

High Speed Rail (West Midlands - Crewe)

Supplementary Environmental Statement 2 and
Additional Provision 2 Environmental Statement

Volume 5: Technical appendices

CA3: Stone and Swynnerton
Air quality report (AQ-001-003)

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Department for Transport

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

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1 Introduction

1.1 Structure of this appendix

- 1.1.1 This document is an appendix to the air quality assessment which forms part of Volume 5 of the Supplementary Environmental Statement 2 (SES2) and Additional Provision 2 Environmental Statement (AP2 ES) for the Stone and Swynnerton community area (CA3).
- 1.1.2 This appendix provides details of changes to the air quality assessment since the production of the High Speed Two (HS2) Phase 2a (West Midlands - Crewe) Environmental Statement (ES)¹ published in July 2017 (the main ES), as well as the Supplementary Environmental Statement (SES1) and Additional Provision Environmental Statement (AP1 ES) published in March 2018².
- 1.1.3 This report should be read in conjunction with Volume 5, Appendix AQ-001-003, which accompanied the main ES, and Volume 5, Appendix AQ-001-000 of the SES1 and AP1 ES.
- 1.1.4 Maps referred to in this appendix are contained in the SES2 and AP2 ES Volume 5: Air quality Map Book, Map Series AQ-01. In addition, the traffic data used for the air quality assessment is set out in Background Information and Data (BID)³ which accompanies the SES2 and AP2 ES (see BID-AQ-002-000: Traffic data used for the air quality assessment in the SES2 and AP2 ES).
- 1.1.5 In this appendix the scheme is referred to as the AP2 revised scheme, which is the SES2 scheme (i.e. the SES1 scheme, submitted to Parliament in March 2018, with the changes described in the SES2) as amended by the AP2 amendments.
- 1.1.6 Where it has been possible to differentiate the air quality assessment between the SES2 changes and the AP2 amendments, this has been done and presented in this report. However, the assessment of road traffic emissions is a combined assessment of both SES2 changes and AP2 amendments in this area.

1.2 Scope, methodology, data sources, assumptions and limitations

- 1.2.1 The assessment scope, key assumptions and limitations are as set out in the main ES Environmental Impact Assessment Scope and Methodology Report and its Addendum (see main ES Volume 5: Appendix CT-001-001⁴ and Volume 5: Appendix CT-001-002⁵).

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

² HS2 Ltd (2018), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Supplementary Environmental Statement and Additional Provision Environmental Statement*, <https://www.gov.uk/government/collections/hs2-phase-2a-supplementary-environmental-statement-and-additional-provision-environmental-statement>

³ HS2 Ltd (2019), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Background Information and Data to accompany Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement*, <https://www.gov.uk/government/organisations/high-speed-two-limited>

⁴ HS2 Ltd (2017), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Environmental Impact Assessment Scope and Methodology Report, Main ES, Volume 5: Appendix CT-001-001*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627187/E23_EIA_SMR_CT-001-001_WEB.pdf

⁵ HS2 Ltd (2017), *High Speed Two (HS2) Phase 2a (West Midlands - Crewe), Environmental Impact Assessment Scope and Methodology Report Addendum, Main ES, Volume 5: Appendix CT-001-002*, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/627188/E24A_CT-001-002_Part_1_WEB.pdf

1.2.2 In order to differentiate between the original proposals assessed as part of the main ES and subsequent changes the following terms are used:

- 'the original scheme' – the Bill scheme submitted to Parliament in July 2017, which was assessed in the main ES;
- 'the SES1 scheme' – the original scheme with the changes described in the SES1 submitted in March 2018;
- 'the AP1 revised scheme' – the SES1 scheme as amended by the AP1 submitted in March 2018;
- 'the SES2 scheme' – the SES1 scheme with the changes described in the SES2; and
- 'the AP2 revised scheme' – the SES2 scheme as amended by the AP2.

2 Baseline air quality data

2.1 Overview

2.1.1 Since the production of the main ES as amended by the SES1 and AP1 ES, air quality measurements for the baseline year of 2016 have become available. Background pollutant concentrations provided by the Department for Environment, Food and Rural Affairs (Defra) have also been updated.

2.1.2 This section provides the new baseline information in the Stone and Swynnerton area.

2.2 Local air quality monitoring data

2.2.1 Monitoring sites within the study area that are considered relevant for this assessment are shown in the SES2 and AP2 ES Volume 5: Map AQ-01-103.

Continuous monitoring

2.2.2 There are no continuous air quality monitoring sites within the Stone and Swynnerton area.

Diffusion tubes

2.2.3 There are 16 diffusion tube sites within the Stone and Swynnerton area considered relevant for the assessment of air quality. Table 1 summarises the results from these diffusion tube sites. Annual mean nitrogen dioxide (NO₂) concentrations were above the air quality standard at one site along the A34 Stone Road in 2016.

Table 1: Annual mean NO₂ concentrations recorded at diffusion tube monitoring sites^{6,7}

Site	Ordnance Survey coordinates	Annual mean NO ₂ concentrations (µg/m ³)			
		2013	2014	2015	2016
DT18	386631, 342851	38	39	37	42
5	390231, 334928	29	32	33	34
8	385680, 342220	30	37	38	33
9	387347, 338484	26	24	24	30
10	387282, 339057	24	26	22	27
13	390310, 332960	24	20	28	26
14	390090, 333150	24	20	29	24
16	388666, 335429	30	25	29	30
19	391149, 331930	26	19	26	23

⁶ Stoke-on-Trent City Council (2017), 2017 Air Quality Annual Status Report

⁷ Stafford Borough Council (2018), 2018 Air Quality Annual Status Report

Site	Ordnance Survey coordinates	Annual mean NO ₂ concentrations (µg/m ³)			
		2013	2014	2015	2016
26	390048, 333273	29	33	24	33
40	384920, 341520	23	21	26	24
Stone	390050, 333270	27	31	37	27
Tittensor	387350, 338490	26	23	23	26
Trentham	386450, 341230	26	37	24	30
M6 Clayton	385080, 342022	33	37	38	36
M6.2	385096, 342012	33	32	32	33

2.3 Background pollutant concentrations

- 2.3.1 Since the production of the main ES as amended by the SES1 and AP1 ES, updated background pollutant concentrations have become available from Defra⁸.
- 2.3.2 The updated background NO₂, PM₁₀⁹ and PM_{2.5}¹⁰ concentrations are within the air quality standards throughout the study area for the baseline year of 2016. Annual mean NO₂ concentrations in the study area were in the range 6.0µg/m³ – 20.6µg/m³ in 2016. Annual mean PM₁₀ and PM_{2.5} concentrations were in the range 10.8µg/m³ – 16.1µg/m³ and 7.3µg/m³ – 10.3µg/m³ in 2016 respectively. The updated background pollutant concentrations are lower than those reported in the main ES as amended by the SES1 and AP1 ES.

⁸ Department for Environment, Food and Rural Affairs (Defra), *Background mapping data for local authorities - 2015*, <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015>

⁹ Particulate matter with aerodynamic diameter of less than 10 micrometres.

¹⁰ Particulate matter with aerodynamic diameter of less than 2.5 micrometres.

3 Air quality assessment – road traffic

3.1 Overview

3.1.1 This section provides details of the assessment of road traffic emissions during construction of the AP2 revised scheme. The assessment considers the combined effects of SES2 changes and AP2 amendments in this area.

3.2 Model verification

3.2.1 Since the production of the main ES, air quality measurements for the baseline year of 2016 have become available. The model verification has therefore been updated to take account of the 2016 monitoring data.

3.2.2 Model verification was undertaken on a route-wide basis where monitoring sites are located adjacent to the modelled road network. The objectives of the model verification are to evaluate model performance and to determine if model adjustment is required.

3.2.3 Some of the monitoring locations were not considered suitable for model verification, due to missing traffic or monitoring data, or other spatial considerations. A total of 21 monitoring sites were included in the verification exercise. The comparison of monitored and modelled NO₂ concentrations is shown in Table 2.

Table 2: Comparison of monitored and modelled NO₂ concentrations

Site	Monitored concentration (µg/m ³)	Modelled concentration (µg/m ³)	Difference [(modelled – monitored/monitored) *100]
CE206	30.7	22.9	-25.4%
CE225	35.1	25.1	-28.4%
CE247	20.6	20.1	-2.6%
DT28	30.8	32.6	5.9%
2	34.0	49.5	45.5%
5	34.0	21.5	-36.8%
8	33.0	40.7	23.2%
10	27.0	23.4	-13.4%
21	27.0	22.4	-16.9%
26	33.0	31.0	-6.1%
29	25.0	23.4	-6.5%
M6CLAYTON	36.0	46.7	29.6%

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Site	Monitored concentration (µg/m ³)	Modelled concentration (µg/m ³)	Difference [(modelled – monitored)/monitored] *100]
DT13	35.0	34.0	-2.8%
DT14	39.0	34.7	-11.2%
DT36	38.0	36.8	-3.2%
DT38	37.0	29.3	-20.8%
DT39	39.0	31.7	-18.6%
DT43	41.0	37.9	-7.5%
A38-1	43.0	41.7	-3.0%
A38-2/2(1)	37.6	40.0	6.4%
A38-2A/B	45.1	42.8	-5.2%

3.2.4 As the majority of modelled NO₂ concentrations were within ±25% of the monitored concentrations and there was no systematic under or over prediction, no model adjustment was undertaken. Modelled concentrations of PM₁₀ and PM_{2.5} have not been adjusted.

3.2.5 Therefore, no changes are predicted from the assessment presented in the main ES.

3.3 Assessment of construction traffic emissions

3.3.1 Construction traffic data used in this assessment is detailed in the BID that accompanies the SES2 and AP2 ES (see BID-AQ-002-000: Traffic data used for the air quality assessment in the SES2 and AP2 ES). The assessment of construction traffic emissions has used traffic data based on an estimate of the average daily flows at the peak year during the construction period (2020-2026). However, vehicle emissions and background concentrations have been taken for the first construction year in 2020.

3.3.2 As set out in SES2 and AP2 ES Volume 1, Introduction to the SES2 and the AP2 ES, since the production of the main ES, updated background pollutant concentrations⁸ and road vehicle emission factors¹¹ have become available from Defra. These have been used in this assessment. The updated road vehicle emission factors are higher for nitrogen oxides (NO_x) than those used in the main ES, especially along motorways. Therefore, higher concentrations have been predicted for the future baseline scenario (without the HS2 scheme). At locations where NO₂ concentrations are predicted to exceed the annual mean air quality standard of 40µg/m³ without the scheme, it is more likely that a small increase in concentrations due to the scheme will result in a significant effect.

¹¹ Department for Environment, Food and Rural Affairs (Defra), *Emissions Factors Toolkit*, <https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html>

Screening of traffic data

3.3.3 The screening process has identified a total of ten roads in the Stone and Swynnerton area for further assessment. These are:

- the M6 motorway;
- the A500 Queensway;
- the A5182 Trentham Road;
- the A34 Stafford Road;
- the A51 Stone South;
- the A51 Butterhill Bank;
- the A50 Uttoxeter Road;
- Yarnfield Lane; and
- new construction sliproads on the M6 motorway around Yarnfield Lane.

3.3.4 Traffic data for construction vehicles using the haul roads and moving between compounds has also been included in the assessment. Further roads have been included in the assessment to account for their emissions at nearby receptors.

Receptors assessed and background concentrations

3.3.5 Table 3 presents the sensitive receptors included in this assessment and the background pollutant concentrations for 2020.

3.3.6 No ecological receptors were identified within 200m of the screened in roads within the Stone and Swynnerton area during construction of the AP2 revised scheme.

Table 3: Modelled receptors (construction phase) and 2020 background pollutant concentrations

Receptor	Description/location	Ordnance Survey coordinates	Background concentrations in 2020 ($\mu\text{g}/\text{m}^3$)			
			NO _x	NO ₂	PM ₁₀	PM _{2.5}
3-C-H1	Sandyford Farm, Sandyford	385731,336206	12.5	9.5	14.4	9.1
3-C-H2	Blakelow Farm, Blakelow, Swynnerton	386676,335309	18.3	13.6	15.1	9.5
3-C-H3	Kennels Cottages, Hall Lane, Swynnerton	385733,335819	10.1	7.7	11.9	8.0
3-C-H4	White House, Stab Lane, Swynnerton	384978,336394	9.6	7.4	12.7	8.3
3-C-H5	Cliffords Wood Bungalows, Stone Road, Swynnerton	384367,336803	9.6	7.4	12.7	8.3
3-C-H6	Whitemoor Farm, Yarnfield Lane, Yarnfield	387634,333249	18.8	13.9	14.9	9.4
3-C-H7	Eastwood, Stone Road, Swynnerton	384477,336707	9.6	7.4	12.7	8.3
3-C-H8	Walton House Farm, Common Lane, Stone	389256,331854	11.9	9.1	13.1	8.5

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Receptor	Description/location	Ordnance Survey coordinates	Background concentrations in 2020 ($\mu\text{g}/\text{m}^3$)			
			NOx	NO ₂	PM ₁₀	PM _{2.5}
3-C-H9	Proposed residential development for up to 500 dwellings, Eccleshall Road – Committed Development (Policy Stone 2 West & South of Stone Housing)	388958,333379	13.1	9.9	13.5	8.8
3-C-H10	Sandyford Cottage, Sandyford	385902,336414	12.5	9.5	14.4	9.1
3-C-H11	Hanchurch House, Hanchurch	385263,341022	17.7	13.2	13.9	8.8
3-C-H12	Fielding Street, Stoke-On-Trent	387813,344231	21.6	15.5	13.4	8.7
3-C-H14	Highfield Drive, Stoke-On-Trent	389048,343636	18.8	13.8	13.3	8.6
3-C-H15	Grove Road, Stoke-On-Trent	388973,343779	22.4	16.1	14.4	9.2
3-C-H16	Newcastle Road, Clayton	385099,342011	17.9	13.3	13.8	8.8
3-C-H17	The Villa, Clayton Road, Newcastle	385104,342172	17.9	13.3	13.8	8.8
3-C-H18	Five Oaks, Knowl Wall, Beech	385319,338874	18.4	13.7	14.6	9.3
3-C-H20	South Lodge, Darlaston Park, Stone	389164,334056	16.7	12.3	13.1	8.9
3-C-H21	Hanchurch Lane, Hanchurch, Stoke-On-Trent	384893,341530	15.6	11.7	14.2	8.9
3-C-H23	Whitmore Road, Hanchurch Crossroad, Newcastle	385078,341833	17.7	13.2	13.9	8.8
3-C-H24	Northwood Lane, Newcastle	385656,342223	17.9	13.3	13.8	8.8
3-C-H25	Nutbrook Avenue, Stoke-On-Trent	388438,343849	22.4	16.1	14.4	9.2
3-C-H27	Greathills, Top Lane, Beech	385521,337797	17.7	13.2	14.7	9.3
3-C-H29	Moss House, Yarnfield Lane, Yarnfield	387323,332928	11.3	8.6	11.8	7.8
3-C-H30	Uttoxeter Road, Stoke-On-Trent	393331,342209	16.5	12.2	13.5	8.6
3-C-H31	Darlaston Grange Cottages, Yarnfield Lane, Yarnfield	388478,333850	13.1	9.9	13.5	8.8
3-C-H32	Greenacres, Chase Lane, Sandyford	386114,336573	17.2	12.8	14.7	9.3
3-C-H34	Victoria Cottage, Moss Lane, Yarnfield	387379,333042	18.8	13.9	14.9	9.4
3-C-H35	The Bungalow, Rose Tree Avenue, Trent Vale	386094,342503	17.5	12.9	13.5	8.6
3-C-H36	Forge Farm, Stafford Road, Aston By Stone, Stone	391136,331987	12.5	9.5	12.0	8.1

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Receptor	Description/location	Ordnance Survey coordinates	Background concentrations in 2020 ($\mu\text{g}/\text{m}^3$)			
			NOx	NO2	PM10	PM2.5
3-C-H37	The Bungalow, Stone Road, Yarlet, Stafford	391243,329873	11.1	8.5	11.5	7.8
3-C-H38	Aston Hill House, Stafford Road, Aston By Stone, Stone	391341,330805	11.2	8.6	11.5	7.7
3-C-H39	Wood Farm, Stone Road, Yarlet, Stafford	391337,330100	11.2	8.6	11.5	7.7
3-C-H40	Poultry Farm, Knowl Wall, Beech, Stoke-On-Trent	385414,339065	18.7	13.9	14.7	9.3
3-C-H41	Crown Inn, Stafford Road, Stone	391273,330945	11.2	8.6	11.5	7.7
3-C-H42	The Croft, Lichfield Road, Stone	391816,332235	14.5	10.8	12.3	8.4
3-C-H43	Northwood Farm Stables, Northwood Lane, Northwood, Newcastle Under Lyme	385688,342139	17.9	13.3	13.8	8.8
3-C-H44	59 Copeland Drive, Stone	391600,332286	14.5	10.8	12.3	8.4
3-C-H45	Cemetery Lodge, Stafford Road, Stone	390891,332234	15.7	11.7	13.4	9.0
3-C-H46	1017 Uttoxeter Road, Stoke-On-Trent	393870,341978	13.6	10.2	12.2	7.8

Assessment results

3.3.7 Table 4 to Table 6 provide the summary of the modelled pollutant concentrations at the assessed receptors, including the magnitude of change and impact descriptor, and comparison against the main ES as amended by SES₁ and AP₁ ES.

Table 4: Predicted annual mean NO₂ concentrations and impacts (construction)

Receptor	Description/location	NO ₂ concentrations (µg/m ³)		Change in NO ₂ concentrations (µg/m ³)	Impact descriptor	Impact descriptor in the main ES as amended by SES ₁ and AP ₁ ES	Significance
		2020 without the AP ₂ revised scheme	2020 with the AP ₂ revised scheme				
3-C-H1	Sandyford Farm, Sandyford	14.2	14.5	0.3	Negligible	Negligible	Not significant
3-C-H2	Blakelow Farm, Blakelow, Swynnerton	23.6	23.9	0.3	Negligible	Negligible	Not significant
3-C-H3	Kennels Cottages, Hall Lane, Swynnerton	11.1	11.3	0.2	Negligible	Negligible	Not significant
3-C-H4	White House, Stab Lane, Swynnerton	9.8	10.0	0.2	Negligible	Negligible	Not significant
3-C-H5	Cliffords Wood Bungalows, Stone Road, Swynnerton	10.9	11.1	0.2	Negligible	Negligible	Not significant
3-C-H6	Whitemoor Farm, Yarnfield Lane, Yarnfield	28.7	29.0	0.3	Negligible	Negligible	Not significant
3-C-H7	Eastwood, Stone Road, Swynnerton	9.7	9.9	0.2	Negligible	Negligible	Not significant
3-C-H8	Walton House Farm, Common Lane, Stone	13.8	14.0	0.2	Negligible	Negligible	Not significant
3-C-H9	Proposed residential development for up to 500 dwellings, Eccleshall Road – Committed Development (Policy Stone 2 West & South of Stone Housing)	12.6	13.1	0.5	Negligible	Negligible	Not significant

Receptor	Description/location	NO2 concentrations ($\mu\text{g}/\text{m}^3$)		Change in NO2 concentrations ($\mu\text{g}/\text{m}^3$)	Impact descriptor	Impact descriptor in the main ES as amended by SES1 and AP1 ES	Significance
		2020 without the AP2 revised scheme	2020 with the AP2 revised scheme				
3-C-H10	Sandyford Cottage, Sandyford	18.9	19.0	0.1	Negligible	Negligible	Not significant
3-C-H11	Hanchurch House, Hanchurch	39.2	39.4	0.2	Slight adverse	Negligible	Not significant
3-C-H12	Fielding Street, Stoke-On-Trent	20.8	20.8	0.0	Negligible	Negligible	Not significant
3-C-H14	Highfield Drive, Stoke-On-Trent	20.4	20.4	0.0	Negligible	Negligible	Not significant
3-C-H15	Grove Road, Stoke-On-Trent	23.6	23.6	0.0	Negligible	Negligible	Not significant
3-C-H16	Newcastle Road, Clayton	31.2	31.6	0.4	Negligible	Negligible	Not significant
3-C-H17	The Villa, Clayton Road, Newcastle	29.0	29.2	0.2	Negligible	Negligible	Not significant
3-C-H18	Five Oaks, Knowl Wall, Beech	22.9	23.0	0.1	Negligible	Negligible	Not significant
3-C-H20	South Lodge, Darlaston Park, Stone	15.0	15.1	0.1	Negligible	Negligible	Not significant
3-C-H21	Hanchurch Lane, Hanchurch, Stoke-On-Trent	27.4	27.5	0.1	Negligible	Negligible	Not significant
3-C-H23	Whitmore Road, Hanchurch Crossroad, Newcastle	28.3	28.6	0.3	Negligible	Negligible	Not significant
3-C-H24	Northwood Lane, Newcastle	25.6	25.8	0.2	Negligible	Negligible	Not significant
3-C-H25	Nutbrook Avenue, Stoke-On-Trent	21.0	21.0	0.0	Negligible	Negligible	Not significant
3-C-H27	Greathills, Top Lane, Beech	23.9	24.0	0.1	Negligible	Negligible	Not significant

Receptor	Description/location	NO2 concentrations ($\mu\text{g}/\text{m}^3$)		Change in NO2 concentrations ($\mu\text{g}/\text{m}^3$)	Impact descriptor	Impact descriptor in the main ES as amended by SES1 and AP1 ES	Significance
		2020 without the AP2 revised scheme	2020 with the AP2 revised scheme				
3-C-H29	Moss House, Yarnfield Lane, Yarnfield	13.2	13.2	0.0	Negligible	Negligible	Not significant
3-C-H30	Uttoxeter Road, Stoke-On-Trent	25.3	25.3	0.0	Negligible	Negligible	Not significant
3-C-H31	Darlaston Grange Cottages, Yarnfield Lane, Yarnfield	13.9	14.0	0.1	Negligible	Negligible	Not significant
3-C-H32	Greenacres, Chase Lane, Sandyford	37.3	37.5	0.2	Negligible	Negligible	Not significant
3-C-H34	Victoria Cottage, Moss Lane, Yarnfield	19.1	19.2	0.1	Negligible	Negligible	Not significant
3-C-H35	The Bungalow, Rose Tree Avenue, Trent Vale	23.5	23.6	0.1	Negligible	Negligible	Not significant
3-C-H36	Forge Farm, Stafford Road, Aston By Stone, Stone	15.5	15.7	0.2	Negligible	N/A	Not significant
3-C-H37	The Bungalow, Stone Road, Yarlet, Stafford	14.2	14.3	0.1	Negligible	N/A	Not significant
3-C-H38	Aston Hill House, Stafford Road, Aston By Stone, Stone	16.9	17.1	0.2	Negligible	N/A	Not significant
3-C-H39	Wood Farm, Stone Road, Yarlet, Stafford	17.7	17.9	0.2	Negligible	N/A	Not significant
3-C-H40	Poultry Farm, Knowl Wall, Beech, Stoke-On-Trent	35.1	35.2	0.1	Negligible	N/A	Not significant
3-C-H41	Crown Inn, Stafford Road, Stone	15.0	15.1	0.1	Negligible	N/A	Not significant
3-C-H42	The Croft, Lichfield Road, Stone	15.8	15.9	0.1	Negligible	N/A	Not significant

Receptor	Description/location	NO ₂ concentrations (µg/m ³)		Change in NO ₂ concentrations (µg/m ³)	Impact descriptor	Impact descriptor in the main ES as amended by SES ₁ and AP ₁ ES	Significance
		2020 without the AP ₂ revised scheme	2020 with the AP ₂ revised scheme				
3-C-H43	Northwood Farm Stables, Northwood Lane, Northwood, Newcastle Under Lyme	21.1	21.2	0.1	Negligible	N/A	Not significant
3-C-H44	59 Copeland Drive, Stone	17.9	18.0	0.1	Negligible	N/A	Not significant
3-C-H45	Cemetery Lodge, Stafford Road, Stone	23.1	23.4	0.3	Negligible	N/A	Not significant
3-C-H46	1017 Uttoxeter Road, Stoke-On-Trent	25.3	25.3	0.0	Negligible	Negligible	Not significant

Table 5: Predicted annual mean PM₁₀ concentrations and impacts (construction)

Receptor	Description/location	PM ₁₀ concentrations (µg/m ³)		Change in PM ₁₀ concentrations (µg/m ³)	Impact descriptor	Impact descriptor in the main ES as amended by SES ₁ and AP ₁ ES	Significance
		2020 without the AP ₂ revised scheme	2020 with the AP ₂ revised scheme				
3-C-H1	Sandyford Farm, Sandyford	15.0	15.0	0.0	Negligible	Negligible	Not significant
3-C-H2	Blakelow Farm, Blakelow, Swynnerton	16.3	16.3	0.0	Negligible	Negligible	Not significant
3-C-H3	Kennels Cottages, Hall Lane, Swynnerton	12.3	12.3	0.0	Negligible	Negligible	Not significant
3-C-H4	White House, Stab Lane, Swynnerton	13.0	13.0	0.0	Negligible	Negligible	Not significant
3-C-H5	Cliffords Wood Bungalows, Stone Road, Swynnerton	13.2	13.2	0.0	Negligible	Negligible	Not significant
3-C-H6	Whitemoor Farm, Yarnfield Lane, Yarnfield	16.7	16.8	0.1	Negligible	Negligible	Not significant

Receptor	Description/location	PM10 concentrations ($\mu\text{g}/\text{m}^3$)		Change in PM10 concentrations ($\mu\text{g}/\text{m}^3$)	Impact descriptor	Impact descriptor in the main ES as amended by SES1 and AP1 ES	Significance
		2020 without the AP2 revised scheme	2020 with the AP2 revised scheme				
3-C-H7	Eastwood, Stone Road, Swynnerton	13.0	13.0	0.0	Negligible	Negligible	Not significant
3-C-H8	Walton House Farm, Common Lane, Stone	13.6	13.6	0.0	Negligible	Negligible	Not significant
3-C-H9	Proposed residential development for up to 500 dwellings, Eccleshall Road – Committed Development (Policy Stone 2 West & South of Stone Housing)	13.8	13.9	0.1	Negligible	Negligible	Not significant
3-C-H10	Sandyford Cottage, Sandyford	15.5	15.6	0.1	Negligible	Negligible	Not significant
3-C-H11	Hanchurch House, Hanchurch	17.2	17.3	0.1	Negligible	Negligible	Not significant
3-C-H12	Fielding Street, Stoke-On-Trent	14.6	14.6	0.0	Negligible	Negligible	Not significant
3-C-H14	Highfield Drive, Stoke-On-Trent	14.8	14.8	0.0	Negligible	Negligible	Not significant
3-C-H15	Grove Road, Stoke-On-Trent	16.2	16.2	0.0	Negligible	Negligible	Not significant
3-C-H16	Newcastle Road, Clayton	16.4	16.5	0.1	Negligible	Negligible	Not significant
3-C-H17	The Villa, Clayton Road, Newcastle	16.3	16.3	0.0	Negligible	Negligible	Not significant
3-C-H18	Five Oaks, Knowl Wall, Beech	15.7	15.7	0.0	Negligible	Negligible	Not significant
3-C-H20	South Lodge, Darlaston Park, Stone	13.5	13.5	0.0	Negligible	Negligible	Not significant
3-C-H21	Hanchurch Lane, Hanchurch, Stoke-On-Trent	16.2	16.2	0.0	Negligible	Negligible	Not significant

Receptor	Description/location	PM10 concentrations ($\mu\text{g}/\text{m}^3$)		Change in PM10 concentrations ($\mu\text{g}/\text{m}^3$)	Impact descriptor	Impact descriptor in the main ES as amended by SES1 and AP1 ES	Significance
		2020 without the AP2 revised scheme	2020 with the AP2 revised scheme				
3-C-H23	Whitmore Road, Hanchurch Crossroad, Newcastle	15.8	15.9	0.1	Negligible	Negligible	Not significant
3-C-H24	Northwood Lane, Newcastle	16.6	16.6	0.0	Negligible	Negligible	Not significant
3-C-H25	Nutbrook Avenue, Stoke-On-Trent	15.5	15.5	0.0	Negligible	Negligible	Not significant
3-C-H27	Greathills, Top Lane, Beech	16.0	16.0	0.0	Negligible	Negligible	Not significant
3-C-H29	Moss House, Yarnfield Lane, Yarnfield	12.3	12.3	0.0	Negligible	Negligible	Not significant
3-C-H30	Uttoxeter Road, Stoke-On-Trent	16.6	16.6	0.0	Negligible	Negligible	Not significant
3-C-H31	Darlaston Grange Cottages, Yarnfield Lane, Yarnfield	14.0	14.1	0.1	Negligible	Negligible	Not significant
3-C-H32	Greenacres, Chase Lane, Sandyford	17.8	17.8	0.0	Negligible	Negligible	Not significant
3-C-H34	Victoria Cottage, Moss Lane, Yarnfield	15.5	15.6	0.1	Negligible	Negligible	Not significant
3-C-H35	The Bungalow, Rose Tree Avenue, Trent Vale	15.9	15.9	0.0	Negligible	Negligible	Not significant
3-C-H36	Forge Farm, Stafford Road, Aston By Stone, Stone	13.1	13.2	0.1	Negligible	N/A	Not significant
3-C-H37	The Bungalow, Stone Road, Yarlet, Stafford	12.4	12.4	0.0	Negligible	N/A	Not significant
3-C-H38	Aston Hill House, Stafford Road, Aston By Stone, Stone	13.1	13.2	0.1	Negligible	N/A	Not significant

Receptor	Description/location	PM10 concentrations ($\mu\text{g}/\text{m}^3$)		Change in PM10 concentrations ($\mu\text{g}/\text{m}^3$)	Impact descriptor	Impact descriptor in the main ES as amended by SES1 and AP1 ES	Significance
		2020 without the AP2 revised scheme	2020 with the AP2 revised scheme				
3-C-H39	Wood Farm, Stone Road, Yarlet, Stafford	12.9	12.9	0.0	Negligible	N/A	Not significant
3-C-H40	Poultry Farm, Knowl Wall, Beech, Stoke-On-Trent	17.3	17.3	0.0	Negligible	N/A	Not significant
3-C-H41	Crown Inn, Stafford Road, Stone	12.7	12.8	0.1	Negligible	N/A	Not significant
3-C-H42	The Croft, Lichfield Road, Stone	13.3	13.3	0.0	Negligible	N/A	Not significant
3-C-H43	Northwood Farm Stables, Northwood Lane, Northwood, Newcastle Under Lyme	15.4	15.4	0.0	Negligible	N/A	Not significant
3-C-H44	59 Copeland Drive, Stone	13.8	13.8	0.0	Negligible	N/A	Not significant
3-C-H45	Cemetery Lodge, Stafford Road, Stone	15.3	15.4	0.1	Negligible	N/A	Not significant
3-C-H46	1017 Uttoxeter Road, Stoke-On-Trent	15.8	15.8	0.0	Negligible	Negligible	Not significant

Table 6: Predicted annual mean PM2.5 concentrations and impacts (construction)

Receptor	Description/location	PM2.5 concentrations ($\mu\text{g}/\text{m}^3$)		Change in PM2.5 concentrations ($\mu\text{g}/\text{m}^3$)	Impact descriptor	Impact descriptor in the main ES as amended by SES1 and AP1 ES	Significance
		2020 without the AP2 revised scheme	2020 with the AP2 revised scheme				
3-C-H1	Sandyford Farm, Sandyford	9.5	9.5	0.0	Negligible	Negligible	Not significant
3-C-H2	Blakelow Farm, Blakelow, Swynnerton	10.3	10.3	0.0	Negligible	Negligible	Not significant
3-C-H3	Kennels Cottages, Hall Lane, Swynnerton	8.2	8.2	0.0	Negligible	Negligible	Not significant
3-C-H4	White House, Stab Lane, Swynnerton	8.4	8.4	0.0	Negligible	Negligible	Not significant
3-C-H5	Cliffords Wood Bungalows, Stone Road, Swynnerton	8.5	8.6	0.1	Negligible	Negligible	Not significant
3-C-H6	Whitemoor Farm, Yarnfield Lane, Yarnfield	10.6	10.6	0.0	Negligible	Negligible	Not significant
3-C-H7	Eastwood, Stone Road, Swynnerton	8.4	8.4	0.0	Negligible	Negligible	Not significant
3-C-H8	Walton House Farm, Common Lane, Stone	8.9	8.9	0.0	Negligible	Negligible	Not significant
3-C-H9	Proposed residential development for up to 500 dwellings, Eccleshall Road – Committed Development (Policy Stone 2 West & South of Stone Housing)	9.0	9.0	0.0	Negligible	Negligible	Not significant
3-C-H10	Sandyford Cottage, Sandyford	9.8	9.9	0.1	Negligible	Negligible	Not significant
3-C-H11	Hanchurch House, Hanchurch	10.9	11.0	0.1	Negligible	Negligible	Not significant
3-C-H12	Fielding Street, Stoke-On-Trent	9.3	9.3	0.0	Negligible	Negligible	Not significant

Receptor	Description/location	PM2.5 concentrations ($\mu\text{g}/\text{m}^3$)		Change in PM2.5 concentrations ($\mu\text{g}/\text{m}^3$)	Impact descriptor	Impact descriptor in the main ES as amended by SES1 and AP1 ES	Significance
		2020 without the AP2 revised scheme	2020 with the AP2 revised scheme				
3-C-H14	Highfield Drive, Stoke-On-Trent	9.4	9.4	0.0	Negligible	Negligible	Not significant
3-C-H15	Grove Road, Stoke-On-Trent	10.2	10.2	0.0	Negligible	Negligible	Not significant
3-C-H16	Newcastle Road, Clayton	10.4	10.4	0.0	Negligible	Negligible	Not significant
3-C-H17	The Villa, Clayton Road, Newcastle	10.3	10.3	0.0	Negligible	Negligible	Not significant
3-C-H18	Five Oaks, Knowl Wall, Beech	10.0	10.0	0.0	Negligible	Negligible	Not significant
3-C-H20	South Lodge, Darlaston Park, Stone	9.1	9.1	0.0	Negligible	Negligible	Not significant
3-C-H21	Hanchurch Lane, Hanchurch, Stoke-On-Trent	10.2	10.2	0.0	Negligible	Negligible	Not significant
3-C-H23	Whitmore Road, Hanchurch Crossroad, Newcastle	10.0	10.1	0.1	Negligible	Negligible	Not significant
3-C-H24	Northwood Lane, Newcastle	10.4	10.4	0.0	Negligible	Negligible	Not significant
3-C-H25	Nutbrook Avenue, Stoke-On-Trent	9.8	9.8	0.0	Negligible	Negligible	Not significant
3-C-H27	Greathills, Top Lane, Beech	10.1	10.1	0.0	Negligible	Negligible	Not significant
3-C-H29	Moss House, Yarnfield Lane, Yarnfield	8.2	8.2	0.0	Negligible	Negligible	Not significant
3-C-H30	Uttoxeter Road, Stoke-On-Trent	10.4	10.4	0.0	Negligible	Negligible	Not significant
3-C-H31	Darlaston Grange Cottages, Yarnfield Lane,	9.1	9.1	0.0	Negligible	Negligible	Not significant

Receptor	Description/location	PM2.5 concentrations ($\mu\text{g}/\text{m}^3$)		Change in PM2.5 concentrations ($\mu\text{g}/\text{m}^3$)	Impact descriptor	Impact descriptor in the main ES as amended by SES1 and AP1 ES	Significance
		2020 without the AP2 revised scheme	2020 with the AP2 revised scheme				
	Yarnfield						
3-C-H32	Greenacres, Chase Lane, Sandyford	11.3	11.3	0.0	Negligible	Negligible	Not significant
3-C-H34	Victoria Cottage, Moss Lane, Yarnfield	9.8	9.8	0.0	Negligible	Negligible	Not significant
3-C-H35	The Bungalow, Rose Tree Avenue, Trent Vale	10.0	10.0	0.0	Negligible	Negligible	Not significant
3-C-H36	Forge Farm, Stafford Road, Aston By Stone, Stone	8.7	8.7	0.0	Negligible	N/A	Not significant
3-C-H37	The Bungalow, Stone Road, Yarlet, Stafford	8.3	8.3	0.0	Negligible	N/A	Not significant
3-C-H38	Aston Hill House, Stafford Road, Aston By Stone, Stone	8.6	8.6	0.0	Negligible	N/A	Not significant
3-C-H39	Wood Farm, Stone Road, Yarlet, Stafford	8.5	8.6	0.1	Negligible	N/A	Not significant
3-C-H40	Poultry Farm, Knowl Wall, Beech, Stoke-On-Trent	10.9	11.0	0.1	Negligible	N/A	Not significant
3-C-H41	Crown Inn, Stafford Road, Stone	8.4	8.4	0.0	Negligible	N/A	Not significant
3-C-H42	The Croft, Lichfield Road, Stone	8.9	8.9	0.0	Negligible	N/A	Not significant
3-C-H43	Northwood Farm Stables, Northwood Lane, Northwood, Newcastle Under Lyme	9.7	9.7	0.0	Negligible	N/A	Not significant
3-C-H44	59 Copeland Drive, Stone	9.2	9.2	0.0	Negligible	N/A	Not significant

Receptor	Description/location	PM2.5 concentrations ($\mu\text{g}/\text{m}^3$)		Change in PM2.5 concentrations ($\mu\text{g}/\text{m}^3$)	Impact descriptor	Impact descriptor in the main ES as amended by SES1 and AP1 ES	Significance
		2020 without the AP2 revised scheme	2020 with the AP2 revised scheme				
3-C-H45	Cemetery Lodge, Stafford Road, Stone	10.1	10.1	0.0	Negligible	N/A	Not significant
3-C-H46	1017 Uttoxeter Road, Stoke-On-Trent	9.9	9.9	0.0	Negligible	Negligible	Not significant

- 3.3.8 The annual mean NO₂, PM₁₀ and PM_{2.5} concentrations are predicted to be within the air quality standards during construction of the AP2 revised scheme. Since the annual mean NO₂ concentrations are predicted to be less than 60µg/m³, the hourly mean standard is also expected to be met. Similarly, since the annual mean PM₁₀ concentrations are predicted to be below 35µg/m³, the daily mean standard is also expected to be met.
- 3.3.9 Negligible impacts are predicted at all receptors for annual mean NO₂, PM₁₀ and PM_{2.5} concentrations.

Assessment of significance

- 3.3.10 No significant effects are anticipated at any receptor in relation to annual mean NO₂, PM₁₀ and PM_{2.5} concentrations.
- 3.3.11 There are no new or different significant effects from the construction of the AP2 revised scheme compared to the main ES as amended by SES1 and AP1 ES.

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