A303 Amesbury to Berwick Down

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8.10.3 Air quality and emissions (AQ.1)

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The Infrastructure Planning (Examination Procedure) Rules 2010

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The Infrastructure Planning (Examination Procedure) Rules 2010

A303 Amesbury to Berwick Down

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Air quality and emissions (AQ.1)

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3 Air quality and emissions (AQ.1)

Question AQ.1.1

Methodology

Sections 2 and 3 of ES Appendix 5.2 [APP-191] state that conservative modelling of background concentrations and emissions has been adopted for both construction and operational phases.

i. Please explain why the modelling of background emissions is considered to be 'conservative' and how these relate to worst case scenarios for the Proposed Development?

ii. Please provide evidence that the Gap Analysis (as discussed in paragraphs 3.1.19/20 of [APP-191]) used to predict future baseline background pollution concentration levels has been peer reviewed?

Response

1. Highways England's approach to the management of uncertainty in future air quality is documented in the Interim Advice Note 170/12v3. This IAN is entitled 'Updated air quality advice on the assessment of future NOx and NO2 projections for users of DMRB Volume 11, Section 3, Part 1 'Air Quality (IAN 170/12v3)'. There is an associated spreadsheet tool which is used to implement IAN 170/12v3 called Long Term Gap Analysis Calculator (version 1.1).

2. In this approach modelled concentrations are uplifted taking account of the trend in actual roadside monitored concentrations and it builds in assumptions in relation to future performance of Euro 6/VI vehicles and their potential impact on roadside nitrogen dioxide concentrations in the future. This approach is considered to provide a realistic worst case, or conservative, assessment of future air quality to establish if future air quality is expected to meet air quality objectives or not.

3. In addition to uplifting road contributions, the spreadsheet used in this approach also uplifts the background component of predicted concentrations.

4. This approach is considered conservative as the air quality assessment for the Scheme does not assume that all improvement in vehicle emissions and background concentrations as anticipated by The Department for Environment, Food and Rural Affairs (Defra) occur over time which represents a realistic worst case.

5. Prior to publication of any of Highways England Interim Advice Notes (IANs), which support published guidance in the Design Manual for Roads and Bridges, they are subject to review and approval by the relevant Technical Project Board (TPB). The TPB for air quality is made up of external air quality representatives from the devolved administrations, alongside delivery teams from within Highways England. Before any IAN can be published they must also be approved by the Chief Highway Engineer. The above approach has been adopted for IAN 170/12v3. Additionally, IAN 170/12v3

has been utilised in the consenting process for approved nationally significant infrastructure projects.

6. On behalf of Wiltshire Council, the air quality chapter [APP-043] underwent a peer review. The draft Statement of Common Ground (SoCG) between Highways England and Wiltshire Council, which will be submitted to the Examination at deadline 2, has been prepared covering air quality, in conjunction with the Wiltshire Environmental Health team. This draft SoCG includes consideration of matters of air quality methodology, such as the consideration of future air quality, and all these matters are agreed between Highways England and Wiltshire Council.

Question AQ.1.2

Methodology

Please provide further explanation of how the adjustment factor of 2.15 and Root mean square error (RMSE) of 3.9 in [APP-191] Table 5.2.3: Verification details have been derived and how they have been applied to the predicted road NOx concentrations. For clarification, please provide a worked example for a specific receptor of the calculation described in [APP-191] Paragraph 3.7.2.

For clarification, please provide a worked example for a specific receptor to demonstrate the relationship between the data in the last 5 columns of [APP-191] Table 5.2.4, and the adjustment factors which have been applied to reach the 'Modelled total NO_2 after adjustment'.

Response

1. The model verification process was undertaken through comparison between raw model outputs (road-contributed NO_X) and the measurements from the 17 monitoring sites in the ES [APP- 191] Table 5.2.4. Further information on the verification process is also presented in the ES [APP-191], Section 3.7.

2. The comparison was made in line with the method described in Local Air Quality Management Technical Guidance (LAQM.TG(16))[1], Paragraphs 7.509 to 7.546. This resulted in the calculation of a bias adjustment factor of 2.15 which was applied to the raw model outputs.

3. The process is summarised below:

    i. Measured concentrations of NO_2 at monitoring sites were converted to road-contributed NO_X using the Department for Environment, Food and Rural Affairs (Defra) NO_X to NO_2 calculator[2] with background concentrations as an additional input taken from Defra sources[3].

    ii. The ratio of monitored road-contributed NO_X to modelled road-contributed NO_X was calculated at each monitoring site.

    iii. The bias adjustment factor was derived from the trend line of the graph of monitored to modelled road-contributed NO_X.

    iv. The bias adjustment factor was applied to the modelled road-contributed NO_X at both monitors and receptors

    v. These adjusted road-contributed NO_X concentrations were converted to total NO_2 using the Defra NO_X to NO_2 calculator with background concentrations as an additional input.

[1] Department for Environment, Food and Rural Affairs (2016b). Local Air Quality Management Technical Guidance (TG16).
[2] Department of Environment, Food and Rural Affairs (2017) NO_X to NO_2 Calculator v6.1. Available online at: < https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOXNO2calc>
[3] Department for Environment, Food and Rural Affairs (2016). 2015-based background maps for NO_X, NO_2, PM_{10} and $PM_{2.5}$. Available at < https://uk-air.defra.gov.uk/data/laqmbackground-maps?year=2015 >

4. The accuracy of the adjusted model was considered using the Route Mean Square Error (RMSE) statistic. This was calculated using the following formula provided in LAQM.TG(16):

$$RMSE = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(Obs_i - Pred_i)^2}$$

5. Where i = the number of observation compared, 1,2, 3 …. N, N = total number of observations compared, Obs = observed concentration at monitoring site, Pred = predicted concentration at monitoring site following adjustment.

6. The RMSE value for the adjusted model was 3.9 µg/m^3, which is <10% of the annual average NO_2 objective, as reported in the ES [APP-191], Table 5.2.4. This is within ideal limits.

7. An example below is given for receptor R1 in the base year of 2017. The final column, total NO_2 in µg/m^3, is reported in the ES [APP-192] Table A5.3 (where the figure is rounded to 10.8), which relates to the calculation described in [APP-191] Paragraph 3.7.2.

Receptor	Raw Model Output – Road NO_X in µg/m^3	Adjusted Model Output – Road NO_X in µg/m^3	NO_X to NO_2 Calculator Output – Road NO_2 in µg/m^3	NO_X to NO_2 Calculator Input – Background NO_2 in µg/m^3	NO_X to NO_2 Calculator Output – Total NO_2 in µg/m^3
R1	2.29 → x 2.15	4.92	2.73	8.02	10.75

8. Table 5.2.4 in the ES Appendices [APP-191] includes data for monitoring sites used in the verification process rather than receptors. The column headings are replicated below along with the first line of data and, in a second row, a fuller description of the derivation of the values with reference to the process i-v described above.

Site ID	Monitored Total NO_2 ($\mu g/m^3$)	Monitored Road NO_X ($\mu g/m^3$)	Modelled Road NO_X ($\mu g/m^3$)	Modelled Total NO_2 before adjustment ($\mu g/m^3$)	Modelled Total NO_2 after adjustment ($\mu g/m^3$)
AMES_001	18.8	19.45	23.42	14.3	20.9
	Directly monitored NO_2 concentration	Output when previous column is inputted to NO_X to NO_2 calculator, step i	Raw model output for road NO_x	Output when previous column is inputted to NO_X to NO_2 calculator (not a constituent step, included to illustrate model performance before adjustment).	Final output, when adjusted model output is inputted to NO_X to NO_2, step v (equivalent to last column in previous table).

Question AQ.1.3

Methodology

At [APP-043] Paragraph 3.7.3 of the ES it is stated that the adjustment factors (for NO_x) were also applied to the predicted road PM10 concentrations in the absence of any monitoring data within the study area within which to calculate specific verification factors for PM10.

i. Are you satisfied that the adjustment factors for modelled NO_x concentrations can reasonably be used as a proxy for verification of modelled PM10 concentrations?

ii. Are you content with the approach adopted by the Applicant to the assessment of compliance with the hourly average NO_2 objective, that is, that the hourly average NO_2 objective is likely to be achieved if annual average concentrations are predicted to be less than 60µg/m3?

Response

1. In relation to point i, there is no PM_{10} monitoring data within the air quality study area, hence the decision taken to use NO_x-derived adjustment factors on PM_{10} model outputs. This was undertaken to provide a precautionary assessment of PM_{10}.

2. The model verification process for PM_{10} was undertaken in the ES [APP-043] in line with the method described in Local Air Quality Management Technical Guidance (LAQM.TG(16))[4]. The guidance from LAQM.TG(16) is presented below stating:

   "7.529 In the absence of any PM_{10} data for verification, it may be appropriate to apply the road NO_x adjustment to the modelled road-PM_{10}. If this identifies exceedances of the objective, then it would be appropriate to monitor PM_{10} to confirm the findings."

3. However, concentrations of PM_{10} are very low in the area (maximum of 14.3µg/m^3 in the baseline situation) and well below the relevant annual average objective of 40 µg/m^3 by 25.7 µg/m^3. Therefore, significant effects with the construction and operation of the Proposed Scheme are not predicted, and it is not considered necessary to monitor PM_{10} to confirm the findings.

4. In relation to point ii, the study area is not in an area of poor air quality, such as an urban city environment where short term objectives are potentially at risk. However, the air quality assessment considered short term air quality effects for completeness. The assessment of the achievement of short term objective values was undertaken in line with LAQM.TG(16), which states:

   "7.90 Predicting exceedances of the NO_2 1-hour objective is not straightforward, as these will be highly variable from year to year, and from site to site. If monitoring is to be relied upon, then this should be carried out for an extended period (preferably a full calendar year) to ensure that the occurrence of

[4] Department for Environment, Food and Rural Affairs (2018). Local Air Quality Management Technical Guidance (TG16).

occasional peaks is adequately captured. Dispersion models cannot predict short-term concentrations as reliably as annual mean concentrations. Moreover model verification is likely to be challenging.

7.91 Previous research carried out on behalf of Defra and the Devolved Administrations[5] identified that exceedances of the NO_2 1-hour mean are unlikely to occur where the annual mean is below 60 µg/m^3. This assumption is still considered valid; therefore local authorities should refer to it if NO_2 1-hour mean monitoring data are not available (typically if monitoring NO_2 using passive diffusion tubes). It should be noted that this relationship is based upon observations made predominantly at roadside and kerbside monitoring sites where road traffic is the primary source of emissions; consequently, this relationship is not considered to be applicable in instances where industrial emissions impact on air quality, where the relationship with compliance on the hourly NO_2 objective is more appropriately considered through dispersion modelling and the plume chemistry of NO_x/NO_2 conversion."

5. Additional support for this approach is found in research[6] commissioned by Defra that finds that *"statistically… the chance of measuring an hourly nitrogen dioxide objective exceedance whilst reporting an annual mean NO_2 of less than 60 µg/m^3 is relatively low (around 5%)." And therefore recommends that "Local authorities should continue to use the threshold of 60 µg/m^3 NO_2 as the trigger for considering a likely exceedance of the hourly mean nitrogen dioxide objective."*

6. The draft Statement of Common Ground (SoCG) between Highways England and Wiltshire Council has been prepared covering air quality, in conjunction with the Wiltshire Environmental Health team. It will be submitted to the Examination for deadline 2. This draft SoCG includes consideration of matters of air quality methodology, such as those outlined above. All matters of methodology are agreed.

[5] Laxen D and Marner B (2003). *Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites*
[6] AEA Energy and Environment (2008). *Analysis of the relationship between annual mean nitrogen dioxide concentration and exceedances of the 1-hour mean AQS Objective.*

Question AQ.1.4

Methodology

Can the Applicant direct the ExA to the meeting note with Wiltshire Council's Environmental Health Officer (EHO) as referenced in paragraph 5.3.26 of the ES [APP-043] that states no specific changes to the methodology were required?

Response

1. The record of engagement from the meeting with Wiltshire Council Environmental Health team concerning the air quality assessment phone conference on the 24th of November 2017 for the Scheme can be found in Appendix Table AQ.1.4. The record of engagement was issued to Wiltshire Council on Tuesday 05/12/2017 at 11:56. The meeting notes were issued with the following accompanying information, as reproduced from the issuing e-mail:

   - *"IAN 170/12 on Long Term Trends accompanied by LTT calculator v1.1.*
   - *IAN 174/13 on Significance of Effects - In particular please see the criteria we discussed in section 2 (Table 2.1 Magnitude of Change and Table 2.2 Local Air Quality Receptors Informing Scheme Significance).*
   - *IAN 175/13 on Compliance with EU Limit Values."*

2. This consultation as alluded to in the ES [APP-043] paragraph 5.3.26, has been followed by extensive phone and written communication and two meetings in person.

3. No changes to the methodology utilised in the ES have been proposed following receipt of the above record of engagement or through these wider exchanges of information or discussions.

4. The draft Statement of Common Ground (SoCG) between Highways England and Wiltshire Council has been prepared covering air quality, in conjunction with the Wiltshire Environmental Health team. It will be submitted to the Examination for deadline 2 and this also includes a record of the engagement on specific issues such as air quality. This SoCG includes consideration of matters of air quality methodology and all matters are agreed.

Question AQ.1.5

Baseline

Can the Applicant state why only 15 of the 32 diffusion tube receptor locations have been included within [APP-063] Figure 5.2?

Response

1. Highways England deployed 32 diffusion tubes in the area local to the Proposed Scheme to provide a range of information on general baseline conditions (i.e. concentrations close to roads) and background conditions (i.e. concentrations away from roads).
2. Figure 5.2 [APP-063] focused on the baseline conditions from the key subset of diffusion tubes that were utilised in the model verification process and in the local air quality assessment rather than all background and baseline diffusion tubes.
3. The details of all diffusion tube locations, along with grid references, are provided in the ES [APP-190] Table 5.1.1.
4. As is typical in diffusion tube surveys not all diffusion tube sites are used in the model verification process. A list of the diffusion tubes not included in the model verification process and the reason for excluding the tubes in numerical order are presented below:
5. AMES_003 – The diffusion tube was not representative of general baseline conditions suitable for verification as it was located next to a car park;

- AMES_004 – The diffusion tube was located approximately 850 m from nearest affected road link and so was outside of the air quality study area;
- AMES_006 – Data capture was below 85% (50%) and so too low to include in the verification process;
- AMES_008 – Monitored NO2 concentrations were lower than Defra modelled background NO2 concentration, indicating the road is likely to be not well used and so is essentially a background location, which are not used in the verification process;
- AMES_009 – Background site which are not used in the verification process;
- AMES_011 – Background site which are not used in the verification process;
- AMES_014 – Monitoring NO2 concentrations were lower than Defra modelled background NO2 concentration, indicating the road is likely to be not well used and so is essentially a background location, which are not used in the verification process;
- AMES_015 – Background site which are not used in the verification process;
- AMES_020 – Not representative of general baseline conditions for use in model verification as next to a car park;
- AMES_022 – Monitoring NO2 concentration lower than Defra modelled background NO2 concentration, indicating the road is likely to be not well used and so is essentially a background location, which are not used in the verification process;
- AMES_024 - Data capture below 85% (66%) and so too low to include in the verification process;
- AMES_025 - Background site which are not used in the verification process;

- AMES_030 – Not located within the modelled air quality study area;
- AMES_031 – Not located within the modelled air quality study area; and
- AMES_032 – Not located within the modelled air quality study area.

6. Seven diffusion tube sites were not used in the verification as they were background sites or performed as background sites with very low monitored concentrations of NO2. This data was used to help understand background air quality conditions in the study area.

7. Two diffusion tube sites were close to pollutant sources not representative of general baseline conditions, but these sites contributed to the general understanding of baseline air quality in the study area.

8. Two diffusion tube sites had insufficient data captured during the monitoring period where diffusion tubes were missing on diffusion tube collection visits.

9. Four diffusion tube sites were outside the final local air quality study area. The reason four diffusion tube sites were outside the final air quality study area is that air quality monitoring has to be deployed well in advance of confirmation of air quality study areas to allow months of data collection. The diffusion tube monitoring locations were chosen to provide the best coverage of areas with potential to be affected by traffic flow changes as a result of the Scheme at the time diffusion tube sites were deployed. Once traffic data was made available and the study area determined just four diffusion tubes were located out with the area of study.

10. Sufficient diffusion tubes were available in the study area to allow model verification to be undertaken for the proposed Scheme. Further information on the verification process is also presented in the ES [APP-191] Section 3.7.

Question AQ.1.6

Air quality receptors

Are you satisfied that all potential sensitive receptors have been taken into account in the Air Quality Assessment (AQA), and with the Applicant's identification of worst-case locations for air quality?

Response

1. The modelled sensitive receptors are located where members of the public may be exposed to and affected by air quality impacts. Paragraph 5.3.10 of the ES [APP-043] states that 'in this assessment the worst-case receptors within the study area have been selected (i.e. receptors closest to affected roads) within 200m, based on guidance presented in HA207/07'[7].

2. The specific locations of the worst-case air quality receptors modelled within the ES [APP-043] have been the subject of specific consultation with the locations being separately provided to Wiltshire Council including:

   - Original release of receptors in GIS files via E-mail on the 11th July 2018;
   - Release of receptors in Excel files via E-mail on the 11th July 2018; and
   - Updated release of final receptor locations as an Excel file via E-mail on the 9th September 2018.

3. The draft Statement of Common Ground (SoCG) between Highways England and Wiltshire Council has been prepared covering air quality, in conjunction with the Wiltshire Environmental Health team. This SoCG is due to be submitted to the Examination for deadline 2. It includes consideration of matters of air quality methodology, such as receptor locations. All matters of methodology are agreed.

[7] Highways Agency (2007). DMRB, Volume 11, Section 3, Part 1 'Air Quality' (HA 207/07).

Question AQ.1.7

Stonehenge Visitor Centre

Do you agree that Receptor R79 represents the worst-case location along the A360 is an appropriate proxy for the assessment of effects on Stonehenge Visitor Centre?

Response

1. This response provides information to assist the panel to consider whether Receptor R79 is an appropriate proxy for the Stonehenge Visitors Centre.

2. Receptor R79 (located 39 m from the A360) is the worst-case receptor on the eastern side of the A360, between the A303 Longbarrow Junction in the south and the Packway in the north, as shown on Figure 5.2E [APP-063].

3. Receptor R79 is also the only public exposure receptor along this section of the A360 where the air quality objectives for annual average air quality apply. This is because, as a residential property, it is the only location where members of the public might be exposed for a long enough duration for the annual average objectives to apply.

4. The Department for Environment, Food and Rural Affairs (Defra) provides guidance on where different air quality objectives apply in their Local Air Quality Management Technical Guidance (LAQM.TG(16))[8], specifically Box 1.1. For annual objectives Box 1.1 includes examples of places where people could be expected to spend a significant portion of their time each year, such as residential properties, schools, hospitals and care homes. The relevance of different long and short-term air quality objectives to different locations is also outlined in the ES [APP-043] paragraph 5.3.10.

5. Locations such as the Stonehenge Visitors Centre are not locations where most people may be expected to spend a significant amount of their time in a year, unlike residential locations etc. As such only short-term standards (i.e. 1hour nitrogen dioxide objectives) apply in these types of visitor attractions.

6. The information presented for R79 can be used to provide an indication of air quality at the Stonehenge visitors centre (i.e. air quality is good) and air quality is expected to be even better at this location than at R79 as the visitors centre is a further 135m from the A360 and contributions of pollutants from roads reduce with increased distance.

[8] Department for Environment, Food and Rural Affairs (2018). Local Air Quality Management Technical Guidance (TG16).

7. The predicted concentrations can also be used in conjunction with Defra guidance to show that air quality against relevant 1-hour short term objectives will be good at the visitors centre. This is because the predicted concentration of NO_2 at R79 is 8.3 µg/m^3 in the existing situation [APP-192] which is 51.7 µg/m^3 below the 60 µg/m^3 annual average when a risk of exceedances of the 1-hour NO_2 air quality objective occurs as discussed in the ES [APP-191] paragraph 3.8.4.

8. Therefore it is concluded that R79 is much closer to the roadside than Stonehenge visitors centre, that R79 represents a worst case scenario proxy for the Stonehenge visitors centre. It can also be concluded that at both locations air quality will be good and well within relevant air quality objectives.

Question AQ.1.8

$PM_{2.5}$

Are you satisfied that potential impacts of $PM_{2.5}$ concentrations have been fully taken into account in the ES and appropriately assessed as a fraction of PM_{10} particulate concentrations?

Response

1. PM_{10} emissions were explicitly modelled for the Environmental Statement (ES) [APP-043]. It was found that concentrations of PM_{10} are very low in the study area (maximum of 14.3 µg/m^3 in the baseline situation) as presented in Tables A5.4-A5.5 in the ES Appendices [APP-192].

2. The risk of $PM_{2.5}$ objectives being exceeded was also considered using this PM_{10} data in the ES [APP-043] for the proposed Scheme. This approach is possible because $PM_{2.5}$ is a size fraction of PM_{10}; hence if the concentrations of PM_{10} are already below the relevant air quality objective for $PM_{2.5}$ it is not possible for an exceedance to be identified by considering $PM_{2.5}$ more explicitly. This approach was utilised in the ES [APP-043] to provide an appropriate level of proportionate and conservative assessment. Using the assumption that all PM_{10} is $PM_{2.5}$, it can be seen that 14.3 µg/m^3 is well below the objective value for $PM_{2.5}$ of 25 µg/m^3 by 10.7 µg/m^3.

3. Any more detailed consideration would simply identify that $PM_{2.5}$ concentrations and changes in concentration are even lower than those considered in the ES and the concentrations presented already in the ES are well within the air quality objective for $PM_{2.5}$ and effects are not significant.

4. This is demonstrated in the ES [APP-043] paragraph 5.9.16, which concluded that *"total concentrations of $PM_{2.5}$ are also anticipated to be well below the objective value of 25 µg/m^3… Significant air quality effects are therefore not predicted for $PM_{2.5}$."* This additional analysis was provided in the ES [APP-043] as a change of more than imperceptible was predicted in the operational phase for PM_{10} at some locations.

5. The draft Statement of Common Ground (SoCG) between Highways England and Wiltshire Council has been prepared covering air quality, in conjunction with the Wiltshire Environmental Health team, to be submitted to the Examination for deadline 2. It includes consideration of matters of air quality methodology, such as those outlined above. All matters of methodology are agreed.

Question AQ.1.9

AQ modelling

The Applicant considers that use of the CURED tool would not be appropriate and instead has based the assessment on advice in IAN 179/12v3 which uplifts the modelled concentrations taking account of the trend in actual roadside monitored concentrations and builds in assumptions in relation to future performance of Euro 6/VI vehicles and their potential impact on roadside nitrogen dioxide concentrations in the future.

i. To what extent (if any) has reliance on future technological improvements been brought into question by recent legal challenges by Client Earth?

ii. How has the assessment taken into account uncertainties which may arise from rates of progress towards the achievement of technological change?

Response

i. To what extent (if any) has reliance on future technological improvements been brought into question by recent legal challenges by Client Earth?

1. In the most recent High Court judgement by Mr Justice Garnham in the action taken by Claimant Client Earth against the Secretary of State for Environment, Food and Rural Affairs, the Secretary of State for Transport and Welsh Ministers was handed down on the 21st of February 2018. The matter of modelling future air quality was considered by the judge who noted:

2. '94 I would add that, in my judgment, modelling future compliance with NO2 limit values is pre-eminently a matter of technical judgement upon which expert opinion is likely to be decisive. DEFRA established an independent panel of experts to provide guidance on this issue. As Ms Smith submits, any challenge to such modelling must show clear legal error or irrationality. I see no such legal error or irrationality here.'

3. Client Earth were unsuccessful in arguing against the modelling approach concerning future air quality taken by Defra. The judgement supports the approach adopted by Defra by noting the use of an expert panel in the provision of guidance on this matter. Therefore, rather than casting doubt on the approved approaches adopted by Defra the judgement supports the use of these consistent with policy 5.8 of the National Policy Statement for National Networks, published in December 2014, as reproduced below:

4. 'Defra publishes future national projections of air quality based on evidence of future emissions, traffic and vehicle fleet. Projections are updated as the evidence base changes. Applicant's assessment should be consistent with this but may include more detailed modelling to demonstrate local impacts.'

5. Therefore, the Defra projections do take account of predictions of future technological improvements at the national scale and this is considered to be appropriate by the court.

6. The above recent high court judgement indicates that Defra has addressed the concerns of the court in relation to future technological improvements which were brought into question by an earlier Client Earth judgement handed down on the 2nd of November 2016. Any concerns over the rates of improvement in air quality have been further taken into account in the modelling and forecasting tools that were used for the air quality assessment for the Scheme. The assessment utilised Defra's air quality tools, such as the Emissions Factor Toolkit (EFT) followed the Highways England IAN 170/12v3 guidance to further account for the uncertainty in future vehicle performance. This is further described in part ii of our response.

ii. How has the assessment taken into account uncertainties which may arise from rates of progress towards the achievement of technological change?

7. Highways England's approach to the management of uncertainty in future air quality is provided in the advice in Interim Advice Note 170/12v3. This IAN is entitled 'Updated air quality advice on the assessment of future NOx and NO2 projections for users of DMRB Volume 11, Section 3, Part 1 'Air Quality (IAN 170/12v3)'. There is an associated spreadsheet tool which is used to implement the IAN 170/12 called Long Term Gap Analysis Calculator (version 1.1).

8. In this approach modelled concentrations are uplifted taking account of the trend in actual roadside monitored concentrations and allowing for uncertainty in future performance of Euro 6/VI vehicles and their potential rates of improvement in roadside nitrogen dioxide concentrations in the future. This approach is considered to provide a realistic worst-case assessment of future air quality to establish if future air quality is expected to meet air quality objectives or for air quality not to meet air quality objectives. On this basis decisions on the significance of changes in air quality can then be made.

9. However, in the case of the Scheme uncertainty in the rates of improvement in air quality over time are not as important as in locations of poor air quality. This is because in the study area for this Scheme air quality is already good, air quality monitoring in the area being already well within the 40 µg/m3 air quality objective. Changes in air quality with the construction or operation of the Scheme are predicted to occur at concentrations below air quality objectives and based on IAN 174/13 on 'Updated advice for evaluating significant local air quality effect for users of DMRB Volume 11, Section 3, Part 1 'Air Quality' (HA207/07) this is not considered to be significant.

10. The draft Statement of Common Ground (SoCG) between Highways England and Wiltshire Council has been prepared covering air quality, in conjunction with the Wiltshire Environmental Health team. It is due to be submitted to the Examination at deadline 2. This SoCG includes consideration of matters of air quality methodology, such as future air quality and significance of effects, and all matters are agreed.

Question AQ.1.10

AQ modelling

Can the Applicant provide a plan depicting the study area for the regional AQA?

Response

1. The regional air quality assessment calculates the mass of emissions of oxides of nitrogen (NO_X) and particulate matter (PM_{10}).

2. The regional air quality study area is based on the regional screening criteria presented in the Design Manual for Roads and Bridges (DMRB) air quality guidance (HA207/07)[9], as reproduced below:

   a. a change of more than 10% Annual Average Daily Traffic (AADT); or

   b. a change of more than 10% to the number of Heavy-Duty Vehicles (HDV) AADT; or

   c. a change in daily average speed of more than 20km/hr.

3. The regional assessment considers emissions emitted in the opening year (2026) and design year (2041) rather than concentrations of pollutants at specific locations, hence why only tables of emissions were provided in the ES [APP-043] Tables 5.11 and 5.12.

4. As described in [APP-043] paragraph 5.9.68 emissions for carbon are presented for the whole traffic model study area for consistency with Web-based Transport Analysis Guidance (WebTAG)[10] used to support the proposed Scheme business case.

5. Plans illustrating the study area for the regional air quality assessment have been provided as part of this response. Appendix Figures AQ1.10A and AQ1.10B depict the study area for the regional air quality assessment for the opening and design years respectively. The figures show roads with predicted qualifying changes in traffic data in line with the regional screening criteria set by DMRB air quality guidance. These roads are focussed within the area encompassing the Scheme and surrounding roads with some isolated links in the wider Region of Focus.

6. The local air quality assessment study area which is utilised in the consideration of changes in concentration of pollutants at locations of relevant exposure (i.e. residential properties) and designated ecosystems (i.e. Sites of Special Scientific Interest) is shown on Figure 5.1 [APP-062].

[9] Highways Agency, 2007. Design Manual for Roads and Bridges Air Quality Guidance (HA207/07).
[10] Department for Transport (DfT), 2015. Transport Analysis Guidance (TAG) Environmental Impact Appraisal (UNIT A3), Section 3 Air Quality Impacts. Dated December 2015.

Question AQ.1.12

Tunnel and approaches

i. With regard to the statement in para 5.6.10 can the Applicant confirm that there is no likelihood of any exceedances of the annual mean and hourly mean NO_2 UK AQS objectives at either tunnel portal or within the tunnel?

ii. What is the likelihood of PM_{10} and $PM_{2.5}$ exceedances in these locations?

iii. Are the relevant authorities satisfied with this approach to tunnel air quality and its potential impacts on air quality in the surroundings?

Response

(i/ii) Exceedances of NO_2, PM_{10}, and $PM_{2.5}$ in relation to the tunnel

1. The tunnel portal and locations within the tunnel are not considered sensitive receptors in terms of NO_2, PM_{10}, or $PM_{2.5}$ as members of the public are not reasonably expected to spend an hour to 24-hours (i.e. short term objectives) or longer at these locations (i.e. annual objectives). Therefore the air quality objectives do not apply at the tunnel portals or within the tunnel.

2. Detail of where air quality objectives should apply is given in Box 1.1 in The Department for Environment, Food and Rural Affairs (Defra) Local Air Quality Management Technical Guidance (LAQM.TG.(16)) (February 2018), reproduced below in Table 1, and also outlined in the Environmental Statement (ES) [APP-043], paragraph 5.3.10.

3. Within the tunnel, the required air quality limits for pollutants including NO_2 are discussed in Highways England's Design Manual for Roads and Bridges (DMRB), section 2, Part 9, BD78/99. The text provided in clause 5.140 states that the applicable pollutant limits for new design purposes should be based on two guidance documents, namely the Health & Safety Executive's document "Workplace Exposure Limits" (EH40) and the World Road Association's report "PIARC 1995: Road Tunnels: Emissions, Ventilation and Environment". Both EH40 and the PIARC report are regularly updated, the most recent PIARC report edition being entitled: "Road Tunnels: vehicle emissions and air demand for ventilation" (PIARC document reference 2019R02EN)

4. The design of the tunnel ventilation system would be required to meet the requirements of EH40, good standard industry practice, and the limits set down in PIARC 2019R02EN and, therefore, the levels of NO_2 present within the tunnel would be controlled to the required limits.

Annual Air Quality Objectives

5. The locations at which annual air quality objectives apply are set out Box 1.1 of LAQM.TG(16) and Table 1 below, includes examples of locations where people may spend significant amounts of an annual period, such as residential properties, schools,

hospitals and care homes. This is also outlined in the ES [APP-043], paragraph 5.3.10.

6. Therefore, the annual mean air quality objectives for NO_2, PM_{10} and $PM_{2.5}$ do not apply at the tunnel portals or within the tunnel.

7. As described in the Design Manual for Roads and Bridges (DMRB) air quality guidance and in the ES [APP-043], paragraph 5.3.10, the air quality assessment only considers receptors located within 200 m of a road as being sensitive to potential air quality impacts. The DMRB distance of 200 m also applies to tunnel portals with research findings identifying that the impact of portal emissions typically only extends up to about 100 to 200 m[11]. No receptors where the annual mean air quality objectives apply fall within 200 m of the portals, therefore there is no potential for any exceedances of the annual mean air quality objectives for NO_2, PM_{10} and $PM_{2.5}$ within 200 m of the tunnel portals.

8. The closest receptors to either portal where annual mean objective values apply are properties on Stonehenge Road, located approximately 400 m south of the East Portal. This location as described above is too far from the portal to be sensitive to potential air quality impacts from the portal. In the ES [APP-043], detailed modelling provided predictions of NO_2 and PM_{10} concentrations at the properties on Stonehenge Road, modelled at worst-case exposure as R77. The concentrations predicted at these receptors are given in the ES Appendices [APP-192] and were very low (6.8 $\mu g/m^3$ NO_2 and 11.2 $\mu g/m^3$ PM_{10} in the Operational DS Scenario). $PM_{2.5}$ is a size fraction of PM_{10}, therefore as the PM_{10} concentration was under the annual mean objective value for $PM_{2.5}$, it follows that the $PM_{2.5}$ concentration will also be. It should also be noted that concentrations reduce at these locations due to the Scheme.

9. Therefore, it can be concluded that there is very little likelihood of any exceedances of the annual mean NO_2 UK AQS objectives; or of any exceedances of the annual mean PM_{10} and $PM_{2.5}$ UK AQS objectives at those receptors where the annual mean objectives apply.

Short Term Air Quality Objectives

10. The locations at which short term air quality objectives apply are locations where people might reasonably expected to spend one hour or longer. This is also outlined in the ES [APP-043], paragraph 5.3.10 and table 1.

11. Therefore, the hourly mean air quality objective for NO_2, and the 24-hour air quality objective for PM_{10} do not apply at the tunnel portals or within the tunnel.

12. As described in the Design Manual for Roads and Bridges (DMRB) air quality guidance and in the ES [APP-043], paragraph 5.3.10, the air quality assessment only considers receptors located within 200 m of a road as being sensitive to potential air quality impacts. The DMRB distance of 200 m also applies to tunnel portals with research findings identifying that the impact of portal emissions typically only extends

[11] McCrae, IS, Pittman, J, Boulter, PG, Turpin, KT. (2009), *Tunnel portal dispersion modelling. Transport Research Laboratory, Report PPR449, October 2009.*

up to about 100 to 200 m[1]. No receptors where the short term mean air quality objectives apply fall within 200 m of the portals, therefore there is no potential for any exceedances of the short term mean air quality objectives for NO_2, and PM_{10} within 200 m of the tunnel portals.

13. The closest receptors to either portal where short term mean objective values apply are Amesbury Park/Amesbury Abbey grounds, located approximately 280 m east of the East Portal. This location as described above is too far from the portal to be sensitive to potential air quality impacts from the portal. Predictions were not provided for this specific location but it is within the wider study area, which is not an area of poor air quality (such as an urban city environment) where short term objectives are potentially at risk.

14. An assessment of the achievement of short term objective values was undertaken in the ES [APP-043] in line with LAQM.TG(16), Paragraphs 7.90-7.93, whereby risk of exceedances of the NO_2 1-hour mean are considered using a threshold of 60 µg/m^3 annual mean (below which exceedances of the 1-hour mean are unlikely), and a formula is provided for calculation of exceedances of the PM_{10} 24-hour mean from the annual mean.

15. NO_2 concentrations at all modelled receptors within the study area are presented in Tables A5.1-A5.3 in the ES Appendices [APP-192] and all are well under the threshold of 60 µg/m^3. The highest NO_2 concentration predicted was 20.3 µg/m^3 in the base year, 39.7 µg/m^3 below the 60 µg/m^3 threshold.

16. The number of daily exceedances of PM_{10} at all modelled receptors in all scenarios is presented in Tables A5.7-A5.9 in the ES Appendices [APP-192], and all are well under the maximum permitted number of exceedances of 35. The maximum number of days predicted that exceeded the PM_{10} 24-hour mean was 3, 32 below the maximum permitted exceedances of 35.

17. Therefore, it can be concluded that there is very little likelihood of any exceedances of the 1-hour mean NO_2 UK AQS objective, or of the 24-hour mean PM_{10} UK AQS objective at those receptors where the relevant short term UK AQS objectives apply close to the tunnel portals.

iii. **Are the relevant authorities satisfied with this approach to tunnel air quality and its potential impacts on air quality in the surroundings?**

18. A telephone conference was held with Wiltshire Council Environmental Health team concerning the air quality assessment on the 24th of November 2017 for the Scheme. The record of engagement (Appended to AQ1.4 response) was issued to Wiltshire Council on Tuesday 05/12/2017 at 11:56. The meeting notes include reference to tunnel portals and provision of information receptors from Highways England to Wiltshire Council (Row 9). Information on the distances of receptors to the tunnel portals was provided through e-mail on the 11th September 2018.

19. This consultation as alluded to in the ES [APP-043] paragraph 5.3.26 has been followed by extensive phone and written communication and two meetings in person.

20. No changes to the methodology utilised in the ES have been proposed following receipt of the above record of engagement or through these wider exchanges of information or discussions.

21. The draft Statement of Common Ground (SoCG) between Highways England and Wiltshire Council has been prepared and submitted at Deadline 2 covering air quality, in conjunction with the Wiltshire Environmental Health team. This SoCG includes consideration of matters of air quality methodology and all matters are agreed.

Table 1: Examples of Where the Air Quality Objectives Should Apply

Averaging Period	**Objectives should apply at:**	**Objectives should generally not apply at:**
Annual Mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access. Hotels, unless people live there as their permanent residence. Gardens of residential properties.
24-hour mean and 8-hour mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	All locations where the annual mean and: 24 hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

Question AQ.1.13

Construction traffic

i. Can the Applicant clarify how the "*construction phase traffic assessment considers the additional HGV movements introduced to the road network due to construction of the scheme, along with the effects of construction phase traffic management*" includes the effects of construction vehicles associated with the movement and placement of tunnel arisings during the construction phase, both along haul routes and the local highway network?

ii. Can the Applicant clarify whether HGV movements within the site boundary and along haul routes, (eg associated with the movement of the tunnel arisings) are included within the construction phase traffic assessment?

iii. If so, can the Applicant state how the worst-case scenario in terms of tunnel arisings has been factored in?

iv. If HGV movements within the site boundary have not been included within the construction phase traffic assessment, what confidence is there in the findings of the assessment and the proposed mitigation to address the likely significant effects?

Response

i. **Can the Applicant clarify how the "construction phase traffic assessment considers the additional HGV movements introduced to the road network due to construction of the scheme, along with the effects of construction phase traffic management" includes the effects of construction vehicles associated with the movement and placement of tunnel arisings during the construction phase, both along haul routes and the local highway network?**

1. The construction phase transport assessment has considered the additional Heavy Goods Vehicle (HGV) movements introduced to the public road network due to construction of the Scheme, along with the effects of construction phase traffic management by including all of these elements in a traffic model. The assessment has been included in [APP-300] – 7.5 Combined Modelling and Appraisal Report – Appendix C (Section 7 and Appendix F). The movement and placement of tunnel arisings is not anticipated to introduce any HGV movements to the public road network as described below, so this is not an element of the traffic model, with one exception set out in paragraph 3.

2. The traffic model includes local roads and the elements of the completed highways that form part of the construction phase that are used in both traffic management and as routes for construction traffic. The modelling has considered two construction stages. Phase one during the construction of the junctions and the second phase whilst the tunnel is being completed and the junctions and Winterbourne Stoke bypass have opened.

3. The traffic modelling does not include haul routes associated with any on-site placement of tunnel arisings. The exception to this is material excavated out

4. to allow access to the tunnel boring machine paragraph 9.3.5 of the Transport Assessment [APP-297].

5. The proposed location for deposition of tunnel arisings is to the east of Parsonage Down SSSI, shown in Figure 4-2 in Appendix 12.1: Tunnel Arisings Management Strategy [APP-285]. Tunnel arisings will emerge from the Western Portal of the tunnel due to operational and environmental constraints described in Table 4-1 in Appendix 12.1 [APP-285]. Paragraph 3.3.2 of Appendix 12.1 [APP-285] describes the method for transport between the Western Portal and the arisings placement site:

6. *"The deposition of tunnel arisings within the immediate vicinity of the Scheme would not require the use of public highways. Tunnel arisings would be moved by truck along site haul roads from the tunnel arisings processing area to the receptor site."*

7. Therefore, there is no anticipated use of the public road network for transportation of tunnel arisings to the placement site east of Parsonage Down, so trips associated with this activity are not included in the traffic model, nor, therefore, the construction phase traffic assessment.

8. However, the air quality assessment did qualitatively consider haul routes within Appendix 5.4: Construction Air Quality and Mitigation (APP-193) finding that no significant changes in air quality are expected as a result of HGV movements on haul routes.

9. The significance finding set out in the ES is derived from local air quality screening criteria presented in the Design Manual for Roads and Bridges (DMRB) air quality guidance and set out in the ES Chapter 5: Air quality, paragraph 5.5.2 (APP-043), which is that *'heavy duty vehicles (HDV) (vehicles greater than 3.5 tonnes, including buses and coaches) flows will change by 200 AADT or more'.* As stated in ES Appendix 5.4 [APP-193] paragraph 6.1.5, *'it is not expected, based on discussions with the project team, that more than 200 HGV trips per day for more than 6 months will travel along the haul routes. Therefore, significant changes in emissions are not expected along these haul routes.'.* These haul route figures include those for transporting and emplacement of tunnel arisings, which, on consultation with the contractor who provided construction advice during the preparation of the ES, are likely to be 6-8 per hour. However, the existing background air quality levels in locations close to the area of the tunnel arisings transport and emplacement are such that exceedances of air quality objectives (particulates (PM10), nitrogen dioxide (NO2) and oxides of nitrogen (NOx)) and significant air quality effects would be very unlikely even if the numbers of vehicles was in excess of the DMRB criteria above.

ii. **Can the Applicant clarify whether HGV movements within the site boundary and along haul routes, (eg associated with the movement of the tunnel arisings) are included within the construction phase traffic assessment?**

10. As stated above, the quantitative construction phase traffic assessment covers Heavy Goods Vehicle movements on the public road network but does not include HGV movements on haul routes extending off the public road network and into the tunnel arisings placement location. These movements are not considered to result in any

significant impacts, as set out in section iii. This is the case both within and outside of the site boundaries. The following sections discuss why this is, and the potential air quality effects associated with the emplacement of tunnel arisings.

iii. **If so, can the Applicant state how the worst-case scenario in terms of tunnel arisings has been factored in?**

11. The haul route to the tunnel arisings placement site would cross the River Till Special Site of Scientific Interest (SSSI), which is also designated as part of the River Avon Special Area for Conservation (SAC). The haul route would be on a temporary bridge to avoid impact on the SSSI.

12. The impact of vehicle trips over the haul route across the River Till has not been specifically discussed in the ES. This is because worst case impacts at this location have already been considered for Phase 2 of the construction works at the new bridge crossing the River Till at E14 and E15 ([APP-043], Table 5.8). Significant effects on this site are not expected as air quality is good and well below the air quality objective (oxides of nitrogen (NOx)) for the protection of ecosystems. Moreover, as set out on in Table 3.1 (Screening Matrix: River Avon SAC), on page 17 of [APP-265], the River Avon SAC has low air quality sensitivity because phosphate (which does not come from atmosphere) is the principal growth limiting nutrient'.

13. The tunnel arisings site is adjacent to the area of the Parsonage Down National Nature Reserve (NNR) that has been designated as a SSSI for its calcareous grassland and is also designated as part of the Salisbury Plain SAC. The grassland is potentially a sensitive receptor for emissions from traffic and the potential effects of changes in air quality were assessed in the ES [APP-043] (E12 and E13) during the construction and operation of the Scheme. The air quality modelling undertaken for this project follows the Design Manual for Roads and Bridges (DMRB) Vol 11 Section 3 Part 1: Air Quality (HA207/07) and specifically Annex F (Assessment of Designated Sites). It also follows Interim Advice Note 174/13 (Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 'Air Quality (HA207/07)) and particularly section 2.6 regarding designated sites. These predictions showed that air quality is good and well below the air quality objective (oxides of nitrogen (NOx)), with concentrations of 6.0 - 10.5 µg/m3, 19.5 – 24.0 µg/m3 below the air quality objective for the protection of ecosystems next to Parsonage Down SSSI. No significant effects were therefore predicted for Parsonage Down SSSI from either the construction phase or the operational phase.

14. As air quality is well below relevant thresholds for NOx, the vehicle movements associated with the emplacement of the tunnel arisings are expected to be highly unlikely to cause a new exceedance at the SSSI and so this is not considered to be significant.

15. The potential for dust to affect the Parsonage Down SSSI will be managed through the Outline Environmental Management Plan (OEMP) [APP-187]. Specifically, dust will be managed with standard mitigation measures (MW-AIR1) and further standard mitigation measures (MW-AIR2). However, it should be noted that the tunnel arisings

at emplacement are expected to have a high moisture content when placed, reducing the risk of dust egress to the SSSI.

iv. **If HGV movements within the site boundary have not been included within the construction phase traffic assessment, what confidence is there in the findings of the assessment and the proposed mitigation to address the likely significant effects?**

16. Air quality in the vicinity of the emplacement site is good and well below relevant thresholds for the protection of ecosystems. Also as discussed above in relation to point i) the number of vehicle movements is below the DMRB air quality guidance threshold (200 HDVs). Taking these into consideration the vehicle movements associated with the emplacement is highly unlikely to cause any exceedance where a significant effect could occur.

17. In relation to dust, once vehicles placing arisings are within 200 m of the boundary of the Parsonage Down SSSI there is potential for emission of dust to affect the calcareous grassland by coating vegetation with deposited dust, which could affect evapotranspiration and photosynthesis. If dust deposition was heavy and prolonged there would be a risk of localised change in the vegetation. Mitigation measures secured by the OEMP [APP-187], specifically standard mitigation measures (MW-AIR1) and further standard mitigation measures (MW-AIR2) would be implemented to avoid or minimise the emission and deposition of dust on the SSSI, such as damping down surfaces to prevent dust emission.

18. Therefore, we are confident in the findings of the assessment, and that no additional measures would be required in the construction phase to mitigate potential air quality effects at the Parsonage Down SSSI.

Question AQ.1.14

Construction Phase 1

Paragraphs 5.9.18 – 5.9.23 of the Air Quality Assessment set out predicted impacts during construction Phase 1. Small increases are predicted at Amesbury (R58), Shrewton and Chitterne (R34 and R35 and R22-R33), and Great Wishford (R84), as a result of traffic diversions from the A303.

i. Are you content that the AQA has assessed the worst-case scenarios for Construction Phase 1, and with the overall conclusions that any increase in harmful emissions from traffic during this phase would result in concentrations well within the relevant AQ standards for NO_2 and $PM_{10}/PM_{2.5}$?

ii. Receptor R58 Amesbury High Street (A305) is predicted to experience a temporary increase in NO_2 concentration of 0.9µg/m^3, resulting in a concentration of 20.7µg/m^3, due to an increase of 1000 vehicles AADT during Phase 1. Are you satisfied that this would not result in an unacceptable air quality impact on human health?

Response

i. **Are you content that the AQA has assessed the worst-case scenarios for Construction Phase 1, and with the overall conclusions that any increase in harmful emissions from traffic during this phase would result in concentrations well within the relevant AQ standards for NO2 and PM10/PM2.5?**

1. The construction phase 1 traffic data that was included in the air quality assessment includes traffic associated with other planned developments within the local area and is inherently cumulative. It is therefore considered to provide a realistic worst case scenario as the basis for assessment. As stated in the ES Chapter 15 on the Assessment of *Cumulative Effects [APP-053], paragraphs 15.2.16 and 15.2.17:*

   "The overall list of other development and allocations was prepared jointly with the transport planners responsible for developing the traffic model, including developments which are judged to be 'near certain' and 'more than likely' in the traffic forecasting as being 'reasonably foreseeable' as defined by HA205/08 (Ref 15.2)1. Therefore, the predicted traffic flows associated with the other developments and allocations identified have been included in the traffic flow predictions. These developments include Highways England's A303 Sparkford to Ilchester and A358 Taunton to Southfields schemes, both due to open in 2023. The predicted traffic flows during construction and operation were used in the noise, air quality, water and people and communities assessments and, as such, these assessments are inherently cumulative."

2. There are no modelled receptors at which concentrations of NO2, PM10 or PM2.5 are anticipated to increase above the relevant air quality objectives in construction phase 1 [APP-043, para 5.9.12]. The maximum predicted annual mean NO2 concentration with construction phase 1 traffic in place is 25.4 µg/m3 at Salisbury

Plain (receptor E3), well below the NO2 annual average air quality objective by 14.6 µg/m3 [APP-192, Table A5.10].

3. Both the PM2.5 and PM10 maximum background concentrations combined with the maximum PM10 contribution (of which PM2.5 is a fraction) of the construction phases are predicted to be well below annual mean objective values of 25 µg/m3 and 40 µg/m3 respectively [APP-043, para 5.9.12]. Therefore, significant effects for particulates on air quality are not anticipated at sensitive receptors during construction of the Scheme.

ii. **Receptor R58 Amesbury High Street (A305) is predicted to experience a temporary increase in NO_2 concentration of 0.9µg/m³, resulting in a concentration of 20.7µg/m³, due to an increase of 1000 vehicles AADT during Phase 1. Are you satisfied that this would not result in an unacceptable air quality impact on human health?**

4. No properties at any location in phase 1 of the construction of the Scheme are predicted to be affected by small, medium or large changes in air quality above an air quality objective for the protection of human health. Whilst the receptor R58 is identified to experience a temporary increase in NO2 concentration of 0.9µg/m3, that increase does not bring the total predicted NO2 concentration above either the average annual objective (40 µg/m3) or the short term (one hour mean) objective (200 µg/m3 not to be exceeded more than 18 times a year). Therefore, no significant temporary air quality effects, including at Receptor R58 Amesbury High Street (A305), are expected in construction phase 1.

5. Additionally, health impacts are considered across a range of topics within the ES Chapter 13 on People and Communities [APP-051]. In regards to health impacts from air quality the chapter summarises in paragraph 13.9.83:

   "the effect of the Scheme on air quality, noise and neighbourhood amenity as a determinant of human health during construction is assessed to be neutral (0)."

6. On the basis of the above unacceptable impacts on human health are not expected from the construction of the Scheme

Question AQ.1.15

Construction Phase 2

Paragraphs 5.9.24 – 5.9.30 of the Air Quality Assessment set out predicted impacts during construction Phase 2. Small increases are predicted at Amesbury (R58). In all other locations decreases in emissions are predicted, due to decreases in traffic once Phase 1 is completed and in operation.

Are you content that the AQA has assessed the worst-case scenarios for Construction Phase 2, and with the overall conclusions that any increase in harmful emissions from traffic during this phase would result in concentrations well within the relevant AQ standards for NO_2 and $PM_{10}/PM_{2.5}$?

Response

1. The construction phase 2 traffic data that was included in the air quality assessment includes traffic associated with other planned developments within the local area and is inherently cumulative. It is therefore considered to provide a realistic worst-case scenario as the basis for assessment. As stated in the ES Chapter 15, Assessment of Cumulative Effects [APP-053] paragraphs 15.2.16 and 15.2.17:

   "The overall list of other development and allocations was prepared jointly with the transport planners responsible for developing the traffic model, including developments which are judged to be 'near certain' and 'more than likely' in the traffic forecasting as being 'reasonably foreseeable' as defined by HA205/08 (Ref 15.2)1. Therefore, the predicted traffic flows associated with the other developments and allocations identified have been included in the traffic flow predictions. These developments include Highways England's A303 Sparkford to Ilchester and A358 Taunton to Southfields schemes, both due to open in 2023. The predicted traffic flows during construction and operation were used in the noise, air quality, water and people and communities assessments and, as such, these assessments are inherently cumulative."

2. There are no modelled receptors at which concentrations of NO2, PM10 or PM2.5 are anticipated to increase above the relevant air quality objectives in construction phase 2 [APP-043, para 5.9.12]. The maximum predicted annual mean NO2 concentration with construction phase 2 traffic in place is 24.4 µg/m3 at Salisbury Plain (receptor E3), well below the NO2 annual average air quality objective by 15.6 µg/m3 [APP-192, Table A5.11].

3. Both the PM2.5 and PM10 maximum background concentrations combined with the maximum PM10 contribution (of which PM2.5 is a fraction) of the construction phases are predicted to be well below annual mean objective values of 25 µg/m3 and 40 µg/m3 respectively [APP-043, para 5.9.12].

4. Therefore, significant effects on air quality are not anticipated for particulates at sensitive receptors during construction of the Scheme.

5. No significant temporary air quality effects, including at Receptor R58 Amesbury High Street (A305), are therefore expected in construction phase 2.

Question AQ.1.16

Construction Phase 2

Please explain why a decrease of 10,400 vehicles AADT and an increase of 600 vehicles on the A36 is predicted during Construction Phase 2.

Response

1. This question relates to ES Chapter 5 on Air Quality [APP-043], paragraph 5.9.28 which refers to an average decrease of 10,400 vehicles per day on the A303 and an average increase of 600 vehicles per day on the A36 during phase 2 of the construction works.

2. The reference to a decrease of 10,400 vehicles per day on the A303 is a drafting error only and a much smaller decrease of 860 vehicles per day should have been reported. The correct decrease of 860 was utilised in the air quality modelling assessment, therefore the conclusions (small anticipated improvements in air quality at Receptors R3 and R7) are unchanged.

3. As set out in section 9.5 of the Transport Assessment [APP-297], the reason for the decrease in vehicles on the A303 and increase on the A36 is due to redistribution of traffic as drivers are expected to avoid the section of the A303 that is under construction. This is anticipated to result in decreases of approximately 860 vehicles per day on this section of the A303.

4. For those vehicles travelling westwards from Salisbury, who choose to avoid the A303, these vehicles are expected to use the A36 resulting in an average increase of approximately 600 vehicles per day on this road. It is anticipated that drivers will avoid the A360 due to delays on the scheme section of the A303. A small number of vehicles per day will utilise other routes to avoid the construction works

Question AQ.1.17

Construction Dust Assessment

The existing A303 road surface is located within 200m of the Stonehenge monument, and limited information or certainty is provided on the processes of turning the existing A303 into the proposed green byway.

Please provide evidence that any potential dust emissions arising from the process of turning the of the existing A303 into a green byway will not adversely impact the unique lichen assemblage at, and visitors to the Stonehenge monument and surrounding area.

Response

1. As stated in the Stonehenge Lichen Report [APP-234] the lichen assemblage on the stones at Stonehenge has not changed in any significant way since the last surveys were conducted in 2002 and 2004 despite being exposed to traffic on the existing A303. Summary paragraph 6 of the report states *"traffic creates dust and gaseous compounds of nitrogen, which can cause changes in lichen communities leading to a predominance of nitrophilic ruderal species".*

2. The Stonehenge Lichen Report [APP-234] addresses the potential effects of construction works in the area local to the lichen assemblage. Summary paragraph 7 states *"activities associated with the proposed works may temporarily cause dust and other atmospheric pollution. Where necessary, mitigation measures could reduce these to an acceptable level."* This includes the types of dust generating activities that may be associated with the process of turning the existing A303 into the proposed green byway.

3. Construction dust mitigation measures will be employed during construction to manage dust emissions. Mitigation by standard good practice mitigation measures is outlined in the Environmental Statement Appendix on Construction Air Quality and Mitigation [APP-193], Section 11 Mitigation Techniques, Table 5.4.9. These dust mitigation measures have also been included in the Outline Environmental Management Plan (OEMP) [APP-187] submitted with the draft Development Consent Order (dDCO) [APP-020], which is secured through Paragraph 4 of Schedule 2 to the dDCO. Measures include management of dust in accordance with best practicable means, including the measures listed in the Institute of Air Quality Management's (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (OEMP, MW-AIR1).

4. Overall the Stonehenge Lichen Report [APP-234] states in summary paragraph 6 *that "the environmental changes which might be caused by the proposed works (upgrading of the A303, Amesbury to Berwick Down) are predicted to be slightly beneficial to the lichen communities of Stonehenge due to the removal of surface traffic on the current course of the A303."*

5. Summary paragraph 9 of the document [APP-234] also states that the production of dust from construction works, when carefully mitigated is likely to have limited impact on the identified lichen assemblages compared to impacts from other local pressures. It states, *"The lack of significant change in the lichens of Stonehenge between 2003/4 and 2017 suggests a degree of resilience. Pollution on a geographical scale, or that from agricultural activities, is likely to have a greater potential effect on the lichen communities than carefully mitigated construction works of limited duration."*

6. Adverse impacts on the unique assemblages are therefore not anticipated from the construction of the Scheme.

Question AQ.1.18

Construction Dust Assessment

Paragraph 5.9.3 of the ES lists all the sensitive receptors identified within the construction dust assessment that have potential to be significantly affected by the Proposed Development. Paragraph 5.9.7 of the ES states "*Site specific mitigation may be necessary to avoid significant temporary effects… in addition to the standard mitigation measures*".

Can the Applicant identify which receptors could experience significant effects in the absence of effective mitigation and how the need for measures that may be necessary will be determined and delivered through the provisions in the DCO?

Response

1. Paragraph 5.9.3 of the Environmental Statement (ES) (Chapter 5 on Air Quality) [APP-043] lists all sensitive receptors within 200m of the Scheme boundary. However, the receptors which are most likely to require further standard site-specific mitigation measures are those outlined in paragraph 5.9.6 as reproduced below:

   '5.9.6 The locations listed above could be affected by construction dust emissions. However, the specific activities that are most likely to generate dust and have receptors within 200m of are as follows:

   a) *stockpiling, construction and minor demolition potentially affecting residential properties along Countess Road, Countess Farm, the nearby Travelodge hotel and the River Avon SSSI/SAC;*
   b) *haul routes potentially affecting Foredown House at Winterbourne Stoke, residential locations in Amesbury and the Travelodge hotel at Amesbury; and*
   c) *earthworks and construction work close to the River Till and Parsonage Down SSSIs.'*

2. These are the receptors that without further standard good practice and best practicable means mitigation are considered to be at risk of temporary significant adverse effects, due to dust generation. The types of further standard mitigation measures expected are those outlined in ES Appendix on Construction Air Quality and Mitigation [APP-193], Section 11 Mitigation Techniques, Table 5.4.10.

3. The need for further standard good practice dust mitigation measures as well as standard good practice dust mitigation measures in some locations has been included in the Outline Environmental Management Plan (OEMP) [APP-187] specifically in MW-AIR2. Compliance with the OEMP is secured through paragraph 4 of Schedule 2 of the draft DCO [APP-020]

Question AQ.1.19

Construction Dust Assessment

Can the Applicant explain the predicted impacts of disposing the 500,000m^3 of tunnel arisings on the land east of Parsonage Down NNR with regards to the emission of NO_2, dust and particulate matter that would be produced during the HGV movements transporting the arisings to and from the Parsonage Down NNR?

Response

1. The tunnel arisings site is adjacent to the area of the Parsonage Down National Nature Reserve (NNR) that has been designated as a Site of Special Scientific Interest (SSSI) for its calcareous grassland and is also designated as part of the Salisbury Plain Special Area of Conservation (SAC). The grassland is potentially a sensitive receptor for emissions from traffic and the potential effects of changes in air quality were assessed in the Environmental Statement (ES) Chapter 5 on Air Quality [APP-043] at the worst-case transect locations E12 and E13 during the construction and operation of the Scheme. The locations of the transects within Parsonage Down SSSI are shown in the ES Figure 5.2D [APP-063].

2. The air quality modelling undertaken for this project follows the Design Manual for Roads and Bridges (DMRB) Vol 11 Section 3 Part 1: Air Quality (HA207/07) and specifically Annex F (Assessment of Designated Sites) which focuses on SSSI and European designated sites. It also follows Interim Advice Note 174/13 (Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 'Air Quality (HA207/07)) and particularly section 2.6 regarding designated sites. These predictions adjacent to the NNR showed that air quality is good and well below the air quality objective (oxides of nitrogen (NOx)) for the protection of ecosystems next to Parsonage Down SSSI, with concentrations of 6.0 - 10.5 µg/m3, 19.5 – 24.0 µg/m3 below the air quality objective for the protection of vegetation. No significant effects were therefore predicted for Parsonage Down SSSI from either the construction phase or the operational phase and nor would significant effects be expected at the adjacent NNR.

3. As air quality is well below relevant thresholds any vehicle movements associated with the emplacement of the tunnel arisings within the NNR are very unlikely to cause a new exceedance at the Parsonage Down NNR. As such there is not expected to be any significant effect arising from these vehicle movements. This was also concluded in relation to haul route vehicle movements considered as part of Appendix 5.4 [APP-193] (also see response to AQ1.13).

4. The potential for dust to affect the Parsonage Down NNR will be managed through the Outline Environmental Management Plan (OEMP) [APP-187].

5. Specifically dust will be managed with standard mitigation measures (MW-AIR1).

6. Part of Parsonage Down NNR is agriculturally improved grassland and arable farmland (ES Chapter 8 on Biodiversity [APP-046] Paragraph 8.9.55). It is not sensitive to NOx from traffic emissions because it does not include chalk grassland species and receives regular applications of nitrogen fertilizer. Part of that NNR farmland (outside the SSSI) is the land which would have emplacement of tunnel arisings such that emissions of NOx, dust and particulate matter in this location would be immaterial.

7. New chalk grassland and associated habitats will be created at east Parsonage Down on land currently used for arable and improved grassland. Where this is adjacent to the SSSI it will provide positive impacts due to its buffering effect between the Parsonage Down SSSI and surrounding agricultural land, in particular reducing nitrogen deposition from fertiliser (ES Chapter 8 on Biodiversity [APP-046] Paragraph 8.8.29).

8. In conclusion the emplacement of tunnel arisings during the construction phase is not predicted to result in significant air quality impacts on the Parsonage Down NNR because of the existing good air quality and the implementation of standard dust mitigation measures.

Question AQ.1.21

Construction Dust Assessment

i. Can the Applicant provide commentary on any risks associated with particulate alpha emitters in phosphatic chalk, and explain whether and how these matters have been taken into account in the AQA, and whether any special measures would be required to mitigate any such risk to an acceptable level? How would these measures be secured through the DCO?

ii. The ExA would also welcome submissions from Public Health England on these matters.

Response

1. Consideration of the risks associated with phosphatic chalk is presented in ES Chapter 10, Geology and Soils [APP-048]. Particulate alpha emitters could in theory pose risks due to inhalation of dust derived from phosphatic chalk during the construction of the tunnel. Within the enclosed environment of the tunnel boring, the health of construction personnel will be protected by the mitigation measures set out in the Outline Environmental Management Plan (OEMP) [APP-187], which includes monitoring and the development of a ventilation strategy (MW-GEO5, MW-GEO10, MW-AIR3). Compliance with the OEMP is secured through paragraph 4 of schedule 2 of DCO [APP-020]. Further information on the phosphatic chalk and radon gas can be found in the ES Chapter 10 [APP-048].

2. Furthermore, Highways England asked Public Health England (PHE) to analyse samples and assess radiological risks from the management of tunnel arisings, including from inhalation of dust.

3. Their work concluded that, even using worst case scenarios, the radiological dose would be very low and the material extracted during the tunnelling operation would pose little radiological risk to people living in the area.

4. Therefore, specific consideration of these matters was not required as part of the air quality assessment. Dust will be managed through standard good practice and further standard good practice measures, as set out in the Outline Environmental Management Plan (OEMP) [APP-187] specifically in MW-AIR1 and MW-AIR2. Compliance with the OEMP is secured through paragraph 4 of Schedule 2 of the draft DCO [APP-020].

Question AQ.1.22

Operational Phase – cumulative effects

Chapter 15 of the ES states that the operational AQAs have taken into account cumulative effects through reliance on the Transport Assessment, which in turn relies on modelling that has included other developments.

i. With reference to [APP-290] can the Applicant clarify which projects are accounted for in the transport model either as 'built in' to the model or as a part of the uncertainty log?

ii. Can the Applicant clarify how the other developments shown on [APP-183] Figure 15.2 as 'Future Baseline' have been incorporated into the air quality baseline for the years 2021 and 2026, considering these other developments are not mentioned within [APP-043] Chapter 5: Air Quality section 5.7: Future baseline?

Response

i. **With reference to [APP-290] can the Applicant clarify which projects are accounted for in the transport model either as 'built in' to the model or as a part of the uncertainty log?**

1. The operational phase traffic data that was included in the air quality assessment includes traffic associated with other planned developments within the local area and is inherently cumulative. It is therefore considered to provide a realistic worst-case scenario as the basis for assessment. Paragraphs 15.2.16 and 15.2.17 in the ES Chapter on the Assessment of Cumulative Effects [APP-053] states:

> *"The overall list of other development and allocations was prepared jointly with the transport planners responsible for developing the traffic model, including developments which are judged to be 'near certain' and 'more than likely' in the traffic forecasting as being 'reasonably foreseeable' as defined by HA205/08 (Ref 15.2)[12]. Therefore, the predicted traffic flows associated with the other developments and allocations identified have been included in the traffic flow predictions.*
>
> *"These developments include Highways England's A303 Sparkford to Ilchester and A358 Taunton to Southfields schemes, both due to open in 2023. The predicted traffic flows during construction and operation were used in the noise, air quality, water and people and communities assessments and, as such, these assessments are inherently cumulative."*

[12] Highways Agency (2008). DMRB, Volume 11, Section 2, Part 5 'Assessment and Management of Environmental Effects' (HA 205/08).

2. The Combined Modelling and Appraisal (ComMA) report [APP-298] summarises the development of the forecast year highway networks. Section 4.2 notes that an Uncertainty Log, used to keep a record of assumptions made in the model that will affect travel demand and supply, was developed in accordance with the Department for Transport's (DfT) Web-based Transport Analysis Guidance (WebTAG) unit M4 'Forecasting and Uncertainty'. Schemes included in the 'Core' scenario are those that are categorised as either 'near certain' or 'more than likely'. Both the A303 Sparkford to Ilchester and the A358 Taunton to Southfields schemes have been categorised as such and so are considered in the modelling undertaken for the scheme. The full Uncertainty Log which includes all cumulative schemes is provided in Appendix A (Tables A1 and A2) of ComMA Appendix C – the Transport Forecasting Package [APP-301].

ii. **Can the Applicant clarify how the other developments shown on [APP-183] Figure 15.2 as 'Future Baseline' have been incorporated into the air quality baseline for the years 2021 and 2026, considering these other developments are not mentioned within [APP-043] Chapter 5: Air Quality section 5.7: Future baseline?**

3. The Assessment Matrix [APP-291] and Figure 15.2, other development with potential for cumulative effects [APP-183] identifies 43 projects that have been identified as forming part of the Future Baseline.

4. As such, all of these developments have been incorporated into the traffic model used for both the 'Do-minimum' and 'Do-something' scenarios used for the air quality assessment. See paragraphs 15.2.16 and 15.2.17 in the ES Chapter on the Assessment of Cumulative Effects [APP-053].

Question AQ.1.23

Operational Phase

Paragraphs 5.9.31 - 5.9.44 of the AQA set out predicted impacts during the operational phase. Small increases in NO_2 concentrations are predicted east of the Countess roundabout (R76), at Amesbury (R58 and R60), Upton Lovell and Codford St Mary (R-19 - R21 and R14) Deptford (R7) and Chicklade (R98 – R100) due to increases in traffic during the operational phase. A small increase in PM_{10} concentrations is predicted at Deptford. In all other locations decreases in emissions are predicted, due to decreases in traffic once the scheme is complete and in operation.

Are you content that the AQA has assessed the worst-case scenarios for the operational phase, and with the overall conclusions that any increase in harmful emissions from traffic during operation would result in concentrations well within the relevant AQ standards for NO_2 and PM_{10}/$PM_{2.5}$?

Response

1. The operational traffic data used as the basis for the air quality assessment includes traffic associated with other planned developments within the local area and is inherently cumulative and is considered to provide a realistic worst-case scenario. Paragraphs 15.2.16 and 15.2.17 in the Environmental Statement (ES) Chapter 15 on the Assessment of Cumulative Effects [APP-053] states:

   "The overall list of other development and allocations was prepared jointly with the transport planners responsible for developing the traffic model, including developments which are judged to be 'near certain' and 'more than likely' in the traffic forecasting as being 'reasonably foreseeable' as defined by HA205/08 (Ref 15.2)[13]. Therefore, the predicted traffic flows associated with the other developments and allocations identified have been included in the traffic flow predictions. These developments include Highways England's A303 Sparkford to Ilchester and A358 Taunton to Southfields schemes, both due to open in 2023. The predicted traffic flows during construction and operation were used in the noise, air quality, water and people and communities assessments and, as such, these assessments are inherently cumulative."

2. There are no modelled receptors at which concentrations of NO_2, PM_{10} or $PM_{2.5}$ are anticipated to increase above the relevant air quality objectives in the operational phase [APP-043, para 5.9.12]. The PM_{10} concentration at receptor R7 at Deptford, mentioned above for its 0.5 µg/m^3 increase in PM_{10} concentration, is predicted to have a concentration of 12.8 µg/m^3 by 2026 with the Scheme in place.

[13] Highways Agency (2008). DMRB, Volume 11, Section 2, Part 5 'Assessment and Management of Environmental Effects' (HA 205/08)

3. As no locations are predicted to exceed any relevant air quality objective for the protection of human health, no significant air quality effects are predicted at any sensitive receptors with the operation of the Scheme.

4. The draft Statement of Common Ground (SoCG) between Highways England and Wiltshire Council has been prepared covering air quality, in conjunction with the Wiltshire Environmental Health team. This SoCG is due to be submitted to the Examination at deadline 2 and includes consideration of matters of air quality methodology and all matters are agreed.

Question AQ.1.24

Please explain why increases in traffic using the A36 through Upton Lovell and Codford St Mary are predicted during the operational phase.

Response

1. As outlined in section 5.4.21 of the Transport Forecasting Package (Appendix C of the Combined Modelling and Appraisal Report, [APP-301]) the A36 north of the A303 is forecast to experience increased traffic flows as a result of traffic re-routing to routes which use the A303, to benefit from the reduced journey times delivered by the scheme, for example, by using the A303/A36 between Amesbury and Warminster rather than The Packway/B390.

Question AQ.1.25

Operational Phase

i. Considering that no operational dust assessment is included within [APP-043] Chapter 5: Air Quality; can the Applicant explain how the assessment that Countess Farm will be adversely impacted by dust during the operational stage of Proposed Development as stated in [APP-53] Table 15.4 was reached?

ii. Can the Applicant provide evidence that no other sensitive receptors will be adversely affected by dust during the operation stage of the Proposed Development?

Response

1. No dust assessment was carried out for the operational phase of the project as this does not involve notable dust-generating activities. As such, no significant dust impacts are expected as a result of the operation of the Scheme, at Countess Farm or any other location.

2. The reference in the ES [APP-053], Table 15.4 to potential adverse operational dust effects at Countess Farm is an error. Reference to 'Dust (potential adverse)' should be removed.

Question AQ.1.26

Tunnel operation

Can the Applicant state how often the tunnel ventilation system is expected to be in operation, and whether frequent use of the ventilation system will cause air quality to impact receptors further than the 200m zone of influence?

Response

Ventilation System Operation

1. Chapter 5 of the Environmental Statement (ES) [APP-043] notes at paragraph 5.9.54 that the tunnel would generally self-ventilate through the piston effect from traffic movement and at paragraph 5.8.12 that tunnel ventilation would only be required to operate when traffic speed drops to below approximately 30 km/h (approximately 20 mph).

2. The exact vehicle speed required for the tunnel to self-ventilate depends upon the conversion ratio of Nitrogen Oxide (NOx) to Nitrogen Dioxide (NO2). However, for the credible range of conversion ratios, at vehicle speeds above 30 km/h the tunnel is predicted to self-ventilate.

3. The Combined Modelling and Appraisal Report – Appendix C [APP-301], section 6.4.2 and the Transport Assessment [APP-297], section 6.8.2 states that there are no modelled operational issues on the approach to, or within, the tunnel section in each of the 'busy day' or neutral AM (morning), IP (inter-peak) and PM (afternoon) modelled peak periods, that would lead to speeds below 30km/h. Also stated in Section 6.4.3 and Figure 6-8 of the Combined Modelling and Appraisal Report – Appendix C [APP-301], the traffic modelling suggests a summer time peak hour average traffic speed of just over 90 km/h (approximately 55 mph). Therefore, under normal operating conditions it is anticipated that no mechanical ventilation will be required.

4. While in operation, traffic management systems will be used to reduce the probability of traffic congestion caused by an incident within the tunnel, which will reduce the likelihood of traffic slowing to speeds below 30 km/h. The tunnel will include a range of safety systems to support an effective response to events, such as an incident management system that will detect stationary vehicles and a detection system to support the identification of fires. Only during these rare events will there be a need for use of the tunnel ventilation system.

Zone of influence

5. The tunnel ventilation system has been designed to provide sufficient air flow to support the piston effect on occasions when the tunnel is not predicted to 'self-ventilate'. Self-ventilation is achieved when the induced piston air flow is greater than that required to control the pollutants. No notable difference in the zone of influence under piston effect and ventilation driven air flow is envisaged and no

notable difference in emissions under either situation is envisaged, as both piston effect and ventilation system are achieving the same end result of tunnel ventilation.

6. In the event that there was a difference in dispersion, the frequency of this variation would be very low and extremely unlikely to affect air quality at distant locations of already very good air quality as described in the response to AQ1.12.

Question AQ.1.27

Tunnel operation

i. Are you content that air quality modelling during operation at the tunnel portals is not required, and with the Applicant's explanation in Paragraph 5.9.48 of the ES that there are no relevant air quality receptors in the immediate vicinity of the tunnel portals?

ii. Do you agree with the conclusion in Paragraph 5.9.49 that the impact of portal emissions typically only extends up to about 100m to 200m?

iii. Are you satisfied that the regulatory requirements for the operation of a highway tunnel, along with European Directives that either superseded or supplement UK regulations, can be relied on to secure acceptable air quality within the tunnel for users?

Response

i. **Are you content that air quality modelling during operation at the tunnel portals is not required, and with the Applicant's explanation in Paragraph 5.9.48 of the ES that there are no relevant air quality receptors in the immediate vicinity of the tunnel portals?**

1. Relevant receptors in relation to tunnel portal locations have been addressed in detail within the Applicant's response to AQ1.12.

2. In summary, air quality objectives only apply where members of the public might reasonably be expected to spend one hour or longer depending on the objective. There are no locations that meet this criterion within 200 m of the tunnel portals. The justification for this distance is given below. Therefore, there is no risk of exceeding any air quality objective within the immediate vicinity of the tunnel portals and modelling at the tunnel portals is not required.

ii. **Do you agree with the conclusion in Paragraph 5.9.49 that the impact of portal emissions typically only extends up to about 100m to 200m?**

3. The zone of influence of portal emissions has been considered in the Applicant's response to AQ1.12. The Design Manual for Roads and Bridges (DMRB) air quality guidance (HA207/07) distance of 200 m for the consideration of air quality effects applies to tunnel portals with research findings identifying that the impact of portal emissions typically only extends up to about 100 to 200 m[14].

[14] McCrae, IS, Pittman, J, Boulter, PG, Turpin, KT. (2009), *Tunnel portal dispersion modelling. Transport Research Laboratory, Report PPR449, October 2009.*

iii. **Are you satisfied that the regulatory requirements for the operation of a highway tunnel, along with European Directives that either superseded or supplement UK regulations, can be relied on to secure acceptable air quality within the tunnel for users?**

4. As noted in paragraph 5.9.52 of the Environmental Statement [APP-043], the tunnel will be designed in line with regulatory requirements for the operation of a highway tunnel, along with European Directives that either supersede or are in supplement to the UK regulations.

5. These regulations require that air quality is controlled appropriately for users of the tunnel (i.e. road users and workers) and therefore only a design which achieves these regulations would be constructed. The acceptable levels of pollutants within the tunnel will be as set down in the Health and Safety Executive document "EH40/2005 Workplace Exposure Limits" (EH40) Edition 3 and in the internationally recognised World Congress Association (PIARC) document "Road Tunnels: Vehicle Emissions and Air Demand for Ventilation" (2019R02EN).

Question AQ.1.28

Tunnel operation

The OEMP [APP-187] includes the tunnel ventilation system in Table 3.2b but makes no reference to monitoring air quality within the tunnel. Can the Applicant direct the ExA to where monitoring of air quality within tunnel is secured through the OEMP or dDCO, what pollutant levels would trigger action, and what that action would be?

Response

1. Air quality within the tunnel is addressed in Paragraphs 5.9.52 to 5.9.54, Chapter 5 of the Environmental Statement [APP-043], which describes that the tunnel will be designed and constructed in line with regulatory requirements for the operation of a highway tunnel.

2. The OEMP [APP-187] Table 3.2b refers the reader to the Environmental Statement, chapter 5 [APP-043]. Paragraph 5.8.12 of this latter document states that a pollution monitoring system would be included in the tunnel to monitor air quality and to inform the use of the ventilation system.

3. There are only three ways in which an automatic tunnel ventilation system could operate: either operating all the time or switched on via a timer function at certain times of the day or week, or switched on in response to in-tunnel pollutant levels. The first ("operating all the time") is unacceptable in terms of energy usage. The second ("timer operation) is not common practice as it has limited relationship with in-tunnel conditions and therefore, the common practice for many years has been to use a pollution monitoring system to determine when the ventilation system should operate.

4. This requirement is described in Highways England's Design Manual for Roads and Bridges, Volume 2, section 2 part 9, BD78/99, which requires at paragraphs 5.160-5.182, 10.5.v and 10.25 that a pollution monitoring system is provided within the tunnel and that signals from this monitoring system are used to control the tunnel ventilation system to ensure that pollution levels remain acceptable. This requires the monitoring of carbon monoxide and visibility as a minimum, although monitoring of nitrogen monoxide is also now commonplace.

5. Similarly, the World Road Association (PIARC) document "Road Tunnels: Vehicle Emissions and air demand for ventilation" (PIARC reference 2019R02EN), which is considered best practice in the design of road tunnel ventilation systems, describes the use of set points and threshold values (levels of pollution) to operate the tunnel ventilation system. This confirms the need for a pollution monitoring system.

6. The requirement to provide a tunnel pollution monitoring system is set out in through the Environmental Mitigation Schedule [APP-186], requirement MS-AQ1.

7. The precise pollutant levels to be used as switching triggers are not specified, however, these would be established during detailed design development and set at a level to ensure the pollution limits were not breached. Further information on tunnel air quality regulatory requirements is provided in the Applicant's response to AQ1.27.

8. The action in the event of any one pollutant reaching its switching trigger level would be to initiate or increase, automatically, the mechanical ventilation in operation (i.e. to switch on fans or to increase the number of fans operating). During normal operations, ventilation analysis confirms that the tunnel will be typically self-ventilating and so ordinarily, the ventilation system will not be operating.

Question AQ.1.29

Local air quality compliance

Please explain whether and how the impact the Proposed Development may have on Wiltshire Council's Air Quality Action Plan has been taken into consideration in the ES?

Response

1. Local authorities are required to review air quality within their administrative areas and when they identify areas that may not meet air quality objectives they have to declare Air Quality Management Area (AQMA(s)). As a result of their declaration of AQMAs, Wiltshire Council created the Air Quality Action Plan (AQAP) for Wiltshire[15] in order to work towards the achievement of objectives in their AQMAs. Whether the Proposed Development will affect Wiltshire AQMAs has been considered in the Environmental Statement (ES) and so the potential impact of the Scheme on the Wiltshire AQAP has also therefore been considered.

2. The potential effects of the Proposed Scheme on Wiltshire AQMAs and so on the effectiveness of the AQAP to meet air quality objectives is specifically considered in the ES [APP-043] by identifying that none of their AQMAs are affected by notable changes in traffic in either the construction or operational phases assessed. This has been done by applying the local study area criteria set out in local air quality screening criteria presented in the Design Manual for Roads and Bridges (DMRB) air quality guidance, as set out in the ES [APP-043], paragraph 5.5.2 and below:

    - road alignment will change by 5m or more; or
    - annual average daily traffic flows will change by 1,000 or more; or
    - heavy duty vehicles (vehicles greater than 3.5 tonnes, including buses and coaches) flows will change by 200 AADT or more; or
    - daily average speeds will change by 10km/hr or more; or
    - peak hour speed will change by 20km/hr or more.

3. Those roads where a notable change in traffic has been identified are shown with orange lines (known as the affected road network) in Figure 5.1: Air Quality Study Area [APP-062]. There are no orange lines within the Wiltshire AQMAs, which demonstrates that these roads are not within the affected road network for either of the construction phases or the opening year of the operational phase.

4. The absence of a notable change in traffic in Wiltshire AQMAs which are located north and south of the A303 is logical (with the nearest AQMA over 10 km south)

[15] Wiltshire Council, 2015. Air Quality Action Plan for Wiltshire (June 2015)

as the purpose of the Scheme is not to specifically promote traffic flows in north/south directions, but rather east/west along the A303 corridor.

5. The absence of a notable change in traffic means that air quality in the AQMAs will not be adversely affected and the ability of the Council to successfully implement its AQAP range of Wiltshire wide and AQMA specific measures is also unaffected.

Question AQ.1.30

Local air quality compliance

i. Are you satisfied with the conclusion at Paragraph 5.9.60 of the ES that there are no links anticipated to be non-compliant with the limit values within the air quality study area for the scheme in either construction phase and the proposed opening year of 2026?

ii. Are you satisfied that the scheme will not contribute to problems currently experienced in AQMAs in Salisbury and Wilton?

iii. Are you satisfied with the conclusion at Paragraph 5.9.63 that for PM_{10} a net benefit with a negative score is predicted for the operation of the scheme, with 671 properties expected to experience an improvement in concentrations and 615 a deterioration, and with the similar conclusion regarding NO_2 emissions in Paragraph 5.9.64?

Response

i. **Are you satisfied with the conclusion at Paragraph 5.9.60 of the ES that there are no links anticipated to be non-compliant with the limit values within the air quality study area for the scheme in either construction phase and the proposed opening year of 2026?**

1. The conclusion at paragraph 5.9.60 of the ES [APP-043] is based on the Department for Environment, Food and Rural Affairs' (Defra) Pollution Climate Mapping (PCM) model, which indicates the earliest year which road links are anticipated to be 'compliant' with the nitrogen dioxide (NO_2) annual average EU limit value of 40 ug/m^3. The PCM model indicates that by 2017 in advance of 2026 all roads links within the scheme study area will already be 'compliant'. Compliance will be unchanged by the construction and operation of the proposed Scheme.

ii. **Are you satisfied that the scheme will not contribute to problems currently experienced in AQMAs in Salisbury and Wilton?**

2. The potential effects of the Proposed Scheme on the Air Quality Management Areas (AQMAs) in Salisbury and Wilton are specifically considered in the Environmental Statement (ES) [APP-043], paragraph 5.6.2, which concludes that neither of these AQMAs are affected by notable changes in traffic in either the construction or operational phases assessed. This has been done by applying the local study area criteria set out in local air quality screening criteria presented in the Design Manual for Roads and Bridges (DMRB) air quality guidance[16], as set out in the ES [APP-043], paragraph 5.5.2. The absence of a notable change in traffic means that air quality in the AQMAs will not be adversely affected.

[16] Highways Agency, 2007. Design Manual for Roads and Bridges air quality guidance (HA207/07).

iii. **Are you satisfied with the conclusion at Paragraph 5.9.63 that for PM_{10} a net benefit with a negative score is predicted for the operation of the scheme, with 671 properties expected to experience an improvement in concentrations and 615 a deterioration, and with the similar conclusion regarding NO_2 emissions in Paragraph 5.9.64?**

3. A web-based Transport Analysis Guidance (TAG) plan level appraisal has been completed in respect of PM_{10} and NO_2 exposure following the WebTAG methodology as described in the ES Appendix on Air Quality Methodology [APP-191] Section 3.12, which considers individual links in isolation. The results indicated that overall the scheme would be beneficial in terms of PM_{10} and NO_2 concentrations with more properties expected to experience an improvement in air quality than a deterioration. The plan level information described above, along with the regional assessment for oxides of nitrogen and particulates, has been prepared as part of the reporting requirements of DMRB only.

Points i, ii and iii

4. The draft Statement of Common Ground (SoCG) between Highways England and Wiltshire Council has been prepared covering air quality, in conjunction with the Wiltshire Environmental Health team. This SoCG will be submitted to the Examination for deadline 2 and includes consideration of matters of air quality. All air quality matters are agreed.

Question AQ.1.31

Local air quality compliance

Paragraph 5.3.26 of ES Chapter 5 [APP-043] states that consultation with Wiltshire County Council regarding air quality was undertaken in September 2018 and that no changes to the methodology were required. This differs from the Wiltshire County Council's RR that implies, air quality monitoring locations were not agreed. The representation continues and states that the proposed development could result in "*Severe adverse effects on Salisbury's AQMAs*" which would appear to contradict Chapter 5 of the ES, in which the Applicant concludes no significant effects are identified.

i. Please comment on these points specifically with reference to the relevant sections of the application documents where you consider significant effects on Salisbury AQMA may arise.

ii. Please explain the statement "*and the severe adverse effect on Salisbury AQMA identified in the ES*" in the Council's RR as the AQAs have not identified a severe adverse effect on Salisbury AQMA.

Response

1. In relation to points (i) and (ii), the relevant representation mistakenly understands that off-site disposal of the tunnel arisings forms part of the proposed Scheme. This is not the case. The potential for adverse effects in the Salisbury Air Quality Management Area (AQMA) was discussed in the context of an assessment of the implications of off-site disposal for the tunnel arisings undertaken in the early stages of the Scheme's preliminary design development. Details of this assessment are presented in the Tunnel Arisings Management Strategy [APP-285]. The Applicant can confirm that, as reported in the air quality assessment [APP-043], no significant air quality effects are expected in the construction or operational phase in any Wiltshire AQMA as none of these AQMAs are located within the air quality study area, as shown on Figure 5.1 Air Quality Study Area [APP-062]. As secured by Requirement 8 of the DCO [APP-020], the tunnel arisings will used within the Order Limits.

2. This was explained to Wiltshire Council by the Applicant's waste team in one of the monthly air and noise calls with Wiltshire Council on the 31st of January 2019.

3. The draft Statement of Common Ground (SoCG) between Highways England and Wiltshire Council has since been prepared covering air quality, in conjunction with the Wiltshire Environmental Health team. The SoCG specifically addressed this point and this matter is agreed. That draft SOCG has been submitted to the Examination at deadline 2.

Question AQ.1.32

Mitigation

The mitigation measures referenced within ES Appendix 5.4 [APP-193] Tables 5.4.9 and 5.4.10 are not included within the OEMP [APP-187].

i. Can the Applicant clarify how the measures stated in [APP-193] Appendix 5.4 Table 5.4.9 and 5.4.10 are secured with reference to relevant Requirements within the DCO or equivalent?

The measures omitted include, but are not limited to:

- Measures specific to trackout;
- Preparing and maintaining the site;
- Specific demolition measures; and
- Measures specific to earthwork.

ES paragraph 5.9.7[APP-043] states that "*Site specific mitigation measures may be necessary to avoid significant temporary effects on air quality for these activities and locations, in addition to mitigation measures*".

ii. Can the Applicant describe the mitigation measures referred to here and state how the measures will be secured?

Response

1. The need for further dust mitigation measures as well as standard best practice dust mitigation measures in some locations has been included in the Outline Environmental Management Plan (OEMP) in MW-AIR1 and MW-AIR2 [APP-187], submitted with the DCO. Compliance with the OEMP is secured through Schedule 2, paragraph 4 of the draft DCO [APP-020].

2. These items set out that the main works contractor must manage dust, air pollution and emissions in accordance with best practicable means; and that specific measures must be based on good practice including those listed in the relevant Institute of Air Quality Management (IAQM) guidance. It goes on to list examples of what those measures might be, but states that the measures are to be set out in more detail in the Construction Environmental Management Plan (CEMP), to be prepared by the contractor.

3. As such, the CEMP will include the measures most relevant to the works, based on IAQM guidance. That guidance informed Appendix 5.4 [APP-193], and so the contractor will, in developing the CEMP, have to provide details of those measures (amongst others). Wiltshire Council will be consulted on the CEMP (as required by item MW-G6 of the OEMP), so will be able to consider whether suitable measures have been put in place. It is therefore not necessary for all the measures in Appendix 5.4 to be repeated in the OEMP.

Question AQ.1.33

Monitoring

Paragraph 5.10.1 of the ES states that no significant effects have been identified for construction and therefore no monitoring measures are proposed. This contradicts the [APP-187] OEMP Table 3.2b which states air quality monitoring measures will occur during the construction phase.

Please clarify the contradiction between paragraph [APP-043] 5.10.1 which states that no monitoring measures during construction will occur and [APP-187] Table 3.2b which outlines construction phase monitoring measures?

Response

1. The Infrastructure Planning (EIA) Regulations 2017 define a 'monitoring measure' as a provision requiring the monitoring of any significant adverse effects on the environment of a proposed development. Therefore, where significant adverse effects have been identified for a topic, any requisite monitoring specific to those significant effects is described separately in sub-section 10 Monitoring, of each Topic chapter. This is the monitoring text referred to in Para 5.10.1 [APP-043] of the ES.

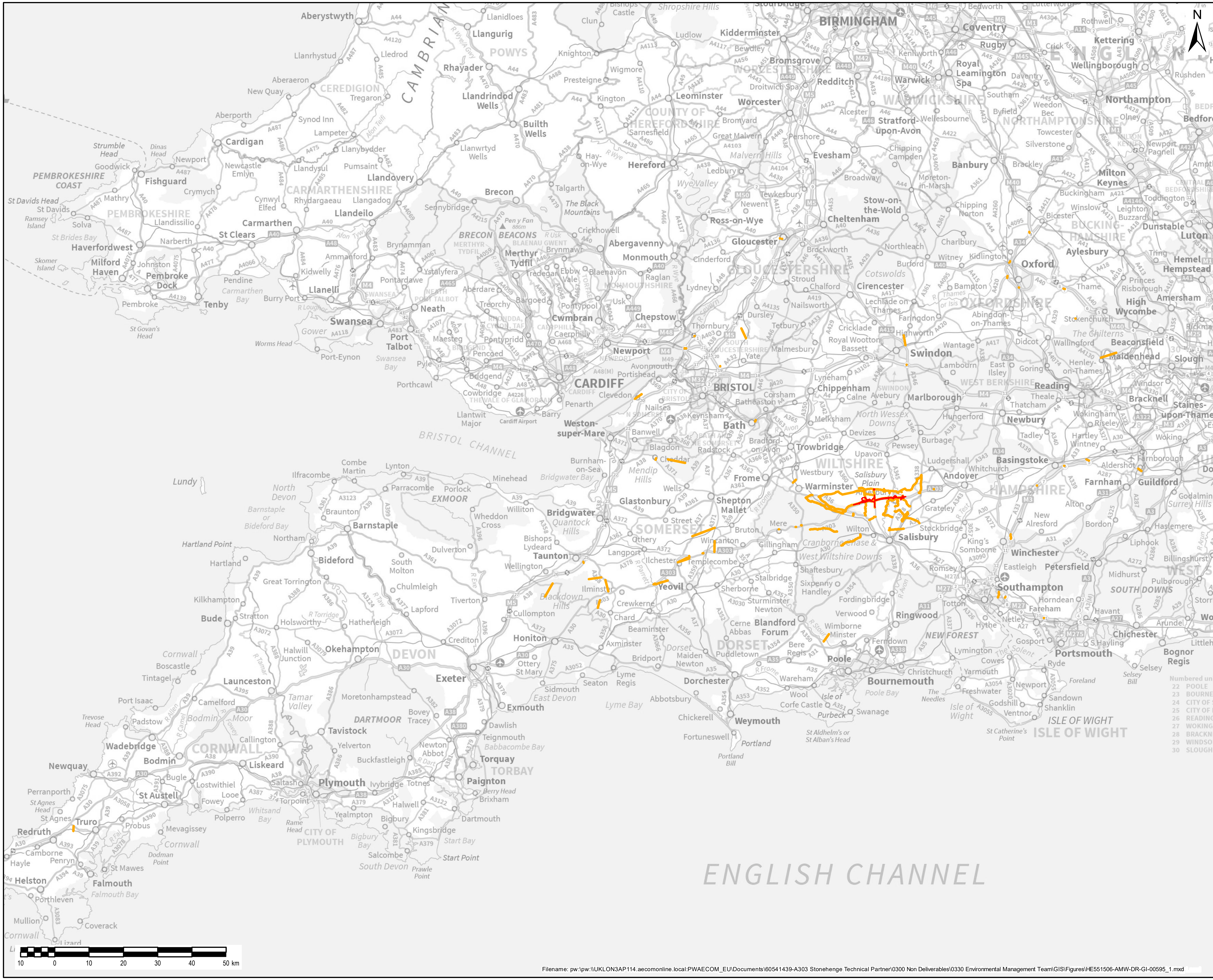
2. Routine construction or operational stage monitoring proposed for the Scheme, for example to ensure that the mitigation measures embedded in the scheme design are appropriately implemented, is referred to in sub-section 8 Design, Mitigation and Enhancement Measures, of each Topic chapter in the ES and also within the Outline Environmental Management Plan (OEMP) [APP-187]. This routine monitoring is the monitoring referred to within Table 3.2(b) of the OEMP (at MW-AIR4) [APP-187] and also within Section 5.8 of the ES Air Quality Chapter [APP-043]. It reflects good practice set out in IAQM guidance.

Appendixes AQ.1

Appendixes AQ.1

Question AQ.1.10

Fig 1.10A



NOTES / LEGEND

Order Limits

Regional Affected Road Network

Revision Details	By / Check	Date	Suffix

Purpose of issue

FINAL

Client

Highways England

Working on behalf of highways england

Project Title

A303 AMESBURY TO BERWICK DOWN

Drawing Title

FIGURE 1.10A
AIR QUALITY REGIONAL STUDY AREA
OPENING YEAR

Designed	Drawn	Checked	Approved	Date
NE	TD	GM	DD	30/04/19

Internal Project No. 60547200

Scale @ A3: 1:1,000,000 | Zone: SW

Highways England
Temple Quay House
2 The Square, Temple Quay
Bristol
BS1 6HA

Drawing Number

Highways England PIN	Originator	Volume	Rev
HE551506	AMW	GEN	01
SCHEME WIDE	DR	GI	00595
Location	Type	Role	Number

Appendixes AQ.1

Question Ag.1.10

Fig 1.10B

NOTES / LEGEND

Order Limits

Regional Affected Road Network

N

Revision Details	By / Check	Date	Suffix

Purpose of issue: FINAL

Client: Highways England

Working on behalf of: highways england

Project Title:

A303 AMESBURY TO BERWICK DOWN

Drawing Title:

FIGURE 1.10B
AIR QUALITY REGIONAL STUDY AREA DESIGN YEAR

Designed	Drawn	Checked	Approved	Date
NE	TD	GM	DD	30/04/19

Internal Project No.: 60547200

Scale @ A3: 1:1,000,000 | Zone: SW

Highways England
Temple Quay House
2 The Square, Temple Quay
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BS1 6HA

Drawing Number	Originator	Volume	Rev
Highways England PIN: HE551506	AMW	GEN	01
SCHEME WIDE	DR	GI	00596
Location	Type	Role	Number

10 0 10 20 30 40 50 km

Filename: pw:\pw:\\UKLON3AP114.aecomonline.local:PWAECOM_EU\Documents\60541439-A303 Stonehenge Technical Partner\0300 Non Deliverables\0330 Environmental Management Team\GIS\Figures\HE551506-AMW-DR-GI-00596_1.mxd

Appendixes AQ.1

Question AQ.1.4

Table AQ.1.4

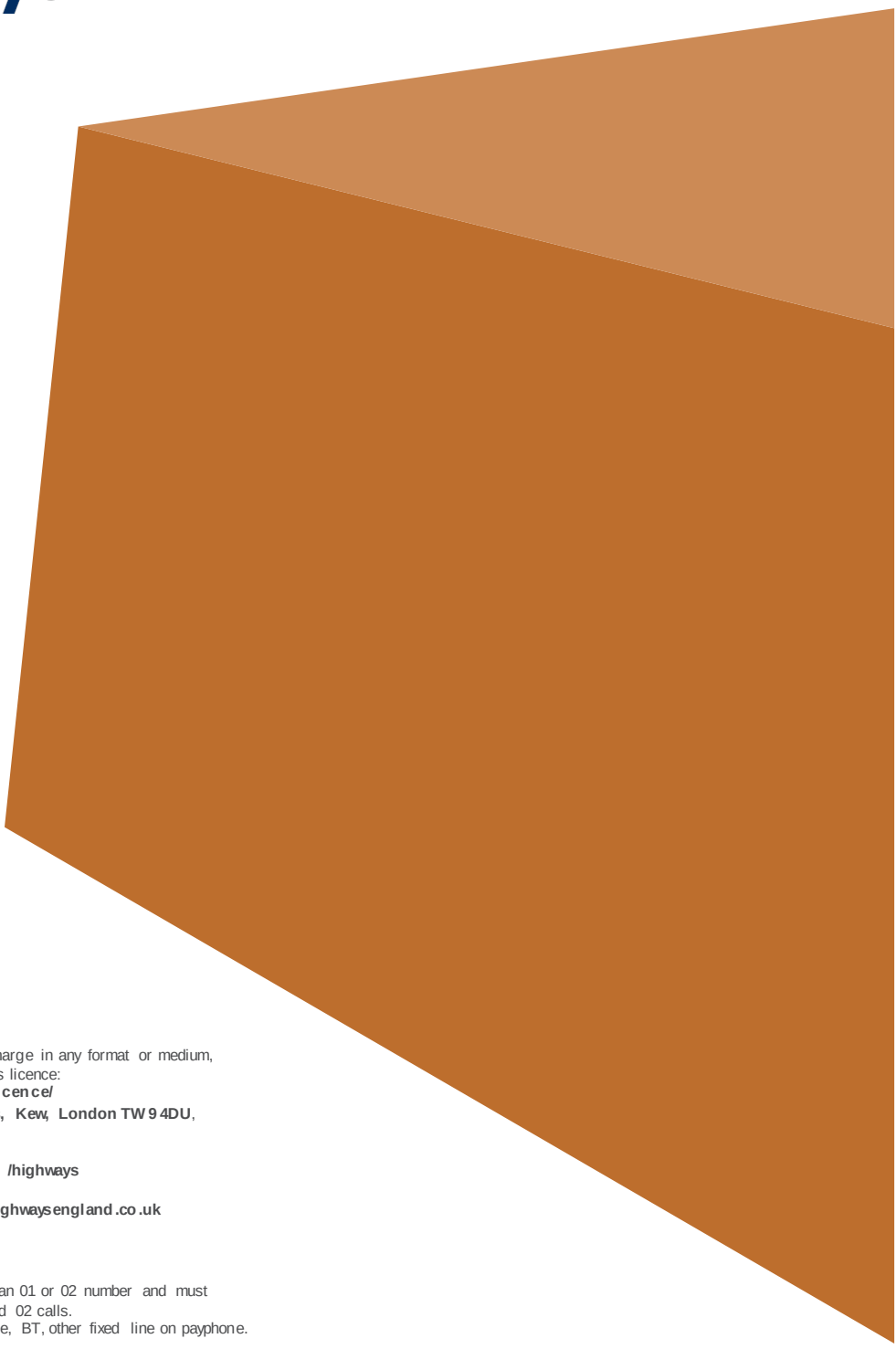
Record of Engagement

Author	[redacted]
Type of Engagement **Phone call /email/ meeting**	Phone Call
Purpose	Initial discussion of the proposed A303 Air Quality Impact Assessment
Location	-
Date and Time	24/11/17 14:00
Meeting title / Topic of discussion	Initial discussion of the air quality impact assessment
Present / contact (name / organisation)	[redacted] and [redacted] (AmW Air Quality), [redacted] and [redacted] (Wilshire Council Environmental Health)
Apologies	-
Distribution	As above, plus [redacted] (AmW Project Management)
Attachments / documents distributed	IAN 170/12 v3 IAN 174/13 IAN 175/13 HA LTT Calculate v1.1 spreadsheet

Item	Key matters and position of parties
1	Air quality study area and proximity to AQMAs · The scope of the air quality study area was discussed, with particular concern expressed by GT and JC regarding Ratfyn Road (particularly Lundisfarne and New Barn Cottages) and Countess Road around the scheme, and the potential for north-south movements that may affect the Salisbury AQMA around the A36/A360 (Wilton Road/Devizes Road). · AmW confirmed that information regarding the final affected road network due to the scheme would likely be available mid-2018. · Regarding ecological sites, GT and JC confirmed this would be addressed by Natural England.
2	Construction compounds and generators · GT and JC enquired whether locations for construction compounds had been confirmed at this stage. AmW confirmed this was still under discussion. · GT and JC asked whether generators would be used on compounds and whether people would be living on the compounds. AmW will confirm these details when information is available.
3	Monitoring data · AmW will provide a shapefile of locations of the Highways England air

	quality monitoring undertaken for the scheme. · GT and JC observed that the Countess Road measurement seemed lower than they would have anticipated. · It was noted that the measurement data collected previously would need to be re-annualised to 2016, rather than the 2015 data currently reported. · GT and JC will provide master spreadsheets of monitoring undertaken within the air quality study area for the scheme.
4	Data sources for background data · AmW confirmed that background data would be sourced from Defra background maps. · GT and JC confirmed there are no background monitoring locations within the Wiltshre Council network. The most recent measured background data was collected in 2011 in Amesbury and was low. · GT and JC noted that background locations would be included in their network from April 2018 and enquired if AmW had any specific locations in mind. · AmW indicated we would review and get back to Wiltshire on this point to confirm if any suggested additions whilst Wiltshire are updating monitoring locations.
5	Pollutants considered within the air quality assessment · Paragraph 6.1.29 of the scoping report sets out the pollutants to be considered in the assessment of air quality. GT and JC asked about the inclusion of $PM_{2.5}$ as this is something asked about by local groups, especially within the AQMAs and with reference to mortality effects. · GT and JC will provide AmW with a link to the PHOF discussions on particulates. · GT and JC explained they undertake some monitoring of particulates using Osiris monitors, with semi-fixed locations in the Calne and Marlborough AQMAs, with an additional two units for ad-hoc measurement locations. · AmW outlined that typically $PM_{2.5}$ is not modelled explicitly under Highways England guidance but that it was possible using standard modelling of PM_{10} to discuss $PM_{2.5}$.
6	Construction phase mitigation · Paragraph 6.1.33 of the Scoping Report identifies that additional mitigation measures would be proposed where required. AmW outlined that standard mitigation measures would be expected typically, but when a need for additional mitigation was identified through the assessment process these would also be recommended. · GT and JC confirmed there were no specific construction phase sensitive receptors that they wished to draw AmW's attention to.
7	Assessment of future air quality and assumed improvements and significance · AmW explained the Highways England methodology approach to considering improvements in air quality over time which would be the main focus of the assessment for future air quality, with some information on local trends provided for additional information. This methodology refers to long term trends and is set out in IAN 170/12. AmW will provide a copy of the latest IAN and spreadsheet tool to GT and JC. · GT and JC asked if the outcomes of an LTT_{E6} approach to future concentrations has been compared to the CURED approach (as developed by Air Quality Consultants and is a method GT and JC are familiar with). · AmW explained that it was understood that the LTT_{E6} was believed to be more conservative than the CURED approach and that we would seek confirmation from Highways England. · AmW explained how significance of effects is assessed in Highways England guidance. This guidance focuses on changes in air quality and total concentrations. Where changes in air quality occur over air quality

	objective values these are then evaluated in the overall determination of significance. AmW offered to provide a copy of IAN 174/13 (and will draw GT and JC's attention to key passages). · It was confirmed that sensitive receptors will be identified and that worst case receptors based on proximity to affected roads etc. will be considered. · The IAN that considers compliance was briefly discussed and a copy will be provided to Wiltshire and AmW outlined that due to the nature of air quality around the scheme that compliance text in the assessment was likely to be limited.
8	Consideration of summer periods within the assessment · AmW explained that the approach to the consideration of summer periods within the air quality assessment is still being developed, but as we are using ADMS-Roads for the ES we have some options to do this e.g. time varying emission files. This type of assessment would not be possible using the simple spreadsheet tools. · GT and JC noted that consideration of the summer periods was critical, particularly noting that on Bank Holidays and other busy days it is congested in both directions at Countess roundabout, therefore local traffic avoids this area as a 10 min journey can become more than an hour. The consideration of rat running is therefore important.
9	Tunnel portals and proximity to sensitive receptors · GT and JC asked whether the tunnel would be naturally ventilated, and if not would point sources be modelled at the ventilation points. AmW to confirm details of portal ventilation. · AmW outlined that the portals were considered to be too far from receptors to require detailed assessment. GT and JC are interested in the distances from the tunnel portals to sensitive receptors, particularly Stone Cottages. AmW to confirm distances to help confirm these are unlikely to require detailed assessment.
10	Construction phase HGVs and spoil/tunnel arisings · GT and JC expressed concern over the potential routes that HGVs would take during the construction phase and noted that routes through AQMAs should be avoided. · GT and JC asked whether spoil from construction, and particularly the tunnel, would be reused on site or need to be transported away, and if so how much would be being removed. · AmW to confirm when this information is available.
11	Construction phase diversion routes · GT and JC expressed concern that as with the consideration of summer periods, diversion routes and rat running during the construction phase needs to be considered.
12	AmW outlined that this was considered to be an initial call and that we would like to thereafter arrange a more regular slot to keep in touch on air quality matters.



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or call **0300 123 5000***.

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