

#### 4. ENVIRONMENT

*For the applicant; Environmental Agency (EA); Natural England (NE); WBerksC; WokBC; RBC; RBWM; BFC; BCC; SBDC; SBC; LBHiII; LBHouns; GLA; Transport for London (TfL); Friends of the Earth (FoE).*

##### Environmental Statement

**E4.1.1 Chapter 5 Section 5.5 APP-145 sets out the methodology for establishing the baseline for the Environmental Impact Assessment (EIA). Are consultees and interested parties satisfied with the approach as adopted?**

1. In August 2014, the then Highways Agency submitted its application for a Scoping Opinion to the Secretary of State. The Scoping Opinion was issued in September 2014 and, as part of the DCO Application documents, a commentary describing how the Scoping Opinion and the comments that it contained were addressed was provided in Appendix 5.1 of the ES (Application Document Reference 6.3).
2. Section 5.5 of the ES (Application Document Reference 6.1) sets out the approach for establishing the baseline conditions for the Environmental Impact Assessment (“EIA”), and on-going trends to predict the future baseline without the Scheme against which to compare construction impacts in 2016, impacts in the Opening Year (2022) and impacts that arise from the operation of the Scheme in the Design Year (2037).
3. Although some consultees and interested parties raised issues in relation to the approach at the outset, Highways England has undertaken further engagement to address these issues. Any residual matters are expected to be addressed in the Statements of Common Ground which will be provided to the ExA. Parties for whom all concerns in respect of the approach to establishing the baseline are expected to be addressed include Historic England and Natural England.

**E4.1.2 Chapter 5 Section 5.7 APP-145 describes how "significance" has been defined in the Environmental Statement (ES), but para 5.7.5 explains that not all topics use the same approach. For example, for landscape and visual impact, in Chapter 8 APP-148, the approach seems to imply that effects of moderate or above may be considered as 'significant' but this is by no means clear. For cultural heritage, Appendix 7.2 APP-311 of Chapter 7 sets out the magnitude of impact, value of receptor and resulting significance, however the table does not show the resultant significance level and it appears that the resulting significance has been missed out. In Chapter 12 APP-152 Table 12.9 sets out the criteria used to define significance of effect in the assessment of noise and vibration. The criteria identified are: neutral; slight; moderate; large and very large but there is no indication of what level of impact is significant in EIA terms. Assessments in the ES should make it clear what level of significance is considered to be 'significant' in EIA terms. This would assist the ExA to understand whether a predicted effect requires measures in order to avoid, reduce and, if possible, remedy significant adverse effects, in accordance with the EIA Regulations. Can the applicant please clarify what is regarded as being a 'significant' effect in EIA terms as applied in each of the technical assessments which have been presented in the ES?**

1. The Infrastructure Planning (Environmental Impact Assessment) Regulations 2009 do not define how 'significance' is assessed, nor do they provide a definition of significance. However, the Design Manual for Roads and Bridges ("DMRB") Volume 11, Section 2, Part 5 HA205/08 'Assessment and Management of Environmental Effects' ("Part 5 HA 205/08"), provides guidance for determining the significance of environmental effects, including cumulative effects, and for the management of those effects. It also indicates where such guidance is not given.
2. Paragraph 2.2 of Part 5 HA 205/08 states that the significance of the effect is formulated as a function of the receptor or resource environmental value (or sensitivity) and the magnitude of project impact (change).
3. First, the environmental value (sensitivity) is assigned based on a series of typical descriptors, examples of which are set out in Table 2.1 of Part 5 HA 205/08. The value (or sensitivity) ranges from Very High to Negligible.
4. Secondly, magnitude of the impact is assessed, based on typical criteria descriptors. These are set out in Table 2.2 of Part 5 HA 205/08. The magnitude of impact ranges from Major to No change.
5. Thirdly, these are cross compared on a table to create significance of effect categories (Table 2.4 Part 5 HA205/08). For example, a receptor with a medium environmental value affected by a minor magnitude of impact would result in a slight significance of effect.
6. Table 2.3 of Part 5 HA 205/08 shows the significance of effect categories against typical descriptors of effect, ranging from Very Large to Neutral. Assigning each effect to one of the five significance categories enables different topic issues to be compared on the same scale (paragraph 2.6 Part 5 HA 205/08). The greater the environmental sensitivity or value of the receptor or resource and the greater the magnitude of impact, the more significant the effect (paragraph 2.7 Part 5 HA 205/08).
7. Effects can either be beneficial or adverse. A single level of significance should be chosen with reasoned judgement for that choice after consideration of the effectiveness of the design and committed mitigation measures (paragraph 2.9 Part 5 HA 205/08). These tables are re-

produced in Appendix 5.2 of the Environmental Statement (“ES”) (Application Document Reference 6.3) and the information as outlined in Part 5 HA 205/08 and described above is outlined in Section 5.7 of the ES (Application Document Reference 6.1).

8. In the absence of guidance on what constitutes a ‘significant’ effect in Environmental Impact Assessment (“EIA”) terms, professional judgement has been applied. In Table 2.3 of Part 5 HA 205/08, a significance category of ‘moderate’ is described as a beneficial or adverse effect which may be important and the cumulative effects of such impacts may influence decision-making. A significance category of ‘large’ or ‘very large’ describes effects that are considered to be very important considerations and likely to be ‘material’ or ‘key factors’ in the decision-making process respectively. Based on these typical descriptors of significance as outlined in Table 2.3 of Part 5 HA 205/08, impacts of a ‘large or above’ significance would be considered as significant, as these impacts are considered to be factors in the decision-making process. However a significance category of ‘moderate’ can be considered as significant in some instances, assessed on a case by case basis, for example where cumulative effects are considered. Impacts of slight or neutral are not considered to be critical in the decision-making process. Table 1 below outlines the methodologies used for each topic within the ES in order to determine the significance of an effect, and the level of significance that is considered to be ‘significant’ in terms of EIA.

ES Topic	Methodology for determining significance	What level of significance is considered to be ‘significant’ in terms of EIA?
Air quality	Paragraph 6.2.82 of the ES outlines that the significance of local operational air quality effects for the Scheme is based on the guidance presented in Interim Advice Note 174/13 ‘Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 Air Quality (HA 207/07)’.	<p>Significance in terms of air quality is based on a series of questions set out in Interim Advice Note (“IAN”) 174/13. These are reproduced in paragraph 6.2.82 of the ES and below:</p> <ul style="list-style-type: none"> <li>a) Is there a risk that environmental standards will be breached?</li> <li>b) Is there a high probability of the effect occurring?</li> <li>c) Will there be a large change in environmental conditions?</li> <li>d) Will the effect continue for a long time?</li> <li>e) Will many people be affected?</li> <li>f) Is there a risk that protected sites, areas or features will be affected?</li> <li>g) Will it be difficult to avoid, or reduce or repair or compensate for the effect?</li> </ul> <p>In order to address question e) above, the number of receptors predicted to experience small, medium and large changes in air quality (paragraph 6.2.85 of the ES) is identified.</p> <p>Those receptors within areas above the Nitrogen Dioxide (NO<sub>2</sub>) limit value of 40 µg/m<sup>3</sup> are assessed based on the change in NO<sub>2</sub> levels. The thresholds for significant effects are outlined in Table 6.4 of the ES (Application Document Reference 6.1).</p> <p>Where numbers of affected receptors are above the upper (large) thresholds listed in Table 6.4 of the ES for locations above the air quality objective, this may suggest significant air quality effects are more likely (paragraph 6.2.85 of the ES).</p> <p>Where numbers of affected receptors are in the middle (medium) threshold for magnitude of change, as listed in Table 6.4 of the ES, significance is based on professional judgement for that receptor.</p> <p>Where numbers of affected receptors are in the lower (small) threshold listed in Table 6.4 of the ES, significant air quality affects are not likely.</p> <p>Where predicted changes in annual average concentrations are less than 0.4µg/m<sup>3</sup> and/or predicted annual average concentrations are less than the objective value with or without the Scheme, the impact is of negligible significance (paragraph 6.2.87 of</p>

ES Topic	Methodology for determining significance	What level of significance is considered to be ‘significant’ in terms of EIA? the ES) (Application Document Reference 6.1).
		<p>Following the collation of information to address the above questions, an informed professional judgement on the significance of local air quality effects for public exposure and European or nationally designated ecosystems can be established.</p>
Cultural heritage	<p>The value of receptors has been determined using criteria derived from DMRB Volume 11, Section 3, Part 2 – Cultural Heritage (HA 208/07). This guidance does not set out the thresholds for significance. Significance is based on the value of the resource and the magnitude of the impact (incorporating the agreed mitigation) for each cultural heritage asset, using the matrix illustrated in Table 5.1 of DMRB Volume 11, Section 3, Part 2 (HA 208/07). This methodology reflects that outlined in DMRB Volume 11, Section 2, Part 5.</p> <p>Professional judgement is required at each step and the overall significance of effect is determined using professional judgement with the matrix used as a check to ensure reasonable, balanced and consistent judgements, as outlined in paragraph 7.2.30 of the ES.</p>	In accordance with DMRB Volume 11, Section 3, Part 2 (HA208/07), a ‘significant’ effect in EIA terms is considered to be one of ‘moderate’ or above in accordance with guidance set out in paragraph 8 above.
Landscape	<p>As outlined in paragraph 8.2.16 of the ES, significance of effect is derived as a product of magnitude of impact and sensitivity of the receptor in each case.</p> <p>Where a range of significance is possible, professional judgment was applied to determine which is most appropriate, on a case by case basis. The basis of the assessment is based on that outlined in DMRB Volume 11, Section 2, Part 5 and typical descriptors from Interim Advice Note 135/10.</p>	The Guidelines for Landscape and Visual Impact Assessment do not require an assessment of significance or significance thresholds, nor is this stated in Interim Advice Note 135/10. Thresholds stated in paragraph 8.2.16 of the ES are a matter of professional judgement, informed by the criteria set out in IAN 135/10 and DMRB Volume 11, Section 2, Part 5. The latter document indicates that ‘large’ or ‘very large’ effects are likely to be material in the decision making process; it is the effects that fall within these categories that are likely to be significant in EIA terms in accordance with guidance set out in paragraph 8 above.
Ecology and nature	Paragraph 9.2.18 of the ES states that the magnitude and significance of residual effects have been identified in	DMRB Volume 11, Section 2, Part 5 (HA205/08), does not set out thresholds for significance. Where guidance is not available the thresholds for significance are based

ES Topic	Methodology for determining significance	What level of significance is considered to be ‘significant’ in terms of EIA?
conservation	<p>accordance with DMRB Volume 11, Section 2, Part 5 (HA205/08), as referred to in Appendix 9.4 of the ES (Application Document Reference 6.3).</p> <p>The significance of the effects on receptors of different categories of value are defined in accordance with Interim Advice Note 130/10 (paragraph 9.2.19 of the ES).</p> <p>Paragraph 9.16.6 of the ES (Application Document Reference 6.1) states that in accordance with DMRB Table 2.3, Volume 11, Section 2, Part 5, neutral effects are those that have <i>“No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.”</i> DMRB considers that effects assessed as slight adverse are generally those which are relevant at the local level, and though they should be considered during the design and implementation of the Scheme, they are <i>“unlikely to be critical in the decision-making process”</i> DMRB Table 2.3, Volume 11, Section 2, Part 5.</p>	<p>on professional judgement and in accordance with guidance set out in paragraph 8 above. Furthermore, a ‘significant’ effect in EIA terms, for ecology and nature conservation, is considered to be one of ‘moderate’ or above.</p>
Geology and soils	<p>As outlined in paragraph 10.2.2 of the ES there are no specific criteria for assessing the significance of the potential effects on geology and soils. As a result, the assessment of the value (sensitivity) of the identified geology and soils receptors, the magnitude of impacts, and the significance of effects has been based on the process presented in Appendix 5.2. This follows DMRB Volume 11, Section 3, Part 5 HIA 205/08 ‘Assessment and Management of Environmental Effects’. Paragraph 10.2.11 of the ES outlines this approach in practice.</p> <p>Scheme-specific geology and soils value (sensitivity) descriptors developed for the purposes of the assessment are presented in Table 10.1 of the ES, and the magnitude</p>	<p>A ‘significant’ effect in EIA terms, for geology and soils, is considered to be one of ‘moderate’ or above in accordance with guidance set out in paragraph 8 above.</p>

ES Topic	Methodology for determining significance	What level of significance is considered to be ‘significant’ in terms of EIA?
	<p>of impact criteria are presented in Table 10.2 of the ES.</p> <p>As outlined in paragraph 10.2.17 of the ES, within DMRB there is no guidance for assessing the significance of the effects of the Scheme on contaminated land, or describing the magnitude of impact. Assessment of the significance of contamination has been undertaken in accordance with the Environment Agency guidance document ‘CLR11: Model Procedures for the Management of Land Contamination’. The process followed comprises a tiered approach which starts with a relatively simple and conservative ‘Tier 1’ assessment of potential risks from possible contaminant linkages (Source- Pathway-Receptor) using a Conceptual Site Model ("CSM"). Any potential risks identified at Tier 1 are then studied in more detail through a ‘Tier 2’: Generic Quantitative Risk Assessment ("GQRA") and, if necessary, a ‘Tier 3’: Detailed Quantitative Risk Assessment ("DQRA"). This guidance does not set out significance thresholds.</p>	
Materials and waste	<p>The sensitivity, magnitude of impact and significance of effect criteria are derived from DMRB Volume 11, Section 2, Part 5 with typical criteria descriptors tailored to the material topic as shown in Appendix 11.1 of the ES and outlined in paragraph 11.2.38 of the ES. Professional judgement has been applied to determine the likely significance of effects on this basis.</p> <p>As outlined in paragraph 11.6.1 of the ES, there are no published or formalised significance criteria relating to the assessment of waste impacts.</p>	Professional judgement has been drawn upon to assess the significance of effects. The significance of residual effects are classified as slight adverse (Table 11.25 of the ES). Such effects are not considered significant in terms of EIA. A ‘significant’ effect in EIA terms, for materials and waste, is considered to be one of ‘moderate’ or above, in accordance with guidance set out in paragraph 8 above.
Noise and	Paragraph 12.2.63 of the ES outlines the significance of	The significance of residual effect across the Scheme ranges from slight adverse, to

ES Topic	Methodology for determining significance	What level of significance is considered to be 'significant' in terms of EIA?
vibration	<p>effect, as shown in Table 12.9 of the ES, as a function of the value or sensitivity of the receptor (Table 12.3) and the magnitude of the impact.</p> <p>For the operational traffic noise assessment, the change in noise level as a result of the Scheme against the baseline is classified according to Table 12.7 and 12.8 of the ES. This is further outlined in paragraph 12.2.59 of the ES.</p> <p>For the construction noise assessment, the difference in noise level is assessed based on the amount by which the noise thresholds outlined in Table 12.1 of the ES are exceeded. Noise difference/change is a measure of the impact, the greater the noise difference/change the higher the impact. Significance is a basis of this impact and the sensitivity of the receptor as outlined in Table 12.9 of the ES.</p>	neutral to slight beneficial (Table 12.21 of the ES). A 'significant' effect in EIA terms is considered to be one of 'moderate' or above, in accordance with guidance set out in paragraph 8 above.
Effect on all travellers	<p>As outlined in paragraph 13.2.1 of the ES, the general approach to the assessment of significance is in accordance with the general principles and structure of assessment methodology contained within DMRB Volume 11, Section 2, Part 5 (HA 205/08) 'Assessment and Management of Environmental Effects', whereby the significance of environmental effects is determined by combining the environmental value and magnitude of impacts.</p> <p>In regards to driver stress, paragraph 13.2.24 of the ES states that unlike in other environmental assessment chapters of DMRB, where the 'significance' of environmental effects is scored using 'significance criteria' based on the environmental value (sensitivity)</p>	The residual effects that could arise from construction and operation of the Scheme are set out in Table 13.30 of the ES. These residual effects are classified as slight adverse to beneficial. A 'significant' effect in EIA terms is considered to be one of 'moderate' or above, in accordance with guidance set out in paragraph 8 above.



ES Topic	Methodology for determining significance	What level of significance is considered to be ‘significant’ in terms of EIA?
	<p>score and magnitude of impact (degree of change) score, none of the assessments contained within the ‘vehicle traveller’ chapter of DMRB has ‘significance criteria’.</p> <p>Given the simplistic nature of the DMRB assessment methodology, this affords the opportunity to adapt and augment the driver stress and journey quality scoring framework, without deviating from the overall approach. The ‘magnitude of impact’ is classified as major, moderate, minor, negligible, or no change in accordance with Table 2.2 of DMRB, Volume 11, Section 2, Part 5, (HA 205/08), which is reproduced in Appendix 13.1 of the ES. The sensitivity criteria are based on DMRB Volume 11, Part 2, Section 5 Table 2.1. For driver stress, relative levels of sensitivity have not been assigned to the receptors (vehicle travellers), as DMRB does not provide, or require the application of, any significance criteria (paragraph 13.4.1 of the ES).</p> <p>For non-motorised users, the sensitivity, magnitude of impact and significance of effects have been assessed in accordance DMRB Volume 11, Section 2, Part 5, (HA 205/08) (paragraph 13.2.29 of the ES), as outlined in Appendix 13.1 of the ES.</p> <p>Within DMRB, there are no specific assessment ‘significance criteria’ or ‘magnitude of impact’ assessment frameworks associated with ‘view from the road’, and therefore a qualitative assessment using professional judgment, based on the above criteria, has been considered appropriate (paragraph 13.7.32 of the ES).</p>	
Community and private	Paragraph 14.2.14 of the ES states that the sensitivity of socio-economic receptors is not determined by reference	A significant effect in EIA terms is defined as an effect having an overall significance, as a product of receptor value and impact magnitude, which is moderate

ES Topic	Methodology for determining significance	What level of significance is considered to be ‘significant’ in terms of EIA?
assets	<p>to designations or an objective standard. Instead, it is the nature of the activity that the human receptor is undertaking that is most influential in determining sensitivity. Professional judgement, stemming from an assessment of the following factors; community, tourism and recreation facilities assessed on the likely level of importance; private properties assessed on their proximity of the Scheme; and agricultural land assessed on the quality and quantity of agricultural land affected; has been applied in determining whether or not an effect is likely to be significant as outlined in paragraph 14.2.10 and 14.2.14 of the ES. A combination of quantitative and qualitative assessment is therefore required.</p> <p>The definitions of magnitude of impact and significance of effect have been adapted from those presented in DMRB and are presented in Appendix 14.1 of the ES.</p>	or above, in accordance with guidance set out in paragraph 8 above.
Road drainage and the water environment	<p>Paragraph 15.2.23 of the ES outlines that the significance of the effects of the Scheme is based on a combination of the value of the resource and the magnitude of the impact, as shown in Table 15.4 of the ES. This methodology is derived from DMRB Volume 11, Section 2, Part 5 (HA 205/08). Professional judgement has been used when selecting the significance of effect where there is a choice, e.g. slight/moderate. This guidance does not set out the thresholds for significance. As a result, significance is assessed on the basis of professional judgement and the general rules outlined in paragraph 8 above.</p>	A significant effect in EIA terms is defined as an effect having an overall significance, as a product of receptor value and impact magnitude, which is moderate or above in accordance with guidance set out in paragraph 8 above. This threshold has been selected based on professional judgement and taking account of the precautionary principle as outlined in paragraph 15.2.23 of the ES.

**Table 1** The methodologies used for each topic within the ES in order to determine the significance of an effect

**E4.1.3** Annex A of the Explanatory Memorandum (EM) App-027 contains a 'Table of Mitigation' which sets out mitigation measures based on the various chapters in the ES and how these mitigation measures will be delivered ie either by requirements in the DCO or through the Construction Environmental Management Plan (CEMP). A reference to the EM is included within para 1.3.2 of Chapter 1 APP-141. However there is no cross reference from within the ES to the Table of Mitigation in Annex A. Can the applicant please provide a table which sets out the mitigation measures which are identified as required in each technical chapter of the ES, and provide a cross reference to that part of the draft DCO through which the mitigation measure would be delivered. In particular the table should clarify which mitigation measures identified as necessary in the ES should be secured through the CEMP.

1. The table at Appendix A has been re-created from the 'Table of Mitigation' presented in Appendix A of the Explanatory Memorandum (Application Document Reference 3.2), with cross references added to the ES where applicable (**in red**).

**E4.1.4 An outline of the CEMP App\_293 is provided. The approval and implementation of the CEMP is secured through Requirement 8 of the draft DCO APP-026. The outline CEMP sets out a series of proposed measures and standards applied by the Highways Agency (as was) and its contractor throughout the construction period. The final CEMP will be certified to BS EN ISO 14001. Do any interested parties have any comments on the sufficiency of the outline CEMP for securing mitigation? The ExA would be interested in particular in comments from NE, the EA and the LPAs who would be responsible for approving the CEMP under requirement 8 of the DCO.**

1. The Outline Construction Environmental Management Plan ("CEMP") (Appendix 4.2A of the Environmental Statement ("ES")) (Application Document Reference 6.3) sets out an over-arching framework for the management of potentially adverse impacts that may arise from the full range of construction activities. The purpose of the Outline CEMP is fully explained in paragraph 1.6.3 of the Environmental Statement ("ES") (Application Reference Document 6.1). Highways England's contractor will be required to adopt, update and implement the CEMP for the duration of the construction contract pursuant to Requirement 8, Schedule 2 of the Draft Development Consent Order ("DCO") (Application Reference Document 3.1).
2. None of the local planning authorities that have submitted a relevant representation on the Application, have raised concerns as to the sufficiency or otherwise of the Outline CEMP for securing mitigation. However, some local planning authorities have commented on the need for further information once the contractor has been appointed. For example, West Berkshire District Council stated that "*a Construction Management Plan governing construction activity will need to be produced*" but they do not comment on the adequacy of the Outline CEMP that was available for review as part of the Application.
3. Relevant representations on the Application have also been received from Natural England, Historic England and the Environment Agency. Natural England notes that "*it is proposed that construction dust will be controlled using best practice techniques...and support the recommendations made in the Environmental Statement that this is secured via a planning condition if necessary*". The Environment Agency makes no specific comment in relation to the Outline CEMP, and neither does Historic England.
4. Many of the mitigation measures set out in the Outline CEMP are based on widely accepted best practice for site management, including British Standards, the Construction Industry Research and Information Association ("CIRIA") guidelines, Section 61 agreements under the Control of Pollution Act 1974, the Environment Agency's Pollution Prevention Guidelines, and Natural England's procedures for protected species licensing. Furthermore, Requirement 8, Schedule 2 of the Draft DCO (Application Document Reference 3.1) includes the approval of the CEMP by the relevant authority. Consequently, Highways England expects that the local planning authorities and statutory environmental bodies will find the Outline CEMP and approval procedure in the Draft DCO sufficient for securing mitigation.

**E4.1.5 Requirement 8 allows the undertaker to modify the CEMP at any time after the authorised development has commenced without the requirement to seek the agreement of the LPA and without any reference to what has been assessed within the ES. There is also no requirement for the CEMP to deliver the mitigation measures identified in the ES, where the ES is relying on the CEMP as the mechanism to deliver the mitigation. Therefore, please explain how the EIA can rely on this mitigation when concluding on the residual significance of the development?**

1. Whilst noting that the wording in this requirement that allows for modification of the CEMP was included in the drafting of the made A556 (Knutsford to Bowden Improvement) Development Consent Order (“DCO”) 2014 at requirement 4(7), Highways England agrees to the deletion of sub-paragraph 3 in requirement 8. This amendment is reflected in the revised draft of the DCO that will be provided by Deadline III.

**E4.1.6 Works 1a (n) of the draft DCO APP-026 states that there would be five police observation platforms on the eastbound carriageway and Works No1b (o) states there would be four police observation platforms on the westbound carriageway but these numbers are not assessed in the ES. Can the applicant provide evidence to show that these have been assessed in the ES?**

1. Paragraph 4.2.2 of Chapter 4 of the Environmental Statement ("ES") (Application Document Reference 6.1) notes that "police observation platforms" ("POPs"), providing a safe area for stationary police vehicles, will be positioned adjacent to some Emergency Refuge Areas ("ERAs").
2. The Scheme Plans (Drawing 4.1 of the ES) (Application Document Reference 6.2) show that there would be five police observation platforms on the eastbound carriageway and five police observation platforms on the westbound carriageway (one of which is retained from the current baseline) on completion of the Scheme. The locations of all additional POPs coincide with locations of Emergency Refuge Areas ("ERAs"). A number of these ERAs have been assessed in Chapter 8 of the ES (Application Document Reference 6.1). Only those ERAs which are expected to cause an effect have been assessed within Chapter 8 of the ES.
3. The environmental assessment shows that as a result of the construction of the ERAs (and POPs), vegetation will be lost and permanent vegetation clearance will be undertaken, with temporary vegetation clearance surrounding the ERAs up to the Order limits of the Scheme, as shown in the Vegetation Clearance drawings (Annex A2 of the Engineering and Design Report ("EDR") (Application Document Reference 7.4)). The Environmental Masterplan, (Annex A1 of the EDR), shows the existing landscape element at each ERA (and associated POP), in order to establish the landscape that will be lost permanently and temporarily. It also outlines what the existing landscape will be replaced with and for what purpose, on completion of the Scheme. The impact of vegetation clearance from the construction of ERAs (and associated POPs) has been assessed in Chapter 8 of the ES (paragraphs 8.6.10 (d), 8.7.12 (d), 8.12.10 (b) and (c) and 8.12.14) where applicable.
4. There are no other parameters of the EIA that are relevant to the assessment of POPs.
5. Table 1 and 2 below outline the ERAs (as shown on the Scheme Plans (Drawing 4.1 of the ES)) and the Environmental Masterplan (Annex A1 of the EDR)), that have associated POPs, and also summarises the impacts of such ERAs. The presence of a POP is not specifically mentioned in each assessment, as every POP which will be provided as part of the Scheme is contiguous with, and forms part of, the ERA. This is explained at paragraph 6.3.17 and 6.3.18 of the EDR (Application Document Reference 7.3), which also illustrates the modest scale of such facilities - a full, separate description and assessment is not required.

Table 1: Summary of Impacts of ERAs on the Eastbound carriageway

<b>Eastbound carriageway ERA reference and Police Observation Platform location</b>	<b>Reference in Chapter 8 of the ES (Application Document Reference 6.1)</b>	<b>Habitat lost (Environmental Masterplan) (Annex A2 of the Engineering Design Report (Application Document Reference 7.4))</b>	<b>Overall conclusion</b>
ERA E8-B1 (sheet 16 Scheme Plan, Sheet 8 Environmental Masterplan)	Not referenced in the ES. Vegetation clearance would be minimal and given ERAs occupy a small area and do not involve prominent structures, landscape/visual impacts would be negligible, resulting in neutral effects.	Open grassland to be replaced with open grassland and linear belts of trees and shrubs	Neutral effects
ERA E7-B1 (sheet 30 Scheme Plan, Sheet 16 Environmental Masterplan)	Paragraph 8.7.12 (d)	Scattered trees to be replaced with linear belts of trees and shrubs	Construction activities as a whole in this area will have a short term minor adverse magnitude of impact resulting in a slight adverse significance of effect on the character of this landscape
ERA E4-B2 (sheet 45 Scheme Plan, Sheet 23 Environmental Masterplan)	Not referenced in the ES. Vegetation clearance would be minimal and given ERAs occupy a small area and do not involve prominent structures, landscape/visual impacts would be negligible, resulting in neutral effects.	Scrub to be replaced with open grassland	Neutral effects
ERA E3-B1 (sheet 51 Scheme Plan, Sheet 26 Environmental Masterplan)	Not referenced in the ES. The ERAs will occupy a small area with larger areas of adjacent woodland remaining such that there would be negligible change to woodland landscape characteristics and no visual intrusion, landscape/visual impacts would be negligible, resulting in neutral effects.	Woodland to be replaced with open grassland and woodland edge	Neutral effects
ERA E1-B1 (sheet 59 Scheme Plan, Sheet 29 Environmental Masterplan)	Not referenced in the ES. The ERAs will occupy a small area with larger areas of adjacent woodland remaining such that there	Woodland to be replaced with open grassland	Neutral effects

<b>Eastbound carriageway ERA reference and Police Observation Platform location</b>	<b>Reference in Chapter 8 of the ES (Application Document Reference 6.1)</b>	<b>Habitat lost (Environmental Masterplan) (Annex A2 of the Engineering Design Report (Application Document Reference 7.4))</b>	<b>Overall conclusion</b>
	would be negligible change to woodland landscape characteristics and no visual intrusion, landscape/visual impacts would be negligible, resulting in neutral effects.		

Table 2: Summary of Impacts of ERAs on the Westbound carriageway

<b>Westbound carriageway ERA reference and Police Observation Platform location</b>	<b>Reference in Chapter 8 of the ES (Application Document Reference 6.1)</b>	<b>Habitat lost (Environmental Masterplan) (Annex A2 of the Engineering Design Report (Application Document Reference 7.4))</b>	<b>Overall conclusion</b>
ERA E8-A2 (sheet 15 Scheme Plan, Sheet 8 Environmental Masterplan)*	Paragraph 8.6.10 (d). Vegetation clearance would be minimal and given ERAs occupy a small area and do not involve prominent structures, landscape/visual impacts would be negligible, resulting in neutral effects	Open grassland to be replaced with open grassland	Neutral effects
ERA E7-A3 (sheet 26 Scheme Plan, Sheet 13 Environmental Masterplan)	Not referenced in the ES. Vegetation clearance would be minimal and given ERAs occupy a small area and do not involve prominent structures, landscape/visual impacts would be negligible, resulting in neutral effects	Scrub to be replaced with open grassland	Neutral effects



<b>Westbound carriageway ERA reference and Police Observation Platform location</b>	<b>Reference in Chapter 8 of the ES (Application Document Reference 6.1)</b>	<b>Habitat lost (Environmental Masterplan) (Annex A2 of the Engineering Design Report (Application Document Reference 7.4))</b>	<b>Overall conclusion</b>
Police observation platform retained (sheet 52 Scheme Plan, Sheet 26 Environmental Masterplan)	N/A	N/A	N/A
ERA E2-A1 (sheet 55 Scheme Plan, Sheet 28 Environmental Masterplan)	Paragraph 8.12.10 (b) and (c) and 8.12.14	Woodland to be replaced with open grassland and linear belts of trees and shrubs	The construction activities will form isolated pockets of very minor disturbance, the Scheme will have a short term negligible magnitude of impact on the character of the adjacent discordant landscapes resulting in a neutral significance of effect.
ERA E1-A1 (sheet 59 Scheme Plan, Sheet 29 Environmental Masterplan)	Not referenced in the ES. The ERAs will occupy a small area with larger areas of adjacent woodland remaining such that there would be negligible change to woodland landscape characteristics and no visual intrusion, landscape/visual impacts would be negligible, resulting in neutral effects.	Woodland to be replaced with open grassland	Neutral effects

\* There are 61 sheets in the Scheme Plan and 31 sheets in the vegetation clearance drawings and environmental masterplan drawings

- The vegetation clearance associated with the installation of ERAs and POPs as a result of carriageway widening at the locations listed in Table 1 and 2 above will result in no more than slight adverse effects. This is not classified as a significant effect. It is considered that the details of these police observation platforms would not affect the overall findings of this assessment.

**E4.1.7 The ES states that there will be approximately 130 closed circuit television cameras but the draft DCO APP-026 states there will be 124. Can the applicant please clarify the number of CCTV cameras which will be used in the proposed development, and demonstrate that a worst case scenario has been assessed in the ES.**

1. The current preliminary design indicates that 124 cameras are required, as stated in the Draft Development Consent Order (“DCO”). However this cannot be confirmed until a “high-level” CCTV survey has been conducted. A high-level survey involves positioning a mobile camera in each of the proposed positions to confirm that the 124 locations provide 100% visibility of the motorway.
2. The figure of “approximately 130” as stated in the Environmental Statement (Application Document Reference 6.1) has been used for assessment as a worst case scenario. Planning is currently underway for the high-level survey which is likely to be carried out in December. This would enable the CCTV locations and numbers to be confirmed in January 2016 and the Draft DCO updated accordingly. However, Highways England can confirm that the maximum number of CCTV cameras that will be provided as part of the Scheme as updated in January 2016, will be 130 to accord with the assessment in the ES.
3. Because each camera is simply a slender, pole-mounted structure (see paragraph 6.4.15 of the Engineering and Design Report (Application Document Reference 7.3)), it is not necessary or proportionate to assess each and every camera, just as it would not be necessary to assess and mention the location of each and every lamp post.

**E4.1.8 The locations of the gantries have been determined by design standards and these standards take into account need for maintenance, safety and visibility for road users. Can the applicant confirm what the design standards are which are referred to in para 8.2.13 APP-148 of the ES?**

1. The standards used to determine gantry locations on smart motorways are contained in Interim Advice Notes ("IANs"). IANs are issued by Highways England from time to time to supplement or update the design standards given in the Design Manual for Roads and Bridges ("DMRB") (see paragraph 6.2.1 of the Engineering and Design Report (Application Document Reference Number 7.3)). They contain specific guidance in connection with works on motorways and trunk roads in England. While IANs must be read together with the DMRB, they are not part of the DMRB. IANs can be accessed at [www.standardsforhighways.co.uk](http://www.standardsforhighways.co.uk). Although most IANs are issued as guidance, some IANs, such as those listed below, are mandatory. Where such mandatory requirements cannot be achieved a departure from standard ("DfS") is required. The need, justification and safety case for all DfSs must be agreed with an independent reviewer appointed by the designer or by the National Safety Control Review Group ("NSCRG") appointed by Highways England.

2. The relevant IANs are:

2.1. IAN 161/13 "Managed Motorways All Lane Running (MM/ALR)".

This document gives requirements and guidance on managed motorway schemes implementing all lane running. It sets out the design parameters and the mandatory requirements for the associated infrastructure and technology requirements, including gantry visibility, spacing, position relative to slip roads, provision of signals and provision of signs.

2.2. IAN 149/11 "Existing Motorway Minimum Requirements".

This document provides amendments and additional relaxations to various DMRB standards, allowing greater flexibility when dealing with the constraints associated with enhancing existing elements of the motorway network, including location of gantries and combination of signs to enable greater re-use of existing gantries.

## Landscape and visual impact

**E4.2.1** A Zone of Visual Influence (ZVI) has been used to identify the study area and this is shown on sheets 1 to 16 of Drawing 8.1 APP-215 to APP-217 and sheets 1 to 16 of Drawing 8.2 APP-219 to APP-221. The ES does not provide details regarding the dimensions of the gantries and therefore it is unclear how the ZVI was identified. Can the applicant confirm the parameters of the gantries and whether there is any flexibility in the dimensions of the gantries sought in the description of the authorised development? Can the applicant confirm that the ZVI has been identified based on worst case dimensions?

1. The parameters of the gantries used for the environmental assessment of the Scheme are:
  - 1.1. **Gantry location.** The location of each gantry is dictated by its operational function and by visibility requirements (refer to response to QE4.1.8). Where the standards allow a range of locations then each gantry has been positioned to suit environmental, geotechnical and land boundary constraints. The proposed locations can be seen in the mainline general arrangement drawings in Annex F1 of the Engineering and Design Report (Application Document Reference 7.4) and in the works plans (Application Document Reference 2.3).
  - 1.2. **Gantry type.** This is determined by the equipment carried on the gantry, by the land available for foundations and by span requirements. Where this leaves more than one option then environmental impact, maintenance requirements and cost are also considered. Details of the different gantry types are shown on the generic gantry details drawings (Application Document Reference 2.8). The gantry type proposed at each location is noted on the works plans.
  - 1.3. **Overall height of gantry.** The height of each gantry has been assessed by summing the following parameters:
    - 1.3.1. Cross-fall on carriageway: between 0.4m and 0.9m depending on location and span of the gantry;
    - 1.3.2. Headroom requirement: 5.8m minimum;
    - 1.3.3. Boom depth: varies as shown on the generic gantry details drawings;
    - 1.3.4. Mounting height of equipment placed above the boom: 0.7m; and
    - 1.3.5. Sign and/or signal size: The size of variable message signals is indicated on the generic gantry details drawings; sign size varies according to sign face design but is dictated by the number of destinations (or the number of lines of text) and the 'x' height (or lettering size) normally 300mm.

The maximum and minimum heights for each of the proposed gantry types are listed in response to QE4.2.4.
  - 1.4. **Gantry equipment:** Typical equipment mounted on each type of gantry is shown on the generic gantry details drawings, and the equipment on each individual gantry is indicated by inset figures on the mainline general arrangement drawings. It is proposed that all gantry mounted signs will be illuminated.
2. The flexibility for these parameters sought in the authorised development is:

- 2.1. **Gantry location.** Article 6 (Power to deviate) of the Draft DCO (Application Document Reference 3.1) defines flexibility sought in gantry location by reference to areas indicated on the works plans. The works plans are drawn to indicate a range of +/-15m from the gantry chainages (i.e. their locations on the Scheme) shown on the mainline general arrangement drawings.
  - 2.2. **Gantry type.** For gantry type 5 (Signal cantilever MS4) two options are included in the application. This is to give the detailed design flexibility to select the option most suited to the individual gantry location. Detailed design will also seek to optimise other elements shown on the generic gantry details drawings such as structural depth, plinth size and pile layout but such change would not impact the parameters used for environmental assessment.
  - 2.3. **Overall height of gantry.** The flexibility sought in the application for overall gantry heights is 0.5m as indicated in Article 6 (Power to deviate) of the Draft DCO (Application Document Reference 3.1).
  - 2.4. **Gantry equipment.** Flexibility is sought in the detailed design of the gantry sign faces within the limits of the overall height. The number and type of variable message signals and advance motorway indicators will remain as shown on the mainline general arrangement drawings.
3. The Zone of Visual Influence (“ZVI”) has been prepared to identify the extent over which the Scheme would be visible and within which the potential significance of effects would occur. With reference to paragraph 8.2.8 of the ES (Application Document Reference 6.1), the ZVI shown in Drawing 8.1 (sheets 1 to 16) and Drawing 8.2 (sheets 1 to 16) of the ES (Application Document Reference 6.2) has been determined based on a number of winter and summer surveys during the Scheme’s design development. The locations and dimensions of the gantries along the Scheme formed part of the design development process and included a review of gantry locations to see if any would potentially result in large or major adverse effect. Where there was the potential for such an effect to occur, opportunities for gantry relocation were considered. With reference to paragraph 8.2.13 of the ES, gantry G8-09 has been relocated westwards from chainage 49+090.000 to chainage 49+435.000 to avoid a significant visual impact on the two residential properties on Mill Lane to the north east of Mill Lane underbridge.
  4. On this basis, the survey team undertaking the last winter survey (worst case scenario) in January 2015 had available and considered outline scheme plans indicating the gantry locations as well as the gantry dimensions ranging from approximately 8m to 15.5m in height, with the largest dimensions (worst case) assumed in cases of uncertainty regarding final design dimensions. This is consistent with the dimensions stated in answer to QE4.2.4 below. Highways England confirms the information used to identify the ZVI is based on the gantry dimensions contained in the Gantry General Arrangements (Application Document Reference 2.8).

**E4.2.2 Has the baseline information for the landscape and visual impact assessment (LVIA) been agreed with relevant stakeholders?**

1. Whilst there has been no formal agreement with regards to the baseline information for the landscape and visual impact assessment ("LVIA"), equally there has been no disagreement as to the baseline information, Highways England considers that the relevant stakeholders have been provided with all the necessary information, and no objections have been raised.
2. The relevant stakeholders consist of the local planning authorities directly affected by the Scheme (comprising the county, unitary and district councils), and the statutory environmental bodies (Environment Agency, Historic England, and Natural England).
3. The approach taken in the LVIA to identify and present the baseline information follows the guidance set out the Highways Agency's Interim Advice Note 135/10: Landscape and Visual Effects Assessment, which supersedes Design Manual for Roads and Bridges Volume 11, Section 3, Part 5. However, importantly, it also had regard to published information from the key stakeholders.
4. The landscape baseline information was obtained from two main sources; a desk top review of documentation, much of it prepared by the relevant stakeholders as noted, and field surveys undertaken by Highways England's landscape architects. The documentation reviewed is itemised in paragraph 8.2.6 of the ES (Application Document Reference 6.1) and is repeated at the end of this response for ease of reference. The project landscape architects also undertook the following field surveys:
  - 5.1 A detailed landscape survey of the local Landscape Character Areas in December 2014. This is explained in paragraph 8.2.8 of the ES. The Landscape Character Areas are presented in Drawing 8.1 (Application Document Reference 6.2);
  - 5.2 Site surveys in 2013 and 2014 during the summer and winter, and in early 2015 to establish the likely visual influence of the Scheme, identify visual receptor groups and describe existing views. This is explained in paragraph 8.2.8 of the ES. Drawing 8.2 Visual Effects includes the zone of visual influence and Drawing 8.3 Viewpoints provides panoramic views for summer, winter and at night (Application Document Reference 6.2); and
  - 5.3 A baseline night time survey in November 2014 to verify the Environmental Zones that define the broad night-time characteristics of areas in terms of relative brightness or darkness. This survey is explained in paragraphs 8.2.9 to 8.2.11 of the ES and illustrated in Drawing 8.4 Sheets 1 to 16 (Application Document Reference 6.2).
5. The documents reviewed for the landscape baseline desk study included (see paragraph 8.2.6 of the ES, Application Reference Number 6.1):
  - 5.1. National Policy Statement for National Networks (2014), Department for Transport;
  - 5.2. Council of Partners of the North Wessex Downs Area of Outstanding Beauty (2009). 'The North Wessex Downs AONB Management Plan 2009–2014';
  - 5.3. Natural England (2012) 'National Character Area Profiles';
  - 5.4. Countryside Agency (now Natural England) (2002) 'North Wessex Downs AONB Integrated Landscape Character Assessment';

5.5. Department for Communities and Local Government (2012) ‘National Planning Policy Framework’;

5.6. adopted and emerging local development plans, comprising:

- 5.6.1 West Berkshire Council Core Strategy Development Plan (2012) (Adopted);
- 5.6.2 West Berkshire District Local Plan 1991 – 2006 (Saved Policies 2007), (Saved Policies);
- 5.6.3 Reading Borough Local Development Framework (2008) (Adopted);
- 5.6.4 Wokingham Borough Core Strategy (2010) (Adopted);
- 5.6.5 Royal Borough of Windsor and Maidenhead Local Plan (2003) (Adopted);
- 5.6.6 Royal Borough of Windsor and Maidenhead Local Plan: Preferred Options Consultation (January 2014) (Emerging Policy, Not Adopted);
- 5.6.7 Slough Local Development Framework, Core Strategy 2006 – 2026 (2004) (Adopted);
- 5.6.8 Slough Local Plan (2004) (Saved Policies);
- 5.6.9 Bracknell Forest Core Strategy (2008) (Adopted);
- 5.6.10 Bracknell Forest Local Plan (2002) (Saved Policies);
- 5.6.11 South Bucks Core Strategy (2011) (Adopted);
- 5.6.12 South Bucks Local Plan (1999) (Saved Policies);
- 5.6.13 London Borough of Hillingdon Local Plan, Part 1 (2012) (Adopted);
- 5.6.14 Hillingdon Unitary Development Plan (1998) (Saved Policies);
- 5.6.15 London Borough of Hillingdon, Local Plan: Part 2 Development Management Policies (Proposed Submission Version, September 2014) (Emerging Policy, Not Adopted);
- 5.6.16 London Borough of Hounslow Unitary Development Plan (2007) (Adopted);  
and
- 5.6.17 London Borough of Hounslow Local Plan, Submission 2015-2030 (Emerging Policy, Not Adopted).

5.7. local landscape character assessments, comprising:

- 5.7.1 Berkshire Landscape Character Assessment (2003) (<http://info.westberks.gov.uk/>);
- 5.7.2 Wokingham Landscape Character Assessment (2004) (<http://www.wokingham.gov.uk/planning/policy/countryside-and-open-space>);

5.7.3 Landscape Character Assessment for the Royal Borough of Windsor and Maidenhead (2004) ([http://www.rbwm.gov.uk/web/pp\\_landscape\\_character\\_assessment.htm](http://www.rbwm.gov.uk/web/pp_landscape_character_assessment.htm)); and

5.7.4 South Bucks District Landscape Character Assessment (2011) (<http://www.buckscc.gov.uk/environment/heritage-ecology/landscape/buckinghamshire-landscape-character-assessment/south-bucks-district-landscape-character-assessment/>).

6. The relevant stakeholders have had at least three formal opportunities to indicate agreement or disagreement with the baseline information:
  - 6.1. in the Scoping Opinion response to the Environmental Impact Assessment Scoping Report;
  - 6.2. on the baseline presented in the Preliminary Environmental Information Report (issued November 2014) (<http://www.highways.gov.uk/publications/m4-junction-3-to-12-smart-motorway-consultation-documents/>) during the formal consultation period; and
  - 6.3. in their relevant representations.
7. No parties (including local planning authorities directly affected by the Scheme and the statutory environmental bodies) that have made a relevant representation have raised any form of comment regarding the baseline information for the LVIA.



**E4.2.3 Vegetation Clearance, Annex A, sheets 1 to 16 APP-098 to APP-099 shows locations for areas of vegetation removal, although notes provided on the plans state that the areas are indicative and will be subject to amendment in line with the design development of road alignment. Can the applicant confirm that the worst case scenario regarding vegetation removal has been assessed?**

1. Highways England confirms the worst case scenario has been assessed in Chapter 8 of the ES (Application Document Reference 6.1).
2. The vegetation clearance shown in the Engineering and Design Report, Annex A2, Vegetation Clearance Sheets 1 to 31 (Application Document Reference 7.4) is based on the information contained in the Engineering and Design Report, Annex F, Mainline General Arrangement, Sheets 1 to 61 (Application Document Reference 7.4). The landscape and visual assessment in Chapter 8 of the ES (Application Document Reference 6.1) is based on the extent of the vegetation clearance shown in Annex A2 of the Engineering and Design Report. As stated in paragraph 8.15.1 of the ES, it has not been possible to determine the exact extent of vegetation clearance at some locations and therefore a precautionary approach has been adopted, i.e. in these locations the worst case scenario has been assumed whereby the majority of the vegetation within the Order limits adjacent to these features will be removed. As described in paragraph 8.3.2 of the Outline Construction Environmental Management Plan (Appendix 4.2A of the ES) (Application Document Reference 6.3), the contractor will put in place appropriate measures to protect landscape and visual amenity from construction activities, which will be secured under Schedule 2, Requirement 8 of the Draft DCO (Application Document Reference 3.1).

**E4.2.4** The spatial scope of the assessment is identified as the ZVI which is shown on Drawing 8.2 Sheets 1 to 16 APP-219 to APP-221. The ES does not provide details regarding the colours or the dimensions of the proposed gantries and therefore it is unclear how the ZVI was identified in relation to the gantries. Details of the types of gantries, together with 3D imaging, are provided in 'Gantry General Arrangements' APP-024, though this document is not referenced in the ES. Can a reference to this document be provided in the ES? Can the applicant also confirm the maximum dimensions of the proposed gantries, and confirm that this dimension was used in the identification of the ZVI, and would be secured through the DCO?

1. Application Plans Gantry General Arrangements is contained in the Scheme as Application Document Reference 2.8. In addition, a reference to the Gantry General Arrangements need not be provided in the ES because the Engineering and Design Report (“EDR”) (Application Document Reference 7.3) contains descriptions of the various gantry types and is incorporated by reference at paragraph 4.1.3 of the ES. The EDR describes the gantry types at Section 6.4. The ES already illustrates gantry types in Drawings 4.1 and 4.2.

**Confirmation on the maximum dimensions of the proposed gantries**

2. Based on the preliminary sign face design and including allowance for mounting height and carriageway cross fall the overall height for each type of gantry is as tabulated below.

<b>Gantry Type</b>	<b>Minimum Height (m)</b>	<b>Maximum Height (m)</b>
<b>Type 1</b>	9	13.4
<b>Type 2</b>	10.6	12.8
<b>Type 3</b>	9.7	15.5
<b>Type 4</b>	8.3	12.8
<b>Type 5</b>	9.0	9.5
<b>Type 6</b>	9.0	9.5
<b>Type 7</b>	10.3	15.2
<b>Type 8</b>	9.0	9.5

3. These dimensions are those used on/derived from the Application Plans Gantry General Arrangements (Application Document Reference 2.8), and are stipulated in the Draft DCO (Application Document Reference 3.1) at Schedule 1 as a result.
4. The Zone of Visual Influence (“ZVI”) has been prepared to identify the extent over which the Scheme would be visible and within which the potential significance of effects would occur. With reference to paragraph 8.2.8 of the ES (Application Document Reference 6.1), the ZVI shown in Drawing 8.1 (sheets 1 to 16) and Drawing 8.2 (sheets 1 to 16) of the ES (Application Document Reference 6.2) has been determined based on a number of winter and summer surveys during the Scheme’s design development. The locations and dimensions of the gantries along the Scheme formed part of the design development process and included a review of gantry locations to see if any would potentially result in large or major adverse.

5. Where there was the potential for this to occur, opportunities for the gantry to be relocated were considered. On this basis the survey team undertaking the last winter survey (worst case scenario) in November 2014 used outline scheme plans indicating the gantry locations as well as the gantry dimensions ranging from approximately 8m to 15.5m in height. The information used to identify the ZVI is based on the gantry dimensions contained in the Gantry General Arrangements (Application Document Reference 2.8). The colour of the proposed gantries does not have a bearing on the extents of the ZVI.

**E4.2.5 Para 8.2.8 APP-148 states that viewpoints were selected for the LVIA to give an indication of the range of views available. Can the applicant confirm that the viewpoints were agreed with stakeholders?**

1. In February 2015, a letter was circulated to relevant local authorities along the Scheme asking for clarification that the viewpoints selected for the Preliminary Environmental Information Report (issued in November 2014) (<http://www.highways.gov.uk/publications/m4-junction-3-to-12-smart-motorway-consultation-documents/>) were acceptable, and therefore could be used for the purposes of the ES.

1.1. While the viewpoints were not specifically agreed with stakeholders, Highways England can show that all relevant stakeholders have been afforded opportunities to contribute to, comment on and agree the viewpoints adopted for the Landscape and Visual Impact Assessment presented in Chapter 8 of the ES (Application Document Reference 6.1). The following table summarises the consultation undertaken by Highways England and the actions taken, and it is notable that some authorities responded, whilst others did not:

Date	Form of Contact	Summary
Slough Borough Council		
11 February 2015	Email requesting confirmation on viewpoints proposed for the ES	Clarification requested that the viewpoints selected for the Preliminary Environmental Information Report are acceptable, and therefore can be used for the purposes of the ES. No response received
West Berkshire District Council		
11 February 2015	Email from Highways Agency requesting confirmation on viewpoints proposed for the ES	Clarification requested that the viewpoints selected for the Preliminary Environmental Information Report are acceptable, and therefore can be used for the purposes of the ES. No response received
Bracknell Forest Council		
11 February 2015	Email requesting confirmation on viewpoints proposed for	Clarification requested that the viewpoints selected for the Preliminary Environmental Information Report are acceptable, and therefore can be used for

Date	Form of Contact	Summary
	the ES	the purposes of the ES. No response received
Buckinghamshire County Council		
11 February 2015	Email requesting confirmation on viewpoints proposed for the ES	Clarification requested that the viewpoints selected for the Preliminary Environmental Information Report are acceptable, and therefore can be used for the purposes of the ES. No response received
London Borough of Hillingdon		
11 February 2015	Email requesting confirmation on viewpoints proposed for the ES	Clarification requested that the viewpoints selected for the Preliminary Environmental Information Report are acceptable, and therefore can be used for the purposes of the ES
17 February 2015	Email from London Borough of Hillingdon to Highways Agency in response to email dated 11 February 2015 requesting confirmation on viewpoints proposed for the ES	Request for additional photomontages from one additional viewpoint
24 February 2015	Email from London Borough of Hillingdon to Highways Agency regarding viewpoints proposed for the ES	Request for further additional photomontages

Date	Form of Contact	Summary
27 February 2015	Email from Highways Agency in response to additional photomontages requested by London Borough of Hillingdon on 17 February 2015 and 24 February 2015	Proposed additional viewpoints attached. Confirmation requested that London Borough of Hillingdon approves of the additional viewpoints
2 March 2015	Email from London Borough of Hillingdon to Highways Agency regarding conservation and landscape relating to Cranford	Sets out additional viewpoints they wish to observe and summarises previous viewpoint findings
27 July 2015	Two emails from Highways England to London Borough of Hillingdon, in response to emails dated 17 February 2015 and 24 February 2015	Provision of six pairs of photomontages (existing and with Scheme) for Cranford Park
27 July 2015	Email from London Borough of Hillingdon to Highways England regarding issue of photomontages	Confirmation by London Borough of Hillingdon that the photomontages had been received and that they would be distributed internally
8 September 2015	Email from Highways England to London Borough of Hillingdon	Email regarding viewpoint locations and photomontages
14 September 2015	Email from Highways England to London	Further to the email sent by Highways England on 27 July 2015 (above), a

Date	Form of Contact	Summary
	Borough of Hillingdon	complete set of revised photomontages issued by Highways England.
London Borough of Hounslow		
11 February 2015	Email requesting confirmation of viewpoints proposed for the ES	Clarification requested that the viewpoints selected for the Preliminary Environmental Information Report are acceptable, and therefore can be used for the purposes of the ES. No response received
Royal Borough of Windsor and Maidenhead		
11 February 2015	Email requesting confirmation on viewpoints proposed for the ES	Clarification requested that the viewpoints selected for the Preliminary Environmental Information Report are acceptable, and therefore can be used for the purposes of the ES. No response received
Reading Borough Council		
11 February 2015	Email requesting confirmation on viewpoints proposed for the ES	Clarification requested that the viewpoints selected for the Preliminary Environmental Information Report are acceptable, and therefore can be used for the purposes of the ES. No response received
South Bucks District Council		
11 February 2015	Email requesting confirmation on viewpoints proposed for	Clarification requested that the viewpoints selected for the Preliminary Environmental Information Report are acceptable, and therefore can be used for

Date	Form of Contact	Summary
	the ES	the purposes of the ES. No response received
Wokingham Borough Council		
11 February 2015	Email requesting confirmation on viewpoints proposed for the ES	Clarification requested that the viewpoints selected for the Preliminary Environmental Information Report are acceptable, and therefore can be used for the purposes of the ES. No response received

5. During a meeting held between Highways England and London Borough of Hillingdon on 22 June 2015 to discuss the Application, London Borough of Hillingdon requested additional photomontages of the Scheme from locations within Cranford Park Conservation Area to show the setting of the Church of St Dunstan against the Scheme. The additional summertime photomontages (six pairs of photomontages (existing and with Scheme) for Cranford Park) were provided by Highways England to London Borough of Hillingdon on 27 July 2015 (refer to table above). These are annexed at Appendix B.
6. Within their relevant representation, Historic England requested that the evaluation of a slight adverse effect on the setting of the Church of St Dunstan, a Grade II\* listed building, during operation be evidenced further through visual assessments from viewpoints to the south of the Church of St Dunstan and within the landscaped park, including night-time visualisations.
7. Highways England prepared additional day-time visualisations for viewpoints within Cranford Park, which were provided to Historic England between 11 September 2015 and 14 September 2015. Night-time visualisations were not prepared as explained below.
8. The existing motorway lighting will be replaced with modern LED luminaires, which will reduce night-time glare and light spill. The proposals are described in paragraph 4.2.4(c) of the ES (Application Document Reference 6.1) and in paragraph 6.3.44 of the Engineering and Design Report (Application Document Reference 7.3). The impact of the lighting proposals is assessed in paragraph 8.2.11 of the ES (Application Document Reference 6.1), which assumes no change and a neutral significance of effect. A difference in visual effect from a reduction in glare from lighting, where the lighting is obscured by trees, cannot be shown on a visualisation. On that basis, such night-time visualisations would not be representative. For this reason, further work on night-time visual impacts has not been considered appropriate or necessary.



**E4.2.6 Para 8.2.11 APP-148 states that no further assessment work (since a survey in November 2014) has been carried out in relation to impacts on the night time landscape from lighting, as the replacement lighting will be retained at its current locations. However, it is uncertain whether the lighting columns will be replaced and if so their design; para 4.2.4 of Chapter 4 APP-144 states "lighting columns will be mounted on top of the new concrete barrier". Details are not provided regarding the existing and proposed light spill. Can the applicant confirm the design of the new lighting and how it compares with the existing lighting and provide details of the how the proposed light spill compares with the existing?**

1. The proposed lighting columns will be located in the same locations as the existing lighting columns as detailed in paragraph 6.3.44 of the Engineering and Design Report ("EDR") (Application Document Reference 7.3)
2. The main carriageway lighting will be mounted on twin-arm columns located in the central reserve. New columns will be required due to the proposed vertical concrete barrier which is also in the central reserve. The new columns will be on top of the proposed vertical concrete barrier and will carry the luminaires 12m above the carriageway, as detailed in paragraph 6.3.44 of the EDR.
3. The slip road lighting will be post-top mounted on new columns located in the verge. This will replace the existing lighting which is mounted on brackets of varying outreaches.
4. The existing lighting is provided via 250W and 400W high-pressure sodium luminaires. The Scheme will use modern Light Emitting Diode ("LED") luminaires throughout. The LED luminaires control the lighting distribution to project light onto the road surface. The luminaires will be installed horizontally and there will be no upward light distribution. The total light output from the LED luminaires to achieve the required road illumination levels will be up to 50% less than that of the existing high pressure sodium luminaires. There will therefore be both less lighting spill and less light pollution. Also the introduction of Central Management System could reduce energy requirements by up to a further 30%. The innovation to utilise LEDs for the gantry lighting will also enable a much greater control of light resulting in lighting being directed on the gantry faces, greatly reducing nuisance light and glare. These benefits are in addition to previous mentioned energy savings which would also be achieved by using LEDs to light the gantries.

**E4.2.7 Chapter 8 APP-148 does not assess the impacts of lighting for night time construction works or of the construction compounds. This was an issue previously raised in the PINS Scoping Report. Can the applicant explain why impacts from night time lighting for construction works and from lighting of construction compounds have not been assessed?**

1. The purpose of the landscape and visual impact assessment is to identify the main effects arising from the assessment and on that basis Chapter 8 of the ES (Application Document Reference 6.1), has assessed the effects of the construction work and construction compounds on the landscape character and visual amenity of the study area.
2. No formal assessment of night-time construction lighting has been carried out. This is because an informal consideration on the basis of professional judgment and experience of similar construction projects indicated that there would be no significant impacts from night-time construction lighting.
3. The potential environmental impacts of the Scheme are assessed with mitigation applied, following Volume 11 of Design Manual for Roads and Bridges (“DMRB”). Construction compound lighting consists of moveable and directional lighting, which is controlled by the Outline Construction Environmental Management Plan (“CEMP”) (Appendix 4.2A of the ES) (Application Document Reference 6.3), and secured by Schedule 2, Requirement 8 of the Draft DCO (Application Document Reference 3.1). The control measures in the Outline CEMP require the contractor to position lighting to ensure that there is no significant effects. As noted in Chapter 8 of the ES, the construction compounds are in areas which are subject to background lighting, and in circumstances where sufficient control measures are in place, the informal assessment was that there would be no significant impact from construction compound lighting. Works on the carriageway were also not anticipated to have any significant impact as the lighting would also be directional, controlled by the CEMP and short term as the works proceed.
4. Highways England has now appointed a contractor to construct the Scheme. An assessment informed by planned lighting and use of the construction compounds is being carried out. This assessment will be made available to the Examining Authority by Deadline III.

**E4.2.8 Drawing 4.1 APP-182 to APP-186 shows a number of new 'post mounted signs', and Chapter 4 APP-144 states that there will be approximately 130 pan, tilt and zoom closed circuit television cameras installed on 15m masts. Can the applicant provide details regarding the post mounted signs and CCTV cameras and confirm whether or not these have been included within the landscape assessment?**

1. Paragraphs 4.2.13 and 4.2.15 of the ES (Application Document Reference 6.1) describe the post (or pole, or verge) mounted signs and the closed circuit television ("CCTV") cameras. Further details of the CCTV installed on 15m masts are presented in the Engineering and Design Report, Annex F5, CCTV Typical Detail (Application Document Reference 7.4). Additional information on the location and height of all signs and gantries is provided in Appendix C to these Responses to Written Questions.
2. CCTV installations were considered as part of the assessment in Chapter 8 of the ES (Application Document Reference 6.1) as integral parts of the conversion to smart motorways (see paragraph 4.2.15 of the ES), but not assessed on an individual basis. This is because the CCTV installations, whether as a single element or collectively as a series of elements across the Scheme would be very minor, inconspicuous and easily overlooked both in terms of views from the M4 motorway and from adjacent visual receptors. It is considered that these features in addition to the more visible elements such as gantries, replacement structures, Emergency Refuge Areas and slip road realignment would result in no noticeable change in addition to that reported in Chapter 8 of the ES if considered separately.

**E4.2.9** There appears to be no reference in Chapter 8 APP-148 as to the visual appearance of the new or replacement environmental (noise) barriers. Can the applicant provide clarification regarding the location and visual appearance of the environmental (noise) barriers ie dimensions, materials, colour, locations, and provide confirmation whether these have been taken into account as part of the Landscape and Visual Impact Assessment and if so how? (see also Q4.7.18)

1. The location of the environmental noise barriers is provided on Drawing 12.2m (Application Document Reference 6.2), in Appendix 12.2 of the ES (Application Document Reference 6.3) and on the Environmental Masterplan drawings presented in Annex A1 of the Engineering and Design Report (Application Document Reference 7.4).
2. The dimensions (length and height) of the proposed new environmental noise barriers are provided in Appendix 12.2 of the ES (Application Document Reference 6.3) and illustrated on each of the Environmental Masterplan Sheets 1 to 32, where the key shows three types of Environmental Barrier:
  - 2.1. Existing Environmental Barrier;
  - 2.2. EE.N.1.3 Environmental Barrier (2.0m high); and
  - 2.3. EE.N.1.3 Environmental Barrier (2.4m high).
3. The visual assessment assumed that the new or replacement environmental barriers would be of timber construction and be of similar appearance and weathering properties to the existing environmental / noise barriers. This is the usual choice for environmental noise barriers that take the form of a fence on highway schemes.
4. Sections 8.6 to 8.13 of Chapter 8 of the ES (Application Document Reference 6.1) consider the existing environmental (noise) barriers and the new and replacement environmental barriers, both as a feature in the landscape and as screening element to traffic from adjacent visual receptors on a link by link basis. The assessment is carried out in terms of each environmental barrier dimensions and locations. The dimensions of the new noise barriers are derived from the noise modelling reported in Chapter 12 of the ES (Application Document Reference 6.1).
5. It is likely that where environmental barriers would be located on a structure such as a bridge, they would comprise an alternative more durable material. At these locations the environmental barrier would be appropriately designed to take account of the urban or landscape context. The detail design of alternative barrier materials, if required, would be developed in consultation with the local planning authority. It is not anticipated that the choice of an alternative material for the environmental barrier to that assessed in Chapter 8 of the ES would materially affect its findings.

**E4.2.10** Table 8.2 APP-148 provides a summary of landscape and visual impacts with the significance of residual effects identified. The table shows temporary and permanent impacts arising from construction and cumulative impacts. For the majority of the impacts which are identified as moderate adverse during operation, they reduce over time to a slight adverse impact. There are two instances where the residual effects from the operational impacts are identified as moderate adverse. One is for Junction 6 to 5 - one residential receptor at Winvale (Chalvey) and the second for visual receptors between Junction 5 to 4b. The ES does not state whether these impacts are capable of being mitigated. Can the applicant please clarify whether the impacts to these residential properties are incapable of being mitigated? Since the LVIA does not clarify which effects are determined to be significant in terms of EIA, can these ongoing impacts be considered as significant (in terms of EIA)?

1. With reference to paragraph 8.10.22 of the ES (Application Document Reference 6.1), the assessment identifies that a group of residential properties on the eastbound side of the Scheme at Winvale (Chalvey) would experience a permanent moderate adverse significance of visual effect as a result of Gantry G4-16. This is a Type 1 gantry which spans the width of the M4 motorway and would stand 13m high above the eastbound carriageway. It is anticipated that this structure would form a prominent, isolated new element of motorway infrastructure above the intervening noise barrier.
2. As indicated on the Environmental Masterplan Sheet 22 in Annex A1 of the Engineering and Design Report (Application Document Reference 7.4) there is limited scope within the highway boundary to provide new planting. Furthermore, with reference to the response to the QE4.2.1, it is also not possible to relocate or reduce the dimensions of Gantry G4-16 (see General Gantry Arrangements (Application Document Reference 2.8)). It is therefore not possible to mitigate the visual effects of Gantry G4-16 on these properties.
3. As stated in paragraph 8.12.12 of the ES (Application Document Reference 6.1), the assessment identifies a group of residential properties on Keats Way (West Drayton) which would experience a permanent moderate adverse significance of visual effect in winter as a result of the reduced width of the intervening tree belt as a result of vegetation clearance associated with the M4 junction 3 eastbound off slip realignment. As shown on the Environmental Masterplan Sheet 22 in Annex A1 of the Engineering and Design Report (Application Document Reference 7.4), there is limited scope within the M4 highway boundary to provide new planting.
4. Highways England considers that the moderate adverse significance of effect reported for receptors at Winvale and West Drayton are not significant in Environmental Impact Assessment terms. The reason for this is that the view from both receptors is already, to varying degrees, influenced by the existing M4 motorway, its structures and traffic. In relation to the receptors at Winvale, although Gantry G4-16 would form a prominent element in the view it would clearly be seen as an additional piece of road infrastructure in the context of the foreground M4 motorway retaining wall with the noise fence above and the traffic on the motorway. With reference to paragraph 8.12.22 of the ES, in relation to the receptors at Keats Way, the existing intervening tree belt would be retained but the width of the tree canopy and its ability to filter views in winter to the traffic on the M4 motorway beyond would be reduced.

**E4.2.11 Although Cumulative effects are discussed APP-148, can the applicant confirm that the scope of the cumulative assessment has been agreed with relevant stakeholders?**

1. In accordance with Design Manual for Roads and Bridges Volume 11, Section 2, Part 5, consultation has been undertaken with relevant local planning authorities and other statutory bodies to agree the list of projects to be considered in the assessment of cumulative effects. Whilst the scope of the cumulative assessment has not been expressly agreed with the relevant stakeholders, there has been extensive liaison between Highways England and relevant stakeholders in order to establish the scope of the cumulative assessment. To the extent that any issues remain, these will be addressed in Statements of Common Ground with the relevant stakeholders.
2. The developments considered within the cumulative assessment (as of January 2015) are listed in Appendix 16.1 of the ES (Application Document Reference 6.3). The locations of the developments are presented on Drawing 16.1 (Application Document Reference 6.2).
3. The Planning Inspectorate, in the Scoping Opinion, advised that the cumulative effects assessment should consider major developments in the area that are:
  - 3.1. under construction;
  - 3.2. permitted application(s) not yet implemented;
  - 3.3. submitted application(s) not yet determined;
  - 3.4. all refusals subject to appeal procedures not yet determined;
  - 3.5. projects on the National Infrastructure Planning portal's programme of projects; and
  - 3.6. projects identified in the relevant development plan (and emerging development plans - with appropriate weight being given as they move closer to adoption) recognising that much information on any relevant proposals will be limited.
4. As stated in paragraph 16.3.2 of the ES (Application Document Reference 6.1), a list of proposed developments to be considered in the assessment of cumulative effects was compiled through searches of local authority planning portals for planning applications; a review of allocated and proposed sites in local plans; consultation responses on the Environmental Impact Assessment Scoping Report; the Planning Inspectorate's Scoping Opinion and direct consultation with local authorities whose areas are predicted to be affected by the Scheme. Rejected planning applications that are not subject to appeal were not considered as their implementation was not considered to be reasonably foreseeable.
5. In December 2014, a letter was circulated to relevant local planning authorities along the Scheme which included a list of developments identified on each of the local authority planning application websites. Responses received provided additional developments for consideration and/or provided updated details on developments already identified. Those additional developments that fell within the study area were considered using the criteria set out above and, where considered appropriate, were added to the list of developments presented in Appendix 16.1 of the ES (Application Document Reference 6.3).
6. Therefore, Highways England can confirm that relevant stakeholders have been afforded opportunities to contribute to the scope of the cumulative assessments presented in the ES (Application Document Reference 6.1). The following table summarises the consultation

undertaken by Highways England to determine the details of relevant developments within 1km of the Scheme for inclusion in the cumulative effects assessment.

Date	Form of Contact	Summary
Slough Borough Council		
3 December 2014	Letter requesting information on cumulative developments and planning history of land	Request for details on relevant developments within 1km of the Scheme and planning history of the land within or immediately adjoining the Order limits
13 January 2015	Email response from Slough Borough Council to email dated 3 December 2014	Provision of details on five developments that may be of relevance
West Berkshire District Council		
3 December 2014	Letter requesting information on cumulative developments	Request for details on relevant developments within 1km of the Scheme
22 January 2015	Email response from West Berkshire District Council to email dated 3 December 2014	Provision of details on developments. More details to follow
Bracknell Forest Council		
3 December 2014	Letter requesting information on cumulative developments	Request for details on relevant developments within 1km of the Scheme
15 January 2015	Email from Highways Agency with additional information in regards to cumulative developments	More detailed study area submitted to Bracknell Forest Council, as requested

Date	Form of Contact	Summary
	information request	
19 January 2015	Email response from Bracknell Forest Council to email dated 3 December 2014	No major developments within 1km study area
Buckinghamshire County Council		
3 December 2014	Letter requesting information on cumulative developments	Request for details on relevant developments and planning history of land within 1km of the Scheme. No response received
London Borough of Hillingdon		
3 December 2014	Letter requesting information on cumulative developments and planning history of land	Request for details on relevant developments within 1km of the Scheme and planning history of the land within or immediately adjoining the Order limits
4 February 2015	Email from London Borough of Hillingdon to Highways Agency in response to letter requesting information on cumulative developments (originally requested 3 December 2014)	Details provided of developments that London Borough of Hillingdon wishes to have considered as part of the ES
London Borough of Hounslow		
3 December 2014	Letter requesting information on cumulative developments	Request for details on relevant developments within 1km of



Date	Form of Contact	Summary
		the Scheme
12 December 2014	Repeat letter requesting information on cumulative developments (originally requested 3 December 2014)	Request for details on relevant developments within 1km of the Scheme
15 January 2015	Email query from London Borough of Hounslow regarding the request for information on cumulative developments (originally requested 3 December 2014)	London Borough of Hounslow requested confirmation of the study area required
3 February 2015	Email response to London Borough of Hounslow's email of 15 January 2015	Confirmation of study area required for information on cumulative developments
Royal Borough of Windsor and Maidenhead		
3 December 2014	Letter requesting information on cumulative developments	Request for details on relevant developments within 1km of the Scheme. No response received
Reading Borough Council		
3 December 2014	Letter requesting information on cumulative developments	Request for details on relevant developments within 1km of the Scheme
5 December 2014	Email from Reading Borough Council to Highways Agency	Provision of information and links to documents on cumulative developments
5 December 2014	Email exchange relating to	Review of proposed and

Date	Form of Contact	Summary
	cumulative development	allocated sites within the borough
9 January 2015	Letter from Reading Borough Council regarding cumulative development	Confirming no proposed developments within or immediately adjoining the proposed Order limits
Transport for London and the Greater London Authority		
3 December 2015 (Greater London Authority)	Letter from the Greater London Authority requesting information on cumulative developments	Request for details on relevant developments within 1km of the Scheme. No response received
South Bucks District Council		
3 December 2014	Letter requesting information on cumulative developments	Request for details on relevant developments within 1km of the Scheme
19 January 2015	Email response from South Bucks District Council to email dated 3 December 2014	<ul style="list-style-type: none"> <li>a) Under construction: None</li> <li>b) Permitted application(s) not yet implemented: None</li> <li>c) Submitted application(s) not yet determined: None</li> <li>d) All refusals subject to appeal procedures not yet determined: None</li> <li>e) Projects on the National Infrastructure's programme of projects: Western Rail Access to Heathrow, Heathrow Expansion Proposals (incl. Heathrow Hub) &amp; the proposed HS2 Spur</li> <li>f) Projects identified in the relevant development plan: None</li> </ul>
23 June 2015	Statement of Common Ground meeting between	Various matters discussed, including cumulative effects

Date	Form of Contact	Summary
	Highways England and South Bucks District Council	of other major infrastructure projects
Wokingham Borough Council		
3 December 2014	Letter requesting information on cumulative developments	Request for details on relevant developments and planning history of the land within 1km of the Scheme
19 January 2015	Written response from Wokingham Borough Council to letter dated 3 December 2014 regarding request for cumulative development information	List compiled of all developments within 1km of the Scheme

## **Flooding**

### **E4.3.1 Is the EA satisfied with the adequacy of the applicant's Flood Risk Assessment (FRA) APP-077 and with its conclusions?**

1. Highways England has not yet reached agreement with the Environment Agency ("EA") as to the adequacy of the Flood Risk Assessment ("FRA") (Application Document Reference 5.3) and its conclusions. However, a meeting between Highways England and the EA took place on the 25 September 2015 to discuss the FRA. During this meeting the compensation storage assessment methodology and available results were discussed. It was agreed that calculations should be completed at a selection of sites to quantitatively prove the principle that floodplain compensation for works within the floodplain can be achieved within the Scheme. Any agreement subsequently reached, following the EA's consideration of the results of these calculations, will be recorded in the Statement of Common Ground between Highways England and the EA.
2. The EA's concern was expressed in its relevant representation as follows '*Highways England proposes works within the floodplain without demonstrating that the level for level compensation is achievable, and therefore has not demonstrated that there would not be an increase in flood risk as a result of the proposed work*'.
3. The commitment to and principle of providing sufficient compensation storage where works are necessary in the floodplain is established in the Application at paragraphs 5.1.21, 5.1.22, 5.1.26, 5.1.36 and 5.1.45 of the FRA and paragraphs 15.4.64 to 15.4.68 and Table 15.5 of the Environmental Statement ("ES") (Application Document Reference 6.1). The FRA presents the results of analysis at key worksites within the floodplain, for example at Ascot Road (River Bourne) and Monkey Island Lane (River Thames) where works to existing overbridges are required. The mitigation required to ensure that there would be no increase in flood risk is described in paragraphs 15.4.64 to 15.4.69 of the ES, where it is stated that compensatory floodplain storage volume will be created, where storage losses occur, by removing and reconfiguring parts of existing embankments.
4. Since the submission of the Application, further work has been undertaken to confirm the requirements for compensation storage provision and to verify the feasibility of its provision on a volume for volume and, where possible, level for level basis. The results of this work have been submitted to the Environment Agency as a proposed appendix to the Statement of Common Ground (SoCG) These results are also appended to these responses to written questions at Appendix D.
5. The further assessment work is being informed by flood water level data supplied by the EA and LiDAR topography information. A total of 45 sites (both offline and along the main carriageway) are currently being assessed to confirm whether works are necessary within the floodplain, and to prove the feasibility of the provision of sufficient compensation storage at those sites confirmed to be in the floodplain.
6. Current reviews show that 29 of the 45 sites where widening works need to take place do not encroach into the 1 in 100 year plus climate change floodplain (Flood Zone 3). Therefore, works at these locations will result in no flood risk impacts and no mitigation is required. At 5 of the 45 sites, the feasibility of floodplain compensation provision on a volume for volume basis has been proven and at the a further 2 sites, with the largest volumetric compensation requirements, provision of this storage on a level for level basis has been demonstrated to be feasible. At the 9 remaining sites, results are pending, with flood data currently awaited from the EA for some of these sites. The outstanding assessments will be used to further

demonstrate that flood compensation, where required, is feasible within the Scheme, verifying the conclusion within the ES and the FRA that the Scheme will not increase flood risk elsewhere.

## Ecology and Nature Conservation

**E4.4.1 Para 9.4.19 Chapter 9 - APP-149 states that all national and international designated sites (which include Thames Basin Heaths Special Protection Area and the South West London Waterbodies SPA/Ramsar) are outside the zone of influence as they are sufficient distance from the scheme and not hydrologically connected. Does NE or any other party have evidence to challenge this statement?**

1. In their relevant representation on the Application, Natural England raised no concerns in relation to the identification of national and international designated sites for the purposes of assessment, and stated *“There are two European designated sites and four Sites of Special Scientific Interest (SSSI) within 200 metres of an affected road link. These are: the Thursley, Ash, Pirbright and Chobham Special Area of Conservation (SAC) and the Thames Basin Heaths Special Protection Area (SPA), and Chobham Common, Foxlease and Ancell's Meadows, Colony Bog and Bagshot Heath SSSI, and Sulham and Tidmarsh Woods and Meadows SSSIs.”*

2. In their relevant representation on the Application, Natural England also raised no concerns in relation to assessment of effects on national and international designated sites, and stated:

*“We are satisfied that the Project will not have a likely significant effect upon the European sites, or result in harm to the SSSIs listed above”.....*

Natural England concluded that:

*“In summary, we therefore have no outstanding issues or concerns with regard to this Project”.*

3. Save for the above, no other parties that have made a relevant representation have raised any form of comment regarding the assessment of effects on national and international designated sites presented in Chapter 9 of the ES (Application Document Reference 6.1).

**E4.4.2 The survey of dormice between junctions 8/9 and 3 has not been updated since 2010. Is NE satisfied with this position? Is NE satisfied that adequate surveys have been carried out for all species?**

1. A desk study, habitat suitability assessment and dormouse surveys were first carried out for the Scheme in 2010. The field surveys were carried out between junctions 12 and 3, between April and October 2010. This study found no evidence of dormice, and concluded that the value of roadside habitats within the area surveyed was negligible, and that dormouse was absent.
2. Subsequently, in 2013, the desk study and field surveys were repeated for part of the Scheme, between junctions 12 and 8/9. The desk study revealed records of dormice near junction 11 (plus records of dormice on the M4 road verge near junction 13, to the west of the Scheme). The field surveys (which were undertaken between May and October 2013 at nine sites, comprising four sites which had been surveyed in 2010 plus five additional sites) found dormouse to be absent. The survey concluded that dormouse is highly likely to be absent from the soft estate between junctions 12 and 8/9.
3. On the basis of the limited availability of dormouse habitats within the Order limits between junctions 8/9 and 3, and the results of the 2010 study which concluded dormice to be absent, it was determined that further surveys for dormouse between junctions 8/9 and 3 were not required to inform the Application. It remains Highways England's view that dormouse is absent from the Order limits.
4. However, as noted in the footnote to Table 9.2 of the ES (Application Document Reference 6.1), Highways England is in the process of undertaking dormouse surveys within the Order limits between junctions 8/9 and 3 (verifying the findings of those last undertaken in 2010). The objective of these surveys is to confirm the continued absence of dormice from within the Order limits.
5. In their relevant representation on the Application, Natural England raised no concerns regarding the adequacy of the species surveys undertaken in support of the DCO Application, and stated "*we envisage no issues relating to protected species for the Project, however we note that Natural England licenses will be required for some of the specific proposed works, e.g. for bats for construction widening above the known roost at Beansheaf Farm culvert.*"
6. Save for the above, no other parties that have made a relevant representation have raised any form of comment regarding the adequacy of surveys undertaken for any species.

**E4.4.3 Table 9.5 APP-149 sets out the significance of the residual effect of the scheme on ecology and nature conservation. Is there any evidence to challenge the conclusions set out in this Table?**

1. Paragraphs 9.2.18-9.2.19 of the ES (Application Document Reference 6.1) briefly summarise the assessment methodology in relation to Ecology and Nature Conservation. Highways England guidance published in Design Manual for Roads and Bridges<sup>1</sup> and Interim Advice Note 130/10<sup>2</sup> has been used as the basis for the assessment; and the sensitivity, magnitude and significance criteria from this guidance are reproduced in Tables A9.4.1-9.4.4 of Appendix 9.4 (Application Document Reference 6.3).
2. The conclusion of the Ecology and Nature Conservation assessment is summarised in Table 9.5 of the ES (Application Document Reference 6.1), which lists the significance of residual effect for each receptor both in the construction and operation phases of the Scheme. The majority of the Scheme's residual effects in relation to ecology and nature conservation have been assessed to be neutral, with the exception of habitat removal in relation to amphibians and reptiles, for which the effects have been assessed as slight adverse.
3. As noted in paragraph 9.16.6 of the ES (Application Document Reference 6.1), Design Manual for Roads and Bridges considers neutral effects to be those that have *"No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error."* Slight adverse effects are relevant at the local level but are considered by Design Manual for Roads and Bridges as *"unlikely to be critical in the decision-making process"*.
4. In their relevant representation on the Application, the Environment Agency raised concerns in relation to the assessment of significance of residual effects. They stated: *"We...disagree with a number of the conclusions in Chapter 9 of the Environmental Statement which states that impact on ecology is neutral given that there will be loss of river habitats (channel bed, margins and banks) as a result of bridge widening and culvert lengthening."*
5. Highways England considers that the impact on aquatic ecology was assessed fully in the Application. The loss of river habitats (channel bed, margins and banks) is very small, as summarised below, and results in a negligible magnitude of impact and a neutral significance of effect regardless of the value of the resource (see Table 15.4 of the ES) (Application Document Reference 6.1).
6. Highways England adopts a precautionary approach to the protection of watercourses and aquatic habitats during construction, to minimise potential construction impacts on watercourses. The potential impact of the in channel works on water quality and ecology will be mitigated, as described in paragraph 14.2.2(a) to (e) of the Outline Construction Environmental Management Plan (Appendix 4.2A of the ES) (Application Document Reference 6.3). Where in channel works are required for Thames Bray Bridge, Chalvey Culvert and Ashley Arch Culvert, the contractor will prepare method statements to be approved by the Environment Agency prior to the start of works, as required by paragraph 14.2.2(d) of the Outline Construction Environmental Management Plan (Appendix 4.2A of the ES) (Application Document Reference 6.3). The contractor will also comply with the Environment Agency's Pollution Prevention Guidelines to

---

<sup>1</sup> Department for Transport (2005) Design Manual for Roads and Bridges Volume 11, Section 2, Part 5. *Assessment and Management of Environmental Effects*

<http://www.standardsforhighways.co.uk/dmrb/vol11/section2/ha20508.pdf>

<sup>2</sup> Highways Agency (2010) Interim Advice Note 130/10. *Ecology and Nature Conservation: Criteria for Impact Assessment*. <http://www.standardsforhighways.co.uk/ians/pdfs/ian130.pdf>



avoid pollution of watercourses as detailed in paragraph 14.3.1, the storage of oils and chemicals as per paragraph 14.4.1, and the management and control of foul waters as per paragraph 14.5.1 of the Outline Construction Environmental Management Plan (Appendix 4.2A of the ES) (Application Document Reference 6.3).

7. The preparation and implementation of the Construction Environmental Management Plan, including approval by the relevant authority, is secured under Requirement 8, Schedule 2 of the Draft DCO (Application Document Reference 3.1).
8. In their relevant representation, Natural England raised no concerns in relation to the assessment of significance of residual effects, and stated *“In summary, we therefore have no outstanding issues or concerns with regard to this Project.”*
9. Save for the above, no other parties that have made a relevant representation have raised any form of comment regarding the significance of the residual effect of the Scheme on ecology and nature conservation, as reported in Table 9.5 of the ES (Application Document Reference 6.1).

## Geology and Soils

### **E4.5.1 Chapter 10 APP-150 identifies no significant residual impact from the project on groundwater resources during either construction or operation. Are the conclusions agreed with statutory consultees?**

1. The conclusions in respect of the residual impacts on groundwater have not been expressly agreed with the statutory consultees. However, the conclusions were reported in both the Preliminary Environmental Information Report (<http://www.highways.gov.uk/publications/m4-junction-3-to-12-smart-motorway-consultation-documents/>) and the Environmental Statement (“ES”) (Application Document Reference 6.1) upon which statutory consultees have had opportunity to comment.
2. Other than the initial enquiries from the Scheme's consultants to statutory consultees with regard to the collation of baseline data, no additional specific consultation has been undertaken in relation to the impacts of the Scheme on the Geology and Soils (including groundwater resources). The reason for this relates primarily to the findings of the Preliminary Sources Study Report (ES Chapter 10, Appendix 10.1, Application Document Reference 6.3). This is a collation of all available geological/geotechnical information relating to the Scheme, prepared by Highways England in October 2013, which did not identify any high value (sensitivity) sites and did not indicate any significant effects as stated in paragraph 10.2.4 of the ES.
3. Following submission of the ES and the commencement of the Examination, a relevant representation has been made by South East Water outlining a concern that the Scheme may impinge on source protection zones for public water supply.
4. Highways England has met with South East Water in order to discuss their concerns. At the meeting, Highways England agreed to undertake some limited ground investigation works in the area of greatest concern to South East Water, at Monkey Island.
5. The ground investigation works will be undertaken so that Highways England can perform a hydrogeological risk assessment in order to demonstrate to South East Water that the groundwater resources will not be impacted upon. It is anticipated currently that the site works and the assessment will be completed by January 2016.

## Air Quality

**E4.6.1 Chapter 6 Section 6.3 APP-146 sets out the air quality regulatory/policy framework. The NNNPS para 5.13 states: "The Secretary of State should refuse consent where, after taking into account mitigation, the air quality impacts of the scheme will affect the ability of a non-compliant area to achieve compliance within the most recent timescales reported to the European Commission at the time of the decision." Having regard to the final judgement of the Supreme Court in the "ClientEarth" case, does the assessment of air quality impacts set out in the ES indicate that the scheme would comply with this requirement of the NNNPS?**

### 1. Introduction

1.1. This response describes:

- 1.1.1. The approach taken by the UK to report compliance with EU Limit Values to the European Commission ("EC");
- 1.1.2. The approach taken by Highways England to establish what risks to EU Limit Compliance there may be from the promotion of schemes;
- 1.1.3. The outcome of an EU compliance risk assessment for the Scheme;
- 1.1.4. Provides a review of the implications of the recent Supreme Court judgement for the Scheme; and
- 1.1.5. Confirms compliance of the Scheme with paragraph 5.13 of the National Networks National Policy Statement.

### 2. EU Limit Value Compliance for the UK

- 2.1. The Department for Environment, Food and Rural Affairs ("Defra") undertakes air quality modelling of some roads within the UK, predicting concentrations of key pollutants such as nitrogen dioxide ("NO<sub>2</sub>"). This modelling is undertaken using their Pollution Climate Model ("PCM") and it is the results from this modelling which is used to report on compliance with NO<sub>2</sub> EU Limit Values to the EC.
- 2.2. The concentrations of NO<sub>2</sub> for each section of road in the PCM are then grouped into agglomeration zones. The maximum predicted NO<sub>2</sub> concentration within a zone is reported to the EC. If the maximum concentration is above the EU Limit Value, as set out in the EU Ambient Air Quality and Cleaner Air for Europe Directive (2008/50/EC,) for annual average concentrations of NO<sub>2</sub> (i.e. 40 µg/m<sup>3</sup>), then an estimate of when the zone is anticipated to comply is also reported to the EC.

### 3. EU Limit Value Compliance Risks Method for Highways Schemes

- 3.1. In order to establish whether there is a risk that a scheme promoted by the then Highways Agency (now Highways England) would affect the ability of a non-compliant zone to achieve compliance or cause a zone anticipated to be compliant to then become non-compliant, a methodology was developed. This method is described in Interim Advice Note ("IAN") 174/13 'Updated air quality advice on risk assessment related to compliance with the EU Directive on ambient air quality and on the production of Scheme Air Quality Action Plans for user of DMRB Volume 11, Section 3, Part 1 'Air Quality'.

- 3.2. IAN 174/13 methodology is undertaken for a scheme using the following steps:
  - 3.2.1. Identify locations within the local operational air quality assessment study area with a PCM road section that may be non-compliant in the opening year of a scheme;
  - 3.2.2. Predict the change in annual average NO<sub>2</sub> concentrations due to a scheme at sensitive receptor locations (i.e. residential properties) using local air quality assessment results along PCM road sections;
  - 3.2.3. Add the predicted scheme changes in annual average NO<sub>2</sub> concentrations to the Defra PCM road section predictions of annual average NO<sub>2</sub>;
  - 3.2.4. Compare the resultant total concentration to the maximum reported to the EC for that zone without the scheme;
  - 3.2.5. If the total concentration with the scheme is higher than the maximum already reported to the EU for that zone then compliance could be delayed; and
  - 3.2.6. An air quality action plan to remove the delay to compliance should then be developed.

#### 4. **EU Limit Value Compliance Risks for the Scheme**

- 4.1. A compliance risk assessment has been undertaken for the Scheme under IAN 174/13 using the steps described above. The compliance risk assessment is reported in paragraphs 6.15.4 to 6.15.7 of the ES (Application Document Reference 6.1).
- 4.2. The compliance assessment identified that there was only one area where PCM road sections within the study area of the local operational air quality assessment were expected by Defra to be non-compliant in the year of opening for the Scheme (2022). This PCM road comprises a section of the A4 located between Warkworth Gardens and Windmill Road in Brentford within the Greater London Urban Area. However, the resultant concentration predicted at this location with the contribution of the Scheme was not higher than the highest PCM Road section annual average NO<sub>2</sub> concentration of 69.5 µg/m<sup>3</sup> within the Greater London Urban Area. In addition, the change in concentration along the A4 PCM road section is imperceptible (i.e. less than 0.4 µg/m<sup>3</sup>). No other PCM road sections were identified to be in non-compliance in the opening year of the Scheme in the Reading/Wokingham Urban Area and South East zone which the Scheme and local operational air quality assessment study area also includes.
- 4.3. On the basis of this evaluation, the Scheme is considered to have a low risk of causing a compliance issue against EU Limit Values and, consequently, no air quality action plan is required.
- 4.4. The requirements of paragraph 5.13 of the National Networks National Policy Statement are addressed in paragraph 6.18.8 of the ES (Application Document Reference 6.1). The paragraph indicates that based on the compliance risk assessment undertaken for the Scheme, the Scheme is not predicted to cause a delay in the ability of a non-compliant area to achieve compliance within the most recent timescales reported to the EC. This is consistent with the requirements of paragraph 5.13 of the National Networks National Policy Statement.

## 5. **Supreme Court Judgement**

- 5.1. The recent Supreme Court judgement (April, 2015) requires the UK Government to prepare a revised national air quality action plan to bring zones which are currently in non-compliance with EU Limit Values back in to compliance as soon as possible. The Supreme Court judgement requires that this plan should be submitted to the EC by the end of 2015.
- 5.2. A draft plan to improve air quality in the UK was issued by Defra for consultation on 12 September 2015 (<https://consult.defra.gov.uk/airquality/draft-aq-plans>). This plan outlines the approach proposed to bring zones not in compliance back in to compliance as soon as possible. The consultation on the draft plan is scheduled to end on 6 November 2015 and the plan is scheduled to be submitted to the EC by the end of 2015. The consultation on the draft plans to improve air quality indicates that Defra considers that the submission of the air quality plan will fulfil the requirements of the Supreme Court judgement.
- 5.3. The draft air quality plan suggests that the Reading/Wokingham Urban Area and South East zones within the local air quality assessment study area for the Scheme will continue to be compliant with EU Limit Values for annual average NO<sub>2</sub> by the time the Scheme opens. The draft air quality plan also indicates that the Greater London Urban Area, which is also within the local air quality assessment study area for the Scheme, will remain non-compliant following the opening of the Scheme, with the date of compliance anticipated to be 2025 instead of 2030. Additionally, the areas of highest annual average NO<sub>2</sub> concentrations are still anticipated to be located outside of the study area for the Scheme (e.g. 69.5 µg/m<sup>3</sup> at Marylebone Road). Hence they are not affected by the Scheme. The dates by which the Greater London zone will become compliant relate to the time taken for air quality to improve in these locations to concentrations below the EU Limit Value for annual average NO<sub>2</sub> concentrations, rather than the locations within the Scheme local operational air quality assessment study area.
- 5.4. Therefore, the publication of the draft air quality plans to address the requirements of the recent Supreme Court judgement does not change the findings of the compliance risk assessment undertaken for the Scheme as set out in paragraphs 6.15.4 to 6.15.7 of the ES (Application Document Reference 6.1). It is also considered very unlikely that any changes in the final air quality plans would alter this position.

## 6. **Conclusion**

- 6.1. The Scheme is considered to be compliant with paragraph 5.13 of the National Networks National Policy Statement, as described in paragraph 6.18.8 of the ES (Application Document Reference 6.1).
- 6.2. The recent Supreme Court judgement and associated draft air quality plans to satisfy this judgement do not alter this conclusion.
- 6.3. There is no reason to expect this conclusion to change by the time of the decision on development consent for the Scheme.

**E4.6.2 To what extent have the local authority Environmental Health Officers and Air Quality Officers been consulted on the assessment set out in Chapter 6? APP-146 Can the applicant, local authorities and other interested parties identify areas of agreement and disagreement with regard to the assessment of air quality impact set out in the ES?**

**1. Local and Regional Authorities**

- 1.1. Local authorities within the air quality study area were consulted at the earlier stages of the assessment process in order to obtain the most up to date monitoring data within their areas. This consultation is set out in Appendix 6.2 of the ES (Application Document Reference 6.3).
- 1.2. The approach to the air quality assessment was consulted upon through the Environmental Impact Assessment Scoping Report for the Scheme (issued August 2014), as described in paragraph 6.1.15.
- 1.3. Consultation events were undertaken following completion of the Preliminary Environmental Information Report (issued November 2014) (<http://www.highways.gov.uk/publications/m4-junction-3-to-12-smart-motorway-consultation-documents/>), following which written submissions were received from local authorities and other interested parties. In addition, following submission of the ES (Application Document 6.1) and the DCO Application, relevant representations have been submitted. Statements of Common Ground are in the process of being agreed with local authorities and Transport for London.

**2. Regional Level**

*2.1. Greater London Authority and Transport for London*

- 2.1.1. As part of the discussions on the Statement of Common Ground, meetings have been held with the Greater London Authority and Transport for London, where issues were raised about the potential for adverse effects on air quality at sensitive receptors located close to roads in their network. Highways England explained that there were no significant effects predicted at any receptors on the relevant network, and that in air quality terms, there were no potentially significant increases on any roads other than the A4 in their area.
- 2.1.2. In their letter to the Planning Inspectorate dated 3 July 2015, the Greater London Authority and Transport for London confirm that "having also had regard to the assessments within the published Environmental Statement, [the Greater London Authority and Transport for London] are similarly satisfied that the impact of the scheme in terms of air quality and noise/vibration would also not be significant".
- 2.1.3. This letter will form the basis of a Statement of Common Ground between Highways England, the Greater London Authority and Transport for London and it is anticipated that there will be no issues which are not agreed.

**3. Borough/District Level**

*3.1. London Borough of Hounslow*

- 3.1.1. Highways England is in the process of agreeing a Statement of Common Ground. The London Borough of Hounslow, raised issues about the potential for adverse impacts

during the construction phase of the Scheme. Highways England explained that there would be minimal construction works undertaken in their area, and there would only be imperceptible impacts on sensitive receptors. The London Borough of Hounslow was satisfied that this addressed their concerns, and this will be reflected in the Statement of Common Ground.

3.1.2. Additionally, issues were raised regarding a predicted small increase in annual mean nitrogen dioxide at a receptor also predicted to be above the objective value, close to the M4, that was presented in the Preliminary Environmental Information (“PEI”) Report (issued November 2014) (<http://www.highways.gov.uk/publications/m4-junction-3-to-12-smart-motorway-consultation-documents/>). Following publication of the PEI Report, Highways England obtained detailed plans of this receptor (Wallis House), and determined that the areas of the receptor closest to the motorway were not in residential use, and were therefore not sensitive to air quality. Further assessment was undertaken of this receptor and this was presented in paragraph 6.14.25 the ES (Application Document Reference 6.1). This identified that the sensitive areas of this property (e.g. residential uses) were set further back from the motorway and imperceptible changes in annual mean nitrogen dioxide were predicted at these locations. Further air quality queries have also been provided by the London Borough of Hounslow concerning the evaluation of air quality significance and the need for air quality mitigation and air quality monitoring. A meeting has been held on the 7<sup>th</sup> October to discuss these matters. These matters will be reflected in the Statement of Common Ground.

### 3.2. London Borough of Hillingdon

3.2.1. In their relevant representation on the Application, the London Borough of Hillingdon stated that *“comments have previously been submitted setting out the councils position, whereby we have no in principle objection, although there are details which require clarification or further assessment (please see letters previously submitted from LB Hillingdon).”*

3.2.2. Highways England is in the process of agreeing a Statement of Common Ground with the London Borough of Hillingdon. Issues were raised regarding the use of emission rates in the air quality assessment that the London Borough of Hillingdon considered to be too optimistic regarding future improvements in vehicle technology. Highways England explained that this was considered within the air quality assessment through the use of Highways England’s IAN (“IAN”) 170/12 Updated air quality advice on the assessment of future NO<sub>x</sub> and NO<sub>2</sub> projections for users of DMRB Volume 11, Section 3, Part 1 ‘Air Quality’.

3.2.3. Over the last few years the rates of improvement anticipated by the Department for Environment, Food and Rural Affairs (“Defra”) have not been realised as quickly as anticipated. This is due to the dieselisation of the vehicle fleet to a greater extent than previously anticipated, with the associated higher emissions of NO<sub>x</sub> and NO<sub>2</sub>, and also because of the gap between the anticipated laboratory based rates of NO<sub>x</sub> emissions compared with real world rates of NO<sub>x</sub> emissions. The approach utilised in the assessment of future air quality recognises this and therefore Highways England have not assumed that in the future all improvements in air quality (i.e. rates of improvement in vehicle emissions etc) will occur at the rate anticipated by Defra. In particular, the treatment of future air quality has been considered through the updated air quality advice on the assessment of future NO<sub>x</sub> and NO<sub>2</sub> projections known as long term trend (“LTT”) analysis (IAN 170/12 v3), which only assumes a portion of improvements in air quality assumed by Defra will occur. This is described in paragraphs 6.2.57 to 6.2.60

of the Environmental Statement. In this precautionary approach all modelling is undertaken consistent with Defra emission rates and associated local air quality management tools. The LTT rates of improvement are applied to post-processed Defra based predictions to a more conservative set of results. It is these more conservative results which have been utilised in the overall operational assessment of significance of the Scheme

3.2.4. Highways England considers and is seeking to agree with the London Borough of Hillingdon that the potential for expansion to Heathrow Airport should not be included in the assessment of air quality for the Scheme, as this was not yet a committed development and that the assessment of compliance with EU Limit Values had been assessed following the Highways England's IAN 175/13 Updated air quality advice on risk assessment related to compliance with the EU Directive on ambient air quality and on the production of Scheme Air Quality Action Plans for user of DMRB Volume 11, Section 3, Part 1 'Air Quality'. It is anticipated that these matters, and any other points raised, will be addressed in the Statement of Common Ground.

### *3.3. Royal Borough of Windsor and Maidenhead*

3.3.1. Highways England is in the process of agreeing a Statement of Common Ground with the Royal Borough of Windsor and Maidenhead. The Royal Borough identified areas of their Borough that are predicted to experience increases in annual mean nitrogen dioxide with the Scheme in place. The predictions show that annual mean concentrations will be below the objective value of 40  $\mu\text{g}/\text{m}^3$  both with and without the Scheme. The Royal Borough of Windsor and Maidenhead believes these concentrations are too close to the objective value and therefore requested mitigation measures be included within the Scheme design to lower annual mean concentrations of  $\text{NO}_2$ , including the use of noise barriers to mitigate air pollutant. The use of noise barriers as an air quality mitigation measure is not currently supported by Highways England as there is limited evidence to suggest this has a measurable impact on pollutant concentrations, and as predicted results are below the objective value, it is not considered necessary to incorporate these or other additional mitigation measures. It is anticipated that these matters will be addressed in the Statement of Common Ground.

### *3.4. Wokingham Borough Council*

3.4.1. In their relevant representation on the Application, Wokingham Borough Council raised the following with regards to air quality: *"The Highways Agency are aware of the Air Quality Management Area that currently exists along the length of the M4 in Wokingham Borough. As Wokingham Borough Council has no direct influence in making positive changes to the environment in the vicinity of the motorway, Wokingham Borough Council strongly request that the Highways Agency not only mitigate any adverse impacts of the scheme but works to improve the environment further."*

3.4.2. As part of the discussions relating to the Statement of Common Ground, a meeting was held with Wokingham Borough Council. Further information was provided to Wokingham Borough Council by Highways England to explain the approach to operational mitigation and it is anticipated that the approach will be agreed in the Statement of Common Ground.

### *3.5. West Berkshire District Council*



3.5.1. In their relevant representation on the Application, West Berkshire District Council raised concerns regarding potential dust and air quality impacts from construction activities on the motorway and the Calcot construction compound (which is referred to in the Application as Construction Compound 2).

3.5.2. Highways England is in the process of agreeing a Statement of Common Ground with West Berkshire Council. Further information on dust controls has been provided to the Council. The measures are based on Institute of Air Quality Management guidance and are presented in Appendix 6.1 of the ES (Application Document Reference 6.3) and the measures have also been adopted within Section 6 of the Outline Construction Environmental Management Plan (Appendix 4.2A of the ES) (Application Document Reference 6.3). West Berkshire Council have requested no further information in relation to Air Quality in West Berkshire.

### 3.6. South Bucks District Council

3.6.1. In their relevant representation on the Application, South Bucks District Council expressed the following concerns with regards to air quality:

*“The impact on Air Quality and Dust. The works are within South Buck’s AQMA so low emissions policies should be adopted to limit impacts.”;*

*“The associated change in NOx and Particulates. The developer is encouraged to seek innovative solutions to reduce the levels of pollutants.”; and*

*“The control of dust, mud and spoil. Management should be coordinated to ensure that there is no negative cumulative effect.”*

3.6.2. Highways England is in the process of agreeing a Statement of Common Ground with the South Bucks District Council. Concerns were raised regarding the construction phase of the Scheme. It was agreed with the Council that the measures incorporated in the Outline Construction Environmental Management Plan (“CEMP”) (Appendix 4.2A of the ES) (Application Document Reference 6.3) regarding the adoption of low emission policies, site management procedures and mitigation measures during the construction phase address these concerns. The measures given in the Outline CEMP will be secured by Schedule 2, Requirement 8 of the DCO (Application Document Reference 3.1).

3.6.3. South Bucks District Council also requested that mitigation measures in the form of noise barriers were included in the Scheme design to mitigate air pollutants. The use of noise barriers as an air quality mitigation measure is not currently supported by Highways England as there is limited evidence to suggest this has a measurable impact on pollutant concentrations, and as a significant effect on air quality with the Scheme is not predicted, it is not considered necessary to incorporate additional mitigation measures to mitigate Scheme effects. However, Highways England will review the potential for a trial of innovative air quality mitigation measures as set out in the Statement of Common Ground.

### 3.7. Slough Borough Council

3.7.1. Highways England is in the process of agreeing a Statement of Common Ground with Slough Borough Council. Slough Borough Council have raised concerns that some of the verification factors used within the air quality assessment were higher than expected.

Highways England confirmed these factors were correctly recorded in the ES (Application Document Reference 6.1) and were appropriate to verify predictions in these areas with higher congestion, such as slip roads, but no agreement has yet been reached.

3.7.2. Slough Borough Council have also stated that they may wish to consider the significance of the Scheme on air quality following recent guidance from Environmental Protection UK (“EPUK”) and Institute of Air Quality Management (“IAQM”) issued in May 2015 (<http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>), and that they may calculate air quality damages costs.

3.7.3. Highways England does not agree that this is necessary. Highways England follows its own methodology to assess the significance of air quality (as outlined in Design Manual for Roads and Bridges Volume 11, Section 3, Part 1 ‘Air Quality’ (HA207/07) and associated Interim Advice Note 174/13), as stated in paragraph 6.2.1 of the ES (Application Document Reference 6.1). Additionally, the EPUK / IAQM guidance in question itself states that:

*“This document has been developed for professionals operating within the planning system. It provides them with a means of reaching sound decisions, having regard to the air quality implications of development proposals. It also is anticipated that developers will be better able to understand what will make a proposal more likely to succeed. This guidance, of itself, can have no formal or legal status and is not intended to replace other guidance. For example, for major new road schemes, Highways England has prepared a series of advice notes on assessing impacts and risk of non-compliance with limit values.”*

3.7.4. This reinforces Highways England’s position that air quality assessments for major road schemes, such as the Scheme, should be undertaken in line with Highways England guidance. Therefore, Highways England believes this is a robust and comprehensive methodology.

3.7.5. In relation to damage costs, the overall appraisal for the Scheme (as reported in the Appraisal Summary Table) (Appendix B of the Socio-Economic Report) (Application Document Reference 7.2) has already considered and reported the associated air quality damage costs to central government for oxides of nitrogen and particulates. The damage costs have been calculated using Department for Transport appraisal guidance notes (WebTAG). These costs have therefore already been accounted for at the national scale. No additional local damage cost calculations or contributions are proposed, as outlined in the Statement of Common Ground.

#### 6.4. London Borough of Hammersmith and Fulham

6.4.1. In their relevant representation on the Application, the London Borough of Hammersmith and Fulham expressed the following concerns with regards to air quality:

*“The impact of increased traffic flows and congestion in West London is likely to have an impact on air quality in the borough. Air quality of a serious concern in terms of the health of resident’s and their quality of life. The Air Quality officer should be asked to provide further comments on this proposal”.*

6.4.2. As part of the discussions on the Statement of Common Ground, meetings have been held with the London Borough of Hammersmith and Fulham, in which they raised concerns regarding the potential for adverse impacts on sensitive receptors in their Borough due to increased traffic flows due to the Scheme. Highways England explained that the Design Manual for Roads and Bridges criteria for potentially significant changes in traffic flows for the air quality assessment were not triggered on any roads within their Borough, and that therefore no significant effects on air quality were predicted. Highways England has provided further information to the London Borough of Hammersmith and Fulham and the position reached will be recorded in the Statement of Common Ground.

6.5. *Bracknell Forest Council*

6.5.1. As part of the discussions on the Statement of Common Ground, meetings have been held with the Bracknell Forest Council, in which they raised concerns regarding the potential for adverse impacts on air quality within its area. Highways England disputed this view, as there are no significant effects on air quality. Subsequent dialogue with Bracknell Forest Council has reassured the Council that these initial concerns have been suitably assessed and will be mitigated through the life of the Scheme. All matters are now agreed by both parties, and this will be confirmed in the Statement of Common Ground.

**Town and Parish Councils**

6.5.2. The section below presents the representations provided by Town and Parish Councils which typically include concerns over air quality and/or carbon emissions. Only Earley Town Council has raised specific points on monitoring air quality following Scheme opening.

6.6. *Dorney Parish Council*

6.6.1. In their relevant representation on the Application, Dorney Parish Council requested that “sympathetic recognition and consideration is given to minimising the intrusive nature of the motorway, but it noise, visual impact or air pollution”.

6.6.2. In the response to relevant representation 46, Highways England notes that the air quality assessment did not identify a significant effect on air quality. Meetings have also been held with Dorney Parish Council where their concerns about the effect of the Scheme on air quality have been discussed.

6.7. *Arborfield and Newland Parish Council*

6.7.1. In their relevant representation on the Application, Arborfield and Newland Parish Council stated that “*There are residents in this Parish who live a little over 200 metres from the current highway boundary, and our first concern is for their environment. We note that the findings of the Environmental Assessment are that air quality and noise impacts will be negligible. However, both air quality and noise impacts may be affected by relatively small changes in parameters. Air quality may be affected by atmospheric changes, and noise levels by small differences*”

6.7.2. In the responses to relevant representation 56, Highways England notes that the air quality study area is limited to 200m from an affected road, as beyond this

distance pollutant concentrations tend towards background concentrations, indicating little contribution from roads at this distance. This methodology is explained in the Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1 HA 207/07.

6.8. *Colnbrook with Poyle Parish Council*

6.8.1. In their relevant representation on the Application, Colnbrook with Poyle Parish Council commented on the length of the DCO application and stated that “*We would however, request to take part in the examination and provide a full written response in due course.*” Specifically regarding air quality, they made the following statements:

*“We strongly object to the London Concrete site being re-located from compound 10 to Sutton Lane compound 9. This would be extremely detrimental to residential properties, as it is located in an AQMA in which Slough Borough Council has said will exceed limits until at least 2020.”*

and

*“Slough AQMA No. 1 – an area encompassing land adjacent to the M4 along the eastbound carriageway between junctions 5 and 7, and along the westbound carriageway between junction 5 and Sutton Lane, for exceedances of annual average NO<sub>2</sub> air quality Objective. There is therefore the potential for adverse effects from construction and demolition dust, which will increase the annual average NO<sub>2</sub> air quality”*

6.8.2. In the response to relevant representation 304, Highways England notes that mitigation measures to address potential impacts on sensitive receptors for air quality during the construction phase are set out in the Outline Construction Environmental Management Plan (Appendix 4.2 of the ES, Application Document Reference number 6.3).

6.9. *Datchet Parish Council*

6.9.1. In their relevant representation on the Application, Datchet Parish Council expressed concern about “*this proposal both during construction and afterwards*” specifically including “*Air Quality; both along the M4 between junctions 4, 5 and 6, and land adjacent to the*”. There is no further text in the relevant representation.

6.9.2. In the response to relevant representation 305, Highways England notes that mitigation measures to address potential impacts on sensitive receptors for air quality during the construction phase are set out in the Outline Construction Environmental Management Plan (Appendix 4.2 of the ES, Application Document Reference number 6.3). In addition it is set out that the air quality assessment did not identify a significant effect on air quality.

6.10. *Earley Town Council*

6.10.1. As part of the discussions on the Statement of Common Ground, meetings have been held with the Earley Town Council. They raised queries on the methodology used in the air quality assessment, and have since confirmed that they realise that they have all the information they require to assuage their concerns within the ES (Application Document Reference 6.1). Further queries on monitoring air quality after the Scheme is opened have also been raised and further information has been provided for their consideration by Highways England. The issues raised will be addressed in the Statement of Common Ground..

## 7. Other Interested Parties

### Members of Parliament and Political Parties

#### 7.1. *John McDonnell MP*

7.1.1. In his relevant representation on the Application, John McDonnell MP stated that he objected to the Scheme on the grounds of “a significant increase in air, noise and light pollution as a direct result of the increase in traffic, not just on the M4 but on the surrounding roads leading to it”.

7.1.2. A meeting has been held with John McDonnell MP to discuss these concerns and in the response to relevant representation 172, Highways England notes that the air quality assessment did not identify a significant effect on air quality.

#### 7.2. *Reading and Woking Green Party*

7.2.1. In their relevant representation on the Application, Reading and Woking Green Party expressed concerns that the Scheme would lead to an increase in traffic and therefore in air pollution.

7.2.2. In the response to relevant representation 133, Highways England notes that the air quality assessment did not identify a significant effect on air quality.

#### 7.3. *West Berkshire Green Party*

7.3.1. In their relevant representation on the Application, West Berkshire Green Party raised concerns regarding the impact of the proposed Scheme on the environment, and specifically increased CO<sub>2</sub> emissions.

7.3.2. In the response to relevant representation 229, Highways England notes that the impact on carbon emissions has been addressed within the air quality assessment for the Scheme against the requirements of the National Policy Statement for National Networks and that the Scheme does not contravene the requirements of that Statement.

### Non-Governmental Organisations

#### 7.4. *Campaign for Better Transport*

7.4.1. In their relevant representation on the Application, Campaign for Better Transport raised the general point that they had concerns regarding “*Increase in traffic, air, noise and light pollution*”, which was expanded upon with regard to air quality:

- 7.4.2. *“If this scheme goes ahead, traffic will increase on the motorway, roads leading to it, and the surrounding road network. Air pollution impacts will be higher than estimated, even though the Environmental Statement (ES) already shows areas where legal limits will be breached if the scheme goes ahead. The vehicle emissions factors used in the ES were updated to be more optimistic about future reductions in 2013 [IAN 170/12 rev3], while all the emerging evidence is that the EuroVI standards test are similar to previous standards in terms of underestimating real world emissions. Following recent legal cases, the technical advice note on assessing the risk of breaching EU directives is currently suspended [IAN175/13]. The issue of air pollution must be examined in full.”*
- 7.4.3. In addition, they raised the following with regards to carbon emissions: *“Increase in carbon emissions. Calculated at more than 4 million extra tonnes.”*
- 7.4.4. In the response to relevant representation 243, Highways England notes the approach to the assessment of future air quality, through the use of Interim Advice Note 170/12 v3. Updated air quality advice on the assessment of future NO<sub>x</sub> and NO<sub>2</sub> projections for users of DMRB Volume 11, Section 3, Part 1 ‘Air Quality), was set out. The response also confirmed that the impact on carbon emissions has been addressed within the air quality assessment for the Scheme against the requirements of the National Policy Statement for National Networks and that the Scheme does not contravene the requirements of that Statement.

7.5. *Friends of the Earth, England Wales and Northern Ireland*

- 7.5.1. In their relevant representation on the Application, Friends of the Earth raised the following with regards to carbon emissions: *“The projected increase of more than 4 million extra tonnes of carbon dioxide over 60 years does not fit with the UK’s commitments to reduce carbon dioxide emissions by 80% by 2050 as set out in the Climate Change Act 2008. This is a relevant matter with regard to section 104 (5) and 104 (7) of the Planning Act 2008. We request an Issue Specific Hearing on this matter.”*

- 7.5.2. In addition, they raised the following with regards to air quality: *“The Air Quality Directive (2008/50) imposes binding emissions limits values on Member States in relation to nitrogen dioxide. The Supreme Court judgement against the UK Government in March 2015 means that the UK must set out measures that enable delivery on obligations on air quality as soon as possible. New schemes which would lengthen the time taken to meet these commitments, or make it impossible to achieve standards of Air Quality should not be approved.*

*The scheme would currently lead to some locations having air pollution above the legal limits set by the Air Quality Directive. Some locations will breach limits as a result of the scheme and there will be worsening of pollution in areas that would breach limits without the scheme. This is a relevant matter with regard to section 104 (7) of the Planning Act 2008. We request an Issue Specific Hearing on this matter to enable expert testimony.”*

- 7.5.3. In the response to relevant representation 244, Highways England notes that the impact on carbon emissions has been addressed within the air quality assessment for the Scheme against the requirements of the National Policy Statement for National Networks and that the Scheme does not contravene the requirements of that Statement. The response goes on to note the approach to the assessment of

compliance of the Scheme with the Air Quality Directive, through the use of Interim Advice Note (“IAN”) 175/13 ‘Updated air quality advice on risk assessment related to compliance with the EU Directive on ambient air quality and on the production of Scheme Air Quality Action Plans for users of DMRB Volume 11, Section 3, Part 1 Air Quality’.

7.6. *Friends of the Earth, Air Pollution Expert (Jenny Bates)*

7.6.1. In her relevant representation on the Application, Jenny Bates identified herself as the Friends of the Earth’s air pollution expert and raised the following:

*“Requirements on not worsening air pollution*

*EU law is clear that air pollution limits are absolute, and must be met irrespective of costs - and that they must be met everywhere in a zone and cannot be averaged across a zone (and any amount is relevant ie there is no threshold of relevance)*

*EU law (as clarified to Clean Air London)*

*[http://cleanair.london/legal/airport-expansion-at-heathrow-or-gatwick-would-breach-air-pollution-laws/attachment/cal-304-letter-of-clarification-from-the-commission-190214\\_redacted-2/](http://cleanair.london/legal/airport-expansion-at-heathrow-or-gatwick-would-breach-air-pollution-laws/attachment/cal-304-letter-of-clarification-from-the-commission-190214_redacted-2/)*

*Air pollution should not be worsened as per these situations:*

*a. non deterioration principle applies if an area under limits: article 12 “...shall maintain the levels of those pollutants below the limit values and shall endeavour to preserve the best ambient air quality, compatible with sustainable development.”*

*b. a new breach cannot be caused*

*c. an existing breach must not be exacerbated*

*A proposal which was Air Quality neutral might have been appropriate if London was with EU legal limits - ie any additional pollution would be fully mitigated.*

*However London is not currently set to meet NO<sub>2</sub> limits until sometime after 2030 - when they had to be met by 2010 or 2015 at the latest with an extension*

*(Government estimated dates for compliance on NO<sub>2</sub>: [http://uk-air.defra.gov.uk/assets/documents/no2ten/140708\\_N02\\_projection\\_tables\\_FINA L.pdf](http://uk-air.defra.gov.uk/assets/documents/no2ten/140708_N02_projection_tables_FINA L.pdf))*

*And the Supreme Court ruling means that in London not only can air pollution not be worsened, but that all possible ways to cut current and projected pollution must be taken ie to cut BAU levels.*

*Any measures conceived of as mitigation for adding to pollution to achieve air quality neutral would have to be adopted, but not the adding to the pollution, given the special measures the UK is under.*

*Therefore any worsening or adding of pollution is unacceptable in the current circumstances, and as there would be some expected worsening of, and adding to, air pollution we understand as a result of the proposals (and any amount is relevant) they are not sound.*

*It is absolutely clear that to comply with the requirements the UK is now under that traffic levels must be cut, not added to as would be the case with these proposals.”*

- 7.6.2. In the response to relevant representation 246, Highways England notes that the impact on air quality of the Scheme has been addressed within the air quality assessment against the requirements of the National Policy Statement for National Networks and that the Scheme does not contravene the requirements of that Statement.

7.7. *Guildford, Woking and Waverley Friends of the Earth*

- 7.7.1. In their relevant representation on the Application, the Guildford, Woking and Waverley Friends of the Earth raised concerns over the Scheme. Specifically regarding air quality they stated *“Carbon emissions in this country have to be reduced. Better public transport, airport buses, coaches etc should be welcomed. A lane for multiple occupancy vehicles and car sharing facilities should be encouraged”*

- 7.7.2. These concerns have been addressed in the response to the Friends of the Earth representation 244 by Highways England, as set out above.

7.8. *Reading Friends of the Earth*

- 7.8.1. In their relevant representation on the Application, the Reading Friends of the Earth raised concerns over the Scheme. Specifically regarding air quality they stated:

*“Meeting air quality and climate change targets may require speed reductions which would reduce any business benefit.”*

*“Scheme should guarantee substantial reduction in carbon emissions from surface transport to contribute to the national Carbon Budgets rather than a 4 million tonne increase. Alternative energy may cost more.”*

and

*“Scheme should guarantee substantial improvement in air quality. Modelling suggests that with the scheme air quality will get worse in over 7,000 properties and may be at illegal levels. Recent reports suggest that diesel emissions are much worse in practice – on real journeys - than predicted by modelling based on emissions standards.”*

- 7.8.2. These concerns have been addressed in the response to the Friends of the Earth representation 244 by Highways England, as set out above.

7.9. *Newbury Friends of the Earth*



7.9.1. In their relevant representation on the Application, the Newbury Friends of the Earth raised concerns over the Scheme. Specifically regarding air quality they stated *“The widening will increase air pollution, and significantly increase CO<sub>2</sub> emissions.”*

7.9.2. These concerns have been addressed in the response to the Friends of the Earth representation 244 by Highways England, as set out above.

7.10. *Richmond and Twickenham Friends of the Earth*

7.10.1. In their relevant representation on the Application, J Waddy on behalf of the Richmond and Twickenham Friends of the Earth raised concerns over the Scheme. Specifically regarding air quality they stated:

*“1.The increase in air, noise and light pollution that widening the road and removing the hard shoulder will create. Traffic will increase on the motorway itself and on roads leading to it, as well as the surrounding road network*

*Air pollution will be higher than estimated by Highways England because vehicles have been shown to create much more pollution in real-life driving conditions than they do in the test situations used to assess the impact of the road.*

*2.Increase in carbon emissions –calculated by Highways England at more than 4 million extra tonnes of carbon over 60 years when the UK is trying to lower CO<sub>2</sub> emissions.”*

7.10.2. These concerns have been addressed in the response to the Friends of the Earth representation 244 by Highways England, as set out above.

7.11. *Isle of Wight Friends of the Earth*

7.11.1. In their relevant representation on the Application, Isle of Wight Friends of the Earth raised concerns over the Scheme. Specifically regarding air quality they stated:

*“This proposal will increase traffic (as it is intended to) resulting in increased CO<sub>2</sub> emissions when we need to reduce them.*

*It will result in increased pollution (eg nitrogen oxides).”*

7.11.2. These concerns have been addressed in the response to the Friends of the Earth representation 244 by Highways England, as set out above.

7.12. *Bricycles – the Brighton and Hove Cycling Campaign Group*

7.12.1. In their relevant representation on the Application, Bricycles raised concerns over the Scheme. Specifically regarding air quality they stated:

*“This scheme will lead to more traffic, further reductions in air quality, increased carbon emissions (an extra four million tonnes) and more danger for people whose vehicles break down or who are involved in collisions / incidents on the motorway. Access will be more difficult for the emergency services.*

*The UK is failing in its legal duty to protect people from the effects of air pollution. Measures which could mitigate these effects in the current scheme*

*could be to remove all-lane running from the proposals, reserving the hard shoulder only for congested times, and reducing the speed limit at all times to below 60 mph.”*

7.12.2. These concerns have been addressed in the response to the Campaign for Better Transport representation 243 by Highways England, as set out above.

7.13. *Dorset Cyclists Network*

7.13.1. In their relevant representation on the Application, Dorset Cyclists Network raised concerns over the Scheme. Specifically regarding air quality they stated:

*“1. The increase in air, noise and light pollution that widening the road and removing the hard shoulder will create – traffic will increase on the motorway itself and on roads leading to it, as well as the surrounding road network. Air pollution will be higher than estimated by Highways England because vehicles have been shown to create much more pollution in real-life driving conditions than they do in the test situations used to assess the impact of the road.*

*3. Increase in carbon emissions – calculated by Highways England at more than 4 million extra tonnes of carbon over 60 years.”*

7.13.2. These concerns have been addressed in the response to the Campaign for Better Transport representation 243 by Highways England, as set out above.

7.14. *Cranford Park Friends*

7.14.1. In their relevant representation on the Application, Cranford Park Friends raised concerns over the Scheme. Specifically regarding air quality they stated:

*“4. We are concerned by dangers to park users' health owing to the increased carbon emissions. Our park is used for sport and recreation by large numbers of people.”*

7.14.2. In the response to relevant representation 44, Highways England notes that the air quality assessment did not identify a significant effect on air quality.

7.15. *Colnbrook Community Association*

7.15.1. In their relevant representation on the Application, Colnbrook Community Association raised concerns over the Scheme. Specifically regarding air quality they stated with regards to the construction phase:

*“• Located in an AQMA in which Slough Borough Council has noted will exceed limits until at least 2020.”*

7.15.2. In the response to relevant representation 201 it is explained that mitigation measures to address potential impacts on sensitive receptors for air quality during the construction phase are set out in the Construction Environmental Management Plan (Appendix 4.2 of the ES, Application Document Reference number 6.3).

7.15.3. The also stated with regards to the operational phase:

*“We remain concerned about worsened noise and air quality in a community already severely blighted by the proximity of the motorway.*

*CNR-61 Westfield Community Hall in Severn Crescent is identified as a ‘sensitive receptor’. This facility suffers badly from disruption from the motorway and average NO<sub>2</sub> of 48.5 (µg/m<sup>3</sup>). We believe this building should be considered for fitting out with a suitable filtration system to reduce NO<sub>2</sub> concentrations.”*

7.15.4. In the response to relevant representation 201, Highways England notes that annual mean concentrations of NO<sub>2</sub> are predicted to be below the objective in this area by the Scheme opening year of 2022.

7.16. *Heathrow Villages Conservation Areas Advisory Panel*

7.16.1. In their relevant representation on the Application, Heathrow Villages Conservation Areas Advisory Panel raised concerns over the Scheme. Specifically regarding air quality they stated with regards to the construction phase:

*“The proposed changes to the M4 where it passes through the London Borough of Hillingdon will have negative impacts on the areas adjacent to the motorway. My concerns relate mainly to environmental pollution, particularly the effects of noise and air quality on the areas bordering the motorway which include two Conservation Areas: Cranford Park and Harlington Village.”*

7.16.2. In the response to relevant representation 306, Highways England notes that the air quality assessment did not identify a significant effect on air quality.

**E4.6.3 In a response to consultation RR-296, WokBC states that air quality impacts from the construction works require further analysis and that air quality impacts from the project on the existing Air Quality Management Area (AQMA) needs further analysis. This should include justification of the locations where no mitigation is to be provided in areas of decreased air quality and clarification of the wider benefits of the scheme. Can WokBC clarify the further analysis which is considered to be required and can the applicant respond to these comments?**

## **1. Relevant Representations regarding Air Quality**

1.1. The following comments regarding air quality were submitted by Wokingham Borough Council:

*“The Highways Agency are aware of the Air Quality Management Area that currently exists along the length of the M4 in Wokingham Borough. As Wokingham Borough Council has no direct influence in making positive changes to the environment in the vicinity of the motorway, Wokingham Borough Council strongly request that the Highways Agency not only mitigate any adverse impacts of the scheme but works to improve the environment further.”*

And

*“Air Quality impact from the project on the existing Air Quality Management Area (AQMA) needs further analysis. This should include justification of the locations where no mitigation is to be provided in areas of decreased air quality and clarification of the wider benefits of the scheme.”*

1.2. Following receipt of the above representation, Wokingham Borough Council was contacted to discuss what further analysis may be required. It was agreed that information would be exchanged on the following items:

1.2.1. The receptors Highways England considered in the operational and construction assessment presented in the ES (Application Document Reference 6.1); and

1.2.2. Why there will not be specific additional mitigation for the operational phase.

## **2. Operational Receptors**

2.1. Information provided to Wokingham Borough Council on the operational receptors considered within the air quality assessment included the following drawings (presented in Application Document Reference 6.2) covering the administrative area of Wokingham Borough Council (provided on 23 and 24 September 2015):

2.1.1. Drawing 6-0 – Study Area and Key Plan;

2.1.2. Drawing 6-3;

2.1.3. Drawing 6-4;

2.1.4. Drawing 6-5;

2.1.5. Drawing 6-5a inset 1;

2.1.6. Drawing 6-5b inset 2;

2.1.7. Drawing 6-32;

- 2.1.8. Drawing 6-33; and
- 2.1.9. Drawing 6-34.
- 2.2. A set of summary information on the sensitive receptors considered in the operational air quality assessment for Wokingham Borough Council's administrative area was also provided on 23 and 24 September 2015, including the following information:
  - 2.2.1. A total of 391 sensitive receptors were modelled.
  - 2.2.2. Five medium increases in annual average NO<sub>2</sub> concentrations in locations over 40 µg/m<sup>3</sup> were predicted with the operation of the Scheme at X47, X612, A65, A65a and A65b, and these sensitive receptors were contributing to the assessment of significance.
  - 2.2.3. The maximum predicted change in annual average NO<sub>2</sub> concentrations with the Scheme in these locations was predicted to be +2.6 µg/m<sup>3</sup> at X612, A65 and A65a.
  - 2.2.4. No other receptors were predicted to be over the 40 µg/m<sup>3</sup> annual average air quality objective for NO<sub>2</sub> with the Scheme.
  - 2.2.5. Three more medium changes were predicted with the Scheme at concentrations below the air quality objective for annual average NO<sub>2</sub>, at concentrations of between 35.5-39.5 µg/m<sup>3</sup>.
  - 2.2.6. Sixty small deteriorations were predicted with the Scheme at concentrations below the air quality objective for annual average NO<sub>2</sub>, at concentrations of between 18.7-21.0 µg/m<sup>3</sup>.
  - 2.2.7. Nineteen small improvements were predicted with the Scheme at concentrations below the air quality objective for annual average NO<sub>2</sub> (with concentrations ranging between 25.3-36.3 µg/m<sup>3</sup>).
  - 2.2.8. These small improvements were predicted along the A4 in Knowl Hill and Hare Hatch.

### 3. Construction Receptors

- 3.1. In relation to the construction phase receptors, the following information was provided to Wokingham Borough Council on 23 September 2015:
  - 3.1.1. All receptors adjacent to the Scheme route are considered with regards to the requirement for standard mitigation measures to be applied to all construction works.
  - 3.1.2. Additionally, there is one residential receptor within 200m of the proposed Construction Compound 4. This receptor is located on Dunt Lane, approximately 175m from the compound location. Therefore, additional site specific mitigation measures have been proposed for this compound, due to the presence of a sensitive receptor within 200m.
  - 3.1.3. The mitigation measures for the construction phase, including both demolition and construction, have been identified and these are described in Appendix 6.1 of the ES

(Application Document Reference 6.3) and in Chapter 6 of the Outline Construction Environmental Management Plan (Appendix 4.2A of the ES) (Application Document Reference 6.3).

3.1.4. These measures are based on the recent Institute of Air Quality Management (“IAQM”) guidance.

3.1.5. The mitigation measures include standard mitigation measures (Section 6.2 of the Outline Construction Environmental Management Plan) and additional mitigation measures (Section 6.3 of the Outline Construction Environmental Management Plan) where residential properties are close to construction compounds.

3.1.6. Section 5.6 of the Outline Construction Environmental Management Plan (Appendix 4.2A of the ES) (Application Document Reference 6.3) also includes measures on site construction layout to control dust, mud, and spoil.

3.1.7. Two drawings showing the location of Construction Compound 4 were also provided to Wokingham Borough Council on 24 September 2015.

#### 4. Evaluation of Significance and Determination of the need for Mitigation

4.1. The following information was provided to Wokingham Borough Council on 23 September 2015 with regard to the approach to the determination of the need for operational air quality mitigation:

4.1.1. The overall operational assessment of significance of the Scheme is set out in paragraph 6.15.16 and Tables 6.21 and 6.22 of the ES (Application Document Reference 6.1).

4.1.2. This overall assessment of significance indicates that air quality effects are not significant and as such no additional specific mitigation is proposed.

4.1.3. This is based on the approach outlined in Interim Advice Note 174/13 Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 ‘Air Quality’ (HA207/07).

4.1.4. This approach asks for a number of key questions to be answered and in particular how many receptors are adversely affected (i.e. a change of more than 0.4 µg/m<sup>3</sup> at concentrations of more than 40 µg/m<sup>3</sup>).

4.1.5. For the Scheme the numbers of receptors that fall in to this evaluation are as follows:

Magnitude of change in annual average NO <sub>2</sub> (µg/m <sup>3</sup> )	Total Number of receptors with:	
	Worsening of air quality already above objective or creation of a new exceedance	Improvement of an air quality already above objective or the removal of an existing exceedance
Large (>4)	0 (1 to 10)	0 (1 to 10)
Medium (>2 to 4)	7 (10 to 30)	0 (10 to 30)

Magnitude of change in annual average NO <sub>2</sub> (µg/m <sup>3</sup> )	Total Number of receptors with:	
	Worsening of air quality already above objective or creation of a new exceedance	Improvement of an air quality already above objective or the removal of an existing exceedance
Small (>0.4 to 2)	11 (30 to 60)	0 (30 to 60)

4.1.6. As the numbers of receptors are well below the numbers of receptors where significant effects may occur for a scheme, this indicates that the Scheme is not significant for air quality and that additional operational mitigation is not required.

4.1.7. A copy of the Interim Advice Note 174/13 that was used to come to the above conclusion was also provided to Wokingham Borough Council on 23 September 2015.

4.2. The aspects of the Scheme that may have air quality benefits, based on professional judgement, were also discussed with Wokingham Borough Council, including:

4.2.1. Controlling flows along the Scheme in busy peak periods to smooth out stop and start driving conditions with the associated elevated emissions from this type of congestion;

4.2.2. Enforcing speed limits will also encourage drivers to drive to speed limits at times when the Scheme is at national speed limits, thereby reducing vehicle emissions;

4.2.3. The Scheme has potential to improve air quality at slip roads and local roads through the reduced need for ramp metering;

4.2.4. The ability to provide advanced information to better direct traffic away from any atypical conditions on to the wider strategic road network (e.g. other motorways) along the Scheme, thereby reducing air quality effects from congested driving;

4.2.5. The potential to identify and remove incidents more quickly to reduce any stop start emissions along the Scheme and also minimise the risk of traffic re-routing and causing increased emissions away from the Scheme; and

4.2.6. It is also anticipated based on other similar schemes that the frequency and severity of incidents will often be less with the Scheme, reducing the frequency of congested driving conditions with the associated elevated emissions along the Scheme and on any diversion routes.

## 5. Conclusion

5.1. On the basis of the information set out above, Wokingham Borough Council has agreed that no further air quality analysis is required, and it is expected that this will be reflected in the Statement of Common Ground.

#### **E4.6.4 Has the study area for the assessment of construction effects and for the assessment of operational effects been agreed with the local authorities?**

##### **1. Introduction**

- 1.1. This response is divided into two sections, with the first section addressing construction effects study area selection and the second considering operational effects study area selection.
- 1.2. Whilst there has not been explicit agreement with local authorities in relation to the study areas for the assessment of construction effects and of operational effects, the local authorities have had a number of opportunities to disagree with the selected study areas, and no such disagreement has been indicated.

##### **2. Construction Study Area Selection**

- 2.1. The approach to the determination of construction dust study area adopted in the ES (Application Document Reference 6.1) is consistent with the study area selection criteria consulted upon through the Scoping Report for the Scheme (issued August 2014), as described in paragraph 6.1.15. No specific local authority consultee comments were received on this aspect of the construction study area from this phase of consultation.
- 2.2. Similarly, the Preliminary Environmental Information Report (issued November 2014) (<http://www.highways.gov.uk/publications/m4-junction-3-to-12-smart-motorway-consultation-documents/>) also utilised a construction dust study area consulted upon through the Scoping Report for the Scheme, as described in paragraph 6.2.13. No specific local authority consultee comments were received on this aspect of the construction study area from this phase of consultation.
- 2.3. Following the publication of the ES (Application Document Reference 6.1), none of the relevant representations received include comments on the identification of the construction study area.
- 2.4. The study area for the assessment of construction is based on the criteria included within Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA 207/07, Air Quality ("HA207/07"). For the construction phase, HA207/07 indicates in paragraph 3.45 that sensitive receptors should be identified within 200m of a construction site. This is the study area adopted for the air quality assessment of the Scheme, as described in paragraph 6.2.8 of the ES (Application Document Reference 6.1).
- 2.5. As described in paragraph 6.2.47 of the ES (Application Document Reference 6.1), sensitive receptors (i.e. residential properties) are identified within 200m of construction sites (i.e. construction compounds and bridge works) with the highest potential to generate dust, then additional site specific mitigation measures have been recommended. These measures are listed in Appendix 6.1 of the ES (Application Document Reference 6.3). Additionally, if a receptor is not identified within 200m, then a standard set of mitigation measures also outlined in Appendix 6.1 of the ES (Application Document Reference 6.3) are still proposed.
- 2.6. Therefore, even if a different study area (i.e. a more extensive study area extending beyond 200m) was required by a local authority consultee, the mitigation that would be applied (i.e. standard mitigation measures) has already been recommended within Appendix 6.1 of the ES (Application Document Reference 6.3) due to the conservative approach to the recommendation of construction dust mitigation proposed.



### 3. Operational Study Area Selection

- 3.1. The approach to the determination of the local operational air quality study area adopted in the ES (Application Document Reference 6.1) is consistent with the study area selection criteria consulted upon through Scoping Report for the Scheme (issued August 2014), as described in paragraphs 6.1.12 and 6.1.13. No specific local authority consultee comments were received on this aspect of the local operational air quality study area from this phase of consultation. The one exception was the London Borough of Hounslow which specifically requested that the parts of the Scheme that are within their administrative area were included within the air quality assessment for the Scheme. The air quality assessment undertaken and presented within the Preliminary Environmental Information Report and Environmental Statement included the Scheme route and affected routes within the London Borough of Hounslow.
- 3.2. Similarly, the Preliminary Environmental Information Report (issued November 2014) also utilised a local operational air quality study area consulted upon with local authority consultees for the Scheme, as described in paragraphs 6.2.14 and 6.2.15. No specific local authority consultee comments were received on the local operational air quality study area from this phase of consultation.
- 3.3. Following the publication of the ES (Application Document Reference 6.1) none of the relevant representations received include comments on the identification the local operational air quality study area.
- 3.4. The study area for the assessment of operational effects is based on the criteria included within HA207/07. In particular, the local operational air quality study area is identified based on the criteria identified in paragraph 3.12, as reproduced below:
  - 3.4.1. road alignment will change by 5m or more; or
  - 3.4.2. annual average daily traffic (“AADT”) flows will change by 1,000 or more; or
  - 3.4.3. heavy duty vehicles (“HDV”) (vehicles more than 3.5 tonnes, including buses and coaches) flows will change by 200 AADT or more; or
  - 3.4.4. daily average speeds will change by 10 km/h or more; or
  - 3.4.5. peak hour speed will change by 20 km/h or more.
- 3.5. The Scheme route is also included within the local operational air quality study area along with any other roads where the additional emissions from these other roads are required to describe pollutant concentrations at sensitive receptor locations within the local operational air quality study. Paragraph 3.13 of HA207/07 adds that only sensitive receptors up to 200m from affected routes require consideration within a local operational air quality study area.
- 3.6. As described in paragraphs 6.2.31 to 6.2.33 the ES (Application Document Reference 6.1), the above approach has been used in the determination of which roads and sensitive receptors to include within the local operational air quality study area.
- 3.7. Consideration of the local operational air quality results for the key pollutant nitrogen dioxide (NO<sub>2</sub>) also confirms that the study area considered within the ES (Application Document Reference 6.1) is considerably larger than the minimum area that would be required to evaluate the overall significance of local operational air quality effects. This is because the

only receptors (i.e. residential properties) that contribute to the overall evaluation of significance (i.e. those with air quality anticipated to be above an air quality objective with the Scheme and to have a perceptible change in air quality i.e. a change of more than 0.4  $\mu\text{g}/\text{m}^3$ ) are located within the approximate centre of the study area between Sindlesham and Upton Park, Slough. Outside of this central section, changes anticipated in traffic, and as such changes in air quality, are anticipated to be reduced. For example, at the margins of the local operational air quality study area beyond junction 12 to the west and junction 3 to the east, changes in air quality are imperceptible (i.e. less than or equal to 0.4  $\mu\text{g}/\text{m}^3$ ) as traffic changes predicted with the operation of the Scheme reduce and these changes are not considered within the overall evaluation of significance for local operational air quality effects.

#### 4. **Conclusion**

- 4.1. The construction and operational study areas have been determined in line with relevant guidance and there have not been any local authority consultee comments from the consultation undertaken for the Environmental Impact Assessment Scoping Report or Preliminary Environmental Information Report which required any amendment to this approach. The only comment received in relation to the study area was from the London Borough of Hounslow, to confirm that the portion of the Scheme in their area would be included in the assessment of effects for air quality.
- 4.2. Additionally, subsequent relevant representations received from local authority consultees in response to the ES (Application Document Reference 6.1) do not comment on the selection of study areas.

**E4.6.5 The assessment of construction phase traffic effects and operational phase traffic effects uses a study area of 200m around road sections likely to be affected by the scheme (para 6.2.31 APP-146) • Can the applicant confirm where the 200m mark begins for the construction phase assessment?**

**Introduction**

1. This response outlines to which construction phase traffic assessments the 200m study area applies, and also explains that this study was not applied as quantitative air quality modelling was not required follow a review of the traffic information available for the construction phase.

**Construction Phase Traffic Air Quality Effects**

2. Paragraph 6.2.31 of the ES (Application Document Reference 6.1) notes that the study area for the construction phase roads air quality assessment is the same as that for the local operational air quality assessment. This applies to two elements of construction traffic including:
  - 2.1. Construction phase heavy goods vehicles (“HGV”) assessment; and
  - 2.2. Construction phase traffic management assessment.
  - 2.3. The findings of these assessments are described in the two below sub-sections.

**Construction Phase HGV Assessment**

3. Paragraph 6.2.48 of the ES (Application Document Reference 6.1) sets out that the anticipated average number of HGVs across the Scheme route and local road network is 150. This is based upon information presented within the Engineering and Design Report (Application Document Reference 7.3).
4. As these changes were not anticipated to be concentrated in one specific location across an annual duration, no further quantitative air quality assessment was undertaken, as described in paragraphs 6.2.49 and 6.2.50 of the ES (Application Document Reference 6.1).
5. Following the publication of the ES (Application Document Reference 6.1), none of the relevant representations received include comments requesting that a quantitative assessment of construction phase HGVs is undertaken.

**Construction Phase Traffic Management Assessment**

6. Paragraph 6.2.51 of the ES (Application Document Reference 6.1) describes that an assessment of potential traffic management effect, and in particular rerouting, considered traffic information contained in Appendix 6.3 of the ES (Application Document Reference 6.3). Based on this traffic information, it was not expected that any individual traffic route would experience enough of a change in traffic to require further quantitative air quality assessment.
7. Following the publication of the ES (Application Document Reference 6.1), none of the relevant representations received include comments requesting that a quantitative assessment of construction phase traffic management is undertaken.

**Study Area 200m Buffer Definition**

8. The 200m buffer, which would have been used to identify sensitive receptor locations for further assessment would have been measured from the centreline of any affected roads.

9. The 200m buffer is based on advice provided in the Design Manual for Roads and Bridges, Volume 11 Environmental Assessment, Section 3 Environmental Assessment Techniques, Part 1 Air Quality (HA 207/07) where it is stated that:

*“Only properties and Designated Sites within 200 m of roads affected by the project need be considered.”*

10. This is because at this distance pollutant concentrations tend towards background concentrations, indicating little contribution from these sources at these distances. Therefore the study area for the assessment is defined as within 200m of the Scheme or of a road link predicted to experience a significant change in traffic flows (as defined in HA207/07). Outside of this study area, sensitive receptors are not anticipated to experience a significant effect on air quality as a result of the Scheme and are therefore not included in the assessment of effects.

### **Conclusion**

11. Following a review of the traffic information available for the construction phase, quantitative air quality modelling was not required for either the construction phase HGV assessment or construction phase traffic management. Therefore, the 200m buffer from road centrelines that would be used to identify a study area and sensitive receptors has not been required.

**E4.6.6 Paras 6.2.7 to 6.2.14 of Chapter 6 APP-146 sets out details of sensitive receptors that may be affected by changes in air quality as a result of the construction and operation of the scheme. Some 3,275 sensitive receptors are identified. To what extent has the definition and identification of sensitive receptors been agreed with local authorities and any other relevant stakeholders?**

## **1. Introduction**

1.1. This response provides a combined response on the approach taken to the definition of sensitive receptors, selection of sensitive receptors and agreement on these points with local authorities and relevant stakeholders for both the construction and operational phases.

## **2. Agreement with Local Authorities and Relevant Stakeholders**

2.1. The approach to the determination of the construction dust study area adopted in the ES (Application Document Reference 6.1) is consistent with the study area selection criteria consulted upon through the Scoping Report for the Scheme (issued August 2014), as described in paragraph 6.1.15 and as described in paragraphs 6.1.12 and 6.1.13 of for the local operational air quality assessment. Two specific local authority consultee comments were received from this phase of consultation on this aspect of the construction dust or local operational air quality study area or specific sensitive receptors.

2.2. The first of these comments was received from South Bucks District Council, which identified Burnham Beeches SAC as a potential air quality sensitive receptor. Further information was provided to South Bucks District Council following completion of the Preliminary Environmental Information Report (issued November 2014) (<http://www.highways.gov.uk/publications/m4-junction-3-to-12-smart-motorway-consultation-documents/>) to confirm that only very limited changes in traffic flows were anticipated in this location and that specific quantitative assessment was not required.

2.3. Bracknell Forest Council identified Air Quality Management Areas (“AQMA”) located between the M4 and the M3 as potential locations for consideration, although the Council also noted that they did not expect significant impacts on their Borough. This is confirmed by the assessment off-Scheme changes in traffic within the Bracknell Forest area, which were very low and did not require detailed assessment for Air Quality, as shown on Drawing 6.0 (Application Document Reference 6.2) which identifies significantly affected road links for Air Quality.

2.4. Natural England, in their Scoping Response, provided a list of national, European and internationally designated sites. The relevant representation provided by Natural England in response to the Environmental Statement (relevant representation 276) confirms that the required receptors within 200m of affected routes have been considered and that they “...are satisfied that the Project will not have a likely significant effect upon the European sites, or result in harm to the SSSIs listed above”.

2.5. Similarly, the Preliminary Environmental Information Report also consulted upon a construction dust study area, as described in paragraph 6.2.13 and as described in paragraphs 6.2.14 and 6.2.15 for the local operational air quality assessment. No specific local authority consultee comments were received from this phase of consultation on the construction dust or local operational air quality study area or specific sensitive receptors. Comments were received from Chalvey Community Forum on educational receptors in the Slough area during the Consultation phase following completion of the Preliminary Environmental Information Report. In response to these queries further information was provided to Chalvey Community

Forum to confirm that the assessment undertaken for the Slough area has considered a large number of sensitive receptors which are far closer to the M4 than the educational receptors identified, which were too far from the Scheme to require detailed assessment for air quality.

2.6. Following the publication of the ES (Application Document Reference 6.1), one of the relevant representations received, from Colnbrook Community Association, included a comment on the consideration of Westfield Community Hall as a sensitive receptor (relevant representation 201). In the response to this relevant representation, Highways England provided information which outlined the anticipated air quality in this locality. No other comments on the consideration of any additional receptors for either the construction dust or local operational air quality assessments were received from local authorities or other relevant stakeholders.

### **3. Definition of Sensitive Receptors**

3.1. The definition of sensitive receptors to be considered within an air quality assessment is included within paragraph 3.13 of Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA207/07, Air Quality (“HA207/07”). The list of sensitive receptors set out within paragraph 3.13 of HA207/07 includes: properties, schools, hospitals and nature conservation sites. Paragraph 3.45 of HA207/07, which relates to construction dust, also includes a similar list of sensitive receptor types.

3.2. Paragraphs 3.13 and F2.1 of Annex F (Assessment of Designated Sites) of HA207/07 further clarifies that nature conservation sites include: Special Areas of Conservation (“SACs”), Sites of Community Importance (“SCIs”), candidate Special Areas of Conservation (“cSACs”), Special Protection Areas (“SPAs”), potential Special Protection Areas (“pSPAs”), Sites of Special Scientific Interest (“SSSIs”) and Ramsar sites.

3.3. The definition of sensitive receptors used within the ES for both the construction and operational phases is described in paragraph 6.2.7 (Application Document Reference 6.1). This paragraph indicates that sensitive receptors are predominantly residential properties, but can also include (for example) schools, internationally and nationally designated ecosystems and allotment gardens (construction dust only).

### **4. Identification of Sensitive Receptors**

4.1. The identification of sensitive receptors for both the construction and operational phases has adopted a worst case approach. In this approach, the closest sensitive receptors to a construction site have been identified within 200m and similarly the closest sensitive receptors to roads have been identified and included within the local operational air quality study area.

4.2. In addition to the inclusion of the closest sensitive receptors to construction sites and the closest sensitive receptors to roads within the local operational air quality study area, additional sensitive receptors have also been identified as part of the Air Quality assessment process.

4.3. For the construction dust assessment, the approximate numbers of sensitive receptors within 200m of construction sites were identified. The construction dust assessment also included allotments as sensitive receptors following consultation comments on the Preliminary Environmental Information Report (issued November 2014) (<http://www.highways.gov.uk/publications/m4-junction-3-to-12-smart-motorway-consultation-documents/>). Similarly, within the local operational air quality assessment a

number of receptors, including residential properties and schools, were added to make sure that all sensitive receptors which could have a change in air quality were assessed, as these contribute to the overall evaluation of significance of effects for the local operational air quality assessment. In total, for the local operational air quality assessment, 3,275 sensitive receptors were assessed, as listed in paragraph 6.2.11 of the ES (Application Document Reference 6.1). From this total number of sensitive receptors, only 18 sensitive receptors contribute to the overall evaluation of significance of effects for the local operational air quality assessment, indicating that a comprehensive number of receptors has been considered to confirm that overall, there are no significant local operational air quality effects.

4.4. No hospitals were included within the local operational air quality assessment, as none were identified within the study area of the assessment.

## **5. Conclusion**

5.1. The construction and operational study areas and identification of sensitive receptors within these study areas has been determined in line with relevant guidance. Any comments received on the sensitive receptors were noted and addressed through the Preliminary Environmental Information Report or Environmental Statement or subsequent relevant representation responses.

5.2. A comprehensive set of construction dust and the local operational air quality sensitive receptors have been considered within the ES (Application Document Reference 6.1). No additional receptors are considered to be required to evaluate the significance of effects associated with the construction dust and operational air quality effects of the Scheme.

**E4.6.7** Whilst the regional air quality assessment set out under para 6.15.11 APP-146 provides results for both the opening year (2022) and the design year (2037) of the scheme, the detailed level assessment, as described in paras 6.2.55 to 6.2.64 APP-146 limits predictions to the baseline year (2013) and the opening year. Can an assessment of local air quality effects be provided for the design year with and without the scheme?

## **1. Introduction**

1.1. In the assessment of the Scheme, the terms “Do Something” and “Do Minimum” are used for the with Scheme and without Scheme scenarios. The terms have been maintained in this response for consistency.

## **2. Design Year Local Air Quality Assessment**

2.1. An additional design year air quality assessment of local operational air quality has been prepared for the central sensitive receptors which contributed to the overall evaluation of significance of effects and surrounding sensitive receptors which are located within the approximate centre of the study area between Sindlesham and Upton Park, Slough. As described in the response to E4.6.4 (Operational Study Area Selection paragraph 4), changes in air quality away from this location are smaller and, as such, the consideration of air quality effects in this area in the design year is considered to be the worst case location for the Scheme, as consistent with the opening year the highest changes in traffic due to the Scheme are anticipated to occur in this approximate centre of the study area.

2.2. The design year air quality assessment has followed the same air quality modelling methodology as outlined in paragraphs 6.2.55 to 6.2.62 of the ES (Application Document Reference 6.1) and in Appendix 6.4 of the ES (Application Document Reference 6.3). The only exception to the previous approach is that as the only pollutant considered in the final overall evaluation of significance of effects for the local operational air quality assessment was nitrogen dioxide (“NO<sub>2</sub>”), the design year has focused on this pollutant alone rather than NO<sub>2</sub> and particulates (“PM<sub>10</sub>”). In addition, the tools and data sources used within the assessment of air quality effects do not currently project as far into the future as 2037 (the design year), and therefore the furthest projection year of 2030 has been used. This relates to the following aspects of the assessment:

2.2.1. Background concentration data;

2.2.2. Defra emission rates;

2.2.3. NO<sub>x</sub> to NO<sub>2</sub> conversion tool; and

2.2.4. Long term trend calculator.

2.3. The assessment of air quality effects for the design year has modelled the impact of the Scheme at 441 receptors close to the M4, in the area described above.

2.4. Annual mean concentrations of NO<sub>2</sub> in the 2037 Do Minimum and 2037 Do Something scenarios are all lower than those predicted at the same receptors in the 2022 Do Minimum and 2022 Do Something scenarios. The annual mean concentrations of NO<sub>2</sub> are between 1.6 and 4.1 µg/m<sup>3</sup> lower in 2037 than in 2022. It should also be noted that as the limit of the emission rates, backgrounds and tools is 2030, the actual concentrations likely to be experienced at all receptors in the study area would be lower than that predicted here, as



there would be a further seven years of improvements in background concentrations and emission rates. Therefore the results presented here are indicative of the general improvements in air quality in the design year.

2.5. The assessment of air quality effects for Do Something compared to Do Minimum in the design year is summarised in Table 1 below, with the criteria for significant effect in brackets, and the corresponding summary for the opening year for comparison:

**Table 1 - Summary of results for opening year and design year (Do Something compared to Do Minimum)**

Magnitude of Change in NO <sub>2</sub> (µg/m <sup>3</sup> )	Number of receptors with:			
	Worsening of air quality objective already above objective or creation of a new exceedance		Improvement of air quality objective already above objective or removal of an existing exceedance	
	2022 Opening Year	2037 Design Year	2022 Opening Year	2037 Design Year
Large (>4)	0 (1 to 10)	0 (1 to 10)	0 (1 to 10)	0 (1 to 10)
Medium (>2 to 4)	7 (10 to 30)	4 (10 to 30)	0 (10 to 30)	0 (10 to 30)
Small (>0.4 to 2)	11 (30 to 60)	0 (30 to 60)	0 (30 to 60)	0 (30 to 60)

2.6. The four receptors that are predicted to experience a medium magnitude increase in annual mean NO<sub>2</sub> concentrations, with predicted concentrations above the objective value with the Scheme in place (Do Something), are:

- 2.6.1. A65 – on King Street Lane (B3030) adjacent to M4 overbridge;
- 2.6.2. A65a – on King Street Lane (B3030) adjacent to M4 overbridge;
- 2.6.3. X35 – at Lake-End, adjacent to M4, near junction 7 westbound on slip; and
- 2.6.4. X612 – on King Street Lane (B3030) adjacent to M4 overbridge.

2.7. The above four receptors were previously identified in the opening year assessment and the evaluation of significance.

2.8. The locations of these receptors are shown on Drawings 6.6, 6.6a and 6.11 (Application Document Reference 6.2).

### **3. Design Year Guidance and Policy Requirements**

- 3.1. Design Manual for Roads and Bridges Volume 11, Section 3, Part 1, HA 207/07, Air Quality (“HA207/07”) provides guidance on which years should be assessed in the local air quality assessment. In particular, paragraph 3.5 states that the worst year in the first 15 years from opening needs to be assessed. The results of the design year local air quality assessment compared to the results for the opening year indicate that the opening year is the worst year in the first 15 years of Scheme opening.
- 3.2. The National Networks National Policy Statement indicates in paragraph 5.7 that air quality assessments should include forecasts of air quality for scheme opening year.
- 3.3. The design year local air quality assessment undertaken for the Scheme reinforces the appropriateness of the guidance requirements within the National Networks National Policy Statement, in that design year calculations are not be required to evaluate the significance of effects associated with local air quality effects.

### **4. Conclusion**

- 4.1. The design year calculations prepared confirm that the local air quality assessment undertaken for the opening year of the Scheme is the worst case from the first 15 years of operation, and that overall, significant air quality effects are not anticipated.

**E4.6.8 Chapter 6 Section 6.16 APP-146 deals with cumulative impacts. Have the key statutory bodies agreed the scope of the cumulative assessment? Are there any additional developments which should be included in the assessment?**

1. In accordance with Design Manual for Roads and Bridges Volume 11, Section 2, Part 5, consultation has been undertaken with relevant local planning authorities and other statutory bodies to agree the list of projects to be considered in the assessment of cumulative effects.
2. In December 2014, a letter was circulated to local authorities along the Scheme which included a list of developments identified on each of the local authority planning application websites. Responses received provided additional developments for consideration and/or provided updated details on developments already identified. Those additional developments that fell within the study area were considered using the criteria set out above and, where considered appropriate, were added to the list of developments presented in Appendix 16.1 of the ES (Application Document Reference 6.3).
3. Therefore, Highways England confirms that, whilst there has been no explicit agreement as to the scope of the cumulative assessment with relevant stakeholders, the key statutory bodies have been afforded a number of opportunities to contribute to the scope of the cumulative assessments presented in the ES (Application Document Reference 6.1). The response to E4.2.11 includes a table which summarises the consultation undertaken by Highways England to determine the details of relevant developments within 1km of the Scheme for inclusion in the cumulative effects assessment.
4. On that basis, Highways England does not consider that there are any additional developments which should be included in the assessment.

## Noise and Vibration

### **E4.7.1 Do the local authorities agree that the locations of sensitive receptors and the areas most exposed to noise from major roads have been correctly identified (Figure 12.1 APP-253 to APP-256)?**

1. Whilst there has been no express agreement on the topic, Highways England notes that no local authorities that have made a relevant representation have raised any form of comment regarding the identification of sensitive receptors and areas most exposed to noise from major roads.
2. The study area was clearly defined in the Scoping Report (issued in August 2014). Subsequently, the Preliminary Environmental Information Report (issued November 2014) (<http://www.highways.gov.uk/publications/m4-junction-3-to-12-smart-motorway-consultation-documents/>) provided a set of drawings showing the study area for the noise and vibration assessment, identifying all of the sensitive receptors included within the assessment. There have also been a number of meetings with relevant local authorities (which are ongoing) to discuss the approach to the noise and vibration assessment (including the study area), the developing results from that assessment, and particular local issues for each local authority. No criticism has been raised at these meetings regarding the identification of sensitive receptors and areas most exposed to noise from major roads.
3. As stated in paragraph 12.1.3 of the ES (Application Document Reference 6.1), the noise and vibration assessment has been carried out in accordance with the requirements of the Design Manual for Roads and Bridges Volume 11, Section 3, Part 7, HD 213/11 Revision 1, which defines the study area for the noise assessment. As stated in paragraph 12.2.33 of the ES, the study area for the assessment of construction phase impacts comprises a 1km area from the centreline of the Scheme, extended where appropriate to address offline construction compounds and construction traffic routes. Paragraph 12.2.34 of the ES notes that the study area for the assessment of operational phase impacts comprises an area extending 1km from the centreline of the Scheme and also includes other routes predicted to be subject to significant change in traffic conditions. Within the 1km buffer zone of the study area, a detailed study area has been defined which comprises 600m corridors either side of the Scheme and either side of any affected links, i.e. any road links which experience a significant change in traffic, and hence noise, as a result of the Scheme.
4. All sensitive receptors within the 1km buffer have been considered in the noise and vibration assessment (presented in the Chapter 12 of the ES) (Application Document Reference 6.1), and a detailed quantitative assessment has been provided for those receptors within the 600m corridors (limited to the Scheme).

**E4.7.2 Has the baseline for the assessment of noise and vibration including the spatial scope (study area) for both construction and operational phases of the scheme together with the identification of the 21 monitoring locations been agreed with local authorities?**

1. Whilst there is no express agreement on the topic, Highways England notes that no local authorities that have made a relevant representation have raised any form of comment regarding the noise monitoring locations or the study areas for the construction and operational phases of the Scheme.
2. The study area was clearly defined in the Environmental Impact Assessment Scoping Report (issued in August 2014). Subsequently, the Preliminary Environmental Information Report (issued November 2014) (<http://www.highways.gov.uk/publications/m4-junction-3-to-12-smart-motorway-consultation-documents/>) provided a set of drawings showing the study area for the noise and vibration assessment, identifying all of the sensitive receptors included within the assessment and the noise monitoring locations. There have also been a number of meetings with relevant local authorities (which are ongoing) to discuss the approach to the noise and vibration assessment (including the study area), the developing results from that assessment, and particular local issues for each local authority. No criticism has been raised at these meetings regarding any aspect of the baseline for the assessment of noise and vibration.

**E4.7.3** The study area in Figure 12.1 APP-253 to APP-256, identifies that apart from that area identified for the proposed construction compound no. 3 (shown on sheet 3 of 16, Figure 12.1 APP-254 ) t all elements of the proposed development are located within the 1km study area. Figure 12.1 APP-253 to APP-256 identifies the location of some of the construction compounds (2, 3, 5, 6, 9 and 11). It is not clear from the noise and vibration assessment whether the applicant is proposing to require construction compounds 1, 4, 7, 8 and 10 and if so, where these are located. Please can the applicant clarify whether the only construction compounds that have been included in the description of the development and assessed in the ES are compounds 2, 3, 5, 6, 9 and 11? Please can the applicant clarify whether construction compounds 1, 4, 7, 8 and 10 are required for the proposed development?

1. Drawing 12.1 of the ES (Application Document Reference 6.2) shows the 1km study area employed in the noise and vibration assessment, in accordance with the requirements of the Design Manual for Roads and Bridges Volume 11, Section 3, Part 7, HD 213/11 Revision 1, which defines the study area for the noise assessment for affected roads, along with the following information:
  - 1.1. Order Limits
  - 1.2. Noise Monitoring Locations;
  - 1.3. Important Areas;
  - 1.4. Construction Noise Receptors;
  - 1.5. Sensitive Receptors (residential and non-residential); and
  - 1.6. Designated Sites.
2. Drawing 12.1 does not specifically show the proposed construction compounds, although they do form part of the assessment.
3. Paragraph 12.2.33 of the ES (Application Document Reference 6.1) defines the study area for construction phase impacts as follows:

*“The study area for the assessment of construction phase impacts comprises a 1km area from the centreline of the Scheme, extended where appropriate to address offline construction compounds and construction traffic routes”*
4. Highways England confirms that construction compounds 2, 3, 4, 5, 6, 7, 8, 9 and 11 have been included in the noise and vibration assessment, as outlined in paragraphs 12.4.80 and 12.4.81 of the ES (Application Document Reference 6.1). The noise and vibration assessment for the proposed construction compounds is provided in paragraphs 12.4.80 to 12.4.87 of the ES, with associated Table 12.15 (Application Document Reference 6.1).
5. Whilst the proposed construction compounds are not shown on Drawing 12.1, drawings showing the construction compounds and surrounding areas were interrogated and the nearest sensitive receptors to each construction compound were identified. The distances from each construction compound to the nearest sensitive receptor were estimated. The noise and vibration assessment presented in Chapter 12 of the ES (Application Document Reference 6.1) considers the impacts of construction compound activities to these closest sensitive receptors.

6. Highways England can confirm that the required construction compounds for the Scheme are:
  - 6.1. Construction Compound 2, see Drawing 1.1 Sheet 2;
  - 6.2. Construction Compound 3, see Drawing 1.1 Sheet 5;
  - 6.3. Construction Compound 4, see Drawing 1.1 Sheets 10 and 11 (junction 10);
  - 6.4. Construction Compound 5, see Drawing 1.1 Sheet 18;
  - 6.5. Construction Compound 6, see Drawing 1.1 Sheet 20;
  - 6.6. Construction Compound 7, see Drawing 1.1 Sheet 22;
  - 6.7. Construction Compound 8, see Drawing 1.1 Sheet 23;
  - 6.8. Construction Compound 9, see Drawing 1.1 Sheet 25; and
  - 6.9. Construction Compound 11, see Drawing 1.1 Sheet 29.
7. The locations of the construction compounds are shown on Drawing 1.1 of the ES (Application Document Reference 6.2) and Work Plans (Application Document Reference 2.3). Of those identified in this question, Construction Compound 1 and Construction Compound 10 are not required for the Scheme. This is explained at paragraphs 8.2.3 to 8.2.5 of the Engineering and Design Report (Application Document Reference 7.3).

**E4.7.4** The assessment states that within the 1km study area, a 600m zone is subject to detailed modelling. The extent of the 600m zone in relation to the proposed development is shown on Figure 12.2 APP-257 to APP-260. This identifies that all elements of the proposed development, apart from the whole of the proposed construction compound no.6, are located within the 600m detailed modelling study area. Figure 12.2 (sheet 3 of 16 APP-258) shows that the entire area of the proposed construction compound no.6 is located outside the 600m study area. It is not clear how construction compound no.6 has been assessed given that it is outside the 600m modelled study area. Please can the applicant explain the assessment of noise and vibration arising from construction compound no.6, given that the site is located outside the 600m zone subject to detailed modelling?

1. The 600 metre detailed study area shown in Drawing 12.2 of the ES (Application Document Reference 6.2) relates to the operational noise assessment (in accordance with the requirements of the Design Manual for Roads and Bridges Volume 11, Section 3, Part 7, HD 213/11 Revision 1) not to the construction noise assessment. Drawing 12.2 does not show the proposed construction compounds.
2. Paragraph 12.2.33 of the ES (Application Document Reference 6.1) defines the study area for construction phase impacts as follows:

*“The study area for the assessment of construction phase impacts comprises a 1 km area from the centreline of the Scheme, extended where appropriate to address offline construction compounds and construction traffic routes”*

3. All construction compounds, including construction compound 6, were subject to detailed noise modelling and the results and assessment were reported in paragraphs 12.4.80 to 12.4.87 of the ES, with associated Table 12.15 (Application Document Reference 6.1). The study area for each construction compound comprised a buffer around the construction compound to include the nearest sensitive receptors to the construction compound boundary in all directions. This enabled the identification of the nearest sensitive receptor to the construction compound, which would be subject to the highest noise levels from construction compound activities.
4. Drawings showing the construction compounds and surrounding areas are identified in response to E4.7.3, namely Drawing 1.1 of the ES (Application Document Reference 6.2) and the Work Plans (Application Document Reference 2.3). These drawings were interrogated and the nearest sensitive receptors to each construction compound were identified. The distances from each construction compound to the nearest sensitive receptor were estimated. The noise and vibration assessment presented in Chapter 12 of the ES (Application Document Reference 6.1) considers the impacts of construction compound activities to these closest sensitive receptors.



**E4.7.5 Construction of the scheme would require the establishment of a main office compound (c.5ha). However, the ES states that the construction compound proposed as the main compound has not yet been identified. Instead, para 12.4.81 APP-152 states that all proposed construction compounds have been treated as the potential main compound. Please can the applicant clarify the size of each construction compound and which construction compounds are suitable for the requirements of the main office compound?**

5. A worst case scenario approach was adopted when assessing the potential compound areas for noise and vibration, i.e. they were all considered to be the main compound, even though it was known that some of the proposed construction compounds would be unsuitable for use as the main construction compound owing to their size. This approach was adopted to ensure a robust noise and vibration assessment, and was not intended to indicate that every construction compound was a potential main construction compound.
6. The anticipated main construction compound has now been identified as Compound No 5. The size of each compound and the proposed purpose of the compounds are contained in the table below:

<b>Compound Reference</b>	<b>Area</b>	<b>Proposed Usage</b>	<b>Comments</b>
Compound No 2 (Access to J12)	2.57Ha	Vehicle recovery, traffic management, material storage, plant storage, concrete batching plant and offices and welfare facilities to support the western end of the scheme	
Compound No 3 (Access to J11)	2.7Ha	Material recycling/processing material storage, plant storage and welfare facilities. The height of the offices, workshops, plant and storage elements within construction compound 3 will need to be limited to no more than 3m in height to ensure minimal visual disruption on the adjacent residential properties. The uses within this compound will also need to be limited such as no concrete batching plant will be allowed Section 8.3.5 of the Outline Construction Environmental Plan, Appendix 4.2A ( Application Document Reference 6-3)	Usage to consider effect of planing permission for development of a park and ride facility on part of the site as noted in Section 5.5.3 (d) of the Outline Construction Environmental Plan Appendix 4.2A of the Environmental Statement (Application Document Reference Number 6.3)
Compound No 4 (Access to J10)	7.44Ha	Existing Highways England land ownership within Junction 10 Slip road configuration - Vehicle recovery area, small plant and material storage, site office and welfare.(Approx. 1ha)	Use of total area limited due to vegetation and limited sight lines available for safe access and egress.

Compound No 5 (Access to J8/9)	6.15Ha	Main construction compound: staff office, car parking, welfare, vehicle recovery and customer care centre, traffic management, plant & material storage, material processing and concrete batching plant.	Located with good access to J8/9 and central to the Scheme and is consequently ideally positioned to operate as the main construction compound for the full Scheme i.e. M4 junction 3 to junction 12.
Compound No 6 (Access to J7)	3.06Ha	This will support the construction of 3No overbridges. Office/welfare and material storage, formwork fabrication and laydown areas etc.	Supports Lake End Road, Huntercombe Spur and Oldway Lane.
Compound No 7 (Access to J6)	1.35Ha	Supports Windsor Branch Rail bridge widening. Formwork fabrication, material storage for bridges, processing and storage of bridge demolition materials from other bridges. Satellite office and welfare.	Supports Windsor Branch widening
Compound No 8 (Access to Datchet Road)	2.02Ha	Supports the demolition and construction of both Datchet Road and Riding Court Road Bridges. Formwork fabrication, material storage for bridges, Earthworks, processing/storage of bridge demolition materials.	Supports Datchet Road Bridge and Riding Court Road Bridge.
Compound No 9 (Access to J5)	3.4Ha	<p>Vehicle Recovery area, offices and welfare facilities, plant and material storage together with processing to support the eastern section of the main line works on the scheme. Additional facilities for formwork manufacture for culvert extensions and other ancillary structures and Langley Under bridge widening works.</p> <p>As with compound 3 the height of the offices, workshops, plant and storage elements within construction compound 9 will be limited to no more than 3m in height to ensure minimal visual disruption on the adjacent residential properties. The uses within these compound will also be limited such as no concrete batching plant will be allowed. Section 8.3.5 of the Outline Construction Environmental Plan, Appendix 4.2A (Application Document Reference 6-3).</p>	40% of compound associated with supporting Bridge works and ancillary structures.

Compound No 11 (Access to J4)	2.08Ha	Vehicle Recovery area and material storage and welfare.	Provide critical vehicle recovery area and construction storage inside the M25.
----------------------------------	--------	---	---

7. From a recent assessment of similar Smart Motorway projects; namely the M3 J2-J4a and the M60; the size of the main compounds are 8ha and 5ha respectively.
8. Construction Compound 5 is considered the most suitable option as the main compound for the whole Scheme, for the following reasons:
  - 8.1. It is located centrally within the Scheme;
  - 8.2. It has a suitable area (approx. 6ha);
  - 8.3. It has good access to the motorway; and
  - 8.4. The magnitude of environmental impact is Minor or Negligible.
9. The other compounds, whilst essential for the construction of the Scheme for the reasons stated in the table, are not of sufficient size or not in the right location to be the main compound. For example, whilst Construction Compound 4 has a larger total area, the access arrangements and vegetation preclude its use as the main compound.

**E4.7.6 It is not clear what hours of construction have been assumed for the noise assessment. Please can the applicant clarify what hours of construction have been used in the noise and vibration assessment in the ES? Where night-time working is required for certain activities, please can the applicant identify what activities these are, the anticipated duration of these activities and how the night-time working has been assessed in the ES? Where differing noise limits are proposed for `day', `evening' and `night' construction activities, please can the applicant clarify what timeframes have been assumed for `day', `evening' and `night' activities? Please can the applicant explain how activities and the construction hours will be controlled through the DCO?**

**Hours of construction assumptions**

1. Table 12.1 of the ES (Application Document Reference 6.1) defines the daytime, evening and night-time construction hours employed in the noise and vibration assessment, as set out in Table E.1 of British Standard 5228-1: 2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise:

1.1. Daytime                                      07:00 to 19:00

1.2. Evening                                        19:00 to 23:00

1.3. Night-time                                    23:00 to 07:00

**Night-time working assumptions**

2. In terms of calculated noise levels for construction works, a reasonable worst case approach has been taken, assuming that construction activities are being carried out at the closest approach to the receptor under consideration (see paragraph 12.4.44 of the ES) (Application Document Reference 6.1). In effect, this is providing a calculated construction noise level for the worst-case hour within whatever period is being addressed (daytime, evening, night-time).

3. Core working hours are defined in the Outline Construction Environmental Management Plan (Appendix 4.2A of the ES) (Application Document Reference 6.3). These differ slightly from those above, with a weekday start time of 08:00, and a start time of 07:00 on Saturdays. These differences have no effect on the conclusions of the noise and vibration assessment, as presented in the ES (Application Document Reference 6.1), since (as stated above) a worst case hour in each period (day, evening, night) has been assessed.

*Activities*

4. Paragraph 12.4.42 of the ES (Application Document Reference 6.1) lists those construction activities likely to be carried out during the night-time period (albeit not exhaustively). These activities are:

4.1. Carriageway surfacing;

4.2. Gantry installation;

4.3. Traffic management;

4.4. Bridge demolition;

4.5. Bridge removal; and

#### 4.6. Bridge installation.

##### *Duration*

5. Gantry installation, traffic management, bridge removal and bridge installation are very short term activities at any particular location, carried out over one or two nights.
6. Regarding carriageway surfacing, whilst surfacing the complete extent of the Scheme will be carried out over a significant period of time, the rate of progress is quite rapid and particular locations will only be exposed to elevated noise levels for a small number of nights (see paragraph 12.4.50 of the ES) (Application Document Reference 6.1).
7. Bridge demolition, which comprises the demolition of the bridge approaches and bridge abutments, may result in elevated noise levels at particular locations for slightly longer periods of time. The contractor will ensure that noise levels from the works are minimised and that potential disturbance is limited to as short a time as possible. Close liaison with the relevant local authorities and local residents will be a key part of the contractor's approach, as outlined in paragraphs 1.4.1 and 1.7.1 of the Outline Construction Environmental Management Plan (Appendix 4.2A of the ES) (Application Document Reference 6.3).

##### *Assessment*

8. The methodology for the calculation and assessment of construction noise and vibration levels is common to daytime, evening and night-time, albeit with different criteria for these three time periods.
9. The methodology for construction noise is provided in paragraphs 12.2.1 to 12.2.6 of the ES, plus accompanying Table 12.1, and paragraph 12.2.55, plus accompanying Table 12.4 (Application Document Reference 6.1). This is the standard ABC method as provided in BS5228-1 'Code of practice for noise and vibration control on construction and open sites. Noise'.
10. The methodology for construction vibration is provided in paragraphs 12.2.7 to 12.2.11 of the ES, plus accompanying Table 12.2, and paragraphs 12.2.56 to 12.2.58, plus accompanying Tables 12.5 and 12.6 (Application Document Reference 6.1). This approach is based on the data and criteria given in BS5228-2 'Code of practice for noise and vibration control on construction and open sites. Vibration'.

##### *Noise levels*

11. The criterion noise levels for daytime, evening and night-time are derived from the prevailing ambient noise levels at the receptors according to the ABC methodology in BS5228-1. The prevailing ambient noise level at a receptor will, of course, vary between daytime, evening and night-time.
12. The daytime, evening and night-time hours are as defined above. As also stated above, the calculated construction noise levels are worst case hour noise levels and it is these 1 hour noise levels which are assessed against the derived criterion levels using the ABC method.

##### *Control over activities and construction hours*

13. Paragraph 5.2.1 of the Outline Construction Environmental Management Plan (Appendix 4.2A of the ES) (Application Document Reference 6.3) states that the contractor will seek to obtain

consents from the relevant local authorities where necessary under Section 61 of the Control of Pollution Act 1974 for the proposed construction works, excluding non-intrusive surveys.

14. Applications for Section 61 consents will include details on proposed working hours and construction activities to be carried out during those hours, including night-time works.
15. Any conditions included in consents / licences / permits will be documented in the final Construction Environmental Management Plan, secured by Requirement 8 (Schedule 2) of the Draft DCO (Application Document Reference 3.1).
16. Working hours are addressed in paragraphs 5.4.1 to 5.4.11 of the Outline Construction Environmental Management Plan (Appendix 4.2A of the ES) (Application Document Reference 6.3).

**E4.7.7 Limits on noise and vibration during construction would need to be agreed with the relevant local authorities (para 12.4.43 APP-152). Please can the applicant clarify what noise and vibration limits are proposed during construction, having regard to the levels that have been assessed within the ES and how these will be controlled through the requirements of the DCO?**

1. Once the contractor has developed the detailed construction programme and associated plant schedule, the likely noise and vibration effects will be verified, including those from operation of the construction compounds. This will include an appraisal of necessary night-time working and the associated noise and vibration effects.
2. The contractor will be required by the CEMP to employ best practicable means to minimise noise and vibration levels during the works. There will be close liaison between the contractor and Local Authority Environmental Health Officers, affected residents and commercial operations, to ensure that noise and vibration during construction are effectively managed. The contractor will enter into Section 61 Agreements (under the Control of Pollution Act 1974) with relevant local authorities. Noise and vibration limits will form part of these Section 61 Agreements.
3. The procedures for managing noise and vibration during construction, including a protocol for compliance monitoring, will be documented in the CEMP. An Outline Construction Environmental Management Plan was submitted in support of the Application (Appendix 4.2A of the ES) (Application Document Reference 6.3) and this will be finalised by the contractor, and agreed with relevant local authorities, prior to commencement of construction works (secured by Requirement 8 of Schedule 2 of the Draft DCO (Application Document Reference 3.1)).
4. Prevailing ambient noise levels to receptors close to the motorway are relatively high, during daytime, evening and night-time periods. These ambient noise levels have been taken into account in paragraphs 12.4.32 to 12.4.87 of the ES (Application Document Reference 6.1) and Appendix 12.3 of the ES (Application Document Reference 6.3), which address construction noise and vibration effects.
5. Suggested noise limits, based on agreed limits with three Local Boroughs on the M3 J2 to 4a scheme, are:
  - 5.1. Daytime and evening: 75 dB  $L_{Aeq, 1 \text{ hour}}$  (free field), with restrictions on times when piling works can be carried out; and
  - 5.2. Night-time: 75 dB  $L_{Aeq, 1 \text{ hour}}$  (free field), with restrictions on the types of activities that can be carried out.
6. Suggested vibration limits, based on agreed limits with three Local Boroughs on the M3 J2 to 4a scheme, are:
  - 6.1. Trigger level of 1 mm/s peak particle velocity for occupied residential and educational buildings:
  - 6.2. Trigger level of 3 mm/s peak particle velocity for occupied commercial premises (applies to premises where work is not of an especially vibration sensitive nature and for potentially vulnerable unoccupied buildings); and
  - 6.3. Trigger level of 5 mm/s peak particle velocity for other unoccupied buildings.

7. Section 5.3 of the Outline Construction Environmental Management Plan (Application Document Reference 6.3) sets out procedures for agreeing to the working hours on site, which will be secured under Schedule 2, Requirement 8 of the Draft DCO (Application Document Reference 3.1). Typically, the contractor may be given permission to carry out works which exceed the above noise levels, provided that notice of the date and timing of these works is given to Highways England and the contractor demonstrates that he intends to take all reasonable measures to mitigate the noise nuisance. After consultations with the local authorities and any other interested bodies, a decision will be given.



**E4.7.8 Appendix 12.3 APP-349 shows the magnitude of the change from the baseline level during construction on residential and non-residential receptors. Para 12.4.54 APP-152 notes that night-time mainline works are restricted to resurfacing, traffic management and gantry installation. However, it is unclear how certain night-time activities would be controlled through the draft DCO APP-026. Please can the applicant clarify how it intends to control night-time mainline works, through the requirements in the draft DCO, limiting these to resurfacing, traffic management and gantry installation, as assessed in the ES? Please can the applicant identify the specific requirements relied upon in the draft DCO to control night-time working for these activities?**

1. Likely night-time works are listed in paragraph 12.4.42 of the ES (Application Document Reference 6.1) and referred to at paragraph 4 of the response to E4.7.6 above. Night-time works specific to the mainline works are referenced in paragraph 12.4.54 of the ES (Application Document Reference 6.1).
2. However, there may be other activities which the contractor requires to carry out at night for both safety and programme expediency (e.g. slip-form central reserve concrete safety barriers). These activities would be included in any applications for Section 61 consents under the Control of Pollution Act 1974.
3. The Requirements are provided in Schedule 2 of the Draft DCO (Application Document Reference 3.1). Requirement 8 relates to the Construction Environmental Management Plan (an Outline Construction Environmental Management Plan was submitted in support of the Application at Appendix 4.2A of the ES (Application Document Reference 6.3)).
4. Requirement 8 states (in part):  
  
*(1) No part of the authorised development is to be carried out until a CEMP, substantially in accordance with the Outline CEMP, annexed to the Outline EMP (dated March 2015), has been submitted to and approved by the relevant planning authority.*  
  
*(2) The construction of the authorised development must be carried out in accordance with the CEMP.*  
  
*(2) The undertaker may modify the CEMP at any time after the authorised development has commenced and must notify Natural England of any modifications as far as they relate to protected species or protected sites.*
5. Paragraph 5.2.1 of the Outline Construction Environmental Management Plan (Appendix 4.2A of the ES) (Application Document Reference 6.3) states that the contractor will seek to obtain consents from the relevant local authorities where necessary under Section 61 of the Control of Pollution Act 1974 for the proposed construction works, excluding non-intrusive surveys.
6. Applications for Section 61 consents will include details on proposed working hours and construction activities to be carried out during those hours, including night-time works.
7. Any conditions included in consents / licences / permits will be documented in the final Construction Environmental Management Plan, secured by Requirement 8, Schedule 2 of the Draft DCO (Application Document Reference 3.1).

**E4.7.9** The results from the change in baseline conditions between the Do Minimum opening year scenario (2022) to the future assessment year (2037) are presented as noise difference contour plots in Drawing 12.3 APP-261 to APP-264. It is noted that no key has been provided on Drawing 12.3 to clarify what the different colours (noise contours) represent. Please can the applicant revise Drawing 12.3 to identify what the different noise difference contour plots represent?

1. Each drawing (Drawings 12.1, 12.2, 12.3, 12.4, 12.5, 12.6) (Application Document Reference 6.2) comprises a key plan sheet and 16 information sheets. For Drawings 12.3, 12.4, 12.5 and 12.6, the key plan sheet includes the key for the noise level difference contours presented in the 16 information sheets.

**E4.7.10 The assessment does not refer to the Rochdale envelope approach being applied. The description of the authorised development in Schedule 1 of the draft DCO APP-026 does not include maximum parameters for the structures included in the proposed development, for example, gantries and noise acoustic barriers. It is unclear what flexibility in terms of the location and dimensions of these structures is being sought. Please can the applicant clarify what are the parameters required for all structures, having regard to the parameters assessed in the ES? Can the applicant identify whether flexibility in the dimension of these structures is sought in the description of authorised development?**

1. As stated in PINS Advice Note 9, the ‘Rochdale Envelope’ is an acknowledged way of dealing with an application comprising EIA development where details of a project have not been fully resolved at the time when the application is submitted. It is an acceptable approach not only in projects authorised by Act or statutory instrument, but also in outline planning permissions.
2. PINS Advice Note 9 suggests that in assessing the ‘likely’ environmental effects of a project, a cautious ‘worst case’ approach should be adopted. Such an approach will then feed through into the mitigation measures envisaged. It is important that these should be adequate to deal with the worst case, in order to optimise the effects of the development on the environment. Furthermore, the level of information required should be sufficient to enable ‘the main,’ or the ‘likely significant’ effects on the environment to be assessed, and the mitigation measures to be described within "clearly defined parameters". PINS Advice Note 9 further states that the challenge for the EIA will be to ensure that all the realistic and likely worst case variations of the project have been properly considered and clearly set out in the ES and as such that the likely significant impacts have been adequately assessed.
3. Under Article 6 of the Draft DCO (Application Document Reference 3.1) a power of deviation is provided. As stated in paragraph 5.10.1 of the ES (Application Document Reference 6.1), this allows the Scheme to be varied within strictly controlled parameters, reinforced by the enforcement available for non-compliance and criminal sanction, which are specified within the DCO. For instance, it allows a change in the height of structures or gantries up to maxima which are specified in the DCO or on the planning drawings, for each type of work which may be subject to that power to deviate. Similarly, some limited ability to move elements of the Scheme in the horizontal plane are provided, for example, the exact location of individual gantries may move horizontally within the limits of the gantry siting zones shown on the Works plans accompanying the DCO Application.
4. As stated in paragraph 5.10.2 of the ES (Application Document Reference 6.1) the power of deviation, contained in the draft DCO, has been considered by those undertaking assessments for this ES having regard to the scope for change under the proposed DCO. Therefore, within the

"clearly defined parameters" sought by the Rochdale principle and provided by the constraints upon the power of deviation, an assessment of a cautious worst case has been undertaken.

5. The detailed design must be within the assessed parameters and will have regard to any additional information presented, such as additional geotechnical information, detailed topographical surveys, and appropriate requirements of the different stakeholders. In order to give the necessary flexibility during the detailed design to accommodate changes that result from consideration of this additional information, the ES (Application Document Reference 6.1) has assessed the impacts of what was considered to be the worst case scenario based on the limits of deviation permitted under the DCO, thereby establishing the Rochdale Envelope for the Scheme.
6. As explained in the response to first written question 5.6 in relation to Engineering and Design, the terms of the dDCO constrain the authorised development to within assessed parameters, as follows:

Article 3(1) grants development consent to Highways England, as the undertaker, for the authorised development to be carried out and operated within the Order limits. As such, any changes that result from the detailed design process, must be constructed within the Order limits, which is the area assessed in the ES within which the development would occur (see section 1.7.2 of the ES at Chapter 1 (Application Document Reference 6.1)). A common sense interpretation is also important - the main line of the M4 will not be diverted, regardless of the limits shown, for instance.

Article 3(3) provides that, subject to the power to deviate under Article 6, the development authorised by the Order is to be constructed in the lines or situations shown on the Works Plans and in accordance with the drawings specified in the requirements. Consequently, the construction of the authorised development is constrained by reference to the Works Plans and the drawings specified in Requirement 6, subject to modification, which cannot lawfully go beyond the scope of the dDCO.

The power to deviate, referenced in Article 3(3) is provided for in Article 6. This enables Highways England, in carrying out the authorised development, to deviate laterally and vertically to the extent provided for in Article 6. As a result of Article 6, any changes to the detailed design must be within the limits of deviation set out in that Article. The extent of that deviation was assessed in the ES (see section 5.10 of the ES at Chapter 5 (Application Document Reference 6.1)). This provides the reasonable worst case 'Rochdale Envelope'.

Requirement 3 provides that details of the layout, scale, siting, design, dimensions and external appearance of the works listed in that requirement, which relate to the construction of bridges, must be approved by the relevant planning authority, so far as they do not accord with the plans listed under requirement 6, which cannot lawfully go beyond the scope of the dDCO. This means that even if the designs differ they must be within the limits of deviation and approved by the relevant planning authority.

Requirement 6 provides that the authorised development must be carried out in accordance with the approved plans submitted with the application, which are listed in that requirement.

Consequently, the development is constrained by reference to those plans, unless otherwise approved by the relevant planning authority, but within the deviation power.

8. The table below lists, for particular types of structure, the parameters relevant to environmental assessment, the values or quantum assumed within the Scheme assessment and the degree of flexibility required to complete the detailed design. The following abbreviations are used in the table:
  - 8.1. ES: Environmental Statement (Application Document Reference 6.1)
  - 8.2. EDR: Engineering and Design Report (Application Document Reference 7.3)
  - 8.3. dDCO: draft Development Consent Order (Application Document Reference 3.1)
  - 8.4. Works plans: Works plans (Application Document Reference 2.3)
  - 8.5. Mainline GAs: Mainline general arrangement drawings (EDR Annex F1) (Application Document Reference 7.4)
  - 8.6. Bridge GAs: Underbridge and Overbridge general arrangement drawings (EDR annex F2) (Application Document Reference 7.4)
  - 8.7. Gantry GAs: Generic gantry details (Application Document Reference 2.8)
9. Where specific design options may be required under defined circumstances these are described in Highways England's response to written question 5.5.

	Design parameter	Assessed value	Flexibility sought in detailed design
<b>Bridges</b>			
(i)	<b>Location</b>	As shown on the Mainline GAs and on the side road plan and profile drawings (Application Document Reference 2.6)	Article 6(a) of the dDCO defines the lateral flexibility sought for realigned side roads at replacement structures within the Order limits.
(ii)	<b>Overall Height</b>	As shown on the Bridge GAs	As defined in Article 6(b) of the dDCO: deviate vertically from the levels shown or noted on the engineering drawings and sections, to a maximum of 0.5m upwards or downwards.
(iii)	<b>Structural form</b>	As shown on the Bridge GAs	<ul style="list-style-type: none"> <li>a. Foundation type, earthwork slopes and wingwall lengths depending on outcome of ground investigation, topographical survey and detailed design.</li> <li>b. Reinforced concrete end supports being replaced by reinforced soil faced with concrete facing panels.</li> </ul>
(iv)	<b>Bridge deck width</b>	As shown on the Bridge GAs and on the side road plan and profile drawings (Application Document Reference 2.6)	Carriageway and/or verge width changes as required by Local Authorities within the deviation described in dDCO Article 6(a)
(v)	<b>Number and length of bridge spans</b>	As shown on the Bridge GAs	<ul style="list-style-type: none"> <li>a. Length of bridge spans to accommodate construction methodology and site access requirements.</li> <li>b. Number of spans, only if identified as a requirement following consultation with Local Authorities</li> </ul>

	Design parameter	Assessed value	Flexibility sought in detailed design
(vi)	<b>Parapet heights</b>	As shown on the Bridge GAs (typically 1.0m high for vehicular or pedestrian traffic or 1.4m for equestrian use)	As defined in Article 6(c) of the dDCO: deviate vertically from the heights stated on the engineering drawings to a maximum of 0.5m upwards.  Parapet heights may need to change where the permitted non-motorised user (“NMU”) of the adjacent highway is changed.
<b>Gantries (see also response to question 4.2.1)</b>			
(vii)	<b>Location</b>	Gantry locations as shown in the mainline GAs. Chainages of each gantry are listed in Appendix C	Article 6(a) of the dDCO defines flexibility sought in gantry location by reference to areas indicated on the works plans. The works plans are drawn to indicate a range of +/-15m from the gantry chainages (i.e. their locations on the Scheme) shown on the mainline general arrangements
(viii)	<b>Gantry type</b>	Details of the different gantry types are shown on the gantry GAs The gantry type proposed at each location is shown on the Mainline GAs and noted on the works plans.  Gantry types are also listed in Appendix C	For gantry type 5 (Signal cantilever MS4) two options are included in the application. This is to give the detailed design flexibility to select the option most suited to the individual gantry location.  Detailed design will also seek to optimise other elements shown on the generic gantry details drawings such as structural depth, plinth size and pile layout but such change would not impact the parameters used for environmental assessment.
(ix)	<b>Overall height of gantry</b>	The height of each gantry has been assessed by summing the following parameters:	The flexibility sought in the application for overall gantry heights is a maximum increase of 0.5m as

	Design parameter	Assessed value	Flexibility sought in detailed design
		<p>Cross-fall on carriageway;</p> <p>Headroom requirement;</p> <p>Boom depth;</p> <p>Mounting height of equipment on the boom; and</p> <p>Sign and/or signal size.</p> <p>The overall height of each gantry is listed in Appendix C</p>	indicated in Article 6(b) of the draft Development Consent Order.
(x)	<b>Gantry equipment</b>	Typical equipment mounted on each type of gantry is shown on the gantry GAs, and the equipment on each individual gantry is indicated by inset figures on the mainline general arrangement drawings and is listed in Appendix C	Flexibility is sought in size of the gantry sign faces within the limits of the overall height described in (ix) above.
<b>Lighting columns</b>			
(xi)	<b>Extent of illuminated carriageway</b>	<p>As described in EDR paragraph 6.3.44 and on the Lighting schematic drawing in EDR Annex F4.</p> <p>All sections of the motorway and slip roads that are currently lit will remain lit; the unlit section from junction 8/9 to junction 10 will remain unlit.</p>	<p>Chainage (location) of individual columns will be determined by detailed designer.</p> <p>Detailed design will consider the option of turning lighting off or down for limited night time periods</p>



	<b>Design parameter</b>	<b>Assessed value</b>	<b>Flexibility sought in detailed design</b>
(xii)	<b>Height of columns</b>	As described in EDR paragraph 6.3.44: 12m above the carriageway	Designers will consider a maximum deviation in height of 0.5m.
(xiii)	<b>Location in verge or central reserve</b>	As described in EDR paragraph 6.3.44: motorway lighting columns in the central reserve mounted on top of the concrete barrier.  Lighting columns for slip roads positioned in the nearside verge.	Level of flexibility sought is limited by:  a. Environmental considerations. No worsening of night time visual impact as assessed in ES and day time visual impact  b. Maintenance requirements. No worsening of road worker safety  c. Construction sequence and methodology. No extension of overall construction programme.  Detailed designer is currently in consultation with maintaining authority and with Scheme contractor.
(xiv)	<b>Type of Luminaire</b>	As described in EDR paragraph 6.3.44: modern light emitting diode (“LED”) lighting with a central management control system.	Detail design will seek to achieve the required levels of carriageway illumination while minimising the power requirements and light spillage
<b>CCTV masts</b>			
(xv)	<b>Location</b>	As shown on the mainline GAs	As required to achieve 100% motorway coverage.  A high level survey (i.e. coverage check from proposed camera points) is programmed for December 2015. Depending on the results of this survey it may be necessary to add or relocate

	Design parameter	Assessed value	Flexibility sought in detailed design
			CCTV masts
(xvi)	<b>Height</b>	As described in EDR paragraph 6.4.15 and shown in a typical detail drawing in EDR Annex F5: Pan, Tilt, Zoom CCTV cameras mounted on 15m masts	Designers will consider a maximum deviation in height of 0.5m.
<b>Retaining walls</b>			
(xvii)	<b>Location and Length</b>	<p>As shown on the mainline GAs and the side road plan and profile drawings (Application Document Reference 2.6).</p> <p>Also retaining walls to a maximum height of 1.5m around Emergency Refuge areas, Police Observation Platforms and Gantry sites.</p> <p>Preliminary design for location and length of retaining walls and earthworks widening is based on currently available topographic survey. Further topographic surveys are now underway to confirm existing ground levels adjacent to highway embankments and cuttings.</p>	<p>As required to suit ongoing topographical survey and detailed design.</p> <p>Level of flexibility sought is limited by:</p> <p>a. Line and level of adjacent carriageways. As defined in dDCO Articles 6(a) and 6(b)</p> <p>b. Adjacent Ground Level. As required by ongoing topographical survey</p> <p>c. Environmental impact. No increase in impact on existing land use or on flood risk assessment.</p>
(xviii)	<b>Height</b>	As shown on the Engineering sections drawings (Application Document Reference 2.5) and in the side road plan and profile drawings.	a. As (xvii)
(xix)	<b>Structural Form</b>	<p>12 different solutions are proposed for earthworks widening. These are shown in the Earthworks Standard Details drawings (Application Document Reference 2.7)</p> <p>The specific solution or solutions proposed at</p>	The proposed structural solutions are based on the ground investigation data in the Preliminary Sources Study Report contained in ES Appendix 10.1 (Application Document Reference 6.3). However further ground investigation is planned

	Design parameter	Assessed value	Flexibility sought in detailed design
		specific locations is shown on the mainline GA, the side road plan and profile drawings and Engineering Section drawings.	which may impact the design assumptions.  Depending on the outcome of the ground investigation survey at any particular location, it may be necessary to change the proposed method of earthwork widening.
<b>Environmental Barriers</b>			
(xx)	<b>Height, Type and Location</b>	As shown on the Environmental Masterplan drawings in EDR annexe A1 (Application Document Reference 7.4)	As required to suit outcome of consultation with residents, Local Authorities and other stakeholders, as limited by dDCO Article 6
<b>Technology and communication items</b>			
(xxi)	<b>Type and Location</b>	Other than Lighting and CCTV cameras, the majority of visible items of technology are located either at Gantry sites (e.g. signal control cabinets) or at Emergency Refuge Areas (e.g. emergency roadside telephones)  Indicative locations and duct access routes have been considered in the preliminary design and have been used to assess the extent of site clearance used to develop the Environmental Masterplan and Vegetation Clearance drawings in EDR annexes A1 and A2 (Application Document Reference 7.4)	The location of visible technology and communication items associated with gantries and emergency refuge areas will be within the limits of the relevant item shown on the Works Plans. Other items to be located within the Order Limits and as defined in dDCO Article 6(a)



**E4.7.11 The authorised development (Schedule 1 of the draft DCO App-026) does not identify as a specific work number: the provision of low-noise surfacing; the addition of new noise barriers; or the removal or reinstatement of existing noise barriers. Please can the applicant confirm that the following elements of the proposed development fall within a work number in Schedule 1 of the draft DCO and identify the specific work number:**

1. Highways England confirms that the elements of the proposed development identified by the Examining Authority fall within a work identified in Schedule 1 of the draft DCO.

#### **Low-noise surfacing**

2. The provision of low-noise surfacing is provided for in the list of works following Work No. 30b, which are proposed to be authorised in connection with the numbered works. Item (e) relates to the provision of thin surface course which, as explained in answer to First Written Question DCO 8.23, is referred to generically as “*low noise surfacing*” because the properties inherent in it reduce the noise generated at the road-tyre interface when compared with traditional Hot Rolled Asphalt (“HRA”) (Manual of Contract Documents for Highway Works, Volume 1 Specification for Highway Works clause 943).
3. Installation of such surfacing is, of course, part of the operations for each M4 carriageway comprised in the Scheme.

#### **New noise barriers**

4. The addition of new noise barriers is provided for in the list of works following Work No. 30b, which are proposed to be authorised in connection with the numbered works. Noise barriers are included in items (n) “*...other works to mitigate adverse effects of ...operation*”, (o) “*the provision of environmental mitigation*” and (p) “*...works for the benefit or protection of land affected by the authorised development.*”

#### **Removal or reinstatement of existing noise barriers**

5. The removal or reinstatement of existing noise barriers is also included in items (n) “*...other works to mitigate adverse effects of ...operation*”, (o) “*the provision of environmental mitigation*” and (p) “*...works for the benefit or protection of land affected by the authorised development*” of the list of works following Work No. 30b.

#### **Please can the applicant identify on which works plans these works are shown, and clarify what the parameters are of these works, as assessed in the ES?**

6. As detailed in paragraph 12.2.54 of Chapter 12 of the Environmental Statement (Application Document Reference 6.1), details of the existing and proposed noise barriers are shown on drawing series 12-2 – Noise Mitigation details. These drawings show the location of existing and proposed barriers that are required by the Scheme and each contain a note confirming that “*All lanes will be provided with low noise surface along the complete length of the Scheme for opening.*”
7. Where existing barriers are removed to facilitate construction works, they will be reinstated (or replaced if in poor condition) as early as possible in the construction process. Where practicable, temporary noise barriers will be installed whilst the permanent barriers are not in place.

8. Existing noise barriers which do not require removal to facilitate construction works will be inspected. Any which are identified as not fit for purpose will be replaced.
9. At this stage of the Scheme, it is not possible to identify which of the existing barriers will be removed and reinstalled / replaced as they have not been inspected. As stated above, this will be completed prior to the start of construction works.

**E4.7.12** The ExA notes that the representations made by interested parties, in particular, Colnbrook with Poyle Parish Council RR-304, Buckinghamshire County Council RR-241 and South Buck District Council RR-282, have identified the following developments as omitted from the cumulative assessment in the ES: the potential third runway at Heathrow (as considered in the Airports Commission's Final Report (July 2015)); Construction of the Western Rail link to Heathrow (2017); S.I.F.E Slough International Freight Exchange; and HS2 Heathrow Express Sidings. Please can the applicant explain why these developments have been omitted from the applicant's cumulative impact assessment? Please can the applicant undertake a cumulative impact assessment for these developments to identify whether the inclusion of these projects would change any of the conclusions reached in the applicant's ES or require any additional mitigation measures in order to avoid, reduce and, if possible, remedy significant adverse effects.

*Cumulative Impact Assessment*

1. Highways England has addressed the representations made by Colnbrook with Poyle Parish Council RR-304, Buckinghamshire County Council RR-241 and South Buck District Council RR-282 in its response to relevant representations, submitted to the ExA on 2 October 2015.
2. The list of cumulative developments considered is presented in Table A16.2.1 of the Environmental Statement (ES) (Application Document Reference Number 6.3, Appendix 16.2). The list was compiled from details provided by local planning authorities and / or published local plans. The assessment was undertaken in accordance with DMRB, Volume 11, Section 2, Part 5 and included all reasonably foreseeable developments (see Chapter 16.1 of the ES).
3. DMRB Volume 11, Section 2, Part 5 (HA 205/08) (Ref 16-1) provides that 'reasonably foreseeable' is interpreted to include other projects that are 'committed'. These should include but will not necessarily be limited to (i) Trunk road and motorway projects which have been confirmed (i.e. gone through the statutory processes), and (ii) Development projects with valid planning permissions as granted by the Local Planning Authority, and for which formal EIA is a requirement or for which non-statutory environmental impact assessment has been undertaken. In addition, this assessment has also considered applications for consent which have been made, but which have not yet been granted.
4. Highways England does not consider it appropriate to assess the cumulative impact of developments which have not been committed. It would also not be proportionate to impose additional mitigation measures on the Scheme in relation to future development which is only a possibility. Any application for significant development in the region of the Scheme will be required to take the Scheme into account when assessing the impact of their proposals, rather than the reverse. It is for future projects to include appropriate mitigation measures should any

significant cumulative adverse effects be identified in the environmental impact assessment carried out by those projects.

#### *Heathrow*

5. The recommendations of the Airports Commission concerning a possible third runway at Heathrow are under consideration by the Government, and no application for consent to construct the proposals has been made. Heathrow is one of two locations where additional airport capacity was considered and as such, pending a decision by the Government, it cannot be regarded as committed. As such, the proposal is not considered to be reasonably foreseeable and so was not included within the cumulative impact assessment for the Scheme. Highways England is unable to undertake a cumulative impact assessment of the third runway as the parameters of the development at Heathrow are not confirmed.

#### *Slough International Freight Exchange*

6. An application to construct S.I.F.E. was refused by Slough Borough Council on 8 September 2011. Accordingly, it was excluded from the developments used as part of the traffic forecasting process for the Scheme. The proposal is to be the subject of a planning inquiry which commenced in September 2015.

#### *HS2 Heathrow Express Sidings*

7. The HS2 Heathrow Express Sidings are still in the development stage and therefore construction programmes are not available. Highways England's contactors will work with Network Rail, local authorities and other stakeholders to minimise local effects caused by construction traffic on adjacent schemes, but at this stage, Highways England is unable to carry out a cumulative impact assessment as the proposals have not been confirmed.

#### *The Western Rail Link to Heathrow*

8. The Western Rail Link to Heathrow proposal was announced on 5 February 2014 following consideration of four options by Network Rail. The Western Rail Link to Heathrow remains at an early stage of development and as yet no applications for its consent have been submitted. It is expected that an application will not be submitted to the Planning Inspectorate until Spring 2016. For that reason, Highways England is unable to carry out a cumulative impact assessment.

#### *Commentary*



9. The various local planning authorities were contacted between December 2013 and January 2014 to establish the then current position in respect of relevant planning proposals in preparation for undertaking the forecasting stage of the M3/M4 model development. The position was frozen in February 2014 to enable the finalisation of the model zones and generation of the respective development trip rates for inclusion in the model.
10. As stated above, it is considered that it is premature to undertake an assessment of the third runway proposal at Heathrow, given its current stage of development. The relocation of Heathrow Express sidings to a site at Langley is a rail operational matter with little, if any, implication for the M4 motorway. However, it is acknowledged that if brought into operation, the Western Rail Link and SIFE proposals could have an effect on the level of traffic flows on the M4.
11. The Western Rail Link will enable rail passengers from Reading to Heathrow avoid having to travel to Paddington and then ‘double back’ to the airport. As such, the Link could attract current car users to switch to rail. However, from figures obtained from the M3/M4 traffic model, only 5% (400 vehicles) of the traffic travelling eastbound on the M4 between junctions 5 and 4b is destined for Heathrow airport. As such, even if a significant proportion of these were to divert to rail, it is not considered that there would be a material effect on traffic conditions on the M4.
12. A review of the vehicle movements for the Slough International Freight Exchange taken from the Transport Assessment prepared in support of the planning application for the Exchange indicates that there are increases in traffic flows that are greater than the Design Manual for Roads and Bridges (DMRB) traffic screening criteria for air quality assessment (See paragraph 6.2.31 of Application Document 6.1) for annual average daily traffic (“AADT”) flows (>1000 veh/day) and heavy duty vehicles (“HDVs”) (>200 veh/day).
13. These changes are anticipated to take place along roads which are included within the air quality study area for the Scheme, including sections of the Scheme route. These additional vehicles therefore have the potential to increase concentrations of pollutants in the future situation without the Scheme (i.e. Do-Minimum Scenario) at sensitive receptor locations. Further consideration of this scheme will therefore be undertaken for air quality during the examination phase. This will include a review of any air quality assessment for the Slough International Freight Exchange development.
14. In terms of noise impact, the additional HGV traffic on the worst affected part of the M4 appears in the Do-Minimum and Do-Something scenarios. The change in noise level, Do-Minimum to Do-Something, with this additional HGV traffic is comparable to that assessed in the

Environmental Statement. Consequently, the change in noise levels Do-Minimum to Do-Something are comparable and the conclusions of the noise assessment in the Environmental Statement do not change.

15. The above considerations and potential for interaction in relation to traffic, air quality and noise are tabulated below.

<b>Proposal</b>	<b>Status</b>	<b>Traffic</b>	<b>AQ</b>	<b>Noise</b>	<b>Other</b>	<b>Notes</b>
Heathrow 3 <sup>rd</sup> runway	Commission recommendations under Government consideration	√	√	√		High degree of uncertainty, pending Government decision. Proposal considered likely to lead to increase in traffic using M4 to access airport, with consequent environmental impacts.
Western Rail Link	Under development;  DCO anticipated Spring 2016	√	√	√		Potential construction conflict. Potential to attract a proportion of road-based Reading - Heathrow trips to rail.
S.I.F.E	Planning Appeal commenced Sept. 2015	√	√	√		Full documentation from original 2011 application available via Slough BC website – includes Transport Assessment.
HS2 HEX Sidings	HS2 Additional Provision 2 – yet to achieve assent.					Assumed to have negligible impact on M4 during operation. HS2 working assumption that one construction traffic route will be via M4 and Junction 5.

**E4.7.13 Please can the applicant confirm that 'chainage', which has been used to describe the length of the existing and proposed noise barriers, is a standard of measurement and explain what this equates to in other measurements i.e. meters?**

1. The term "chainage" is commonly used to define the location of a point on the centreline of a road or other linear project. It is intended as a means of identifying a location within the project by reference to the project's start and end points, and it is measured entirely internally to the project, as opposed to by reference to other features such as motorway marker posts. As the Scheme is linear, referring to a location along its length by a chainage is sufficient to identify the location.
2. The chainage is measured in metres, along the centre of the Scheme. The term no longer refers to the Imperial measurement known as "Chains" (66 feet).
3. The chainage reference adopted for the Scheme starts at 10,000 to the east of junction 3 and increases towards the west. Junction 12, for example, is at chainage 62,200. It might be possible to state that a particular culvert or gantry is at Chainage 15,796. That would mean that the item was 5,796m, measured along the motorway centreline, from the commencement of the Scheme to east of Junction 3. The arbitrary start chainage of 10,000 has been adopted on the Scheme to avoid confusion by eliminating the possibility of referring to a Scheme location with a negative chainage.
4. Chainages along the Scheme, at intervals of 100m, are shown on various plans and drawings such as the Works Plans (Application Document Reference Number 2.3) and the Scheme Plans in the Environmental Statement (Application Document Reference Number 6.2, figure 4.1).

**E4.7.14 Please can the applicant clarify the dimensions (length and height) of the existing noise barriers, having regard to the representations made by interested parties, in particular, Dorney Parish Council RR-046, challenging the dimensions of the existing barriers, as stated in the ES?**

1. Details of existing noise barriers, as employed in the noise and vibration assessment, were provided in Table A12.1.1 of Appendix 12.1 of the ES (Application Document Reference 6.1) and were shown in Drawing 12.2 of the ES (Application Document Reference 6.2).
2. Following consultation, two of these existing noise barriers have been revised, as follows:
  - 2.1. Hillingdon: Barrier to Eastbound Carriageway, Ch 11230 (Mp 22/2 ) to Ch 12350 (Mp 23/3); and
  - 2.2. South Bucks: Barrier to Westbound Carriageway, Ch 30970 (Mp 41/9 ) to Ch 30780 (Mp 41/7) (near Dorney Reach).
3. During a meeting held between Highways England and London Borough of Hillingdon held on 22 June 2015 to discuss the Application, London Borough of Hillingdon queried whether the existing barrier to the eastbound carriageway to the west of junction 3 is a noise barrier (approximate chainage 11230 to 12350). A site inspection carried out by Highways England revealed that the height of this barrier was approximately 1.5m throughout this stretch with the construction type being fairly consistent. The fence was closed boarded and did not appear to be an acoustic barrier. In the modelling work undertaken for the ES (Application Document Reference 6.1), this barrier was included as an existing noise barrier, with a height of 1.8m. Consequently, the schedule of existing noise barriers, as provided in Table A12.1.1 of Appendix 12.1 of the ES (Application Document Reference 6.3), requires revision with the removal of this barrier, as does Drawing 12.2 of the ES (Application Document Reference 6.2).
4. Highways England has confirmed that they will provide a noise barrier (minimum height 2m) as part of the Scheme mitigation to replace this existing barrier. Thus, in the Do Minimum scenarios, there is no noise barrier, and in the Do Something scenarios, there is a noise barrier. It follows that the reductions in noise level to receptors in this area will be an improvement on those reported in the ES (which assumed a noise barrier in both the Do Minimum and Do Something scenarios).
5. In their relevant representation on the Application, South Bucks District Council indicated that the height of the barrier in their area was 1.8m, not 2.0m as included in the previous modelling work and reported in the ES (Application Document Reference 6.1).
6. Following receipt of this relevant representation, Highways England carried out an inspection of the noise barrier to the west bound carriageway (which provides mitigation to Dorney Reach). The barrier was measured at between 1.8 to 1.9 metres high, rather than the 2.0 metres employed in the noise modelling undertaken for the purposes of the environmental impact assessment, the results of which were reported in the ES Chapter 12 (Application Document Reference 6.1) (along with Appendices 12.1 to 12.5 and Drawings 12.1 to 12.6).
7. As a result of this discrepancy, the noise model was revised, and the height of this barrier conservatively set at 1.8 metres in the model. Noise levels at all sensitive receptors in the area were calculated. The recalculated noise levels were compared to those reported in the ES (which assumed a 2.0 metre high barrier) and the differences were found to be negligible. On

that basis, the noise level changes for this area, as reported in the ES, are still valid. A comparison is provided at Appendix 3 to the responses to the relevant representations.

8. Consequently, the schedule of existing noise barriers, as provided in Table A12.1.1 of Appendix 12.1 of the ES (Application Document Reference 6.3), requires revision with the height of this noise barrier set at 1.8 metres.
9. A revised Table A12.1.1 of Appendix 12.1 of the ES, incorporating the above revisions (and those minor corrections as submitted in response to the Rule 6 Letter) is provided below.

**Revised Table A12.1.1 Existing Noise Barriers**

Link	Eastbound	Westbound
J12 to J11	Chainage 55200 to 55775, Height 1.4 metres	Chainage 54900 to 55220, Height 1.8 metres, on W/B on-slip
J11 to J10	Chainage 46985 to 47085, Height 2 metres Chainage 47170 to 47320, Height 2 metres Chainage 47435 to 48190, Height 2 metres Chainage 48290 to 48485, Height 2 metres Chainage 53650 to 54125, Height 1.8 metres	Chainage 48300 to 48755, Height 1.9 metres
J10 to J8/9	-	-
J8/9 to J7	Chainage 30370 to 30620, Height 2 metres Chainage 30630 to 30965, Height 2 metres Chainage 32400 to 32705, Height 2 metres Chainage 32740 to 32885, Height 2 metres	Chainage 29360 to 29520, Height 2 metres Chainage 30625 to 30970, Height 1.8 metres Chainage 32400 to 32690, Height 2 metres Chainage 32740 to 33250, Height 2 metres

Link	Eastbound	Westbound
J7 to J6	Chainage 26200 to 26470, Height 1.8 metres  Chainage 26415 to 26580, Height 2 metres, on E/B off-slip  Chainage 27310 to 27925, Height 2 metres  Chainage 27950 to 28405, Height 2 metres  Chainage 28670 to 28970, Height 2.4 metres	-
J6 to J5	Chainage 20580 to 20685, Height 1.8 metres  Chainage 24650 to 24970, Height 1.8 metres  Chainage 25045 to 25510, Height 1.8 metres  Chainage 25600 to 25930, Height 1.8 metres, on E/B on-slip  Chainage 25870 to 26060, Height 1.8 metres	Chainage 21445 to 22385, Height 2 metres  Chainage 22865 to 23650, Height 2 metres
J5 to J4b	Chainage 17560 to 17900, Height 2 metres  Chainage 19000 to 19280, Height 1.8 metres  Chainage 19290 to 19400, Height 1.8 metres  Chainage 19420 to 20250, Height 1.8 metres	Chainage 17830 to 18350, Height 1.8 metres  Chainage 19260 to 19430, Height 2 metres  Chainage 19465 to 19810, Height 2 metres
J4b to J4	Chainage 14050 to 14120, Height 2 metres  Chainage 14140 to 15960, Height 2 metres	-

<b>Link</b>	<b>Eastbound</b>	<b>Westbound</b>
J4 to J3	Chainage 12500 to 12565, Height 1.8 metres  Chainage 12575 to 12940, Height 1.8 metres  Chainage 12945 to 13280, Height 1.8 metres	Chainage 11250 to 11750, Height 1.8 metres  Chainage 11750 to 11815, Height 1.8 metres



**E4.7.15 Please can the applicant clarify the dimensions of the new noise barriers and confirm that these have been assessed in the noise and vibration assessment? It is noted that the location and heights of the additional new barriers differs between Tables A12.5.1 APP-351 and A12.2.1 APP-348 and Diagram 12.2 APP-257 to APP-260 in the noise and vibration assessment.**

*Dimensions*

1. The proposed mitigation for the Scheme comprises low noise surfacing across all lanes, along the complete extent of the Scheme, and a number of new noise barriers, the heights and extents of which are defined in Table A12.2.1 of Appendix 12.2 of the ES (Application Document Reference 6.3). The locations and extents of these new noise barriers are provided in Drawing 12.2 of the ES (Application Document Reference 6.2).

*Assessment*

2. The noise and vibration assessment, as reported in Chapter 12 of the ES (Application Document Reference 6.1), is for the Scheme with the above mitigation in place. The magnitude of impact for the Scheme is minor beneficial in the short term and negligible in the long term. The significance of effect for the operation of the Scheme is assessed as slight beneficial in the short term and neutral in the long term, with the vast majority of the Scheme corridor experiencing negligible or minor reductions in noise levels with the Scheme in operation (see paragraph 12.4.110 of the ES) (Application Document Reference 6.1). These noise reductions are shown in Drawing 12.4 of the ES for the short-term, and in Drawing 12.5 of the ES for the long term (Application Document Reference 6.2).

*Differences between Tables and Diagrams*

3. However, it is noted in paragraph 12.4.112 of the ES (Application Document Reference 6.1) that there is potential to improve further the noise climate within the Scheme corridor. A qualitative appraisal of an enhanced mitigation strategy to achieve this is provided in Appendix 12.5 of the ES (Application Document Reference 6.3). This enhanced mitigation strategy comprises the provision of additional noise barriers, as outlined in Table A12.5.1 of Appendix 12.5 of the ES (Application Document Reference 6.3) and the replacement of some existing noise barriers with higher noise barriers, as outlined in Table A12.5.2 of Appendix 12.5 of the ES (Application Document Reference 6.3).
4. The effects of implementing this enhanced mitigation strategy have not been assessed in Chapter 12 of the ES. Hence, the assessment provided in Chapter 12 of the ES (Application Document Reference 6.1) (which concludes that the vast majority of the Scheme corridor will experience noise reductions with the Scheme in operation) is very much a worst case.
5. Work is ongoing to provide a quantitative assessment of the enhanced mitigation strategy outlined in Appendix 12.5 of the ES (Application Document Reference 6.3). This comprises an iterative process which is employed to estimate the numbers of receptors experiencing specific reductions in noise levels (for an additional noise barrier, as detailed in Table A12.5.1 of Appendix 12.5 of the ES (Application Document Reference 6.3), or replacement of an existing barrier, as detailed in Table A12.5.2 of Appendix 12.5 (Application Document Reference 6.3)), monetising these reductions in noise levels (as employed in TAG appraisal) and comparing this monetisation value with the cost of the mitigation to provide a cost benefit analysis. Thus, the lengths and heights of new barriers, and the heights of replacement barriers, will be optimised.

**E4.7.16** Table A12.5.2 APP-351 identifies the locations of existing barriers which would be replaced, presumably on a like for like basis, in accordance with the statement made in para 1.1.1 of Appendix 12.5 APP-351. However, Table A12.5.2 APP-351 states that there would be an increase in barrier height at the locations where the barrier would be replaced. The proposed increase in barrier height is not stated. Please can the applicant clarify what the increase in height would be and how this has been assessed in the ES?

*Basis for replacement*

1. Highways England confirms that the statement made at paragraph 1.1.1 of Appendix 12.5 of the ES (Application Document Reference 6.3) is accurate. Existing noise barriers will be retained or replaced like for like if in poor condition.

*Height*

2. It is noted in paragraph 12.4.112 of the ES (Application Document Reference 6.1) that there is potential to further improve the noise climate within the Scheme corridor. A qualitative appraisal of an enhanced mitigation strategy to achieve this is provided in Appendix 12.5 of the ES (Application Document Reference 6.3). This enhanced mitigation strategy comprises the provision of additional noise barriers, as outlined in Table A12.5.1 of Appendix 12.5 of the ES (Application Document Reference 6.3) and the replacement of some existing noise barriers with higher noise barriers, as outlined in Table A12.5.2 of Appendix 12.5 of the ES (Application Document Reference 6.3).
3. With reference to Table A12.5.2 of Appendix 12.5 of the ES (Application Document Reference 6.3), the increase in height (if any) where a barrier is replaced cannot be confirmed, as it is subject to further quantitative assessment of the enhanced mitigation strategy, which is currently taking place.

*Assessment*

4. The effects of implementing this enhanced mitigation strategy have not been assessed in Chapter 12 of the ES. Hence, the assessment provided in Chapter 12 of the ES (Application Document Reference 6.1) (which concludes that the vast majority of the Scheme corridor will experience noise reductions with the Scheme in operation) is a worst case scenario.
5. The noise and vibration assessment is for the Scheme with the proposed mitigation in place. That assessment considers the provision of low noise surfacing across all lanes throughout the Scheme and a number of new noise barriers, the heights and extents of which are defined in Table A12.2.1 of Appendix 12.2 of the ES (Application Document Reference 6.3).

**E4.7.17 Where the applicant has only identified the need for placement of new barriers along a single side of the M4, rather than both sides, please can the applicant clarify why a barrier is not required on the opposite, non-protected, side? Please can the applicant explain how the noise and vibration assessment has considered noise reflection, where noise is reflected by a barrier onto receptors opposite, having regard to the concerns raised by interested parties in their relevant representations, in particular, Aborfield and Newland Parish Council RR-056r regarding noise reflection from the existing barriers?**

#### **Barriers**

1. The location of barriers is selected based upon the identification of sensitive receptors and the need to interpose a barrier between the receptor and the noise source - the M4 motorway.
2. Where a barrier is only proposed on a single side of the motorway, this is because the receptors on the opposite side are not identified as being sensitive or the effects of the Scheme are not identified as being significant.
3. Whilst a barrier will have a reflective quality when interposed between the noise source and the receptor, reflecting sound back away from the receptor, to have a sufficiently adverse effect to require a barrier on the opposite side of the motorway would require the reflected noise and the traffic noise to amount together to a significant effect on the no-barrier side of the motorway.
4. Reflected noise from a barrier will not necessarily result in the need for a barrier on the no-barrier side, particularly where no sensitive receptors are present.

#### **Noise reflections**

5. The calculation method includes an allowance for noise reflections from reflective surfaces such as noise barriers. All barriers are assumed to be reflective in the calculation. The effects of the Scheme are shown in Drawing 12.4 of the ES for the short term and in Drawing 12.5 of the ES for the long term (Application Document Reference 6.2). The noise reductions with the Scheme in operation are evident (including those areas on the no-barrier side of the motorway, where existing barriers are in place or new barriers are specified).
6. For existing barriers, it is assumed that a noise study would have been carried out prior to the specification and installation of those barriers.

**E4.7.18 Please can the applicant provide a revised plan showing the location of existing and proposed barriers and identify where the existing barrier would need to be removed and reinstated? The height dimensions of the barriers should also be provided, including AOD, on the plan.**

1. Drawing 12.2 of the ES (Application Document Reference 6.2) shows the locations and extents of existing and proposed new barriers, as employed in the noise assessment presented in Chapter 12 of the ES (Application Document Reference 6.1). A revised Drawing 12.2 is provided as part of this response.
2. The revised drawing incorporates the height information requested above, plus the revisions relating to the barriers to Hillingdon and to Dorney Reach and the response to the Rule 6 Letter (see response to Question E4.7.14). It should be noted that barrier heights AOD are not critical, since it is the relative heights of the protected receptor and the noise source which govern the height of the barrier. The barrier heights are ordinarily given above ground level for this reason.
3. Existing noise barriers are detailed in a revised Table 12.1.1 of Appendix 12.1 of the ES (incorporating the revisions relating to the barriers to Hillingdon and to Dorney Reach and the response to the Rule 6 Letter), provided below.
4. Proposed new barriers are detailed in a revised Table A12.2.1 of Appendix 12.2 of the ES (incorporating the revisions relating to the barrier to Hillingdon), provided below.
5. Where existing barriers are removed to facilitate construction works, they will be reinstalled (or replaced if in poor condition) as early as possible in the construction process. Where practicable, temporary noise barriers will be installed whilst the permanent barriers are not in place.
6. Existing noise barriers which do not require removal to facilitate construction works will be inspected. Any which are identified as not fit for purpose will be replaced.
7. During the detailed design stage, the contractor will draw up a detailed schedule for the removal and reinstallation / replacement of existing acoustic barriers, and the installation of proposed new barriers.
8. At this stage, the existing noise barriers which will need to be removed and reinstated / replaced cannot be identified - it will depend upon their condition at the time of the works.

**Revised Table A12.1.1 - Existing Noise Barriers**

<b>Link</b>	<b>Eastbound</b>	<b>Westbound</b>
J12 to J11	Chainage 55200 to 55775, Height 1.4 metres	Chainage 54900 to 55220, Height 1.8 metres, on W/B on-slip
J11 to J10	Chainage 46985 to 47085, Height 2 metres  Chainage 47170 to 47320, Height 2 metres  Chainage 47435 to 48190, Height 2 metres  Chainage 48290 to 48485, Height 2 metres  Chainage 53650 to 54125, Height 1.8 metres	Chainage 48300 to 48755, Height 1.9 metres
J10 to J8/9	-	-
J8/9 to J7	Chainage 30370 to 30620, Height 2 metres  Chainage 30630 to 30965, Height 2 metres  Chainage 32400 to 32705, Height 2 metres  Chainage 32740 to 32885, Height 2 metres	Chainage 29360 to 29520, Height 2 metres  Chainage 30625 to 30970, Height 1.8 metres  Chainage 32400 to 32690, Height 2 metres  Chainage 32740 to 33250, Height 2 metres

Link	Eastbound	Westbound
J7 to J6	<p>Chainage 26200 to 26470, Height 1.8 metres</p> <p>Chainage 26415 to 26580, Height 2 metres, on E/B off-slip</p> <p>Chainage 27310 to 27925, Height 2 metres</p> <p>Chainage 27950 to 28405, Height 2 metres</p> <p>Chainage 28670 to 28970, Height 2.4 metres</p>	-
J6 to J5	<p>Chainage 20580 to 20685, Height 1.8 metres</p> <p>Chainage 24650 to 24970, Height 1.8 metres</p> <p>Chainage 25045 to 25510, Height 1.8 metres</p> <p>Chainage 25600 to 25930, Height 1.8 metres, on E/B on-slip</p> <p>Chainage 25870 to 26060, Height 1.8 metres</p>	<p>Chainage 21445 to 22385, Height 2 metres</p> <p>Chainage 22865 to 23650, Height 2 metres</p>
J5 to J4b	<p>Chainage 17560 to 17900, Height 2 metres</p> <p>Chainage 19000 to 19280, Height 1.8 metres</p> <p>Chainage 19290 to 19400, Height 1.8 metres</p> <p>Chainage 19420 to 20250, Height 1.8 metres</p>	<p>Chainage 17830 to 18350, Height 1.8 metres</p> <p>Chainage 19260 to 19430, Height 2 metres</p> <p>Chainage 19465 to 19810, Height 2 metres</p>

Link	Eastbound	Westbound
J4b to J4	Chainage 14050 to 14120, Height 2 metres  Chainage 14140 to 15960, Height 2 metres	-
J4 to J3	Chainage 12500 to 12565, Height 1.8 metres  Chainage 12575 to 12940, Height 1.8 metres  Chainage 12945 to 13280, Height 1.8 metres	Chainage 11250 to 11750, Height 1.8 metres  Chainage 11750 to 11815, Height 1.8 metres

**Revised Table A12.2.1 - Additional Noise Barriers**

<b>Link</b>	<b>Eastbound</b>	<b>Westbound</b>
J12 to J11	-	-
J11 to J10	Chainage 48950 to 49020, Height 2 metres  Chainage 49020 to 49070, On Bridge, Height 2 metres  Chainage 49070 to 49150, Height 2 metres	Chainage 49020 to 49070, On Bridge, Height 2 metres
J10 to J8/9	-	-
J8/9 to J7	-	-
J7 to J6	Chainage 26550 to 27340, Height 2 metres	-
J6 to J5	Chainage 20275 to 20400, Height 2 metres  Chainage 25500 to 25625, On Bridge, Height 2 metres	Chainage 20275 to 20400, Height 2 metres  Chainage 24250 to 24400, Height 2.4 metres  Chainage 25500 to 25625, On Bridge, Height 2 metres
J5 to J4b	Chainage 19900 to 20020, Height 2 metres  Chainage 20020 to 20275, On Bridge, Height 2 metres	Chainage 19900 to 20020, Height 2 metres  Chainage 20020 to 20275, On Bridge, Height 2 metres
J4b to J4	-	-



<b>Link</b>	<b>Eastbound</b>	<b>Westbound</b>
J4 to J3	Chainage 11230 to 11750, Height 2 metres  Chainage 11750 to 12140, Height 2 metres  Chainage 12160 to 12350, Height 2 metres	-

**E4.7.19 Please explain how the replacement of barriers in poor condition is secured through the description of associated development in Schedule 1 of the draft DCO APP-026 submitted with the application?**

1. The provision of noise barriers generally is secured by:
  - 1.1. Requirement 7, which requires an Environmental Management Plan to be approved by the local planning authorities prior to any part of the Scheme being carried out; and
  - 1.2. Requirement 10, which requires “enclosure or *attenuation* fencing” to be installed in accordance with the Highways Agency’s Manual of Contract Documents for Highway Works, volume 1 - Specification for Highway Works (consolidated Edition, November 2005, as amended at May 2014).
2. The CEMP is secured by Requirement 8, which requires that no part of the authorised development is to be carried out until a CEMP, substantially in accordance with the outline Construction Environmental Management Plan, annexed to the outline EMP (dated March 2015), has been submitted to and approved by the relevant planning authority.

## Cultural Assets

### **E4.8.1 Chapter 7 Table 7.3 APP-147 concludes that there would be no more than moderate adverse impacts on cultural heritage assets or their setting during the construction phase of the scheme, and no more than slight adverse impacts on the setting of cultural heritage assets during operation of the scheme. Does any party have evidence to challenge this conclusion?**

1. The conclusions of the cultural heritage assessment, presented in Chapter 7 of the ES (Application Document Reference 6.1), have not been challenged explicitly by any party in a relevant representation to this Examination. However, Highways England has been in discussion with two parties regarding the assessment of cultural heritage assets. For ease of reference, a summary of the relevant representations and subsequent work carried out by Highways England is provided here.

#### *Historic England*

2. In their relevant representation on the Application, Historic England stated the following:

*“The Scheduled Ancient Monument of Cippenham Court could be indirectly impacted by the scheme through a temporary negative impact to its setting during the construction phase. The Environmental Statement assesses this impact to be minor and temporary and therefore proposes no mitigation. We agree with this assessment.”*

*“We note that the Mesolithic site at Bray Wick is located just 250m from Construction Compound 5 at J8/9. However, we consider that this is a sufficient distance away not to impact on the monument. Although there is potential for significant archaeological remains to extend beyond the scheduled area, we note the proposal geophysical surveys and trial trenching are proposed to evaluate the archaeological potential of the area around Construction Compound 5. We are therefore satisfied that any harm caused by the scheme to Bray Wick Mesolithic site is likely to be minor and largely temporary.”*

3. Further, Historic England requested that the evaluation of a slight adverse effect on the setting of Cranford Park Conservation Area be evidenced further through visual assessments from viewpoints to the south of the Church of St Dunstan and within the landscaped park, including night-time visualisations.
4. Highways England has prepared additional day-time visualisations for viewpoints within Cranford Park, which have been provided to Historic England for their consideration. Night-time visualisations have not been prepared. The existing motorway lighting will be replaced with modern LED luminaires, which will reduce night-time glare and light spill. The proposals are described in paragraph 4.2.4(c) of the ES (Application Document Reference 6.1) and in paragraph 6.3.44 of the Engineering and Design Report (Application Document Reference 7.3). The impact of the lighting proposals is assessed in paragraph 8.2.11 of the ES (Application Document Reference 6.1), which assumes no change and a neutral significance of effect. A difference in visual effect from a reduction in glare from lighting where the lighting is obscured by trees cannot be shown on a visualisation. On that basis, such night-time visualisations would not be representative. For this reason, further work on night-time visual impacts has not been considered necessary.
5. The Church of St Dunstan is set amid parkland with many mature trees. Consequently, it was not possible to obtain an unobstructed view of the Church of St Dunstan with the M4 in the background. One view from the churchyard towards a new gantry has been prepared and

provided to Historic England. This photomontage shows that the gantry is obscured by evergreen trees. Based on this photomontage, Highways England considers that the conclusion of a slight adverse effect on the setting of the Church of St Dunstan is reasonable.

6. Photomontages have also been prepared of views from other listed buildings and locations within Cranford Park towards the M4, comprising the bridge, the driveway between the bridge and Church of St Dunstan, the stable block, and in the vicinity of the walled garden. These photomontages were provided to Historic England between 11 September 2015 and 14 September 2015.
7. A photomontage has also been taken from the meadow within Cranford Park Conservation Area towards the M4 of the existing gantry to be removed. This has also been provided to Historic England. In this location, some verge vegetation will be removed to accommodate works associated with widening the slip road, and will be replanted. The area of vegetation to be removed and the replanting proposals are presented in the Engineering and Design Report Annex A2 Vegetation Clearance Sheet 30 and Annex A1 Environmental Masterplan Sheet 30 (Application Document Reference 7.4). The photomontage shows an improvement in the view due to the removal of the gantry, despite the temporary clearance in vegetation during construction.
8. Historic England's relevant representation states that the significance of the heritage assets in Cranford Park Conservation Area, and their apparent vulnerability, justifies a precautionary approach to avoiding adverse impacts, which would be in accordance with paragraph 129 of the National Planning Policy Framework. Paragraph 129 of the National Planning Policy Framework advises that local authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal, including developments that affect the setting of a heritage asset, taking account of the available evidence and any necessary expertise. Local authorities are advised to take the assessment into account when considering the impact of a proposal on heritage assets to avoid or minimise conflict between the conservation of the heritage asset and any aspect of the proposal.
9. Highways England considers that, taking together the work done for the ES (Application Document Reference 6.1) and the subsequent photomontages for Cranford Park provided to Historic England, a precautionary approach has been taken to the assessment of the effects of the Scheme on Cranford Park Conservation Area and associated listed buildings and confirms that an assessment of slight adverse significance of effect is a precautionary outcome. The Scheme as proposed avoids harm to the significance of this heritage asset and provides enhancement through the improvement in lighting and removal of one gantry.

*London Borough of Hillingdon*

10. In their relevant representation, London Borough of Hillingdon expressed concern about the effect of the Scheme on the setting of Cranford Park Conservation Area and the listed buildings within it, including the Grade II\* listed Church of St Dunstan, with particular reference to loss of planting.
11. The proposed works around junction 3 are shown in the Scheme Plan, Drawing 4.1 Sheet 60 and 61 (Application Document Reference 6.2) and the assessment of the Scheme on the setting of Cranford Park Conservation Area and associated buildings is addressed in Section 7.13 and Table 7.3 of the ES (Application Document Reference 6.1). The Scheme will require small areas of vegetation removal within the highway boundary to accommodate one new gantry and the modifications to the westbound slip road. These areas are shown in Annex A2 Vegetation Clearance drawing Sheet 30 of the Engineering and Design Report (Application

Document Reference 7.4). Proposals for replacement planting are shown in Annex A1 Environmental Masterplan Sheet 30 of the Engineering and Design Report (Application Document Reference 7.4). There will be no vegetation removal within Cranford Park Conservation Area. Highways England considers that there will be very little change to planting in the vicinity of Cranford Park Conservation Area due to the Scheme, which is unlikely to change the setting of Cranford Park Conservation Area.

12. London Borough of Hillingdon requested additional photomontages of the Scheme from locations within Cranford Park Conservation Area to show the setting of the Church of St Dunstan against the Scheme. The additional summertime photomontages were provided by Highways England to London Borough of Hillingdon in July 2015. Paragraph 7.13.16 of the ES (Application Document Reference 6.1) states that the construction of Gantry G1-02 may lead to a minor magnitude of impact to the setting of the Church of St Dunstan (a high value asset), resulting in a slight adverse significance of effect. The additional photomontages provided to London Borough of Hillingdon show that the Scheme will be obscured behind evergreen trees and will therefore be unlikely to change the setting of Cranford Park Conservation Area and associated listed buildings. Highways England considers that the assessment presented in the ES (Application Document Reference 6.1) is therefore a 'worst case'.

## Effects on all travellers

**E4.9.1** The assessments have been undertaken in accordance with the general principles and structure of assessment methodology contained within Design Manual for Roads and Bridges (DMRB)<sup>3</sup> Volume 11, Section 2, Part 5 HA 205/08 'Assessment and Management of Environmental Effects' APP-352, which has been applied, as appropriate, and tailored to the context of the proposed development. Has the approach to the assessment used, and its results, been agreed with relevant stakeholders?

### *Approach to Assessment*

1. Whilst the approach to assessment used has not been agreed with relevant stakeholders, there have been numerous opportunities to comment on the approach to assessment. Only one comment was received by Highways England, and none of the other relevant representations indicate that any other party has an issue with the approach to assessment used by Highways England.
2. The sole comment received in connection with the assessment of the effects on all travellers is contained within the Relevant Representation submitted by Wokingham Borough Council (Rep no 296):

*“Reviewing the documents gives rise to a number of concerns particularly around the use of Driver Stress as a proxy to assess the impact of the scheme on the local roads. There are also some significant concerns on the impact to our residents in relation to air quality and noise.”*

And:

*“The Driver Stress assessment is the only information available to the local authority to determine the extent of the impact on our local roads; however, the data as published in the report is of no use. Driver stress is determined using vehicle flow and vehicle speed. The data on traffic flows with and without the scheme is given for the M4 motorway but is excluded from the assessment of the local roads.”*

3. The approach to the assessment of effects on all travellers was first shared with stakeholders in the Preliminary Environmental Information Report (<http://www.highways.gov.uk/publications/m4-junction-3-to-12-smart-motorway-consultation-documents/>), produced in November 2014 and available for the Public Information Exhibitions during November and December that year.
4. In response to feedback, the methodology adopted was enhanced to inform Chapter 13 of the Environmental Statement (Application Document Reference 6.1), where the approach to assessment was detailed. View from the Road was assessed in accordance with the Design Manual for Roads and Bridges, Volume 11, Section 3, Part 9, Chapter 2.
5. Driver Stress was assessed in accordance with Volume 11, Section 3, Part 9, Chapter 3. In addition, Paragraph 4.1, Chapter 4 states that driver stress has three main components: frustration, fear of accidents, and uncertainty relating to the route being followed. DMRB acknowledges the lack of reliable correlations between physical factors and driver stress. Accordingly categorisation of driver stress in terms of speeds and flows forms the advised approach. The

---

<sup>3</sup> <http://www.standardsforhighways.co.uk/dmrb/>

augmented and tailored approach adopted for Chapter 13 of the Environmental Statement reflects the acknowledgement in DMRB of the above stated three main components of driver stress.

6. The assessment of impacts on NMUs during the temporary diversion of Public Rights of Way in Chapter 13 has been in accordance with Volume 11, Section 3, Part 8, Chapter 6, New Severance

*Results*

7. The results of the assessment were presented in the Environmental Statement at Chapter 13. The results were not agreed with relevant stakeholders. Again, however, there has been no criticism of the results of the assessment in the relevant representations.

**E4.9.2 Paragraph 13.7.31 APP-153 states that 133 additional gantries and associated signs are proposed as part of the scheme, as described in detail in the Engineering and Design Report (EDR). However when cross referenced a disparity has been identified. The DCO APP-026 only includes reference to 130 gantries with the demolition of 37 of the existing gantries, while para 7.11.3 of the EDRAp-096 indicates that there would be 162 gantries, with 33 existing gantries. Can the applicant confirm the correct numbers of proposed gantries and explain the disparity?**

1. The total number of gantries proposed on the scheme is 162. This includes 133 new gantries and re-use of 29 existing gantries. The number of each gantry type, as defined in draft Development Consent Order (“DCO”) Schedule 1 (Application Document Reference Number 3.1) and on the Works Plans (Application Document Reference 2.3), is as follows:

<b>Gantry Type</b>	<b>Description</b>	<b>No. of</b>
<b>1</b>	Super-span portal	18
<b>2</b>	Single carriageway portal	5
<b>3</b>	Super-span cantilever	25
<b>4</b>	Sign only cantilever	26
<b>5</b>	Signal cantilever, MS4	51
<b>6</b>	Signal cantilever, MS3	8
<b>New</b>	<b>Sub Total of Proposed New Gantries</b>	<b>133</b>
<b>7</b>	Portal type gantry	9
<b>8</b>	Signal cantilever	20
<b>Re-used</b>	<b>Sub Total of Re-used Gantries</b>	<b>29</b>
<b>All</b>	<b>Total Number of Gantries</b>	<b>162</b>

2. The numbers of proposed and retained gantries quoted in the draft DCO, the Environmental Statement (“ES”) (Application Document Reference 6.1) and the Engineering and Design Report (“EDR”) (Application Document Reference 7.3) are all consistent with the table above, however this question has highlighted errors in the total number of existing gantries and the number to be demolished quoted in the application documents:
3. Paragraph 13.7.31 of the ES (APP-153) states that 133 additional gantries and associated signs are proposed as part of the scheme, as described in detail in the Engineering and Design Report (EDR). This refers to the total number of proposed new gantries (gantries types 1 to 6) as tabulated above.
4. The draft DCO (APP-026) only includes reference to 130 gantries. This is the total of the new gantries over the M4, i.e. of those gantries associated with Work Nos. 1a and 1b. The remaining three new gantries are included in draft DCO under Work Nos.12e, 27a and 29d.



- 1.1. The draft DCO also only includes the demolition of 37 of the existing gantries. Existing gantries to be demolished are indicated in purple on the Works Plans and labelled as “Demolish Gantry”. A recount indicates that there are 41 gantries to be demolished.
- 1.2. Paragraph 7.11.3 of the EDR (APP-096) states that “the Preliminary Design requires a total of 162 gantries”. This is the total of proposed new and reused gantries (gantry types 1 to 8) as tabulated above.
- 1.3. Paragraph 7.11.3 of the EDR (APP-096) states that “currently there are 33 existing gantries between junction 12 and junction 3”. This number, quoted in the EDR, is not correct. The correct number of existing gantries is 70, of which 29 will be retained and 41 demolished.