



High Speed Rail (West Midlands - Crewe)

Supplementary Environmental Statement and
Additional Provision Environmental Statement

Volume 3

Route-wide effects



High Speed Rail (West Midlands - Crewe)

Supplementary Environmental Statement and
Additional Provision Environmental Statement
Volume 3

Route-wide effects



Department for Transport

High Speed Two (HS2) Limited has been tasked by the Department for Transport (DfT) with managing the delivery of a new national high speed rail network. It is a non-departmental public body wholly owned by the DfT.

High Speed Two (HS2) Limited,
Two Snowhill
Snow Hill Queensway
Birmingham B4 6GA

Telephone: 08081 434 434

General email enquiries: HS2enquiries@hs2.org.uk

Website: www.gov.uk/hs2

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

ARUP



High Speed Two (HS2) Limited has actively considered the needs of blind and partially sighted people in accessing this document. The text will be made available in full on the HS2 website. The text may be freely downloaded and translated by individuals or organisations for conversion into other accessible formats. If you have other needs in this regard, please contact High Speed Two (HS2) Limited.

© High Speed Two (HS2) Limited, 2018, except where otherwise stated.

Copyright in the typographical arrangement rests with High Speed Two (HS2) Limited.

This information is licensed under the Open Government Licence v2.0. To view this licence, visit www.nationalarchives.gov.uk/doc/open-government-licence/version/2 **OGL** or write to the Information Policy Team, The National Archives, Kew, London TW9 4DU, or e-mail: psi@nationalarchives.gsi.gov.uk. Where we have identified any third-party copyright information you will need to obtain permission from the copyright holders concerned.



Printed in Great Britain on paper containing at least 75% recycled fibre.

Contents

Structure of the HS2 Supplementary Environmental Statement and Additional Provision		i
Environmental Statement		
1	Introduction	1
1.1	Introduction to the SES and AP ES for High Speed Two Phase 2a	1
1.2	Terminology used to describe the scheme	2
1.3	Scope of this report	2
1.4	Structure of this report	4
Part 1: Supplementary Environmental Statement		6
2	Agriculture, forestry and soils	6
2.1	Introduction	6
2.2	Changes to the assessment	6
3	Climate change	7
3.1	Introduction	7
3.2	Changes to the assessment	7
4	Ecology and biodiversity	8
4.1	Introduction	8
4.2	Changes to the assessment	8
5	Major accidents and natural disasters	12
5.1	Introduction	12
5.2	Changes to the assessment	12
6	Socio-economics	13
6.1	Introduction	13
6.2	Changes to the assessment	13
7	Waste and material resources	16
7.1	Introduction	16
7.2	Changes to the assessment	16
8	Phase One, Phase 2a and Phase 2b combined impacts	17
8.1	Introduction	17

8.2	Summary of changes to combined impacts	17
Part 2: Additional Provision Environmental Statement		18
9	Agriculture, forestry and soils	18
9.1	Introduction	18
9.2	Changes to the assessment	18
10	Climate change	19
10.1	Introduction	19
10.2	Changes to the assessment	19
11	Ecology and biodiversity	20
11.1	Introduction	20
11.2	Changes to the assessment	20
12	Major accidents and natural disasters	23
12.1	Introduction	23
12.2	Changes to the assessment	23
13	Socio-economics	24
13.1	Introduction	24
13.2	Changes to the assessment	24
14	Waste and material resources	25
14.1	Introduction	25
14.2	Changes to the assessment	25
15	Water resources and flood risk	26
15.1	Introduction	26
15.2	Changes to the assessment	26
15.3	Route-wide WFD compliance	27
15.4	Route-wide flood risk	28
16	Phase One, Phase 2a and Phase 2b combined impacts	29
16.1	Introduction	29
16.2	Summary of changes to combined impacts	29
17	References	32

List of figures

Figure 1: Structure of the SES and AP ES

iii

List of tables

Table 1: Summary of corrections to Section 7, Ecology and biodiversity of Volume 3: Route-wide effects of the main ES	9
Table 2: Summary of corrections to Section 12, Socio-economics of Volume 3: Route-wide effects of the main ES	14
Table 3: Combined impacts of Phase One, Phase 2a AP revised scheme and Phase 2b	29

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

This report is part of the suite of documents that make up the Supplementary Environmental Statement (SES) and Additional Provision Environmental Statement (AP ES) for Phase 2a of the High Speed Two (HS2) rail network between the West Midlands and Crewe. The SES and the AP ES are separate documents, however, they are bound together and presented in a number of volumes as described below. The structure of the SES and AP ES is shown in Figure 1.

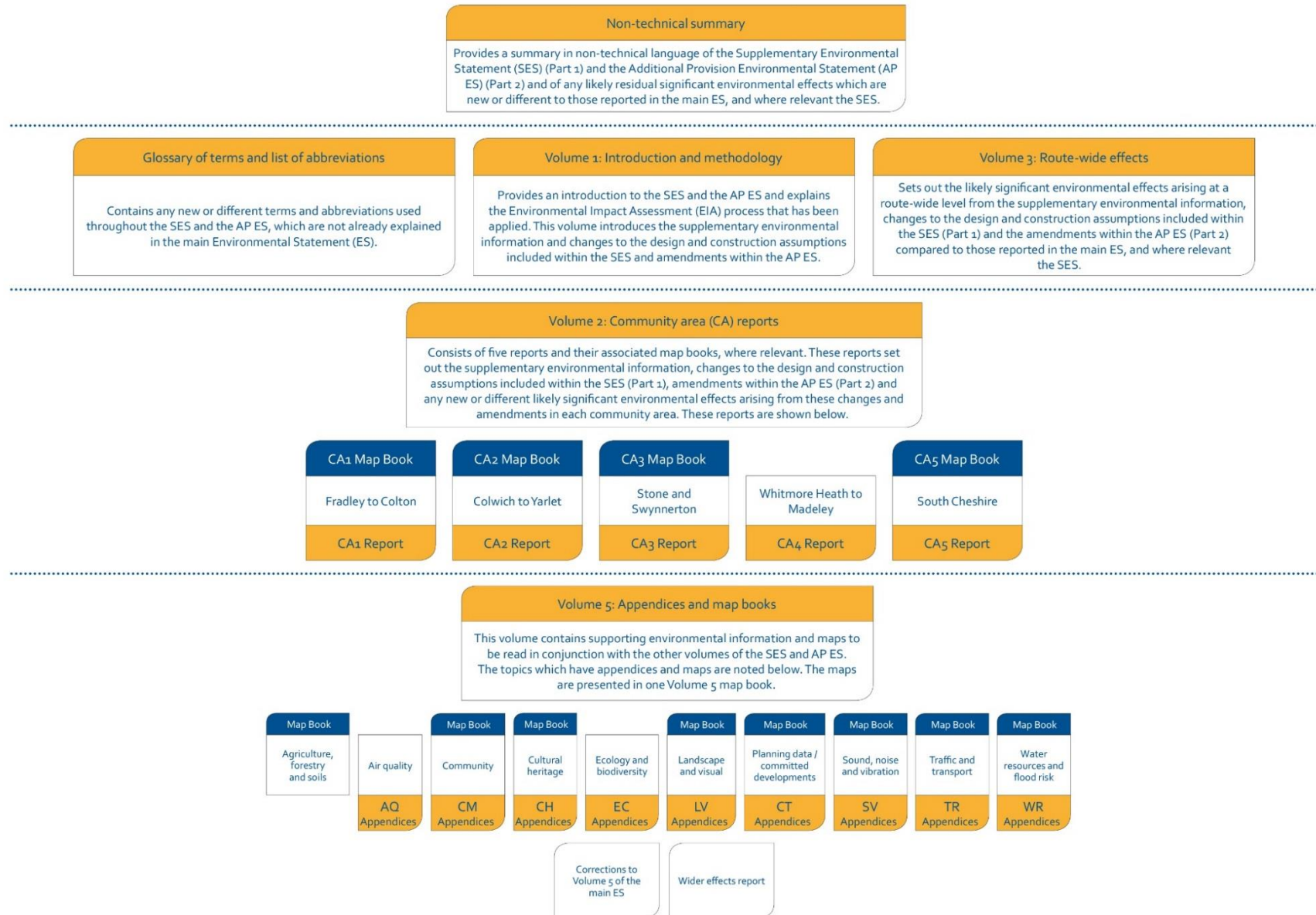
- Non-technical summary (NTS). This provides a summary in non-technical language of the SES (Part 1) and the AP ES (Part 2). It presents a summary of any likely residual significant environmental effects (i.e. effects which are likely to remain after mitigation measures are put in place), both beneficial and adverse, which are new or different to those reported in the Environmental Statement (ES) submitted to Parliament in July 2017 in support of the hybrid Bill for Phase 2a of HS2 ('the main ES'), and where relevant the SES;
- Glossary of terms and list of abbreviations. This contains any new or different terms and abbreviations used throughout the SES and the AP ES which are not already explained in the main ES;
- Volume 1: Introduction to the SES and the AP ES. This introduces the supplementary environmental information and changes to the design and construction assumptions included within the SES and amendments within the AP ES. The report explains the environmental impact assessment (EIA) process which has been applied;
- Volume 2: Community area reports and map books. These report the supplementary environmental information and changes to the design and construction assumptions included within the SES (Part 1), amendments within the AP ES (Part 2) and any new or different likely significant environmental effects arising from these changes and amendments in each community area. These effects are compared to those reported in the main ES, and where relevant, the SES. The maps relevant to each community area are provided in separate Volume 2 map books and should be read in conjunction with the relevant community area report;
- Volume 3: Route-wide effects. This describes any new or different likely significant environmental effects arising at a route-wide level from the supplementary environmental information and changes to the design and construction assumptions included within the SES (Part 1) and the amendments within the AP ES (Part 2) compared to those reported in the main ES, and where relevant the SES; and
- Volume 5: Appendices and map book. These contain supporting environmental information and associated maps.

SES and AP ES Volume 3: Route-wide effects

A Volume 4: Off-route effects report was produced as part of the main ES. A separate Volume 4 has not been produced as part of the SES and AP ES as off-route effects are very limited in number and are reported in the most relevant Volume 2 community area report.

Certain reports and maps containing Background Information and Data (BID) have been produced, which do not form part of the SES and AP ES. These documents are available on the HS2 website. The BID documents and maps present background survey information and other relevant background material.

Figure 1: Structure of the SES and AP ES



1 Introduction

1.1 Introduction to the SES and AP ES for High Speed Two Phase 2a

- 1.1.1 The High Speed Rail (West Midlands - Crewe) Bill ('the Bill') was submitted to Parliament together with an Environmental Statement (ES)¹ in July 2017 ('the main ES'). If enacted by Parliament, the Bill will provide the powers to construct, operate and maintain Phase 2a of HS2.
- 1.1.2 This phase of HS2 will provide the western section of Phase Two between the West Midlands and Crewe, comprising approximately 36 miles (58km) of HS2 route (including the section which would connect with and form the first part of Phase 2b) and two spurs (approximately 4 miles (6km)) south of Crewe that will allow trains to transfer between the HS2 route and the existing West Coast Main Line (WCML). The remainder of Phase Two, between Crewe (where it would connect with Phase 2a) and Manchester, and between the West Midlands and Leeds will be the subject of a separate hybrid Bill.
- 1.1.3 Since the deposit of the Bill, a number of changes to the design and construction assumptions have occurred. Environmental information not previously available for the assessment has also become available and the need for a number of corrections to the main ES has been identified. Any new or different significant effects that are likely to result from changes to the design and construction assumptions within the existing powers and limits of the Bill, and as a result of the further environmental information and corrections, are reported in the SES. The AP ES reports on the likely significant environmental effects of the additional provisions to the Bill for which powers are sought under the AP, having taken into account the environmental information in the SES. The additional provisions are changes to the scheme that require amendment to the Bill powers and limits. These include:
- temporary laydown works, diversion works and other works to utilities such as gas mains, water mains, overhead electricity lines and telecommunications cables;
 - relocation of balancing ponds;
 - construction traffic routes, maintenance access routes and a Network Rail access road;
 - highway improvements including: improving visibility at highway junctions; widening of highway verges; highway realignments; and a roundabout at the junction of the realigned Dog Lane, the A51 The Rowe, Bent Lane and the A51 through Stableford;
 - the viaduct crossing of Norton Bridge to Stone Railway and track crossovers along the HS2 route. This includes: the raising of the alignment of the HS2 route from the B5026 Eccleshall Road to the northern extent of Yarnfield

¹ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>.

North embankment; amendments to the viaduct crossing of the Norton Bridge to Stone Railway and Filly Brook; and the horizontal realignment of the HS2 route from the northern extent of Yarnfield North embankment to Tittensor Road overbridge;

- revised flood mitigation measures around the Stone Infrastructure Maintenance Base – Rail (IMB-R) and Norton Bridge to Stone Railway;
- a new junction of the A51 Bury Bank and Stone Rural Byway Open to All Traffic (BOAT) 34; and
- a change to the earthworks on the northern and southern approaches of the Swynnerton Estate North green overbridge.

1.1.4 The SES and the AP ES are separate environmental statements, but have been produced as combined volumes.

1.1.5 Both the SES and AP ES provide an update to the main ES and should be read in conjunction with it.

1.2 Terminology used to describe the scheme

1.2.1 The following terms are also used to differentiate between changes included in the SES and those included in the AP ES:

- ‘SES design changes’ - changes to the scheme design reported in the SES that do not require additional powers;
- ‘SES changes’ – all changes reported in the SES that do not require additional powers. This may include new baseline information, changes to the design and construction assumptions and corrections; and
- ‘AP amendments’ - changes to the scheme reported in the AP ES that include requirements for additional powers in the Bill.

1.2.2 In order to differentiate between the original proposals assessed as part of the main ES and subsequent changes and amendments, the following terms are used to define the scheme as it relates to the HS2 Phase 2a project:

- ‘the original scheme’ - the Bill scheme submitted to Parliament in July 2017, which was assessed in the main ES;
- ‘the SES scheme’ - the original scheme with any changes described in the SES that are within the existing powers of the Bill; and
- ‘the AP revised scheme’ - the original scheme as amended by the SES changes and AP amendments.

1.3 Scope of this report

1.3.1 A scoping process has been undertaken for the SES changes and AP amendments in order to determine whether there is potential for the change or amendment to give rise to any new or different likely significant environmental effects compared with those reported in the main ES. Where such potential effects have been identified at a

local level, they are reported in Volume 2 of the SES and AP ES, for the relevant community areas.

- 1.3.2 Each SES change and AP amendment has also been considered to determine its potential to give rise to any new or different likely significant route-wide environmental effects. Route-wide effects reported in this volume are those considered to be appropriately assessed at a geographical scale greater than that presented within Volume 2 of the SES and AP ES.
- 1.3.3 The route-wide effects, depending on the type of change, are reported in the SES (Part 1) or AP ES (Part 2) of this document, which are in turn divided into environmental topics.
- 1.3.4 Part 1 of this report describes any new or different likely significant route-wide effects as a result of the SES changes in comparison with the effects of the original scheme.
- 1.3.5 Part 2 reports any new or different likely significant route-wide effects as a result of the AP amendments and any relevant cumulation with the impacts of the SES changes, in comparison with the effects of the original scheme. Part 2 also presents a summary of the combined impacts of Phase One, Phase 2a and Phase 2b, taking into account the SES changes and AP amendments.
- 1.3.6 A number of environmental topics have been scoped out of further route-wide assessment. This is where effects arising from the SES changes and AP amendments are localised in extent and no new or different likely significant route-wide effects have been identified. The environmental topics scoped out from the SES are: air quality; community; cultural heritage; health; land quality; landscape and visual (including Cannock Chase Area of Outstanding Natural Beauty (AONB)); sound, noise and vibration; traffic and transport; and water resources and flood risk. The environmental topics scoped out from the AP ES are: air quality; community; cultural heritage; health; land quality; landscape and visual (including Cannock Chase AONB); sound, noise and vibration; and traffic and transport.
- 1.3.7 For those topics where it was considered that there was the potential for new or different likely significant route-wide effects as a consequence of the SES changes and AP amendments, further assessment has been carried out. For the SES, these environmental topics are: agriculture, forestry and soils; ecology and biodiversity; and socio-economics. For the AP ES, these environmental topics are: agriculture, forestry and soils; ecology and biodiversity; socio-economics; and water resources and flood risk. In each of these sections, the environmental topic is introduced and conclusions are presented.
- 1.3.8 The climate change, major accidents and natural disasters, and waste and material resources assessments are reported only at a route-wide level rather than within the Volume 2, community area reports of the SES and AP ES. This follows the approach taken in the main ES. For these route-wide topics, assessment has been carried out to determine whether there are any new or different likely significant route-wide effects as a consequence of the SES changes or AP amendments.
- 1.3.9 The methodology for each environmental topic assesses effects in a different way appropriate to that environmental topic; therefore the approach to assessment of route-wide effects varies between environmental topics. The Scope and Methodology

Report (SMR) (Volume 5: CT-001-001 of the main ES)² and the SMR Addendum (Volume 5: CT-001-002 of the main ES)³ presents the basis of the route-wide assessment for each topic.

- 1.3.10 The standard measures that will be used to mitigate likely significant adverse environmental effects during the construction and operation of the scheme are described in the main ES, Volume 1, Section 9 and the draft Code of Construction Practice (CoCP) (Volume 5: CT-003-000 of the main ES)⁴ submitted in support of the Bill. Implementation of these measures has been assumed in this SES and AP ES.
- 1.3.11 Following the approach taken in the main ES, committed developments are considered within the assessments but only referred to if there is the potential for new or different likely significant route-wide cumulative effects.

1.4 Structure of this report

1.4.1 The report is structured as follows:

- Section 1: Introduction;

Part 1: Supplementary Environmental Statement

- Section 2: Agriculture, forestry and soils;
- Section 3: Climate change;
- Section 4: Ecology and biodiversity;
- Section 5: Major accidents and natural disasters;
- Section 6: Socio-economics;
- Section 7: Waste and material resources;
- Section 8: Phase One and Phase Two combined impacts;

Part 2: Additional Provision Environmental Statement

- Section 9: Agriculture, forestry and soils;
- Section 10: Climate change;
- Section 11: Ecology and biodiversity;
- Section 12: Major accidents and natural disasters;
- Section 13: Socio-economics;

² HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001)*. Available online at.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627187/E23_EIA_SMR_CT-001-001_WEB.pdf

³ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement, Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002)*. Available online at

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627189/E24-B_CT-001-002_Part_B_WEB.pdf

⁴ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement, Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000)*. Available online at <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>

SES and AP ES Volume 3: Route-wide effects

- Section 14: Waste and material resources;
- Section 15: Water resources and flood risk; and
- Section 16: Phase One and Phase Two combined impacts.

Part 1: Supplementary Environmental Statement

2 Agriculture, forestry and soils

2.1 Introduction

2.1.1 Volume 3 of the main ES⁵ reported the route-wide impacts and likely significant effects on agriculture, forestry and soils arising from the construction and operation of the original scheme. It reported temporary and permanent significant route-wide effects on best and most versatile (BMV) land as a result of the original scheme.

2.1.2 This section of the report identifies any new or different significant effects to those reported in Volume 3 of the main ES due to the SES changes.

2.2 Changes to the assessment

2.2.1 An assessment was undertaken to determine if the SES changes would be likely to result in any new or different significant route-wide effects on agriculture, forestry and soils from those reported in the main ES.

2.2.2 Construction of the SES scheme will require the same area of agricultural and forestry land as the original scheme, and will therefore not give rise to any new or different likely significant route-wide effects compared to those presented in Volume 3 of the main ES.

2.2.3 No new or different likely significant effects are considered likely during operation for agriculture, forestry and soils.

⁵ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

3 Climate change

3.1 Introduction

- 3.1.1 Volume 3 of the main ES⁶ reported the assessment of the greenhouse gas (GHG) emissions of the original scheme during construction and operation. It also reported the assessment of in-combination climate change impacts and climate change resilience of the original scheme during construction and operation.
- 3.1.2 This section of the report identifies any material changes to the assessment reported in Volume 3 of the main ES due to the SES changes.

3.2 Changes to the assessment

- 3.2.1 An assessment was undertaken to determine if the SES changes would be likely to result in a material difference to the assessment of climate change from those reported in Volume 3 of the main ES.
- 3.2.2 The SES changes are not considered to result in a material difference to the GHG assessment presented in Volume 3 of the main ES.
- 3.2.3 The assessment also determined that there would be no change to the outcome of the in-combination climate change impacts assessment nor the climate change resilience assessment arising from the SES changes.

⁶ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

4 Ecology and biodiversity

4.1 Introduction

4.1.1 Volume 3 of the main ES⁷ reported the impacts and likely significant effects on ecological resources that will occur at a route-wide level as a consequence of the construction and operation of the original scheme. The route-wide assessment addressed significant effects at the regional and national level, and in-combination effects not discussed within Volume 2 of the main ES.

4.1.2 This section of the report identifies any new or different likely significant effects to those reported in Volume 3 of the main ES due to the SES changes.

4.2 Changes to the assessment

4.2.1 There are a number of corrections to the route-wide assessment reported in Volume 3 of the main ES, as a result of corrections made to the Volume 2 Community area reports. Table 1 provides a summary of those changes to the assessment. It provides a description of the correction, replicates the text from Volume 3 of the main ES, and provides the revised text.

⁷ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

Table 1: Summary of corrections to Section 7, Ecology and biodiversity of Volume 3: Route-wide effects of the main ES

Reference in Volume 3: Route-wide effects of the main ES	Description of correction	Text in Volume 3: Route-wide effects of the main ES	Revised text	Change to significant effects and mitigation
Section 7, Ecology and biodiversity, paragraph 7.3.4	<p>Volume 3 of the main ES reported the route-wide total for the area of ancient woodland to be lost to the original scheme, from woodlands to be added to the Ancient Woodland Inventory (AWI). This was the sum of the individual losses reported within the Volume 2 Community area reports.</p> <p>A correction has been made to the figure for loss of ancient woodland from one woodland complex (Wrinehill Wood and adjacent woodland fragments) reported in the Volume 2, Community area 4 report (Whitmore Heath to Madeley). Consequently, a correction to the total loss of ancient woodland from those woodlands is required.</p>	<p>Paragraph 7.3.4</p> <p>On the basis of a heritage review undertaken by HS2 Ltd, Natural England has confirmed that 11 woodlands of potential relevance to the assessment will be added to the AWI. Eight of these ancient woodlands occur within, or partially within, the Proposed Scheme and approximately 4.3ha of ancient woodland will be lost from these sites. The total loss of ancient woodland is therefore approximately 10.5ha.</p>	<p>Paragraph 7.3.4</p> <p>On the basis of a heritage review undertaken by HS2 Ltd, Natural England has confirmed that 11 woodlands of potential relevance to the assessment will be added to the AWI. Eight of these ancient woodlands occur within, or partially within, the Proposed Scheme and approximately 4ha of ancient woodland will be lost from these sites. The total loss of ancient woodland is therefore approximately 10.2ha.</p>	<p>No change to route-wide effects or mitigation. Despite the reduced area affected by the construction of the original scheme, the loss of ancient woodland remains a significant adverse effect at the county level, as reported in the main ES.</p>
Section 7, Ecology and biodiversity, paragraphs 7.3.6 and 7.3.15	<p>Volume 3 of the main ES reported total figures for mitigation provision, which included the figures reported within the Volume 2, Community area reports of the main ES, and the mitigation areas associated with local/parish level effects.</p> <p>Corrections have been made to the figures reported in the Volume 2, Community area reports. Areas of woodland, grassland and hedgerow habitat creation were incorrectly reported in the ecology assessment and as a result, the route-wide mitigation figures reported within the Volume 3, Route-wide effects have been revised. The areas were, however, shown correctly on Volume 2: Maps CT-06 of the main ES.</p> <p>There is no requirement for additional land as a result of this correction.</p>	<p>Paragraph 7.3.6</p> <p>In addition, retained woodland at Whitmore Wood, extending to 11.9ha, will be enhanced through the introduction of appropriate management, for example through the introduction of measures to manage adverse impacts of deer on woodland regeneration.</p> <p>Paragraph 7.3.15</p> <p>A total of approximately 394ha of habitats of principal importance will be created, mainly lowland mixed deciduous woodland and lowland meadow.</p>	<p>Paragraph 7.3.6</p> <p>In addition, retained woodland at Whitmore Wood, extending to 12.9ha, will be enhanced through the introduction of appropriate management, for example through the introduction of measures to manage adverse impacts of deer on woodland regeneration.</p> <p>Paragraph 7.3.15</p> <p>A total of approximately 481ha of habitats of principal importance will be created, mainly lowland mixed deciduous woodland and lowland meadow.</p>	<p>No change to route-wide effects or mitigation. The assessment was based on the correct mitigation areas.</p>
Section 7, Ecology and biodiversity, paragraphs 7.3.7 and 7.3.14	<p>Volume 3 of the main ES reported the route-wide total for the area of habitats of principal importance to be lost to the original scheme. Total losses of the two habitats of principal importance that are impacted to the largest extent (lowland mixed deciduous woodland and lowland meadow) are</p>	<p>Paragraph 7.3.7</p> <p>The most notable habitat losses that will occur as a consequence of the construction of the Proposed Scheme are:</p>	<p>Paragraph 7.3.7</p> <p>The most notable habitat losses that will occur as a consequence of the construction of the Proposed Scheme are:</p>	<p>No change to route-wide effects or mitigation. The corrected areas will not change the level of significance of the</p>

Reference in Volume 3: Route-wide effects of the main ES	Description of correction	Text in Volume 3: Route-wide effects of the main ES	Revised text	Change to significant effects and mitigation
	<p>described, as is the total loss of semi-natural broadleaved woodland. All of these figures were calculated from the sum of the individual losses of habitats of principal importance reported within the Volume 2 Community area reports in the main ES, in addition to the losses that are local/parish level effects.</p> <p>Corrections have been made to the figures for loss of grassland and woodland habitats of principal importance within the Volume 2, Community area 5 report, (South Cheshire). Consequently, a correction to the route-wide totals for losses of habitats of principal importance and total loss of semi-natural broadleaved woodland are required.</p>	<ul style="list-style-type: none"> semi-natural broadleaved woodland: loss of approximately 46ha across the Proposed Scheme. The loss represents less than 0.01% of the resource in England. <p>Paragraph 7.3.14</p> <p>Where habitats of principal importance will be lost, opportunities for the creation of compensatory habitat have been explored. Overall, approximately 107.8ha of habitats of principal importance will be lost as a result of construction of the Proposed Scheme, including up to 42.7ha of lowland mixed deciduous woodland and 39ha of lowland meadow.</p>	<ul style="list-style-type: none"> semi-natural broadleaved woodland: loss of approximately 48.8ha across the Proposed Scheme. The loss represents less than 0.01% of the resource in England. <p>Paragraph 7.3.14</p> <p>Where habitats of principal importance will be lost, opportunities for the creation of compensatory habitat have been explored. Overall, approximately 109.9ha of habitats of principal importance will be lost as a result of construction of the Proposed Scheme, including up to 45.5ha of lowland mixed deciduous woodland and 38.3ha of lowland meadow.</p>	<p>effect reported in the main ES.</p>
<p>Section 7, Ecology and biodiversity, paragraph 7.3.8</p>	<p>A correction has been made to the length of hedgerow lost to construction of the original scheme reported within Volume 2, Community area 5 (South Cheshire) report of the main ES. As a result, the route-wide hedgerow loss reported within Volume 3, Route-wide effects has been revised.</p>	<p>Paragraph 7.3.8</p> <p>On a precautionary basis, assuming the loss of all hedgerows within the land required for the Proposed Scheme, there will be an overall loss of up to approximately 180km of hedgerows, representing 0.04% of the resource in England.</p>	<p>Paragraph 7.3.8</p> <p>On a precautionary basis, assuming the loss of all hedgerows within the land required for the Proposed Scheme, there will be an overall loss of up to approximately 189km of hedgerows representing 0.04% of the resource in England.</p>	<p>No change to route-wide effects and mitigation. The corrected areas will not change the level of significance of the effect reported in the main ES.</p>

SES and AP ES Volume 3: Route-wide effects

- 4.2.2 An assessment was undertaken to determine if the SES changes would be likely to result in any new or different likely significant effects on ecology and biodiversity from those reported in Volume 3 of the main ES.
- 4.2.3 The SES changes are not considered to result in any new or different likely significant route-wide effects on ecology and biodiversity from those presented in Volume 3 of the main ES.

5 Major accidents and natural disasters

5.1 Introduction

5.1.1 Volume 3 of the main ES⁸ provided an assessment of the route-wide impacts and likely significant effects arising directly from the construction and operation of the original scheme if it were to be affected by a major accident and/or natural disaster.

5.1.2 This section of the report identifies any new or different significant effects to those reported in Volume 3 of the main ES due to the SES changes.

5.2 Changes to the assessment

5.2.1 An assessment was undertaken to determine if the SES changes would be likely to result in new or different significant effects from those reported in the main ES if the SES scheme were to be affected by a major accident and/or natural disaster.

5.2.2 A review of the foreseeable risks associated with the SES changes, recorded in a risk register as required under the Construction (Design and Management) (CDM) 2015 Regulations⁹, has been undertaken. This review has concluded that the SES changes are not considered to result in any new or different likely significant effects from those reported in Volume 3 of the main ES. In addition, no new or different likely significant traffic and transport or flood risk effects or changes to the climate change resilience assessment have been identified as a result of the SES changes. Therefore, there are no new or different risks or likely significant effects from those presented in Volume 3 of the main ES.

5.2.3 The nature of the SES changes is such that there will be no new or different likely significant effects during operation.

⁸ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

⁹ *The Construction (Design and Management) Regulations 2015*. SI 2015 No. 51. Her Majesty's Stationery Office, London, http://www.legislation.gov.uk/uksi/2015/51/pdfs/uksi_20150051_en.pdf

6 Socio-economics

6.1 Introduction

6.1.1 Direct and indirect socio-economic effects of the original scheme are reported in the main ES¹⁰ at a route-wide and community area level. The assessment in Volume 3 of the main ES considered:

- route-wide construction employment created (direct and indirect);
- employment in businesses directly and indirectly affected by construction;
- operational employment; and
- operational effects on existing business employment.

6.1.2 This section of the report identifies any new or different significant effects to those reported in Volume 3 of the main ES due to the SES changes.

6.2 Changes to the assessment

6.2.1 The need for a correction to the number of construction workers reported in Volume 3 of the main ES was identified. Table 2 provides a summary of those changes to the assessment. It provides a description of the correction, replicates the text from Volume 3 of the main ES, and provides the revised text.

¹⁰ HS2 Ltd (2017), *High Speed Rail (West Midlands-Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>.

Table 2: Summary of corrections to Section 12, Socio-economics of Volume 3: Route-wide effects of the main ES

Reference in Volume 3: Route-wide effects of the main ES	Description of correction	Text in Volume 3: Route-wide effects of the main ES	Revised text	Change to significant effects and mitigation																														
<p>Section 12, Socio-economics, paragraph 12.6.2</p> <p>Section 17, Table 38: Combined Impacts of Phase One, Phase 2a and Phase 2b</p>	<p>The total construction years and full time equivalent workforce numbers reported in Volume 3 of the main ES did not include both on-site construction workforce and off-site workforce.</p>	<p>Paragraph 12.6.2</p> <p>The Proposed Scheme will support employment in the construction industry over the construction period. Overall, it is estimated that the construction phase will generate 22,400 person years of construction employment opportunities (equivalent to 2,240 permanent full time construction jobs), which will be a major beneficial effect and is, therefore, considered to be significant.</p> <p>Table 38</p> <table border="1"> <thead> <tr> <th></th> <th>Phase One</th> <th>Phase 2a</th> <th>Phase 2b</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Employment</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Construction jobs created</td> <td>14,600</td> <td>2,240</td> <td>Refer to footnote¹¹</td> <td>15,770</td> </tr> </tbody> </table>		Phase One	Phase 2a	Phase 2b	Total	Employment					Construction jobs created	14,600	2,240	Refer to footnote ¹¹	15,770	<p>Paragraph 12.6.2</p> <p>The Proposed Scheme will support employment in the construction industry over the construction period. Overall, it is estimated that the construction phase will generate 23,900 person years of construction employment opportunities (equivalent to 2,390 permanent full time construction jobs), which will be a major beneficial effect and is, therefore, considered to be significant.</p> <p>Table 38</p> <table border="1"> <thead> <tr> <th></th> <th>Phase One</th> <th>Phase 2a</th> <th>Phase 2b</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Employment</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Construction jobs created</td> <td>14,600</td> <td>2,390</td> <td>Refer to footnote¹¹</td> <td>16,990</td> </tr> </tbody> </table>		Phase One	Phase 2a	Phase 2b	Total	Employment					Construction jobs created	14,600	2,390	Refer to footnote ¹¹	16,990	<p>No change to route-wide effects or mitigation.</p>
	Phase One	Phase 2a	Phase 2b	Total																														
Employment																																		
Construction jobs created	14,600	2,240	Refer to footnote ¹¹	15,770																														
	Phase One	Phase 2a	Phase 2b	Total																														
Employment																																		
Construction jobs created	14,600	2,390	Refer to footnote ¹¹	16,990																														

¹¹ Value not presented in the Phase 2b Sustainability Statement.

SES and AP ES Volume 3: Route-wide effects

- 6.2.2 An assessment was undertaken to determine if the SES changes would be likely to result in any new or different significant effects to the route-wide socio-economic assessment of the original scheme reported in the main ES.
- 6.2.3 The SES changes relevant to socio-economics relate primarily to changes to the construction compounds and programme associated with railway installation works, as described in the SES and AP ES Volume 2, Community Area reports (Part 1) and the correction to the estimated construction full time equivalent employees in Table 2. These changes will have minimal impact on total numbers of existing employment affected by construction and the total numbers of construction employment created. Whilst the employment figures given in Volume 3 of the main ES will change, the change is considered to be negligible and will not result in any new or different likely significant route-wide effects from those presented in Volume 3 of the main ES.
- 6.2.4 There will be no changes to operational employment or businesses during operation as a result of the SES changes.

7 Waste and material resources

7.1 Introduction

7.1.1 Volume 3 of the main ES¹² reported an assessment of the route-wide impacts and likely significant effects associated with the off-site disposal to landfill of solid waste that will be generated by the construction and operation of the original scheme.

7.1.2 This section of the report identifies any new or different likely significant effects to those reported in Volume 3 of the main ES due to SES changes.

7.2 Changes to the assessment

7.2.1 A qualitative assessment has been undertaken for the SES changes to identify if they would generate a new or different volume of solid waste compared to the original scheme, and identify any material increase in the quantity of waste requiring off-site disposal to landfill. The SES changes would lead to the generation of negligible quantities of additional waste.

7.2.2 Based on this qualitative assessment, it is not considered that the SES changes will result in any new or different likely significant environmental effects during construction, on a route-wide basis, associated with the off-site disposal to landfill of solid waste.

7.2.3 None of the SES changes result in a change to the operational waste generated by the original scheme, as reported in Volume 3 of the main ES.

¹² HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

8 Phase One, Phase 2a and Phase 2b combined impacts

8.1 Introduction

8.1.1 Volume 3 of the main ES presented a tabulated summary of the potential total impacts of Phase One, Phase 2a and Phase 2b on a range of environmental receptors. Impacts of the Phase 2a original scheme were based on design data and assessments undertaken as part of the EIA assessments. The Phase One data was taken from the Phase One SES⁴ and AP⁵ ES¹³. The quantification of the impacts of Phase 2b was derived from the Phase 2b Sustainability Statement¹⁴.

8.2 Summary of changes to combined impacts

8.2.1 As presented in Section 6 of this report, a correction has been made to the information provided in the main ES Volume 3, Section 17 in relation to the combined impacts of the construction jobs created.

8.2.2 The SES changes will result in very minor or negligible changes to the combined impact figures reported in Volume 3 of the main ES.

8.2.3 Section 16, Table 3 of this report provides a tabulated summary of the potential total impacts (individually and combined) for Phase One, the Phase 2a AP revised scheme and Phase 2b.

¹³ HS2 Ltd (2015). *High Speed Rail (London - West Midlands). Supplementary Environmental Statement 4 and Additional Provision 5 Environmental Statement Volume 3: Route-wide effects*, <https://www.gov.uk/government/publications/ses4-and-ap5-es-december-2015-volume-1-to-3-introduction-and-methodology-area-reports-route-wide-effects-and-glossary>

¹⁴ Temple-RSK (2016), *High Speed Rail: Phase 2b Preferred Route. Sustainability Statement including Post Consultation Update. Volume 1: Main Report of the Appraisal of Sustainability. A report by Temple-RSK for HS2 Ltd*

Part 2: Additional Provision Environmental Statement

9 Agriculture, forestry and soils

9.1 Introduction

- 9.1.1 Volume 3 of the main ES¹⁵ reported the route-wide impacts and likely significant effects on agriculture, forestry and soils arising from the construction and operation of the original scheme.
- 9.1.2 Section 2 of this volume reports that the SES changes will not result in any new or different likely significant route-wide effects to the original scheme.
- 9.1.3 This section of the AP ES identifies any new or different likely significant effects to those reported in Volume 3 of the main ES, as amended by the SES, due to the AP amendments.

9.2 Changes to the assessment

- 9.2.1 A scoping exercise was undertaken to determine if the AP amendments would be likely to result in any new or different significant effects on agriculture, forestry and soils from those reported in the main ES, as amended by the SES.
- 9.2.2 The main ES reported that a total of approximately 2,090ha of agricultural land, including approximately 1,370ha of best and most versatile (BMV) agricultural land, would be required temporarily for the construction of the original scheme. Construction of the AP revised scheme will require approximately 25.9ha of additional agricultural land temporarily, of which 18.7ha is BMV land.
- 9.2.3 Following construction, the land required temporarily will be primarily reinstated to its pre-existing agricultural condition. The remaining area of land that will change permanently from agricultural use in the AP revised scheme will increase by 11.1ha, of which approximately 8.6ha is BMV land in Grade 2 and Subgrade 3a, and 2.5ha is in Subgrade 3b. No additional forestry land will be required as a result of the AP revised scheme.
- 9.2.4 The AP amendments are not sufficient in scale to result in any new or different likely significant route-wide temporary or permanent effects during construction or operation of the AP revised scheme from those reported in the main ES.

¹⁵ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

10 Climate change

10.1 Introduction

- 10.1.1 Volume 3 of the main ES¹⁶ reported an assessment of the greenhouse gas (GHG) emissions of the original scheme during construction and operation. It also reported the assessment of in-combination climate change impacts and climate change resilience of the original scheme during construction and operation.
- 10.1.2 Section 3 of this volume reports that the SES changes are not considered to result in a material difference to the GHG assessment presented in Volume 3 of the main ES. It also reports that SES changes do not affect the outcome of either the in-combination climate change impacts assessment or the climate change resilience assessment.
- 10.1.3 This section of the AP ES identifies any material changes to the assessment reported in Volume 3 of the main ES, as amended by the SES, due to the AP amendments.

10.2 Changes to the assessment

- 10.2.1 A scoping exercise was undertaken to determine if the AP amendments would be likely to result in a material difference to the assessment of climate change reported in Volume 3 of the main ES, as amended by the SES.
- 10.2.2 The AP amendments are not considered to result in a material difference to the GHG assessment presented in Volume 3 of the main ES, as amended by the SES.
- 10.2.3 The assessment also determined that there would be no changes to the outcome of the in-combination climate change impacts assessment or the climate change resilience assessment, as reported in the main ES, as amended by the SES, as a result of the AP revised scheme.

¹⁶ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

11 Ecology and biodiversity

11.1 Introduction

- 11.1.1 Volume 3 of the main ES¹⁷ reported an assessment of the impacts and likely significant effects on ecological resources that would occur at a route-wide level as a consequence of the construction and operation of the original scheme. The route-wide assessment addressed significant effects at the regional and national level, and in-combination effects not discussed within Volume 2 of the main ES.
- 11.1.2 Section 4 of this volume reports that the SES changes will not result in any new or different likely significant route-wide effects to those reported in the main ES.
- 11.1.3 This section of the AP ES identifies any new or different likely significant effects on ecological resources to those reported in Volume 3 of the main ES, as amended by the SES scheme, due to the AP amendments.

11.2 Changes to the assessment

Designated sites

- 11.2.1 The AP amendments will not result in any new or different likely significant effects on statutory designated wildlife sites to those reported in Volume 3 of the main ES, as amended by the SES.
- 11.2.2 AP amendment AP-001-102 (Additional land for the permanent diversion of two South Staffordshire Water 36-inch water mains under River Trent viaduct) will result in a new significant effect on one additional non-statutory wildlife site (the Kings Bromley Pit (north-west of Manor Park) Local Wildlife Site (LWS)) that was not reported in Volume 3 of the main ES. The AP revised scheme will, therefore, result in significant loss and/or fragmentation effects to 16 LWS compared to the 15 LWS reported in the main ES. The additional site is within Staffordshire. The number of LWS affected by the AP revised scheme equates to approximately 2% of the total LWS within Staffordshire, which is unchanged from the main ES. The additional loss of habitat from a non-statutory wildlife site required for the AP revised scheme represents a different significant adverse effect on the ecological networks, of which the LWS forms a part, to that reported in the main ES, as amended by the SES.
- 11.2.3 The mitigation and compensation measures proposed in the main ES, as corrected by the SES, will ensure there will be no additional permanent significant residual effects on the LWS or ecological network at the regional or route-wide level as a result of the AP amendment.

Habitats

- 11.2.4 There will be no change to the extent of ancient woodland losses reported compared to the main ES, as corrected by the SES.

¹⁷ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

- 11.2.5 The AP amendments will result in the following changes to the extent of the most notable habitat losses that are described in the main ES, as amended in the SES:
- semi-natural broadleaved woodland: a net increase by approximately 5.4ha in the area of broadleaved woodland required for the construction of the AP revised scheme compared with the original scheme as corrected by the SES¹⁸. The AP revised scheme will, therefore, result in the loss of approximately 54.2ha of semi-natural broadleaved woodland¹⁹. This remains less than 0.01% of the resource in England²⁰;
 - neutral grassland: following additional surveys and the subsequent re-classification of areas of grassland habitat, the AP revised scheme will result in the loss of approximately 96.4ha of unimproved and semi-improved neutral grassland. This includes additional losses totalling approximately 0.5ha of neutral grassland, and reduced losses totalling approximately 6.1ha in other areas. There is, therefore, a net reduction by approximately 5.6ha of neutral grassland to be lost as a result of the construction of the AP revised scheme, compared with the original scheme, which remains less than 0.02% of the total neutral grassland resource in England²⁰;
 - ponds: loss of an additional four ponds arising from the construction of the AP revised scheme compared with the original scheme. The AP revised scheme will, therefore, result in the loss of 281 ponds. This remains approximately 0.15% of the natural resource in England²⁰; and
 - hedgerows: using the same precautionary approach adopted in the main ES, the AP revised scheme will result in the loss of approximately 187km of hedgerows compared with the 189km reported to be lost as a result of the original scheme, as corrected by the SES¹⁸. The loss of hedgerows across the AP revised scheme remains approximately 0.04% of the resource in England²⁰.
- 11.2.6 In comparison with the SES scheme, the AP amendments will increase the loss of habitats of principal importance listed under Section 41 of the Natural Environment and Rural Communities (NERC) Act²¹ by approximately 5.9ha. Therefore, overall, the AP revised scheme will result in the loss of approximately 115.8ha of habitats of principal importance, including approximately 50.9ha of lowland mixed deciduous woodland and 38.8ha of lowland meadows.
- 11.2.7 Several of the AP amendments involve or necessitate revisions to the ecological compensation areas included within the original scheme. Overall, the AP revised scheme will result in the creation of 478.8ha of habitats of principal importance, a net reduction of approximately 2.2ha compared to the SES scheme.
- 11.2.8 None of the changes in the extent of habitat losses as a result of the AP amendments are likely to generate any new or different significant effect at a route-wide level.

¹⁸ Correction in Section 4 of this report.

¹⁹ This loss is the total of woodland habitats of principal importance that are lost, namely lowland mixed deciduous woodland and wet woodland. The majority of ancient woodland lost is also semi-natural broadleaved woodland and these areas are, therefore, included within this total. Areas of ancient woodland that are Plantation on Ancient Woodland Sites (PAWS) are not included within this total.

²⁰ *State of the Natural Environment 2008 (NE85)* (2008). Natural England.

²¹ *Natural Environment and Rural Communities Act (2006)*. Her Majesty's Stationery Office.

Species

- 11.2.9 The AP amendments will not result in any new or different likely significant effects on protected and notable species/species groups that are relevant at a route-wide level. In addition, they are not likely to result in any new or different significant effects on species from those reported in the main ES, as amended by the SES.

12 Major accidents and natural disasters

12.1 Introduction

- 12.1.1 Volume 3 of the main ES²² reported an assessment of the route-wide impacts and likely significant effects arising directly from the construction and operation of the original scheme if it were to be affected by a major accident and/or natural disaster.
- 12.1.2 Section 5 of this volume reports that the SES changes would not result in any new or different likely significant route-wide effects.
- 12.1.3 This section of the report identifies any new or different likely significant effects arising from the vulnerability of the AP revised scheme to risks from major accidents or natural disasters.

12.2 Changes to the assessment

- 12.2.1 A scoping exercise was undertaken to determine whether the AP amendments would be likely to result in a material difference to the route-wide assessment of the vulnerability of the original scheme to risks from major accidents and natural disasters reported in Volume 3 of the main ES, as amended by the SES.
- 12.2.2 A review of the foreseeable risks associated with the AP amendments, recorded in a risk register as required under the Construction (Design and Management) (CDM) 2015 Regulations²³, has been undertaken. This review has concluded that the AP amendments are not considered to result in new or different likely significant effects from those reported in Volume 3 of the main ES, as amended by the SES. In addition, no new or different likely residual significant traffic and transport or flood risk effects, or changes to the climate change resilience assessment have been identified as a result of the AP amendments.
- 12.2.3 The nature of the AP amendments is such that there will be no new or different likely significant effects during operation.

²² HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

²³ *The Construction (Design and Management) Regulations 2015*. SI 2015 No. 51. Her Majesty's Stationery Office, London, http://www.legislation.gov.uk/uksi/2015/51/pdfs/uksi_20150051_en.pdf

13 Socio-economics

13.1 Introduction

13.1.1 Volume 3 of the main ES²⁴ reported the direct and indirect socio-economic effects of the original scheme at a route-wide and community area level. The assessment in Volume 3 of the main ES considered route-wide:

- construction employment created (direct and indirect);
- employment in businesses directly and indirectly affected by construction;
- operational employment (direct and indirect); and
- operational effects on existing business employment.

13.1.2 Section 6 of this volume reports that the SES changes will not result in any new or different likely significant route-wide effects.

13.1.3 This section of the report identifies any new or different likely significant effects to those reported in Volume 3 of the main ES, as amended by the SES, due to the AP amendments.

13.2 Changes to the assessment

13.2.1 None of the amendments proposed as part of the AP revised scheme have been identified as likely to result in any new or different significant route-wide socio-economic effects from those presented in Volume 3 of the main ES, as amended by the SES.

13.2.2 The amendments will have minimal impacts on total numbers of existing employment affected by construction and total numbers of construction employment created. Whilst the employment figures given in Volume 3 of the main ES may change, any such change is considered to be negligible and will not alter the conclusions of the assessment.

²⁴ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

14 Waste and material resources

14.1 Introduction

14.1.1 Volume 3 of the main ES²⁵ reported an assessment of the route-wide impacts and likely significant effects associated with the off-site disposal to landfill of solid waste that would be generated by the construction and operation of the original scheme.

14.1.2 Section 7 of this volume reports that the SES changes will not result in any new or different likely significant route-wide effects from those reported in Volume 3 of the main ES during construction and operation of the SES scheme.

14.1.3 This section of the report identifies any new or different likely significant effects to those reported in Volume 3 of the main ES, as amended by the SES, due to the AP amendments.

14.2 Changes to the assessment

14.2.1 The AP amendments have been assessed to identify if they would give rise to new or different likely significant effects associated with the off-site disposal to landfill of solid waste, reported in Volume 3 of the main ES.

14.2.2 A qualitative assessment has been undertaken for each of the AP amendments to identify if it will generate a new or different volume of solid waste during construction compared to the original scheme, as amended by the SES scheme, and identify any material increase in the quantity of construction waste requiring off-site disposal to landfill. It is expected that the AP amendments will lead to the generation of negligible quantities of additional construction waste. Based on this qualitative assessment, it is not considered that the AP amendments will result in any new or different likely significant environmental effects, on a route-wide level, associated with the off-site disposal to landfill of solid waste from construction.

14.2.3 None of the AP amendments will result in a change to the operational waste generated by the original scheme, as reported in Volume 3 of the main ES, as amended by the SES.

²⁵ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

15 Water resources and flood risk

15.1 Introduction

15.1.1 Volume 3 of the main ES²⁶ provided an assessment of the route-wide impacts and likely significant effects related to surface water and groundwater resources (quality and quantity) and flood risk. It included consideration of the following issues:

- the risk to water resources associated with accidents or spillages from trains during operation of the original scheme;
- a summary of how the original scheme complies with the statutory requirements of the Water Framework Directive (WFD)²⁷; and
- route-wide flood risk related to alignment of the original scheme with the Sequential Test and Exception Test policies in the National Planning Policy Framework (NPPF)²⁸.

15.1.2 This section of the report identifies any new or different likely significant effects to those reported in Volume 3 of the main ES due to the AP amendments.

15.2 Changes to the assessment

15.2.1 A scoping exercise was undertaken to determine whether any of the AP amendments would act in combination to lead to new or different regional or route-wide likely significant effects on water resources or flood risk.

15.2.2 AP amendments were identified with the potential to change the assessment reported in the main ES relating to:

- the assessment of WFD compliance; and
- flood risk issues related to alignment with the Sequential Test and Exception Test policies in the NPPF.

15.2.3 The AP amendments relevant to the water resources and flood risk assessment all relate to Filly Brook and its tributaries:

- AP-003-001: Additional land permanently required and a change in the powers of the Bill for the viaduct crossing of the Norton Bridge to Stone Railway and track crossovers along the HS2 route; and
- AP-003-002: Additional land permanently required for the IMB-R/Norton Bridge to Stone Railway flood mitigation measures.

15.2.4 Changes to the viaduct crossing of the Norton Bridge to Stone Railway and track crossovers along the HS2 route (see AP-003-001 in the SES and AP ES Volume 2, Community area 3 report (Part 2)) will extend the Yarnfield South embankment and

²⁶ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

²⁷ Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for Community action in the field of water policy (Water Framework Directive or WFD) (2000). Strasbourg, European Parliament and European Council.

²⁸ Department for Communities and Local Government (2012), *National Planning Policy Framework*, Her Majesty's Stationery Office, London.

Yarnfield North embankment at the Infrastructure Maintenance Base – Rail (IMB-R) near Stone, such that both embankments would extend into the floodplain and channel. The extension of the embankments has the potential to impact on both the assessment of WFD compliance and the ability of the AP revised scheme to accord with the Sequential Test and Exception Test policies in NPPF, which have been assessed on a route-wide basis.

15.3 Route-wide WFD compliance

- 15.3.1 The impact of AP-003-001 and AP-003-002 is described in detail in SES and AP ES Volume 5: Appendix WR-001-000²⁹, which forms an addendum to the WFD compliance assessment report submitted as part of the main ES. A summary is provided below.
- 15.3.2 A total of six scheme components relating to AP-003-001 and AP-003-002 were scoped in as having the potential to have effects on WFD status and status objectives. Five of these are located on Filly Brook and one is on a previously unassessed unnamed tributary of Filly Brook (located on the south side of the Norton Bridge to Stone Railway). Both of these watercourses are located within the Trent from Tittensor to River Sow (GB104028053272³⁰) WFD surface water body.
- 15.3.3 AP-003-001 on Filly Brook includes the addition of two new culverts, the Filly Brook culvert and Filly Brook West culvert, which replace the Filly Brook viaduct and the Filly Brook West underbridge proposed in the original scheme, respectively. As a result of the addition of these culverts, the length of the proposed realignment of the watercourse has increased by approximately 175m at this location. This is shown on Map CT-06-222 in the SES and AP ES Volume 2, CA3 Map Book.
- 15.3.4 Two new, small culverts have also been included within a proposed replacement floodplain storage feature located upstream of Yarnfield Lane (AP-003-002). This is shown on Map CT-06-223 in the SES and AP ES Volume 2, CA3 Map Book. Upstream of the culverts, the existing Filly Brook channel will be realigned and improved over approximately 238m, in conjunction with the wetland habitat creation proposed.
- 15.3.5 Changes on the unnamed tributary of Filly Brook comprise the removal of the existing culvert underneath the Norton Bridge to Stone Railway at the existing confluence with Filly Brook and the diversion of the watercourse along the southern side of the Norton Bridge to Stone Railway to join Filly Brook further to the north-east.
- 15.3.6 AP-003-002 includes a number of additional measures that have been embedded within the AP revised scheme to mitigate adverse impacts on the ecological status and potential of Filly Brook. These include the permanent acquisition of land for provision of replacement floodplain storage areas. These have been designed with sections of realigned channel that will provide enhanced aquatic habitat, improved riparian zone vegetation and new areas of wetland directly adjacent to the channel (see SES and AP ES Volume 2, Community area 3 report).

²⁹ HS2 Ltd (2018). *High Speed Rail (West Midlands - Crewe) Supplementary Environmental Statement and Additional Provision Environmental Statement Volume 5, WFD Compliance Assessment Addendum (WR-001-000)*, www.gov.uk/hs2

³⁰ Environment Agency's water body identification number.

- 15.3.7 The WFD Addendum has concluded that the AP revised scheme will not cause a deterioration of the current status of the Trent from Tittensor to River Sow (GB104028053272³¹) WFD surface water body or prevent the water body from achieving its status objectives. The AP revised scheme will therefore be compliant with the objectives of the WFD.

15.4 Route-wide flood risk

- 15.4.1 The NPPF requires that essential infrastructure should only be located in floodplain areas in exceptional circumstances. The Exception Test requires evidence to be provided that the development provides wider sustainability benefits to the community that outweigh flood risk. It also requires that a site specific flood risk assessment must “demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall”.
- 15.4.2 Extending the Yarnfield South and Yarnfield North embankments southwards over Filly Brook floodplain has potential implications for flood risk. Approximately 0.3ha of floodplain, within the area required for the AP revised scheme, will be raised above flood level, with a consequent loss of natural floodplain attenuation. Whilst this is a local issue, it does have route-wide implications given that the route-wide approach has been to avoid floodplain areas, wherever this is reasonably practicable, unless a proposal can be developed that is aligned with the Sequential and Exception Tests in the NPPF.
- 15.4.3 To mitigate these impacts, flood management measures are included in the AP revised scheme that will both fully mitigate the impacts of the loss of floodplain storage and also reduce flood risk in the Filly Brook catchment overall. In addition to ensuring that the AP revised scheme is protected from flooding, these measures will reduce flood risk to a number of existing local receptors including farmland and properties on Yarnfield Lane, the M6 and existing conventional rail infrastructure. Details of the flood risk management measures are provided in the SES and AP ES Volume 5: Appendix WR-003-000. An updated hydraulic modelling report for Filly Brook, based on the AP revised scheme, is also provided (see BID-WR-004-000³² that accompanies the SES and AP ES). These measures will ensure the effective management of the AP revised scheme within the floodplain of Filly Brook and accord with the guidance in the NPPF.
- 15.4.4 None of the amendments proposed as part of the AP revised scheme have been identified as likely to result in any new or different significant route-wide water resources and flood risk effects from those presented in Volume 3 of the main ES.

³¹ Environment Agency's water body identification number.

³² HS2 Ltd (2018). *High Speed Two Phase 2a (West Midlands - Crewe), Background Information and Data, Hydraulic modelling reports (BID-WR-004-000)*, www.gov.uk/hs2

16 Phase One, Phase 2a and Phase 2b combined impacts

16.1 Introduction

16.1.1 Volume 3 of the main ES³³ presented a tabulated summary of the potential total impacts (individually and combined) of Phase One, the Phase 2a original scheme and Phase 2b on a range of environmental receptors.

16.2 Summary of changes to combined impacts

16.2.1 Table 3 presents a summary of the potential total impacts of Phase One, the Phase 2a AP revised scheme and Phase 2b on a range of environmental receptors. The Phase 2a AP revised scheme data is taken from the SES and AP ES. The Phase One data is taken from the Phase One SES₄ and AP₅ ES³⁴. The quantification of the impacts of Phase 2b was derived from the Phase 2b Sustainability Statement³⁵.

Table 3: Combined impacts of Phase One, Phase 2a AP revised scheme and Phase 2b

	Phase One	Phase 2a AP revised scheme	Phase 2b	Overall total (Phase One, Phase 2a AP revised scheme and Phase 2b total)
Route characteristics (km)				
Total	216 ³⁶	58 ³⁷	279.3	553.3
At grade	0	1.1	19.3	20.4
Tunnel	49.5	2.2	21.7	73.4
Cutting	74.7	28 ³⁸	89.4	192.1
Viaduct	16.3	5.5 ³⁸	38.5	60.3
Embankment	62.5	21.2 ³⁸	110.4	194.1
Property and settlements				
Demolitions (residential)	326 dwellings (218 buildings)	26 dwellings	255	607
Demolitions (community)	19 community facilities	0 community facilities	4	23

³³ HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

³⁴ HS2 Ltd (2015). *High Speed Rail (London - West Midlands) Supplementary Environmental Statement 4 and Additional Provision 5 Environmental Statement. Volume 3. Route-wide effects*, <https://www.gov.uk/government/publications/ses4-and-ap5-es-december-2015-volume-1-to-3-introduction-and-methodology-area-reports-route-wide-effects-and-glossary>

³⁵ Temple-RSK (2016). *High Speed Rail: Phase 2b Preferred Route. Sustainability Statement including Post Consultation Update. Volume 1: Main Report of the Appraisal of Sustainability*. A report by Temple-RSK for HS2 Ltd.

³⁶ Includes an additional 13km of route attributable to retaining walls and stations.

³⁷ There are also two spurs each of approximately 6km in length which run parallel to the main line of the original scheme, connecting it to the WCML south of Crewe.

³⁸ Change due to AP-003-001

SES and AP ES Volume 3: Route-wide effects

	Phase One	Phase 2a AP revised scheme	Phase 2b	Overall total (Phase One, Phase 2a AP revised scheme and Phase 2b total)
Demolitions (commercial/retail/manufacturing/industrial/miscellaneous)	372 units (309 buildings) ³⁹	49 units ^{40,41}	209	630
Total demolitions	546 buildings	86 buildings ⁴²	468	1,100
Employment				
Permanent jobs created	2,200 ⁴³	140	Refer to footnote ⁴⁴	2,340 ⁴⁵
Construction jobs created	14,600 ⁴⁶	2,260 ⁴⁷	Refer to footnote ⁴⁴	16,860 ⁴⁵
Jobs displaced	7,950 ⁴⁸	40	5,050	13,040
Noise				
Monetary valuation of noise impacts	n/a ⁴⁹	£-3.18m ⁵⁰	Refer to footnote ⁴⁴	-
Landscape				
AONB crossed at surface (km)	7.6	0	0	7.6
Cultural heritage				
Scheduled Monuments directly affected	1	0	1	2
Registered Battlefields directly affected	1	0	0	1
Grade I and II* structures directly affected	2	0	0	2
Grade II structures directly affected	17	3	6	26
Registered Parks and Gardens directly affected	2	0	0	2

³⁹ This figure includes some properties which also provide community resources, e.g. public house, local services.

⁴⁰ Total includes outbuildings at farm holdings.

⁴¹ This includes one additional demolition to that reported in Volume 3 of the main ES. This additional demolition is provided as a correction in the SES and AP ES Volume 2, Community area 1 report.

⁴² Includes total of residential, community, commercial and miscellaneous buildings including outbuildings associated with residential properties.

⁴³ Indicative direct operational employment figure was estimated to the nearest 100 jobs.

⁴⁴ Value not presented in the Phase 2b Sustainability Statement.

⁴⁵ Excludes Phase 2b as not presented in the Phase 2b Sustainability Statement.

⁴⁶ Number reported as an approximate equivalent of permanent full time construction jobs.

⁴⁷ The estimated permanent full time construction jobs for the Phase 2a AP revised scheme is lower than reported in Volume 3 of the main ES. This is due to changes in construction assumptions described in SES and AP ES Volume 2, Community area 1, 2, 3 and 5 reports and the correction included in Table 2 of this report.

⁴⁸ Jobs displaced comprise jobs relocated elsewhere in the UK economy and jobs lost, due to land being acquired for the construction and operation of the scheme (see the main ES, Volume 3 (Section 11) for details).

⁴⁹ The assessment method has materially changed since that used for the AP5 ES (December 2015) and hence the levels are not directly comparable.

⁵⁰ Total net present value of change in noise.

SES and AP ES Volume 3: Route-wide effects

	Phase One	Phase 2a AP revised scheme	Phase 2b	Overall total (Phase One, Phase 2a AP revised scheme and Phase 2b total)
Conservation Areas directly affected	2	4	5	11
Biodiversity and wildlife				
Natura 2000 sites affected	0	0	0	0
SSSIs directly affected	3	0	1	4
Habitats of principal importance directly affected	4 ¹	8 ³ ⁵¹	Refer to footnote ⁴⁴	124 ⁴⁵
Ancient Woodlands directly affected	3 ²	10 ⁵²	10 ⁵³	5 ²
Water resources and flood risk				
Major ⁵⁴ rivers diverted	8	0	4	12
Route through Flood Zone 3 (km)	12.0	2.4	18.2	32.6
Station/depot occupation of Flood Zone 3 (ha)	2.1	0.6 ⁵⁵	Refer to footnote ⁴⁴	2.7 ⁴⁵
Cutting or tunnel through SPZ 1 or 2 (km)	6.7	0.6	0.7	8
Land use resources				
Active landfills crossed	0	0	6	6
Grade 1 and 2 agricultural land (km)	22.0	9.9	34.5	66.4
Waste and material resources				
Excavated material (million m ³)	63.4 ⁵⁶	16.4 ⁵⁷	16.0	95.8
Concrete (million tonnes)	13.04	2.10	4.65	19.79
Steel (million tonnes)	1.30	0.13	0.51	1.94

⁵¹ This figure is the number of distinct areas of habitat of principal importance (e.g. individual qualifying grasslands and woodlands) that are within, or partially within, the land required for the AP revised scheme.

⁵² Total of 10 ancient woodlands, comprising two Ancient Woodland Inventory sites and eight additional ancient woodlands sites that have been added to the Ancient Woodland Inventory as a result of heritage surveys undertaken.

⁵³ Relates to Ancient Woodland Inventory sites only.

⁵⁴ Major rivers are defined, in the context of this table, as those with a catchment area greater than 50km² at the point of the route crossing. This definition is set out in the Phase 2b Sustainability Statement.

⁵⁵ Volume 3 of the main ES reported this area as 2.1ha, which included the IMB-R near Stone and surrounding area of land required for construction of the IMB-R. The area of land permanently required within Flood Zone 3 for the IMB-R in the original scheme is 0.6ha. Therefore, there is no change in the area of land permanently required for the IMB-R in the AP revised scheme compared to the original scheme.

⁵⁶ This figure is the total quantity of excavated material that will be generated from the construction of Phase One. This includes excavated material that will be reused in the construction process as well as excavated material that will be made available for use off-site or disposed of on or off site.

⁵⁷ This figure is the estimated quantity of excavated material that will be generated from the construction of the AP revised scheme (including waste generated as a result of SES changes and AP amendments). It includes excavated material that will be reused in the construction process as well as excavated material that may require off-site disposal.

17 References

Department for Communities and Local Government (2012), *National Planning Policy Framework*. Available online at: <https://www.gov.uk/guidance/national-planning-policy-framework>.

Directive 2000/60/EC of the *European Parliament and of the Council establishing a framework for Community action in the field of water policy* (Water Framework Directive or WFD) 2000. European Parliament and European Council, Strasbourg.

The Construction (Design and Management) Regulations, (2015). Her Majesty's Stationery Office, London. Available online at: http://www.legislation.gov.uk/ukxi/2015/51/pdfs/ukxi_20150051_en.pdf.

HS2 Ltd (2015). *High Speed Rail (London - West Midlands). Supplementary Environmental Statement 4 and Additional Provision 5 Environmental Statement. Volume 3. Route-wide effects*. Available online at: <http://www.gov.uk/hs2>.

HS2 Ltd (2017). *High Speed Rail (West Midlands - Crewe) Environmental Statement*. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>.

HS2 Ltd (2017), *High Speed Rail (West Midlands - Crewe) Environmental Statement Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report (Appendix CT-001-001)*. Available online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627187/E23_EIA_SMR_CT-001-001_WEB.pdf.

HS2 Ltd (2017), *High Speed Rail (West Midlands - Crewe) Environmental Statement Volume 5: Technical appendices, Environmental Impact Assessment Scope and Methodology Report Addendum (Appendix CT-001-002)*. Available online at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627189/E24-B_CT-001-002_Part_B_WEB.pdf.

HS2 Ltd (2017), *High Speed Rail (West Midlands - Crewe) Environmental Statement Volume 5: Technical appendices, draft Code of Construction Practice (CT-003-000)*. Available online at: <https://www.gov.uk/government/publications/draft-code-of-construction-practice-for-hs2-phase-2a>.

HS2 Ltd (2018), *High Speed Rail (West Midlands-Crewe) Supplementary Environmental Statement and Additional Provision Environmental Statement Volume 5, WFD Compliance Assessment Addendum (WR-001-000)*. Available online at: www.gov.uk/hs2

HS2 Ltd (2018), *High Speed Two Phase 2a (West Midlands-Crewe), Background Information and Data, Hydraulic modelling reports (BID-WR-004-000)*. Available online at: www.gov.uk/hs2.

Natural England (2008), *State of the Natural Environment. NE85*. Her Majesty's Stationery Office, London.

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

SES and AP ES Volume 3: Route-wide effects

Temple RSK, (2016), *High Speed Rail: Phase 2b Preferred Route. Sustainability Statement including Post Consultation Update. Volume 1: Main Report of the Appraisal of Sustainability*. Available online at:

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/568547/D25_WEB_C331_Sustainability_Statement_Including_Post_Consultation_Update_Volume_1_Main_Report_WEB_VERSION.pdf.

High Speed Two (HS2) Limited
Two Snowhill
Snow Hill Queensway
Birmingham B4 6GA

08081 434 434
HS2Enquiries@hs2.org.uk