



ENVIRONMENTAL STATEMENT: 6.3 APPENDIX 12-1: IN-COMBINATION CLIMATE CHANGE IMPACTS ASSESSMENT

DECARBONISATION

Cory Decarbonisation Project

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Revision A

APPENDIX 12-1: IN-COMBINATION CLIMATE CHANGE IMPACTS ASSESSMENT

1.1. INTRODUCTION

- 1.1.1. The In-combination Climate Change Impacts (ICCI) assessment is presented in **Table 12-1** below. The assessment considers the extent to which climate change exacerbates or ameliorates the potential effects identified within each of the technical assessments presented in **Chapters 5: Air Quality (Volume 1)** to **Chapter 11: Water Environment and Flood Risk (Volume 1)** and **Chapter 13: Greenhouse Gases (Volume 1)** to **Chapter 20: Major Accidents and Disasters (Volume 1)**.
- 1.1.2. The ICCI assessment presented in this technical appendix has been informed by a summary of the future baseline presented within **Chapter 12: Climate Resilience (Volume 1)**. Professional judgement has been used to assess how potential effects presented within the technical assessments will be affected by climate change.

IN-COMBINATION CLIMATE CHANGE IMPACTS ASSESSMENT

Table 12-1: In-Combination Climate Change Impacts Assessment

EIA Topic	Climate Hazard	Potential Impacts of Climate Change	Mitigation
Chapter 5: Air Quality	<ul style="list-style-type: none"> ● extreme temperature events; and ● drought. 	<p>During the construction phase, climate change could result in persistent meteorological conditions that either act to increase risk from dust deposition (prolonged drought) or to decrease risk (prolonged unsettled weather). During the operation phase, climate change might affect dispersion patterns due to increased temperatures and changes to wind speeds. However, it is unlikely to significantly change the magnitude of the change in ground level concentrations between the baseline and Proposed Scheme scenarios for all modelled sources.</p>	<p>No additional mitigation is required beyond those measures set out in Chapter 5: Air Quality (Volume 1), which are considered sufficient to address risks from increased air pollution.</p>
Chapter 6: Noise and Vibration	<ul style="list-style-type: none"> ● extreme temperature events; ● drought; and ● gales, high winds and storms. 	<p>Construction noise will be managed through the measures set out in the Outline CoCP (Document Reference 7.4) and due to the relatively short construction period, the potential in-combination impacts resulting from climate change are not expected to exacerbate the construction noise and vibration effects reported in Chapter 6: Noise and Vibration (Volume 1).</p>	<p>No additional mitigation is required beyond those measures set out in Chapter 6: Noise and Vibration (Volume 1) as these remain effective in the context of anticipated climate change scenarios.</p>

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		<p>The changes in wind speed and humidity are unlikely to significantly amplify noise and vibration during the operation phase of the Proposed Scheme due to the proximity of the nearest sensitive receptors.</p>	
<p>Chapter 7: Terrestrial Biodiversity</p>	<ul style="list-style-type: none"> • changes in annual average precipitation; • extreme precipitation events (flooding); • drought; • changes in annual average temperature; and • extreme temperature events. 	<p>Effects on species are considered to include changes in distribution and abundance, the timing of seasonal events and habitat use and consequential changes in the composition of plant and animal communities. Habitats and ecosystems are also likely to change in character.</p> <p>There is strong evidence that climate change is affecting UK terrestrial biodiversity, as described in Section 7.6 of Chapter 7: Terrestrial Biodiversity (Volume 1).</p> <p>Although there may be some changes in species populations and distribution in the longer term, the majority of species and habitats included within the technical assessment are likely to remain stable in the short term (construction phase of the Proposed Scheme). It is therefore considered unlikely that the ecological baseline will change significantly during construction.</p>	<p>The planting proposed within the design of the Proposed Scheme would contain multiple plant and tree species to reduce the risk of potentially invasive species dominating the Mitigation and Enhancement Area and maximising resilience against the potential for pests and diseases. Planting proposals for species selection should specify a selection of drought-resistant species.</p> <p>Planting proposals are included in the Outline LaBARDS (Document Reference 7.9). A full LaBARDS will be developed in substantial accordance with this outline, which is secured by a requirement of the Draft DCO (Document Reference 3.1).</p>

EIA Topic	Climate Hazard	Potential Impacts of Climate Change	Mitigation
		<p>There may be some changes to species populations and distribution in the longer term and throughout the operation of the Proposed Scheme. However, it is difficult to predict, with considerable confidence, the likely response of the key ecological features to climatic change.</p>	
<p>Chapter 8: Marine Biodiversity</p>	<ul style="list-style-type: none"> ● extreme temperature events; ● changes in annual average temperature; ● gales, high winds and storms; ● sea level rise; and ● storm surge and storm tide. 	<p>Impacts on species are considered to include changes in distribution and abundance, the timing of seasonal events and habitat use and, consequential changes in the composition of marine communities. Marine communities are also likely to change in character.</p> <p>There is strong evidence that climate change is affecting UK marine biodiversity, as described in Chapter 8: Marine Biodiversity (Volume 1).</p> <p>Although there may be some changes in species populations and distribution in the longer term, the majority of species and habitats included within the technical assessment are likely to remain stable in the short term (construction phase of the Proposed Scheme). It is therefore considered unlikely that the marine biodiversity baseline will change significantly during construction.</p>	<p>Maintenance dredging will be subject to approval by the MMO and PLA who will be able to ensure that impacts consider the latest understanding of the baseline environment.</p>

EIA Topic	Climate Hazard	Potential Impacts of Climate Change	Mitigation
		<p>There may be some changes to marine species populations and distribution in the longer term and throughout the operation of the Proposed Scheme. Notably:</p> <ul style="list-style-type: none"> • rising sea levels may result in an increase in the habitat available for subtidal species and a reduction for intertidal adapted species during the operation phase; • changes in annual average temperature may lead to increases in water temperature within the River Thames, which may result in increased habitat viability for INNS. This may cause the degradation or loss of the plankton, benthic invertebrate and fish community in the surrounding area; and • changing water temperatures may also cause a shift in community composition with colder water adapted species, moving northwards to be replaced by more southern adapted species. <p>However, it is difficult to predict with confidence, the likely response of the key marine biodiversity features to climatic change.</p>	

EIA Topic	Climate Hazard	Potential Impacts of Climate Change	Mitigation
Chapter 9: Historic Environment	<ul style="list-style-type: none"> ● extreme precipitation events (flooding); ● extreme temperature events; ● changes in annual average temperature; ● drought; ● storm surge and storm tide; and ● sea level rise. 	<p>Increased rainfall, sea levels and storm events, leading to fluvial erosion pose a risk to archaeology (e.g. buried deposits preserved within the former floodplain environment, particularly any deposits within the foreshore).</p> <p>Drier summers could cause droughts and ground shrinkage. Greater extremes and fluctuations of temperature will increase the thermal expansion and contraction of materials such as wood, stone, metal and paint. Where archaeological remains are present in waterlogged ground, drier conditions could lead to the degradation of such features and evidence (through drying out), leading to a loss of heritage significance. In all likelihood, this is not anticipated to lead to a significant elevated effect when considered in combination with the historic environment assessment (Chapter 9: Historic Environment (Volume 1)).</p> <p>In drier conditions, the risk of soil erosion increases, as well as soil shrinkage, which can cause subsidence, structural deformation and collapse. There are no standing historic buildings recorded on the Site which would potentially be impacted by shrinkage.</p>	<p>No additional mitigation is required beyond those measures set out in Chapter 9: Historic Environment (Volume 1) as these remain effective in the context of anticipated climate change scenarios.</p>

EIA Topic	Climate Hazard	Potential Impacts of Climate Change	Mitigation
Chapter 10: Townscape and Visual	<ul style="list-style-type: none"> ● extreme precipitation events (flooding); ● extreme temperature events; ● changes in annual average temperature; ● gales, high winds and storms; ● storm surge and storm tide; and ● sea level rise. 	<p>Potential increase in failed proposed mitigation planting and the management of new and existing planting due to heatwaves and drought.</p> <p>Potential loss of vegetation cover due to scorching leading to destabilisation of soil structure.</p> <p>Potential longer growing season, more vigorous vegetation growth in spring and autumn.</p> <p>Potential damage to planting from high winds and rain infiltration into surfaces and materials.</p> <p>Soil erosion leads to destabilisation.</p>	<p>The planting proposed within the design of the Proposed Scheme considers species selection, mixes and avoidance of single species used in mitigation planting, for example, sourcing from local suppliers and ensuring species are suitable for local conditions, resilient to threats, pests, climate change and diseases. Planting proposals for species selection should specify a selection of drought-resistant species.</p> <p>Planting proposals are included in the Outline LaBARDS (Document Reference 7.9), a full LaBARDS will be developed in substantial accordance with this outline, compliance with which is secured by a requirement of the Draft DCO (Document Reference 3.1).</p> <p>Sustainable Urban Drainage Systems (SuDs) are included as part of the Outline Drainage Strategy (Document Reference 7.2), a full Drainage Strategy will be developed in substantial accordance with this outline, compliance with which is secured by a requirement of the Daft DCO (Document Reference 3.1).</p>

EIA Topic	Climate Hazard	Potential Impacts of Climate Change	Mitigation
			Additional mitigation is outlined in Chapter 10: Townscape and Visual (Volume 1) .
Chapter 11: Water Environment and Flood Risk	<ul style="list-style-type: none"> ● extreme precipitation events (flooding); ● extreme temperature events; ● changes in annual average temperature; ● gales, high winds and storms; ● drought; ● storm surge and storm tide; and ● sea level rise. 	<p>The most likely change would be associated with an increase in peak river flows, sea levels and peak rainfall intensity. The Proposed Scheme is located within a Flood Zone 3 designated area. Peak rainfall intensity may increase as a result of climate change, which could potentially increase the risk of fluvial and surface water flooding to the Proposed Scheme. Additionally, the sea levels may rise which could increase the risk of overtopping/ breach of the River Thames flood defences.</p> <p>This may increase the frequency of flood risk to identified receptors and increase the extent of Flood Zone 3, resulting in a greater area of the Proposed Scheme being at risk of fluvial flooding.</p> <p>Potentially drier summers, including drought, could lead to increasing soil moisture deficit and reduce groundwater storage and thus overall groundwater levels.</p> <p>Changes in groundwater flow and levels.</p> <p>Increase flood risk, increased discharge volume and surface water run-off.</p>	<p>The drainage strategy for the Proposed Scheme will be developed to account for future increases in extreme rainfall in accordance with the Environment Agency’s guidance – this will be able to be confirmed in the approval of the full strategy pursuant to the Draft DCO (Document Reference 3.1).</p> <p>Appendix 11-2: Flood Risk Assessment (Volume 3) has utilised the Environment Agency’s Thames Estuary 2100 water levels, to inform the design of the Proposed Scheme. This Environment Agency study incorporates the effects of climate change on extreme precipitation events, storm surge/storm tides and sea level rise. It demonstrates how the Proposed Scheme will be developed safely to manage the risk of flooding to and as a result of the Proposed Scheme.</p> <p>Compliance with the Flood Risk Assessment (Appendix 11-2: Flood Risk Assessment (Volume 3)) is</p>

EIA Topic	Climate Hazard	Potential Impacts of Climate Change	Mitigation
			<p>secured by a requirement of the Draft DCO (Document Reference 3.1). Appendix 11-3: Groundwater Impact Assessment (Volume 3) outlines mitigation required for changes in groundwater flow and levels which are included in the Mitigation Schedule (Document reference 7.8). Additional mitigation is outlined in Chapter 11: Water Environment and Flood Risk (Volume 1).</p>
<p>Chapter 13: Greenhouse Gases</p>	<p>not applicable.</p>	<p>Anthropogenic greenhouse gas emissions are contributing to global warming; anything that increases or decreases greenhouse gas emissions is therefore inherently linked to climate change. The Proposed Scheme enables the long term storage of carbon dioxide and therefore aims to counter current increases in carbon emissions in the atmosphere.</p> <p>No impacts are anticipated.</p>	<p>No additional mitigation is required beyond those measures set out in Chapter 13: Greenhouse Gases (Volume 1) as climate change is a result of the accumulation of greenhouse gases in the atmosphere.</p>

EIA Topic	Climate Hazard	Potential Impacts of Climate Change	Mitigation
Chapter 14: Population, Health and Land Use	<ul style="list-style-type: none"> ● extreme precipitation events (flooding); ● extreme temperature events; ● gales, high winds and storms; ● drought; ● storm surge and storm tide; and ● sea level rise. 	<p>Increased frequency and intensity of storm events lead to reduced opportunities for the general population to access and enjoy open space and nature, reduced suitability of conditions for active travel options.</p>	<p>No additional mitigation is required beyond those measures set out in Chapter 14: Population, Health and Land Use (Volume 1), which are considered sufficient to address any risks to population, human health and land use.</p>
Chapter 15: Socio-economics	<ul style="list-style-type: none"> ● extreme precipitation events (flooding); ● extreme temperature events; ● changes in annual average temperature; ● gales, high winds and storms; ● drought; ● storm surge and storm tide; and ● sea level rise. 	<p>Access to the Site being severed from flooding during construction works.</p> <p>Access to car parking and land being severed from flooding at the Site and in the surrounding area.</p>	<p>No additional mitigation is required beyond those measures set out in Chapter 15: Socio-economics (Volume 1). Any potential impacts associated with flooding are covered in Chapter 11: Water Environment and Flood Risk (Volume 1).</p>

EIA Topic	Climate Hazard	Potential Impacts of Climate Change	Mitigation
Chapter 16: Materials and Waste	<ul style="list-style-type: none"> ● extreme precipitation events (flooding); ● extreme temperature events; ● gales, high winds and storms; and ● drought. 	<p>Stockpiles of bulk material assets may be compromised, or damaged during extreme weather events, adversely impacting the quality of raw construction materials.</p>	<p>No additional mitigation is required beyond those measures set out in Chapter 16: Materials and Waste (Volume 1) as these remain effective in the context of anticipated climate change scenarios.</p>
Chapter 17: Ground Conditions and Soils	<ul style="list-style-type: none"> ● extreme precipitation events (flooding); ● extreme temperature events; ● drought; and ● sea level rise. 	<p>Potential future increases or decreases in precipitation could affect groundwater quality underlying the Site as potential contaminants currently above the groundwater table could be mobilised.</p>	<p>No additional mitigation is required beyond those measures set out in Chapter 17: Ground Conditions and Soils (Volume 1) as these remain effective in the context of anticipated climate change scenarios.</p>
Chapter 18: Landside Transport	<ul style="list-style-type: none"> ● extreme precipitation events (flooding); ● extreme temperature events; ● changes in annual average temperature; ● gales, high winds and storms; and ● drought. 	<p>Potential for increased disruption due to increased frequency of transport routes becoming unviable or inaccessible. Climate change is not anticipated to alter the effects reported in Chapter 18: Landside Transport (Volume 1).</p> <p>The Framework CTMP (Document Reference 7.7) considers vehicular routing in the event of extreme weather conditions during the construction phase.</p> <p>The Outline EPRP (Document Reference 7.11) considers vehicular routing in the event</p>	<p>No additional mitigation is required beyond those measures set out in Chapter 18: Landside Transport (Volume 1), Framework CTMP (Document Reference 7.7) and the Outline EPRP (Document Reference 7.11).</p>

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		of extreme weather conditions during the operation phase.	
Chapter 19: Marine Navigation	<ul style="list-style-type: none"> ● extreme precipitation events (flooding); ● extreme temperature events; ● changes in annual average temperature; ● gales, high winds and storms; ● storm surge and storm tide; and ● sea level rise. 	<p>River levels are expected to rise as a result of climate change. As a result, the water level will be elevated in comparison to the Proposed Jetty deck level, causing the vessel to be positioned at an even higher level relative to both the Proposed Jetty deck and dolphins. This could affect vessel mooring line angles, as well as the clearance of the deck. However, water level rise has been accounted for in the Proposed Jetty design, therefore there is no anticipated effect. River level rise has been accounted for in the design of the Proposed Jetty.</p> <p>Extreme flood events are likely to become more frequent and more severe (i.e. a higher water level), which will impact vessel movements, such as more difficult vessel control during the berthing and unberthing stages, and the positioning and vessel movement whilst at berth, which could result in increased strain on fenders, ropes and the vessel.</p>	<p>No additional mitigation is required beyond those measures set out in Chapter 19: Marine Navigation (Volume 1) and Appendix 19-1: Preliminary Navigation Risk Assessment (Volume 3) as rising and extreme water levels having been accounted for in the design of the Proposed Jetty, specifically the deck level of the loading platform, walkways, and dolphins.</p> <p>This includes no berthing being undertaken during extreme flood events.</p>

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		Extreme flood events are likely to become more frequent and more severe (i.e. a higher water level).	
Chapter 20: Major Accidents and Disasters	<ul style="list-style-type: none"> ● extreme precipitation events (flooding); ● extreme temperature events; ● changes in annual average temperature; ● gales, high winds and storms; ● drought; ● storm surge and storm tide; and ● sea level rise. 	<p>The potential major accident and disaster events that have been considered within this chapter have been assessed against likely climate hazards, as set out within Chapter 12: Climate Resilience (Volume 1).</p>	<p>No additional mitigation is required beyond those measures set out in Chapter 20: Major Accidents and Disasters (Volume 1). The vulnerability of the Proposed Scheme to the risk of major accident and disaster events identified is not anticipated to change as a result of these climate hazards.</p>



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