A303 Amesbury to Berwick Down

TR010025

Volume 8

Deadline 6
8.37.4 - Responses to the ExA's Written Questions - Cultural Heritage (CH.2)

APFP Regulation 5(2)(q)

Planning Act 2008

The Infrastructure Planning (Examination Procedure) Rules 2010

July 2019

Infrastructure Planning

Planning Act 2008

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A303 Amesbury to Berwick Down

Development Consent Order 20[**]

Responses to the ExA's Written Questions

- Cultural Heritage (CH.2)

Regulation Number:	Regulation 5(2)(q)
Planning Inspectorate Scheme Reference	TR010025
Application Document Reference	8.37.4
Author:	A303 Amesbury to Berwick Down Project Team, Highways England

Version	Date	Status of Version
Rev 0	26 July 2019	Deadline 6 Issue

List of Chapters

4 Cultural Heritage (CH.2)

Question CH.2.1

Consultation/ agreement/ approval

The ExA considers that every effort should be made to reach agreement with Heritage Monitoring Advisory Group (HMAG) and Wiltshire Council Archaeology Service (WCAS) on the form and content of the Detailed Archaeological Mitigation Strategy (DAMS) [REP4-024].

In the event of disagreement, it considers that the statutory bodies should fulfil their normal role in having the final decision on the form and content of the DAMS. Given the unsurpassed international importance of the site it is vital that this role remains with the nationally authorised statutory bodies, who carry the greatest expertise and who operate in a completely independent and objective manner.

Similarly, during the preliminary and main works, with regard to fieldwork issues of mitigation, unexpected finds, the signing off of sites, and so on, every effort should be made to reach agreement. In the event of a dispute, it is unlikely that reference to the SoS would be practicable and it considers that the statutory bodies should again fulfil their normal role.

The statutory role of Wiltshire Council and Historic England is confirmed in the DL4 version of the DAMS.

Please comment.

Highways England response

1. Highways England concurs that every effort should be made to reach agreement on the DAMS and continues to engage with HMAG and WCAS to conclude this. The Deadline 6 submission of the DAMS represents a further evolution of the strategy towards this goal. Highways England does not anticipate any fundamental disagreement with HMAG or WCAS remaining when the final version of the DAMS is submitted for Examination at Deadline 8.
2. The Deadline 4 version of the DAMS acknowledges the statutory roles of Wiltshire Council and Historic England [REP4-024, paragraph 1.3.3]. Highways England recognises the importance of the WHS and the role of these statutory bodies, however we do not agree that it is their normal role to have the final decision on the form and content of the DAMS - or an equivalent written scheme of investigation – on highways nationally significant infrastructure projects (NSIPs) (see for example The A14 Cambridge to Huntingdon Improvement Scheme Development Consent Order 2016, The A19/A184 Testo's Junction Alteration Development

Consent Order 2018, and The M20 Junction 10a Development Consent Order 2017). Highways England does not anticipate having to make provision for the DAMS not being approved, but if it did, its starting point would be to adopt an approach consistent with other highways NSIPs, providing for approval by the Secretary of State, after consultation with Wiltshire Council and Historic England. Highways England would be willing to provide further detail on this question in the unlikely (in Highways England's opinion) event that it seems possible that the DAMS will not be agreed.

3. Moving on to the question of ultimate approval of documents subsidiary to the DAMS, Highways England has considered the position, in consultation with HMAG, and proposes the following arrangements.
4. The DAMS requires the production of Heritage Management Plans (HMP), Method Statements (MSs) and Site Specific Written Schemes of Investigation (SSWSIs). These documents are required to be developed in consultation with HMAG (within the WHS) and WCAS (outside the WHS), and with Historic England where scheduled monuments are concerned.
5. The HMP, MSs and SSWSIs combine to define and control the work necessary to implement the requirements of the DAMS. Highways England is content that responsibility for approval of these detailed documents should rest with Wiltshire Council, who have a statutory role across the length of the Scheme, both within and outside the WHS. Highways England proposes that Wiltshire Council will exercise this approval role in consultation with Historic England, to the extent the works the subject of the approval would ordinarily trigger the need for scheduled monument consent, in line with Historic England's statutory role in relation to designated heritage assets for DCMS (but also acknowledging that Wiltshire may consult with Historic England where it considers it necessary to have specialist advice from Historic England (such as advice from Science Advisors)) The draft DAMS submitted at Deadline 6 has been updated to reflect these roles.
6. With regard to fieldwork issues of mitigation, the draft DAMS requires HMAG members, WCAS and Historic England to be afforded access to the sites, site records and any other information through regular site meetings [REP4-024, paragraph 8.1.7]. These meetings will review implementation of the DAMS (including implementation of the HMPs, MSs and SSWSIs approved by Wiltshire Council) and the suitability and effectiveness of the sampling strategies adopted, on the basis of specialist advice [REP4-024, paragraph 8.1.10]. The purpose of the meetings is to seek agreement on these matters. While HMAG have an advisory role in this regard within the WHS, Wiltshire Council and Historic England would be represented in their statutory capacities. In the event that any revisions or adaptations of the strategies in the approved SSWSIs are required, these would be subject to the approval of Wiltshire Council, in consultation with Historic England where appropriate

(in the circumstances explained above). The draft DAMS submitted at Deadline 6 has been updated to reflect this role for Wiltshire Council.

7. Where unexpected discoveries arise, a new SSWSI would be prepared for approval by Wiltshire Council, in consultation with Historic England where appropriate, as above. The necessary works would be instructed by Highways England in accordance with the approved SSWSI.
8. With regard to the signing off of sites in terms of archaeological completion, our position is that Highways England is the competent body under the DCO and should therefore retain responsibility for signing off the completion of archaeological works on site, in consultation with Wiltshire Council and, where relevant as above, Historic England.This position is considered reasonable given the archaeological works on site will be required to be undertaken and completed in line with the SSWSIs, which will already have been approved by Wiltshire Council, following appropriate consultation of Historic England (if required in the circumstances explained above). This process is therefore distinct from the monitoring meetings, which are held to seek agreement on progress and work in hand, such that sign off of the completed works should not be a matter of dispute.

Question CH.2.2

Extent of the Mitigation Area covered by the DAMS [REP4-024]

Some stretches of proposed road line appear not to be covered as mitigation areas in the DAMS.

Why is this so?

Highways England response

9. The draft DAMS (a revised version of which is submitted at Deadline 6) proposes archaeological mitigation in response to the Scheme impacts on the archaeological resource identified through the comprehensive evaluation programme. In areas where the evaluation programme did not identify any significant archaeological remains, no archaeological mitigation is proposed. The DAMS makes provision in respect of unexpected finds and those provisions would apply equally to an area whether it had been subject to archaeological mitigation or not.

Question CH.2.3

Pre-commencement works

How will pre-commencement works be controlled prior to certification of the OEMP [REP4-020]?

Highways England response

1. Prior to the Order coming into force, surveys for archaeology and cultural heritage may include non-intrusive and / or reversible surveys, such as surface artefact collection. The scope of these would be determined in consultation with the Heritage Monitoring and Advisory Group (HMAG) (within the WHS) and Wiltshire Council and Historic England (outside the WHS) and the surveys would be undertaken in accordance with the established framework agreed for archaeological surveys to date. That framework consists of the Archaeological Evaluation Strategy Report (AESR) [http://a303scientificcommittee.org.uk/images/documents/june2018/A303_Archaeological_Strategy1.pdf] and the accompanying Overarching Written Scheme of Investigation [http://a303scientificcommittee.org.uk/images/documents/june2018/Overarching_Written_Scheme_of_Investigation_for_Archaeological_Evaluation.pdf], which have been approved by HMAG and the Scientific Committee previously. All work would be monitored on site by Wiltshire Council Archaeology Service (outside the WHS) and members of HMAG (within the WHS).
2. Once the Order (if made) comes into force, given the definition of both the OEMP and detailed archaeological mitigation strategy in paragraph 1 of Schedule 2 of the draft DCO [REP4-018], which describes those documents as being “certified by the Secretary of State”, requirements 4(2) and 5 cannot be complied with (and therefore the preliminary works cannot be undertaken) until the OEMP and DAMS have been certified. There is therefore no circumstance in which pre-commencement works (preliminary works) could be lawfully undertaken in accordance with the DCO between the Order coming into force and certification of the OEMP.

Question CH.2.4

Outline Archaeological Mitigation Strategy (OAMS)

i. What is the role of the OAMS [APP-220] after the emergence of the DAMS?

ii. When will it be uncoupled from the OEMP [REP4-020]?

Highways England response

1. The Outline Archaeological Mitigation Strategy (OAMS) [APP-220] was the basis for the development of the Detailed Archaeological Mitigation Strategy (DAMS) (a revised version of which is submitted at Deadline 6) and was included as an appendix to the OEMP as the basis for a number of the OEMP [REP4-020] requirements. Now that the draft DAMS is in existence, the OAMS is redundant and has no further role.
2. As stated in paragraph 1.3.2 of the OEMP (updated at Deadline 4, REP4-020]), the OAMS has been succeeded by the DAMS which was initially issued in draft at Deadline 2. This has been reflected in the most recent draft of the OEMP submitted at Deadline 6 (paragraphs 1.3.2 and 1.3.3).

Question CH.2.5

Archaeological loss

Please confirm the location and area of land which would be archaeologically sterilised under the Proposed Development.

Highways England response

3. The exact area of the Scheme within which archaeological remains would be either removed or buried is 166 hectares, comprising 100 hectares within which archaeological remains would be removed as part of the archaeological mitigation programme (archaeological excavation) and 66 hectares where remains would be buried beneath landscape fill. A further 98 hectares would be temporarily covered with fill deposits during construction, but would be returned to agriculture or chalk grassland following completion of the works. Highways England does not accept that any of these areas would be archaeologically 'sterilised'. The draft DAMS submitted at Deadline 6 proposes suitable mitigation where remains will be removed, or buried.
4. The Scheme has been designed to minimise the extent of archaeological loss within the WHS and the draft DAMS proposes a comprehensive programme of archaeological mitigation works to ensure the identification, recording and detailed archaeological excavation of affected remains across the Scheme. The remains that are archaeologically excavated are therefore not 'sterilised' but are archaeologically recorded to high standards in advance of construction. That material, once published, is then available for reanalysis, re-interrogation and re-interpretation once the archive has been assembled and deposited with a Museum.
5. The draft DAMS proposes the preservation *in situ* of archaeological remains that are to be buried, where the proposed fill is less than 2 m deep [see the draft DAMS submitted at Deadline 6, paras 5.2.9-5.2.14; 5.3.17-5.3.18 and 6.2.4-6.2.6] (where the proposed fill depth is over 2 m, archaeological investigation is proposed). Where remains are to be buried under less than 2m of landscape fill, the existing topsoil would be retained *in situ* and a permeable hi-visibility geotextile barrier membrane would be laid to separate deposited material from existing. Archaeological remains that are buried beneath less than 2 m of fill would continue to be accessible for future archaeological investigation, as the deposited material could be removed by machine to expose the barrier membrane - these areas are also therefore not 'archaeologically sterilised'. As no landscape fill is proposed within the WHS, no archaeological remains within the WHS would be buried in this manner.
6. Archaeological remains would also be preserved *in situ* where the existing ground surface would be temporarily covered during the works [see the draft DAMS submitted at Deadline 6, paras 5.2.27-5.2.34; 5.2.42-5.2.46; 5.2.47-

5.2.49 and 6.2.4-6.2.6]. This would include within site compounds and working areas, temporary roads and temporary haul roads, and beneath topsoil stockpiles. The existing topsoil would be retained *in situ* and a permeable hi-visibility geotextile barrier membrane would be laid to separate deposited material from existing topsoil. The covering material would be removed to carefully expose the barrier membrane, prior to returning the land to agriculture or chalk grassland, as relevant.

7. In summary, the area within which archaeological remains would be removed as part of the archaeological mitigation programme (archaeological excavation) is 100 hectares. Archaeological remains would be preserved in situ over a further 164 hectares, comprising 66 hectares where remains would be buried beneath less than 2m of landscape fill and a further 98 hectares where remains would be temporarily covered with fill deposits during construction.
8. It is not considered therefore that any of this land would be “archaeologically sterilised”.

Question CH.2.6

Geophysical techniques

Discuss the reliability of the investigation results of different geophysical techniques and the need to compare data sets across different techniques.

Highways England response

1. The geophysical surveys undertaken for the Scheme formed part of a comprehensive archaeological evaluation strategy [http://a303scientificcommittee.org.uk/images/documents/june2018/A303_Archaeological_Strategy1.pdf], developed with input from the Scientific Committee and approved by the Heritage Monitoring and Advisory Group (HMAG) and Wiltshire Council. Our response to this question considers the surveys undertaken and the various issues raised in submissions and at ISH2.
2. The geophysical survey approach has been designed in conjunction with Historic England and their Science Advisors. Geophysical surveys for the Scheme comprised detailed magnetometer surveys over the full extent of the land within the Scheme's red line boundary, to current Historic England minimum standards; pilot studies and areas of targeted ground penetrating radar (GPR) and electrical resistivity surveys; multi-channel GPR; and targeted electrical resistance tomography (ERT). Access for these surveys required Highways England to negotiate voluntary agreements with landowners or seek statutory powers of entry. The data sets across these differing techniques were compared as part of the assessment of the results in the geophysical survey reports.
3. With regard to the use of magnetic survey (magnetometry, also known as gradiometer survey) as the principal component of the works, Highways England acknowledges that in some cases a multi-technique approach may be beneficial in providing more data looking at differing geophysical properties (magnetic and electrical properties) of any potential features. For this reason the pilot studies and areas of targeted GPR and resistivity surveys were undertaken, however, comparing these results indicated that these techniques added little further information to the original gradiometer surveys. While some might argue that blanket coverage by GPR, resistivity, and electromagnetic survey might identify more features across the Scheme, from the evidence of the pilot studies this would be limited. Highways England's position is that it is unlikely that the gradiometer survey will have missed any substantial features (a conclusion borne out by the results of the additional surveys undertaken, as explained above): the limited potential for added benefit from a multi-technique approach would not out-weigh the time, cost and practical limitations in terms of land access. The geophysical survey approach taken by Highways England was endorsed by HMAG with inputs from the Scientific Committee.

4. At ISH 2, the examination heard evidence from the Consortium of Archaeologists and Blick Mead Project Team concerning the Stonehenge Hidden Landscapes Project (SHLP) and the Stonehenge Landscape EMI (SLE) project. The SHLP applied motorized magnetometer, GPR and low frequency electromagnetic (EM) surveys over various areas. The SHLP provided Highways England with an assessment of its results in relation to the Scheme's boundary. While the SHLP surveys are of high resolution and comprised a wide suite of techniques, there is little in the information available to Highways England to confirm that these techniques would have added a significant amount of information over and above what its own surveys delivered. With regard to electromagnetic induction (EMI), while the Stonehenge Landscape EMI (SLE) project referred to by Paul Garwood of the Consortium of Archaeologists has evidently produced interesting results, combining further survey based on the SHLP results with targeted intrusive investigations, it is not clear from the information available to Highways England that it has identified clear or substantial features that cannot be seen in the gradiometer data for the Stonehenge Hidden Landscape Project. The only area where the EMI survey appears to have been of clear benefit is where significant amounts of ferrous debris limited the gradiometer survey: this is not the case within the survey areas along the Scheme. With regards to the phenomenon of demagnetization (as described by Paul Garwood), we have been unable to corroborate any process in which this would occur over a large enough area or with any degree of permanence so as to have an effect on our survey.
5. Highways England acknowledges that a multi-technique approach will give more information regarding a wider variety of geophysical properties when compared to a single-technique approach (as explained above, our approach has used a combination of techniques). However, in each case, the cost, time and practical limitations of such an approach need to be considered against the quality and usefulness of that information and the objectives of the approved archaeological evaluation strategy. Geophysical survey results do not produce an exact picture of what is below the ground surface, hence it is important to follow survey with a well-designed programme of evaluation and trenching. It is not a realistic expectation that geophysical survey results alone would identify every feature below the ground, even if it were practicable to apply all available techniques. Rather, geophysical survey is a prospection tool used to inform archaeological investigation going forward. Simply having more data does not necessarily produce more useful information.
6. Our pilot studies for the Scheme have allowed us to determine the best technique for prospection and apply this across the Scheme, with further targeted surveys in areas showing archaeological activity. This approach has informed further stages of investigation. A benefit of undertaking geophysical surveys as part of a wider evaluation strategy is that we have

been able to review our geophysical survey results against the trenching; this generally demonstrates a good correlation.

7. Taken together, the range of evaluation techniques, combining non-intrusive geophysical surveys with ploughzone artefact collection and trial trenching, has allowed a robust understanding of the archaeological resource affected by the Scheme. In Highways England's assessment, the limited potential for added benefit from a multi-technique approach would not out-weigh the time, cost and practical limitations in terms of land access. The geophysical survey approach taken by Highways England and endorsed by HMAG with inputs from the Scientific Committee, combining extensive gradiometer survey with targeted resistivity, GPR, multi-channel GPR and ERT surveys, goes far beyond a typical commercial survey. The pilot studies and application of a variety of techniques across various parts of the Scheme provide a high level of confidence that our approach is an appropriate and robust means of archaeological prospection.

Question CH.2.8

Blick Mead, Vespasian's Camp, and Amesbury Park RPG Settings

At the ASI it was clear that, despite the early summer foliage, visibility and aural connection exists between these historic assets and areas to the north. During autumn and winter, with the loss of foliage, the visual and aural link is almost certain to be greater. In any event, we cannot be sure the tree screen will remain in its present form. The settings of the assets, therefore, extend to the north and, at present, contribute to their significance through the enclosing backdrop they offer.

The Proposed Development may well harm the settings of these historic assets through greater visual prominence of traffic which would be elevated on the flyover, even if noise levels are contained. Also, as was clear at the site visit that the eastern portal, from which traffic would emerge on a rising incline, would be visibly intrusive, particularly at night with upward angled headlights. It would be likely to have an impact on the existing character and significance of Vespasian's Camp.

Please comment.

Highways England response

1. The Applicant respectfully states that for all these assets, their setting and the way in which they are experienced is influenced by environmental factors such as noise, dust and vibration from other land uses in the vicinity, and by our understanding of the historic relationship between places, not just visual considerations.
2. In respect of the suggestion that the Examining Authority cannot be sure that the tree screen will remain in its present form, as the trees bordering all these historic assets are part of the Registered Historic Park and Garden the Applicant considers that they are likely to remain for the foreseeable future and the period of the Scheme's operation. This is because the purpose of the Historic England 'Register of Historic Parks and Gardens of special historical interest in England' is to:

   "encourage those who own them, or who otherwise have a role in their protection and their future, to treat these special places with due care."
3. As the trees are present now, it is appropriate to consider them as the 'baseline' for the assessment, i.e. the existing situation.
4. ***Blick Mead***

   At Blick Mead, the density of the vegetation screens vehicles on the A303, except for glimpsed views of the upper parts of high sided vehicles, which are still largely filtered by the vegetation. There are no open views of vehicles on the existing A303 nor across the wider landscape to the north,

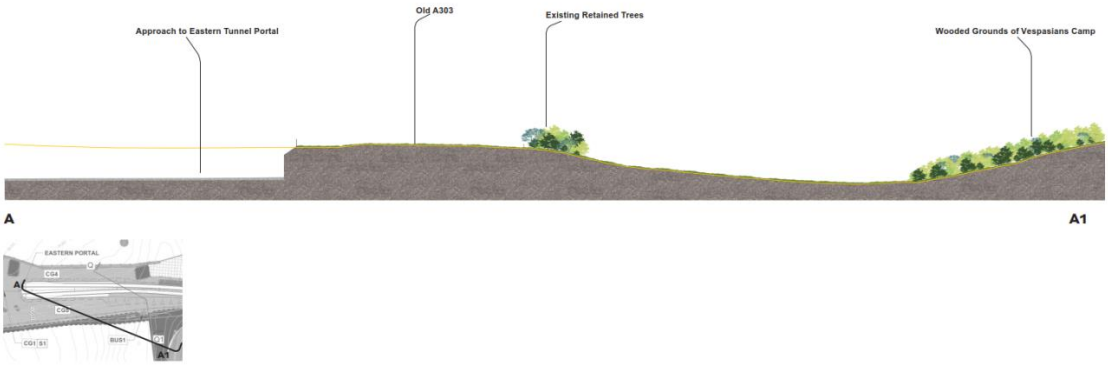
as Blick Mead is in a relatively low-lying position and enclosed on all sides by vegetation. Vehicles on the A303 are audible.

5. Blick Mead's current setting, as it is experienced today, is characterised by the wooded parkland landscape of Amesbury Abbey, which restricts views in and out, both in summer and winter conditions.
6. This setting, and its relationship to the existing road, would not change through the construction of the Scheme. The flyover as it crosses over the current Countess Roundabout is located c.470m to the east-north-east and is visually screened by woodland. This part of the Scheme would therefore not be visible from Blick Mead and would not harm the setting of Blick Mead.
7. The Scheme would be at grade as it passes the Blick Mead site to the north (as with the existing A303). The Scheme alignment has been optimised past the Blick Mead archaeological site, to avoid land-take and to keep the road at existing grade. Therefore, any views of an increased amount of traffic would be in the direct context of existing views of traffic. The sight of an additional number of vehicles would not result in a greater visual prominence of the road and it would not impact the setting of Blick Mead.
8. In terms of the aural connection, once the Scheme is operational, Figure 9.24 [APP-167] indicates a negligible increase in noise (the light blue hatching in Figure 9.24).
9. The ES therefore reports No change and a Neutral Effect on the Blick Mead archaeological site (Appendix 6.8 – Cultural Heritage - Summary of non-significant effects [APP-217, page 5]).
10. ***Vespasian's Camp***

    The ASI walked through Vespasian's Camp and was led to one location at the north-west edge of the asset, from which there was a very narrow view towards part of the existing A303 and the pylon on the north side of the A303. The view was largely filtered by the existing trees, i.e. both their stems and leaves, as they are growing across the sloping ground between the existing A303 and the ASI location. The orientation of the view was to the north-west.
11. In winter, there would be a reduction in the leaf cover, as most of the trees were deciduous. However, there would still be filtered views because of the density of the tree stems. The visual prominence of vehicles on the existing A303, its road surface, markings, signage and the visibility of the pylon currently increases in winter as a result, further emphasising the fact that these features currently detract from the asset's setting.
12. Whereas, with the Scheme, Countess Flyover would not be visible within this view, as it is located to the east of the ASI location. Nor would it be visible from Vespasian's Camp overall, because of the density of the existing woodland, even when not in leaf, and that the flyover is in a lower position within the landscape than Vespasian's Camp.

13. The eastern portal would be constructed within the setting of Vespasian's Camp, but as noted in the Environmental Statement Appendix 6.9 - Cultural Heritage Setting Assessment [APP-218, page 75], the proposed Scheme would adopt a nearly identical surface alignment to the existing A303 dual carriageway that is situated directly adjacent to the north side of this heritage asset.

14. The portal entrance would be lower than intervening ground levels as indicated by the following section from the ASI location (at the right of the section) towards the eastern portal (at the left of the section) and therefore there would not be views of traffic emerging from the shallow incline (illustrated below).



15. There would therefore not be views of glare from vehicle headlights due to the alignment of the Scheme and the intervening landform and vegetation. The Scheme would not be more visibly intrusive to the setting of Vespasian's Camp than the existing road, or change the existing character, or diminish the contribution made by the setting to the significance of Vespasian's Camp due to the portal being in cutting and that it would be further from the ASI location than vehicles on the existing A303 and the direct glare from their headlights.

16. The Applicant also respectfully states that traffic noise is already very apparent in the more northerly parts of Vespasian's Camp on the existing A303 dual carriageway, as experienced on the ASI. In terms of the aural connection, Figure 9.4 [APP-167] predicts a negligible/minor reduction in noise, along with some areas of a negligible increase in noise (lightest blue) which on balance is considered to result in no change.

17. The Cultural Heritage Setting Assessment [APP-218] therefore concludes that the permanent impact of the construction of the Scheme and the operation of the Scheme would be No Change to a Very High value asset, leading to a Neutral significance of effect. The Applicant therefore respectfully disagrees that the Proposed Scheme will harm the setting of Vespasian's Camp as there would be No Change to the setting of Vespasian's Camp and the Scheme would not change the existing character

or diminish the contribution made by the setting to the significance of Vespasian's Camp.

18. ***Amesbury Abbey Grade II* Registered Park and Garden***

With regards to Amesbury Abbey Grade II* Registered Park and Garden (RPG), the Applicant recognises that the Scheme would be constructed within its setting, but the existing A303 dual carriageway runs within its setting directly adjacent to the northern boundary of the RPG where traffic noise was very apparent during the ASI.

19. Visually, however, traffic on the existing A303 is only visible from a small number of locations at the northern edge of the RPG and within these views it is filtered by the intervening vegetation. The A303 is not visible from within the remainder of the RPG, as demonstrated on the ASI, due to the distance from the A303 and the intervening vegetation.

20. In winter conditions, the density of the vegetation within the RPG would continue to screen the A303, except for localised areas on its northern edge, although views would remain filtered by the deciduous vegetation.

21. In terms of the aural connection, once the Scheme is operational, Figure 9.4 [APP-167] predicts a minor increase in noise to the west of Countess within the RPG.

22. The Setting assessment states *"there would be an impact on the northern boundary and part of the eastern boundary of Amesbury Abbey RPG as a result of the Scheme. However, that impact would not extend far into the RPG due to screening provided by the dense vegetation that covers the majority of the northern part of the asset." [APP-218, para. 3.4.10].*

23. There would be no visual impact on the most significant parts of the park at its centre with the grade I listed Amesbury Abbey [6054] and grade II listed Ornamental Vase [6058], or to the centre west on and adjacent to the River Avon where there are three grade II* listed assets, Gay's Cave and Diamond [6055], the Chinese Temple [6056], and Baluster Bridge and Gate Piers [6057].

24. The Setting Assessment [APP-218] concludes that there would not be a significant adverse effect to the RPG either in terms of construction permanent impacts or in terms of the Scheme's operation, due to it being a minor impact upon a High value asset resulting in a Slight Adverse effect.

Question CH.2.9

DAMS DL4 Version [REP4-024]

i. Comments are invited on the expanded sections of the Archaeological Research Strategy, including the Research Questions. Can any light be shed on theories concerning changing populations over time, and the idea of a funary zone to the west characterised by lithics, and a living zone to the east characterised by ceramics?

ii. Comments are invited on paras 5.2.7 and 5.2.8, which include detail on Tunnel movement monitoring stations. Should movement parameters be specified and trigger points set for the instigation of remedial measures to be put forward by the Contractor for agreement? Should movement monitors also be located elsewhere to safeguard archaeology, and should similar measures be put in place for vibration risks?

iii. Comments are invited on para 5.2.11, Handling, storage and placement of excavated topsoil. Why should the first bullet point apply only to topsoil from within the WHS? Who judges whether topsoil could contain archaeological artefacts in the second bullet point?

iv. Comments are invited on paras 5.2.43 and 5.2.54, Geotechnical and other intrusive surveys.

v. Comments are invited on para 6.1.16, Archaeological Clerk of Works. Should it be monitor rather than co-ordinate archaeological site works – responsibility for co-ordination would probably fall to the contractor.

vi. Para 6.1.17, Unexpected finds. The ExA suggests that if agreement is not forthcoming on the significance of the find and the appropriate course of action, approval of the Wiltshire Council/ Historic England is sought as statutory bodies.

vii. Comments are invited on para 6.1.20, Interruptions and delays – who makes the decision regarding the cessation or resumption of work?

viii. Comments are invited on paras 6.3.14 to 6.3.16 regarding ploughzone sampling.

ix. Comments are invited on paras 6.3.42 and 6.3.43, Tree hollows.

x. Comments are invited on Section 8.1 Communications Strategy, Section 8.2 Progress Reporting, and Section 8.3 Monitoring of Post Excavation Works.

xi. Para 8.4.2: the ExA suggests ‘approved by the TPA in agreement with HMAG/ WCAS’.

xii. Comments are invited on Table 11.3, Summary of proposed mitigation areas, and Appendix D Action Areas: Proposed archaeological fieldwork areas and preservation in situ areas.

xiii. Flowchart A2, Archaeological Mitigation: phases and roles – should the box heading Project supervision read, Project inspection and

monitoring, since the archaeological contractor will supervise his work team and the TPA project manager will inspect, monitor and approve?

xiv. Flowcharts A3 to A9, should the double headed arrows linking the top tiers of boxes signify agreement?

xv. Further comments, if any, are invited on the DAMS provisions for the treatment of archaeology buried under arisings, that affected by haul roads and compounds, and that subject in other ways to vibration, compression, crushing, or distortion [REP4-024].

Highways England response

i. Comments are invited on the expanded sections of the Archaeological Research Strategy, including the Research Questions. Can any light be shed on theories concerning changing populations over time, and the idea of a funerary zone to the west characterised by lithics, and a living zone to the east characterised by ceramics?

1. Highways England continues to engage with members of the Heritage Monitoring and Advisory Group (HMAG) and the Scientific Committee to develop and refine the archaeological research agenda for the DAMS. The Deadline 6 submission of the DAMS includes the transition between chronological periods as a research theme and the potential for the evidence to contribute to emerging theories concerning changing populations and differing 'zones' of land use, together with site-specific research questions, as well as period-based themes and research questions derived from the Stonehenge and Avebury Archaeological Research Framework (SAARF) and the South West Archaeological Research Framework (SWARF).
2. As noted in Highways England's Response to the Examining Authority's Written Questions CH.1.5 [REP2-025], however, regarding changing populations in prehistory:
3. *'There is continuing debate in academic circles as to whether the arrival of 'Beaker tradition' material culture was associated with immigrants to Britain or not. It would be highly conjectural to try to tie the different phases in the construction and use of Stonehenge and its monuments to a particular group of immigrants / indigenous people on present evidence.'*
4. As stated in Highways England's Comments on any further information submitted at Deadline 4 [REP5-003, para 34.1.30]:
5. *'The concept of 'zones' in the Stonehenge landscape – living/dead, funerary/settlement is debatable: while it is possible to read the evidence this way, it is not necessarily the case, nor is it the consensus. The Applicant considers that the suggestion of a zone of funerary activity within the Scheme boundary is not demonstrated by the evidence from the evaluation of the eastern portal and its approaches.'*

6. As stated in Highways England's Comments on any further information submitted at Deadline 4 ,[REP5-003, para 34.1.2, 34.1.3 and 34.1.5], a purely 'settlement zone' is not evidenced from the evaluation results.

   ii. Comments are invited on paras 5.2.7 and 5.2.8, which include detail on Tunnel movement monitoring stations. Should movement parameters be specified and trigger points set for the instigation of remedial measures to be put forward by the Contractor for agreement? Should movement monitors also be located elsewhere to safeguard archaeology, and should similar measures be put in place for vibration risks?

7. The DL 6 submission of the DAMS contains revised proposals for tunnel movement monitoring stations in paragraphs 5.2.7 and 5.2.8 following recent consultations with HMAG. See also the Applicant's submission at Deadline 5 – Comments on any further information submitted at Deadline 4, para 11.1.7 [REP5-003]

8. Whilst Highways England will continue to discuss with key stakeholders the issue of the methodology for measuring vibration during detailed design, it does not consider that it is necessary to finalise that at this stage. The Trigger Levels are informed by further information and investigations that will only be available during the detailed design.

9. The precise details of the vibration monitoring methodology will be set out in the Noise and Vibration Management Plan required by MW-NOI3 of the Outline Environmental Management Plan (OEMP) [REP4-020]. MW-NOI6 of the OEMP provides that the monitoring proposal will be included within the Noise and Vibration Management Plan. MW-G7 of the OEMP requires various management plans, including the Noise and Vibration Management Plan to be prepared in consultation with Wiltshire Council, the Environment Agency, Historic England and Natural England on those aspects that are relevant to their functions. As such, key stakeholders will feed into the process of determining the final vibration monitoring regime, including in relation to archaeology. The Noise and Vibration Management Plan will set out specific details of the vibration monitoring methodology in terms of the choice of transducers, method of coupling, measurement locations, measurement durations, etc., in accordance with the requirements of the relevant British Standards (BS 7385: 1993, BS ISO 4866:2010, and BS 5228: 2009+A1: 2014 as referenced in MW-NOI5 of the OEMP [REP4-020]).

10. At this stage, before detailed design is completed, a commitment has been made to vibration monitoring at the Stonehenge monument when the tunnel boring machine is within 250m of the monument (MW-NOI6), due to the level of interest in the Stones. Additional vibration monitoring locations at potentially sensitive heritage assets, such as barrows, will be determined on the basis of the further analysis required by MW-NOI5 to identify any potentially vibration sensitive cultural heritage assets based on the sensitivity of the assets and proximity to tunnelling works.

11. The prediction methodology adopted in the Environmental Statement for vibration from tunnelling follows the methodology prescribed in BS 5228:2009 + A1:2014 'Code of Practice for noise and vibration control on construction and open sites'. This methodology is conservative as it is derived from worst case source data for tunnelling in rock using a hydraulic hammer. Source data for TBM works and chalk ground conditions indicates lower levels of vibration are likely to be generated, however as a precautionary approach the BS 5228 tunnelling vibration prediction methodology has been used.
12. The Applicant considers that there is sufficient site investigation to inform the preliminary design in terms of the choice of a closed-face TBM and options for construction of the cross-passages. Variations in ground conditions (including solution features) are allowed for in the choice of a modern closed-face TBM that can employ techniques to investigate the ground in front of the tunnel and facilitate mitigation measures for any local features subsequently identified.
13. See also the Applicant's response to agenda item 6 (iii) in the Written Summary of Oral Submission from ISH5 regarding Noise, Vibration, Health and Wellbeing [REP4-033] and the response to Written Question Fg.1.5 [REP2-031] which considers these issues in addition to the response to written question Ns 2.7 provided at this Deadline 6.
14. A programme of ground movement monitoring and complementary vibration monitoring is standard best practice on tunnelling projects. This is required as part of the risk management strategy and in compliance with the Association of British Insurers/British Tunnelling Society Joint Code of Practice for the Risk Management of Tunnel Works. The prediction methodology for tunnelling induced ground movement assessment has followed a staged assessment used as best practice in tunnelling. This is directly comparable with the approach taken in the DCO submission for Silvertown Tunnel and consent for Crossrail, whereby sensitive structures requiring a further detailed evaluation were identified but Trigger Levels were not established at this stage of the submission. The principle of Trigger Level monitoring is well established in tunnelling practice and is confirmed during the detailed design of the works. It is a process requiring the assessment of many variables often requiring a complex model of the tunnelling activity including 3D effects and soil-structure interaction in addition to a condition assessment of the asset. The Trigger Levels are therefore informed by further information and investigations that will only be available during the detailed design and will be developed for the Ground Movement Monitoring Strategy secured in the OEMP under MW-CH8 and MW-G7 in consultation with HMAG.
15. The assessment of the risk will be based on the existing and supplementary ground investigation being undertaken for detailed design. As part of the safe system of works the contractor will develop a suite of measures to allow

for further investigation and assessment of ground conditions ahead of the tunnel face and identify the need for ground treatment where necessary to maintain movement to within agreed limits to protect archaeology. Where the need for ground treatment is identified this will be undertaken from inside the tunnel portal/ bore where it is safe and practicable to do so in preference to surface intervention.

16. Both vibration and settlement monitoring will be implemented during the works to confirm predictions and trigger intervention by means of ground stabilisation to prevent unexpected movement causing damage. This will be secured under the DCO through provisions included in the OEMP including MW-CH1, MW-CH7, MW-CH8, MW-NOI3, MW-NOI5 and MW-NOI6 with the development of the Heritage Management Plan and monitoring strategy to protect the historic environment.
17. The 1mm settlement contour line, as indicated by the Scheme order limits in the tunnel section, is the limit of predicted ground movement from the construction of the tunnel. There is no reason to monitor ground movement beyond this point as modelling has shown that settlement >1mm is not predicted.

iii. Comments are invited on para 5.2.11, Handling, storage and placement of excavated topsoil. Why should the first bullet point apply only to topsoil from within the WHS? Who judges whether topsoil could contain archaeological artefacts in the second bullet point?

18. The reason why the first bullet point at 5.2.11 should only apply to topsoil within the WHS is that there is concern from heritage partners regarding the mixing of topsoil that may contain archaeological finds from within the WHS with topsoil from other parts of the Scheme, leading to false interpretations in the future. The Preliminary Works and Main Works Contractors will develop Soil Management Strategies (as set out in the updated OEMP as submitted at Deadline 6) to control and manage the movement of topsoil from within the order limits of the Scheme, both within the WHS and outside the WHS. The second bullet point at 5.2.11 (5.2.15 of the DL 6 submission DAMS) requires the origin and placement of topsoil that could contain archaeological artefacts to be mapped and for this information to be lodged with the WSHER: this requirement applies across the Scheme, not only the WHS.
19. Regarding who judges whether topsoil could contain archaeological artefacts or not – other than topsoil that has been sieved to recover artefactual material, all topsoil from within the Scheme boundary will contain archaeological artefacts in varying densities and concentrations and as a result of human exploitation of this landscape over a long period of time, from prehistoric periods to the modern period. The DAMS has been amended at Deadline 6 to reflect this.

iv. Comments are invited on paras 5.2.43 and 5.2.54, Geotechnical and other intrusive surveys.

20. Geotechnical surveys are required to inform the preparation of the detailed design.

21. v. Comments are invited on para 6.1.16, Archaeological Clerk of Works. Should it be monitor rather than co-ordinate archaeological site works – responsibility for co-ordination would probably fall to the contractor.

22. The reference to 'co-ordinate' in para. 6.1.16 has been replaced with 'monitor' in the DL 6 submission of the DAMS.

23. vi. Para 6.1.17, Unexpected finds. The ExA suggests that if agreement is not forthcoming on the significance of the find and the appropriate course of action, approval of the Wiltshire Council/ Historic England is sought as statutory bodies.

24. Highways England has proposed in response to SWQ CH.2.1 that unexpected finds would be dealt with through a further SSWSI to be approved by Wiltshire Council. The DAMS submitted at Deadline 6 reflects this change.

    vii. Comments are invited on para 6.1.20, Interruptions and delays – who makes the decision regarding the cessation or resumption of work?

25. As in the Archaeological Evaluation stage, Highways England will make the decisions with regards to the cessation or resumption of work in consultation with Wiltshire Council: the DL 6 DAMS confirms that these decisions will be agreed with Wiltshire Council..

    viii. Comments are invited on paras 6.3.14 to 6.3.16 regarding ploughzone sampling.
    ix. Comments are invited on paras 6.3.42 and 6.3.43, Tree hollows.
    x. Comments are invited on Section 8.1 Communications Strategy, Section 8.2 Progress Reporting, and Section 8.3 Monitoring of Post Excavation Works.
    xii. Comments are invited on Table 11.3, Summary of proposed mitigation areas, and Appendix D Action Areas: Proposed archaeological fieldwork areas and preservation in situ areas.
    xv. Further comments, if any, are invited on the DAMS provisions for the treatment of archaeology buried under arisings, that affected by haul roads and compounds, and that subject in other ways to vibration, compression, crushing, or distortion [REP4-024].

26. (viii), (ix), (x), (xii), (xv) – Highways England continues to consult with HMAG with regards the evolving strategy with regards to ploughzone sampling, tree hollows, Section 8.1 Communications Strategy, Section 8.2 Progress Reporting, and Section 8.3 Monitoring of Post Excavation Works, Table 11.3, Summary of proposed mitigation areas, Appendix D Action Areas: Proposed archaeological fieldwork areas and preservation in situ areas, the treatment of archaeology buried under arisings, that affected by haul roads and compounds, and that subject in other ways to vibration, compression,

crushing, or distortion to ensure a proportionate and reasonable approach to the delivery of the archaeological mitigation works for the Scheme.

xi. Para 8.4.2: the ExA suggests 'approved by the TPA in agreement with HMAG/ WCAS'.

27. Highways England rejects this suggestion. Highways England is the competent authority to sign off completion of archaeological sites, in consultation with Wiltshire Council. This position is considered reasonable given the archaeological works on site will be required to be undertaken and completed in line with the SSWSIs, which will already have been approved by Wiltshire Council, following appropriate consultation of Historic England (if required) and the entire works will have been carried out and subject to monitoring by and in consultation with Wiltshire Council. Please see the response to written question CH.2.1 for further detail.

xiii. Flowchart A2, Archaeological Mitigation: phases and roles – should the box heading Project supervision read, Project inspection and monitoring, since the archaeological contractor will supervise his work team and the TPA project manager will inspect, monitor and approve?

28. The column headed Project supervision concerns the role of Highways England in supervising the delivery of the project: the roles of the TPA and ACoW in inspecting, monitoring and approval of the work are part of this. The proposed amendment is therefore not considered necessary.

xiv. Flowcharts A3 to A9, should the double headed arrows linking the top tiers of boxes signify agreement?

29. The advisory role of HMAG and the approval roles of Wiltshire Council and Historic England are addressed in the text of the DL 6 submission of the DAMS. Highways England has proposed in response to SWQ CH.2.1 that SSWSIs, HMPs and Method Statements would be approved by Wiltshire Council, in consultation with Historic England, to the extent the works the subject of the approval would ordinarily trigger the need for scheduled monument consent. Flowcharts A3 and A6 have been amended at Deadline 6 to reflect this. For the remaining flowcharts, it would not be accurate or reflective of text in the DL6 DAMS for the double headed arrows to signify "agreement".

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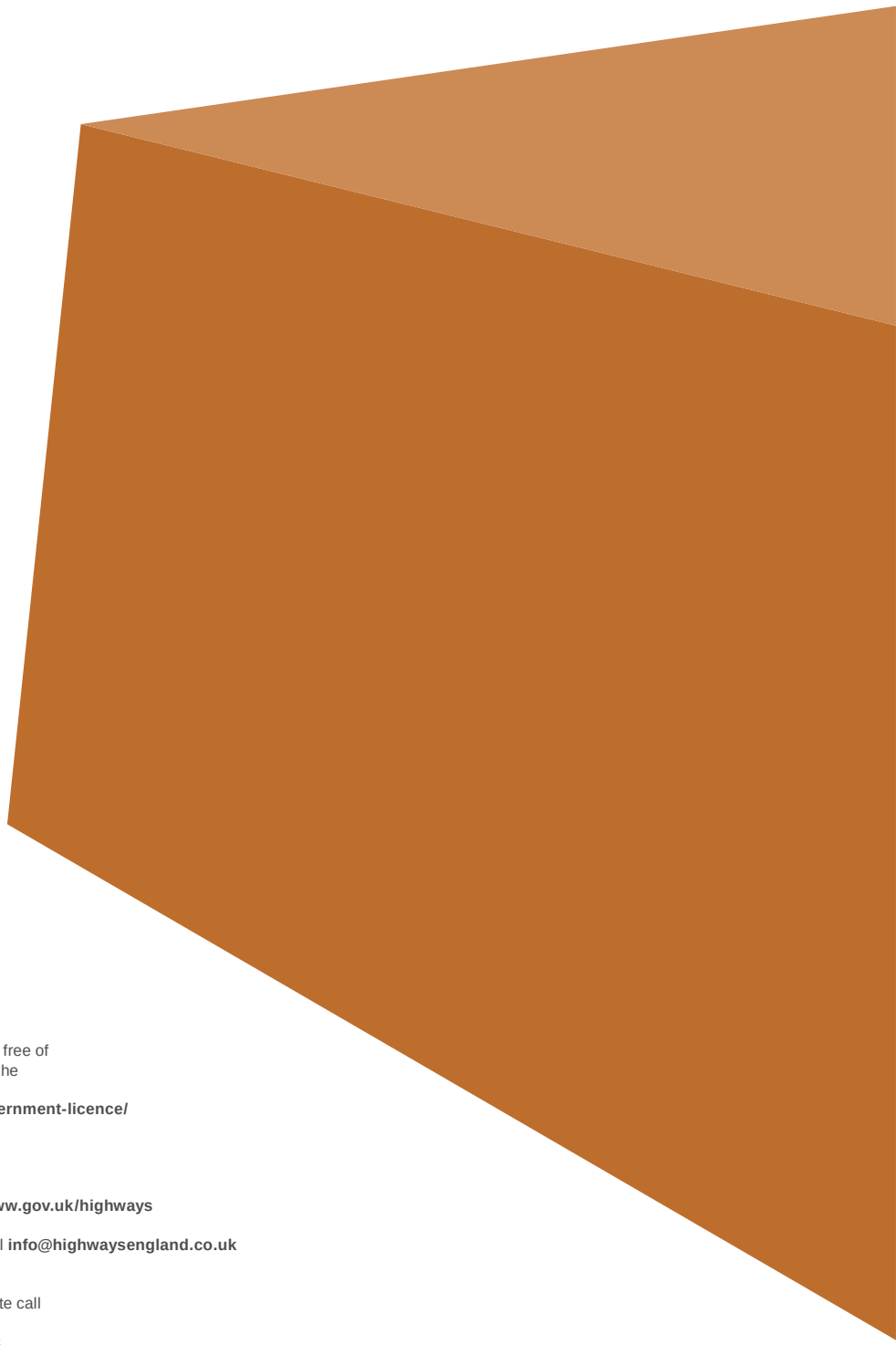

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