

A303 Amesbury to Berwick Down

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Deadline 6

**8.37.7 - Responses to the ExA's Written Questions
- Climate Change (CC.2)**

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Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rules 2010

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Infrastructure Planning

Planning Act 2008

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Responses to the ExA's Written Questions

- Climate Change (CC.2)

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7 Climate Change (CC.2)

Question CC.2.1

The Applicant's written summaries of oral submissions put at the Open Floor Hearings held on 22 and 23 May comments on the submissions made in response to Mr Mike Birkin [REP3-013].

- i. As regards the reference to the Government's Road Investment Strategy (2015) does the assessment of annual CO₂ impacts from delivering a programme of investment on the Strategic Road Network take into account the latest set of UK Climate Projections and/ or Government carbon reduction targets? If not, how does this affect the assessment?
- ii. Likewise, does the paragraph 2.4.3.5 reference to the ES Chapter 14 assessment of carbon emissions (GHG) take into account the latest set of UK Climate Projections and/ or Government carbon reduction targets? If not, how does this affect the assessment?

Highways England response

1. In responding to this question, the Applicant considers that it would be helpful to clarify the purpose and relevance of United Kingdom Climate Projections 2018 (UKCP18¹). UKCP18, the current set of climate projection data published by the MET Office, are used for assessing climate change resilience (CCR) i.e. the resilience of a Scheme to the impacts of future climate change, not for assessing the greenhouse gas (GHG) impacts arising due to the construction and operation of the Scheme. For that reason, the Applicant does not consider that the publication of the UKCP18 data gives cause to reassess the annual CO₂ impacts of the Scheme.
2. For more information on the review undertaken by the Applicant in respect of the UKCP18 data, please refer to the response provided to CC.2.4.

¹ <https://www.metoffice.gov.uk/research/collaboration/ukcp/about>

- i. **As regards the reference to the Government's Road Investment Strategy (2015) does the assessment of annual CO₂ impacts from delivering a programme of investment on the Strategic Road Network take into account the latest set of UK Climate Projections and/ or Government carbon reduction targets? If not, how does this affect the assessment?**
3. The Applicant understands that the reference to Government carbon reduction targets, is a reference to the targets set within the Climate Change Act 2008 (2050 Target Amendment) Order 2019² (the 2019 Order), which amends the Climate Change Act 2008 by revising the previous 2050 carbon target (of an 80% reduction of carbon emissions compared to 1990 levels) to a 100% reduction, i.e. a net zero carbon target.
4. As the Government's Road Investment Strategy (2015) Strategy pre-dates the 2019 Order, the revised carbon reduction target has not been taken into account in the 2015 Strategy.
5. In so far as this question relates to the impact of the new net zero target on the 2015 Strategy and the Government's programme of schemes as a whole, the Applicant considers this to be a matter for the Government. However, to the extent that the Scheme forms a part of the Government's road investment strategy, the new net zero target gives no cause for the Applicant to alter its existing assessment, which is that the impact of the Scheme as part of that programme of schemes toward the revised target is considered to be negligible for the reasons set out in part ii of this response.
- ii. **Likewise, does the paragraph 2.4.3.5 reference to the ES Chapter 14 assessment of carbon emissions (GHG) take into account the latest set of UK Climate Projections and/ or Government carbon reduction targets? If not, how does this affect the assessment?**
6. The Environmental Statement Chapter 14 [APP-052] was written prior to the publication of the new Government carbon reduction targets set within the Climate Change Act 2008 (2050 Target Amendment) Order 2019³ (i.e. the net zero target). As such, Chapter 14 does not take the revised carbon reduction target into account.
7. However, the Applicant does not consider that the latest carbon reduction target will affect the assessment of annual CO₂ impacts as presented in Chapter 14 of the Environmental Statement [APP-052], which, in brief, identified no likely significant effects on climate change at either construction

² 2019 No 1056. **The Climate Change Act 2008 (2050 Target Amendment) Order 2019**

³ 2019 No 1056. **The Climate Change Act 2008 (2050 Target Amendment) Order 2019**

or operational stage as a result of the Scheme. The reasons for the Applicant's position are set out below:

8. The trajectory of delivery for the UK's 2050 carbon reduction target is set out through a series of five-year carbon reduction budgets published by the Government. To understand the CO₂ impact of the Scheme, estimated CO₂ emissions from the Scheme have been compared against the five-year carbon budget period in which they arise to determine if the Scheme will have an impact on the UK meeting the 2050 target. The carbon assessment in Chapter 14 of the Environmental Statement (ES) [APP-052] was undertaken using the set of carbon budgets available at the time of the assessment, which were calculated to meet the previous (80% reduction) target. The Committee on Climate Change, the body responsible for setting the carbon budgets, has announced it will revise its assessment of the appropriate path for emissions over the period to 2050 to meet the net zero carbon target as part of its advice next year (2020) on the sixth carbon budget. It will therefore not be possible to update the assessment of the CO₂ impact of the Scheme against the new net zero carbon target until the revised carbon budgets are published.
9. However, in any event we note that the existing assessment as set out in Chapter 14 of the ES [APP-052] and updated assessment set out in the Applicant's response to the Examining Authority's First Written Question CC.1.6 [REP2-028] demonstrate that the Scheme's GHG impact as a proportion of total UK carbon emissions is negligible such that it can be considered to be immaterial. To summarise the response provided in CC.1.6, the outputs from the carbon assessment presented in table 14.16 [APP-052] indicate that Scheme emissions during the 4th carbon budget period (2023 to 2027) are estimated to be 449,231tCO₂e which equates to 0.023% of the 4th carbon budget (1,950 MtCO₂e). During the 5th carbon budget period (2028 to 2032) net GHG emissions from the operation of the Scheme are estimated to be 136,080 tCO₂e. This equates to 0.008% of the total 5th carbon budget (1725 MtCO₂e).
10. In such circumstances, the Applicant does not consider that the new net zero target gives cause to alter the assessment set out in Chapter 14 of the ES as updated in the Applicant's response to the Examining Authority's First Written Question CC.1.6.

Question CC.2.2

Paragraph 2.4.3.5 of the written summaries of oral submissions put at the Open Floor Hearings held on 22 and 23 May also states that “*in the context of the overall UK GHG emissions the magnitude of the increase will not have a material impact on the government meeting its carbon reduction targets*” [REP3-013].

- i. Does that take into account the latest Government pronouncements on carbon reduction targets? If not, how would that affect the position?
- ii. Please comment upon contribution made by the scheme to the cumulative impact together with other schemes on overall UK GHG emissions in the light of the latest set of UK Climate Projections and/
- iii. or Government carbon reduction targets?

Highways England response

1. In responding to this question, the Applicant considers that it would be helpful to clarify the purpose and relevance of United Kingdom Climate Projections 2018 (UKCP18⁴). UKCP18, the current set of climate projection data published by the MET Office, are used for assessing climate change resilience (CCR) i.e. the resilience of a Scheme to the impacts of future climate change, not for assessing the greenhouse gas (GHG) impacts arising due to the construction and operation of the Scheme. For that reason, the Applicant does not consider that the publication of the UKCP18 data gives cause to reassess the annual CO₂ impacts of the Scheme.
2. For more information on the review undertaken by the Applicant in respect of the UKCP18 data, please refer to the response provided to CC.2.4.
 - i. **Does that take into account the latest Government pronouncements on carbon reduction targets? If not, how would that affect the position?**
3. In response to the Examining Authority's question, in terms of the reference to the 'latest Government pronouncement on carbon reduction targets', we understand this to be a reference to the targets set within the Climate Change Act 2008 (2050 Target Amendment) Order 2019⁵ (the 2019 Order), which amends the Climate Change Act 2008 by revising the previous 2050 carbon target (of an 80% reduction of greenhouse gas (GHG) compared to 1990 levels) to a 100% reduction, i.e. a net zero carbon target. The 2019 Order was laid before parliament after the relevant open floor hearings for this Examination had been held (on 22 and 23 May 2019).

⁴ <https://www.metoffice.gov.uk/research/collaboration/ukcp/about>

⁵ 2019 No 1056. **The Climate Change Act 2008 (2050 Target Amendment) Order 2019**

4. As such the statement of the Applicant quoted in this question CC.2.2 above did not take into account the Government's latest carbon reduction targets.
 5. However, the Applicant does not consider that the revised carbon reduction target gives cause to amend the statement quoted in this question, i.e. that "in the context of the overall UK GHG emissions the magnitude of the increase will not have a material impact on the government meeting its carbon reduction targets", for the reasons set out below.
 6. The trajectory of delivery for the UK's 2050 carbon reduction target is set out through a series of five-year carbon reduction budgets published by the Government. To understand the CO₂ impact of the Scheme, estimated CO₂ emissions from the Scheme have been compared against the five-year carbon budget period in which they arise to determine if the Scheme will have an impact on the UK meeting the 2050 target. The carbon assessment in Chapter 14 of the Environmental Statement (ES) [APP-052] was undertaken using the set of carbon budgets available at the time of the assessment, which were calculated to meet the previous (80% reduction) target. The Committee on Climate Change, the body responsible for setting the carbon budgets, has announced they will revise their assessment of the appropriate path for emissions over the period to 2050 to meet the net zero carbon target as part of its advice next year (2020) on the sixth carbon budget. It will therefore not be possible to update the assessment of the CO₂ impact of the Scheme against the new net zero carbon target until the revised carbon budgets are published.
 7. However, in any event we note that the existing assessment as set out in Chapter 14 of the ES [APP-052] and updated assessment set out in the Applicant's response to the Examining Authority's First Written Question CC.1.6 [REP2-028] demonstrate that the Scheme's GHG impact as a proportion of total UK carbon emissions is negligible such that it can be considered to be immaterial. Further information on this point is given in answer to Question CC2.1. In such circumstances, the Applicant does not consider that the new net zero target is likely to affect the conclusions of the existing assessment
- ii. Please comment upon contribution made by the scheme to the cumulative impact together with other schemes on overall UK GHG emissions in the light of the latest set of UK Climate Projections and/**
8. In response to part ii of the Examining Authority's question, we note our explanatory note at the beginning of this answer. UK Climate Change Projections are used for the purpose of assessing the potential impacts of climate change on a proposed development (i.e. the Climate Change Resilience (CCR)), not for assessing the greenhouse gas (GHG) impacts as a result of a development.
 9. For that reason, the Applicant does not consider that the publication of the UKCP18 data gives cause to revise the existing assessment of carbon reduction targets.

iii. or Government carbon reduction targets?

10. The Applicant does not consider that it is possible to provide an accurate or robust assessment of the contribution made by the Scheme to the cumulative impact, together with other Schemes, on overall UK GHG emissions. This is because:
- a. Firstly, the receptor for GHG emissions is the global atmosphere, which has a relatively large carrying capacity for GHG emissions in relation to any single project. Indeed, it is unlikely that any single UK project, in isolation or cumulatively, would have a material impact on global GHG emissions (even if the zone of influence was extended to a national boundary; i.e. the UK national emissions). The UK annually represents about 1% of global GHG emissions.
 - b. Secondly, by its nature the GHG assessment is implicitly cumulative. Data used to assess GHG emissions from road users over the life of the scheme is based on the traffic model. This model takes into consideration the impact of planned development on road use. The cumulative impact of the Scheme and these other developments is therefore included.
 - c. Thirdly, on the basis of the reported metric – carbon dioxide equivalent (CO₂e) - all emissions contribute equally to climate change.
11. However, in the context of the figures quoted in answer to question CC2.1, the Applicant does not consider that the revised carbon reduction target will have a significant impact on the contribution made by the Scheme to the cumulative impact, together with other schemes, on overall UK GHG emissions.

Question CC.2.4

The response to ExQ1 CC.1.1 states that “*the Applicant is familiar with, and has undertaken a review of, UKCP18 to assess whether the latter data would affect the conclusions of Chapter 14 of the ES*” [REP2-028].

Please provide further details of that review to support the assertion “that the new projections do not affect the conclusions of Chapter 14, which is that none of the potential impacts are identified as significant”.

Highways England response

12. The review of UK Climate Projections 2018 (UKCP18), to assess the extent to which they may affect the conclusions of ES Chapter 14 focused on comparing these new projections against the UK Climate Projections 2009 (UKCP09) that were assessed by the Applicant to develop future baseline conditions, as set out in ES Chapter 14, Section 14.6 [APP-052] and ES Appendix 14.1 (Climate resilience baseline) [APP-288].
13. In this comparison, the Representative Concentration Pathway (RCP) 8.5 scenario from UKCP18 was used, which is the scenario most similar to the UKCP09 ‘High Emissions’ scenario that was used in the original assessment. The RCP 8.5 scenario is based on a future where greenhouse gases continue to grow unmitigated.
14. Tables 1 and 2, below, provide a summary of projections for changes to mean daily conditions at the 25km grid cell in Amesbury, including projections for temperature and precipitation for the 2020s (2010-2039), the 2050s (2040-2069) and the 2080s (2070-2099) time periods using both UKCP09 and UKCP18. The 25km grid cell for Amesbury was selected as it includes the site of the Scheme.
15. Projections at the 50% probability level are shown, as well as projections at the wider range (10% and 90%) in brackets.

Table 1: Projected changes to temperature variables (°C), as per UKCP09 and UKCP18 relative to 1961 – 1990 baseline.

	Time Period					
	2020s (UKCP09)	2020s (UKCP18)	2050s (UKCP09)	2050s (UKCP18)	2080s (UKCP09)	2080s (UKCP18)
Change in mean annual daily temperature (°C)	+1.45 (+0.79 to +2.15)	+1.1 (+0.5 to +1.8)	+2.85 (+1.81 to + 4.10)	+2.3 (+1.2 to +3.5)	+4.43 (+2.93 to +6.34)	+4.1 (+2.3 to +6.1)
Change in mean summer daily temperature (°C)	+1.54 (+0.52 to +2.60)	+1.4 (+0.5 to +2.4)	+3.14 (+1.44 to +5.10)	+3.0 (+1.2 to +4.8)	+4.90 (+2.70 to +7.90)	+5.6 (+2.6 to +8.8)

Change in mean winter daily temperature (°C)	+1.20 (+0.54 to +2.19)	+1.0 (+0.1 to +1.9)	+2.30 (+1.34 to +3.50)	+2.0 (+0.6 to +3.5)	+3.40 (+2.10 to +5.10)	+3.4 (+1.3 to +5.6)
Change in mean daily maximum summer temperature (°C)	+1.96 (+0.67 to +3.57)	+1.6 (+0.5 to +2.8)	+4.18 (+1.80 to +7.10)	+3.4 (+1.1 to +5.8)	+6.53 (+3.00 to +11.26)	+6.3 (+2.5 to +10.4)
Change in mean daily minimum winter temperature (°C)	+1.47 (+0.64 to +2.38)	+1.0 (+0.1 to +2.0)	+2.73 (+1.31 to +4.40)	+2.0 (+0.6 to +3.7)	+3.95 (+1.65 to +6.70)	+3.5 (+1.1 to +6.1)

Table 2: Projected changes to precipitation variables (%), as per UKCP09 and UKCP18 relative to 1961 – 1990 baseline

	Time Period					
	2020s	2020s	2050s	2050s	2080s	2080s
	(UKCP09)	(UKCP18)	(UKCP09)	(UKCP18)	(UKCP09)	(UKCP18)
Change in mean annual daily precipitation (%)	+0.40 (-5.50 to +7.00)	+1.0 (-3.0 to +5.0)	+0.45 (-6.46 to +7.35)	+0.0 (-6.0 to +6.0)	+0.82 (-7.80 to +10.80)	+1.0 (-6.0 to +8.0)
Change in mean summer daily precipitation (%)	-4.80 (-24.40 to +18.10)	-6.0 (-26.0 to +16.0)	-20.13 (-45.20 to +8.40)	-22.0 (-51.0 to +10.0)	-30.15 (-58.40 to +4.40)	-37.0 (-71.0 to +4.0)
Change in mean winter daily precipitation (%)	+6.50 (-2.40 to +19.00)	+7.0 (-5.0 to +21.0)	+17.60 (+2.87 to +38.50)	+12.0 (-4.0 to +31.0)	+28.00 (+7.00 to +63.00)	+23.0 (0.0 to +50.0)
Change in mean winter precipitation on the wettest day (%)*	+7.85 (-4.00 to +21.90)	N/A	+16.90 (+1.00 to +36.90)	N/A	+28.00 (+7.10 to +58.00)	N/A

* Projections for change in precipitation on the wettest day are not yet available through UKCP18, nor are any suitable proxy projections.

16. From the data presented in the tables above it can be seen that UK CP09 and UKCP18 data are generally consistent. There are a few differences however particularly in relation to the projected changes in mean daily summer temperatures and mean summer daily precipitation in the 2080s. Furthermore, slightly lower increases in annual average daily temperatures are projected by UKCP18, as are slightly greater changes in annual and summer precipitation levels, and (generally) slightly lower changes in winter precipitation levels, when compared to UKCP09 projections. Overall however, as the UKCP09 and UKCOP18 projections are broadly consistent, they would not affect the likelihood nor consequence ratings of any of the identified possible impacts. Nor would additional impacts be expected from

the change in projections. The new projections therefore would not affect the conclusions of Chapter 14 of the Environmental Statement (ES) [APP-052].

17. A review of identified mitigation measures has also been undertaken accounting for the updated UKCP18 data. It was concluded that the mitigation measures built into the design and assumed management practices identified in ES Chapter 14 Section 14.8 [APP-052] and ES Appendix 14.2 (Summary of climate impact effects) [APP-289] are still appropriate.

Question CC.2.5

Please provide an update to the response to ExQ1 CC.1.6 (ii) in the light of the latest Government pronouncement in relation to achieving net-zero GHG emissions by 2050.

Highways England response

1. We understand that this question relates to the response provided to CC.1.6 part ii of which states: "Please provide further justification for the ES conclusion set out in paragraph 14.19.11, that the GHG impact of the scheme would not have a material impact on the Government meeting its carbon reduction targets."
2. The Applicant's response to CC.1.6 part ii stated that: "Whilst the GHG assessment has identified an increase in GHG emissions, in the context of the overall UK GHG emissions the magnitude of the increase will not have a material impact on the Government meeting its carbon reduction targets".
3. In response to the Examining Authority's question, in terms of the reference to the latest Government pronouncement in relation to achieving net-zero GHG emissions by 2050, we understand this to be a reference to the targets set within the Climate Change Act 2008 (2050 Target Amendment) Order 2019⁶ (the 2019 Order), which amends the Climate Change Act 2008 by revising the previous 2050 carbon target (of an 80% reduction of carbon compared to 1990 levels) to a 100% reduction, i.e. a net zero carbon target.
4. For the reasons provided in response to the Examining Authority's Second Written Question CC.2.2, it is not possible to update the assessment of the GHG impact of the Scheme (as updated in CC.1.6) on the ability of the Government to meet its carbon reduction targets until the Government publishes its revised carbon budgets, which will reflect the new net-zero carbon target. The Committee on Climate Change, the body responsible for setting out carbon budgets, has announced that revised carbon budgets will be published next year (2020).
5. Nonetheless, the Applicant does not consider that the new net-zero carbon target will affect the assessment of annual CO₂ impacts as presented in Chapter 14 of the Environmental Statement [APP-052] which, in brief, identified no likely significant effects on climate change at either construction or operational stage as a result of the Scheme. Notwithstanding the new net zero target the Applicant remains of the view that the Scheme will not have a material impact on the ability of the Government to meet its carbon reduction

⁶ 2019 No 1056. **The Climate Change Act 2008 (2050 Target Amendment) Order 2019**

targets. Further information on this point is given in the Applicant's response to the Examining Authority's Second Written Question CC.2.1.

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