

HS2

Hanchurch Air Quality Report

Phase 2a (West Midlands - Crewe)

FINAL

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1 Introduction

1.1 Background

- 1.1.1 In its petition to the House of Commons Select Committee in response to the HS2 Phase 2a Addition Provisions 2, a residents group (known as the Newcastle Road residents) raised concerns about the HS2 Phase 2a scheme. The concern particularly related to proposed amendment AP2-003-017: Additional land required for modifications to the roundabout junction of the A500 Queensway/A519 Newcastle Road/A519 Clayton Road (Hanchurch Interchange) and the signalised crossroads junction of the A519 Newcastle Road/A5182 Trentham Road/B5038 Whitmore Road and a new temporary satellite construction compound, which introduced improvements to the Hanchurch Interchange roundabout and surrounding road infrastructure¹.
- 1.1.2 As part of the Environmental Impact Assessment (EIA) of the AP2 revised scheme, no significant effects for local air quality were reported in the Supplementary Environmental Statement 2 and Additional Provision 2 in the Stone and Swynnerton area.
- 1.1.3 In their petition (AP2-00075) the Newcastle Road residents stated the following:
- *'Residents are concerned about the air quality both during and after the re-configuration of the roads here if the projected number of HGVs is accurate. The A500 junction with the roundabout and Newcastle Road has air quality monitoring equipment already installed';* and
 - In a response to the question 'What do they want to be done in response', the petitioner responded, *'Constant monitoring of the air quality along Newcastle Road and, should the CO2/NOx gas emissions levels become unacceptably high, contingency plans to be made for re-routing HS2 HGV traffic'.*
- 1.1.4 During engagement with HS2 Ltd in relation to the AP2 revised scheme, the Newcastle Road residents group raised concerns regarding the potential impacts the HS2 Phase 2a scheme might have on local air quality, the methodology used, and the result of the air quality assessment.
- 1.1.5 This report has been produced in response to the concerns of the Newcastle Road residents regarding air quality in relation to the HS2 Phase 2a scheme. The report aims to:

¹ In response to the Newcastle Road residents' appearance, the HOC SC made a recommendation to the Promoter to provide a crossing point of the A519/A500 to avoid severance to non-motorised users (NMU). This is the subject of a separate study and report (Document no. C861-ARP-HY-NOT-000-000021 A500 Queensway - Crossing Options Study).

- create a single source of information regarding the air quality assessment undertaken as part of the EIA;
- set out the contribution that the HS2 Phase 2a scheme, and in particular amendment AP2-003-017, will have on the future baseline during construction and operation; and
- Set out details of what controls the nominated undertaker² will put in place to ensure compliance to the Environmental Minimum Requirements (EMRs)³.

1.2 Air quality reporting

- 1.2.1 The air quality assessment undertaken at Hanchurch is detailed in Section 5 Volume 2 of the Community Area 3 report, Stone and Swynnerton, and Volume 5: Appendix AQ-001-003 of the HS2 Phase 2a Environmental Statement⁴ (ES).
- 1.2.2 Updated environmental information, changes to the design and construction assumptions and amendments to the Phase 2a Bill were published in:
- (HS2 Phase 2a Supplementary Environmental Statement (SES) and Additional Provision (AP ES⁵) March 2018; and
 - HS2 Phase 2a Supplementary Environmental Statement 2 (SES2) and Additional Provision 2 (AP2 ES) February 2019.
- 1.2.3 Changes relating to the viaduct crossing of the Norton Bridge and Stone Railway in the AP1 ES (reported under AP1-003-001: Additional land permanently required and a change in the powers of the hybrid Bill for the viaduct crossing of the Norton Bridge to Stone Railway and track crossovers along the HS2 route), which affected the traffic flows during construction at the southern part of Newcastle Road, which triggered the need for a revision to the air quality assessment. The air quality assessment is reported in Section 5.1 of the Volume 2 Community Area 3 report, Stone and Swynnerton, and Volume 5: Appendix AQ-001-000 of the SES and AP ES.
- 1.2.4 Changes in construction traffic flows as a result of design changes and amendments in the SES2 and AP2 ES⁶ also triggered the need for a revision to the

² 'Nominated undertaker' means the organisation or organisations which will be appointed by the Secretary of State to design, construct, operate and maintain High Speed Rail (West Midlands - Crewe).

³ HS2 Ltd (2019). High Speed Rail (West Midlands - Crewe) Draft Environmental Minimum Requirements, Annex 1: Draft Code of Construction Practice. Available online at <https://www.gov.uk/government/publications/environmental-minimum-requirements-for-hs2-phase-2a>

⁴ 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>

⁵ HS2 Ltd (2018), High Speed Rail (West Midlands – Crewe) Supplementary Environmental Statement and Additional Provision Environmental Statement. Available online at: <https://www.gov.uk/government/collections/hs2-phase-2a-supplementary-environmental-statement-and-additional-provision-environmental-statement>

⁶ The impact of the design changes and amendments on construction traffic flows, including resulting impacts on air quality, have been considered in combination and reported in Volume 2 Section 7 of the SES2 and AP2 ES.

air quality assessment in this Stone and Swynnerton area. The air quality assessment is reported in Section 7.4 of the Volume 2 Community Area 3 report, Stone and Swynnerton, and Volume 5: Appendix AQ-001-003 of the SES2 and AP2 ES.

1.3 Report structure

1.3.1 This report is structured as follows:

- Section 2 provides an overview of the air quality methodology;
- Section 3 provides an overview of the air quality assessment undertaken at Hanchurch in the HS2 Phase 2a ES, as amended by the SES and AP ES and SES2 and AP2 ES; and
- Section 4 provides information on controls during construction, including relevant undertakings and assurances, monitoring and compliance with the EMRs.

2 Air quality methodology

2.1 Air quality standards

2.1.1 Air quality limit values and objectives are quality standards for clean air for the protection of human health and the natural environment. In the ES, the term 'air quality standard' has been used to refer to both the English air quality objectives and the air quality limit values introduced in the UK based on European Union (EU) Directives. The standards have been used in the air quality assessment, reported in the ES, to determine the magnitude of impacts and significance of effects to local air quality. The air quality standards relevant to the assessment are presented in Table 1.

Table 1: Air quality standards

Pollutant	Averaging period	Standard
Nitrogen dioxide (NO ₂)	Annual mean	40µg/m ³
	1-hour mean	200µg/m ³ ^[1]
Particulate matter (PM ₁₀) ⁷	Annual mean	40µg/m ³
	24-hour mean	50µg/m ³ ^[2]
Fine particulate matter (PM _{2.5})	Annual mean	25µg/m ³
^[1] Not to be exceeded more than 18 times a year ^[2] Not to be exceeded more than 35 times a year		

2.1.2 These are set by European Union Directive 2008/50/EC⁸ based on recommendations by the World Health Organisation. They have been transposed into national legislation in England by the Air Quality Standards Regulations 2010⁹, as amended in 2016¹⁰.

⁷ PM_{2.5} and PM₁₀ describe two size fractions of airborne particles that can be inhaled and therefore are of concern for human health. The designations refer to particles of size less than 2.5 and 10 microns in diameter.

⁸ Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe.

⁹ The Air Quality Standards Regulations 2010, SI 2010/1001.

¹⁰ The Air Quality Standards Regulations 2016, SI 2016/1184.

2.2 Method of assessment

- 2.2.1 The method of assessment is detailed in the HS2 Phase 2a Scope and Methodology Report (SMR)¹¹ and SMR Addendum¹² provided in Volume 5 of the HS2 Phase 2a ES and is summarised below. Extensive consultation of the SMR was undertaken, including with environmental health departments at local authorities affected by the HS2 Phase 2a scheme. A summary of the consultation responses are set out in Section 4.7 of the Phase 2a EIA SMR Consultation Summary Report¹³. Following review of the draft SMR consultation responses, no comments were considered to alter the scope and methodology for the Phase 2a air quality assessment.
- 2.2.2 The air quality assessment has been undertaken following the approach detailed in the Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 1¹⁴. This is in common with the assessment of air quality for other large infrastructure projects, especially highway schemes. The thresholds detailed in DMRB Volume 11 Section 3 for local air quality have been used to define an affected road network. These thresholds are:
- a change in daily traffic flows by 1,000 or more as annual average daily traffic (AADT); or
 - a change in daily flows of Heavy Duty Vehicles (HDV) by 200 AADT or more; or
 - a change in road alignment by 5m or more; or
 - a change in daily average speed by 10kph or more; or
 - a change in peak hour speed by 20kph or more.
- 2.2.3 Traffic flows on the highway network have been provided for a 'without scheme' and 'with scheme' scenarios. The data used in the air quality assessment takes

¹¹ 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/publications/scope-and-methodology-report-for-hs2-phase-2a>

¹² 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 Part 1). Available online at: <https://www.gov.uk/government/publications/scope-and-methodology-report-for-hs2-phase-2a>

¹³ HS2 Ltd (2016) HS2 Phase 2a: West Midlands to Crewe Environmental Impact Assessment Scope and Methodology Report: Consultation Summary Report. Available online at : https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/552523/HS2_Phase_2a_EIA_SMR_CSR.pdf

¹⁴ Highways Agency (2007), *Design Manual for Roads and Bridges: Volume 11, Section 3 Part 1 HA 2007/07 Air Quality*. Available online at: <http://www.standardsforhighways.co.uk/ha/standards/dmr/vol11/section3/ha20707.pdf> [Accessed June 2019]

account of predicted changes in traffic as a result of all planned and committed developments¹⁵ in the area.

- 2.2.4 Sensitive receptors (residential properties, schools, hospitals, nursing homes) have been selected within 200m of the affected road network, as defined in DMRB Volume 11 Section 3, and pollutant concentrations have been predicted using atmospheric dispersion modelling. The model outputs are verified against measurements at air quality monitoring sites along the road network.
- 2.2.5 Air quality impacts as a result of the HS2 Phase 2a scheme have been predicted following guidance from the Institute of Air Quality Management (IAQM) and Environmental Protection (UK) (referred to as 'IAQM/EPUK guidance')¹⁶ as shown in Table 2.
- 2.2.6 Receptors predicted to experience negligible or slight impacts were described as having no significant air quality effects. Receptors predicted to experience moderate or substantial impacts were described as having significant air quality effects.

Table 2: Impact descriptors (from the IAQM/EPUK guidance)

Predicted annual mean concentration in relation to standard	Percent change in concentrations as a result of the HS2 Phase 2a Scheme in relation to standard			
	1%	2 – 5%	6 – 10%	10%
< 75%	Negligible	Negligible	Slight	Moderate
76 – 94%	Negligible	Slight	Moderate	Moderate
95 – 102%	Slight	Moderate	Moderate	Substantial
103 – 109%	Moderate	Moderate	Substantial	Substantial
> 110%	Moderate	Substantial	Substantial	Substantial

¹⁵ Committed development considered in relation to the HS2 Phase 2a scheme includes approved planning consents, allocations and minerals safeguarding areas (MSA) in adopted development plans, identified up to 1st July 2018 where the potential for environmental effects may occur. These are listed in Volume 5, Appendix CT-004-000, which accompanied the HS2 Phase 2a ES (see HS2 Phase 2a ES Volume 5: Appendix CT-004-000), the SES and AP ES (see SES and AP ES Volume 5: Appendix CT-004-000), and the SES2 and AP2 ES (see SES2 and AP2 ES Volume 5: Appendix CT-004-000). Available online at: <https://www.gov.uk/government/collections/hs2-phase-2a-environmental-statement>

¹⁶ Moorcroft and Barrowcliffe et al. (2017), *Land-Use Planning & Development Control: Planning for Air Quality*. London: Institute of Air Quality Management.

3 Air quality assessment

3.1 Overview of assessment

3.1.1 The air quality assessment comprised of the following:

- a review of existing baseline conditions (including information on pollution sources, background concentrations and air quality monitoring data);
- an assessment of potential impacts to air quality during construction and operation (including emissions of dust from construction activities and emissions from road traffic on the highway network and site haul routes); and
- the application of mitigation measures, where required.

3.2 Existing baseline conditions

3.2.1 The area around the A519 Newcastle Road is located within Stafford Borough Council close to the boundary with Newcastle-under-Lyme Borough Council. The main source of air pollution in this area is road traffic along the M6, slip roads and access roads at Junction 15 of the M6, the A519 Newcastle Road, the A500 Queensway and the A5182 Trentham Road.

3.2.2 Estimates of background air quality have been obtained from the Department for Environment, Food & Rural Affairs (Defra)¹⁷. These are available for 1km² grid squares around the UK for a baseline year and projected up to 2030. The area around the A519 Newcastle Road is at the intersection of four grid squares. Table 3 presents the average pollutant concentrations of these squares for the existing baseline assessment year of 2016¹⁸, the construction assessment year of 2020¹⁹ and the operation assessment year of 2027²⁰, as reported in the HS2 Phase 2a ES. It can be observed that background concentrations are within the air quality standards in all assessment years for all pollutants.

3.2.3 These background concentrations have been taken into account for the prediction of air quality impacts from the HS2 Phase 2a scheme. Background concentrations are predicted to improve in future years due to improvements in vehicle

¹⁷ Defra, Background mapping data for local authorities, <https://uk-air.defra.gov.uk/data/laqm-background-home>

¹⁸ 2016 represents the baseline assessment year for the ES.

¹⁹ 2020 is the first year of construction. The air quality assessment assumes vehicle emission rates and background pollutant concentrations from year 2020. This is because both pollutant emissions from vehicle exhausts and background pollutant concentrations are anticipated to reduce year by year as a result of vehicle emission controls, and so the year 2020 represents the worst case for the construction assessment. The assessment of construction traffic emissions has used traffic data based on an estimate of the average daily flows at the peak year (2023) during the construction period (2020-2026).

²⁰ 2027 is used in the assessment as the first year of operation of the HS2 Phase 2a scheme.

technology, changes in fleet composition and the introduction of lower emission vehicles into the fleet.

Table 3: Background pollutant concentrations (from Defra)

Year	NO ₂ (µg/m ³)	PM ₁₀ (µg/m ³)	PM _{2.5} (µg/m ³)
2016	16.4	14.7	9.4
2020	13.2	14.2	9.0
2027	9.4	14.0	8.7
Annual mean air quality standard	40	40	25

Background concentrations taken as an average of the following grid squares (X/Y coordinates): 384500/341500; 385500/341500; 384500/342500; and 385500/342500.

- 3.2.4 Air quality monitoring in the area is undertaken by Stafford Borough Council using passive instruments (diffusion tubes) for NO₂. No measurements of PM₁₀ or PM_{2.5} are undertaken by the council.
- 3.2.5 There are two monitoring sites on the A519 Newcastle Road close to the Hanchurch roundabout; one at the kerbside and the other at a property façade. There is an additional monitoring site at a property façade on Hanchurch Lane to the south of this area.
- 3.2.6 The location of these sites is shown in Figure 1 and the NO₂ measurements for 2012 – 2016 are presented in Table 4. It can be observed that NO₂ concentrations are within the air quality standard at all sites. Concentrations are higher at the kerbside, reducing with increased distance from the source (the roads), and are lower at the property façades.

Table 4: Air quality measurements at local authority monitoring sites

Site ID	Location	Annual mean NO ₂ concentrations (µg/m ³)				
		2012	2013	2014	2015	2016
M6CLAYTON	A519 Newcastle Road (kerbside)	37	33	37	38	36
M6_2	A519 Newcastle Road (property)	32	33	32	32	33
40	Hanchurch Lane (property)	22	23	21	26	24

Data sources:
 Stafford Borough Council (2018), *2018 Air Quality Annual Status Report*.
 Stafford Borough Council (2017), *2017 Air Quality Annual Status Report*.
 Site ID as per the local authority ID as reported in the Air Quality Annual Status Report

Figure 1: Location of local authority monitoring sites



3.3 Road traffic emissions

- 3.3.1 Emissions from road traffic in the area were included in the air quality assessments reported in the HS2 Phase 2a ES, SES and AP ES, and SES2 and AP2 ES. Figure 2 presents the modelled roads included in the air quality assessment.
- 3.3.2 Table 5 presents the construction traffic data flows in AADT and heavy goods vehicles (HGVs) along the main roads in the area. The data is presented for the 'without scheme' and 'with scheme' scenarios. The data is also presented for the HS2 Phase 2a ES assessment and the revised traffic flows in the SES and AP ES, and

in the SES2 and AP2 ES. The traffic data in the SES2 and AP2 ES supersedes the data from earlier assessments.

Figure 2: Modelled roads in air quality assessment

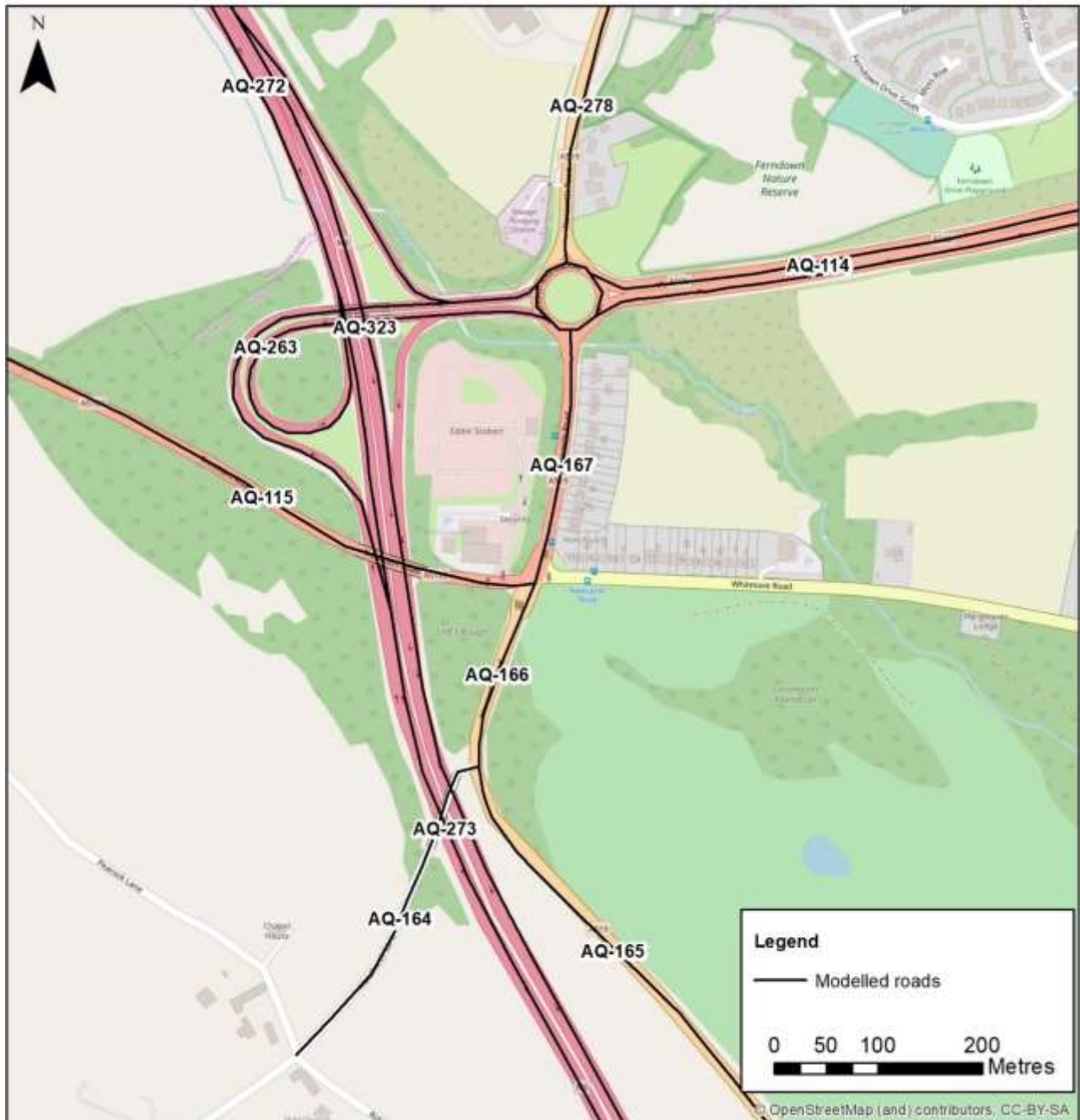


Table 5: Construction traffic data used in the air quality assessment

Environmental Statement	AADT			HGV (annual average daily flows)		
	2020 without scheme	2020 with scheme	Change	2020 without scheme	2020 with scheme	Change
AQ-278²¹: A519 Clayton Road						
HS2 Phase 2a ES	16,718	16,718	0	484	484	0
SES1 and AP1 ES	<i>Not reassessed – no change in traffic flows compared to HS2 Phase 2a ES</i>					
SES2 and AP2 ES	16,718	16,718	0	484	484	0
AQ-114: A500 Queensway (between M6 junction 16 to A500 Hanchurch roundabout and A34 Stone Road)						
HS2 Phase 2a ES	22,091	22,967	876	3,178	3,582	404
SES1 and AP1 ES	<i>Not reassessed – minor reduction in traffic flows compared to HS2 Phase 2a ES</i>					
SES2 and AP2 ES	22,114	22,662	548	3,135	3,136	1 ²²
AQ-263: M6 junction 15 to A500 Hanchurch roundabout						
HS2 Phase 2a ES	34,955	37,234	2,279	4,455	5,280	825
SES1 and AP1 ES	<i>Not reassessed – minor reduction in traffic flows compared to HS2 Phase 2a ES</i>					
SES2 and AP2 ES	35,000	37,079	2,079	4,455	5,024	569
AQ-167: A519 Newcastle Road (between Whitmore Road and A500 Hanchurch roundabout at junction with A519)						
HS2 Phase 2a ES	15,172	16,817	1,645	1,672	2,166	494
SES1 and AP1 ES	15,172	16,815	1,643	1,672	2,173	501
SES2 and AP2 ES	15,172	16,812	1,640	726	1,295	569
AQ-115: A5182 Trentham Road (between Newcastle Road and A53 from A5192 Trentham Road to Bent Lane)						
HS2 Phase 2a ES	7,508	10,418	2,910	697	1,390	693
SES1 and AP1 ES	7,508	10,412	2,904	697	1,390	693
SES2 and AP2 ES	7,508	8,399	891	687	1,160	473
AQ-166: A519 Newcastle Road (between Hanchurch Lane and Whitmore Road)						
HS2 Phase 2a ES	8,350	8,935	585	480	652	172
SES1 and AP1 ES	8,350	8,959	609	480	698	218
SES2 and AP2 ES	8,350	9,167	817	180	344	164
AQ-164: Hanchurch Lane (between Newcastle Road and Peacock Lane)						
HS2 Phase 2a ES	485	485	0	28	28	0
SES1 and AP1 ES	<i>Not reassessed – no change in traffic flows compared to HS2 Phase 2a ES</i>					

²¹ AQ-XXX represents a unique identifier for each road link included in the air quality model.

²² The primary contributors to changes in construction traffic between the original scheme and the AP2 revised scheme are the changes to the movement of excavated material, the construction programme and construction assumptions. The assessment takes into account measures to reduce the need to move material by the road network and use of site haul routes to limit construction traffic on the road network.

Environmental Statement	AADT			HGV (annual average daily flows)		
	2020 without scheme	2020 with scheme	Change	2020 without scheme	2020 with scheme	Change
SES2 and AP2 ES	485	485	0	7	7	0
AQ-165: A519 Newcastle Road (between Drayton Road and Hanchurch Lane)						
HS2 Phase 2a ES	6,934	7,519	585	708	880	172
SES1 and AP1 ES	6,934	7,542	608	708	929	221
SES2 and AP2 ES	6,934	7,751	817	272	436	164
AQ-273: M6 junction 14 to junction 15						
HS2 Phase 2a ES	129,338	134,094	4,756	22,454	25,450	2,996
SES1 and AP1 ES	<i>Not reassessed – no change in traffic flows compared to HS2 Phase 2a ES</i>					
SES2 and AP2 ES	129,384	131,928	2,544	22,454	24,228	1,774
AQ-323: M6 junction 15 (within junction)						
HS2 Phase 2a ES	102,438	103,376	938	23,046	23,528	482
SES1 and AP1 ES	<i>Not reassessed – no change in traffic flows compared to HS2 Phase 2a ES</i>					
SES2 and AP2 ES	101,934	103,770	1,836	22,554	24,044	1,490
AQ-272: M6 junction 15 to junction 16						
HS2 Phase 2a ES	114,732	117,218	2,486	22,050	23,234	1,184
SES1 and AP1 ES	<i>Not reassessed – no change in traffic flows compared to HS2 Phase 2a ES</i>					
SES2 and AP2 ES	114,074	117,160	3,086	21,558	23,276	1,718

3.4 Predicted air quality impacts

- 3.4.1 The air quality assessment included four receptors representative of worst case locations in the area. These are properties on Clayton Road (3-C-H17), Newcastle Road (3-C-H16), Whitmore Road (3-C-H23) and Hanchurch Lane (3-C-H21), as shown in Figure 3.

Figure 3: Location of sensitive receptors included in the air quality assessment



3.4.2 The predicted NO₂ concentrations at these receptors during construction of the AP2 revised scheme²³ are presented in Table 6 (as extracted from Table 4 of the SES2 and AP2 ES Volume 5: Appendix AQ-001-003 Air quality report²⁴). It can be

²³ The AP2 revised scheme is the Bill scheme submitted to Parliament in July 2017, which was assessed in the HS2 Phase 2a ES, updated by the changes described in the Supplementary Environmental Statement 1 and the Additional Provision 1 Environmental Statement (submitted in March 2018) and the Supplementary Environmental Statement 2 and the Additional Provision 2 Environmental Statement (submitted February 2019)

²⁴ HS2 Ltd (2019), High Speed Rail (West Midlands – Crewe) HS2 Phase 2a Supplementary Environmental Statement 2 and Additional Provision 2 Environmental Statement Volume 5 Air quality technical appendices (AQ-001-003). Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/776007/J26_HS2_Phase_2a_A_P2_Volume_5_CA3_Air_quality.pdf

observed that NO₂ concentrations are predicted to be between 27.5 - 31.6µg/m³ in 2020 which is within the air quality standard of 40µg/m³. Changes due to the AP2 revised scheme are predicted to be between 0.1 - 0.4µg/m³. Negligible impacts are predicted at all receptors for NO₂ and therefore no significant effects are likely during construction of the AP2 revised scheme.

Table 6: Predicted NO₂ concentrations (µg/m³) at sensitive receptors during construction (from north to south)

Receptor ID	Description	OS coordinates	2020 without scheme	2020 with scheme	Change	Impact	Effect
3-C-H17	The Villa, Clayton Road	385104, 342172	29.0	29.2	0.2	Negligible	Not significant
3-C-H16	1 Newcastle Road	385099, 342011	31.2	31.6	0.4	Negligible	Not significant
3-C-H23	166 Whitmore Road	385078, 341833	28.3	28.6	0.3	Negligible	Not significant
3-C-H21	Roma Cottage, 1 Hanchurch Lane	384893, 341530	27.4	27.5	0.1	Negligible	Not significant

3.4.3 The predicted PM₁₀ concentrations at these receptors during construction of the AP2 revised scheme are presented in Table 7 (as extracted from Table 5 of the SES2 and AP2 ES Volume 5: Appendix AQ-001-003 Air quality report²⁴). It can be observed that PM₁₀ concentrations are predicted to be between 15.9 - 16.5µg/m³ in 2020, which is within the air quality standard of 40µg/m³. Changes due to the AP2 revised scheme are predicted to be up to 0.1µg/m³. Negligible impacts are predicted at all receptors for PM₁₀ and therefore no significant effects are anticipated during construction of the AP2 revised scheme.

Table 7: Predicted PM₁₀ concentrations (µg/m³) at sensitive receptors during construction (from north to south)

Receptor ID	Description	OS coordinates	2020 without scheme	2020 with scheme	Change	Impact	Effect
3-C-H17	The Villa, Clayton Road	385104, 342172	16.3	16.3	< 0.1	Negligible	Not significant
3-C-H16	1 Newcastle Road	385099, 342011	16.4	16.5	0.1	Negligible	Not significant
3-C-H23	166 Whitmore Road	385078, 341833	15.8	15.9	0.1	Negligible	Not significant
3-C-H21	Roma Cottage, 1 Hanchurch Lane	384893, 341530	16.2	16.2	< 0.1	Negligible	Not significant

3.4.4 The predicted PM_{2.5} concentrations at these receptors during construction of the AP2 revised scheme are presented in Table 8 (as extracted from Table 6 of the SES2 and AP2 ES Volume 5: Appendix AQ-001-003 Air quality report²⁴). It can be observed that PM_{2.5} concentrations are predicted to be between 10.1 - 10.4µg/m³ in 2020,

which is within the air quality standard of $25\mu\text{g}/\text{m}^3$. Changes due to the AP2 revised scheme are predicted to be up to $0.1\mu\text{g}/\text{m}^3$. Negligible impacts are predicted at all receptors for $\text{PM}_{2.5}$ and therefore no significant effects are anticipated during construction of the AP2 revised scheme.

Table 8: Predicted $\text{PM}_{2.5}$ concentrations ($\mu\text{g}/\text{m}^3$) at sensitive receptors during construction (from north to south)

Receptor ID	Description	OS coordinates	2020 without scheme	2020 with scheme	Change	Impact	Effect
3-C-H17	The Villa, Clayton Road	385104, 342172	10.3	10.3	< 0.1	Negligible	Not significant
3-C-H16	1 Newcastle Road	385099, 342011	10.4	10.4	< 0.1	Negligible	Not significant
3-C-H23	166 Whitmore Road	385078, 341833	10.0	10.1	0.1	Negligible	Not significant
3-C-H21	Roma Cottage, 1 Hanchurch Lane	384893, 341530	10.2	10.2	< 0.1	Negligible	Not significant

4 Controls during construction

4.1.1 HS2 Ltd has set a route-wide Traffic Management Plan and requirements for low emission vehicles during construction of the HS2 Phase 2a scheme. The requirements for low emission vehicles aim to minimise pollution from HS2 vehicles during construction. Further details are provided in Section 4.4 of this report. The Traffic Management Plan is set out in Information Paper E3: Management of Traffic During Construction²⁵, which outlines the framework for the assessment, control and management of traffic on the road network associated with the construction of the HS2 Phase 2a Scheme. It also sets out the process by which affected residents, businesses and others will be informed of how construction activities could impact on the road network and existing traffic, as well as how construction traffic flows will be controlled and managed in their area. The paper includes information on:

- **Section 3: Construction traffic impacts.** This section explains the likely nature of construction traffic impacts and contains avoidance measures to reduce them by minimising the movement of construction materials and the workforce e.g. by the requirement for workforce travel plans.
- **Section 4: Assessment of environmental impacts of construction traffic.** This section explains how the environmental impacts of construction traffic have been identified in the HS2 Phase 2a ES, SES and AP ES and SES2 and AP2 ES.
- **Section 5: Control and management of construction traffic to mitigate impacts.** This section sets out specific measures to control and manage traffic to mitigate impacts, such as the powers provided in the hybrid Bill for the control of construction traffic by qualifying planning authorities and the relevant highway authority.
- **Section 6: Traffic management measures.** This section sets out how construction of the HS2 Phase 2a scheme will likely affect different forms of transport such as pedestrians, cyclists and equestrians, public transport users and general vehicular traffic.
- **Section 7: Consultation.** This section includes information on how HS2 Ltd have consulted and will continue to consult on route-wide highways and traffic issues.

²⁵ HS2 Ltd (2019) High Speed Two Phase 2a Information Paper E3: Management of Traffic During Construction. Available online at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/828980/E3_Management_of_Traffic_During_Construction_v1.2.pdf

4.1 Environmental Minimum Requirements

- 4.1.1 The Phase 2a HS2 Environmental Minimum Requirements²⁶ (EMRs) are a suite of documents containing the over-arching commitments by the Secretary of State to afford appropriate management and protection of the environment.
- 4.1.2 The controls contained in the EMRs, along with powers contained in the High Speed Rail (West Midlands - Crewe) Bill (the Bill) and the Undertakings given by the Secretary of State, will ensure that impacts which have been assessed in the ES will not be exceeded, unless any new impact or impacts in excess of those assessed in the ES:
- results from a change in circumstances which was not likely at the time of the ES; or
 - would not be likely to be environmentally significant²⁷; or
 - results from a change or extension to the project, where that change or extension does not itself require an EIA under either (i) article 4(1) of and paragraph 24 of Annex 1 to the EIA Directive; or (ii) article 4(2) of and paragraph 13 of Annex 2 to the EIA Directive^{28,29}; or
 - would be considered as part of a separate consent process (and therefore further EIA, if required).
- 4.1.3 Any nominated undertaker will be contractually bound to comply with the controls set out in the EMRs and will use reasonable endeavours to adopt mitigation measures that will further reduce any adverse environmental impacts caused by the HS2 Phase 2a scheme, insofar as these mitigation measures do not add unreasonable costs to the project or unreasonable delays to the construction programme.
- 4.1.4 For more information on the EMRs, see Phase 2a Information Paper E1: Control of Environmental Impacts³⁰.

4.2 Code of Construction Practice

- 4.2.1 The Code of Construction Practice (CoCP) forms Annex 1 of the EMRs and sets out a series of control measures and the standards to be implemented throughout

²⁶ HS2 Ltd (2017), Environmental minimum requirements for HS2 Phase 2a. Available online at: <https://www.gov.uk/government/publications/environmental-minimum-requirements-for-hs2-phase-2a>

²⁷ This covers all effects (both positive and adverse) where those effects are simply of no environmental significance.

²⁸ EIA Directive 2011 (2011/92/EU) as amended by Directive 2014/52/EU.

²⁹ Broadly, this would not allow those changes or extensions to the project (once it has received Royal Assent) which would give rise to adverse environmental effects within the EIA.

³⁰ HS2 Ltd (2017), Phase 2a Information Paper E1: Control of Environmental Impacts. Available online at: <https://www.gov.uk/government/publications/environment-hs2-phase-2a-information-papers>

construction of the HS2 Phase 2a scheme to protect communities and the environment. At a local level, where required, site-specific control measures will be included within Local Environmental Management Plans (LEMPs) to be developed following consultation with the relevant stakeholders. A Draft CoCP³¹ has been prepared, which will be finalised on Royal Assent.

4.2.2 Section 7 of the Draft CoCP sets out measures that will be implemented to limit disturbance from construction activities specifically in relation to air quality, as far as reasonably practicable. Those sections of particular relevance to mitigation adjacent to highways include the following and are provided in Appendix A of this report:

- **7.2 Measures to reduce potential impacts on air quality.** This section includes measures relating to site management, construction plant, vehicles³² and equipment, transportation, storage and handling of materials, haul routes, demolition activities, excavations and earthworks activities, grouting activities, conveying, processing, crushing, cutting and grinding activities, and air quality effects adjacent to highways.
- **7.3 Monitoring of air quality³³.** This section includes measures relating to inspection and monitoring procedures to assess the effectiveness of measures to prevent dust and air pollutant emissions.
 - **Monitoring adjacent to highways.** This section details monitoring to be undertaken where significant effects are predicted.

4.2.3 The following sections are also of relevance and can be accessed at the link provided.

- **7.1 Air quality management – general provisions.** This section includes measures to be taken by the nominated undertaker's contractors to control and limit dust, air pollution, odour and exhaust emission during the construction works as far as reasonably practicable and in accordance with best practicable means (BPM).
- **7.2 Measures to reduce potential impacts on air quality** (as described in paragraph 4.2.2).
 - **Transportation, storage and handling of materials.** This section includes measures to be implemented to limit pollution arising from the transportation and storage of materials.

³¹ HS2 Ltd (2019). High Speed Rail (West Midlands - Crewe) Draft Environmental Minimum Requirements, Annex 1: Draft Code of Construction Practice. Available online at <https://www.gov.uk/government/publications/environmental-minimum-requirements-for-hs2-phase-2a>

³² See HS2 Phase 2a information paper: Air quality. Available online at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/828982/E14_Air_Quality_v1.2.pdf

³³ HS2 Air Quality monitoring reports, available online at <https://www.gov.uk/government/collections/monitoring-the-environmental-effects-of-hs2>

- **Demolition activities.** This section includes measures to be implemented to limit dust pollution arising from demolition activities.
- **Excavations and earthworks activities.** This section includes measures to be implemented to limit dust pollution arising from excavations and earthworks activities.
- **Conveying, processing, crushing, cutting and grinding activities.** This section includes measures to be implemented to limit dust pollution associated with processing and crushing rock, for use as aggregate or other materials within the works, and for conveying material, processing, crushing, cutting and grinding and liming.

4.3 HS2 Register of Undertakings and Assurances

4.3.1 HS2 Ltd will ensure that any commitments given to Parliament during the passage of the hybrid Bill will be recorded and complied with. There are two types of commitments:

- undertakings, which are binding (usually contingent) agreements between HS2 Ltd and another party, set out in legal documents or given by another means to the Select Committee itself or to Parliament; and
- assurances, which are unilateral written commitments made by HS2 Ltd in a letter or other document (such as an Information Paper), or in petition responses.

4.3.2 Undertakings and assurances will be recorded in an official register, held by the Department for Transport (DfT). The nominated undertaker will be contractually obliged to comply with all relevant undertakings and assurances set out in the Register. The nominated undertaker is also required to execute and deliver to the relevant party the deeds or agreements required by those undertakings or assurances. Those deeds and agreements must be delivered and executed in the form and at the time specified in the relevant assurance or undertaking or, if no form or time is specified, as reasonably required by the Secretary of State.

4.3.3 Further information on how the Secretary of State will ensure compliance with assurances made by HS2 Ltd is set out in HS2 Phase 2A Information Paper B5, Compliance with Undertakings and Assurances³⁴.

³⁴ A copy can be found at: <https://www.gov.uk/government/publications/understanding-the-hybrid-bill-hs2-phase-2a-information-papers>

4.4 HS2 Phase 2a Information Paper E14: Air quality

- 4.4.1 HS2 Phase 2a Information Paper E14: Air quality³⁵ sets out the approach HS2 Ltd will follow to try to avoid emissions to air causing significant adverse effects on communities and to prevent air pollution. The measures set out are intended to maintain good air quality for those people living and working close to the HS2 Phase 2a scheme as far as is reasonably practicable.

Objectives

- 4.4.2 HS2 Ltd has the following objectives for air quality relating to its construction and operation of the HS2 Phase 2a scheme.
- avoid pollutant emissions to air;
 - avoid causing public and workforce exposure to air pollutants where emissions cannot be avoided;
 - reduce pollutant emissions where emissions cannot be avoided;
 - minimise public and workforce exposure to pollutant emissions where exposure cannot be avoided;
 - work with the relevant authorities to maintain air quality, especially where construction or operations may have significant air quality effects in locations where those authorities have management areas or zones with plans or measures directed at compliance with national air quality standards; and
 - provide mitigation for dust soiling, where it cannot be prevented.

Control measures

- 4.4.3 HS2 Ltd has set route-wide emission requirements and targets for the engines of contractor heavy goods vehicles, vans and cars used during construction. These include the use of lower emission vehicles during construction by using Euro VI heavy goods vehicles and Euro 4 petrol/Euro 6 diesel vans and cars. This commitment has been taken into account in the air quality assessment.

³⁵ Available online at:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/779295/E14_Air_Quality_v1.1.pdf

Appendix A – Extracts from Section 7 of the draft CoCP (Air quality)

7.2 Measures to reduce potential impacts on air quality

Air quality effects adjacent to highways

The nominated undertaker will manage air quality effects adjacent to the highways, where these have been identified as significant in the hybrid Bill ES or subsequent assessments.

In order to manage significant impacts related to highway traffic changes and interventions, the nominated undertaker will put in place a process to manage those impacts through measurement of air quality and regular assessments of the air quality situation as affected by the construction of the scheme. Where significant effects are still predicted, action plans will be put in place with the objective of removing those significant effects.

This management process is modelled on Defra's Local Air Quality Management (for which the statutory duties of local authorities are set out in Part IV of the Environment Act 1995), and the periodic reviews and action plans are envisaged as being similar to those produced in that process.

7.3 Monitoring of air quality

This process comprises: measure – review – action plan. Baseline (pre-works) air quality monitoring will be required in locations where potential significant effects are predicted. Forecast baseline and 'with HS2 construction traffic' flows will be reviewed and updated in these locations, if necessary.

These baseline measurements will be reviewed, and an air quality assessment produced at an appropriate stage to determine whether significant effects are still predicted. Where significant effects are still predicted, the air quality monitoring should be continued, and an air quality action plan should be drawn up, with the objective of removing the significant effects, as soon and as far as practicable.

The action plan should be presented at Transport Liaison Group meetings (as set out in the Route-wide Transport Management Plan) and Planning Forum sub-group for Environmental Health meetings. The process of reviewing highway and air quality impacts should be repeated at appropriate intervals (e.g. annual or biannual), until no significant effects are predicted or detected (as far as practicable), or two years after the completion of construction, whichever is sooner.

The monitoring, reviews, assessments and action plans will be developed in consultation with local authorities. The necessary provisions will be made in Local Environmental Management Plans.

Monitoring adjacent to highways

Monitoring of air quality effects shall be undertaken adjacent to highways, where these have been identified as significant in the hybrid Bill ES (as amended) or subsequent assessments. The monitoring shall be undertaken following current best practice guidance (currently Defra's Local Air Quality Management Technical Guidance 2016).