

# HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

## Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement

Volume 2 | Community forum area reports

CFA4 Kilburn (Brent) to Old Oak Common

October 2015

SES3 and AP4 ES 3.2.1.4



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Department  
for Transport

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# Structure of the HS<sub>2</sub> Supplementary Environmental Statement 3 and Additional Provision 4 Environmental Statement

The Supplementary Environmental Statement 3 (SES<sub>3</sub>) and Additional Provision 4 Environmental Statement (AP<sub>4</sub> ES) comprises:

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

## SES<sub>3</sub> and AP<sub>4</sub> ES Volume 2 - CFA<sub>4</sub>, Kilburn (Brent) to Old Oak Common

amendments are also taken into account where relevant;

- Volume 5: Appendices and Map Books. This contains environmental information and associated maps in support of the other volumes of the SES<sub>3</sub> and AP<sub>4</sub> ES; and
- Glossary of terms and list of abbreviations. This contains any new or different terms and abbreviations used throughout the SES and AP ES reports, additional to those included in the main ES.

# Structure of this report

This volume of the SES<sub>3</sub> and AP<sub>4</sub> ES is divided into CFA reports, which are in turn divided into two parts.

Part 1 of this CFA report provides supplementary environmental information relating to changes to the design or construction assumptions which do not require changes to the Bill.

Part 1 of each CFA report includes, where relevant:

- a description of the changes or updates within the CFA that have triggered the need for reassessment;
- an assessment of the environmental effects of the changes for relevant environmental topics considering the:
  - scope, assumptions and limitations of the SES<sub>3</sub> assessment;
  - changes of relevance to the assessment;
  - environmental baseline;
  - effects arising during construction;
  - effects arising from operation; and
  - mitigation and residual effects; and
- a summary of any new or different likely residual significant effects as a result of the changes.

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

- a summary of the proposed amendments within each CFA that have triggered the need for reassessment;
- a description of each amendment;
- an assessment of the environmental effects of each amendment for relevant environmental topics considering the:
  - scope, assumptions and limitations of the AP<sub>4</sub> ES assessment;
  - environmental baseline;
  - effects arising during construction;
  - effects arising from operation; and
  - mitigation and residual effects; and
- a summary of any new or different likely residual significant effects as a result of each proposed amendment.

# 1 Introduction

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

Table 1: Scheme definitions

Scheme name	Definition	Relevant CFAs
the original scheme	the Bill scheme submitted to Parliament in November 2013, which was assessed in the main ES	1 – 26
the AP1 revised scheme	the original scheme as amended by the AP submitted in September 2014	7 – 26
the SES scheme	the original scheme with the design changes described in the SES submitted in July 2015	4 – 26
the AP2 revised scheme	the SES scheme as amended by the AP2 submitted in July 2015	4 – 26
the SES2 scheme	the original scheme as updated by the SES scheme, with the design changes described in the SES2 submitted in September 2015	1 – 5 (i.e. this applies in the London area only)
the AP3 revised scheme	the SES2 scheme as amended by the AP3 submitted in September 2015	1 – 5 (i.e. this applies in the London area only)
the SES3 scheme	the SES2 scheme with the design changes described in the SES3 submitted in October 2015	4 – 26
the AP4 revised scheme	the SES3 scheme as amended by the AP4 submitted in October 2015	4 – 26

- 1.1.5 SES<sub>3</sub> (Part 1 of this report) describes changes to the scheme that have occurred within the current limits and powers of the Bill, and therefore do not require an AP to the Bill.
- 1.1.6 Design changes assessed within the SES<sub>3</sub> for this CFA include:
- provision of a subway at Old Oak Common Lane; and
  - a maintenance base at Old Oak Common station.
- 1.1.7 The changes are described in Part 1 under a series of sub-headings, and assessed on a topic by topic basis using the same approach adopted in the main ES.
- 1.1.8 The purpose of SES<sub>3</sub> is to provide an assessment of any new or different likely significant environmental effects arising from the changes described.
- 1.1.9 There were SES<sub>2</sub> changes in this CFA so the SES<sub>3</sub> changes are compared to the SES<sub>2</sub> scheme. There were AP<sub>2</sub> amendments, so these are taken into account as appropriate.
- 1.1.10 The AP<sub>4</sub> ES (Part 2 of this report) describes the likely significant effects of amendments to the design of the scheme, which require the use of land outside the original limits of the Bill, additional access rights, or other extensions to the powers conferred by the Bill, making it necessary to submit an AP to the Bill. The amendments assessed within the AP<sub>4</sub> ES for this CFA include:
- relocation of the Salusbury Road vent shaft to Canterbury Works;
  - the realignment of Stamford Brook sewer; and
  - provision of access to the Crossrail depot from the west.
- 1.1.11 The AP<sub>4</sub> ES assesses each amendment separately for all relevant topics. The purpose of the AP<sub>4</sub> ES is to provide an assessment of any new or different likely significant environmental effects arising from the amendments compared to the SES<sub>3</sub> scheme, taking into account AP<sub>1</sub>, AP<sub>2</sub> and AP<sub>3</sub> amendments where relevant.
- 1.1.12 The standard measures that will be used to mitigate likely significant adverse environmental effects during construction and operation of the scheme are described in the main ES, Volume 1, Section 9 and the draft Code of Construction Practice (CoCP) submitted in support of the Bill. Implementation of these measures has been assumed in this SES<sub>3</sub> and AP<sub>4</sub> ES.

# Part 1: Supplementary Environmental Statement 3

## 2 Summary of changes

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

- 2.1.1 Table 2 provides a summary of the changes to the design or construction assumptions not requiring a change to the Bill, which will result in new or different significant effects in Kilburn (Brent) to Old Oak Common community forum area (CFA<sub>4</sub>). Figure 1 shows the locations.

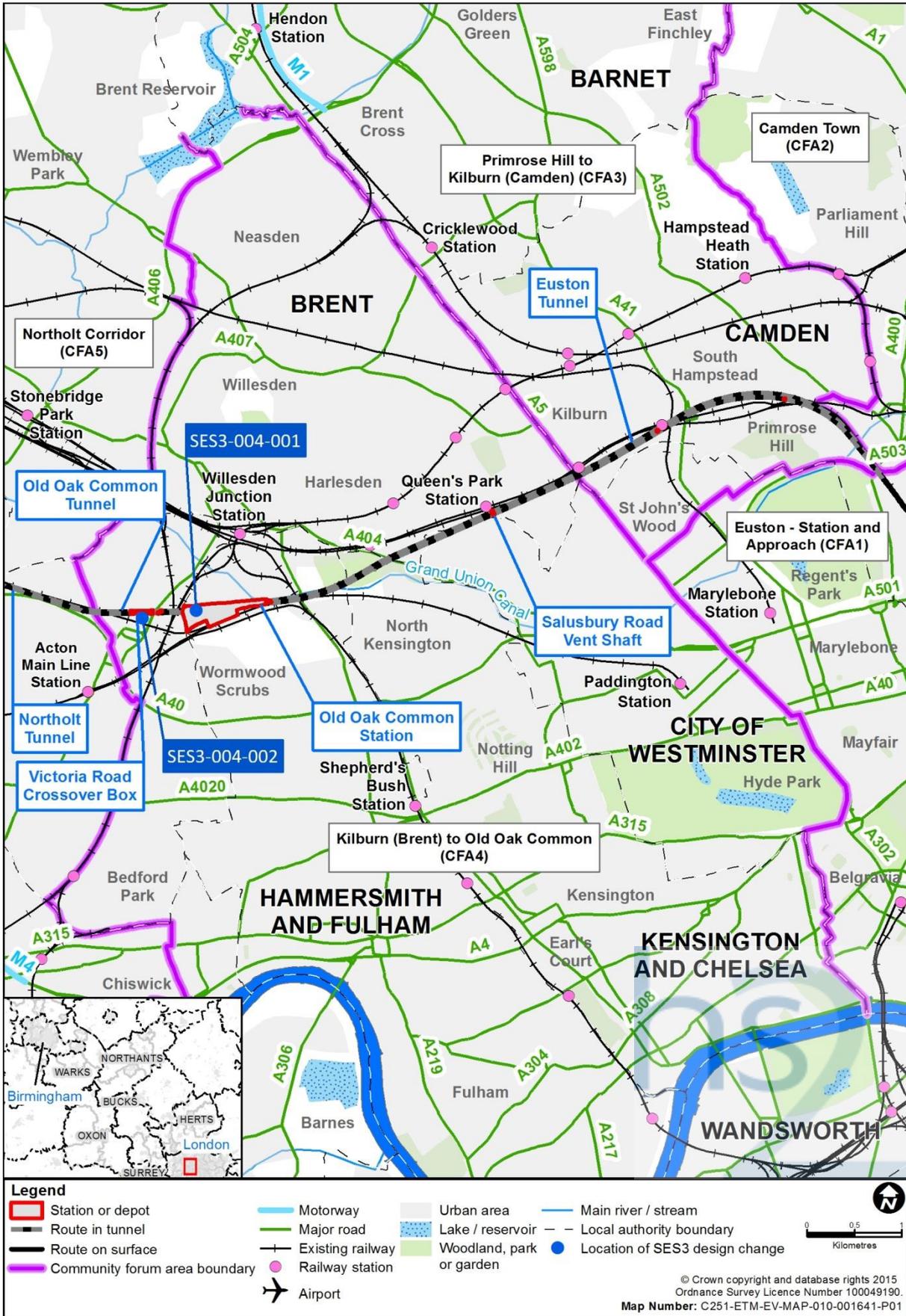
## SES<sub>3</sub> and AP<sub>4</sub> ES Volume 2 - CFA<sub>4</sub>, Kilburn (Brent) to Old Oak Common

Table 2: Summary of changes to the design or construction assumptions not requiring a change to the Bill in CFA<sub>4</sub>

Name of design change or construction assumption	Description of the SES <sub>2</sub> scheme	Description of the SES <sub>3</sub> scheme
<p>Provision of a subway at Old Oak Common</p> <p>SES<sub>3</sub>-004-001</p>	<p>No subway under Old Oak Common Lane was proposed in the SES<sub>2</sub> scheme.</p>	<p>Since submission of the main ES, Transport for London (TfL) has proposed the development of a new station on the North London Overground Line adjacent to Old Oak Common station. These proposals include a new subway for pedestrians, beneath Old Oak Common Lane, linking the Old Oak Common station site with the proposed overground station and any future development to the west.</p> <p>The station and subway will be constructed as part of a future development by third parties.</p> <p>The SES<sub>3</sub> scheme will include a concrete box structure beneath Old Oak Common Lane, which will provide a connection to the future station and pedestrian subway proposed by TfL. The box will extend to the western edge of Old Oak Common Lane, from the junction of Old Oak Common Lane and the northern access to Old Oak Common station, below the access road ramp. All works are within the extent of land included in the Bill.</p>
<p>Provision of a HS<sub>2</sub> maintenance base near Old Oak Common</p> <p>SES<sub>3</sub>-004-002</p>	<p>No maintenance bases within CFA<sub>4</sub> were proposed in the SES<sub>2</sub> scheme.</p> <p>The SES<sub>2</sub> scheme includes the Victoria Road crossover box main compound, located to the west of Old Oak Common station and east of Chase Road. The compound would be used to manage construction of the Victoria Road crossover box. The area was to be returned to suitable development use upon completion of construction.</p>	<p>Since submission of the Bill, a requirement has been identified for a new permanent maintenance facility in the vicinity of Old Oak Common station. The base will be located within the site of the Victoria Road crossover box main compound on land previously proposed to be returned to suitable development use following construction. It will comprise an accommodation building, storage facilities; and vehicle parking.</p>

# SES3 and AP4 ES Volume 2 - CFA4, Kilburn (Brent) to Old Oak Common

Figure 1: Locations of design changes not requiring a change to the Bill in CFA4



## Description of changes to the design or construction assumptions

### *Provision of a subway at Old Oak Common (SES<sub>3</sub>–004–001)*

- 2.1.2 The main ES described the proposed Old Oak Common station, located to the east of Old Oak Common Lane, and associated access (refer to maps CT–05–009a and CT–06–009a in the main ES Volume 2, CFA<sub>4</sub> Map Book).
- 2.1.3 Since submission of the main ES, Transport for London (TfL) has proposed the development of a new station on the North London Overground Line (NLL), to the west of Old Oak Common Lane. These proposals include a new subway for pedestrians linking the Old Oak Common station site with the proposed overground station and any future development to the west. These proposals will be taken forward as part of a future development by third parties.
- 2.1.4 The SES<sub>3</sub> scheme will however include a 16m wide, 4m high underground reinforced concrete box structure, at approximately 2m below ground level, beneath Old Oak Common Lane. This will facilitate a future connection to the proposed TfL station and pedestrian subway. The box would extend, approximately 25m to the western edge of Old Oak Common Lane, from the junction of Old Oak Common Lane and the northern access to Old Oak Common station, below the access road ramp. The remaining subway west of Old Oak Common Lane, and fit-out, will be constructed as part of future development by third parties (refer to maps CT–05–009a and CT–06–009a in the SES<sub>3</sub> and AP<sub>4</sub> ES Volume 2, CFA<sub>4</sub> Map Book). The proposed works are within the extent of the existing limits for which powers are sought by the Bill.
- 2.1.5 The provision of a subway at Old Oak Common station is not considered to make changes that require reassessment of the effects or proposed mitigation as set out in the main ES, the SES and AP<sub>2</sub> ES, or the SES<sub>2</sub> and AP<sub>3</sub> ES with respect to any environmental topics.

### *Provision of a HS2 maintenance base near Old Oak Common (SES<sub>3</sub>–004–002)*

- 2.1.6 The main ES proposed a limited number of road-accessible maintenance bases on the operational route away from the main base at the infrastructure maintenance depot (IMD) at Calvert (located in CFA<sub>13</sub>). No maintenance bases were proposed within CFA<sub>4</sub>.
- 2.1.7 The main ES describes the Victoria Road crossover box main compound, located to the west of Old Oak Common station and east of Chase Road. The compound will be used to manage construction of the Victoria Road crossover box. The area would be returned to suitable development use upon completion of construction.
- 2.1.8 Since submission of the Bill, a requirement has been identified for a new permanent maintenance facility in the vicinity of Old Oak Common station. The base will be located within the site of the Victoria Road crossover box main compound, to the east of Chase Road, between the Victoria Road crossover box to the north and the Acton and Northolt Line to the south. The maintenance base will be single storey. The overall site area required permanently is approximately 55m by 20m (1100m<sup>2</sup>). The land required for the permanent provision of the maintenance base is located within the existing limits of the Bill.

- 2.1.9 The primary purpose of the maintenance base will be to allow efficient maintenance of the HS2 railway during its operation. The maintenance base will comprise:
- an accommodation building;
  - a secure container to store tools and equipment;
  - storage facilities for typical maintenance components and consumables plus access for deliveries. This will provide for storage of larger components at the maintenance base prior to their use for planned maintenance. It is envisaged that these items will be delivered to the maintenance base by road; and
  - a parking area, comprising 20 spaces, allowing for 15 staff vehicles and five maintenance vehicles.
- 2.1.10 Typical maintenance activities that may make use of these storage facilities will include:
- maintenance of off-track items such as the drainage and pumps associated with attenuation ponds;
  - fencing repairs;
  - landscape management;
  - maintenance work within tunnel vent shafts;
  - servicing of communication equipment;
  - major items of work at stations, such as maintenance of escalators; and
  - building maintenance.
- 2.1.11 The complete compound (accommodation, storage area, car parking, etc.) will be securely fenced. The compound area will also need to be lit adequately so that people and vehicles can move around safely during the hours of darkness.
- 2.1.12 The base will be accessed from Victoria Road. Access will be limited to cars (staff vehicles) and light commercial vehicles such as long wheel-base flat-beds (maintenance vehicles). However, large articulated vehicles (up to 18.75m in length) may be used to deliver components from time to time. No rail access will be provided at the maintenance base.
- 2.1.13 The proposed maintenance base is not considered to make changes that require reassessment of the effects or proposed mitigation as set out in the main ES, the SES and AP<sub>2</sub> ES, or the SES<sub>2</sub> and AP<sub>3</sub> ES with respect to any environmental topics.

## **2.2 Topics included in the SES<sub>3</sub> assessment**

- 2.2.1 The changes described above in Section 2.1 do not result in new or different significant effects for any environmental topics and are therefore not discussed further.

## **3 Assessment of changes**

- 3.1.1 The changes described above in Section 2.1 above do not result in any new or different significant effects in respect of any of the environmental topics.

# Part 2: Additional Provision 4 Environmental Statement

## 4 Summary of amendments

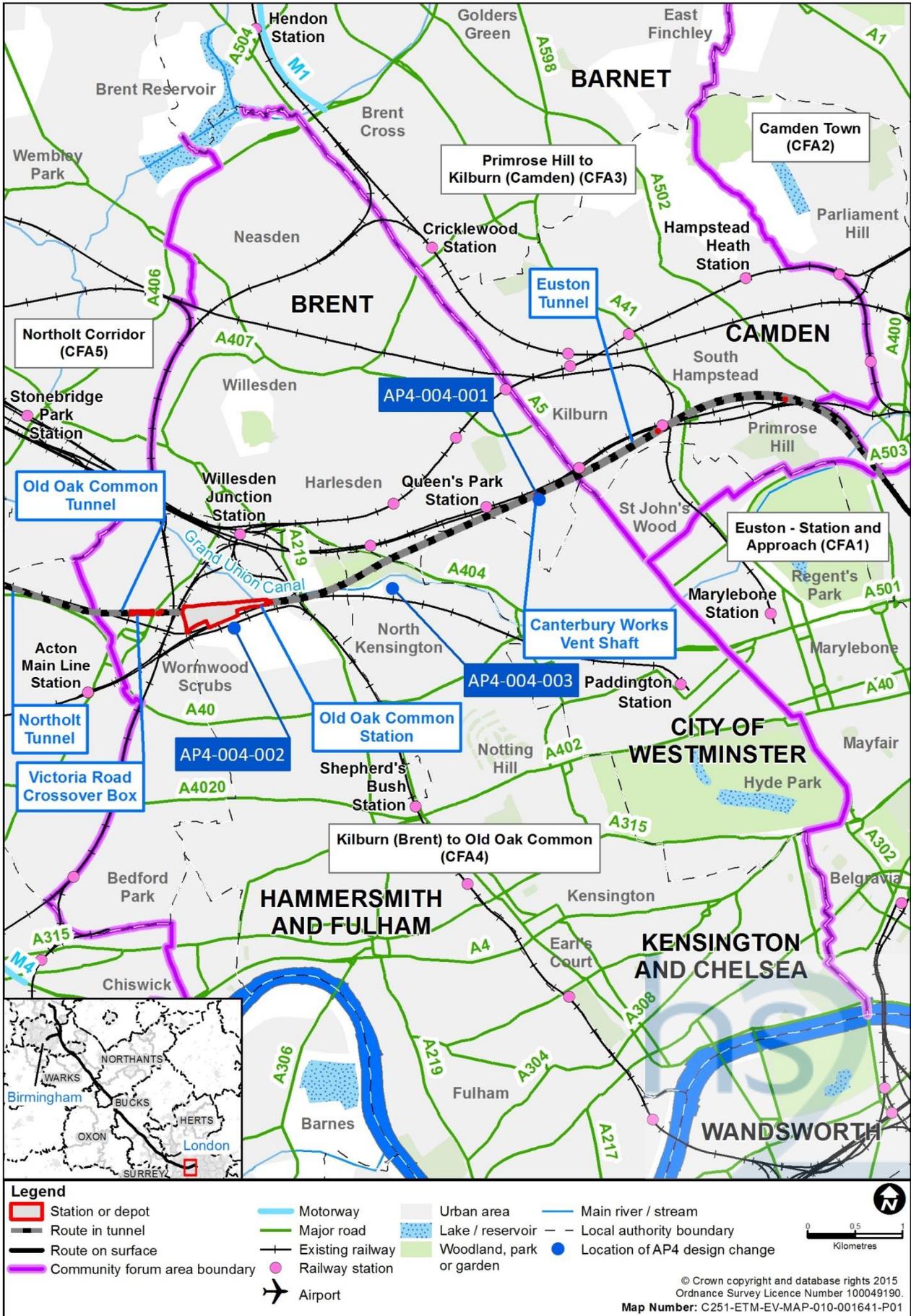
- 4.1.1 Table 3 provides a summary of the amendments in the Kilburn (Brent) to Old Oak Common community forum area (CFA<sub>4</sub>) and Figure 2 shows the locations.
- 4.1.2 Amendments in this CFA result in changes to waste arisings, which are reported in Volume 5, Appendix WM-001-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES.
- 4.1.3 An assessment of the likely significant environmental effects associated with the disposal of construction, demolition, excavation, worker accommodation, site and operational waste has been undertaken for the SES<sub>3</sub> scheme and AP<sub>4</sub> revised scheme as a whole. See Volume 3, Section 19 of the SES<sub>3</sub> and AP<sub>4</sub> ES for further information.

## SES<sub>3</sub> and AP<sub>4</sub> ES Volume 2 - CFA<sub>4</sub>, Kilburn (Brent) to Old Oak Common

Table 3: Summary of amendments in CFA<sub>4</sub>

Name of amendment	Description of the SES <sub>3</sub> scheme	Description of the AP <sub>4</sub> revised scheme
<p>Additional land required for the relocation of Salusbury Road vent shaft to Canterbury Works</p> <p>AP<sub>4</sub>-004-001</p>	<p>Provision of a vent shaft and auto-transformer station (ATS) beside Salusbury Road in Kilburn, positioned across the Euston tunnel and the HS<sub>1</sub>-HS<sub>2</sub> Link tunnel.</p>	<p>Provision of a vent shaft and ATS at Canterbury Works in Kilburn to provide access to the Euston tunnel. The land required for the amendment is outside the current limits of the Bill.</p> <p>The powers sought in the Bill to provide the vent shaft and associated works at Salusbury Road will be retained but not exercised.</p>
<p>Additional land required for the realignment of Stamford Brook sewer</p> <p>AP<sub>4</sub>-004-002</p>	<p>The Bill provides for diversion of the Stamford Brook sewer across the Great Western Main Line (GWML) at Old Oak Common including its diversion under the future Crossrail depot. Works involve vegetation clearance of a small section of land within Wormwood Scrubs Railway Embankment Site of Borough Importance Grade I (SBI.I.) No works within Wormwood Scrubs Park SBI.I were included as part of the main ES.</p> <p>In the SES scheme, additional land was included to build a 920m long tunnel from the Atlas Road Satellite Construction Compound, via a shaft, to the east end of the Old Oak Common HS<sub>2</sub> station box, to enable the removal of excavated material.</p>	<p>The diversion route of the sewer has been re-aligned under future Crossrail depot, and beneath the Intercity Express Programme (IEP) depot, into Wormwood Scrubs Park SBI.I, and then run westwards before connecting into the existing sewer within Braybrook Street. The sewer tunnel under the IEP depot will be constructed using thrust-bore techniques, the rest being constructed by trenching. A new satellite construction compound will also be located within Wormwood Scrubs Park SBI.I.</p> <p>The diversion and new construction compound will require additional land outside the limits of the Bill.</p>
<p>Provision of western access to Crossrail depot</p> <p>AP<sub>4</sub>-004-003</p>	<p>The Bill includes the GWML railway trackworks, to the southeast of Kensal Green Cemetery, to support the operational functionality of Old Oak Common station.</p> <p>The AP<sub>2</sub> revised scheme also included access rights over Canal Way, a private road, to provide access to the GWML (AP<sub>2</sub>-004-002).</p>	<p>Since submission of the Bill, the future provision for infrastructure associated with Crossrail has been reviewed and a requirement has been identified to provide access to the proposed Crossrail depot from the west, through the train carriage washing machines, while maintaining a Crossrail commitment for passive provision for a station at Kensal Portobello. As such, additional GWML trackworks will be undertaken in this area under the AP<sub>4</sub> revised scheme to allow realignment of the depot tracks with associated relocation of rail systems equipment.</p> <p>The works will be undertaken within land included in the Bill.</p>

Figure 2: Locations of amendments in CFA4



## 5 Assessment of amendments

### 5.1 Additional land required for the relocation of Salusbury Road vent shaft to Canterbury Works (AP4-004-001)

- 5.1.1 The Bill provides for a ventilation and intervention shaft structure (vent shaft) and auto-transformer station (ATS) to be located at Salusbury Road to provide access to the Euston tunnel and the HS1-HS2 Link tunnel (refer to maps CT-05-007 and CT-06-007 in the main ES Volume 2, CFA4 Map Book).
- 5.1.2 Since the submission of the Bill, the Secretary of State has decided not to pursue the HS1-HS2 Link, and has given this commitment to Parliament (refer to SES and AP2 ES Volume 2, CFA4 Report, SES-004-001).
- 5.1.3 This amendment relates to land required for the construction of a permanent vent shaft, the erection of an ATS and the relocation of a Network Rail electricity substation and its associated structures, over an area of approximately 0.6ha, which is outside the limits of the Bill (refer to maps CT-05-007 and CT-06-007 in the SES3 and AP4 ES Volume 2, CFA4 Map Book). Assuming this amendment is approved, powers will not be exercised over the land at Salusbury Road, required for the vent shaft and ATS in the original scheme and described in the main ES.
- 5.1.4 The Canterbury Works vent shaft site is currently used as a business park, comprising car parking and commercial and light industrial activities. The vent shaft will provide passive and mechanical ventilation for the Euston tunnel and will allow intervention in the event of an emergency. Key features of this vent shaft will include a permanent fenced compound containing:
- a shaft headhouse building, measuring approximately 700m<sup>2</sup> and approximately 9.5m high above existing ground level. It will provide access to the Euston tunnel below;
  - an ATS to supply power for the trains. The ATS will measure approximately 400m<sup>2</sup>, with a height of approximately 5m; and
  - an area of hardstanding, to allow for maintenance and emergency access.
- 5.1.5 The base of the vent shaft will be approximately 41m below ground, with foundations extending to approximately 51m below ground.
- 5.1.6 The Canterbury Works vent shaft site will be accessed through two entrances, one off Canterbury Road via Canterbury Terrace and one off Albert Road. Albert Road is accessed from B413 Carlton Vale. The permanent headhouse entrance will be from Albert Road.
- 5.1.7 The Canterbury Works main compound will be used to manage construction of the Canterbury Works vent shaft 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;

- support approximately 50 workers each day during civil engineering works and support approximately 25 workers each day throughout railway installation works; and
- facilitate the railway installation works managed from the Victoria Road crossover box main compound.

5.1.8 Works associated with this amendment 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.

5.1.9 The shaft structure will comprise a concrete diaphragm walled earth retaining structure and will take approximately one year and four months to construct.

5.1.10 The existing commercial and industrial buildings at the Canterbury Works vent shaft site will be demolished as a result of the vent shaft works.

5.1.11 No temporary or permanent diversions of roads, footpaths or cycleways will be required.

5.1.12 No diversions of existing utilities or watercourses will be required.

5.1.13 The additional land for a vent shaft, ATS, relocated Network Rail substation and its associated structures required at Canterbury Works is not considered to make changes that require a reassessment of the environmental effects or proposed mitigation as set out in the main ES for agriculture, forestry and soils. However there were changes where reassessment was considered to be required for air quality; community; cultural heritage; ecology; land quality; landscape and visual assessment; socio-economics; sound, noise and vibration; traffic and transport; and water resources and flood risk assessment.

## Air quality

### *Introduction*

- 5.1.14 This section of the report describes the environmental baseline in relation to air quality that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

### *Scope, assumptions and limitations*

- 5.1.15 The assessment scope, key assumptions and limitations and the methodology for determining significance of effects for air quality are as set out in the Scope and Methodology Report (SMR) Addendum 3 (Volume 5: Appendix CT-001-000/4) of the SES<sub>2</sub> and AP<sub>3</sub> ES.

### *Existing baseline*

- 5.1.16 The baseline air quality information for Kilburn (Brent) to Old Oak Common is described in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 4) and SES and AP<sub>2</sub> ES (Volume 2, CFA<sub>4</sub> Report: Section 3).
- 5.1.17 There are no statutory designated ecological sites within the CFA that could potentially be affected by changes in air quality as a result of the amendment.

### *Future baseline*

#### **Construction (2017)**

- 5.1.18 Future background pollutant concentrations have been sourced from the Department for Environment, Food and Rural Affairs (Defra) background maps for 2017 that predict NO<sub>2</sub> and PM<sub>10</sub> concentrations in 2017 to be lower than in the 2012 baseline.
- 5.1.19 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified in the main ES, SES and AP<sub>2</sub> ES and SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.1.20 The conversion of Canterbury House from offices to homes is a committed development that it is assumed will be built and occupied by 2017. It is therefore included as a receptor location for the air quality assessment.
- 5.1.21 None of the other identified developments affect the assessment of the amendment's likely construction impacts on air quality.

#### **Operation (2026)**

- 5.1.22 Future background pollutant concentrations have been sourced from the Department for Environment, Food & Rural Affairs (Defra) background maps for 2026 that predict NO<sub>2</sub> and PM<sub>10</sub> concentrations in 2026 to be lower than in the 2012 baseline.
- 5.1.23 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments that are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.

- 5.1.24 With the exception of the conversion of Canterbury House from offices to homes, none of the identified developments affect the assessment of the amendment's likely operational impacts on air quality.

#### *Effects arising during construction*

- 5.1.25 The amendment is not considered to make changes to traffic flows that require reassessment of air quality impacts from construction traffic.
- 5.1.26 The main ES reported no significant effects on air quality from construction dust arising from the construction of the vent shaft and ATS previously proposed at Salusbury Road.
- 5.1.27 Assuming implementation of the mitigation measures set out in the draft CoCP, construction works at Canterbury Works will not give rise to any significant effects from dust or emissions from construction traffic.

#### *Effects arising from operation*

- 5.1.28 The main ES reported no significant effects on air quality during operation of the vent shaft and ATS previously proposed at Salusbury Road. The amendment will likewise not give rise to any significant effects on air quality.

#### *Mitigation and residual effects*

- 5.1.29 The assessment of the amendment has assumed that the general measures detailed in Section 7 of the draft CoCP (Volume 5: Appendix CT-003-000) in the main ES will be implemented. No additional mitigation measures are required.
- 5.1.30 The construction works at Canterbury Works will not give rise to any residual significant effects.

#### *Cumulative effects*

- 5.1.31 There are no new likely significant cumulative effects for air quality as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> amendments or any relevant committed development.

### **Community**

#### *Introduction*

- 5.1.32 This section of the report describes the environmental baseline in relation to community that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

#### *Scope, assumptions and limitations*

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

### *Existing baseline*

- 5.1.34 The baseline community information for Kilburn (Brent) to Old Oak Common is described in the main ES (Volume 2, CFA4 Report: Section 5).
- 5.1.35 In addition, the area around the Canterbury Works vent shaft site is predominantly residential to the west and south of the site. The London Underground Central Line bounds the site to the north, beyond which is further residential use. To the east of the site is St Mary's Catholic Primary School. The school has approximately 400 pupils of ages 3–11.

### *Future baseline*

#### **Construction (2017)**

- 5.1.36 Volume 5: Appendix CT-004-000 of the SES3 and AP4 ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified in the main ES, SES and AP2 ES and SES2 and AP3 ES.
- 5.1.37 The conversion of Canterbury House from offices to homes is a committed development that is assumed will be built and occupied by 2017. It therefore forms part of the 2017 baseline for the air community assessment.
- 5.1.38 None of the other identified developments affect the assessment of the amendment's likely construction impacts on community.

#### **Operation (2026)**

- 5.1.39 Volume 5: Appendix CT-004-000 of the SES3 and AP4 ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified in the main ES, SES and AP2 ES and SES2 and AP3ES.
- 5.1.40 With the exception of the conversion of Canterbury House from offices to homes, none of the identified developments affect the assessment of the amendment's likely operational impacts on community.

### *Effects arising during construction*

- 5.1.41 Residents of properties at Carlton House on Canterbury Terrace (approximately 20 dwellings) and Canterbury House (approximately 10 dwellings) are predicted to experience in-combination effects as a result of construction activities. The effects are:
- significant noise effects from demolition and site preparation works;
  - significant visual effects for properties looking east from Carlton House and north from Canterbury House towards the construction compound; and
  - significant increase in HGV movements accessing the area from the B413 Carlton Vale.
- 5.1.42 The combination of these effects, which will coincide for up to one year and nine months, will have a new major adverse effect on the amenity of residents, which is significant.

- 5.1.43 To the east of the main construction compound is St Mary's Catholic Primary School, which is a highly valued community resource. Access to the school is unlikely to be affected by construction activity as the main construction compound is accessed to the north via Albert Road and construction traffic will exit the construction compound to the south on to Canterbury Road, opposite the junction with Chichester Road, away from the school's access.
- 5.1.44 The school is predicted to experience in-combination effects resulting from a combination of significant visual effects, with views of the demolition of the existing buildings on the site and the construction of the vent shaft, headhouse and the substation. This is combined with significant construction noise effects during the daytime for approximately one year and nine months.
- 5.1.45 The combination of the effects on the children and staff at the school is predicted to result in a new major adverse effect on their amenity, which is significant.
- 5.1.46 The additional vent shaft at Canterbury Works means that there is no longer a need for the vent shaft at Salusbury Road that was part of the original scheme. Therefore the following significant effects reported in the main ES will not occur:
- major adverse in-combination effects on approximately 80 residential properties on the B<sub>414</sub> Salusbury Road, Claremont Road and some properties at the east of the B<sub>413</sub> Kilburn Lane; and
  - a moderate adverse effect from the loss of public toilets in the car park adjacent to Premier House.
- 5.1.47 Details of assessments of community resources are included in SES<sub>3</sub> and AP<sub>4</sub> ES Volume 5: Appendix CM-001-004. Changes to significantly affected community resources are shown on Map CM-01-010 (Volume 5, Community Map Book).

#### *Effects arising from operation*

- 5.1.48 The main ES reported no significant operational effects on community at Salusbury Road. The amendment will not give rise to any significant operational effects.

#### *Mitigation and residual effects*

- 5.1.49 The construction of the Canterbury Works vent shaft will result in new significant residual effects on residential amenity during construction at properties to the west and south of the main construction compound.
- 5.1.50 There is also predicted to be a new significant residual amenity effect during construction on St Mary's Catholic Primary School, located to the east of the main construction compound. HS<sub>2</sub> Ltd will work closely with St Mary's Catholic Primary School to identify reasonably practicable measures to mitigate the residual significant amenity effects.
- 5.1.51 Significant residual amenity effects on residents on the B<sub>414</sub> Salusbury Road, Claremont Road and B<sub>413</sub> Kilburn Lane and the residual adverse effect from the loss of public toilets in the car park adjacent to Premier House will no longer occur due to removal of the vent shaft at Salusbury Road.

### *Cumulative effects*

- 5.1.52 There are no new likely significant cumulative effects for community as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> or AP<sub>3</sub> amendments or any relevant committed development.

## **Cultural heritage**

### *Introduction*

- 5.1.53 This section of the report describes the environmental baseline in relation to cultural heritage that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

### *Scope, assumptions and limitations*

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

### *Existing baseline*

- 5.1.55 The cultural heritage baseline for the assessment takes into account information collected in support of the main ES, which included walkover survey, remote sensing data, and data from national and local registers. A full list is provided in Volume 2, CFA<sub>4</sub> Report: Section 6.3 of the main ES.
- 5.1.56 The baseline cultural heritage information for Kilburn (Brent) to Old Oak Common is described in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 6) and SES and AP<sub>2</sub> ES (Volume 2, CFA<sub>4</sub> Report). There is one asset additional to those previously reported, the locally listed Canterbury House (asset reference<sup>1</sup> KIL136). The asset is directly adjacent to the land required at Canterbury Works.
- 5.1.57 For the purposes of the cultural heritage assessment, Canterbury House is an asset of low value. The building has aesthetic value associated with its classical styling that is formed around a symmetrical façade two storeys high in brick with a stucco ground floor and the use of polychromatic brickwork. The building has historical value; it was built by Saxby and Farmer, the railway signal manufacturers who constructed signalling for the London and North Western Railway until 1903. Canterbury House is the only building to remain out of a complex of buildings and railway sidings that were located in the Canterbury Works vent shaft site and hence the setting of this asset is not considered to contribute to its value.
- 5.1.58 The Canterbury Works vent shaft site is located approximately 20m north of the South Kilburn Conservation Area (asset reference KIL002) and 50m south of the Kilburn Conservation Area (asset reference KIL004). The Canterbury Works vent shaft site is screened from these assets by the West Coast Main Line (WCML) to the north and by

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<sup>1</sup> Cultural heritage assets within CFA<sub>4</sub> are identified with a unique reference code, KILXXX; further detail on these assets can be found in the gazetteer in Volume 5 of the main ES: Appendix CH-002-004.

modern commercial and residential properties to the south and west. Both of the conservation areas are assets of moderate value.

- 5.1.59 The Canterbury Works vent shaft site is located approximately 400m west of the Kilburn High Road Archaeological Priority Area (asset reference KIL094); this reflects the alignment of the Roman Watling Street and core of the medieval settlement that developed along the road. The closest archaeological asset to the land required at Canterbury Works is a medieval settlement indicated by the site of the medieval manor house (asset reference KIL093), located approximately 380m east of the site. The settlement was linear and focused on Kilburn High Road to the east. The Canterbury Works vent shaft site is likely to have been agricultural land until the early nineteenth century. From the mid-nineteenth century onwards there have been multiple phases of industrial development. This is likely to have caused a high level of ground disturbance and due to the shallow nature of archaeological deposits will have reduced the potential for archaeological remains to survive.

### *Future baseline*

#### **Construction (2017)**

- 5.1.60 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.1.61 None of the identified developments affect the assessment of the amendment's likely construction impacts on cultural heritage.

#### **Operation (2026)**

- 5.1.62 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.1.63 None of the identified developments affect the assessment of the amendment's likely operational impacts on cultural heritage.

### *Effects arising during construction*

- 5.1.64 No significant construction effects were reported in the main ES relating to the vent shaft and ATS at Salusbury Road. The construction works at Canterbury Works do not encroach on any identified heritage assets or their setting, including the South Kilburn Conservation Area (asset reference KIL002) and the Kilburn Conservation Area (asset reference KIL004). The works are adjacent to Canterbury House (asset reference KIL136), an asset of low value, but will not directly impact the asset. As the setting does not contribute to the value of this asset, there are no effects on setting as a result of this amendment.
- 5.1.65 The temporary and permanent works are not considered to have a significant impact on the value of the asset and therefore will not give rise to any significant effects from construction.

### *Effects arising from operation*

- 5.1.66 The amendment will not affect any identified heritage assets or their setting and therefore will not give rise to any significant operational effects.

### *Mitigation and residual effects*

- 5.1.67 No mitigation measures are required.
- 5.1.68 The amendment will not give rise to any residual significant effects.

### *Cumulative effects*

- 5.1.69 There are no new likely significant cumulative effects for cultural heritage as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> or AP<sub>3</sub> amendments or any relevant committed development.

## **Ecology**

### *Introduction*

- 5.1.70 This section of the report describes the environmental baseline in relation to ecology that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

### *Scope, assumptions and limitations*

- 5.1.71 Updates to the scope of the assessment for ecology are set out in Volume 1 of the SES<sub>3</sub> and AP<sub>4</sub> ES. The key assumptions and limitations, and the methodology for determining significance of effects are as set out in Volume 1, the SMR and the SMR addendum (Volume 5: Appendix CT-001-000/01 and Appendix CT-001-000/02 of the main ES) and the SMR Addendum 4 (SES<sub>3</sub> and AP<sub>4</sub> ES Volume 5: CT-001-000/5).
- 5.1.72 To address any limitations in data, a precautionary baseline has been considered according to the guidance reported in the main ES, Volume 5: Appendix CT-001-000/2. This constitutes a 'reasonable worst-case' basis for the subsequent assessment. The precautionary approach to the assessment that has been adopted identifies the likely significant ecological effects of the AP<sub>4</sub> revised scheme.

### *Existing baseline*

- 5.1.73 A summary of the baseline information relevant to the assessment of the amendment is provided below.

### **Designated sites**

- 5.1.74 There are no designated sites relevant to the assessment of this amendment.

### **Habitats**

- 5.1.75 The additional land required for the amendment appears from aerial imagery to comprise a mix of commercial buildings, hardstanding, trees and areas used for storage. These habitats are likely to be of no more than local/parish value.

### **Protected and/or notable species**

- 5.1.76 The buildings affected by the amendment are used for light industry and commercial purposes and contain a high proportion of single-skinned, asbestos-roofed workshops. The site itself is highly urban, with artificial lighting, limited foraging and poor connectivity with higher-quality habitats. On the basis of poor habitat quality and limited roost potential it is likely that only small roosts of common bat species could occur. The small number of trees may have the potential to support some common breeding birds. It is unlikely that any of these habitats support species assemblages of more than local/parish value.

#### *Future baseline*

### **Construction (2017)**

- 5.1.77 Volume 5: Appendix CT-004-000 of the SES3 and AP4 ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP2 ES and the SES2 and AP3 ES.
- 5.1.78 None of the identified developments affect the assessment of the amendment's likely construction impacts on ecology.

### **Operation (2026)**

- 5.1.79 Volume 5: Appendix CT-004-000 of the SES3 and AP4 ES provides details of the developments that are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP2 ES and the SES2 and AP3 ES.
- 5.1.80 None of the identified developments affect the assessment of the amendment's likely operational impacts on ecology.

#### *Effects arising during construction*

### **Avoidance and mitigation measures**

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

### **Assessment of impacts and effects**

#### *Designated sites*

- 5.1.82 The amendment will not give rise to any significant effects on designated sites.

#### *Habitats*

- 5.1.83 The amendment will result in the additional loss of scattered trees within an area of hardstanding in an urban environment. The trees are of no more than local/parish value. This amendment will not give rise to any significant effects on habitats.

#### *Protected and/or notable species*

- 5.1.84 The amendment will result in the loss of a small number of buildings and trees in a new location that could potentially be used by bat and breeding bird populations of up

to local/parish value. The amendment will not give rise to any significant effects on bird and bat populations.

### **Cumulative effects**

- 5.1.85 There are no new likely significant cumulative effects for ecology as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> or AP<sub>3</sub> amendments or any relevant committed development.

### **Mitigation and residual effects**

#### *Other mitigation measures*

- 5.1.86 No mitigation measures are required.

#### *Summary of likely residual effects*

- 5.1.87 The amendment will not give rise to any residual significant effects on ecological receptors.

#### *Effects arising from operation*

- 5.1.88 The amendment will not give rise to any significant operational effects on designated sites, habitats or species.

### **Land quality**

#### *Introduction*

- 5.1.89 This section of the report describes the environmental baseline in relation to land quality that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

#### *Scope, assumptions and limitations*

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

#### *Existing baseline*

- 5.1.91 The baseline land quality information for Kilburn (Brent) to Old Oak Common is described in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 8).
- 5.1.92 In addition, a summary of the baseline conceptual site model (CSM) for areas associated with the amendment is provided in Table 4.

## SES<sub>3</sub> and AP<sub>4</sub> ES Volume 2 - CFA<sub>4</sub>, Kilburn (Brent) to Old Oak Common

Table 4: Summary of baseline CSM for sites which may pose a contaminative risk for the Canterbury Works vent shaft site

Area reference <sup>2</sup>	Area name and classification	Main potential impacts	Main baseline risk <sup>3</sup>
AP <sub>4-4-002</sub>	Former and existing on-site railway land overlying the London Clay Formation at the Canterbury Works shaft site	Potential impact on human health on-site from contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust and contaminated shallow perched/groundwater	Moderate / low
		Potential impact on human health on-site from contamination by inhalation of asphyxiative or explosive ground gases	Moderate / low
		Potential impact to off-site receptors from wind-blown contaminated dust	Low
		Migration of hazardous gas and vapours to confined spaces off-site via permeable strata or conduits and creation of an asphyxiating or explosive atmosphere	Moderate / low
AP <sub>4-4-119</sub> , AP <sub>4-4-10</sub> , AP <sub>4-4-001</sub>	Former on-site warehouse, garage and motor works at the Canterbury Works shaft site	Potential impact on human health on-site from contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust and contaminated shallow perched/ groundwater	Moderate/ low
		Potential impact on human health off-site from migration of soil vapours and volatile organic compounds (by diffusion or due to wind)	Low
		Migration of hazardous gas and vapours to confined spaces on- and off-site via permeable strata or conduits and creation of an asphyxiating or explosive atmosphere	Moderate / low

### *Future baseline*

#### **Construction (2017)**

5.1.93 The potential for the baseline to change in the lead up to the construction of the amendment is limited to the extent to which any new development necessitates remediation or mitigation measures to control potential contamination releases. Any new development in the study area on potentially contaminated land will need to be suitable for its intended use as set out in the National Planning Policy Framework (NPPF). To meet this requirement new development sites may require remediation to be undertaken. This will mean that some areas described as having potentially

<sup>2</sup> Each area is assigned a unique identification number.

<sup>3</sup> The moderate or high risks identified reflect the uncertainty in existing baseline information. Whilst there are unlikely to be properties or receptors that experience the reported high or moderate existing baseline risk in the absence of site investigation, a precautionary, worst-case risk is reported in the table.

contaminative current and/or historical land use, may no longer be of significance at the time of construction.

5.1.94 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments that are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.

5.1.95 None of the identified developments affect the assessment of the amendment’s likely construction impacts on land quality.

**Operation (2026)**

5.1.96 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments that are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.

5.1.97 None of the identified developments affect the assessment of the amendment’s likely operational impacts on land quality.

*Effects arising during construction*

5.1.98 Table 5 presents a summary of the construction effects obtained from a comparison of the baseline and construction impacts. The construction risk assessment takes into account the implementation of the mitigation measures set out within the draft CoCP.

Table 5: Summary of temporary (construction) effects

Area ref	Area name	Main baseline risk	Main construction risk	Construction effect and significance
AP <sub>4-4-002</sub>	Former and existing on-site railway land overlying the London Clay Formation at the Canterbury shaft site	<p>Potential impact on human health on-site from contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust and contaminated waters = Moderate/low.</p> <p>Potential impact on human health on-site from contamination by inhalation of asphyxiative or explosive ground gases = Moderate/low.</p> <p>Potential impact off-site receptors due to migration of wind-blown dust = Low.</p> <p>Migration of hazardous gas and vapours to confined spaces off-site via permeable strata or conduits and creation of an asphyxiating or explosive atmosphere = Moderate/low.</p>	<p>Pathway not present<sup>4</sup></p> <p>Pathway not present</p> <p>Low</p> <p>Moderate/low</p>	Negligible (not significant)

<sup>4</sup> The implementation of the CoCP means that the risk of human exposure to potential contamination during construction will be mitigated and controlled

SES<sub>3</sub> and AP<sub>4</sub> ES Volume 2 - CFA<sub>4</sub>, Kilburn (Brent) to Old Oak Common

Area ref	Area name	Main baseline risk	Main construction risk	Construction effect and significance
AP <sub>4</sub> -4-119, AP <sub>4</sub> -4-10, AP <sub>4</sub> -4-001	Former on-site warehouse, garage and motor works at the Canterbury shaft site	<p>Potential impact on human health on-site from contamination by direct contact, ingestion and inhalation of contaminants in soil and soil-derived dust and contaminated waters = Low to moderate / low.</p> <p>Potential impact on human health off-site from migration of soil vapours and volatile organic compounds (by diffusion or due to wind) = Low.</p> <p>Migration of hazardous gas and vapours to confined spaces off-site via permeable strata or conduits and creation of an asphyxiating or explosive atmosphere = Moderate/ low.</p>	<p>Pathway not present</p> <p>Low</p> <p>Moderate/low</p>	Negligible (not significant)

- 5.1.99 In summary, the vent shaft will extend 41m below ground level with foundations extending to 51m below ground. A geological cross-section for CFA<sub>4</sub> is presented in main ES Volume 5: Appendix WR-002-004 and shows that the London Clay is expected to be at least 60m thick in this area and therefore the construction is not expected to extend below the base of the London Clay. The low permeability nature of the London Clay effectively acts as a barrier to limit the downward migration of contamination and is expected to offer protection to the underlying aquifers.
- 5.1.100 The land required will include land previously used for car servicing and an electrical substation and as such may include contaminants. The main potential risks identified are associated with human health on-site, where current and historical potentially contaminative activities are affected by the amendment. It is expected that the measures adopted within the CoCP will ensure that risks to human health will not be increased over baseline conditions and in some instances may improve during construction as any remediation required by the CoCP is undertaken. The effects are not considered to be significant.
- 5.1.101 The main compound at Canterbury Works may include maintenance facilities for plant and machinery and fuel storage in bunded tanks. As such, the use and storage of potentially contaminative materials such as fuels, oils and solvents may occur. The shaft site may also be used for temporary storage of potentially contaminated soils. It is anticipated that the measures outlined in the draft CoCP will manage risks from the storage of such materials.
- 5.1.102 No significant construction effects on land quality relating to the works at Salusbury Road were reported in the main ES. The construction works at Canterbury Works will not give rise to any significant land quality effects during construction.

### *Effects arising from operation*

- 5.1.103 An ATS is proposed to be located within the Canterbury Works vent shaft site. An express feeder ATS can, in principle, be a source of contamination through accidental discharge or leaks of coolant. However, the proposed express feeder ATS, in common with other modern substations, will use secondary containment appropriate to the level of risk.
- 5.1.104 Maintenance and operation of the AP4 revised scheme will be in accordance with environmental legislation and good practice whereby appropriate spillage and pollution response procedures will be established.
- 5.1.105 It is unlikely that there will be any cumulative effects on land quality or in-combination effects on receptors because of the environmental controls that will be placed on operational procedures.
- 5.1.106 No significant operation effects on land quality relating to the works at Salusbury Road were reported in the main ES. The amendment will not give rise to any significant land quality effects during operation.

### *Mitigation and residual effects*

- 5.1.107 The risk assessment for the post-construction stage will include measures that will be adopted in the CoCP to remove, treat or isolate contamination. Further measures could also include the construction of permanent embedded design features in buildings/vent shaft, such as gas protection measures (e.g. ventilation of confined spaces or inclusion of gas-resistant membranes in basement or floor slabs). Overall risks for future site maintenance users from pre-existing contamination sources will be low to very low and are therefore not significant.
- 5.1.108 It is considered unlikely that additional remediation works will be required over and above the mitigation measures contained as standard within the draft CoCP.
- 5.1.109 There may be ongoing monitoring requirements, including monitoring of groundwater quality or ground gas, following any remediation works carried out during construction.
- 5.1.110 No residual significant effects on land quality relating to the works at Salusbury Road were reported in the main ES. The amendment will not give rise to any residual significant land quality effects.

### *Cumulative effects*

- 5.1.111 There are no new likely significant cumulative effects for land quality as a result of the AP4 amendments interacting with one another, the AP2 or AP3 amendments or any relevant committed development.

## **Landscape and visual assessment**

### *Introduction*

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

### *Scope, assumptions and limitations*

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

### *Existing baseline*

- 5.1.114 The additional area of land required for the amendment is located within the Kilburn Lane and Carlton Vale Post-War Residential and Community Landscape Character Area (LCA) as described in the main ES (Volume 2, CFA 4 Report: Section 9). The Paddington Cemetery and 19th Century/Pre-War Residential LCA lies to the north of the Canterbury Works vent shaft site, north of the existing railway corridor. No other LCA in the study area will be affected by the amendment.
- 5.1.115 The Canterbury Works vent shaft site is currently occupied by light industrial and commercial units, a car park and an electricity substation that detract from landscape character. The WCML and the London Overground Line pass the northern boundary, housing abuts the western side and St Mary's Catholic Primary School is adjacent, to the east. The Canterbury House building to the south is currently being converted to residential accommodation.
- 5.1.116 The amendment will be visible from additional viewpoints in the area. Those closest to the amendment are:
- Viewpoint 011.2.004: view north-west from residential properties on Canterbury Road;
  - Viewpoint 011.2.005: view north from residential properties on Chichester Road;
  - Viewpoint 011.6.007: view west from St Mary's Catholic Primary School;
  - Viewpoint 011.2.008: view west from flats in Cathedral Walk;
  - Viewpoint 012.2.003: view east from residential properties on Carlton House on Canterbury Terrace;
  - Viewpoint 012.2.004: view south from Brondesbury Villas;
  - Viewpoint 012.4.006: view north-east from Albert Road; and
  - Viewpoint 012.2.007: view north-east from flats on Albert Road.
- 5.1.117 The foreground of the view from Viewpoint 011.2.004: view north-west from residential properties on Canterbury Road, is of Canterbury House. Vegetation within the Canterbury Works vent shaft site, the car park and the WCML corridor are visible in a narrow view along the access road beyond. The existing industrial uses on the Canterbury Works vent shaft site and the railway corridor beyond are detracting elements in the view.
- 5.1.118 The foreground of the view from Viewpoint 011.2.005: view north from residential properties on Chichester Road, is of the vehicle repair workshop and Canterbury

House. Beyond Canterbury House, vegetation, the car park and the WCML corridor are visible from upper floor windows in residential properties on Chichester Road. The existing industrial uses on the Canterbury Works vent shaft site and the railway corridor beyond are detracting elements in the view.

- 5.1.119 The foreground of the view from Viewpoint 011.6.007: view west from St Mary's Catholic Primary School, is of the school playground. Canterbury House is visible in the background, over vegetation growing in the playground and on the Canterbury Works vent shaft site. The existing industrial uses on the site are detracting elements in the view.
- 5.1.120 The Viewpoint 011.2.008: view west from flats in Cathedral Walk, is representative of views from the nine-storey Gorefield House flats on Cathedral Walk. The foreground view is of the brick boundary wall of the Royal Mail depot and the Gorefield House flats on the left. Vegetation surrounding the all-weather sports pitch adjacent to St Mary's Catholic Primary School screens longer views of the school and the WCML beyond. The Canterbury Courts flats are visible through gaps in the vegetation in the background of the view.
- 5.1.121 The foreground of the view from Viewpoint 012.2.003: view east from residential properties on Carlton House on Canterbury Terrace, is of the vehicle repair workshop and the National Rail depot, with the Canterbury Works, the car park and the WCML corridor visible in the background. The existing industrial uses on the site and the railway corridor beyond are detracting elements in the view.
- 5.1.122 In the foreground from Viewpoint 012.2.004: view south-east from Brondesbury Villas, the vegetation in the back gardens filters views of the fencing, gantries and overhead lines of the railway corridor. The Canterbury Court and Carlton House flats can be seen in the background, beyond the vegetation growing on the Canterbury Works site in the middle ground. The railway corridor and associated infrastructure are detracting elements in the view.
- 5.1.123 Viewpoint 012.4.006: view north-east from Albert Road. In the foreground the gates of the Network Rail depot allow filtered views of the trees growing in the depot and the gantries carrying the overhead lines on the WCML beyond. The four-storey Carlton House is a dominant element in the view. The existing industrial uses on the site and the railway corridor are detracting elements in the view.
- 5.1.124 Viewpoint 012.2.007: view north-east from flats on Albert Road, this viewpoint is representative of views from flats including Wood House and Swift House off Albert Road. The trees lining the right hand side of Albert Road partially filter views to the right of the view, Swift House, an eleven-storey block and the twelve-storey Wood House are dominant elements in the foreground framing views towards Mary Green, a residential tower off Abbey Road and Carlton House at the end of the road in the background of the view.

### *Future baseline*

#### **Construction (2017)**

- 5.1.125 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.

- 5.1.126 The Canterbury House building is currently being developed for residential use which will introduce an additional receptor, Viewpoint 011.2.009: view north from Canterbury House, into the area by the start of construction.
- 5.1.127 In the foreground of the view from viewpoint 011.2.009 is the area north of the Canterbury Works building which is occupied by a number of small buildings in industrial use and an open area currently used for car storage. The view of cars is filtered and partly screened by a line of trees across the middle of the Canterbury Works vent shaft site. The gantries carrying the overhead lines of the WCML to Euston can be seen in the background of the view.
- 5.1.128 None of the other identified developments affect the assessment of the amendment's likely construction impacts on LCAs and visual receptors.

### **Operation (2026)**

- 5.1.129 Volume 5: Appendix CT-004-000 of the SES3 and AP4 ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP2 ES and the SES2 and AP3 ES.
- 5.1.130 The Canterbury House building is currently being developed for residential use which will introduce an additional receptor, Viewpoint 011.2.009: view north from Canterbury House into the area by the start of construction.
- 5.1.131 None of the other identified developments affect the assessment of the amendment's likely operational impacts on LCAs and visual receptors.

### *Effects arising during construction*

#### **Landscape assessment**

- 5.1.132 The Kilburn Lane and Carlton Vale Post-War Residential and Community LCA was assessed as being affected by the original scheme and will also be affected by this amendment. The LCA is of fair condition, of low tranquillity and local value; therefore it is considered to be of medium sensitivity to change. The main ES reported a moderate adverse significant effect during construction on this LCA, due to the construction of the Salisbury Road vent shaft and ATS.
- 5.1.133 Both locations are within the Kilburn Lane and Carlton Vale Post-War Residential and Community LCA.
- 5.1.134 Landscape impacts during construction of the amendment will arise from the demolition of existing structures on the site, the construction of the vent shaft, the headhouse, the electricity substation and associated structures, the removal of vegetation and the presence of construction plant and construction activity. The vent shaft site will be surrounded by hoardings, in accordance with the CoCP.
- 5.1.135 The hoardings, the presence of cranes, construction traffic and activity will introduce prominent new elements into the Kilburn Lane and Carlton Vale Post-War Residential and Community LCA. However, in the context of the busy rail corridor north of the Canterbury Works vent shaft site and the current industrial use of the site, the elements will be largely characteristic of their setting.

- 5.1.136 Impacts will be most intense in close proximity to the works, but they will diminish across the wider LCA due to the density of the surrounding urban development. Overall, the magnitude of change will be medium, which when combined with the medium sensitivity of the character area will result in a moderate adverse significant effect on the Kilburn Lane and Carlton Vale Post-War Residential and Community LCA.
- 5.1.137 The amendment will generate a different significant effect on the Kilburn Lane and Carlton Vale Post-War Residential and Community LCA due to the relocation of the effects from the Salusbury Road site to the Canterbury Works vent shaft site; however, the effect will remain moderate adverse, as reported in the main ES, which is significant.
- 5.1.138 The amendment will also affect the Paddington Cemetery and 19<sup>th</sup> Century Residential LCA to the north due to the introduction of cranes and construction activity into the area, adjacent to the boundary of this LCA. These are not considered likely to influence the overall character of the LCA because they will only affect a small area of the LCA and will be separated from it by the WCML railway corridor. The main ES predicted a negligible effect on this LCA.
- 5.1.139 The construction works at Canterbury Works will not give rise to a new or different effect on this LCA and will not change the level of significance of the effects reported in the main ES, SES, SES<sub>2</sub>, or SES<sub>3</sub>.

### **Visual assessment**

- 5.1.140 The main ES reported significant adverse effects on the following receptors during construction of the vent shaft, headhouse and the ATS at Salusbury Road:
- Viewpoint 013.2.001: view west from Salusbury Road/Albert Road junction (major adverse);
  - Viewpoint 013.2.002: view north from Kilburn Lane (major adverse);
  - Viewpoint 013.4.003: view east from Kilburn Lane (moderate adverse);
  - Viewpoint 013.4.004: view north from Portnall Road (moderate adverse);
  - Viewpoint 014.4.001: view south from Salusbury Road (moderate adverse); and
  - Viewpoint 014.2.002: view east from dwellings on Claremont Road (major adverse).
- 5.1.141 The relocation of the vent shaft, headhouse and ATS from Salusbury Road means that the aforementioned receptors will now no longer be affected.
- 5.1.142 The proposed amendment will however give rise to effects on additional visual receptors near the Canterbury Works vent shaft site. These are described below.
- Viewpoint 011.2.004: view north-west from residential properties on Canterbury Road*
- 5.1.143 The demolition of the existing buildings on the Canterbury Works vent shaft site and the construction of the vent shaft, the headhouse building and the substation will be

clearly visible over Canterbury House from the eight-storey Canterbury Court. Construction plant and activities will be new features in the view, but they will be seen in the context of the overhead lines and railway infrastructure on the railway corridor beyond. The magnitude of change will be medium, which combined with the high sensitivity of the receptor will result in a new moderate adverse significant effect.

*Viewpoint 011.2.005: view north from residential properties on Chichester Road*

- 5.1.144 The demolition of the vehicle repair workshop and the construction of the vent shaft, headhouse building and substation will be clearly visible over Canterbury House. Construction at ground level will be largely screened by hoardings. Construction plant and activities will be new features in the view, but they will be seen in the context of the overhead lines and railway infrastructure on the railway corridor beyond. The magnitude of change will be medium, which combined with the high sensitivity of the receptor will result in a new moderate adverse significant effect.

*Viewpoint 011.6.007: view west from St Mary's Catholic Primary School*

- 5.1.145 The demolition of the existing buildings on the Canterbury Works vent shaft site and the construction of the vent shaft, headhouse and the substation will be clearly visible above a boundary hedge within the school grounds, from the single-storey school, the car park and the playground, a minimum of 15m away. The school premises are considered, for the purposes of the visual assessment, to be of low sensitivity. The existing uses on the site mainly take place at ground level and are screened from view during the summer. The cranes and construction activity will result in a substantial change to the view close to receptors. The magnitude of change will be high, which combined with the low sensitivity of the receptor will result in a new moderate adverse significant effect.

*Viewpoint 012.2.003: view east from Carlton House on Canterbury Terrace*

- 5.1.146 The demolition of the existing buildings on the site and the construction of the vent shaft, the headhouse and the substation will be clearly visible above the construction site hoardings, a minimum of 10m away. Despite the presence of existing industrial uses on the site and the railway corridor beyond, the presence of cranes and construction activity will result in a substantial change to the view, close to receptors. The magnitude of change will be high, which combined with the high sensitivity of the receptor will result in a new major adverse significant effect.

*Viewpoint: 011.2.008: view west from flats in Cathedral Walk*

- 5.1.147 The demolition of the existing buildings on the site and the construction of the vent shaft, the headhouse and the substation will be largely screened by the existing brick wall and vegetation in the foreground. The works will represent a change in the background of the view, which will be seen as an inconspicuous element within the wider view. The magnitude of change will be negligible, which combined with the high sensitivity of the receptor will result in a negligible and non-significant effect.

*Viewpoint 011.2.009: view north from Canterbury House (Future baseline)*

- 5.1.148 The demolition of the existing buildings on the Canterbury Works vent shaft site and the construction of the vent shaft, the headhouse and the substation will be clearly visible above the construction site hoardings, a minimum of 5m away. Despite the

existing industrial uses on the Canterbury Works vent shaft site, the presence of cranes and construction will result in a substantial change to the view, close to these receptors. The magnitude of change will be high, which combined with the high sensitivity of the receptor will result in a new major adverse significant effect.

*Viewpoint 012.2.004: view south-east from Brondesbury Villas*

- 5.1.149 The demolition and construction works will be visible in the background of the view viewed in the context of the existing wide railway corridor. The works will introduce new features that are continuously visible but are largely characteristic of the existing view as the Canterbury Works vent shaft site is already in industrial use. The magnitude of change will be low, which combined with the high sensitivity of the receptor will result in a minor adverse and non-significant effect.

*Viewpoint 012.4.006: view north-east from Albert Road*

- 5.1.150 The works will be largely screened by the Carlton House properties, which afford only a narrow view of the Canterbury Works vent shaft site from Albert Road. As the change would be largely filtered by intervening built form and viewed in the context of the existing railway corridor, the magnitude of change will be low, which combined with the low sensitivity of the receptor will result in a minor adverse and non-significant effect.

*Viewpoint 012.4.007: view north-east from flats on Albert Road*

- 5.1.151 Views from the ground floor properties would be largely screened by Carlton House. The works would be visible from the upper floors of Wood House and Swift House off Albert Road as part of a series of components in the wider panoramic view. As the change would be largely screened by intervening built form and viewed in the context of the existing railway corridor and adjacent built elements, the magnitude of change will be negligible, which combined with the high sensitivity of the receptor will result in a negligible and non-significant effect.

*Effects arising from operation*

**Landscape assessment**

- 5.1.152 The Kilburn Lane and Carlton Vale Post-War Residential and Community LCA was assessed as being affected by the original scheme and will also be affected by this amendment. The main ES reported a moderate adverse significant effect on the Kilburn Lane and Carlton Vale Post-War Residential and Community LCA during year 1, year 15 and year 60 of operation due to the presence of the Salusbury Road vent shaft and ATS.
- 5.1.153 Both the Salusbury Road and the Canterbury Works locations are in the Kilburn Lane and Carlton Vale Post-War Residential and Community LCA.
- 5.1.154 During operation, the amendment will affect a smaller proportion of the LCA than the area that would have been affected by the vent shaft, headhouse and the ATS at Salusbury Road. This is due to the Canterbury Work site being enclosed on three sides by tall buildings that are three storeys or more, whereas the original Salusbury Road site is more open, with buildings only on one side. The Canterbury Works vent shaft site is already in industrial use and the new structures, though larger in scale and

covering a larger area than those currently on the site, will not be incongruous in the context of the existing land use or the adjacent railway corridor. Overall, vent shaft and ancillary works required at the Canterbury Works vent shaft site will reduce the level of effects on the setting of the Kilburn Lane and Carlton Vale Post-War Residential and Community LCA from moderate adverse (which is significant), as reported in the main ES, to minor adverse in year 1 of operation and in years 15 and 60, which is not significant.

- 5.1.155 The additional land required at the Canterbury Works vent shaft site will not give rise to a new or different significant effect on the Paddington Cemetery and 19<sup>th</sup> Century/Pre-War Residential LCA to the north and will not change the level of significance of the effects on this LCA, which were reported as negligible in the main ES.

### **Visual assessment**

- 5.1.156 The main ES reported significant adverse effects in year 1, year 15 and year 60 on the following receptors during operation due to the presence of the vent shaft, headhouse and the ATS at Salusbury Road:

- Viewpoint 013.2.001: view west from Salusbury Road/Albert Road junction (major adverse);
- Viewpoint 013.2.002: view north from Kilburn Lane (major adverse);
- Viewpoint 013.4.003: view east from Kilburn Lane (major adverse);
- Viewpoint 013.4.004: view north from Portnall Road (major adverse);
- Viewpoint 014.4.001: view south from Salusbury Road (major adverse); and
- Viewpoint 014.2.002: view east from dwellings on Claremont Road (major adverse).

- 5.1.157 The relocation of the vent shaft, headhouse and ATS from Salusbury Road means that the aforementioned receptors will no longer be affected.

- 5.1.158 The amendment will however give rise to new effects on additional visual receptors near the Canterbury Works vent shaft site. These are described below.

*Viewpoint 011.2.004: view north-west from residential properties on Canterbury Road*

- 5.1.159 The proposed vent shaft, headhouse and substation will be clearly visible over Canterbury House from the eight-storey Canterbury Court and represent new features in the view. However, these will be seen in the context of the overhead lines and railway infrastructure on the railway corridor beyond. The magnitude of change will be low, which combined with the high sensitivity of the receptor will result in a minor adverse and therefore not significant in year 1 of operation, which will remain unchanged in year 15 and 60 due to the lack of planting.

*Viewpoint 011.2.005: view north from residential properties on Chichester Road*

- 5.1.160 The proposed vent shaft, headhouse and substation will be clearly visible over Canterbury House, though screened at ground level. The vent shaft, headhouse and

substation will be new features in the view, but they will be seen in the context of the overhead lines and railway infrastructure on the railway corridor beyond. The magnitude of change will be low, which combined with the high sensitivity of the receptor will result in a minor adverse and therefore not significant effect in year 1 of operation, which will remain unchanged in year 15 and 60 due to the lack of planting.

*Viewpoint 011.6.007: view west from St Mary's Catholic Primary School*

- 5.1.161 The vent shaft, headhouse and the substation will be partially visible above and views filtered through a boundary hedge within the school grounds. The school premises are considered, for the purposes of the visual assessment, to be of low sensitivity. The existing uses on the site mainly take place at ground level and are screened from view during the summer. The magnitude of change will be low, which combined with the low sensitivity of the receptor will result in minor adverse and therefore not significant effect in year 1 of operation, which will remain unchanged in year 15 and 60 due to the lack of planting.

*Viewpoint: 011.2.008: view west from flats in Cathedral Walk*

- 5.1.162 The headhouse and the substation will be largely screened by the existing brick wall and vegetation in the foreground. The vent shaft, headhouse and the substation will represent a change in the background of the view, which will be seen as an inconspicuous element within the wider view. The magnitude of change will be negligible, which combined with the high sensitivity of the receptor will result in a negligible and therefore not significant effect in year 1 of operation, which will remain unchanged in year 15 and 60 due to the lack of planting.

*Viewpoint 011.2.009: view north from Canterbury House (Future baseline)*

- 5.1.163 The large scale of the proposed vent shaft, headhouse and substation and the close proximity of the security fence mean that the headhouse will occupy a larger proportion of the view than the existing uses on the site and will be prominent in the view. The substation will be an industrial structure but it will be viewed in the context of the tracks and gantries of the railway corridor to the north. The magnitude of change will be medium, which combined with the high sensitivity of the receptor will result in a moderate adverse significant effect in year 1 of operation, which will remain in year 15 and 60 due to the lack of planting.

*Viewpoint 012.2.003: view east from Carlton House on Canterbury Terrace*

- 5.1.164 Loss of vegetation as a result of the amendment, the large scale of the proposed vent shaft, headhouse and substation and the close proximity of the security fence mean that the amendment will occupy a larger proportion of the view than the existing uses on the site. The amendment will be prominent in the view; however, the existing buildings and use of the site for parking and car maintenance already detract from the existing view. The substation will be an industrial structure but will be viewed in the context of the tracks and gantries of the railway corridor to the north. The magnitude of change will be medium, which combined with the high sensitivity of the receptor will result in a moderate adverse significant effect in year 1 of operation, which will remain unchanged in year 15 and 60 due to the lack of planting.

*Viewpoint 012.2.004: view south-east from Brondesbury Villas*

- 5.1.165 The proposed vent shaft, headhouse and substation and the security fence will be visible in the background of the view viewed in the context of the existing wide railway corridor. The works will introduce new features that are continuously visible but are largely characteristic of the existing view as the Canterbury Works Site is already in industrial use. The magnitude of change will be low, which combined with the high sensitivity of the receptor will result in a minor adverse and non-significant effect in year 1 of operation, which will remain unchanged in year 15 and 60 due to the lack of planting.

*Viewpoint 012.4.006: view north-east from Albert Road*

- 5.1.166 The proposed vent shaft, headhouse and substation will be largely screened by the Carlton House properties which afford only a narrow view of the Canterbury Works site from Albert Road. As the change would be largely filtered by intervening built form and viewed in the context of the existing railway corridor, the magnitude of change will be low, combined with the low sensitivity of the receptor will result in a minor adverse and non-significant effect in year 1 of operation, which will remain unchanged in year 15 and 60 due to the lack of planting.

*Viewpoint 012.4.007: view north-east from flats on Albert Road*

- 5.1.167 Views from the ground floor properties will be largely screened by Carlton House. The works will be visible from the upper floors of Wood House and Swift House off Albert Road as part of a series of components in the wider panoramic view. As the change will be largely screened by intervening built form and viewed in the context of the existing railway corridor and adjacent built elements, the magnitude of change will be negligible, which combined with the high sensitivity of the receptor will result in a negligible and non-significant effect in year 1 of operation, which will remain unchanged in year 15 and 60 due to the lack of planting.

*Mitigation and residual effects*

- 5.1.168 Fencing 3.6m tall (part of the construction noise mitigation strategy), as described in the draft CoCP, will be erected along the construction site boundary between construction site at Canterbury Works and the residential communities.
- 5.1.169 The vent shaft, headhouse and ATS have not been designed in detail, but they will be designed to reduce their landscape and visual impacts through the selection of appropriate materials, choice of paving for the hardstanding area and boundary treatment.
- 5.1.170 No other mitigation measures are considered practicable. The residual significant effects on LCAs and visual receptors during construction and operation remain as described above.
- 5.1.171 The amendment will give rise to new significant effects on additional visual receptors near the Canterbury Works vent shaft site at viewpoint 011.2.009: View north from Canterbury House and Viewpoint 012.2.003: View east from Carlton House on Canterbury Terrace.

### *Cumulative effects*

- 5.1.172 There are no new or different likely significant cumulative effects for landscape and visual assessment as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> or AP<sub>3</sub> amendments or any relevant committed development.

## **Socio-economics**

### *Introduction*

- 5.1.173 This section of the report describes the environmental baseline in relation to socio-economics information that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

### *Scope, assumptions and limitations*

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

### *Existing baseline*

- 5.1.175 The baseline socio-economics information for CFA<sub>4</sub> Kilburn (Brent) to Old Oak Common is described in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 10).

### *Future baseline*

#### **Construction (2017)**

- 5.1.176 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments that are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.1.177 None of the identified developments affect the assessment of the amendment's likely construction impacts on socio-economics.

#### **Operation (2026)**

- 5.1.178 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments that are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.1.179 None of the identified developments affect the assessment of the amendment's likely operational impacts on socio-economics.

### *Effects arising during construction*

- 5.1.180 The amendment will result in the displacement of the Canterbury Works, which comprises premises containing five businesses occupied in industrial activities. The availability of alternative industrial space in the local area should allow occupiers of these premises to find alternative business premises to relocate to. It is estimated that the amendment would result in the displacement or possible loss of a total of 20 jobs. This is a minor adverse effect, however it is not considered to be significant.

5.1.181 As a consequence of this amendment the worksite at Salusbury Road as identified in the main ES will no longer be required and the Bakerloo Line welfare facility at Premier House, Kilburn Lane will be retained. This will result in 55 jobs no longer being lost or displaced. The significant permanent major adverse effect of the original scheme on this resource as reported in the main ES (Volume 2, CFA Report 4: Section 10) will not occur.

5.1.182 The amendment will therefore result in the net retention of 35 jobs compared with the loss reported in the main ES.

#### *Effects arising from operation*

5.1.183 The amendment will not give rise to any significant operational effects.

#### *Mitigation and residual effects*

5.1.184 No mitigation measures in addition to those identified in the main ES are required.

5.1.185 The demolition of Premier House, Kilburn Lane is reported as a residual significant effect in the main ES; however, the amendment will result in the retention of this resource. As such, the AP<sub>4</sub> revised scheme will no longer result in a residual significant effect on Premier House.

#### *Cumulative effects*

5.1.186 There are no new likely significant cumulative effects for socio-economics as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> or AP<sub>3</sub> amendments or any relevant committed development.

### **Sound, noise and vibration**

#### *Introduction*

5.1.187 This section of the report describes the environmental baseline in relation to sound, noise and vibration that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

#### *Scope, assumptions and limitations*

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

5.1.189 Local assumptions and limitations for sound noise and vibration are set out in main ES Volume 2 CFA<sub>4</sub> Report.

#### *Existing baseline*

5.1.190 The overall approach to baseline data collection for sound noise and vibration is described in Volume 5: Appendix SV-001-000 from the main ES.

5.1.191 The measurements undertaken over the Kilburn (Brent) to Old Oak Common area are described in Volume 5: Appendix SV-002-004 in the main ES.

- 5.1.192 Surrounding the vent shaft site at Canterbury Works, five additional baseline sound measurements have been undertaken including three long-term measurements and two short-term measurements. These were undertaken at locations judged to be representative of local residential properties and St Mary's Catholic Primary School. Further information regarding the baseline data in this area is described in SES<sub>3</sub> and AP<sub>4</sub> ES Volume 5: Appendix SV-002-004.
- 5.1.193 The existing baseline sound environment around the vent shaft site at Canterbury Works includes contributions from local road traffic on Canterbury Road, rail traffic on the NLL and WCML and more distant road traffic on Kilburn High Road. Daytime sound levels are typically 55 to 60dB surrounding the site but fall to around 50dB in some screened locations. Night-time sound levels in this area are typically 5 to 10dB lower than those during the day.

### *Future baseline*

#### **Construction (2017)**

- 5.1.194 With the exception of the addition of baseline sound levels for the new assessment locations, the future baseline for construction in 2017 and construction traffic in 2021 remains unchanged from that reported in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 11.2).
- 5.1.195 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments that are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.1.196 None of the identified developments affect the assessment of the amendment's likely construction impacts on sound, noise and vibration.

#### **Operation (2026)**

- 5.1.197 With the exception of the addition of baseline sound levels for the new assessment locations, the future baseline for operation in 2026 remains unchanged from that reported in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 11.2).
- 5.1.198 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments that are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.1.199 None of the identified developments affect the assessment of the amendment's likely operational impacts on land quality.

### *Effects arising during construction*

- 5.1.200 The assessment of construction sound, noise and vibration takes account of the avoidance and mitigation measures set out in the draft CoCP, including 3.6m hoarding (main ES, Volume 5: Appendix CT-003-000).

#### **Residential receptors: direct effects – individual dwellings**

- 5.1.201 The following residential buildings additional to those reported in the main ES are forecast to experience noise levels higher than the noise insulation trigger levels, as defined in the draft CoCP, as set out in Volume 5: Appendix SV-003-004 of the SES<sub>3</sub>

and AP<sub>4</sub> ES. For daytime construction the trigger level is 75dB<sup>5</sup> measured outdoors, or the existing ambient if this is already above this level.

- one terraced building (approximately 40 dwellings) on Canterbury Terrace;
- Canterbury House (approximately 20 dwellings); and
- one terraced building (approximately 40 dwellings) on Brondesbury Villas.

5.1.202 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.

5.1.203 Noise levels at the following residential buildings were forecast to exceed the noise insulation trigger levels in the main ES, but this is no longer the case as a result of the amendment:

- William Dunbar House (approximately 10 dwellings), Albert Road;
- Cullen House (approximately 10 dwellings), Salusbury Road;
- Claremont Court, Claremont Road (approximately five dwellings) and 307 Kilburn Road; and
- 332 to 335 Kilburn Lane (approximately 15 dwellings).

#### **Residential receptors: direct effects – communities**

5.1.204 With regard to noise outside dwellings, the assessment of temporary effects takes account of construction noise relative to existing sound levels. In locations with lower existing sound levels<sup>6</sup>, construction noise effects are likely to 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<sup>7</sup>.

5.1.205 The amendment will give rise to new direct adverse effects on residential communities and shared open areas that are considered to be significant on a community basis. These are presented in Table 6.

5.1.206 The durations of impacts shown in Table 6 at each location are the total number of months in which the relevant impact criteria are forecast to be exceeded, leading to the adverse noise effects that are considered significant when assessed on a community basis. Construction activities are likely to vary considerably in intensity during these periods and only the noisiest activity is identified in Table 6.

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<sup>5</sup> L<sub>pAeq,0800-1800</sub> measured at the façade.

<sup>6</sup> Further information is provided in main ES Volume 5: Appendix SV-001-000.

<sup>7</sup> Further information is provided in main ES Volume 5: Appendix SV-001-000 and SES<sub>2</sub> and AP<sub>3</sub> Volume 5: Appendix SV-003-001.

Table 6: New significant direct adverse effects on residential communities

Significant effect number <sup>8</sup>	Type of significant effect	Time of day	Location	Cause (noisiest construction activities)	Likely duration of impact
CSV04-C11	Construction noise	Daytime	Approximately 40 dwellings on Canterbury Terrace	Canterbury Works Vent Shaft – Demolition. Typical and highest monthly noise levels of 75dB and 85dB <sup>9</sup>	One year and nine months
CSV04-C12	Construction noise	Daytime	Approximately 100 dwellings on Canterbury Road	Canterbury Works Vent Shaft – Demolition. Typical and highest monthly noise levels of 55dB and 65dB	One month
CSV04-C13	Construction noise	Daytime	Approximately 40 dwellings on Brondesbury Villas	Canterbury Works Vent Shaft – Demolition. Typical and highest monthly noise levels of 65dB and 75dB	Seven months
CSV04-C14	Construction noise	Daytime	Approximately 20 dwellings in Canterbury House	Canterbury Works Vent Shaft – Demolition. Typical and highest monthly noise levels of 70dB and 85dB	One year and nine months

5.1.207 The following significant construction noise or vibration effects, which were forecast in the main ES at residential communities due to construction of the Salusbury Road vent shaft, are no longer likely as a result of the amendment:

- CSV04-C01 – approximately: 20 dwellings in Winterleys, 45 dwellings in William Dunbar House, 20 dwellings in Watling Place and 10 dwellings in Thames Court, Albert Road; and 10 dwellings in Bond House, Rupert Road;
- CSV04-C02 – approximately: 30 dwellings in Cullen House, Salusbury Road; 15 dwellings on Kilburn Lane; 10 dwellings in Claremont Court, Claremont Road; and 10 dwellings on Claremont Road; and
- CSV04-C03 – approximately 20 dwellings on Brondesbury Road.

#### **Residential receptors: indirect effects**

5.1.208 No significant indirect construction noise effects on residential receptors were identified in the main ES as a result of the works at Salusbury Road vent shaft. The construction works at Canterbury Works will not give rise to any new significant effects.

#### **Non-residential receptors: direct effects**

5.1.209 The proposed amendment will give rise to a new likely significant construction noise adverse effect on a reasonable worst-case basis at St Mary’s Catholic Primary School (CSV04-Nog). Adverse noise effects have been identified during the daytime with

<sup>8</sup> Significant construction-related noise effects are identified with a unique identification number, CSV xx-xxx. Further detail on these effects can be found in Volume 5, Appendix SV-003-004 of the SES3 and AP4 ES.

<sup>9</sup> Night-time: equivalent continuous sound level at the facade, L<sub>pAeq, 23:00 – 07:00</sub>

facade noise levels rising at times to around 70dB over a period of approximately one year and nine months during construction of the Canterbury Works vent shaft.

5.1.210 The significant construction noise or vibration effects identified in the main ES at the following non-residential receptors are no longer likely to occur as a result of the amendment:

- St. Luke's Church, Kilburn Lane (CSV<sub>04</sub>-No<sub>2</sub>); and
- Blessing Medical Centre, 307 Kilburn Lane (CSV<sub>04</sub>-No<sub>3</sub>).

#### **Non-residential receptors: indirect effects**

5.1.211 No significant indirect construction noise effects on non-residential receptors were identified in the main ES as a result of the works at Salusbury Road vent shaft. The construction works at Canterbury Works will not give rise to any new significant effects.

#### *Effects arising from operation*

5.1.212 Significant noise effects from the operational static sources such as mechanical ventilation at vent shafts and the ATS at Canterbury Works will be avoided through their design and the specification of noise emission requirements as described in the main ES Volume 5: Appendix SV-001-000.

5.1.213 The amendment will not give rise to any significant operational effects.

#### *Mitigation and residual effects*

5.1.214 The avoidance and mitigation measures (including noise insulation) reduce noise inside all dwellings from the construction activities such that it will not reach a level where it will significantly affect residents.

5.1.215 The measures reduce adverse effects from construction noise outdoors on the majority of residential communities such that they are not considered significant when assessed on a community basis, except at the residential communities at Canterbury Terrace, Canterbury Road, Brondesbury Villas and Canterbury House that are closest to the works.

5.1.216 On a reasonable worst-case basis, noise from specific construction activities has been identified as resulting in a new temporary significant residual effect at St Mary's Catholic Primary School.

5.1.217 HS2 Ltd will continue to seek all reasonably practicable measures to further reduce these significant effects. In doing so, HS2 Ltd will continue to engage with stakeholders to fully understand the receptor, its use and the benefit of the measures.

#### *Cumulative effects*

5.1.218 There are no new likely significant cumulative effects for sound, noise and vibration as a result of the AP4 amendments interacting with one another, the AP2 or AP3 amendments or any relevant committed development.

## Traffic and transport

### *Introduction*

- 5.1.219 This section of the report describes the environmental baseline in relation to traffic and transport that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

### *Scope, assumptions and limitations*

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

### *Existing baseline*

- 5.1.221 The baseline traffic and transport information for Kilburn (Brent) to Old Oak Common is described in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 12).
- 5.1.222 Supplementary traffic surveys were undertaken in June 2014 to cover locations not previously surveyed but potentially now affected by the AP<sub>4</sub> revised scheme. This includes surveys in the Salusbury Road area where there were ongoing roadworks at the time of the previous surveys. The additional surveys were undertaken on the following roads: Albert Road; B<sub>4</sub><sub>13</sub> Kilburn Lane; and Fernhead Road. These supplementary surveys are reported in SES and AP<sub>2</sub> ES Volume 5, Traffic and Transport Annexes: TR-001-000 (Annex B (ii)).

### *Future baseline*

#### **Construction**

- 5.1.223 The future baseline for construction remains unchanged from that reported in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 12) and the SES and AP<sub>2</sub> ES (Volume 2, CFA<sub>4</sub> Report).

#### **Operation (2026 and 2041)**

- 5.1.224 The future baseline for operation remains unchanged from that reported in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 12) and the SES and AP<sub>2</sub> ES (Volume 2, CFA<sub>4</sub> Report).

### *Effects arising during construction*

- 5.1.225 The construction works at Canterbury Works will result in up to 100 HGV combined two-way trips<sup>10</sup> per day during the peak construction period of approximately 6 months. These levels of construction activity and traffic are similar to those for the previously proposed Salusbury Road vent shaft and ATS, as reported in the main ES.
- 5.1.226 The routes used to access the worksite from the wider highway network also remain largely the same and consequently result in no changes to traffic flows on the wider network. However, the local access to reach the Canterbury Works vent shaft site

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<sup>10</sup> Two-way trips refer to the total number of vehicle movements in both directions (i.e. with 200 westbound vehicles and 100 eastbound, there would be 300 two-way trips)

along Albert Road and Canterbury Terrace from the B<sub>413</sub> Carlton Vale was not previously proposed. The use of these roads by construction traffic, including HGVs, will result in a new moderate adverse significant effect in terms of traffic severance for non-motorised users wishing to cross the road on Albert Road and Canterbury Terrace due to the increase in HGV traffic.

- 5.1.227 The Salisbury Road vent shaft main compound required the relocation of a bus stop on Premier Corner and a bus stop on Claremont Road. These were reported as having a significant moderate adverse effect and major adverse effect respectively in relation to public transport access. These relocations will no longer be required due to the revised vent shaft location and these significant effects as reported in the main ES will not occur. The closure of the Premier Corner western footway and northern Kilburn Lane footway adjacent to the construction compound will also no longer be required.
- 5.1.228 The original scheme involved the redevelopment of Salisbury Road car park, leading to the loss of up to 40 parking spaces, including one disabled car parking space, which constituted major adverse significant effects. These parking spaces will be retained with this amendment and the significant adverse effects reported in the main ES will not occur.
- 5.1.229 The significant effects that will result from construction of the amendment are shown on Map TR-03-004b (SES<sub>3</sub> and AP<sub>4</sub> ES Volume 5, Traffic and Transport, Map Book).

#### *Effects arising from operation*

- 5.1.230 Vehicle trips to the vent shaft during operation will be infrequent. The amendment will therefore not give rise to any new or different significant operational effects. However, the adverse significant effect due to loss of parking at the Salisbury Road car park reported in the main ES will no longer occur.

#### *Mitigation and residual effects*

- 5.1.231 No mitigation measures in addition to those identified in the main ES are required.
- 5.1.232 The construction works at Canterbury Works will give rise to new significant residual moderate adverse effects on traffic severance for non-motorised users of Albert Road and of Canterbury Terrace. Previously reported significant residual adverse effects resulting from the temporary and permanent loss of parking at Salisbury Road car park and the temporary relocation of bus stops on Premier Corner and Claremont Road will no longer occur.

#### *Cumulative effects*

- 5.1.233 The above assessment has taken into account cumulative effects, including planned development, by taking account of background traffic growth as well as traffic and transport impacts of works being undertaken in neighbouring areas.
- 5.1.234 There are no new likely significant cumulative effects for traffic and transport as a result of the AP<sub>4</sub> amendments interacting with one another or any AP<sub>2</sub> amendments.

## Water resources and flood risk assessment

### *Introduction*

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

### *Scope, assumptions and limitations*

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

### *Existing baseline*

- 5.1.237 The baseline information for surface and groundwater resources in the Kilburn (Brent) to Old Oak Common area is described in the main ES (Volume 2, CFA4 Report: Section 13).
- 5.1.238 There are no surface water features in this area and hence there is no impact on pathways to surface water. Surface water resources have therefore not been considered further in this assessment.
- 5.1.239 The Canterbury Works vent shaft site is underlain by the London Clay Formation and is classified as Unproductive strata. No Water Framework Directive (WFD) classification has been given to the London Clay Formation. There are no superficial deposits in the area, although there is made ground across much of the site.
- 5.1.240 There are no licensed groundwater abstractions and no reported private, unlicensed groundwater abstractions in this area. There is the potential for unlicensed abstractions to exist, as a licence is not required for abstraction volumes below 20m<sup>3</sup> per day.
- 5.1.241 There are no discharges to groundwater within 1km of the Canterbury Works vent shaft site.
- 5.1.242 The Canterbury Works vent shaft site is within Flood Zone 1, i.e. there is a low risk of river and tidal flooding; therefore, effects on river and tidal flood risk have not been considered further in this assessment.
- 5.1.243 A combination of surface water and sewer surcharge is the primary risk of flooding in the area. In the vicinity of the Canterbury Works vent shaft site there are areas at risk of surface water flooding although the proposed vent shaft itself is not shown to be located within an area at risk of surface water flooding. The updated Flood Map for Surface Water (uFMfSW) identifies a risk of surface water flooding along Canterbury Road during a 1 in 100 years return period (1% annual probability) rainfall event and Canterbury Terrace, including the surrounding works buildings, during a 1 in 1000 years return period (0.1% annual probability) rainfall event.

### *Future baseline*

#### **Construction (2017)**

- 5.1.244 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments that are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.1.245 None of the identified developments affect the assessment of the amendment's likely construction impacts on water resources and flood risk.

#### **Operation (2026)**

- 5.1.246 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments that are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.1.247 None of the identified developments affect the assessment of the amendment's likely operational impacts on water resources and flood risk.
- 5.1.248 Current projections to the 2080s indicate that climate change may affect the future baseline against which the impacts of the AP<sub>4</sub> revised scheme on surface water and groundwater resources have been assessed. There may be changes in the flow and water quality characteristics of surface water and groundwater bodies as a result of changes in climate. However, except for flood flows, these changes will not give rise to a new or different significant effect.
- 5.1.249 Further information on the potential additional impacts of climate change for water resources and flood risk is provided in Sections 7 and 8 of Volume 1 and Table 13 of Volume 5: Appendix CT-009-000 of the main ES.

### *Effects arising during construction*

- 5.1.250 The vent shaft at Canterbury Works will extend 41m below ground level with foundations extending to 51m below ground. A geological cross-section is presented in the main ES, Volume 5: Appendix WR-002-004 and shows that the London Clay Formation is expected to be at least 60m thick and therefore the construction is not expected to extend below the base of the London Clay Formation and as such will not impact on any groundwater receptors.
- 5.1.251 The vent shaft structure described in the main ES at Salisbury Road was not located in an area identified at risk of flooding from surface water and the proposed headhouse and ATS at Canterbury Works is located outside of the area at risk.
- 5.1.252 The construction works at Canterbury Works will not give rise to any significant effects on water resources and flood risk during construction.

### *Effects arising from operation*

- 5.1.253 Surface water run off from permanent infrastructure at the vent shaft will be attenuated to existing rates, before being discharged to the public sewer network. Therefore, there will be no impacts on groundwater, surface water features or to flood risk.

- 5.1.254 The amendment will not give rise to any significant effects on water resources and flood risk during operation.

### *Mitigation and residual effects*

- 5.1.255 The assessment assumes implementation of mitigation measures set out in the draft CoCP. The general approach to mitigation is set out in Volume 1, Section 9 of the main ES.
- 5.1.256 Mitigation measures to reduce potential adverse impacts include sustainable drainage systems, where reasonably practicable, to reduce the rate and volume of run-off from the railway and associated infrastructure to prevent an increase in flood risk. Surface water run off from permanent infrastructure at the vent shaft will be attenuated to existing rates, before being discharged to the public sewer network. Tunnel drainage at the vent shaft will be a minimal volume and will be pumped out for disposal to sewer at a controlled rate to address flood risk.
- 5.1.257 The surface water run off and drainage systems will also serve to reduce the risk of contaminated run off entering Thames Water sewers as a result of the operation of the AP<sub>4</sub> revised scheme.
- 5.1.258 The amendment will not give rise to any residual significant effects.

### *Cumulative effects*

- 5.1.259 There are no new likely significant cumulative effects for water resources and flood risk as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> or AP<sub>3</sub> amendments or any relevant committed development.

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

- 5.1.260 The amendment to relocate the vent shaft and ATS from the Salusbury Road site to the Canterbury Works vent shaft site will give rise to new and different significant effects with regard to community, landscape and visual, socio-economics, sound, noise and vibration and traffic and transport. These are summarised in Table 7 below. In respect of all other environmental topics, the amendment does not give rise to new significant environmental effects.

Table 7: Summary of new or different likely residual significant effects as a result of the amendment

Topic	Removed significant effects	New or different significant effects
Community	Major adverse in-combination effects on approximately 80 residential properties on the B <sub>414</sub> Salusbury Road, Claremont Road and some properties at the east of the B <sub>413</sub> Kilburn Lane.  Moderate adverse effect from the loss of public toilets in the car park adjacent to Premier House.	New major adverse in-combination effects on residential amenity during construction on residents of properties at Carlton House, Canterbury Terrace (approximately 20 dwellings) and Canterbury House (approximately 10 dwellings).  New major adverse in-combination effects on amenity at St Mary's Catholic Primary School.
Landscape and visual assessment	Moderate adverse effect on the Kilburn Lane and Carlton Vale Post-War Residential and Community LCA during construction (around the Salusbury Road Site)	Different moderate adverse effect on the Kilburn Lane and Carlton Vale Post-War Residential and Community LCA during construction (around the Canterbury Works vent shaft site) due to the

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Topic	Removed significant effects	New or different significant effects
	<p>Moderate adverse effect on the Kilburn Lane and Carlton Vale Post-War Residential and Community LCA during operation.</p>	<p>relocation of the effects from the Salusbury Road site to the Canterbury Works vent shaft site.</p> <p>Minor adverse effect on the Kilburn Lane and Carlton Vale Post-War Residential and Community LCA during operation.</p>
	<p>Adverse effects during construction at the following visual receptors:</p> <ul style="list-style-type: none"> <li>● Viewpoint 013.2.001: View west from Salusbury Road/Albert Road junction (major adverse effect);</li> <li>● Viewpoint 013.2.002: View north from Kilburn Lane (major adverse effect);</li> <li>● Viewpoint 013.4.003: View east from Kilburn Lane (moderate adverse effect);</li> <li>● Viewpoint 013.4.004: View north from Portnall Road (moderate adverse effect);</li> <li>● Viewpoint 014.4.001: View south from Salusbury Road (moderate adverse effect); and</li> <li>● Viewpoint 014.2.002: View east from dwellings on Claremont Road (major adverse effect).</li> </ul>	<p>New adverse effects during construction at the following visual receptors:</p> <ul style="list-style-type: none"> <li>● Viewpoint 011.2.004: view north-west from residential properties on Canterbury Road (moderate adverse effect);</li> <li>● Viewpoint 011.2.005: View north from residential properties on Chichester Road (moderate adverse effect);</li> <li>● Viewpoint 011.6.007: View west from St Mary's Catholic Primary School (moderate adverse effect);</li> <li>● Viewpoint 012.2.003: View east from Carlton House on Canterbury Terrace (major adverse effect); and</li> <li>● Viewpoint 011.2.009 north from Canterbury House building (Future Baseline (major adverse effect).</li> </ul>
	<p>Adverse effects during operation in year 1, year 15 and year 60 at the following visual receptors:</p> <ul style="list-style-type: none"> <li>● Viewpoint 013.2.001: View west from Salusbury Road/Albert Road junction (major adverse effect);</li> <li>● Viewpoint 013.2.002: View north from Kilburn Lane (major adverse effect);</li> <li>● Viewpoint 013.4.003: View east from Kilburn Lane (moderate adverse effect);</li> <li>● Viewpoint 013.4.004: View north from Portnall Road (moderate adverse effect);</li> <li>● Viewpoint 014.4.001: View south from Salusbury Road (moderate adverse effect); and</li> <li>● Viewpoint 014.2.002: View east from dwellings on Claremont Road (major adverse effect).</li> </ul>	<p>New adverse effects during operation in year 1, year 15 and year 60 at the following new visual receptors:</p> <ul style="list-style-type: none"> <li>● Viewpoint 011.2.009: View north from residential properties on Canterbury Works (Future Baseline) (moderate adverse effect); and</li> <li>● Viewpoint 012.2.003: View east from Carlton House on Canterbury Terrace (moderate adverse effect).</li> </ul>
Socio-economics	Major permanent adverse effect resulting from the demolition the Bakerloo Line facility at Premier House, Kilburn Lane and associated job losses.	None

Topic	Removed significant effects	New or different significant effects
Sound, noise and vibration	<p>Significant direct adverse effects during construction on residential communities and shared open areas at the following locations:</p> <ul style="list-style-type: none"> <li>• Approximately: 20 dwellings in Winterleys, Albert Road; 20 dwellings in Watling Place, Albert Road; 10 dwellings in Bond House, Rupert Road; 10 dwellings in Thames Court, Albert Road; and 45 dwellings in William Dunbar House, Albert Road;</li> <li>• Approximately: 30 dwellings in Cullen House, Salusbury Road; 15 dwellings on Kilburn Lane; 10 dwellings in Claremont Court, Claremont Road; 10 dwellings on Claremont Road; and 15 dwellings on Kilburn Lane; and</li> <li>• Approximately 20 dwellings on Brondesbury Road.</li> </ul> <p>Significant direct adverse noise effects during construction on the following non-residential receptors:</p> <ul style="list-style-type: none"> <li>• St. Luke's Church, Kilburn Lane;</li> <li>• Blessing Medical Centre, 307 Kilburn Lane.</li> </ul>	<p>New significant direct adverse effects during construction on residential communities and shared open areas at the following locations:</p> <ul style="list-style-type: none"> <li>• Approximately 40 dwellings on Canterbury Terrace during daytime for a duration of approximately one year and nine months;</li> <li>• Approximately 100 dwellings on Canterbury Road during daytime for a duration of approximately one month;</li> <li>• Approximately 40 dwellings on Brondesbury Villas during daytime for a duration of approximately seven months; and</li> <li>• Approximately 20 dwellings on Canterbury House during daytime for a duration of approximately one year and nine months.</li> </ul> <p>New significant direct adverse effects during construction on St Mary's Catholic Primary School during the daytime for a duration of approximately one year and nine months.</p>
Traffic and transport	<p>Major adverse effect on parking at Salusbury Road car park, with the loss of all the public car parking spaces during both construction and operation.</p> <p>Moderate adverse effect and major adverse effect during construction from the relocation of a bus stop on Premier Corner and a bus stop on Claremont Road respectively.</p>	<p>New moderate significant effect during construction in terms of traffic severance for non-motorised users wishing to cross the road on Albert Road and Canterbury Terrace.</p>

## 5.2 Additional land required for the realignment of Stamford Brook sewer (AP<sub>4</sub>-004-002)

5.2.1 The Bill provides for diversion of the Stamford Brook sewer across the Great Western Main Line (GWML) at Old Oak Common, including its diversion under the future Crossrail depot, currently being built on railway lands to the north of Old Oak Common<sup>11</sup>. The original scheme would have involved excavating shafts in the access road to the Intercity Express Programme (IEP) depot (previously named the North Pole depot) from which the new diverted sewer would be constructed. This would have resulted in disruption of the IEP depot operations (refer to maps CT-05-008 and CT-005-009a in main ES Volume 2, CFA<sub>4</sub> Map Book).

5.2.2 The sewer diversion route in the main ES would have involved vegetation clearance of a small section of land within Wormwood Scrubs Railway Embankment Site of

<sup>11</sup> The Crossrail depot will be constructed to the north of the Old Oak Common station main compound prior to 2018.

Borough Importance Grade I (SBI.I). No works within Wormwood Scrubs Park SBI.I were required

- 5.2.3 In the SES scheme, additional land was included to build an approximately 920m long tunnel from the Atlas Road Satellite Construction Compound, via a shaft, to the east end of the Old Oak Common HS2 station box (refer to AP<sub>2</sub>-004-005 in the SES and AP<sub>2</sub> ES, CFA<sub>4</sub> Report). The tunnel will enable removal of excavated material by conveyor belt from the Euston tunnel directly to the Willesden Euroterminal main construction compound and the Atlas Road satellite compound, and segment delivery in the opposite direction (refer to maps CT-05-008 and CT-005-009a in the SES and AP<sub>2</sub> ES Volume 2, CFA<sub>4</sub> Map Book).
- 5.2.4 Since submission of the Bill, the sewer diversion route has been amended and will temporarily require approximately 2.5ha of additional land not provided by the Bill. The realigned sewer will begin further north beneath the future Crossrail depot and will be constructed under the IEP depot and into Wormwood Scrubs Park SBI.I, then run westwards before connecting into the existing sewer within Wormwood Scrubs (this existing sewer continues southwards to Braybrook Street). This will avoid works in the access road to the IEP depot and the associated disruption of the IEP depot operations (refer to maps CT-05-008 and CT-005-009a in the SES<sub>3</sub> and AP<sub>4</sub> ES Volume 2, CFA<sub>4</sub> Map Book).
- 5.2.5 The sewer tunnel under the IEP depot will be constructed by thrust-bore techniques; elsewhere, the sewer will be constructed by open-cut trenching.
- 5.2.6 In order to mitigate the effects of settlement arising from the station box and logistics tunnel excavation, the sewer under the Crossrail depot will need to be protected or replaced, subject to a settlement assessment. Access to the sewer will be provided through the depot off Old Oak Common Lane
- 5.2.7 The works will require use of a new temporary satellite compound, named the Stamford Brook satellite compound, which will be located adjacent to the existing sewer within Wormwood Scrubs Park SBI.I and be approximately 0.6ha in size. The compound will be accessed off Braybrook Street and in place for approximately four months, for the duration of the open-cut construction works.
- 5.2.8 The Stamford Brook satellite compound area will be returned to its pre-construction state following construction.
- 5.2.9 Five new permanent manholes will be constructed within Wormwood Scrubs along the line of the new sewer, with a sixth manhole at the connection with the existing Thames Water sewer.
- 5.2.10 The sewer realignment is not considered to make changes that require a reassessment of the environmental effects or proposed mitigation as set out in the main ES for: agriculture, forestry and soils; land quality; socio-economics; and traffic and transport. However there were changes where reassessment was considered to be required for: air quality; community; cultural heritage; ecology; landscape and visual assessment; sound, noise and vibration; and water resources and flood risk assessment.

## Air quality

### *Introduction*

- 5.2.11 This section of the report describes the environmental baseline in relation to air quality that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

### *Scope, assumptions and limitations*

- 5.2.12 The assessment scope, key assumptions and limitations and the methodology for determining significance of effects for air quality are as set out in the SMR Addendum 3 (Volume 5: Appendix CT-001-000/4) of the SES<sub>2</sub> and AP<sub>3</sub> ES.

### *Existing baseline*

- 5.2.13 The baseline air quality information for CFA<sub>4</sub> Kilburn (Brent) to Old Oak Common is described in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 4) and the SES and AP<sub>2</sub> ES (Volume 2, CFA<sub>4</sub> Report: Section 3).

### *Future baseline*

#### **Construction (2017)**

- 5.2.14 Future background pollutant concentrations have been sourced from the Defra background maps for 2017 that predict NO<sub>2</sub> and PM<sub>10</sub> concentrations in 2017 to be lower than in the 2012 baseline.
- 5.2.15 The future baseline for construction in 2017 remains unchanged from that reported in the SES and AP<sub>2</sub> ES (Volume 2, CFA<sub>4</sub> Report).
- 5.2.16 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.2.17 None of the identified developments affect the assessment of the amendment's likely construction impacts on air quality.

#### **Operation (2026)**

- 5.2.18 Future background pollutant concentrations have been sourced from the Defra background maps for 2026 that predict NO<sub>2</sub> and PM<sub>10</sub> concentrations in 2026 to be lower than in the 2012 baseline.
- 5.2.19 The future baseline for operation in 2026 remains unchanged from that reported in the SES and AP<sub>2</sub> ES (Volume 2, CFA<sub>4</sub> Report).
- 5.2.20 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments that are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.2.21 None of the identified developments affect the assessment of the amendment's likely operational impacts on air quality.

### *Effects arising during construction*

- 5.2.22 The amendment is not considered to make changes to traffic flows that require reassessment of air quality impacts from construction traffic.
- 5.2.23 The main ES reported no significant effects on air quality from dust emissions during construction. Given the mitigation contained within the draft CoCP, the Stamford Brook sewer realignment will not give rise to any new significant construction effects.

### *Effects arising during operation*

- 5.2.24 The sewer realignment will not give rise to any new or different significant operational effects and will not change the level of significance of the effects reported in the main ES, the SES and AP<sub>2</sub> ES or the SES<sub>2</sub> and AP<sub>3</sub> ES.

### *Mitigation and residual effects*

- 5.2.25 Emissions to the atmosphere will be controlled and managed during construction through the route-wide implementation of the CoCP.
- 5.2.26 The assessment of the amendment has assumed that the general measures detailed within Section 7 of the draft CoCP (Volume 5: Appendix CT-003-000) in the main ES will be implemented.
- 5.2.27 No additional mitigation measures (i.e. in addition to those identified in the main ES and subsequent SES reports) are required.
- 5.2.28 No new or different residual effects on air quality occur as a consequence of the sewer realignment. The significant residual effects of the AP<sub>4</sub> revised scheme in this area are therefore unchanged from those reported in the main ES, the SES and AP<sub>2</sub> ES or the SES<sub>2</sub> and AP<sub>3</sub> ES.

### *Cumulative effects*

- 5.2.29 There are no new or different likely significant cumulative effects for air quality as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> or AP<sub>3</sub> amendments or any relevant committed development.

## **Community**

### *Introduction*

- 5.2.30 This section of the report describes the environmental baseline in relation to community that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

### *Scope, assumptions and limitations*

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

### *Existing baseline*

- 5.2.32 The baseline community information for Kilburn (Brent) to Old Oak Common is described in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 5).

### *Future baseline*

#### **Construction (2017)**

- 5.2.33 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.2.34 None of the identified developments affect the assessment of the amendment's likely construction impacts on community.

#### **Operation (2026)**

- 5.2.35 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.2.36 None of the identified developments affect the assessment of the amendment's likely operational impacts on community.

### *Effects arising during construction*

- 5.2.37 The works to realign the Stamford Brook sewer will require land from Wormwood Scrubs open space, including a strip of land along the northern edge of the open space and an area of land that will be used as the Stamford Brook satellite compound. The temporary use of this area will not result in a significant effect on the users of Wormwood Scrubs, particularly considering the large size of the open space and that no formal playing fields are affected.
- 5.2.38 The Stamford Brook sewer realignment will not give rise to any new or different significant construction effects compared to those reported in the main ES and SES and AP<sub>2</sub> ES.

### *Effects arising during operation*

- 5.2.39 There were no significant community effects during operation reported in the main ES or the SES and AP<sub>2</sub> ES. The Stamford Brook sewer realignment will not give rise to any new significant operational effects.

### *Mitigation and residual effects*

- 5.2.40 No additional mitigation measures (i.e. in addition to those identified in the main ES and subsequent SES reports) are required.
- 5.2.41 No new or different residual effects on community occur as a consequence of the sewer diversion. The significant residual effects of the AP<sub>4</sub> revised scheme in this area are therefore unchanged from those reported in the main ES and the SES and AP<sub>2</sub> ES.

### *Cumulative effects*

- 5.2.42 There are no new or different likely significant cumulative effects for community and flood risk as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> or AP<sub>3</sub> amendments or any relevant committed development.

## **Cultural heritage**

### *Introduction*

- 5.2.43 This section of the report describes the environmental baseline in relation to cultural heritage that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

### *Scope, assumptions and limitations*

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

### *Existing baseline*

- 5.2.45 The baseline cultural heritage information for CFA<sub>4</sub> Kilburn (Brent) to Old Oak Common is described in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 6) and SES and AP<sub>2</sub> ES (Volume 2, CFA<sub>4</sub> Report).
- 5.2.46 The additional land required for the Stamford Brook sewer realignment is located adjacent to the IEP depot (asset reference KIL024), and the GWML, constructed as the London and Birmingham Railway in 1837 (asset reference KIL029). The IEP depot was constructed in 1992 for the maintenance of locomotives for the Waterloo International terminal project; it served Waterloo International Station until 2007. The London and Birmingham Railway was engineered by Robert Stephenson and completed in 1837. It later became part of the Great Western Railway and the Old Oak Common depot was constructed during the early twentieth century (asset reference KIL105). The rail heritage of Old Oak Common depot and the GWML has historical significance associated with early rail travel and the 20<sup>th</sup> century development of Great Western Railway.
- 5.2.47 There are no known archaeological assets located in the area proposed for the sewer realignment. The area north of the IEP depot is likely to have been impacted by the high level of ground disturbance associated with 19<sup>th</sup> and 20<sup>th</sup> century development. In Wormwood Scrubs the level of earlier ground disturbance is likely to be more limited, meaning there may be some potential for survival of archaeological remains. Historically, Wormwood Scrubs was common land and is unlikely to have been settled from the medieval period onwards.

### *Future baseline*

#### **Construction (2017)**

- 5.2.48 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments that are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.

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

### **Operation (2026)**

- 5.2.50 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.2.51 None of the identified developments affect the assessment of the amendment's likely operational impacts on cultural heritage.

### *Effects arising during construction*

- 5.2.52 No significant construction effects were reported in the main ES in regard to the diversion of the Stamford Brook sewer. The land required for the revised sewer realignment does not encroach on any identified heritage assets or their setting.
- 5.2.53 The proposed sewer realignment will not give rise to a new or different significant effect on cultural heritage during construction compared to those reported in the main ES and the SES and AP<sub>2</sub> ES.

### *Effects arising during operation*

- 5.2.54 No significant operational effects were reported in the main ES in regard to the diverted Stamford Brook sewer. The land required for the revised sewer realignment does not encroach on any identified heritage assets or their setting.
- 5.2.55 The proposed sewer realignment will not give rise to a new or different significant effect on cultural heritage during operation.

### *Mitigation and residual effects*

- 5.2.56 No additional mitigation measures (i.e. in addition to those identified in the main ES and subsequent SES reports) are required.
- 5.2.57 No new or different residual effects occur as a consequence of the amendment. The significant residual effects of the AP<sub>4</sub> revised scheme in this area are therefore unchanged from those reported in the main ES and the SES and AP<sub>2</sub> ES.

### *Cumulative effects*

- 5.2.58 There are no new or different likely significant cumulative effects for cultural heritage as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> or AP<sub>3</sub> amendments or any relevant committed development.

## **Ecology**

### *Introduction*

- 5.2.59 This section of the report describes the environmental baseline in relation to ecology that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

### *Scope, assumptions and limitations*

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

### *Existing baseline*

- 5.2.62 The ecological baseline of the land required for the amendment has been based on aerial photography and relevant existing information gathered from national organisations and from regional and local sources as described in the main ES (Volume 2, CFA4 Report: Section 7).
- 5.2.63 A summary of the baseline information relevant to the assessment of the amendment is provided below. For those receptors described in the main ES, further details are provided in Volume 2, CFA4 Report: Section 7 of the main ES and in Volume 5, including maps EC-01 to EC-12 of the main ES.

### **Designated sites**

- 5.2.64 There is one statutory designated site located within the land required for the proposed amendment. Wormwood Scrubs Local Nature Reserve (LNR) comprises grassland and a number of species of native trees. Common lizards and over 100 species of birds, along with common mammals and invertebrates have been recorded. The site is of district/borough value.
- 5.2.65 There are two Local Wildlife Sites (LWS) relevant to the assessment located within the land required for the amendment. Wormwood Scrubs Park SBI.I includes damp, dry acid grassland and trees that support common reptiles, common butterflies, breeding and migratory birds. The site is of district/borough value. Old Oak Common Sidings Birch Wood SBI.I is a small woodland (2.86ha), which has developed on the former railway sidings close to the Grand Union Canal. It is one of very few naturally-established woods in the Borough of Hammersmith and Fulham, and is of district/borough value.

### **Habitats**

- 5.2.66 Rough grassland is present in Wormwood Scrubs Park. This grassland is managed as meadows and mown infrequently. The grassland managed as meadow is one of the primary reasons for designation in Wormwood Scrubs Park SBI.I. This grassland is identified in the main ES as being of district/borough value.
- 5.2.67 Amenity turf is present in Wormwood Scrubs. This grassland is of local/parish value. Stands of semi-improved grassland are also present at Wormwood Scrubs. This grassland is identified in the main ES as being of local/parish value.

- 5.2.68 Plantation woodland, consisting of young trees, is present at the northern edge of Wormwood Scrubs along the embankment adjacent to the land required for the amendment. This woodland consists of diverse tree-planting stock including willow and poplar. Further areas of scrub dominated by buddleia and bramble are present in the land required for the amendment. Trees, hedgerows and woodland are habitats which are especially important in Hammersmith and Fulham, and are included in a combined Habitat Action Plan (HAP) in the Hammersmith and Fulham Biodiversity Action Plan (BAP). These small areas of secondary woodland and scrub are adjacent to the land required for the amendment and are of local/parish value.
- 5.2.69 The woodland along the Grand Union Canal is dominated by silver birch, interspersed with goat willow, sycamore and ash. Bramble scrub and butterfly-bush grow around the woodland edges, while other areas support a typical 'wasteland' flora. This woodland is of district/borough value.

### **Protected and/or notable species**

- 5.2.70 A total of 28 notable species of breeding birds were recorded at Wormwood Scrubs Park, 13 of which were considered likely to be breeding. Most were not notable within a London context, but breeding meadow pipits are important in a borough context. The breeding bird assemblage of Wormwood Scrubs Park is considered to be of district/borough value in the main ES. It is likely that the woodland which forms part of the Old Oak Common Sidings Birchwood SBI will support a range of common breeding birds which are part of the Old Oak Common and Grand Union Canal assemblage identified in the main ES as of local/parish value.
- 5.2.71 Winter bird surveys undertaken from Public Rights of Way (PRoW) at Wormwood Scrubs Park recorded a total of 30 species. Eleven notable species were recorded. Four of these are red list species and seven amber list species. There were large numbers of ring-necked parakeet and carrion crow. However, the parakeet is introduced and the crow is abundant in London. No other notable flock sizes were recorded. Desk study data indicates the site has generated a long list of casual records but the regular winter assemblage is unremarkable. Based on available data and the habitats present the wintering bird assemblage is considered in the main ES to be of local/parish value.
- 5.2.72 The transect surveys from PRoW at Wormwood Scrubs Park recorded regular, very low level, dispersed commuting and foraging activity from common and soprano pipistrelle bats with a single pass also recorded from a noctule bat. Soprano pipistrelle and noctule bat are species of principal importance (SoPI<sup>12</sup>). The assemblages of bats commuting and foraging in railway land at Old Oak Common, at the Grand Union Canal and adjacent woodland and Wormwood Scrubs are considered to be of local/parish value. In the absence of access for survey it has been assumed that maternity roosts of common species and roosts of rare species could be present in the trees along the canal and in woodlands nearby, and hence assemblages of up county/metropolitan value could be present.
- 5.2.73 As described in the main ES, desk study findings indicate that habitats at Wormwood Scrubs Park support a terrestrial invertebrate assemblage likely to be of interest in

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<sup>12</sup> These are the species found in England identified as requiring action under the UK BAP, and are still regarded as conservation priorities under the UK Post-2010 Biodiversity Framework

London. The assemblage is considered to be of up to county/metropolitan value. Other habitats in the surrounds including the railway land and adjacent scrub/woodland along the Grand Union Canal are likely to support assemblages of up to district/borough value.

- 5.2.74 Desk study indicates slow worm and common lizard have been recorded along the railway land at Old Oak Common and Wormwood Scrubs Park. It is likely that common reptiles will be present along the existing railway and in scrub and woodland edge habitat within the AP<sub>4</sub> revised scheme.
- 5.2.75 Slow worm and common lizard are species of principal importance, and all reptiles are London BAP priority species. Slow worm is an Ealing BAP species.
- 5.2.76 Given the extent of suitable habitat at Wormwood Scrubs Park and surrounding railway land, it is possible that moderate populations of slow worm and common lizard could be present here, as well as through the railway land and adjacent habitat. Common reptiles in Wormwood Scrubs Park and other areas affected by the amendments are likely to be of district/borough value.

### *Future baseline*

#### **Construction (2017)**

- 5.2.77 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.2.78 None of the identified developments affect the assessment of the amendment's likely construction impacts on ecology.

#### **Operation (2026)**

- 5.2.79 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.2.80 None of the identified developments affect the assessment of the amendment's likely operational impacts on ecology.

### *Effects arising during construction*

#### **Avoidance and mitigation measures**

- 5.2.81 The assessment assumes implementation of the measures set out within the draft CoCP of the main ES, which includes translocation of protected species where appropriate.

#### **Assessment of impacts and effects**

##### *Designated sites*

- 5.2.82 The original scheme resulted in no adverse effects on Wormwood Scrubs LNR. The construction of the amendment will result in the permanent loss of approximately 0.5ha of Wormwood Scrubs LNR (approximately 13.4ha), predominantly scrub and the occasional mature tree representing only approximately 4% of the site. Due to the small scale of the habitat loss and the common nature of the habitats affected the

amendment is not expected to result in a significant effect on the integrity of the Wormwoods Scrubs LNR.

- 5.2.83 The construction of the amendment will result in the temporary loss of approximately 2ha of Wormwood Scrubs Park SBI.I (approximately 47ha), predominantly grassland (1.5ha) with some scrub (0.5ha), representing only approximately 4% of the SBI site. Due to the small scale of the habitat loss and the common nature of the habitats affected the amendment is not expected to result in a significant effect on the Wormwood Scrubs Park SBI.I.
- 5.2.84 The amendment will result in the permanent loss of approximately 0.2ha of the Old Oak Common Sidings Birch Wood SBI.I representing approximately 7% of the site. This amendment will result in a new effect on the integrity of the Old Oak Common Sidings Birch Wood SBI.I, which is significant at the district/borough level.

#### *Habitats*

- 5.2.85 The construction of the amendment will result in the loss of 0.2ha of woodland habitat at Old Oak Common Sidings Birch Wood SBI.I. This is a new effect, which is significant at the district / borough level.
- 5.2.86 The construction of the amendment will result in new effects on other habitats such as grassland, scrub and the occasional mature tree from the amendment will result in new effects, which are not significant.

#### *Protected and/or notable species*

- 5.2.87 The main ES reported that the original scheme would result in adverse effects on the bat assemblage utilising the Grand Union Canal and Old Oak Common railway land that would be significant at the county/metropolitan level. The amendments will result in the loss of trees along the Grand Union Canal and Old Oak Common railway land which have been assumed to be used by roosting and foraging bats. This will result in a different significant effect but will not change the level of significance of effect reported in the main ES.
- 5.2.88 It is considered unlikely that any other effects on species receptors, significant at more than the local/parish level, will occur.

#### **Cumulative effects**

- 5.2.89 There are no new or different likely significant cumulative effects for ecology as a result of the AP4 amendments interacting with one another, the AP2 or AP3 amendments or any relevant committed development.

#### **Mitigation and residual effects**

##### *Other mitigation measures*

- 5.2.90 With the exception of very small areas for the manhole covers, the habitats affected in the Wormwood Scrubs LNR and the Wormwood Scrubs Park SBI.I will be restored to the existing condition following the works.
- 5.2.91 With the exception of a small manhole cover, the area of woodland / scrub habitat lost from the Old Oak Common Sidings Birch Wood SBI.I will be replanted on completion

of the works, and this will address the new significant effects arising from the amendment.

- 5.2.92 The loss of any additional roosts will be compensated within the limits of the Bill through the provision of replacement roosting habitat in accordance with the Ecological Principles of Mitigation (main ES Volume 5: Appendix CT-001-000/2). This will address the different effect on the bat assemblage utilising the Grand Union Canal and Old Oak Common railway land and reduce effects to a level where they are not significant.

#### *Summary of likely residual effects*

- 5.2.93 The amendment will not give rise to new or different likely residual significant effects on ecological receptors, compared to those reported in the main ES, the SES and AP<sub>2</sub> ES or the SES<sub>2</sub> and AP<sub>3</sub> ES.

#### *Effects arising from operation*

- 5.2.94 No significant effects on ecological receptors during operation were reported in the main ES or the SES and AP<sub>2</sub> ES. The amendment will not give rise to any new or different operational significant effects on designated sites, habitats or species.

## **Landscape and visual assessment**

### *Introduction*

- 5.2.95 This section of the report describes the environmental baseline in relation to landscape and visual that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

### *Scope, assumptions and limitations*

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

### *Existing baseline*

- 5.2.97 A summary of the baseline information in the main ES relevant to the assessment of the amendment is provided below.
- 5.2.98 The area of land required for the Stamford Brook sewer realignment crosses the Old Oak Common Depot and Surrounding Transport Infrastructure LCA and the Wormwood Scrubs Open Space LCA which are described in the main ES (Volume 2, CFA 4 Report: Section 9 and Volume 5: Appendix LV-001-004, Section 2). Wormwood Scrubs is also designated as Metropolitan Open Land.
- 5.2.99 The works associated with the amendment will be visible from the following viewpoints:
- Viewpoint 17.2.008: view north-west from HM Prison Wormwood Scrubs and Hammersmith Hospital;

- Viewpoint 17.3.009: view north-west from Wormwood Scrubs open space; and
- Viewpoint 019.2.001: view north from Braybrook Street.

5.2.100 These viewpoints are described in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 9 and Volume 5: Appendix LV–001–004, Part 2 of the main ES).

### *Future baseline*

#### **Construction (2017)**

5.2.101 Volume 5: Appendix CT–004–000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.

5.2.102 None of the identified developments affect the assessment of the amendment’s likely construction impacts on LCAs and visual receptors.

#### **Operation (2026)**

5.2.103 Volume 5: Appendix CT–004–000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.

5.2.104 None of the identified developments affect the assessment of the amendment’s likely operational impacts on LCAs and visual receptors.

### *Effects arising during construction*

#### **Landscape assessment**

5.2.105 The Wormwood Scrubs Open Space LCA is of high sensitivity to change. Wormwood Scrubs is designated as Metropolitan Open Land. The main ES reported a moderate adverse significant effect on the Wormwood Scrubs Open Space LCA during construction due to the scale of the works in the Old Oak Common depot and on Old Oak Common Lane, the construction of the access road to the IEP depot and the loss of vegetation on Wormwood Scrubs.

5.2.106 The amendment will result in the loss of vegetation on the rail embankment along the northern boundary of Wormwood Scrubs Open Space LCA and will involve excavation of the sewer trench across Wormwood Scrubs to an existing sewer in Braybrook Street. The trench works will extend the construction footprint further into Wormwood Scrubs than in the original scheme and the new satellite construction compound in Wormwood Scrubs will be a prominent new feature in the landscape. However, despite the increased scale of activity in the LCA, in the context of the large-scale construction works already assessed in the main ES, the amendment will not give rise to new or different significant effects on the Wormwood Scrubs Open Space LCA and will not change the level of significance of the effect reported in the main ES.

5.2.107 The Old Oak Common Depot and Surrounding Transport Infrastructure LCA is of low sensitivity to change. The main ES reported a minor adverse effect, which is not significant, on this LCA. The Stamford Brook sewer realignment works will take place partly within the Old Oak Common Depot and Surrounding Transport Infrastructure LCA where rail maintenance and construction work already occurs on a regular basis. Therefore the amendment will not give rise to a new or different significant effect on

the Old Oak Common Depot and Surrounding Transport Infrastructure LCA and will not change the level of significance of the effect reported in the main ES.

### **Visual assessment**

- 5.2.108 The main ES reported a minor adverse, non-significant effect on viewpoint 17.2.008: view north-west from HM Prison Wormwood Scrubs and Hammersmith Hospital. The sewer realignment will bring the construction footprint closer to this viewpoint; however views will be filtered and screened by intervening vegetation and though they will be visible, they will not be prominent new features in the view. Therefore the amendment will not give rise to new or different significant effects on this viewpoint.
- 5.2.109 The main ES reported a minor adverse, non-significant effect on viewpoint 019.2.001: view north from Braybrook Street. The sewer realignment will bring the construction footprint closer to this viewpoint; however, views will be filtered and screened by intervening vegetation and though they will be visible, they will not be prominent new features in the view. Therefore the amendment will not give rise to new or different significant effect on this viewpoint.
- 5.2.110 The main ES reported a moderate adverse significant effect on viewpoint 17.3.009: view north-west from Wormwood Scrubs open space. The sewer realignment will bring the construction footprint closer to this viewpoint; however, views will be filtered and screened by intervening vegetation and though they will be visible, they will not be prominent new features in the view. Therefore the amendment will not give rise to a new or different significant effect on this viewpoint.

### *Effects arising during operation*

#### **Landscape assessment**

- 5.2.111 The main ES reported non-significant effects on the Old Oak Common Depot and Surrounding Transport Infrastructure LCA and non-significant effects on the Wormwood Scrubs Open Space LCA during year 1, year 15 and year 60 of operation.
- 5.2.112 The land required for construction of the sewer realignment will be restored to its former condition with seeding and planting. The amendment will therefore not give rise to new significant effects on either LCA during operation.

#### **Visual assessment**

- 5.2.113 The main ES reported non-significant effects on the three viewpoints closest to the amendment (refer to Volume 5: Appendix LV-001-004, Part 4 of the main ES):
- Viewpoint 17.2.008: view north-west from HM Prison Wormwood Scrubs and Hammersmith Hospital (negligible);
  - Viewpoint 17.3.009: view north-west from Wormwood Scrubs open space (negligible); and
  - Viewpoint 019.2.001: view north from Braybrook Street (negligible).
- 5.2.114 The land required for construction of the sewer realignment will be restored to its former condition with seeding and planting. The amendment will therefore not give rise to new significant effects on these viewpoints.

### *Mitigation and residual effects*

- 5.2.115 No additional mitigation measures (i.e. in addition to those identified in the main ES and subsequent SES reports) are required.
- 5.2.116 No new or different residual effects on LCAs and visual receptors occur as a consequence of the sewer realignment. The significant residual effects of the AP<sub>4</sub> revised scheme in this area are therefore unchanged from those reported in the main ES and SES and AP<sub>2</sub> ES.

### *Cumulative effects*

- 5.2.117 There are no new or different likely significant cumulative effects for landscape and visual as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> amendments or any relevant committed development.

## **Sound, noise and vibration**

### *Introduction*

- 5.2.118 This section of the report describes the environmental baseline in relation to sound, noise and vibration that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

### *Scope, assumptions and limitations*

- 5.2.119 The assessment scope, key assumptions and limitations for sound, noise and vibration are as set out in Volume 1, the SMR (Volume 5: Appendix CT-001-000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES.
- 5.2.120 Local assumptions and limitations for sound, noise and vibration are set out in main ES Volume 2, CFA<sub>4</sub> Report: Section 11.

### *Existing baseline*

- 5.2.121 The baseline sound, noise and vibration information for CFA<sub>4</sub> is described in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 11.2) and SES and AP<sub>2</sub> ES (Volume 2, CFA<sub>4</sub> Report: Section 3). Baseline sound levels representative of the assessment locations affected by this amendment have been used in the construction sound, noise and vibration assessments.

### *Future baseline*

#### **Construction (2017 and 2021)**

- 5.2.122 The future baseline for construction in 2017, and construction traffic in 2021, remains unchanged from that reported in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 11) and the SES and AP<sub>2</sub> ES (Volume 2, CFA<sub>4</sub>, Section 3).
- 5.2.123 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.2.124 None of the identified developments affect the assessment of the amendment's likely construction impacts on sound, noise and vibration.

### **Operation (2026)**

- 5.2.125 The future baseline for operation in 2026 remains unchanged from that reported in the main ES (Volume 2, CFA<sub>6</sub> Report: Section 9) and SES and AP<sub>2</sub> ES (Volume 2, CFA<sub>4</sub>, Section 3).
- 5.2.126 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.2.127 None of the identified developments affect the assessment of the amendment's likely operational impacts on sound, noise and vibration.

### *Effects arising during construction*

- 5.2.128 The closest noise-sensitive receptors to the amendment are the residential properties on Braybrook Street, located over 250m to the south of the main excavation works associated with the amendment. In the main ES, no likely significant effects from construction noise were identified at these receptors.
- 5.2.129 Additional works are associated with realigning the Stamford Brook sewer. This will involve excavation of a trench for the realigned sewer between 250m and 800m from sensitive receptors. It will also include temporary set up of the Stamford Brook satellite compound, approximately 400m from sensitive receptors. There are anticipated to be no construction works associated with the temporary access road from the site to Braybrook Street as the existing surface is sufficient. Generally this will be accessed by 3 to 4 HGV per day with a peak of up to 8 to 9 per day.
- 5.2.130 An assessment has been undertaken to determine whether construction noise and vibration associated with the amendment would result in a likely significant effect, using the significance criteria detailed in the main ES (Volume 5: Appendix SV-001-000).
- 5.2.131 The works associated with the amendment do not lead to a substantial change in noise and vibration levels from those reported in the main ES and consequently the amendment will not give rise to a new or different significant effect compared to those reported in the main ES, the SES and AP<sub>2</sub> ES or the SES<sub>2</sub> and AP<sub>3</sub> ES.

### *Effects arising from operation*

- 5.2.132 As the amendment is during the construction phase only, the amendment will not give rise to a new or different significant operational noise or vibration effect compared to those reported in the main ES, the SES and AP<sub>2</sub> ES or the SES<sub>2</sub> and AP<sub>3</sub> ES.

### *Mitigation and residual effects*

- 5.2.133 The assessment of construction noise and vibration assumes the implementation of the principles and management processes set out in the draft CoCP (Volume 5: Appendix CT-003-000).
- 5.2.134 No mitigation measures in addition to those identified in the main ES and the SES and AP<sub>2</sub> ES are required.

- 5.2.135 No new or different residual effects on sound, noise and vibration occur as a consequence of the sewer diversion. The significant residual effects of the AP<sub>4</sub> revised scheme in this area are therefore unchanged from those reported in the main ES, the SES and AP<sub>2</sub> ES or the SES<sub>2</sub> and AP<sub>3</sub> ES.

### *Cumulative effects*

- 5.2.136 This assessment has considered the potential cumulative construction noise effects of the scheme and other committed developments.
- 5.2.137 There are no new or different likely significant cumulative effects for sound, noise and vibration as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> or AP<sub>3</sub> amendments or any relevant committed development.

## **Water resources and flood risk assessment**

### *Introduction*

- 5.2.138 This section of the report describes the environmental baseline in relation to water resources and flood risk that is relevant to the assessment. It then identifies any new or different likely significant environmental effects as a result of the amendment, compared to those of the SES<sub>3</sub> scheme.

### *Scope, assumptions and limitations*

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

### *Existing baseline*

- 5.2.140 The baseline water resources and flood risk information for CFA<sub>4</sub> Kilburn (Brent) to Old Oak Common is described in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 13).
- 5.2.141 The Grand Union Canal (Paddington Arm) is present approximately 130m north-east of the proposed sewer diversion as shown on Map WR-01-004, (Volume 5, Water Resources and Flood Risk Assessment Map Book in the main ES). The canal is designated as an artificial water body with a current overall status of Moderate.
- 5.2.142 The London Clay Formation underlies the whole of the study area. The London Clay Formation is classed as Unproductive strata, and as such has not been classified under the WFD. Geological mapping indicates that there are no superficial deposits on or within 250m of the AP<sub>4</sub> revised scheme. It is, however, likely that made ground is present across much of the site.
- 5.2.143 No groundwater Source Protection Zones for public water supplies will be crossed by the AP<sub>4</sub> revised scheme in the area. Four licensed groundwater abstractions are present 700m to 900m south-east of Old Oak Common. Details are presented in main ES Volume 5: Appendix WR-002-004.
- 5.2.144 There are no reported private, unlicensed groundwater abstractions and no licensed or unlicensed surface water abstractions in this area. There is however the potential for unlicensed abstractions to exist, as a licence is not required for abstraction volumes below 20m<sup>3</sup> per day, however none have been identified within the study area.

- 5.2.145 The Environment Agency reports that there are no active surface water or groundwater discharge consents within 500m of the proposed sewer diversion.
- 5.2.146 The London Borough of Hammersmith and Fulham (LBHF) Strategic Flood Risk Assessment (SFRA) indicates that there is a risk of surface water flooding occurring across the IEP depot, as well as overland flow or surface run off near Hythe Road and between the railway lines north of the station at Old Oak Common. The Environment Agency uFMfSW has recently been updated to incorporate Drain London mapping with previously completed Environment Agency mapping, and has therefore been used to inform the assessment as the most up-to-date information.
- 5.2.147 The uFMfSW shows a risk of flooding along the base of a dry valley coincident with the line of the proposed sewer diversion within the Wormwood Scrubs Park SBI.I. The area is shown to be at risk in the 1 in 1000 years return period (0.1% annual probability) rainfall event, with a thin strip of land, coincident with a small ditch to the south of the IEP depot, shown to be at risk in the 1 in 30 years return period (3.33% annual probability) rainfall event. North of the IEP, within the HS<sub>2</sub> land required for station construction, the line of the sewer is within another area at risk in the 1 in 1000 years return period (0.1% annual probability) rainfall event. The area surrounding the IEP depot building is at risk in the 1 in 30 years return period (3.33% annual probability) rainfall event.
- 5.2.148 The proposed sewer diversion lies in Flood Zone 1, does not cross any areas of historic river flooding, or areas at Moderate (or greater) susceptibility to groundwater flooding, as defined by the Environment Agency.
- 5.2.149 A potential risk of flooding associated with a breach of the Grand Union Canal (Paddington Branch) has been identified.
- 5.2.150 The proposed satellite compound in Wormwood Scrubs is located within an area at risk of flooding in the 1 in 1000 years return period (0.1% annual probability) rainfall event.

### *Future baseline*

#### **Construction (2017)**

- 5.2.151 The future baseline for construction in 2017 remains unchanged from that reported in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 13).
- 5.2.152 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2017, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.2.153 The Crossrail depot will be constructed to the north of the Old Oak Common station main compound prior to 2017. The surface water drainage for the depot will not worsen the existing pattern of run off as the design and construction of the drainage will have to be in compliance with NPPF and London Plan guidance. Therefore, it is assumed that there are no committed developments that are likely to cause changes to the water baseline prior to construction in this study area.
- 5.2.154 The WFD status of the Grand Union Canal (Paddington Arm) may be updated prior to 2017. This potential change in baseline is not considered to result in the reported effects from the AP<sub>4</sub> revised scheme changing in significance.

### **Operation (2026)**

- 5.2.155 The future baseline for operation in 2026 remains unchanged from that reported in the main ES (Volume 2, CFA<sub>4</sub> Report: Section 13).
- 5.2.156 Volume 5: Appendix CT-004-000 of the SES<sub>3</sub> and AP<sub>4</sub> ES provides details of the developments which are assumed to have been implemented by 2026, additional to those identified in the main ES, the SES and AP<sub>2</sub> ES and the SES<sub>2</sub> and AP<sub>3</sub> ES.
- 5.2.157 None of the identified developments affect the assessment of the amendment's likely operational impacts on water resources and flood risk.
- 5.2.158 Current projections to the 2080s indicate that climate change may affect the future baseline against which the impacts of the AP<sub>4</sub> revised scheme on surface water and groundwater resources have been assessed. There may be changes in the flow and water quality characteristics of surface water and groundwater bodies as a result of changes in climate. However, except for flood flows, these changes will not give rise to a new or different significant effect compared to those reported in the main ES.
- 5.2.159 Further information on the potential additional impacts of climate change for water resources and flood risk is provided in Sections 7 and 8 of Volume 1 and Table 13 of Volume 5: Appendix CT-009-000 of the main ES.

### *Effects arising during construction*

- 5.2.160 The proposed sewer realignment will be constructed in accordance with the CoCP. Implementation of the measures within the draft CoCP will ensure that these construction works will not have an adverse impact on surface water quality.
- 5.2.161 The proposed sewer realignment will require only shallow excavations. A geological cross-section is presented in the main ES (Volume 5: Appendix WR-002-004), and shows that the London Clay Formation is expected to be at least 70m thick in this area. The construction is not expected to extend below the base of the London Clay Formation (which is classified as Unproductive strata) and as such there is no pathway for impacts on water resources in the underlying aquifers.
- 5.2.162 Therefore, the proposed sewer realignment will not give rise to new or different significant construction effects for water resources.
- 5.2.163 The sewer diversion will take place within an area at risk of surface water flooding. However, with the exception of the proposed satellite construction compound in Wormwood Scrubs, none of this has the potential to significantly alter flood mechanisms in the area through displacement of flood waters.
- 5.2.164 In accordance with Section 16 of the draft CoCP, excavated material storage, construction compounds and site offices will be located outside of areas at risk of flooding where practicable to avoid having an impact on the risk of flooding elsewhere. In the case of the satellite construction compound in Wormwood Scrubs, there will be a site specific flood risk management plan prepared prior to construction to manage the potential risks such that there will be no impact on the risk of flooding elsewhere as a result of construction of the AP<sub>4</sub> revised scheme.

5.2.165 As a result, no significant increase in flood risks from all sources during the construction process are identified, and therefore no significant temporary effects are expected as a result of the amendment to the sewer diversion.

5.2.166 All areas required as part of this amendment will be returned to their previous state following construction. It is assumed that the sewer diversion will be designed with equivalent or greater capacity than the existing sewer and therefore will not have any adverse effect on the risk of flooding from surface water or sewers in the area. The proposed sewer realignment will not give rise to a new or different significant effect on flood risk.

#### *Effects arising during operation*

5.2.167 The realigned section of sewer would have a capacity greater than or equal to the capacity of the existing sewer. Therefore, there will be no impacts on groundwater, surface water features or to flood risk as a result of its operation.

5.2.168 The proposed sewer realignment will not give rise to new or different significant operational effects on water resources and flood risk.

#### *Mitigation and residual effects*

5.2.169 The assessment assumes implementation of the CoCP. The general approach to mitigation is set out in Volume 1, Section 9 of the main ES.

5.2.170 The draft CoCP sets out the measures and standards of work that will be applied to the construction of the AP<sub>4</sub> revised scheme. It will provide effective management and control of the impacts during the construction period including those required for utility diversions and strengthening, grouting, watercourse diversions, installing culverts and tunnelling.

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

5.2.172 No new or different residual effects on water resources and flood risk occur as a consequence of the amendment. The significant residual effects of the AP<sub>4</sub> revised scheme in this area are therefore unchanged from those reported in the main ES or SES and AP<sub>2</sub> ES.

#### *Cumulative effects*

5.2.173 There are no new or different likely significant cumulative effects for water resources and flood risk as a result of the AP<sub>4</sub> amendments interacting with one another, the AP<sub>2</sub> or AP<sub>3</sub> amendments or any relevant committed development.

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

5.2.174 The proposed amendment to realign the Stamford Brook sewer in Wormwood Scrubs will not give rise to new or different significant effects for any environmental topics. The significant residual effects of the AP<sub>4</sub> revised scheme in this area are therefore unchanged from those reported in the main ES, the SES and AP<sub>2</sub> ES, the SES<sub>2</sub> and AP<sub>3</sub> ES and the SES<sub>3</sub>.

### **5.3 Provision for western access to Crossrail depot (AP4-004-003)**

- 5.3.1 The original scheme included GWML railway trackworks, to the southeast of Kensal Green Cemetery, to support the operational functionality of Old Oak Common station (refer to maps CT-05-008 in main ES Volume 2, CFA4 Map Book).
- 5.3.2 The AP2 revised scheme also included access rights over Canal Way, a private road, to provide access to the GWML (refer to AP2-004-002 in the SES and AP2 ES, CFA4 report and map CT-05-008 in the SES and AP2 ES Volume 2, CFA4 Map Book).
- 5.3.3 Since submission of the Bill, the future provision for infrastructure associated with Crossrail has been reviewed and a requirement has been identified to provide access to the proposed Crossrail depot from the west, through the train carriage washing machines, while maintaining a Crossrail commitment for passive provision for a station at Kensal Portobello. As such, additional GWML trackworks will be undertaken in this area under the AP4 revised scheme to allow realignment of the depot tracks with associated relocation of rail systems equipment (refer to maps CT-05-007, CT-05-007-L1, and CT-05-008 in the SES3 and AP4 ES Volume 2, CFA4 Map Book). The works will be undertaken within land included in the Bill.
- 5.3.4 The amendment is not considered to make changes that require a reassessment of the environmental effects or proposed mitigation as set out in the main ES for any environmental topics.

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

- 6.1.1 All of the effects of the changes proposed in this CFA have been described in Section 3 and there are no further combined effects to report.

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