•	•Construction equipment used will be designed to operate in the temperatures expected in North Wales. The Contractor will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather condi- tions.	Unlikely	Minor	Low		*N/A*		• As part of a wider Winter Service Plan a section will be prepared on freeze prevention for pipes, and snow and de-icing procedures for roads. Doing so will help prevent disruption and avoid possible health and safety incidences.	Rare	Minor	Low		*N/A*	
5	Extreme rainfall/ Fluvial Flooding	Extreme rainfall events over an extended period can cause surface water flooding of the construction site and local roads. This affects viability of and access to the site, causing potential delays to construction work and damage to equipment, as well as a hazard to driving.									•	•				•Risks have been considered within the Flood Risk Assessment and summarised within Chapter 13: Water Environment and Flood Risk, with a Water Drainage Strategy to demonstrate management of surface water run-off from the Proposed Development during construction. •Construction phase impacts will likely be mitigated through the implementation of standard construction techniques and mitigation measures, as are described in a wide range of good practice publications which will be listed in the ES (e.g. C811 Environmental Good Practice on site (fifth edition)). This involves flood consultations with local flood	Unlikely	Minor	Low		*N/A*		•Install a water pump for the areas with critical infrastructure and a key part of construction operations. This will help increase the sites surface drainage capacity. •Raise critical infrastructure to be above PMF (Probable maximum flood). •Construction materials with superior properties that offer increased tolerance to heavy precipitation and other extreme weather events such as storms, will be used, where feasible. •Install additional attenuation features at key locations or	Unlikely	Minor	Low		*N/A*	
6	Tidal/coastal flooding	Sea level rise and storm surges may result in coastal flooding from the Dee Estuary to occur proximal to the plant. This may cause asset damage during construction, and limit access to the site.	•	•	•	•	•	•	•	•	•	•	•	•	•		Moderate	Moderate	High		*N/A*			Unlikely	Moderate	Medium		*N/A*	
7	Storm events (wind)	Storm events (including high winds) make work environments and the use of construction equipment and machinery unsafe resulting in damage to construction equipment and/ or temporary building facilities causing delays or safety risks.	•								•			•	•	•The Contractor will monitor weather forecasts and receive Cyfoeth Naturiol Cymru (Natural Re- sources Wales) flood alerts and plan works ac- cordingly, protecting workers and resources from any extreme weather conditions such as storms and flooding.	Unlikely	Moderate	Medium		*N/A*		•If applicable undertake regular monitoring of trees and vegetation in the area, pruning as necessary to avoid damage to the construction site or blocking access roads, in the event of a storm with high wind speed.	Unlikely	Moderate	Medium		*N/A*	
8	Storm events (wind)	Inaccessible construction site(s) due to severe weather events associated with storms restricting working hours, delaying delivery of construction materials and equipment, preventing access of construction operatives onto site and delaying operations.	•									•			•	•The Contractor will monitor weather forecasts and receive Cyfoeth Naturiol Cymru (Natural Re- sources Wales) flood alerts and plan works ac- cordingly, protecting workers and resources from any extreme weather conditions such as storms and flooding. •Wind patterns will be monitored and an early warning system will be in place to allow contingency plans to be in place in advance of predicted windy conditions. Doing so will help minimise disruption to and damage. •A wind monitoring plan which establishes procedures and measures that will be instated during period of strong winds.	Unlikely	Minor	Low		*N/A*			Unlikely	Minor	Low		*N/A*	
OPERATION																													
9	Extreme temperatures (heat)	Heatwaves result in heat stress for plant workers, causing health and safety incidents													•	•Uniper has been certified under ISO 45001 for occupational health and safety since 2021, applying best practice for health and safety management. Cooling provisions for both the plant and the gas turbine will comprise either an air- cooled condenser array or a hybrid cooling system, in addition to a CO2 cooling and compression plant, and an exhaust gas cooling and conditioning plant.	Unlikely	Minor	Low	Unlikely	Minor	Low	•Ensure all outdoor workers have access to indoor facilities, air conditioning, breaks in shaded areas and water breaks. •Cease outdoor and no essential work if working conditions are too dangerous, and could result in injury to workers and damage to equipment.	Unlikely	Minor	Low	Unlikely	Minor	Low
10	Extreme temperature (heat)	Heatwaves cause the ambient temperature to rise above optimal design temperature of the plant, reducing production efficiency.	•		•		•		•							•Due to extreme heat events, controls will be incor- porated within the engineering design of buildings and structures and the appropriate engineering standards used so operations are unlikely to be in- terrupted. Controls include cooling provisions for both the plant and the gas turbine will comprise either an air-cooled condenser array or a hybrid cooling system, in addition to a CO2 cooling and compression plant, and an exhaust gas cooling and conditioning plant.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	•Monitor frequency and magnitude of impact over time and if required incorporate further cooling mechanisms into plant upgrades.	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium
11	Extreme temperature (heat)	Damage to infrastructure by prolonged high temperatures (heat damage, deformation, cracking and thermal expansion) causing reduced localised useability of sections of the plant and increased maintenance.	•	•		•						•					Unlikely	Minor	Low	Unlikely	Minor	Low	•Monitor frequency and magnitude of impact over time and if required increase maintenance requirements. •Consider selection of more durable, heat-resitant materials in upgrades. time and if required increase maintenance requirements. •Consider selection of more durable, heat-resitant materials in upgrades.	Unlikely	Minor	Low	Unlikely	Minor	Low

12	Extreme temperature (cold)	Prolonged periods of extreme cold can result in snow and frost conditions. These cold conditions can affect the exterior of the plant, resulting in reduced durability and/or design life, and may affect the efficiency of the plant operations. Black ice on access points increase health and safety risk.					•	•				•			•	•Due to extreme cold temperatures, snow loading and freezing liquids will be accounted within the engineering design of buildings and structures and the appropriate engineering standards used so operations are unlikely to be interrupted. The heat output of the plant is over 300 MW, requiring a heat recovery boiler to handle excess heat, so extremely low temperatures are unlikely to impact	Unlikely	Minor	Low	Moderate	Minor	Medium	•As part of a wider Winter Service Plan a section will be prepared on Snow and de-icing procedures for when cold temperatures occur and the roads become covered in snow/ice. Doing so will help prevent disruption and avoid possible fatalities.	Rare	Minor	Low	Rare	Minor	Low
13	Extreme rainfall	Extreme rainfall events can cause surface water and or flash flooding to occur proximal to the plant. This may cause malfunctioning of operations and limited access, which carries a health and safety risk.				•						•			•	• The risks will be considered within the Flood Risk Assessment and summarised within Chapter 13: Water Environment and Flood Risk, with a Water Drainage Strategy to demonstrate management of surface water run-off from the Proposed Development.	Unlikely	Minor	Low	Moderate	Minor	Medium	•Consideration will be given to installing a water pump for the areas with critical infrastructure. This will help increase surface drainage capacity.	Unlikely	Minor	Low	Moderate	Minor	Medium
14	Fluvial flooding	Extreme rainfall over an extended period can lead to nearby rivers exceeding their natural capacity causing surface water and or flash flooding to occur to or around the plant, limiting access and causing damage to ground level infrastructure, power supplies and other assets.	•				•		•	•		•			•		Unlikely	Minor	Low	Moderate	Minor	Medium		Unlikely	Minor	Low	Moderate	Minor	Medium
15	Tidal/coastal flooding	Sea level rise and storm surges can results in coastal flooding to occur to or proximal to the plant, potentially damaging assets and limiting access, both of use pose health and safety risks.	•	•	•	•	•	•	•	•	•	•	•	•	•	• The SuDS Manual Simple Index Approach (CIRIA C753) will be used to inform the design of the surface water drainage system so that it provides adequate treatment of run-off. • Consider introducing a drainage maintenance/operation plan so that the drainage system is monitored and kept blockage free. • The DMRB guidance will inform the importance, magnitude and significance of effects to identify the potential impacts of construction and operation on the surface water environment.	Moderate	Moderate	High	Moderate	Moderate	High	•To mitigate against coastal and fluvial flooding, it is currently anticipated that some targeted ground raising may be required to increase ground levels above the existing average ground height in order to protect critical operational infra- structure from flood events and considering the effects of climate change. This estimated land raise for the Main Site is based upon an earlier Facility Condition Assessment (FCA) undertaken for the indicative site and is therefore subject to further assessment and potential revision.	Moderate	Moderate	Medium	Moderate	Moderate	Medium
16	Water scarcity (Drought)	Drought disrupts water supply, causing process stoppages and therefore disruptions to plant operations	•	•	•											•Weather forecasts will be monitored so any expected drought conditions are prepared for in advance and contingency measures can be in place to minimise disruption.	Rare	Moderate	Medium	Rare	Moderate	Medium		Rare	Minor	Low	Rare	Minor	Low
17	Storm events (Wind)	Severe wind event has higher wind loading than designed, causing stress to infrastructure, resulting in damage or reduced design life and potential safety hazard. This can result in damage to infrastructure resulting in financial loss and the need for upgrades.						•	•	•						• Current wind loadings are incorporated within the engineering design of buildings and structures and the appropriate engineering standards used so operations are unlikely to be interrupted. •Wind patterns will be monitored and an early warning system will be in place to allow contingency plans to be in place in advance of predicted windy conditions. Doing so will help minimise disruption to and damage. •A wind monitoring plan which establishes procedures and measures that will be instated during period of strong winds.	Unlikely	Minor	Low	Unlikely	Minor	Low		Unlikely	Minor	Low	Unlikely	Minor	Low
18	Storm events (Lightning)	Increased lightning events can cause damage to infrastructure and structures, and may result in power outages, affecting overall operations.	•	•									•			• Design engineering standards to be incorporated by the Proposed Development for the provision of lighting protection systems on buildings and structures, such as lightning protections (rods) built into structures, who are also earthed. • Weather forecasts will be monitored to assess any potential lightning storms	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium	• Workers will avoid any hazards that may increase the risk of being struck by lightning, including open spaces, tall objects, water, open wiring, metal fencing, and other metal objects	Unlikely	Moderate	Medium	Unlikely	Moderate	Medium
19	Wildfires	Increased heatwaves and dry periods increase the potential for wildfires, causing damage to plant and facilities, especially to flammable materials stored on site.	•	•							•					• Location of Proposed Development i.e Industrial area limits risk of wildfire. All employees of Uniper receive specialist fire prevention training. area limits risk of wildfire. All employees of Uniper receive specialist fire prevention training.	Rare	Moderate	Medium	Rare	Moderate	Medium	•Develop and maintain a Fire Management Plan and an early warning detection system.	Rare	Moderate	Medium	Rare	Moderate	Medium
20	Wildfires	Increased heatwaves and dry periods increase the potential for wildfires, which could result in injury or fatality to workers.													•		Rare	Moderate	Medium	Rare	Moderate	Medium		Rare	Moderate	Medium	Rare	Moderate	Medium

Connah's Quay Low Carbon Power

Preliminary Environmental Information Report Volume IV, Appendix 20-A: Greenhouse Gas Baseline Data and Methodology Report

Uniper

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1. Greenhouse Gas Baseline Data and Methodology Report

1.1 Scope of the Assessment

1.1.1 **Table 1** outlines a breakdown of emissions, and their respective sources, accounted for within this greenhouse gas (GHG) assessment. GHG emissions have been considered across the whole lifecycle of the Proposed Development (**Table 1**).

Table 1: Scope of Potential GHG Emission Sources across the Proposed Development's Lifecycle

Lifecycle stage	Activity	Primary emission sources	Scoped In/out?
Enabling works	Any enabling works	GHG emissions from any activities required onsite prior to construction	In
	Land clearance	Loss of a carbon sink	In
Production	Raw material extraction and manufacturing of products/ materials. Transport of products/ materials to site.	Embodied GHG emissions. GHG emissions from fuel consumption for the transportation of materials.	In
Construction	On-site construction activity. Transport of construction workers.	Energy (electricity, fuel, etc.) consumption from plant and vehicles, generators on site, and construction workers commuting. GHG emissions from fuel consumption for transportation of construction workers.	In
	Transportation and disposal of construction waste	GHG emissions from energy use and from fuel consumption for transportation of waste.	In
	Provision and treatment of water	GHG emissions from the supply of potable water, and the disposal and treatment of Wastewater.	In
Operation	Operation of the Proposed Development	GHG emissions from electricity generation, when not captured by the carbon capture plant, and energy use in buildings. GHG emissions from operation of the Proposed Development. GHG emissions from the potential unavailability of the captured carbon transport and storage system.	In

Lifecycle stage	Activity	Primary emission sources	Scoped In/out?
		GHG emissions from the upstream supply chain of natural gas i.e., well-to-tank emissions.	
	Use of vehicles (i.e. cars and motorcycles)	GHG emissions from vehicle use from worker journeys to and from the Site.	In
	Disposal and transportation of operational waste	GHG emissions from recycling/ disposal of process waste and domestic waste GHG emissions from fuel consumption for transportation of raw materials and waste.	In
	Provision and treatment of wastewater	GHG emissions from the supply of potable water, and the disposal and treatment of wastewater.	In
	Building/infrastructure maintenance	GHG emissions from maintenance of buildings and infrastructure /assets in the operational stage.	In
Decommissioning	On-site decommissioning activity. Transport of decommissioning workers.	Energy (electricity, fuel, etc.) consumption from plant and vehicles, generators on site, and workers commuting. GHG emissions from fuel consumption for transportation of Workers.	In
	Transportation and disposal of waste	GHG emissions from energy use and from fuel consumption for transportation of waste.	In
	Provision and treatment of water.	GHG emissions from the supply of potable water, and the disposal and treatment of wastewater.	In

1.1.2 The PAS 2080 Specification (Ref 1) allows the exclusion (or 'scoping out') of GHG emissions sources that contribute or remove less than 1% to the total inventory (**Table 1**). Where an emissions source is less than 1% it may be considered as not material. Inventories that exclude these minor sources are still considered complete for verification purposes. This exclusion of immaterial emission sources, that are <1% of a given emissions inventory, is based on a 'de minimis' (relatively minimal) contribution.

1.2 Impact Assessment Methodology

1.2.1 The purpose of the GHG assessment is to understand the impact of GHG emissions from the Proposed Development on the climate. To understand this impact the assessment quantifies the GHG emissions over the lifecycle of the Proposed Development and puts them into the context of the UK and Wales meeting its net zero targets. Climate Change is an issue devolved to the Senedd Cymru, and Wales has published its own carbon budgets based on advice from the Climate Change Committee. Wales, along with other devolved administrations, remains part of the UK, so emissions within Wales are also included in the UK's legally binding carbon budgets.

1.2.2 To align with best practice set out in PAS2080:2023 Carbon Management in Buildings and Infrastructure the assessment adopts a project lifecycle approach to quantifying emissions. The output of this quantification is used to identify emissions 'hot spots' (i.e. sources of emissions with greatest contribution to the overall emissions footprint) This enables priority areas for mitigation to be identified. This approach is also consistent with the principles set out in the Institute of Environmental Management and Assessment (IEMA) Guidance (GHG Assessment) (Ref 2).

1.2.3 Where activity data have allowed, expected GHG emissions arising from the lifecycle activities associated with the Proposed Development have been calculated by multiplying activity data by a relevant emission factor:

Activity data × GHG emissions factor = GHG emissions

1.2.4 Activity data is a quantifiable measure of activity or resources, such as operating hours or volumes of fuels used. Emission factors are used to convert the activity data into GHG volumes.

1.2.5 Activity data has been sourced from within Uniper. Where specific data are not available, a mix of assumptions and industry benchmarks have been used to fill data gaps. Where this is not possible, then a qualitative approach to addressing GHG impacts has been followed, in line with the IEMA Guidance (Ref 2). Any assumptions, inclusions and exclusions that inform the GHG emissions calculation have been clearly described in the sections below.

1.2.6 2023 Emission Factors published by the UK Department of Energy Security and Net Zero (DESNZ) (Ref 3), and material embodied carbon data from the University of Bath's Inventory of Carbon and Energy (ICE) V3.0 (Ref 4), have been used as the primary sources of emissions factors when calculating GHG emissions.

1.2.7 In line with the World Business Council for Sustainable Development (WBCSD) and World Resources Institute's (WRI) GHG Protocol guidelines (Ref 5), the lifecycle GHG impact assessment will consider the seven Kyoto Protocol GHGs (Ref 6):

- Carbon dioxide (CO_2);
- Methane (CH_4);
- Nitrous oxide (N_2O);

- Sulphur hexafluoride (SF_6);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Nitrogen Trifluoride (NF_3).

1.2.8 These GHGs are referred to in this chapter under an encompassing definition of 'GHG emissions', in conjunction with the unit of tCO_2e (tonnes CO_2 equivalent) or $MtCO_2e$ (megatonnes of CO_2 equivalent).

Determining Effects

1.2.9 **Table 1** summarises the key anticipated GHG emissions sources associated with the Proposed Development and whether they have been scoped into the final assessment.

1.2.10 In particular, it should be noted the subsequent export of CO_2 from the Proposed CO_2 AGI (following metering and testing) is proposed to utilise the existing natural gas pipeline within the Main Site, as detailed in **Chapter 4: The Proposed Development (PEIR Volume II)**. Therefore, this has been discounted from the assessment of construction effects.

Sensitive Receptors

1.2.11 The identified receptor for GHG emissions is the global climate. This is because the effects of GHG emissions are not geographically constrained, meaning all developments have the potential to result in a cumulative effect on GHG emissions. For the purpose of the GHG emissions impact assessment, the UK's and Wales carbon budgets will be used as a proxy for the global climate (**Table 1**).

Classification of Effects

1.2.12 The IEMA Guidance (GHG Assessment) (Ref 2) states that there are no currently agreed methods to evaluate levels of GHG significance, and that professional judgement is required to contextualise a project's emission impacts.

1.2.13 In GHG accounting, it is considered good practice to contextualise emissions against pre-determined carbon budgets (Ref 2). Given this, emissions derived from the Proposed Development will be contextualised against both the UK (**Table 2**) and Welsh (**Table 3**) Carbon Budgets. These budgets are as proposed by the CCC, agreed by government, and ratified by parliament and Senedd Cymru, respectively. This contextualisation will be applied in terms of both the sensitivity of the receptor and the magnitude of potential impacts, as appropriate.

1.2.14 In a UK context, it should be noted that the supplementary carbon budgets (beyond 2037) have not been formally adopted by the UK Government or ratified by Parliament (see **Table 2**). Therefore, it is recommended that the CCC balanced net-zero pathway is utilised (post-2037) to illustrate the Proposed Development's progress towards the net-zero trajectory by 2050 (**Table 2**).

1.2.15 However, as stated, supplementary Carbon Budgets (e.g., beyond 2037) have not been formally adopted by the Government or ratified by parliament. Therefore, they can only be used as an indicative measure to contextualise the Proposed Development's progress towards the national net-zero trajectory.

1.2.16 The Climate Change Committee's (CCC) balanced net-zero pathway is divided into 5-year periods post-2037; this is to match the previous 1-6 legally binding UK national Carbon Budgets. The proposed Carbon Budget periods, derived from the net-zero pathway, encompass the 7th, 8th, and 9th indicative budget periods up to 2050. Such budgets are in line with the UK's 1.5-degree trajectory, as detailed in **Table 2**.

1.2.17 Beyond 2050, it is expected that the UK, and more specifically Wales, will remain at net-zero.

UK Carbon Budgets

1.2.18 The UK Carbon Budgets are in place to restrict the volume of greenhouse gas emissions the UK can legally emit in a five-year period (**Table 2**). The UK is currently in the 4th carbon budget period, which runs from 2023 to 2027, as detailed in **Table 2**. The 3rd to the 5th carbon budgets reflects the earlier UK target (80% reduction target by 2050). The 6th carbon budget, legislated in June 2021, is the first budget to reflect the amended net-zero target. As the Proposed Development will be active past 2050, the assessment also compares the emissions against CCC balanced net-zero pathway (by 2050) (**Table 2**).

1.2.19 Construction of the Proposed Development is likely to intersect the UK carbon budget periods running from 2028-2032 and 2033-2037 (UK 5th and 6th carbon budgets respectively) (**Table 2**). This is due an anticipated single-phase construction of both CCGT Trains 1 and 2 from Q4 in 2031 taken as a reasonable worst-case scenario, as stated in paragraph 5.2.2 of **Chapter 5: Construction Management and Programme (PEIR Volume II)**. Under this worst-case scenario, site enabling works, construction activities, and the eventual commissioning of the Trains is expected to last for approximately five years. This is visualised within the indicative single phase construction and commissioning programme (see Table 5-2 of **Chapter 5: Construction Management and Programme (PEIR Volume II)**).

1.2.20 As described in paragraph 2.2.36 of **Chapter 2: Methodology and Consultation**, each Train of the Proposed Development could have an operational life of circa 30 years. Given the assumed approximate 5-year construction of both Trains from Q4 2031 (see above), the Proposed Development is anticipated to operate from 2035 to 2065,as a reasonable worst-case scenario. This operational period will intersect the UK 5th and 6th Carbon Budgets and the net zero target of 2050 (**Table 2**).

1.2.21 At the end of the operational period outlined above, decommissioning activities are currently anticipated to commence after 2065 for the assumed adoption of the Proposed Development's single phase construction (paragraph 1.2.19), as per paragraph 4.5.2 of **Chapter 4: The Proposed Development**.

Table 2: UK Carbon Budgets and Indicative Carbon Budgets Based Upon the CCC's Balanced Net-Zero Pathway (Ref 7)

Carbon budget period	UK Carbon Budget ($MtCO_2e$)	Indicative Carbon Budgets based upon the CCC's balanced net-zero pathway ($MtCO_2e$)	Indicative CCC's Electricity Supply Carbon Budgets based upon the CCC's balanced net–zero pathway for Electricity Supply ($MtCO_2e$)	Indicative CCC's Construction Carbon Budgets based upon the CCC's balanced net–zero pathway for Construction ($MtCO_2e$)
4th (2023-2027)	1,950		189	254
5th (2028-2032)	1,725		9	183
6th (2033-2037)	965		36	95
7th (2038-2042)		*526*	*23*	*34*
8th (2043-2047)		*195*	*12*	*17*
9th (2048-2050)		*17*	*3*	*9*

Welsh Carbon Budgets

1.2.22 Similar to the above, The Welsh Carbon Budgets are in place to restrict the mass of GHG emissions that Wales can legally emit in a five-year period (**Table 3**). Wales is currently situated in Carbon Budget 2, which runs from 2021 to 2025.

1.2.23 Construction of the Proposed Development is likely to intersect the UK carbon budget periods running from 2026-2035 (Welsh Carbon Budgets 2026-2030 and 2031-2035) (**Table 3**).

1.2.24 The operation of the Proposed Development (~30 years) is expected between 2030-2060 and 2035-2065, intersecting Welsh Carbon Budgets 3, 4, 5, 6 and 7, and beyond) (**Table 3**).

Table 3: Welsh Carbon Budgets

Carbon Budget Period	Welsh Carbon Budget ($MtCO_2e$)
2021-2025	163
2026-2030	127
2031-2035	83
2036-2040	48
2041-2045	27
2046-2050	14

Significance of Effects

1.2.25 The IEMA Guidance (GHG Assessment) (Ref 2) describes five distinct levels of significance; these are not solely based on whether the Proposed Development emits GHG emissions alone, but on how the Proposed Development makes a relative contribution towards achieving a science-based 1.5°C aligned transition towards net-zero. The different significance

levels are plotted against the UK and Welsh net-zero compatible trajectory, as presented in **Table 2** and **Table 3**, to evaluate the likely significance of effects of the Proposed Development.

1.2.26 The effect of a project can shift from significant to not-significant by incorporating mitigation measures that substantially improve on business-as-usual and meet or exceed the science-based emissions trajectory of ongoing, but declining emissions towards net zero.

1.2.27 This method to determine the significance of GHG emissions are summarised in **Table 4**.

Table 4: Definition of Levels of Significance (Ref 2)

Significance	Effects	Description	Example in the IEMA Guidance (Climate Change)
Significant	Major adverse	A project that follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the UK's net zero trajectory or accepted aligned practice or area-based transition targets. It is down to the practitioner to differentiate between the 'level' of significant adverse effects e.g. 'moderate' or 'major' adverse effects.	The project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
	Moderate adverse		The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.
Not significant	Minor adverse	A project that is compatible with the budgeted, science based 1.5 °C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve that. It may have residual emissions but is doing enough to align with and contribute to the relevant transition scenario, keeping the UK on track towards net zero by 2050 with at least a 78% reduction by	The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.

Significance	Effects	Description	Example in the IEMA Guidance (Climate Change)
		2035, thereby potentially avoiding significant effects.	
	Negligible	A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory and has minimal residual emissions. This project is playing a part in achieving the rate of transition required by nationally set policy commitments.	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Significant	Beneficial	A project that causes GHG emissions to be avoided or removed from the atmosphere. Only projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect.	The project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

Rochdale Envelope

1.2.28 A focused use of the Rochdale Envelope approach has been adopted to present a worst-case assessment of potential environmental effects of the different parameters of the Proposed Development that cannot yet be fixed. The parameters included within the Rochdale Envelope are described within **Chapter 20: Climate Change (PEIR Volume II)**.

Assessment Assumptions and Limitations

1.2.29 At this stage of the Proposed Development's design, the current GHG assessment is limited to the availability of data and information.

1.2.30 Assumptions surrounding the inclusions and exclusions of data used to assess the likely impact of GHG emissions across the construction, operational, and decommissioning phases have been detailed in paragraphs 20.3.19 and 20.3.20 of **Chapter 20: Climate Change (PEIR Volume II)** respectively.

1.3 Baseline Conditions and Study Area

Study Area

1.3.1 The study area for the baseline of each assessment type is informed by the needs of the future assessment itself.

1.3.2 As the GHG assessment considers the impact of the Proposed Development on the climate, the GHG assessment includes emissions associated with the Proposed Development within the context of both the UK's and, more specifically, the Welsh Carbon Budgets (see **Section 1.2**). This includes all direct GHG emissions from within the Indicative Site Boundary arising during all stages of the construction, operation, and decommissioning of the Proposed Development. It also includes indirect GHG emissions occurring off-site that are significantly related to the Proposed Development, such as embodied carbon as a result of production of the construction materials, transportation, waste processing and waste disposal.

Existing Baseline

1.3.3 The Proposed Development Site is described in **Chapter 4: The Proposed Development (PEIR Volume II)**. The Proposed Development Site is situated within the existing Connah's Quay Power Station and land under the control of the Applicant. The existing Connah's Quay Power Station currently provides 1,380 MWe of dispatchable power to the National Grid. As noted within paragraph 2.2.27 of **Chapter 2**, it has Capacity Market Agreements in place until 2028, with any future plans for the existing power station being confirmed by the Applicant in due course.

1.3.4 For the adopted worst-case for GHG emissions, the existing Connah's Quay Power Station is assumed to operate continually until 2035 when, operationally, these units would be replaced by Train 1 and 2 of the Proposed Development (paragraph 2.2.30, **Chapter 2: Assessment Methodology and Consultation (PEIR Volume II)**).

1.3.5 For this GHG assessment, the baseline is the 'business as usual' scenario whereby the Proposed Development is not developed. However, given the uncertainty surrounding the existing power station's future operation, it is reasonable for the 'business as usual' scenario to assume that the Proposed Development's lifetime generation will ultimately be provided by another existing, unabated CCGT power station within the grid, as a means of balancing the National Grid's generation capacity. This is because existing, unabated CCGTs provide similar dispatchable marginal generating capacity to that that will be provided by the Proposed Development. Contextualising lifetime operational emissions from the Proposed Development against those from an existing unabated CCGT, therefore, allows a direct like for like comparison to be carried out.

1.3.6 Whilst it is recognised that EN-1 (paragraph 4.9.25, Ref 8) requires all new commercial scale combustion power stations to be constructed Carbon Capture Ready, this baseline comparison is explicitly with an existing, unabated CCGT technology and not with new installations. It is existing gas-fired power stations, such as the existing Connah's Quay Power Station, that

low-carbon installations such as the Proposed Development must displace in support of the UK's net zero ambitions.

Future Baseline

1.3.7 The future baseline scenarios are set out in paragraph 2.2.20 of **Chapter 2: Methodology and Consultation (PEIR Volume II)**.

1.3.8 The future baseline for the assessment of the impact of the Proposed Development on climate is a projected 'business as usual' scenario where the Proposed Development is not constructed, and the Proposed Development's projected lifetime generation is provided by an existing, unabated CCGT power station (paragraph 1.3.5).

1.3.9 For the adopted worst-case project scenario, the existing Connah's Quay Power Station is assumed to remain operational until 2035 as described in **Chapter 2: Methodology and Consultation (PEIR Volume II)**, followed by an eventual decommissioning and closure of the existing plant by 2035. At this point, the future baseline emissions are considered to be zero and all other emissions are considered as additional. Use of this precautionary principal approach provides a conservative assessment, as not all activities (and therefore GHG emissions) will be additional activities given the nature of existing land-use on the Site.

References

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Ref 8. DESNZ, 2023; Overarching National Policy Statement for Energy (EN-1) [online]. Available at: https://assets.publishing.service.gov.uk/media/65a7864e96a5ec0013731a93/overarching-nps-for-energy-en1.pdf (Accessed 26/02/24)

Connah's Quay Low Carbon Power

Preliminary Environmental Information Report
Volume IV, Climate Change Resilience Baseline Data and Methodology Report

Uniper

The Planning Act 2008
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
PINS Reference: EN010166
September 2024

Delivering a better world

Prepared for:
Uniper UK Limited

Prepared by:
AECOM Limited

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1. Climate Change Resilience Baseline Data and Methodology Report

1.1 Scope of the Assessment

1.1.1 **Table 1** outlines a breakdown of climate variables that have been scoped in and out of the Climate Change Resilience Assessment (CCRA).

Table 1: Scope of Climate Variables

Climate Variable	Considered in CCRA Review	Rationale
Storms (wind, storm surge, lightning)	In	The Proposed Development may be vulnerable to storms, storm surges, and lightning.
Extreme precipitation	In	The Main Site is located in an area that is susceptible to pluvial and fluvial flood risk.
Sea level rise	In	The Main Site is located in an area that is susceptible to sea level rise, including coastal flooding and coastal erosion.
Extreme temperatures	In	Fluctuating temperatures (extreme heat and extreme cold) could impact the structural integrity of buildings and materials.
Precipitation change	In	The Proposed Development may be vulnerable to changes in precipitation, for example, pressure on water supply during periods of reduced rainfall, and damage to structures and drainage systems during periods of heavy precipitation. The Site is located in an area that has a projected trend towards drier summers on average.
Wildfires	In	The Main Site is located in area that is susceptible to wildfires.
Wind	In	The Proposed Development may be vulnerable to changing wind speeds, which could impact the structural integrity of buildings and materials.
Estuary temperature	In	The Proposed Development is likely to be affected by a small increase in estuary temperature during its operational life, which can create issues with peak discharge temperature permit compliance due to high intake water temperatures.

1.2 Impact Assessment Methodology

Risk Assessment

1.2.1 **Table 2** highlights the criteria used to determine the likelihood of a climate change hazard occurring (Ref 1).

Table 2: Description of Likelihood for Climate Change Hazard

Term	Qualitative	Quantitative
Rare	Highly unlikely to occur	5%
Unlikely	Unlikely to occur	20%
Moderate	As likely to occur as not	50%
Likely	Likely to occur	80%
Almost certain	Very likely to occur	95%

1.2.2 The consequences descriptors are presented in **Table 3.** The categories and descriptions provided are based on the European Union (EU) Technical Guidance on Climate proofing (Ref 1).

Table 3: Consequences Analysis

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Asset damage / Engineering / Operational	Impact can be absorbed through normal activity	An adverse event that can be absorbed by taking business continuity actions	A serious event that requires additional emergency business continuity actions	A critical event that requires extraordinary / emergency business continuity actions	Disaster with the potential to lead to shut down or collapse or loss of the asset / network
Safety and Health	First aid case	Minor injury, medical treatment	Serious injury or lost work	Major or multiple injuries, permanent injury, or disability	Single or multiple fatalities
Environment	No impact on baseline environment. Localised in the source area. No recovery required	Localised within site boundaries. Recovery measurable within one month of impact	Moderate harm with possible wider effect. Recovery in one year	Significant harm with local effect. Recovery longer than one year. Failure to comply with environmental regulations / consent	Significant harm with widespread effect. Recovery longer than one year. Limited prospect of full recovery
Social	No negative social impact	Localised, temporary social impacts	Localised, long-term social impacts	Failure to protect poor or vulnerable groups (1). National, long-term social impacts	Loss of social licence to operate. Community protests
Financial (for single extreme event or annual	x % IRR (***) < 2 % of turnover	x % IRR 2-10 % of Turnover	x % IRR 10-25 % of turnover	x % IRR 25-50 % of turnover	x % IRR > 50 % of Turnover

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
average impact) (**)					
Reputation	Localised, temporary impact on public opinion	Localised, short-term impact on public opinion	Local, long-term impact on public opinion with adverse local media coverage	National, short- term impact on public opinion; negative national media coverage	National, long-term impact with potential to affect the stability of the Government
Cultural Heritage and cultural premises	Insignificant impact	Short term impact. Recovery or repair.	Serious damage with wider impact to tourism industry	Significant damage with national and international impact	Permanent loss with resulting impact on society

(1) Including groups that depend on natural resources for their income/livelihoods and cultural heritage (even if not considered poor) and groups considered poor and vulnerable (and often that have less capacity to adapt) as well as persons with disabilities and older persons.

(*) The ratings and values suggested here are illustrative. The project promoter and climate-proofing manager may choose to modify them.

(**) Example indicators – other indicators that may be used including costs of immediate / long-term emergency measures; restoration of assets; environmental restoration; indirect costs on the economy, indirect social costs.

(***) Internal Rate of Return (IRR).

References

Ref 1. European Commission (2021). Commission Notice — Technical guidance on the climate proofing of infrastructure in the period 2021-2027 (2021/C 373/01). Official Journal of the European Union, C 373, 1-EN.

Connah's Quay Low Carbon Power

Preliminary Environmental Information Report Volume IV, Appendix 20-D: In-combination Climate Change Assessment

Uniper

The Planning Act 2008
The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017
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1. In-combination Climate Change Assessment

1.1 Summary of Likely Significant Residual Effects

In-Combination Climate Change Assessment

1.1.1 **Table 1** details in-combination climate change impacts (ICCI) risks identified for the Proposed Development. There were no ICCIs identified for Marine Ecology, Terrestrial Heritage, Marine Heritage, Soils and Agricultural Land, Socio-Economics, Recreation and Tourism, Major Accidents and Disasters, Landscape and Visual Amenity, and Waste.

1.1.2 The embedded design and mitigation for Major Accidents and Disasters will need to account for climate change (e.g. temperature changes, flooding) intrinsically for the design life of the assets under Control of Major Accident Hazards (COMAH) to satisfy the Health and Safety Executive (HSE) that the risks are reduced to As Low As Reasonably Practicable (ALARP). By assuming that this is already required, additional mitigation is not needed.

1.1.3 All outstanding technical ICCI's (Terrestrial Ecology and Water Environment) will be identified within the ES to be submitted with the DCO Application. Flood Risk accounts for climate change projections and this has been taken into account within **Appendix 13-C: Flood Consequence Assessment (PEIR Volume IV).** Hydraulic modelling will be undertaken at the ES stage to provide further details on fluvial flood risk and inform mitigation measures.

Table 1: In-Combination Climate Change Assessment

Discipline/ Receptor	Climate Hazard	Likelihood of hazard occurring	Likely ICCIs identified	Description of ICCI and embedded mitigation	Likelihood of ICCI occurring	Consequence	Significance
Noise and Vibration							
Noise and Vibration	Increase in mean summer air temperature	High	Increased temperatures may require greater cooling which will increase the number of cooling fans in operation, which could then result in potential increase in noise effects to receptors in the surrounding environment.	The assessment will be based on the worst-case scenario so there will be no further impact on noise effects impacting the surrounding environment.	Negligible	Negligible	Not significant
Noise and Vibration	Increase in mean summer air temperature	Very likely	Potential to exacerbate noise effects on communities in terms of individual dwellings and on a wider community, due to windows being open more often due to an increase in high temperatures.	The noise assessment criteria assume windows are open and closing windows is a form of mitigation against noise. Consequently, there is no further impact on noise effects arising from the ICCI.	Negligible	Negligible	Not significant
Noise and Vibration	Increase in mean summer air temperature	Very likely	Increases in temperature and humidity of the air reducing the atmospheric attenuation of noise.	Over distances of a few hundred metres, which covers the noise study area, atmospheric effects can be ignored. Consequently, increases in temperature and humidity is unlikely to affect noise sources during the construction phase and operational phase.	Negligible	Negligible	Not significant
Air Quality							

Discipline/ Receptor	Climate Hazard	Likelihood of hazard occurring	Likely ICCIs identified	Description of ICCI and embedded mitigation	Likelihood of ICCI occurring	Consequence	Significance
Air Quality	Change in mean annual air temperature	Likely	Ambient weather conditions, including barometric pressure and temperature can slightly affect the amount of natural gas fuel burned within the combustion process for a given output. The consequence of an increase in fuel consumption would be a corresponding increase in stack mass flow rate and emission rates of trace pollutants in the stack plume.	An increase in stack gas mass flow rates is likely to lead to an increase in the residual CO_2 content and mass emission rate in the plume. Warmer conditions result in a slight decrease in fuel consumption, while cooler conditions generally result in a slight increase. The "reference" emissions case used for the air quality assessment considers a conservative scenario with upper range estimates of both stack mass flow and trace pollutant emission rate. The dispersion modelling assessment has used five years of meteorological data, which accounts for the full range of weather conditions experienced in the area around the site.	Low	Negligible	Not significant
Transport and Traffic							
Local Highway Network	Increase in winter precipitation rate	Likely	Increases in precipitation may increase the potential for disruption on the wider road network due to increased frequency of transport routes becoming unviable or inaccessible.	The Construction Traffic Management Plan (CTMP) considers vehicle routing options during the construction phase, including details of any planned road closures / diversions.	Low	Negligible	Not significant
Aquatic Ecology							
Aquatic Ecology	Increase in winter rainfall	Very Likely	Increased winter rainfall combined with the Proposed Development could impact on receiving waterbodies'	Increased surface water runoff and sedimentation.	Low	Moderate	Not significant

Discipline/ Receptor	Climate Hazard	Likelihood of hazard occurring	Likely ICCIs identified	Description of ICCI and embedded mitigation	Likelihood of ICCI occurring	Consequence	Significance
			(ponds and drains) flow regime and water quality impacting on the aquatic environment.	The impact of climate change on expected flows will be accommodated in the design of drainage infrastructure to ensure appropriate treatment and attenuation of anticipated flows, as outlined above.			
Aquatic Ecology	Increased droughts/ reduced water levels in summer	Likely	Reduced water levels as a result of climate change and the Proposed Development could negatively impact on receiving waterbodies' (ponds and drains) flow regime and water quality impacting on the aquatic environment.	Prolonged drought periods in combination with higher temperatures could lead to dissolved oxygen crashes and fish mortalities. The impact of climate change on expected flows will be accommodated in the design of drainage infrastructure to ensure appropriate treatment and attenuation of anticipated flows, as outlined above.	Low	Low	Not significant
Water Environment							
Flood risk	Increased rainfall intensity	Likely	Increased peak fluvial flows resulting in increased flood risk to the site, impacting the drainage network, and increasing potential loss of floodplain associated with land raising.	Flood consequence assessment will be based on flood risk incorporating estimated climate change over the life of the project	This will be assessed in the ES.		
Flood risk	Increase in winter rainfall	Very likely	Operation: Increased precipitation can impact the frequency and duration of flooding from all sources	Drainage infrastructure (including attenuation) will be designed to accommodate anticipated flows, with an appropriate allowance for			

Discipline/ Receptor	Climate Hazard	Likelihood of hazard occurring	Likely ICCIs identified	Description of ICCI and embedded mitigation	Likelihood of ICCI occurring	Consequence	Significance
			(e.g. tidal, fluvial, surface water, artificial sources, groundwater and infrastructure) – could lead to flooding off-site	increases in rainfall intensity due to climate change. The drainage strategy will consider the Supplementary Planning Guidance LPGN 29 – Management of Surface Water for New Development, adopted by Flintshire County Council (Ref 1). In accordance with this guidance, surface water runoff from the Proposed Development Site in undeveloped (greenfield) areas will be limited to the greenfield runoff rate. For any previously developed (brownfield) areas, surface water discharge will be limited to greenfield rates of runoff (or as close as reasonably practical). The drainage network will be designed so that there is no flooding in the 1 in 30-year Annual Exceedance Probability (AEP) simulated storm event, in accordance with the Supplementary Guidance LPGN 29. Attenuation will be appropriately sized to accommodate the 1 in 100-year AEP event, with a minimum 20% allowance for increases in rainfall intensity due to climate change, in accordance with Welsh Government guidance for climate change allowances. Both the central and upper (20% and 40%) climate change allowances will be assessed to understand the range of impact.			

Discipline/ Receptor	Climate Hazard	Likelihood of hazard occurring	Likely ICCIs identified	Description of ICCI and embedded mitigation	Likelihood of ICCI occurring	Consequence	Significance
				The design will also consider the impacts of tide levels on new drainage infrastructure			
Flood risk	Increased sea levels and storm surges	Likely	Increased sea levels resulting in flooding to the site and impacts to the drainage network. The Proposed Development requires raising land levels and as it is located in a coastal flood plain, this could have an impact on off-site receptors due to changes to flow pathways.	Flood consequence assessment will be based on flood risk incorporating estimated climate change over the life of the project.			
Water quality	Increase in winter rainfall	Very likely	Operation: Increased precipitation can impact peak discharge rates for surface water runoff, which can impact receiving waterbodies (receptors) if the capacity of the drainage infrastructure is exceeded in extreme events. If this results in the storage capacity of attenuation features being exceeded, then there is potential for the River Dee to receive untreated water. This could lead to a deterioration in water quality.	The impact of climate change on expected flows will be accommodated in the design of drainage infrastructure to ensure appropriate treatment and attenuation of anticipated flows, as outlined above.			
Water quality	Increased sea temperature	Likely	Discharge of cooling water with increased sea temperature due to climate	The operational discharge temperature of cooling water discharges compared to the existing			

Discipline/ Receptor	Climate Hazard	Likelihood of hazard occurring	Likely ICCIs identified	Description of ICCI and embedded mitigation	Likelihood of ICCI occurring	Consequence	Significance
			change could result in impacts to marine environments.	case is not confirmed. Any increases in discharge temperature, in additional to CC increases could result in increased temperatures locally and regionally across the River Dee SSSI, potentially impacting on habitats. The temperature of cooling water has not been confirmed, modelling of potential effects is also still to take place, as such not suitable to provide an impact assessment at this stage.			
Water resources	Increased droughts	Likely	Reduction in water availability for abstraction and impact on nearby existing abstractions	Increases in abstraction from surface water and groundwater sources could reduce availability of water for other users. Currently assumed that there will be no significant change to abstraction for cooling water from the River Dee, and no new abstractions from other sources.			
Flood risk	Increase in winter precipitation rate	Likely	Increased peak discharge rates for surface water runoff, impacting receiving waterbodies if the capacity of the drainage infrastructure is exceeded in extreme events. If this results in attenuation storage capacity being exceeded then there is potential for the Dee Estuary WFD water body to receive untreated and polluted water,	The impact of climate change on expected flows will be accommodated in the design of drainage infrastructure to ensure appropriate attenuation and storage for anticipated flows.	Low	Low	Not significant

Discipline/ Receptor	Climate Hazard	Likelihood of hazard occurring	Likely ICCIs identified	Description of ICCI and embedded mitigation	Likelihood of ICCI occurring	Consequence	Significance
			potentially leading to a deterioration in water quality.				
Groundwater aquifers	Decrease in summer precipitation rate	Possible	Reduction in precipitation could reduce aquifer storage and groundwater levels. Construction: construction activities such as dewatering can reduce groundwater levels. This potential impact will be localised and unlikely to impact the surrounding environment.	Reduction in groundwater levels could reduce water availability for water dependent receptors and water users (i.e. groundwater abstractions). Dewatering during construction will be kept to a minimum and only undertaken where required to limit any reduction in groundwater recharge.	Low	Low	Not significant
Groundwater aquifers	Increase in winter precipitation rate	Possible	Changes in groundwater flow and levels. Construction and operation: An increase in groundwater level may increase the possibility of groundwater levels rising closer to the ground surface/mixing with potential shallower contamination (within Made Ground) which would otherwise not be encountered. This would increase the likelihood of potential impact on groundwater quality locally.	Potential for increase in groundwater levels and associated groundwater flooding. Flood consequence assessment will be based on flood risk incorporating estimated climate change over the life of the project. It is likely that the adjustment to the hydrogeological regime would remain localised and of relatively low magnitude.	Low	Low	Not significant

Discipline/ Receptor	Climate Hazard	Likelihood of hazard occurring	Likely ICCIs identified	Description of ICCI and embedded mitigation	Likelihood of ICCI occurring	Consequence	Significance
Groundwater aquifers	Sea Level rise	Possible	Changes in groundwater flow and levels. And potential to move saline interface landward. Construction and operation: An increase in groundwater level may increase the possibility of groundwater levels rising closer to the ground surface/mixing with potential shallower contamination (within Made Ground) which would otherwise not be encountered. Dewatering activities can lead to the saline interface being drawn in land. This potential impact will be localised and unlikely to impact the surrounding environment.	Potential for saline interface to move landward. Dewatering during construction will be kept to a minimum and only undertaken where required to limit saline intrusion. It is likely that the potential saline intrusion would remain localised and of relatively low magnitude.	Low	Low	Not significant
Groundwater aquifers	Storm surges	Unlikely	Changes in groundwater flow and levels. Construction and operation: An increase in groundwater level may increase the possibility of groundwater levels rising closer to the ground surface/mixing with potential shallower contamination (within Made Ground) which would	Potential for increase in groundwater levels and associated groundwater flooding. Flood consequence assessment will be based on flood risk incorporating estimated climate change over the life of the project. It is likely that the adjustment to the hydrogeological regime would remain localised and of relatively low magnitude.	Low	Low	Not significant

Discipline/ Receptor	Climate Hazard	Likelihood of hazard occurring	Likely ICCIs identified	Description of ICCI and embedded mitigation	Likelihood of ICCI occurring	Consequence	Significance
			otherwise not be encountered. Dewatering activities can lead to the saline interface being drawn in land. This potential impact will be localised and unlikely to impact the surrounding environment.				
Groundwater aquifers	Increase in occurrences of drought	Possible	Reduction in precipitation could reduce groundwater levels. Summer droughts could also reduce water quality from reduced dilution of pollutants during the summer therefore increasing pollutants when precipitation events occur. This potential impact will be localised and unlikely to impact the surrounding environment.	Reduction in groundwater levels could reduce water availability for water dependent receptors and water users (i.e. groundwater abstractions). Dewatering during construction will be kept to a minimum and only undertaken where required to limit any reduction in groundwater recharge. Construction works will have a negligible impact on water quality due to mitigation measures implemented through the CoCP.	Low	Low	Not significant
Geology and Ground Conditions							
Groundwater	Increase to winter rainfall	Very likely	An increase in groundwater level may increase the possibility of groundwater levels rising closer to the ground surface / mixing with potential shallower contamination (within Made Ground) which would otherwise not be	During construction, groundwater quality may be temporarily adversely affected due to potential ground disturbance/dewatering. The potential rise in groundwater level may require additional dewatering considerations, which may decrease groundwater quality through mobilizing existing contamination.	Moderate	Low	Not significant

Discipline/ Receptor	Climate Hazard	Likelihood of hazard occurring	Likely ICCIs identified	Description of ICCI and embedded mitigation	Likelihood of ICCI occurring	Consequence	Significance
			encountered. This would increase the likelihood of potential impact on groundwater quality	However, these would be incorporated into the design works. Contamination which may be encountered during construction will have been removed, remediated or mitigated to some extent. Maintenance and operation of the Proposed Development will be in accordance with environmental legislation and good practice. Therefore, it is unlikely that there will be an increased risk to groundwater quality should levels rise.			
Human Health	Increase in annual temperature	Very likely	Increase in dust generation which may increase potential exposure to dusts/contaminants impacting human health	During the construction phase, extended dry spells may cause increased dust production. This consequence is minimized as far as reasonably practicable, through the measures incorporated into the draft CEMP (e.g. reduce dust emissions through the effective transportation and storage of materials).	Moderate	Low	Not significant
Human Health							
Human Health	Increase in mean annual maximum air temperature.	Possible (Construction)	Increased dust production during construction due to more hot days, impacting human health.	During construction, an increase in air temperatures may cause increased dust pollution which could affect human receptors suffering from respiratory conditions. This consequence would be minimised as far as is reasonably practicable, through measures required by the	Low	Low	Not significant

Discipline/ Receptor	Climate Hazard	Likelihood of hazard occurring	Likely ICCIs identified	Description of ICCI and embedded mitigation	Likelihood of ICCI occurring	Consequence	Significance
				Code of Construction Practice (CoCP) (e.g. reduce dust emissions through the effective transportation and storage of materials), including the proposed monitoring regime.			

References

Ref 1. Flintshire County Council. (2017). Management of Surface Water for New Development: Supplementary Planning Guidance Note 29. Retrieved from https://www.flintshire.gov.uk/en/PDFFiles/Planning/Adopted-SPGNs/SPGN-No-29.-Management-of-Surface-Water-for-New-Development.pdf