



# Lower Thames Crossing

## 7.2 Planning Statement

### Appendix I Carbon strategy and policy alignment (Tracked changes version)

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#### List of contents

	Page number
<b>Appendix I Carbon strategy and policy alignment .....</b>	<b>1</b>
<b>I.1 Executive summary.....</b>	<b>1</b>
<b>I.2 Update of Planning Statement Appendix I following tender process, November 2023 .....</b>	<b>2</b>
<b>I.3 Introduction .....</b>	<b>2</b>
<b>References .....</b>	<b>10</b>

**Deleted: Appendix I Carbon strategy and policy alignment 1¶**  
I.1 Executive summary 1¶  
I.2 Introduction 2¶  
**References 8¶**

## Appendix I Carbon strategy and policy alignment

### I.1 Executive summary

I.1.1 This Appendix has been updated to reflect the new post-tender carbon limit as secured through CBN04, presented in Appendix E and Appendix F of Version 2 of the Carbon and Energy Management Plan which has been similarly updated at Deadline 7 **[Document Reference 7.19 (2)]**. The tenders incorporated reduced baseline limits, from which the Applicant is able to commit to a reduced carbon limit of 1.44 million tCO<sub>2</sub>e of construction emissions, down from 1.763 million tCO<sub>2</sub>e secured in Version 1 of the First Iteration of the Carbon and Energy Management Plan **[APP-552]**.

I.1.2 This appendix sets out the Applicant's approach to carbon within the DCO application. It explains how the Project represents a step change in approach for a road scheme of this scale, in terms of the scope and nature of the measures which the Applicant is committing to deliver to reduce emissions during the construction and operation of the new road. Together with the policies which the Government has set out in its Decarbonising Transport Plan (2021), these measures ensure that the Project is aligned with a trajectory to net zero and that the Project's emissions would not therefore be significant, in accordance with relevant guidance.

## **I.2 Update of Planning Statement Appendix I following tender process, November 2023**

- I.2.1 The original Development Consent Order (DCO) application version of this document set out a series of mechanisms and processes designed to reduce the construction carbon emissions from the Project. Since the Planning Statement was submitted in October 2022, the Applicant has continued to explore ways in which GHG emissions can be reduced on the Project. The Applicant has progressed the procurement of the three design and build contracts and has received PAS 2080:2016 accreditation.
- 1.1.1 Appendix I to the Planning Statement has been updated to reflect:
- a. carbon savings achieved by embedding carbon in the procurement of its three design and build contracts
  - b. reallocation of land use change sequestration to align with PAS 2080:2023<sup>1</sup>
- 1.1.2 The effect of these two changes is to enable the Applicant to reduce the Project's maximum level of emissions (CBN04) to 1.44 million tCO<sub>2</sub>e. This reduction provides demonstrable evidence of the successful implementation of steps three and four of the First Iteration of the Carbon and Energy Management Plan (to select the right partners and set minimum standards).

## **I.3 Introduction**

- I.3.1 The Applicant has committed to '*use the Lower Thames Crossing scheme as a key project to test low carbon innovation and approaches*' in its move towards carbon neutral construction (National Highways, 2021). The Project will be used as a testbed to explore how the Applicant would reduce construction emissions to reach its target of achieving net zero carbon construction by 2040 (National Highways, 2021) and help the UK reach net zero by 2050, going beyond the requirements of current planning policy.
- I.3.2 This is one of the first major UK infrastructure projects to use carbon as a central issue in procurement to drive innovation and material efficiency from Contractors prior to detailed design and to incentivise further reductions in greenhouse gas (GHG) emissions.
- I.3.3 The Applicant fully understands that the route to a net zero construction industry remains uncertain with significant challenges presented by products like cement and steel, which have particularly high emissions from manufacturing. The Project is raising the bar for best practice in carbon reduction and carbon management, setting an example for other large scale

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<sup>1</sup> British Standards Institution (2023). PAS 2080:2023: Carbon Management in Infrastructure. London: British Standards Institution.

construction projects to replicate, learn from and build on. The aim is to make a significant step forward in the transition to low emissions construction. Using innovative, recycled, or sustainable materials, techniques and processes fit for the challenge presented by the transition to net zero emissions by 2050, the Project will start to demonstrate how this will be accomplished.

- I.3.4 This document has been produced to explain how the Applicant's approach goes beyond previous practice and the requirements of the National Policy Statement for National Networks (NPSNN), to push the construction industry towards a net zero trajectory.

### Carbon in National Planning Policy

- I.3.5 In setting out the requirements for promoters of Nationally Significant Infrastructure Projects on the road and rail networks, the NPSNN requires (at paragraph 5.18) applicants to demonstrate that their project would not have a material impact on the ability of Government to meet its carbon reduction targets.
- I.3.6 However, the Applicant's proposals for the Project seek to go beyond strict compliance with the NPSNN tests. This is evidenced through the detailed carbon reduction commitments made in the Carbon and Energy Management Plan (Application Document 7.19), which is discussed further below.
- I.3.7 The Applicant has already published a pathway to achieving net zero emissions across all its projects and operations. In *Net Zero Highways: our 2030 / 2040 / 2050 Plan* (National Highways, 2021), the Applicant has laid out a series of targets, including one for a 40-50% reduction in construction and maintenance emissions by 2030, 70-80% by 2035 and net zero by 2040. This last target is ten years ahead of the Government's net zero target for the UK's carbon account by 2050.
- I.3.8 In line with the aims of the Net Zero Highways Plan, the Applicant has been undertaking a number of activities to prepare National Highways for the challenge of emissions reduction. These have included:
- a. Setting up a special team to look at low carbon options for cement, steel and construction plant fuelling, including investigating the opportunity to benefit from a proposed green hydrogen fuel supply network in the lower Thames area.
  - b. Setting up a new environmental sustainability division to work with the Applicant's executive directors and board to deliver the carbon reduction targets set out in the Net Zero Highways Plan, including achieving net zero for corporate emissions by 2030, net zero for construction and maintenance emissions by 2040 and net zero for road user emissions by 2050.

- c. Reviewing and updating the Design Manual for Roads and Bridges to integrate net-zero carbon thinking. Updating engineering standards to permit the use of new low-carbon materials and processes is key to low carbon procurement.
- d. Collaboration with other major infrastructure providers such as HS2 and Network Rail to identify and share themes and understanding in relation to emissions reduction.

I.3.9 Maintaining a consistent approach to the Applicant's corporate plan has been a key theme.

I.3.10 The Development Consent Order (DCO) application for the Project, includes a legally binding Carbon and Energy Management Plan (Application Document 7.19), a first for the Applicant. This management plan commits to a series of measures which give effect to and set new best practice standards, to enable a step change in carbon reduction for new civil engineering projects. There will be three iterations of this document, the first is submitted with the DCO application, the second submitted by the Contractors to the Secretary of State for its approval prior to construction and the third prior to road opening to cover maintenance and replacements on the new road. Each iteration will be developed in accordance with the detailed frameworks and processes set out in the first iteration.

### Carbon mitigation in the preliminary design

I.3.11 The Applicant has worked to understand the best up-to-date construction materials and techniques that could be used and applied within the Project. The aim has been to incorporate good-practice emissions reductions, whilst not constraining the greater reductions likely to be achieved during detailed design and then construction. Over-specifying low carbon materials during preliminary design could reduce the freedom of Contractors to introduce even better performing materials as they become available.

I.3.12 The Applicant has adopted best low carbon practice in the Project's carbon model (as described in the Carbon and Energy Management Plan), and would encourage and incentivise the Project's Contractors to achieve further significant reductions during detailed design and construction.

I.3.13 A detailed and comprehensive carbon model for the construction and maintenance of the Project has been prepared by the Applicant. The goal in quantifying the Project's carbon emissions is to report forecast emissions and to identify the main contributors to the total. Reduction efforts will be focussed on these carbon emission hotspots.

I.3.14 The carbon model, following preliminary design, ~~forecast~~ total construction emissions of 1.763 million tCO<sub>2</sub>e. This ~~estimate represented~~ best practice in the

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industry at the time of submission (October 2022), as it incorporated an extensive range of commercially available, low carbon technologies and approaches. The Applicant included a legally binding commitment in the DCO application that net construction emissions will not exceed this figure.

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I.3.15 During the procurement of the design and build contracts, the Applicant included carbon as a key criterion in the tender evaluation (in line with commitment CBN01 [APP-552]). The Applicant presented bidders with a carbon limit aligned to the Project-wide maximum level of construction emissions of 1.763 million tCO<sub>2e</sub>, asked them to commit to this limit or a lower limit, and asked them to explain how they would go beyond this and construct the Project for the lowest practicable carbon emissions. The net effect of these lower carbon emission commitments is a revised carbon limit of 1.44 million tCO<sub>2e</sub>, a significant reduction of 323,000 tonnes from the estimated total of 1.763 million tCO<sub>2e</sub> which was set by CBN04 at the time of the DCO submission.

**Deleted:** This represents a challenging bar, which Contractors must commit to meet and better through their choice of materials and construction techniques such as low carbon cements, steel fibre reinforcement in the tunnel lining rather than emissions-heavy steel rebar, use of electric and hybrid plant for a proportion of construction activities and other low carbon practices. The specific materials and approaches are not mandated, not least because even better performing materials may become available, but the overall goal and framework for achieving it is committed through the Carbon and Energy Management Plan (Application Document 7.19).

I.3.16 This shows that the approach to construction emissions reduction has been successful to date, and that the civil engineering market is ready to be challenged to reduce the pollution arising from major projects.

I.3.17 As with the previous figure, the Contractors still retain the right to specify different materials and construction methods. It is important to note that there are numerous possible pathways to deliver the Project and reduce emissions. The actual pathway will be determined by the Contractors and their designers when developing the detailed design, procurement strategy and construction methodologies. Further details would be provided in the second iteration of the Carbon and Energy Management Plan once these have been finalised.

**Deleted:** The procurement process has been designed to set a carbon limit, for each of the three design and build contracts, consistent with an overall maximum level of emissions for the construction phase of the Project of 1.763 million tCO<sub>2e</sub>. ¶  
The Applicant has also committed through

I.3.18 A second change since the DCO application was submitted in October 2022 is that the Applicant has achieved the commitment, CBN13, made in the Carbon and Energy Management Plan [APP-552] to achieve PAS 2080 verification for the Project, this being the management standard titled 'Carbon Management in Infrastructure', published by the British Standards Institution in 2016. This is widely acknowledged as the best civil engineering carbon management system and requires the Applicant to continuously improve its emissions reduction trajectory. The Project achieved verification to this standard in January 2023.

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I.3.19 The Applicant is currently undergoing certification against the latest update to PAS 2080 (PAS 2080:2023 Carbon Management in Infrastructure (British Standards Institution, 2023)).

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I.3.20 All Contractors and their directly appointed sub-contractors on the Project would also need to attain PAS 2080 verification and maintain it for the duration of the construction phase. The Applicant is mandating this from the outset, so that there is a common language and approach throughout the supply chain.



## Construction carbon in the DCO application

- I.3.21 The Project's emissions are described in detail in ES Chapter 15: Climate (Application Document 6.1), along with an analysis of their significance and a description of the mitigation measures to be put in place to maximise carbon reduction.
- I.3.22 ~~By comparing the Project's construction emissions to the UK's carbon budgets, ES Chapter 15: Climate (Application Document 6.1) concludes that those emissions would not be significant. In this respect, the Project accounts for a small percentage of the Government's carbon budgets, while the Carbon and Energy Management Plan (Application Document 7.19) sets out the mechanisms by which the Project will achieve an industry leading position. The impact on the carbon budgets has been reduced by the revised carbon limit discussed in this report. The percentage contributions are now estimated to be 0.048% and 0.045% for the 4<sup>th</sup> and 5<sup>th</sup> carbon budgets respectively, reduced from 0.058% and 0.053% respectively previously.~~
- I.3.23 The Project's contribution to the 6<sup>th</sup> carbon budget is now estimated to be 0.045% down from 0.048%.
- I.3.24 A further analysis of significance was made using a method published by the Institute of Environmental Management & Assessment (IEMA). The IEMA guidance makes clear that the crux of significance is not whether the Project emits GHG emissions, or even the magnitude of those emissions, but whether the Project contributes to reducing GHG emissions relative to a baseline and is consistent with a trajectory towards net zero. In this respect, the Project not only accounts for a very small percentage of the Government's carbon budgets, but would also provide the step change proposed in National Highways' Net Zero Highways, which projects a trajectory of carbon reduction which is itself more demanding than the Government's targets.
- I.3.25 The further reduction achieved during procurement from 1.763 million tCO<sub>2</sub>e to 1.44 million tCO<sub>2</sub>e (equivalent to a 18% reduction) puts the Project on a steeper downward curve, from the already challenging 1.763 million tCO<sub>2</sub>e previously set as the carbon limit. Further reductions are expected as the Contractors commence their detailed designs, as this will reveal further detail of remaining carbon hotspots and allow designers to focus attention on efficiency, material selection, haulage distances and construction techniques. Reductions will be driven by the Contractors' own compliance with their PAS 2080 carbon management methods, with further reductions driven by the financial incentives put in place through the contract. All these actions should lead to further significant reductions, as the civil engineering industry continues to improve carbon efficiency and innovate at an increasingly rapid pace.

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- I.3.26 This 'First Iteration' of the Carbon and Energy Management Plan would be approved and committed to as part of the DCO. It is written to establish the mechanisms and processes that the Applicant is committing to, in relation to carbon emission reductions. Contractors must then prepare a 'Second Iteration' of the plan, which builds on the framework of the First Iteration and incorporates further measures to reduce emissions during the construction phase. The Contractors must submit their Second Iteration of the plan for approval by the Secretary of State before commencing work on site. The document must be compliant with the PAS 2080 carbon management system.
- I.3.27 Each of the Contractors' Carbon and Energy Management Plans would need to be refreshed annually to ensure it remains consistent with emerging best practice.
- I.3.28 Beyond the construction of the Project, the Applicant is committed to a long-term low carbon approach to managing and operating the new road. The DCO application therefore includes a requirement for the Applicant to prepare a 'Third Iteration' of the Carbon and Energy Management Plan in relation to the operational phase of the Project, which will set out how carbon emissions will be managed and minimised during the operation and maintenance of the new road. The Third Iteration of the Carbon and Energy Management Plan would also need to be submitted to the Secretary of State for approval.

### Mitigating carbon during construction

- I.3.29 The Project is one of the first major projects to implement PAS 2080 for both the Applicant and all of the main delivery partners. The first iteration of the Carbon and Energy Management Plan (Application Document 7.19) sets out a variety of carbon measures including requirements for Contractors to:
- a. Beat their own carbon target, which will be set as a contract requirement (that combined for the three contracts align with the reduced carbon limit 1.44 million tCO<sub>2</sub>e).
  - b. Document the assessment of carbon emissions for all asset designs, showing how low-carbon solutions have been adopted. Efficiency in design can lead to substantial reductions without recourse to special materials.
  - c. Appoint a director responsible for carbon reduction, as senior accountability for carbon reduction is known to assist in promoting emissions reduction.

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- d. Create a PAS 2080 compliant management plan for all construction activities, incorporating collaboration between the road and tunnel Contractors, which will set the agenda for carbon reduction throughout the construction period. The Applicant will review and approve these plans when they are updated annually.
- e. Achieve PAS 2080 verification within a year of appointment, which requires not only a full carbon management system, but continuous improvement.
- f. Manage a PAS 2080 compliant system which must be replicated by all their directly appointed sub-contractors.
- g. Report progress against their agreed carbon target quarterly to the Applicant.
- h. Create state of the art low carbon construction compounds, including commitments to the use of electric vehicles, renewable energy generation and provision for active transport.

I.3.30 The First Iteration of the Carbon and Energy Management Plan also requires the Applicant to undertake the following:

- a. Manage an agreed financial incentive for carbon reduction. This will be paid on completion as a reward for savings Contractors have made below the contracted target. This will be a cost-effective incentive, as many of the carbon savings will be made by efficient design and material savings. Effectively this is a double incentive if Contractors can save money by being efficient and then claim the incentive.
- b. Promote the use by Contractors of specially written enhancement clauses in the contract, which encourage the uptake of innovations and new emissions reduction opportunities.
- c. Publicly report progress on carbon reduction annually, which will also promote good Contractor behaviour.
- d. Achieve PAS 2080 verification for the Project and manage the integration of carbon reduction across all three contracts.

### Road user emissions

I.3.31 Traffic emissions have been calculated using the Department for Transport Emissions Factors Toolkit, Version 11 (Department for Environment, Food and Rural Affairs (Defra) (2021).

I.3.32 The net change in road-user emissions between scenarios with and without the Project shows an increase in GHG emissions resulting from changes in traffic on the network of 4.8 million tonnes carbon dioxide equivalent (tCO<sub>2e</sub>) over the

60-year appraisal period. However, this figure is substantially over-estimated because the Toolkit has not yet been updated to take full account of the Department for Transport's *Decarbonising transport: a better, greener Britain* (herein referred as the Transport Decarbonisation Plan (TDP)) (Department for Transport, 2021). The TDP includes a range of non-planning policies which will help to reduce carbon emissions over the transport network as a whole over time (including policies to decarbonise vehicles and radically reduce vehicle emissions).

- I.3.33 Recognising the government's commitment to achieve the outcomes set by the TDP, the Project has calculated a lower bound and an upper bound figure for the change in emissions resulting from the use of the Project, to reflect potential uncertainties in policy success within the TDP. These figures range from 1.17 million tCO<sub>2</sub>e for the upper bound, to 0.56 million tCO<sub>2</sub>e for the lower bound, giving a mean figure of 0.87 million tCO<sub>2</sub>e, which is a substantial reduction from the assessment of 4.8 million tCO<sub>2</sub>e based on Version 11 of the Emissions Factors Toolkit.

## References

- British Standards Institution (2016). PAS 2080, Carbon Management in Infrastructure, [British Standards Institution \(2023\). PAS 2080:2023: Carbon Management in Infrastructure. London: British Standards Institution.](#)
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- Institute of Environmental Management and Assessment Guide (2022). Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2<sup>nd</sup> Edition
- National Highways, 2021, Net zero highways: our 2030 / 2040 / 2050 plan

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