

HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

Supplementary Environmental Statement and Additional Provision 2 Environmental Statement

Volume 5 | Technical appendices CFAs 7-15

CFA7 | Colne Valley

CFA9 | Central Chilterns

CFA10 | Dunsmore, Wendover and Halton

CFA11 | Stoke Mandeville and Aylesbury

CFA14 | Newton Purcell to Brackley

CFA15 | Greatworth to Lower Boddington

July 2015

SES and AP2 ES 3.5.1.2

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Supplementary Environmental Statement and
Additional Provision 2 Environmental Statement

Volume 5 | CFA7 | Colne Valley

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CFA name and number	Topic	Code
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CFA9, Central Chilterns	Air quality	AQ-001-009
	Cultural heritage	CM-001-009
		LV-001-009
	Sound, noise and vibration	SV-003-009
CFA10, Dunsmore, Wendover and Halton	Air quality	AQ-001-010
	Community	CM-001-010
	Cultural heritage	CH-002-010
		CH-003-010
	Landscape and visual assessment	LV-001-010
	Sound, noise and vibration	SV-003-010
CFA 11, Stoke Mandeville and Aylesbury	Air quality	AQ-001-011
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CFA15, Greatworth to Lower Boddington	Air quality	AQ-001-015
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	Cultural heritage	CH-004-015

CFA name and number	Topic	Code
	Landscape and visual assessment	LV-001-015
	Sound, noise and vibration	SV-002-015
		SV-003-015
		SV-004-015

Environmental topic:	Air quality	AQ
Appendix name:	Data appendix	001
Community forum area:	Colne Valley	007

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1 Introduction

1.1 Structure of this air quality assessment appendix

- 1.1.1 This appendix provides an update to Appendix AQ-001-007 from the main Environmental Statement (ES) (Volume 5, Appendix AQ-001-007). This update should be read in conjunction with Appendix AQ-001-007 from the main ES.
- 1.1.2 This appendix is structured as follows:
- baseline air quality data (Section 2);
 - dust impact evaluation and risk rating (Section 3); and
 - air quality assessment - road traffic (Section 4).
- 1.1.3 Maps referred to throughout this air quality appendix are contained in the Volume 5 Air Quality Map Book of the main ES.

1.2 Scope of this assessment

- 1.2.1 This air quality assessment considers changes to local air quality as a result of:
- corrections to Appendix AQ-001-007 from the main ES;
 - changes to the design or construction assumptions which do not require changes to the Bill (i.e. SES design changes); and
 - updates to traffic models.
- 1.2.2 SES design changes and AP2 amendments outside of Colne Valley community forum area (CFA7), together with network wide traffic modelling amendments have resulted in changes to forecast heavy goods vehicle (HGV) traffic flows within CFA7 during construction, in comparison to those under the main ES. These have been assessed as they are considered to have the potential to result in new or different likely significant effects on traffic and transport and therefore air quality.
- 1.2.3 The main traffic and transport changes associated with the SES design changes in CFA7 are:
- an updated traffic model for the area covering Harvil Road, Swakeleys Road and the A40;
 - the requirement for HGVs entering the London Low Emission Zone during construction, for the purposes of transporting excavated material, to be powered by Euro VI (or lower emission) engines; and
 - amended HGV flows on the A40, between M40 J1 and A413 Amersham Road, notably an increase in forecast traffic flows.
- 1.2.4 There are no changes that require assessment to the design of the HS2 scheme in CFA7 that are outside the existing limits of the Bill (i.e. AP2 amendments).

Methodology, data sources and design criteria

- 1.2.5 The assessment scope, key assumptions and limitations for air quality are set out in Volume 1, the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001 - 000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES, as amended by the SMR Addendum 2 (Volume 5: Appendix CT-001 -000/3) of the SES and AP2 ES, which was produced to specifically amend and advance the SMR for AP2. The SMR Addendum 2 focuses on updates and refinements to: the establishment of the baseline and definition of the survey; the scope of the air quality assessment; and the assessment methodology.

2 Air quality assessment - road traffic

2.1 Overall assessment approach

- 2.1.1 The overall assessment approach remains the same as described in Appendix AQ-001-007 of the main ES. Where changes to this approach have been employed, these are detailed in section 2.2

2.2 Model inputs and verification

Model parameters for detailed assessment

- 2.2.1 The ADMS-Roads model was used for the detailed assessment. A surface roughness length of 1.5m, surface roughness at meteorological site of 0.2m, minimum Monin Obukhov length of 100m and latitude of 51.5 degrees were used in the detailed assessment. All other model parameters were model default settings. Meteorological data from the London Heathrow monitoring site was used.

Model verification

- 2.2.2 Since the model predicts nitrogen oxide (NO_x) contributions for the modelled roads, this was initially compared to the NO_x road contribution derived from NO_x concentrations (where available) measured at monitoring sites and Defra background maps.
- 2.2.3 Roadside monitoring sites were chosen from across the traffic model area, which extends west of the study area. This allowed a greater number of sites to be included in the verification. Sites where nearby busy roads were not included in the traffic model data set (and which, therefore, could not be modelled correctly as roadside sites with the traffic data set) or where monitored road NO_x was found to be negative were excluded from assessment. The results of this comparison are shown in Table 1.

Table 1: Comparison of monitored and modelled NO_x concentrations for verification

Site	Ordnance Survey co-ordinates	Monitored total NO ₂	Monitored total NO _x	Background NO ₂	Background NO _x	Monitored road NO _x	Modelled road NO _x	Monitored /modelled road NO _x
LLB - Ikea (AURN)	520866, 185169	76.0	257.4	33.4	56.1	201.3	51.5	3.9

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Site	Ordnance Survey co- ordinates	Monitored total NO ₂	Monitored total NO _x	Background NO ₂	Background NO _x	Monitored road NO _x	Modelled road NO _x	Monitored /modelled road NO _x
LLB - John Keble Primary School	521619, 183554	41.1	86.7	35.1	60.3	26.4	22.8	1.2
LBE - Hangar Lane Gyratory (AURN)	518537, 182708	95.0	324.6	37.0	63.4	261.2	72.3	3.6
LBE - Western Avenue (AURN)	520430, 181950	73.3	184.8	37.3	64.7	120.2	30.0	4.0
LBHi - South Ruislip (AURN)	510835, 184916	52.1	111.7	27.1	42.7	69.0	18.5	3.7
LBHi - Oxford Avenue (AURN)	509551, 176974	44.1	78.4	37.1	66.0	12.4	5.5	2.2
LBHa - Pinner Road (AURN)	513504, 188998	46.8	110.4	23.9	36.8	73.5	8.6	8.6
RBKC - Cromwell Road (AURN)	526524, 178965	69.1	155.9	39.8	66.2	89.7	30.7	2.9
RBKC - Kings Road (AURN)	527268, 178089	92.6	224.3	39.1	64.8	159.4	17.2	9.2
LLB - Junction of Kingsbury Road / Edgware Road	521447, 188730	54.0	Not measured	29.2	47.4	55.9	18.8	3.0

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Site	Ordnance Survey co-ordinates	Monitored total NO ₂	Monitored total NO _x	Background NO ₂	Background NO _x	Monitored road NO _x	Modelled road NO _x	Monitored /modelled road NO _x
LLB - Junction North Circular Road / Chartley Avenue	521222, 186122	93.0	Not measured	36.6	62.2	184.4	61.7	3.0
LLB - Dudden Hill Lane junction with High Road	522191, 184821	60.0	Not measured	31.5	52.1	69.2	37.4	1.8
LLB - Junction Dollis Hill Lane / Cricklewood	523180, 186590	76.0	Not measured	31.3	51.5	128.6	33.6	3.8
LLB - Chichele Road near Melrose Avenue	523692, 185372	65.0	Not measured	31.1	51.1	87.7	21.2	4.1
LLB - IKEA, North Circular Road	520866, 185173	103.0	Not measured	33.4	56.1	237.6	42.0	5.7
LLB - High Street, Harlesden	521743, 183361	76.0	Not measured	35.1	60.3	116.6	34.7	3.4
LLB - Kilburn Bridge	525461, 183558	101.0	Not measured	35.1	59.5	223.6	28.1	7.9
LLE - Ealing Horn Lane AQMS (co-located)	520432, 181428	52.0	Not measured	37.3	64.7	30.1	18.8	1.6

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Site	Ordnance Survey co-ordinates	Monitored total NO ₂	Monitored total NO _x	Background NO ₂	Background NO _x	Monitored road NO _x	Modelled road NO _x	Monitored /modelled road NO _x
triplicate)								
LLE - 326 Western Avenue	520424, 181957	59.0	Not measured	37.3	64.7	50.8	28.7	1.8
LLE - 57 - 75 Old Oak Common Lane (PO)	521557, 180996	49.0	Not measured	34.1	57.0	30.2	14.8	2.0
LLE - 39 Old Oak Lane	521587, 182684	50.0	Not measured	34.7	59.9	29.8	14.5	2.1
LLE - 5 Leamington Park	520532, 181517	46.0	Not measured	37.3	64.7	14.1	21.4	0.7
LBHF - Westway	522548, 180960	77.0	Not measured	34.9	57.4	124.4	41.9	3.0
LBHF - Hammersmith B'way	523327, 178484	77.0	Not measured	45.7	79.6	95.0	41.8	2.3
LBHF - Talgarth Road	524150, 178363	56.0	Not measured	40.3	67.3	38.7	55.5	0.7
LBHF - Uxbridge Road	522861, 180061	43.0	Not measured	34.9	57.4	14.2	8.8	1.6
RBKC - Chatsworth Court	525263, 178936	51.0	Not measured	42.3	71.4	20.0	16.5	1.2
RBKC - Sloane Square	528011, 178675	81.0	Not measured	40.0	66.1	128.5	22.8	5.6
RBKC - Chelsea Physic Garden (Gate)	527726, 177727	59.0	Not measured	40.0	56.7	60.3	17.1	3.5

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Site	Ordnance Survey co-ordinates	Monitored total NO ₂	Monitored total NO _x	Background NO ₂	Background NO _x	Monitored road NO _x	Modelled road NO _x	Monitored /modelled road NO _x
RBKC - Sloane Avenue	527411, 178659	56.0	Not measured	39.1	64.8	41.5	8.1	5.1
RBKC - Cromwell Road/ Natural History Museum	526550, 178968	70.0	Not measured	39.8	66.2	86.1	25.7	3.3
RBKC - Pavillion St/ Sloane Avenue	527889, 179145	54.0	Not measured	43.1	72.5	27.2	13.2	2.1
RBKC - Kensington High Street Kensington Church St	525630, 179674	62.0	Not measured	38.6	63.8	61.5	16.6	3.7
RBKC - Fulham Road/ Limerston St	526377, 177867	55.0	Not measured	38.5	63.5	40.0	18.6	2.1
RBKC - Warwick Road	524825, 178902	50.0	Not measured	40.3	67.3	21.8	15.9	1.4
RBKC - Ladbroke Grove / Nth Ken Library	524342, 181271	53.0	Not measured	41.7	72.1	24.7	26.6	0.9
RBKC - Cromwell Road/ Earls Court Road	525355, 178841	84.0	Not measured	42.3	71.4	133.4	69.4	1.9

2.2.4 The calculated model adjustment factor for the road contribution of NO_x was 3.21. This was applied to all NO_x results from the ADMS-Roads modelling. This is in accordance with Defra guidance¹ on model verification.

2.2.5 A final check was then made to compare the total NO₂ concentrations from the modelling to the monitored data. This is shown in Table 2.

Table 2: Comparison of monitored and modelled annual average NO₂ concentrations

Site	Monitored concentration (µg/m ³)	Modelled concentration (µg/m ³)	Difference ((modelled - monitored)/monitored) x 100
LLB - Ikea (AURN)	76.0	86.5	14%
LLB - John Keble Primary School	41.1	64.2	56%
LBE - Hangar Lane Gyratory (AURN)	95.0	104.2	10%
LBE - Western Avenue (AURN)	73.3	72.2	-1%
LBHi - South Ruislip (AURN)	52.1	53.3	2%
LBHi - Oxford Avenue (AURN)	44.1	47.9	9%
LBHa - Pinner Road (AURN)	46.8	39.5	-16%
RBKC - Cromwell Road (AURN)	69.1	73.4	6%
RBKC - Kings Road (AURN)	92.6	60.5	-35%
LLB - Junction of Kingsbury Road / Edgware Road	54.0	55.5	3%
LLB - Junction North Circular Road / Chartley Avenue	93.0	96.1	3%
LLB - Dudden Hill Lane junction with High Road	60.0	74.1	23%
LLB - Junction Dollis Hill Lane / Cricklewood	76.0	70.6	-7%
LLB - Chichele Road near Melrose Avenue	65.0	59.3	-9%

¹ Department for Environment, Food and Rural Affairs (2009) *Technical Guidance Note LAQM TG(09)*

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Site	Monitored concentration ($\mu\text{g}/\text{m}^3$)	Modelled concentration ($\mu\text{g}/\text{m}^3$)	Difference ((modelled - monitored)/monitored) x 100
LLB - IKEA, North Circular Road	103.0	79.1	-23%
LLB - High Street, Harlesden.	76.0	74.6	-2%
LLB - Kilburn Bridge	101.0	68.8	-32%
LLE - Ealing Horn Lane AQMS (co-located triplicate)	52.0	62.0	19%
LLE - 326 Western Avenue	59.0	71.1	21%
LLE - 57 - 75 Old Oak Common Lane (PO)	49.0	55.0	12%
LLE - 39 Old Oak Lane	50.0	55.8	12%
LLE - 5 Leamington Park	46.0	64.5	40%
LBHF - Westway	77.0	79.5	3%
LBHF - Hammersmith B'way	77.0	86.9	13%
LBHF - Talgarth Road	56.0	93.3	67%
LBHF - Uxbridge Road	43.0	48.5	13%
RBKC - Chatsworth Court	51.0	62.2	22%
RBKC - Sloane Square	81.0	66.3	-18%
RBKC - Chelsea Physic Garden (Gate)	59.0	57.3	-3%
RBKC - Sloane Avenue	56.0	50.6	-10%
RBKC - Cromwell Road/ Natural History Museum	70.0	69.0	-1%
RBKC - Pavillion Street/ Sloane Avenue	54.0	59.2	10%
RBKC - Kensington High Street/Kensington Church Street	62.0	59.5	-4%

Site	Monitored concentration ($\mu\text{g}/\text{m}^3$)	Modelled concentration ($\mu\text{g}/\text{m}^3$)	Difference ((modelled - monitored)/monitored) x 100
RBKC - Fulham Road/ Limerston Street	55.0	61.4	12%
RBKC - Warwick Road	50.0	60.0	20%
RBKC - Ladbroke Grove / Nth Ken Library	53.0	71.8	36%
RBKC - Cromwell Road/ Earls Court Road	84.0	104.8	25%

- 2.2.6 As the majority of modelled NO_2 concentrations were within 25% of the monitored concentrations, no further adjustment was undertaken.

2.3 Construction traffic

- 2.3.1 Construction traffic data used in this assessment are detailed in the SES and AP2 ES Appendix TR-001-000.

Receptors assessed

- 2.3.2 Receptors assessed are presented in Table 1 and in Map AQ-01-007 (Volume 5, Air Quality Map Book).

Table 3 : Modelled receptors (construction phase)

Receptor	Description/location	Ordnance Survey (OS) coordinates	Scenarios assessed with the scheme
7-1	Oakwood (Swakeleys Road)	506231, 185626	2012 base, 2017 base and construction using DMRB
7-2	Frays Farm (A40 (between J1 and Swakeleys Road junction))	505764, 185569	2012 base, 2017 base and construction using DMRB
7-3	4 Chairmans Walk (A412 Denham Way/North Orbital Road (south of satellite compounds))	503993, 188600	2012 base, 2017 base and construction using DMRB
7-4	Coldharbour Farm Cottages	501694, 189317	2012 base, 2017 base and construction using DMRB
7-8	Properties on Hornhill Road/The Hawthorns (Hornhill Road (west of Woodland Road))	502640, 192220	2012 base, 2017 base and construction using DMRB
7-9	1 The Drive, Ickenham	506183, 185614	2012 base, 2017 base and construction using ADMS-Roads
7-10	238 Swakeleys Road	506321, 185874	2012 base, 2017 base and construction using ADMS-Roads

Receptor	Description/location	Ordnance Survey (OS) coordinates	Scenarios assessed with the scheme
7-11	Mid Colne Valley SSSI (A412 Denham Way/North Orbital Road (south of satellite compounds))	504008, 189279	2012 base, 2017 base and construction using ADMS-Roads
7-12	Fray's Farm Meadows SSSI	505713, 185651	2012 base, 2017 base and construction using ADMS-Roads
7-13	1 Harvil Road	506500, 186100	2012 base, 2017 base and construction using ADMS-Roads
7-14	248 Swakeleys Road	506243, 185738	2012 base, 2017 base and construction using ADMS-Roads
7-15	238 Swakeleys Road (south)	506317, 185867	2012 base, 2017 base and construction using ADMS-Roads
7-16	220 Swakeleys Road	506409, 185987	2012 base, 2017 base and construction using ADMS-Roads
7-17	Lodore Green (north)	506503, 186064	2012 base, 2017 base and construction using ADMS-Roads
7-18	1 The Drive, Ickenham	506191, 185623	2012 base, 2017 base and construction using ADMS-Roads
7-19	238 Swakeleys Road (north)	506324, 185880	2012 base, 2017 base and construction using ADMS-Roads
7-20	Lodore Green (south)	506499, 186056	2012 base, 2017 base and construction using ADMS-Roads
7-21	90 The Drive, Ickenham	506428, 186529	2012 base, 2017 base and construction using ADMS-Roads

Background concentrations

2.3.3 The background concentrations used in the assessment are shown in Table 4 taken from Defra maps.

Table 4 : Background 2012 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ($\mu\text{g}/\text{m}^3$)		
	NO _x	NO ₂	PM ₁₀
(7-1) Oakwood (Swakeleys Road)	45.6	28.5	22.0
(7-2) Frays Farm (A40 (between J1 and Swakeleys Road junction))	46.4	28.3	21.7
(7-3) 4 Chairmans Walk (A412 Denham Way/North Orbital Road (south of satellite compounds))	30.3	20.3	18.8

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Receptor (or zone of receptors)	Concentrations (µg/m ³)		
	NO _x	NO ₂	PM ₁₀
(7-4) Coldharbour Farm Cottages	42.2	26.3	21.2
(7-8) Properties on Hornhill Road/The Hawthorns (Hornhill Road (west of Woodland Road))	35.5	23.0	21.4
(7-9) 1 The Drive, Ickenham	45.6	28.5	22.0
(7-10) 238 Swakeleys Road	45.6	28.5	22.0
(7-11) Mid Colne Valley SSSI (A412 Denham Way/North Orbital Road (south of satellite compounds))	25.0	17.0	17.7
(7-12) Fray's Farm Meadows SSSI	46.4	28.3	21.7
(7-13) 1 Harvil Road	33.0	21.6	19.1
(7-14) 248 Swakeleys Road	45.6	28.5	22.0
(7-15) 238 Swakeleys Road (south)	45.6	28.5	22.0
(7-16) 220 Swakeleys Road	45.6	28.5	22.0
(7-17) Lodore Green (north)	33.0	21.6	19.1
(7-18) 1 The Drive, Ickenham	45.6	28.5	22.0
(7-19) 238 Swakeleys Road (north)	45.6	28.5	22.0
(7-20) Lodore Green (south)	33.0	21.6	19.1
(7-21) 90 The Drive, Ickenham	33.0	21.6	19.1

Table 5 : Background 2017 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations (µg/m ³)		
	NO _x	NO ₂	PM ₁₀
(7-1) Oakwood (Swakeleys Road)	38.3	24.6	20.6
(7-2) Frays Farm (A40 (between J1 and Swakeleys Road junction))	38.5	24.9	20.3
(7-3) 4 Chairmans Walk (A412 Denham Way/North Orbital Road (south of satellite compounds))	26.4	17.9	17.6
(7-4) Coldharbour Farm Cottages	34.7	22.8	19.9

Receptor (or zone of receptors)	Concentrations ($\mu\text{g}/\text{m}^3$)		
	NO _x	NO ₂	PM ₁₀
(7-8) Properties on Hornhill Road/The Hawthorns (Hornhill Road (west of Woodland Road))	29.7	19.7	20.1
(7-9) 1 The Drive, Ickenham	38.3	24.6	20.6
(7-10) 238 Swakeleys Road	38.3	24.6	20.6
(7-11) Mid Colne Valley SSSI (A412 Denham Way/North Orbital Road (south of satellite compounds))	21.4	14.8	16.7
(7-12) Fray's Farm Meadows SSSI	38.5	24.9	20.3
(7-13) 1 Harvil Road	28.1	18.9	17.9
(7-14) 248 Swakeleys Road	38.3	24.6	20.6
(7-15) 238 Swakeleys Road (south)	38.3	24.6	20.6
(7-16) 220 Swakeleys Road	38.3	24.6	20.6
(7-17) Lodore Green (north)	28.1	18.9	17.9
(7-18) 1 The Drive, Ickenham	38.3	24.6	20.6
(7-19) 238 Swakeleys Road (north)	38.3	24.6	20.6
(7-20) Lodore Green (south)	28.1	18.9	17.9
(7-21) 90 The Drive, Ickenham	28.1	18.9	17.9

DMRB model results

- 2.3.4 This section provides the summary of the modelled pollutant concentrations for the assessed receptors using the DMRB methodology. The magnitude of change and impact descriptors for the four human receptors identified are derived following the Environmental Protection UK (EPUK) methodology². The criteria used to define significance at the ecological sites identified are in line with guidance set out in the Environment Agency H1 guidance document³, which in turn refers back to joint Environment Agency/Natural England guidance⁴.

² Environmental Protection UK (EPUK), (2010), Development Control: Planning for Air Quality

³ Environment Agency (2011), H1 Annex F Air Emissions V2.2

⁴ UK Air Pollution Information System (APIS) (2015). www.apis.ac.uk

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Table 6 : Summary of DMRB annual mean NO₂ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previously reported main ES impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
7-1	37.8	32.3	35.7	3.4	Medium	Slight Adverse	Negligible
7-2	34.6	30.3	31.2	0.9	Small	Negligible	Negligible
7-3	22.2	19.7	20.0	0.3	Imperceptible	Negligible	Negligible
7-4	34.5	29.6	29.8	0.2	Imperceptible	Negligible	Negligible
7-8	23.5	20.2	20.5	0.3	Imperceptible	Negligible	Negligible

Table 7 : Summary of DMRB annual mean PM₁₀ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previously reported main ES impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
7-1	24.5	22.6	23.0	0.4	Imperceptible	Negligible	Negligible
7-2	23.0	21.3	21.4	0.1	Imperceptible	Negligible	Negligible
7-3	19.2	18.0	18.1	<0.1	Imperceptible	Negligible	Negligible
7-4	22.6	21.0	21.0	<0.1	Imperceptible	Negligible	Negligible
7-8	21.5	20.3	20.3	0.1	Imperceptible	Negligible	Negligible

Table 8 : Critical level assessment for the protection of vegetation

Receptor	NO _x concentrations (µg/m ³)				Critical level (annual mean)	Change in concentrations as % of critical level	Total NO _x as a % of critical level	Potentially significant? ⁵
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme	Change in concentrations (µg/m ³)				
7-11 Mid Colne Valley	34.0	29.7	30.3	0.7	30.0	2.3	101	Yes

⁵ Change in NO_x concentration greater than 1% of critical level and total NO_x concentration greater than 70% of critical level.

Receptor	NO _x concentrations (µg/m ³)							
SSSI								

Table 9 : Critical load - nutrient nitrogen deposition

Receptor	Nitrogen deposition rate (kg N/ha/year)							
	2012 baseline deposition	2017 without SES AP2 scheme	2017 with SES AP2 scheme	Change in deposition (kg N/ha/year)	Critical load range (kg N/ha/year)	Change in deposition as % of critical load	Total nitrogen deposition as a % of critical load	Potentially significant? ⁶
7-11 Mid Colne Valley SSSI	21.2	21.2	21.3	0.1	15 - 25	0.7 (Low) 0.4 (High)	142 (Low) 85 (High)	No

- 2.3.5 Changes in modelled concentrations have been calculated to determine the impact to local air quality. Slight impacts have been predicted as a result of these increases in NO₂ concentrations at Swakeleys Road. All other findings indicate small and negligible increases in NO₂ resulting in negligible impacts and no significant effect.
- 2.3.6 The changes in PM₁₀ concentrations are imperceptible at all receptors identified. As a result, a negligible impact was found at all receptor in relation to PM₁₀, with no further modelling required.
- 2.3.7 From the ecological assessment it can be observed that the NO_x impact at both the Mid Colne Valley SSSI and Fray's Farm Meadows SSSI, at points chosen to be indicative of worst case exposure from traffic related emissions, are greater than 1% of the critical level, and total NO_x is greater than 70% of the critical level set for the protection of vegetation. Detailed modelling has therefore been undertaken. Nutrient nitrogen deposition is also predicted to have a potentially significant effect at Fray's Farm Meadows SSSI.

Detailed modelling results

- 2.3.8 This section provides the summary of the modelled pollutant concentrations for the assessed receptors using ADMS-Roads. The magnitude of change and impact descriptors for human receptors are derived following the EPUK methodology. The criteria used to define significance at the ecological sites identified are in line with guidance set out in the Environment Agency H1 guidance document, which in turn refers back to joint Environment Agency/Natural England guidance. With regard to ecology, in order to indicate area of the habitat that may be subject to significant effects the model included transects at increasing distances away from the roadside.

⁶ Change in N deposition greater than 1% of critical load and total N deposition greater than 70% of critical load.

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Table 10 : Summary of ADMS-Roads annual mean NO₂ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previously reported main ES impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
7-09	66.2	57.0	57.2	0.2	Imperceptible	Negligible	Substantial adverse
7-10	55.3	48.4	49.5	1.1	Small	Slight adverse	Substantial adverse
7-13	38.0	32.8	33.0	0.2	Imperceptible	Negligible	Moderate adverse
7-14	58.1	50.3	51.4	1.1	Small	Slight adverse	Substantial adverse
7-15	55.5	48.4	49.5	1.1	Small	Slight adverse	Substantial adverse
7-16	51.0	44.3	44.9	0.6	Small	Slight adverse	Substantial adverse
7-17	45.4	39.3	39.9	0.5	Small	Slight adverse	Substantial adverse
7-18	67.9	58.7	59.0	0.3	Imperceptible	Negligible	Negligible
7-19	55.1	48.3	49.4	1.1	Small	Slight adverse	Negligible
7-20	47.7	41.5	42.2	0.6	Small	Slight adverse	Negligible
7-21	34.1	29.4	29.7	0.2	Imperceptible	Negligible	Negligible

Table 11 : Summary of ADMS-Roads annual mean PM₁₀ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previously reported main ES impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
7-09	28.2	26.2	26.6	0.5	Small	Negligible	Negligible
7-10	25.8	23.9	24.4	0.5	Small	Negligible	Negligible
7-13	20.9	19.5	19.8	0.3	Imperceptible	Negligible	Negligible
7-14	26.4	24.5	25.0	0.6	Small	Negligible	Negligible

SES and AP2 ES Appendix AQ-001-007

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previously reported main ES impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
7-15	25.8	23.9	24.5	0.5	Small	Negligible	Negligible
7-16	25.0	23.2	23.7	0.5	Small	Negligible	Negligible
7-17	22.0	20.5	21.0	0.5	Small	Negligible	Negligible
7-18	28.5	26.4	26.9	0.6	Small	Negligible	Negligible
7-19	25.7	23.9	24.4	0.5	Small	Negligible	Negligible
7-20	22.4	20.8	21.4	0.6	Small	Negligible	Negligible
7-21	20.6	19.4	19.7	0.4	Imperceptible	Negligible	Negligible

Table 12 : Summary of ADMS-Roads 24-hour PM₁₀ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previously reported main ES impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
7-09	21.4	15.3	16.7	1	Small	Negligible	Negligible
7-10	14.3	9.9	11.1	1	Small	Negligible	Negligible
7-13	4.5	2.8	3.1	0	Imperceptible	Negligible	Negligible
7-14	16.0	11.2	12.5	1	Small	Negligible	Negligible
7-15	14.4	10.0	11.2	1	Small	Negligible	Negligible
7-16	12.4	8.6	9.5	1	Imperceptible	Negligible	Negligible
7-17	6.3	4.0	4.7	1	Imperceptible	Negligible	Negligible
7-18	22.2	15.9	17.4	2	Small	Negligible	Negligible
7-19	14.1	9.8	11.0	1	Small	Negligible	Negligible
7-20	7.0	4.5	5.3	1	Imperceptible	Negligible	Negligible
7-21	4.2	2.7	3.1	0	Imperceptible	Negligible	Negligible

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Table 13 : Critical level assessment for the protection of vegetation

Receptor	NO _x concentrations (µg/m ³)							
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme	Change in concentrations (µg/m ³)	Critical level (µg/m ³) (annual mean)	Change in concentrations as % of critical level	Total NO _x as a % of critical level	Potentially significant?
7-11 Mid Colne Valley SSSI								
7-11 (10m)	37.9	32.3	33.0	0.8	30.0	2.6%	110.1%	Yes
7-11 (20m)	34.4	29.4	29.8	0.5	30.0	1.6%	99.5%	Yes
7-11 (50m)	31.3	26.8	27.0	0.2	30.0	0.7%	90.1%	No
7-11 (100m)	30.0	25.7	25.8	0.1	30.0	0.3%	86.1%	No
7-11 (150m)	29.6	25.4	25.4	0.1	30.0	0.2%	84.8%	No
7-11 (200m)	29.3	25.2	25.2	0.0	30.0	0.1%	84.0%	No
7-12 Fray's Farm Meadows SSSI								
7-12 (20m)	183.5	145.6	147.5	1.9	30.0	6.3%	491.6%	Yes
7-12 (50m)	104.7	84.0	84.8	0.8	30.0	2.7%	282.6%	Yes
7-12 (100m)	75.9	61.5	61.9	0.4	30.0	1.3%	206.3%	Yes
7-12 (150m)	64.3	52.5	52.7	0.2	30.0	0.7%	175.6%	No

Table 14 : Critical load - nutrient nitrogen deposition

Receptor	Nitrogen deposition rate (kg N/ha/year)							
	2012 baseline deposition	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme	Change in deposition (kg N/ha/year)	Critical load range (kg N/ha/year)	Change in deposition as % of critical load	Total nitrogen deposition as a % of critical load	Potentially significant?
7-11 Mid Colne Valley SSSI								
7-11	21.8	21.6	21.7	0.1	15 - 25	0.7 (Low)	145 (Low)	No

Receptor	Nitrogen deposition rate (kg N/ha/year)							
(10m)						0.4 (High)	87 (High)	
7-11 (20m)	21.3	21.2	21.2	0.1	15 - 25	0.4 (Low) 0.3 (High)	142 (Low) 85 (High)	No
7-11 (50m)	20.9	20.8	20.8	0.0	15 - 25	0.2 (Low) 0.1 (High)	139 (Low) 83 (High)	No
7-11 (100m)	20.7	20.6	20.7	0.0	15 - 25	0.1 (Low) 0.1 (High)	138 (Low) 83 (High)	No
7-11 (150m)	20.6	20.6	20.6	0.0	15 - 25	0.1 (Low) 0.0 (High)	137 (Low) 82 (High)	No
7-11 (200m)	20.6	20.6	20.6	0.0	15 - 25	0.0 (Low) 0.0 (High)	137 (Low) 82 (High)	No
7-12 Fray's Farm Meadows SSSI								
7-12 (20m)	38.2	33.9	34.2	0.3	20 - 30	1.8 (Low) 1.1 (High)	228 (Low) 137 (High)	Yes
7-12 (50m)	26.9	25.0	25.1	0.1	20 - 30	0.8 (Low) 0.5 (High)	168 (Low) 101 (High)	No
7-12 (100m)	22.7	21.8	21.8	0.1	20 - 30	0.4 (Low) 0.2 (High)	146 (Low) 87 (High)	No
7-12 (150m)	21.1	20.5	20.5	0.0	20 - 30	0.2 (Low) 0.1 (High)	137 (Low) 82 (High)	No

Assessment of significance

- 2.3.9 The significance of the impacts on air quality from construction traffic has been assessed in accordance with the EPUK methodology.
- 2.3.10 The assessment predicted that there will be numerous locations where air quality standards are exceeded for NO₂, with and without the revised scheme. Many receptor locations will also experience an increase in concentrations of NO₂ and PM₁₀ with the revised scheme.
- 2.3.11 NO₂ impacts during the construction phase were predicted in the main ES to be moderate or substantial adverse at receptors on and bordering Swakeleys Road.
- 2.3.12 In this revised assessment, largely because of changes to the mass haul traffic flows and use of Euro VI compliant vehicles for the transport of excavated materials, the

impacts have decreased and are predicted to be slight adverse or negligible at these receptors. This is no longer a significant effect.

- 2.3.13 No new or different significant effects have been identified for ecological receptors, compared to the main ES. It is highly likely that the small increases will not have a measurable effect on the plant communities within the respective SSSIs.

3 References

Department for Environment, Food and Rural Affairs (Defra) (2014), Defra background maps 2011, <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011>; Accessed: March 2015.

Environmental Protection UK (EPUK) (2010), Development Control: Planning for Air Quality.

Environment Agency (2011), H1 Annex F Air Emissions V2.2.

Highways Agency (2007), The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07).

HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

Supplementary Environmental Statement and
Additional Provision 2 Environmental Statement

Volume 5 | CFA9 | Central Chilterns

SES and AP2 ES Appendix AQ-001-009

Environmental topic:	Air quality	AQ
Appendix name:	Data appendix	001
Community forum area:	Central Chilterns	009

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1 Introduction

1.1 Structure of this air quality assessment appendix

- 1.1.1 This appendix provides an update to Appendix AQ-001-009 of the main Environmental Statement (ES) (Volume 5, Appendix AQ-001-009). This update should be read in conjunction with Appendix AQ-001-009 of the main ES.
- 1.1.2 This appendix is structured as follows:
- baseline air quality data (Section 2);
 - dust impact evaluation and risk rating (Section 3); and
 - air quality assessment, road traffic (Section 4).
- 1.1.3 Maps referred to throughout this air quality appendix are contained in the Volume 5 Air Quality Map Book of the main ES.

1.2 Scope of this assessment

- 1.2.1 This air quality assessment considers changes to local air quality as a result of:
- corrections to Appendix AQ-001-009 from the main ES;
 - changes to the design or construction assumptions which do not require changes to the Bill (i.e. SES design changes); and
 - changes to the design of the scheme that are outside the existing limits of the Bill (i.e. AP2 amendments).
- 1.2.2 SES design changes and AP2 amendments outside of the Central Chilterns community forum area (CFA9) have resulted in changes to the movement of excavated material and forecast heavy goods vehicle (HGV) traffic flows within CFA9 during construction (in comparison to those under the original scheme and reported in the main ES). These have been assessed as they are considered to have the potential to result in new or different likely significant effects on traffic and transport and therefore air quality.
- 1.2.3 The changes include the removal of the sustainable placement area at Hunt's Green Farm in the Dunsmore, Wendover and Halton community forum area (CFA10) (SES-010-001).
- 1.2.4 The main traffic and transport changes associated with the SES design changes in CFA9 are an increase in the number of HGV flows on the A413 between the border with the Chalfonts and Amersham community forum area (CFA8) and the B485 Chesham Road/Frith Hill associated with the movement of excavated material. The A413, between the B485 Frith Hill and the border with CFA10 however is no longer used for the movement of excavated material, resulting in a decrease in HGV flows on this section of road. The B485 Chesham Road/Frith Hill, between A413 and King' Lane is now used for the movement of excavated material, which results in an increase in HGV flows on this road.

- 1.2.5 There is also one change to the design of the scheme that is outside the existing limits of the Bill, which has been included in this SES and AP2 ES Appendix AQ-001-009 assessment, namely AP2-009-001 Chiltern Tunnel North Portal Extension.

Methodology, data sources and design criteria

- 1.2.6 The assessment scope, key assumptions and limitations for air quality are set out in Volume 1, the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001 - 000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES as amended by the SMR Addendum 2 (Volume 5: Appendix CT-001 - 000/3 of the SES and AP2 ES), which was produced to specifically amend and advance the SMR for AP2. The SMR Addendum 2 focuses on updates and refinements to the establishment of the baseline and definition of the survey; the scope of the air quality assessment; and the assessment methodology.

2 Baseline air quality data

2.1 Existing air quality

- 2.1.1 There are no changes to any monitored baseline air quality relevant to this revised assessment. Updated background maps supplied by the Department for Environment, Food and Rural Affairs (Defra) for both existing and future pollutant concentrations have been incorporated.

Background pollutant concentrations

- 2.1.2 Estimates of background air quality have been taken from Defra updated maps. Background NO₂ concentrations are within air quality standards throughout the study area, with annual mean concentrations in the range 11.2µg/m³ - 13.2µg/m³ in 2012. Background PM₁₀ concentrations are within air quality standards throughout the study area, with annual mean concentrations in the range 17.6µg/m³ - 18.1µg/m³ in 2012.

3 Dust impact evaluation and risk rating

- 3.1.1 This section provides details of the assessment of dust emissions during construction of the scheme. Since the submission of the main ES, new guidance¹ has been published by the Institute of Air Quality Management (IAQM). This assessment follows the approach described in the new guidance. Maps of the assessed receptors in relation to the scheme and associated construction activities are contained within the Volume 5 air quality map book within in the main ES.

3.2 Chiltern tunnel north portal extension

- 3.2.1 This AP2 seeks the extension of the tunnel portal hood from 100m to 220m, and the associated extension of the access road. Earthworks abutting the scheme are to be widened and there is the potential for realignment of tracks due to extended tunnel

¹ IAQM, 2014, *Guidance on the assessment of dust from demolition and construction*, London

portal hood leading to widening of the scheme corridor, with impact on structures and earthworks.

- 3.2.2 The elements of this AP2 which have been considered in the dust impact evaluation are the proximity of the works in relation to existing sensitive receptors near the portal, together with the level of earthworks and associated vehicle movements / track out.

Dust emission magnitude

- 3.2.3 Each dust generating activity has been assigned a dust emission magnitude as shown in Table 1. Information used to determine the dust emissions magnitude for each of the activities has been taken from the AP-C222-066-scoping v3 document and CT-06-031 scheme drawings.

Table 1 : Dust emission magnitude for construction activities

Activity	Dust emission magnitude	Reasoning
Demolition	N/A	No demolitions are required
Earthworks	Large	Total site area >10,000m ²
Construction	Large	On-site concrete batching likely - use of dusty construction materials
Trackout	Medium	10-50 HDV (>3.5t) outward movements in one day

- 3.2.4 This assessment of the dust emission magnitude for this AP2 is consistent with the assessment findings within the main ES for CFA9, albeit in a slightly different location.

Assessed receptors and sensitivity of the area

- 3.2.5 The sensitivity of the area to dust soiling, human health and ecological impacts has been assessed for each dust-generating activity in Table 2.
- 3.2.6 This AP2 is located within an area (less than 20m) of local woodland (Mantle's Wood) and is approximately 350m away from the nearest residential property, Mantle Farm.
- 3.2.7 Following the IAQM methodology to assess the risk of dust impacts, the sensitivity of the area takes into account a number of factors, including; the specific sensitivities of the receptors in the area, the proximity and number of those receptors to potential emission sources, existing local PM₁₀ background concentrations and any additional site-specific factors which may affect the risk of wind-blown dust e.g. surrounding trees. Using this approach, the overall sensitivity of the area is summarised in Table 2.
- 3.2.8 This assessment of the sensitivity of the area is consistent with the assessment findings within the main ES for CFA9.

Table 2 : Sensitivity of the area to dust soiling, human health and ecological impacts

Activity	Dust soiling	Human health	Ecological
Earthworks	Low sensitivity	Low sensitivity	Low sensitivity
Construction	Low sensitivity	Low sensitivity	Low sensitivity
Trackout	Low sensitivity	Low sensitivity	Low sensitivity

Risk of impacts

- 3.2.9 Taking into consideration the dust emission magnitude and the sensitivity of the area, the AP2-009-001 and the site has been classified as Low Risk (Table 3). This has been determined based on the likely activities at the site, in combination with the proximity to the nearest residential property and the site location within the non-statutory designated Mantle's Wood. It should be noted that this is the risk prior to the implementation of mitigation measures which are embedded within the project as part of the draft Code of Construction Practice (CoCP).
- 3.2.10 It is anticipated that with the implementation of the measures described in the draft CoCP, the risk of impacts will be reduced further.
- 3.2.11 This assessment of the risk of impacts is consistent with the assessment findings within the main ES for CFAg and there is no change in significance, with impacts remaining as Not Significant with the implementation of the draft CoCP mitigation.

Table 3 : Summary dust risk table prior to mitigation

Activity	Dust soiling	Human health	Ecological
Earthworks	Low Risk	Low Risk	Low Risk
Construction	Low Risk	Low Risk	Low Risk
Trackout	Low Risk	Low Risk	Low Risk

4 Air quality assessment - road traffic

4.1 Overall assessment approach

- 4.1.1 As a result of SES changes, AP2 changes and wider updates to the traffic modelling network outlined in Section 1.2, construction traffic movements in CFAg have changed from those in the main ES. These have been assessed as they are considered to have the potential to result in new or different likely significant effects on traffic and transport and therefore air quality.
- 4.1.2 Where the Design Manual for Roads and Bridges (DMRB)² thresholds detailed in the Scoping and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1) are not exceeded, no additional assessment is required as the air quality impacts will be

² Highways Agency (2007) The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07)

minimal. Where these thresholds are breached, then a quantitative assessment has been carried out. Where the road configuration is straightforward and the baseline air quality within standards, the DMRB screening method has been used to predict changes in air quality. Professional judgment has been used to select the appropriate tool for each area.

4.1.3 In this study area the DMRB screening method was considered to be a suitable tool for the quantitative assessment.

4.1.4 The overall assessment approach remains the same as described in Appendix AQ-001-009 of the main ES.

4.2 Construction traffic

4.2.1 Construction traffic data used in this assessment are detailed in the SES AP2 ES Appendix TR-001-009.

Receptors assessed

4.2.2 The additional traffic and the need for road diversions have the potential to change air quality for some receptors. During the construction phase, all road links identified for assessment will experience increases in traffic numbers. Where DMRB criteria for undertaking a local air quality assessment were met, a number of receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are presented in Table 4 and in Map AQ-01-009 (Volume 5, Air Quality Map Book of the main ES).

4.2.3 Four roads within CFAg were identified as meeting DMRB criteria in this SES and AP2 ES Appendix AQ-001-009 and therefore receptors were selected. The four roads identified were:

- A413 Amersham Road - (increase in traffic compared to main ES - not assessed previously);
- A413 Missenden Bypass (South of B485)- (increase in traffic compared to main ES - not assessed previously); and
- King's Lane (south of Frith Hill)- (reduction in traffic compared to main ES - assessed previously).

4.2.4 B485 Chesham Road/Frith Hill (west of King's Lane) - (increase in traffic compared to main ES - not assessed previously).

4.2.5 By comparison to the CFAg assessment in the main ES, one road which was previously assessed now has reductions in construction traffic flows. It is therefore now not included in this assessment as it no longer meets the DMRB criteria, namely: B485 Chesham Road (east of King's Lane).

4.2.6 Overall, due to increases in construction traffic on three roads in CFAg which now meet DMRB criteria, three additional receptors were identified and included within this SES and AP2 ES Appendix AQ-001-009, compared to the main ES. A reduction in traffic flows on one of the previously assessed roads in the main ES however means it is no longer included in the assessment.

Table 4 : Modelled receptors (construction phase)

Receptor	Description/location	Ordnance Survey (OS) coordinates	Scenarios assessed with the scheme
9-1	1 Parkview Cottages (A413 Amersham Road)	493137, 198821	2012 base, 2017 base and construction
9-2	Great Missenden C of E Combined School (A413 Missenden Bypass (South of B485))	489794, 201253	2012 base, 2017 base and construction
9-3	59 King's Lane (King's Lane (south of Frith Hill))	491034, 201477	2012 base, 2017 base and construction
9-4	5 Cudsdens Court (B485 Chesham Road / Frith Hill (west of King's Lane))	490903, 201201	2012 base, 2017 base and construction

Background concentrations

4.2.7 The background concentrations used in the assessment are shown in Table 5 taken from the updated Defra maps.

Table 5 : 2017 background concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ($\mu\text{g}/\text{m}^3$)		
	NO _x	NO ₂	PM ₁₀
9-1 1 Parkview Cottages	16.4	11.6	16.8
9-2 Great Missenden C of E Combined School	15.5	10.9	16.7
9-3 59 Kings Lane	13.7	9.7	16.8
9-4 5 Cudsdens Court	13.9	9.9	14.9

DMRB model results

4.2.8 This section provides the summary of the modelled pollutant concentrations for the assessed receptors using the DMRB methodology. The magnitude of change and impact descriptors for the two human receptors identified are derived following the Environmental Protection UK (EPUK) methodology³.

³ Environmental Protection UK (EPUK), (2010), Development Control: Planning for Air Quality

Table 6 : Summary of DMRB annual mean NO₂ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previous assessment impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
9-1	17.2	15.2	16.0	0.83	Small	Negligible	N/A
9-2	16.4	14.4	15.1	0.70	Small	Negligible	N/A
9-3	11.6	10.1	10.9	0.74	Small	Negligible	Negligible
9-4	15.2	13.4	15.0	1.64	Small	Negligible	N/A

Table 7 : Summary of DMRB annual mean PM₁₀ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previous assessment impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
9-1	18.5	17.5	17.6	0.08	Imperceptible	Negligible	N/A
9-2	18.4	17.4	17.5	0.07	Imperceptible	Negligible	N/A
9-3	17.8	16.9	17.1	0.20	Imperceptible	Negligible	Negligible
9-4	18.8	15.7	15.9	0.25	Imperceptible	Negligible	N/A

Assessment of significance

- 4.2.9 The impact on air quality of the change in traffic in CFA9 is negligible for NO₂ and PM₁₀ during construction. Pollutant concentrations will remain well within air quality standards with and without the changes. There are no AQMAs within the study area.
- 4.2.10 The changes in air quality at worst-case receptors during the construction phase will not cause significant effects for receptors since the adverse impact is negligible, taking into account background air quality and air quality standards. There is no change in significance from the main ES.

5 References

Department for Environment, Food and Rural Affairs (Defra), (2014), Defra background maps 2011; <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011>; Accessed: March 2015.

Environmental Protection UK (EPUK), (2010), Development Control: Planning for Air Quality.

Highways Agency, (2007), The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07).

SES and AP2 ES Appendix CM-001-009

Environmental topic:	Community	CM
Appendix name:	Community assessment	001
Community forum area:	Central Chilterns	009

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1 Introduction

1.1.1 This appendix provides an update to the Appendix CM-001-009 community assessment in the main Environmental Statement (ES) as a result of removal of the sustainable placement area at Hunt's Green Farm in CFA10 (SES-010-001) and design changes for which additional land is required in Mantle's Wood for the Chiltern tunnel north portal (AP2-009-001) assessed as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This update should be read in conjunction with Appendix CM-001-009 community assessment from the main ES.

1.1.2 This appendix is structured as followed:

- Part 1: Supplementary Environmental Statement:
 - community impact assessment record sheets - construction; and
 - community impact assessment record sheets - operation.
- Part 2: Additional Provision 2 Environmental Statement:
 - community impact assessment record sheets - construction; and
 - community impact assessment record sheets – operation.

Part 1: Supplementary Environmental Statement

2 Community impact assessment record sheets - construction

2.1 Residential properties on the B485 Chesham Road / Frith Hill

Table 1 : Residential properties on the B485 Chesham Road / Frith Hill community impact assessment record sheet

Resource name	Residential properties on the B485 Chesham Road / Frith Hill (between the A413 and King's Lane)
CFA	Central Chilterns (CFA9).
Resource type	Residential properties.
Resource description/profile	Approximately 11 residential properties located on the B485 Chesham Road/Frith Hill (between the A413 and King's Lane) to the south west of the village of South Heath, as shown on Map CM-01-030.
Assessment year	Construction phase (2017+).
Impact 1: loss of amenity	<p>Impact: residents of approximately 11 properties on the B485 Chesham Road/Frith Hill (between the A413 and King's Lane) are predicted to experience in-combination effects arising from significant noise, construction traffic (HGV) and visual effects during the construction phase, resulting in a loss of amenity.</p> <p>Noise: there will be a significant indirect noise effect due to the construction traffic using the B485 Chesham Road/Frith Hill.</p> <p>Construction traffic: there will be a significant increase in HGV movements along the B485 Chesham Road/Frith Hill (between the A413 and King's Lane).</p> <p>Visual: there will also be significant visual effects (for approximately six of the 11 properties) associated with the South Heath green tunnel including the construction access road, the construction compound and demolition activity.</p> <p>Duration: The combination of these effects will occur during peak construction months.</p>
Assessment of magnitude	<p>Major (for approximately six properties): as these residents will be affected by significant residual noise, construction traffic (HGV) and visual effects.</p> <p>Medium (for approximately five properties): as these residents will be affected by significant residual noise and construction traffic (HGV) effects.</p>
Relevant receptors	Owners/occupiers of the residential properties.
Assessment of sensitivity of receptor(s) to impact	High: as these are residential receptors.
Significance rating of effect	Major adverse- significant effect on residents due to loss of amenity. This is a new significant effect which was not reported in the main ES.
Proposed mitigation options for significant effects	No further mitigation of amenity effects.
Residual effect significance rating	Major adverse- significant effect on residents due to loss of amenity. This is a new residual significant effect which was not reported in the main ES.

Part 2: Additional Provision 2 Environmental Statement

3 Community impact assessment record sheets - construction

3.1 Mantle's Wood

Table 2 : Mantle's Wood community impact assessment record sheet

Resource name	Mantle's Wood
Community forum area (CFA)	Central Chilterns (CFA9).
Resource type	Open space and recreational public right of way (PRoW).
Resource description/profile	Mantle's Wood, as shown on Map CM-01-029 (Volume 5, community map book), is a designated local wildlife site (LWS), owned by the Forestry Commission and promoted as a place to visit by the Woodland Trust ¹ ; at present the site is leased to a private tenant.
Assessment year	Construction phase (2017+).
Impact 1: permanent loss of land	<p>Impact: Mantle's Wood will be severed by construction activities and will experience permanent loss of land due to land required for construction of the northern Chiltern tunnel portal.</p> <p>The Chiltern tunnel will surface with a tunnel portal in the centre of Mantle's Wood, north-west of Hyde Heath and the scheme will then proceed in cutting. Approximately 30% of the wood (approximately 5.94ha out of 20ha) will be permanently required for the construction of the scheme, severing the north and the south of the wood.</p> <p>Presently Mantle's Wood is partly accessible by two PRoW which are used by local residents for walking activities. As part of the AP2 revised scheme Footpaths LMI/21 and GMI/23 will be realigned, which will maintain access to the wood.</p> <p>Duration of impact: permanent.</p>
Assessment of magnitude	Medium: as Mantle's Wood will be partially compromised permanently.
Relevant receptors	Users of Mantle's Wood.
Assessment of sensitivity of receptor(s) to impact	<p>Medium: Information received from Great Missenden Parish Council indicates that this is a valued community resource.</p> <p>A survey undertaken on Saturday 25 August 2012 (08:00-18:00, cloudy weather with showers) observed a total of 31 people throughout the day: 30 walkers/dog walkers and one cyclist indicating usage of the PRoW to be relatively high².</p> <p>There are alternative open spaces and woodlands (accessible by PRoW) within walking distance (1km) of Mantle's Wood including Hyde Heath Common, Bray's Wood and White's Wood. Hedgemoor and Farthings Woods are also within walking distance, but these are not accessible by PRoW and are also partially within the land required for construction.</p> <p>Even though there are accessible alternatives, Mantle's Wood is a popular resource and it is permanently severed by construction activities with approximately 30% of it made unusable.</p>

¹ Woodland Trust; Mantle's Wood, a Forestry Commission England wood; <http://visitwoods.org.uk/en/visit-woods/Pages/large-wood-map.aspx?wood=38910&site=Mantle's-Wood#.UIZdZsWCmrg>; Accessed: 12 September 2013.

² It should be noted that there are no benchmarks against which to judge whether an open space is well used or not for a given population density. Usage is only one of the criteria by which the value to the community of an open space is assessed.

SES and AP2 ES Appendix CM-001-009

Resource name	Mantle's Wood
Significance rating of effect	Moderate adverse- significant effect due to land required for the construction of the Proposed Scheme. The significance of the effect at Mantle's Wood is the same as that reported in the main ES.
Proposed mitigation options for significant effects	No further mitigation options identified.
Residual effect significance rating	Moderate adverse- significant effect due to land required for the construction of the scheme. The significance of the effect at Mantle's Wood is the same as that reported in the main ES.

4 References

Woodland Trust; Mantle's Wood, a Forestry Commission England wood;
<http://visitwoods.org.uk/en/visit-woods/Pages/large-wood-map.aspx?wood=38910&site=Mantle's-Wood#.UIZdZsWCmrg>; Accessed: 12 September 2013.

Environmental topic:	Landscape and visual assessment	LV
Appendix name:	Landscape report	001
Community forum area:	Central Chilterns	009

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1 Introduction

- 1.1.1 This appendix provides an update to Appendix LV-001-009 landscape report from the main Environmental Statement (ES) Volume 5, CAFg Central Chilterns as a result of design changes additional land required in Mantle's Wood for the Chiltern tunnel north portal (AP2-009-001) as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This details the baseline for all significantly effected landscape character areas (LCA) and represented viewpoints that are new or different to those reported in the main ES. It should be read in conjunction with Appendix LV-001-009 landscape report from the main ES, which provides baseline descriptions for all landscape character areas (LCA) and representative viewpoints.
- 1.1.2 AP2 ES Map series LV-02, LV-07 and LV-08, as referred to throughout this landscape and visual assessment appendix, are contained in the Volume 5 landscape and visual assessment map book and should be read in conjunction with the original Volume 5 landscape and visual assessment map book.

2 Environmental baseline report

- 2.1.1 This section describes new visual assessment viewpoints located within the study area for this CFA, which have been identified to inform the SES and AP2 ES these are ordered from south to north along the route of the scheme.

3 Visual baseline

- 3.1.1 For some visual receptors, no appropriate location from which to capture a representative photograph of the view was available, therefore no photograph has been included and the assessment has been undertaken based on professional judgement.
- 3.1.2 The viewpoint number identifies the viewpoint locations which are shown on maps LV-07-30b to LV-07-34a and LV-08-30b to LV-08-34a (Volume 5 of the main ES) and on map LV-04-033 (Volume 5 of this SES and AP2 ES). In each case, the middle number (xxx.x.xxx) identifies the type of receptor as follows:
1. protected views - these relate to those viewpoints, panoramas and viewing corridors that have been designated by local planning authorities, county councils or other relevant stakeholders. Protected views have a high sensitivity to change. None of these receptor types have been identified within the study area;
 2. residential views – these have a high sensitivity to change, as attention is often focused on the landscape surrounding the property, rather than on another focused activity (as will be the case in predominantly employment or industrial areas);
 3. recreational views – these receptors (apart from those engaged in active sports) generally have a high sensitivity to change, as attention is focused on enjoyment of the landscape. Tourists engaged in activities whereby attention is focused on the surrounding landscape or townscape also have a high sensitivity to change;
 4. transport views - travel through an area is often the means by which the greatest numbers of people view the landscape. Because of the glimpsed nature of the view from trains or road vehicles, people travelling through an area on main roads have a low sensitivity to change. People travelling through urban areas (including pedestrians where the focus is not in recreation) also generally have a low sensitivity to change;
 5. hotels and healthcare institutions - people staying in hotels and healthcare institutions have periods of time when their attention may be focused on the landscape, whilst at other times attention is more likely to be focused on other activities. Based on the level of interaction with the surrounding landscape, these receptors have a medium sensitivity to change. None of these receptor types have been identified within the study area or, where present, they have been represented by other viewpoint categories;
 6. employment - people at work and within educational institutions are the least sensitive receptors, as their attention is likely to be focused on their work activity. These receptors have a low sensitivity to change. None of these receptor types have been identified within the study area or, where present, they have been represented by other viewpoint categories; and
 7. active sports - people engaged in active sports have a low sensitivity to change as their attention is likely to be focused on their activity. None of these receptor types have been identified within the study area or, where present, they have been represented by other viewpoint categories.

Viewpoint AP2.087.3.004: View north from PRow (Footpath LMI/17)

This view is looking north from the realigned public right of way (PRow) LMI/17. No image available due to restricted access.

Winter

Semi-mature trees in the foreground filter views of the landfill in the middle ground. These landfill works and associated access track in the foreground are the main focus of this view through the foreground vegetation. The background is formed by agricultural fields and successive belts of mature trees.

Summer

In summer the trees in the immediate foreground and those forming field in the background obscure further views to the north-east.

Environmental topic:	Sound, noise and vibration	SV
Appendix name:	Construction assessment report	003
Community forum area:	Central Chilterns	009

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1 Introduction

- 1.1.1 This appendix provides an update to Appendix SV-003-009 construction assessment report for Central Chilterns community forum area (CFAg) from the main Environmental Statement (ES) published in November 2013 as a result of design changes as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This update should be read in conjunction with Appendix SV-003-009 construction assessment report from the main ES.

2 Scope, assumptions and limitations

2.1 Introduction

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

2.2 Changes of relevance to this assessment

- 2.2.1 The following changes are relevant to this assessment: SES design changes which in combination have resulted in changes to forecast traffic flows within CFAg during construction, in comparison to those under the original scheme. These changes are described further in SES and AP2 ES Volume 2 CFAg. These changes have the potential to result in new or different likely residual significant indirect effects on construction sound, noise and vibration.

3 Effects arising during construction

3.1 Avoidance and mitigation measures

- 3.1.1 There are no changes to the avoidance and mitigation measures as presented in the main ES Volume 2 CFAg.

3.2 Quantitative identification of impacts and effects

Airborne sound: indirect effects

- 3.2.1 Construction road traffic associated with the construction phases of the scheme will generate airborne noise. The change in traffic noise level at a reference distance of 10m from the edge of the nearside carriageway resulting from the presence of construction traffic for a given road has been predicted, based upon traffic information for the scheme. The results for the roads where additional potentially significant effects could arise as a result of SES design changes are presented in Table 1.
- 3.2.2 Explanation of the information within Table 1 is provided in the Main ES Volume 5 Appendix SV-001-000, with the following additional notes:



Where the significant effect column is highlighted in dark red, then a significant effect is identified on nearby communities or individual receptors.

Change values



Yellow denotes a minor impact – a change is of 3-5 dB or 1-3dB where a high existing sound level is identified.



Orange denotes a moderate impact – a change is of 5-10 dB or 3-5dB where a high existing sound level is identified.



Red denotes a major impact – a change is of >10 dB or >5dB where a high existing sound level is identified.

Table 1 : Assessment of construction traffic noise

Road name	Area	Future baseline sound level (dB)	Future baseline sound level + construction traffic (dB)	Change (dB)	Significant effect
		Daytime L _{pAeq,16hr} 0700-23:00 free-field	Daytime L _{pAeq,16hr} 0700-23:00 free-field		
B485 Chesham Road/Frith Hill (west of King's Lane)	Great Missenden	70.9	72.3	+1.4	CSV09-Co3

3.3 Assessment of significance of effects

Residential receptors: indirect effects

- 3.3.1 As a result of the SES changes within CFA9, construction traffic is likely to cause adverse noise effects on residential receptors along B485 Chesham Road / Frith Hill (west of King's Lane) (CSV09-Co3). Approximately 11 dwellings located immediately adjacent to the road are forecast to experience an increase in outdoor noise levels of around 1dB in an area where there is a high existing sound level during the peak months.
- 3.3.2 These adverse effects represent a change in the acoustic character of the area that is likely to cause a perceived change in the quality of life, and are considered significant when assessed on a community basis taking account of the local context.

HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

Supplementary Environmental Statement and
Additional Provision 2 Environmental Statement

Volume 5 | CFA10 | Dunsmore, Wendover and Halton

Environmental topic:	Air quality	AQ
Appendix name:	Data appendix	001
Community forum area:	Dunsmore, Wendover and Halton	010

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1 Introduction

1.1 Structure of this air quality assessment appendix

1.1.1 This appendix provides an update to Appendix AQ-001-010 of the main Environmental Statement (ES) (Volume 5, Appendix AQ-001-010). This update should be read in conjunction with Appendix AQ-001-010 of the main ES.

1.1.2 This appendix is structured as follows:

- baseline air quality data (Section 2);
- dust impact evaluation and risk rating (Section 3); and
- air quality assessment - road traffic (Section 4).

1.1.3 Maps referred to throughout this air quality appendix are contained in the Volume 5 air quality map book, within this Supplementary Environmental Statement (SES) and Additional Provision 2 ES (AP2 ES).

1.2 Scope of this assessment

1.2.1 This air quality assessment considers changes to local air quality as a result of :

- corrections to Appendix AQ-001-010 from the main ES;
- changes to the design or construction assumptions which do not require changes to the Bill (i.e. SES design changes); and
- changes to the design of the scheme that are outside the existing limits of the Bill (i.e. AP2 amendments).

1.2.2 SES design changes and AP2 amendments outside of Dunsmore, Wendover and Halton community forum area (CFA10) have resulted in changes to the movement of excavated material and forecast heavy goods vehicle (HGV) traffic flows within CFA10 during construction (in comparison to those under the original scheme and reported in the main ES). These have been assessed as they are considered to have the potential to result in new or different likely significant effects on traffic and transport and therefore air quality.

1.2.3 The following change within CFA10 has altered the movement of excavated material and forecast HGV traffic flows: removal of the sustainable placement area at Hunt's Green Farm (SES-010-001).

1.2.4 The following change outside of CFA10 has altered the movement of excavated material and forecast HGV traffic flows: reduction of earthworks near Old House Farm near Lower Boddington in CFA15 (SES-015-001).

1.2.5 These design changes have subsequently resulted in amended HGV traffic flows on the following roads:

- Rocky Lane, between A413 London Road and Rocky Lane underbridge satellite construction compound– increase in forecast flows;

- A413 London Road/ Nash Lee Road, between boundary with CFAg and Rocky Lane – decrease in forecast flows;
- A413 London Road, between Rocky Lane and B4009 Nash Lee Road – increase in forecast flows; and
- B4009 Nash Lee Rd, between B4009 Nash Lee Road overbridge satellite construction compound and A413 Nash Lee Road – increase in forecast flows.

1.2.6 There is also one change to the design of the scheme that is outside the existing limits of the Bill, which has been included in this SES and AP2 ES Appendix AQ-001-010 assessment, namely AP2-010-004 Wendover Cricket Club.

Methodology, data sources and design criteria

1.2.7 The assessment scope, key assumptions and limitations for air quality are set out in Volume 1, the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001 - 000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES as amended by the SMR Addendum 2 (Volume 5: Appendix CT-001 -000/3 of the SES and AP2 ES), which was produced to specifically amend and advance the SMR for AP2. The SMR Addendum 2 focuses on updates and refinements to: the establishment of the baseline and definition of the survey; the scope of the air quality assessment; and the assessment methodology.

2 Baseline air quality data

2.1 Existing air quality

2.1.1 There are no changes to any monitored baseline air quality relevant for this revised assessment. Updated background maps supplied by the Department for Environment, Food and Rural Affairs (Defra) for both existing and future pollutant concentrations have been incorporated.

Background pollutant concentrations

2.1.2 Estimates of background air quality have been taken from Defra updated maps. Background NO₂ concentrations are within air quality standards throughout the study area, with annual mean concentrations in the range 10.8µg/m³ - 11.3µg/m³ in 2012. Background PM₁₀ concentrations are within air quality standards throughout the study area, with annual mean concentrations in the range 16.8µg/m³ - 17.5µg/m³ in 2012.

3 Dust impact evaluation and risk rating

3.1.1 This section provides details of the assessment of dust emissions during construction of the scheme. Since the submission of the main ES, new guidance¹ has been published by the Institute of Air Quality Management (IAQM). This assessment follows the approach described in the new guidance. Maps of the assessed receptors

¹ IAQM, 2014, *Guidance on the assessment of dust from demolition and construction*, London

in relation to the scheme and associated construction activities are contained within the Volume 5 Air Quality Map Book within the SES and AP2 ES.

3.2 Wendover Cricket Club

- 3.2.1 Wendover Cricket Club has proposed to provide an alternative location, adjacent to the B4009 Tring Road and south of Halton Community Combined School, which will provide 12 acres of land to accommodate two cricket pitches and all necessary ancillary buildings, practice areas and car park etc.
- 3.2.2 The elements of this AP2 which have been considered in the dust impact evaluation are earthworks and the associated vehicle movements and track out.

Dust emission magnitude

- 3.2.3 Each dust generating activity has been assigned a dust emission magnitude as shown in Table 1. Information used to determine the dust emissions magnitude for each of the activities has been taken from the AP-C222-171 scoping V3 document.

Table 1 : Dust emission magnitude for construction activities

Activity	Dust emission magnitude	Reasoning
Demolition	N/A	No demolitions are required.
Earthworks	Large	Total site area >10,000m ²
Construction	Small	Building volume <25,000m ³
Trackout	Small	<10 HDV (>3.5t) outward movements in any one day

Assessed receptors and sensitivity of the area

- 3.2.4 The sensitivity of the area to dust soiling and human health impacts has been assessed for each dust-generating activity in Table 1.
- 3.2.5 AP2-010-004 is located 20-50m away from Wendover Height Veterinary Centre, with Halton Combined School and residential properties also bordering the proposed site. No ecologically sensitive receptors were identified near AP2-010-004.
- 3.2.6 Following the IAQM methodology to assess the risk of dust impacts, the sensitivity of the area takes into account a number of factors, including; the specific sensitivities of the receptors in the area, the proximity and number of those receptors to potential emission sources, existing local PM₁₀ background concentrations and any additional site-specific factors which may affect the risk of wind-blown dust e.g. surrounding trees. Using this approach, overall sensitivity of the area is summarised in Table 2.
- 3.2.7 This assessment of the sensitivity of the area is consistent with the assessment findings within the main ES for CFA10.

Table 2 : Sensitivity of the area to dust soiling, human health and ecological impacts

Activity	Dust soiling	Human health
Earthworks	Low sensitivity	Low sensitivity
Construction	Low sensitivity	Low sensitivity
Trackout	Low sensitivity	Low sensitivity

Risk of impacts

- 3.2.8 Taking into consideration the dust emission magnitude and the sensitivity of the area, the AP2-010-004 and the site has been classified as Low Risk (Table 3). This has been determined based on the likely activities at the site, in combination with the proximity to the nearest properties. There will be no change with AP2-010-004 from the construction impacts assessed within the main ES.
- 3.2.9 It should be noted that this is the risk prior to the implementation of mitigation measures which are embedded within the project as part of the draft Code of Construction Practice (CoCP).
- 3.2.10 It is anticipated that with the implementation of the measures described in the draft CoCP, the risk of impacts will be reduced further.
- 3.2.11 This assessment of the risk of impacts is consistent with the assessment findings within the main ES for CFA10 and there is no change in significance, with impacts remaining as not significant with the implementation of the draft CoCP mitigation.

Table 3 : Summary dust risk table prior to mitigation

Activity	Dust soiling	Human health
Earthworks	Low risk	Low risk
Construction	Negligible	Negligible
Trackout	Negligible	Negligible

4 Air quality assessment - road traffic

4.1 Overall assessment approach

- 4.1.1 As a result of SES changes and AP2 changes within and outside of CFA10, together with wider updates to the traffic modelling network outlined in Section 1.2, construction traffic movements in CFA10 have changed from those in the main ES. These have been assessed as they are considered to have the potential to result in new or different likely significant effects on traffic and transport and therefore air quality.
- 4.1.2 Where the Design Manual for Roads and Bridges (DMRB) thresholds detailed in the SMR Volume 5: Appendix CT-001-000/1 are not exceeded, no additional assessment is

required as the air quality impacts will be minimal. Where these thresholds are breached, then a quantitative assessment has been carried out.

- 4.1.3 Where the road configuration is straightforward and the air quality falls within standards, the DMRB screening method has been used to predict changes in air quality. Professional judgment has been used to select the appropriate tool for each area.
- 4.1.4 In this study area the DMRB screening method was considered to be a suitable tool for the quantitative assessment.
- 4.1.5 The overall assessment approach remains the same as described in Appendix AQ-001-010 of the main ES.

4.2 Construction traffic

- 4.2.1 Construction traffic data used in this assessment are detailed in SES and AP2 ES Appendix AQ-001-010.

Receptors assessed

- 4.2.2 The additional traffic and the need for road diversions have the potential to change air quality for some receptors. During the construction phase, all road links identified for assessment will experience increases in traffic numbers. Where DMRB criteria for undertaking a local air quality assessment were met, a number of receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are presented in Table 4 and in Map AQ-01-010 (Volume 5, Air Quality map book of the main ES).
- 4.2.3 Four roads within CFA10 were identified as meeting DMRB criteria in this SES and AP2 ES Appendix AQ-001-010 and therefore receptors were selected. The four roads identified were:
 - Rocky Lane - (increase in traffic compared to main ES - not assessed previously);
 - A413 London Road (south of Small Dean Lane) - (increase in traffic compared to main ES - not assessed previously);
 - A413 Nash Lee Road - (increase in traffic compared to main ES - assessed previously); and
 - B4009 Nash Lee Rd) - (increase in traffic compared to main ES - assessed previously).
- 4.2.4 In comparison to the CFA10 assessment in the main ES, two roads which were previously assessed have reductions in construction traffic flows. They are therefore now not included in this assessment as they no longer meet the DMRB criteria, namely:
 - A4010 Aylesbury Road/Risborough Road; and
 - North Lee Lane.

- 4.2.5 Overall, two additional affected roads and receptors were identified and included within this SES and AP2 ES Appendix AQ-001-010 compared to the main ES. Two previously assessed roads and receptors were removed, however, as they no longer meet DMRB criteria, compared to the main ES (i.e. a reduction in traffic numbers).

Table 4 : Modelled receptors (construction phase)

Receptor	Description/location	Ordnance Survey (OS) coordinates	Scenarios assessed with the scheme
10-1	Barnwood (Rocky Lane)	487572, 205808	2012 base, 2017 base and construction
10-2	Road Barn Farm (A413 London Road (south of Small Dean Lane))	487506, 206307	2012 base, 2017 base and construction
10-3	10 Ellesborough Road (A413 Nash Lee Road)	486586, 207594	2012 base, 2017 base and construction
10-4	Terrick Row (B4009 Nash Lee Road)	484007, 208210	2012 base, 2017 base and construction

Background concentrations

- 4.2.6 The background concentrations used in the assessment are shown in Table 5 taken from the updated Defra maps.

Table 5 : 2017 background concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ($\mu\text{g}/\text{m}^3$)		
10-1 Barnwood	13.4	9.55	16.7
10-2 Road Barn Farm	13.5	9.62	16.3
10-3 10 Ellesborough Road	13.9	9.86	16.0
10-4 Terrick Row	13.1	9.33	16.6

DMRB model results

- 4.2.7 This section provides the summary of the modelled pollutant concentrations for the assessed receptors using the DMRB methodology, see Tables 6 and 7. The magnitude of change and impact descriptors for the two human receptors identified are derived following the Environmental Protection UK (EPUK) methodology.

Table 6 : Summary of DMRB annual mean NO₂ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previous assessment impact descriptor
	2012 baseline	2017 without scheme	2017 with scheme				
10-1 Barnwood	11.3	9.89	11.3	1.44	Small	Negligible	N/A
10-2 Road Barn Farm	15.3	13.7	14.9	1.24	Small	Negligible	N/A
10-3 10 Ellesborough Road	13.2	11.6	12.2	0.59	Small	Negligible	Negligible
10-4 Terrick Row	13.3	11.9	13.6	1.67	Small	Negligible	Negligible

Table 7 : Summary of DMRB annual mean PM₁₀ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previous assessment impact descriptor
	2012 baseline	2017 without scheme	2017 with scheme				
10-1 Barnwood	17.6	16.8	16.9	0.15	Imperceptible	Negligible	N/A
10-2 Road Barn Farm	18.2	17.3	17.4	0.13	Imperceptible	Negligible	N/A
10-3 10 Ellesborough Road	17.2	16.3	16.3	0.05	Imperceptible	Negligible	Negligible
10-4 Terrick Row	18.1	17.2	17.4	0.16	Imperceptible	Negligible	Negligible

Assessment of significance

- 4.2.8 The impact of the AP2 changes is negligible at worst for NO₂ and PM₁₀ during construction. Pollutant concentrations will remain well below air quality standards with and without the changes. There are no Air Quality Management Areas (AQMA) within the study area.
- 4.2.9 The changes in air quality at worst-case receptors during the construction phase will not cause significant effects since the adverse impact is negligible, taking into account background air quality and air quality standards. There is no change in significance from the previous assessment in the main ES.

5 References

Department for Environment, Food and Rural Affairs (Defra), (2014), Defra background maps 2011; <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011>; Accessed: March 2015.

Environmental Protection UK (EPUK), (2010), Development Control: Planning for Air Quality.

Highways Agency, (2007), The Design Manual for Roads and Bridges, (Volume 11, Section 3, Part 1 Air Quality HA207/07).

SES and AP2 ES Appendix CM-001-010

Environmental topic:	Community	CM
Appendix name:	Community assessment	001
Community forum area:	Dunsmore, Wendover and Halton	010

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1 Introduction

- 1.1.1 This appendix provides an update to the Appendix CM-001-010 community assessment from the main Environmental Statement (ES) as a result of changes to construction traffic movements arising from removal of the sustainable placement area at Hunt's Green Farm in CFA10 (SES-010-001) and the reduction of earthworks near Old House near Lower Boddington and relocation of the balancing pond in CFA15 (SES-015-001); and the additional land required for Ellesborough Road cricket ground and pavilion in CFA10 (AP2-010-004) assessed as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2ES). This update should be read in conjunction with Appendix CM-001-010 Community assessment from the main ES.
- 1.1.2 This appendix is structured as followed:
- Part 1: Supplementary Environmental Statement:
 - Community impact assessment record sheets – construction; and
 - Part 2: Additional Provision 2 Environmental Statement:
 - Community impact assessment record sheets – construction.

Part 1: Supplementary Environmental Statement

2 Community impact assessment record sheets - construction

2.1 Residential properties on Rocky Lane

Table 1 : Residential properties on Rocky Lane community impact assessment record sheet

Resource name	Residential properties on Rocky Lane
CFA	Dunsmore, Wendover and Halton (CFA10).
Resource type	Residential properties.
Resource description/profile	Residential properties on Rocky Lane, east of Dunsmore, as shown on Map CM-01-032, C6 (Volume 5, Community Map Book).
Assessment year	Construction phase (2017+)
Impact 1: loss of amenity	<p>Impact: residents of approximately ten properties on Rocky Lane are predicted to experience in-combination effects arising from significant noise and HGV effects during the construction phase, resulting in a loss of amenity.</p> <p>Noise: there will be significant indirect noise effects associated with the construction traffic using Rocky Lane.</p> <p>Traffic: there will be a significant increase in HGV movements along Rocky Lane between the A413 and the Rocky Lane underbridge satellite compound.</p> <p>Duration: effects will be experienced during the peak of the construction activities being coordinated by the Rocky Lane satellite compound, which will be in place for six years and nine months in total.</p>
Assessment of magnitude	Medium: as residents will be affected by significant residual noise and HGV effects.
Relevant receptors	Owners/occupiers of the residential properties.
Assessment of sensitivity of receptor(s) to impact	High: as these are residential receptors.
Significance rating of effect	Major adverse- significant effect on residents due to loss of amenity. This is a new significant effect; it was not reported in the main ES.
Proposed mitigation options for significant effects	No further mitigation of amenity effects.
Residual effect significance rating	Major adverse- significant effect on residents due to loss of amenity. This is a new residual significant effect; it was not reported in the main ES.

2.2 Residential properties on Nash Lee Road

Table 2 : Residential properties on Nash Lee Road community impact assessment record sheet

Resource name	Residential properties on Nash Lee Road
CFA	Dunsmore, Wendover and Halton (CFA10).
Resource type	Residential properties.
Resource description/profile	Residential properties on the B4009 Nash Lee Road Rocky Lane, as shown on Map CM-01-032, C6 (Volume 5, Community Map Book).
Assessment year	Construction phase (2017+)
Impact 1: loss of amenity	<p>Impact: residents of approximately six properties on Nash Lee Road are predicted to experience in-combination effects arising from significant noise and visual effects during the construction phase, resulting in a loss of amenity.</p> <p>Noise: significant noise effects associated with the construction traffic using the B4009.</p> <p>Visual: significant visual effects associated with the realignment of Nash Lee Road (this significant effect was reported in the main ES).</p> <p>Duration: effects will be experienced during the peak of the construction activities.</p>
Assessment of magnitude	Medium: as residents will be affected by significant residual noise and visual effects.
Relevant receptors	Owners/occupiers of the residential properties.
Assessment of sensitivity of receptor(s) to impact	High: as these are residential receptors.
Significance rating of effect	<p>Major adverse- significant effect on residents due to loss of amenity.</p> <p>This is a new significant effect; it was not reported in the main ES.</p>
Proposed mitigation options for significant effects	No further mitigation of amenity effects.
Residual effect significance rating	<p>Major adverse- significant effect on residents due to loss of amenity.</p> <p>This is a new residual significant effect; it was not reported in the main ES.</p>

Part 2: Additional Provision 2 Environmental Statement

3 Community impact assessment record sheets - construction

3.1 Ellesborough Road cricket ground and pavilion

Table 3 : Ellesborough Road cricket ground community impact assessment record sheet

Resource name	Ellesborough Road Cricket Ground and pavilion
CFA	Dunsmore, Wendover and Halton (CFA10).
Resource type	Community facility.
Resource description/profile	Ellesborough Road Cricket Ground and pavilion, as shown on Map CM-01-032, B6 (Volume 5, Community Map Book), covers 2ha and is located west of Wendover, from which it is separated by the A413 Nash Lee Road and the existing Marylebone to Aylesbury Line. The cricket ground is owned by Wendover Cricket Club and has been established for more than 50 years. It is used as the main site for the senior team of Wendover Cricket Club ¹ . Its dimensions fulfil the requirements of the English Cricket Board for use for adult matches. Maintenance equipment, located at the ground, is also used for the cricket ground and pavilion at the Witchell.
Assessment year	Construction phase (2017+).
Impact 1: temporary loss of community facility	<p>Impact: construction of the Wendover green tunnel will require the permanent loss of the Ellesborough Road Cricket Ground and pavilion owned by Wendover Cricket Club. The AP2 revised scheme provides for the purchase of an alternative site to accommodate a new facility for Wendover cricket club. The new site is 4.9ha and will accommodate two cricket pitches, ancillary buildings (including a pavilion) and a car park. It is located adjacent to the B4009 Tring Road, north-east of Wendover on the southern outskirts of Halton. It is approximately 1.9km by road from the existing Ellesborough Road cricket ground and 1.4km from the centre of Wendover (the intersection of Aylesbury Road and the High Street). The new cricket ground at Halton may not be operational before the Ellesborough Road cricket ground is demolished.</p> <p>Duration of impact: temporary .</p>
Assessment of magnitude	High: due to the temporary loss of the facility during the construction phase.
Relevant receptors	Members of Wendover Cricket Club, pupils of Wendover Middle School and other users and spectators.
Assessment of sensitivity of receptor(s) to impact	<p>High: as it is a frequently used and valued resource.</p> <p>The Wendover Cricket Club has approximately 400 members. The club has junior members as well as senior members.</p> <p>The Ellesborough Road site is used frequently, hosting adult league matches and junior matches totalling approximately 55 per year. Practice sessions are also held at the club from April through to August and for the last three years there has been an after-school club run during the summer term for Wendover Middle School.</p> <p>There are no local comparable alternatives that could be used temporarily. There is another cricket pitch in Wendover (Witchell Cricket Ground), also owned by Wendover Cricket Club, approximately 800m south on Witchell, which is used for recreational cricket, (some junior</p>

¹ Wendover Cricket Club; <http://wendovercc.play-cricket.com/home/home.asp>; Accessed: 12 September 2013.

Resource name	Ellesborough Road Cricket Ground and pavilion
	games and non-club games, including the Village Cup). The Witchell Cricket Ground and pavilion is not a comparable alternative, however, because it is not suitable for regular senior cricket as it is too small, has no cricket square and only an artificial pitch to play on. In addition, there are various hazards nearby, including a children's play area and public footpaths that cross the ground.
Significance rating of effect	Major adverse- significant effect due to land required for the construction of the scheme and the temporary loss of the community facility. The level of significance of this effect has not changed from that reported in the main ES, but the effect is now temporary rather than permanent as was reported in the main ES.
Proposed mitigation options for significant effects	No further mitigation proposed.
Residual effect significance rating	Major adverse- significant effect due to land required for the construction of the scheme and the temporary loss of the community facility. The level of significance of this residual effect has not changed from that reported in the main ES, but the effect is no temporary rather than permanent as was reported in the main ES..

Environmental topic:	Cultural heritage	CH
Appendix name:	Gazetteer of heritage assets	002
Community forum area:	Dunsmore, Wendover and Halton	CFA10

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1 Introduction

- 1.1.1 This appendix provides an update to Appendix CH-002-010 cultural heritage gazetteer of heritage assets to the main Environmental Statement (ES) as a result of design changes AP-010-004 assessed as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This update should be read in conjunction with Appendix CH-002-010 cultural heritage gazetteer of heritage assets from the main ES.

2 Gazetteer

Table 1 : Gazetteer of heritage assets for CFA10

Unique ID	Map reference	Asset type	Name	Description	Period	Designation	Grade	Significance/value	NHL reference	HER reference
DWH173		Ancient woodland	Rowborough Copse	<p>Ancient and semi ancient woodland. A surviving remnant of more extensive forest as part of the mosaic of other stands of surviving ancient woodland in the surrounding landscape. Its value lies in its potential for well-preserved archaeological remains of woodland management and industries typical of woodland such as wood banks, saw pits, quarries and small settlements. They can also preserve features of earlier periods.</p> <p>Setting is not a factor contributing to the asset's value because ancient woodland is nearly always a surviving fragment of a much larger, since lost landscape; hence the non-woodland surrounds are rarely</p>	Medieval - post medieval	Ancient Woodland	N/A	High	N/A	N/A

SES and AP2 ES Appendix CH-002-010

Unique ID	Map reference	Asset type	Name	Description	Period	Designation	Grade	Significance/value	NHL reference	HER reference
				contemporary						
DWH174		Ancient woodland	Top Moors	<p>Ancient and semi ancient woodland. A surviving remnant of more extensive forest as part of the mosaic of other stands of surviving ancient woodland in the surrounding landscape. Its value lies in its potential for well-preserved archaeological remains of woodland management and industries typical of woodland such as wood banks, saw pits, quarries and small settlements. They can also preserve features of earlier periods.</p> <p>Setting is not a factor contributing to the asset's value because ancient woodland is nearly always a surviving fragment of a much larger, since lost landscape; hence the non-woodland surrounds are rarely contemporary</p>	Medieval - post medieval	Ancient Woodland	N/A	High	N/A	N/A

SES and AP2 ES Appendix CH-002-010

Unique ID	Map reference	Asset type	Name	Description	Period	Designation	Grade	Significance/value	NHL reference	HER reference
DWH175		Ancient woodland	Hale Wood	<p>Extensive area of ancient replanted woodland. A surviving remnant of more extensive forest as part of the mosaic of other stands of surviving ancient woodland in the surrounding landscape. Its value lies in its potential for well-preserved archaeological remains of woodland management and industries typical of woodland such as wood banks, saw pits, quarries and small settlements. They can also preserve features of earlier periods.</p> <p>Setting is not a factor contributing to the asset's value because ancient woodland is nearly always a surviving fragment of a much larger, since lost landscape; hence the non-woodland surrounds are rarely contemporary</p>	Post medieval	Ancient woodland	N/A	High	N/A	N/A

SES and AP2 ES Appendix CH-002-010

Unique ID	Map reference	Asset type	Name	Description	Period	Designation	Grade	Significance/value	NHL reference	HER reference
DWH176		Built heritage	Halton House and Park	<p>This is a large house, park and landscape established by the Rothschild family in the late 19th century. The park is centred on a large country house designed by W R Rogers of Cubbits in 1881-3. It has been built in the French renaissance style. The extended house has undergone much alteration following its conversion to a Royal Air Force (RAF) officers mess in 1919.</p> <p>The house sits in the formal garden, which is now largely laid to lawn. The major garden features lie to the west (the pond and fountain) and north (the italian garden).</p> <p>The park surrounds the garden to the west and south. It is bisected by the Wendover arm of the Grand Union Canal. The area west of the canal is now layed to pasture and disconnected from the</p>	Post medieval	Listed Building	Grade II*	High	1332843	Mbc12143
		Historic landscape				Registered Park and Garden	Grade II	Insert significance of the RPG	1000601	

SES and AP2 ES Appendix CH-002-010

Unique ID	Map reference	Asset type	Name	Description	Period	Designation	Grade	Significance/value	NHL reference	HER reference
				<p>house. The area to the east of the canal is now curtailed by RAF development.</p> <p>The setting of the park makes a limited contribution to its value, as the landscape park is considered to be primarily inward looking. However, there are some clear views out, including from the drive 1km east of the house with panoramic views north along the Chiltern scarp and from the Chalet to the south of the park looking west towards the house and across the Vale beyond.</p>						
DWH177		Built heritage	Halton Camp	Originally used by the Royal Flying Corp and then RAF as a technical training camp. Military flying has been associated with Halton since 1912 when the land was leased from Alfred Rothschild. The site was purchased in 1919 to establish a permanent camp for	Post Medieval	Listed Building	Seven Grade II listed buildings	Moderate	1393050, 1393051, 1393052, 1393053, 1393054, 1393055, 1393056	Mbc24938

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Unique ID	Map reference	Asset type	Name	Description	Period	Designation	Grade	Significance/value	NHL reference	HER reference
				<p>the RAF.</p> <p>The associated group of barrack blocks, messes and education block, off Polish Avenue date from 1920's. They are built in the domestic revival style favoured by the War Office from 1870 until the expansion period of the 1930's.</p> <p>The woodland setting contributes to the value of the asset.</p>						
DWH178		Findspot, artefact scatter	Land West of Hatton Camp	Fieldwalking and a metal detection rally were undertaken between the Upper Iknield Way and the Grand Union Canal. A significant scatter of archaeological artefacts was found across the area dating from the Neolithic period through to the 19th century. The eastern corner of the field (which includes the proposed cricket pitch area) has been identified as an 'Archaeological	Prehistoric, Roman, early medieval, medieval, post medieval	Archaeological notification area	N/A	Moderate	N/A	<p>MBC31671,</p> <p>MBC31684,</p> <p>MBC31683,</p> <p>MBC31680,</p> <p>MBC30377,</p> <p>MBC30372,</p> <p>MBC31676,</p> <p>MBC29408,</p> <p>MBC29409,</p> <p>MBC31675,</p> <p>MBC28694,</p> <p>MBC29440,</p> <p>MBC29441,</p> <p>MBC29434,</p> <p>MBC29436,</p> <p>MBC30376,</p> <p>MBC30378,</p> <p>MBC29432,</p> <p>MBC29445,</p>

SES and AP2 ES Appendix CH-002-010

Unique ID	Map reference	Asset type	Name	Description	Period	Designation	Grade	Significance/value	NHL reference	HER reference
				Notification Area' due to the significant presence of Roman findspots (including pottery and mettlework) in this area.						MBC29446, MBC28688, MBC31673, MBC29439, MBC29443, MBC31685, MBC29444, MBC29426, MBC29410, MBC29421, MBC29433, MBC29419, MBC29425, MBC31679, MBC29420, MBC31672, MBC31677, MBC31678, MBC29418, MBC30371, MBC31674, MBC29415, MBC29416, MBC30373, MBC29438, MBC29414, MBC29423, MBC29413. MBC29411. MBC30374. MBC31681, MBC31682, 222800002, MBC29437, MBC28697, MBC29424, 222800000,

SES and AP2 ES Appendix CH-002-010

Unique ID	Map reference	Asset type	Name	Description	Period	Designation	Grade	Significance/value	NHL reference	HER reference
										MBC29417, 222803000, 222801000, 222802000, 222800000, 222800000, MBC29435, MBC29442, MBC29430, 222900000, MBC29422, 222800001, MBC29427, MBC29431, 582400000, 223400000
DWH179		Earthwork	Rowborough Copse, World War I Trenches	World War I practice trenches visible as earthworks and partly excavated and reconstructed.	Modern	N/A	N/A	Low	N/A	951008000
DWH180		Findspot	South of Rowborough Copse.	Iron Age metal work found on ground surface	Iron age	N/A	N/A	Low	N/A	207100000
DWH181		Documentary evidence	Halton Camp Railway	Twentieth century railway from Wendover to Halton Camp, disused.	Modern	N/A	N/A	Low	N/A	951006000
DWH182		Built heritage	Wendover Arm, Grand Union Canal	The Wendover section of the Grand Union Canal, constructed	Post medieval	N/A	N/A	Low	N/A	N/A

SES and AP2 ES Appendix CH-002-010

Unique ID	Map reference	Asset type	Name	Description	Period	Designation	Grade	Significance/value	NHL reference	HER reference
				1799.						
DWH183		Documentary evidence	Icknield Way	Early Neolithic to medieval period trackway.	Prehistoric, Roman, medieval	N/A	N/A	Low	N/A	994900000
DWH184		Findspot	Beechwood Lane, Wendover	Findspot for Late Iron Age pottery	Iron Age	N/A	N/A	Low	N/A	MCB30948
DWH185		Documentary evidence	Princess Mary's RAF Hospital, Halton Camp	Site of RAF hospital opened 1919. Demolished 1995 to 2008.	Modern	N/A	N/A	Low	N/A	0666600000

Environmental topic:	Cultural heritage	CH
Appendix name:	Impact assessment table	003
Community forum area:	Dunsmore, Wendover and Halton	CFA10

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1 Introduction

- 1.1.1 This appendix provides an update to Appendix CH-003-010 cultural heritage impact assessment to the main Environmental Statement (ES) as a result of design changes AP-010-004, assessed as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This update should be read in conjunction with Appendix CH-003-010 cultural heritage impact assessment from the main ES.

2 Impact assessment

Table 1 : Impact assessment for CFA10

Unique identification	Name	Designation (s)	Value	Construction impact			Operation impact			New or different environmental effect from that reported in the main ES or the Additional Provision (AP1) ES
				Nature of impact including mitigation	Scale of impact	Effect	Nature of impact including mitigation	Scale of impact	Effect	
DWH173	Rowborough Copse	Ancient Woodland	High	The asset is not within the land required, temporarily or permanently, for the construction of the scheme. The development does not, therefore, affect the value of the asset. Its setting is not a contributing factor to the value as ancient woodland is nearly always a surviving fragment of a much larger landscape that has since been lost.	No Change	Neutral	No impact on value	No change	Neutral	No effect
DWH174	Top Moors	Ancient Woodland	High	The asset is not within the land required for the construction of the scheme. The development does not, therefore, affect the value of the asset. Its setting is not a contributing factor to the value as ancient woodland is nearly always a surviving fragment of a much larger, since lost landscape.	No change	Neutral	No impact on value	No change	Neutral	No effect
DWH175	Hale Wood	Ancient Woodland	High	The asset is not within the land required for the construction of the scheme. The development does not, therefore, affect the value of the asset. Its setting is not a contributing	No change	Neutral	No impact on value	No change	Neutral	No effect

SES and AP2 ES Appendix CH-003-010

Unique identification	Name	Designation (s)	Value	Construction impact			Operation impact			New or different environmental effect from that reported in the main ES or the Additional Provision (AP1) ES
				Nature of impact including mitigation	Scale of impact	Effect	Nature of impact including mitigation	Scale of impact	Effect	
				factor to the value as ancient woodland is nearly always a surviving fragment of a much larger, since lost landscape.						
DWH176	Halton House and Park	Listed Building Registered Park and Garden	Moderate	<p>There will be no physical impact upon any element of the parkland. The registered park lies entirely outside of the land required for the construction of the scheme. The key elements of the parkland, including the Grade II* listed Halton House, formal gardens and garden features, will not have their value impacted by the scheme.</p> <p>The design and layout of the park is generally inward-looking, with the setting making a limited contribution to its value.</p> <p>The key views from the parkland looking north from the house across the Vale and from the Chalet looking west towards the house and across the Vale will not have their value impacted as the proposed cricket ground lies to the south of the asset.</p>	No change	Neutral	No impact on value	No change	Neutral	No effect
DWH177	Halton Camp	Listed Buildings	Moderate	There will be no physical impact upon any element of the Camp as it lies entirely outside of the land required	No change	Neutral	No impact on value	No change	Neutral	No effect

SES and AP2 ES Appendix CH-003-010

Unique identification	Name	Designation (s)	Value	Construction impact			Operation impact			New or different environmental effect from that reported in the main ES or the Additional Provision (AP1) ES
				Nature of impact including mitigation	Scale of impact	Effect	Nature of impact including mitigation	Scale of impact	Effect	
				for the construction of the scheme. The woodland setting will not be impacted by the scheme as it is outside the land required for the scheme.						
DWH178	Land West of Hatton Camp	Archaeological notification area	Moderate	The assets is partly located in the land. Required for construction of the scheme. The construction of the scheme will involve the removal and/or truncation of the asset.	High	Major adverse	No impact on value	No change	Neutral	This is a new effect from that reported in the main ES and AP1 ES.
DWH179	Rowborough Copse, World War I Trenches		Low	The asset is located outside of the area required for the construction of the scheme.	No change	Neutral	No impact on value	No change	Neutral	No effect
DWH180	South of Rowborough Copse.		Low	The asset is located outside of the area required for the construction of the scheme.	No change	Neutral	No impact on value	No change	Neutral	No effect
DWH181	Halton Camp Railway		Low	The asset is located outside of the area required for the construction of the scheme.	No change	Neutral	No impact on value	No change	Neutral	No effect
DWH182	Wendover Arm, Grand Union Canal		Low	The asset is located outside of the area required for the construction of the scheme.	No change	Neutral	No impact on value	No change	Neutral	No effect

SES and AP2 ES Appendix CH-003-010

Unique identification	Name	Designation (s)	Value	Construction impact			Operation impact			New or different environmental effect from that reported in the main ES or the Additional Provision (AP1) ES
				Nature of impact including mitigation	Scale of impact	Effect	Nature of impact including mitigation	Scale of impact	Effect	
DWH183	Icknield Way		Low	The asset is located outside of the area required for the construction of the scheme.	No change	Neutral	No impact on value	No change	Neutral	This is a new effect from that reported in the main ES and AP1 ES.
DWH184	Beechwood Lane, Wendover		Low	The asset is located outside of the area required for the construction of the scheme.	No change	Neutral	No impact on value	No change	Neutral	This is a new effect from that reported in the main ES and AP1 ES.
DWH185	Princess Mary's Royal Air Force (RAF) Hospital, Halton Camp		Low	The asset is located outside of the area required for the construction of the scheme.	No change	Neutral	No impact on value	No change	Neutral	This is a new effect from that reported in the main ES and AP1 ES.

Environmental topic:	Landscape and visual assessment	LV
Appendix name:	Landscape report	001
Community forum area:	Dunsmore, Wendover and Halton	010

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1 Introduction

- 1.1.1 This appendix provides an update to Appendix LV-001-010 landscape report from the main Environmental Statement (ES) Volume 5, Dunsmore, Wendover and Halton community forum area (CFA10) as a result of design changes: additional land required for Ellesborough Road cricket ground and pavilion for Wendover Cricket Club (AP2-010-004), as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This appendix details the baseline for all significantly effected landscape character areas (LCA) and represented viewpoints that are new or different to those reported in the main ES. It should be read in conjunction with Appendix LV-001-010 landscape report from the main ES, which provides baseline descriptions for all LCAs and representative viewpoints.
- 1.1.2 AP2 Map series LV-01, as referred to throughout this landscape and visual assessment appendix, is contained in the SES and AP2 ES Appendix Volume 5, landscape and visual map book and should be read in conjunction with the original Volume 2 landscape and visual assessment map book.

2 Environmental baseline report

- 2.1.1 This section describes new visual assessment viewpoints located within the study area for this CFA, which have been identified to inform the SES and AP2 ES and are ordered from south to north along the route of the scheme.
- 2.1.2 A summary of the landscape and visual baseline is provided in CFA10 of the SES and AP2 ES.

3 Visual baseline

- 3.1.1 For some visual receptors, no appropriate location from which to capture a representative photograph of the view was available, therefore no photograph has been included and the assessment has been undertaken based on professional judgement.
- 3.1.2 New receptors identified in this assessment are shown on map LV-03-37-R1 (Volume 5 of this SES and AP2 ES). In each case, the middle number (xxx.x.xxx) identifies the type of receptor as follows:
1. protected views - these relate to those viewpoints, panoramas and viewing corridors that have been designated by local planning authorities, county councils or other relevant stakeholders. Protected views have a high sensitivity to change. None of these receptor types have been identified within the study area;
 2. residential views – these have a high sensitivity to change, as attention is often focused on the landscape surrounding the property, rather than on another focused activity (as will be the case in predominantly employment or industrial areas);
 3. recreational views – these receptors (apart from those engaged in active sports) generally have a high sensitivity to change, as attention is focused on enjoyment of the landscape. Tourists engaged in activities whereby attention is focused on the surrounding landscape or townscape also have a high sensitivity to change;
 4. transport views - travel through an area is often the means by which the greatest numbers of people view the landscape. Because of the glimpsed nature of the view from trains or road vehicles, people travelling through an area on main roads have a low sensitivity to change. People travelling through urban areas (including pedestrians where the focus is not in recreation) also generally have a low sensitivity to change;
 5. hotels and healthcare institutions - people staying in hotels and healthcare institutions have periods of time when their attention may be focused on the landscape, whilst at other times attention is more likely to be focused on other activities. Based on the level of interaction with the surrounding landscape, these receptors have a medium sensitivity to change.
 6. employment - people at work and within educational institutions are the least sensitive receptors, as their attention is likely to be focused on their work activity. These receptors have a low sensitivity to change. None of these receptor types have been identified within the study area or, where present, they have been represented by other viewpoint categories; and
 7. active sports - people engaged in active sports have a low sensitivity to change as their attention is likely to be focused on their activity. None of these receptor types have been identified within the study area or, where present, they have been represented by other viewpoint categories.

Viewpoint AP2.3.001: View east from P_{RoW} WEN/63A/2 and P_{RoW} WEN/1/1

This viewpoint is representative of views from the public right of way (P_{RoW}) WEN/63A/2 and P_{RoW} WEN/1/1 P_{RoW}.

Winter

The foreground and middle ground views, illustrated in Figure 1, looking east are of open arable fields. The Wendover Heights Veterinary Centre, neighbouring buildings and the B4009, Tring Road are visible beyond the field boundary. Wendover Woods are visible in the background.

Summer

In summer the trees will be in leaf, screening the B4009, Tring Road, but the foreground views will be unchanged.

Figure 1: Viewpoint AP2. 037-R1.3.001 – winter view Date taken: 19 February 2015. Nikon D3200 35mm lens (stitched panorama)



Viewpoint AP2.5.004: View south-west from Leonard Pulham Nursing Home

It was not possible to capture a view from this viewpoint due to the lack of site access.

Winter

In the foreground, the view is largely screened by dense planting between the mainly one-storey nursing home and the neighbouring field, although there may be glimpsed views through gaps in the vegetation.

Summer

In summer, views from the nursing home looking south-west are largely screened by the trees in full leaf.

Viewpoint AP2.2.005: View north-west from Portal Road

This viewpoint is representative of views at ground level from residential properties on Portal Road.

Winter

In the foreground, the planting along the Tring Road filters views of the road in the middle ground. In the background of the view, an arable field and woodland beyond are just visible through the trees.

Summer

In summer, the trees in leaf will largely screen the road and wholly screen the arable field and woodland beyond.

Figure 2: Viewpoint AP2.037-R1.2.005 – winter view Date taken: 25 March 2015. Nikon D3200 35mm lens (stitched panorama)



Viewpoint AP2.4.006: View north from the B4009 Tring Road

This viewpoint is representative of views from pedestrians and vehicles on the B4009 looking north.

Winter

The B4009 Tring Road is in the foreground of the view. The arable field beyond is largely screened by vegetation bordering Tring Road. However, there are glimpsed views through breaks in the roadside vegetation. The glimpsed views allow views across the open fields in the middle ground and the vegetation bordering the fields in the background of the view.

Summer

The view from the road of the open fields in the middle ground and the vegetation bordering the fields in the background of the view will be further screened by the trees bordering the road in full leaf.

Figure 3: Viewpoint AP2.037-R1.4.006 – winter view Date taken: 25 March 2015. Nikon D3200 35mm lens (stitched panorama)



Viewpoint AP2.2.007: View north-east from The Beeches and Wendover Church of England Junior School

This viewpoint is representative of views from the Beeches and Wendover Church of England Junior School.

Winter

In the foreground and middle ground, the view is open across the neighbouring field. There are glimpsed views in the middle and background of the view of vegetation along the field boundary (including Rowborough Copse) and of Wendover Heights Veterinary Centre and neighbouring development.

Summer

Vegetation in leaf will filter most views from this location. This view from the Wendover C of E Junior School is largely screened in the foreground by existing planting on the school boundary. There may be glimpsed views in the middle and background of vegetation along the field boundary including Rowborough Copse and Wendover Heights Veterinary Centre and neighbouring development.

Figure 4 : Viewpoint AP2.037-R1.5.008 – winter view Date taken: 25 March 2015. Nikon D3200 35mm lens (stitched panorama)



Environmental topic:	Sound, noise and vibration	SV
Appendix name:	Construction assessment report	003
Community forum area:	Dunsmore, Wendover and Halton	010

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1 Introduction

- 1.1.1 This appendix provides an update to Appendix SV-003-010 construction assessment report for Dunsmore, Wendover and Halton community forum area (CFA10) from the main Environmental Statement (ES) as a result of design changes as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This update should be read in conjunction with Appendix SV-003-010 construction assessment report from the main ES.

2 Scope, assumptions and limitations

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

2.2 Changes of relevance to this assessment

- 2.2.1 SES design changes in combination have resulted in a change in traffic flow on some roads within this CFA.
- 2.2.2 The movement of a haul route during construction amendment (AP2-010-001) has the potential to lead to changes in significant noise effects in this area. An assessment of these changes has been carried out and has not lead to any substantial changes to the information reported in the main ES.
- 2.2.3 The additional land required for Ellesborough Road cricket ground and pavilion for Wendover Cricket Club amendment (AP-010-004) has the potential to lead to changes in significant noise effects in this area. The assessment of the potential construction sound noise and vibration has been undertaken on a precautionary worst case basis assuming the new club house and car park being located on the northern site boundary. Allowing for the incorporated mitigation set out in the draft Code of Construction Practice (CoCP) including 2.4m site hoarding no significant effects from construction Sound noise and vibration are predicted at the veterinarian practice, commercial and residential receptors located to the north of the site.

3 Effects arising during construction

3.1 Quantitative identification of impacts and effects

Airborne sound: indirect effects

- 3.1.1 Construction road traffic associated with the construction phases of the scheme will generate airborne noise. The change in traffic noise level at a reference distance of 10m from the edge of the nearside carriageway resulting from the presence of construction traffic for a given road has been predicted, based upon traffic information for the scheme. The results for the roads where additional potentially significant effects could arise as a result of SES design changes and AP2 amendments in combination are presented in Table 1.

3.1.2 Explanation of the information within Table 1 is provided in the Main ES Volume 5: Appendix SV-001-000, with the following additional notes:

	Where the significant effect column is highlighted in dark red, then a significant effect is identified on nearby communities or individual receptors.
Change values	
	Yellow denotes a minor impact – a change is of 3-5 dB or 1-3dB where a high existing sound level is identified.
	Orange denotes a moderate impact – a change is of 5-10 dB or 3-5dB where a high existing sound level is identified.
	Red denotes a major impact – a change is of >10 dB or >5dB where a high existing sound level is identified.

Table 1 : Assessment of construction traffic noise levels

Road name	Area	Future baseline sound level (dB)	Future baseline sound level + construction traffic (dB)	Change (dB)	Significant effect
		Daytime L _{pAeq,16hr} 0700-23:00 free-field	Daytime L _{pAeq,16hr} 0700-23:00 free-field		
Rocky Lane	Kingsash	58.6	65.4	+6.8	CSV10-Co3
B4009 Nash Lee Road	Wendover	69.4	70.9	+1.5	CSV10-Co4
A4010 Aylesbury Road / Risborough Road	Little Kimble	71.1	72.8	+1.7	CSV10-Co5

3.2 Assessment of significance of effects

Residential receptors: indirect effects

3.2.1 As a result of the SES changes within CFA10, construction traffic is likely to cause adverse noise effects on residential receptors along the following local roads:

- Rocky Lane (CSV10-Co3) – approximately 10 dwellings located immediately adjacent to the road are forecast to experience an increase in outdoor noise levels of around 7dB during the peak months;
- B4009 Nash Lee Road (CSV10-Co4) – approximately 17 dwellings located immediately adjacent to the road are forecast to experience an increase in outdoor noise levels of around 2 dB in an area where there is a high existing sound level during the peak months; and
- A4010 Aylesbury Road / Risborough Road (CSV10-Co5) – approximately 30 dwellings located immediately adjacent to the road are forecast to experience an increase in outdoor noise levels of around 2dB in an area where there is a high existing sound level during the peak months.

- 3.2.2 These adverse effects represent a change in the acoustic character of the area that is likely to cause a perceived change in the quality of life, and are considered significant when assessed on a community basis taking account of the local context.

HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

Supplementary Environmental Statement and
Additional Provision 2 Environmental Statement

Volume 5 | CFA11 | Stoke Mandeville and Aylesbury

SES and AP2 Appendix AQ-001-011

Environmental topic:	Air quality	AQ
Appendix name:	Data appendix	001
Community forum area:	Stoke Mandeville and Aylesbury	011

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1 Introduction

1.1 Structure of this air quality assessment appendix

- 1.1.1 This appendix provides an update to Appendix AQ-001-011 from the main Environmental Statement (ES) (Volume 5, Appendix AQ-001-011). This update should be read in conjunction with Appendix AQ-001-011 from the main ES.
- 1.1.2 This appendix is structured as follows:
- baseline air quality data (Section 2);
 - dust impact evaluation and risk rating (Section 3); and
 - air quality assessment - road traffic (Section 4).
- 1.1.3 Maps referred to throughout this air quality appendix are contained in the Volume 5 air quality map book, within this Supplementary Environmental Statement (SES) and Additional Provision 2 ES (AP2 ES).

1.2 Scope of this assessment

- 1.2.1 This air quality assessment considers changes to local air quality as a result of :
- corrections to Appendix AQ-001-011 from the main ES; and
 - changes to the design or construction assumptions which do not require changes to the Bill (i.e. SES design changes).
- 1.2.2 SES design changes and AP2 amendments outside of area Stoke Mandeville and Aylesbury (CFA11) have resulted in changes to the movement of excavated material and forecast heavy goods vehicle (HGV) traffic flows within CFA11 during construction (in comparison to those under the original scheme and reported in the main ES). These have been assessed as they are considered to have the potential to result in new or different likely significant effects on traffic and transport and therefore air quality.
- 1.2.3 The following changes have altered the movement of excavated material:
- removal of the sustainable placement area at Hunt's Green Farm in the Dunsmore, Wendover and Halton community forum area (CFA10) (SES-010-001); and
 - reduction of earthworks near Old House Farm near Lower Boddington in the Greatworth to Lower Boddington community forum area (CFA15) (SES-015-001).
- 1.2.4 The main traffic and transport changes in CFA11 are amended HGV flows on:
- A41 Bicester Road, between Blackgrove Road and Aylesbury Vale Parkway station access (CFA11) - reduction in forecast flows; and
 - A418 Oxford Road, between the scheme alignment and the A41 in Aylesbury - reduction in forecast flows.

- 1.2.5 There are no changes that require assessment to the design of the scheme in CFA11 that are outside the existing limits of the Bill (i.e. AP2 amendments).

Methodology, data sources and design criteria

- 1.2.6 The assessment scope, key assumptions and limitations for air quality are set out in Volume 1, the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001 - 000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES as amended by the SMR Addendum 2 (Volume 5: Appendix CT-001-000/3 of the SES and AP2 ES), which was produced to specifically amend and advance the SMR for AP2. The SMR Addendum 2 focuses on updates and refinements to the establishment of the baseline and definition of the survey; the scope of the air quality assessment; and the assessment methodology.

2 Baseline air quality data

2.1 Existing air quality

- 2.1.1 There are no changes to any monitored baseline air quality relevant to this revised assessment. Updated background maps supplied by Department for Environment, Food and Rural Affairs (Defra) for both existing and future pollutant concentrations have been incorporated.

Background pollutant concentrations

- 2.1.2 Estimates of background air quality have been taken from Defra updated maps. Background NO₂ concentrations are within air quality standards throughout the study area, with annual mean concentrations in the range 11.5µg/m₃ - 16.4µg/m₃ in 2012, which are lower than previously issued and reported. Background PM₁₀ concentrations are within air quality standards throughout the study area, with annual mean concentrations in the range 16.9µg/m₃ - 19.2µg/m₃ in 2012.

3 Dust impact evaluation and risk rating

- 3.1.1 There are no scoped in SES design changes or AP2 amendments located within CFA11. The dust impact evaluation and risk rating for the HS2 scheme therefore remains unchanged from the submission of the main ES.

4 Air quality assessment - road traffic

4.1 Overall assessment approach

- 4.1.1 As a result of SES design changes, AP2 amendments and wider updates to the traffic modelling network outlined in Section 1.2, construction traffic movements in CFA11 have changed from those in the main ES. These have been assessed as they are considered to have the potential to result in new or different likely significant effects on traffic and transport and therefore air quality.

- 4.1.2 Where the Design Manual for Roads and Bridges (DMRB)¹ thresholds detailed in the Scoping and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1) are not exceeded, no additional assessment is required as the air quality impacts will be minimal. Where these thresholds are breached, then a quantitative assessment has been carried out.
- 4.1.3 Where the road configuration is straightforward and the baseline air quality within standards, the DMRB screening method has been used to predict changes in air quality. Professional judgment has been used to select the appropriate tool for each area.
- 4.1.4 In this study area there is an Air Quality Management Area (AQMA) in Aylesbury that requires detailed modelling assessment. Elsewhere, DMRB screening method was considered to be a suitable tool for the quantitative assessment.
- 4.1.5 The overall assessment approach remains the same as described in Appendix AQ-001-011 of the main ES.

4.2 Construction traffic

- 4.2.1 Construction traffic data used in this assessment are detailed in the SES and AP2 ES Appendix TR-001-000.

Receptors assessed

- 4.2.2 For all road links where DMRB criteria for assessing local air quality were met due to increased traffic flows, a number of receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest pollutant concentrations along the roads, including closest to junctions or to the road itself.
- 4.2.3 All receptors where DMRB screening identified a likely moderate adverse or substantial adverse impact and within and close to the Aylesbury AQMA were also modelled within ADMS-Roads. Additional receptors close to DMRB receptors were added in order to ensure that worst-case exposure locations were captured.
- 4.2.4 Receptors assessed are presented in Table 1 and in Map AQ-01-011 (Volume 5, air quality map book). The majority of receptors assessed are situated on the A418 Oxford Road and the A41 Bicester Road, due to increases in construction traffic through Aylesbury.
- 4.2.5 With regard to sensitive ecological habitats, the Chilterns Beechwoods Special Area of Conservation (SAC), which was considered within the main ES (Volume 5, Appendix AQ-001-011) as being potentially affected, has been scoped out of this SES and AP2 ES assessment. It was scoped out because the adjacent A4010 Aylesbury Road/Risborough Road, which was previously assessed, now has a reduction in HGV construction traffic compared to the main ES.

¹ Highways Agency (2007) The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07)

- 4.2.6 The HGV movements on the A4010 Aylesbury Road/Risborough Road no longer meet the DMRB screening criteria and the ecological site therefore does not require further assessment, as the impacts are considered to be not significant.
- 4.2.7 The updated Appendix predicts an increase of 153 HGV movements per day on A4010 Aylesbury Road/Risborough Road in 2021 due to construction, whilst the main ES previously assessed predicted an increase of 299 HGVs per day due to construction; a reduction of 146 HGV movements per day by the ecological site.
- 4.2.8 Due to the significant changes made to the construction traffic routing since the main ES, a number of roads around Aylesbury are now predicted to see a large reduction in the number of HGVs compared to the main ES. As a result, only one road within CFA11 was identified as meeting DMRB criteria in this SES and AP2 ES Appendix AQ-001-011. The single road identified as meeting DMRB criteria for CFA11 was: the A4010 Risborough Road (south of bypass).
- 4.2.9 By comparison to the CFA11 assessment in the main ES, two roads which were previously assessed see reductions in construction traffic flows and no longer meet the DMRB screening criteria requiring assessment, namely:
- A418 Oxford Road; and
 - A41 (east of Blackgrove Road).
- 4.2.10 Whilst large improvements in HGV flows are now predicted on A418 and A41 through Aylesbury, due to the presence of an AQMA in Aylesbury, an assessment was again undertaken of these roads as a comparison to main ES, to show the improvement in air quality. With the exception of the Chiltern Beechwoods SAC ecologically sensitive site, the assessed receptors remain unchanged.

Table 1: Modelled receptors (construction phase)

Receptor	Description/location	Ordnance Survey (OS) coordinates	Scenarios assessed with the scheme
11-1	Park Lodge - rural receptor on the A418 Oxford Road	479964, 212350	2012 base, 2017 base and construction
11-2	78 Oxford Road - urban receptor on Oxford Road	481409, 213814	2012 base, 2017 base and construction
11-3	2 Billingsfield Cottages - rural receptor on the A41	479150, 215427	2012 base, 2017 base and construction
11-4	Property on Monmouth Close - urban receptor on the A41.	480613, 214613	2012 base, 2017 base and construction
11-5	Property on Beech Grove, Aylesbury, close to A418	480684, 212951	2012 base, 2017 base and construction
11-6	Property on Beech Grove, Aylesbury, close to A418	480684, 212969	2012 base, 2017 base and construction
11-7	A418	480777, 213115	2012 base, 2017 base and

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Receptor	Description/location	Ordnance Survey (OS) coordinates	Scenarios assessed with the scheme
			construction
11-8	A418	481082, 213401	2012 base, 2017 base and construction
11-9	A418	481311, 213698	2012 base, 2017 base and construction
11-10	A418	481339, 213753	2012 base, 2017 base and construction
11-11	A418	481454, 213850	2012 base, 2017 base and construction
11-12	A418	481478, 213854	2012 base, 2017 base and construction
11-13	A41	481435, 213897	2012 base, 2017 base and construction
11-14	A418	481512, 213868	2012 base, 2017 base and construction
11-15	A41	481437, 213933	2012 base, 2017 base and construction
11-16	A41	481371, 213933	2012 base, 2017 base and construction
11-17	A41	481348, 213990	2012 base, 2017 base and construction
11-18	A41	481298, 214029	2012 base, 2017 base and construction
11-19	A41	481096, 214460	2012 base, 2017 base and construction
11-20	A41	480995, 214498	2012 base, 2017 base and construction
11-21	A41	480862, 214537	2012 base, 2017 base and construction
11-22	A41	480827, 214548	2012 base, 2017 base and construction
11-23	A41	480452, 214673	2012 base, 2017 base and construction

Receptor	Description/location	Ordnance Survey (OS) coordinates	Scenarios assessed with the scheme
11-24	A41	480422, 214676	2012 base, 2017 base and construction
11-25	A41	480379, 214691	2012 base, 2017 base and construction
11-26	A41	480118, 214760	2012 base, 2017 base and construction
11-27	A41	479901, 214860	2012 base, 2017 base and construction
11-28	A41	479937, 214829	2012 base, 2017 base and construction
11-29	A41	479868, 214918	2012 base, 2017 base and construction
11-30	A41	479786, 214943	2012 base, 2017 base and construction
11-31	A41	479763, 214968	2012 base, 2017 base and construction
11-32	A41	479728, 215001	2012 base, 2017 base and construction
11-33 Chilterns Beechwoods SAC	Scoped out of assessment		
11-34	Gaydon (A4010 Risborough Road (south of bypass))	483649, 208796	2012 base, 2017 base and construction

Background concentrations

- 4.2.11 The background concentrations used in the assessment are shown in Table 2 taken from the updated Defra maps. For the ADMS-Roads dispersion modelling the 2012 baseline was derived from the average of concentrations monitored at three roadside sites on the A418 and A41, these being unchanged from the original ES. From these the contribution from the 2012 base traffic on the A41 and A418 was subtracted to derive the 2012 baseline contribution from other sources. For 2017, the 2012 derived baseline is factored by 0.87, this being the ratio of the predicted decrease in baseline NO₂ from the Defra mapping between 2012 and 2017. This approach was used in the study to reflect more accurately the existing concentrations in the AQMA that are present at the junction of the A418 and A41. The use of baseline from urban background sites was considered, but this approach underestimated baseline conditions. The approach used was considered the most representative, given limited traffic data available.

Table 2 : Background 2017 concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations (µg/m ³)		
	NO _x	NO ₂	PM ₁₀
11-1 Park Lodge	13.7	9.90	16.0
11-2 78 Oxford Road	Not recorded	28.0	17.2
11-3 2 Billingsfield Cottages	14.7	10.6	17.2
11-4 Property on Monmouth Close	Not recorded	28.0	18.1
11-5 to 11-32 Properties on or adjoining A418 and A41	Not recorded	28.0	N/A
11-33 Chilterns Beechwoods SAC	Scoped out of assessment		
11-34 Gaydon (A4010 Risborough Road)	13.3	9.45	16.7

DMRB model results

4.2.12 This section provides the summary of the modelled pollutant concentrations for the assessed receptors using the DMRB methodology. The magnitude of change and impact descriptors are also derived following the Environmental Protection UK (EPUK) methodology².

4.2.13 No ecological sites are however considered to be affected within CFA11, compared to the main Environmental Statement (ES) (Volume 5, Appendix AQ-001-011).

Table 3 : Summary of DMRB annual mean NO₂ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previously reported main ES impact descriptor
	2012 baseline	2017 SES and AP2 scheme	2017 with SES and AP2 scheme				
11-1	19.0	16.7	16.8	0.1	Imperceptible	Negligible	Negligible
11-2	39.9	33.5	33.6	0.1	Imperceptible	Negligible	Negligible
11-3	21.4	18.3	18.4	0.1	Imperceptible	Negligible	Negligible
11-4	44.0	36.8	36.9	0.1	Imperceptible	Negligible	Moderate adverse

² Environmental Protection UK (EPUK), (2010), Development Control: Planning for Air Quality

Receptor	Concentrations ($\mu\text{g}/\text{m}^3$)			Change in concentrations ($\mu\text{g}/\text{m}^3$)	Magnitude of change	Impact descriptor	Previously reported main ES impact descriptor
	2012 baseline	2017 SES and AP2 scheme	2017 with SES and AP2 scheme				
11-34 (A4010 Risborough Road)	14.8	13.0	13.0	0.1	Imperceptible	Negligible	Negligible

Table 4 : Summary of DMRB annual mean PM10 results (construction phase)

Receptor	Concentrations ($\mu\text{g}/\text{m}^3$)			Change in concentrations ($\mu\text{g}/\text{m}^3$)	Magnitude of change	Impact descriptor	Previously reported main ES impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
11-1	18.3	17.3	17.3	0.01	Imperceptible	Negligible	Negligible
11-2	19.5	18.3	18.3	0.01	Imperceptible	Negligible	Negligible
11-3	19.6	18.4	18.4	0.01	Imperceptible	Negligible	Negligible
11-4	21.0	19.5	19.5	0.01	Imperceptible	Negligible	Negligible
11-34	18.4	17.4	17.5	0.03	Imperceptible	Negligible	Negligible

Detailed modelling results

4.2.14 This section provides the summary of the modelled pollutant concentrations for the assessed receptors using ADMS-Roads. The magnitude of change and impact descriptors for human receptors are derived following the EPUK methodology.

Table 5 : Summary of ADMS-Roads annual mean NO2 results (construction phase)

Receptor	Concentrations ($\mu\text{g}/\text{m}^3$)			Change in concentrations ($\mu\text{g}/\text{m}^3$)	Magnitude of change	Impact descriptor	Previously reported main ES impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
11-2	39.7	34.0	34.3	0.24	Imperceptible	Negligible	Slight adverse
11-4	40.4	33.6	33.9	0.28	Imperceptible	Negligible	Negligible
11-5	36.9	32.0	32.1	0.170	Imperceptible	Negligible	Negligible
11-6	36.8	31.8	32.0	0.160	Imperceptible	Negligible	Negligible
11-7	36.5	31.5	31.6	0.16	Imperceptible	Negligible	Negligible

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Receptor	Concentrations (µg/m³)			Change in concentrations (µg/m³)	Magnitude of change	Impact descriptor	Previously reported main ES impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
11-8	35.3	30.6	30.7	0.1	Imperceptible	Negligible	Negligible
11-9	36.5	31.5	31.7	0.13	Imperceptible	Negligible	Negligible
11-10	39.4	33.7	33.9	0.22	Imperceptible	Negligible	Negligible
11-11	40.0	34.3	34.5	0.25	Imperceptible	Negligible	Slight adverse
11-12	36.8	31.8	31.9	0.080	Imperceptible	Negligible	Negligible
11-13	41.2	34.6	34.9	0.28	Imperceptible	Negligible	Moderate adverse
11-14	34.6	30.0	30.1	0.0700	Imperceptible	Negligible	Negligible
11-15	40.8	34.2	34.6	0.33	Imperceptible	Negligible	Moderate adverse
11-16	37.5	31.8	31.9	0.14	Imperceptible	Negligible	Negligible
11-17	38.1	32.1	32.3	0.190	Imperceptible	Negligible	Negligible
11-18	37.0	31.3	31.5	0.15	Imperceptible	Negligible	Negligible
11-19	33.9	29.4	29.4	0.04	Imperceptible	Negligible	Negligible
11-20	37.5	31.7	31.9	0.18	Imperceptible	Negligible	Negligible
11-21	39.3	32.9	33.2	0.25	Imperceptible	Negligible	Negligible
11-22	40.1	33.7	33.9	0.28	Imperceptible	Negligible	Slight adverse
22-23	40.5	34.0	34.4	0.32	Imperceptible	Negligible	Moderate adverse
11-24	43.1	35.7	36.1	0.4	Small	Slight adverse	Moderate adverse
11-25	42.9	35.5	35.9	0.38	Imperceptible	Negligible	Moderate adverse
11-26	41.4	34.6	34.8	0.25	Imperceptible	Negligible	Moderate

Receptor	Concentrations ($\mu\text{g}/\text{m}^3$)			Change in concentrations ($\mu\text{g}/\text{m}^3$)	Magnitude of change	Impact descriptor	Previously reported main ES impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
							adverse
11-27	42.5	35.5	35.8	0.29	Imperceptible	Negligible	Moderate adverse
11-28	39.2	33.1	33.3	0.18	Imperceptible	Negligible	Negligible
11-29	41.5	34.6	34.9	0.33	Imperceptible	Negligible	Moderate adverse
11-30	37.9	32.2	32.3	0.16	Imperceptible	Negligible	Negligible
11-31	37.6	31.9	32.1	0.14	Imperceptible	Negligible	Negligible
11-32	37.7	32.1	32.2	0.15	Imperceptible	Negligible	Negligible

Assessment of significance

- 4.2.15 Due to significant changes made to the construction traffic routing since the publication of the main ES, a number of roads around Aylesbury are now predicted to see a large reduction in the number of HGVs compared to the main ES. As a result, only one road within CFA11 was identified as meeting DMRB criteria in this SES and AP2 ES Appendix AQ-001-011.
- 4.2.16 Whilst large improvements in HGV flows are now predicted on A418 and A41 through Aylesbury, due to the presence of an AQMA in Aylesbury, an assessment was again undertaken of these roads as a comparison to main ES, to show the reduction in impacts on air quality. With the exception of the Chiltern Beechwood SAC, which was scoped out because the adjacent A4010 Aylesbury Road/Risborough Road now predicts a large reduction in HGV movements compared to the main ES (and subsequently below the DMRB screening criteria), the CFA11 assessed receptors remain unchanged.
- 4.2.17 For locations outside Aylesbury, using the DMRB methodology, the overall magnitude of impacts of the change in traffic in CFA11 at the most exposed receptors was found to be negligible for both NO_2 and PM_{10} during the construction phase.
- 4.2.18 Within Aylesbury, using detailed assessment using ADMS-Roads, the overall impact of the change in traffic in CFA11 was found to be slight adverse for NO_2 at one single receptor along the A41 in Aylesbury and negligible at other locations. Pollutant concentrations are predicted to remain within air quality standards. These receptors are close to the Friarage AQMA in Aylesbury.
- 4.2.19 On this basis, there is a change in the significance of effects when compared to the original ES, as the significant effects identified in Aylesbury no longer occur.

- 4.2.20 In the main Environmental Statement (ES) (Volume 5, Appendix AQ-001-011), significant effects were also predicted for the Chilterns Beechwoods SAC. In the current assessment, these effects have been reduced to not significant.

5 References

Environmental Protection UK (EPUK), (2010), Development Control: Planning for Air Quality.

Highways Agency (2007), The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07).

Environmental topic:	Landscape and Visual	LV
Appendix name:	Landscape report	001
Community forum area:	Stoke Mandeville and Aylesbury	011

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Figure 1: Viewpoint AP2.2.001 – winter view. Date taken: 6 February 2013. Nikon D6o 35mm lens (stitched panorama)

Figure2: Viewpoint AP2.111.2.001 – summer view. Date taken: 26 September 2012. Nikon D6o 32mm lens (stitched panorama)

Figure 3: Viewpoint AP2.114.3.003 - winter view. Date taken: 25 March 2015.Canon 35oD, 50mm lens (stitched panorama)

1 Introduction

- 1.1.1 This appendix provides an update to Appendix LV-001-011 landscape report from the main Environmental Statement (ES) Volume 5, CFA 11 Stoke Mandeville and Aylesbury as a result of a design change: noise mitigation on the A4010 Stoke Mandeville Bypass (AP2-011-002) as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 (AP2 ES). This details the viewpoints that are new or different to those reported in the main ES. It should be read in conjunction with Appendix LV-001-011 landscape report from the main ES, which provides baseline descriptions for all LCAs and representative viewpoints.

Environmental baseline report

2 Introduction

- 2.1.1 This section describes new or different visual assessment viewpoints located within the study area for this CFA, which have been identified to inform the SES and AP2 ES these are ordered from south to north along the route of the scheme.
- 2.1.2 A summary of the landscape and visual baseline is provided in CFA11 of the SES and AP2 ES.

3 Visual baseline

- 3.1.1 For some visual receptors, no appropriate location from which to capture a representative photograph of the view was available, therefore no photograph has been included and the assessment has been undertaken based on professional judgement.
- 3.1.2 The viewpoint number identifies the viewpoint locations which are shown on maps LV-07-038 to LV-07-043 and LV-08-038 to LV-08-043 (Volume 5, landscape and visual assessment map book). New receptors identified in this assessment are shown on maps LV-03-039 and LV-04-039 (Volume 2 of this SES and AP2 ES). In each case, the middle number (xxx.x.xxx) identifies the type of receptor as follows:
1. protected views - these relate to those viewpoints, panoramas and viewing corridors that have been designated by local authorities, county councils or other relevant stakeholders. Protected views have a high sensitivity to change. None of these receptor types have been identified within the study area;
 2. residential views – these have a high sensitivity to change, as attention is often focused on the landscape surrounding the property, rather than on another focused activity (as will be the case in predominantly employment or industrial areas);
 3. recreational views – these receptors (apart from those engaged in active sports) generally have a high sensitivity to change, as attention is focused on enjoyment of the landscape. Tourists engaged in activities whereby attention is focused on the surrounding landscape or townscape also have a high sensitivity to change;
 4. transport views - travel through an area is often the means by which the greatest numbers of people view the landscape. Because of the glimpsed nature of the view from trains or vehicles, people travelling through an area on main roads have a low sensitivity to change. People travelling through urban areas (including pedestrians where the focus is not in recreation) also generally have a low sensitivity to change;
 5. hotels and healthcare institutions - people staying in hotels and healthcare institutions have periods of time when their attention may be focused on the landscape, whilst at other times attention is more likely to be focused on other activities. Based on the level of interaction with the surrounding landscape, these receptors have a medium sensitivity to change. None of these receptor types have been identified within the study area or, where present, they have been represented by other viewpoint categories;
 6. employment - people at work and within educational institutions are the least sensitive receptors, as their attention is likely to be focused on their work activity. These receptors have a low sensitivity to change. None of these receptor types have been identified within the study area or, where present, they have been represented by other viewpoint categories; and
 7. active sports - people engaged in active sports have a low sensitivity to change as their attention is likely to be focused on their activity. None of these receptor types have been identified within the study area or, where present, they have been represented by other viewpoint categories.

Viewpoint AP2.111.2.001: View east and south-west from dwellings on Old Risborough Road and from footpath ELL/2

This viewpoint is representative of the typical view experienced from two storey residences on Old Risborough Road looking east and south-west. In the main ES, the view looking east only was assessed. In the AP2 ES, the view looking south-west (in the direction of the amendment) is also assessed.

Figure 1: Viewpoint AP2. 111.2.001 – winter view. Date taken: 6 February 2013. Nikon D60 35mm lens (stitched panorama)



Figure2: Viewpoint AP2.111.2.001 – summer view. Date taken: 26 September 2012. Nikon D60 32mm lens (stitched panorama)



Winter

This view experienced, as illustrated in Figure , comprises a small irregular shaped pastoral field bounded by hedgerows in the foreground. The view is partly obscured at ground level by a hedgerow. In the middle ground of the view mature trees are visible running along the length of the A4010 Risborough Road approximately 100m from the viewpoint. Wendover Woods on the higher ground at Boddington Hill is visible as a wooded skyline in the background.
Views south and west from the residences and footpath ELL/2 are largely filtered by existing vegetation in the foreground. Views for the footpath are more open to the west.

Summer

In summer mature trees in the middle ground of the view (illustrated in Figure) overlap to restrict more distant views.

Night-time

At night the middle ground of the view is faintly lit by street lighting and passing vehicles on the A4010 Risborough Road.

4 Corrections to Appendix LV-001-011 within the main ES

Viewpoint AP2.114. 3.003: View north-west from Hall End and north-east from the Public Right of Way SMA/16, 17,18

This viewpoint is representative of the view from Hall End and the Public Right of Way SMA/16, 17 and 18.

Winter

This view experienced, as illustrated in 3, comprises large, open pastures with little boundary vegetation in the foreground. In the middle ground of the view mature trees are visible running along the field boundary and associated with properties including Hall End to the right of the view (surrounded by mature trees) and the houses and commercial units on B4443 Lower End Road in the background, to the left of the view. Overhead power lines cross the landscape, extending into the distance. The view is predominantly rural; the comparatively flat topography emphasis the wide skies.

Summer

There is little screening vegetation in the view and consequently the summer view is similar to the winter view.

Figure 3: Viewpoint AP2.114.3.003 - winter view. Date taken: 25 March 2015.Canon 350D, 50mm lens (stitched panorama)



SES and AP2 ES Appendix SV-004-011

Environmental topic:	Sound, noise and vibration	SV
Appendix name:	Operational assessment report	004
Community forum area:	Stoke Mandeville and Aylesbury	011

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1 Introduction

- 1.1.1 This appendix provides an update to Appendix SV-004-011 operational assessment report for Stoke Mandeville and Aylesbury community forum area (CFA11) from the main Environmental Statement (ES) as a result of ES corrections and design changes AP2-011-002, as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This update should be read in conjunction with Appendix SV-004-011 Operational assessment report from the main ES.

2 Scope, assumptions and limitations

2.1 Changes of relevance to this assessment

Main ES correction

- 2.1.1 Operational vibration assessment locations 700333 and 700334 were omitted from the assessment.

Additional Provision 2 ES

- 2.1.2 Noise mitigation on the A4010 Stoke Mandeville Bypass (AP2-011-002).

3 Effects arising during operation

3.1 Avoidance and mitigation measures

- 3.1.1 These are set out in SES and AP2 ES, Volume 2, Report 11, Section 5.2.

3.2 Quantitative identification of impacts and effects

Ground-borne sound and vibration

- 3.2.1 Assessment locations defined for the quantitative assessment of impacts are shown on main ES map series SV-02 in the CFA11 Volume 5 sound, noise and vibration map book. Assessment locations 700333 and 700334, omitted from the main ES are presented in Table 1.
- 3.2.2 Explanation of the information in Table 1 is provided in main ES Appendix SV-001-000 and SV-004-011.

Table 1 : Ground-borne sound and vibration levels, noise and vibration impacts and effects (AP2 ES CFA11)

Assessment location		Impact criteria				Significance criteria								Significant effect
		Ground-borne sound level dB L_{pASmax}	VDV $m/s^{1.75}$ Daytime (07:00 - 23:00)	VDV $m/s^{1.75}$ Night time (23:00 – 07:00)	% increase or decrease in VDV	Number of impacts represented	Type of effect	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation effect	
ID	Area represented													
320799	Oxford Road, Hartwell	-	0.16	0.08	-	1	NA	R	T	-	-	-	-	
700333	Old Risborough Road, Stoke Mandeville	-	0.30	0.15	-	2	A	R	T	-	-	Y	-	OSV11-Co1
700334	Whitethorn Close, Stoke Mandeville	-	0.20	0.10	-	4	A	R	T	-	-	Y	-	OSV11-Co1

Impact summary

- 3.2.4 The operational ground borne sound and vibration impacts identified in Table 1 are summarised in Table 2, including those include in Appendix 5, SV-004-011 Table 2.

Table 2 : Ground-borne sound and vibration impacts and effects at residential and non-residential receptors (Main ES, AP1 ES, SES and AP2 ES - CFA11)

	Number of ground-borne sound impacts			
	Low	Medium	High	Very High
Residential properties	0	0	0	0
Non-residential properties	0			0
	Number of ground-borne vibration impacts			
	Minor	Moderate	Major	Risk of building damage
Residential properties	6	0	0	0
Non-residential properties	0			0

Airborne sound: direct impacts and effects

- 3.2.5 The direct effects from the operation of the scheme as well as any new, amended or altered roads or railway lines (including AP2-011-002), which are identified as part of the scheme, are presented in Table 3 for those receptors where the operational airborne sound levels are altered as a result of amendment AP2-011-002.
- 3.2.6 The assessment information, impact criteria and significance criteria for the assessment of the incorporated mitigation case at residential and non-residential receptors are presented in Table 3. The results should be considered in conjunction with the information contained in main ES map series Sv-02 in the CFA11 Volume 5 sound, noise and vibration map book.
- 3.2.7 Explanation of the Table 3 information is provided in main ES, Volume 5: Appendix SV-001-000 and Appendix Sv-004-011.

Table 3 : Operational noise – detailed results (AP2 ES amended)

Impact criteria												Significance criteria								Significant effect
Assessment Location ID	Area represented	HS2 Only			Do minimum (Opening year)			Do something (Opening year +15)		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
341860	Westfield, Aylesbury	49	41	59/62	52	43	47	54	45	2	2	NA	24	R	T	-	-	-	-	OSV11 Co3
810002	Old Risborough Road rear façades 2	60	51	71/74	49	44	52	60	51	11	8	A	1	R	T	-	-	-	-	-
810003	Old Risborough Road rear facades 3	59	50	72/75	49	44	52	59	51	10	7	A	1	R	T	-	-	-	-	-
317279	Booker Park School, Stoke Leys Close, Aylesbury (School)	50	43	59/62	52	43	47	54	45	2	2	B	1	G4	T	-	-	-	-	OSV11 No1
317279	Lower Road, Aylesbury (British Legion Club)	50	43	59/62	52	43	47	54	45	2	2	B	1	G5	T	-	-	-	-	
810001	Bucks Goat Centre, Old Risborough Road – South façade (General Commercial)	59	50	66/69	49	44	52	59	50	10	7	A	1	R	T	-	-	-	-	

Direct impact - summary

- 3.2.9 The operational airborne noise impacts identified in Table 3 are summarised in Table 4, including those included in Appendix 5, SV-004-011 Table 4.

Table 4 : Summary of operational airborne sound impacts

Receptor	Number of Impacts		
	Minor	Moderate	Major
Residential properties	100	141	23
Non-residential properties	0	1	1
Quiet Areas	None	None	None

3.3 Assessment of significance of effects

Residential receptors: direct effects - communities

- 3.3.1 The main ES scheme identified likely significant effect at the south-western edge of Aylesbury, at approximately 25 dwellings in the vicinity of Westfield and Batt Furlong including the shared open area by Westfield identified as OSV11-Co3. At this location the likely adverse noise effect was predicted as a result of increases in sound from the new road bypass and the realigned railway.
- 3.3.2 The noise mitigation provided by the amendment reduces the operational noise levels associated with the new road bypass, to an extent that the levels at assessment location 341860, are below the lowest observed adverse effect level during the daytime and result in a negligible impact during the daytime and night-time, thus removing the significant operational noise effect identified in the main ES.

Non-residential receptors: direct effects

- 3.3.3 The main ES scheme identified likely significant effects at Booker Primary School identified as OSV11-No1. At this location the likely adverse noise effect was predicted as a result of increases in sound from the new road bypass and the realigned railway.
- 3.3.4 The noise mitigation provided by the amendment reduces the operational noise levels associated with the new road bypass, to an extent that the levels at Booker Primary School, are below the screening criteria for a school, as defined in main ES, Volume 5, SV-001-000. Therefore the significant operational noise effect at Booker Primary School is removed as a result of this amendment.

HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

Supplementary Environmental Statement and
Additional Provision 2 Environmental Statement

Volume 5 | CFA14 | Newton Purcell to Brackley

Environmental topic:	Air quality	AQ
Appendix name:	Data appendix	001
Community forum area:	Newton Purcell to Brackley	014

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1 Introduction

1.1 Structure of this air quality assessment appendix

- 1.1.1 This appendix provides an update to Appendix AQ-001-009 from the main Environmental Statement (ES) (Volume 5, Appendix AQ-001-014). This update should be read in conjunction with Appendix AQ-001-014 from the main ES.
- 1.1.2 This appendix is structured as follows:
- baseline air quality data (Section 2);
 - dust impact evaluation and risk rating (Section 3); and
 - air quality assessment, road traffic (Section 4).
- 1.1.3 Maps referred to throughout this air quality appendix are contained in the Volume 5 air quality map book in the main ES.

1.2 Scope of this assessment

- 1.2.1 This air quality assessment considers changes to local air quality as a result of :
- corrections to Appendix AQ-001-014 from the main ES;
 - changes to the design or construction assumptions which do not require changes to the Bill (i.e. SES design changes); and
 - changes to the design of the scheme that are outside the existing limits of the Bill (i.e. AP2 amendments).
- 1.2.2 SES design changes and AP2 amendments outside of the Newton Purcell to Brackley community forum area (CFA14), together with network wide traffic modelling amendments have resulted in changes to the movement of excavated material and forecast heavy goods vehicle (HGV) traffic flows within CFA14 during construction, in comparison to those under the original scheme and reported in the main ES. These have been assessed as they are considered to have the potential to result in new or different likely significant effects on traffic and transport and therefore air quality.
- 1.2.3 The changes include the:
- removal of the sustainable placement area at Hunt's Green Farm in the Dunsmore, Wendover and Halton community forum area (CFA10) SES-010-001); and
 - reduction of earthworks near Old House Farm near Lower Boddington in the Greatworth to Lower Boddington community forum area (CFA15) (SES-015-001).
- 1.2.4 The main traffic and transport changes associated with the SES design changes in CFA14 are:
- A421, between the boundary with the Calvert, Steeple Claydon, Twyford and Chetwode community forum area (CFA13) and A43 – decrease in forecast

flows;

- A₄₃, between the M₄₀ and A₄₂₂ – decrease in forecast flows;
- A₄₂₂, between the A₄₃ and the A₄₂₂ Brackley Road Overbridge Satellite Compound – decrease in forecast flows; and
- A₄₄₂₁, between the A₄₂₁ and the A₄₁ – increase in forecast flows.

- 1.2.5 There is also one change to the design of the scheme that is outside the existing limits of the Bill, which has been included in this SES and AP2 ES Appendix AQ-001-014 assessment, namely AP2-014-001 Featherbed Lane temporary closure and compound relocation.

Methodology, data sources and design criteria

- 1.2.6 The assessment scope, key assumptions and limitations for air quality are set out in Volume 1, the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001 - 000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES as amended by the SMR Addendum 2 (Volume 5: Appendix CT-001 -000/3 of the SES and AP2 ES), which was produced to specifically amend and advance the SMR for AP2. The SMR Addendum 2 focuses on updates and refinements to the establishment of the baseline and definition of the survey; the scope of the air quality assessment; and the assessment methodology.

2 Baseline air quality data

2.1 Existing air quality

- 2.1.1 There are no changes to any monitored baseline air quality relevant to this revised assessment. Updated background maps supplied by Department for Environment, Food and Rural Affairs (Defra) for both existing and future pollutant concentrations have been incorporated.

Background pollutant concentrations

- 2.1.2 Estimates of background air quality have been taken from Defra updated maps. Background NO₂ concentrations are within air quality standards throughout the study area, with annual mean concentrations in the range 10.1µg/m³ - 20.1µg/m³ in 2012. Background PM₁₀ concentrations are within air quality standards throughout the study area, with annual mean concentrations in the range 17.1µg/m³ - 21.1µg/m³ in 2012.

3 Dust impact evaluation and risk rating

- 3.1.1 This section provides details of the assessment of dust emissions during construction of the scheme. Since the submission of the main ES, new guidance¹ has been published by the Institute of Air Quality Management (IAQM). This assessment follows the approach described in the new guidance. Maps of the assessed receptors

¹ IAQM, 2014, *Guidance on the assessment of dust from demolition and construction*, London.

in relation to the scheme and associated construction activities are contained within the Volume 5 Air Quality Map Book of the main ES.

3.2 Featherbed Lane temporary closure and compound relocation

3.2.1 This AP2 seeks that an alternative diversion is put in place during construction to allow Featherbed Lane (Fulwell Lane) to remain open to traffic for the duration of the construction period at ch 090+500. In addition, the Featherbed Lane Overbridge Satellite Compound will be relocated south east with an access road onto the Featherbed Lane diversion.

3.2.2 The main elements of this AP2 which have been considered in the dust impact evaluation are the associated vehicle movements and earthworks/construction.

Dust emission magnitude

3.2.3 Each dust generating activity has been assigned a dust emission magnitude as shown in Table 1.

Table 1 : Dust emission magnitude for construction activities

Activity	Dust emission magnitude	Reasoning
Demolition	N/A	No demolitions are required for AP2-014-001
Earthworks	Small	Total site area less than 2,500m ² , less than 5 heavy earth moving activities at any one time
Construction	Medium	Less than 25,000 - 100,000 m ³ building volume with potentially dust construction material
Trackout	N/A	No trackout impacts are expected for AP2-014-001

3.2.4 This assessment of the dust emission magnitude for AP2-014-001 is consistent with the assessment findings within the main ES for CFA14.

Assessed receptors and sensitivity of the area

3.2.5 The sensitivity of the area to dust soiling, human health impacts has been assessed for each dust-generating activity in Table 2.

3.2.6 AP2-014-001 is located 50-100m away from the nearest residential and commercial property, Tibbets Farm. No ecologically sensitive receptors were identified with the potential to be affected by AP2-014-001 impacts. Ecological impacts are therefore not considered any further.

3.2.7 Following the IAQM methodology to assess the risk of dust impacts, the sensitivity of the area takes into account a number of factors, including; the specific sensitivities of the receptors in the area, the proximity and number of those receptors to potential emission sources, existing local PM₁₀ background concentrations and any additional

site-specific factors which may affect the risk of wind-blown dust e.g. surrounding trees. Using this approach, the overall sensitivity of the area is summarised in Table 2.

- 3.2.8 This assessment of the sensitivity of the area is consistent with the assessment findings within the main ES for CFA14.

Table 2 : Sensitivity of the area to dust soiling, human health and ecological impacts

Activity	Dust soiling	Human health
Earthworks	Low sensitivity	Low sensitivity
Construction	Low sensitivity	Low sensitivity

Risk of impacts

- 3.2.9 Taking into consideration the dust emission magnitude and the sensitivity of the area, the AP2-014-001 and the site have been classified as Low Risk for construction activities and Negligible Risk for Earthworks (Table 3). This has been determined based on the likely activities at the site, in combination with the proximity to the nearest residential property; Tibbets Farm. It should be noted that this is the risk prior to the implementation of mitigation measures which are embedded within the project as part of the draft Code of Construction Practice (CoCP).
- 3.2.10 It is anticipated that with the implementation of the measures described in the draft CoCP, the risk of impacts will be reduced further.
- 3.2.11 This assessment of the risk of impacts is consistent with the assessment findings within the main ES for CFA14 and there is no change in significance, with impacts remaining as Not Significant with the implementation of the CoCP mitigation.

Table 3 : Summary dust risk table prior to mitigation

Activity	Dust soiling	Human health
Earthworks	Negligible	Negligible
Construction	Low risk	Low risk

4 Air quality assessment - road traffic

4.1 Overall assessment approach

- 4.1.1 As a result of SES design changes, AP2 amendments and wider updates to the traffic modelling network outlined in Section 1.2, construction traffic movements in CFA14 have changed from those in the main ES. These have been assessed as they are considered to have the potential to result in new or different likely significant effects on traffic and transport and therefore air quality.
- 4.1.2 Where the Design Manual for Roads and Bridges (DMRB)² thresholds detailed in the Scoping and Methodology Report (SMR) (Volume 5: Appendix CT-001-000/1) are not

² Highways Agency (2007), *The Design Manual for Roads and Bridges*, (Volume 11, Section 3, Part 1 Air Quality HA207/07).

exceeded, no additional assessment is required as the air quality impacts will be minimal. Where these thresholds are breached, then a quantitative assessment has been carried out.

- 4.1.3 Where the road configuration is straightforward and the air quality within standards, the DMRB screening method has been used to predict changes in air quality. Professional judgment has been used to select the appropriate tool for each area.
- 4.1.4 In this study area the DMRB screening method was considered to be a suitable tool for the quantitative assessment.
- 4.1.5 The overall assessment approach remains the same as described in Appendix AQ-001-014 of the main ES.

4.2 Construction traffic

- 4.2.1 Construction traffic data used in this assessment are detailed in the SES and AP2 ES Appendix TR-001-000.

Receptors assessed

- 4.2.2 The additional traffic and the need for road diversions have the potential to change air quality for some receptors. During the construction phase, all road links identified for assessment will experience increases in traffic numbers. Where DMRB criteria for undertaking a local air quality assessment were met, a number of receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are presented in Table 4 and in Map AQ-01-014 (Volume 5, Air Quality Map Book of the main ES).
- 4.2.3 Four roads within CFA14 were identified as meeting DMRB criteria in this SES and AP2 ES Appendix AQ-001-014 and therefore receptors were selected. The four roads identified were:
 - A422 Brackley Road - (reduction in traffic compared to main ES - assessed previously);
 - A4421 Buckingham Road (south of Barton Hartshorn) - (increase in traffic compared to main ES - not assessed previously);
 - A43 (North of M40 J10) - (reduction in traffic compared to main ES - assessed previously); and
 - A43 (between A421 and A422) - (reduction in traffic compared to main ES - assessed previously).
- 4.2.4 By comparison to the CFA14 assessment in the main ES, one additional road which was previously assessed has reductions in construction traffic flows and is therefore now not included in this assessment as it no longer meet the DMRB criteria, namely: A421 (London Road).
- 4.2.5 Overall, one additional affected road and receptor was identified and included within this SES and AP2 ES Appendix AQ-001-014 compared to the main ES. One previously

assessed road and receptor was removed, however, as it no longer met DMRB criteria, compared to the main ES (i.e. a reduction in traffic numbers).

Table 4 : Modelled receptors (construction phase)

Receptor	Description/location	Ordnance Survey (OS) coordinates	Scenarios assessed with the scheme
14-1	Greenfinches (A422 Brackley Road)	462100, 236046	2012 base, 2017 base and construction
14-2	Station House (A4421 Buckingham Road (south of Barton Hartshorn))	462889, 231239	2012 base, 2017 base and construction
14-3	The Cottages (A43 (North of M40 J10))	454780, 228961	2012 base, 2017 base and construction
14-4	Barley Mow Farm (A43 (between A421 and A422))	457616, 233466	2012 base, 2017 base and construction

Background concentrations

4.2.6 The background concentrations used in the assessment are shown in Table 5 taken from the updated Defra maps.

Table 5 : 2017 background concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ($\mu\text{g}/\text{m}^3$)		
	NO _x	NO ₂	PM ₁₀
14-1 Greenfinches	12.0	8.95	16.8
14-2 Station House	11.4	8.53	16.2
14-3 The Cottages	21.9	15.7	19.0
14-4 Barley Mow Farm	14.0	10.3	20.2

DMRB model results

4.2.7 This section provides the summary of the modelled pollutant concentrations for the assessed receptors using the DMRB methodology (see Table 6 and Table 7). The magnitude of change and impact descriptor for the two human receptors identified is derived following the Environmental Protection UK (EPUK) methodology³.

³ Environmental Protection UK (EPUK), (2010), *Development Control: Planning for Air Quality*.

Table 6 : Summary of DMRB annual mean NO₂ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previous assessment impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
14-1 Greenfinches	12.4	11.0	14.7	3.68	Medium	Negligible	Slight adverse
14-2 Station House	14.6	12.8	14.2	1.40	Small	Negligible	Negligible
14-3 The Cottages	24.1	19.1	19.5	0.44	Small	Negligible	Negligible
14-4 Barley Mow Farm	17.9	14.5	15.0	0.54	Small	Negligible	Negligible

Table 7 : Summary of DMRB annual mean PM₁₀ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previous assessment impact descriptor
	2012 baseline	2017 without SES and AP2 scheme	2017 with SES and AP2 scheme				
14-1 Greenfinches	18.1	17.3	17.7	0.40	Small	Negligible	Negligible
14-2 Station House	18.1	17.2	17.4	0.15	Imperceptible	Negligible	Negligible
14-3 The Cottages	20.8	19.5	19.5	0.04	Imperceptible	Negligible	Negligible
14-4 Barley Mow Farm	21.8	20.8	20.8	0.05	Imperceptible	Negligible	Negligible

Assessment of significance

- 4.2.8 The impact on air quality of the changes in traffic in CFA14 is negligible at worst for NO₂ and PM₁₀ during construction. Pollutant concentrations will remain well within air quality standards with and without the changes. There are no AQMA's within the study area.
- 4.2.9 The changes in air quality at worst-case receptors during the construction phase will not cause significant effects for receptors since the adverse impact is negligible, taking into account background air quality and air quality standards. There is no change in significance from the main ES.

5 References

Department for Environment, Food and Rural Affairs (Defra) (2014) Defra background maps 2011; <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011>; Accessed: March 2015.

Environmental Protection UK (EPUK), (2010), Development Control: Planning for Air Quality.

Highways Agency (2007) The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07).

SES and AP2 ES Appendix CM-001-014

Environmental topic:	Community	CM
Appendix name:	Community assessment	001
Community forum area:	Newton Purcell to Brackley	014

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1 Introduction

- 1.1.1 This appendix provides an update to the Appendix CM-001-014 community assessment from the main Environmental Statement (ES) as a result of design changes arising from the Turweston replacement playing fields (AP2-014-004), assessed as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2ES). This update should be read in conjunction with Appendix CM-001-014 Community assessment from the main ES.
- 1.1.2 This appendix sets out AP2 community impact assessment record sheets for construction.

2 AP2 community impact assessment record sheets - construction

2.1 Turweston playing field

Table 1 sets out the record sheet for Turweston playing field community.

Table 1 : Turweston playing field community impact assessment record sheet

Resource name	Turweston Playing Field
CFA	CFA14- Newton Purcell to Brackley.
Resource type	Open space and recreational public right of way (PRoW).
Resource description/profile	Located on Oatley's Road within Turweston (shown on Map CM-01-046), the site has a children's playground, a single basketball net and associated area of hardstanding, junior football posts and an adult size football post, a cricket net and a small storage building. The playing field is owned by Fields in Trust, formerly the National Playing Fields Association, for the benefit of the community and it is open for use by the public during the following times: April-September from 08:00- 20:00 and October-March from 08:00-17:00.
Assessment year	Construction phase (2017+).
Impact 1: temporary loss of resource	<p>Impact: approximately 42% (0.84ha of a total site of 19, 900m²) of the playing field will be required temporarily for the re-routing of a power line. Following this the majority of the land will be returned to use, however 0.365ha (approximately 18%) will be retained for construction of cutting for the scheme. The rest of the field (which includes the children's playground) will remain available for use throughout construction. The basketball post and storage building are both fixed structures which will be within the land required for construction of the scheme, so they will be permanently lost. Replacement playing fields will be provided in the village of Turweston as part of the AP2 revised scheme following the construction of the scheme. However, work on provision of the new field will commence after the construction of the scheme.</p> <p>Duration of impact: utilities work will take approximately a year and a half and the construction of cutting will take a further year and a half. Work to provide the replacement playing field site will commence after construction of the scheme. Therefore, the duration of the effect will be at least three years.</p>
Assessment of magnitude	Medium: due to the resource being partly closed/compromised and unusable for a proportion of its intended purpose for at least three years. While the children's playground will remain open, formal adult sports such as football or cricket will not be able to be accommodated within the area that remains available for use.
Relevant receptors	Users of the playing field and play area.
Assessment of sensitivity of receptor (s) to impact	<p>Turweston playing fields is a valued community resource, used by a mix of age ranges including children. There are no alternative playing field facilities in the village. The nearest alternative recreational playing field sites are in Brackley on Church Road and Pebble Lane Brackley (approximately 1.5km away).</p> <p>Sensitivity: high given the lack of local alternatives in the village itself and the value placed on the resource by the local community.</p>
Significance rating of effect	Major adverse- significant. This is the same level of significance as reported in the main ES.

SES and AP2 ES Appendix CM-001-014

Resource name	Turweston Playing Field
Proposed mitigation options for significant effects	HS2 Ltd will continue discussions with landowners to seek reasonably practicable measures to further reduce or avoid these significant effects.
Residual effect significance rating	Major adverse - significant. This is the same level of significance as reported in the main ES.

Environmental topic:	Sound, noise and vibration	SV
Appendix name:	Operational assessment report	004
Community forum area:	Newton Purcell to Brackley	014

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1 Introduction

- 1.1.1 This appendix provides an update to Appendix SV-004-014 operational sound, noise and vibration assessment report for Newton Purcell to Brackley community forum area (CFA14) from the main Environmental Statement (ES) as a result of main ES corrections, as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This update should be read in conjunction with Appendix SV-004-014 operational sound, noise and vibration assessment report from the main ES.

2 Scope, assumptions and limitations

2.1 Changes of relevance to this assessment

Main ES correction

- 2.1.1 The main ES did not include an operational sound, noise and vibration assessment at three assessment locations:
- Sundale House, Northampton Road (assessment location 720301);
 - committed development Radstone Fields, Brackley (assessment location 901043); and
 - committed development Foxhill, Brackley (assessment location 901045).

3 Effects arising during operation

3.1 Avoidance and mitigation measures

- 3.1.1 These are set out in main ES, Volume 2, report CFA14.

3.2 Quantitative identification of impacts and effects

Ground-borne sound and vibration

- 3.2.1 The assessment locations are outside of the scoping distance for the assessment of operational ground-borne sound and vibration identified in main ES Appendix SV-001-000.

Airborne sound: direct impacts and effects

- 3.2.2 The direct effects from the operation of the HS2 scheme which includes any altered existing roads and railway lines are presented in Table 1 for those assessment locations identified in Section 2.1.1.
- 3.2.3 The assessment information, impact criteria and significance criteria for the assessment of the incorporated mitigation case at residential and non-residential receptors are presented in Table 1. The results should be considered in conjunction with the information contained in main ES map series SV-02 in the CFA14 Volume 5 sound, noise and vibration map book.

- 3.2.4 Explanation of the Table 3 information is provided in main ES, Volume 5: Appendix SV001-000 and Appendix Sv-004-014.

Table 1 : Operational noise – detailed results (ES correction amended)

Assessment Location ID	Impact criteria											Significance criteria								Significant effect
	Area represented	HS2 scheme only (year 15 traffic)			Do nothing (Opening year baseline)			Do something (Opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
720301	Sundale House, Northampton Road	71	63	75/78	58	54	64	71	63	13	9	S	1	R	T	-	-	-	NI	OSV14-Do2
901043	Committed development CFA14/22	58	50	57/60	57	49	64	58	50	1	1	NA	1	R	T	-	-	-	-	
901045	Committed development – CFA14/20	48	40	55/57	47	39	50	49	41	2	2	NA	1	CD	T	-	-	-	-	

Direct impact - summary

- 3.2.5 The operational airborne noise impacts identified in Table 1 are summarised in Table 2, including those included in main ES Appendix 5, SV-004-014 Table 4.

Table 2 : Summary of operational airborne sound impacts

Receptor	Number of impacts		
	Minor	Moderate	Major
Residential properties	34	26	6
Non-residential properties	0	0	1
Quiet Areas	None	None	None

3.3 Assessment of significance of effects

Residential receptors: direct effects- individual dwellings

- 3.3.1 Taking account of the avoidance and mitigation measures incorporated into the HS2 scheme, the main ES assessment identified one residential dwelling close to the HS2 scheme, Oaks Farm, Banbury Road, Finmere, represented by receptor reference 277496 (marked as OSV14-Do1 in main ES Appendix SV-004-014, Table 3) where noise would exceed the daytime trigger threshold set in the Regulations. It was therefore estimated that this building is likely to qualify for noise insulation under the Regulations. It is indicated on main ES, Volume 5: map book - sound, noise and vibration, map series SV-02.
- 3.3.2 The ES correction identifies a further property, Sundale House, Northampton Road, represented by receptor reference 720301 (marked as OSV14-Do2 in the SES and AP2 ES Appendix SV-004-014, Table 1) where noise would exceed the daytime trigger threshold set in the Regulations. It is therefore estimated that this building is also likely to qualify for noise insulation under the Regulations. It is indicated on the SES and AP2 ES, Volume 5: map book - sound, noise and vibration, map series SV-02.
- 3.3.3 The mitigation measures including noise insulation will reduce noise inside all dwellings such that it will not reach a level where it would significantly affect residents.

HIGH SPEED RAIL (LONDON - WEST MIDLANDS)

Supplementary Environmental Statement and
Additional Provision 2 Environmental Statement

Volume 5 | CFA15 | Greatworth to Lower Boddington

Environmental topic:	Air quality	AQ
Appendix name:	Data appendix	001
Community forum area:	Greatworth to Lower Boddington	015

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1 Introduction

1.1 Structure of this air quality assessment appendix

- 1.1.1 This appendix provides an update to Appendix AQ-001-015 in the main Environmental Statement (ES) (Volume 5, Appendix AQ-001-015). This update should be read in conjunction with Appendix AQ-001-015 from the main ES.
- 1.1.2 This appendix is structured as follows:
- baseline air quality data (Section 2);
 - dust impact evaluation and risk rating (Section 3); and
 - air quality assessment - road traffic (Section 4).
- 1.1.3 Maps referred to throughout this air quality appendix are contained in the Volume 5 air quality map book in the main ES.

1.2 Scope of this assessment

- 1.2.1 This air quality assessment considers changes to local air quality as a result of :
- corrections to Appendix AQ-001-015 in the main ES;
 - changes to the design or construction assumptions which do not require changes to the Bill (i.e. SES amendments); and
 - changes to the design of the scheme that are outside the existing limits of the Bill (i.e. AP2 amendments).
- 1.2.2 SES design changes and AP2 amendments outside of Greatworth to Lower Boddington community forum area (CFA15) have resulted in changes to the movement of excavated material and forecast heavy goods vehicle (HGV) traffic flows within CFA15 during construction (in comparison to those under the original scheme and reported in the main ES). These have been assessed as they are considered to have the potential to result in new or different likely significant effects on traffic and transport and therefore air quality.
- 1.2.3 The following change within CFA15 has altered the movement of excavated material and forecast HGV traffic flows: reduction of earthworks near Old House Farm near Lower Boddington in CFA15 (SES-015-001).
- 1.2.4 The following change outside of CFA15 has also altered the movement of excavated material and forecast HGV traffic flows: removal of the sustainable placement area at Hunt's Green Farm (SES-010-001).
- 1.2.5 The main roads on which the changes to the traffic and transport will occur, compared to the main ES, are:
- A361, between and the M40 and Chipping Warden green tunnel main compound – increase in traffic flows compared to the main ES;
 - B4525 Banbury Lane – decrease in traffic flows compared to the main ES;

- Banbury Lane – decrease in traffic flows compared to the main ES;
- Banbury Road, between Banbury Lane and Thorpe Mandeville cutting satellite compound – decrease in traffic flows compared to the main ES;
- Chipping Warden (road through village) - decrease in traffic in the operational phase; and
- A361 Chipping Warden relief road - this is a new road in the operational phase.

- 1.2.6 There are also two changes to the design of the scheme that are outside the existing limits of the Bill, which has been included in this assessment, namely AP2-015-005 Lower Thorpe Viaduct satellite compound access, and AP2-015-009 Chipping Warden relief road.
- 1.2.7 In addition, it is the Hs2 Ltd's intention to construct the Chipping Warden relief road in two stages. Stage 1 would be completed in advance of the main works and would extend from the A361 Banbury Road from a point just to the north of Hogg End, to a point north of Long Barrow but south of Stone House. The connection to the A361 at the northern point would be a temporary connection until such time that Stage 2 is completed.
- 1.2.8 Stage 2 would take place once the section of Green Tunnel over which the relief road would be routed has been constructed. Once this is completed the temporary connection to the A361 would be modified to become the permanent link from the village to the relief road.
- 1.2.9 In the main ES, the Chipping Warden relief road was proposed to be constructed and used only during the construction period, to avoid construction traffic passing through the village. As such, the assessment of impacts considered only the construction phase. The amended proposal is the Chipping Warden relief road to become permanent and therefore it is assessed in both the construction and operational phases.
- 1.2.10 This will not change the significance of the effects reported in this SES and AP2 ES Appendix. Stage 1 would take 12 months to complete, during which time construction traffic would pass through Chipping Warden village. However, Stage 1 will be complete prior to the introduction of HGV vehicles used for the movement of excavated material. Therefore, the flows assessed for the stage 1 scenario are lower than those of the original scheme in the main ES. There are no significant effects identified for this phase. In addition, there are also no significant effects identified for the construction phase.
- 1.2.11 Following construction of the stage 1 relief road, construction traffic and through-traffic on the A361 Byfield Road will use the relief road. This will result in a net decrease in traffic numbers through Chipping Warden village, improving air quality compared to the existing baseline. There are however no significant effects associated with this change or the use of the relief road.

Methodology, data sources and design criteria

- 1.2.12 The assessment scope, key assumptions and limitations for air quality are set out in Volume 1, the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001 -

000/1) and the SMR Addendum (Volume 5: Appendix CT-001-000/2) of the main ES as amended by the SMR Addendum 2 (Volume 5: Appendix CT-001-000/3 of the SES and AP2 ES), which was produced to specifically amend and advance the SMR for AP2. The SMR Addendum 2 focuses on updates and refinements to: the establishment of the baseline and definition of the survey; the scope of the air quality assessment; and the assessment methodology.

2 Baseline air quality data

2.1 Existing air quality

- 2.1.1 There are no changes to any monitored baseline air quality relevant for this revised assessment. Updated background maps supplied by the Department for Environment, Food and Rural Affairs (Defra) for both existing and future pollutant concentrations have been incorporated.

Background pollutant concentrations

- 2.1.2 Estimates of background air quality have been taken from Defra updated maps. Background NO₂ concentrations are within air quality standards throughout the study area, with annual mean concentrations in the range 10.2µg/m³ - 11.1µg/m³ in 2012. Background PM₁₀ concentrations are within air quality standards throughout the study area, with annual mean concentrations in the range 16.0µg/m³ - 17.8µg/m³ in 2012.

3 Dust impact evaluation and risk rating

3.1 Overview

- 3.1.1 This section provides details of the assessment of dust emissions during construction of the scheme. Since the submission of the main ES, new guidance¹ has been published by the Institute of Air Quality Management (IAQM). This assessment follows the approach described in the new guidance. Maps of the assessed receptors in relation to the scheme and associated construction activities are contained within the Volume 5 Air Quality Map Book of the main ES.

3.2 Lower Thorpe Viaduct satellite compound access

- 3.2.1 This amendment seeks to reduce congestion traffic on the Banbury Lane, through the proposed inclusion of a new temporary haul route running adjacent to the HS2 alignment from Banbury Road to the Lower Thorpe viaduct satellite compound.
- 3.2.2 The primary elements which have been considered in the dust impact evaluation are the proximity of the works in relation to existing sensitive receptors and the associated vehicle movements and emissions through track out activities.
- 3.2.3 There are reduced traffic flows on Banbury Lane which may reduce the impact on air quality from the scheme. However, the new haul road may increase dust emissions in the area.

¹ IAQM, 2014, *Guidance on the assessment of dust from demolition and construction*, London

Dust emission magnitude

- 3.2.4 Each dust generating activity has been assigned a dust emission magnitude as shown in Table 1. Information used to determine the dust emissions magnitude for each of the activities has been taken from AP-C222-191-scoping v3 document and drawing numbers C222-ATK-CL-DPL-020-214350 and C222-ATK-CL-DPL-020-214550.

Table 1 : Dust emission magnitude for construction activities

Activity	Dust emission magnitude	Reasoning
Demolition	N/A	No demolitions are required
Earthworks	Large	Total site area greater than 10,000m ²
Construction	Small	Construction activities likely to be minimal
Trackout	Large	Greater than 50 HDV ² (more than 3.5t) outward movements in any one day, unpaved road greater than 100m

- 3.2.5 This assessment of the dust emission magnitude for this AP2 is consistent with the assessment findings within the main ES for CFA15.

Assessed receptors and sensitivity of the area

- 3.2.6 The sensitivity of the area to dust soiling and human health impacts has been assessed for each dust-generating activity in Table 1.
- 3.2.7 AP2-015-005 is located 20-50m away from the nearest residential properties, Water End and Manor Farm. The receptors are therefore classified as low sensitivity to dust soiling and human health, as there are only two receptors close to dust sources. No ecologically sensitive receptors were identified near AP2-015-005.
- 3.2.8 Following the IAQM methodology to assess the risk of dust impacts, the sensitivity of the area takes into account a number of factors, including; the specific sensitivities of the receptors in the area, the proximity and number of those receptors to potential emission sources, existing local PM₁₀ background concentrations and any additional site-specific factors which may affect the risk of wind-blown dust e.g. surrounding trees. Using this approach, the overall sensitivity of the area is summarised in Table 2.
- 3.2.9 This assessment of the sensitivity of the area is consistent with the assessment findings within the main ES for CFA15.

Table 2 : Sensitivity of the area to dust soiling, human health and ecological impacts

Activity	Dust soiling	Human health
Earthworks	Low sensitivity	Low sensitivity
Construction	Low sensitivity	Low sensitivity

² Heavy Duty Vehicles (HDV)

Activity	Dust soiling	Human health
Trackout	Low sensitivity	Low sensitivity

Risk of impacts

- 3.2.10 Taking into consideration the dust emission magnitude and the sensitivity of the area, the AP2-015-005 and the site has been classified as low risk as set out in Table 3. This has been determined based on the likely activities at the site, in combination with the proximity and number of residential properties. It should be noted that this is the risk prior to the implementation of mitigation measures which are embedded within the project as part of the draft Code of Construction Practice (CoCP).
- 3.2.11 It is anticipated that with the implementation of the measures described in the draft CoCP, the risk of impacts will be reduced further.
- 3.2.12 This assessment of the risk of impacts is consistent with the assessment findings within the main ES for CFA15 and there is no change in significance, with impacts remaining as not significant with the implementation of the draft CoCP mitigation.

Table 3 : Summary dust risk table prior to mitigation

Activity	Dust soiling	Human health
Earthworks	Low Risk	Low Risk
Construction	Negligible	Negligible
Trackout	Low Risk	Low Risk

3.3 Chipping Warden relief road

- 3.3.1 This amendment seeks that the temporary alignment of the A361 Byfield Road is made permanent and the road extended southwards, to the west of Chipping Warden. It will be used by construction traffic as well as providing a permanent relief road for the town.
- 3.3.2 The primary elements which have been considered in the dust impact evaluation are the associated vehicle movements.

Dust emission magnitude

- 3.3.3 Each dust generating activity has been assigned a dust emission magnitude as shown in Table 4. Information used to determine the dust emissions magnitude for each of the activities has been taken from AP-C222-214-scoping v3 document, CT-06-075 and CT-06-075-L1 SES AP2 revised scheme drawings.

Table 4 : Dust emission magnitude for construction activities

Activity	Dust emission magnitude	Reasoning
Demolition	N/A	No demolitions are required.
Earthworks	Large	Total site area more than 10,000m ²

Activity	Dust emission magnitude	Reasoning
Construction	Large	Total building volume more than 100,000m ³ and on-site concrete batching likely.
Trackout	Large	More than 50 HDV (greater than 3.5t) outward movements in any one day, unpaved road more than 100m.

- 3.3.4 This assessment of the dust emission magnitude for this amendment is consistent with the assessment findings within the main ES for CFA15, as there is no change in the actual design or construction of the road.

Assessed receptors and sensitivity of the area

- 3.3.5 The sensitivity of the area to dust soiling and human health impacts has been assessed for each dust-generating activity in Table 5.
- 3.3.6 AP2-015-009 is located 20-50m away from several residential properties in Chipping Warden. No ecologically sensitive receptors were identified near AP2-015-009.
- 3.3.7 Following the IAQM methodology to assess the risk of dust impacts, the sensitivity of the area takes into account a number of factors, including; the specific sensitivities of the receptors in the area, the proximity and number of those receptors to potential emission sources, existing local PM₁₀ background concentrations and any additional site-specific factors which may affect the risk of wind-blown dust e.g. surrounding trees, the overall sensitivity of the area is summarised in Table 5.
- 3.3.8 This assessment of the sensitivity of the area is consistent with the assessment findings within the main ES for CFA15.

Table 5: Sensitivity of the area to dust soiling, human health and ecological impacts

Activity	Dust soiling	Human health
Earthworks	Low sensitivity	Low sensitivity
Construction	Low sensitivity	Low sensitivity
Trackout	Low sensitivity	Low sensitivity

Risk of impacts

- 3.3.9 Taking into consideration the dust emission magnitude and the sensitivity of the area, the AP2-015-009 and the site has been classified as Low Risk (Table 6). This has been determined based on the likely activities at the site, in combination with the proximity to the nearest residential properties. There will be no change with AP2-015-009 from the construction impacts assessed within the main ES.
- 3.3.10 It should be noted that this is the risk prior to the implementation of mitigation measures which are embedded within the project as part of the draft CoCP.
- 3.3.11 It is anticipated that with the implementation of the measures described in the draft CoCP, the risk of impacts will be reduced further.

- 3.3.12 This assessment of the risk of impacts is consistent with the assessment findings within the main ES for CFA15 and there is no change in significance, with impacts remaining as not significant with the implementation of the draft CoCP mitigation.

Table 6 : Summary dust risk table prior to mitigation

Activity	Dust soiling	Human health
Earthworks	Low Risk	Low Risk
Construction	Low Risk	Low Risk
Trackout	Low Risk	Low Risk

4 Air quality assessment - road traffic

4.1 Overall assessment approach

- 4.1.1 As a result of SES changes and AP2 changes within and outside of CFA15, together with wider updates to the traffic modelling network outlined in Section 1.2, construction traffic movements in CFA15 have changed from those in the main ES. These have been assessed as they are considered to have the potential to result in new or different likely significant effects on traffic and transport and therefore air quality.
- 4.1.2 Where the Design Manual for Roads and Bridges (DMRB) thresholds detailed in the SMR (Volume 5: Appendix CT-001-000/1) are not exceeded, no additional assessment is required as the air quality impacts will be minimal. Where these thresholds are breached, then a quantitative assessment has been carried out.
- 4.1.3 Where the road configuration is straightforward and the baseline air quality within standards, the DMRB screening method has been used to predict changes in air quality. Professional judgment has been used to select the appropriate tool for each area.
- 4.1.4 In this study area the DMRB screening method was considered to be a suitable tool for the quantitative assessment.
- 4.1.5 The overall assessment approach remains the same as described in Appendix AQ-001-015 of the main ES.

Construction traffic

- 4.1.6 Construction traffic data used in this assessment are detailed in SES and AP2 ES Appendix TT-001-015.
- 4.1.7 With regards to the effects of the proposed phasing of the Chipping Warden relief road construction, there will be a beneficial impact to air quality along Chipping Warden through-road in phase 2. The effects will not be significant and no significant effects were previously identified.

- 4.1.8 Stage 1 will also be completed prior to the introduction of HGV vehicles used for the movement of excavated material and therefore the flows assessed for the stage 1 scenario are lower than those of the original scheme in the main ES.

Receptors assessed

- 4.1.9 The additional traffic and the need for road diversions have the potential to change air quality for some receptors. During the construction phase, all road links identified for assessment will experience increases in traffic numbers. Where DMRB criteria for undertaking a local air quality assessment were met, a number of receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are presented in Table 7 and on Map AQ-01-015 (Volume 5, Air Quality Map Book of the main ES).
- 4.1.10 Six roads within CFA15 are assessed as they were identified as meeting DMRB criteria for this SES and AP2 ES Appendix AQ-001-015 and therefore receptors were selected for assessment. The six roads identified were:
- B4525 Banbury Lane (south west of Banbury Road)- (reduction in traffic compared to main ES - assessed previously);
 - Banbury Road (south west of Thorpe Mandeville) - (reduction in traffic compared to main ES - assessed previously);
 - Banbury Road - (increase in traffic compared to main ES - not assessed previously);
 - A361 Banbury Road (south of Relief road) - (increase in traffic compared to main ES - assessed previously);
 - A361 Chipping Warden Relief road - increase in traffic compared to main ES - not assessed previously in operational phase); and
 - A361 Byfield Road (between 290/05 and Relief road) - increase in traffic compared to main ES - not assessed previously).
- 4.1.11 By comparison to the CFA15 assessment in the main ES, two other roads which were previously assessed have reductions in construction traffic flows and are therefore now not included in this assessment as they no longer meet the DMRB criteria, namely:
- A422 Hennef Way; and
 - A423 Southam Road.

Table 7 : Modelled receptors (construction phase)

Receptor	Description/location	Ordnance Survey (OS) coordinates	Scenarios assessed with the scheme
15-1	Chacombe Lodge Farm (B4525 Banbury Lane (south west of Banbury Road))	451839, 243996	2012 base, 2017 base and construction

Receptor	Description/location	Ordnance Survey (OS) coordinates	Scenarios assessed with the scheme
15-2	Walnut House (Banbury Road (south west of Thorpe Mandeville))	452968, 244585	2012 base, 2017 base and construction
15-3	Thorpe House (Banbury Road)	453065, 243729	2012 base, 2017 base and construction
15-4	Brookfield (A361 Banbury Road (south of Relief road))	449436, 248387	2012 base, 2017 base and construction
15-5	29 Appletree Road (A361 Chipping Warden Relief road)	449757, 248940	2012 Base, 2017 Base and Construction
15-6	Stone House (A361 Byfield Road (between 290/05 and Relief road))	450008, 249398	2012 base, 2017 base and construction

Background concentrations

4.1.12 The background concentrations used in the assessment are shown in Table 8 taken from the updated Defra maps.

Table 8 : 2017 Background concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations ($\mu\text{g}/\text{m}^3$)		
	NO _x	NO ₂	PM ₁₀
15-1 Chacombe Lodge Farm	12.4	9.37	17.0
15-2 Walnut House	11.8	8.93	16.4
15-3 Thorpe House	11.7	8.82	16.2
15-4 Brookfield	12.1	9.15	15.2
15-5 29 Appletree Road	12.1	9.15	15.2
15-6 Stone House	11.5	8.71	16.2

DMRB model results

4.1.13 This section provides the summary of the modelled pollutant concentrations for the assessed receptors using the DMRB methodology, set out in Tables 9 and 10. The magnitude of change and impact descriptor for the two human receptors identified is derived following the Environmental Protection UK (EPUK) methodology.

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Table 9 : Summary of DMRB annual mean NO₂ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previous assessment impact descriptor
	2012 baseline	2017 without SES AP2 scheme	2017 with SES AP2 scheme				
15-1 Chacombe Lodge Farm	13.7	12.0	14.8	2.84	Medium	Negligible	Negligible
15-2 Walnut House	11.1	9.51	11.7	2.22	Medium	Negligible	Negligible
15-3 Thorpe House	10.5	8.85	8.99	0.14	Imperceptible	Negligible	N/A
15-4 Brookfield	10.7	10.5	15.5	4.95	Large	Slight adverse	N/A
15-5 29 Appletree Road	10.7	9.21	10.2	1.03	Small	Negligible	N/A
15-6 Stone House	12.2	10.7	17.9	7.22	Large	Slight adverse	N/A

Table 10 : Summary of DMRB annual mean PM₁₀ results (construction phase)

Receptor	Concentrations (µg/m ³)			Change in concentrations (µg/m ³)	Magnitude of change	Impact descriptor	Previous assessment impact descriptor
	2012 baseline	2017 without SES AP2 scheme	2017 with SES AP2 scheme				
15-1 Chacombe Lodge Farm	18.3	17.5	17.7	0.25	Imperceptible	Negligible	Negligible
15-2 Walnut House	17.4	16.6	16.8	0.20	Imperceptible	Negligible	Negligible
15-3 Thorpe House	17.0	16.2	16.2	0.01	Imperceptible	Negligible	N/A
15-4 Brookfield	16.0	15.5	16.0	0.51	Small	Negligible	N/A
15-5 29 Appletree Road	16.0	15.2	15.4	0.12	Imperceptible	Negligible	N/A
15-6 Stone House	17.5	16.7	17.4	0.76	Small	Negligible	N/A

Assessment of significance

- 4.1.14 The impact on air quality of the changes to traffic in CFA15 for the receptors assessed is not a significant effect for NO₂ and PM₁₀ during construction. Pollutant concentrations will remain well within air quality standards with and without the changes. There are no Air Quality Management Areas (AQMA) within the study area.
- 4.1.15 The changes in air quality at worst-case receptors during the construction phase will not cause significant effects, taking into account background air quality and air quality standards. There is no change in significance from the main ES which also concluded a not significant effect.

4.2 Operational traffic

- 4.2.1 Operation traffic data used in this assessment are detailed in SES and AP2 ES Appendix TT-001-015.
- 4.2.2 The changes to the operational traffic data since the main ES surround the permanent inclusion of the Chipping Warden relief road (AP2-015-009).
- 4.2.3 In this study area the DMRB screening method was considered to be a suitable tool for the quantitative assessment.
- 4.2.4 The traffic arising on the Chipping Warden Relief Road during operational phase have been assessed using the DMRB approach. The use of the relief road results in a new impact compared to the main ES, as the relief road was only proposed to be in place during the construction phase in the main ES. There is a beneficial effect on air quality at receptors in Chipping Warden in the operational phase, as a result of through traffic using the relief road. However, as the effects in Chipping Warden during the operational phase are not significant, there is no change in the significance of impacts at receptors in the village.

Receptors assessed

- 4.2.5 During the operational phase, all road links identified for assessment will experience changes in traffic numbers. Where DMRB criteria for undertaking a local air quality assessment were met, a number of receptors representative of worst-case exposure locations were selected for assessment. These included locations representative of highest concentrations along the roads, including closest to junctions or to the road itself. Receptors assessed are presented in Table 11 and on Map AQ-01-015 (Volume 5, Air Quality Map Book of the main ES).
- 4.2.6 Two additional roads within CFA15 were identified as meeting DMRB criteria in this SES and AP2 ES Appendix and therefore receptors were selected compared to the main ES. The two roads identified were:
- Chipping Warden (road through village) - (reduction in traffic compared to main ES - not assessed previously); and
 - A361 Chipping Warden (Relief road) - (increase in traffic compared to main ES - not assessed previously).

Table 11 : Modelled receptors (operation phase)

Receptor	Description/location	OS coordinates	Scenarios assessed with the scheme
15-7	16 Banbury Road (Chipping Warden (road through village))	449870 248817	Base 2012, base 2026, operational 2026
15-8	29 Appletree Road (A361 Chipping Warden Relief road)	449677 249104	Base 2012, base 2026, operational 2026

Background concentrations

4.2.7 The background concentrations used in the assessment are shown in Table 12 taken from the updated Defra maps.

Table 12 : Background concentrations at assessed receptors

Receptor (or zone of receptors)	Concentrations (µg/m³)		
	NO _x	NO ₂	PM ₁₀
15-7	9.74	6.65	14.8
15-8	9.74	6.65	14.8

DMRB model results

4.2.8 This section provides the summary of the modelled pollutant concentrations for the assessed receptors using the DMRB methodology, set out in Tables 13 to 16. The magnitude of change and impact descriptor for the two human receptors identified is derived following the EPUK methodology.

Table 13 : Summary of DMRB annual mean NO₂ results (2026 operational phase)

Receptor	Concentrations (µg/m³)			Change in concentration	Magnitude of change	Impact descriptor
	2012 baseline	2026 without SES AP2 scheme	2026 with SES AP2 scheme			
15-7 16 Banbury Road	13.3	8.96	7.06	-1.90	Small improvement	Negligible
15-8 29 Appletree Road	10.7	6.65	7.01	0.36	Imperceptible	Negligible

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Table 14 : Summary of DMRB annual mean PM10 results (2026 operational phase)

Receptor	Concentrations ($\mu\text{g}/\text{m}^3$)			Change in concentration	Magnitude of change	Impact descriptor
	2012 baseline	2026 without SES AP2 scheme	2026 with SES AP2 scheme			
15-7 16 Banbury Road	16.6	15.3	14.9	-0.45	Small improvement	Negligible
15-8 29 Appletree Road	16.0	14.8	14.8	0.05	Imperceptible	Negligible

Table 15 : Summary of DMRB annual mean NO2 results (2041 operational phase)

Receptor	Concentrations ($\mu\text{g}/\text{m}^3$)*			Change in concentration	Magnitude of change	Impact descriptor
	2012 baseline	2041 without SES AP2 scheme	2041 with SES AP2 scheme			
15-7 16 Banbury Road	13.3	9.48	7.05	-2.43	Medium improvement	Negligible
15-8 29 Appletree Road	10.7	6.65	6.91	0.27	Imperceptible	Negligible

*Background NO2 concentrations in 2041 assumed to be the same as in 2026.

Table 16 : Summary of DMRB annual mean PM10 results (2041 operational phase)

Receptor	Concentrations ($\mu\text{g}/\text{m}^3$)*			Change in concentration	Magnitude of change	Impact descriptor
	2012 baseline	2041 without SES AP2 scheme	2041 with SES AP2 scheme			
15-7 16 Banbury Road	16.6	15.5	14.9	-0.58	Small improvement	Negligible
15-8 29 Appletree Road	16.0	14.8	14.8	0.06	Imperceptible	Negligible

*Background NO2 concentrations in 2041 assumed to be the same as in 2026.

Assessment of significance

- 4.2.9 Two additional roads within CFA15 were identified as meeting DMRB criteria in this SES and AP2 ES Appendix and therefore receptors were selected compared to the main ES.
- 4.2.10 The Chipping Warden Bypass remaining open into operational phase will create new impacts. However, these impacts are not significant for both NO₂ and PM₁₀ in both future years, and therefore overall there are no new significant effects and no

changes in the significance of effects compared the original ES. There is an improvement in concentrations on Banbury Road through Chipping Warden village due to the diversion of traffic around the village compared to the existing base case. However, there is no change in the significance of this effect compared to the main ES, as this was also previously not significant. Pollutant concentrations will remain well within air quality standards with and without the changes at all locations. There are no AQMAs within the study area.

- 4.2.11 The changes in air quality at worst-case receptors during the operational phase will not result in significant effects since both the adverse and positive impacts are negligible, taking into account background air quality and air quality standards. There are no changes in significance from the main ES.

5 References

Department for Environment, Food and Rural Affairs (Defra) (2014) Defra background maps 2011; <http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011>; Accessed: March 2015.

Environmental Protection UK (EPUK), (2010), Development Control: Planning for Air Quality.

Highways Agency (2007), The Design Manual for Roads and Bridges (Volume 11, Section 3, Part 1 Air Quality HA207/07).

Environmental topic:	Community	CM
Appendix name:	Community assessment	001
Community forum area:	Greatworth to Lower Boddington	015

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1 Introduction

- 1.1.1 This appendix provides an update to the Appendix CM-001-015 community assessment from the main Environmental Statement (ES) as a result of design changes arising from the reconfiguration of the Warwick Road and Banbury Road junction (AP2-015-008) and the Chipping Warden Bypass (AP2-015-009), assessed as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This update should be read in conjunction with Appendix CM-001-015 community assessment in the main ES.
- 1.1.2 This appendix sets out the AP2 community impact assessment record sheets for construction.

2 AP2 community impact assessment record sheets - construction

2.1 Glyn Davies Wood

Table 1 : Glyn Davies Wood community impact assessment record sheet

Resource name	Glyn Davies Wood Nature Reserve (part of Fox Covert)
CFA	Greatworth to Lower Boddington (CFA15).
Resource type	Open space and recreational public right of way (PRoW).
Resource description/profile	Glyn Davies Wood Nature Reserve (part of Fox Covert) is a 3ha site located at the northern boundary of the study area on Banbury Road, as shown on Map-CM-01-053, G6 (Volume 5, Community Map Book of the main ES). It is managed by Banbury Ornithological Society and is accessible to members of the society throughout the year for bird watching and recording other wildlife such as butterflies or bats ¹ .
Assessment year	Construction phase (2017+).
Impact 1: temporary loss of land and access	<p>Impact: the Glyn Davies Wood Nature Reserve lies partly within the land required for the construction of scheme.</p> <p>West of Upper Boddington the scheme will be in cutting. It will pass through the western section of Glyn Davies Wood Nature Reserve. The entrance to the nature reserve and lay-by on Banbury Road, which Banbury Ornithological Society members use for parking, are both within the land required for the construction of the scheme and therefore will be inaccessible during this time. Without the provision of an alternative entrance and parking facilities, access to the nature reserve will not be possible during the construction phase.</p> <p>Duration of impact: approximately one year.</p>
Assessment of magnitude	High: use of the resource will be compromised due to lack of access to the site.
Relevant receptors	Members of the Banbury Ornithological Society who use the Glyn Davies Wood Nature Reserve.
Assessment of sensitivity of receptor(s) to impact	<p>Low: there are approximately 120 members of Banbury Ornithological Society who have access to the site. Membership is drawn from outside the immediate community (from Oxfordshire and Warwickshire) so this is not purely a local community resource.</p> <p>Banbury Ornithological Society owns/manages five other sites which its members can use and which could act as alternatives to the Glyn Davies Wood Nature Reserve. These are Grimsbury Plantation Reserve (near Banbury; 15km/13min away), Balscote Quarry (near Balscote 20km/23min away), Tadmorton Heath Reserve (near Tadmorton Heath 25km/26min away), Pauline Flick Reserve (near Great Rollright 35km/37min away) and Bicester Wetland Reserve (near Bicester 46km/34min away).</p>
Significance rating of effect	Moderate adverse- significant effect due to temporary loss of land and lack of access. The level of significance of this effect is the same as that reported in the main ES.
Proposed mitigation options for significant	Permanent access to the Glyn Davies Wood Nature Reserve (part of Fox Covert) will be maintained through the re-provision of the entrance and lay-by for car parking off Stoneton Lane after the

¹ Banbury Ornithological Society; Our Reserves; www.banburyornithologicalsociety.org.uk/page%206.htm; Accessed: 14 October 2013.

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Resource name	Glyn Davies Wood Nature Reserve (part of Fox Covert)
effects	construction period. No further mitigation identified.
Residual effect significance rating	Moderate adverse- significant effect due to temporary loss of land and duration that the site will be inaccessible for. The level of significance of this this effect is the same as that reported in the main ES.

2.2 Residential properties along A361 Byfield Road

Table 2 : Residential properties along A361 Byfield Road community assessment record sheet

Resource name	Residential properties along A361 Byfield Road
CFA	Greatworth to Lower Boddington (CFA15).
Resource type	Residential properties.
Resource description/profile	Residential properties on the A361 Byfield Road in Chipping Warden, as shown on Map CM-01-051, F8 (Volume 5, Community Map Book of the main ES).
Assessment year	Construction phase (2017+).
Impact 1: loss of amenity	<p>Impact: during phase one of the construction programme for the Chipping Warden Bypass, residents of approximately ten properties along A361 Byfield Road are predicted to experience in-combination effects arising from significant visual and heavy goods vehicles (HGV) effects during the construction phase, resulting in a loss of amenity.</p> <p>Visual: there will be significant visual effects due to works associated with the green tunnel (as reported in the main ES) and also due to direct views of earthworks disruption, realignment of the airfield perimeter road, removal of trees and construction of the route of the bypass (due to the amendment).</p> <p>Construction traffic: there will be significant HGV movements along the A361 Byfield Road during phase one of the construction programme.</p> <p>Duration: the combination of these effects is predicted to last for approximately one year until the main works of the bypass are completed; after this all vehicle and HGV construction traffic will not need to pass along the A361, and will instead use the bypass, so amenity effect will be removed.</p>
Assessment of magnitude	Medium: as residents will be affected by significant residual visual and HGV effects.
Relevant receptors	Owners/occupiers of the residential properties.
Assessment of sensitivity of receptor(s) to impact	High: as these are residential receptors.
Significance rating of effect	Major adverse- significant effect on residents due to loss of amenity. The level of significance is the same as that reported in the main ES.
Proposed mitigation options for significant effects	No further mitigation of amenity effects.
Residual effect significance rating	Major adverse- significant effect on residents due to loss of amenity. The level of significance is the same as that reported for the main ES.

2.3 Chipping Warden School

Table 3 : Chipping Warden School community assessment record sheet

Resource name	Chipping Warden School
CFA	Greatworth to Lower Boddington (CFA15).
Resource type	Community infrastructure.
Resource description/profile	Chipping Warden School is located on the A361 Byfield Road, as shown on Map CM-01-051, F7 (Volume 5, Community Map Book). It is a primary academy (as of 1 September 2013) which currently has approximately 60 pupils from ages four to 11, but has capacity for approximately 100. The academy takes children from Chipping Warden, Aston le Walls and Edgcote ² .
Assessment year	Construction phase (2017+).
Impact 1: loss of amenity	<p>Impact: users of Chipping Warden School are predicted to experience in-combination effects arising from significant visual, noise and construction traffic effects during the construction phase, resulting in a loss of amenity.</p> <p>Visual: significant visual effects due to direct views of earthworks disruption to existing fields, realignment of the airfield perimeter road, construction of the route of the bypass and part removal of trees within the Chipping Warden (disused) Airfield.</p> <p>Noise: due to daytime construction noise associated with the construction of the Chipping Warden bypass and Chipping Warden green tunnel</p> <p>Construction traffic: there will be a significant increase in HGV movements along the A361 Byfield Road during phase one of construction of the Chipping Warden Bypass.</p> <p>Duration: the combination of visual, noise and construction traffic effects is predicted to last for approximately one year until the main works of the bypass are completed; after this all vehicle and HGV construction traffic will not need to pass along the A361, and will instead use the bypass, so construction traffic effect will be removed.</p> <p>Following this the combination of visual and construction noise effects is predicted to last for a further year.</p>
Assessment of magnitude	<p>High (year one): as users of the school will be affected by significant residual visual, noise and HGV effects.</p> <p>Medium (year two): as users of the school will be affected by significant residual visual and noise effects</p>
Relevant receptors	Users of Chipping Warden Primary School.
Assessment of sensitivity of receptor(s) to impact	High: alternative primary schools in the area include St Mary's Catholic Primary School in Aston le Walls (approximately 2.5km away) and Byfield Primary School (approximately 5km away). However it is unlikely that students or staff will be able to attend an alternative school during the construction period. Given this and the fact that the school is a resource which is used on a daily basis (during term time) the sensitivity of users is considered high.
Significance rating of effect	Major adverse- significant effect on community facility due to loss of amenity. The level of significance is the same as that reported for the main ES.

² Chipping Warden Primary Academy; <http://www.chippingwarden.northants.sch.uk/index.htm>; Accessed: 14 October 2013.

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Resource name	Chipping Warden School
Proposed mitigation options for significant effects	No further mitigation of amenity effects.
Residual effect significance rating	Major adverse- significant effect on community facility due to loss of amenity. The level of significance is the same as that reported for the main ES.

Environmental topic:	Cultural heritage	CH
Appendix name:	Survey reports	004
Community forum area:	Greatworth to Lower Boddington	015

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1 Introduction

- 1.1.1 This appendix provides an update to Appendix CH-004-012 cultural heritage survey reports from the main Environmental Statement (ES), assessed as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This update should be read in conjunction with Appendix CH-004-015 cultural heritage survey reports from the main ES.

2 Geophysical surveys

2.1 Site - (CS030) Near Costow House Site

Introduction

- 2.1.1 Geophysical survey was conducted over an area at Lower Thorpe Mandeville (NGR SP542447), during December 2014 and January 2015. The aim of the survey was to locate and characterise any anomalies of possible archaeological interest within the study area.

The site

- 2.1.2 The survey area lies to the south east of Lower Thorpe Mandeville, Northamptonshire (see CH-07-075, SES and AP2 ES Volume 5 Cultural Heritage Map Book). The survey area encompasses four undulating fields of mixed grassland and agricultural land. The northern field is grassland, the western and southern agricultural land, and the eastern is a mix of agricultural and grassland.
- 2.1.3 The geological setting is mudstone bedrock of the Whitby Mudstone Formation across the west of the site, with areas of sandstone bedrock of the Northampton and Horsehay Sand Formations in the centre, and ooidal limestone of the Taynton Limestone Formation in the east. There are no overlying superficial deposits for the majority of the site with an area of diamicton of the Oadby Member in the south of the site (BGS 2014). The local soils are classified as clayey soils with similar fine loamy over clayey soils belonging to the Denchworth (712b) association¹.

Summary archaeological/historic background

- 2.1.4 The following information is summarised from the HS2 Written Scheme of Investigation for Geophysical and Fieldwalking Surveys - Northamptonshire².
- 2.1.5 The survey area lies to the south east of Lower Thorpe Mandeville, Northamptonshire. The survey area has generally high potential for multi-period archaeology.
- 2.1.6 The survey area has been identified as being located in two landscape character areas comprising the edge of an undulating plateau within an interfluvium, and the edge of a tributary valley of the Cherwell. Such areas are typical for prehistoric settlement activity, as evidenced in the range of nearby cropmark sites. However, the extent and character of what may be present in the area that survey area itself is located is uncertain. The site has therefore been

assessed as having a risk rating of 3 (medium), defined as an area where the archaeological character is partially understood and where further detail is required to provide sufficient information to inform the assessment.

- 2.1.7 In addition part of the survey area (the south west corner) lies immediately adjacent to the earthworks of a deserted medieval settlement around Costow House. This area also includes the potential for Neolithic and Bronze Age remains, as evidenced by nearby cropmarks and findspots. As it is not known whether or not these sites may extend into this part of the survey area; it has been assessed as having a risk rating³ of 2 (high). This is defined as an area where archaeological character is poorly understood and where data collected indicates that the area is likely to contain archaeological remains of significance.

Methodology

- 2.1.8 The survey was carried out in line with current Historic England (formerly English Heritage) guidelines⁴ and the written scheme of investigation. All survey grid positioning was carried out using Trimble R8 Real Time Kinematic (RTK) VRSNow equipment. The geophysical survey area was georeferenced relative to the Ordnance Survey (OS) National Grid by tying in to local detail and corrected to the mapping provided by HS2 Ltd.
- 2.1.9 The magnetometer survey was carried out with Bartington Grad 601-2 fluxgate gradiometers, collecting data every 0.25m along traverses 1m apart. Data processing has been performed as appropriate using an in-house software package employing the following processing steps: zero mean sensor, step correction (de-stagger) and interpolation (on the Y axis).

Limitations

- 2.1.10 The ground conditions were good throughout the surveyable fields, the land being flat and covered in short grass, with no obstructions.

Results description

- 2.1.11 The dataset is characterised by areas of parallel linear anomalies and areas of discrete anomalies across much of the site (see CH-09-075 and CH-10-075, SES and AP2 ES Volume 5 Cultural Heritage Map Book). Concentrations of positive and negative linear anomalies are also seen across the site. High amplitude bipolar linear anomalies are present in the north and south of the site, as well as areas of high amplitude responses around many of the field boundaries.

Results interpretation

Archaeology

- 2.1.12 Concentrations of linear anomalies across the north of the site (Areas E, D and G) are likely to relate to settlement activity. The majority of these anomalies appear to form complexes of enclosures, whilst the anomalies in the east are more likely to relate to a former field system (Area F).
- 2.1.13 An area of widely spaced parallel linear anomalies can be seen in the south of the site. This is indicative of ridge and furrow cultivation (Area H to G).

¹ Soil Survey of England and Wales, (1983), Soils of England and Wales, Sheet 6: South East England

² ETM (2014), Written Scheme of Investigation for Geophysical and Fieldwalking Surveys - Northamptonshire Document No: C252-ETM-EV-REP-020-000119_P04

³ HS2 (2012) Hs2 London to West Midlands Topic Cultural Heritage Technical Note – Risk Based Approach. Document No. C250-ARP-EV-NOT-000-003300

⁴ EH 2008 - Geophysical Survey in Archaeological Field Evaluation, English Heritage, Portsmouth

Old Field Boundaries

- 2.1.14 Positive linear anomalies in the eastern and southern fields. These relate to former field boundaries present on available mapping from 1884.

Possible Archaeology

- 2.1.15 A small number of positive linear and area anomalies across the site (Area B and C). These are indicative of former cut features and may relate to the former settlement activity or be of agricultural origin. A number of small discrete positive anomalies have also been identified, mostly around the areas of settlement (Areas D, E and F). These are indicative of backfilled pits and may be of archaeological origin, however these responses are seen across much of the site and as such could equally be natural Parallel positive linear anomalies, running approximately north-south, are almost certainly evidence of former agricultural practices; in this instance ridge and furrow seems likely.

Natural

- 2.1.16 Areas of discrete positive anomalies and magnetic variation. Given the complex geology of the site it is likely that these responses are natural in origin.

Modern

- 2.1.17 High amplitude bipolar linear anomalies are present in the northern and southern fields. These are indicative of underground services. Areas of high amplitude responses around field boundaries relate to fencing, whilst dipolar responses across the site are likely to relate to modern ferrous debris.

Conclusions

- 2.1.18 The survey has identified a number of areas of former settlement across the north of the site which may be of pre-medieval date. Including three areas of previously unidentified settlement (Areas D (GLB212), E (GLB214) and GLB214). There is also evidence of a pre-medieval field system running through this area. The presence of ridge and furrow combined with the former field boundaries suggests that the area has been used as agricultural land since the medieval period. A number of possible archaeological anomalies have also been identified; however these could equally be of agricultural or natural origin. The remaining anomalies are modern or natural in origin. The modern anomalies relate to agricultural activity, underground services, fencing and ferrous debris.

2.2 Site - (CS035) Area to South of Lower Boddington

Introduction

- 2.2.1 Geophysical survey was conducted over an area at Lower Boddington (NGR SP 474 521), during December 2014 and January 2015. The aim of the survey was to locate and characterise any anomalies of possible archaeological interest within the study area.

The site

- 2.2.2 The survey area lies approximately 0.5km west Lower Boddington, Northamptonshire (see CH-07-082, SES and AP2 ES Volume 5 Cultural Heritage Map Book). The survey area encompasses two agricultural fields (Fields 1 and 5) and four fields of grassland (fields 2, 3, 4 and 6). The site slopes gently from north down to the south.

- 2.2.3 The geological setting mudstone bedrock of the Charmouth Mudstone Formation, with no overlying superficial deposits (BGS 2014). The local soils are classified as clayey soils with similar fine loamy over clayey soils belonging to the Denchworth (712b) association⁵.

Summary archaeological/historic background

- 2.2.4 The following information is summarised from the HS2 Written Scheme of Investigation for Geophysical and Fieldwalking Surveys - Northamptonshire⁶.
- 2.2.5 The survey area lies on the western side of Lower Boddington. Although the survey area occupies a relatively poorly-drained undulating lowland; the good south-easterly aspect of this particular site, overlooking a tributary of the River Cherwell, make this a relatively good locality for past activity of prehistoric, Romano-British, medieval and post-medieval date within this region. This is supported by the presence of several nearby prehistoric settlement sites indicated by cropmarks and nearby medieval settlement remains, as well as implied by the proximity of the Iron Age, Roman, and medieval routeway along its north-eastern edge. It is possible that the well-preserved ridge and furrow across the surrounding area, and the survey area in particular, may have both masked and preserved remains from earlier periods.
- 2.2.6 The survey area has therefore been assessed as having a risk factor of 3 (medium); defined as an area where archaeological character is partially understood and further detail is required to provide sufficient information to inform the assessment. Magnetometry was selected as a method appropriate to the scale of the survey area, and the nature of the underlying geology.

Methodology

- 2.2.7 The survey was carried out in line with current Historic England guidelines⁷ and the written scheme of investigation. All survey grid positioning was carried out using Trimble R8 Real Time Kinematic (RTK) VRSNow equipment. The geophysical survey area was georeferenced relative to the Ordnance Survey (OS) National Grid by tying in to local detail and corrected to the mapping provided by HS2 Ltd.
- 2.2.8 The magnetometer survey was carried out with Bartington Grad 601-2 fluxgate gradiometers, collecting data every 0.25m along traverses 1m apart. Data processing has been performed as appropriate using an in-house software package employing the following processing steps: zero mean sensor, step correction (de-stagger) and interpolation (on the Y axis).

Limitations

- 2.2.9 The ground conditions were good throughout the surveyable fields, the land being flat and covered in short grass, with no obstructions.

Results description

- 2.2.10 The dataset is characterised by widely spaced curving parallel linear anomalies across the site (see CH-09-082 and CH-10-082, SES and AP2 ES Volume 5 Cultural Heritage Map Book). A number of positive linear anomalies and linear areas of dipolar responses can also be seen

⁵ Soil Survey of England and Wales, (1983), Soils of England and Wales, Sheet 6: South East England

⁶ ETM (2014), Written Scheme of Investigation for Geophysical and Fieldwalking Surveys - Northamptonshire Document No: C252-ETM-EV-REP-020-000119_P04

⁷ EH 2008 - Geophysical Survey in Archaeological Field Evaluation, English Heritage, Portsmouth

across the site. Areas of high amplitude responses are present along the field boundaries, with high amplitude dipolar responses across the site.

Results interpretation

Archaeology

- 2.2.11 Positive linear anomalies in fields 1 and 2. These are indicative of former cut features, and are likely to relate to an area of former settlement (areas A, C and D). Areas of widely spaced curving parallel linear anomalies can be seen across much of the site. These are indicative of ridge and furrow cultivation.

Old Field Boundaries

- 2.2.12 Positive linear anomalies and linear areas of scattered magnetic debris. These are all likely to relate to former field boundaries not present on available mapping. Some of these are likely to relate to the ridge and furrow cultivation seen in the area.

Possible Archaeology

- 2.2.13 Positive linear anomalies, mostly across the south of the site (area F). These are indicative of former cut features and may be of archaeological or modern agricultural origin. These could relate to the area of settlement or the ridge and furrow activity; however the isolated nature of the anomalies makes interpretation difficult.

Modern

- 2.2.14 Areas of high amplitude responses around field boundaries relate to fencing, whilst dipolar responses across the site are likely to relate to modern ferrous debris.

Conclusions

- 2.2.15 The survey has identified a probable NEW area of former pre-medieval settlement in fields 1 and 2 (GLB215). Ridge and furrow cultivation combined with a number of former field boundaries suggests that the area has been used for agricultural land since the medieval period. A number of possible archaeological linear anomalies have also been identified; however it is not possible to determine their origin with any degree of confidence. The remaining anomalies are modern in origin, relating to fencing and ferrous debris.

2.3 References

BGS 2014 British Geological Survey, Geology of Britain Viewer
<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>, 1:50,000 scale geology, centred on 472150, 220850. Accessed 08/01/2015.

EH 2008 - Geophysical Survey in Archaeological Field Evaluation, English Heritage, Portsmouth.

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HS2 (2012) HS2 London to West Midlands Topic Cultural Heritage Technical Note – Risk Based Approach. Document No. C250-ARP-EV-NOT-000-003300.

SSEW 1983 Soils of England and Wales: Sheet 6 South East England, Soil Survey of

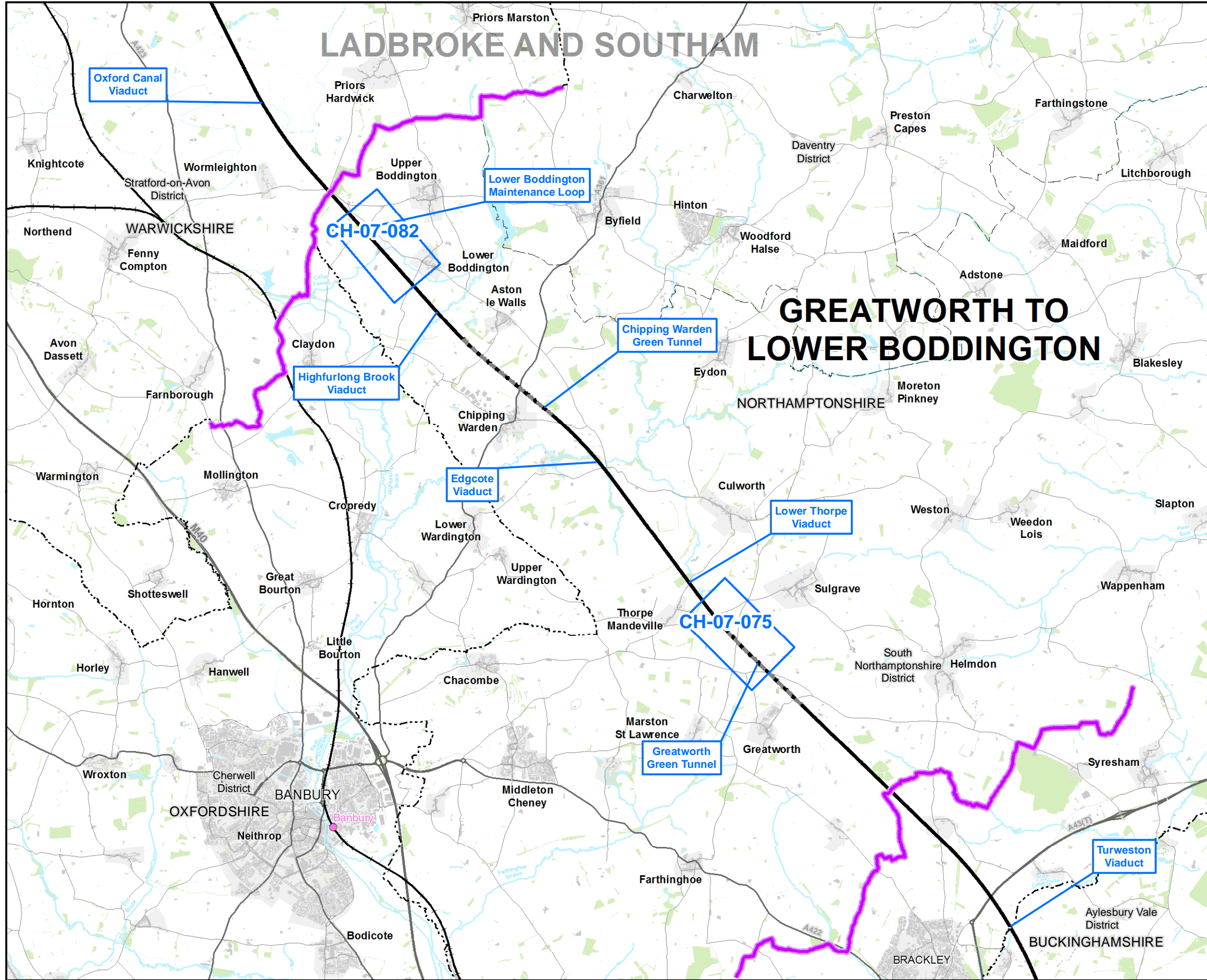
England and Wales, Harpenden.

2.4 Figures

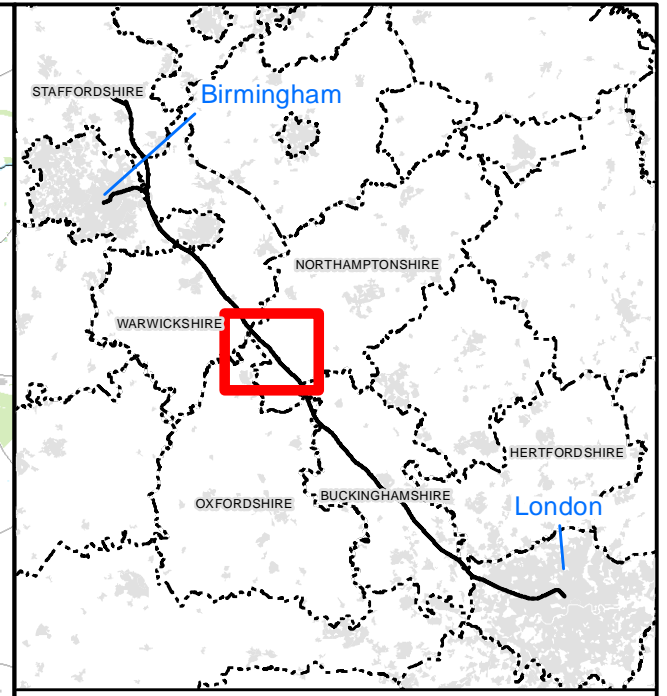
The following figures are in set out in the SES and AP2 ES Appendix cultural heritage map book:

- CH-07-075 - 082 Archaeological Geophysical Survey – Location, 1:5000;
- CH-09-075 – 082 Archaeological Geophysical Survey - Magnetometer Data Plot, 1:5000; and
- CH-10-075 – 082 Archaeological Geophysical Survey - Interpretation Plot, 1:5000.

LADBROKE AND SOUTHAM



GREATWORTH TO LOWER BODDINGTON



Map Series Information:

This map series shows archaeological geophysical survey locations within the land required for the construction of the Proposed Scheme.

Main Map Legend <ul style="list-style-type: none">Route in tunnelRoute on surface; WatercourseDepot, station, headhouse or portal buildingCommunity forum boundaryExisting railway stationCounty boundaryDistrict/Borough boundary	<ul style="list-style-type: none">Map sheets included in this community forum with surveys
Map Number CH-07-INDEX-CFA15	
Map Name Index Map of: Archaeological Geophysical Survey - Location SES and AP2 ES	
Community Forum Area CFA15: Greatworth to Lower Boddington	

Note: Not all data layers in the legend are represented on every map.

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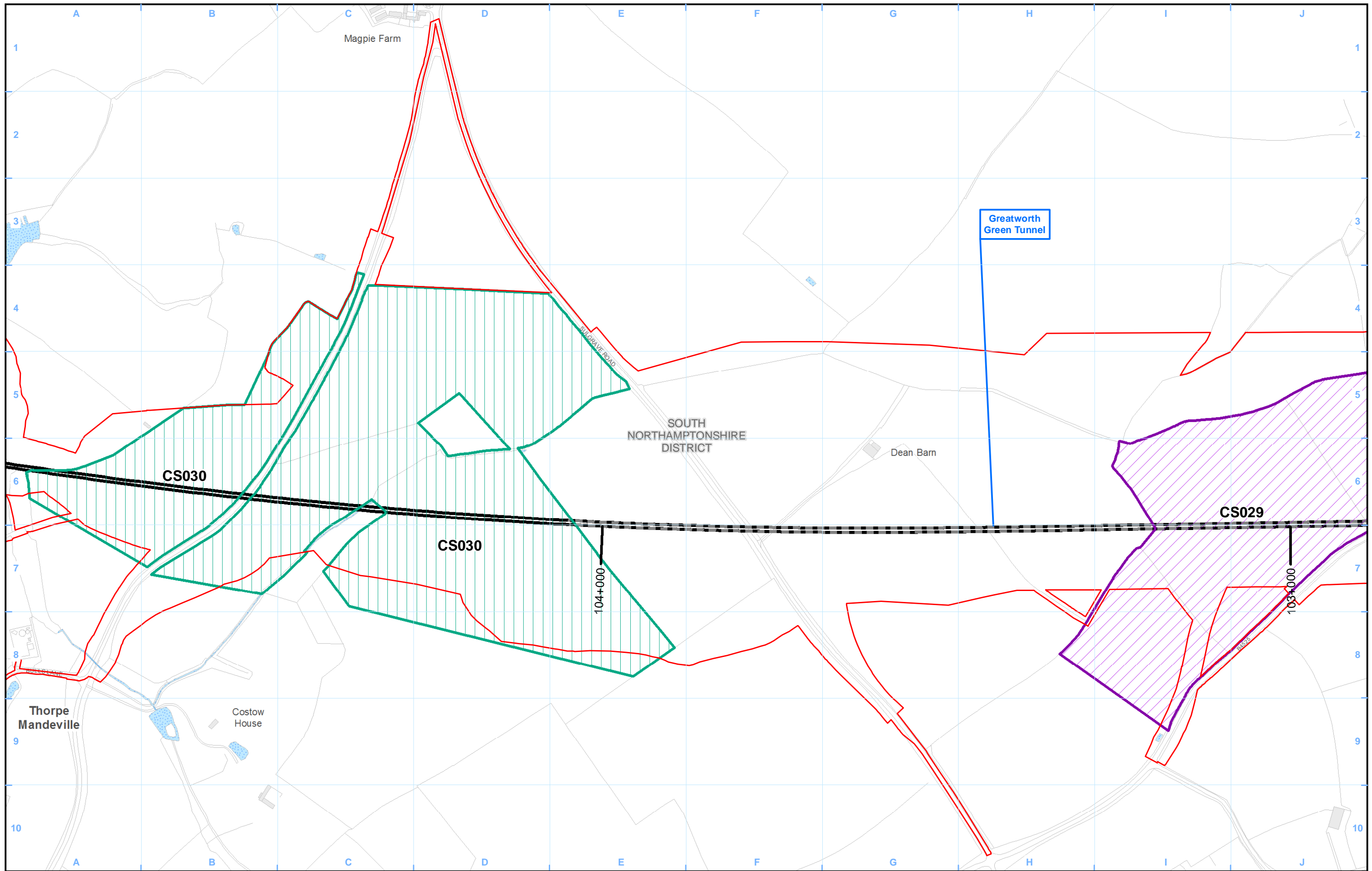
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0 800 1,600 2,400 3,200 Metres

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Doc Number: C252-ETM-EV-MAP-020-004305-AP02-P01 **Date:** 04/06/15



Route in tunnel

Route on surface

Depot, station, headhouse or portal building

Land potentially required during construction

Community forum boundary

District/Borough boundary

Watercourse

Water body

Areas surveyed in 2013

Fieldwalking surveys completed

Geophysical surveys completed

Area identified for survey 2014

Geophysical and Fieldwalking surveys

Geophysical surveys

Map Number

CH-07-075

Map Name

Archaeological Geophysical Survey -
Location
SES and AP2 ES

Community Forum Area CFA15:
Greatworth to Lower Boddington

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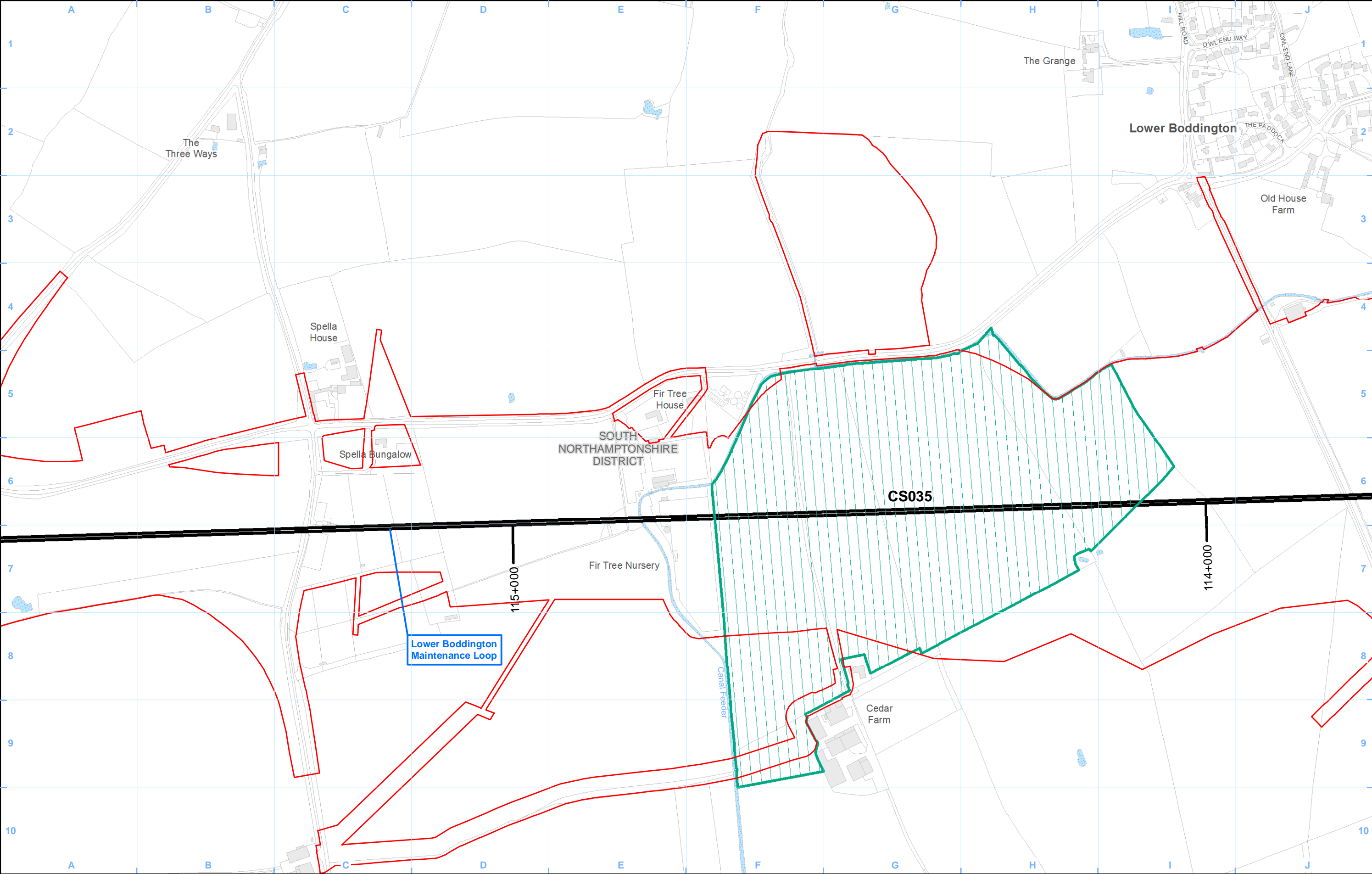
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Metres

Doc Number: C252-ETM-EV-MAP-020-003994-AP02-P01

Date: 04/06/15

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Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community forum boundary
- District/Borough boundary

- Watercourse
- Water body

Areas surveyed in 2013

- Fieldwalking surveys completed
- Geophysical surveys completed

Area identified for survey 2014

- Geophysical and Fieldwalking surveys
- Geophysical surveys

Map Number CH-07-082

Map Name
Archaeological Geophysical Survey -
Location
SES and AP2 ES

Community Forum Area CFA15:
Greatworth to Lower Boddington

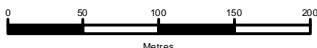


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Date: 04/06/15

LADBROKE AND SOUTHAM

CH-09-082

Lower Boddington
Maintenance Loop

Highfurlong Brook
Viaduct

Chipping Warden
Green Tunnel

Edgcote
Viaduct

GREATWORTH TO LOWER BODDINGTON

Lower Thorpe
Viaduct

CH-09-075

Greatworth
Green Tunnel

Turweston
Viaduct

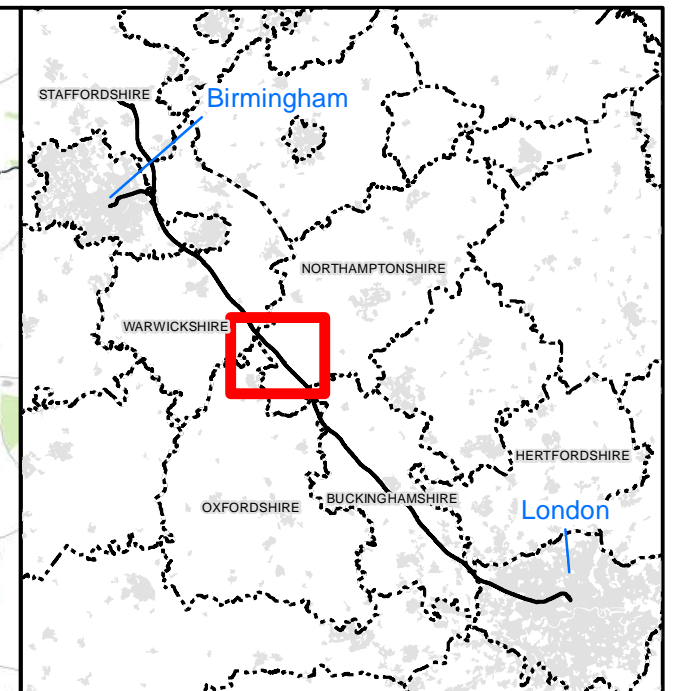


- Main Map Legend**
- Route in tunnel
 - Route on surface; Watercourse
 - Depot, station, headhouse or portal building
 - Community forum boundary
 - Existing railway station
 - County boundary
 - District/Borough boundary
 - Map sheets included in this community forum with surveys

Map Number CH-09-INDEX-CFA15

Map Name Index Map of:
Archaeological Geophysical Survey - Magnetometer
data plot
SES and AP2 ES

Community Forum Area CFA15:
Greatworth to Lower Boddington



Map Series Information:

This map series shows magnetometer survey results within the land required for the construction of the Proposed Scheme.

Note: Not all data layers in the legend are represented on every map.

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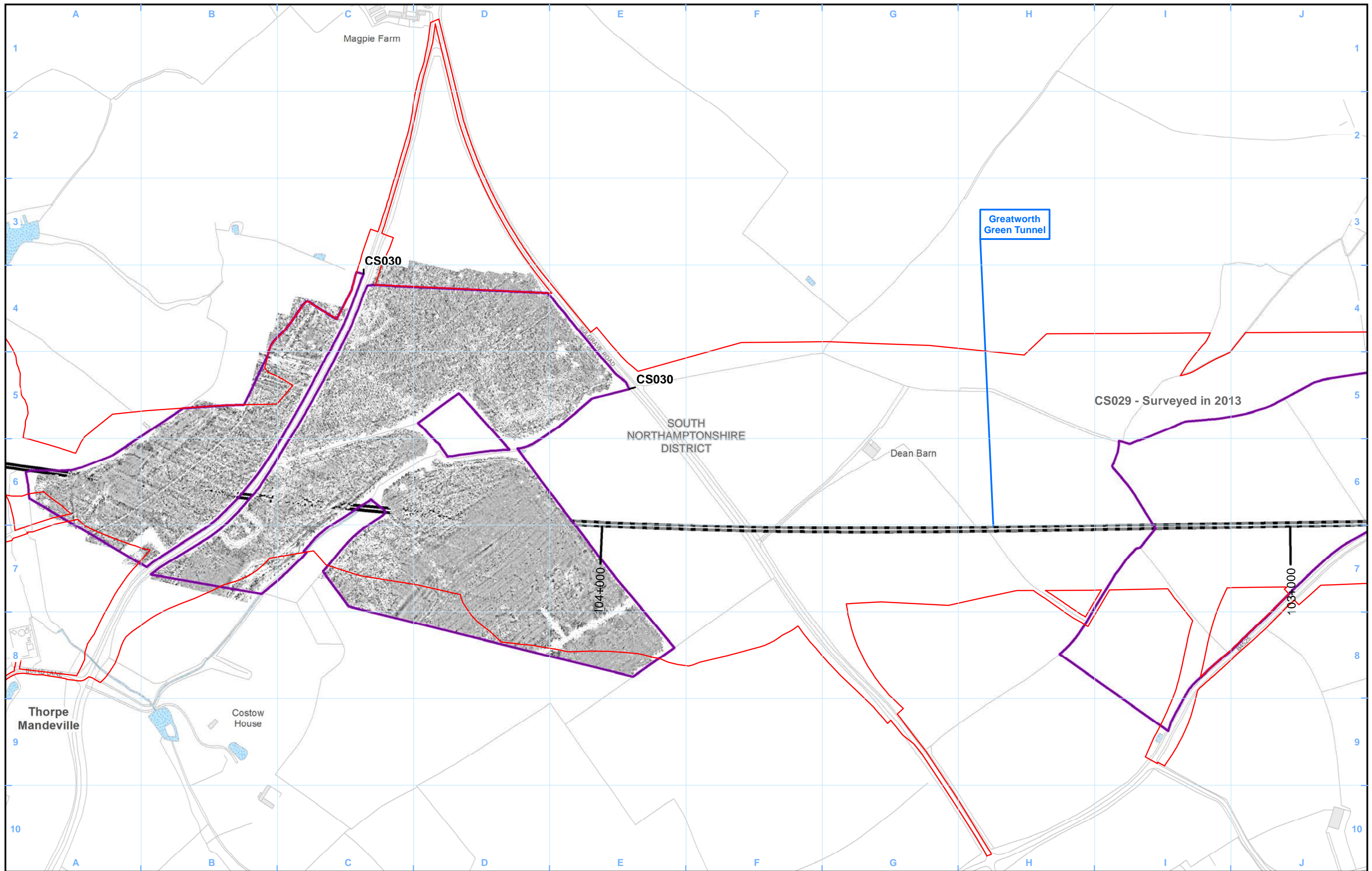
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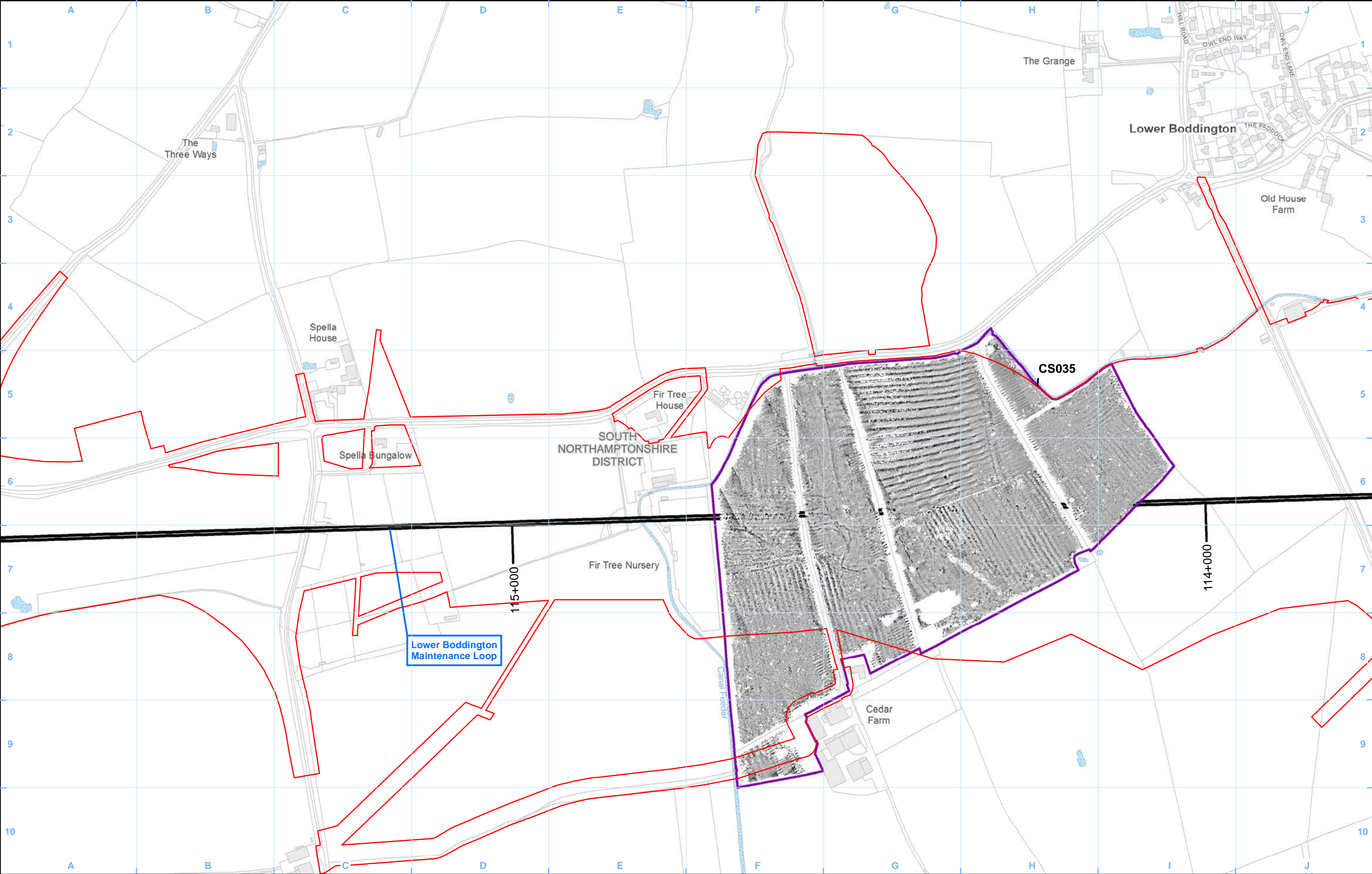
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Doc Number: C252-ETM-EV-MAP-020-004312-AP02-P01 Date: 04/06/15



Legend <ul style="list-style-type: none">Route in tunnelRoute on surfaceDepot, station, headhouse or portal buildingLand potentially required during constructionCommunity forum boundaryDistrict/Borough boundaryEdge of geophysical surveyWatercourseWater body	<table border="1"><tr><td>Map Number</td><td>CH-09-075</td></tr><tr><td>Map Name</td><td>Archaeological Geophysical Survey - Magnetometer data plot SES and AP2 ES</td></tr><tr><td colspan="2">Community Forum Area CFA15: Greatworth to Lower Boddington</td></tr></table>	Map Number	CH-09-075	Map Name	Archaeological Geophysical Survey - Magnetometer data plot SES and AP2 ES	Community Forum Area CFA15: Greatworth to Lower Boddington		<div><p>HS2 Ltd accept no responsibility for any circumstances, which arise from the reproduction of this map after alteration, amendment or abbreviation or if it is issued in part or issued incomplete in any way.</p><p>Registered in England. Registration number 06791686. Registered office: One Canada Square, London, E14 5AB.</p><p>© Crown copyright and database rights 2015. Ordnance Survey Licence Number 100049190.</p><p>Scale at A3: 1:5,000</p><p>0 50 100 150 200 Metres</p><p>Doc Number: C252-ETM-EV-MAP-020-004009-AP02-P01 Date: 04/06/15</p></div>
Map Number	CH-09-075							
Map Name	Archaeological Geophysical Survey - Magnetometer data plot SES and AP2 ES							
Community Forum Area CFA15: Greatworth to Lower Boddington								



Legend <ul style="list-style-type: none">Route in tunnelRoute on surfaceDepot, station, headhouse or portal buildingLand potentially required during constructionCommunity forum boundaryDistrict/Borough boundaryEdge of geophysical surveyWatercourseWater body	Map Number CH-09-082	<p>HS2 Ltd accept no responsibility for any circumstances, which arise from the reproduction of this map after alteration, amendment or abbreviation or if it is issued in part or issued incomplete in any way.</p> <p>Registered in England. Registration number 06791686. Registered office: One Canada Square, London, E14 5AB.</p> <p>© Crown copyright and database rights 2015. Ordnance Survey Licence Number 100049190.</p> <p>Doc Number: C252-ETM-EV-MAP-020-004010-AP02-P01</p>
	Map Name Archaeological Geophysical Survey - Magnetometer data plot SES and AP2 ES Community Forum Area CFA15: Greatworth to Lower Boddington	

LADBROKE AND SOUTHAM

CH-10-082

Lower Boddington
Maintenance Loop

Chipping Warden
Green Tunnel

Highfurlong Brook
Viaduct

Edgcote
Viaduct

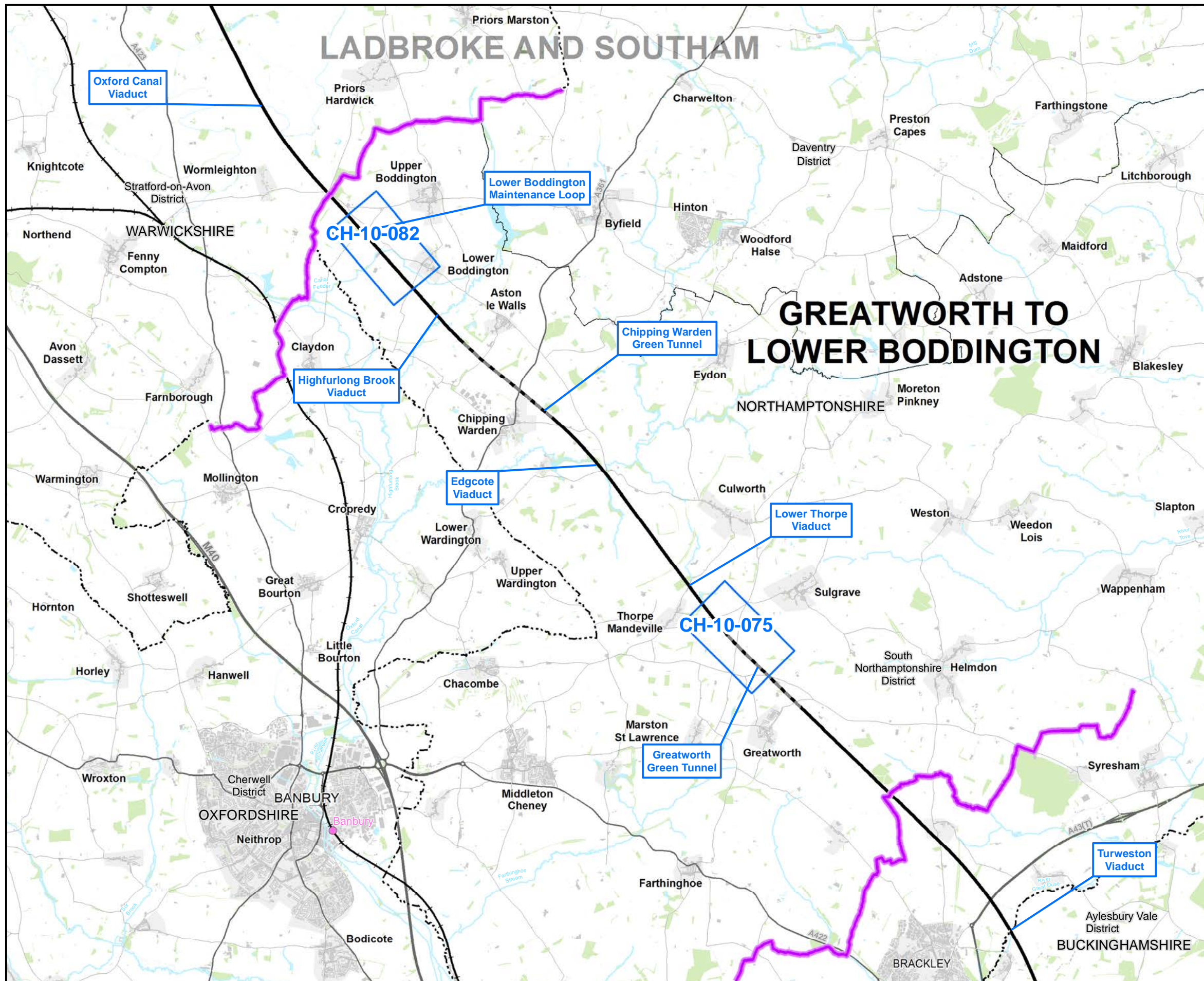
GREATWORTH TO LOWER BODDINGTON

Lower Thorpe
Viaduct

CH-10-075

Greatworth
Green Tunnel

Turweston
Viaduct

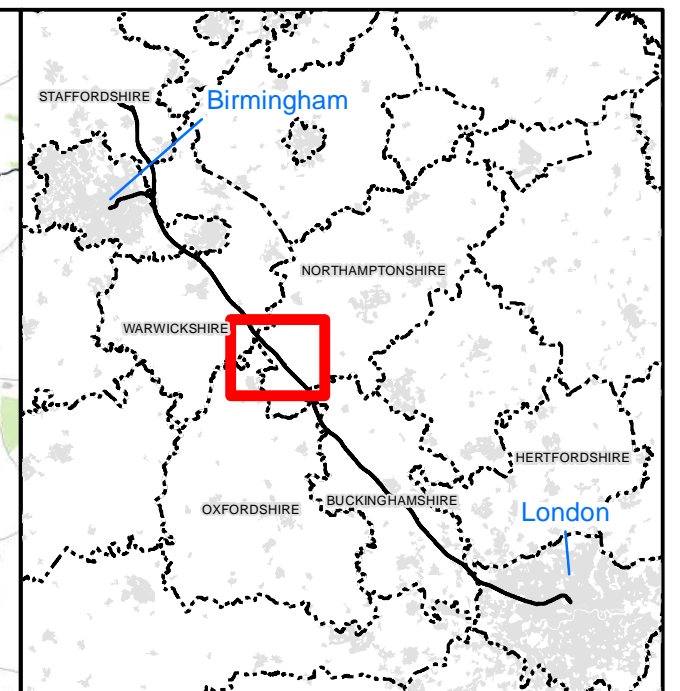


- Main Map Legend**
- Route in tunnel
 - Route on surface; Watercourse
 - Depot, station, headhouse or portal building
 - Community forum boundary
 - Existing railway station
 - County boundary
 - District/Borough boundary
 - Map sheets included in this community forum with surveys

Map Number CH-10-INDEX-CFA15

Map Name
Index Map of:
Archaeological Geophysical
Survey - Interpretation plot
SES and AP2 ES

Community Forum Area CFA15:
Greatworth to Lower Boddington



Map Series Information:

This map series shows interpretation of magnetometer survey results within the land required for the construction of the Proposed Scheme.

Note: Not all data layers in the legend are represented on every map.

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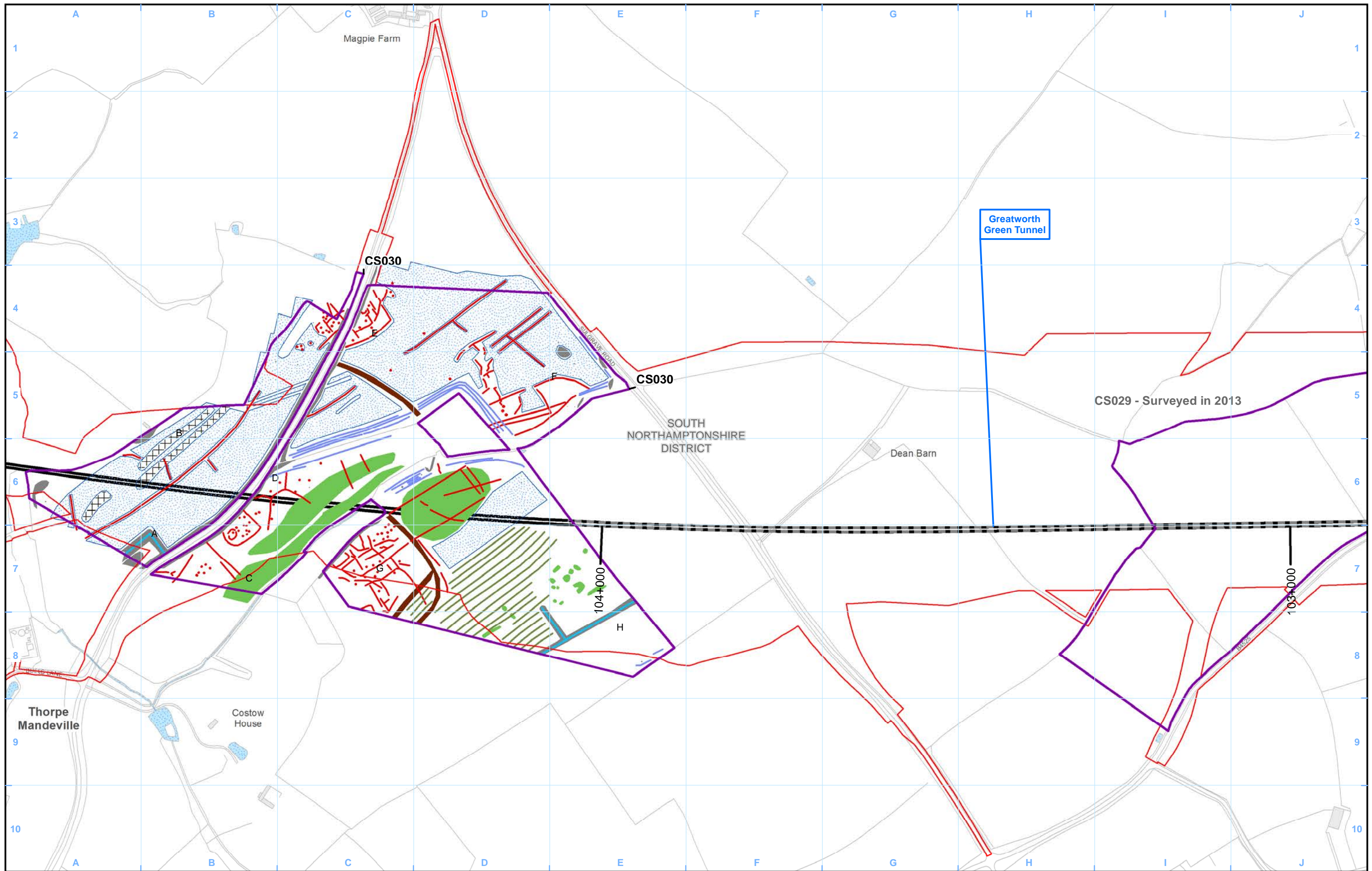
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Metres

Doc Number: C252-ETM-EV-MAP-020-004319-AP02-P01 Date: 04/06/15



Legend

Route in tunnel	Water body	Ridge and Furrow	Old field boundary
Route on surface	Edge of geophysical survey	Trend	Plough
Depot, station, headhouse or portal building	Geophysical survey results	Archaeology (discrete)	Ridge and Furrow
Land potentially required during construction	Archaeology	Archaeology (zone)	Uncertain
Community forum boundary	Drain	Ferrous	
District/Borough boundary	Pipe	Industrial Burnt Fired	
Watercourse	Plough	Natural	

Map Number: CH-10-075

Map Name: Archaeological Geophysical Survey - Interpretation plot SES and AP2 ES

Community Forum Area CFA15: Greatworth to Lower Boddington

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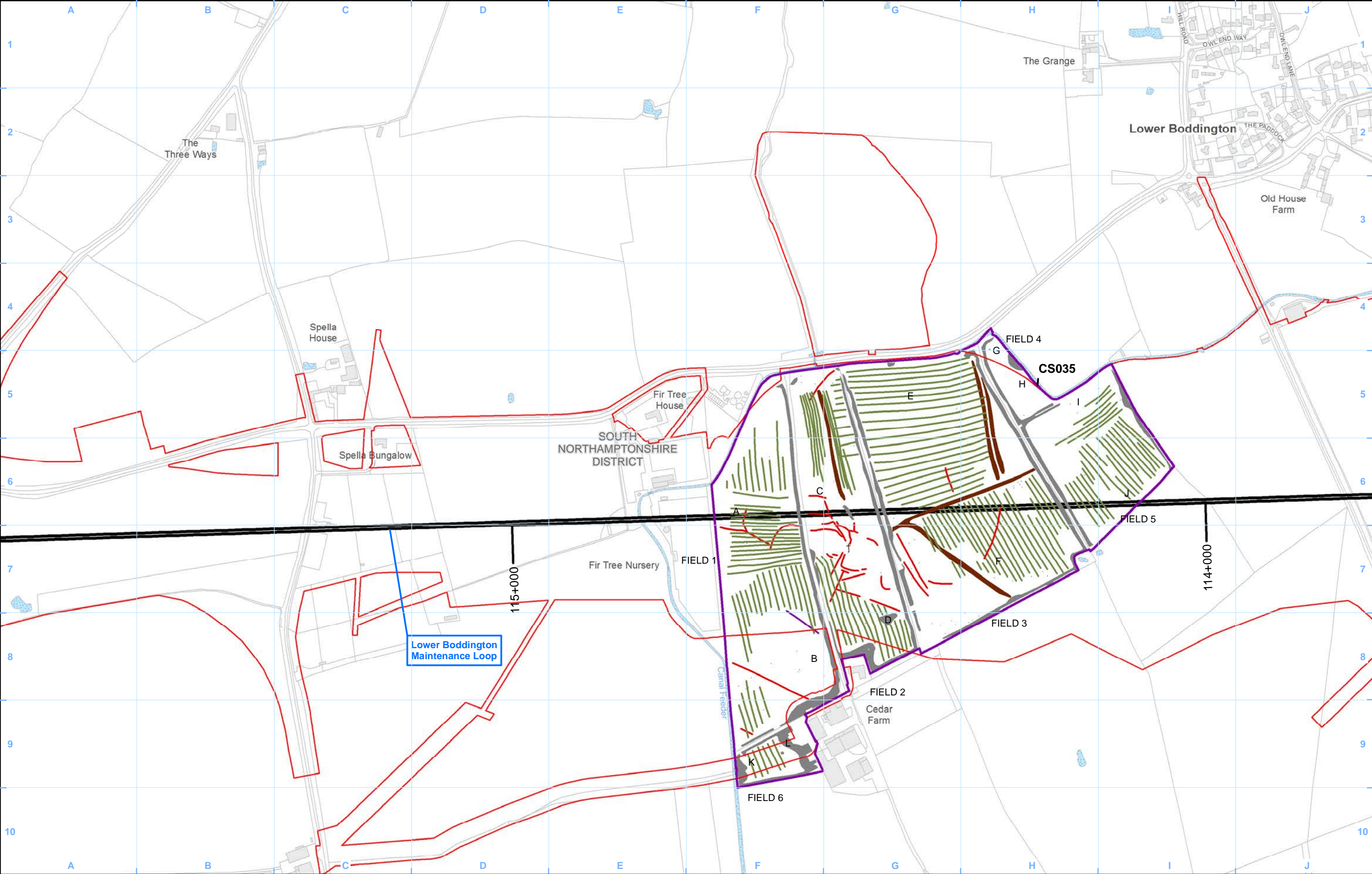
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Date: 04/06/15

Scale at A3: 1:5,000

0 50 100 150 200 Metres



Legend

Route in tunnel	Water body	Ridge and Furrow	Old field boundary
Route on surface	Edge of geophysical survey	Trend	Plough
Depot, station, headhouse or portal building	Geophysical survey results	Archaeology (discrete)	Ridge and Furrow
Land potentially required during construction	Archaeology	Archaeology (zone)	Uncertain
Community forum boundary	Drain	Ferrous	
District/Borough boundary	Pipe	Industrial Burnt Fired	
Watercourse	Plough	Natural	

Map Number
CH-10-082

Map Name
Archaeological Geophysical Survey - Interpretation plot SES and AP2 ES

Community Forum Area CFA15:
Greatworth to Lower Boddington

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Doc Number: C252-ETM-EV-MAP-020-004025-AP02-P01 **Date:** 04/06/15

Environmental topic:	Landscape and visual assessment	LV
Appendix name:	Landscape report	001
Community forum area:	Greatworth to Lower Boddington	015

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2	Environmental baseline report	1
3	Visual baseline	1

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Figure 2 : Viewpoint AP2.211.2.004 - winter view. Date taken: 19 February 2015.Nikon D3200, 35mm lens (stitched panorama).	3

1 Introduction

- 1.1.1 This appendix provides an update to Appendix LV-001-015 landscape report from the main Environmental Statement (ES) Volume 5, Greatworth to Lower Boddington community forum area (CFA15) as a result of design change: Chipping Warden bypass (AP2-015-009), as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This details the viewpoints that are new or different to those reported in the main ES. It should be read in conjunction with Appendix LV-001-015 landscape report from the main ES, which provides baseline descriptions for all Landscape Character Areas (LCA) and representative viewpoints.

2 Environmental baseline report

- 2.1.1 This section describes new visual assessment viewpoints located within the study area for this CFA, which have been identified to inform the SES AP2 ES and are ordered from south to north along the route of the scheme.
- 2.1.2 A summary of the landscape and visual baseline is provided in CFA15 of the SES and AP2 ES.

3 Visual baseline

- 3.1.1 For some visual receptors, no appropriate location from which to capture a representative photo of the view was available, therefore no photograph has been included and the assessment has been undertaken based on professional judgement.
- 3.1.2 New receptors identified in this assessment are shown on maps LV-01-287, LV-01-288, LV-03-061, LV-04-061 (Volume 5 of this SES and AP2 ES). In each case, the middle number (xxx.x.xxx) identifies the type of receptor as follows:
1. protected views - these relate to those viewpoints, panoramas and viewing corridors that have been designated by local authorities, county councils or other relevant stakeholders. Protected views have a high sensitivity to change. None of these receptor types have been identified within the study area;
 2. residential views – these have a high sensitivity to change, as attention is often focused on the landscape surrounding the property, rather than on another focused activity (as will be the case in predominantly employment or industrial areas);
 3. recreational views – these receptors (apart from those engaged in active sports) generally have a high sensitivity to change, as attention is focused on enjoyment of the landscape. Tourists engaged in activities whereby attention is focused on the surrounding landscape or townscape also have a high sensitivity to change;
 4. transport views - travel through an area is often the means by which the greatest numbers of people view the landscape. Because of the glimpsed nature of the view from trains or road vehicles, people travelling through an area on main roads have a low sensitivity to change. People travelling through urban areas (including pedestrians where the focus is not in recreation) also generally have a low sensitivity to change;
 5. hotels and healthcare institutions - people staying in hotels and healthcare institutions have periods of time when their attention may be focused on the landscape, whilst at other times attention is more likely to be focused on other activities. Based on the level of interaction with the surrounding landscape, these receptors have a medium sensitivity to change. None of these receptor types have been identified within the study area or, where present, they have been represented by other viewpoint categories;
 6. employment - people at work and within educational institutions are the least sensitive receptors, as their attention is likely to be focused on their work activity. These receptors have a low sensitivity to change. None of these receptor types have been identified within the study area or, where present, they have been represented by other viewpoint categories; and
 7. active sports - people engaged in active sports have a low sensitivity to change as their attention is likely to be focused on their activity. None of these receptor types have been identified within the study area or, where present, they have been represented by other viewpoint categories.

Viewpoint AP2.211.2.003: View looking north-west from properties on the northern edge of Chipping Warden adjacent to Chipping Warden Primary School

This viewpoint is located at the northern edge of Chipping Warden and is representative of views from the A361, the front and side facing aspect of residential properties on the northern edge of Chipping Warden, recreational users of Footpath AE18 and pupils and staff at the Chipping Warden School and Nursery.

Winter

The immediate foreground is defined by the extents of the A361 highway and its junction with Long Barrow. The highway boundary is characterised by various hedgerow types, ranging from ornamental evergreen components associated with adjacent properties to the left and right of view, with transition to native field boundary and hedgerow trees across the middle extent of view. A break in the hedgerow affords mid to background views across the extents of Chipping Warden Airfield (disused) with distinctive linear belts of poplars visible across the skyline.

Summer

No summer view available. In summer the view will be largely unchanged, however the density of foliage associated with highway boundary vegetation and skyline trees will be accentuated.

Figure 1 : Viewpoint AP2.211.2.003 - winter view. Date taken: 19 February 2015.Nikon D3200, 35mm lens (stitched panorama).



Viewpoint AP2.211.2.004: View looking north-west from properties on Appletree Road on the western edge of Chipping Warden

The viewpoint is located at the western edge of Chipping Warden and is representative of views from the rear facing aspect of residential properties on the western edge of Chipping Warden, residential properties on the western edge of Chipping Warden on Allens Orchard, recreational users of Footpath AE19, recreational users of the allotments off Appletree Road and road users of Appletree Road.

Winter

The foreground is defined by the route of Appletree Road and the adjacent broad, grass verge. The slightly elevated position of the road affords views over roadside hedgerows across the mid to background extents of agricultural fields to the left and right of view. Views to the right of view are limited by linear belts of evergreen trees coincident with the boundary of Chipping Warden Airfield (disused). Views to the left of view include the middle ground extents of allotments on the western edge of Chipping Warden, with views beyond to a backdrop skyline of field boundary trees and hedgerows.

Summer

No summer view available. In summer the view will be largely unchanged, however the density of foliage associated with roadside and background trees and hedgerows will be accentuated.

Figure 2 : Viewpoint AP2.211.2.004 - winter view. Date taken: 19 February 2015.Nikon D3200, 35mm lens (stitched panorama).



Environmental topic:	Sound, noise and vibration	SV
Appendix name:	Baseline sound, noise and vibration report	002
Community forum area:	Greatworth to Lower Boddington	015

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2	Scope, assumptions and limitations	1
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3	Environmental Baseline	1
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	3.2 Existing baseline sound levels	1
	3.3 Future baseline methodology	4

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1 Introduction

- 1.1.1 This appendix provides an update to Appendix SV-002-015 baseline sound, noise and vibration report for community forum area Greatworth to Lower Boddington (CFA15) from the main Environmental Statement (ES) as a result of design changes AP2-015-009 as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This update should be read in conjunction with Appendix SV-002-015 baseline sound, noise and vibration report from the main ES.

2 Scope, assumptions and limitations

2.1 Changes of relevance to this assessment

- 2.1.1 The assessment of construction and operational sound, noise and vibration for the Chipping Warden Bypass amendment AP2-015-009 involves assessment in a new geographical area to that previously assessed in the main ES, requiring baseline data for new assessment locations. This appendix includes details of the existing and future baseline sound environment within the area.
- 2.1.2 Maps showing the baseline sound monitoring locations and assessment locations within this area are included in Map Series SV-03 and SV-04 (Volume 5, sound, noise and vibration map book).

3 Environmental Baseline

3.1 Existing baseline data collection methodology

- 3.1.1 The overall approach to baseline data collection for sound noise and vibration is described in Volume 5: Appendix SV-001-000 of the main ES.
- 3.1.2 The measurements undertaken over the Greatworth to Lower Boddington area are described in Appendix SV-002-015 of the main ES. No further measurements have been undertaken due to this amendment.

3.2 Existing baseline sound levels

- 3.2.1 From the measurements described in Section 3.1, baseline sound levels have been ascertained for each new assessment location within this area. These levels are presented in terms of the following key sound indicators:

- for the operational sound assessment:
 - $L_{pAeq,16hr\text{ weekday}}$ daytime (07:00-23:00) sound pressure level;
 - $L_{pAeq,8hr\text{ weekday}}$ night-time (23:00-07:00) sound pressure level;
 - arithmetic average of $L_{pAFmax,5min}$ night-time sound pressure level; and
 - highest $L_{pAFmax,5min}$ night-time sound pressure level.

- for the construction sound assessment:
 - daytime L_{pAeq} sound pressure level (Monday to Friday 07:00-19:00; Saturday 07:00-13:00);
 - evening/weekend L_{pAeq} sound pressure level (Monday to Friday 19:00-23:00; Saturday 13:00-23:00; Sunday 07:00-23:00); and
 - night-time L_{pAeq} sound pressure level (Monday to Sunday 23:00-07:00).

3.2.2 The values are presented in Table 1. The data source coding included within this table details how the baseline sound levels allocated to each assessment location have been derived. This coding is summarised in Table 2 and explained in detail in Volume 5: Appendix SV-001-000 of the main ES.

Table 1 : Existing baseline sound levels

Assessment location ID	Area represented	Measurement location	Existing baseline sound level (dB)							Data source coding[1]
			For operational sound assessment				For construction sound assessment			
			Daytime L _{pAeq,16hr}	Night-time L _{pAeq,8hr}	Arithmetic average of night-time L _{pAFmax,5min}	Highest night-time L _{pAFmax,5min}	Daytime L _{pAeq}	Evening / weekend L _{pAeq}	Night-time L _{pAeq}	
901157	Banbury Road, Chipping Warden	CS0009	52.3	47.4	69.1	88.9	52.9	49.3	46.6	3,C,iii,b
901158	Allens Orchard, Chipping Warden	CS0009	55.4	50.6	69.1	88.9	56.0	52.4	49.7	3,C,iii,b
901159	Allens Orchard, Chipping Warden	CS0009	53.6	48.7	69.1	88.9	54.2	50.6	47.9	3,C,iii,b
901160	Allens Orchard, Chipping Warden	CS0028	50.6	45.7	52.0	71.8	51.2	47.6	44.9	1,A,iii,b
901161	Appletree Road, Chipping Warden	CS0028	50.6	45.7	52.0	71.8	51.2	47.6	44.9	1,A,iii,b
901162	Appletree Road, Chipping Warden	CS0028	50.6	45.7	52.0	71.8	51.2	47.6	44.9	1,A,iii,b
901163	Manor Farm, Chipping Warden	CS4023	53.9	53.0	46.9	85.0	54.3	48.6	53.0	1,A,iii,b
901164	Arbury banks, Chipping Warden	CS0028	50.6	45.7	52.0	71.8	51.2	47.6	44.9	1,A,iii,b

Table 2 : Data source coding key

Code	Data source type
1	Long-term measurement location
2	Short-term (linked to simultaneous long-term)
3	Short-term (using profile from non-simultaneous long-term)
4	Short-term using standard (National Noise Incidence Study ¹ or other) 24hour profile
5	Specific validated prediction
6	Predictions from other sources (Defra noise maps ² , etc.).
7	Generic levels

Code	Corrections applied
A	Data from above source applied directly
B	Correction applied for screening
C	Correction applied for distance from source
D	Minimum level cut-off applied

Code	Distance from measurement
i	Data applied from a measurement at or very close to the assessment location
ii	Data applied from a local measurement location at a greater distance but noted to have equivalent acoustic climate
iii	Data applied from a distant measurement location where sound levels would be expected to be similar

Code	Uncertainty
a	Data are considered highly representative of the prevailing sound climate
b	Data are considered representative of the prevailing sound climate, but variations in measured levels indicate that there may be a higher degree of uncertainty than for (a).
c	Data are considered to be an estimate of the sound climate, (e.g. taken from Defra noise maps, etc.).

3.3 Future baseline methodology

Construction

- 3.3.1 The assessment of noise from construction activities assumes a baseline year of 2017. As a conservative assumption, it has been assumed that no change in baseline sound levels will occur between the existing baseline (2012/13) and the future baseline year of 2017.
- 3.3.2 Due to the duration of the construction work and as the precise timing of the highest sound levels would be different in each location, using baseline sound levels for 2017 as the start of the construction period, provides a reasonable worst case assessment.

¹ Building Research Establishment, (2002), *National Noise Incidence Study 2000/2001*.

² Defra, Noise Mapping England, <http://services.defra.gov.uk/wps/portal/noise/>; accessed 26 July 2013.

- 3.3.3 The assessment of construction traffic is based on future baseline traffic flows for 2021, as a year which is representative of the middle of the construction period.

Operation

- 3.3.4 There is potential for future baseline sound levels for operation (2026) to change when compared to the existing baseline sound levels (2012) as a result of changes in baseline sound sources.
- 3.3.5 In the vast majority of cases where change might occur it is expected that baseline sound levels will increase at assessment locations due to increases in vehicle movements on roads. It is therefore considered that the use of the 2012 baseline levels in the operational assessment will result in a worst case assessment of the impact of changes in the future baseline sound levels in the majority of locations.
- 3.3.6 Therefore for the purposes of this assessment future baseline levels have been assumed to be identical to those identified in Table 1 of this appendix for 2012.
- 3.3.7 In addition, based on available road traffic information a screening exercise has been undertaken to identify any areas in which a reduction in baseline sound level might be likely. Where reductions in baseline sound level have been identified a further screening assessment has been completed to identify if these changes would be likely to materially affect the operational sound assessment.
- 3.3.8 The screening assessment has not identified any locations in this area where a decrease in future baseline (2026), compared to existing baseline (2012), is likely to materially affect the operational sound assessment.

SES and AP2 ES Appendix SV-003-015

Environmental topic:	Sound, noise and vibration	SV
Appendix name:	Construction assessment report	003
Community forum area:	Greatworth to Lower Boddington	015

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1 Introduction

- 1.1.1 This appendix provides an update to Appendix SV-003-015 construction assessment report for the Greatworth to Lower Boddington community forum area (CFA15) from the main Environmental Statement (ES) as a result of design changes as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2) ES. This update should be read in conjunction with Appendix SV-003-015 construction assessment report from the main ES.

2 Scope, assumptions and limitations

2.1 Changes of relevance to this assessment

- 2.1.1 The assessment scope, key assumptions and limitations for sound, noise and vibration are as set out in Volume 1, the Scope and Methodology Report (SMR) (Volume 5: Appendix CT-001-000) and the SMR Addendum (Volume 5: Appendix CT-001-000) of the main ES.
- 2.1.2 SES design changes and AP2 amendments in combination have resulted in a change in traffic flow on some roads within this CFA.
- 2.1.3 The Chipping Warden bypass amendment (AP2-015-009) has the potential to lead to changes in significant construction noise effects in Chipping Warden. An assessment of these changes is presented in this appendix.

3 Effects arising during construction

3.1 Avoidance and mitigation measures

- 3.1.1 The avoidance and mitigation measures are presented in the main ES Volume 2.
- 3.1.2 In addition to this mitigation, taller screening as described in the draft Code of Construction Practice (CoCP) has been assumed along the edge of the construction site boundary adjacent to the residential communities along Allens Orchard.

3.2 Quantitative identification of impacts and effects

Airborne sound: direct impacts and effects

- 3.2.1 The assessment results, impact criteria and significance criteria for the assessment of the scheme at residential and non-residential receptors are presented in Table 1 and Table 2 respectively. For additional information see the Main ES, Volume 5, CFA15, Appendix SV-003-015 with the following additional notes:

Where the significant effect column is highlighted in pink, then a significant effect is identified at the referenced community, or individual non-residential receptor.

SES and AP2 ES Appendix SV-003-015

*	<p>Significant effect – the quantitative impact methodology has identified either:</p> <ol style="list-style-type: none"> 1) no impact at this receptor but further information (see assessment) has identified that a significant effect is nonetheless likely; or 2) an impact at this receptor which, based upon further qualitative receptor information, (see assessment text) does not give rise to a significant effect.
~	<p>The forecast adverse effects are not considered to be significant on a community basis (further information on methodology is provided in the main ES Volume 5: Appendix SV-001-000).</p>
A	<p>Type of effect – adverse effect.</p>
S	<p>Type of effect – significant adverse effect.</p>
NA	<p>Type of effect – not generally an adverse effect.</p>
B	<p>Type of effect – for non-residential receptors further detail about the type of effect is set out in the text of the main ES Appendix SV-001-000.</p>
R	<p>Type of receptor - residential.</p>
G	<p>Type of receptor:</p> <p>(G1) theatres, large auditoria and concert halls;</p> <p>(G2) sound recording and broadcast studios;</p> <p>(G3) places of meeting for religious worship, courts, cinemas, lecture theatres, museums and small auditoria or halls;</p> <p>(G4) schools, colleges, hospitals, hotels and libraries; or</p> <p>(G5) offices and general commercial premises.</p>
T	<p>Receptor design – typical.</p>
S	<p>Receptor design - special.</p>
H	<p>Existing environment – high existing ambient noise levels: daytime level more than 75dB, evening-time level more than 65dB or night-time level more than 55dB L_{pAeq} at the façade.</p>
NI	<p>Mitigation effect - identified as likely to qualify for noise insulation under the draft Construction Code of Practice (draft CoCP).</p>
D,E,N	<p>Impact duration (months) – duration of impact during the day (D), evening (E) or night (N).</p>

Table 1 : Assessment of construction noise at residential receptors

Assessment location		Impact criteria				Significance criteria									Significant effect
ID	Area represented	Typical/highest monthly outdoor LpAeq [dB] at the facade [Assessment category A/B/C]			Construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700-1900	Evening 1900-2300	Night 2300-0700											
250944	Mill Lane, Chipping Warden	49/55 [A]	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	NA	16	R	T	-	-	-	-	-	
251074	Hogg End, Chipping Warden	48/54 [A]	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	NA	47	R	T	-	-	-	-	-	
251187	Mill Lane, Chipping Warden	47/53 [A]	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	NA	10	R	T	-	-	-	-	-	
251231	Culworth Road, Chipping Warden	46/54 [A]	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	NA	5	R	T	-	-	-	-	-	
251253	Byfield Road, Chipping	50/54 [A]	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	NA	16	R	T	-	-	-	-	-	
251398	Byfield Road, Chipping Warden	48/52 [C]	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	NA	16	R	T	H	-	-	-	-	

Assessment location		Impact criteria				Significance criteria										Significant effect
ID	Area represented	Typical/highest monthly outdoor LpAeq [dB] at the facade [Assessment category A/B/C]			Construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect		
		Day 0700-1900	Evening 1900-2300	Night 2300-0700												
251478	Appletree Road, Chipping Warden	50/54 [A]	-	-	Day: Chipping Warden bypass – excavation - excavation CWRR	NA	34	R	T	-	-	-	-	-		
251564	Appletree Road, Chipping Warden	52/56 [A]	-	-	Day: Chipping Warden bypass - excavation - excavation realignment of airfield road	NA	8	R	T	-	-	-	-	-		
251660	Byfield Road, Chipping Warden	48/52 [A]	-	-	Day: Chipping Warden bypass - excavation – excavation CWRR	NA	8	R	T	H	-	-	-	-		
252223	Byfield Road, Chipping Warden	52/56 [A]	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	NA	2	R	T	-	-	-	-	-		
252318	Byfield Road, Chipping Warden	56/61 [C]	-	-	Day: Chipping Warden bypass - excavation - excavation realignment of airfield road	NA	6	R	T	H	-	-	-	-		
253775	Unnamed Road, Aston Le Walls	51/59 [A]	-	-	Day: Chipping Warden green tunnel: Phase 1a sections C, D & E - construction works - construct base	NA	1	R	T	H	-	-	-	-		

Assessment location		Impact criteria				Significance criteria										Significant effect
ID	Area represented	Typical/highest monthly outdoor LpAeq [dB] at the facade [Assessment category A/B/C]			Construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect		
		Day 0700-1900	Evening 1900-2300	Night 2300-0700												
257184	Appletree Lane, Aston Le Walls	51/56 [A]	-	-	Day: Chipping Warden green tunnel: Phase 1a sections C, D & E - construction works - construct base	NA	1	R	T	H	-	-	-	-		
258470	Culworth Road, Chipping Warden	49/64 [A]	-	-	Day: Edgcote cutting - cutting - excavation	NA	4	R	T	-	-	-	-	-		
258653	Edgcote, Banbury	43/49 [A]	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	NA	2	R	T	-	-	-	-	-		
258741	Edgcote, Banbury	43/51 [A]	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	NA	1	R	T	-	-	-	-	-		
258773	Edgcote, Banbury	44/51 [A]	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	NA	7	R	T	-	-	-	-	-		
258938	Edgcote, Banbury	45/53 [A]	-	-	Day: Edgcote cutting - cutting - excavation	NA	1	R	T	-	-	-	-	-		

Assessment location		Impact criteria				Significance criteria										Significant effect
ID	Area represented	Typical/highest monthly outdoor LpAeq [dB] at the facade [Assessment category A/B/C]			Construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect		
		Day 0700-1900	Evening 1900-2300	Night 2300-0700												
259052	Byfield Road, Chipping Warden	52/56 [A]	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	NA	8	R	T	-	-	-	-	-		
259161	Edgcote, Banbury	44/48 [A]	-	-	Day: Edgcote cutting - cutting - excavation	NA	1	R	T	-	-	-	-	-		
700435	Chipping Warden, Banbury	43/46 [A]	-	-	Day: Chipping Warden green tunnel: Phase 1b sections C and B - construction works - construct base	NA	2	R	T	-	-	-	-	-		
700436	Appletree Road, Chipping Warden	46/50 [A]	-	-	Day: Chipping Warden bypass - excavation excavation CWRR	NA	1	R	T	H	-	-	-	-		
901157	Banbury Road, Chipping Warden	49/57 [A]	-	-	Day: Chipping Warden bypass - site clearance work site clearance CWRR	NA	15	R	T	-	-	-	-	-		
901158	Allens Orchard, Chipping Warden	53/62 [A]	-	-	Day: Chipping Warden bypass - tie-in construction (south) road construction CWRR	NA	8	R	T	-	-	-	-	-		
901159	Allens Orchard, Chipping Warden	56/65 [A]	-	-	Day: Chipping Warden bypass - mitigation earthworks - mitigation fill 109+830 - 112+300	NA	8	R	T	-	-	-	-	-		

Assessment location		Impact criteria				Significance criteria									Significant effect
ID	Area represented	Typical/highest monthly outdoor LpAeq [dB] at the facade [Assessment category A/B/C]			Construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700-1900	Evening 1900-2300	Night 2300-0700											
901160	Allens Orchard, Chipping Warden	43/51 [A]	-	-	Day: Chipping Warden bypass - tie-in construction (south) road construction CWRR	NA	11	R	T	-	-	-	-	-	
901161	Appletree Road, Chipping Warden	61/64 [A]	-	-	Day: Chipping Warden bypass - mitigation earthworks - mitigation fill 109+830 - 112+300	NA	14	R	T	-	-	-	-	-	
901162	Appletree Road, Chipping Warden	57/64 [A]	-	-	Day: Chipping Warden bypass - excavation excavation CWRR	NA	5	R	T	-	-	-	-	-	
901163	Manor Farm, Chipping Warden	48/52 [A]	-	-	Day: Chipping Warden bypass – excavation excavation CWRR	NA	3	R	T	H	-	-	-	-	
901164	Arbury banks, Chipping Warden	52/61 [A]	-	-	Day: Chipping Warden bypass - site clearance work site clearance CWRR	NA	15	R	T	-	-	-	-	-	

Table 2 : Assessment of construction noise at non-residential receptors

Assessment location		Impact criteria				Significance criteria									Significant effect
ID	Area represented	Typical/highest monthly outdoor LpAeq [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700-1900	Evening 1900-2300	Night 2300-0700											
250944	Mill Lane, Chipping Warden	49/55	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	B	1	G3	T	-	-	-	D 6	-	*
251253	Byfield Road, Chipping	50/54	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	B	1	G3	T	-	-	-	D 8	-	*
258741	Edgcote, Banbury	43/51	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	B	1	G3	T	-	-	-	-	-	
251187	Mill Lane, Chipping Warden	47/53	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	B	1	G4	T	-	-	-	-	-	
252223	Byfield Road, Chipping Warden	52/56	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct walls	B	1	G4	T	-	-	-	D 24	-	CSV15-No3

Assessment location		Impact criteria				Significance criteria									Significant effect
ID	Area represented	Typical/highest monthly outdoor LpAeq [dB] at the façade			Construction activity resulting in highest forecast noise levels	Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Impact duration [months]	Mitigation effect	
		Day 0700-1900	Evening 1900-2300	Night 2300-0700											
251398	Byfield Road, Chipping Warden	48/52	-	-	Day: Chipping Warden green tunnel: Phase 2b sections A and B - construction works - construct base	B	1	G5	T	H	-	-	-	-	
901163	Manor Farm, Chipping Warden	48/52	-	-	Day: Chipping Warden bypass - excavation excavation CWRR	B	1	G5	T	H	-	-	-	-	

Airborne sound: indirect effects

- 3.2.2 Construction road traffic associated with the construction phases of the scheme will generate airborne noise. The change in traffic noise level at a reference distance of 10m from the edge of the nearside carriageway resulting from the presence of construction traffic for a given road has been predicted, based upon traffic information for the scheme. The results for the roads where additional potentially significant effects could arise as a result of SES design changes and AP2 amendments in combination are presented in Table 3.
- 3.2.3 Explanation of the information within Table 3 is provided in the main ES Volume 5: Appendix SV-001-000, with the following additional notes:



Where the significant effect column is highlighted in dark red, then a significant effect is identified on nearby communities or individual receptors.

Change values



Yellow denotes a minor impact – a change is of 3-5 dB or 1-3dB where a high existing sound level is identified.



Orange denotes a moderate impact – a change is of 5-10 dB or 3-5dB where a high existing sound level is identified.



Red denotes a major impact – a change is of >10 dB or >5dB where a high existing sound level is identified.

Table 3 : Assessment of construction traffic noise levels

Road name	Area	Future baseline sound level (dB)	Future baseline sound level + construction traffic (dB)	Change (dB)	Significant effect
		Daytime L _{pAeq,16hr} 0700-23:00 free-field	Daytime L _{pAeq,16hr} 0700-2300 free-field		
B4525 Banbury Lane (SW of Banbury Road)	Thorpe Mandeville	70.0	72.4	+2.4	
Banbury Lane (SW of Thorpe Mandeville)	Thorpe Mandeville	64.7	70.4	+5.7	
A361 Banbury Road (south of bypass)	Chipping Warden	68.9	73.5	+4.6	
A361 Chipping Warden bypass	Chipping Warden	70.4**	74.5	+4.1	*
A361 Byfield Road (between 290/05 and bypass)	Chipping Warden	68.9	73.6	+4.7	

* * A361 Chipping Warden bypass future baseline noise level is calculated using operational 2026 traffic flows to illustrate the increase due to construction traffic only.

3.3 Assessment of significance of effects

Residential receptors: direct effects - individual dwellings

- 3.3.1 No residential buildings within the assessment are forecast to experience noise levels higher than the noise insulation trigger levels as defined in the draft CoCP as a result of the amendment.

Residential receptors: direct effects - communities

- 3.3.2 The avoidance and mitigation measures in this area will avoid airborne construction noise adverse effects on the majority of receptors and communities. In this area, the mitigation measures reduce the effects of outdoor construction noise on the acoustic character around the local residential communities such that the effects are considered to be not significant.

Residential receptors: indirect effects

- 3.3.3 On the A361 Chipping Warden bypass an increase of approximately 4dB due to construction traffic above the predicted opening year operational noise levels has been forecast on the new road. However, taking into account the sound levels from other sources in the area the noise effects are not considered to be significant at residential properties close to the new road when assessed on a community basis.
- 3.3.4 Changes in noise level due construction traffic have also been identified in additional locations, however, taking into account the number of sensitive receptors likely to be exposed to these changes, significant effects are unlikely to occur on the following roads:
- B4525 Banbury Lane (south-west of Banbury Road);
 - Banbury Lane (south-west of Thorpe Mandeville);
 - A361 Banbury Road (south of the bypass); and
 - A361 Byfield Road (between 290/05 and the bypass).

Non-residential receptors- direct effects

- 3.3.5 The main ES identified a significant construction noise effect on Chipping Warden Primary School (CSV15-No3). The proposed amendment includes construction of the Chipping Warden bypass and therefore construction works are no longer required for the Byfield Road realignment. These changes lead to an increased duration of the adverse effects at the school caused by different construction activities (from 17 months in the main ES to 24 months).
- 3.3.6 The significant noise and vibration effect on Chipping Warden Primary School (CSV15-No3) has been identified on a reasonably foreseeable worst case basis due to daytime construction noise associated with the construction of the Chipping Warden bypass and Chipping Warden green tunnel that are closest to the school. The reasonable worst case forecast noise levels at the school are up to 56dB for a total period of approximately two years months starting in 2018.

- 3.3.7 The proposed amendment including construction of the Chipping Warden bypass and therefore no longer constructing the Byfield Road realignment will give rise to a different significant effect at the Chipping Warden Primary School (CSV15-No3). However, this amendment will not change the identification of a significant effect on this receptor reported in the main ES and the AP1 ES.
- 3.3.8 HS2 Ltd will continue to engage with Chipping Warden Primary School in order to identify all reasonably practicable measures to further reduce or avoid these significant effects.
- 3.3.9 The quantitative assessment of construction noise due to the introduction of the Chipping Warden bypass (AP2-015-009) has identified a potential noise impact at a St Peter and St Paul's church located on Mill Lane, Chipping Warden (represented by Assessment Location 250944). Taking into account the application of best practicable means mitigation as described within the draft CoCP, it is likely that the level of construction noise incident upon this receptor will be reduced in comparison to that predicted and a significant effect is considered unlikely to occur at this receptor.
- 3.3.10 The quantitative assessment of construction noise due to the introduction of the Chipping Warden bypass (AP2-015-009) has identified a potential noise impact at a Wesleyan Chapel on Byfield Road (represented by Assessment Location 251253). Taking into account the application of best practicable means mitigation as described within the draft CoCP, it is likely that the level of construction noise incident upon this receptor will be reduced in comparison to that predicted and a significant effect is considered unlikely to occur at this receptor.

Non-residential receptors: indirect effects

- 3.3.11 On the A361 Chipping Warden bypass an increase of approximately 4dB above the predicted opening year operational noise levels has been forecast due to construction traffic on the new road. However, taking into account the sound levels from other sources in the area a significant effect has not been identified at non-residential properties close to the new road.

Cumulative effects from the scheme and other committed developments

- 3.3.12 This assessment has considered the potential cumulative construction noise effects of the scheme and other committed developments. In this area, no committed developments are due to be built at the same time as the scheme and accordingly, construction noise or vibration from the scheme is unlikely to result in any significant cumulative noise effects.

Environmental topic:	Sound, noise and vibration	SV
Appendix name:	Operational assessment report	004
Community forum area:	Greatworth to Lower Boddington	015

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1 Introduction

- 1.1.1 This appendix provides an update to Appendix SV-004-015 operational assessment report for community forum area Greatworth to Lower Boddington (CFA15) from the main Environmental Statement (ES) as a result of Amendments AP2-015-002 and AP2-015-009, as part of the Supplementary Environmental Statement (SES) and the Additional Provision 2 Environmental Statement (AP2 ES). This update should be read in conjunction with Appendix SV-004-015 operational assessment report from the main ES.

2 Scope, assumptions and limitations

2.1 Changes of relevance to this assessment

Additional Provision 2 ES

- 2.1.1 Operational sound, noise and vibration assessments have been undertaken for the following AP2 amendments:
- Greatworth Hall revisions to earthworks, land drainage and access (AP2-015-002); and
 - New Chipping Warden Bypass (AP2-015-009).

3 Effects arising during operation

3.1 Avoidance and mitigation measures

- 3.1.1 These are set out in the main ES, CFA15, Volume 2, Report 11.

3.2 Quantitative identification of impacts and effects

Ground-borne sound and vibration

- 3.2.1 The amendments do not alter the assessment of operational ground-borne sound and vibration identified in main ES Appendix SV-004-015.

Airborne sound: direct impacts and effects

- 3.2.2 The direct effects from the operation of the scheme as well as any new, amended or altered roads or railway lines (including amendment AP2-015-002 and AP2-015-009), which are identified as part of the scheme, are presented in Table 1 for those locations in the vicinity of the amendments.
- 3.2.3 The assessment information, impact criteria and significance criteria for the assessment of the incorporated mitigation case at residential and non-residential receptors are presented in Table 1. The results should be considered in conjunction with the information contained in main ES map series Sv-02 in the CFA15 Volume 5 sound, noise and vibration map book.
- 3.2.4 Explanation of the Table 1 information is provided in the main ES, Volume 5: Appendix SV-001-000 and Appendix Sv-004-015.

Table 1 : Operational noise – detailed results (AP2 ES amended)

Assessment Location		Impact criteria										Significance criteria								Significant effect
ID	Area represented	HS2 scheme only (year 15 traffic)			Do nothing (opening year baseline)			Do something (opening year baseline + year 15 traffic) ****		Change		Type of effect	Number of impacts represented	Type of receptor	Receptor design	Existing environment	Unique feature	Combined impact	Mitigation of effect	
		Day *	Night **	Max ***	Day *	Night **	Max ***	Day *	Night **	Day *	Night **									
273039	Greatworth, Banbury	61	52	71/76	43	36	44	62	52	19	17	A	2	R	T	-	-	-	-	~
273073	Greatworth, Banbury	56	47	68/71	48	35	43	57	47	8	12	A	1	R	T	-	-	-	-	~
272291	Greatworth, Banbury	41	33	54/57	68	58	68	68	58	0	0	NA	2	R	T	H	-	-	-	
273323	Greatworth, Banbury	43	34	55/58	48	35	43	50	38	1	2	NA	1	R	T	-	-	-	-	
903000	Arbury Banks, Chipping Warden	47	40	59/62	51	46	52	50	45	0	0	NA		R	T	-	-	-	-	
903001	Hogg End, Chipping Warden	47	40	59/62	51	46	52	50	46	0	0	NA		R	T	-	-	-	-	
903002	Hogg End, Chipping Warden	46	39	59/62	50	40	48	48	39	-1	-1	NA		R	T	-	-	-	-	
903003	The Close, Chipping Warden	44	37	57/60	51	46	52	51	46	1	0	NA		R	T	-	-	-	-	
903004	Banbury Road, Chipping Warden	53	46	58/61	62	57	64	59	56	-3	-1	-		R	T	-	-	-	-	OSV15-Co2
903005	Byfield Road, Chipping Warden	55	47	61/64	63	58	65	55	54	-8	-5	-		R	T	-	-	-	-	OSV15-Co2
903006	Mill Lane, Chipping Warden	45	38	58/61	50	40	48	50	40	1	1	NA		R	T	-	-	-	-	
903007	Mill Lane, Chipping Warden	44	37	59/62	50	40	48	50	40	0	0	NA		R	T	-	-	-	-	
903008	Byfield Road, Chipping Warden	53	46	60/63	67	62	69	67	62	-1	0	NA		R	T	H	-	-	-	
903009	Byfield Road, Chipping Warden	55	47	60/63	67	62	69	66	62	-1	-1	NA		R	T	H	-	-	-	
273039	Greatworth Hall, Greatworth (Office)	61	52	71/76	43	36	44	62	52	19	17	B	4	G5	T	-	-	-	-	OSV15-No1

Direct impact - Summary

- 3.2.6 The operational airborne noise impacts identified in Table 1 are summarised in Table 2, including those included in main ES Appendix 5, SV-004-015 Table 4.

Table 2 : Summary of operational airborne sound impacts

Receptor	Number of impacts		
	Minor	Moderate	Major
Residential properties	10	5	16
Non-residential properties	0	0	6
Quiet areas	None	None	None

3.3 Assessment of significance of effects

Residential receptors: direct effects- individual dwellings

- 3.3.1 Taking account of the avoidance and mitigation measures incorporated into the original scheme, the main ES assessment identified a number of residential buildings close to the route where the daytime forecast noise level does not exceed the threshold set in the Regulations but the forecast night-time noise level would exceed the World Health Organization's Interim Target of 55dB¹ or the maximum noise level (dependent on the number of train passes) as a train passes exceeds the criterion². It is therefore estimated that these buildings will be offered noise insulation as described previously in the avoidance and mitigation measures section, of Volume 2: Report 15. These buildings are indicated on Volume 5: map book - sound, noise and vibration, map series SV-02:
- The Dairy, Granary Barn, The Threshing Barn and The Forge on Culworth Road near Chipping Warden, represented by receptor reference 258470 (marked as OSV15-Do2 in Table 3); and
 - The Old Dairy and the dwelling at Greatworth Hall, Greatworth, represented by receptor reference 273039 (marked as OSV15-Do1 in Table 3). These dwellings are also identified as being likely to qualify for noise insulation as a consequence of construction noise as described earlier in this section.
- 3.3.2 The mitigation measures including noise insulation will reduce noise inside all dwellings such that it will not reach a level where it would significantly affect residents.
- 3.3.3 Taking account of the avoidance and mitigation measures identified in amendment AP2-015-002, the AP2 ES assessment reduces the operational sound levels at The Old Dairy and the dwelling at Greatworth Hall, to a level below the significant observed adverse effect level identified in main ES Appendix Sv-001-000, and therefore the

¹ Equivalent continuous level, L_{pAeq,T} 23:00-07:00 measured without reflection from the front of buildings.

² During the night (2300-0700) a significant effect is also identified where the scheme results in a maximum sound level at the façade of a building at or above: 85dB L_{pAFmax} (where the number of train pass-bys exceeding this value is less than or equal to 20); or 80dB L_{pAFmax} (where the number of train pass-bys exceeding this value is greater than 20).

likely significant operational airborne noise effect at these properties and hence the qualification for noise insulation is removed as a result of this amendment.

Non-residential receptors: direct effects

- 3.3.4 Whilst the operational airborne sound levels at Greatworth Hall offices are reduced as a result of amendment AP2-015-002, a major operational noise impact has been identified based upon the change in the airborne noise level incident at this receptor. Therefore, the conclusions presented in the main ES are not altered, specifically; Greatworth Hall offices are identified, on a precautionary basis, as being subject to a significant adverse effect denoted by OSV15-No1 in Table 1 and drawing SV-02 (see SES and AP2 ES Volume 5 Sound, Noise and Vibration Map Book). This may take the form of the activity disturbance to the people using the offices.

