The Planning Act 2008 - Chapter 2 Examination TR010025

A303 Amesbury to Berwick Down Improvements

Written Submission by the Council for British Archaeology and CBA Wessex

Responses and Comments in respect of ExA Second Written Questions

July 2019

AL.2	**Alternatives**	
AL.2.1	Applicant	The response to ExQ1 AL.1.5 indicates that the project retains its status in the current RIS (2015-2020) and it is currently envisaged that it will not be necessary to carry it over into the next RIS period. **i. Does that still represent the current position or is it likely that there would be a carry over to the next RIS period and a further assessment for its inclusion within that?** **ii. If so, does that have any implications for compliance with the National Policy Statement for National Networks (NPSNN), and hence the ExA's approach to the consideration of alternatives?** The CBA has made representations that along with NPSNN the statutory requirements of the Infrastructure Act 2015 is an important part of the 'framework' for determining DCO highways applications under the 2008 Planning Act. Because of the statutory status of the RIS and the environmental duties of the Secretary of State and Highways England under the 2015 Act, we believe the RIS to be a clear part of the framework for decision-making (as defined by the SEA Regulations and interpreted by the courts) because it defines a spatially defined programme of projects, within a statutory delivery plan that under the 2015 Act must be complied with by the Applicant and the Secretary of State, while also fulfilling their statutory duties to have regard and particular regard to the effects of the RIS on the environment. Because the RIS defines the need for the programme of National Infrastructure Schemes in terms of highways, (of which this scheme is one) together with other economic, social and environmental objectives, it does clearly (in Ouseley J's terminology supported by the Appeal and Supreme Courts), *"set a framework for subsequent decision-making on development consents, laying down rules or criteria or policy guidance, for it. …… The significant environmental effects have to be assessed at a time when they can play their full part in the decision; they cannot be left unassessed so that the development decision is made when the framework in the plan has sold the pass. A plan framework tilts the balance, creates presumptions, and urges weight to be given to various factors."* We have presented an analysis for why RIS and its downstream hierarchy of plans/programmes DOES fall within the scope of SEA, but in seeking to rebut the CBA's case ([REP2-070] para 21.1.16) the Applicant has relied on broad assertion, not evidence-based analysis. The Applicant – • has not presented any formal screening carried out by Highways England or the Secretary of State to substantiate their assertions

		• has not presented any formal legal opinion obtained by Highways England or the Secretary of State to substantiate their assertions • has NOT shown that any specific point in the analysis presented by the CBA is incorrect. The statutory status of the RIS under the 2015 Infrastructure Act and the Secretary of State and HE's statutory duties both to comply with it and have regard to its effects on the environment, is why through NSPNN it sets the framework for decision making, not least via NPSNN para 2.10, which requires that Examining Authority and the Secretary of State should start their assessment of applications on the basis the need for them *"both as individual networks and as an integrated system"* and the specific requirements under paragraphs 4.3 to 4.5. All the provisions of NPSNN must thus be assessed within this context *"both as individual networks and as an integrated system"*. In the absence of any SEA of RIS (or its downstream plans and programmes) the logical implication for compliance with NPSNN (which is also meant to inform RIS) is for the role of this scheme within RIS to be considered in terms of cumulative effects. Clearly this is neither possible nor appropriate for every individual issue. But it is particularly relevant in two contexts: • First, where scheme-by-scheme budgetary limits included in the RIS framework constrain the ability to address significant harm to nationally or internationally protected landscapes: when seen in the context of an integrated system, a different allocation could deliver significantly more environmental benefits and substantially reduce harm to those landscapes. • Second, in the context of the contributions of individual RIS schemes to its overall impact on environmental issues that can *only* be addressed in the context of an 'integrated system' taken as a whole, the obvious example is climate change and the need to minimise carbon emissions. Of these, the CBA's most direct concerns are with the former issue where the historic environment (including archaeological monuments) are a core component of protected landscapes, as explained in our main written submission ([REP2-070]). The questions raised here thus reinforce our concerns that big strategic issues are at stake in terms of how the Road Investment Strategy as currently set, and that it not only could be, but actually IS acting as a constraining framework on how nationally and internationally important environmental issues might best be addressed, both in the context of NPSNN requirements, and in respect of the absence of SEA. Noting the limitations of EIA provisions for addressing large scale cumulative, indirect effects and

		alternative solutions, and the courts' repeated judgments stressing how SEA and EIA need to go hand-in-hand, we believe the absence of an SEA for RIS is therefore an issue in respect of compliance with s.104 of the 2008 Act.
CH.2	**Cultural heritage**	
CH.2.1	Applicant All Interested Parties	**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.** The CBA AGREES that it is essential that the statutory role of Wiltshire Council and Historic England is maintained throughout the archaeological process for the reasons given above. We note in particular the critical importance of independence and objectivity free from the conflicts of interest inherent in the contractor's roles. It is also important that the role of HMAG and the Scientific Committee be maintained and acknowledged to cover all aspects of WHS OUV, not just within the WHS as mistakenly referred to in the draft DAMS
CH.2.2	Applicant	**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?**

		It would appear that such areas would be covered by the catch-all provision It is symptomatic of and needs to be considered within a much more general problem with the approach presented in the draft DAMS. Currently the draft DAMS is couched in terms of the limits to what research objectives could be addressed, based on a narrow site-by-site view reliant on inherently limited and uncertain fieldwork results. The approach should be the other way round: to take all the established research objectives and apply a precautionary risk-based approach to consider what the potential archaeological totality of the scheme is, what opportunities exist, and what investigative methods need to be applied - and where – to **overcome** the current uncertainties and limitations of what is known to date. Coupled with the sampling limitations proposed, a significant part of the *actual* archaeology of the scheme, including contributions to WHS OUV, could be lost without proper identification and recording. All areas likely to contain material contributing to the OUV of the WHS (broadly E of R Till to Countess roundabout) where topsoil is removed should be subject to recovery of ploughzone artefacts prior to archaeologically controlled stripping and cleaning with sufficient investigation of all features potentially contributing to OUV to ensure that important material is not destroyed without full investigation and recording. This needs to be guided by the levels of information needed to address all relevant research questions not by arbitrarily set general purpose sampling strategies that may curtail rather than enhance research.
CH.2.5	Applicant All Interested Parties	**Archaeological loss** **Please confirm the location and area of land which would be archaeologically sterilised under the Proposed Development** The CBA has previously commented that the overall outcome of the works for the **actual** archaeology of the scheme footprint is far from clear, yet this is important in applying the WHS Management plan policies and relevant NSPPN paragraphs (see CBA written submissions [REP2-070 and REP2-075]). This question requires a tiered response because a) 'Sterilised' as used in common parlance has two distinct meanings, which applied to archaeology could either be broadly beneficial or distinctly harmful b) Areas being 'sterilised' can arise in different ways c) Given doubts about whether preservation *in situ* can be delivered, with the default position being archaeological stripping and (potentially) excavation, there are significant areas where radically differing outcomes are possible.

		First, in the sense of rendering the archaeological resource *immune* from harm, we suggest that this means • remains being undisturbed with topsoil left *in situ* AND subject to a long-term change in land use that removes all forms of potential harm, including for example other kinds of development (including utilities); plough damage; burrowing animals; tree roots and windthrows; or • in addition to the above, remains also being rendered inaccessible for future research The first of these may include some areas of landscape mounding false cuttings etc mainly within the highways boundary deeper than the range of burrowing animals and utilities, and in long-term maintenance as chalk grassland (provided that the archaeology is preserved without damage during emplacement of embankment materials. Taking the areas where archaeological remains are retained *in situ* but rendered in accessible to future research (common to both meanings) this includes areas which would be permanently buried beneath permanent embankments for the scheme beyond the reach of utilities, animals windthrows etc. This does not include areas of deep spoil disposal, since topsoil would not be retained *in situ* (draft DAMS 5.2.10). **Second**, in the sense of depriving society of the potential for future archaeological *progeny* (ie knowledge) we suggest that this means: • the curtailment of future archaeological potential through remains being removed; or • remains being so emasculated as to loose a high proportion of their value; or • remains being rendered inaccessible for future research. We would further propose that a distinction is to be made between major divisions in how evidence survives, by which one whole aspect might be curtailed leaving another aspect available for future, key examples being • upstanding visible earthworks and structures • ploughzone archaeology • subsoil archaeology • waterlogged deposits • alluvial and colluvial deposits

		• collection, retention and discard of artefacts, biological and other palaeo-environmental material A further consideration under this meaning is the distinction between what is destroyed without record and what is destroyed but with records and objects allowing future researchers to revisit what was retrieved, but not reinvestigate the original intact remains. This first meaning would appear to apply as follows: a) the curtailment of future archaeological potential through remains being removed • **All areas of topsoil removal:** Even if subsoil features are to be preserved *in situ*, the removal of topsoil would destroy meaningful artefact distributions, and in particular the physical loss of a very high proportion of surviving prehistoric lithics. Given their physical survival (prehistoric pottery also being important but more fragile) and the 'special' character of most earlier prehistoric subsoil pits, burials etc, the ploughzone lithics represent a large and distinct resource with high potential both collectively and through rare individual artefacts (eg from retouched implements for different purposes to polished axes or exotic stone) to contribute to a wide range of research questions. The proportion NOT sampled according to draft DAMS para 6.3.4, this typically means **99% to 96% unrecorded loss** (ie 100% of the area less the sample proposed for investigation and retrieval of artefacts) except rarely for assemblages (96% to 80%), or even more rarely less still. This assemblage driven model is predicated on areas with low level scatters being largely excluded from recovery, even though these might be chronologically or functionally indicative or include rare and exotic artefacts not occurring in clusters, thereby curtailing some lines of research not recognised in the DAMS. This especially relevant to Mesolithic material that is often sparse as well as requiring appropriately fine sieving techniques and meshes (cf Draft DAMS paragraph 6.3.27) and exotic artefacts and eg bluestone chips. • **All areas of topsoil placement:** The removal of topsoil for use elsewhere is recognised as not only destroying artefact distributions but also creating false ones where the 99% to 96% of unsampled topsoil is placed. While the location of the 'donor' and 'recipient' areas are due be recorded, the process still sterilises the surface archaeology of recipient areas as well as the donor locations. (The proposal 5.2.11 to keep all topsoil derived from the WHS for re-use within its boundary is an archaeologically meaningless recipe for confusion, doing nothing to preserve the archaeology) • **All areas of subsoil disturbance:** The archaeology of all areas where subsoil disturbance is proposed will be lost. This is likely to include all cuttings, foundations including piling for

		structures, drainage ditches, services, retained cutting cut and cover tunnel and tunnel maintenance building, tunnel escape shafts etc PLUS any disturbance required for temporary construction purposes (eg backfilled excavations for structures). The proportion of deposits NOT investigated (and therefore subject to unrecorded loss of artefacts, animal bones, other palaeo-environmental material and human remains) would vary: *First*, the total relative areas identified for mitigation by machine excavation, hand excavation or strip map and record investigation are not given *Second*, the total area where none of these apply but would be subject to archaeological monitoring and recording is not given. For areas subject to the most intensive and careful investigation (ie *machine excavation* and *hand excavation*) the following indicative proportions of archaeological deposit would be lost without recovery of artefacts, animal bones, other palaeo-environmental material (and potentially human remains): ○ **100%** of approx.. **87.5%** of tree throw hollows (based on [REP3-24] p.13 and draft DAMS 6.3.42-6.3.43); PLUS c. 85% per m^3 of the remaining c. 12.75% (see below) ○ **80%** of linear features not identified below ○ **60%** enclosure ditches ○ **80% to 0%** for middle Bronze Age to Iron Age ditches (dependent on there being sufficient material in the initial sample or other evidence to date them) ○ **0%** small curvilinear features ○ **0%** burials (where identifiable as such) ○ **0% or 50%** small pits, postholes etc (especially structures) ○ **Variable %** *in situ* ground surfaces, colluvial deposits etc The proportion of deposits areas of subsoil disturbance due to be investigated under **strip-map-and-record investigation,** or **archaeological monitoring and recording** a more flexible approach to sampling is to be adopted in relation to research objectives identified in individual SSWSIs (with expert advice). It is not clear, whether these could include research issues outside those already identified in DAMS? In principle this is a far more responsive approach but these areas are not hand-cleaned so small features and those backfilled with clean chalk (as with some burials post holes etc) are at significantly more risk of being missed. Typically, these

		approaches are far less rigorous, seeking only to characterise remains, elucidate stratigraphic relationships and investigate key deposits such as burials. So apart from exceptional features, a significantly **higher** proportion of archaeological deposits with any artefacts, animal bones, other palaeo-environmental material and potentially human remains they might contain would be lost without recovery. • **All waterlogged deposits:** The extent of waterlogged archaeological deposits (or indicators of human presence from peat deposits) in the Avon valley does not appear to have been mapped; nor has the recorded depth below ground level of waterlogging in the now empty Wilsford Shaft been considered in relation to the potential for other such features (as noted in the excavation report). Any effects are far from easy to predict because of the multivariate factors involved and localised conditions that can prevail. In this case the evidence is not available to make clear predictions. This is much more fully discussed below in respect of Blick Mead hydrology, but in general, desiccation and the resultant oxidation and bio-degradation of preserved organic remains in waterlogged deposits can result in total loss of whole dimensions of archaeological knowledge reflecting artefacts and associated personal, crafts, economic, ritualistic activities not otherwise in evidence; foodstuffs and diet; living conditions; economic activities; the changing environment; etc. As noted below the speed and degree of loss can be highly variable due to multiple factors, not just height of the water table. • **All alluvial and colluvial deposits:** Apart from the intrinsic value of these deposits and any artefacts and palaeo-environmental material occurring within them, they can also result in far better preservation than elsewhere of any earlier archaeological remains (including ground surfaces etc) which elsewhere have been destroyed by the centuries of cultivation that created most colluvial deposit in the first place. Appendix D of the draft DAMS provides for each identified 'site' an account of *Soil, Colluvial Sequences and Natural Features*. This shows that colluvial deposits are relatively ubiquitous in respect of fairly thin deposits, with some much more significant areas. But while a variety of specific localities have been identified (colluvial dry valley deposits, other geomorphological hollows with infill; alluvial deposits in the Avon and Till floodplains). However, the extent of these deposits is not fully mapped, and it is not clear to what extent where such deposits would be lost how fully they would be excavated to ensure that no well-preserved material within or beneath them would be lost.

		Because of these limitations of mapping and proposed approach to sampling such deposits in relation to areas of subsoil disturbance, it is not possible to judge what proportion might be lost, either with or without full excavation and record. • **Collection, retention and discard:** 'Collection' refers to materials that are collected for analysis (whether by hand or systematic sieving or other processing); 'retention' refers to the proportion of collected material retained for further study and long-term curation; 'discard' includes materials that are discarded at any stage, with or without study. Thus what is not collected is, by default, discarded; some common bulky materials may be collected and recorded but not retained for future study; some materials (especially those recovered through soil sampling or retrieved in blocks for laboratory excavation) may be retained with processing residues discarded. The draft DAMS sets out the proposed approaches at paragraphs 6.3.25 to 6.3.30 and 6.3.52 to 6.3.80. These sections provide a fairly coherent idea of what would be collected and retained, and how detailed approaches would be developed for each SSWSI, but they provide very little idea of what would be discarded – especially in respect of being discarded automatically with deposits not investigated under the general sampling policy see above. The sections dealing with late prehistoric ditches and human remains illustrate the issue (but without demonstrating a solution: *6.3.36 ….Linear features identified as of later prehistoric (Middle Bronze Age to Iron Age) date will be considered for up to 100% excavation, to take account of the frequency of human burials and other intentional deposits (e.g. animal burials) encountered within the palisade system linears excavated west of Stonehenge and at West Amesbury.* *6.3.69 …[Human] Remains may also be discovered at other locations along the Scheme as they are generally undetected by traditional reconnaissance methods. Both undisturbed burials and disturbed remains may be found within the investigation areas in shallow or deep features, or in a dispersed condition. They may be present within subsoil or colluvial deposits, or within features cut into the underlying natural surface. Burials may be associated with other funerary structures or monuments.* Read in conjunction with the percentage discard rates outlined above it is clear that the sampling strategy being adopted is predicated on enhancing the sampling done to date, not

		maximising recovery of materials contributing to ALL potentially relevant research issues. This has to be seen in the practical context of how excavation proceeds: ○ the general provision for linear features is 20% excavation minimum 1m sections, so if no indication of date has been found in the initial sample (which would not be unusual) the policy for the other 80% of 4m+ lengths (including any burials, concentrations of finds etc) would be discard. ○ This would be the policy anyway for Roman or Saxon ditches which can also contain such materials ○ In the case of other features, it is likely that most deliberate burials would be located and investigated (at least in the areas of more careful excavation) but the potential for discard of human remains with the other kinds of deposit referred are clearly significant. Because individual SSWSIs will be required to conform with the DAMS, there will be little scope to develop a more responsive approach. This is because DAMS is predicated on a limited view of research potential based on the results of survey and fieldwork, not that potential total archaeological content of the scheme. A particular problem of arbitrary limits on %deposits investigated is that artefact and animal bone assemblages are not maximised to provide all the insights they could if they are large enough to go beyond the most basic analysis ○ Not just what crops were grown and meat eaten, but what husbandry techniques were used ○ Not just what date a few sherds of pottery might (or might not) suggest but also social, artistic dietary and other information that larger assemblages can reveal Instead of being arbitrarily set to the usual industry standard (there is nothing special about what is proposed here), the approach, especially for OUV needs to be geared to ensuring as much evidence as possible is assembled to address both established and new research questions. Further issues arise in respect of Museum collection and discard policies, and especially how these may be affected by practical consideration of storage space. It is understood that Salisbury Museum has agreed in principle to accept the entire project archive (Draft DAMS para 10.1.2 p112), but there is no indication either whether the Museum has received any indicative forecast (based on evaluation materials and proposed or potential sampling strategies) what scale of archive might be involved; nor is it clear what their retention and discard policy would be for this material; nor whether there could be any issues of storage space, or curation and

conservation capacity given that this would be by far the largest project ever undertaken within and adjacent to the WHS.

Overall Policy Implications

We note Highways England's comments on Mr Lambrick's observations on the implications of NPSNN paragraph 5.139 (see Appendix B of [REP4-030]), in which they propose a different reading of paragraph 5.139 based on the judgment in Hayes v. York CC judgment [2017] EWHC 1374 (Admin). They suggest that paragraph 5.139 stating that the ability to *record evidence* should not be a factor in determining the significance of loss should not be taken as written, and that some (non-decisive0 weight can be given to the benefits accruing from the ability to record.

We explained in some detail in our original written statement why, as firmly stated in NPSNN, investigation and record is to be regarded as inferior to retention *in situ*. The Applicant's interpretation of the judgment in Hayes v York City Council appears to be erroneous: the CBA would draw the ExA' attention to the facts that

- At paragraph 85 of his judgment the Mr Justice Kerr effectively limits its wider application beyond the case at hand, because the he acknowledged that, even though he doubted it, *The distinction between public benefits weighed in the scales in the balancing exercise and mitigation measures which attenuate the detriment caused by an already justified development* could be intrinsically valid.
- Since then, neither the wording of NPSNN nor the NPPF have altered on that score – despite a thorough-going update of NPPF in 2018 and a smaller one in 2019
- Since then Planning Policy Guidance on the historic environment has just been updated (https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment *Paragraph: 002 Reference ID: 18a-002-20190723* July 23rd 2019) to re-emphasise the policy as written:

  Part of the public value of heritage assets is the contribution that they can make to understanding and interpreting our past. So where the complete or partial loss of a heritage asset is justified (noting that the ability to record evidence of our past should not be a factor in deciding whether such loss should be permitted), the aim then is to:
  - *capture and record the evidence of the asset's significance which is to be lost*
  - *interpret its contribution to the understanding of our past; and*
  - *make that publicly available (National Planning Policy Framework paragraph 199)*

		This seems to leave the main point from the Hayes v. York CC judgment to be that once decision-makers have decided whether or not loss or harm is justified in the light of other public benefits (which were the justification for consenting that case of less than substantial harm), *the extent to which the detriment is mitigated* is still relevant to what happens next. This would imply that while the loss of or harm to the asset might in principle be justifiable on other grounds, consent could still be withheld if *the extent to which the detriment is mitigated* is not adequate, despite the implicit assumption that in cases of loss or harm appropriate recording will be ensured. Were the discredited euphemism *'preservation by record'* – as used copiously by HE in the draft DAMS – to be applied in its literal sense (as if inevitably partial recovery were equivalent to *in situ* preservation) it would undermine current policies against substantial harm and preferences for *in-situ* preservation for future generations. As explained in our original written submissions ([REP2-070; REP2-075]), the WHS Management Plan sets a higher standard of test in respect of archaeology that contributes to the OUV of the WHS.

CH.2.6	Applicant
	
	All Interested Parties
		Geophysical techniques
		
		Discuss the reliability of the investigation results of different geophysical techniques and the need to compare data sets across different techniques.
		
		The CBA has already commented on this at some length both in writing and orally. To address this properly several considerations need to be addressed:
		• What different geophysical techniques HAVE been used over what areas?
		• What sampling rates were used over what areas?
		• What techniques were not used that could provide an enhanced level of results?
		• As compared with evaluation results how reliable are the surveys in respect of
		  ○ distinguishing archaeological remains from natural features
		  ○ identifying and distinguishing different kinds of archaeology
		  ○ recording features that no longer have a subsoil existence)
		  ○ not giving false positives
		  ○ not missing significant archaeological features
		• Where the techniques that have been used were not successful (especially in not identifying archaeological features subsequently found by trenching) would the deployment of other techniques be successful?

		The Applicant has presented evidence that almost the whole scheme area was covered by magnetometry. Two levels of magnetometry sampling have been applied over most of the scheme, the majority being covered by the denser levels. Very much smaller areas have been covered by electrical resistance profiling and ground penetrating radar to clarify specific areas (colluvial deposits and some features detected by magnetometry to clarify their form). Some of the work relied upon was carried out for previous schemes (in particular at the east end of the area affected) but the details are not presented. There is no simple clear map of exactly which methods were applied where. Magnetometry is reliant on detecting differentiations in magnetically sensitive deposits (reliant on ferrous particles in the soil whose magnetic sensitivity can be enhanced by organic decay or heat). Where features (such as graves) are backfilled with the same subsoil as was excavated and little or no other magnetically enhanced material they tend to be undetectable. Similarly, typical sampling levels often fail to detect small features such as small pits and burials because the differential magnetic characteristics are too weak to detect. A comparison of the two levels of sampling used has been presented by the Applicant, indicating (not surprisingly) that greater clarity has been achieved by the closer spaced sampling transects. But as previously noted both in written submissions and orally, the Applicant has NOT systematically compared the geophysics results (as recorded in interpretive mapping) to what was found in evaluation trenching. The CBA's overall impression from examining evaluation reports interpretative mapping of geophysics with trenching and ploughzone sampling is that on the negative side of the balance the geophysics • failed to locate ANY of prehistoric burials and pits revealed by trenching (including not distinguishing one within a larger tree-throw anomaly that was identified) • lacked clarity about the vast majority of nonlinear geophysical anomalies or potential anomalies including whether or not they are of natural or anthropogenic origin • was not fully reliable in locating/characterising some linear anomalies On the positive side the geophysics did • demonstrate (unsurprisingly) that the subsoil archaeology of the scheme area is far more complex than known from pre-survey knowledge including aerial imagery • locate moderately reliably most linear anomalies, but not much more reliably than aerial imagery

		• achieved some identification of linear anomalies not manifest as subsoil features (this could be where enhanced magnetic properties of an un-ditched boundary still persist in the topsoil and is analogous to cropmarks similarly not being manifest as subsoil features, as is also indicated here. This should be but has not been identified as a positive addition to the potential scope of ploughzone archaeology. The greatest problem with the geophysics is the lack of any systematic quantified scrutiny of reliability. This applies at two levels. *First* The scope of work and consideration of techniques presented to the Examination does not include any other systematic review or trialling of methods used elsewhere in the WHS, or any systematic research into how different methodologies might reduce inevitable uncertainty. Although different methods including resistivity have been widely applied, and in many cases then tested by excavation in the WHS, it is not clear how far any implications were considered. In the light of such a review it ought to be possible to judge rather better whether deployment of techniques that have not been used would have been a valuable adjunct, and if so whether this should be part of the pre-excavation (ploughzone) mitigation strategy. *Second* The applicant has not yet provided any systematic quantification to correlate geophysical anomalies identified and ploughzone archaeology to evaluation results. The quantification should include as a minimum • The number of geophysical anomalies were identified and what proportion rated as definite or potential archaeology • The number and proportion of anomalies intersected by trenching • The number and proportion of anomalies interpreted as *definite* archaeological intersected by trenches that a) were verified; b) not verified • The number and proportion of anomalies interpreted as *possible* archaeological intersected by trenches that a) were verified; b) not verified • The number and proportion of different types of archaeological feature revealed by trenching (notably human burials and pits etc) NOT located by geophysics • The location of verified prehistoric archaeology relative to the density of ploughzone artefacts within 10m.

		To estimate and how the totality of the archaeology of the scheme might be affected these figures need to be compiled in a manner that distinguishes different permanent and temporary landtake areas.
CH.2.7	Blick Mead Project Team	**Occurrence of burials** The Applicant's written summary of ISH2, at agenda item 5(ii), page 212, notes that Professor Parker Pearson appears to have considered the potential occurrence of burials across the whole of the western approaches as opposed to the area affected by the cutting [REP4-030]. **Please comment.** Instead of carping at Professor Parker Pearson's calculations, it would be more helpful if the Applicant's approach to answering such challenges was to carry out the perfectly valid extrapolation exercise themselves. The Applicant has simply not addressed the fundamental point that Professor Parker Pearson, the CBA and others have made: that there has been no realistic quantified assessment of the totality of the archaeology of the scheme footprint. The question of burials in the area of the western approaches is only one example, chosen because it is so obviously an issue there: the much wider point is that the same broad issue applies everywhere, to all types of deposits. The Applicant's response also fails to acknowledge what the worst case scenario for cumulative effects might be given the latitude available for detailed design changes within the limits of deviation – a point very relevant to ExA's question concerning what archaeology would sterilised
CH.2.8	Applicant All Interested Parties	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. As CBA has previously commented in written and oral submissions, on flaws in the Applicant's approach to assessing the effects on the significance of heritage assets through changes to their setting. The ExA is right to challenge the adequacy of the assessment made by the Applicant in this and other cases. The ExA's observations made during the ASI are a valuable and very pertinent part of what the assessment needs to consider – and in different ways relevant to each of the assets – but they are by no means the full picture. In Appendix E of our main written submission [REP2-076] we presented a matrix outlining the factors needing to be taken into account and how this can facilitate an assessment based on ordered professional judgement. In our original submission we did not look into this in detail. In view of our previous concern coupled with the ExA's request for further comment, we have now looked at this more fully. Although still falling short of a comprehensive assessment, we hope that the fairly lengthy account that follows not only takes account of the ExA's observations, but also puts them into the context of a fuller assessment of the main setting issues that arise. This includes the complexity of how particular aspects of the scheme contribute not only to several different effects on different heritage assets which in themselves are significant; but when seen it terms of • The quantum harm when the proposals are seen in terms of significantly exacerbating the original harm caused by the A303; and • The quantum effects on three key heritage assets and others not examined of several particular aspects of the scheme plus the original A303. are even more significant in terms of their cumulative effects (cf PINS Infrastructure advice note 17). As explained in oral submissions these three assets belong to utterly different periods straddling over 9 millennia; they are entirely different in their character, function and historical context and as a result the nature of their significance could not be more different. A further consideration is that there is a Bronze Age barrow within the scheduled area of Vespasian's Camp (potentially a millennium earlier) that has not been considered, although the factors contributing to its setting in terms of relationships to topography and other monuments are rather different. Likewise the relationships of a linear group of barrows extending E from King barrow Ridge, in part marked by a few of the Nile clumps have not been fully considered. We have not include these.

		The approach adopted by the Applicant has not fully identified which aspects of their surroundings most contribute to or detract from the significance of these assets; nor how those factors were changed by the construction of the present A303; nor how far the proposed scheme would further affect understanding and appreciation of these assets' very different significances. In not considering how the scheme would add cumulatively to the severe impacts caused by the present A303, the assessment also provides no basis for appreciating how, if an altogether different route were to be adopted (such as an optimised F010), there might be an opportunity not only to avoid any new harm, but also, with landowners' support, reverse that caused when the current road was built. The Applicant's approach to assessing the settings of assets contributing to OUV as 'bare earth' for the HIA and those deemed not to contribute to OUV as vegetated is especially bizarre and ill-conceived in this case, especially as the exclusion of some assets as contributing to OUV is also misplaced: • Blick Mead is already acknowledged as contributing to WHS OUV because of its major significance in contributing to an understanding of the societies and landscape that were the forerunners of the Neolithic and Bronze Age monumental complex – but a no trees 'bare earth' context here could not be more inappropriate. • Vespasian's Camp is not recognised by the Applicant as contributing to the WHS OUV despite being a major part of the general value of the WHS for understanding prehistory and its key relevance to the later prehistoric demise of the beliefs that drove the creation of the Neolithic and Bronze Age landscape – and despite the scheduled area actually containing a Bronze Age barrow in a significant position. Considering the likely state of open vegetation for the Camp and the later effects of inclusion within a designed landscape planning and its overgrown state; trees and vegetation in thus case is obviously key to working out what contributes or detracts from the setting of the Camp in its various guises. • The Amesbury Abbey Park RPG is not seen by the applicant as being relevant to WHS OUV and yet when its original full extent is considered, it is the prime area of the WHS to exhibit the eighteenth and early nineteenth century approach to how prehistoric monuments might be incorporated into a heightened appreciation of the landscape. This was achieved through carefully designed planting and creation of walks and drives intended to enable and encourage people to explore and appreciate prehistoric monuments in their surroundings. It is thus a quintessential example of how OUV 7 – *The influence of the remains of Neolithic and Bronze Age*

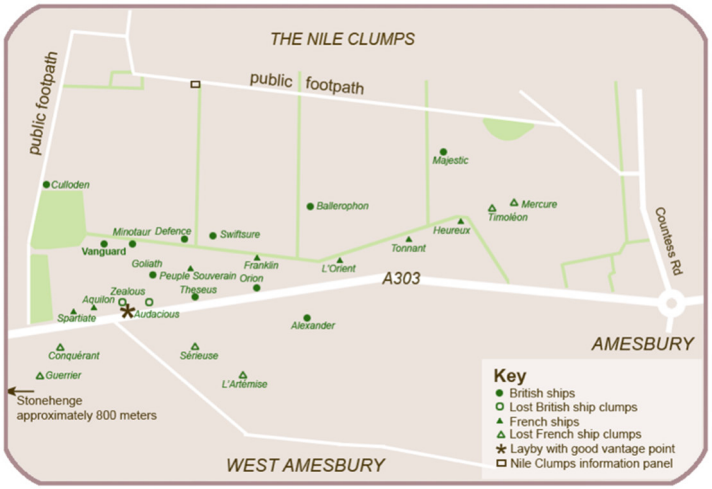
		funerary and ceremonial monuments and their landscape settings on architects, artists, historians, archaeologists and others – applies in the landscape, not just on paper or in art. In summary, the key points for **Blickmead** are: • Highly significant and substantial early Mesolithic waterlogged activity area using a spring at the foot of a short valley running E off the Avon floodplain at the head of an isthmus of dry ground in a substantial loop in the course of the river. Probable recognition/use as sacred spring in later periods. • Vegetated surroundings of small clearing in area of wet woodland of native trees highly appropriate (though cleared area may well be significantly too small; would have been quiet and very dark at night) – *immediately adjacent existing A303 is highly intrusive alien landform: tarmac road, barriers, signage etc., EFFECT of scheme will exacerbate this with additional structures (drainage, signage, flyover, E tunnel approach) at light distance* • Inter-visibility with adjacent areas of activity is unlikely to have been available in pre-clearance landscape so relative lack of it increases significance of aural environment, night sky and physical proximity to other areas of activity and potentially daily interaction and access to natural resources - *immediately adjacent existing A303 is highly intrusive because of noise; some traffic and lights visible though trees; traffic movement; lack of tranquillity; EFFECT of scheme will exacerbate this* • Floodplain location and access up and down river valley is a key characteristic – *existing A303 severs this; EFFECT of scheme would exacerbate this severance and loss of character with even larger road foot print within the Avon floodplain at Countess Roundabout* • High riverside water table resulting in waterlogged preservation of deposits with potential to inform evidence of wider setting is important – *existing A303 may have disturbed/destroyed deposits; EFFECT of scheme may exacerbate this beyond any effects at Blickmead itself* • Topographical setting (end of former dry valley and ridge and access to differing resources on chalkland) also key to character – *existing cutting for A303 susbtantially alters natural topography; EFFECT of scheme would significantly exacerbate this close by (ie within a few minutes walk) through cutting, retaining walls and tunnel mouth etc* • Diachronic relationships and different characteristics of other Mesolithic activity in the overall vicinity is important to appreciate Blickmead within context of the wider development of Mesolithic activity in the area, and potential influence on later developments as a special location including its probable use as a sacred spring as suggested by deposition of multi-period prehistoric and later objects – *The existing A303 may have disturbed/ destroyed apart of site or*

		adjacent sites and possibly other sites nearby where Mesolithic material is in close proximity; other unusual key elements known to exist in WHS; EFFECT of scheme likely to impact on known flint scatter sites, exacerbating loss OVERALL: the scheme would tend to exacerbate the significant harm already done by the existing A303 in the last 50 years including its highly intrusive and alien physical form and aural presence; substantial impact on local topography; severance effects for the valley floor resources that supported Blickmead's existence and (potentially) other areas of activity. In summary, the key points for **Vespasian's Camp** are: • Major late prehistoric hillfort occupying spur of high ground that ends as an isthmus in a tight bend of the R Avon (one of several hillforts along the Avon and its tributaries which is the approximate location of a possible tribal boundary in late prehistory): prominent visible defensible position and affording good outward views; • The location of the fort on a natural spur was originally cut off at N end by a large defensive ditch (obscured by 18th century landscaping but still present) where there was an entrance from the N. *The cutting for the existing A303 severs this spur and substantially altered the natural landform obscuring the relationship of the N end of the hillfort and approaches to its N entrance in relation to the natural topography. The EFFECT of scheme would exacerbate this severance and loss of character in relation to natural topography with substantial further cutting into the ridge to the W and added embankment and structure in the Avon floodplain at Countess Roundabout* • Woodland covering the hillfort and surroundings is in part due to incorporation into RPG landscaping, also reflected in paths having been incorporated into the earthworks – which embody 18th and 19th century recognition and celebration of prehistory in the landscape, but has become overgrown so neither the original openness required for the hillfort nor the effect of 18th century landscaping can be easily understood and appreciated. As well as hindering views out, the woodland now obscures the hillfort and its prominence and defensive function in the landscape (originally with white chalk ramparts). Arable fields in the wider surroundings reflect a broad landuse more likely to be in keeping with late prehistoric landscape for which there is evidence of fields. *The immediately adjacent existing A303 adds an additional, more alien strip of landform/cover: tarmac road, barriers, signage etc. EFFECT of scheme would exacerbate this with additional structures (drainage, signage, flyover, E tunnel approach)* • Inter-visibility with surroundings is likely to have been a key characteristic of the hillfort, as would an aural environment dominated by natural sounds. *But for the detracting presence of*

		overgrown woodland, the immediately adjacent existing A303 would be highly intrusive visually and is still significantly intrusive because of noise; some traffic and lights visible though trees; traffic movement; lack of tranquillity; EFFECT of scheme would be to exacerbate these effects • Diachronic relationships and different characteristics of the site include pre-existing Bronze Age barrows; Bronze Age and later field systems; periods of use through later prehistory (potentially spanning period up to emergence of major tribal entities); relationship to Blick Mead sacred spring. *The effects of the existing A303 on other multi-period sites nearby has obscured their inter-relationships and multiperiod evolution of human activity within a highly distinctive but now diminished topographical setting; EFFECT of scheme would further intrude on and obscure such inter-relationships through further substantial changes to topography and added intrusiveness* OVERALL: the scheme would tend to exacerbate the significant harm already done by the existing A303 in the last 50 years including its highly intrusive and alien physical form and aural presence, and its substantial impact on local topography. In summary, the key points for **Amesbury Abbey Park RPG** are: • Amesbury Abbey Park RPG is graded II*. Of the 1600 registered parks in England it is amongst the 27% designated as being *"of more than special interest and graded II*"*; 9% are designated as being *"of exceptional interest and are classified as Grade I"* • As designated the Amesbury Abbey Park RPG is part of a much more extensive area of former parkland that the ES has not fully identified or assessed. Historic England's *King Barrow Ridge* report (Research Department Report Series No. 83-2011) explains that *The acquisition of [the West Amesbury and Countess] manors in the mid-18th century allowed the [3rd] Duke [of Queensbury] to extend Amesbury Park to include the New King Barrows: they were probably planted with Scots Firs around this time. The full extent of the Park was short-lived: after the Duke's death in 1778 land was dis-parked and returned to arable….. By 1846 beeches and yews had been added to form plantations around the New King Barrows and the southernmost two of the Old King Barrows, with a 'Keeper's house.' …….The pattern of trees east of the Ridge are popularly known as the 'Battle of the Nile' clumps, however, these too were probably planted within the Park by 1778, twenty years before the great naval battle took place.* 72% of the original 26 clumps survive or have been restored. There is nonetheless a very strong tradition that they were planted at the end of the 18th century at the

behest of Emma Hamilton to commemorate the British and French battle formations at the height of Nelson's victory in the battle of the Nile (1798), each named after a ship seems likely to be an embellishment of an idea to name the clumps after the ships in commemoration of the battle.

19th century land use
Source Historic England *King Barrow Ridge* Research Department Report Series No. 83-2011



The Nile Clumps
Source Emma Hamilton Society ()

- The RPG designation description includes the following: *The setting of the site includes the town of Amesbury extending to its south-east and the River Avon and its banks to the north-east. To the north and west of the site lie the Nile Clumps, tree clumps planted here by the late C18 (Andrews and Drury, 1773), some of which have recently (2002) been replanted (Mott MacDonald 2002). The course of The Avenue, the archaeological remains of a prehistoric road that leads to Stonehenge, runs through the area of the Nile Clumps. Stonehenge is situated c 1.5km west from Amesbury Abbey and was owned by the Antrobus family until 1915. The area north and west of the site (not included in the area registered here) has been farmed since the early C19 and is divorced from the park by the A303, introduced in the late 1960s.* This should also include the King Barrow plantations.

		• In terms of topography, the Park at its maximum 18th century extent stretched from the floor of the Avon Valley to the crest of King Barrow Ridge, taking in the spur on which Vespasian's Camp and barrow are located. The landscaping of the Camp (both with tree planting and modification of the earthworks for designed walks) and the planting of the barrows on King Barrow Ridge and a few as locations for the Nile Clumps suggests that at its full extent the park was intended to facilitate walks that could incorporate its full east west extent allowing contemplation of prehistory on the way culmination in a view of Stonehenge. *The original A303 resulted in a major cutting through the ridge at the E end of the Camp within the original parkland, representing a major change in its topography, severing the natural route by which the full east-west extent of the park would have been traversed using the N entrance of the hillfort (which was modified as part of the parkland landscaping and creation of walks). The EFFECT of the proposed scheme would be to exacerbate this intrusion, substantially widening the cutting at the N end of Vespasian's Camp and deepening and extending it westwards into the side of the King Barrow Ridge, making it even more difficult to appreciate the physical topographic context of the original design and what that says about 18th century attitudes to prehistory in the landscape.* • In terms of general vegetation and landuse, although the central section incorporating Vespasian's Camp is overgrown, most of the key tree planting is still intact (or in some cases restored). The arable landuse amongst the clumps is a feature of how the parkland evolved in the nineteenth century. *The impact of present A303 was significant, physically severing the original parkland (which is partly why the full extent of the parkland was not included) and introducing an alien mixture of tarmac and roadside vegetation in a strip right across the former park. The EFFECT of the proposed scheme would be to exacerbate this intrusion involving significant additional land-take on a different alignment and introduction of major structures in terms of the tunnel portal and cutting retaining walls* • In terms of designed plantations, the Nile clumps are unusual both being early examples of such planting and because of their having become, by tradition, a significant commemoration of a major battle that is still recognised today. By the mid nineteenth century they were retained as tree clumps within arable fields. *The severance caused by the present A303 seems to have been a factor indirectly leading to the loss of some 'ships', but most were retained as clumps within arable fields with the A303 occupying a fairly narrow at-grade strip. The EFFECT of the proposed realignment would incorporate two of the Nile Clumps within the scheme boundary on the edge of a substantial cutting; the introduction of 'chalk grassland and intermittent scrub' planting over the tunnel portal would contribute to the substantial additional change of historic character and land use.*

		• In terms of the overall atmosphere and tranquillity of the Park, it would originally have been tranquil countryside disturbed by little other that farming activity which was part-and-parcel of the countryside, but for the western boundary where horse-drawn and later motorised traffic using the old main road would have been somewhat intrusive. *The impact of the present A303 was to introduce what is now a major source of new intrusion on the formerly peaceful central part of the Park (especially at the N entrance of Vespasian's Camp while somewhat reducing the far less significant intrusion along its western boundary. While visually from within the RPG boundary this is less than it might be if trees were cleared to reveal the position of Vespasian's Camp in the landscape, it is extremely apparent within the former extent of the Park that is they aspect of its setting. Audibly the A303 cuts through the centre of the former parkland and is present at King Barrow Ridge. The EFFECT of the proposed scheme would be to exacerbate visual and noise intrusion, not least because of the additional hard structures in the retained cutting and tunnel portal, and even if only glimpsed through trees, night and day headlights emerging from the tunnel. This would not be fully offset by some reduction in intrusion at the King Barrow Ridge plantations. Although the view towards Stonehenge from those plantations would be substantially restored (but for visitor activity) the kinetic experience of that view being the culmination of an exploration of prehistory through the landscape would have finally been physically destroyed, whereas now, if the A303 were replaced by a scheme avoiding the WHS altogether (such as an optimised F010) there would in principle be an opportunity (with landowners' support) to fully restore the full original 18th century design concept.* OVERALL: the scheme would tend to exacerbate the significant harm already done by the existing A303 in the last 50 years including its highly intrusive and alien physical form and aural presence, and its substantial impact on local topography and exacerbating the severance caused by the A303. Taking all three assets together, the Applicant has misunderstood the contributions that these assets make to the WHS OUV. The cumulative harm is serious. This can easily be judged by imagining how the settings of these assets might be physically restored if the A303 were to be removed from the WHS altogether (as might be achieved with an optimised surface route to the south such as F010) with reinstatement of the natural topography, woodland management for Vespasian's Camp and re-establishment of missing Nile Clumps.
CH.2.9	All Interested Parties	**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 funerary zone to the west characterised by lithics, and a living zone to the east characterised by ceramics? In general these expanded sections are helpful, in principle painting a broader picture of issues relevant to archaeological work in the WHS; in many respects they serve to emphasise the likelihood of unexpected discoveries and the limitations of what is known of the total archaeological content of the scheme. But because the uncertainties of the surveys and evaluations have not been analysed properly, the real archaeological potential of the scheme has not been clarified. By adopting a narrow, site-by-site damage-limitation form of mitigation based on what is known so far, the Research Questions identified as being relevant are too limited and too often dismissed without good grounds as having little potential. A good example of research questions being closed down, not opened up by the approach adopted is the inconsistency between the text and Appendix D as to whether the Mesolithic to Neolithic transition could be explored. Another is the Applicant's dismissal of CBA's observation in oral evidence that the small hengiform or segmented ring ditch SW of the junction (and perhaps other monuments on that alignment) might be part of the Winterbourne Crossroads linear cemetery alignment (or at least have significant intended relationships). Instead of treating this as a valid question, checking it against other examples of multi-period linear cemeteries in the Stonehenge and Avebury WHS, the Wessex Region and beyond, it has been dismissed on purely procedural grounds. See below for further comments. The approach should be the other way round: rather than being *shaped by* the current uncertainties and limitations of what is known to date, the approach, given the location, scale and extent of the scheme, should be to consider what opportunities exist to *overcome* the limitations and address bigger (and different) questions. Such an approach would better meet the unprecedented challenge that would be set if the scheme were to be approved, including being more responsive to the sort of issues identified by the ExA. Such issues exemplify the open challenge posed by a research-led approach as compared with the much narrower damage-limitation exercise adopted by the applicant: if these – and many other similarly broad issues – are to be addressed, the Strategy needs to consider the following questions for each major research issue • What sort of evidence is capable of shedding light on the issue and needed to address it?

		• Where is that evidence likely to be found in respect of different types of deposit from ploughzone to natural hollows, tree hollows, colluvial and alluvial deposits, waterlogged deposits and fills of a wide range of anthropogenic features? • How much of that evidence is required to make it possible to draw reasonably valid conclusions? • What methods of survey, topsoil stripping, subsoil cleaning, test pits, auguring etc are needed to ensure that all such burial environments have been identified and their extent within the affected areas mapped? • What methods of investigation recovery techniques and sampling methods need to be applied to recover all the types of evidence required to answer all relevant research questions? • What levels of investigation and what detailed sampling strategies are needed within those methods and techniques to ensure recovery of enough evidence to create a robust set of data to support the analyses needed to answer all relevant questions? • In particular, what levels of investigation, general sampling and recovery methods are required to ensure that critical but rare pieces of the evidence jigsaw are not missed? As Mr Lambrick explained in oral evidence (citing the rarity but importance of Mesolithic lithics; exotic stone objects in the ploughzone, or burials occurring in later prehistoric - though also later - boundary ditches), the last question above is in many ways the most critical. Similar considerations apply to ensuring features such as cremations, burials and structural elements like postholes are not missed. This emphasises how there are some research questions that can only be addressed by very thorough recovery of lithics, ceramics, animal bones or human remains in sufficient quantity for a sufficient chronological time-span to demonstrate differences in human activity through time. Because the extrapolations from survey and evaluation evidence and past discoveries have not been done, the basis for judging how far such questions might be addressed is not firm. Nevertheless, the additional text presented in the review of research is a useful beginning. But it is let down by the current damage-limitation approach and application of standard sampling rates more designed to characterise than fully explore the evidence available. The result will tend to close down many avenues of research that might otherwise be explored. 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?

		Please see below; the provisions for monitoring should be subject to **approval** by Historic England and Wiltshire County Council 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? The provision for retaining topsoil for reuse within the WHS makes no sense archaeologically unless it were to be replaced in sufficient accuracy where it came from to retain the integrity of archaeological information – we do not believe this is possible. The WHS is a management construct not an archaeological asset in its own right that would benefit in the sort of way that (for example) a bag of finds from a specific stratigraphic deposit has a contextual integrity. As noted elsewhere, the boundary of the WHS is not the boundary of OUV. The provision has no clear archaeological logic The important provision is to record where topsoil is moved from and to so that when its archaeological content is found in a new location there is a record that it does not represent an authentic record of archaeological activity on that site. All topsoil from the scheme is likely to contain archaeological objects (as indicated by the tiny sample explored in the evaluation fieldwork). There is thus no need to judge the archaeological content of the topsoil: a general systematic means of mapping all topsoil movement from one are to another is required (and we assume that is what is intended). iv. Comments are invited on paras 5.2.43 and 5.2.54, Geotechnical and other intrusive surveys. This provision is desirable to cover the likely need to enhance records. Two circumstances arise: • Covering gaps in coverage • Resurveying areas using other techniques to clarify (IF possible) the archaeological content to provide better information for planning excavations • Resurveying areas to be buried under topsoil to ensure that as full a non-destructive evidence base as possible is made before that opportunity is lost to future investigators (please see comments in response to Q.CH.2.5 about 'sterilising' archaeology) 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.

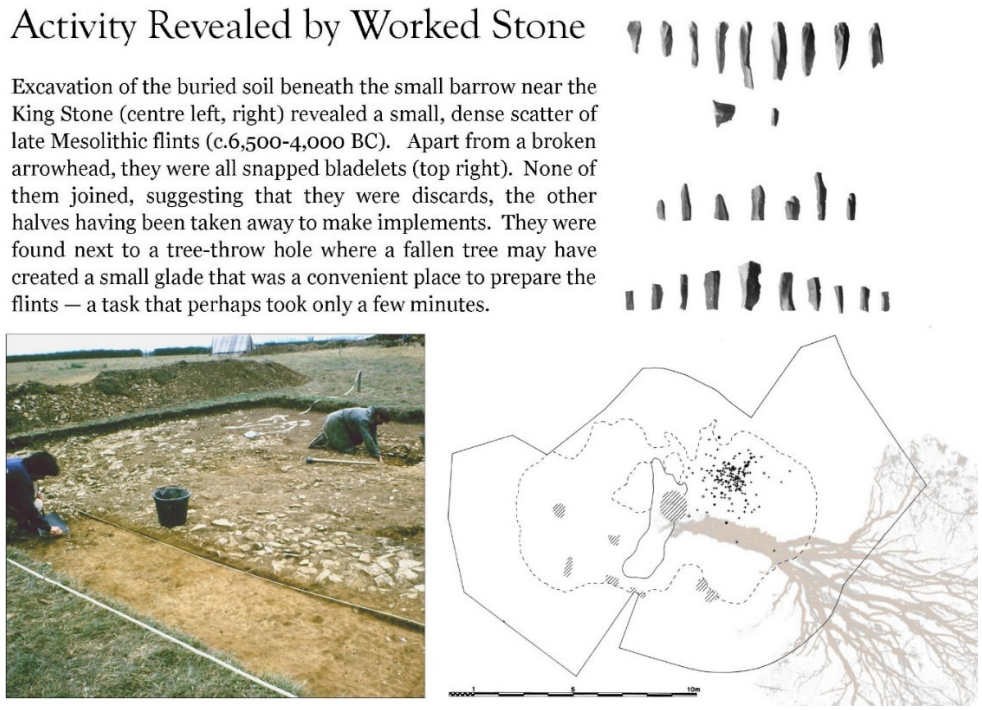
		The details of the role need to be better defined: detailed archaeological logistics should be the purview of the archaeological contractor; oversight of the programme of work and co-ordination to ensure archaeological works are completed thoroughly and in a timely manner; including instructions for the contractor to deploy additional resources should not be down to the archaeological contractor alone. Consideration needs to be given to what has worked well (ie has resulted in high level of effective archaeological response) in other transport infrastructure schemes 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. **YES** This is vital to avoid conflicts of interest (cf other comments on approach of limiting rather than maximising research opportunities and quality of recovery of information). But see also below, regarding issues of interruptions and delays. A co-ordinated approach is required to overall risk management, including the whole procurement and contracting philosophy, structure and culture. vii. Comments are invited on para 6.1.20, Interruptions and delays – who makes the decision regarding the cessation or resumption of work? Once again, it is vital to avoid conflicts of interest. The specific issues noted in 6.1.20 are amongst the least significant potential problems in terms of interruptions and delays. Delays through snow and prolonged heavy frost resulting in frozen ground conditions and potentially damaging objects can present significantly more serious weather problems than rain, but even so these risks should be allowed for in standard project programming to ensure sufficient time allocations are set according to different times of year, also ensuring that the potential need to deploy practical mitigation measures (shelters, sheeting to cover work areas etc) is allowed for. Far more significant are the potential interruptions and delays arising from unexpected discoveries – or in this case miscalculated/underestimated potential arising in this case by the draft DAMS focussing all the effort on what is known without having attempted to extrapolate existing knowledge to what may potentially be found). This issue is not recognised in paragraph 6.1.17. Nor is there any assessment of which areas would be on the general project critical path, and therefore especially sensitive to delay. As presented, sections 5 and 6 of the draft DAMS do not present a demonstrable basis for mutually shared proactive management to ensure maximum collaboration in achieving archaeological objectives

		while minimising unnecessary risks to project programme and adopting creative means of mitigating problems that do arrive. The entire emphasis is on liaison with external bodies rather than also recognising the vital need for fully proactive mutually supportive internal partnership working across the project. Considerations of best practice need to be applied, developed from past experience at two levels: • Overall procurement and contracting philosophy • Examples where successful archaeological outcomes were achieved with minimal disruption, despite challenges to programme. *Procurement and Contracting* In terms of UK infrastructure, British Airways' approach to the procurement contracting and management of all the specialist contracting skills required to deliver Terminal 5 as a world class development within time and budget has been widely recognised (see for example National Audit Office https://www.nao.org.uk/defencevfm/wp-content/uploads/sites/16/2013/02/BAAPlcTerminal5.pdf for a summary of the approach). It was based on an extremely robust and open approach deeply rooted in a basis of co-operation in which all players seek solutions on a partnership basis harnessing a very strong collaborative risk management strategy embracing a core philosophy of continuous improvement in which quality of outcomes at every level was the fundamental, project-wide objective. It was based on incentivising quality and effective performance, not disincentivising contractors with undue responsibilities for risk or penalising delays or cutting corners to make up time. This well-known case study included a major archaeological investigation of an extremely extensive predominantly prehistoric archaeological landscape. The archaeology like everything else was part-and-parcel of the core procurement, contract and risk management strategy Highways England has not yet fully adopted such a philosophy (which is as much or more a cultural challenge as a procedural or managerial issue). A report jointly commissioned, overseen and funded by Highways England and the Office of Rail and Road, reviewed the situation against standards set by the Chartered Institute for Procurement and Supply. This showed that significant improvements were then needed in several areas (*Highways England Procurement Capability Review* of 2017, https://orr.gov.uk/__data/assets/pdf_file/0015/26322/highways-england-procurement-and-contract-management-capability-2017.pdf). Appendix 5 of the report details several top priority areas where a more pro-active, more collaborative, more innovative and more quality-focussed rather than damage-limitation based approach would be beneficial. A significant number of these reflect areas relevant to how the inherent risks presented by archaeology need to be managed.

		Unexpected discoveries Examples of unexpected discoveries of major significance on road schemes and other infrastructure projects are so common that in general they are to be expected. What they are; where they occur; how time-consuming and intricate their investigation and recording prove to be; and most critically, how they relate to the construction programme are the big risks. Examples include cases where such discoveries were relatively easily accommodated within programmes and cases where adjustments were needed; they also include cases that were or were not exacerbated by problematic winter conditions. There have been several unexpected discoveries on the A14 over the last year or more. Some older examples include • A1(M): Iron Age chariot burial discovered when excavator uncovered a stone slab covering the grave • HS1: A large Roman cemetery on the critical path for preliminary works to divert electricity pylons (winter requiring shelter, heaters and light, extended working to reduce delay) • A417/A419 improvement scheme: a substantial Roman settlement at the N end of the scheme on the critical path for site clearance, requiring re-organisation of programme for lengthy excavation (starting in winter) • HS1 a post-medieval cemetery at St Pancras (identified in ES and archaeological programme) investigation pre-empted by rapid (non-archaeological) clearance by contractor to make up time for delays caused elsewhere. Only stopped when CBA and other NGOs intervened to publicise the case, highlighting issues and helping Historic England to require contractor to revert to the agreed archaeological approach *Overall* Currently the draft DAMS provides only a few comments on low-level risk management, not a proactive high-level analysis showing where archaeological actions relate to the overall broad-brush critical path for delivery of the scheme. An obvious example is the unresolved risk that a large-scale excavation might be required for the main construction site and haul roads, or the parameters of uncertainty in respect of the actual archaeological content of areas on the critical path for the Preliminary Works and Main Works programmes. viii. Comments are invited on paras 6.3.14 to 6.3.16 regarding ploughzone sampling. **Not adequate** – See comments above (Q.CH.2.5) about sampling relative to loss of archaeology. The assemblage driven approach proposed will not adequately ensure recovery of small clusters, or rare but highly significant objects (including exotic lithic materials early metalwork etc) or a full picture of

		Mesolithic activity for which enhanced sieving is needed. The limitations imposed by the approach would deny proper analysis of clustering by skewing results to areas of recurrent activity over longer periods, not the overall pattern at any one time or what happens between foci of monuments or domestic activity. It would substantially hinder systematic correlation of how artefacts in the ploughzone and the activities they represent (or suggest was not an area of activity) relates to subsoil features. For the World Heritage site and its surroundings, the same sampling strategy should be adopted as for pure research projects – as would be applied to any of these areas if they were to remain available for research into future generations. This MORE not less important because the scale of loss is far higher and far less capable of being replicated on future occasions. ix. Comments are invited on paras 6.3.42 and 6.3.43, Tree hollows. **Not adequate** – see comments above re loss of archaeology. In earlier submissions and oral evidence we have referred to the substantial potential importance of these features, but this has been correctly acknowledged by HE in their review of ploughzone archaeology and tree hollows, [] they have not adequately explained the issues or the potential complexity of these features as revealed by the publications they cite (the lead author - and excavation director – of one being CBA's expert witness for the Examination). In some (but not all) cases of tree hollows arise from trees falling over (whether by wind or other mechanisms, including human agency). In these cases the direction of fall of the tree can often – but not always – be ascertained from the stratigraphy of the deposits filling the hollow created by the rotating root plate. In these cases a distinction (sometimes very marked) can be seen between topsoil (and whatever was in it) that fell into the side of the hollow towards the direction of fall, and subsoil (gradually falling off the upended roots) trapped in the usually larger side away from the direction of fall. Either side may also trap fallen or washed in charcoal, snails etc etc from the contemporary surface. Where related to tree clearance they may trap charcoal which is of special significance if identifiable as root charcoal and hence more likely to be related to contemporaneous activities/ clearance. The methods of large scale forest clearance in the Neolithic and Bronze Age are uncertain: while chopping down large forest trees with stone (and later, bronze) axes is demonstrably plausible; so is the possibility of ring-barking trees and pulling them over when roots have sufficiently decayed. Fallen trees can also be used as a convenient place for shelter etc., they can thus trap redeposited surface material and/or material reflecting use of the area, the environment (as revealed by encapsulated topsoil, snails charcoal etc) and contemporaneous activity.

CASE STUDY ONE An intriguing example found beneath the remnants of a small Bronze Age barrow at the Rollright Stones, N Oxon (Lambrick, G) Excavation of a largely ploughed out round barrow revealed a highly concentrated scatter of non-joining Mesolithic snapped bladelets and a broken arrow head in the very thin old ground surface next to an irregular hollow of soil representing the topsoil side of a tree-throw hole. This is interpreted as an extremely short lived moment when someone with a pocketful of pre-prepared bladelets used a fallen tree which created a well-lit opening in the forest canopy as a good place (perhaps sitting on the trunk of the fallen tree) to prepare some implement(s) using the other halves of the badelets, discarding the unwanted pieces and broken arrowhead. Had the barrow not been built on this particular spot; or if just once it had been ploughed a few centimetres more deeply, the tree throw hole (which contained no anthropogenic material) would have survived and the bladelets would have been mixed into the topsoil.



Case study 1 – extract of G Lambrick (2017) *An Illustrated Guide to the Rollright Stones* The Rollright Trust

CASE STUDY TWO In the Highways England review of ploughzone and tree hollow archaeology reference is made to work at the Drayton Cursus in 1985-6 (Lambrick, G. and Robinson, M., "Tree-throw holes and tree clearance," in *Lines in the Landscape*, Oxford, Oxford Archaeology, 2003, pp. 60-67). But the HE study does not explain the sampling approaches adopted there or what was revealed. The site straddled the line of one side of the Drayton Neolithic cursus (south of Abingdon) where the prehistoric ground surface survived beneath Roman and later alluvium. Sometimes evident through it, removal of the buried soil revealed a dense scatter of 78 tree-throw hollows occupying c.30% of the exposed excavation area; not all were excavated, but even so finds of pottery, worked flint and animal bone came from 28%; root charcoal was recovered and carbon dated to the early and middle Neolithic; ceramics ranged from early Neolithic to Beaker; lithic artefacts ranged from Mesolithic to Bronze Age; animal bones reflected domestic use; charcoal and signs of scorching were common; large fragments of Neolithic pottery suggest deliberate deposition.

Case study 2 – Drayton tree-throw hollows with summary of dating and direction of fall After fig 4.3 in A Barclay, G Lambrick, J Moore and M Robinson (2002) *Lines in the Landscape* OA Thames Valley Landscapes monograph no 15

		At Drayton the number of productive Neolithic to Bronze Age tree-throw holes outnumbered deliberately dug pits by 7:1; more pottery and lithics were recovered from tree-throw holes than pits; the majority of pottery and lithics came from the pre-alluvial ground surface. These are fairly typical results where there are foci of interest. Partly apparent at Drayton - but even more so elsewhere - is that the concentration of tree hollows and the proportion containing anthropogenic material is very variable but not very readily predictable, especially in plough-truncated areas where other indications of activity in surviving soils no longer survive. The variability revealed by the very small evaluation sample as in the plans presented in the Highways England review, but not reported, hints at this. Making the most of the significant research opportunities that tree hollows present needs careful consideration of how relative densities of burning, artefacts etc they reveal (as well as their role in specific domestic or ritualised activity) can reveal patterns of activity relative to other forms of archaeology (whether pits, monuments burial etc etc). This needs to be seen within a far clearer appreciation of what they represent: the best contexts for understanding prehistoric activity other than deliberately created features (which often contain 'special' rather than 'ordinary' deposits are buried land surfaces, especially where sealed and therefore attributable to a particular period or span of periods. The ploughzone is in effect the total content of any ground surface(s) within the depth of present and past cultivation: survival of soft prehistoric pottery is unusual because of attrition, but lithics survive well but can be too worn or broken by attrition for useful detail such as use-wear marks to survive. Tree hollows and other buried hollows tend to act as a more or less random sample of disturbed buried ground surface but with some *in situ* material. They are therefore a much less complete but also less disturbed record of prehistoric activity. The sampling proposed appears to be a minimum of 150 litres of fill (eg 15% of a hollow c. 1.5m diameter averaging 0.4m deep) from a maximum 12.5% of all identified hollows, which, depending on variability of sizes, represents a 2% sample of total available deposit. Even with maximum proposed sampling 87.5% would be discarded and since even 50% excavation of the remainder seems highly unlikely, it can safely be assumed that between 93% and 98% of tree hollow deposits would be lost. Considering their significant potential this would substantially limit the research questions that might otherwise be addressed.

		x. Comments are invited on Section 8.1 Communications Strategy, Section 8.2 Progress Reporting, and Section 8.3 Monitoring of Post Excavation Works. In general the communication strategy within the archaeological team and external curators (and the public) is reasonably clear. What is just as critical (but missing) is the strategy for communication across all relevant sectors and management hierarchy of the project team. While this is quite substantially up to the main contractor and their subcontractors, there needs to be statement of basic principles (such as those adopted for T5 and recommended by the Applicants own procurement review) to demonstrate a commitment to excellent, continuous improvement partnership working driven by seeking highest quality outcomes. 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. Please see comments above Q.CH.2.2; Q.CH.2.5; Q.CH.2.6; Q.CH.2.7 The structure of Action Areas is clearer than much of the rest of the DAMS, presenting more of an area- rather than site-based approach by which the known archaeology, extrapolations form the surveys and evaluation and previous discoveries contribute to a more wide-ranging recognition of research potential. However, the site-by site emphasis within this is over-prescriptive not allowing for the uncertainties inherent in the evaluative surveys and trenching. This becomes especially apparent when consideration is given to the provisions for the fall-back of investigative work if preservation *in situ* is not feasible (see below Q.CH.2.9 xv). There are numerous gaps and uncertainties (such as the wide wedge-shaped area E of the E tunnel portal) where it is not clear why they should be omitted. It is noted that some research issues recognised in this account are dismissed in the main text. 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? All these flow charts are presented as if they are not part of a major construction project with which they must be fully co-ordinated. These charts are exceptionally simplistic and give no indication of how

		this strategy must be integrated with other imperatives. As such they seem an inadequate basis for integration into the DCO. 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]. The CBA has made submissions both written and orally on this matter, and in the ongoing absence of any effective coverage of this issue in the draft DAMS we wish to summarise again the issues that need to be addressed: • Technical literature has not been cited (and presumably not consulted) to develop the *in situ* preservation provisions on an informed basis, nor correlated with conflicting principles of soil handling as required by DEFRA and BS standards • There has been no attempt either to determine what could or could not be reconciled with those standards; or whether, in the absence of equivalent archaeological standards, soil conservation or archaeological conservation would take precedence • Paragraph 5.3.11 of the draft DAMS indicates that HMAG/ WCAS and the Historic England Science Advisor would only be consulted about the detail for achieving preservation *in situ*, NOT who would determine as between the two conflicting standards, noting that the alternative to *in situ* preservation beneath topsoil is archaeological excavation. As with other provisions this should be subject to approval by the relevant national agencies for both issues (Histric England and the Environment Agency) together the relevant officers in Wiltshire County Council. • While Historic England's Guidance on preservation in situ (2016) referred to in paragraph 5.3.12 of the draft DAMS provides some useful general guidance, it does NOT cover this issue in any detail, only observing that *Construction of buildings and embankments, and heavy vehicle tracking (including in arable cultivation) can cause significant loading and potentially lead to sediment deformation and damage to artefacts. Some valuable research on loading impacts on archaeological remains has been carried out in the last ten years (Sidell et al 2004; Hyde 2004) and this is an area where further observations, research and synthesis could be undertaken.* It provides no guidance on the practicalities involved (cf DMRB vol 10 and comments below) and the only references cited are two of the papers CBA has drawn attention to in the PARIS conference proceedings, but not he DEFRA research.

		• There has been no attempt to look at the detailed differences that arise from burying archaeology different purposes, or different short and long term outcomes. • The most significant distinction to be made is between those areas used temporarily for construction and returned to agriculture, and those used for permanent spoil disposal and landscape mounding. • In the case of temporary usage there is a further distinction to be made between areas used passively for storage and those used actively for plant and what loadings and stresses arise from such uses and therefrom, what thickness of protective hardcore is required • For mounding a distinction is made in the draft DAMS between areas of deep fill where topsoil would be stripped and ploughzone and subsoil investigations would be undertaken, and other areas where no stripping would be carried out. • There is no evidence for why the loading of thick but static spoil would presumptively be more damaging (thereby requiring removal of existing topsoil) than the loadings and dynamic forces of compression and distortion occasioned by use by heavy plant. • For none of these scenarios is the sequence of installation, source of hardcore for creation of compounds and haul roads, method of installation in terms of plant NOT working on unprotected topsoil or exposed subsoil working explained. • For the areas of compounds haul roads and temporary diversion of the A303 etc., there is no explanation of the method of removal, again ensuring that plant does not work from re-exposed topsoil; where the retrieved hardcore would be disposed of; or what provision would be made to ensure that damaging agricultural decompaction methods were NOT used subsequently – even just as a precaution – after the land was released back to farming. • For all the compound areas, temporary road diversion and haul roads it is acknowledged that leaving topsoil in situ may not prove feasible; the alternative of leaving subsoil archaeology in situ with additional protective covering is not considered • The alternative to preservation beneath topsoil for these areas is excavation; but there is no details about this in the site-by-site appendices, and for example the satellite compound for the B3083 is not registered as a site in the Appendix D action areas. It is nowhere observed that the main and B3083 compounds have not been evaluated, and in the case of Countess East, the coverage and detail of what previous geophysical surveys and evaluation trenches revealed has not been presented - only the recent geophysics carried out under this scheme being covered).

		Since the proposals for preservation of topsoil *in situ* under compounds, temporary road diversion and haul roads prior to return to agriculture is *prima facie* contrary to DEFRA and BS Standards, and there is no countervailing archaeological standard that trumps these provisions. Examples include • *Areas of soil to be protected from construction activities (e.g. retained trees, protected habitats, archaeology, invasive weeds) should be clearly marked out by barrier tape and exclusion signs. Haul routes should be no wider than necessary to accommodate two passing vehicles and should be stripped of soil down to a firm base. Indiscriminate vehicle movements across soil should be avoided.* • *Once re-usable soil resources have been identified within a site it is important to strip them carefully for beneficial reuse on or off-site.* • *Not stripping topsoil from areas that are to be built on, regraded or trafficked by site vehicles will increase project costs, as the resource will be wasted.* • *The preferred method for minimising damage to topsoil … shows the transport vehicle running on the basal layer under subsoil as subsoil is also to be stripped. If only topsoil is to be stripped, the vehicle would run on the subsoil layer.* • *On most construction sites, the receiving layer will have been compacted by vehicles, foot trafficking or the storage of building materials. Therefore, prior to spreading soil the substrate should be properly de-compacted to break up any panning to reduce flood risk and to promote deeper root growth. … In … open areas, a tractor-drawn subsoiler is capable of loosening soil that is not too heavily or deeply compacted. In some instances, compressed air injection can be used to de-compact the soil profile.* • *Deep compaction can only be effectively relieved using heavy duty ripper equipment.* So far the Applicant's response to the CBA's concerns has been as follows ([REP4-030] p 2-30): *Mr Taylor QC explained that the draft DCO includes a requirement for the Applicant to comply with the OEMP and DAMS, both of which are approved by the Secretary of State and would be certified documents. As a result, any soil management strategy could not contain any provision that conflicted with the approach in the DAMS, as that would mean compliance with the DAMS could not be achieved in accordance with the DCO requirement. Mr Taylor QC noted that in practice, this conflict would not arise.* ***Post hearing note:** item MW-GEO7 of the OEMP requires that the main works contractor develops a Soils Handling Strategy, with reference to BS3882: 2015 Specification for Topsoil and*

		the Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Site. This is further bolstered by the new paragraph 5.2.11 in the updated DAMS submitted at Deadline 4" Both these statements strongly reinforce the CBA's view that it would be the unchanged paragraph 5.1.2 in the draft DAMS: *"In respect of archaeological remains within the footprint of the Scheme, where preservation in situ is not feasible, a comprehensive programme of archaeological mitigation fieldwork and recording will be implemented."*). The 'feasibility' of complying both with DEFRA and BS Standards AND with the archaeological preservation ambition looks very slim, even for permanent mounding (especially in the light of possible topsoil shortages). Even if only unfeasible for compounds etc to be returned to agriculture, this is still makes a big difference to the nature of archaeological mitigation (especially where these areas have not been evaluated). On the basis of PINS Advice Note 17 (on adopting the precautionary approach and worst case scenarios when considering cumulative effects) the CBA retains its the view that until specifically demonstrated to the contrary, the ExA should assume that paragraph 5.1.2 will apply and that all archaeology – at least in the areas of preservation of topsoil under compounds, haul roads and temporary road diversions etc. – would be lost or significantly harmed and therefore need to be subject to investigation. This has significant policy implications, bringing these areas and the added uncertainty about their actual archaeological content into the ambit of NPSNN policy 5.139 (see above regarding the Applicant's misplaced observations on Hayes v York CC). The overall loss of archaeology is far from clear, as the various areas were not subject to ploughzone archaeology and evaluation, or in the case of Countess East previous work has not been presented in detail. • The main compound area was not trial trenched or sampled for ploughzone archaeology, and given the limitations of the geophysics it is therefore very uncertain as to what the content of this area could be; however, it includes a Bronze Age barrow, is crossed by a continuation of a major boundary ditch that is scheduled to the SE and is adjacent to a strip along the realigned A536 where evaluation and plough zone archaeology demonstrated significant potential. It thus appears to contribute to various aspects of WHS OUV. (see Appendix D Sites 17 and 19). • The B3038 compound was included in geophysical survey which revealed field systems and possible enclosures of possible Later Prehistoric, Roman, Medieval/ Post-medieval date and remains of an Iron Age/ Romano-British settlement on High Down but was not subject to ploughzone archaeology or evaluation (see Appendix D Site 53).

		• The Countess compound was surveyed and evaluated for previous proposals as well as being subject to GPS survey for the current scheme. It contains significant multiperiod archaeology, including Neolithic activity, a Roman settlement with a stone building and associated features and an early Saxon settlement including a series of sunken featured-buildings (which suggest other less readily identified remains as well – see Appendix D Sites 31 and 50 – mapped as within this area but if so adding much else). These main areas also include an array of service trenches etc separately listed in the mitigation tables too difficult to untangle. Similarly the haul roads, temporary road are adjacent to areas listed for excavation but too difficult to disentangle into coherent areas for systematic treatment. .
De.2	**Design**	
De.2.1	Applicant	**OEMP, Chapter 4: Detailed Design [REP4-020]**
	All Interested Parties	Chapter 4 of the OEMP is headed 'Development of detailed design in the WHS'. However, para 4.4.4 deals with matters outside of the WHS, quite rightly in the ExA's view, since the detailed design aspects should be matters of concern and consistency throughout the whole Scheme. **Therefore, should the title of the chapter be amended, and its scope widened?** **YES –** In addition to any general widening of scope, it should explicitly include the extensive works and significant structures and landscaping outside the WHS boundary as it stands, but nonetheless affecting its setting and OUV. Some of these areas could become part of the WHS following boundary review.
De.2.2	Applicant All Interested Parties	**OEMP, Chapter 4: Detailed Design - Design Vision [REP4-020]** Section 4.3, Design Principles – intended guidance indicated in para 4.3.2 (a), (b), and (c); and in Table 4.1, in particular P-G01, and P-LE01 to 03: The ExA endorses the aim set out in the DAS of minimising the visibility of new structures within the WHS (para 4.4.3), and responding to two sensitive landscapes; the heritage landscape and the wider setting (para 4.4.9), without competing with them or providing an alternative focus. Overall, an understated approach of restrained visual impact and elegance is appropriate. Despite the proposed guidance intended to achieve this, an imaginative input through an overall design vision is necessary. This is absent from the Scheme at present and, in a Scheme of international importance such as this, it is not appropriate to leave the design to the contractor. **Do the parties agree?**

		YES. As we have noted in our main written submission, for such a major intervention it is never going to be anything but a massive 21st century imprint on the landscape of an utterly unprecedented scale within the WHS. It is not at all clear that an 'overall design vision' would help: the aims referred to suggest localised responses without creating an overall alternative focus, so any other 'vision' would seem in danger of emphasising not reducing the impact. If anything the principle should be even more localised, based on addressing (if possible) the specific aspects of setting where some reduction of harm might be possible**.** At present the setting analyses have not been sufficiently explicit about how relevant factors would change (see CBA submissions [REP2-070 para 50ff; REP2-076; REP3-049]).
De.2.3	Applicant All Interested Parties	**OEMP, Chapter 4: Detailed Design [REP4-020]** Para 4.4.3: Should consultation also take place on the fencing, or other safety measures, preventing access to the cutting? **YES:** See DMRB volume 10 for illustrations of good and bad practice in treatment of highways fencing and other boundaries, especially in sensitive locations, and how understanding the local landscape can be crucial to achieving acceptable outcomes.
De.2.4	Applicant All Interested Parties	**OEMP, Chapter 4: Detailed Design [REP4-020]** **Para 4.4.4: Should consultation also take place on:** **i. River Till viaduct?** **ii. Countess flyover?** **iii. Green Bridges?** **YES:** See DMRB volume 10 for illustrations of good and bad practice in treatment of structures in sensitive landscapes. Apart from statutory bodies, it is reasonable that those who live in the area and use these structures (and the public at large) should have a say as they do with any development application that covers issues of detailed design.
De.2.5	Applicant All Interested Parties	**OEMP, Chapter 4: Detailed Design [REP4-020]** Para 4.4.14: Notes that it is appropriate that the final decision on detailed design remains the Applicant's preserve, using its expertise and knowledge as to what would be appropriate and operationally feasible in the context of the Scheme. However, matters such as operational geometry and other matters of highway functionality would be defined in the OEMP and elsewhere, and would have been confirmed during the development of the design process well before the final decisions are made on detailed design. Wiltshire Council is the

		statutory body regarding planning matters, including design approvals, and has expertise and knowledge as to what would be appropriate. **In the exceptional event of it not being possible for the SCG and The Authority to reach agreement after escalation of the matter, should not the final decision on detailed design rest with Wiltshire Council?** **YES:** The process should operate like decisions made on the acceptability of the design of other new development affecting the setting of ancient monuments, conservation areas and listed buildings: Historic England and other statutory consultees should be consulted; local people and interests should be able to comment; and the local authority should decide. This analogous to a reserved matters detailed application to an outline consent**.**
CC.2	**Climate change**	
CC.2.1	Applicant	The Applicant's written summaries of oral submissions put at the Open Floor Hearings held on 22 and 23 May comments on the submissions made in response to Mr Mike Birkin [REP3-013]. **i. As regards the reference to the Government's Road Investment Strategy (2015) does the assessment of annual CO2 impacts from delivering a programme of investment on the Strategic Road Network take into account the latest set of UK Climate Projections and/ or Government carbon reduction targets? If not, how does this affect the assessment?** Please see CBA's previous representations about RIS and SEA [REP2-070 para 124ff; REP2-078; REP3-049]) and comments above (Q.AI.2.1) **ii. Likewise, does the paragraph 2.4.3.5 reference to the ES Chapter 14 assessment of carbon emissions (GHG) take into account the latest set of UK Climate Projections and/ or Government carbon reduction targets? If not, how does this affect the assessment?** As above, please see CBA's previous representations about RIS and SEA and comments above (Q.AI.2.1)
CC.2.2	Applicant	Paragraph 2.4.3.5 of the written summaries of oral submissions put at the Open Floor Hearings held on 22 and 23 May also states that "*in the context of the overall UK GHG emissions the magnitude of the increase will not have a material impact on the government meeting its carbon reduction targets*" [REP3-013].

		i. Does that take into account the latest Government pronouncements on carbon reduction targets? If not, how would that affect the position? **ii. Please comment upon contribution made by the scheme to the cumulative impact together with other schemes on overall UK GHG emissions in the light of the latest set of UK Climate Projections and/or Government carbon reduction targets?** Please see CBA's previous representations about RIS and SEA [REP2-070 para 124ff; REP2-078; REP3-049] and comments above (Q.AI.2.1)
CC.2.4	Applicant	The response to ExQ1 CC.1.1 states that "*the Applicant is familiar with, and has undertaken a review of, UKCP18 to assess whether the latter data would affect the conclusions of Chapter 14 of the ES*" [REP2-028]. **Please provide further details of that review to support the assertion "*that the new projections do not affect the conclusions of Chapter 14, which is that none of the potential impacts are identified as significant*".** Please see CBA's previous representations about RIS and SEA [REP2-070 para 124ff; REP2-078; REP3-049]and comments above (Q.AI.2.1)
CC.2.5	Applicant	**Please provide an update to the response to ExQ1 CC.1.6 (ii) in the light of the latest Government pronouncement in relation to achieving net-zero GHG emissions by 2050.** Please see CBA's previous representations about RIS and SEA [REP2-070 para 124ff; REP2-078; REP3-049] and comments above (Q.AI.2.1)
Whether adequate funding is likely to be available		
CA.2.13	Applicant	The revised Funding Statement confirms that Option 1 is now precluded and the means of finance would be by way of Option 2, namely, solely public finance [REP2-005]. **i. Please comment upon the National Audit Office report of May 2019 as regards the value for money provided by the scheme and whether there are any implications arising therefrom for the availability of public funds for the project?**

		The National Audit Office report of May 2019 was highly critical of the value for money approach adopted but did not expose the full illogicality of it, especially when seen as it should be in the light of a) Cheaper alternatives (such as a variant of F010 surface route to the south) that achieve far better outcomes for the WHS and in particular • How far (IF it is valid) the heritage valuation was framed in a manner such as to distinguish between a balance of small net benefit over harm to the WHS (in the Applicants view) and against full benefit without harm of a route avoiding the WHS? • How far (IF it is valid) the heritage valuation (PLUS the additional benefit for the WHS) contributes to the VFM of a route such as F010 avoiding the WHS? • What additional costs would arise if the alternative route such as F010 were to be optimised to shorten its length and minimise impacts on nationally protected assets and avoid harm to the internationally designated Avon Valley SAC? • IF the heritage valuation is NOT considered a valid approach, how far short of a positive net VFM would be achieved for different options b) The wider context of where money spent on this scheme from the overall RIS budget is not available to others where, unlike the Stonehenge WHS, effects on nationally and internationally protected areas are unavoidable. • In the absence of any generally accepted methodology for monetising heritage ecological and other 'intangible' benefits, how might BEST past practice be used as a better surrogate for good VFM to judge where, across the RIS programme of highways development, expenditure on costly means of delivering net environmental benefit minimise harm on otherwise unavoidable nationally internationally protected landscapes is best allocated? Please see CBA's previous representations about RIS and SEA [REP2-070 para 124ff; REP2-078; REP3-049] and comments above (Q.AI.2.1) **iii. Can the Applicant provide any timeline for the scrutiny of the business case for the project by the Government?** **iv. Please explain how the road investment strategy (RIS) funding system works in practice, for example, from which RIS is it likely that the scheme would be funded?** **v. What would be the implications for the funding of the project if it is not included in RIS 2 when RIS period 1 ends in March 2020?** For all the above, please see CBA's previous representations about RIS and SEA [REP2-070 para 124ff; REP2-078; REP3-049] and comments above (Q.AI.2.1)

		vi. Please comment on the recent Public Accounts Committee report – Transport Infrastructure in the South West - which included consideration of the funding of the project. Please see CBA's previous representations about RIS and SEA [REP2-070 para 124ff; REP2-078; REP3-049] and comments above (Q.AI.2.1) and comments above regarding alternatives. A matter not considered by either the NAO or PAC is the relationship between a cheaper alternative outside the WHS (like F010) and the overall delivery of the 8 projects for the SW corridor. Conclusion 4 of the PAC report is that *"The Department and Highways England's piecemeal approach to upgrading the A303/A358 makes it more difficult to demonstrate value for money across the whole road corridor."* But the Committee focussed entirely on the Stonehenge tunnel, just assuming it is required to deliver some net benefit. They did NOT probe whether a cheaper alternative might deliver better value for money, as well as greater benefit and no harm for the WHS against some harm across a non-protected landscape; nor how that landscape compares with other areas affected by RIS projects such as the Oxford-Cambridge Expressway which would be likely to cross some areas of open countryside of comparable quality; nor other schemes such as the A417 which if left on the surface as proposed would have a substantial, unavoidable effect on the nationally protected Cotswolds AONB. Nor did they consider that such a cheaper alternative might be somewhat longer but carry less costs AND less risk AND give greater certainty to delivery of the other components of the corridor, thereby improving the overall value for money and environmental benefits and reliability of delivery of the whole.
Fg.2.33	Applicant Environment Agency Wiltshire Council	**Dewatering** The OEMP now commits to the use of closed face tunnelling techniques. This should prevent the risk of large-scale dewatering being required [REP4-020]. **i. To what extent was small-scale dewatering assessed in the Environmental Statement and does it reflect the worst-case scenario in terms of dewatering?** ii. **Should a limit on the level of smaller-scale dewatering be secured as part of the DCO to ensure that dewatering, beyond that assessed, does not take place?** iii. **Is the approval/ permitting procedure sufficient to ensure any required dewatering is adequately controlled?** These questions pre-suppose that the baseline hydrological survey is adequate to identify a 'worst case' scenario. See comments below

Fg.2.34	Environment Agency Wiltshire Council	**Dewatering** **Are there any residual concerns in respect of potential dewatering and to what extent would the permitting regime deal with these?** This question pre-suppose that the baseline hydrological survey is adequate to identify a 'worst case' scenario. See comments below
Fg.2.37	Applicant Environment Agency Wiltshire Council	**Soils management strategy** In MW-G7 the OEMP states that the main works contractor will consult with Wiltshire Council, the Environment Agency (and others) on those aspects of the various specified plans relevant to their functions [REP4020]. In respect of the Soils Management Strategy it appears to be unclear who would be consulted. **Please provide clarity on this, for example would this include Wiltshire Council. Should this be more clearly stated in the OEMP?** Please see comments on Q.CH.2.9 xv above: Historic England must also be involved and the bodies should **approve** the Soils Management Strategy, not merely be consulted
Fg.2.41	Wiltshire Council	**Blick Mead hydrogeology** **How would general post construction monitoring of water levels alleviate concerns of the potential impact on the Blick Mead site if there is no express requirement to monitor this site explicitly in relation to the impact on archaeological remains?** This issue is concerns not just monitoring but IF an adverse effect (or potentially adverse effect) were to be detected, how would any remedial action be taken and what would it comprise? A key issue here (perhaps implicit in the question) is that any hydrological monitoring must be effective in respect of the most sensitive and potentially technically difficult resource to monitor with both robustness and the means to halt and prevent further harm. See further comments below Q.Fg.2.42 and Q.Fg.2.43.
Fg.2.42	Applicant Environment Agency	**Blick Mead hydrogeology** Notwithstanding the Applicant's position that future monitoring of groundwater at the Blick Mead site is not required, it is suggested that the site could/ would be monitored more generally and more widely (with reference to MW-WAT10). The Groundwater Management Plan is proposed to be prepared in

	Historic England	consultation with the Environment Agency only who have no heritage responsibility. In the event that groundwater levels are affected at the Blick Mead site it is unclear how any reporting and subsequent remediation would be adequately secured without any requirement to take account of the heritage assets at the site. **In this context, how would any general monitoring adequately take account of the effect on archaeological remains?** As above: this issue concerns not just monitoring but IF an adverse effect (or potentially adverse effect) were to be detected for archaeological preservation, how would any action to halt decay and prevent any further harm be taken? And what such action would be adopted how quickly to achieve that? The concept of *'remediation'* in these circumstances is inappropriate, suggesting that any initial harm might be 'remedied,' but this is NOT possible: like archaeological deposits and objects, preserved organic remains are dead and incapable of regeneration. The only response possible is to stop ongoing loss and prevent any further harm. This means not only monitoring to detect harm in the first place but also to monitor the effectiveness of any preventative measures. See further comments below Q.Fg.2.43
Fg.2.43	Mark Bush on behalf of the Blick Mead Project Team The Council for British Archaeology	***Blick Mead hydrogeology*** ***The period of monitoring did not cover a full 12 months; however, it did collect data from the highs and lows of one calendar year.*** ***With this in mind, what practical implications could the shorter monitoring period have?*** Apart from not even recording one full hydrological cycle and being confined to winter months, let alone several cycles over a number of years. The logs in the graph in the technical monitoring report ([AS-022] p16) indicate that starting levels were already on an upward trajectory. There is also insufficient clarity about the complex 3-D spatial relationship between organic survival and water table fluctuations, including the duration of draw-down periods affecting different parts of the site. This is further exacerbated by the lack of adequate spatial information about the quality of preservation – including no information at all about pollen (one of the most standard sources of palaeo-environmental information), despite being cited as available ([APP-282] para 2.5.7 item 4). What follows is an overview of the issues in order that the shortcomings of present data and their implications can be better appreciated.

		Overall issue ES Appendix 11.4 [APP-282] states that > *"The Mesolithic layer is shown on borehole transects within source [7] and these are reproduced in Figure 2.2, Figure 2.3 and Figure 2.4. They show that the Mesolithic layer occurs between 67m aOD and 68m aOD, immediately overlying sands and gravels. The depth to the Mesolithic layer below surface is variable, but ranges between around 0.75m and 2m beneath made ground and undifferentiated alluvium."* This immediately indicates the potential 3-D complexity of the issue of how fluctuating water table relates to preserved Mesolithic deposits, but makes no refence to evidence of later use of the site (possibly as a sacred spring). The 3D complexity of this is even more apparent in the considerable spatial variability in the amplitude of ground water fluctuation as summarised by the graph in the technical monitoring report ([AS-022] p16). The question of the adequacy of baseline monitoring information thus raises concerns not just about the highs and lows of a very short monitoring period from late November to early March 2018-19, but also the lack of information about how long the ground water level is above or below any particular level and how that relates spatially to relevant archaeological remains. In terms of archaeological evidence, it is important to appreciate that different kinds of remains have different degrees of resilience to decay and also have very different stories to tell. Where there is a risk of loss or degradation, the issue is not only what types of material are likely to survive and how well; but even more, what kind of evidence is at risk of being lost or degraded. Depending on whether trees and plants are insect or wind pollinated, the extent of tree cover at the time, and which pollen taxa can survive well in organic and acidic sediments that are not fully waterlogged but well-sealed from processes of decay, pollen typically reflects the vegetation in a wide surrounding catchment area. It can therefore provides valuable evidence of the wider landscape. Many other plant remains are more reflective of localised conditions and also anthropogenic activities. Insects are again usefully variable in their habitat preferences, and with most taxa being winged creatures, they can reflect both the wider landscape and localised conditions; but once again, preservation is variable (as exemplified by the ants found in sealed but not waterlogged condition beneath Silbury Hill whose wings were preserved showing that work started in late summer). Overall it is the survival of multiple lines of evidence (including those less reliant on water logging like snails, sediments, charcoal, animal bones, diatoms etc) that provides greatest palaeo-environmental potential.

		Contrary to Highways England's assertion ([REP4-030] Deadline 4 Submission - *8.30.2 Written summaries of oral submissions put at Cultural Heritage hearings on 5th and 6th June 2019* p 2-34), Mr Lambrick did not refer to Starr Carr; but he DID outline how it is important to appreciate that the issue at stake for the waterlogged preservation at Blick Mead is not just the ground water levels *per se,* but how they affect soil conditions, and in particular the soil chemistry and life cycle of organisms that affect the survival or decay of organic remains. As he noted, the factors that affect this are not only the degree of waterlogging but also the soil matrix of any deposits, any fissuring and the overlying sediments. Short term fluctuations in groundwater levels may have lesser or greater effects on organic survival depending the sedimentary matrix of the overlying and underlying deposits. Much depends on whether any pathways are opened up for decay mechanisms to be triggered. Acidic soils tend to preserve organic remains better than calcareous ones. (cf Historic England 2016, *Preserving Archaeological Remains: Decision-taking for Sites under Development*) But crucial to all this (as Mr Lambrick also indicated) is not just the upper and lower levels in the natural seasonal fluctuation of the water table, but also the duration of such changes, especially the length of any exposure of organic deposits above ground water and whether this is sufficient for pathways of oxygenation and thereby the introduction and/or multiplication of bacteria and other organisms responsible for biological decay to be opened up (eg worms and other sources of bioturbation; fine rootlet holes; or cracking in alluvial clay covering). *Organic survival* Organic survival is not an 'either/or' mechanism: different parts of plants (eg leaves, seeds, pollen etc) have more or less resistance to decay; different taxa of plants vary in the resilience of these elements for survival. The same goes for insects. The quality of preservation – and its associated vulnerability to decay – can be judged to a significant degree from what survives. This varies with burial conditions and any post-deposition bioturbation etc. Preservation of peat deposits will vary from where they are in contact with other strata to where they are pure peat (in the case of the very limited evidence presented for Blick Mead the assessment of what organic materials are preserved was limited to the upper and lower margins of the main peat horizon – see below). As indicated above, these issues have implications for what ranges of archaeologically significant materials survive and hence what research issues can or cannot be addressed. In this case, the reported results from the assessment – only one set of samples from a single borehole (BH25) (ES Appendix 11.4 [APP-282] 2.5.9 p.15-16) – indicate that the highest level at which waterlogged seeds and insects survived was 67.85m aOD to 67.83m aOD. These are described as *'not well preserved'* indicating that they are close to the threshold of survival. But this is not conclusive: despite the reference to pollen analysis having been carried out at Blick Mead (para 2.5.7), no pollen

		sampling is reported, although pollen is amongst the most resilient forms of organic survival and can provide good archaeologically useful evidence even if other material is claimed not to warrant further analysis. Furthermore, as reported, the sampling was only carried out at the top and bottom of the peat deposit, so preservation may be much better immediately below the upper level. It is also not stated whether or not this single borehole sample represents the highest recorded level of waterlogged preservation, and it is impossible otherwise to establish this. Of the 46 deposits described in Appendix A entitled "Archaeological Log of Waterlogged Conditions" (p.23ff), a high proportion are described as "dark brown organic clayey silt…." and only 15 refer to 'peat' or 'plant detritus' etc. Of these the top level of those recording some indication of in these vary from c.67.47 to 68.87 aOD but they vary in thickness from a few centimetres to well over a metre, making it impossible to know at what level preservation might occur (eg BH 21). As noted above, no assessment of pollen survival is reported, although pollen is amongst the more resilient types of organic material to survive. For example the repeated references to 'dark brown organic clayey silt' could contain pollen even if no other plant or insect remains survive. Some deposits listed in the "Archaeological Log of Waterlogged Conditions" have descriptions which refer to worm granules and 'massive' or 'blocky' structure which indicate the conditions where small changes in the duration of waterlogging could affect preservation. Overall this makes the 3D assessment of waterlogged preservation well-nigh impossible. It looks as if data used by the Blick Mead project to obtain a preliminary broad definition of the Blick Mead site has been used as a shortcut to fulfil a far more complex role for which it was not intended. *Implications of hydrological fluctuations* Mr Lambrick referred to his experience observing total loss of preservation in less than 5 years in the case of the dewatering effects of a gravel quarry where good waterlogged conditions survived in a ditch either side of field boundary dividing different stages of extraction. Decay in broadly stable but deteriorating conditions can be much slower and more insidious, but ultimately no less destructive. Monitoring groundwater levels may provide reassurance if no change happens in the amplitude and duration of immediately localised groundwater levels over a long period for which there is extended baseline data; if the amplitude and duration of enhanced ground water levels increase, gradual long-term decay may be slowed or stopped. If they decrease and if the duration of exposure to air increases, decay may be triggered or accelerated. The bore hole assessment of the site as reported in ES Appendix 11.4 [APP-282] shows that the depth of Mesolithic material and relationship to underlying gravels and overlying alluvium is variable and complex. In addition, the nature of the ground water environment may make a difference, especially

		whether it is essentially static or dynamic. In this case, the Blick Mead site and its surroundings are in a series of seasonal springs and watercourses, the Blick Mead site being in the vicinity of the highest of these springs relative to the outflow into the river Avon, and also, as the monitoring records indicate, the area where fluctuations in groundwater levels are highest. Referring to the Hydrological assessment and Tier 2 Blickmead assessment [APP-282] and ground water monitoring results Highways England state (in a post hearing note in their comments on Cultural Heritage oral submissions [REP4-030 p. 2-33]) *"There is a natural variation in groundwater and surface water levels. Monitoring between autumn 2018 and spring 2019 showed a variation of approximately 0.8m from 67.7m aOD to 68.5m aOD at WS09…"* However, the on-site groundwater monitoring report ([AS-022] pp 3) shows that variation at WS10 and at the actual archaeological site immediately adjacent to WS09 varied by 0.9m from 67.62 to 68.51 aOD and 67.70 to 68.59 aOD respectively: Taking the outer limits of these three points suggests in the immediate cluster as from 67.62 to 68.59 aOD – potentially a difference of almost 1m, rather than the 0.8m suggested. The Applicant goes on to state that *"Groundwater levels fluctuate in the underlying aquifer and are generally above 68m aOD, although could potentially drop below the upper level of the Mesolithic deposits layer (and towards 67.5m aOD) for a number of months in a natural drought (paragraph 2.7.1). It is therefore agreed that the Mesolithic deposits are usually below the water but water table lowering below 67.85m aOD would not be uncommon."* But no consideration has been given to a number of key issues: • To what extent the 2018 levels – at over 0.2m below 67.85 at the site – represents a 'drought' • The actual 'number of months' that the watertable fell below the Mesolithic levels • What proportion of the known or potential extent of the Mesolithic deposits (see below) – or any later deposits – would have been affected. Overall, however much the Tier 2 assessment may be in line with procedural steps, in this case it has not gathered the necessary data to make a properly informed judgment of the likely effects of any relatively minor (or more severe) changes that the works on the scheme might trigger. Nor has any consideration been given to how the vulnerability of the site to hydrological change might be affected by the climate trends reported in the main hydrology report. What the assessment does indicate – despite all its shortcomings – is that • the Blick Mead site as recorded lies within a substantially fluctuating watertable by up to 1m per year and probably more in the driest conditions

		• within this variation a significant part of the deposit where waterlogged remains survive or partially survive is within the zone that is above the water table for significant periods • quality of preservation in the 'waterlogged layers' as described is variable • survival may depend heavily on the varying matrices of deposit as well as hydrological fluctuation • both the archaeological horizon and the fluctuations in hydrology vary significantly across the area studied to date • these factors indicate a very complex 3D pattern of survival and vulnerability. In these circumstances with at least some preservation being on the cusp of being lost, it would appear that a significant proportion of the upper levels of the Blick Mead site where preservation of organic materials still survives are very vulnerable to change. Such vulnerability is not just down to the varying height of the water table, but also the recurrent periodicity, year-on-year, when deposits are exposed above the water table, and the sediment matrix of an preserved naterial. The monitoring to date only demonstrates the vulnerability to slight change, NOT resilience to survive it
Fg.2.44	Applicant Environment Agency Historic England Wiltshire Council Mark Bush on behalf of the Blick Mead Project Team The Council for British Archaeology	**Blick Mead hydrogeology** The extent of the archaeological remains at the Blick Mead site is unknown. **To what extent should this influence any monitoring at the site both in terms of establishing the baseline and then ongoing monitoring?** See above: The uncertain extent of the Blick Mead site – or related sites near by or use of the areas as a sacred spring in later periods – are all uncertain. A precautionary approach would establish a monitoring scheme designed not only to provide 3D modelling across the known part of the Blick Mead deposits so far as those have been interpolated from bore holes and other evidence but would extend bore hole surveys across the recorded area of peat and higher subsurface 'islands' of higher ground on the pre-alluvial floor of the Avon valley where remain might survive. As surmised in the question, that could then establish the foundations of a 3D model across which the survival of organic deposits, the occurrence of indicators of human presence (eg charcoal, vegetation disturbance, artefacts or chips thereof), and the spatial and temporal fluctuations in watertable relative to these deposits could be monitored as a 3D model.
Fg.2.46	Applicant	**Blick Mead hydrogeology**

	Environment Agency Historic England Wiltshire Council	In the Environment Agency's response to DL4 it was advised that any dewatering in the vicinity of the Blick Mead site has the potential to impact on groundwater levels but that this would be subject to regulation by the Environment Agency [REP4-049]. It appears that an assessment of risk to all receptors would be required prior to the issue of any licence. **Would any assessment of risk extend to the effect on archaeological remains and is there sufficient expertise in the process to scrutinise any heritage impacts prior to issuing any licence?** As indicated above (Q.Fg.2.43; Q.Fg.2.44) the factors controlling the survival of organic deposits at Blick Mead is a 4-dimensional conundrum of detailed 3-D spatial variation in the deposits concerned; 3-D variation in both the height and amplitude variation of the water table; and the periodicity of such amplitude variation from year to year, related to rainfall. If this were not complicated enough, there is also significant variation in the matrix of preservation in different deposits. This would need to start with a new bespoke multi-disciplinary (hydrological, palaeo-environmental, geo-sedimentary and archaeological) survey to establish the foundations of a 3D model across which the survival of organic deposits, the occurrence of indicators of human presence (eg charcoal, vegetation disturbance, artefacts or chips thereof), against which the spatial and temporal fluctuations in watertable relative to these deposits could be monitored, both in 3D and through time. The kind of regulated control on ground water levels exercised by the Environment Agency has nothing to do with the detailed sensitive modelling required here. The challenge is not simple but requires a multi-disciplinary team of specialists as indicated above, and this would need to include specialists in different types of palaeo-environmental research (eg pollen, other plant remains, insects) to establish the basic 3D model of actual preservation. Part of the monitoring needs to be re-sampling deposits (spatially close to but not contaminating original sampling points (all sample holes being fully resealed) to establish a comparative basis for actual preservation (including looking at presence/density of microorganisms of decay). Because the processes of decay are potentially slow and insidious, this would need to be done over a period of years. If even after a very dry year no change was detected, and this remained the pattern the repeat sampling interval might be lengthened and geared to recorded hydrology and rainfall records.
Fg.2.47	Applicant Environment Agency	**Blick Mead hydrogeology**

	Historic England Wiltshire Council	In the Environment Agency's response to DL4 it was noted that there is potential for the final design to deviate from that assessed to date and, if this were to occur, then further assessment of risk in respect of the magnitude and extend of impacts on groundwater would be required [REP4-049]. **If this were to occur what measures would there be to ensure that any further risk assessment would take account of the potential to impact on the archaeology at the Blick Mead site?** As indicated above the issue is a far more complex challenge than has been envisaged by the Environment Agency; a bespoke monitoring regime is required that properly reflects the apparent vulnerability of the site (see above Q.Fg2.43, as exp
Fg.2.48	Applicant Environment Agency Historic England Wiltshire Council	**Blick Mead hydrogeology** Please provide a detailed response to the submissions made by Mark Bush on behalf of the the Blick Mead Project Team [REP4-047]. **Please have particular regard to the tiered assessment and whether it would be necessary for this to be advanced ie to tier 4?**
HW.2	**Health and wellbeing**	
HW.2.1	Applicant Historic England ICOMOS Wiltshire Council	Loss of the casual encounter with the Stones as you pass on the A303 is referenced by numerous RRs as an important part of the cultural experience of the area. The WHS Management Plan recognises there has been routes through the landscape for significant periods of time and the location of the road has opened this up to artists, poets, musicians etc which has further developed the cultural significance of the site. **i. Whilst there will remain views from rights of way would you agree the casual encounter by the commuter will be lost?** **ii. What significance do you consider this has on the OUV for the WHS?** The view from the road is a significant aspect of the setting of Stonehenge with the history referred to. It is also somewhat related to the Amesbury Abbey Park at its fullest extent when it appears to have been intended to facilitate an exploration from the floor of the Avon Valley to the top of King Barrow Ridge, just north of the A303, taking in a series of prehistoric monuments enhanced by carefully designed tree planting and culminating in the view from King Barrow Ridge to Stonehenge. Arguably

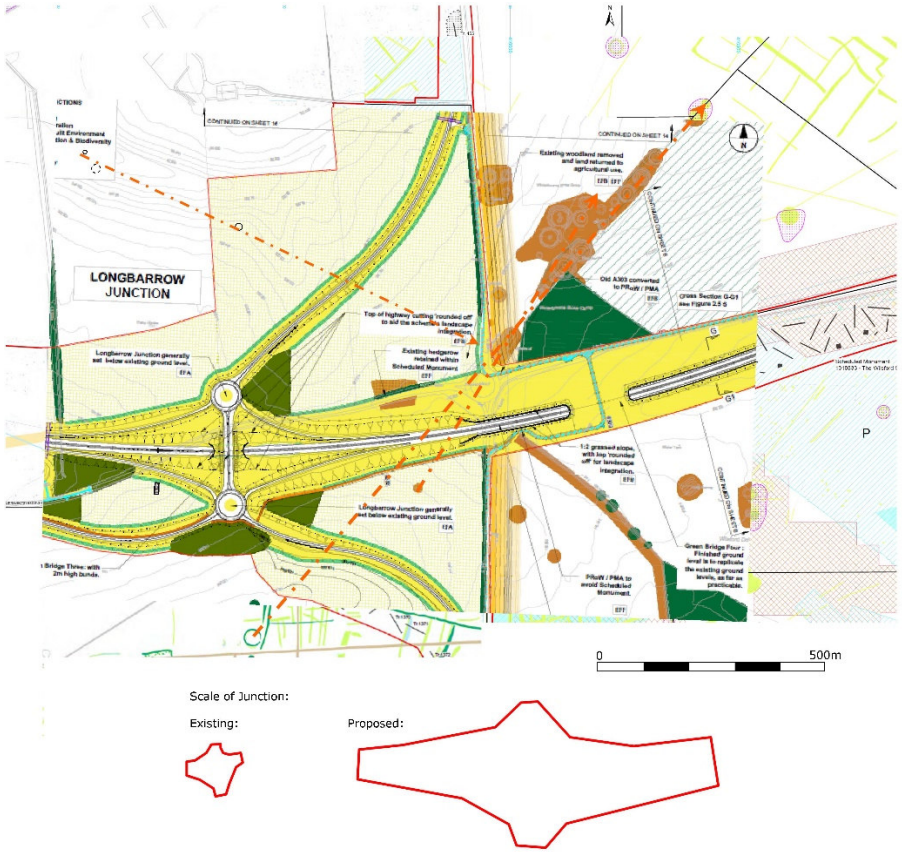
		being a designed landscape experience of its time, this is an even more significant expression of the aspect OUV referred to (see Q.CH.2.8 above). The issue here is whether the specific **means** of obtaining this view is an issue of setting (to which great weight must be attached) or just an issue of visual amenity – ie the perception of the driver and passengers of vehicles as the receptors of changes in visual impulses related to development. Although setting involves how people understand or appreciate the significance of heritage assets that does not that an asset's setting relies on people having access to appreciate it (strictly private grounds of a mansion are still a part of its setting even if the public never visit). Likewise, while views of assets and from them are part of how their surroundings contribute to their significance, the means by which such views are obtained are not usually intrinsically part of that significance and will mostly be entirely incidental. As observed in the question, the view will remain; what is more, if approached from the east, it would be more likely to be from the old road via West Amesbury and much less likely to be by car, and so more akin to the pre-1960s and pre-motorised transport era. The issue is thus not the view *per se* but the experience (just as much of the cultural heritage value of an historic sports stadium is the 'hallowed turf' and the whole kinetic experience of attending a long - established social ritual). Considered from this perspective, the motorist's view (as opposed to a pedestrian's view from more or less the same spot) does have a specific cultural heritage significance of the Stones being a valued landmark on a journey regularly experienced – sometimes referred to as marking the traveller's arrival into, or departure from South West England. Perhaps most strongly appreciated travelling west descending King Barrow Ridge, this is a distinct cultural experience established in the age of motorised transport, and amongst such journeys through England punctuated by landmarks, this is one of the best known and most significant. As such it too could be seen as making some contribution to the OUV of "the influence of the …. monuments and their landscape settings on … others." The loss of this view from the road can thus be seen as a heritage issue, not just a matter of visual effects or amenity and well-being. However, in weighing the heritage significance of the view of Stonehenge and its surroundings from the A303, care is needed to distinguish two different heritage values: • the specific 20th century cultural and symbolic significance for motorists that would be lost; and • the significance of the view of Stonehenge to appreciate the significance in its topographical and landscape surroundings which would remain, and be enhanced.

		But apart from this specific and subtle distinction in heritage significance, there is the more straightforward general loss of the view to thousands of passers-by is a clear effect in terms of amenity and visual effects; and because of the number of people who enjoy the experience, the loss is of some significance. It would equally be so for any other alternative scheme that removed the A303 from the central part of the WHS west of King Barrow Ridge.
HW.2.2	Applicant Wiltshire Council Historic England	How have the competing desires of the Druids who wish to have any human remains found on the site reinterred and archaeologists desire to study, understand and display those remains been considered and addressed? [REP3-012, REP2-003 (Article 16), APP–296, REP2-032 (HW.1.17)] The Druids are entirely free to hold their views on this matter – but no more so than other groups pagans, other religions, archaeologists, human anthropologists, other scientists, historians or anyone else who has a scientific interest or asserts a religious spiritual or cultural interest in such remains. Legally there are two competing considerations: • One is whether the Druids have any rights under the Human Tissues Act for reclaiming ancestral remains. A test case at Avebury some years ago show that they have no better right than anyone else who wished to claim some ancestral or un-demonstrable religious or spiritual link. • The other, stemming from the Section 9(8) and Section 5(4) of the Planning Act 2008, is the provision under NSPNN paragraph 5.140 *"to deposit the archive generated in a local museum or other public depository willing to receive it"* The archive in this sense means all the materials collected as well as records made. This is further entrenched legally by the provisions of the draft DAMS. A further consideration is the need to conserve archaeological remains for the benefit of future generations under paragraphs 5.122 and 5.129 of the NPSNN and the WHS Management Plan (*passim*). Reburial of remains would deprive archaeologists of the ability to go beyond the forms of research currently available to address at some future date with new or better scientific techniques the sort of research questions that the ExA has posed in Q.CH.2.9 above. The Applicant ([REP4-030 Appendix B) has criticised Mr Lambrick's oral submission about the need for a precautionary approach in respect of these policies, stating that *"It is an unpersuasive position to assert that the Scheme should be prevented from being progressed in the face of a speculative argument that future technology may discover more information in this area of*

		the WHS. This is particularly the case having regard to the technology which is already available now, the comprehensiveness of the assessment undertaken and the mitigation measures in place in the Detailed Archaeological Mitigation Strategy (DAMS) [REP2-038]." In fact Mr Lambrick made no such assertion and had simply pointed out that in the context of a World Heritage Site an especially precautionary approach is needed in the light of NPSNN paragraphs 5.124, 5.129, 5.131 and the WHS Management Plan 2.3.1 etc. The CBA has sought to highlight the inherent uncertainties in archaeological endeavour, and the despite a reasonably thorough fieldwork based on geophysics, ploughzone archaeology and evaluation, how massive uncertainties remain, not least in respect of human burials. The Applicant's statement displays an alarming degree of complacent self-satisfaction and overconfidence that lacks credibility: it is perhaps above all in scientific techniques now available for investigation human remains that the greatest advances have been made, not just in enhanced paleo-pathology, but also ancient DNA and radio isotope investigations. Advances in microscopy, digital data handling and imaging techniques add further still. When it is so obvious that the techniques available now are so much more varied and informative now than was the case 10 20 or 30 years ago, it is short-sighted to suggest that that potential for future technology to discover more information in the WHS it is merely *"speculative".* If archaeologists had always displayed such self-satisfied confidence in the current technology and comprehensiveness of their own methodologies, they might hardly have advanced beyond what William Stukeley – a pioneer of his day – achieved in the 18th century.
LV.2	**Landscape and visual**	
LV.2.1	Applicant All Interested Parties	**Integrity of landscape and cultural heritage** The integral nature of the landscape, astronomy, the skies, and the monuments of Stonehenge is of enormous importance. The Stonehenge landscape has changed and developed spatially, visually, and emotionally into an enormously significant setting of ceremonial and cultural importance over many thousands of years. In the Examination, some have argued that this aspect, of paramount importance, has been underappreciated in the ES and the HIA. Criticisms have been made of the failure to consider emerging evidence which might give rise to new theories on the significance and history of the Stonehenge landscape. Also, criticism has been made of the absence of a precautionary approach, which might prevent the Scheme destroying evidence or disrupting ancient topography and important spatial interrelationships within and beyond the WHS.

		Please comment, particularly in the light of: **i. HIA, page 23, penultimate paragraph, re: second Attribute (the physical remains in relation to the landscape), 'The Scheme has been developed to avoid known concentrations of archaeological remains…' [APP-195].** The scheme has not sought to avoid known concentrations of archaeology so much as avoiding physical disturbance of scheduled ancient monuments (though noticeably not the same monument just beyond the limit of scheduling); this is very different from 'known concentrations of archaeological remains', which patently include those revealed by ploughzone sampling and trench evaluations that the scheme does not avoid. Nor does it avoid the setting of numerous known monuments. As observed in our main statement [REP2-070], the CBA has maintained a long interest not only in Stonehenge as one of Britain's foremost monuments and heritage attractions, but also in relation the pace of research and new discoveries in the WHS. The last 15 years since the last inquiry into a proposed tunnel for the A303 has marked not only an exceptional wealth of transformative new discoveries, but also a blossoming of fresh ideas and thinking about how the landscape developed and how it was used and what it meant to people. The approach adopted by the Applicant is to be of the moment, not allow for new ideas that in some cases are still developing or others not yet formulated; those referred to below are cases in point (that referred to in paragraph 59 of our main submission was included in error and should be ignored.) The topographical setting of monuments, the night sky and the movement of celestial bodies are the aspects of the setting of all the monuments in the WHS that have changed least. This gives them a special pristine quality to these aspects of setting where harm has been avoided. As explained in the case of the settings of Blick Mead, Vespasian's Camp and the Amesbury Abbey RPG, changes to topography in key places can be very harmful – and in those cases the scheme will substantially exacerbate the existing harm, while in the western junction and approaches a whole new array of extensive change would for the first time be introduced. **ii. Josh Pollard and colleagues' 2017 publication, which identified not only the area adjacent to the western approach, but also a substantial area to the north, several kilometres long, with a remarkable density of Beaker associated material. A risk exists of sterilising this evidence with the construction of the western approach and the Longbarrow**

		junction. (Noted in Part 1, paragraph 9 of the 5/6 June ISH written summary of the Consortium of Archaeologists and Blick Mead Project Team [REP4-047]). The CBA has previously highlighted the importance of this area which is in some respects conformed by the survey and evaluation results [REP2a-005] and see below **iii. The discovery of two long barrows to the south in 2017 adding to the remarkable concentration of Neolithic monuments dating from before the construction of Stonehenge. These appear to form a circular array focussed on the top of a dry valley (Wilsford Coombe?), which the western approach cutting would disturb. (Noted in Part 2, paras 11 and 12 of the same written summary [REP4-047], and elsewhere including Dr David Field's Written Representation [REP2-163]).** The CBA has previously highlighted the artificiality of assessing relationships between monuments and their place in the topographic landscape as static clusters of monuments despite their not being created at one time. They have been perceived (largely arbitrarily) as single block, when in fact they exhibit complex alignments and relationships that evolved over time. This is especially true of long barrows that mostly predated the later accumulation of later Neolithic and Bronze Age barrows. The complexity of teasing this out and working out what relationships could have existed is not simple; but it is relevant. It is worth noting that the Historic England research report *"Stonehenge World Heritage Site Landscape Project: Lake Barrows, The Diamond and Normanton Gorse"* (Bowden, M. Field, D. and Soutar, S 2012) made a comparable observation to this, including the possible continuance of the head of this dry valley as a focal point into the Bronze Age with a series of barrow cemeteries surrounding it and the Wilsford Shaft located in the head of the valley. **iv. A much later array dating from the Early Bronze Age is suggested in Section 4 of Paul Garwood's paper, Winterbourne Stoke Crossroads, Early Bronze Age funerary complex. He notes the clustering of monuments in large complexes with linear arrangements, within sight of Stonehenge and its wider environs. Whilst their central focus is Stonehenge they relate in a complex spatial and visual relationship to each other.** As Dr Garwood's paper indicates, ideas about this are also not static but reflect a continuous development of appreciation and understanding. The Winterbourne Stoke Crossroads cemetery is not inter-visible with Stonehenge, but certainly has other potentially significant alignments.



The Applicant [REP4-30 p2-16] was dismissive of Mr Lambrick's suggestion that the segmented ring ditch and another penannular ring ditch along the ridge to the SW might be deliberately sited on the alignment of the Long Barrow and/or cemetery, but only on the defensive grounds that they were not part of the approved static grouping of monuments agreed with consultees. Another possible alignment worth noting is that of three small potentially segmented or hengiform ring ditches identified from cropmarks and/or geophysics (one within the main compound) which appear to be aligned on the SW end of the Long Barrow and on the line of a subsidiary ridge to the west. Neither of these is especially

		convincing but they follow ridges and both the Normanton Down and King Barrow Ridge cemeteries exhibit rows of monuments roughly at right angles to the main linear cluster. Part of this challenge is not just to look beyond the WHS boundary (and static interpretive constructs) bur to ignore it and to look at the evidence. **v. The failure to make use of viewsheds from particular monuments to gauge the visual connectedness of features within the overall landscape.** We agree this aspect of setting would be assisted by use of individual view sheds for monuments – and in view of the complexity of monument clusters, the number these might reasonably have been done by selecting the main examples of different types and periods covering the full area of such clusters and outliers. It is clear that linear (and other) barrow cemeteries developed through time and those in the Stonehenge WHS all exhibit long periods of development in which changes of orientation of alignments seems to be evident. While intervisibility is not the only for assessing the setting of such monuments, their siting and spatial arrangements do suggest that this was important, and for some areas there is palaeo-environmental evidence of a relatively clear landscape, as explained in Historic England's report on King Barrow Ridge: *Environmental evidence suggests that large natural clearings or glades of grassland, scrub and some trees were a natural part of an extensive open forest which stretched across the southern English chalklands in the early post-glacial period (Allen & Scaife 2007, 25). This openness, with the opportunities for hunting and gathering it provided, attracted Mesolithic communities who constructed what is perhaps the first monument in the Stonehenge landscape: the post holes in what was later to become the Stonehenge car park (Vatcher & Vatcher 1973; Young et al 2009, 155).* *It may also be a contributing factor to the density of later, Neolithic and Bronze Age monuments. Soils buried beneath Amesbury 42 probably supported grassland for some time prior to construction of the long barrow (Richards 1990, 98). The buried soils along the Ridge indicate a predominantly open landscape by the later Neolithic, probably lightly grazed or browsed and including some shrubs (Cleal & Allen 1994, 82). Some shade or woodland is also suggested by molluscan evidence from the Coneybury henge (Richards 1990, 157). The large number of round barrows constructed in an open established downland landscape indicates that any remaining woodland was probably cleared by around 2000BC (Allen & Scaife 2007). The degree of land-use on the Ridge appears to have intensified during the Early Bronze Age, when molluscan evidence suggests more control of stock within a managed grazing regime (Cleal & Allen 1994, 82).*

		(Sharon Bishop (2011) *Stonehenge World Heritage Site Landscape Project: King Barrow Ridge* Historic England Research Dept Rept 83-2011, p5) **vi. Operational Guidelines for the Implementation of the World Heritage Convention (WHC.17/01) notes at paragraph 100 that, for properties nominated under criteria (i) – (vi), boundaries should be drawn to include all those areas and attributes which are a direct tangible expression of the OUV of the property, as well as those areas which in the light of future research possibilities offer potential to contribute to and enhance such understanding.** **HIA paragraph 5.10.4 [APP-195] and Highways England's response to ExQ1 CH.1.58 [REP2-025] note that, in the forthcoming WHS boundary review, mooted changes include extension of the existing boundary to the north and west. This suggests extreme caution should be exercised with regard to the Longbarrow junction works. The junction, with its motorway scale partially sunk into the landscape, has the potential to fundamentally alter the ancient topography integral to the above points, interfere with the connected monument arrays, and disturb archaeological remains.** The CBA entirely agrees with these observations – and would draw the ExA's attention to our submissions that have highlighted this (eg [REP2a-205]).
LV.2.2	Applicant	**The effect on landscape character of the proposed Longbarrow junction** ES Appendix 7.7: Schedule of Landscape Effects [APP-227], LLCA 11 Oatlands Hill (page 15) notes the Year 1 Effect of the Scheme as moderate adverse and the Year 15 Effect as slight adverse. The analysis seems to confine itself to the impact on the character of surface cultivation. This appears to ignore the vast changes to the ancient topography and landscape character made by the insertion of a motorway junction and approach cutting. These elements would be of a scale beyond that of the Stones or any of the surrounding monuments, and of a geometric pattern alien to the character of the overall landscape of the WHS and its environs. **Please comment.** **Agreed:** there are several aspects of landscape that would be substantially changed: • Massively increased overall footprint of the proposed junction as compared with the present • Introduction of large structures into the landscape • Changes to topography from the cuttings

		• Introduction of new uncharacteristic alignments of fields in between the arms of the junction losing the existing field pattern over a very large area • Introduction of numerous hedges and tree plantings transforming the openness of the landscape
LV.2.3	Applicant All Interested Parties	**Visual receptors associated with the route of the existing A303 and Green Bridge 4** **i. Have analyses been made of the visual effects of the cutting from points on the ex A303, especially those close to the western portal where the cutting is at its widest and deepest and the ex A303 closest?** By my rough calculation, at Chainage 7200, the cutting is 35m wide and 11m deep, with a width of 60m across the embankment tops. At that point, the ex A303 is only 20m from the permanent fence line and the edge of the embankment, and only 35m from the edge of the cutting. **ii. Have analyses been made of the visual effects of the embankments and cutting from Green Bridge 4?** These questions and observations highlight the substantial intrusion of alien new structures into the WHS on a completely unprecedented scale. The green bridge may be designed to limit visual intrusion through planting but it is likely to have little or no effect on noise intrusion, and no consideration has been given to air quality emissions at the tunnel portals or along the retained cuttings
LV.2.4	Applicant All Interested Parties	**Tranquillity** The OED defines tranquillity as serenity, calmness; Chambers Dictionary as calmness, peacefulness; the GLVIA glossary as a state of calm and quietude associated with peace. Tranquillity is considered within ES Chapter 7: Landscape and Visual [APP-045], where the IAN 135/10 definition of tranquillity is adopted, as remoteness and sense of isolation […] often determined by the presence or absence of built development and traffic. The analysis then relates largely to the perception of noise, although it touches on the perception of vehicles and settlements, and the panoramic extent of views. Figure 7.5 illustrates existing tranquillity across the study area as mapped by the CPRE. **i. How is the CPRE analysis derived? Is it based on noise measurement or on other factors?**

		ii. Have attempts been made to map projected tranquillity with the Scheme in place? **iii. Have attempts been made to analyse tranquillity in terms of serenity, calmness, and peace rather than the impact of noise, qualities which might be affected by the proximity to major road cuttings or junctions, whether or not accompanied by noise?** **iv. Has the connection between tranquillity and the feeling of completeness of the landscape and the interconnectedness of its features been considered?** **v. Has the connection between tranquillity and the presence of astronomical features and light pollution in night skies, particularly important on this site, been considered?** These points apply in relation to both the construction and operational phases of the Scheme. The CBA would add a more general comment that the approach to assessment has focussed on receptor-specific locations, based on standard DMRB approaches, not a landscape-based approach to the concept of tranquillity as a key example of EIA impact interactions operating at an area scale of kinetic movement through the landscape, not point by point receptors. One of the effects of the scheme would be to open up larger areas of the WHS to public access which is an objective of the WHS Management Plan. It is obvious that relative to the scheme some parts of the WHS would gain in tranquillity but others would not, and some would be reduced. We would also draw attention to the broadness of the concept of tranquillity, and while we accept that noise, visual busyness, light interference etc are all contributory, other senses need to be considered as well, and there remains no mapping of air quality changes – especially at the tunnel portals, retained cuttings and green bridges which are within a short distance of several important visitable monuments.
LV.2.6	Applicant Wiltshire Council Historic England	**Landscaping scheme** **i. Why, in Requirement 8 of the DL4 dDCO, is the submission and approval of the overall landscape scheme limited to Work No 4 and the WHS [REP4-018]?** **ii. Are WILTSHIRE COUNCIL and Historic England content that only consultation, rather than agreement, should be in place prior to submission to the SoS for approval?** The CBA would support **approval** by Wiltshire and Historic England

Ns.2	**Noise and vibration**	
Ns.2.1	Applicant The Stonehenge Alliance Wiltshire Council	**Tranquillity** The issue of tranquillity appears to remain in dispute in that the visitors to the WHS and particularly the Stones would appear to influence the degree of tranquillity at the Stones and in the vicinity of the Stones. As a consequence, the degree of effect from the current road is arguably reduced and the degree of benefit from its removal in respect of tranquillity in the area of the Stones may be regarded as less significant. **Do you consider that tranquillity will be achieved at the Stones as a consequence of the scheme?** Stonehenge is by far the most heavily visited stone circle in the UK and is constantly bustling with tourists and buggies for the less abled etc. On this count alone the majority if not all other stone circles are more tranquil; many of them far more so. Stonehenge is also far from being the only well-visited stone circle or henge monument adjacent to roads. The CBA would suggest that this question can only be properly considered relative to public experience at Stonehenge and other prehistoric monument complexes, especially stone circles and henges – not only (most obviously) Avebury, but also many others. While not being a systematic sample of all visitors (many do not engage with online reviews) a quick examination of the number of 'Google' online review scores and a rapid examination of the nature of comments – especially low scoring ones – gives some indication of how heavily different monuments are visited and the nature of concerns that relate to tranquillity – especially as a whole experience (ie what contributes to or detracts from a sense of calm peacefulness remoteness etc) • Stonehenge stands c.175 metres from the A303, scoring 4.5 from 26,000 Google reviews • Avebury with a moderately busy local 'B' road bisecting the monument scores 4.6 from 4,000 reviews • The Ring of Brodgar 30m from a quiet B road scores 4.6 from 860 rviews • The Rollright Stones Kings Men stands within c. 8m of a busy C road and is well visited with a score of 4.5 from 626 reviews.

		• The Stanton Drew stone circles and cove, c380m from a moderately busy B road has a score of 4.5 from 236 reviews • Arbor Low stone circle henge c. 1km from a fairly quiet A road scores 4.5 from 223 reviews • The impressive Mayburgh henge within 40m of the M6 at Penrith scores 4.1 from 80 reviews • Durrington Walls henge (within the Stonehnge WHS) which is bisected by a moderately used B road scores 4.8 from 16 reviews What is most striking is that a small non-random sample of the more negative as well as more positive reviews suggests that traffic intrusion is not a big issue for ANY of these monuments. For Stonehenge overcrowding, cost of entry and land ack of access into the Stones (ie the general intrusiveness of do's and don'ts and visitor pressure) are by far the major concerns related to overall tranquillity; and of the more positive comments, many make reference to visiting at times when the site is least busy with visitors. It is noticeable that these and other scores for stone circles and henges are all very similar whether or not they are close to roads, and other factors predominate. The relatively low score for Mayburgh henge has nothing to do with the nearby M6, but is mainly due to a number of visitors thinking that it only consisted of the central standing stone, not the truly remarkable enormous bank of collected river cobbles surrounding it. It appears no attempt has been made by the Applicant to interrogate or sample the 26,000 review posts on Google or the larger numbers on Facebook or others on Tripadvisor etc to establish the extent to which either visitor crowding or the A303 is a major problem for tranquillity of Stonehenge (or its surroundings): superficially, it appears that crowds and queues – and recommendations to avoid them – are far more common comments than the intrusion of the A303 (including an instance commenting on quietness and tranquillity first thing in the morning before the main bulk of tourists arrive). Although the Contingent Valuation study was validated by independent assessors, this was done on the inherent premise of a 2.9km A303 tunnel past the Stones and its effects, NOT an independent question about the importance of tranquillity as part of the heritage and landscape qualities of Stonehenge or the wider WHS, or how tranquillity compares in importance with other factors affecting visitor experience. While the study report (eg para) may have been taken to remove a range of biases and standard problems associated with Contingent Valuation studies, it did not address – and was not intended or designed to address – the biases and assumptions that are inherent in the basic hypothetical scenario that it sought to examine:

		The construction of a dual carriageway between Amesbury and Berwick Down, including a 2.9km tunnel underneath the WHS with both portals located within the WHS but out of sight from the stone circle. By removing the road from the central portion of the World Heritage Site, those using the road will no longer be able to see Stonehenge while driving and those visiting the site will no longer be affected by the road. To either side of the tunnel itself, widening the road and constructing tunnel portals will have adverse impacts on other monuments (e.g. burial sites) within the WHS. Some inherent biases arise from the wording of this hypothetical scenario: • The first sentence referred to the stone circle, but not to the existence of other monuments in the central portion of the WHS • The second sentence was ambiguous in referring to 'those visiting the site' meaning Stonehenge not the World Heritage Site; • The final sentence was erroneous and highly biased in referring to o 'widening the road' (as if just adding a lane to the A303); o 'either side of the tunnel itself' not at each end; o not referring to the width and length of cuttings involved; o not mentioning the grade-separated junctions within the setting of the WHS; o nor indicating the nature or scale of 'impacts on other monuments' or that this included not only impacts on their setting, but also loss of significant known and unknown archaeology. More serious problems arise from the deeply entrenched bias towards the whole scenario. It is stated (para) that: "*This assessment focuses exclusively on the cultural heritage impacts of removing the A303 from its current location within the WHS, in terms of noise reduction, increased tranquillity, visual amenity and reduced landscape severance.*" But this is misleading: as far as respondents were concerned, the scenario presented to them was one particular scheme (as noted above) which was taken as a given, with no option for **entirely** *removing the A303 from its current location within the WHS*. Not surprisingly, the results were equally inherently steered towards and used for justifying that particular vision, not any alternative scenario or any wider considerations within which to situate the hypothesised scenario.

		Thus respondents were NOT asked: • How significant a sense of tranquillity is to the character, significance and amenity of the Stonehenge WHS (as visitors to Stonehenge, to the wider WHS; or amongst the wider public how important a consideration it should be)? • What they felt most contributed to or detracted from tranquillity at Stonehenge and in the WHS? • What significance traffic intrusion had for them relative to other forms of intrusion on tranquillity? • How they rated traffic intrusion relative to tranquillity at different places within the whole WHS? • How they would rate alternative means of removing A303 traffic intrusion (including the options of either adopting a longer, more expensive tunnel or a much cheaper surface route outside the WHS and not affecting a nationally or internationally protected landscape)? • What they would be willing to pay (or expect to be paid) for adopting a route adding a range of extra distances/times to their journeys • How they would rate removal of traffic intrusion relative to other objectives of the WHS Management Plan, inclusion retaining its archaeological integrity • To consider, as tax payers, what a substantial saving on the £1.7bn price tag might best be spent on: a) to relieve traffic and improve transport infrastructure or more generally? OR b) for any other purpose. nd Even s beyoong n so l derived from the equivalent number of enbrr as A303 users proportional to the a subset of as a s ro four "a given amount of th e scheme is justifiable (any alternative put forward, including 14 people suggesting a longer tunnel, not being a reply to a question was treated as a 'protest' response. While the inherent harm to the WHS was alluded to (see above) the scheme is test and it was simply a question of whether it might be justified without reference to any inherent harm involved. (respondents a If borne out by a more systematic analysis, this would support the view that it is crowding by tourists that is the main factor detracting from tranquillity and ambience, not the A303. It certainly suggests that tranquillity would not be achieved as a result of the scheme.

Ns.2.7 AND Ns.2.8	Historic England Applicant Wiltshire Council The Council for British Archaeology ICOMOS Blick Mead Project Team	**[Vibration and Settlement]** **NOTE: Although the effects may be rather different, the issues of vibration and settlement relative to archaeology raise much the same broad principles of archaeological sensitivity and risk assessment and management parameters. The following observations broadly apply to both Ns.2.7 and Ns.2.8 and for the sake of space we have not sought to repeat them for each question** The levels at which significant effects might occur depend on the archaeological remains affected, including objects as well as structures and deposits. This in turn relates to their condition in the ground. Their sensitivity and vulnerability to vibration and settlement effects will obviously differ both according to their inherent character and the specific ground conditions in which they survive. So far as the CBA is aware, there are no general standards for judging the degree of either vibration or settlement would be considered 'significant,' and so far as there have been previous studies they almost all relate to urban structures and deposits in relation to railway or metro tunnels with complex overlying mixed geology and made ground. Some technical studies of earthquake effects may also be relevant, but again they are not specific to or provide any direct read-across to the situation of this scheme. For both vibration and settlement effects the engineering profession has developed standard and often sophisticated predictive modelling techniques (including 3D computerised modelling) that could and should be applied to map in three dimensions the likely effects (cf other submissions). Broadly this would address three key factors: • The hydro-geological, physical and geo-chemical composition of the geological strata being bored (including susceptibility to fracturing, compression or other movement) • The scale, form and 3D location of the structures concerned • The method of their installation and the physical and other forces that they exert on the geological strata being bored The potential impacts on archaeology depend on the predicted magnitude of any effects within a 3D zone above and/or adjacent to the structures concerned, out to the limits of any influence. The significance of any effects depends not only on the scale, duration and character of any movement, but also the sensitivity and vulnerability of any archaeology affected (including as yet undiscovered

		remains). The methods of monitoring and thresholds for any measures to take protective action need to be attuned to the most sensitive/ vulnerable remains of significance liable to be affected. There are no established standards for what is judged as 'significant' and so far as there are recorded instances, any lessons need to be adapted to the specific circumstances of this scheme. This is fundamentally a matter of risk assessment, and the CBA suggests that the context of such an assessment must take account of the broad parameters of accuracy to which archaeologists excavate and record remains – especially those that are delicate intricate and complex – and examples of worst case scenarios in terms of sensitivity of deposits, structures and objects to being distorted moved or displaced. *Excavation and recording tolerances* The range of tools that archaeologists use for controlled excavation, aiming at achieving accuracies ranging from a few centimetres to less than a millimetre, range from • large excavators working with toothless buckets used for stripping topsoil, normally controlled for exposing final surface to around 1-3cm accuracy • large hand tools (mattocks, shovels etc) for rapid hand digging normally controlled to similar levels of accuracy • the ubiquitous pointing trowel for general purpose careful excavation controlled to around 0.2-0.5cm accuracy • small specialist delicate tools (eg plasterer's leafs, paint brushes, etc) for delicate field or coarse laboratory excavation working to c.1-5mm accuracy • smallest specialist delicate tools (eg scalpels, dentists' probes and drills, air pressure tools etc) for careful laboratory excavation to c.0.1-1mm accuracy. • the finest detail 'excavation' is undertaken microscopic level to expose fine detail of objects or clean encrusted dirt from objects using other specialist conservation tools working to even finer accuracies. Paragraphs 6.3.48 and 6.7.14 of the revised draft DAMS specify that all recording will be levelled to Ordnance Datum metres to two decimal places. Within that general-purpose control applicable to all deposits recording is often to sub-centimetre accuracy and where especially fine detail is needed may be down to millimetric accuracy. In some cases such accuracy is achieved by photogrammetric, laser and other forms of scanning. In others blocks of material are extracted for careful excavation in the laboratory.

		Examples of potentially vulnerable deposits and objects This needs detailed consideration, but in the current scheme could for example include burials with delicate grave goods that might be displaced; timber lined or coffin graves (typical of some Beaker burials where a coffin or timber-lined cist that held the burial subsequently collapsed or partially collapsed leaving extremely loose unconsolidated fill and even voids. In this and some other scenarios of deposits exhibiting highly variable degrees of consolidation movement could in principle include transposition of small objects from one position or stratum to another. Remains potentially especially sensitive to these effects are objects such as whole but cracked pots; and high status composite objects originally composed of a mixture of materials, some of which survive (eg metal, stone, ceramic, bone, antler) and others do not (eg wood horn, leather, string, hair, hide, wicker etc). This also applies to relationships between objects relative to decayed containers (eg arrows in a quiver or just arrowheads in a bag?) and decayed bodies. In some cases the exact original form of objects is ONLY evident in the distribution of surviving parts of them in the ground – a classic example being early bronze age rivetted daggers, where the exact position of the rivets relative to the blade reveals the size, position and likely form of the decayed horn or wooden hilt and (for example) antler pommel, including in some cases the decorative use of rivets. Such objects are more common around Stonehenge than in most areas. The remarkable Bush Barrow burial on Normanton Down included some quite extraordinary grave goods – three bronze daggers plus rivets, two exceptionally large; the smallest with 140,000 gold studs 0.2mm diameter (evidence of child jewel-smithing); two very thin sheet gold plaques; an exotic stone mace, of which the decayed handle had been decorated with carved zig-zag bone rings. Unmarked by any barrow ditch or mound, the grave of the "Amesbury Archer" contained *"the richest array of items ever found from this period. Around 100 objects were found, including the complete skeleton of a man, three copper knives, two small gold hair tresses, two sandstone wristguards to protect his wrists from the bow string, 16 flint arrowheads and five pots. This makes the grave the richest Bronze Age find in Britain - there are ten times the usual number of finds from other graves."* (https://www.wessexarch.co.uk/our-work/amesbury-archer)
Ns.2.7	Historic England Applicant Wiltshire Council	**Vibration effects on archaeology** NOTE: The CBA is not directly involved in discussions and is only in a position to make general comments on this is a highly technical matter, as below.

	The Council for British Archaeology ICOMOS Blick Mead Project Team	In light of the comments made by the different parties to date can you advise on the latest position in respect of: **i. An agreed methodology for measuring vibration and what standards could be used to safeguard archaeological remains.** Any methodology needs to be applied to predict what degree of movement might occur in relation to relevant construction activities. These include: • Piling for retaining walls, cut and cover tunnels, green bridges, bridges • Tunnelling • Machinery operating over haul roads and construction compounds where vibration and resonant forms of loading (eg from the speed of loaded vehicles) is likely to be linked to compression effects This is a highly technical matter on which the CBA is not directly involved and is only in a position to make general comments. It is one of several matters on which there is little or no evidence that the Applicant has examined relevant technical research into archaeology and vibration. This includes research related to piling but also other relevant literature may include the effects of soil movement relative to cultivation and vibrations arising naturally in earthquake zones. Other than specific piling and tunnelling studies, we have previously highlighted resources such as the quinquennial proceedings of the international PARIS conferences, DEFRA research into soil disturbance and archaeology etc. However, much relevant literature relates to urban archaeology and built structures, and any literature review needs to focus on such resources mainly to the extent that they provide a sound generic basis for reading across to the primary factors at play for this scheme, especially in relation to defining the need to obtain a full understanding of the geology as well as the types of archaeological remains potentially affected. Historic England's recently revised guidance on piling (historicengland.org.uk/images-books/publications/piling-and-archaeology/heag270-piling-and-archaeology/ March 2019) provides useful guidance on the possible effects of different piling techniques (though not on other sources of ground vibration) and concludes *Unfortunately, in England, there has been no clear requirement for archaeologists to collect piling data from redevelopment sites in any rigorous way. In many instances, evaluations have consciously avoided areas adjacent to piles because they are likely to be disturbed (Davies 2004). This results in vital opportunities to understand the past impacts of construction being missed. It is good practice for this to be a basic requirement on any excavation where previous*

		foundations are encountered because it provides a better understanding of site conditions and the likely future potential impacts of proposed new piles. **ii. The level at which significant effects might occur.** There is much relevant technical literature on how low frequency vibration transposes into physical movement, and parameters of the generating source and receiving ground conditions (structurally and hydrologically) that largely dictate the scale of effect. We note and support the concerns voiced by others that it is fundamental that adequate predictive modelling can only be understood with a full consideration of how vibration would be propagated the geology of the areas affected. Overall, the assessment to date has not provided the necessary predictive modelling to address this issue; even so, there is likely to be significant uncertainty. **iii. How any vibration will be monitored to protect archaeology.** Monitoring can only forewarn about problems arising, establish whether levels of vibration might be damaging relative to predictions and/or check that any measures to protect archaeology are effective. Methods will need to measure both vertical and lateral vibrations. **iv. Mechanism/ mitigation to avoid potential adverse effects including any agreed positions of monitoring locations.** As above, two separate issues arise here: a) the positions chosen must be effective in addressing the issues and achieving standards indicated under points i) to iii) above; b) the need for appropriate mechanisms for protection and avoidance or reduction of the risk of damage, which should be based BOTH on a choice of techniques that are likely to minimise damage in the first place; AND on their having potential to be modified in the method of application to reduce and if possible prevent the risk of damage occurring. These are technical issues requiring specialist analysis, and different solutions are likely to be needed for the different scenarios in which vibration effects may arise. It is fairly obvious that as the highest risks will arise close to the source of vibration, and therefore monitoring should be focussed on transects passing close to monuments and sites of potential vulnerability, including where little archaeology is currently known but could exist. It should be noted

		in particular that burials have already been discovered in the general vicinity of the western tunnel approach retained cutting, cut and cover tunnel and green bridge. Perhaps the simplest is for piling, the principle being that the need for prior archaeological investigation and recording extending to the limit of potential vibration damage, not just the limit of physical disturbance. For other sources of potential harm different solutions for enhanced protection (methods of operation and improved buffering) would be relevant. In respect of the proposed twin bore tunnel, combined monitoring points for both subsidence and vibration could be considered, though the specific requirements for vibration monitoring are likely to be different to those for settlement.
Ns.2.8	Historic England Applicant Wiltshire Council The Council for British Archaeology ICOMOS Blick Mead Project Team	**Settlement effects on archaeology** NOTE: The CBA is not directly involved in discussions and is only in a position to make general comments on this highly technical matter. In light of the comments made by the different parties to date can you advise on the latest position in respect of: **i. An agreed methodology for measuring settlement, and what standards could be used to safeguard archaeological remains.** Until there is a proper 3D predictive model of the anticipated settlement is developed (as is standard practice for many tunnelling schemes) it is hardly possible to arrive at any decision about measuring settlement and what standards should be applied; as others have argued, this in turn cannot be done without more detailed understanding of the structural qualities of the Phosphatic Chalk through which the tunnel would be driven. Some general points of principle can be suggested: a) Greater clarity about the geological and hydrogeological properties of the strata through which the tunnel would be driven, focussing specifically on those characteristics that are contributory factors to settlement risk, including how these vary along and across the limits of deviation of the proposed tunnel b) 3D spatial modelling of the predicted risk of settlement along the length of the tunnel and extending beyond the worst case limit of settlement risk for any alignment within the limits of deviation c) Consideration needs to be given to worst case scenarios of potential damage to archaeological remains (see below for the example of composite organic and non-organic artefacts) d) A monitoring regime should be adopted to meet (at a minimum) the following needs:

		• Sufficiently dense transects or grid of monitoring points to test the 3D predictive model to millimetric tolerances of settlement movement along the full length of the tunnel bores • Monitoring points placed sufficiently *far from* known monuments to give forewarning of any need to modify TBM progress and/or adoption other preventative measures • Monitoring points placed sufficiently *close to* known monuments to monitor actual settlement movement and (where applicable) the effectiveness of any prevention or reduction of impact • Sufficiently dense transects or grid of monitoring points to record actual settlement to millimetric tolerances along and across the length of the tunnel bores to ensure future understanding any settlement in relation to other forms of possible post-depositional changes for both known and as yet undiscovered archaeological resources that may be affected **ii. The level at which significant effects might occur.** The greatest risk is likely to be where the TBM would be working close to archaeological sites and monuments, especially at its shallowest levels. The current estimates of up to 2-3cm of movement is well above basic tolerances for archaeological recording outlined above; far above tolerances applied to the most significant and vulnerable objects and deposits, and those so fragile that they are lifted as consolidated blocks for laboratory excavation. It is also clear that the kinds of situation in which such considerations occur (notably burials, including richly furnished burials not marked by barrows) are an important feature of the Stonehenge WHS and the surrounding area. Currently it seems clear that if potentially vulnerable remains were affected, significant damage could occur; but as others have noted, the current assumptions do not seem to be based on a full understanding of geology, and no 3-D modelling has been done to predict the spatial occurrence of settlement impacts relative to archaeological remains. The proposed tunnel passes beneath or close to several scheduled monuments and other sites (it is not clear if these included full results from recent surveys) – see revised draft DAMS site 23, pp 232-7. This includes burial mounds which have been excavated to different degrees with burials of different periods including Beaker and Early Bronze Age for which rich grave goods and objects of composite materials are relatively common. Some mounds are known to have contained multiple burials of this kind; others may contain burials yet to be discovered. The occurrence of 'flat graves' not marked by barrows is also possible, and as illustrated by the evaluations these can readily occur close to in between or at some distance from known barrows.

		Because they are so much harder to find than barrows (even with modern geophysics) they are also almost certain not to have been found by early antiquaries and archaeologists and represent a major as yet under-recorded resource, potentially more intact as a record of funerary practice than the upstanding monuments. That such unmarked graves can be richly furnished was demonstrated by the discovery of the 'Amesbury Archer' and his companion a few years ago. **iii. How the settlement will be monitored to protect archaeology.** See suggested general requirements above: monitoring should be carried out before, during and after the passage of the TBM along each bore of the tunnel. The monitoring of both bores should include the whole width of the monitoring area for both bores so that cumulative effects can be established. After completion of the tunnel should continue at decreasingly frequent intervals until all movement has stopped with final checks at longer intervals to confirm stability. As indicated above all results should be archived with archaeological records with summary information deposited in the HER for future reference. **Mechanism/ mitigation to avoid potential adverse effects including any agreed positions of monitoring locations.** Paragraph 5.2.8 of the revised draft DAMS states that *"The requirement for these will be scoped to minimise the number of installations required. The locations of these installations will be selected to avoid known archaeological remains. Targeted archaeological mitigation at these locations will include ploughzone artefact collection, archaeological excavation and recording and/ or archaeological topographic survey, as relevant."* This is not an adequate provision – see general principles suggested above. • The requirement for the number of stations required should be scoped to ensure robust and accurate monitoring, with spacing sufficiently close to pick up variations in effects: NOT to 'minimise' the number of installations. • The locations should ensure that they include locations close to or surrounding sites and monuments that could be affected, as well as providing forewarning of potential problems and recording actual movement for both known and as yet undiscovered remains. • The installations as proposed (revised draft DAMS para 5.2.6 to 5.2.7) represent minimal intrusions whose exact locations could easily be chosen to avoid known or unknown archaeological features and located within approx. 1m of a planned point the precise position being chosen to be in a 'blank' area of chalk subsoil. Full recording of the ploughzone

		archaeology would be needed, but any need for excavation would normally be obviated by adjusting the precise location of the installation. • As indicated above, the timing of monitoring must be made clear. As a general point, one of the problems of defining what should be put in place is the lack of previous technical monitoring. If this scheme is top proceed it should be seen as an opportunity to carry out research into the effects of tunnelling beneath rural monuments.
Ns.2.9	Druid Orders Rollo Maughfling Arthur Pendragon Lois Lloyd The Stonehenge Alliance	**Noise** During the hearings concern was expressed that the noise effects from A360 and new Longbarrow junction would result in additional noise impacts on nearby archaeology/ monuments/ places of cultural/spiritual significance. The sound profiles that have been provided (Fig 9.4 2026 Do Something Noise Levels) show a limited field of increased noise extending from the western portals and in the area of the new Longbarrow junction. **Do you consider this shows an improvement over the current situation and will improve the tranquillity of the WHS, thus improving the opportunity for quiet contemplation/ enjoyment of the landscape?** The mapping of noise level change seems to indicate that any improvement will not last [fig 9.5 differs] and is less further away from the cutting (presumably due to effective vertical walls. It is not clear if effects of reverberation and echo have been taken into account and how far the finish of the rtaining walls would make a difference.
Tr.2	**Traffic and transport**	
Tr.2.3	Applicant	The Stonehenge Alliance's position is that without the inclusion of the 'contingent valuation' of removing the A303 from WHS (which they say is inherently flawed) the BCR for the scheme is "*an appallingly low 0.31*". The Applicant's position is that the economic case for the scheme is a matter for the Government and the Road Investment Strategy and the ExA should focus on evaluation of the planning merits. **How is this compatible with the advice in paragraph 4.5 of the NPSNN which states that "*The* [economic case prepared for a transport business case] *will be important for the examining authority and the Secretary of State's consideration of the adverse impacts and benefits of the Proposed Development*"?**

		The CBA agrees that proper scrutiny of the economic case as set out in paragraph 4.5 NPSNN is essential. Furthermore, we note that this has to be done in the context of the previous two paragraphs which (with added emphasis) state: **" *4.3*** *In considering any proposed development, and in particular, when weighing its adverse impacts against its benefits, the Examining Authority and the Secretary of State should take into account:* • *its potential benefits, including the facilitation of economic development, including job creation, housing and environmental improvement, and any long-term or wider benefits;* • *its potential adverse impacts, including any longer-term and cumulative adverse impacts, as well as any measures to avoid, reduce or compensate for any adverse impacts.* ***4.4*** *In this context, environmental, safety, social and economic benefits and diverse impacts, should be considered at national, regional and local levels. These may be identified in this NPS, or elsewhere.* As noted above, the CBA remains convinced that RIS 1 should have been, and RIS 2 should be subject to SEA to address paragraph 4.4, especially when read in conjunction with paragraph 2.10, *The Examining Authority and the Secretary of State should therefore start their assessment of applications for infrastructure covered by this NPS on [the] basis ...* of *….a compelling need for development of the national networks – both as individual networks and as an integrated system..* But in the absence of an SEA (of either RIS as a whole or the 8 schemes that contribute to improving the A303/A353 route SW route), the overall effects of the scheme in relation to *environmental, safety, social and economic benefits and diverse impacts…. both as individual networks and as an integrated system* still need to be assessed, at least in relation to high level considerations, especially those where: a) environmental effects – most notably carbon emissions and climate change – are so generic and cumulatively insidious that assessing their characteristics and the effectiveness of any *measures to avoid, reduce or compensate for any adverse impacts* can ONLY be considered on the basis of *individual networks and as an integrated system* not just individual projects b) the economic case for development is only truly robust if all (or at least several) of the schemes within the route corridor are delivered in a timely manner – and conversely c) the exceptional scale, complexity cost and environmental sensitivity of the Amesbury to Bewrick Down scheme could threaten or significantly delay delivery of other schemes, thereby merely shunting traffic congestion and safety problems down the road while falling significantly short of

achieving the full economic benefit of a free-flowing network (cf Public Accounts Committee concerns)

d) enhanced environmental benefits can be delivered by a substantially cheaper alternative (such as an optimised F010 route) the adverse impacts of which can be adequately *avoided, reduced or compensated for;* AND as a result economic and social costs can be delivered with greater confidence and less risk of stymying other schemes, thereby maximising economic, social and environmental benefits while more effectively limiting harm

e) the exceptional cost of the project is not actually required to maximise environmental, social and economic benefits (because this can be achieved in other ways), but by virtue of its scale going ahead with the project would deprive other schemes of substantial expenditure needed to address otherwise unavoidable environmental harm – especially in respect of nationally and internationally protected landscapes.

As part of the Green Book approach to testing the economic case for the prosed scheme, the Applicant chose (uniquely) to apply a contingent valuation study to try to monetise the net heritage benefit of removing the A303 from the central part of the WHS by burying it in a 2.9km tunnel at the cost of dualling it in cuttings at either end. The whole approach – and its use as a contribution to justifying the exceptional expenditure proposed was predicated on the assumption that the proposed tunnel would be a major benefit and was the only option on offer. It sought to establish a Willingness to Pay for the 2.9km tunnel and other works from three groups: UK visitors to Stonehenge; users of the A303; and the general population. While the first and last groups were questioned by direct polling, the road user group was not based on collecting the views of actual users of the road but a road user subset of the general population. These results indicated a *Willingness To Pay* scenario of payment through national taxation of c.£24 per household per year for three years by UK visitors; c.£21 for road users; and c. £14 general population. The report noted that

> *"The net present value (NPV) of the three years' worth of WTP payments therefore represents the overall individual WTP for the road removal"*

and from this it was extrapolated that

> *"The **aggregate net benefit** of moving the A303 road into a tunnel to **visitors** is **£24.50m**, for **road users** it is **£49.15m**, and for the **general population** it is **£1.20 billion**."*

However, these statements do not accurately state what was actually valued, which in fact was the WTP for the 2.9km tunnel and surface enlargement at either end, NOT the removal of the road from the WHS. It is also questionable whether the indirect approach to looking at the value to road users based

		on a subset of the general population adequately covered the loss of the 'view from the road' and whether the harm caused to the WHS at either end of the tunnel was made sufficiently clear. Nonetheless this is a substantial figure, and in so far as it has any validity, it may be surmised that in principle, given the reference to harm in the hypothetical scenario, that the WTP for complete removal of the scheme from the WHS might be significantly higher. How much higher is difficult to judge, but could be substantially so bearing in mind other factors: • The substantial focus on Stonehenge itself, where other intrusions are greatest so tranquillity gains are arguably least significant (see above) • Other parts of the WHS where other intrusions are less and proximity to the A303 is greater, so intrusion may be worse and its removal more valued, but in significant cases this would not be alleviated by the chosen scenario • The lack of clarity about nature and scale of impact beyond the ends of the tunnel, not just a bit of extra intrusion • The lack of consideration of harm to the WHS through substantial development in its setting • The failure to present respondents with any alternative scenarios that might be obviously more effective. A further problem arises because the overall NPV has been calculated as if the value gained is only for the current generation over an extremely short period (not even beyond the time it would take to deliver the project!!). The actual potential forms of financing applicable to the scheme have very different time frames: private finance arrangements (as originally intended for this scheme) are typically paid back over 30 years or more; the RIS structure is based on a 5-year cycle that can be carried over into the next period. By any measure the 3 year NPV period is extremely short, and spread over ten, twenty or thirty years at a far lower annual rate, the overall WTP might well have proved much higher. From this it is reasonable to conclude that 1. The public do put a very large value on removing the A303 from the Stonehenge WHS, but what this amounts to is far less clear than this study purports to show 2. Because the hypothetical scenario was predicated on a specific 2.9km tunnel with harm at either end, the extrapolated NPV cannot be supposed to be the upper limit for any scheme, but rather represents a minimum baseline for improvement

		3. If ANY weight is to be given to this (see below) it must be applied equally to any alternative that would more effectively remove the A303 from the WHS – especially any that also removes main roads from its setting 4. On the basis of the hypothetical scenario presented being a minimum baseline NPV, it should be assumed that it would be significantly higher for a scenario with significantly greater net benefit. While the study provides no basis for estimating this, it is reasonable to suppose that small incremental steps in increasing benefit over harm might not greatly enlarge the NPV, a substantial premium might well be attached to a scenario (such as might be achieved with an optimised option F010 or a tunnel extending beyond the setting of the WHS) that achieved complete removal of main roads from the WHS and its setting without causing any harm. BUT there are also much more fundamental problems: 1. The whole principle of monetising the historic environment is very poorly established and not remotely generally accepted as a core approach to heritage management by ANY sector of the wise spectrum of interests that CBA's institutional and individual membership reflects. This includes a. national agencies, museums, heritage NGOs, universities, professional bodies, heritage consultancies and contractors, learned societies, environmental and educational bodies b. county council heritage services, authorities, historical, archaeological and architectural societies and umbrella bodies, museums, local heritage consultancies and contractors c. individual local societies, preservation trusts, museums, consultancies d. individuals across the amateur, official, professional and academic spectrum 2. The principle (let alone any established practice) for monetising the historic environment is NOT an established part of Government policy, but to put this in its wider context consideration needs to be given to the work of the Natural Capital Committee over the last 6-7 years (see https://www.gov.uk/government/groups/natural-capital-committee *passim*) a. So far as monetising environmental capital has begun to become policy, it only applies to Natural Capital b. So far as Natural Capital includes aspects of the historic environment, this only reflects how heritage contributes to Natural Capital, NOT the intrinsic value of cultural capital in its own right c. So far as monetisation methods have begun to be explored for Natural Capital, this has not included any studies for heritage aspects

		d. So far as Natural Capital exemplifies how environmental monetisation might be developed as a useful instrument of policy, it demonstrates the need for a very cautious step-by-step approach carefully examining options within an overall conceptual and practical framework that can consider how a consistent approach might be developed that would be applicable to many different scenarios e. Despite the work done under official policy by the Natural Capital Committee, the applicability of any methods for monetising environmental capital has NOT been incorporated into Highways England's procedures. 3. The principle of monetising the historic environment (OR landscape OR biodiversity) is not an established part of WebTag or DMRB processes 4. So far as it is within the leeway for additional studies of valuation to be applied as an addition to such approaches in exceptional circumstances, those procedures require a balanced systematic basis for comparison across alternative means of delivering environmental benefits or avoiding harm, NOT to heavily skew the comparison towards one solution over others (whether more or less costly) OR through the narrowness of the methodology constrain the valuation to only one scenario, thereby artificially limiting the full valuation of more costly, but more effective solutions. When seen within the context of NSPNN paragraphs 2.1 and 4.3 to 4.5 and the Public Accounts Committee and National Audit Office reports, these considerations are even more telling, demonstrating how this the flawed application of this study has not only badly skewed consideration of how best the problems of the A303 in the Stonehenge WHS might best be resolved, but also how this has skewed prospects for delivery of the whole A303/A353 route, AND as CBA has indicated, having a major knock-on effect relative to how far, within the overall budget allocation for RIS major avoidable or unavoidable effects on internationally and nationally protected landscapes can be addressed.
WM.2	Waste Management	
WM.2.4	Applicant	**Tunnel arisings** 400,000 square metres of the tunnel arisings will be utilised to allow blending into the surrounding landscape, providing essential landscape mitigation for the embankments at the Winterbourne Stoke bypass. Table 10.12 states that no import of soil is required.

		What would be the origin of any topsoil required to provide the landscaped areas around the embankments? The proposals for all off-line embankments and landscape mounding involve *in situ* burial of existing topsoil undisturbed, in order both to preserve ploughzone archaeology and subsoil remains in those areas. The retained cuttings cut and cover tunnels and green bridges limit the amount of topsoil available from the main line works, and the area of topsoil thus excavated is not given. To comply with the archaeological mitigation proposed, all the topsoil needed for landscaping purposes would be derived from the main road line and cuttings (and possibly structural embankments) only. A further commitment is made in the draft DAMS (para 5.2.11 p.) that the Soil Handling Strategy *ensure that topsoil excavated from inside the WHS is stockpiled separately and re-used within the WHS as close as practicable to the area from which it was derived*. This presumably means that soils excavated from the areas of cut-and-cover tunnel sections and green bridges will be reused on top of them, and small amounts may be used for un retained cuttings and embankment sides; but at both ends of the tunnel a significant surplus would be left from the retained cuttings not available outside the WHS. It seems likely that a significant shortfall would arise that (presumably) would be made up for by spreading the topsoil over tunnel arisings much thinner than the existing soils in those areas. This would have knock-on implications not only for ecological habitat creation but also for meeting the proposed Soil Handling Strategy requirement that *"the origin and placement of topsoil that could contain archaeological artefacts to be mapped and for this information to be lodged with the WSHER"*.
WM.2.8	Applicant Wiltshire Council	**Tunnel arisings** Given the quantity of materials and vehicle movements, please could the Applicant provide an outline methodology for the placement of the excavated materials at land east of Parsonage Down NNR (including that to be used for landscaping around the structural embankments). **Should a detailed methodology be secured, and should this require consultation with/ the agreement of the Council?**

		As previously noted both in writing and orally, a vital consideration for the method of soil placement is whether – and exactly how *in situ* preservation of topsoil beneath the landscape mounding, both at Parsonage Down and all other areas of such mounding would be achieved. As we have previously advised, an outline methodology IS required and in the CBA's view must show in particular: • What the likely structural capabilities of the emplaced material is likely to be (especially as between tunnel arisings and directly excavated subsoil and chalk from cuttings • How it would be ensured that the plant required (dumper trucks bulldozers etc) would not run directly on the existing topsoil but only on already emplaced material • What thickness of such material would be required to prevent rutting and compression impacts on the buried top soil. • How far this thickness would need to vary as between tunnel arisings and other sources of material • What thickness and volume of topsoil would be needed and to what extent these areas would be left as bare (or almost bare) chalk to minimise creation of 'false' archaeology, ecological problems associated with over-fertile soils • How the methodology will be reconciled with DEFRA's guidance on the handling of soils in construction and BSI standards for soils and subsoil, noting that much of this is contrary to such guidance and standards An outstanding problem, raised by CBA in both written and oral submissions, but not clarified by the latest draft DAMS, is that there is still no explicit mechanism by which conflicting standards for *in situ* preservation of archaeology and the DEFRA guidance and BSI Standards are to be resolved. If as indicated Wiltshire County Council is the body with the relevant expertise on both aspects (and any ecological or other considerations) to act as the objective authority on this matter it is one where agreement should be required, not just consultation. The mechanism must demonstrate how coordination of specialists and local authority officials will work and how this will be built into all relevant legally binding commitments under the DAMS, soil handling methods statement and other mitigation commitments.–
WM.2.10	Applicant	**Deposition of excavated materials** The deposition of excavated materials, other than on land east of Parsonage Down NNR, forms part of the ancillary works.

		i. Would/ could this include tunnel arisings and what is the likely extent of this deposition. It is also relevant to know where such deposition would occur relative to archaeological resources and the nature of such ancillary works. **ii. How has the impact of this been assessed and what measures would be in place to control the associated impacts?** It is not clear from the draft DAMS if these areas have been identified and whether or not preservation *in situ* of any known and unknown archaeology would definitely be achieved, or would be subject to recording (or contingency for recording).