Climate Change and Government Policy

A303 Stonehenge Examination TR010025

Barry Garwood

Introduction

This document continues the discussion on Climate Change and Government Policy between Highways England and myself.

My original Relevant Representation, **RR-1651**, led to a response by Highway's England in their **AS-026** comments on Relevant Representations.

I replied to this with **REP3 -074**, which led to further response from Highways England with **REP4-036.**

I then replied to this with my **REP5-028,** part of which is reproduced below, along with Highways England's response, **REP7–021,** Section 15.1.

The above documents are available from the Examination Library and Relevant Representation Library.

The Conversation on Climate Change

Here I refer to Highways England's **REP7-021**, Section 15.1.1 **,** which quotes my **REP5-028**:

I said in **REP5-028:**

"The Tunnels

The IPCC report notes cement production, a key part of concrete, results in high carbon dioxide emissions.

Let us consider how much concrete would be needed to construct twin bore tunnels, each 2.9 km long and 13m wide. It is understood that a minimum 5.2m height is required, with dual width roads being at least 7m wide.

Pythagoras' theorem confirms an internal bore of close to 9m.

An overall tunnel bore of 13m is specified, giving internal and external radii of 4.5m and 6.5m respectively, indicating walls around 2m thick..

Hence the tunnel lining will have a volume, $V = (6.5^2 - 4.5^2) \times \pi \times 2900 \times 2 = 400{,}000 m^3$.

The tunnels alone will require around $400{,}000 m^3$ of lining, with what will presumably be reinforced concrete.

Typical densities for concrete are around 2400 kg per m^3. Carbon dioxide emissions from concrete production can be up to 0.5 kg per kg of reinforced concrete made, largely because of the high cement content, although steel is also significant.

The carbon footprint of building the tunnels could be around 400,000 tons of carbon dioxide emissions, or close to this, depending on the grade of concrete used.

This is in addition to any other concrete used for bridges, flyovers, slip roads, cuttings, portals and any other infrastructure.

This seems an extraordinarily high amount for a few kilometres of road and takes no account of the increase in operational emissions from a higher road capacity.

Conclusion

Highways England's claim, that a single road scheme in isolation will be unlikely to prevent the government reaching its targets, starts to look rather dubious when we consider the A303 scheme as a whole. It looks even more doubtful when we consider all ongoing road schemes alongside one another.

The total carbon footprint of the scheme may seem much smaller than the total carbon budget set by the IPCC, but let us remember that it is the total carbon budget for all mankind for all time.

The obvious conclusion is that we can't continue building more and bigger roads, with ever increasing traffic volumes, without negatively impacting on climate change to the point that global warming will be out of control within a few decades..

We need to start changing our ways.

Government policy needs to move away from building ever more roads. Continuing as at present will have a catastrophic and irreversible effect on the environment within a small number of years.

I submit that the adverse effect on climate change is grounds for rejecting these proposals.”

Highways England comment in their REP7-021 response to REP5-028:

The Applicant's assessment of greenhouse gas (GHG) emissions including carbon emissions as a result of the Scheme is set out in Chapter 14 of the Environmental Statement (ES) [APP-052]. In particular we note the detailed description of the assessment methodology, which is set out at section 14.3 of this Chapter.

As stated in paragraph 14.3.2, the emissions assessment has been conducted in line with guidance contained within Highways England's IAN 114/08 – Highways Agency Carbon Calculation and Reporting Requirements (Ref 14.2) and supplemented by use of Highways England's Carbon Reporting Tool. The approach set out in IAN 114/08 is in line with the World Business Council for Sustainable Development / World Resources Institute Greenhouse Gas Protocol guidelines.

The assessment set out in Chapter 14 of the ES concludes that there will be no significant effects on climate at either construction or operational stage from the Scheme (please see section 14.9 and the 'Climate' section of Chapter 16, Summary of Effects [APP-054]).

Please also see response to item 44.4 in the Comments on Written Representations Report submitted at deadline 3 [REP3-013] which summarises (as set out in Chapter 14, Section 14.9, paragraph 14.9.11) the ES assessment of carbon emissions, reiterating that the Scheme will not have a material impact on the ability of the UK Government to meet its carbon reduction targets.

The response to item 44.4 also puts this assessment into the context where the case for the Scheme has been identified: the proposed road improvement is needed to address the local and regional demands arising from the current issues with the road and to deliver the objectives set for the Scheme.

The Applicant notes the views of Mr Garwood and wishes to make no further comment on these, other than to clarify that the ES and subsequent responses to the Examining Authority's written questions identified no significant effect on climate at construction or operational stage as a result of the Scheme (see Chapter 14, section 14.9 [APP-052] and our response to the Examining Authority's First and Second Written Questions CC.1.6 [REP2-028] and CC.2.1 and CC.2.5 [REP6-025]).

Analysis

I thank Highways England for referring me to ES Chapter 14.3 and informing me that "t*he emissions assessment has been conducted in line with guidance contained within Highways England's IAN 114/08 – Highways Agency Carbon Calculation and Reporting Requirements (Ref 14.2) and supplemented by use of Highways England's Carbon Reporting Tool.*"

I have endeavoured to look at this guidance. An internet search reveals a document:

Interim Advice Note 114/08
Highways Agency Carbon Calculation
And Reporting Requirements

This gives an overview of how the Highways Agency would like contractors to report GHG emission data, in order to calculate an annual Carbon Footprint. It also informs us that:

"*The Highways Agency Carbon Calculation framework is a standalone data collection process that will be applied across the business in financial years 2008-09 and 2009-10, after which it is intended that carbon reporting mechanisms will be integrated into business management processes, at which time this IAN will be withdrawn*."

As such, it seems somewhat out of date.

A further search for Highways England's Carbon Reporting Tool reveals more up to date information in the form of::

Carbon emissions calculation tool: Highways England

This is intended for contractors to self report a scheme's Carbon Footprint and includes a link to the:

Sustainable Development Strategy and Action Plan

The latter is described as a "*Strategy outlining Highways England's approach and priorities for sustainable development*" and was updated in December 2018. It includes further links to following documents, which I have quoted from:

Sustainable Development Strategy

What is sustainable development and why is it important to Highways England?

Sustainable development is defined in our licence to operate, as "encouraging economic growth while protecting the environment and improving safety and

quality of life for current and future generations".

Vision

The UK has a legally-binding commitment to achieve an 80 per cent reduction in its greenhouse gas emissions by 2050.

The infrastructure sector is responsible for almost one-sixth of total emissions and therefore has a key role to play in contributing to the national reduction.

Ambition

We will play our part in reducing UK carbon emissions: carbon emissions play a significant role in increasing the rate of climate change, with associated health and well-being impacts.

Road transport is one of the main sources of carbon emissions."

Sustainable Development and Environment Action Plan Roads Period 1 December 2018

This document details the strategy, along with the timescale for implementation.

Under the title of **Environment Specific Actions**, it sets out various ambitions, including:

We will undertake an assessment of possible options for achieving better embedded environmental performance within the organisation, including the potential use of a formal Environmental Management System.

The Environment and Air Quality Designated Funds provide us with the opportunity to deliver significant improvements to the environment across all of our network.

We will have effective environmental considerations built into all future supply chain contracts

Under **Sustainable development Specific Actions**,

*We will move away from a reliance on historical weather records as a basis for standards and specifications to a position where standards are informed by the latest science on climate change. (*My highlighting*)*

Deliver a meaningful contribution to the UK Government target of an 80% reduction in carbon emissions, against the levels in the 1990s, by 2050.

The Deadline for achieving these aims is given as either 19/20, or as 2020.

Discussion

The main guidance referred to by Highways England, *IAN 114/08,* seems vague, out of date and irrelevant, from what I have found online.

Even the more recent documents owe more to management talk, economic growth and other general concepts, than they do to modern climate science.

The first point to notice is the claim that '*standards are informed by the latest science on climate change*'.

This is followed by '*the UK Government target of an 80% reduction in carbon emissions, against the levels in the 1990s, by 2050*'.

As most people are probably aware, the Government have now committed to zero net carbon emissions by 2050.

The latest scientific advice from the IPCC is that we need to take action now to reduce our emissions.

The Sustainable Development Strategy acknowledges that the *'infrastructure sector is responsible for almost one-sixth of total emissions' and 'Road transport is one of the main sources of carbon emissions', stating 'We will play our part in reducing UK carbon emissions: carbon emissions play a significant role in increasing the rate of climate change'.*

Such language is not consistent with the detail of this scheme.

The position of Highways England appears to be to carry on as before, pouring concrete and increasing road capacity.

The language of the Environmental Statement (ES) on Climate (APP – 052) comprises more of the self-assessed matrices that lead to conclusions of no adverse impacts.

ES Section 14.6.11 states that '*By the 2020s (2010-2039), annual average daily temperatures are projected to be 1.45°C higher than the 1961-90 baseline average.*'

The latest Government target is to achieve zero net carbon emissions by 2050.

The latest IPCC report that sets out a framework for this talks of limiting temperature rises to 1.5°C above pre-industrial (19th Century) levels.

Highways England consider much higher temperature rises to be acceptable, with their 1.45°C above 1961-90 levels being equivalent to around 2°C above pre-industrial levels and this by the 2020s, not 2050.

ES Table 14.14: Emissions breakdown by construction activity notes:

Embodied carbon in raw materials and transportation of materials to site - 267,100 tons CO2 emission, comprising 57% of the total.

Fuel, electricity and water - 198,935 tons CO2 emission, comprising 43% of the total.

My view is that the figure for materials is likely to be a minimal estimate for tunnel construction alone, given the quantity of concrete likely to be required and the very high emissions resulting from its production.

Another 200,000 tons CO2 emissions are estimated from fuel for construction purposes.

These are very large figures given the urgency of the situation has led to declerations of a Climate Emergency.

They are assessed against Government climate budgets set out in ES 14.9.7:

a) 3rd carbon budget (2018 to 2022) 2544 MtCO2e;
b) 4th carbon budget (2023 to 2027) 1950 MtCO2e;
c) 5th carbon budget (2028 to 2032) 1725 MtCO2e.

Highways England note in ES 14.9.10 that on the basis of their own calculations, the scheme would contribute no more than 0.03% of any 5 year carbon budget.

That is for the construction stage of this scheme alone. There are many further schemes proposed along the A303, which are not included in this figure.

Other road schemes are planned elsewhere around the country. When added together, they are likely to comprise several percent of such budgets.

Of course, additional road capacity leads to further emissions from increased traffic.

ES Table 14.15 suggests this scheme alone will lead to an annual increase of 33,915 tons CO2 emissions by 2041 above a baseline of leaving the road as is.

That would equate to an extra 165,000 tons in any five year period, at a time when these budgets are expected to decrease rapidly.

The carbon budgets used are themselves based on previous carbon emission targets that have now been superseded by the latest plans to reduce emissions to zero net carbon dioxide by 2050.

Conclusion

The carbon footprint from concrete production and road construction is very high.

The latest climate targets will require much lower carbon dioxide emissions than the budgets used to assess the impact of this scheme.

Additional traffic as a result of the scheme will further compound the impact.

By continuing to push ahead with such a scheme, Highways England gives the impression that Climate Change is not their problem.

The Government is unlikely to meet the latest climate targets by continuing with policies such as the A303 and other similar road widening schemes.

References

IPCC Special Report (2018)
https://www.ipcc.ch/sr15/

A303 Stonehenge Examination Library
https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010025/TR010025-000484-Stonehenge%20-%20Examination%20Library%20Template.pdf

A303 Stonehenge Relevant Representation Library
https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/TR010025/TR010025-000553-RR%20Exam%20Library.pdf

Interim Advice Note 114/08 Highways Agency Carbon Calculation And Reporting Requirements
http://www.standardsforhighways.co.uk/ha/standards/ians/pdfs/ian114.pdf

Carbon emissions calculation tool: Highways England
https://www.gov.uk/government/publications/carbon-tool

Sustainable Development Strategy and Action Plan
https://www.gov.uk/government/publications/highways-england-sustainable-development-strategy

Sustainable Development Strategy
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/605079/Sustainable_Development_Strategy_6.pdf

Sustainable Development and Environment Action Plan Roads Period 1 December 2018
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/763125/Sustainable_Development_and_Environment_Action_Plan_final.pdf