

HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

Supplementary Environmental Statement 3 and
Additional Provision 4 Environmental Statement

Volume 2 | Community forum area reports

CFA10 Dunsmore, Wendover and Halton

October 2015

SES3 and AP4 ES 3.2.1.10



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Department for Transport

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A report prepared for High Speed Two (HS2) Limited:

AECOM

ARUP

ATKINS

CAPITA



ineco



**PARSONS
BRINCKERHOFF**



High Speed Two (HS2) Limited,
One Canada Square,
London
E14 5AB

Details of how to obtain further copies are available from HS2 Ltd.

Telephone: 020 7944 4908

General email enquiries: HS2enquiries@hs2.org.uk

Website: www.gov.uk/hs2

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Structure of the HS₂ Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement

The Supplementary Environmental Statement 3 (SES₃) and Additional Provision 4 Environmental Statement (AP₄ ES) comprises:

- Non-technical summary (NTS). This provides a summary in non-technical language of the SES₃ (Part 1) and AP₄ ES (Part 2) and of any likely significant environmental effects, both beneficial and adverse, which are new or different to those reported in the High Speed 2 (HS₂) Phase One Environmental Statement (ES) submitted to Parliament in November 2013 in support of the hybrid Bill ('the Bill') for Phase One of HS₂ (hereafter referred to as 'the main ES') as updated by subsequent SES and AP ES documents.
- Volume 1: Introduction to the SES₃ and AP₄ ES. This introduces the supplementary environmental information and design changes included within the SES₃ and amendments, which have resulted in the need to amend the Bill, within the AP₄ ES. It also explains any changes to the scope, methodology, assumptions and limitations required for the environmental assessment.
- Volume 2: Community Forum Area (CFA) reports and Map Books. These describe the supplementary environmental information and design changes included within the SES₃ (Part 1) and amendments within the AP₄ ES (Part 2). Any new or different likely significant environmental effects arising from these changes and amendments in each CFA, compared to those reported in the main ES, as updated by SES and SES₂ documents (and SES₃ for the AP₄ amendments) are reported. The AP₁, AP₂ and AP₃ amendments are also taken into account where relevant. In addition, the main local alternatives that have been considered are described, where relevant.
- Volume 3: Route-wide effects. This reports new or different likely significant route-wide effects arising from the supplementary environmental information and design changes included within the SES₃ (Part 1) and amendments within the AP₄ ES (Part 2) compared to those reported in the main ES as updated by SES and SES₂ (and SES₃ for the AP₄ amendments). The AP₁, AP₂ and AP₃ amendments are also taken into account where relevant.
- Volume 4: Off-route effects. This reports new or different likely significant off-route effects arising from the supplementary environmental information and design changes included within the SES₃ and amendments within the AP₄ ES compared to those reported in the main ES as updated by SES and SES₂ (and SES₃ for the AP₄ amendments). The AP₁, AP₂ and AP₃ amendments are also

SES₃ and AP₄ ES Volume 2 – CFA₁₀, Dunsmore, Wendover and Halton

taken into account where relevant.

- Volume 5: Appendices and Map Books. This contains environmental information and associated maps in support of the other volumes of the SES₃ and AP₄ ES.
- Glossary of terms and list of abbreviations. This contains any new or different terms and abbreviations used throughout the SES and AP ES reports, additional to those included in the main ES.

Structure of this report

This volume of the SES₃ and AP₄ ES is divided into CFA reports, which are in turn divided into two parts.

Part 1 provides supplementary environmental information relating to:

- new baseline information with respect to traffic and transport surveys;
- changes to the design or construction assumptions which do not require changes to the Bill; and
- a correction to the main ES.

Part 1 of each CFA report includes, where relevant:

- a description of the changes or updates within the CFA that have triggered the need for reassessment;
- an assessment of the environmental effects of the changes for relevant environmental topics considering the:
 - scope, assumptions and limitations of the SES₃ assessment;
 - changes of relevance to the assessment;
 - environmental baseline;
 - effects arising during construction;
 - effects arising from operation; and
 - mitigation and residual effects.
- a summary of any new or different likely residual significant effects as a result of the changes.

Part 2 provides environmental assessment information relating to proposed amendments to the design, which have resulted in the need to alter the powers conferred by the Bill. The following is included where relevant:

- a summary of the proposed amendments within each CFA that have triggered the need for reassessment;
- a description of each amendment;
- an assessment of the environmental effects of each amendment for relevant environmental topics considering the:
 - scope, assumptions and limitations of the AP₄ ES assessment;
 - environmental baseline;
 - effects arising during construction;
 - effects arising from operation; and

- mitigation and residual effects.
- a summary of any new or different likely residual significant effects as a result of each proposed amendment.

1 Introduction

- 1.1.1 The Bill for High Speed Rail between London and the West Midlands was submitted to Parliament together with the main ES in November 2013. The AP₁ ES, which was submitted in September 2014, contained generally minor amendments to the design of the original scheme (i.e. the scheme submitted in November 2013) in CFAs 7 - 26. The SES and AP₂ ES, which were submitted in July 2015, updated the main ES and contained a number of further amendments to the design of the original scheme in CFAs 4 - 26. The SES₂ and AP₃ ES, which were submitted in September 2015, contained further updates to the main ES and reported the assessment of a number of amendments to the design of the original scheme in CFAs 1 - 5.
- 1.1.2 Since the submission of the main ES and subsequent SES and AP documents, updates to environmental baseline information and changes to scheme design or assumptions have occurred, which may lead to new or different significant effects. These effects, depending on the type of change, are reported in the SES₃ (Part 1) or AP₄ ES (Part 2) of this document.
- 1.1.3 The Bill and associated Additional Provisions (APs) to the Bill described above, if enacted by Parliament, will provide the powers to construct, operate and maintain Phase One of HS₂.
- 1.1.4 In order to differentiate between the original scheme and the subsequent changes, the terms set out in Table 1 are used:

Table 1: Scheme definitions

Scheme name	Definition	Relevant CFAs
the original scheme	the Bill scheme submitted to Parliament in November 2013, which was assessed in the main ES	1 - 26
the AP ₁ revised scheme	the original scheme as amended by the AP submitted in September 2014	7 - 26
the SES scheme	the original scheme with the design changes described in the SES submitted in July 2015	4 - 26
the AP ₂ revised scheme	the SES scheme as amended by the AP ₂ submitted in July 2015	4 - 26
the SES ₂ scheme	the original scheme as updated by the SES scheme, with the design changes described in the SES ₂ submitted in September 2015	1 - 5 (i.e. this applies in the London area only)
the AP ₃ revised scheme	the SES ₂ scheme as amended by the AP ₃ submitted in September 2015	1 - 5 (i.e. this applies in the London area only)
the SES ₃ scheme	the SES ₂ scheme with the design changes described in the SES ₃ submitted in October 2015	4 - 26
the AP ₄ revised scheme	the SES ₃ scheme as amended by the AP ₄ submitted in October 2015	4 - 26

- 1.1.5 SES₃ (Part 1 of this report) contains updated environmental baseline information and describes changes to the scheme that have occurred within the current limits and powers of the Bill, and therefore do not require an AP to the Bill. This includes:
- new baseline information with respect to traffic and transport surveys;
 - a change to construction assumptions which does not require changes to the Bill; and
 - a correction to the main ES.
- 1.1.6 The change to construction assumptions assessed within the SES₃ for this CFA includes further information on the construction of utilities works west of Wendover.
- 1.1.7 The changes are described in Part 1 under a series of sub-headings and assessed on a topic by topic basis using the same approach adopted in the main ES.
- 1.1.8 The purpose of SES₃ is to provide an assessment of any new or different likely significant environmental effects arising from the changes described.
- 1.1.9 There were no SES₂ changes in this CFA, so the SES₃ changes are compared to the SES scheme. There were AP₁ and AP₂ amendments, so these are taken into account as appropriate.
- 1.1.10 The AP₄ ES (Part 2 of this report) describes the likely significant effects of amendments to the design of the scheme, which require the use of land outside the original limits of the Bill, additional access rights, or other extensions to the powers conferred by the Bill, making it necessary to submit an AP to the Bill. The amendments assessed within the AP₄ ES for this CFA include:
- extension to the Chiltern tunnel from Mantle’s Wood portal to South Heath green tunnel north portal and associated works; and
 - relocation of the Nash Lee Road overbridge satellite compound.
- 1.1.11 The AP₄ ES assesses each amendment separately for all relevant topics. The purpose of the AP₄ ES is to provide an assessment of any new or different likely significant environmental effects arising from the amendments compared to the SES₃ scheme, taking into account AP₁ and AP₂ amendments where relevant.
- 1.1.12 The standard measures that will be used to mitigate likely significant adverse environmental effects during construction and operation of the scheme are described in the main ES, Volume 1, Section 9 and the draft Code of Construction Practice (CoCP) submitted in support of the Bill. Implementation of these measures has been assumed in this SES₃ and AP₄ ES.

Part 1: Supplementary Environmental Statement 3

2 Summary of changes

2.1 New environmental baseline information

Traffic and transport

- 2.1.1 Additional traffic surveys have been undertaken at junctions in this area to supplement the information reported in the main ES. The impacts of traffic associated with HS2 construction have been reassessed in the context of this supplementary data.
- 2.1.2 Details of the survey data are included in SES3 and AP4 ES, Volume 5: Appendix TR-001-000. The assessment of the additional baseline data is reported in Section 3.

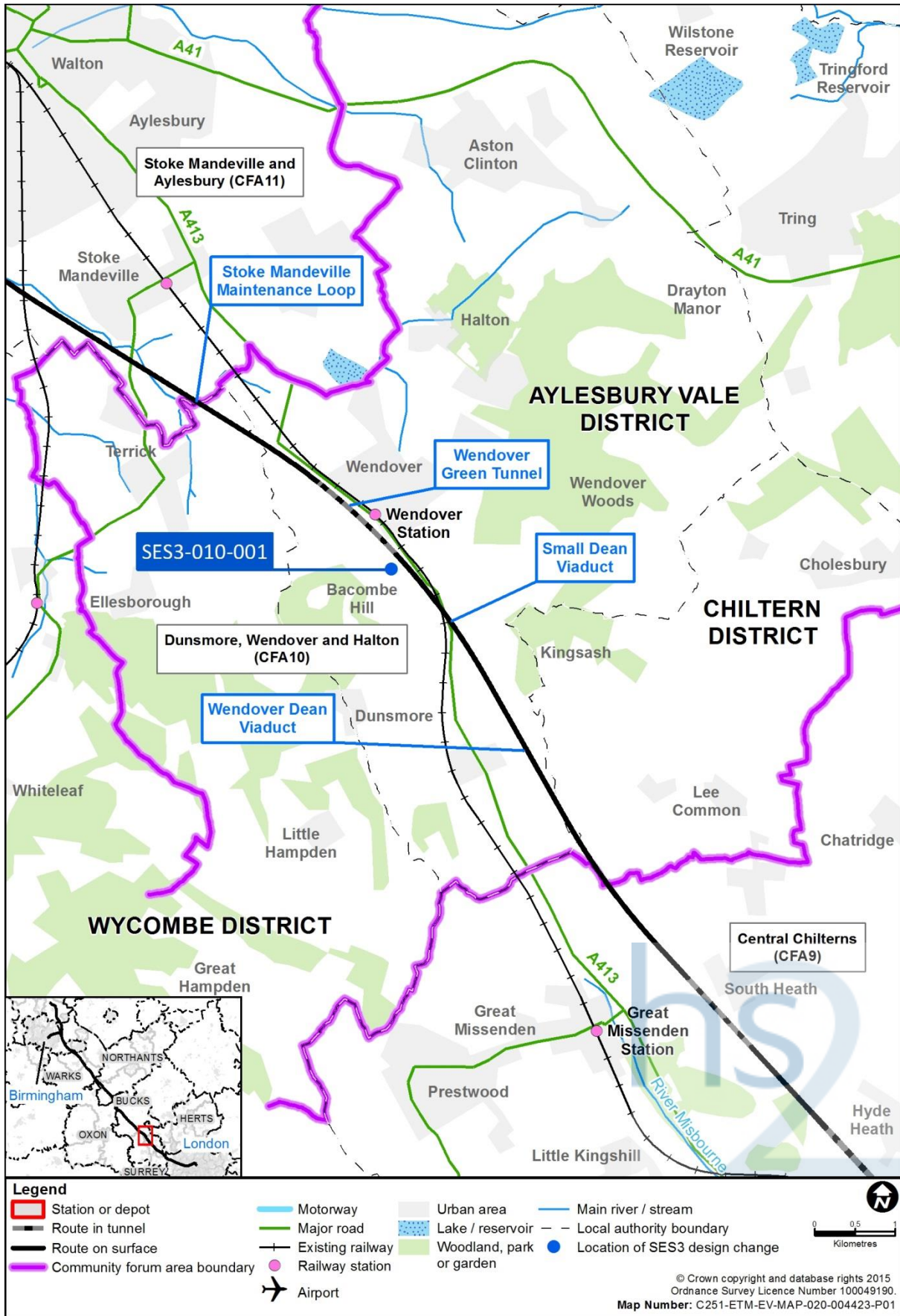
2.2 Changes to the design or construction assumptions not requiring a change to the Bill

- 2.2.1 Table 2 provides a summary of the change to the construction assumptions not requiring a change to the Bill which will result in new or different significant effects in the Dunsmore, Wendover and Halton community forum area (CFA10). Figure 1 shows the location of the change.

Table 2: Summary of the change to the construction assumptions not requiring a change to the Bill in CFA10

Name of design change or construction assumption	Description of the SES scheme	Description of the SES3 scheme
Utility works to the west of Wendover (SES3-010-001)	The permanent realignment of a 400kV overhead power line and pylons on the west side of the HS2 route for a length of approximately 1km from the Small Dean viaduct to Bacombe Lane, to the west of Wendover, by 50m to the south.	Further construction information with regard to piles for the pylon towers has become available for the permanent realignment of the 400kV overhead power line.

Figure 1: Location of the change to construction assumptions not requiring a change to the Bill in CFA10



Description of changes to the design or construction assumptions

Utility works to the west of Wendover (SES3-010-001)

- 2.2.2 The Bill provides for the permanent realignment of pylons and a 400kV overhead power line on the west side of the HS2 route, for a length of approximately 1km, from the Small Dean viaduct to Bacombe Lane, to the west of Wendover (refer to maps CT-05-037, CT-06-037, CT-05-038 and CT-06-038 in main ES, Volume 2, CFA10 Map Book).
- 2.2.3 Since submission of the Bill, additional construction information has become available. The layout of the permanent realignment of the overhead power line has not changed from that proposed in the original scheme and no additional land is required. The works will require the stripping of vegetation and removal of topsoil. Excavators will be used to dig holes for the foundations and in certain ground conditions specialist piling rigs will be used. Pre-mixed concrete and steelwork will then be delivered to site in wagons, for the foundation, frames and bases, and the pylons then delivered in sections. The foundations will be designed to address geotechnical conditions specific to the location of each pylon and may include piles up to 30m deep. The pylons will be put up using a mobile crane which lifts the assembled steelwork into position. The works are expected to take approximately three months to complete. Topsoil will be temporarily stored adjacent to the working area and will be used to reinstate the area once construction is complete.
- 2.2.4 The additional construction information results in the potential for new or different significant effects for water resources and flood risk assessment, and these are reported in Section 3.

2.3 Corrections

- 2.3.1 Since submission of the SES2 and AP3 ES, the need for a number of corrections in the contents of the main ES has been identified. Table 3 sets out where there has been a need to correct the Volume 2 CFA report for Dunsmore, Wendover and Halton because of the potential to alter the significant environmental effects reported or a factual inaccuracy relating to significant effects has been identified. The table gives the location of the correction in the relevant ES, the reason for the correction, replicates the text, where applicable provides revised text, and identifies whether the correction changes a significant effect reported. The correction has been taken into account in the technical assessments contained within Section 3 of this SES.

Table 3: Summary of correction in CFA10

Reference in the relevant ES	Reason for correction	Text in the relevant ES	Revised text	Change to significant effects and mitigation
<p>Traffic and transport</p> <p>Paragraph 12.4.20, Volume 2, CFA10 of the main ES.</p>	<p>A minor adverse effect in construction was omitted from the main ES in relation to increased travel distance for non-motorised users at Footpath ELL/25. A significant minor adverse effect should have been reported in this location.</p>	<p>Paragraph 12.4.20, Volume 2, CFA10 of the main ES:</p> <p>'There will be minor adverse effects on non-motorised users due to increased travel distance from 11 of the public rights of way (PRoW) and two road diversions, at WEN/55 (Footpath), WEN/15A - Ridgeway Trail (Footpath), WEN/6, WEN/11, WEN/6 - Aylesbury Ring Trail (Footpath), WEN/11 (Two Footpaths), Ellesborough Road, WEN/13A (Footpath), WEN/39 (Footpath), WEN/36 - Chiltern Way trails Footpath), TLE/5 (Footpath), Bowood Lane, and TLE/3 (Footpath), with eight of the PRoW diversions and one road diversion will be between 100 and 300 metres in length. The diversion at TLE/3 (Footpath) and Bowood Lane will be approximately 550m and the diversions at WEN/6 and WEN/6 Aylesbury Ring will be approximately 800m in length. There will be a moderate adverse effect due to the diversion of WEN/57 - Icknield Way trail (Bridleway) by approximately 2.2km'.</p>	<p>Paragraph 12.4.20, Volume 2, CFA10 of the main ES:</p> <p>'There will be minor adverse effects on non-motorised users due to increased travel distance from 12 of the PRoW and two road diversions, at ELL/25 (Footpath), WEN/55 (Footpath), WEN/15A - Ridgeway Trail (Footpath), WEN/6, WEN/11, WEN/6 - Aylesbury Ring Trail (Footpath), WEN/11 (Two Footpaths), Ellesborough Road, WEN/13A (Footpath), WEN/39 (Footpath), WEN/36 - Chiltern Way trails Footpath), TLE/5 (Footpath), Bowood Lane, and TLE/3 (Footpath), with eight of the PRoW diversions and one road diversion will be between 100 and 300 metres in length. The diversion at TLE/3 (Footpath) and Bowood Lane will be approximately 550m, the diversion at ELL/25 (Footpath) will be approximately 650m, and the diversions at WEN/6 and WEN/6 Aylesbury Ring will be approximately 800m in length. There will be a moderate adverse effect due to the diversion of WEN/57 - Icknield Way trail (Bridleway) by approximately 2.2km'.</p>	<p>Yes.</p> <p>New minor adverse significant effect with regard to increased travel distance for non-motorised users at Footpath ELL/25. No change to the mitigation proposed in the main ES is required.</p>

2.4 Topics included in the SES₃ assessment

- 2.4.1 The changes described above in Sections 2.1 to 2.3 result in new or different significant effects in respect of: traffic and transport, and water resources and flood risk assessment.

3 Assessment of changes

3.1 Traffic and transport

Introduction

- 3.1.1 This section of the report describes the environmental baseline in relation to traffic and transport that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the changes introduced in Section 2, compared with the SES scheme.

Scope, assumptions and limitations

- 3.1.2 The assessment scope, key assumptions and limitations for traffic and transport are as set out in Volume 1, the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES.

SES₃ changes of relevance to this assessment

- 3.1.3 Supplementary traffic data has been collected at the following highway junctions, which are the subject of this assessment:

- A₄₁₃ / Rocky Lane/ Chesham Lane;
- A₄₀₁₀ Risborough Road / B₄₀₀₉ Nash Lee Road / Chalkshire Road; and
- A₄₀₁₀ Risborough Road / North Lee Road.

- 3.1.4 Details of survey data are included in SES₃ and AP₄ ES, Volume 5: Appendix TR-001-000.

- 3.1.5 More detailed assessment of the junctions of A₄₁₃ Nash Lee Road with B₄₀₀₉ Nash Lee Road and A₄₁₃ Nash Lee Road with Small Dean Lane has also been undertaken, using existing traffic data.

Environmental baseline

Existing baseline

- 3.1.6 The existing baseline for traffic and transport is as set out in Volume 2, CFA₁₀, Section 12 of the main ES, updated by the additional traffic surveys.

Future baseline

Construction

- 3.1.7 The future baseline for construction is as reported in the main ES (Volume 2, CFA₁₀, Section 12), updated by the additional traffic surveys.

Operation (2026 and 2041)

- 3.1.8 The future baselines for operation are as reported in the main ES (Volume 2, CFA₁₀, Section 12), updated by the additional traffic surveys.

Effects arising during construction

Avoidance and mitigation measures

- 3.1.9 No avoidance or mitigation measures, additional to those reported in the main ES, are proposed.

Assessment of impacts and effects

Temporary effects

- 3.1.10 The supplementary traffic data has the potential to change the assessment of the impacts of construction traffic on the local network, with regard to congestion and delays to vehicle users.
- 3.1.11 The revised assessment has identified the removal of significant effects in relation to congestion and delays to vehicle users at the following junctions:
- A₄₀₁₀ Risborough Road with B₄₀₀₉ Nash Lee Road/ Chalkshire Rd: removal of the major adverse significant effect reported in the main ES;
 - A₄₁₃ Nash Lee Road with Small Dean Lane: removal of the major adverse significant effect reported in the main ES; and
 - A₄₁₃ Nash Lee Road with B₄₀₀₉ Nash Lee Road: removal of the moderate adverse significant effect reported in the main ES.
- 3.1.12 The revised assessment has identified one new likely significant effect in relation to congestion and delays to vehicle users at the junction of A₄₀₁₀ Risborough Road with North Lee Road (major adverse).
- 3.1.13 The revised assessment of the A₄₁₃ / Rocky Lane/ Chesham Lane junction has not identified any new or different likely significant effects compared with those reported in the main ES or the SES and AP₂ ES.

Permanent effects

- 3.1.14 The permanent effects of construction on traffic and transport are reported under 'Effects arising from operation'.

Other mitigation measures

- 3.1.15 No changes to mitigation measures reported in Volume 2, CFA₁₀, Section 12 of the main ES are proposed.

Cumulative effects

- 3.1.16 The above assessment has taken into account cumulative effects, including planned developments, by taking account of background traffic growth, as well as traffic and transport impacts of works being undertaken in neighbouring areas.

- 3.1.17 There are no new or different likely significant cumulative effects for traffic and transport as a result of the SES₃ assessment interacting with AP₂ amendments.

Summary of likely residual significant effects

- 3.1.18 The revised assessment identifies a new major residual adverse significant effect at the A₄₀₁₀ Risborough Road with North Lee Road junction in relation to congestion and delay to vehicle users. It also identifies the removal of residual adverse significant effects at the A₄₀₁₀ Risborough Road with B₄₀₀₉ Nash Lee Road/ Chalkshire Rd junction (a major adverse significant effect as reported in the main ES), the A₄₁₃ Nash Lee Road with Small Dean Lane junction (a major adverse significant effect as reported in the main ES), and the A₄₁₃ Nash Lee Road with B₄₀₀₉ Nash Lee Road junction (a moderate adverse significant effect as reported in the main ES).
- 3.1.19 The correction reported in Table 3 has resulted in a new minor residual adverse significant effect relating to increased travel distance for non-motorised users at Footpath ELL/25.
- 3.1.20 The significant effects that result from construction of the SES₃ scheme are shown on map TR-03-054 in the SES₃ and AP₄ ES, Volume 5, Traffic and Transport Map Book.

Effects arising from operation

- 3.1.21 There are no new or different significant operation effects for traffic and transport as a result of the SES₃ assessment, in comparison with the main ES and SES and AP₂ ES.

3.2 Water resources and flood risk assessment

Introduction

- 3.2.1 This section of the report describes the environmental baseline in relation to water resources and flood risk assessment that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the changes described in Section 2, compared to those of the SES scheme.

Scope, assumptions and limitations

- 3.2.2 The assessment scope, key assumptions and limitations for water resources and flood risk assessment are as set out in Volume 1, the SMR (Volume 5: Appendix CT-001 - 000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2).

SES₃ changes of relevance to this assessment

- 3.2.3 The following change is relevant to this assessment: utility works to the west of Wendover (SES₃-010-001).

Environmental baseline

Existing baseline

- 3.2.4 A summary of the baseline information relevant to the assessment of the SES₃ scheme is provided below. For those receptors described in the main ES, further details are provided in the main ES Volume 2, CFA₁₀, Section 13.3 and in Volume 5.

- 3.2.5 The installation of permanent pylons could potentially have an impact on groundwater resources. There are no surface water bodies close to the utilities works and the works do not cross any areas of flood risk; surface water and flood risk have not been considered further.
- 3.2.6 The assessment has taken account of changes in relevant legislation published since the main ES was produced¹. Details regarding the geology of the site can be found in Volume 5, Appendix WR-002-010 of the main ES.
- 3.2.7 Maximum recorded groundwater levels in Winter 2000/1 (representing high regional groundwater levels) were 14.5m above ordnance datum (AOD), or approximately 5m below ground level (bgl) at the crossing with the A413, falling to 13.0m AOD, approximately 2mbgl, at Wendover cricket ground. This suggests groundwater levels will be above the level of ground disturbance for construction of the pylons in this location.
- 3.2.8 There are five reported private licensed groundwater abstractions within 1km of the location of the diversion, as set out in main ES Volume 5: Appendix WR-002-010 Table 3.
- 3.2.9 There are no public water supply (PWS) boreholes or reported private unlicensed groundwater abstractions within 1km of the utility diversion. There is the potential for further unlicensed abstractions to exist, as a licence is not required for abstraction volumes below 20m³ per day.

Future baseline

Construction (2017)

- 3.2.10 All committed developments are required to comply with the National Planning Policy Framework development plans and other legislation and guidance. As such, committed developments are not expected to have a material effect on the water resources and flood risk baseline. The potential change in Water Framework Directive status objectives is not considered to result in changes to the effects reported in the main ES and SES and AP₂ ES.

Operation (2026)

- 3.2.11 For the reasons stated in 3.2.13 for construction, the committed developments are not expected to result in a change in significance of the effects from operation.

Effects arising during construction

Avoidance and mitigation measures

- 3.2.12 The assessment assumes implementation of the draft CoCP (Volume 5: Appendix CT-000-003 of the main ES). The general approach to mitigation is set out in Volume 1, Section 9 of the main ES.

¹ The Water Act 2014 and the Environmental Permitting (England and Wales) (Amendment) Regulations 2014

- 3.2.13 Details of avoidance and mitigation measures that will reduce potential adverse effects on surface water and flood risk are given in Volume 5: Appendices WR-002-010 and WR-003-010 of the main ES.
- 3.2.14 An appropriate method of piling will be used to avoid creating hydraulic pathways, such as cracks and cavities between the construction works and the natural rock, and also to avoid creating pathways between the aquifer and ground surface.

Assessment of impacts and effects

Temporary effects

- 3.2.15 The main ES reported that the utility diversion would not have any significant temporary adverse effects on surface water resources or flood risk. The construction methodology will not give rise to a new or different significant effect on surface water or flood risk.
- 3.2.16 The installation of the pylons is likely to involve piling within the Chalk. This work will take place in the outer source protection zone² of two private abstractions (GWA₂ and GWA₃), which are used to supply flow to the Grand Union Canal (Wendover Arm) and could have a moderate impact on them, leading to a moderate adverse effect, which is significant. In the main ES, the potential for significant effects on private water abstractions was identified. If piling up to 30m below ground level is required, it will give rise to a different significant effect on the private abstractions. However, this will not change the level of significance of the moderate adverse effects reported in the main ES.
- 3.2.17 Notwithstanding the mitigation measures set out in the draft CoCP, groundwater quality in the Chalk aquifer and nearby spring-fed watercourses has the potential to be affected by increased turbidity, especially since construction will take place in shallow Chalk where fissuring is likely to be more frequent and fissures more likely to be enlarged. However, natural groundwater velocities are low and natural attenuation in the aquifer is likely. The impact on turbidity in the Chalk aquifer as a whole is therefore assessed to be negligible, with a neutral effect, which is not significant.
- 3.2.18 No other significant effects on groundwater resources or water-dependent habitats have been identified during the construction stage.

Permanent effects

- 3.2.19 The existence of piles below the groundwater level could cause localised groundwater mounding due to groundwater flow being constricted between the pile groups. Given the distance between the pylons and the scale of the Chalk aquifer it is assessed that the piles will not significantly hinder groundwater flow and there will be negligible impact on groundwater flooding at the scale of the Mid Chilterns Chalk and negligible impact on flow to local abstractions. With implementation of the draft CoCP, there will be sufficient mitigation in place to ensure the impact is minor, giving rise to a minor adverse effect, which is not significant.

² The inner protection zone of a private water abstraction is defined as the 50-day travel time from any point below the water table to the source with a minimum 50m-radius and is equivalent to a PWS SPZ₁. The outer protection zone of a private water abstraction is defined by a 400-day travel time from a point below the water table and equivalent to SPZ₂ at a PWS.

- 3.2.20 The construction methodology for the utility diversion will not give rise to new or different permanent significant effects and will not change the level of significance of the effects reported in the main ES.

Other mitigation measures

- 3.2.21 At licensed private water abstractions where there is the potential for adverse effects on abstraction during construction, monitoring of groundwater turbidity will be used to verify if effects are occurring and provide evidence to justify further intervention, should that be required. Appropriate mitigation measures will be agreed with the owner in advance of construction commencing and may, for example, consist of the provision of a temporary alternative supply.

Cumulative effects

- 3.2.22 There are no new or different likely cumulative effects for water resources and flood risk as a result of the SES₃ changes interacting with one another, the AP₁ amendments, AP₂ amendments, or any relevant committed development.

Summary of likely residual significant effects

- 3.2.23 The construction methodology for the utility diversion will not give rise to a new or different residual significant effect and will not change the level of significance of the effects reported in the main ES.

Effects arising from operation

- 3.2.24 There are no new or different significant operational effects for water resources and flood risk as a result of the SES₃ scheme.

Part 2: Additional Provision 4 Environmental Statement

4 Summary of amendments

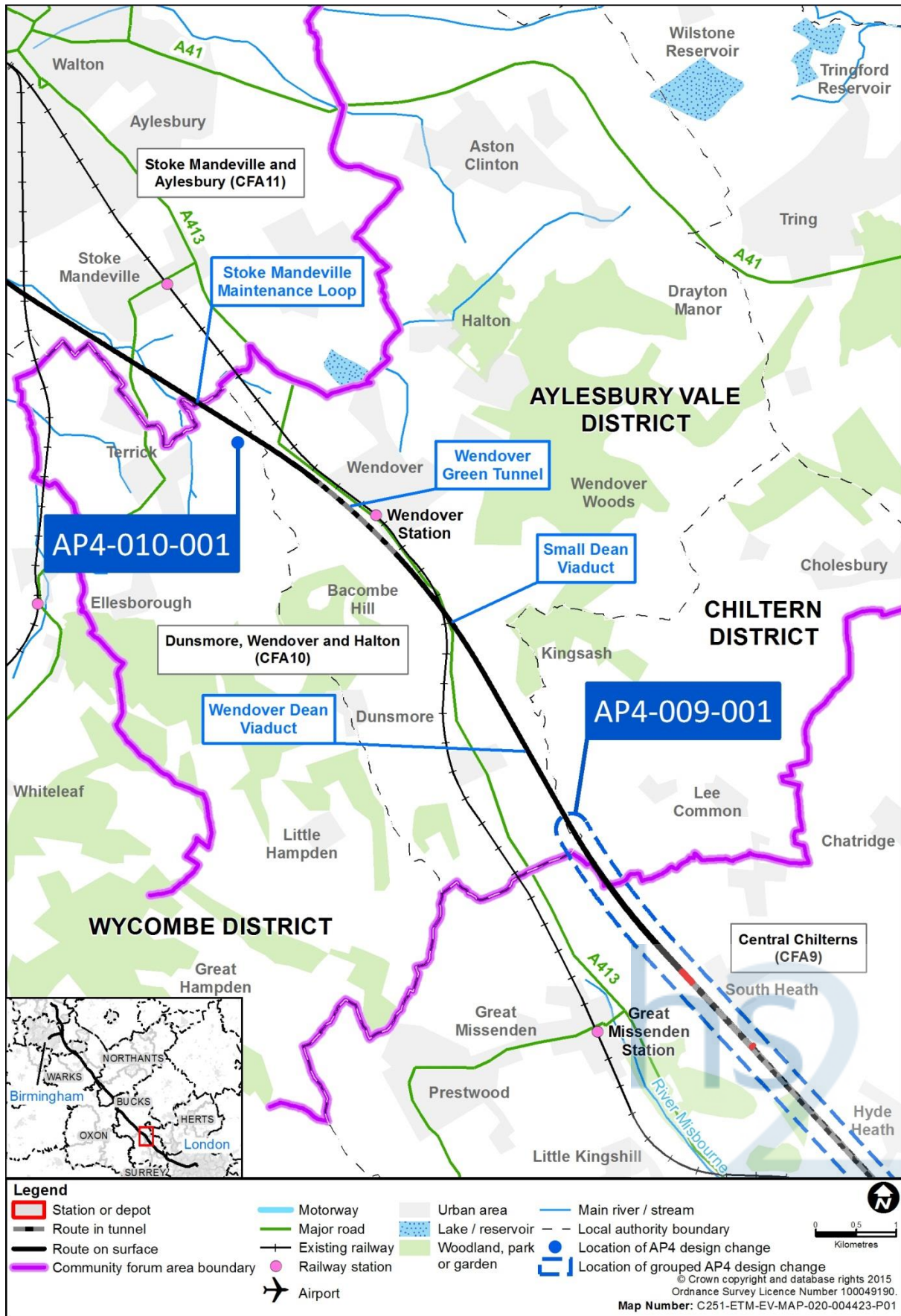
- 4.1.1 Table 4 provides a summary of the amendments in the Dunsmore, Wendover and Halton area (CFA₁₀) and Figure 2 shows the locations.

Table 4: Summary of amendments in CFA10

Name of amendment	Description of the SES3 scheme	Description of the AP4 revised scheme
<p>Extension of the Chiltern tunnel from Mantle's Wood portal to South Heath green tunnel north portal and associated works</p> <p>(AP4-009-001)</p>	<p>The original scheme would emerge from tunnel at Mantle's Wood in CFA9 and continue north-west mainly in deep cutting, as far as the B485 Chesham Road where it would enter the South Heath green tunnel. Upon emerging from the South Heath green tunnel, north of Frith Hill, the original scheme would continue north-west in a cutting, up to 11m deep in this area, north to Leather Lane.</p> <p>The original scheme provided for the permanent provision of the Chiltern tunnel north portal, located approximately 600m west of Hyde Heath including a portal building, access track and a 100m-long porous portal³.</p>	<p>Extension of the bored Chiltern tunnel in CFA9 by approximately 2.6km from Mantle's Wood, north-west of Hyde Heath, emerging at a revised Chiltern tunnel north portal, north-west of South Heath.</p> <p>The change within CFA10 associated with the extension of the Chiltern tunnel is the provision of a mid-point auto-transformer station (ATS) on the eastern side of the alignment, north of Leather Lane with access from Leather Lane.</p> <p>All changes within CFA10 remain within the limits of the Bill.</p>
<p>Additional land required for the overbridge satellite compound at Nash Lee Road</p> <p>(AP4-010-001)</p>	<p>The Bill provides land adjacent to and south of the B4009 Nash Lee Road on a temporary basis to accommodate the Nash Lee Road overbridge satellite compound, located approximately 1.5km to the north of Wendover.</p>	<p>Relocation of the satellite compound north of the B4009 Nash Lee Road, to an agricultural field to the west of the Wendover north cutting and north of properties off the B4009.</p> <p>Additional land is required temporarily and is outside the limits of the Bill.</p>

³ Porous portals are perforated structures at tunnel portals. These are usually formed of concrete and designed to allow the passage of air from the tunnel. Their function is to reduce the build-up of air pressure when a high-speed train enters a tunnel. The use of this porous portal will ensure that the pressure waves are controlled and kept at a level which does not significantly affect the surrounding area.

Figure 2: Locations of amendments in CFA10



5 Assessment of amendments

5.1 Extension of the Chiltern tunnel from Mantle's Wood portal to South Heath green tunnel north portal and associated works (AP4-009-001)

- 5.1.1 The original scheme provides for the route to pass beneath part of the Chilterns Area of Outstanding Natural Beauty (AONB) in tunnel. The original scheme for the Chiltern tunnel would provide for a 13.5km twin-bored tunnel commencing south of the M25 between junctions 16 and 17 and east of Chalfont St Peter, in the Colne Valley area (CFA7) and emerging at Mantle's Wood, north-west of Hyde Heath, in the Central Chilterns (CFA9). There would be four ventilation and intervention shafts (vent shafts) along the length of the Chiltern tunnel, near Chalfont St Peter, Chalfont St Giles, Amersham (all CFA8) and near Little Missenden (CFA9).
- 5.1.2 Upon emerging from the Chiltern tunnel (CFA9) the original scheme would continue north-west in a cutting, up to 23m deep, for approximately 750m, then on an embankment, up to 5m high, for approximately 100m. It would then continue in a cutting, up to 13m deep, for approximately 650m up to the B485 Chesham Road, south-west of South Heath. The original scheme would enter the South Heath green tunnel adjacent to the B485 Chesham Road and would continue north-west, emerging north-west of South Heath and east of Great Missenden. Upon emerging from the South Heath green tunnel, north of Frith Hill, the original scheme would continue north-west in a cutting, up to 11m deep in this area, north of Leather Lane (and would continue through to the Dunsmore, Wendover, and Halton area in CFA10) (see Map CT-05-030 to 034b and CT-06-030 to 034b from the main ES).
- 5.1.3 The original scheme allowed for the permanent provision of the Chiltern tunnel north portal, located approximately 600m west of Hyde Heath, including a portal building, access track and a 100m-long porous portal.
- 5.1.4 In the AP2 revised scheme, changes were made to extend the Chiltern tunnel north porous portal to 220m (AP2-009-001). The portal building was relocated approximately 120m north-west along the HS2 route to accommodate the longer portal. The permanent access track to the portal building and associated earthwork was extended by approximately 120m in length and realigned closer to the track. All changes associated with the Chiltern tunnel in the AP2 revised scheme were within CFA9.
- 5.1.5 The Select Committee published a statement on 21 July 2015 stating that it believed the case had been made for an extension of the bored Chiltern tunnel to the north end of the South Heath green tunnel. Following this statement, the AP4 revised scheme includes provision for an approximately 2.6km extension to that tunnel, from Mantle's Wood, north-west of Hyde Heath, to a revised Chiltern tunnel north portal, north-west of South Heath (refer to map CT-05-033 and CT-06-033 in the SES3 and AP4 ES, Volume 2, CFA9 Map Book).
- 5.1.6 This amendment also includes further changes to the scheme design in CFA8 and CFA9, as well as changes in CFA7 in relation to traffic; however, traffic effects as a

result are assessed as being negligible (refer to AP₄ ES CFA₇ Volume 2). These are described in the relevant CFA reports.

5.1.7 If the AP₄ revised scheme is approved the AP₂ revised scheme will not be pursued.

5.1.8 This amendment includes changes to the scheme design in CFA₈, CFA₉ and CFA₁₀, as well as changes in CFA₇ in relation to traffic. These are described in the relevant SES₃ and AP₄ CFA reports. In addition to the 2.6km tunnel extension, the amendment (AP₄-009-001) will incorporate the following, from south to north in CFA₈, CFA₉ and CFA₁₀:

- the same horizontal alignment as the original scheme (CFA₈, CFA₉ and CFA₁₀);
- the addition of cooling equipment and accompanying electrical switchgear to vent shafts at the following locations along the route: Chalfont St Peter, Chalfont St Giles and Amersham vent shaft in CFA 8 and Little Missenden and Chesham Road in CFA 9. There will no additional land required to accommodate this equipment;
- a larger permanent surface area for the Chalfont St Giles vent shaft and auto-transformer feeder station to accommodate an express feeder auto-transformer station (CFA₈);
- a deepening of the vent shaft at the Little Missenden vent shaft and auto-transformer feeder station (CFA₉);
- a new vent shaft located adjacent to Annie Bailey's public house and restaurant with access from B485 Chesham Road (CFA₉);
- environmental mitigation in the SES₃ scheme will no longer be required between Mantle's Wood and the new north portal as the scheme will tunnel below the woodland (CFA₉);
- a zoom porous portal at the new Chiltern tunnel north portal (CFA₉);
- a realignment of a 400kV overhead electricity line to the west of the South Heath (CFA₉) which includes the replacement of two pylons with one taller pylon (approximately 11m higher than the existing pylons);
- a wider and deeper cutting northwards from the new north portal, compared to the original scheme, due to the greater depth of the bored tunnel alignment and a greater width required by the track separation for the bored tunnel. The changes to the cutting will require the height of the overbridges to be increased (CFA₉ and CFA₁₀);
- the Chiltern tunnel north portal construction compound, including a rail fit out compound will be accessed via the A413 Missenden Bypass. This area will be restored to its former use following the rail fit out stage with a permanent access provided from Frith Hill to the new portal (CFA₉);
- the provision for noise fence barriers approximately 3m high and 1.4km long at the top of the cutting on the eastern side of the route, extending from the new

portal to Leather Lane (CFA₉). The barriers will be integrated with the landscape earthworks and landscape planting. An alternative 6m high barrier at the bottom of the cutting may also provide the level of attenuation required and could be substituted for the 3m barrier now proposed, but further design development is required before this can be confirmed; and

- a mid-point auto-transformer feeder station located on the eastern side of the HS₂ route north of Leather Lane with access from Leather Lane (CFA₁₀).

5.1.9 The amendment will result in an overall net reduction in the land required across CFA₈, CFA₉ and CFA₁₀ compared with the original scheme. In particular, the removal of 8.9ha of ancient woodland from Mantle's Wood, Farthings Wood and Sibley's Coppice in CFA₉ is no longer required. In CFA₁₀, the revised location of the mid-point ATS will remain within the Bill limits and no additional land is required during construction. The amendment requires an additional 3.8ha of land permanently in holdings reported in CFA₁₀ that would have been re-instated to agricultural use in the SES₃ scheme, mainly for landscape earthworks and mitigation planting. The element of the amendment within CFA₁₀ is described in detail in the following section.

Extension to the Chiltern tunnel

5.1.10 The original scheme provided for circular twin-bore tunnels, each bore with an internal diameter of approximately 8.8m and an external diameter of approximately 9.6m. Depending on surface topography the tunnel depths varied between approximately 15m and 45m below ground level.

5.1.11 Since submission of the SES and AP₂ ES, a revised design to the Chiltern tunnel has been developed extending it by approximately 2.6km, emerging to the north-west of South Heath. The AP₄ revised scheme will have a lower vertical alignment between Little Missenden and south of Liberty Lane. The difference in vertical alignment between the AP₄ revised scheme and SES₃ scheme will be up to 32m through this section. The horizontal alignment of the Chiltern tunnel remains unchanged from the SES₃ scheme and the line speed will remain at be 320kph through the tunnel section.

5.1.12 The amendment surfaces north-west of South Heath. This will require a deeper and wider cutting compared with the SES₃ scheme due to the requirement for greater track separation associated with the twin bore tunnel.

5.1.13 The vertical alignment of Leather Lane overbridge will alter as a result of larger spans over a wider cutting. The overbridge will be raised by approximately 0.5m. Cottage Farm accommodation overbridge remains unchanged from the SES₃ scheme.

Mid-point auto-transformer station

5.1.14 The mid-point ATS will be relocated approximately 150m north of Leather Lane (refer to map CT-o6-o35 in the SES₃ and AP₄ ES Volume 2, CFA₁₀ Map Book). Permanent access will be provided off Leather Lane. Landscape earthworks and mitigation planting will integrate this structure into the landscape.

5.1.15 The changes related to the extension of the Chiltern tunnel from Mantle's Wood portal to South Heath green tunnel north portal and associated works are not considered to make changes that require a reassessment of the environmental effects or proposed mitigation as set out in the main ES and SES and AP₂ ES for CFA₁₀ with

respect to: air quality; community; ecology; land quality; and socio-economics. However, there were changes where reassessment was considered to be required in respect of: agriculture, forestry and soils; cultural heritage; landscape and visual; sound, noise and vibration; traffic and transport; and water resources and flood risk assessment.

Agriculture, forestry and soils

Introduction

- 5.1.16 This section of the report describes the environmental baseline in relation to agriculture, forestry and soils that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES₃ scheme.

Scope, assumptions and limitations

- 5.1.17 The assessment scope, key assumptions and limitations for agriculture, forestry and soils are as set out in Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES.
- 5.1.18 The area of agricultural land affected permanently by the amendment in CFA₁₀ is 3.8ha and therefore will not alter the significance of effect, or result in a different effect, on best and most versatile (BMV) agricultural land or forestry land within the CFA₁₀ area (Dunsmore, Wendover and Halton). The route-wide effects on BMV land and forestry land are reported in Volume 3.

Existing baseline

- 5.1.19 The majority of the soils that will be affected by the amendment are of the moderately-to-imperfectly drained Batcombe association. Developed over the Clay-with-Flints Formation, these soils consist typically of slightly stony silt loam or silty clay loam topsoil, which overlie slightly stony clay loam and clay subsoils and are susceptible to slight seasonal waterlogging; they are classified as Wetness Class⁴ (WC) II or III. Soils within the Charity 2 association will also be affected and have slightly or moderately stony silty clay loam topsoil in WCI (described in Volume 2, CFA₁₀, Section 3 of the main ES).
- 5.1.20 Two holdings are reported as affected in the main ES and SES and AP₂ ES and will be further affected by this amendment:
- Hunt's Green Farm (CFA₁₀/1⁵), which is a 100ha holding engaged in arable crop production and rearing beef cattle and sheep; and
 - Strawberry Hill Farm (CFA₁₀/2), which is a 220ha holding engaged in arable crop production and rearing beef cattle and sheep.

⁴ The Wetness Class (WC) of a soil is classified according to the depth and duration of waterlogging in the soil profile and has six bands.

⁵ Holding reference number assigned in the main ES.

Future baseline

Construction (2017)

- 5.1.21 Volume 5: Appendix CT-004-000 of the SES3 and AP4 ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified under the same reference number in the main ES and the SES and AP2 ES.
- 5.1.22 None of the identified developments affect the assessment of the AP4 amendment's likely construction impacts on agriculture, forestry and soils.
- 5.1.23 Most existing Environmental Stewardship agreements will expire in 2015 and will be replaced by a new environmental land management scheme (countryside stewardship) which, together with the new greening measures introduced by Common Agricultural Policy reform, will affect the detailed management of individual farm holdings, but are not expected to change fundamentally the baseline circumstances described.

Operation (2026)

- 5.1.24 Volume 5: Appendix CT-004-000 of the SES3 and AP4 ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified under the same reference number in the main ES and the SES and AP2 ES.
- 5.1.25 None of the identified developments affect the assessment of the AP4 amendment's likely operational impacts on agriculture, forestry and soils.

Effects arising during construction

- 5.1.26 The amendment to relocate the mid-point ATS will not give rise to a new or different temporary significant effect and will not change the level of significance of the temporary effects reported in the main ES or SES and AP2 ES.
- 5.1.27 As reported in the SES and AP2 ES, approximately 18.8ha of land would be required permanently at Hunt's Green Farm (19% of the holding), giving rise to a moderate adverse significant effect. The area of Hunt's Green Farm required permanently under the amendment will be approximately 21.0ha (21% of the holding). This is a major/moderate adverse effect, which is significant, due to the percentage of the farm required.
- 5.1.28 As reported in the SES and AP2 ES approximately 23.5ha of land would be required permanently at Strawberry Hill Farm (11% of the holding) giving rise to a moderate adverse significant effect. The area of Strawberry Hill Farm required permanently under the amendment will be approximately 25.1ha (11% of the holding). This remains a moderate adverse effect, which is significant, due to the percentage of the farm required.

Effects arising from operation

- 5.1.29 The amendment to relocate the mid-point ATS will not give rise to a new or different significant effect from operation and will not change the level of significance of the effects reported in the main ES or SES and AP2 ES.

Mitigation and residual effects

- 5.1.30 No additional mitigation measures (i.e. in addition to those identified in the main ES and SES and AP₂ ES) are required.
- 5.1.31 The amendment to relocate the mid-point ATS will give rise to a different significant residual effect on land required permanently at Hunt's Green Farm. This will change the level of significance of the effects reported in the SES and AP₂ ES from a moderate adverse significant effect, to a major/moderate adverse significant effect (refer to map AG-01-019 in the Volume 5, Agriculture, forestry and soils Map Book of the SES₃ and AP₂ ES).

Cumulative effects

- 5.1.32 There are no new or different likely significant cumulative effects for agriculture, forestry and soils as a result of the AP₄ amendments interacting with one another, the AP₁ amendments, AP₂ amendments or any relevant committed development.

Cultural heritage

Introduction

- 5.1.33 This section of the report describes the environmental baseline in relation to cultural heritage that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES₃ scheme.

Scope, assumptions and limitations

- 5.1.34 The assessment scope, key assumptions and limitations for cultural heritage are as set out Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES.

Existing baseline

- 5.1.35 The cultural heritage baseline for the assessment takes into account information collected in support of the main ES, which included walk-over survey, geophysical survey, remote sensing data, and data from national and local registers. A full list is provided in Volume 2, Section 6.3 of the main ES.
- 5.1.36 The land required for the mid-point ATS and associated landscaping includes land west of Hunt's Green Farm where archaeological finds dating to the Roman, medieval and post-medieval period have been recovered (asset reference⁶ DWH014); these are considered assets of low heritage value.

Future baseline

Construction (2017)

- 5.1.37 Volume 5: Appendix CT-004-000 of the SES₃ and AP₄ ES provides details of the developments which are assumed to have been implemented by 2017, additional to

⁶ Asset reference: a unique code for each cultural heritage asset identified within the study area; further detail on these assets can be found in the gazetteer in Volume 5: Appendix CH-002-011 of the main ES

those identified under the same reference number in the main ES and the SES and AP₂ ES.

- 5.1.38 None of the identified developments affect the assessment of the amendment's likely construction impacts on cultural heritage.

Operation (2026)

- 5.1.39 Volume 5: Appendix CT-004-000 of the SES₃ and AP₄ ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified under the same reference number in the main ES and the SES and AP₂ ES.
- 5.1.40 None of the identified developments affect the assessment of the AP₄ amendment's likely operational impacts on cultural heritage.

Effects arising during construction

- 5.1.41 The amendment to relocate the mid-point ATS will result in additional construction work taking place in the setting of Hunt's Green Farm (asset reference DWH007); however, this will be in the context of the construction work for the wider scheme. It will therefore not give rise to a new or different significant effect and will not change the temporary moderate adverse significant effect reported in the main ES.

Effects arising from operation

- 5.1.42 The amendment to relocate the mid-point ATS will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES (Volume 2, CFA₁₀, Section 6).

Mitigation and residual effects

- 5.1.43 No additional mitigation measures (i.e. in addition to those identified in the main ES and subsequent SES reports) are required.
- 5.1.44 The amendment to relocate the mid-point ATS will not result in a different effect or change the level of significance of the moderate adverse effect during construction reported in the main ES (Volume 2, CFA₁₀, Section 6).

Cumulative effects

- 5.1.45 There are no new or different likely significant cumulative effects for cultural heritage as a result of the AP₄ amendments interacting with one another, the AP₁ amendments, AP₂ amendments or any relevant committed development.

Landscape and visual assessment

Introduction

- 5.1.46 This section of the report describes the environmental baseline in relation to landscape and visual that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES₃ scheme.

Scope, assumptions and limitations

- 5.1.47 The assessment scope, key assumptions and limitations for the landscape and visual assessment are as set out in Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES. Updates to the methodology for the landscape and visual assessment are also described in Volume 1 of the AP₁ ES and Volume 1 of the SES and AP₂ ES.

Existing baseline

- 5.1.48 The area of land required for the amendment is located within Lee Undulating Valley Slopes Landscape Character Area (LCA), which is in the Chilterns AONB, as described in the main ES (Volume 2, CFA₁₀, Section 9).
- 5.1.49 The view west from King's Lane near Potter Row (viewpoint 096.4.002) is located in close proximity to the area and is described in the main ES (Volume 2, CFA₁₀, Section 9).

Future baseline

Construction (2017)

- 5.1.50 Volume 5: Appendix CT-004-000 of the SES₃ and AP₄ ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified under the same reference number in the main ES and the SES and AP₂ ES.
- 5.1.51 None of the identified developments affect the assessment of the amendment's likely construction impacts on landscape and visual receptors.

Operation (2026)

- 5.1.52 Volume 5: Appendix CT-004-000 of the SES₃ and AP₄ ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified under the same reference number in the main ES and the SES and AP₂ ES.
- 5.1.53 None of the identified developments affect the assessment of the amendment's likely operational impacts on landscape and visual receptors.

Effects arising during construction

Landscape assessment

- 5.1.54 The Lee Undulating Valley Slopes LCA was assessed as being affected by the original scheme and will also be affected by this amendment. The Lee Undulating Valley Slopes LCA is in good condition and tranquil, therefore it is considered to be of high sensitivity to change. The SES and AP₂ ES reported a moderate adverse significant effect during construction due to formation of a 15m deep cutting, the construction of the Leather Lane overbridge realignment, the realignment of two PRoW, the loss of hedgerow vegetation and the presence of temporary material stockpiles. Furthermore, approximately 150m of Grim's Ditch scheduled monument and associated mature vegetation will be removed.

- 5.1.55 The amendment to relocate the mid-point ATS will introduce additional construction activity into the LCA; however, in the context of the wider construction works for the AP₄ revised scheme it will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES or SES and AP₂ ES

Visual assessment

- 5.1.56 Viewpoint 096.4.002: view west from King's Lane near Potter Row: the main ES and SES and AP₂ ES reported a moderate adverse significant effect during construction due to views of the Leather Lane satellite compound, plant and machinery associated with the temporary storage area, the removal of hedgerows, and the removal of vegetation along the length of Leather Lane in the foreground.
- 5.1.57 The construction of the mid-point ATS will be visible, in the middle ground beyond temporary material stockpiles. This will be seen in the context of a wider area of construction works and will give rise to a different significant effect, however it will not change the level of significance of the effects reported in the main ES and SES and AP₂ ES (Volume 2, CFA₁₀, Section 9).

Effects arising from operation

Landscape assessment

- 5.1.58 The Lee Undulating Valley Slopes LCA was assessed as not being significantly affected in the main ES and the SES and AP₂ ES.
- 5.1.59 The relocation of the mid-point ATS will be a small change in relation to the scale of the SES₃ scheme. It will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES or SES and AP₂ ES.

Visual assessment

- 5.1.60 Viewpoint 096.4.002: view west from King's Lane near Potter Row: the main ES and SES and AP₂ ES reported a moderate adverse significant effect during year 1 of operation due to views of the elevated Leather Lane overbridge approximately 450m away. Glimpsed views of overhead line equipment will be obtained along the length of the HS₂ route, whilst vegetation lost during construction will still be apparent in the view in year 1 of operation. By year 15 and beyond to year 60 of operation, reinstated and proposed planting will have matured, providing additional screening. This will result in effects that are minor and not considered to be significant.
- 5.1.61 The mid-point ATS will be partially visible in the middle ground of the view, resulting in a moderate adverse effect in winter and summer of year 1 of operation. By year 15 and beyond to year 60 of operation, reinstated and proposed planting will have matured, providing additional screening. This will result in effects that are minor and not considered to be significant. The amendment to relocate the mid-point ATS will not give rise to a new or different significant effect and will not change the level of significance of the effect reported in the main ES (Volume 2, CFA₁₀, Section 9) or SES and AP₂ ES (Volume 2, CFA₁₀, Section 3.3).

Mitigation and residual effects

- 5.1.62 Effects in year 1 of operation may be further reduced by establishing planting early in the construction programme, which may be considered during the detailed design stage. However, no other mitigation measures are considered practicable due to the high visibility of elements of the scheme and the sensitivity of the surrounding receptors.
- 5.1.63 The mid-point ATS will be visible from viewpoint 096.4.002: view west from King's Lane near Potter Row during construction, giving rise to a different significant effect on that viewpoint. However, this will not change the level of significance of the moderate adverse significant effect reported in the main ES (Volume 2, CFA₁₀, Section 9) or SES and AP₂ ES.

Cumulative effects

- 5.1.64 There are no new or different likely significant cumulative effects for landscape or visual as a result of the AP₄ amendments interacting with one another, the AP₁ amendments, AP₂ amendments or any relevant committed development.

Sound, noise and vibration

Introduction

- 5.1.65 This section of the report describes the environmental baseline in relation to sound, noise and vibration that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES₃ scheme.

Scope, assumptions and limitations

- 5.1.66 The assessment scope, key assumptions and limitations for sound, noise and vibration are as set out in Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES.
- 5.1.67 Local assumptions and limitations for sound, noise and vibration are set out in the main ES Volume 2, CFA₁₀, Section 11.

Existing baseline

- 5.1.68 The baseline traffic information has been updated since the main ES and the SES and AP₂ ES by the SES₃ scheme; further information can be found in the Transport Assessment (refer to SES₃ and AP₄ ES Volume 5: Appendix TR-001-000).
- 5.1.69 In other respects, the baseline sound, noise and vibration information for CFA₁₀ Dunsmore, Wendover and Halton will not change as a result of the amendment. The baseline is described in the main ES, Volume 2, CFA₁₀ Report: Section 11 and Volume 5: Appendix SV-002-010. Baseline sound levels representative of the assessment locations affected by the AP₄ amendments have been used in the assessment.

Future baseline

Construction (2017)

- 5.1.70 The baseline traffic information for 2017 has been updated since the main ES, SES and AP₂ ES by the SES₃ scheme. In all other respects, the future baseline for construction in 2017 remains unchanged from that reported in the main ES, Volume 2, CFA₁₀, Section 11.
- 5.1.71 Volume 5: Appendix CT-004-000 of the SES₃ and AP₄ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified under the same reference number in the main ES and the SES and AP₂ ES.
- 5.1.72 None of the identified developments affect the assessment of the amendment's likely construction impacts on sound, noise and vibration.

Operation (2026)

- 5.1.73 The baseline traffic information for 2026 has been updated since the main ES, SES and AP₂ ES by the SES₃ scheme. In all other respects, the future baseline for operation in 2026 remains unchanged from that reported in the main ES, Volume 2, CFA₁₀, Section 11.
- 5.1.74 Volume 5: Appendix CT-004-000 of the SES₃ and AP₄ ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified under the same reference number in the main ES and the SES and AP₂ ES.
- 5.1.75 None of the identified developments affect the assessment of the amendment's likely operational impacts on sound, noise and vibration.

Effects arising during construction

Residential and non-residential receptors: direct effects

- 5.1.76 The closest noise-sensitive receptors within CFA₁₀ to the amendment are the residential properties on King's Lane and Potter Row, located more than 300m to the east of the mid-point ATS.
- 5.1.77 In the main ES, no likely significant direct construction noise effects on residential or non-residential receptors were identified in the vicinity of the amendment in CFA₁₀.
- 5.1.78 The works associated with the amendment do not represent a substantial intensification of the works reported in the main ES. Due to this and the distance to the nearest noise-sensitive receptor the amendment will not give rise to new or different direct significant effects on residential or non-residential receptors in comparison with those reported in the main ES in CFA₁₀.

Residential and non-residential receptors: indirect effects

- 5.1.79 In the main ES, no likely significant indirect noise effects were reported on residential or non-residential receptors along A₄₀₁₀ Aylesbury Road / Risborough Road.
- 5.1.80 In the SES and AP₂ ES, a likely significant indirect noise effect (on a community basis) was reported around approximately 30 dwellings located immediately adjacent to the

A₄₀₁₀ Aylesbury Road / Risborough Road (significant effect number CSV₁₀-Co₅) caused by construction traffic as a result of SES changes. As a result of the AP₄ amendment in combination with the supplementary traffic survey data (refer to SES₃ and AP₄ ES Volume 5: Appendix TR-001-000, this significant indirect noise effect is no longer likely.

Effects arising from operation

- 5.1.81 Significant noise effects from the operational static sources such as the mid-point ATS will be avoided through their design and the specification of noise emission requirements as described in the main ES Volume 5: Appendix SV-001-000.
- 5.1.82 The amendment to relocate the mid-point ATS will consequently not give rise to a new or different significant effect compared to those reported in the main ES or SES and AP₂ ES.

Mitigation and residual effects

- 5.1.83 The assessment of construction noise and vibration assumes the implementation of the principles and management processes set out in the draft CoCP (Volume 5: Appendix CT-003-000 of the main ES).
- 5.1.84 No additional mitigation is considered necessary as a result of the amendment.
- 5.1.85 As a result of the amendment in combination with the supplementary traffic survey data, the residual significant noise effect arising from construction traffic on A₄₀₁₀ Aylesbury Road / Risborough Road identified as CSV₁₀-Co₅ in Volume 5: Appendix SV-003-010 of the SES and AP₂ ES is no longer likely to occur.
- 5.1.86 There are no further changes to the residual significant construction or operational noise effects identified in the main ES or SES and AP₂ ES as a result of this amendment.

Cumulative effects

- 5.1.87 There are no new or different likely significant cumulative effects for sound, noise and vibration as a result of the AP₄ changes interacting with one another, the AP₁ amendments, AP₂ amendments or any relevant committed development.

Traffic and transport

Introduction

- 5.1.88 This section of the report describes the environmental baseline in relation to traffic and transport that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES scheme.

Scope, assumptions and limitations

- 5.1.89 The assessment scope, key assumptions and limitations for traffic and transport are as set out in Volume 1, the SMR (Volume 5: Appendix CT-010-000/1) and the SMR Addendum (Volume 5: Appendix CT-010-000/2) of the main ES.

Existing baseline

- 5.1.90 The existing baseline for traffic and transport is set out in Volume 2, CFA10, Section 12 of the main ES. In addition new survey information has been collected at the junction of A413, Rocky Lane and Chesham Lane, which has been used to update the baseline. This is reported in Volume 5: Appendix TR-001-000 of the SES3 and AP4 ES.

Future baseline

Construction

- 5.1.91 The future baseline for construction is as set out in Volume 2, CFA10, Section 12 of the main ES, updated by the additional traffic surveys.

Operation (2026 and 2041)

- 5.1.92 The future baselines for operation are as set out in Volume 2, CFA10, Section 12 of the main ES, updated by the additional traffic surveys.

Effects arising during construction

- 5.1.93 The extension of the Chiltern tunnel (AP4-009-001) in CFA9 has resulted in the following changes within this area (CFA10), in comparison to the SES3 scheme:
- changes to forecast construction traffic flows generated by compounds within the area related to the Chiltern Tunnel extension. This results in an increase in all construction vehicles (by up to 20 trips as day) on the A413 across the area and B4009 Nash Lee Road;
 - revised construction route assumptions as a result of the Chiltern tunnel extension (described in Volume 2, CFA9 of the SES3 and AP4 ES), resulting in a decrease in all construction vehicles on King's Lane (Kingsash) between Rocky Lane (also known as Chesham Lane) and Bowood Lane; and
 - revised construction routes as a result of the new A413 link road to the Chiltern Tunnel North Portal satellite compound. This has enabled 50% of trips related to the movement of excavated material from Hunt's Green to be routed via the new A413 link road, the A413 between the link road and B4009 Nash Lee Road, and Nash Lee Road. Previously all these movements used Rocky Lane, which is still used for 50% of trips. This revision to construction routes will reduce impacts on Rocky Lane and the A413/ Rocky Lane junction in CFA10.
- 5.1.94 The amendment will result in new or different likely residual significant effects during construction in relation to congestion and delays to vehicle users at the following junctions:
- A413 London Road with Dunsmore Lane: increase in HGV traffic flows compared to the SES scheme resulting in a major adverse significant effect (a moderate adverse significant effect reported in Part 1 of the SES and AP2 ES and a major adverse effect reported in the main ES); and
 - A413 London Road with Bowood Lane: increase in HGV traffic flows compared to the SES scheme resulting in a major adverse significant effect (a moderate adverse significant effect reported in Part 1 of the SES and AP2 ES and a major

adverse effect reported in the main ES).

5.1.95 The amendment will result in the removal of a minor adverse significant effect as reported in the main ES in relation to traffic related severance for non-motorised users at: King's Lane (Kingsash) between Rocky Lane (also known as Chesham Lane) and Bowood Lane. This results from the introduction of a haul road between the Chiltern Tunnel North Portal satellite compound and Bowood Lane Overbridge satellite compound reducing construction traffic on this route.

5.1.96 The amendment will result in different likely significant effect in relation to traffic related severance for non-motorised users at the following locations:

- Rocky Lane, between A₄₁₃ London Road and the Rocky Lane underbridge satellite compound: reduction in HGV traffic flows compared to the SES scheme resulting in a moderate adverse significant effect (a major adverse significant effect reported in Part 1 of the SES and AP₂ ES; and
- A₄₁₃ London Road between B₄₈₅ Frith Hill/Chesham Road (in CFA₉) and Rocky Lane: increase in HGV traffic flows compared to the SES scheme resulting in a major adverse significant effect (a not significant effect reported in Part 1 of the SES and AP₂ ES). This effect is also reported within CFA₉.

5.1.97 The significant effects that result from construction of the amendment are shown on map TR-03-054 in the SES₃ and AP₄ ES, Volume 5, Traffic and transport Map Book.

Effects arising from operation

5.1.98 The amendment does not change the operation of the scheme and consequently there will be no new or different significant operation effects for traffic and transport in comparison with the reporting in the main ES or SES and AP₂ ES.

Mitigation and residual effects

5.1.99 Avoidance and mitigation measures are set out in Volume 2, CFA₁₀, Section 12 of the main ES. No further traffic and transport avoidance or mitigation measures are required during construction or operation.

5.1.100 The amendment will result in different significant residual effects in relation to congestion and delays at the junctions of A₄₁₃ London Road with Dunsmore Lane and of A₄₁₃ London Road with Bowood Road (both major adverse significant residual effects, which were reported as moderate adverse effects in the SES and AP₂ ES and major adverse effects in the main ES).

5.1.101 In relation to traffic-related severance for non-motorised users, the amendment results in the removal of one significant effect and also in new or different residual effects. The minor adverse significant residual effect reported in the main ES for King's Lane (Kingsash) between Rocky Lane (also known as Chesham Lane) and Bowood Lane is removed; the major adverse significant effect reported in the SES and AP₂ ES for Rocky Lane, between A₄₁₃ London Road and the Rocky Lane underbridge satellite compound reduces to a moderate adverse significant residual effect; and there is a new major adverse significant residual effect on the A₄₁₃ London Road between B₄₈₅ Frith Hill/Chesham Road (in CFA₉) and Rocky Lane compared to the effects reported in the SES and AP₂ ES.

Cumulative effects

- 5.1.102 The above assessment has taken into account cumulative effects, including planned developments by taking account of background traffic growth, as well as traffic and transport impacts of works being undertaken in neighbouring areas.
- 5.1.103 There are no new or different likely significant cumulative effects for traffic and transport as a result of AP₄ amendments interacting with one another or AP₂ amendments.

Water resources and flood risk assessment

Introduction

- 5.1.104 This section of the report describes the environmental baseline in relation to water resources and flood risk that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES₃ scheme.

Scope, assumptions and limitations

- 5.1.105 The assessment scope, key assumptions and limitations for the water resources and flood risk assessment are as set out Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES.
- 5.1.106 The mid-point ATS is not located within an area at risk of flooding from rivers, surface water, groundwater, sewers or artificial waterbodies, and there are no surface water features in the area. The effect on the risk of flooding and on surface water resources is therefore not considered further in the assessment of this amendment.

Existing baseline

- 5.1.107 A summary of the baseline information relevant to the assessment of the amendment is provided. For those receptors described in the main ES, further details are provided in the main ES Volume 2, CFA₁₀, Section 13.3 and in Volume 5 of the main ES.
- 5.1.108 The principal geology underlying the site, as mapped by the British Geological Survey (BGS), comprises Cretaceous Chalk of the Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) (White Chalk subgroup), underlain by the Chalk Rock Member, the New Pit Chalk and Holywell Nodular Chalk Formations (undifferentiated). The majority of the Chalk in the site area is overlain by superficial deposits, specifically the Clay-with-Flint Formation. The Chalk formations are all classified as a Principal aquifer, and the Clay-With-Flint as Unproductive strata. Further details regarding the geology can be found in Volume 2, Appendix WR-002-010 of the main ES.
- 5.1.109 PWS TH₃₁₃⁷ is located 900m to the west of the amendment. The ATS will be constructed in source protection zone 3 (SPZ₃) for this abstraction, but the associated earthworks will extend into SPZ₂.

⁷ The reference number identifies the relevant SPZ on the WR-02 series maps in Volume 5, Water Resources Map Book of the main ES.

- 5.1.110 There are no licensed or reported private unlicensed groundwater abstractions within 1km of this amendment. There is the potential for further unlicensed abstractions to exist, as a licence is not required for abstraction volumes below 20m³ per day.
- 5.1.111 There are 13 discharges to groundwater within 1km of this amendment. Full details are set out in main ES Volume 5: Appendix WR-002-010 Table 4.
- 5.1.112 Environment Agency borehole monitoring data indicates that maximum recorded groundwater levels in winter 2000/1 (representing high regional groundwater levels) were 133m AOD, i.e. approximately 57m below ground level (bgl) on the boundary with CFA₉, rising to 142m AOD, i.e. approximately 20mbgl, at Wendover Dean (approximately 600m south-west of the route). This suggests that groundwater levels will be approximately 50m below the base of the amendment works in this location.

Future baseline

Construction (2017)

- 5.1.113 The future baseline for construction in 2017 remains unchanged from that reported in the main ES (Volume 2, CFA₁₀, Section 13.3).

Operation (2026)

- 5.1.114 The future baseline for operation in 2026 remains unchanged from that reported in the main ES (Volume 2, CFA₁₀, Section 13.3).

Effects arising during construction

- 5.1.115 The construction of the amendment will take place above the water table in the wider Chalk aquifer. As a result the risk of impacts on groundwater quality, particularly at PWS, due to increased turbidity is reduced substantially as compared to construction work undertaken below the water table. Therefore, it is assessed that the likely impact on the PWS TH₃₁₃ will remain as set out in the main ES; minor impact with slight effect and therefore not significant.
- 5.1.116 As already indicated, the route is expected to be above the water table and the risk of impacts on groundwater quality will be reduced. The impact on turbidity in the Chalk aquifer is therefore assessed to be negligible, with a neutral effect, which is not significant.
- 5.1.117 The relocation of the mid-point ATS will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.

Effects arising from operation

- 5.1.118 The relocation of the mid-point ATS will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.

Mitigation and residual effects

- 5.1.119 No additional mitigation measures (i.e. in addition to those identified in the main ES and subsequent SES reports) are required.

- 5.1.120 There are no new or different residual significant effects for water resources or flood risk as a result of the amendment, in comparison with the main ES.

Cumulative effects

- 5.1.121 There are no new or different likely significant cumulative effects for water resources or flood risk as a result of the AP₄ amendments interacting with one another, the AP₁ amendments, AP₂ amendments or any relevant committed development.

Summary of new or different likely residual significant effects as a result of the amendment

- 5.1.122 The relocation of the mid-point ATS will give rise to a different significant effect for agriculture, forestry and soils on Hunt's Green Farm, due to the permanent requirement for additional land. This will change the level of significance of the effects reported in the SES and AP₂ ES from moderate adverse, significant, to major/moderate adverse, significant.
- 5.1.123 The mid-point ATS will be visible from viewpoint 096.4.002: view west from King's Lane near Potter Row during construction, giving rise to a different significant visual effect on that viewpoint. However, this will not change the level of significance of the effects reported in the main ES and SES and AP₂ ES.
- 5.1.124 As a result of the amendment in combination with the supplementary traffic survey data, the residual significant noise effect around approximately 30 dwellings arising from construction traffic on A₄₀₁₀ Aylesbury Road / Risborough Road, identified as CSV_{10-C05} in the SES and AP₂ ES, is no longer likely (refer to SES₃ and AP₄ ES, Volume 5: Appendix SV-003-010).
- 5.1.125 The amendment will result in different significant residual effects for traffic and transport in relation to congestion and delays at the junctions of A₄₁₃ London Road with Dunsmore Lane and of A₄₁₃ London Road with Bowood Road (both major adverse significant residual effects, which were reported as moderate adverse effects in the SES and AP₂ ES and major adverse effects in the main ES).
- 5.1.126 In relation to traffic related severance for non-motorised users, the amendment results in the removal of one significant effect and also new or different residual effects. The minor adverse significant residual effect reported in the main ES for King's Lane (Kingsash) between Rocky Lane (also known as Chesham Lane) and Bowood Lane is removed, the major adverse significant effect reported in the SES and AP₂ ES for Rocky Lane, between A₄₁₃ London Road and the Rocky Lane underbridge satellite compound reduces to a moderate adverse significant residual effect and there is a new major adverse significant residual effect on the A₄₁₃ London Road between B₄₈₅ Frith Hill/Chesham Road (in CFA₉) and Rocky Lane compared to the effects reported in the SES and AP₂ ES.

5.2 Additional land required for the overbridge satellite compound at Nash Lee Road (AP₄-010-001)

- 5.2.1 The Bill provides land adjacent to and south of the B₄₀₀₉ Nash Lee Road on a temporary basis to accommodate the Nash Lee Road overbridge satellite compound, located approximately 1.5km to the north of Wendover. This compound would be

used for civil engineering and railway systems installation works (refer to maps CT-05-039 and CT-05-040a of the main ES, Volume 2, CFA10 Map Book). The land would be restored to agriculture once the compound is no longer required. A temporary construction haul road would be located along the west of the HS2 route. Footpath ELL/25 would be temporarily stopped up during construction and a diversion provided to the west of an existing pond adjacent to the B4009 Nash Lee Road and via the B4009 Nash Lee Road for a period of approximately one year to one year and six months, adding an additional 650m for pedestrian users.

- 5.2.2 Since submission of the Bill, alternative locations for the Nash Lee Road overbridge satellite compound have been considered, in order to reduce disruption to farming operations. The amendment relocates the satellite compound north of the B4009 Nash Lee Road, to an agricultural field to the west of the Wendover north cutting and north of properties off the B4009 Nash Lee Road ('Hunters Leaze', 'The Linhay', 'Oakside' and 'Chenas House'). The construction haul road on the west of the HS2 route will be realigned to avoid the pond to the south of the B4009 Nash Lee Road. The amendment provides an alternative means of access to the agricultural land off Nash Lee Road (refer to map CT-05-040a of the SES3 and AP4 ES, Volume 2, CFA10 Map Book). A shorter diversion of Footpath ELL/25, which reduces the length of the diversion from 650m to 440m, will be maintained during construction. The diversion starts at the point where Footpath ELL/25 crosses a temporary material stockpile on the west of the HS2 route, passes between the stockpile and the pond adjacent to the B4009 Nash Lee Road and continues via Nash Lee Road.
- 5.2.3 The land required for the satellite compound and temporary agricultural access is outside the original limits of the Bill, hence the need for this amendment. The land previously proposed for the satellite compound in the original scheme will remain within Bill limits; however, a suitable assurance will be given to the landowner that this location will not be used during construction. Approximately 0.6ha of additional land will be required temporarily for the amendment.
- 5.2.4 The relocation of the satellite compound is not considered to make changes that require a reassessment of the environmental effects or proposed mitigation as set out in the main ES with respect to: air quality; community; land quality; socio-economics; traffic and transport; and water resources and flood risk assessment. However, there were changes where reassessment was considered to be required in respect of: agriculture, forestry and soils; cultural heritage; ecology; landscape and visual assessment; and sound, noise and vibration.

Agriculture, forestry and soils

Introduction

- 5.2.5 This section of the report describes the environmental baseline in relation to agriculture, forestry and soils that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES3 scheme.

Scope, assumptions and limitations

- 5.2.6 The assessment scope, key assumptions and limitations for agriculture, forestry and soils are as set out in Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES.
- 5.2.7 The area of agricultural land affected by the amendment is relatively small (0.6ha) and therefore will not alter the significance of effect, or result in a different effect, on BMV agricultural land or forestry land within the CFA₁₀ area (Dunsmore, Wendover and Halton). The route-wide effects on BMV land and forestry land are reported in Volume 3.
- 5.2.8 On completion of the works the land required for the amendment will be restored to its former agricultural use.

Existing baseline

- 5.2.9 The amendment will place the satellite compound within Hunters Leaze (main ES reference CFA₁₀/17), which is already affected by the original scheme. Hunters Leaze is a 16ha grassland holding that is considered to be of low sensitivity to change.
- 5.2.10 The satellite compound in the original scheme would have been located in Stocken Farm (CFA₁₀/16). Stocken Farm is a 48ha arable holding of medium sensitivity to change.

Future baseline

Construction (2017)

- 5.2.11 Volume 5: Appendix CT-004-000 of the SES₃ and AP₄ ES provides details of the developments which it is assumed will have been implemented by 2017, additional to those identified under the same reference number in the main ES and the SES and AP₂ ES.
- 5.2.12 None of the identified developments affect the assessment of the AP₄ amendment's likely construction impacts on agriculture, forestry and soils.
- 5.2.13 Most existing Environmental Stewardship agreements will expire in 2015 and will be replaced by a new environmental land management scheme (countryside stewardship) which, together with the new greening measures introduced by Common Agricultural Policy reform, will affect the detailed management of individual farm holdings, but are not expected to change fundamentally the baseline circumstances described.

Operation (2026)

- 5.2.14 Volume 5: Appendix CT-004-000 of the SES₃ and AP₄ ES provides details of the developments which it is assumed will have been implemented by 2026, in addition to those identified under the same reference number in the main ES and the SES and AP₂ ES.
- 5.2.15 None of the identified developments affect the assessment of the AP₄ amendment's likely operational impacts on agriculture, forestry and soils.

Effects arising during construction

- 5.2.16 The additional area of land that will be temporarily required from Hunters Leaze is approximately 0.6ha and will be in addition to the 12.7ha that has already been identified as required for the construction of the original scheme. The total area of land temporarily required is 13.3ha which represents 83% of this holding. The original requirement for 12.7ha of land represented 80% of the holding and was assessed as a moderate, temporary adverse effect, which is significant due to proportion of the holding required, severance and low sensitivity of the holding. This amendment will not change the level of significance of the effects reported in the main ES or give rise to a new or different significant effect.
- 5.2.17 The area of land in Stocken Farm required temporarily during construction will be reduced from 3.7ha to 3.1ha under this amendment. Access for agricultural machinery will be less obstructed than for the original scheme. This will not change the level of significance of the effects reported in the main ES (i.e. a minor, temporary adverse effect due to proportion of the holding required) or give rise to a new or different effect.
- 5.2.18 The amendment to relocate the Nash Lee Road overbridge satellite compound will not give rise to a new or different permanent significant effect and will not change the level of significance of the permanent effects reported in the main ES.

Effects arising from operation

- 5.2.19 The amendment to relocate the Nash Lee Road overbridge satellite compound will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES.

Mitigation and residual effects

- 5.2.20 The land required temporarily for construction will be restored to its former agricultural use once the works are completed. The soil handling will involve stripping, storing and reinstating topsoils on land required for the temporary works, following best practice guidance for handling soil set out in the draft CoCP. The amendment will result in no change in the likely residual significant effects reported in the main ES.

Cumulative effects

- 5.2.21 There are no new or different likely significant cumulative effects for agriculture, forestry and soils as a result of the AP₄ amendments interacting with one another, the AP₁ amendments, AP₂ amendments or any relevant committed development.

Cultural heritage

Introduction

- 5.2.22 This section of the report describes the environmental baseline in relation to cultural heritage that is relevant to the assessment. It then identifies any new or different likely significant environment effects as a result of the amendment, compared to those of the SES₃ scheme.

Scope, assumptions and limitations

- 5.2.23 The assessment scope, key assumptions and limitations for cultural heritage are as set out Volume 1, the SMR (Volume 5: Appendix CT-001 -000) and the SMR Addendum (Volume 5: Appendix CT-001-000) of the main ES.

Existing baseline

- 5.2.24 The cultural heritage baseline for the assessment takes into account information collected in support of the main ES, which included walk-over survey, geophysical survey, remote sensing data, and data from national and local registers. A full list is provided in Volume 2, Section 6.3 of the main ES.
- 5.2.25 The additional land required for the satellite compound does not encroach on any recorded heritage assets. Two areas of medieval ridge and furrow lie within 500m of the new land required. The first (asset reference DWH143) is approximately 220m to the north-west then second (asset reference DWH153) is approximately 280m to the south-east. They are both assets of low heritage value.
- 5.2.26 The Lower Icknield Way (asset reference DWH129), an asset of moderate heritage value, runs through the location of the realigned North Lee overbridge. The Lower Icknield Way follows the same route as a Roman Road, its heritage value lies in the potential for surviving buried archaeology either side of the ancient routeway.

Future baseline

Construction (2017)

- 5.2.27 Volume 5: Appendix CT-004-000 of the SES3 and AP4 ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified under the same reference number in the main ES and the SES and AP2 ES.
- 5.2.28 None of the identified developments affect the assessment of the AP4 amendment's likely construction impacts on cultural heritage.

Operation (2026)

- 5.2.29 Volume 5: Appendix CT-004-000 of the SES3 and AP4 ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified under the same reference number in the main ES and the SES and AP2 ES.
- 5.2.30 None of the identified developments affect the assessment of the AP4 amendment's likely operational impacts on cultural heritage.

Effects arising during construction

- 5.2.31 The main ES reported a low adverse impact on the Lower Icknield Way (asset reference DWH129), with the original scheme having a minor adverse effect. Significant effects were reported in the main ES for the two areas of ridge and furrow (asset references DWH143 and DWH153), with the original scheme having a high adverse impact resulting in a moderate adverse effect. As the land required for the amendment to relocate the Nash Lee Road overbridge satellite compound does not

extend over these heritage assets, it will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES (Volume 2, CFA₁₀, Section 6).

Effects arising from operation

- 5.2.32 The amendment to relocate the Nash Lee Road overbridge satellite compound will not give rise to any new or different significant operational effects and will not change the level of significance as reported in in the main ES (Volume 2, CFA₁₀, Section 6).

Mitigation and residual effects

- 5.2.33 There will be no change to the mitigation and residual effects reported in Volume 2 of the main ES.

Cumulative effects

- 5.2.34 There are no new or different likely significant cumulative effects for cultural heritage as a result of the AP₄ amendments interacting with one another, the AP₁ amendments, AP₂ amendments, or any relevant committed development.

Ecology

Introduction

- 5.2.35 This section of the report describes the environmental baseline in relation to ecology that is relevant to the assessment. It then identifies any new or different likely significant environment effects as a result of the amendment, compared to those of the SES₃ scheme.

Scope, assumptions and limitations

- 5.2.36 Updates to the scope of the assessment for ecology are set out in Volume 1 of the SES₃ and AP₄ ES. The key assumptions and limitations, and the methodology for determining significance of effects are as set out in Volume 1, the SMR and the SMR Addendum (Volume 5: Appendix CT-001-000/01 and CT-001-000/02 of the main ES) and in Addendum 4 to the SMR (SES₃ and AP₄ ES Volume 5: Appendix CT-001-000/5).
- 5.2.37 To address any limitations in data, a precautionary baseline has been considered according to the guidance reported in the main ES, Volume 5: Appendix CT-001-000/2. This constitutes a 'reasonable worst case' basis for the subsequent assessment. The precautionary approach to the assessment that has been adopted identifies the likely significant ecological effects of the AP₄ revised scheme.

Existing baseline

- 5.2.38 The ecological baseline of the land required for the amendment has been based on field data collated for the main ES, aerial photography and relevant existing information gathered from national organisations and from regional and local sources including: Buckinghamshire and Milton Keynes Environmental Records Centre; Berkshire; Buckinghamshire and Oxfordshire Wildlife Trust; Chilterns Conservation Board; North Bucks Bat Group; Berkshire and South Buckinghamshire Bat Group and Buckinghamshire Amphibian and Reptile Group.

- 5.2.39 A summary of the baseline information relevant to the assessment of the amendment is provided below. For those receptors described in the main ES, further details are provided in Volume 2, CFA10, Section 7.3 and in Volume 5, including map series EC-01 to EC-12 of the main ES.

Designated sites

- 5.2.40 There are no statutory or non-statutory designated nature conservation sites or areas of ancient woodland relevant to this assessment. Statutory and non-statutory designated sites in the wider area are described in the main ES, Volume 2, CFA10, Section 7 and are shown on Maps EC-01-019 to EC-01-021a, Volume 5, Ecology Map Book.

Habitats

- 5.2.41 Two hedgerows are present along the perimeter of the land required for the amendment, including 100m of species-rich hedgerow that also meets the criteria for important hedgerows⁸ along the western boundary. The main ES reports that all surveyed hedgerows qualify as a habitat of principal importance (Natural Environment and Rural Communities (NERC) Act, 2006)⁹. Hedgerows in the vicinity of the amendment form part of a wider resource of established and important hedgerows that is of district/borough value, as reported in the main ES.
- 5.2.42 The additional land required for the amendment comprises semi-improved grassland which is assessed as being of local/parish value in the main ES.
- 5.2.43 Habitats surrounding the land required for the amendment are described in the main ES: Volume 2 CFA10, Section 7.3 and are shown on map EC-02-021a in the main ES: Volume 5, Ecology Map Book.

Protected and/or notable species

- 5.2.44 The main ES identifies a number of suitable bat roosting habitats in the wider area. If present, the potential assemblages of bats that utilise these habitats are likely to be of up to county/metropolitan value. Trees with moderate potential to support roosting bats are present on the eastern boundary of land required for the satellite compound and the hedgerows provide foraging habitat and commuting routes for bats. Any bats utilising these habitats would form part of the assemblage of up to county/metropolitan value identified in the main ES.

Future baseline

Construction (2017)

- 5.2.45 Volume 5: Appendix CT-004-000 of the SES3 and AP4 ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified under the same reference number in the main ES and the SES and AP2 ES.

⁸ The Hedgerows Regulations 1997 (SI 1997 No. 1160). London. Her Majesty's Stationery Office.

⁹ Natural Environment and Rural Communities Act 2006 (Chapter 16). London. Her Majesty's Stationery Office.

- 5.2.46 None of the identified developments affect the assessment of the amendment's likely construction impacts on ecology.

Operation (2026)

- 5.2.47 Volume 5: Appendix CT-004-000 of the SES and AP₄ ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified under the same reference number in the main ES and the SES and AP₂ ES.
- 5.2.48 None of the identified developments affect the assessment of the amendment's likely operational impacts on ecology.

Effects arising during construction

Avoidance and mitigation measures

- 5.2.49 The assessment assumes implementation of the measures set out within the draft CoCP (Volume 5: Appendix CT-003-000 of the main ES), which includes translocation of protected species where appropriate.

Designated sites

- 5.2.50 The additional land required for the Nash Lee Road overbridge satellite compound will not give rise to new or different significant effect on designated sites.

Habitats

- 5.2.51 The main ES reports that construction of the original scheme will result in the removal of 22km of hedgerow in this area. The loss and fragmentation of the hedgerow network will result in a permanent adverse effect on the conservation status of hedgerows that is significant at the district/borough level.
- 5.2.52 As part of a precautionary assessment, it is assumed that construction activities would result in the loss of all hedgerows within the land required for the amendment. The amendment results in the loss of an additional 100m section of intact species-rich hedgerow within land required to accommodate the satellite compound. The amendment therefore results in a different significant effect on the conservation status of the hedgerow network. However, this will not change the level of significance of the effects in the main ES.
- 5.2.53 It is unlikely that the amendment will result in any other new or different significant effects on habitat receptors of relevance at more than the local/parish level.
- 5.2.54 Local/parish level effects which are in addition to those identified in the main ES and the SES and AP₂ ES are listed in Volume 5: Appendix EC-003-02 of the SES₃ and AP₄ ES.

Protected and/or notable species

- 5.2.55 The main ES reports that the loss of habitat suitable for foraging, commuting and roosting bats within land required for the original scheme is not expected to result in significant effects on the conservation status of bat assemblages in CFA₁₀.

- 5.2.56 The amendment would result in the removal of 100m of species-rich hedgerow potentially utilised by commuting and foraging bats. However, these changes would not generate any new or different significant effects, or change the level of significance of effects reported in the main ES.

Cumulative effects

- 5.2.57 There are no new or different likely significant cumulative effects for ecology as a result of the AP₄ amendments interacting with one another, the AP₁ amendments, AP₂ amendments or any relevant committed development.

Mitigation and residual effects

Other mitigation measures

- 5.2.58 As described in the main ES, new hedgerows will be created and connected habitat will be provided within the landscaping scheme to compensate for losses of wildlife corridors that hedgerows provide. The measures included in the main ES will address the different effect on the hedgerow network arising from the amendment. Any adverse impacts on hedgerows and the wildlife corridors they create will be reduced to a level where they are not significant.
- 5.2.59 No additional mitigation measures (i.e. in addition to those identified in the main ES) are required.

Summary of likely residual effects

- 5.2.60 No new or different residual effects on ecological receptors occur as a consequence of the amendment. The significant residual effects of the AP₄ revised scheme in this area are therefore unchanged from those reported in the main ES.

Effects arising from operation

- 5.2.61 The additional land required for the Nash Lee Road overbridge and satellite compound does not change the operation of the scheme and so there are no new or different significant operation effects for ecology as a consequence of the amendment. The significant effects of the AP₄ revised scheme are therefore unchanged from those reported in the main ES.

Landscape and visual assessment

Introduction

- 5.2.62 This section of the report describes the environmental baseline in relation to landscape and visual that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES₃ scheme.

Scope, assumptions and limitations

- 5.2.63 The assessment scope, key assumptions and limitations for the landscape and visual assessment are as set out in Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES. Updates to the methodology for the landscape and visual assessment are also described in Volume 1 of the AP₁ ES and Volume 1 of the SES and AP₂ ES.

Existing baseline

- 5.2.64 The area of land required for the amendment is located within Longwick Vale LCA, which is in the Chilterns AONB, as described in the main ES (Volume 2, CFA₁₀, Section 9). The B₄₀₀₉ Nash Lee Road overbridge satellite compound in the original scheme was located in the adjacent Risborough Foothills LCA.
- 5.2.65 Viewpoints surrounding the amendment are described in the main ES (Volume 2, CFA₁₀, Section 9 and in CFA₉, Section 9). Viewpoints in CFA₁₀ closest to this amendment are:
- Viewpoint 107.2.002: view south-east from dwellings on Nash Lee Road, Nash Lee;
 - Viewpoint 108.2.001: view south-west from dwellings on Nash Lee Lane;
 - Viewpoint 109.2.001: view east from dwellings on Risborough Road; and
 - Viewpoint 109.4.001: view east from the B₄₀₀₉ Nash Lee Road.

Future baseline

Construction (2017)

- 5.2.66 Volume 5: Appendix CT-004-000 of the SES₃ and AP₄ ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified under the same reference number in the main ES and the SES and AP₂ ES.
- 5.2.67 None of the identified developments affect the assessment of the amendment's likely construction impacts on landscape and visual resources.

Operation (2026)

- 5.2.68 Volume 5: Appendix CT-004-000 of the SES₃ and AP₄ ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified under the same reference number in the main ES and the SES and AP₂ ES.
- 5.2.69 None of the identified developments affect the assessment of the amendment's likely operational impacts on landscape and visual receptors.

Effects arising during construction

Landscape assessment

- 5.2.70 The main ES reported a major adverse significant effect on the Longwick Vale LCA due to the works associated with the formation of up to 4m deep cuttings, the construction of the Stoke Grove ATS (ATS), the realignment of the B₄₀₀₉ Nash Lee Road, the construction of the maintenance loop, the construction of the new A₄₀₁₀ Stoke Mandeville bypass (described within Volume 2, CFA₁₁, Section 7 of the main ES) and the realignment of a PRoW. Temporary material stockpiles will also be introduced into the landscape. In addition, the B₄₀₀₉ Nash Lee Road overbridge satellite compound in the adjacent Risborough Foothills LCA will affect the setting of the Longwick Vale LCA.

- 5.2.71 The relocation of the B4009 Nash Lee Road overbridge satellite compound from the adjacent Risborough Foothills LCA into the Longwick Vale LCA will result in a direct impact upon the Longwick Vale LCA rather than the indirect impact identified in the main ES. The construction of the satellite compound will be an additional element of the scheme within Longwick Vale LCA and will give rise to a different significant effect. However, in the context of the wider construction works, this will not change the level of significance of the effects reported in the main ES (Volume 2, CFA10, Section 9).
- 5.2.72 A moderate adverse significant effect was reported in the main ES for the Risborough Foothills LCA as a result of the realignment of the B4009 Nash Lee Road, introduction of temporary material stockpiles, the removal of vegetation and severance of agricultural land, impact of construction activities and the Nash Lee overbridge satellite compound facilitating these works.
- 5.2.73 The relocation of the B4009 Nash Lee Road overbridge satellite compound into the adjacent Longwick Vale LCA will remove one element of construction activity from the Risborough Foothills LCA. However, due to the scale of construction within the LCA, it will not give rise to a new or different significant effect and will not change the moderate adverse significant effect on the Risborough Foothills LCA as reported in the main ES (Volume 2, CFA10, Section 9).

Visual assessment

- 5.2.74 Viewpoint 107.2.002: view south-east from dwellings on Nash Lee Road, Nash Lee, was assessed as being affected by the original scheme and will also be affected by the amendment. The main ES reported a major adverse effect during construction due to views of plant and machinery associated with construction of the B4009 Nash Lee Road realignment, vegetation removal and construction activities in the background associated with the route crossing. The B4009 Nash Lee Road overbridge satellite compound will no longer form part of the view. However, the construction of the B4009 Nash Lee Road realignment and associated vegetation removal will remain visible. While the view most affected by the original scheme was to the south-east, views to the north, where the satellite compound will now be located, will be affected by both the original scheme and the amendment. The amendment will therefore give rise to a different significant effect. However, this will not change the level of significance of the effects reported in the main ES.
- 5.2.75 Viewpoint 108.2.001: view south-west from dwellings on Nash Lee Lane was assessed as being affected by the original scheme and will also be affected by this amendment. The main ES reported a major adverse effect due to construction activities related to the realignment of the B4009 Nash Lee Road and associated vegetation loss, activities associated with the creation of a balancing pond and partial views of the B4009 Nash Lee Road overbridge satellite compound. The amendment will be located to the north-west of the original location in the middle ground of the view. As it will be partially screened by intervening vegetation and with the main construction activity associated with the scheme in the foreground the amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects on these receptors reported in the main ES.

- 5.2.76 Viewpoint 109.2.001: view east from dwellings on Risborough Road was assessed as being affected by the original scheme and will also be affected by this amendment. The main ES reported a moderate adverse effect due to construction activities including the removal of vegetation, topsoil stripping and earthworks. The amendment will be located approximately 900m from the viewpoint. Due to distance and intervening vegetation, the increased activity associated with the amendment will be imperceptible in the context of the extent of works required for the original scheme. The amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects on these receptors reported in the main ES.
- 5.2.77 Viewpoint 109.4.001: view east from the B4009 Nash Lee Road was assessed as being affected by the original scheme and will also be affected by this amendment. The main ES reported a moderate adverse effect, due to construction activities including the creation of a 2.5m deep cutting, elevation of a P_{RoW} and construction of an embankment approximately 3m high. Construction activities will be partially obscured by vegetation in the foreground and middle ground of the view. The amendment will be located to the north-west of the original location in the middle ground of the view, partially screened by intervening vegetation. The amendment will not give rise to a new or different significant effect and will not change the level of significance of the effects on these receptors reported in the main ES.

Effects arising during operation

- 5.2.78 There are no new or different operational effects for landscape and visual assessment as a result of the proposed amendment, in comparison with the SES₃ scheme.

Mitigation and residual effects

- 5.2.79 New planting, early in the construction programme, located to the rear of properties on the B4009 Nash Lee Road and retaining tree cover along the north-eastern property boundaries will assist in providing screening for these residents and reducing the impact during construction.
- 5.2.80 The amendment will give rise to a different residual significant effect on Longwick Vale LCA, where the satellite compound will be constructed. However, in the context of the wider construction works, this will not change the level of significance of the major adverse significant effect reported in the main ES.
- 5.2.81 The amendment will give rise to a different residual significant effect on Viewpoint 107.2.002: view south-east from dwellings on Nash Lee Road, Nash Lee during construction. However, this will not change the level of significance of the major significant adverse effect reported in the main ES.

Cumulative effects

- 5.2.82 There are no new or different likely significant cumulative effects for landscape or visual as a result of the AP₄ amendments interacting with one another, the AP₁ amendments, AP₂ amendments or any relevant committed development.

Sound, noise and vibration

Introduction

- 5.2.83 This section of the report describes the environmental baseline in relation to sound, noise and vibration that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES₃ scheme.

Scope, assumptions and limitations

- 5.2.84 The assessment scope, key assumptions and limitations for sound, noise and vibration are as set out in Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES. Consideration is given to the change in construction noise and vibration only.
- 5.2.85 Local assumptions and limitations for sound, noise and vibration are set out in main ES Volume 2, CFA₁₀, Section 11.

Existing baseline

- 5.2.86 The baseline for sound, noise and vibration is described in the main ES, Volume 2, CFA₁₀ Report: Section 11 and Volume 5: Appendix SV-002-010. Baseline sound levels representative of the assessment locations affected by the AP₄ amendments have been used in the assessment.

Future baseline

Construction (2017)

- 5.2.87 Volume 5: Appendix CT-004-000 of the SES₃ and AP₄ ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified under the same reference number in the main ES and the SES and AP₂ ES.
- 5.2.88 None of the identified developments affect the assessment of the AP₄ amendment's likely construction impacts on sound, noise and vibration.

Operation (2026)

- 5.2.89 Volume 5: Appendix CT-004-000 of the SES₃ and AP₄ ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified under the same reference number in the main ES and the SES and AP₂ ES.
- 5.2.90 None of the identified developments affect the assessment of the AP₄ amendment's likely operational noise and vibration impacts.

Effects arising during construction

- 5.2.91 The closest noise-sensitive receptors to the amendment are the residential properties located on the B4009 Nash Lee Road approximately 50m to the south-east of the amendment. The changes brought about by the amendment will alter the intervening distances between construction activities and receptors, which has the potential to

alter the reported effects on residential receptors on the B₄₀₀₉ Nash Lee Road and Nash Lee Lane.

- 5.2.92 An assessment has been undertaken to determine whether construction noise and vibration associated with the amendment would result in a likely significant effect, using the significance criteria detailed in the main ES (Volume 5: Appendix SV-001-000).
- 5.2.93 The amendment to relocate the Nash Lee Road overbridge satellite compound will not give rise to a new or different significant effect and will not change the level of significance of the effects reported in the main ES (Volume 5: Appendix SV-003-010).

Effects arising during operation

- 5.2.94 This amendment to relocate the satellite compound will not give rise to new or different significant effects as compared to those reported in the main ES.

Mitigation and residual effects

- 5.2.95 The assessment of construction noise and vibration assumes the implementation of the principles and management processes set out in the draft CoCP (Volume 5: Appendix CT-000-003 of the main ES). No additional mitigation is required as a result of the amendment.
- 5.2.96 The amendment will result in no change in the likely residual significant effects as reported in the main ES.

Cumulative effects

- 5.2.97 There are no new or different likely significant cumulative effects for sound, noise and vibration as a result of the AP₄ amendments interacting with one another, the AP₁ amendments, AP₂ amendments or any relevant committed development.

Summary of new or different likely residual significant effects as a result of the amendment

- 5.2.98 The amendment to relocate the Nash Lee Road overbridge satellite compound will give rise to a different residual significant landscape effect on Longwick Vale LCA, where the satellite compound will be constructed. However, in the context of the wider construction works, this will not change the level of significance of the major adverse significant effect reported in the main ES.
- 5.2.99 The amendment to relocate the Nash Lee Road overbridge satellite compound will give rise to a different significant visual effect on viewpoint 107.2.002: view south-east from dwellings on Nash Lee Road, Nash Lee during construction. However, this will not change the level of significance of the major adverse significant effects reported in the main ES (Volume 2, CFA₁₀, Section 9).

6 Combined effects of amendments in this CFA due to changes in traffic flows

- 6.1.1 All of the effects of the changes proposed in this CFA have been described above and there are no further combined effects to report.

High Speed Two (HS2) Limited

One Canada Square
London E14 5AB

T 020 7944 4908

E hs2enquiries@hs2.org.uk

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