Preliminary Environmental Information Report

Volume 2

Chapter 8: Climatic Factors

8 Climatic Factors

8.1 Introduction

8.1.1.1 This chapter of our Preliminary Environmental Information Report (PEIR) considers the effects from construction and operation of the River Thames Scheme (RTS) ('the project') in relation to climatic factors. Within this chapter we have included topic specific sections on:

- Legislation, policy and guidance (noting any changes since Environmental Impact Assessment (EIA) scoping);
- Engagement with consultees, including responses to comments received on the RTS EIA Scoping Report;
- The assessment methodology for this topic (again noting any changes or updates since EIA scoping);
- Key environmental considerations and opportunities,
- Primary and tertiary mitigation;
- Our preliminary assessment of effects;
- Secondary mitigation; and
- Future work for this topic of our EIA.

8.1.1.2 For a summary of the key baseline elements associated with climatic factors see Section 5.4.

8.1.1.3 The study area for both climate change mitigation and climate change resilience and adaptation will be as described in Section 8.2.3 of our RTS EIA Scoping Report (Environment Agency & Surrey County Council, October 2022) ('our EIA Scoping Report'). Some minor amendments have been made to account for updates to the PEIR design parameters and project boundary for our EIA PEIR, however the criteria used to determine the study area has remained the same. The updates are described in Section 2.4 of Chapter 2: Project Description.

8.1.1.4 For both the climate change mitigation assessment and the climate change resilience assessment, the study area comprises the area within the project boundary for our EIA PEIR, plus a 500m buffer, or if greater, the area of the 1 in 100 year floodplain (i.e. the area with a one per cent chance of flooding in any given year) that will experience a change in flood extent as a result of the project. The climate mitigation assessment

study area is the same as the climate change resilience assessment study area due to the requirement to include the construction and likely operational traffic routes and buildings with the potential to flood under a 1 in 100 year flood event (see Figure 5.5).

8.1.1.5 Aspects of this chapter have overlaps with other chapters of our PEIR, including Chapter 7: Biodiversity, Chapter 10: Flood Risk, Chapter 11: Health, Chapter 13: Materials and Waste, Chapter 15: Socio-Economics and Chapter 18: Water Environment.

8.1.1.6 The assessment will consider the likely significant effects of the project upon climate change, including against greenhouse gas emissions contextualised against science-based targets, and the resilience of the project to climate change effects. For the purpose of this assessment, the term 'climate change mitigation' refers to the likely significant effects arising from the project on climate (greenhouse gas (GHG) emissions), whereas 'climate change adaptation' refers to the risk and likely significant effects from projected future climate change on the project. Climate change mitigation and climate change adaptation will be considered separately for assessment purposes, as they affect vastly different spatial scales and follow distinct methodologies.

8.1.1.7 This chapter therefore includes subheadings to cover:

- Climate change mitigation (identification, management and minimisation of GHG emissions associated with construction and operation of the project); and
- Climate change resilience and adaptation (CCR) (climate change risk assessment) during the construction and operation of the project from future climate change and potential In-Combination Climate Impacts (ICCI) with other EIA topics).

8.2 Legislation, Policy and Guidance

8.2.1.1 A summary of key legislation, policy and guidance relevant to climatic factors is provided in Appendix M of the EIA Scoping Report. Since the publication of our EIA Scoping Report in October 2022, the National Policy Statement for Water Resources Infrastructure (NPS) has been updated and finalised (Defra, 2023). No notable changes to the NPS from the draft NPS (published in 2018) have been identified as relevant to this chapter. However, since October 2022, the following new guidance has

been introduced. The standard has an expanded scope, a new emphasis on whole life carbon, and a stronger alignment with the transition to a net zero carbon economy by 2050.

PAS 2080: 2023 (Carbon Management in Buildings and Infrastructure) (to replace PAS 2080:2016) – launched in April 2023

8.2.1.2 The guidance states that:

It was identified that infrastructure is responsible for over 50% of the UK's carbon emissions, therefore PAS 2080 was designed to specifically address the management of carbon in infrastructure.

It looks at the whole life cycle of the carbon used on projects and promotes reduced carbon, reduced cost infrastructure delivery and a culture of challenge in the infrastructure value chain where innovation can be fostered.

Environmental Improvement Plan: 2023 (First Revision of the 25 Year Environment Plan)

8.2.1.3 The plan states it will:

- *Update on progress and plans to reach net zero;*
- *Publish a Land Use Framework in 2023, setting out how the balance between multiple demands on land including climate mitigation and adaptation will be achieved;*
- *Publish the third National Adaptation Programme (NAP3) in 2023 that will set out the five year strategy to build the UK's climate resilience; and*
- *Continue the role as a global leader in tackling climate change, biodiversity loss and land degradation and push for an integrated approach to international action.*

Climate change is also exacerbating natural hazards and the risk they pose to our health, the environment, and to our economy – hence the goal of a reduced risk of harm from environmental hazards. It will:

- *Deliver an investment plan to improve coastal and flood defences, including £100 million on the most frequently flooded areas.*

8.3 Engagement

8.3.1 Responses to EIA Scoping

8.3.1.1 Table 8-1 below summarises the comments and responses received on our Scoping Report following formal submission to the Planning Inspectorate (PINS) including the PINS EIA Scoping Opinion (dated 15 November 2022) ('the PINS Scoping Opinion') and any key comments received from statutory consultees. Full consultee comments on our EIA Scoping Report and our responses to these comments are provided in Appendix 4.1.

Table 8-1: Responses to comments received on the EIA Scoping Report

Consultee or Organisation	Summary of comment	Project Response
PINS	The EIA Scoping Report proposes to scope out impacts from general maintenance, which are described in EIA Scoping Report Section 4.3.2 and across multiple chapters. However, the long-term maintenance activities required to ensure that the design profile is maintained are not described and the Inspectorate considers that this could include activities such as dredging or structural work which have potential to give rise to significant pollution and hydromorphological effects. In the absence of further details regarding the extent and nature of such effects, the Inspectorate does not consider that this matter may be scoped out. The ES should explain the likely maintenance activities and provide an outline of the operational maintenance plan, demonstrating how this would mitigate any likely significant effects.	Maintenance of the channel to restore the design profile was originally scoped into the Biodiversity and Water Environment topics, and has now also been scoped into the Climatic Factors, Flood Risk, Health, Landscape and Visual, and Materials and Waste topics as per the PINS scoping response. The ES and supporting Application material will clearly set out our approach to the maintenance regime(s) to be put in place, however, effects from general maintenance activities remain scoped out of the EIA.
PINS	The EIA Scoping Report explains that effects such as construction of compounds, vehicle use for	We will expand our assessment to include construction activities in the climate change mitigation

Consultee or Organisation	Summary of comment	Project Response
	embankment construction, processing materials, transportation of hazardous materials/waste to licensed sites will be managed through the CEMP and licenses, and that an assessment should be scoped out on this basis. It is unclear why such activities should be excluded from the carbon footprint assessment. The ES should quantify the emissions from activities and compare them against appropriate thresholds to demonstrate whether significant effects are likely to occur.	assessment. This is reported in our PEIR and will be reported in the ES.
PINS	The EIA Scoping Report paragraph 8.7.2.1 states it is not anticipated there will be impacts during construction due to the associated short relative timescales. Whilst the Inspectorate acknowledges that the timescales are short, the nature of the Proposed Development means that it is likely to be readily influenced by climate related effects e.g. increased drought or flood frequency. The Inspectorate considers that the ES should address this risk and identify relevant mitigation where significant effects are likely. The Inspectorate notes that Appendix D does not address the risk of major flooding events, when referencing Chapter 8 Climate Change. The ES should set out the necessary mitigation required to address a significant flooding event during construction where significant effects are likely.	We will expand our assessment to include the climate change risks, resilience and adaptation for the construction phase of the project. Major flooding events will also be included within the Climatic Factors assessment. This is reported in our PEIR and will be reported in the ES.
Local Planning Authority	It is not clear what has been scoped out for construction phase GHG effects. Some movement of plant and	All effects from construction (including movement of plant and materials) will be scoped in

Consultee or Organisation	Summary of comment	Project Response
(LPA) Project Group	materials appears to be scoped out with little evidence as to why. Further justification should be provided.	to the climate change mitigation and climate change resilience and adaptation assessments.
LPA Project Group	It is not clear if the construction stage is being scoped out of further assessment in the Climate Change Adaptation assessment. It is not scoped out in Section 8.5, however there a several references to “not envisioning climate will have any effect on the project during the construction phase”. No justification is given to support this statement. If the construction stage is being proposed to be scoped out, further justification is required given that there is an abundance of evidence that climate change is having impacts already and the construction period will go into the next decade.	All effects from construction (including movement of plant and materials) will be scoped in to the climate change mitigation and climate change resilience and adaptation assessments, although it is noted that climate effects in comparison to the baseline will not greatly differ. This is reported in our PEIR and will be reported in the ES.

8.3.2 Other Engagement since EIA Scoping

8.3.2.1 Section 8.2.2 of our EIA Scoping Report summarises the stakeholder engagement relevant to the Climatic Factors topic that was undertaken prior to submission of the EIA Scoping Report.

8.3.2.2 No further engagement with statutory consultees in relation to this topic has been undertaken in the preparation of our PEIR assessment. Further engagement with statutory consultees will take place, as required, to inform the ES.

8.4 Methodology

8.4.1 Introduction

8.4.1.1 This section should be read in conjunction with Chapter 4 ‘Approach to the Environmental Assessment’ which sets out relevant information on the design parameters and information that have informed our PEIR

assessment, and how we have approached various aspects of the assessment including:

- The scope of the assessment;
- The methodology (including the approach to defining the baseline environment, topic study areas, and assessment methodology and criteria);
- The approach to mitigation; and
- The approach to cumulative effects.

8.4.1.2 The assessment methodology used for the Climatic Factors assessment in our PEIR and to be used in the Environmental Statement (ES) is presented in Section 8.7 of our EIA Scoping Report and updated below in Sections 8.4.2 to 8.4.5.

8.4.1.3 The assessment methodology broadly follows that as stated within our EIA Scoping Report. On receipt of the PINS Scoping Opinion (see also Section 8.3.1), the assessment methodology has been updated to include:

- An assessment of the climate change risks, resilience and adaptation for the construction phase of the project (in addition to the operational phase);
- An assessment of the construction phase GHG emissions of the project; and
- Consideration of long-term maintenance activities such as restoring the channel profile, including an outline of the operational maintenance plan, in the Outline Climate Change Adaptation Plan to demonstrate how this would mitigate any likely significant effects.

8.4.2 Climate Change Mitigation

8.4.2.1 At the time of our PEIR assessment, the quantitative data required to carry out a detailed assessment of GHG emissions is not yet available. A high level (reasonable worst case) assessment has been carried out for the construction and operation stage GHG emissions, outlining the potential sensitivity and magnitude of change and subsequent likely significance, alongside proposed mitigation. This has incorporated professional judgement. These likely significant effects will be refined when further quantified detail on the project GHG emissions is provided at the ES stage.

8.4.2.2 Construction and operation phase GHG emissions will be assessed within the ES and an inventory of direct and indirect emissions associated with the project created and quantified for the whole project lifecycle.

8.4.2.3 The assessment will consider whole life project GHG emissions data identified in the Carbon Management Plan, which will align with PAS 2080: 2023, and rely on the Environment Agency carbon calculator (which is part of the Whole Life (Construction) Eric Carbon Planning Tool). Any sources of emissions that are not expected to result in a material contribution to the overall total emissions (c. < five per cent of the total) will be identified and excluded from further assessment. Data will also be obtained from other Development Consent Order (DCO) documents, such as outputs from the Natural Capital Assessment and the Materials Management Plan. The Carbon Management Plan includes quantification of sequestered carbon within the project (for example, through habitat creation, enhancement or mitigation works), alongside the quantification of lifecycle GHGs outlined within PAS2080.

8.4.2.4 An assessment of 'embedded' GHG emissions associated with the materials used to construct the project will be produced. For those materials used, a set of robust GHG 'emissions factors' (i.e. GHG emissions resulting from a given unit of a source activity or material) will be applied, to enable a like for like comparison to be made. These emissions factors will be sourced primarily from the UK Government Greenhouse Gas Conversion factors for Company Reporting (UK Government, 2022) as well as the project Carbon Management Plan.

8.4.2.5 Residual GHG emissions (following mitigation) will be compared against the statutory UK carbon budgets in order to view the project's GHG contribution in the context of this.

8.4.2.6 Firstly in this assessment of significance and in accordance with the NPS on Water Resource Infrastructure, the emissions associated with construction and operation will be assessed *'against the water company's ability to deliver its contribution to the government's targets and commitments'*. To determine the likely significance of the effect, the Institute of Environment Management and Assessment (IEMA) guidance (IEMA, 2020a) (see Appendix M of our EIA Scoping Report) considers that, based upon the judgement of the practitioner, this can be assessed against whether the project is compatible with the achievement of a

science-based target, as described below. Significance rating is based upon the relationship between the sensitivity of the receptor and the net change of residual GHG emissions. This is a robust and industry accepted approach and in accordance with guidance and policy.

8.4.2.7 A carbon budget places a restriction on the total amount of GHGs that can be emitted over a certain period of time. In the UK, carbon budgets cover a period of five years (Table 8-3). They have been set up to the sixth carbon budget, which covers the period between 2033 and 2037. For each budget, GHG emission levels are reduced (e.g. from 965 $MtCO_2e$ for the sixth carbon budget compared to 1,725 $MtCO_2e$ for the fifth budget (2028- 2032) (DBEIS, 2016)). The receptor will be the global climatic system (more specifically, the contribution to carbon budget during which the emissions occur, underpinning science-based targets). The receptor is of a high sensitivity in relation to the carbon budgets, to reflect how close globally we are to the scientifically defined limit.

8.4.2.8 The likely significance of effect will be determined through applying net change of residual GHG emissions with sensitivity (carbon budgets), as per other EIA assessments. However, according to the IEMA GHG Guidance (IEMA, 2022a) *"the crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050."*

8.4.2.9 The assessment of GHGs does not include identification of local sensitive receptors, as GHG emissions do not directly affect specific locations, but lead to indirect effects by contributing to climate change. The sensitive receptor with respect to GHG emissions is therefore the atmosphere (which is always of high sensitivity), where GHGs contribute to increasing atmospheric temperatures and resultant climate change effects.

8.4.2.10 With regards to the magnitude of change, unlike other ES chapters, there are no impact descriptors for GHG emissions.

8.4.2.11 To establish the likely significance of the GHG emissions from a development therefore requires assessment of:

- Their consistency with policy requirements, since these have been specified to ensure the economy decarbonises in line with the UK's net zero target; and
- The degree to which the development has sought to mitigate its emissions.

8.4.2.12 Examining each of these dimensions allows the assessment to make professional judgement on the likely significance of effects based on a set of significance criteria established in the IEMA GHG Guidance, summarised in Table 8-2.

Table 8-2: GHG Significance Criteria

Significance Rating	Description	Criteria to Determine Significance of Net GHG Emissions
Major Adverse (Significant)	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.	The project's net 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.
Moderate Adverse (Significant)	A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.	The project's net 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.

Significance Rating	Description	Criteria to Determine Significance of Net GHG Emissions
Minor Adverse (Not Significant)	A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.	The project's net GHG impacts are: • fully consistent with applicable existing and emerging policy requirements; and • in line good practice design standards for projects of this type.
Negligible (Not Significant)	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.	The project's net GHG impacts are: • reduced through measures that go well beyond existing and emerging policy; and • better than good practice design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050.
Beneficial (Significant)	A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.	The project's net GHG impacts are: • below zero; and • it causes a reduction in atmospheric GHG concentrations, whether directly or indirectly, compared to the without-project baseline.

8.4.2.13 Some impacts, such as those from changes to travel patterns or changes to flooding damage, are expected to contribute to the overall whole life GHG emissions in a positive way (i.e. changes to flood damage will avoid

future maintenance and repair). Commentary on improvements to active travel (walking and cycling infrastructure) will be provided in the ES either qualitatively or quantitatively dependant on the data available at the ES stage. There will also be reductions in the number of properties that will be subject to flooding, which will reduce the amount of damage and replacement to goods and fittings. This improvement will be quantified at the ES stage. Both these impacts have been qualitatively assessed in this PEIR chapter.

8.4.2.14 Table 8-3 shows the statutory UK carbon budgets up to 2037 (i.e. out to the Sixth Carbon Budget), which highlights a decline in the amount of GHG emissions that the UK can legally emit going into the future. This means that sources of emissions that make an increased contribution to the UK's carbon inventory will negatively affect the ability of the UK to meet its carbon budgets in the future. The appropriate carbon budget will be used within the assessment of the construction and operation phase, to assess the contribution and subsequent likely significance of effect.

Table 8-3: Relevant Carbon Budgets for the Assessment

Carbon Budget	Total Budget ($MtCO_2e$)
3rd (2018-2022)	123.3
4th (2023-2027)	65.9
5th (2028-2032)	34.3
6th (2033-2037)	17.9

8.4.2.15 The Environment Agency (2019) has set an ambitious target to be net zero by 2030. They therefore have a science-based target for an emissions reduction of 45 per cent by 2030 with the remaining 55 per cent to be offset. The Environment Agency has also adopted PAS 2080 into project processes using a carbon hierarchy to reduce whole life carbon and carbon calculators to project and record carbon data at the project level, which has been implemented on the RTS. They are adopting a carbon budgeting approach to place the same value on carbon reporting as on financial reporting. Surrey County Council has also adopted Surrey's Climate Change Strategy (Surrey County Council, 2020d), a shared ambition of Surrey's 12 local authorities. This outlines how, in

order to achieve net zero carbon emissions by 2050, current carbon emissions across all areas of Surrey's activity must be reduced by 46 per cent by 2025, and by 67 per cent by 2030, compared to 2019 levels.

Assumptions and Limitations

8.4.2.16 Where assumptions need to be made, they will be selected to present the reasonable worst-case scenario for that particular item/factor.

8.4.2.17 It is also assumed that operational energy use and transport linked to the project will produce less GHG emissions over time, as the grid is decarbonised.

8.4.2.18 Detailed data is not always available for particular emissions sources, and in these cases a description of the assumptions made (such as using benchmarks) will be stated.

8.4.3 Climate Change Resilience and Adaptation

8.4.3.1 At the time of our PEIR submission, sufficient design and construction information required to carry out a detailed CCR assessment is not yet available. However, a high level CCR assessment has been carried out based on data available at the time of submission.

8.4.3.2 The CCR assessment considers the resilience of the project itself to the physical impacts of climate change from construction and operation.

8.4.3.3 IEMA guidance 'Climate Change Resilience and Adaptation' (IEMA, 2020a) (see Appendix M of our EIA Scoping Report), defines climate change resilience as the '*ability to respond to changes in climate. If a receptor or project has good climate change resilience, it is able to respond to the changes in climate in a way that ensures it retains much of its original function and form. A receptor or project that has poor climate change resilience will lose much of its original function or form as the climate changes'.*

8.4.3.4 The CCR assessment differs from many other EIA topics in that it considers how the resilience of a development is affected by an external factor (climate change) not how environmental receptors are affected by a development's impacts. Consequently, the CCR impacts cannot be assigned significance with respect to the severity of impacts in the same way as for the other environmental topics. Instead a risk-analysis based

approach has been used for our PEIR CCR assessment and will be completed in greater detail at the ES Stage. The process followed for this high level CCR assessment is therefore described in paragraphs 8.4.3.5 to 8.4.3.7 and provided in Section 8.7.3.

8.4.3.5 The risk assessment uses a combination of likelihood of climate impacts occurring and the potential consequence of those impacts to determine risk according to a five-point scale: very low, low, medium, high or very high. Any effects determined to be high or very high risk have been identified as requiring mitigation. For the purposes of the CCR, the 2080s Future Climate Scenario has been used. This is in accordance with the IEMA guidance 'Climate Change Resilience and Adaptation' (IEMA, 2020a), which states that *"Recommended best practice is to use the higher emissions scenario (RCP 8.5 in the latest UKCP18 projections) at the 50th percentile, for the 2080s timelines, unless a substantiated case can be made for not doing this (e.g. anticipated lifespan of the project is shorter than 2080s)".*

8.4.3.6 The methodology for the CCR risk assessment is as follows (and is consistent with the IEMA Guidance mentioned in paragraph 8.4.3.3 above):

1. Identify the receptors (e.g. assets and asset groups) included within the project that would be potentially at risk from climate change impacts;
2. Identify climate change hazards (e.g. floods, heatwaves, droughts) that may affect the geographical location of the project;
3. Determine the likelihood of climate change hazards (e.g. floods, heatwaves, droughts) occurring in the future, based on the future climate change projections;
4. Determine the likelihood of the hazard having a climate change impact on the receptors, noting that:
    - the likelihood of each impact will be determined based on the definitions in Table 8.4 below;
    - the assessment will be qualitative using expert judgement and in discussion with the design team, with the exception of flood risk for which quantitative assessments will be carried out; and

- existing or embedded mitigation and enhancement measures will be taken into account in the assignment of a likelihood category.

5. Determine the consequence of each impact based on the definitions in Table 8-5 below; and
6. Determine the risk level and thus significance of effect on receptors based on a combination of likelihood and consequence, as shown in Table 8-6. The assessment is qualitative and uses expert judgement based on knowledge of similar projects, engagement with the wider project team and a review of relevant literature.

Table 8-4: Criteria to Assess Likelihood of Climate Change Impact

Level of Likelihood	Definition of Likelihood
Very Low	It is highly improbable that the impact will occur during the operational phase of the assets or systems or the construction phase.
Low	Impact is not expected to occur during the operational phase of the assets or systems or the construction phase.
Medium	Impact may occur during the operational phases of the assets or systems or the construction phase.
High	Impact is expected to occur during the lifespan of the assets or systems or the construction phase.
Very High	It is highly probable that the impact will occur during the lifetime of assets or systems or the construction phase.

Table 8-5: Criteria Used to Assess Consequence of a Climate Change Impact

Measure of Consequence	Description
Negligible	No damage to the project, minimal adverse effects on health, safety and the environment or financial loss. Little change to service and disruption lasting less than one day.
Minor Adverse	Localised disruption or loss of service. No permanent damage, minor restoration work required: disruption lasting less than one day. Small financial losses and/or slight adverse health or environmental effects.
Moderate Adverse	Limited damage and loss of service with damage recoverable by maintenance or minor repair. Disruption lasting more than one day but less than one week. Moderate financial losses. Adverse effects on health or the environment.
Large Adverse	Extensive damage and severe loss of service. Disruption lasting more than one week. Early renewal of 50-90% of the project. Permanent physical injuries and/or fatalities. Major financial loss. Large adverse effect on the environment, requiring remediation.
Very Large Adverse	Permanent damage and complete loss of service. Disruption lasting more than one week. Early renewal of the project >90%. Severe health effects or fatalities. Extreme financial loss. Very large adverse loss to the environment requiring remediation and restoration.

Table 8-6: Significance of Effects Matrix (Consequence of Climate Change Impact against Likelihood of Climate Change Impact)

	Negligible Consequence	Minor Adverse Consequence	Moderate Adverse Consequence	Large Adverse Consequence	Very Large Adverse Consequence
Very High Likelihood	Not Significant	Significant	Significant	Significant	Significant
High Likelihood	Not Significant	Not Significant	Significant	Significant	Significant
Medium Likelihood	Not Significant	Not Significant	Not Significant	Significant	Significant
Low Likelihood	Not Significant	Not Significant	Not Significant	Significant	Significant
Very Low Likelihood	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

8.4.3.7 Step 7 of the IEMA Guidance listed in paragraph 8.4.3.6 highlights the need for adaptive management with regards to climate change resilience and adaptation. Adaptive management is the process that enables uncertainty to be included in operational decision-making. By taking an adaptive management approach, projects can introduce additional mitigation if required to avoid unacceptable effects on the receiving environment.

8.4.3.8 The ES will:

- Assess whether the adopted measures are likely to be sufficient for the project's whole lifespan, or whether further interventions are likely to be required in the future;
- Identify those parts of the project management measures that should be kept under periodic review, and/or passive provision be made for their incorporation; and
- Suggest a mechanism for how the likely significant effects from climate change can be monitored in the future, and updated over the project's lifespan.

8.4.3.9 On the basis of the above, an Outline Climate Change Adaptation Plan will be produced at the ES stage as a measure to mitigate against the likely significant effects of climate change on generic receptors. It will identify those parts of the project's design or management procedure that relate to resilience/adaptation (as well as those that could be the responsibility of others, such as future operators, Local Planning Authorities (LPAs) and neighbouring landowners).

8.4.4 In-Combination Climate Change Impacts

8.4.4.1 The ICCI assessment assesses the extent to which climate change exacerbates an effect on an environmental receptor considered in other technical assessments (Chapters 6-18).

8.4.4.2 The ICCI assessment methodology has been developed in line with the IEMA Guidance (IEMA, 2020a).

8.4.4.3 The ICCI assessment follows the same approach to assessing impacts and determining significance as for each of the PEIR topics, but with the added consideration of future climate change projections.

Phase 1 (PEIR Stage) Assessment of In-Combination Climate Change Impact Likelihood

8.4.4.4 Phase 1 aims to screen out any ICCIs that are considered too unlikely to occur, e.g. the climate change hazard does not influence the impact identified by the topic, and therefore they do not require further assessment.

8.4.4.5 It considers the effects already identified in other technical assessments based upon their own impact assessment methodologies, and the current PEIR design parameters. It also identifies any embedded mitigation measures proposed by the environmental discipline and the engineering and design teams.

8.4.4.6 A list of potential ICCIs was collated based on:

- the initial assessment from the other technical assessments based on their own assessment methodologies; and
- a literature review of recent guidance, science and policy relating to climate change impacts on the relevant receptors.

8.4.4.7 The likelihood of each potential ICCI occurring was assessed using expert judgement based on two factors:

- the likelihood of the climate impact occurring, based on the climate hazard assessment and
- the likelihood of the climate impact changing an effect already identified by another technical assessment within this PEIR. This assessment was based on the literature review and expert judgement of the climate and environmental specialists.

8.4.4.8 Due to the uncertainties involved, the potential ICCIs were assessed to be either 'likely' or 'unlikely'. Where the ICCI was deemed 'unlikely', either due to the climate impact being unlikely to occur or there being a weak link between the climate impact and the effect on a receptor, it will not be taken forward to Phase 2 (ES Stage).

Phase 2 (ES Stage) Assessment of In-Combination Climate Change Impact Likelihood

8.4.4.9 Phase 2 (ES Stage) will assess the consequence and likelihood of the ICCIs identified in Phase 1, enabling a determination of significance for each.

8.4.4.10 The effect of an ICCI will be considered significant if:

- an effect which was previously not significant becomes significant against the significance criteria used by the discipline due to climate change (e.g. an increase in consequence of effect or an increase in scale of change); and/or
- an existing significant effect is exacerbated against the significance criteria used by the discipline due to climate change (e.g. a further increase in the consequence of effect or a further increase in scale of change).

8.4.4.11 If an effect was not previously significant and any exacerbation by climate change does not change this, the ICCI effect is not significant.

Future Baseline Environment for Climate Change Resilience and In-Combination Climate Change Impacts Assessments

8.4.4.12 The current baseline environment for consideration within the Climatic Factors assessments is as described within our EIA Scoping Report and Chapter 5 of this PEIR. The future baseline to be considered within the Climate Change Resilience and ICCI assessments is described here.

8.4.4.13 Information regarding historic climate conditions was obtained from the UKCP18 observed climate data sets. All the data for the current baseline were obtained from this source.

8.4.4.14 The future climate projections for South East England, based on RCP8.5, are presented and described below for the climatic variables:

- Temperature;
- Precipitation; and
- Wind speed.

8.4.4.15 When assessing the effects of climate change on the engineering and design and in a technical PEIR/ES chapter, the data presented in the proceeding tables will be used as the basis for the assessments.

Temperature

8.4.4.16 Table 8-7 presents the projected air temperature data for South East England up until 2099, in 20 year time-slices, from 2020. In line with the Met Office predictions, the data presents future summers to be hotter and winters to be warmer, with the annual temperature steadily increasing.

8.4.4.17 As the assessment considers both construction and future year operational phases, different time-slices will be considered. When developing adaptive mitigation measures, consideration will be given to the appropriate time to implement these measures based on the temperature increase at each time-slice.

8.4.4.18 The data are presented for the Annual Mean, Summer Maximum, and Winter Minimum temperature for each time-slice. Construction phase assessments will use the 2020-2039 time-slice and operational phase assessments will use the 2080-2099 time-slice.

Table 8-7: Air Temperature Anomaly at 1.5m Above Ground Level (°C) Relative to Baseline

	Predicted Change from Baseline (°C) Annual Mean: 50th Percentile	Predicted Change from Baseline (°C) Summer Max: 50th Percentile	Predicted Change from Baseline (°C) Winter Min: 50th Percentile
Time-slice 2020-2039	1.05	1.50	0.91
Time-slice 2040-2059	1.87	2.77	1.65
Time-slice 2060-2079	2.96	4.28	2.53
Time-slice 2080-2099	4.29	6.43	3.60

Precipitation

8.4.4.19 Table 8-8 presents the predicted percentage change in precipitation levels relative to the 1980-2000 baseline. In line with the Met Office predictions, the data presents future summers to be drier and winters to be wetter. The data also predicts that annual precipitation will reduce marginally up to 2099.

8.4.4.20 When developing adaptive mitigation measures, consideration will be given to the appropriate time to implement these measures based on the precipitation change at each time-slice. The data are presented for the seasonal extremes of winter and summer, as well as an Annual projection for each time-slice.

Table 8-8: Precipitation Rate Anomaly (%) Relative to Baseline

	Predicted Change from Baseline (°C) Annual: 50th Percentile	Predicted Change from Baseline (°C) Summer: 50th Percentile	Predicted Change from Baseline (°C) Winter: 50th Percentile
Time-slice 2020-2039	1.39	1.50	0.91
Time-slice 2040-2059	-0.10	2.77	1.65
Time-slice 2060-2079	-0.04	4.28	2.53
Time-slice 2080-2099	-0.83	6.43	3.60

Wind Speed

8.4.4.21 UKCP18 probabilistic data for wind is not available, nor any RCP8.5 data for wind through alternative projections. However, the Met Office's UKCP18 Factsheet describes how there is expected to be an increase in near surface wind speeds over the UK for the second half of the 21st century for the winter season when more significant wind speeds are experienced. This is accompanied by an increase in frequency of winter storms over the UK. It is therefore assumed for the purposes of the operational phase (the construction phase will occur in the first half of the 21st century and therefore not be materially different) that there will be more future storm events within the 2080-2099 time-slice compared to current day, and without adaptation, the damage and associated economic losses from extreme winds will rise due to increasing asset values.

Summary

8.4.4.22 Based on the above UKCP data, information regarding the key climate change hazards for the South East of England from construction is given below:

- Increase in the number of extremely hot days; and
- Climate changes in 2020-2039 time period and increased probability of extreme weather events such as increased temperature and

increased rainfall. This period will see climate change effects much less pronounced than those outlined in the operational phase of the project.

8.4.4.23 The key climate change hazards to be considered through the project's operational phase are:

- Increased number of extremely hot days;
- Extremely cold weather;
- Increased frequency of flooding from river, surface and ground sources;
- Increased risk of drought;
- Extreme wind speeds; and
- Increased risk of lightning strikes.

8.4.5 Cumulative Effects

8.4.5.1 Noting the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 and the IEMA guidance (IEMA, 2020a), cumulative GHG emissions will be addressed in detail in the ES, within the Climatic Factors ES chapter. This cumulative assessment will be set out separately from the other technical ES chapters, given that GHG emissions do not have a local geographical limit, and therefore there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other.

8.4.5.2 In terms of climate change adaptation, relevant cumulative schemes will be investigated to consider their resilience to the future climate scenario, and any changes to climatic risks in conjunction with the project. ICCI has been prepared through discussion with the technical specialists for the other PEIR chapters, whereby the effects identified have been reviewed in terms of the future climate scenarios' ability to affect both the sensitivity of the receptor and the magnitude of the change.

Assumptions and Limitations

8.4.5.3 The climate change adaptation assessment will provide an indication of the likely significant effects of climate change on the project based on professional judgement and engagement with the project team.

8.4.5.4 The UKCP18 projections do not provide a single precise prediction of how weather and climate will change years into the future. Instead UKCP18 provides ranges that aim to capture a spread of possible climate responses. This better represents the uncertainty of climate prediction science. It should also be noted that the level of uncertainty of the projections is dependent on the climate variable, for example, there is greater confidence around changes in temperature than there is on changes in wind. In the climate vulnerability assessment this will be considered when assessing the likelihood of effects. Key assumptions and limitations of UKCP18 data can be found on the Met Office Website (Lowe et al., 2018).

8.4.5.5 There are also general limitations at the PEIR stage, whereby specific details relating to construction worksite layouts and traffic data (amongst others) are not fully known, hence a quantified assessment of GHGs can only be carried out at the ES Stage.

8.5 Key Environmental Considerations and Opportunities

8.5.1.1 Below are the key considerations and opportunities with respect to Climatic Factors.

8.5.2 Climate Change Mitigation

8.5.2.1 The project has the potential to give rise to negative likely significant effects on climate by causing emissions of GHGs to be dispersed into the atmosphere from its construction and operational life.

8.5.2.2 Through ongoing use of the project's Carbon Management Plan, opportunities will be explored throughout the project development to minimise GHG emissions and where possible sequester carbon or generate renewable energy. Early calculations have ascertained that, through reducing the carbon footprint of the project and the use of carbon sequestration, carbon emissions through the construction and operational phases of the project are likely to be further reduced.

8.5.3 Climate Change Resilience and Adaptation

8.5.3.1 The project is a climate change adaptation project in itself by reducing flood risk overall as one measure to improve resilience. As part of the project, landscape and blue and green infrastructure will be designed to

be resilient and adapted for climate change i.e. so that they will continue to function even during flood events and particularly with future climate change as flood levels will continue to increase. In addition, they will work to improve interception of precipitation, reduce urban heat island effects and provide additional solar shading through additional canopy cover.

8.5.3.2 Based on the UKCP18 predictions, it is widely accepted that on average, the UK will experience hotter and drier summers, and warmer, wetter winters. Additionally, it is likely that climate change will increase the intensity and frequency of extreme weather events such as storms, heavy rainfall and heatwaves. The project has an opportunity to be designed to help alleviate the effects of these events.

8.6 Primary and Tertiary Mitigation

8.6.1 Introduction

8.6.1.1 On consideration of mitigation for the climate change mitigation assessment, reference should be made to Paragraph 4.4.16 of the NPS for Water Resources Infrastructure (Defra, 2023a), which states: '*The Secretary of State will consider the effectiveness of the mitigation measures in order to ensure that the greenhouse gas emissions are as low as reasonably practicable. The Secretary of State's view of the adequacy of the mitigation measures will be a material factor in the decision-making process, particularly the applicant's proposed offsetting measures, for any significant emissions expected from the project'.*

8.6.2 Primary Mitigation

Climate Change Mitigation

8.6.2.1 The carbon reduction hierarchy will be applied through the design process as primary mitigation for climate change mitigation effects. This will work to either eliminate, reduce, substitute or compensate carbon emissions (in order of preference).

Climate Change Resilience and Adaptation

8.6.2.2 Paragraph 8.5.3.1 explains how the project in itself is proposed to manage future climate change resilience and adaptation. In addition to this, the following primary mitigation is proposed in relation to climate change

resilience and adaptation effects. These will all ensure the project is designed to withstand effects from projected future climate change:

- Sustainable Drainage Systems (SuDS) will be designed for the operational stage to ensure no increase in surface water flooding, including an appropriate allowance for climate change.
- SuDS will be designed to manage flood risk through construction (that could be exacerbated by climate change). Design of construction surface water drainage systems (storage and conveyance of stormwater restricted appropriately) including temporary SuDS / specific plant (pumps / tanks) will also address water quality.
- An Outline Climate Adaptation Plan will be developed. Measures to make the project more resilient to projected future climate change could include monitoring and adaptive management such as:
  - Reduction of water consumption through the specification of highly efficient water installations. Further consideration of rainwater/greywater harvesting should be given, including the future adaptability to collect this in greater quantities;
  - Public realm could be installed with drinking water fountains;
  - External spaces could be planted with a range of species, including native and drought resistant species. Tree sizes and pits should be appropriately sized to deal with periods of drought in summers; and
  - Heating systems (if any are proposed) could be provided with zonal, programmable thermostatic controls linked to a master control panel which will allow occupants to control each zone independently for maximum flexibility. Hot water could be separately programmable.
- Climate Resilient Design for temporary and permanent structures and buildings. Design of temporary and permanent office buildings using appropriate guidance from the Chartered Institute of Building Service Engineers (CIBSE) to mitigate against the predicted effects of climate change.

8.6.3 Tertiary Mitigation

Climate Change Mitigation

8.6.3.1 Tertiary mitigation is proposed to reduce GHG emissions from construction and operation. Tertiary mitigation proposed in relation to climate change mitigation effects includes:

- Production of a Materials Management Strategy. The strategy will work to reduce GHG emissions and is being developed in parallel to the DCO process. It will:
  - Detail efficient management proposals for processing, recovery, or re-use of materials and waste generated by the project, reducing the need to import materials from off-site, and minimise the volume of unsuitable materials requiring off-site disposal.
  - Be implemented in line with relevant permitting requirements and CL:AIRE DoWCoP; and
  - Inform design development and the development of appropriate primary, tertiary, and secondary mitigation.
- Production of a Carbon Management Plan, in line with the requirements of PAS2080, that aims to:
  - Identify and deliver opportunities to reduce embodied and operational carbon as part of design development and through optimal construction methodologies;
  - Identify opportunities for delivery of carbon mitigation;
  - Identify and deliver carbon savings through the management and use of materials excavated on site; and
  - Identify and deliver renewable energy provision opportunities.
- Application of the waste hierarchy, for example, reduce generation of waste, reuse of arisings, treatment of waste to make it suitable for reuse etc.
- Production of a Site Waste Management Plan to set out the amount and type of waste and how it will be reused, recycled or disposed of in accordance with legislation.
- Use of Non-Road Mobile Machinery (NRMM) with low emissions.
- Production of a Construction Traffic Management Plan to ensure all highways works are safe, planned and co-ordinated in order to secure the expeditious movement of traffic on the road network; and to minimise inconvenience to the public. This would work to manage

and/or reduce congestion and associated GHG emissions as a result of traffic. It could include measures such as (this is not an exhaustive list):
    - Necessary modification to parking restrictions or suspensions (amending existing or implementing new);
    - Necessary bus stop suspensions or relocations;
    - Details on off-site lorry holding arrangements (site management); and
    - How stakeholder and community liaison and co-ordination will be managed.
- Production of a Construction Logistics Plan to detail the logistics management arrangements for worksites to minimise impacts on communities and the environment from transportation of construction materials/waste. This would work to manage and/or reduce congestion and associated emissions as a result of traffic. This could include measures such as (this is not an exhaustive list):
    - Details on standard working hours and any requirements to restrict vehicle movements during certain sensitive periods of the day/month/year;
    - Any commitments on construction vehicle routing e.g. any requirements to avoid certain junctions/routes/air pollution hotspots (e.g. AQMAs); and
    - Co-ordination with local stakeholders (Local Highway Authority and developers) to minimise collective disruption to operation of the highway from construction works.
- Production of a Construction Travel Plan to proactively manage and influence workforce (and visitor) travel to and from worksites to limit traffic movement and the associated GHG emissions, and reduce disruption in the vicinity of the site. This could include measures such as (this is not an exhaustive list):
    - Details of access arrangements to worksites to facilitate convenient and safe access for pedestrians, cyclists and drivers;
    - Provision of current information on the local transport network (pedestrian, cycle, bus, rail) to enable workers and visitors to make informed decisions on their travel behaviour; and
    - Objectives to be set, monitored and reported against to limit and reduce car travel.
- Production of an Operational Travel Plan to proactively manage and influence employee (and visitor) travel to and from facilities being

provided at the New Green and Blue Open Spaces, to encourage the use of sustainable travel methods and reduce GHG emissions and network disruption locally to these facilities. This could include measures such as (this is not an exhaustive list):

- Details of access arrangements, vehicle/electric vehicle/bicycle parking availability and information on the local transport network (pedestrian, cycle, bus, rail) to enable employees and visitors to make informed decisions on their travel behaviour;
- Provision of secure and convenient cycle storage and facilities such as changing facilities and lockers; and
- Objectives to be set, monitored and reported against to limit and reduce car travel.

Climate Change Resilience and Adaptation

8.6.3.2 There is currently no tertiary mitigation proposed for climate change resilience and adaptation effects.

8.7 Preliminary Assessment of Likely Significant Effects

8.7.1 Introduction

8.7.1.1 Our PEIR adopts a precautionary approach. Assessments reported within this chapter are a preliminary assessment of potential likely significant environmental effects based on the design parameters set out in Chapter 2. This precautionary approach has been taken for the PEIR as there is some information on the project that is currently incomplete and the parameters within Chapter 2 are high level and account for a range of uses and allowance for design development within a boundary that could possibly be refined once this work has been completed. For example, some designs, construction and mitigation details (and therefore also land requirements) or baseline information is still required from further surveys, assessments and/or consultation feedback. In making a determination of likely significant effects, we have considered the sensitivity of receptors (a receptor being a feature of the environment that responds to change) and the potential magnitude (i.e. size) of change caused by the RTS. The methodology for defining sensitivity and magnitude varies by topic and is defined in the topic sections of our Scoping Report and in Section 8.4 of this chapter.

8.7.1.2 We are committed to including mitigation measures as necessary to address likely significant negative environmental effects as far as reasonably practicable. Both primary and tertiary mitigation are considered to form part of the RTS; those applicable to this topic are set out in Section 8.6. Several of these mitigation measures are still being developed, and therefore as a precaution, the preliminary assessment of effects for our PEIR does not assume full achievement of these in considering if a project effect is likely to be significant (Appendix 4.2 identifies the implementation status of primary and tertiary mitigation for the PEIR assessment). Furthermore, the potential likely significant effects reported within our PEIR have been assessed prior to the implementation of secondary mitigation measures, those applicable to this topic are set out in Section 8.7.4. These secondary mitigation measures are the subject of further development; and given they are still being developed, are not able to be applied to develop a 'residual' effects assessment.

8.7.1.3 Our PEIR is based on the latest design and construction parameters and baseline information. As such the findings of the preliminary environmental appraisal presented within our PEIR may be subject to change as the design progresses, as mitigation is further developed or information from further studies becomes available, such as our work to produce a Carbon Management Plan to influence ongoing project designs. The final assessment of effects undertaken as part of the EIA and reported within the ES will be based on the latest information available at that time.

8.7.2 Climate Change Mitigation

Potential Likely Significant Effects

8.7.2.1 Our preliminary assessment of likely significant environmental effects has identified the potential for the following likely significant effects from construction in relation to climate change mitigation:

- Temporary significant increase in GHGs in the atmosphere as a result of all construction activities. This effect would be negative.

8.7.2.2 Our preliminary assessment of likely significant environmental effects has identified the potential for the following significant effects from operation in relation to climate change mitigation:

- Permanent significant increase in GHGs in the atmosphere as a result of operational activities, such as channel maintenance and operational works, altered traffic movements and through the provision of habitats and renewable energy. The effect would vary from neutral to negative.

8.7.2.3 It should be noted that, as explained in Section 8.7.1.1, the likely significant effects reported here are based on a reasonable worst-case assessment. The project is expected to provide many beneficial effects, most notably a reduction in flood risk to surrounding properties and the avoidance of carbon costs of recovery activities. These likely significant effects will be reviewed and quantified at the ES stage. Given the Environment Agency's target to be net zero by 2030, Surrey County Council's net zero targets, the decarbonisation agenda within this project and the knowledge that a Carbon Management Plan will influence the project designs (see Section 8.5.2.2), it is expected that the likely significant effects reported here will be reduced at the ES stage.

8.7.2.4 Further details of the potential likely significant effects from construction and operation with respect to receptors, project components and project activities, in relation to climate change mitigation can be found in Table 1 and 2 in Appendix 8.1.

Potential Likely Non-Significant Effects

8.7.2.5 Further details of the non-significant effects from construction and operation with respect to receptors, project components and project activities, in relation to climate change mitigation can be found in Table 3 and 4 in Appendix 8.1.

8.7.2.6 Some examples of climate change mitigation non-significant effects include (this is not an exhaustive list):

- Excavated material (including gravel) will be produced as a by-product of the project, and re-used within the project, causing a temporary avoidance of GHG emissions from excavating and transporting material from elsewhere. The effect would be positive.
- Potential for positive permanent effects on the global atmosphere through habitat planting and maturation of vegetation acting as a sink for carbon, generation of renewable energy promoting low carbon

sources of energy and active travel encouraging less GHG intensive forms of transportation.

8.7.3 Climate Change Resilience and Adaptation

8.7.3.1 As discussed in paragraph 8.4.3.5, the process followed for this high level CCR assessment is described here. No likely significant effects upon climate change and adaptation have been identified from this preliminary assessment.

Potential Likely Non-Significant Effects from Construction

8.7.3.2 As per the methodology described in paragraph 8.4.3.6, we have identified the following potential climate change hazards upon climate resilience and adaptation during the 2020-2039 time period and increased probability of extreme weather events:

- increased risk of overheating in temporary building accommodation for construction workers likely to have negative effects on working conditions during construction of the project (high likelihood); and
- disruption or hinderance of construction processes (high likelihood).

8.7.3.3 The receptors likely to experience these climate change hazards are identified below:

- temporary buildings for construction workers and site offices;
- temporary transport infrastructure;
- third party utilities;
- material handling areas;
- excavations; and
- construction processes

8.7.3.4 As per the methodology described in paragraph 8.4.3.6, construction-related climate resilience and adaptation effects are anticipated to be ‘high’ in likelihood and ‘minor adverse’ in consequence. These effects are therefore deemed likely not significant. Our proposed primary mitigation (see paragraph 8.6.2.2) will embed measures to mitigate climate change throughout construction.

Potential Likely Non-Significant Effects from Operation

8.7.3.5 As per the methodology described in paragraph 8.4.3.6, we have identified the following potential climate change hazards upon climate resilience and adaptation resulting from an anticipated future increase in the number of extremely hot days, extreme cold weather, increased frequency of flooding from river, surface and groundwater sources, increased risk of drought and extreme wind speeds:

- overheating could lead to structural damage to proposed bridges and road re-alignment (medium likelihood);
- overheating in structures and buildings leading to thermal discomfort and heat stress (high likelihood);
- overheating could lead to negative working conditions for site operatives (medium likelihood);
- increased hot days could lead to drought with effects on habitats by lack of water/drying out (medium likelihood);
- sensitive equipment and mechanical operating mechanisms may fail to operate correctly due to high temperatures (medium likelihood);
- reliability of journeys may reduce at low temperatures due to cracking of pavement surfaces (low likelihood);
- possible increase in number of days outside the normally acceptable range for heating systems and increased risk of heating ventilation and air conditioning failure (low likelihood);
- possible negative health implications for site users and disruption to service operation of the project (low likelihood);
- flooding of infrastructure during operation: inundation of transportation network (access roads and railways) (medium likelihood);
- flooding of new buildings and structures, basements and sub structures causing permanent damage (medium likelihood);
- flooding affecting the ability to carry out monitoring and maintenance activities (medium likelihood);
- flooding could drown any New Green and Blue Open Space (low likelihood);
- increased heat stress to plants/landscaped areas (medium likelihood);
- increased water stress for new buildings (medium likelihood);

- failure or damage to parts of structure or infrastructure as a result of changes in strong winds and gustiness (medium likelihood); and
- failure or damage to parts of structures or infrastructure as a result of changes in strong winds and gustiness (medium likelihood).

8.7.3.6 The receptors likely to experience these climate change hazards are identified below:

- transport infrastructure;
- flood channel capacity improvements;
- permanent new structures;
- habitat creation areas/landscaping;
- utilities; and
- proposed maintenance.

8.7.3.7 As per the methodology described in paragraph 8.4.3.6 operational-related climate resilience and adaptation effects will range from low to high likelihood, with the consequence for each impact being minor adverse. Operational-related climate resilience and adaptation effects are therefore anticipated to be likely not significant. The proposed primary mitigation (see paragraph 8.6.2.2) will embed measures to mitigate climate change from operation from the outset.

8.7.3.8 A key project goal is alleviating flood risk, which in itself is a consequence of climate change. Positive effects on climate resilience, to be reviewed in the ongoing design at the ES stage, will include protection of buildings and spaces making them more resilient to future climate change, as well as a reduction in flood risk within the study area leading to an avoidance of flood damages to properties (such flood damages usually resulting in increased GHG emissions).

8.7.4 Secondary Mitigation

8.7.4.1 No further secondary mitigation is currently identified for climate change mitigation effects. Primary and tertiary mitigation measures specified for this assessment (see Section 8.6) will be developed to further reduce GHG emissions resulting from the project.

8.7.4.2 Secondary mitigation is not currently under consideration for climate resilience and adaptation effects as they are likely not significant. Key mitigation for climate resilience and adaptation is already accounted for as

primary mitigation through construction and operation (see paragraph 8.6.2.2).

8.7.4.3 Further mitigation may be proposed if considered necessary at the ES stage, to ensure any mitigation from the ES assessment continues to feed into the primary and tertiary mitigation measures and subsequently be embedded within the detailed designs or construction practises.

8.8 Further Work for the EIA

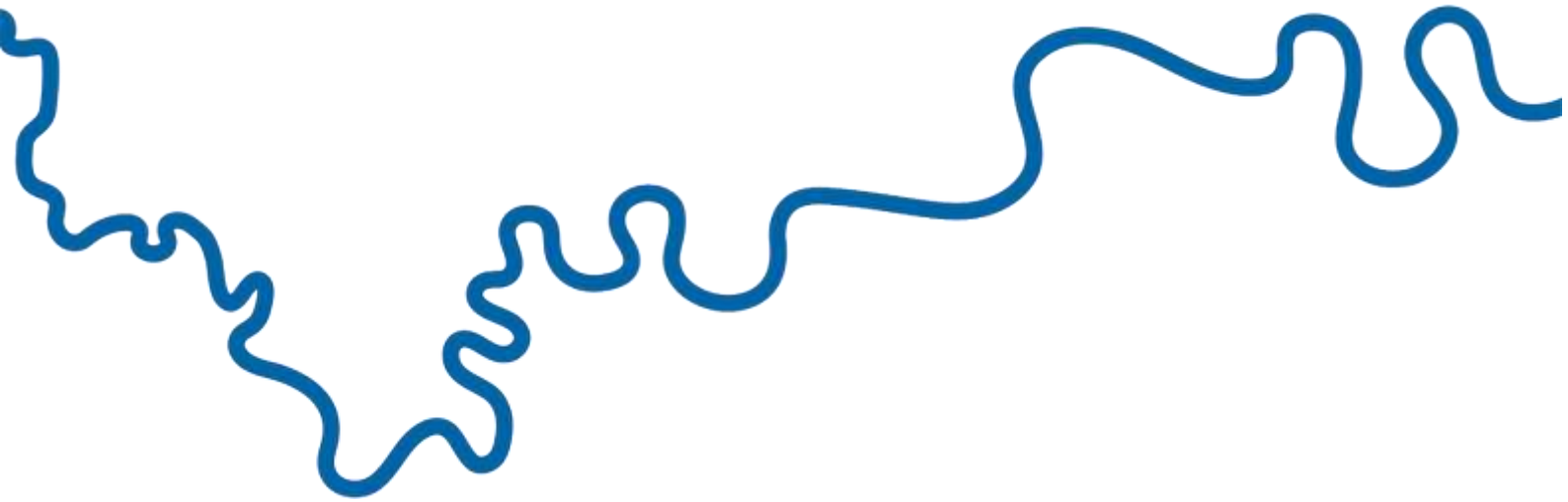
8.8.1.1 Detailed climate change mitigation and climate change resilience and adaptation assessments for construction and operation of the project will be undertaken in accordance with the methodology set out Section 8.4.2 and Section 8.4.3 above.

8.8.1.2 The assessment will be based on the effects scoped in the assessment and as per those included within Section 8.7 of this PEIR. It will consider any relevant aspects of PINS EIA Scoping Opinion and be informed by any further information received during the statutory consultation process. The mitigation measures set out in this chapter will be further developed and their ability to reduce effects identified within the ES.

8.8.1.3 The climate change mitigation assessment will be based on the information provided within the Carbon Management Plan which will align with PAS2080: 2023, as well as the Environment Agency carbon calculator (which is part of the Whole Life (Construction) Eric Carbon Planning Tool).

8.8.1.4 An Outline Climate Adaptation Plan is to be progressed through ongoing design and assessment and will be provided as an Appendix to the ES.

8.8.1.5 We consider that the further development of the project design and mitigation measures which will be reflected in the ES and DCO application, will enable a reduction in the scale of identified negative likely significant effects set out in this chapter.



SURREY COUNTY COUNCIL

Environment Agency

The River Thames Scheme represents a new landscape-based approach to creating healthier, more resilient and more sustainable communities by reducing the risk of flooding and creating high quality natural environments.

River Thames
Scheme