HS2

High Speed Rail (London – West Midlands)

Supplementary environmental information report

Canterbury Works Ventilation Shaft S1

August 2024

Department for Transport

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Acronyms and abbreviations

Table 1: Acronyms and abbreviations

Acronym	Description
AP	Additional Provision
BPM	Best Practicable Means
CFA	Community Forum Area
CoCP	Code Of Construction Practice (Annex 1 of the EMRs)
CoPA	Control of Pollution Act
CWVS	Canterbury Works Ventilation Shaft
dB	Decibels
D-Wall	Diaphragm Wall
DH	Design House
EIA	Environmental Impact Assessment
EMR	Environmental Minimum Requirements
EPA	Environmental Protection Act 1990
ES	Environmental Statement
HGV	Heavy Goods Vehicle
HS2	High Speed 2
PCS	Precast Concrete Segments
SCS	Skanska Costain Strabag Joint Venture
SCL	Sprayed Concrete Lining
SES	Supplementary Environmental Statement
SMR	Scope and Methodology Report
SoS	Secretary of State for Transport
TBM	Tunnel Boring Machine

1 Introduction

1.1 Background to High Speed Two

1.1.1 The hybrid Bill for High Speed Rail between London and the West Midlands ('the Bill') was submitted to Parliament together with an Environmental Statement (ES) in November 2013 ('the main ES'). The Bill was amended a number of times following its submission to take account of changes to the scheme (e.g. design refinements) and these were promoted through Parliament as Additional Provisions (APs). A total of five APs were promoted.

1.1.2 Any new or different significant effects that were likely to result from changes to the design which did not require amendments to the Bill; changes to construction assumptions, new environmental baseline information and corrections to the main ES were reported in Supplementary Environmental Statements (SESs). These were deposited alongside the APs.

1.1.3 The Bill was enacted in February 2017 to become the High Speed Rail (London - West Midlands) Act 2017 ('the HS2 Act'). The HS2 Act confers the necessary powers required to construct, maintain, and operate the HS2 railway from London to the West Midlands.

1.2 Introduction to this SES and its Purpose

1.2.1 This SES describes new or different likely significant effects at Canterbury Works Ventilation Shaft (within Community Forum Area 4) arising from changes to construction methodology. This report details if these significant effects exceed those reported in the ES (as amended byAP4) and that, despite the implementation of the controls set out in the Environmental Minimum Requirements (EMRs), are predicted to remain as new significant effects.

1.3 The Environmental Minimum Requirements

1.3.1 The HS2 EMRs set out the high-level environmental and sustainability commitments that the Government has entered through the hybrid Bill process.

1.3.2 The EMRs consist of a suite of framework documents which: (i) define the mechanisms by which the nominated undertaker will engage with communities and other key stakeholders; and (ii) implement environmental and sustainability management measures designed to protect communities and the environment during detailed design development and construction. The nominated undertaker is the body, appointed by the Secretary of State for Transport (SoS), responsible for delivering Phase One of HS2.

1.3.3 The nominated undertaker, taking forward the detailed design and implementation of Phase One of HS2, is required by the SoS to implement the controls and obligations set out in the EMR General Principles. The components of the EMRs are described in the EMR General Principles (CS755 02/17, February 2017).

1.3.4 It is the intention of the Secretary of State to carry out the project so that its impact is as assessed in the ES. The controls contained in the EMRs, along with powers contained in the HS2 Act and the Undertakings given by the Secretary of State, will ensure that impacts which have been assessed in the ES (as amended) 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 significant; or
- results from a change or extension to the project, where that change or extension does not itself require environmental impact assessment (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; or
- would be considered as part of a separate consent process (and therefore further EIA if required).

2 Scope

2.1.1 Section 63(3) of the High Speed Rail (London – West Midlands) Act 2017 Act ("the Act") amends Regulation 9 (relating to subsequent applications) of the Environmental Impact Assessment Regulations. In particular Regulation 9, paragraph (1)(b)(ii) of the Environmental Impact Assessment Regulations is amended to specifically reference the Act.

2.1.2 Regulation 9(3) allows the relevant planning authority to request further environmental information (under Regulation 25) where they believe environmental information currently provided is deemed not adequate to assess the significant effects of the development on the environment.

2.1.3 In anticipation of a Regulation 25 Notice under the EIA Regs by London Borough of Brent this Supplementary Environmental Statement (SES) has been written to provide such further environmental information to the ES (as amended) as is required.

2.1.4 Additionally, Paragraph 1.1.3 of the High Speed Rail (London - West Midlands) Environmental Minimum Requirements (EMR) General Principles states that:

"The controls contained within the Environmental Minimum Requirements (EMRs) [...] will ensure that impacts which have been assessed in the ES will not be exceeded, unless any new impact in excess of those assessed in the ES results from a change in circumstances which was not likely at the time of the ES..."

2.1.5 Furthermore paragraph 3.1.8 states:

"In the circumstances in the first bullet point of paragraph 1.1.3, if the significant adverse impacts identified in the ES are likely to be exceeded, the nominated undertaker will take all reasonable steps to minimise or eliminate those additional impacts. If despite these reasonable steps, significant impacts remain the nominated undertaker will report them"

2.1.6 Consequently, this document also provides a report to meet the requirements of paragraph 3.1.8 of the EMR General Principles.

3 Site Description and Context

3.1.1 The main ES provided a shaft structure for ventilation and intervention and an auto–transformer station (ATS) located at Salusbury Road in order to allow access to the Euston Tunnels and the HS1-HS2 Link Tunnel. The revised AP4 design of the scheme relocated the Salusbury Road Ventilation Shaft from the Hybrid Bill scheme to the Canterbury Works Road Ventilation Shaft ('the Site') location.

3.1.2 From the AP4 proposed scheme (ES SES3 and AP4 Volume 2 CFA4 Map book CT-06-006b), the Site is located south of the West Coast Main Line (WCML) and north of Canterbury Road (see Figure 1). The site is approximately 500m to the east of Salusbury Road Bridge, the main north-south railway crossing and access route to Queens Park.

3.1.3 As reported in the ES (as amended), works at the Site are to construct a shaft structure for ventilation and intervention, but would also require the erection of an ATS and the relocation of a Network Rail (NR) electricity substation and its associated structures, over an area of approximately 0.6ha.

3.1.4 The Site is located in London Borough of Brent. The area around the Site is predominantly industrial in use with residential land use to the west and south of the site (Map CT-06-006b (SES3 & AP4, ES Volume 2, CFA4 Map Book)). The WCML bounds the site to the north, beyond which is further residential use. The Site was previously used as a business park, comprising car parking, commercial and light industrial activities. To the east of the Site is St Mary's Catholic Primary School.

3.1.5 Access to The Site is off Canterbury Road via Canterbury Terrace. A second access via Albert Road is agreed with NR and will be constructed during the Works. Albert Road is accessed from B413 Carlton Vale. The permanent headhouse entrance for operation and maintenance of the shaft and ATS will be via Canterbury Road, with Albert Road entrance only used for emergency access.

4 Summary of changes at Canterbury Works Ventilation Shaft

4.1 Changes to the engineering design or to construction methodology since the publication of the ES (as amended)

4.1.1 The need to make changes to the design and to construction assumptions has been identified since the submission of the ES (as amended). The changes made in the SES3 and AP4, ES Volume 2, CFA4 Report Canterbury Works Ventilation Shaft area related to engineering design, the construction programme and construction assumptions. The changes are described below.

4.1.2 Those changes, to both the engineering design and construction assumptions, which have occurred during the development of the Works, and which are considered immaterial and/or not anticipated to generate new or different significant environmental effects from those reported in the ES (as amended), are not documented further in this report.

Engineering design changes

4.1.3 The relevant description of the engineering design of the scheme in the ES (as amended) at Canterbury Works Ventilation Shaft included:

- a rectangular shaft, approximately 30m by 25m, with a depth below ground level of approximately 41m.

4.1.4 The relevant description of changes to the engineering design of the revised scheme at Canterbury Works Ventilation Shaft to those described in the ES (as amended) have included:

- A single vertical circular shaft with 15.8m internal diameter located between the tunnels; and
- Shaft depth increased to 47.5m below ground.

4.1.5 The changes listed above were adopted during scheme design for the following benefits:

- a design that would be easier to maintain and operate;
- a reduction in construction program
- a smaller shaft overall, requiring less material to be excavated;
- a design with a reduced carbon footprint due to a reduction in materials requirements.

Changes to construction methodology

ES Baseline

4.1.6 The ES (as amended) provided indicative details of the construction works to be managed from the construction compounds in the area – see Section 5.1 of SES3 & AP4, ES Volume 2, Community Forum Area report: CFA4 Kilburn (Brent) to Old Oak Common. The information included the duration of works, number of workers and a summary of the works to be undertaken. A construction programme was also provided, which included indicative periods for the core construction activities.

4.1.7 The assumed construction methodology for Canterbury Works Ventilation Shaft detailed within the ES (as amended) included the following key assumptions:

- All construction activities are to be undertaken in line with the HS2 Code of Construction Practice (CoCP) working hours management;
- The construction approach for the Site would be completed with works outside of core hours, specifically horizontal sprayed concrete lining (SCL) for the cross passages and those under Railway possessions;
- The shaft construction would utilise a diaphragm walling (D-Walls) construction technique, and it was assumed that the D-walling works would be completed only during core hours;
- Approximately 100 dwellings forecast to experience noise levels higher than the noise insulation trigger levels, as defined in the CoCP and Information Paper E23; and
- Noise effects considered to be significant on a community basis, associated with construction activity at the Canterbury Works Vent Shaft main compound, affecting approximately 200 dwellings during the day.

4.1.8 The ES (as amended) also assumed the Works associated with this construction will be carried out in the following broad phases:

- site clearance and enabling works;
- building demolition;
- vent shaft construction;
- vent shaft internal structures civil engineering and building works;
- excavation and construction of short connecting tunnels between the vent shaft and tunnels;
- headhouse construction; and
- railway systems installation:
  - installation of the ATS at Canterbury Works vent shaft; and
  - fit-out of Canterbury Works vent shaft and headhouse.

Changes to Construction Methodology

4.1.9 The relevant description of changes to the construction assumption of the revised scheme at Canterbury Works Ventilation Shaft to those described in the ES (as amended) have included:

- The main shaft will now be constructed using precast concrete segments (PCS) in the upper part of the shaft. Below the PCS rings SCL will be used for the primary lining and cast-in-situ concrete for the secondary lining. This construction method replaces the use of diaphragm walls.

4.1.10 The changes listed above with regard to the construction assumptions provide the following benefits:

- by utilising SCL the risk to ground movement is significantly reduced when compared to the method (D-wall) assumed in the ES (as amended). The construction workspace becomes safer and the risk of ground settlement in the area (and impacts to third party assets, notably Network Rail) is significantly reduced; and
- a reduction in excavation volumes has a benefit in terms of reduced overall heavy goods vehicle (HGV) movements to and from the site, and the associated reduction in carbon.

4.1.11 The consequence of the combined changes set out above, coupled with the requirement to ensure the safety of the Works make it necessary to utilise extended hours working to carry out shaft and adit construction works.

4.1.12 Core hour operations as described in the ES (as amended) are Monday to Friday (0800 - 1800), and Saturdays (0800), excluding bank holidays. Proposed working hours and durations outside of core hours are:

- Shaft Excavation & Construction to stage of readiness for TBM passage (including SCL): 24/5 – 44 days

4.2 Topics impacted

4.2.1 Following a review of the combined changes in circumstances detailed in the preceding paragraphs, new significant effects have been identified with respect to construction Sound Noise and Vibration only. Effects for other environmental topics assessed in the ES (as amended) as a result of the changes are not assessed to be significant and are not considered further in this report.

4.2.2 A review of the construction Sound Noise and Vibration impacts is reported in Section 5.

4.3 Construction programme

4.3.1 4.3.1 The indicative construction programme as set out in the ES (as amended) is detailed below. It is intended that the overall duration of activities will not alter from that set out in the ES (as amended), however the construction delivery dates have changed.

4.3.2 Canterbury Works main compound will be used to manage construction of the CWVS, headhouse and ATS including equipment fit-out. It will also be used for civil engineering and railway installation works and will be occupied for approximately six years, but works will not take place continuously. The excavation and construction of the shaft will take approximately two and a half years, starting in 2018. This will be followed by a 10-month suspension period to allow for the transit of both tunnel boring machines (TBMs) through the shaft before work in the shaft can recommence. There will then be approximately two and a half years for other civil engineering, mechanical and electrical work with site demobilisation at the end of 2024.

4.3.3 The shaft structure will comprise a concrete diaphragm walled earth retaining structure, with internal reinforced concrete structures, and will take approximately one year and four months to construct.

5 Assessment of changes at Canterbury Works Ventilation Shaft

5.1 Sound, noise and vibration

5.1.1 This section reports on the likely significant effects from construction noise impacts on:

- people, primarily where they live ('residential receptors') in terms of a) individual dwellings and b) on a wider community basis, including any shared community open areas resulting from the extended hours working related to the change in construction methodology reported in Section 4.

5.1.2 Any new or different likely significant environmental effects as a result of the changes summarised in Section 4 are identified and compared to the ES (as amended).

5.1.3 In this section 'sound' is used to describe the acoustic conditions which people experience as a part of their everyday lives. The assessment considers how those conditions may change through time and how sound levels and the acoustic character of community areas is likely to be modified through the changes outlined in section 4. Noise is taken as unwanted sound and hence adverse effects are noise effects and mitigation is, for example, by noise barriers.

5.1.4 Effects can be caused by temporary activities associated with the delivery of HS2. These effects may be direct, specifically resulting from construction activities within a given site, and/or indirect e.g. resulting from changes in traffic patterns on existing roads or railways that result from the construction or operation of HS2.

5.1.5 Based on the impacts from changes described in Section 4 only temporary, direct effects from construction are assessed in this report.

5.2 Scope, assumptions and limitations

5.2.1 The assessment set out in this section has been undertaken in accordance with the relevant methodologies (relating to construction) set out in the Scope and Methodology Report (SMR) - (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the ES (as amended). Further information is contained in Volume 5: Appendix SV-001-000 of the ES (as amended).

5.2.2 Construction noise predictions have been presented for a number of residential and non-residential receptors around the Canterbury Works Ventilation Shaft site.

5.3 Environmental baseline

5.3.1 The area surrounding the Site is subject to a wide range of sound sources including road traffic, trains, commercial operations, domestic and community activities.

5.3.2 The existing baseline sound environment consequently varies considerably from location to location, dependent upon the nature and setting of local sound sources.

5.3.3 In the vicinity of the Site the main sound sources are traffic on Canterbury Road and trains on WCML.

5.3.4 Baseline sound level data collected and reported as part of the HS2 ES (as amended) has been used in this revised assessment for the daytime levels. This baseline sound level data was collected at locations representative of the airborne sound-sensitive receptors. Details of the baseline airborne sound levels can be found in HS2 Environmental Statement, Volume 5: Appendix SV-002-004; CFA4 Baseline Report: Kilburn (Brent) to Old Oak Common.

5.3.5 As part of the revised assessment for this report, the evening and night-time noise levels for periods when no activity was in progress on the Site have been reviewed to see if there have been any changes in the ambient noise levels for these periods since the ES (as amended) stage measurements were made. The noise data from the three permanent noise monitors for January and February 2022 was reviewed, and the data suggests that the average ambient noise levels are significantly in excess of the ES (as amended) stage levels. The lowest levels for each period have been used as part of this assessment.

5.3.6 As part of the Community Effects Assessment, the updated evening and night-time noise levels were assumed, and a revised assessment of category based on the principles used for the ES Stage Assessment is shown in Table 2.

Table 2: Assessment Criteria for Groups of Residential Receptors at CRWS Site (Community Impact)

ES (as amended) Location ID	Location	Community Assessment Category			Data Source Coding
		Daytime (Normal Core Hours)	Evening	Night-time	
901182	Carlton House (East) Canterbury Terrace, London	71	56	56	1,A,ia
901183	Carlton House (West) Canterbury Terrace, London	56	42	42	2,A,ia
901184	Canterbury Road, London	63	40	40	1,A,ia
901186	Brondesbury Villas, London	58	45	45	1,A,ia
901188	Canterbury House	69	53	53	1,A,ia
901185A (part of 901185)	The Caretaker's Residence, St. Mary's School (individual dwelling)	71	47	56	1,A,ia

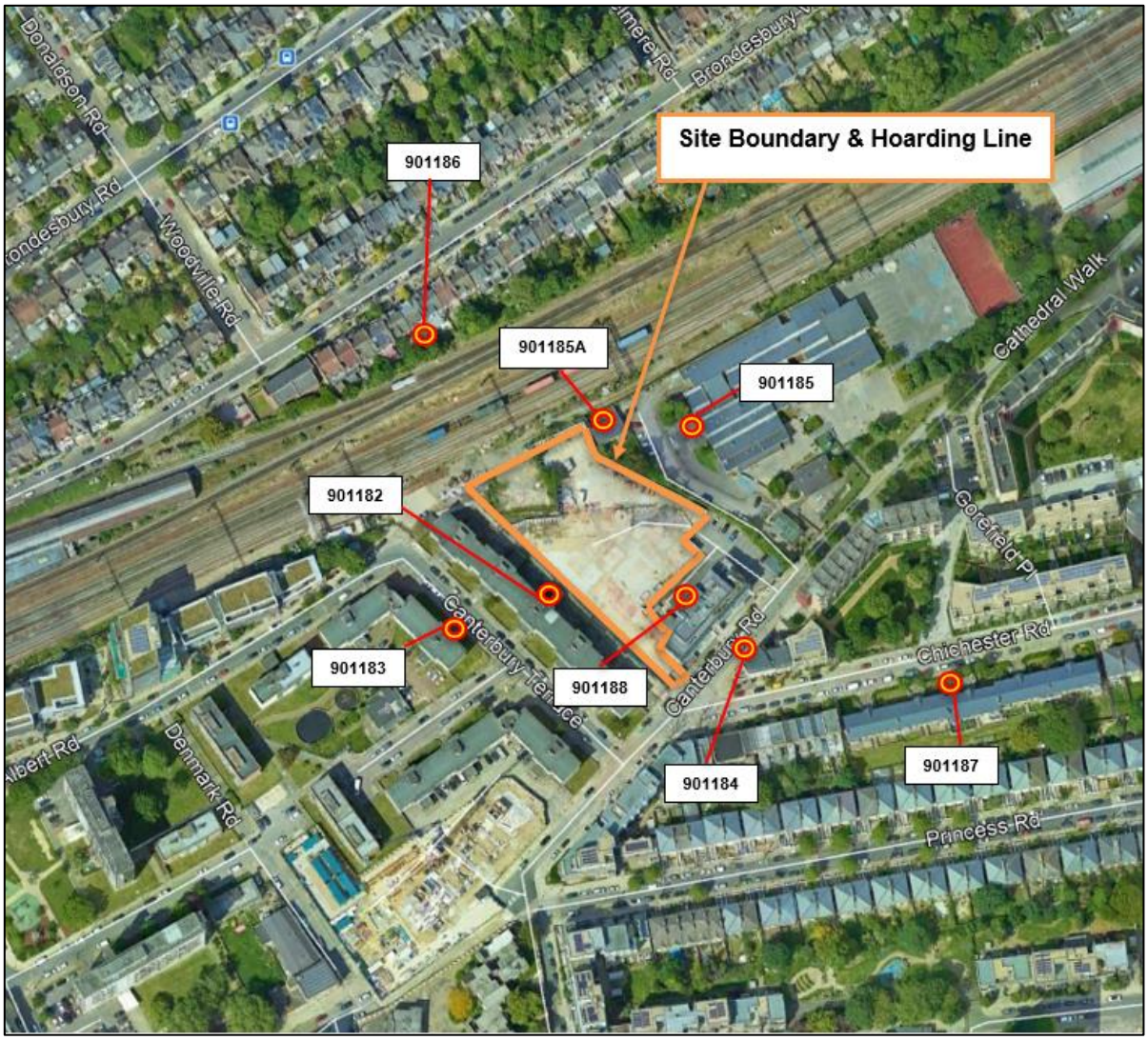
Notes to Table 2:

- *Daytime criteria based on the ES (as amended) stage ambient noise levels.*
- *Evening and Night-time criteria based on updated ambient noise levels from the site boundary.*

• *Data Source coding as per methodology in ES (SES3 and AP4 Appendix SV-002-004).*

5.3.7 Figure 1 below illustrates the location of all residential and non-residential receptors in the vicinity of the Site.

Figure 1: Location of ES (as amended) residential and non-residential Noise Receptors (Receptor ID) - (HS2 ES, Volume 5: Appendix SV-002-004; CFA4 Baseline Report: Kilburn (Brent) to Old Oak Common)



5.4 Effects arising during construction

Avoidance and mitigation measures

5.4.1 The assessment assumes the implementation of the principles and management processes set out in the HS2 Code of Construction Practice (CoCP) – (Annex 1 of the Environmental Minimum Requirements), which are:

- best practicable means (BPM) as defined by the Control of Pollution Act 1974 (CoPA) and Environmental Protection Act 1990 (EPA) will be applied during construction activities to minimise noise (including vibration) at neighbouring residential properties;
- as part of BPM, mitigation measures are applied in the following order:
  - noise and vibration control at source: for example, the selection of quiet and low vibration equipment, review of construction methodology to consider quieter methods, location of equipment on site, control of working hours, the provision of acoustic enclosures and the use of less intrusive alarms, such as broadband vehicle reversing warnings; and then
  - screening: for example, local screening of equipment or perimeter hoarding;
- where, despite the implementation of BPM, the noise exposure exceeds the criteria defined in the CoCP, noise insulation or ultimately temporary rehousing will be offered in accordance with the HS2 Noise Insulation and Temporary Re-Housing Policy described in the CoCP;
- lead contractors will seek to obtain prior consent from the relevant local authority under Section 61 of CoPA for the proposed construction works. The consent application will set out BPM measures to minimise construction noise, including control of working hours, and provide a further assessment of construction noise and vibration including confirmation of noise insulation/temporary re-housing provision;
- contractors will undertake and report such monitoring as is necessary to assure and demonstrate compliance with all noise and vibration commitments. Monitoring data will be provided regularly to and be reviewed by the HS2 Ltd and will be made available to the local authorities; and
- contractors will be required to comply with the terms of the CoCP and appropriate action will be taken by HS2 Ltd as required to ensure compliance.

Assessment of impacts and effects

Airborne Sound: direct impacts and effects

5.4.2 Activities associated with the changes set out in Section 4 will generate airborne noise. For each type of receptor, subject to the screening distances identified, and based upon supplied plant information from engineers, the typical and highest monthly LAeq,T noise levels from construction activities have been calculated at assessment locations, which are representative of a number of receptors in the study area.

5.4.3 The assessment of the likely impacts and significant effects as a result of the construction noise has considered the effects on:

- residential receptors, both as individual dwellings and communities; and
- non-residential receptors, including quiet areas.

Assessment of significant effects

Residential receptors: direct effects – individual dwellings

5.4.4 Taking account of the construction methodology changes in Section 4 and the avoidance and mitigation measures set out in this section the following dwellings are forecast to experience night-time noise levels higher than the noise insulation trigger levels, as defined in the HS2 Information Paper E23, that were not identified in the main ES:

- One dwelling in the Caretaker's Building at St. Mary's School. ES (as amended) location ID 901185A

5.4.5 For night-time construction the trigger level is 55dB measured outdoors, or the existing ambient noise level if it is already above the 55dB level. The equivalent daytime trigger level is 75dB.

5.4.6 The mitigation measures, including noise insulation, will reduce noise inside all dwellings such that it does not reach a level where it will significantly affect residents.

Residential receptors: direct effects – communities (airborne noise)

5.4.7 With regard to noise outside dwellings, the assessment of temporary effects takes account of construction noise relative to existing sound levels.

5.4.8 Construction noise effects can potentially be caused by changes to noise levels outside dwellings. These may be considered by the local community as an effect on the acoustic character of the area and hence be perceived as a change in the quality of life. These effects are considered to be significant when assessed on a community basis taking account of the local context.

5.4.9 Taking account of the construction methodology changes in Section 4, and the avoidance and mitigation measures set out in this section, then the majority of receptors and communities will avoid airborne construction noise adverse effects. However, in some cases temporary adverse noise effects will remain on a community basis and these effects are considered to be significant.

5.4.10 Annex 1 (Table A.1) reports on the assessment of direct adverse noise effects on residential communities and highlights any effects which are considered significant. The revised assessment prepared for this report confirms that receptors Canterbury Terrace (901182), Carlton Road (901184), Brondesbury Villas (901186) and Canterbury House (901188) still are predicted to experience significant effect from a community perspective during the Daytime period.

5.4.11 Canterbury Terrace (901182) and Canterbury House (901188) are predicted to experience a new significant effect from a community perspective during the Night time period. Table 3 below summarises these effects as assessed in Annex 1.

Table 3: Summary of Direct Airborne Sound Effects at Residential Receptors on a Community Basis

Significant effect number	Type of significant effect	Time of day	Location	Cause (construction activities)	Assumed duration of impact
CSV04-C11	Noise (temporary increased annoyance)	Daytime (08:00 – 18:00)	Approximately 40 dwellings in Carlton House (East). ES (as amended) location ID 901182	Canterbury Works Vent Shaft construction works: lower shaft & adit SCL works	One year and three months
		Night (22:00 – 08:00)	Approximately 40 dwellings in Carlton House (East). ES (as amended) location ID 901182	Canterbury Works Vent Shaft construction works: lower shaft & adit SCL works	Two months
CSV04-C12	Noise (temporary increased annoyance)	Daytime (08:00 – 18:00)	Approximately 100 dwellings on Carlton Road. ES (as amended) location ID 901184	Canterbury Works Vent Shaft construction works: lower shaft & adit SCL works	One month
CSV04-C13	Noise (temporary increased annoyance)	Daytime (08:00 – 18:00)	Approximately 40 dwellings in Brondesbury Villas. ES (as amended) location ID 901186	Canterbury Works Vent Shaft construction works: lower shaft & adit SCL works	Seven months
CSV04-C14	Noise (temporary increased annoyance)	Daytime (08:00 – 18:00)	Approximately 20 dwellings in Canterbury House. ES (as amended) location ID 901188	Canterbury Works Vent Shaft construction works: lower shaft & adit SCL works	One year and three months
		Night (22:00 – 08:00)	Approximately 20 dwellings in Canterbury House. ES (as amended) location ID 901188	Canterbury Works Vent Shaft construction works: lower shaft & adit SCL works	Two months

Residential receptors: indirect effects

5.4.12 There are no new or different indirect significant construction noise effects on residential receptors as a result of the SES design changes, in comparison with the main ES.

Non-Residential receptors: direct effects

5.4.13 There are no new or different direct significant construction noise effects on non-residential receptors as a result of the SES design changes, in comparison with the main ES.

Non-Residential receptors: indirect effects

5.4.14 There are no new or different indirect significant construction noise effects on non-residential receptors as a result of the SES design changes, in comparison with the main ES.

6 Conclusion

6.1 Summary of new or likely significant effects as a result of the changes

6.1.1 The design changes have resulted in different significant effects from airborne sound being identified for individual dwellings and communities. The application of mitigation by means of noise insulation will reduce the effect of airborne sound on individual dwellings such that they are not significant, but the significant effects on communities (noise outside dwellings) will remain.

6.1.2 Various on-site BPM mitigation measures have been considered to reduce the noise being emitted from the construction works, however there are direct effects of airborne sound at residential receptors on a community basis at a total of 60 dwellings at Canterbury Works Ventilation Shaft Construction Compound. This is a new significant effect not reported in the ES (as amended).

7 References

HS2 Environmental Statement, Volume 5: Appendix CT-001-000/1); Scope and Methodology Report (SMR).

HS2 Environmental Statement, Volume 5: Appendix CT-001-000/2); Scope and Methodology Report (SMR) Addendum.

HS2 Environmental Statement, Volume 2, SES3 and AP4, ES Volume 2, CFA04 Report Community Forum Area Report: CFA04 I Kilburn (Brent) and Old Oak Common.

HS2 Environmental Statement, Volume 5, Sound, Noise and Vibration Map Book.

HS2 Environmental Statement, Volume 5: Appendix SV-001-000, Methodology, Assumptions and Assessment.

HS2 Environmental Statement, Volume 5: Appendix SV-002-004; CFA04 I Kilburn (Brent) and Old Oak Common

HS2 Environmental Statement, Volume 5: Appendix SV-003-005; CFA04 I Kilburn (Brent) and Old Oak Common Construction Noise Assessment:

High Speed Rail (London West Midlands), Environmental Minimum Requirements General Principals.

Annex 1 – Airborne Sound Assessment Tables (Direct Effects)

This Annex presents details of the assessment of direct effects from airborne sound at residential and non-residential receptors for the Supplementary Environmental Statement.

For each type of receptor, subject to the screening distances identified, and based upon supplied plant information from engineers, the typical and highest monthly LpAeq,T noise levels from construction activities have been calculated at the façade of all assessment locations, which are representative of a number of receptors in the study area.

The assessment results, impact criteria and significance criteria for the assessment of the scheme at residential and non-residential receptors are presented in Table A.1 and Table A.2 respectively.

The construction activity resulting in highest forecast noise levels is reported in Table A.1 and Table A.2 for each assessment location and time period, where the highest forecast noise level from any individual construction activity is above LpAeq,T 40dB during the daytime and evening periods and LpAeq,T 35dB during the night-time. Where the highest forecast noise level from any individual construction activity is less than LpAeq,T 40dB during the daytime and evening or LpAeq,T 35dB during the night-time no activities have been reported.

Explanation of the information within Table A.1 and Table A.2 is provided in the HS2 Environmental Statement, Volume 5: Appendix SV-001-000, with the following additional notes set out below:

	Where the significant effect column is highlighted in pink, then a significant effect is identified at the referenced community, or individual non-residential receptor
*	* Significant effect – the quantitative impact methodology has identified either:
	1) no impact at this receptor but further information (see assessment) has identified that a significant effect is nonetheless likely; or
	2) an impact at this receptor which, based upon further qualitative receptor information, (see assessment text) does not gives rise to a significant effect.
~	Significant effect - impacted dwellings which are either spatially remote from larger defined residential areas, or a small number of dwellings whose impact is not considered to represent the larger defined residential area, and as such are not considered to be part of a community significant effect.
A	Type of effect – annoyance
D	Type of effect – disturbance
Sd	Type of effect – sleep disturbance
Q	Type of effect – deterioration of acoustic quality
R	Type of receptor – residential
G	Type of receptor: (G1) theatres, large auditoria and concert halls;

	Where the significant effect column is highlighted in pink, then a significant effect is identified at the referenced community, or individual non-residential receptor
	(G2) sound recording and broadcast studios; (G3) places of meeting for religious worship, courts, cinemas, lecture theatres, museums and small auditoria or halls; (G4) schools, colleges, hospitals, hotels and libraries; or (G5) offices and general commercial premises.
T	T Receptor design – typical
S	S Receptor design - special
H	Existing environment – high existing ambient noise levels: daytime level more than 75dB, evening-time level more than 65dB or night-time level more than 55dB LpAeq at the façade.
NI	Mitigation effect - identified as likely to qualify for noise insulation under the draft Construction Code of Practice (draft CoCP).
D, E, N	Impact duration (months) – duration of impact during the day (D), evening (E) or night (N).

Table A1: Assessment of construction noise at residential receptors

ID	Area represented	Typical/highest monthly outdoor L_{pAeq} [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	Significant Effect
		Day 0800-1800	Evening 1800-2200	Night 2200-0800											
901182	Carlton House (East), Canterbury Terrace, London	71/78 [A]	56/61 [B]	56/61 [C]	Works associated with Canterbury Works site ventilation shaft Day: Construction of the SCL Lower Section of shaft & adits Evening - Construction of the SCL Lower Section of shaft & adits Night - Construction of the SCL Lower Section of shaft & adits	A	40	R	T	-	-	-	D21 N4	NI	CSV04-C11
901183	Carlton House (West), Canterbury Terrace, London	56/63 [A]	42/48 [A]	42/48 [B]	Works associated with Canterbury Works site ventilation shaft Day: Construction of the SCL Lower Section of shaft & adits Evening - Construction of the SCL Lower Section	NA	40	R	T	H	-	-	-	-	

ID	Area represented	Typical/highest monthly outdoor L_{pAeq} [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	Significant Effect
		Day 0800-1800	Evening 1800-2200	Night 2200-0800											
					of shaft & adits Night - Construction of the SCL Lower Section of shaft & adits										
901184	Canterbury Road, London	63/68 [A]	40/49 [A]	40/49 [C]	Works associated with Canterbury Works site ventilation shaft Day: Construction of the SCL Lower Section of shaft & adits Evening - Construction of the SCL Lower Section of shaft & adits Night - Construction of the SCL Lower Section of shaft & adits	Q	100	R	T	-	-	-	D1	-	CSV04-C12
901186	Brondesbury Villas, London	58/67 [A]	45/52 [B]	45/52 [C]	Works associated with Canterbury Works site ventilation shaft Day: Construction of the SCL Lower Section of shaft &	S	40	R	T	H	-	-	D7	-	CSV04-C13

ID	Area represented	Typical/highest monthly outdoor L_{pAeq} [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	Significant Effect
		Day 0800-1800	Evening 1800-2200	Night 2200-0800											
					adits Evening - Construction of the SCL Lower Section of shaft & adits Night - Construction of the SCL Lower Section of shaft & adits											
901187	Chichester Road, London	45/49 [A]	35/43 [A]	35/43 [B]	Works associated with Canterbury Works site ventilation shaft Day: Construction of the SCL Lower Section of shaft & adits Evening - Construction of the SCL Lower Section of shaft & adits Night - Construction of the SCL Lower Section of shaft & adits	NA	20	R	T	-	-	-	-	-	

ID	Area represented	Typical/highest monthly outdoor L_{pAeq} [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	Significant Effect
		Day 0800-1800	Evening 1800-2200	Night 2200-0800											
901188	Canterbury House	69/75 [A]	53/60 [A]	53/60 [C]	Works associated with Canterbury Works site ventilation shaft Day: Construction of the SCL Lower Section of shaft & adits Evening - Construction of the SCL Lower Section of shaft & adits Night - Construction of the SCL Lower Section of shaft & adits	A	20	R	T	-	-	-	D21 N_4	NI	CSV04-C14
901185A (part of 901185)	Caretaker's Building at St. Mary's School	71/77	56/61	56/61	Works associated with Canterbury Works site ventilation shaft Day: Construction of the SCL Lower Section of shaft & adits Evening - Construction of the SCL Lower Section of shaft & adits	A	1	R	T	-	-	-	D21 N6	NI	CSV04-C15

ID	Area represented	Typical/highest monthly outdoor L_{pAeq} [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	Significant Effect
		Day 0800-1800	Evening 1800-2200	Night 2200-0800											
					Night - Construction of the SCL Lower Section of shaft & adits										