

## EXHIBIT LIST

Reference No: HOL/10024

Petitioner: Buckinghamshire Standard Pack

Published to Collaboration Area: Tuesday 18-Oct-2016

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1	<a href="#">P3744 South Heath and Great Missenden Area Specific Information</a>	2 - 36
2	<a href="#">P3745 Great Missenden HaulRoad: Sift Report</a>	37 - 75







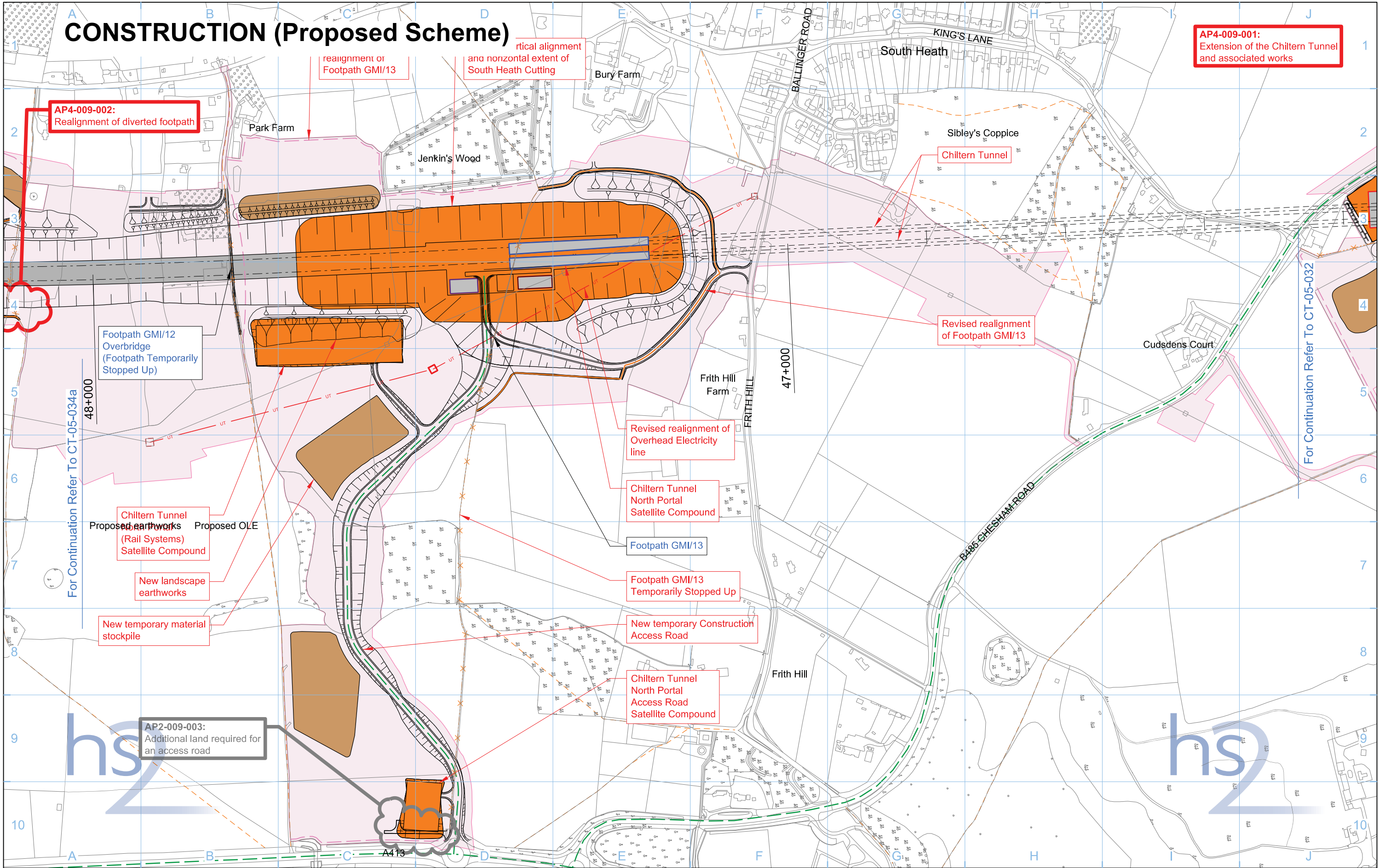
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# HS2 Phase One House of Lords Select Committee

## Great Missenden & South Heath: Area Specific Information

### Route Summary





# CONSTRUCTION (Proposed Scheme)

AP4-009-001:  
Extension of the Chiltern Tunnel  
and associated works

AP4-009-002:  
Realignment of diverted footpath

realignment or  
Footpath GMI/13

ritical alignment  
and nonzontal extent of  
South Heath Cutting

Footpath GMI/12  
Overbridge  
(Footpath Temporarily  
Stopped Up)

Chiltern Tunnel

Revised realignment  
of Footpath GMI/13

For Continuation Refer To CT-05-032

For Continuation Refer To CT-05-034a

Chiltern Tunnel  
(Rail Systems)  
Satellite Compound

New landscape  
earthworks

New temporary material  
stockpile

AP2-009-003:  
Additional land required for  
an access road

Revised realignment of  
Overhead Electricity  
line

Chiltern Tunnel  
North Portal  
Satellite Compound

Footpath GMI/13

Footpath GMI/13  
Temporarily Stopped Up

New temporary Construction  
Access Road

Chiltern Tunnel  
North Portal  
Access Road  
Satellite Compound

Legend			

Map Number	CT-05-033
Map Name	Construction Phase SES3 and AP4 ES
Community Forum Area	CFA09 Central Chilterns

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Scale at A3: 1:5,000

0 50 100 150 200 250  
Metres

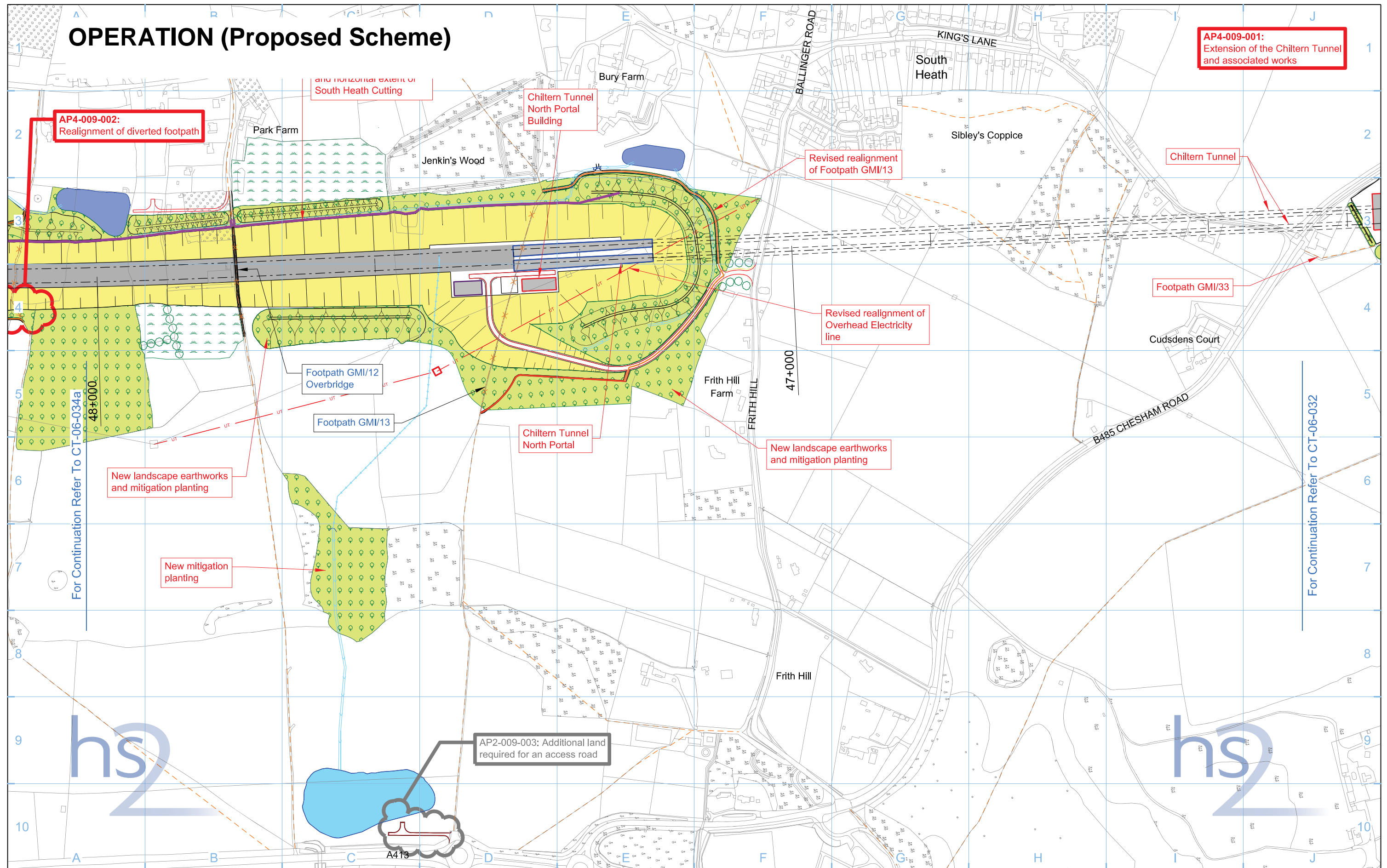
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Doc Number: C222-ATK-EV-DPL-020-050906-AP04

P02 Date: 18/09/15



# OPERATION (Proposed Scheme)



<b>Legend</b>		<b>Map Number</b> CT-06-033		 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. Registered office: One Canada Square, London, E14 5AB Scale at A3: 1:5,000 0 50 100 150 200 250 Metres © Crown copyright and database rights 2015, Ordnance Survey Licence Number 100049190. Doc Number: C222-ATK-EV-DPL-020-060906-AP04 P02 Date: 18/09/15 HOL/10024/0004
Depot, station, headhouse or portal building	Tunnel portal	Electricity substation	Land drainage area	
Ecological mitigation pond	Replacement floodplain storage	Woodland habitat creation	Wetland habitat creation	<b>Community Forum Area</b> CFA09 Central Chilterns
Grassland habitat creation	Landscape mitigation planting (scrub / woodland)	Landscape earthworks	Rail alignment formation	
Grassed areas	Sustainable placement	Engineering earthworks	Returned to suitable development use	
Public realm/Replacement community facility	County boundary	Borough / District boundary	Community forum boundary	
Watercourse diversion	Existing watercourse	Ditches - new	Hedgerow habitat creation	
Main utility works	Existing public right of way (PRoW)	New, diverted or realigned PRoW	Stopped-up PRoW	
Tunnels external extent	Rail alignment	HS2 Access road	Noise fence barrier	
Chainage (e.g. 10+000)				



# Route summary: South Heath

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The north portal of the Chiltern tunnel, including a 200m porous portal, is in an approx. 17m deep cutting, lying immediately north of Frith Hill, South Heath. From the portal the railway continues northwards for approximately 3km, passing under Leather Lane and Bowood Lane in cutting, varying from approx. 3.5m to 14m deep. Approximately 500m north of Bowood Lane the railway passes over the Wendover Dean viaduct, some 500m long and up to 18m high.

## Mitigation:

- A 3m high noise fence barriers at the top of the cutting on the eastern side;
- A 2m high landscape earthworks screening views of the noise fence barrier; and
- Landscape planting adjacent to Stocking's Wood to screen views of the portal from the west.

## Scheme developments since publication of hybrid Bill in 2013:

- A reduction in the landscape and visual effects on South Heath during both construction and operation due to the extension of the Chiltern bored tunnel to beyond South Heath (AP<sub>4</sub>);
- Land severance impacts on agriculture and habitat will be reduced;
- A reduction in the number of demolitions required;
- An overall reduction in traffic and transport impacts, particularly in South Heath; and
- Amenity effects will no longer arise due to lower noise levels, both during construction and operation.





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# HS2 Phase One House of Lords Select Committee

## Great Missenden & South Heath: Area Specific Information

### Cross Sections





# Buckinghamshire Chiltern District

# South Heath

## Chiltern Tunnel

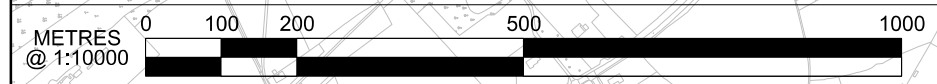
Chesham Road  
Vent Shaft























# Chiltern Tunnel North Portal

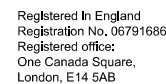
# Chiltern Tunnel North Portal Building

## Great Missenden

River Misbourne



Legends/Notes:	
	Depot, station, headhouse or portal building
	Tunnel portal
	Balancing pond
	Land drainage area
	Replacement floodplain storage
	Landscape mitigation planting (scrub / woodland)
	Grassed areas
	Engineering earthworks
	Landscape earthworks
	Rail alignment formation
	Grassland habitat creation
	Tunnels external extent
	Rail alignment
	Noise fence barrier
	Ditches - new
	Hedgerow habitat creation
	HS2 Access road
	Existing public right of way (PRoW)
	New, diverted or realigned PRoW
	Stopped-up PRoW
	UT
	Main utility works

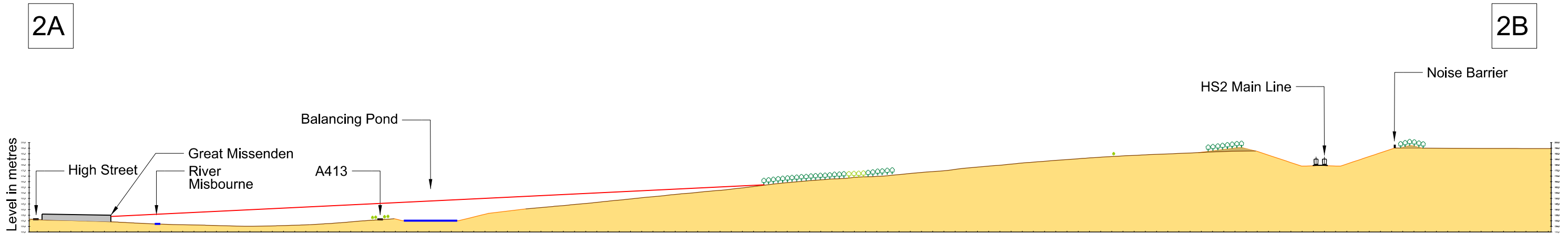
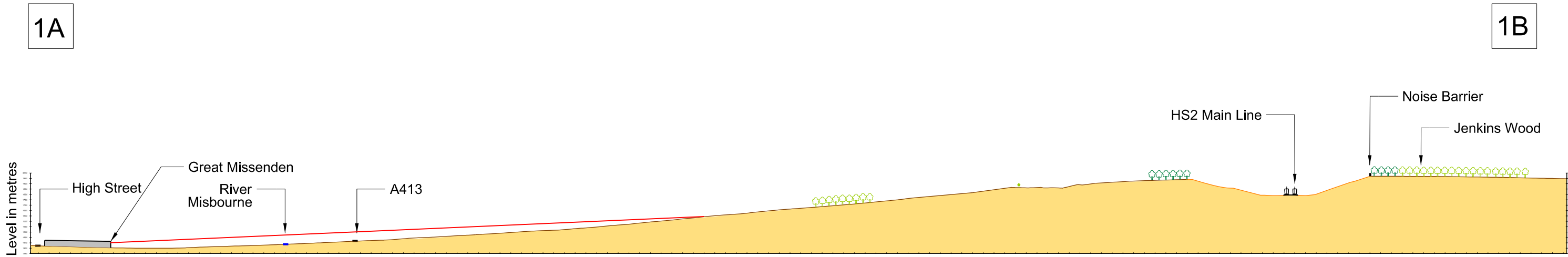


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Atkins

-HOL/10024/0007





For Location Of Sections Refer To Drawing No. C222-ATK-EV-DPL-020-760906-PET000000

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						Scale with caution as distortion can occur.				Date 28/04/2016	Scale AS SHOWN	Size A3
										Drawing No. C222-ATK-EV-DSE-020-760906-PET000000		Rev. P02

P3744 (7)

Description

Drawn

Checked

Con App

HS2 App

HOL/10024/0008





# Buckinghamshire Chiltern District

# POTTER ROW

1A

## South Heath

## Chiltern Tunnel

# Chiltern Tunnel

## North Portal

# Chiltern Tunnel North Portal Building

FRITH HILL

B485 CHESHAM ROAD

## Footpath Overbridge



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7442 (8)	Description	Drawn	Checked	Con App	HS2 App	

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










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Legends/Notes:

- |  |  |   |                                     |
|--|--|---|-------------------------------------|
|  | Depot, station, headhouse or portal building     |  | Tunnels external extent             |
|  | Tunnel portal                                    |  | Rail alignment                      |
|  | Balancing pond                                   |  | Noise fence barrier                 |
|  | Land drainage area                               |  | Ditches - new                       |
|  | Replacement floodplain storage                   |  | Hedgerow habitat creation           |
|  | Landscape mitigation planting (scrub / woodland) |  | HS2 Access road                     |
|  | Grassed areas                                    |  | Existing public right of way (PRoW) |
|  | Engineering earthworks                           |  | New, diverted or realigned PRoW     |
|  | Landscape earthworks                             |  | Stopped-up PRoW                     |
|  | Rail alignment formation                         |  | UT                                  |
|  |  |  | Main utility works                  |



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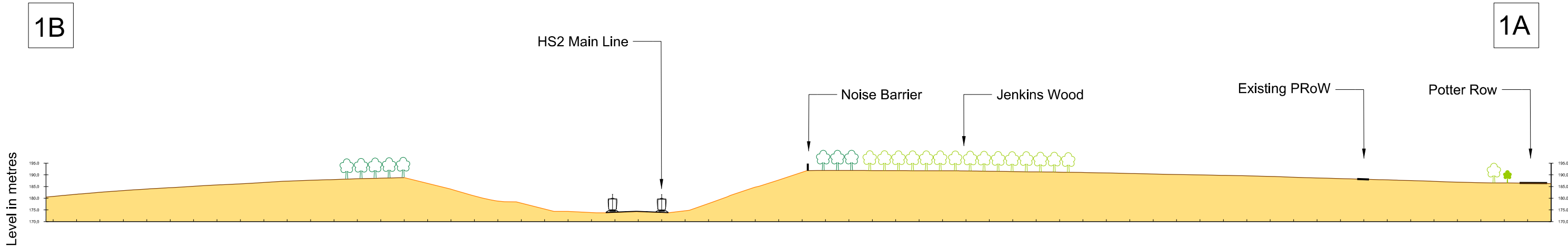
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Zone	Country South	Project/Contract			Country South Design
Design Stage	DESIGN-FOR-PETITION	Discipline/Function			Environmental
Drawing Title	Chiltern Tunnel Portal and South Heath Cutting  Cross Section Plan  Final Preliminary Design	Drawn  IE	Checked	Approved	
		Date 28/04/2016	Scale AS SHOWN	Size A3	
		Drawing No. C222-ATK-EV-DPL-020-763906-PET000000			Rev. P02

-HOL/10024/0009








P3744 (8)





Section 1A-1B (year 15)  
Scale as shown

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1B

KING'S LANE

South Heath

## Chiltern Tunnel

# Buckinghamshire Chiltern District

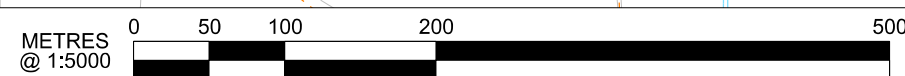
Footpath  
Overbridge

## Chiltern Tunnel North Portal

Chiltern Tunnel  
North Portal  
Building

FRITH HILL

B485 CHESHAM ROAD



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Legends/Notes:

- Legend (shades, lines, symbols):
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  - Landscape mitigation planting (scrub / woodland)
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  - Engineering earthworks
  - Landscape earthworks
  - Rail alignment formation
  - Grassland habitat creation
  - Tunnels external extent
  - Rail alignment
  - Noise fence barrier
  - Ditches - new
  - Hedgerow habitat creation
  - HS2 Access road
  - Existing public right of way (PRoW)
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  - UT - Main utility works



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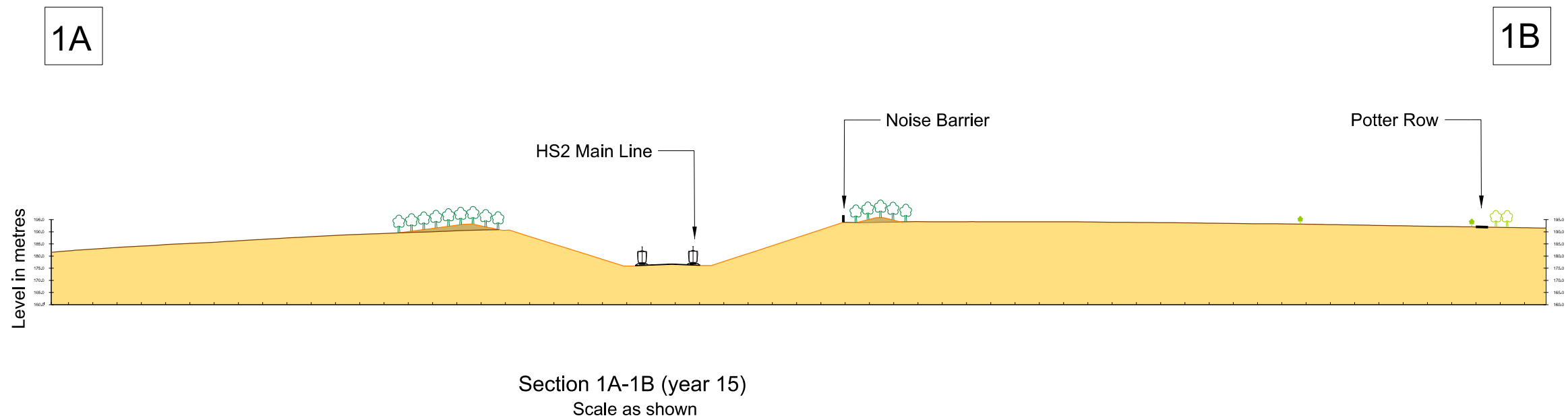
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	Final Preliminary Design	Date	Scale	Size	
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		Drawing No.			Rev.
		C222-ATK-EV-DPL-020-761906-PET000000			P02

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P3744 (10)





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P3744 (11)						Scale with caution as distortion can occur.	Drawing No.		C222-ATK-EV-DSE-020-761906-PET000000		Rev.		P02		

HOL/10024/00





# Buckinghamshire Chiltern District



POTTER ROW

KING'S LANE

South Heath

## Chiltern Tunnel

**BALLINGER ROAD**

FRITH HILL

# Chiltern Tunnel North Portal

Chiltern Tunnel  
North Portal  
Building

B485 CHESHAM ROAD

Footpath  
Overbridge

METRES  
@ 1:5000

A horizontal scale bar with alternating black and white segments. The segments are labeled 0, 50, 100, 200, and 500, representing metres. The bar is divided into five equal segments, each representing 100 metres.

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- |  |  |   |                                     |
|--|--|---|-------------------------------------|
|  | Depot, station, headhouse or portal building     |  | Grassland habitat creation          |
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|  |  |  | UT - Main utility works             |



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Zone	Country South	Project/Contract			Country South Design
Design Stage	DESIGN-FOR-PETITION	Discipline/Function			Environmental
Drawing Title	<p>Petitioners Group K</p> <p>Cross Section Plans</p> <p>Final Preliminary Design</p>	Drawn	Checked	Approved	
		IE			
		Date	Scale	Size	
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		Drawing No.			Rev.
		C222-ATK-EV-DPL-020-762906-PET000000			P02

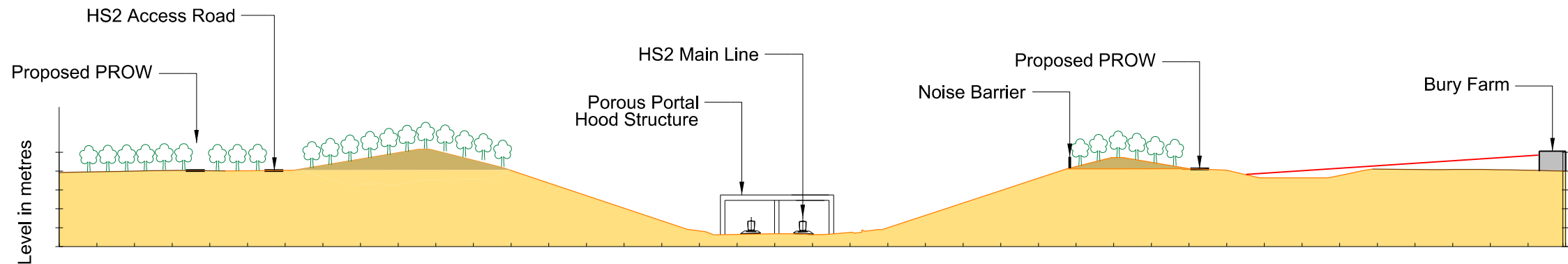
-HOL/10024/0013

P3744 (12)



1B

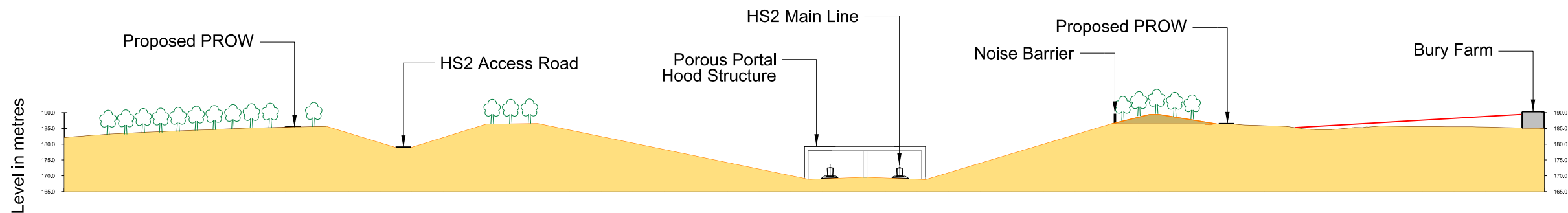
1A



Section 1A-1B (year 15)  
Scale as shown








2B

2A



Section 2A-2B (year 15)  
Scale as shown

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# **HS2 Phase One House of Lords Select Committee**

## **Great Missenden & South Heath: Area Specific Information**

### **Operational Noise Maps**



See text for full description and extent of significant effects. (\*) Where SES/AP is reason for significant effect.

Receptor/significant effect removed/added (as a result of amendment\*: APX-XXX-YYY).

SES/AP change ref.

Significant effect descriptor

Reduced effect Increased effect

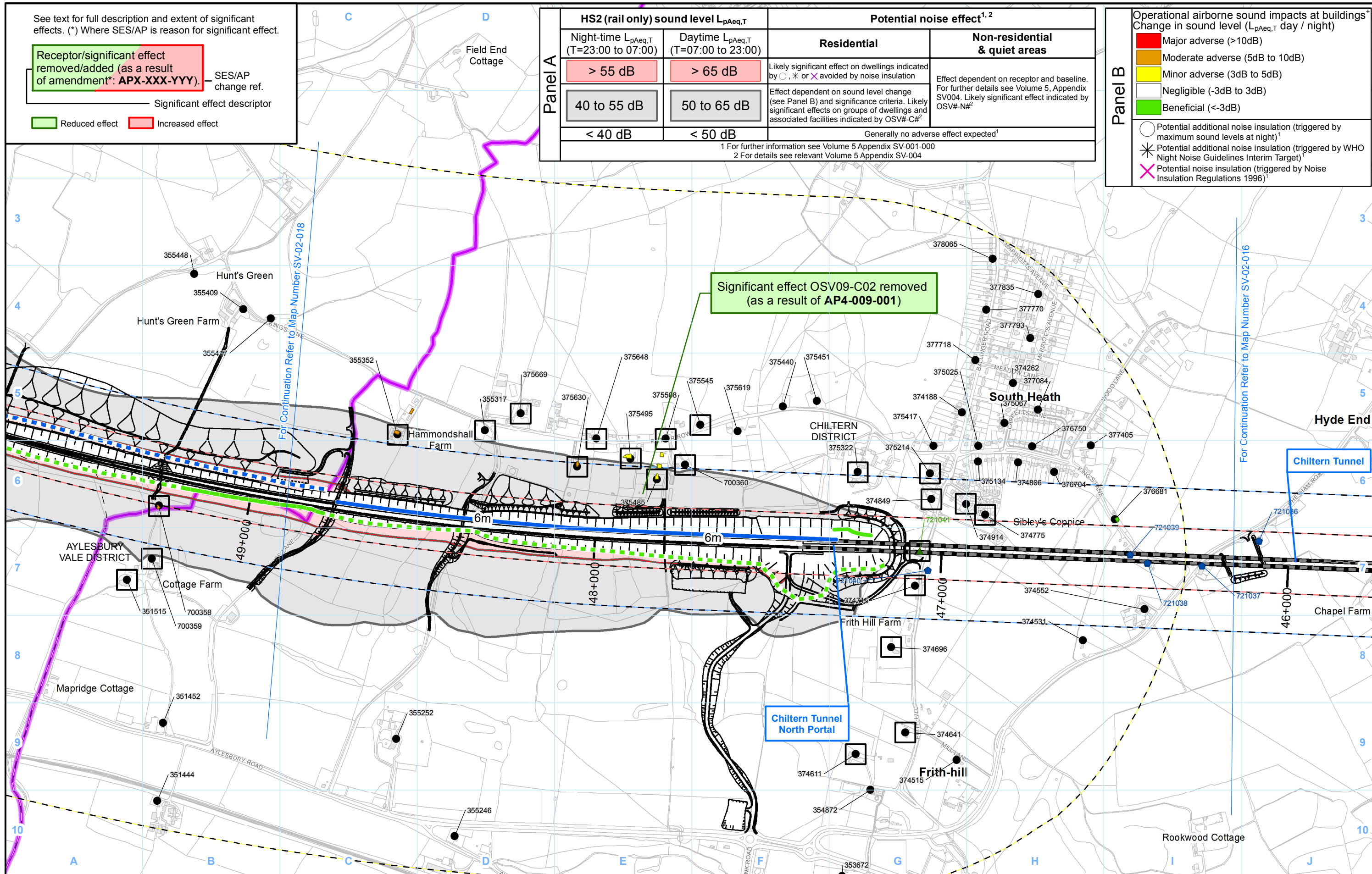
Panel A	HS2 (rail only) sound level $L_{pAeq,T}$		Potential noise effect <sup>1,2</sup>	
	Night-time $L_{pAeq,T}$ (T=23:00 to 07:00)	Daytime $L_{pAeq,T}$ (T=07:00 to 23:00)	Residential	Non-residential & quiet areas
	> 55 dB	> 65 dB	Likely significant effect on dwellings indicated by ○, * or ✕ avoided by noise insulation	Effect dependent on receptor and baseline. For further details see Volume 5, Appendix SV004. Likely significant effect indicated by OSV#-N#
	40 to 55 dB	50 to 65 dB	Effect dependent on sound level change (see Panel B) and significance criteria. Likely significant effects on groups of dwellings and associated facilities indicated by OSV#-C#	
	< 40 dB	< 50 dB	Generally no adverse effect expected <sup>1</sup>	

1 For further information see Volume 5 Appendix SV-001-000  
2 For details see relevant Volume 5 Appendix SV-004

Operational airborne sound impacts at buildings\*  
Change in sound level ( $L_{pAeq,T}$  day / night)

Major adverse (>10dB)  
Moderate adverse (5dB to 10dB)  
Minor adverse (3dB to 5dB)  
Negligible (-3dB to 3dB)  
Beneficial (<-3dB)

Potential additional noise insulation (triggered by maximum sound levels at night)<sup>1</sup>  
Potential additional noise insulation (triggered by WHO Night Noise Guidelines Interim Target)  
Potential noise insulation (triggered by Noise Insulation Regulations 1996)<sup>1</sup>



#### Legend - General features

Route in bored tunnel  
Route in green tunnel  
Route on surface  
Depot, station, headhouse or portal building  
Community forum boundary  
District/Borough boundary

Engineering earthworks: Non engineering earthworks:  
Embankment  
Cutting  
L<sub>max</sub> >= 60dB façade\*\*  
Residential buildings only  
\* Labelled with total barrier height above rail level  
\*\* ES/SES HS2 train only L<sub>max</sub> + 2.5dB façade correction

#### Legend - Sound related features

Committed developments (label as CFA#/#) - SV Only  
Envisaged mitigation to avoid / reduce significant noise effects:  
Landscaping and/or fence barriers\*  
Engineering e.g. cuttings (green tunnels separately marked)  
Envisaged measures further reducing noise effects:  
Other environmental e.g. landscaping  
Engineering e.g. cuttings  
Airborne sound study area

Ground-borne sound & vibration study area (residential and non-residential)  
Ground-borne sound & vibration study area (highly sensitive non-residential)  
Airborne sound assessment location  
Airborne sound and vibration assessment location  
Ground-borne sound and/or vibration assessment location  
Airborne sound, ground-borne sound and vibration assessment location  
Minor ground-borne noise or vibration impact\*

Map Number SV-02-017  
Map Name Operational Airborne Noise and Vibration Impacts and Likely Significant Effects (with Assessment Locations) Post-AP Petitions  
Community Forum Area CFA9: Central Chilterns

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# **HS2 Phase One House of Lords Select Committee**

## **Great Missenden & South Heath: Area Specific Information**

### **Great Missenden Temporary Access Road**



# Gt Missenden temporary access road





# Gt Missenden temporary access road

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## Description

The extension of the Chiltern tunnel moved the Chiltern tunnel portal from Mantles Wood to the north side of South Heath. To support the construction works for the new portal location, the adjacent South Heath cutting alongside Potter Row and the rail systems fit out required from this portal, a temporary access road has been incorporated into the construction works running from the A413/Link Road roundabout up to the portal worksite area.

The temporary access road would:

- Be in place for about 7 years
- Would carry up to approx. 200 2-way HGVs/day during the main cutting excavation works
- Would be removed and the land reinstated following completion of the construction works

As part of the construction works, improvements would be made to the A413/Link Road roundabout and adjacent B485 Chesham Road/A413 roundabouts to ensure that construction traffic could be accommodated on the existing junctions without causing additional congestion.



# Gt Missenden temporary access road

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## Local concerns

Following publication of the tunnel extension and inclusion of the temporary access road, local concerns regarding the access road were raised. Particular concerns related to the location of the access road and use of the existing Link Road/A413 junction, including:

- Concern over visibility of the temporary access road from viewpoints in Gt Missenden
- Concern over additional traffic and congestion on the roundabouts
- Concern regarding safety of the junction due to additional HGV traffic entering the roundabout from the new access, in particular for the adjacent children's play area on the Gt Missenden side of the Link Road roundabout
- Concern regarding additional 'rat-running' through Gt Missenden to avoid congested junctions

In recognition of this, an assurance was provided to Buckinghamshire County Council (BCC) such that the promoter would implement an alternative access road location to be brought forward by BCC subject to the alternative alignment:

- Being provided consistent with the overall railway construction programme
- Not creating new adverse environmental effects that could not be mitigated or reduced
- Not increasing the cost of the haul road.



# Gt Missenden temporary access road

## Assessment of alternative locations for the access road

The promoter provided design information to BCC and supported the assessment of alternative access road alignments. The most appropriate alternative route was identified adjacent to Leather Lane, however the assessment by the Promoter of this alternative route against the assurance given to BCC found that it:

- Would cost significantly more than the Proposed Scheme access road
- Would introduce a new likely adverse significant environmental impact due to construction works across a known archaeological site
- Would be difficult to implement to meet the construction timetable for works in this area

In addition:

- It would require the introduction of a new junction on the A413 near to Leather Lane with associated traffic delay impacts. Improvements to the Link Road junction would need to be reconsidered due to lower construction traffic use, with potentially less reduction in existing traffic congestion.
- It would require acquisition of land outwith the Bill limits, both for the access road and alongside the HS2 route. **This is not supported by the Promoter as it would require the introduction of an Additional Provision to the Bill.**
- The required land acquisition would otherwise require a separate planning process to be instigated by BCC and with potential landowner objections this could significantly delay this process.

Given the additional land required, the increased cost of the alternative options assessed, the new environmental impact, the high development costs that would be incurred through the planning process and significant additional risk to the programme, the Promoter does not support a change to the Proposed Scheme.



# Gt Missenden temporary access road

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## **Mitigation for the proposed access road**

The Promoter has been in discussion with BCC, Chiltern District Council and Gt Missenden Parish Council regarding potential mitigation for the temporary access road, as follows.

### **Traffic**

As part of separate assurances to BCC regarding construction traffic impacts on key junctions in Buckinghamshire, the Promoter has developed alternative schemes to mitigate the impact of construction traffic on both the A413/Link Road and A413/B485 Chesham Road roundabouts, taking into account access road construction traffic. This has demonstrated that improvement works can be introduced to both junctions to reduce both existing traffic congestion and the impact of construction traffic. A draft assurance is being provided to BCC regarding the implementation of agreed works to these junctions.

### **Safety**

An assurance is being provided to BCC regarding the provision of safety fence barrier alongside the children's play area and skate park during detailed design of the junction improvements.

The junction improvements and access road approach onto the roundabout would be subject to appropriate road safety audits as part of the design process and the Promoter does not consider that new safety risks would be created.

### **Visual screening**

An assurance is being provided to BCC to introduce enhanced screening of the temporary access road through revised screen bunds and introduction of some screen planting.



# Gt Missenden temporary access road

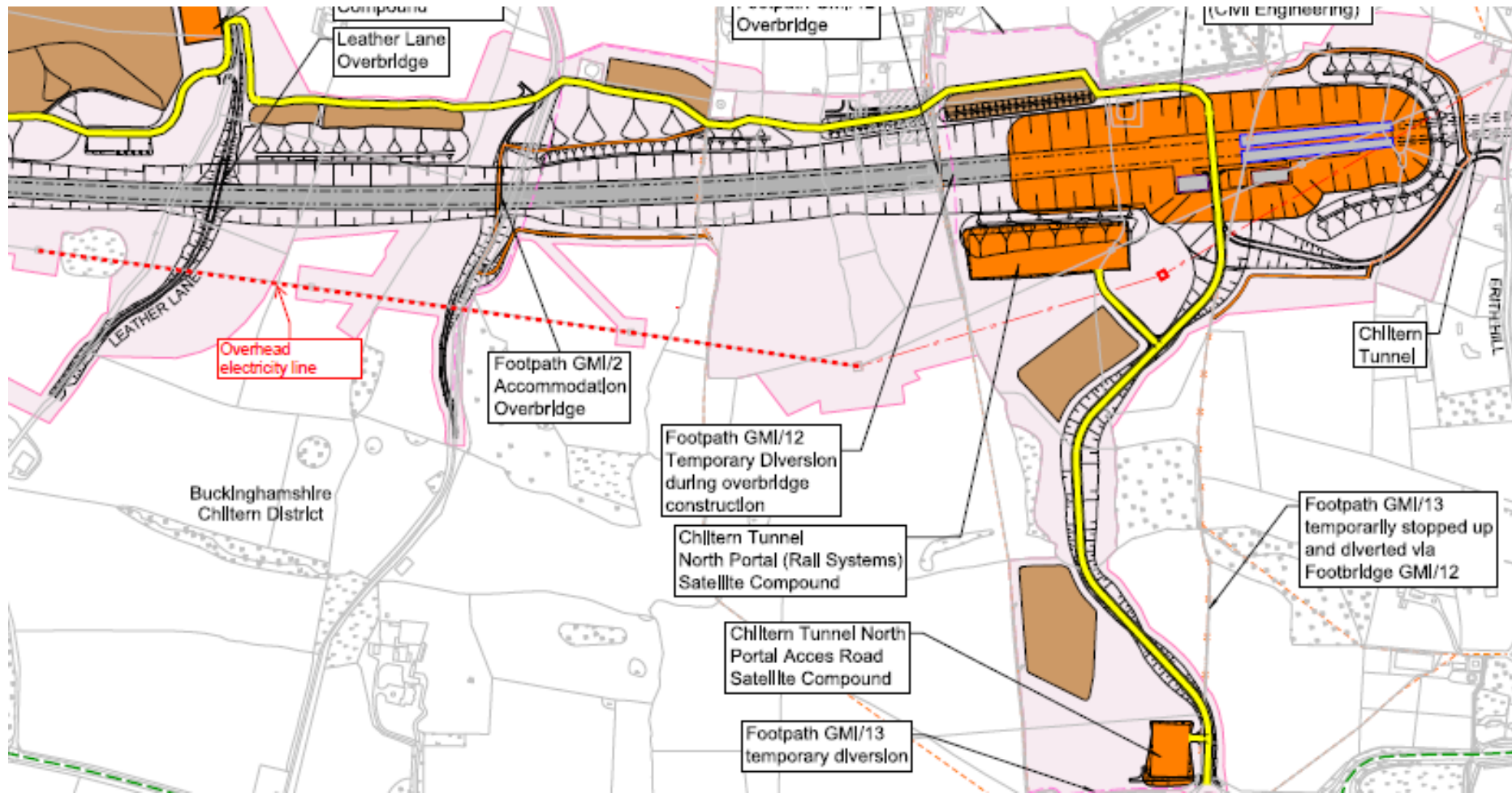
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Further information on the temporary access road:

- Construction phase drawing – see following slide
- Operational phase drawings – see following slide
- Traffic information – see following slides
  - Construction compound routes and vehicle numbers
  - Construction phase traffic flows
  - Forecast construction traffic histogram

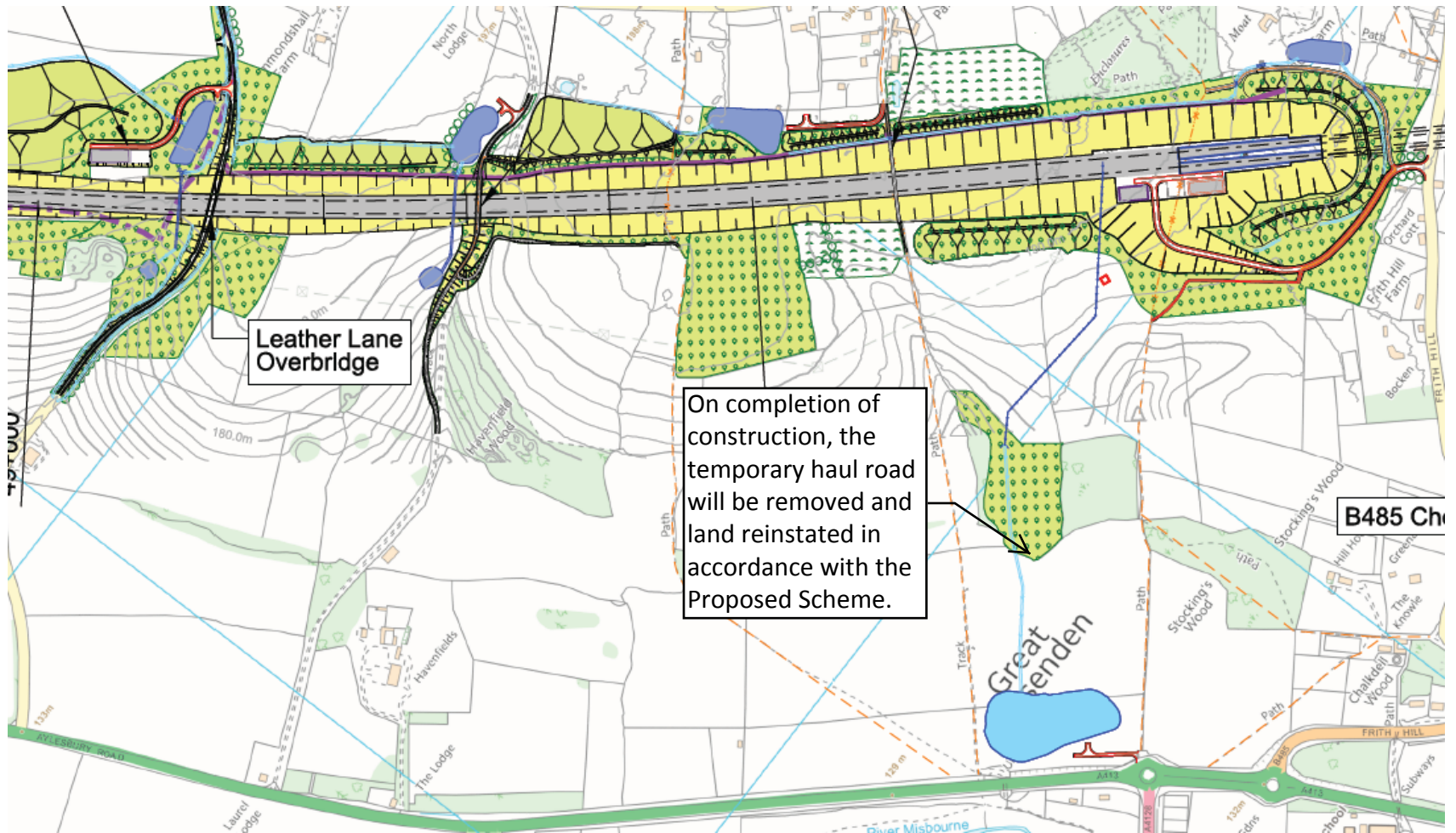


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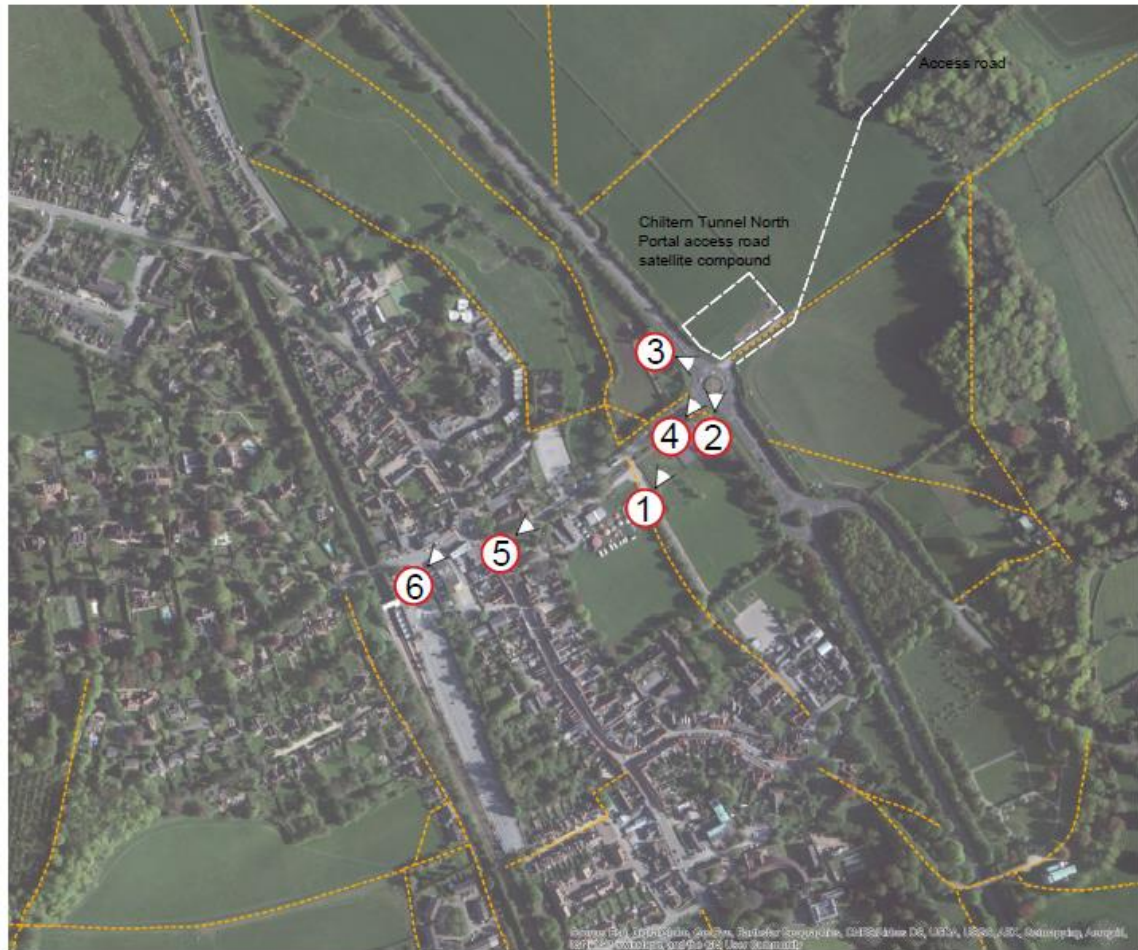


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# Great Missenden Temporary Access Road - Verified Photo Locations



Legend

① Photo location

**Public Rights of Way (PROW)**

- Bridleway
- Footpath
- Permissive Route
- Restricted Byway

These images are verifiable photographs which were produced using the verifiable photography specification within the HS2 Scope and methodology report addendum (CT-001-000/2)



# Great Missenden Temporary Access Road

## Verified Photo Location 1 of 6

Viewpoint 1 - View looking north-east across Great Missenden play area and tennis courts to the countryside beyond.



### Image Details

Camera:	Canon EOS 6D
Lens:	Canon EF 50 mm
Tripod Height:	1.6m AOD
Date:	05/10/2016
Time:	10.38am
Weather Conditions:	Light sun, little cloud cover
Focal Length:	50mm
Latitude / Longitude:	51.704728 / 0.705106



# Great Missenden Temporary Access Road

## Verified Photo Location 2 of 6

Viewpoint 2 - View looking north-east from the corner of the A4128 Link Road and the A413 towards Stooking's Wood.



### Image Details

Camera:	Canon EOS 6D
Lens:	Canon EF 50 mm
Tripod Height:	1.6m AOD
Date:	05/10/2016
Time:	10:55am
Weather Conditions:	Light sun, little cloud cover
Focal Length:	50mm
Latitude / Longitude:	51.705473 / 0.704149



# Great Missenden Temporary Access Road

## Verified Photo Location 3 of 6

Viewpoint 3 - View looking east from the grass verge adjacent to the A413 and Buryfield House towards Stocking's Wood.



### Image Details

Camera:	Canon EOS 6D
Lens:	Canon EF 50 mm
Tripod Height:	1.6m AOD
Date:	05/10/2016
Time:	11.03am
Weather Conditions:	Light sun, little cloud cover
Focal Length:	50mm
Latitude / Longitude:	51.706009 / 0.704743



# Great Missenden Temporary Access Road

## Verified Photo Location 4 of 6

Viewpoint 4 - View from the A4128 Link Road adjacent to the skate park towards Stoking's Wood.



### Image Details

Camera:	Canon EOS 6D
Lens:	Canon EF 50 mm
Tripod Height:	1.8m ACD
Date:	05/10/2016
Time:	11:12am
Weather Conditions:	Light sun, little cloud cover
Focal Length:	50mm
Latitude / Longitude:	51.705424 / 0.704606



# Great Missenden Temporary Access Road

## Verified Photo Location 5 of 6

Viewpoint 5 - View looking north-east along the A4128 Link Road tree-lined avenue towards the countryside beyond the edge of Great Missenden urban fringe.



### Image Details

Camera:	Canon EOS 6D
Lens:	Canon EF 50 mm
Tripod Height:	1.6m ACD
Date:	05/10/2016
Time:	11:21am
Weather Conditions:	Light sun, little cloud cover
Focal Length:	50mm
Latitude / Longitude:	51.704010 / 0.707321



# Great Missenden Temporary Access Road

## Verified Photo Location 6 of 6

Viewpoint 6 - View looking north-east from the footpath adjacent to Great Missenden station entrance, towards the countryside in the background.



### Image Details

Camera:	Canon EOS 6D
Lens:	Canon EF 50 mm
Tripod Height:	1.6m AOD
Date:	05/10/2016
Time:	11:28am
Weather Conditions:	Light sun, little cloud cover
Focal Length:	50mm
Latitude / Longitude:	51.703993 / 0.708731





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# HS2 Phase One House of Lords Select Committee

## Great Missenden & South Heath: Area Specific Information

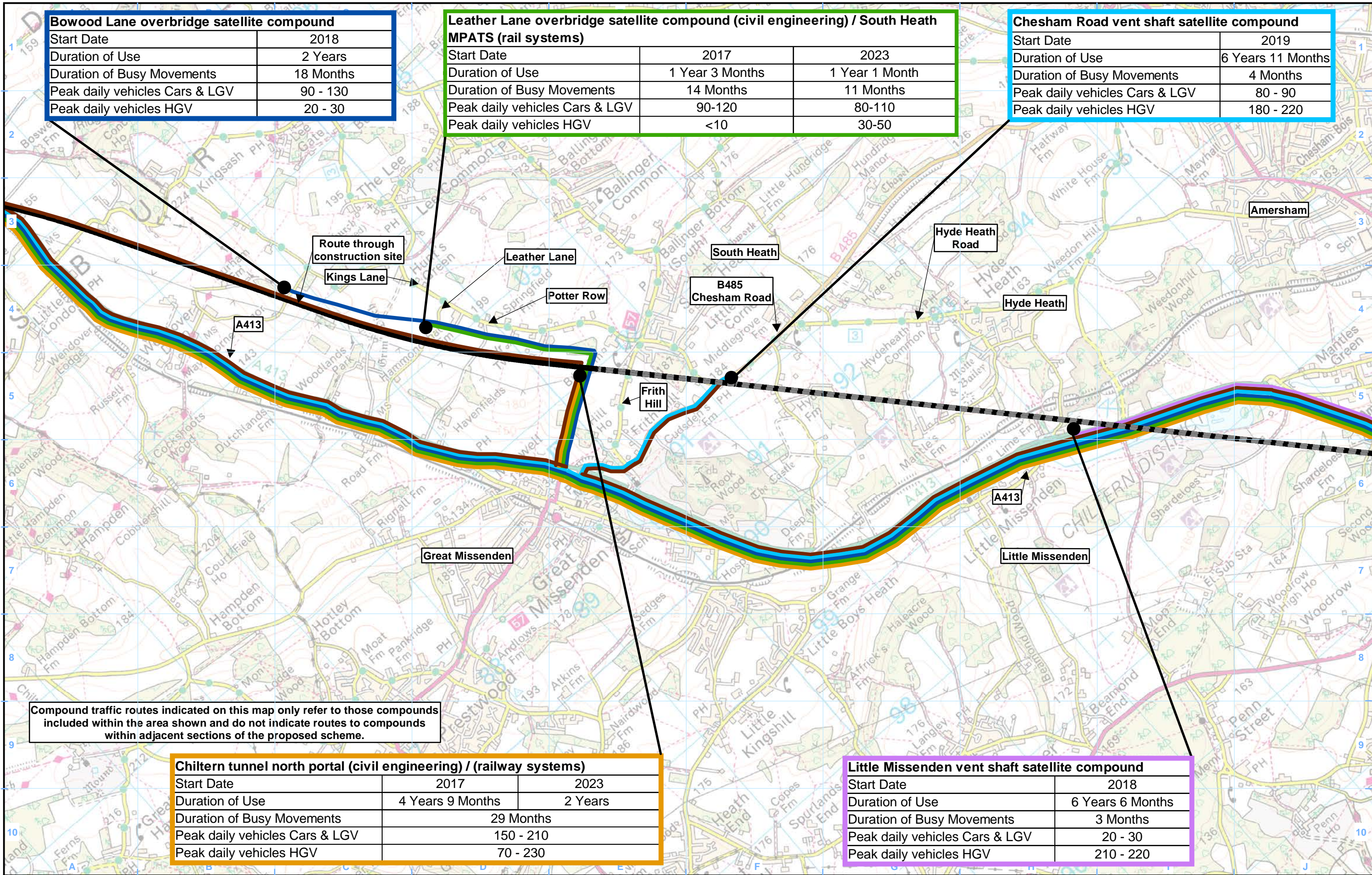
### Traffic & Transport



Bowood Lane overbridge satellite compound	
Start Date	2018
Duration of Use	2 Years
Duration of Busy Movements	18 Months
Peak daily vehicles Cars & LGV	90 - 130
Peak daily vehicles HGV	20 - 30

Leather Lane overbridge satellite compound (civil engineering) / South Heath MPATS (rail systems)		
Start Date	2017	2023
Duration of Use	1 Year 3 Months	1 Year 1 Month
Duration of Busy Movements	14 Months	11 Months
Peak daily vehicles Cars & LGV	90-120	80-110
Peak daily vehicles HGV	<10	30-50

Chesham Road vent shaft satellite compound	
Start Date	2019
Duration of Use	6 Years 11 Months
Duration of Busy Movements	4 Months
Peak daily vehicles Cars & LGV	80 - 90
Peak daily vehicles HGV	180 - 220



Compound traffic routes indicated on this map only refer to those compounds included within the area shown and do not indicate routes to compounds within adjacent sections of the proposed scheme.

Chiltern tunnel north portal (civil engineering) / (railway systems)		
Start Date	2017	2023
Duration of Use	4 Years 9 Months	2 Years
Duration of Busy Movements	29 Months	
Peak daily vehicles Cars & LGV	150 - 210	
Peak daily vehicles HGV	70 - 230	

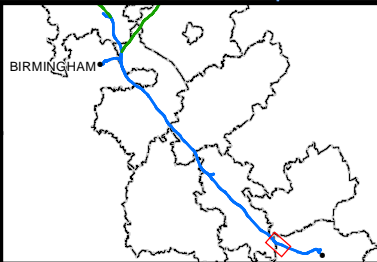
Little Missenden vent shaft satellite compound	
Start Date	2018
Duration of Use	6 Years 6 Months
Duration of Busy Movements	3 Months
Peak daily vehicles Cars & LGV	20 - 30
Peak daily vehicles HGV	210 - 220

Legend

- Construction compounds
- Route in tunnel
- Mass haul traffic route
- Route on surface
- Compound traffic routes

Description Key

Start Date	Indicative start/set up date.
Duration of Use	Estimated duration of use (years).
Duration of Busy Movements	Estimated duration with busy vehicle movements (months).
Peak daily vehicles Cars & LGV	Average daily combined two-way vehicle trips during busy period and within peak month of activity.
Peak daily vehicles HGV	



High Speed Two  
Central Chilterns CFA 9  
Construction Compounds Routes  
and Vehicle Numbers

Petitioner

Petition number

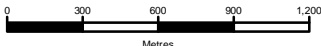


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Scale at A3: 1:30,000



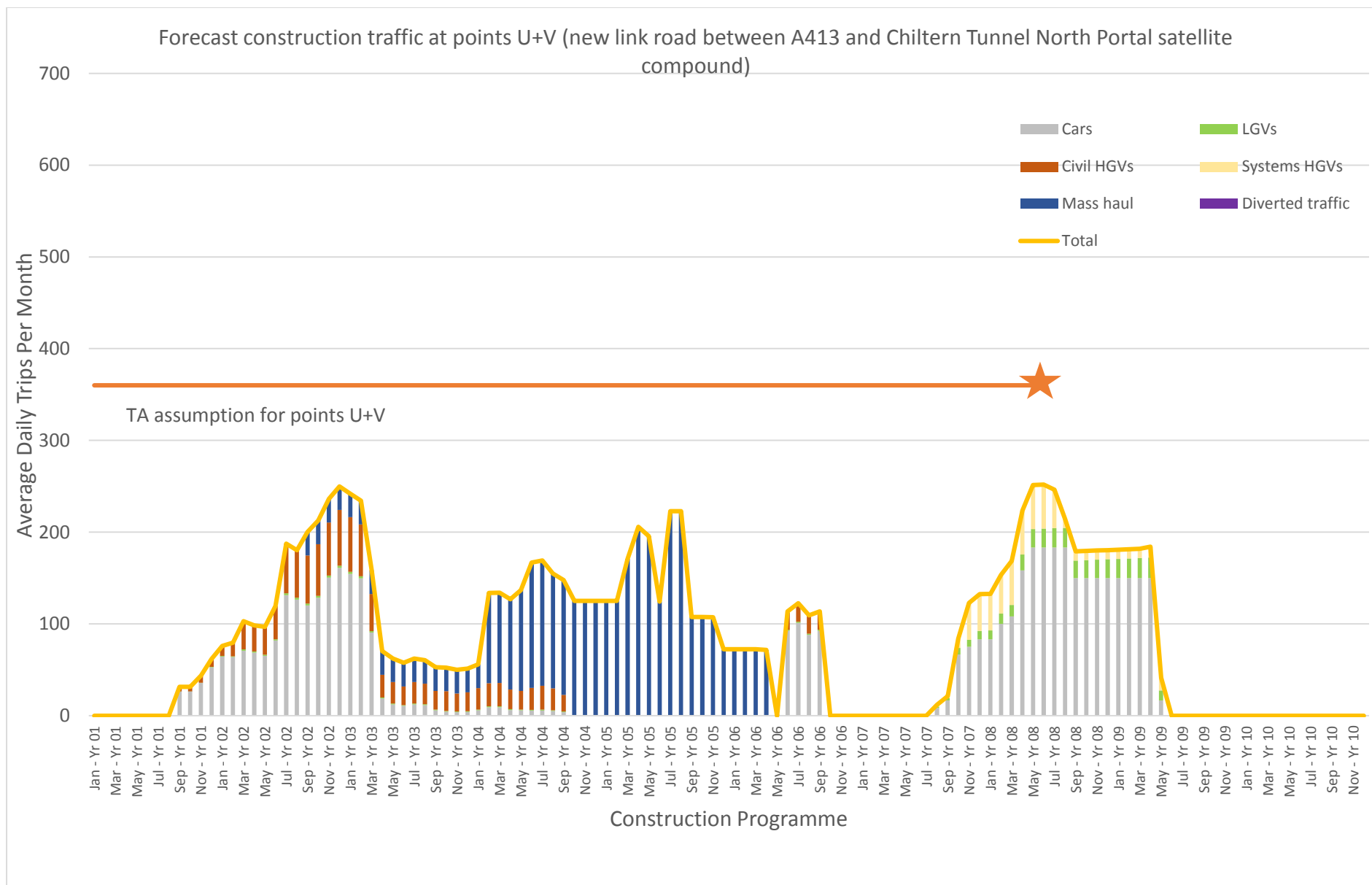




V	Southbound	2021 daily weekday	HS2	2021 daily flow plus HS2	% increase
	Cars & LGVs	0	45	45	N/A
	HGVs	0	135	135	N/A

Zone	Country South	Project/Contract		
Design Stage	DESIGN-FOR-PETITION	Discipline/Function		
Drawing Title	Central Chilterns CFA9  Daily Weekday Traffic Flows  Construction Phase	Drawn  IE	Checked	Approved
		Date 27/04/2016	Scale AS SHOWN	Size A3
		Drawing No. C222-ATK-CL-DPL-020-309623-PET000000		Rev. P02









## Great Missenden Haul Road Sift Report

Revision	Date	Issued for/Revision details	Revised by
P01	03/08/2016	Initial issue	D.Ross
P02	08/08/2016	Minor revisions following HS2 comments	D.Ross

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# London West Midlands

## Great Missenden Haul Road Sift Report

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## List of acronyms

DP	Delivery Partner
EIR	environmental information request
FOI	freedom of information
PSC	professional services consultant
PSF	professional service framework
TBM	Tunnel Boring Machine
BCC	Buckinghamshire County Council
TWAO	Transport and Works Act Order

## References

Title	Reference
HS2 Project dictionary	HS2-HS2-PM-GDE-000-000002
Style guide	HS2-HS2-CO-GDE-000-000001
HS2 – Route Development Appraisal Template	HS2-HS2-SA-TEM-000-000004
HS2 Route Development Procedure	HS2-HS2-SA-PRO-000-000007



Great Missenden Haul Road Sift Report

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# 1 Executive summary

1.1.1 This report summarises the optioneering exercise undertaken for the Great Missenden haul road in response to alternative options proposed by Buckinghamshire County Council (BCC). The options have been put forward for consideration under the conditions of the assurance provided to Buckinghamshire County Council (BCC) by the Promoter that states:

*'The Secretary of State will require the nominated undertaker to implement an alternative haul road alignment at Great Missenden subject to:*

- *Buckinghamshire County Council's alternative proposals being agreed with the nominated undertaker to a timetable consistent with the overall railway construction programme, with that agreement not to be unreasonably withheld;*
- *the alternative proposals not creating new significant adverse environmental effects that cannot be mitigated or reducing the effectiveness of existing mitigation, except by the agreed provision of an alternative;*
- *Buckinghamshire County Council securing all necessary additional powers and permissions to a timetable consistent with the overall railway construction programme; and*
- *the alternative scheme not increasing the cost of the haul road, and not impacting the economic timely and safe construction of the railway'.*

1.1.2 The report provides a summary of the options considered and compares these to the Proposed Scheme. The report provides information to demonstrate whether an option complies with the requirements of the assurance provided to BCC.

1.1.3 The following options were developed for the above locations:

- a. Option A (baseline): the Proposed Scheme at Final Preliminary Design comprising a temporary haul road from the Great Missenden roundabout providing access to the Chiltern tunnel north portal civil engineering and rail systems satellite compounds and an additional length of haul road running along the eastern side of the HS2 alignment;
- b. Option B: comprising a proposed alternative haul road located south of Leather Lane with the Chiltern tunnel north portal civil engineering and rail systems compounds retained as per the Proposed Scheme, with access provided by the proposed haul road from the A413 up to the HS2 alignment and an additional length of haul road running along the west side of the HS2 alignment;
- c. Option C: comprising a proposed alternative haul road located south of Leather Lane with the Chiltern tunnel north portal rail systems compound located at track level within the South Heath cutting, with access provided by the proposed haul road from the A413 up to the HS2 alignment. The Chiltern tunnel north portal civil engineering compound is retained as per



## Great Missenden Haul Road Sift Report

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the proposed scheme with an additional length of haul road running along the west side of the HS2 alignment providing access to the portal (similar to option B); and

- d. Option D: comprising a proposed alternative haul road located south of Leather Lane with the Chiltern tunnel north portal rail systems compound located at existing ground level adjacent to the proposed haul road with access provided by the haul road. This option was discounted following an initial review due to the presence of an overhead electricity line crossing the rail systems compound.

1.1.4 Options A, B and C have been evaluated in accordance with the SIFT criteria as defined in the HS2 – Route Development Appraisal Template (ref. HS2-HS2-SAT-TEM-000-000004 rev. P02).

1.1.5 Assessment of the options through the sift process indicates that for:

### Option B

- The option would add significant additional costs to the project;
- The construction period for this option would be increased to approximately 10 months compared to the Proposed Scheme period of 6 months, due to the additional highway works required. With land access required by September 2017 for Option A, land access for Option B would thus need to be achieved by May 2017 to ensure an equivalent completion date. The alternative design, assessment and planning process to acquire the necessary land and powers would need to be completed ahead of May 2017; this is considered unlikely to be achievable in the time available and would thus add significant risk to, and likely extend, the overall construction programme;
- Would likely add a new significant effect through the removal of known prehistoric archaeological finds in the area of the A413 junction and proposed Great Missenden Haul Road Satellite compound; and
- Would add additional delays to vehicular users of Leather Lane and to the A413 through the addition of a temporary signalised junction for the haul road access.

### Option C

- Would further increase costs as compared to the Proposed Scheme and is thus clearly less desirable than Option B;
- Would have more significant environmental impacts with the need to undertake more extensive works for the rail systems compound affecting the proposed final cutting profile in this area;
- The construction programme would be compatible with Option B;
- Would likely add a new significant effect through the removal of known prehistoric archaeological finds in the area of the A413 junction and proposed Great Missenden Haul Road Satellite compound;



## Great Missenden Haul Road Sift Report

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- Would remove approximately 0.03 hectares (equating to approximately 1%) of Havenfield Wood, an ancient woodland, although the section of woodland is not thought to be of ancient woodland designation but classified as a habitat of principal importance; and
- Would add additional delays to vehicular users of Leather Lane and to the A413 through the addition of a temporary signalised junction for the haul road access.

1.1.6 Along with the additional construction costs noted which would accrue to the Promoter, there would be substantial additional preparation costs incurred in developing the required information for an alternative alignment including design, environmental assessment, identification of new land and property impacts and preparation of planning requirements associated with the development of an alternative option, likely to be in the form of a Transport and Works Act Order (TWAO). Under the assurance provided, these preparation and associated costs would fall to BCC and could be in the order of £1million, a significant sum to be incurred for a temporary access road.

1.1.7 Based on the sift assessment, neither Option B nor Option C would comply with the requirements of the assurance and both would add additional costs and impacts to the project. As such, no change to the Proposed Scheme is proposed.



## Great Missenden Haul Road Sift Report

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# 2 Introduction

2.1.1 This document provides the description and evaluation of options for the Great Missenden haul road in accordance with the HS2 Route Development Procedure (HS2-HS2-SA-PRO-000-000007 rev. P04) and utilising HS2 – Route Development Appraisal Template document (HS2-HS2-SA-TEM-000-000004 rev. P02).

2.1.2 The Great Missenden Haul Road is required to provide access from the A413 Aylesbury Road to the HS2 alignment during the construction phase. The haul road will be used for civil engineering vehicle access to construct overbridges and the Chiltern tunnel north portal, remove excavated material from South Heath cutting and remove the Tunnel Boring Machines (TBM) from the north portal. Rail systems also require the haul road to gain access to the Chiltern north portal to undertake the portal building fit out and rail and systems installation.

2.1.3 In response to an alternative option for the haul road proposed by Buckinghamshire County Council (BCC), options for the location of the rail systems compound and access to the civil engineering compounds and other work areas have been developed and assessed.

2.1.4 The options have been put forward for consideration under the conditions of the assurance provided to Buckinghamshire County Council (BCC) by the Promoter that states:

*‘The Secretary of State will require the nominated undertaker to implement an alternative haul road alignment at Great Missenden subject to:*

- Buckinghamshire County Council’s alternative proposals being agreed with the nominated undertaker to a timetable consistent with the overall railway construction programme, with that agreement not to be unreasonably withheld;*
- the alternative proposals not creating new significant adverse environmental effects that cannot be mitigated or reducing the effectiveness of existing mitigation, except by the agreed provision of an alternative;*
- Buckinghamshire County Council securing all necessary additional powers and permissions to a timetable consistent with the overall railway construction programme; and*
- the alternative scheme not increasing the cost of the haul road, and not impacting the economic timely and safe construction of the railway’.*

2.1.5 The report provides a summary of the options considered and compares these to the Proposed Scheme. The report provides information to demonstrate whether an option complies with the requirements of the assurance provided to BCC.



## Great Missenden Haul Road Sift Report

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### 3 Scope of the Sift

- 3.1.1 The scope of this sift was to consider the alternative haul road proposal in conjunction with the requirements for rail systems and civil engineering during the construction phase.
- 3.1.2 The following options were developed for assessment:
- Option A (baseline): the Proposed Scheme at Final Preliminary Design;
  - Option B: comprising the proposed alternative haul road located south of Leather Lane with the Chiltern tunnel north portal civil engineering and rail systems compounds retained as per the Proposed Scheme;
  - Option C: comprising the proposed alternative haul road located south of Leather Lane with the Chiltern tunnel north portal rail systems compound located at track level within the South Heath cutting; and
  - Option D; comprising the proposed alternative haul road located south of Leather Lane with the Chiltern tunnel north portal rail systems compound located at existing ground level adjacent to the haul road.
- 3.1.3 The proposal for the alternative haul road proposal will not impact on any operational aspects of the Proposed Scheme.

### 4 Assumptions

#### Engineering:

- 4.1.1 The Chiltern tunnel north portal civil engineering satellite compound will be used for construction of the Chiltern tunnel north portal and removal of the TBMs. Access will be required to track level for road vehicles. This compound will be located as per the Proposed Scheme in all options considered in this sift.
- 4.1.2 During the civil engineering works access will also be required for road vehicles and low loaders to construct Footpath GMI/12 overbridge, Footpath GMI/2 Accommodation overbridge and Leather Lane overbridge.
- 4.1.3 The Chiltern tunnel north portal (rail systems) satellite compound will be used to undertake the portal building fit out and rail and systems installation. The compound is required to be approximately 12,000m<sup>2</sup>, be on a flat area and have access to track level for road vehicles to undertake portal building fit out and rail and systems installation.

#### Environmental:

- 4.1.4 All impacts reported here are potential predicted impacts and would be subject to surveys, assessment and professional interpretation and judgement as part of the EIA process.



## Great Missenden Haul Road Sift Report

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- 4.1.5 Potential impacts have been identified on the basis of an unmitigated scheme.
- 4.1.6 Property demolitions, loss, or direct impacts to designated features and resources are addressed as construction phase impacts.
- 4.1.7 Construction impacts for cultural heritage has assumed that all construction activity within the land required, temporarily or permanently, for the Proposed Scheme, will result in the removal of archaeological assets. Operational impacts for cultural heritage considers the impacts on the setting of heritage assets.

### Costs

- 4.1.8 Cost comparisons of the options utilise the same cost rates for similar items. Quantities are based on current draft alignments as suggested by HS2 Ltd. and as shown on the sketches included in Appendix A.
- 4.1.9 It has been assumed for current purposes that the junction required between the haul road near Leather Lane and the A413 (Options B and C) would be a signalised junction and costs have been included on this basis. The junction would be removed on completion of the HS2 works.

- 4.1.10 For the cost comparison, the following assumptions have been made regarding associated junction works:

#### Option A:

- Improvement of the Great Missenden/Link Road junction in line with Option M1 as submitted to BCC;
- Improvement of the A413/B485 junction in line with Option M1 as submitted to BCC;
- Inclusion of the permanent access road to the tunnel portal from Frith Hill; and
- It is assumed that the improvement works to the A413 junctions would not be removed on completion of HS2 works.

#### Options B and C:

- Provision of a signalised junction from the temporary access road onto the A413, including subsequent removal and re-instatement of the area;
- Improvement of the A413/B485 junction in line with Option M1 as submitted to BCC;
- Inclusion of the permanent access road to the tunnel portal from Frith Hill; and
- No improvement works to the Great Missenden/Link Road junction have been included under these options as no traffic assessment work has been undertaken to assess the need with altered construction traffic through this junction.



## Great Missenden Haul Road Sift Report

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- 4.1.11 For all options allowance has been included for the removal of temporary access roads and reinstatement of the area on completion.
- 4.1.12 A summary of Option A, B & C costs are included in Appendix B.



## Great Missenden Haul Road Sift Report

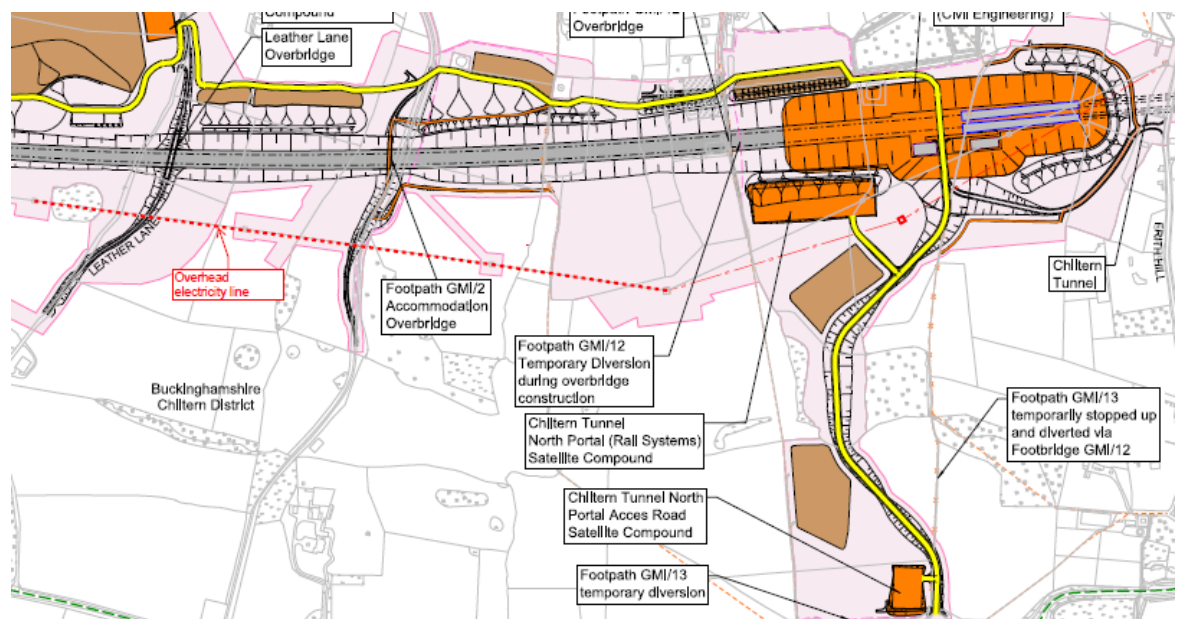
## 5 Constraints

### 5.1 Study Area

- 5.1.1 The study area includes the length of the HS2 alignment between the Chiltern tunnel north portal, Ch47+200 to Leather Lane, Ch48+800.

### 5.2 Site Constraints

- 5.2.1 Figure 5.1 shows the Proposed Scheme layout (Option A).



**Figure 5-1 Location plan of the Proposed Scheme Layout (Option A)**

### 5.3 Environmental Constraints

- 5.3.1 The environmental setting is determined by the rural landscape of the Chilterns Area of Outstanding Natural Beauty and the chalk escarpment. The area is predominantly rural in character, consisting of mixed agricultural land use interspersed with areas of woodland, scattered cottages, farmsteads and villages including Great Missenden to the south and South Heath to the south-west. Also of note within the area is the existing overhead electricity line and the existing transport corridor of the A413 and the Marylebone to Aylesbury Line which run in a south-east to north-west direction, broadly following the Misbourne Valley. The remaining road network consists of unclassified roads and tracks for private access such as the sunken lane of Leather Lane.
- 5.3.2 The main environmental constraints in this area are:
- The loss of agricultural land, predominantly of Grade 3 with some Grade 2 in the Misbourne Valley;



## Great Missenden Haul Road Sift Report

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- The loss of fields and hedgerows in the area;
- Visual intrusion in the landscape;
- Havenfield Wood, partly designated as ancient woodland, the remainder designated as a habitat of principal importance; and
- Known prehistoric archaeological finds adjacent to the A413 and Leather Lane junction.

5.3.3 The following PRoW are located in the area:-

- Footpath GMI/2;
- Footpath GMI/12; and
- Footpath GMI/13.

## 5.4 Engineering Constraints

5.4.1 As shown in Figure 5-1, a National Grid overhead electricity line is located to the west of the HS2 alignment. There would be significant crane activity at the rail systems compound associated with the off-loading of construction items, the presence of the overhead electricity line and ensuring adequate safety and clearance from the crane operations is a critical constraint.



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# 6 Option Description

6.1.1 This section provides a description of each option considered as part of the alternative proposal.

6.1.2 For those options not discounted following an initial review and assessment the qualitative assessment against the sift criteria is contained in Section 7.

## 6.2 Option A (Baseline) – Proposed Scheme (Final Preliminary Design)

6.2.1 The Proposed Scheme comprises the extended Chiltern tunnel with a temporary haul road extending from the A413 Aylesbury Road/Great Missenden roundabout to the Chiltern tunnel north portal. It is assumed that this length of access road from the A413 to the portal site will be constructed as a 6m wide macadam surfaced highway given the level of traffic expected and period of use.

6.2.2 The Chiltern tunnel north portal access road satellite compound, required to construct the temporary haul road, is located to the north-east of the Great Missenden roundabout.

6.2.3 A haul road along the east side of the HS2 alignment will provide access to construct Footpath GMI/12 overbridge, Footpath GMI/2 Accommodation overbridge and Leather Lane overbridge. This section of the haul road is assumed not to require surfacing due to the level of traffic expected and period of use and is thus costed as an unsurfaced type 1 material.

6.2.4 The temporary haul road from the A413 will be used for removing excavated material from South Heath cutting that will be transported on the A413 Aylesbury Road and reused within the HS2 scheme north of Wendover.

6.2.5 The temporary haul road will be used for removing the TBMs from the Chiltern tunnel north portal.

6.2.6 The haul road will provide access to/from the A413 Aylesbury Road and the Chiltern tunnel north portal rail systems satellite compound during the portal building fit out and rail and systems installation.

6.2.7 Footpath GMI/13 will be temporarily stopped up and diverted via Footpath GMI/12 during the construction phase.

6.2.8 Junction improvements will be required at the Great Missenden/Link Road and B485 Chesham Road roundabouts to accommodate construction traffic and mitigate delays.



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6.2.9 On completion of construction, the temporary haul road will be removed and land reinstated in accordance with the Proposed Scheme.

6.2.10 Refer to drawing no. C222-ATK-EV-DPL-020-250906-PET000000 in Appendix A for details of the Proposed Scheme.

### **6.3 Option B – Alternative Haul Road (rail systems compound as Proposed Scheme)**

6.3.1 This option comprises the extended Chiltern tunnel with the proposed alternative temporary haul road from the A413 located south of Leather Lane.

6.3.2 The Chiltern tunnel north portal civil engineering and rail systems satellite compounds are retained as per the Proposed Scheme with access provided by the haul road and a section of haul road along the west side of the HS2 alignment. It is assumed that the haul road construction from the A413 to the HS2 alignment and along the west side of the alignment to the portal site will be constructed as a 6m wide macadam surfaced highway given the level of traffic expected and period of use. This is compatible with the highway provision in Option A to the portal site.

6.3.3 The Great Missenden haul road satellite compound, required to construct the temporary haul road, is located to the south-east of the new junction with the A413 Aylesbury Road.

6.3.4 The haul road along the west side of the HS2 alignment will provide access to construct Footpath GMI/12 overbridge and Footpath GMI/2 Accommodation overbridge. The haul road along the east side of the HS2 alignment in Option A will not be required as part of this option.

6.3.5 The temporary haul road will be used for removing excavated material from South Heath cutting that will be transported on the A413 Aylesbury Road and reused within the HS2 scheme north of Wendover.

6.3.6 A new temporary traffic junction will be required to provide access from the A413 to the proposed haul road. It is assumed that this would be a signalled junction but at this stage no geometric design or traffic assessment has been undertaken.

6.3.7 A short section of Leather Lane and its junction with the A413 Aylesbury Road will be temporarily stopped up with a connection to the haul road to provide access to the A413 for local traffic.

6.3.8 Footpath GMI/12 will be temporarily stopped up and diverted via Footpath GMI/13 during the construction phase.



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- 6.3.9 It is considered that junction improvements would still be required at the B485 Chesham Road junction as for Option A and that improvements may still be required at the Great Missenden/Link Road roundabout to accommodate construction traffic and mitigate delays.
- 6.3.10 On completion of construction, the temporary haul road and junction will be removed and land reinstated in accordance with the Proposed Scheme.
- 6.3.11 Refer to drawing no. C222-ATK-EV-DPL-020-251906-PET000000 in Appendix A for details of Option B.

### **6.4 Option C – Alternative Haul Road (rail systems compound relocated to Ch48+600 at track level)**

- 6.4.1 This option comprises the extended Chiltern tunnel with the proposed alternative temporary haul road from the A413 located south of Leather Lane.
- 6.4.2 The Chiltern tunnel north portal civil engineering satellite compound is retained as per the Proposed Scheme with access provided by the haul road and a section of haul road along the west side of the HS2 alignment. It is assumed that the haul road construction from the A413 to the HS2 alignment and along the west side of the alignment to the portal site will be constructed as a 6m wide macadam surfaced highway given the level of traffic expected and period of use. This is compatible with the highway provision in Option A to the portal site.
- 6.4.3 The Chiltern tunnel north portal rail systems satellite compound is located at the bottom of South Heath cutting, at track level, with access provided by the haul road. Significant earthworks would be required to create the compound which would need to be removed and the earthworks reinstated on completion of the rail systems construction activities. This could change the interface strategy between the civil engineering and rail systems construction work packages, as well as increasing the cost of the temporary works
- 6.4.4 The Great Missenden haul road satellite compound, required to construct the temporary haul road, is located to the south-east of the new junction with the A413 Aylesbury Road.
- 6.4.5 The haul road along the west side of the HS2 alignment will provide access to construct Footpath GMI/12 overbridge and Footpath GMI/2 Accommodation overbridge. The haul road along the east side of the HS2 alignment in Option A will not be required as part of this option.
- 6.4.6 The temporary haul road will be used for removing excavated material from South Heath cutting that will be transported on the A413 Aylesbury Road and reused within the HS2 scheme north of Wendover.



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- 6.4.7 A new temporary traffic junction will be required to provide access from the A413 to the proposed haul road. It is assumed that this would be a signalled junction but at this stage no geometric design or traffic assessment has been undertaken.
- 6.4.8 A short section of Leather Lane and its junction with the A413 Aylesbury Road will be temporarily stopped up with a connection to the haul road to provide access to the A413 for local traffic.
- 6.4.9 Footpath GMI/12 will be temporarily stopped up and diverted via Footpath GMI/13 during the construction phase.
- 6.4.10 It is considered that junction improvements would still be required at the B485 Chesham Road junction as for Option A and that improvements may still be required at the Great Missenden/Link Road roundabout to accommodate construction traffic and mitigate delays.
- 6.4.11 On completion of construction, the temporary haul road and junction will be removed and land reinstated in accordance with the Proposed Scheme.
- 6.4.12 Refer to drawing no. C222-ATK-EV-DPL-020-252906-PET000000 in Appendix A for details of Option C.

## 6.5 Option D – Alternative Haul Road (rail systems compound relocated to Ch48+600 at existing ground level)

- 6.5.1 This option comprises the extended Chiltern tunnel with the proposed alternative temporary haul road from the A413 located south of Leather Lane.
- 6.5.2 The Chiltern tunnel north portal civil engineering satellite compound is retained as per the Proposed Scheme with access provided by the haul road and a section of haul road along the west side of the HS2 alignment. It is assumed that the haul road construction from the A413 to the HS2 alignment and along the west side of the alignment to the portal site will be constructed as a 6m wide macadam surfaced highway given the level of traffic expected and period of use. This is compatible with the highway provision in Option A to the portal site.
- 6.5.3 The Chiltern tunnel north portal rail systems satellite compound is located at the top of South Heath cutting, i.e. existing ground level, with access provided by the haul road.
- 6.5.4 The Great Missenden haul road satellite compound, required to construct the temporary haul road, is located to the south-east of the new junction with the A413 Aylesbury Road.
- 6.5.5 The haul road along the west side of the HS2 alignment will provide access to construct Footpath GMI/12 overbridge, Footpath GMI/2 Accommodation



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overbridge and Leather Lane overbridge. The haul road along the east side of the HS2 alignment in Option A will not be required as part of this option.

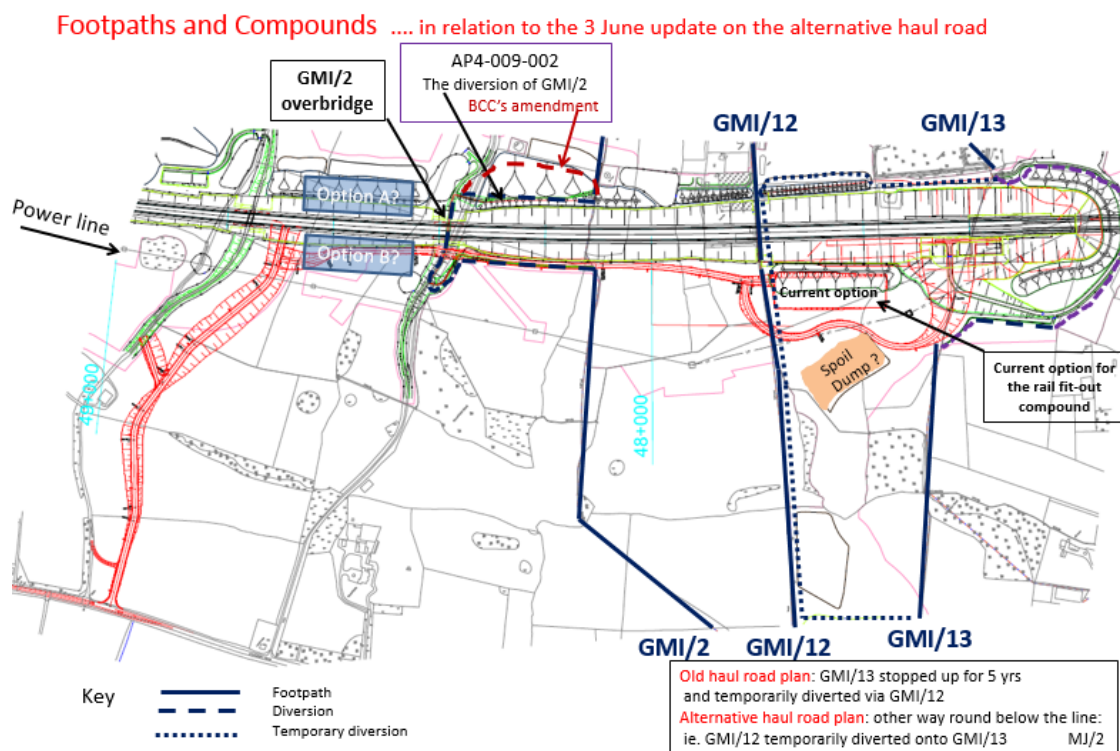
- 6.5.6 The temporary haul road will be used for removing excavated material from South Heath cutting that will be transported on the A413 Aylesbury Road and reused within the HS2 scheme north of Wendover.
- 6.5.7 A new temporary traffic junction will be required to provide access from the A413 to the proposed haul road. It is assumed that this would be a signalled junction but at this stage no geometric design or traffic assessment has been undertaken.
- 6.5.8 A short section of Leather Lane and its junction with the A413 Aylesbury Road will be temporarily stopped up with a connection to the haul road to provide access to the A413 for local traffic.
- 6.5.9 Footpath GMI/12 will be temporarily stopped up and diverted via Footpath GMI/13 during the construction phase.
- 6.5.10 It is considered that junction improvements would still be required at the B485 Chesham Road junction as for Option A and that improvements may still be required at the Great Missenden/Link Road roundabout to accommodate construction traffic and mitigate delays.
- 6.5.11 On completion of construction, the temporary haul road and junction will be removed and land reinstated in accordance with the Proposed Scheme.
- 6.5.12 Option D was discounted prior to undertaking the qualitative assessment against the sift criteria due to the impact on safety presented by the presence of the overhead electricity line. There would be significant crane activity at the rail systems compound associated with the off-loading of construction items, the presence of the overhead electricity line and ensuring adequate safety and clearance from the crane operations is a critical constraint.



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## 6.6 Buckinghamshire County Council Rail Systems Compound Options

6.6.1 Two options for the rail systems compound, Options A and B, were separately proposed by BCC as shown in Figure 6.1.



**Figure 6-1 BCC Options A & B (extract of BCC PowerPoint slide)**

6.6.2 Option A locates the rail systems compound on the east side of the HS2 alignment, it is assumed the intention is for the compound to be at track level. This option was considered but has not been assessed for the following reasons:

- Being located on the east side would result in all rail systems construction vehicles having to cross the alignment to access the compound which would not be desirable;
- Significant earthworks would be required to create the compound which would need to be removed and the earthworks reinstated on completion of the rail systems construction activities. This could change the interface strategy between the civil engineering and rail systems construction work packages, as well as increasing the cost of the temporary works; and
- Access from the rail systems compound is required to the north portal of the Chiltern tunnel to undertake the portal building fit out and rail and systems installation. If it is assumed an access road is provided at track level, in addition to the current railway corridor, this would result in additional earthworks or temporary retaining structures which would need to be



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removed and earthworks reinstated on completion of the rail system construction activities. This would potentially have an impact on cost and programme.

- 6.6.3 Option B locates the rail systems compound on the west side of the HS2 alignment and it is assumed the intention is for the compound to be at track level. This option is therefore similar to Option C which is covered in section 6.4 above and included in the assessment.

## 6.7 Options A, B & C Earthworks Summary

- 6.7.1 Table 6-1 below summarises the cut and fill earthworks quantities for Options A, B and C. All volumes are approximate and subject to change following further design development.

Item	Option A		Option B		Option C	
	Cut m <sup>3</sup>	Fill m <sup>3</sup>	Cut m <sup>3</sup>	Fill m <sup>3</sup>	Cut m <sup>3</sup>	Fill m <sup>3</sup>
Haul road (from A413)	150,000	7,000	83,000	20,000	83,000	20,000
Haul road (east/west of HS2)	400	1,500	109,000	22,000	130,000	3,000
Rail Systems compound	20,000	100	20,000	100	66,000	100
<b>Total</b>	<b>170,400</b>	<b>8,600</b>	<b>212,000</b>	<b>42,100</b>	<b>279,000</b>	<b>23,100</b>
<b>Surplus excavated material</b>	<b>161,800</b>		<b>169,900</b>		<b>255,900</b>	

**Table 6-1 Options A, B & C earthworks summary**

## 6.8 Programme implications

- 6.8.1 The construction programme for the Option A Proposed Scheme haul road is approximately 6 months. Based on the longer length of roadway required under Option B or C and the additional earthworks, it is envisaged that the construction period would increase to approximately 10 months.
- 6.8.2 In addition for Option B or C there would need to be sufficient time for the preparation of a Transport & Works Act order (TWAo) or planning application to gain the additional land required and provide the necessary planning information. It is envisaged that preparation of the TWAo could take around 9 months with additional time to be allowed for any necessary BCC Planning Inquiry.
- 6.8.3 HS2 current assumptions for the Great Missenden haul road is that construction will be undertaken as part of the Enabling Works Contract, with a land access requirement of September 2017 in order to commence construction works. For Option B or C the envisaged longer construction period would mean that land access would be required around May 2017 to ensure completion of



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construction remained compatible with the Proposed Scheme. BCC would thus need to ensure that the necessary planning approvals were complete ahead of this date, however, given the extent of design and assessment work required and subsequent time required to achieve a successful planning application and obtain the land, this would not appear to be feasible.



7 Evaluation against Assessment Criteria

Table 7-1 Great Missenden Haul Road engineering appraisal sift assessment table

Location:		Great Missenden					
Option name and description:		Great Missenden Haul Road					
OPTIONS CONSIDERED:		A (baseline)		B		C	
OPTION DESCRIPTION		Proposed Scheme – Final Preliminary Design		Alternative haul road, systems compound as Proposed Scheme		Alternative haul road, systems compound at track level	
Headings	Appraisal criteria	QUALITATIVE IMPACT DESCRIPTION and/or QUANTITATIVE ASSESSMENT	RATING	QUALITATIVE IMPACT DESCRIPTION and/or QUANTITATIVE ASSESSMENT	RATING	QUALITATIVE IMPACT DESCRIPTION and/or QUANTITATIVE ASSESSMENT	RATING
Strategic Fit	Capture whether an option meets the Project Specification	The solution is in accordance with the project specification and technical requirements.	O	The solution is in accordance with the project specification and technical requirements.	O	The solution is in accordance with the project specification and technical requirements.	O
Construction Feasibility	Assess the relative complexity of construction Assess the relative construction programme	<u>Construction complexity:</u> <ul style="list-style-type: none"><li>The haul road to the north portal requires significant excavation earthworks (pprox.. 150,000m³).</li><li>The section of haul road on the east side of the alignment requires minimal earthworks.</li><li>The rail systems compound requires excavation earthworks (pprox.. 20,000m³).</li><li>Temporary surplus excavated material is pprox.. 161,800m³.</li></ul> <u>Construction programme:</u> <ul style="list-style-type: none"><li>Current assumed access requirement of September 2017 to start haul road works.</li><li>Approx. 6month construction duration for the haul road envisaged.</li></ul>	O	<u>Construction complexity:</u> <ul style="list-style-type: none"><li>The haul road construction requires significant excavation earthworks (pprox.. 83,000m³).</li><li>The section of haul road on the west side of the alignment requires significant excavation earthworks (pprox.. 109,000m³).</li><li>The rail systems compound requires excavation earthworks (pprox.. 20,000m³).</li><li>Temporary surplus excavated material is pprox.. 169,900m³.</li></ul> <u>Construction programme:</u> <ul style="list-style-type: none"><li>Approx. 10month construction duration for the haul road envisaged.</li><li>An assumed access requirement of May 2017 would be required to start haul road works to ensure construction completion as Option A.</li><li>Alternative design, assessment and planning process to acquire the necessary land and powers would need to be completed ahead of May 2017; this is considered unlikely to be achievable.</li></ul>	---	<u>Construction complexity:</u> <ul style="list-style-type: none"><li>The haul road construction requires significant excavation earthworks (pprox.. 83,000m³).</li><li>The section of haul road on the west side of the alignment requires significant excavation earthworks (pprox.. 130,000m³).</li><li>The rail systems compound requires significant excavation earthworks (pprox.. 66,000m³).</li><li>Temporary surplus excavated material is pprox.. 255,900m³.</li></ul> <u>Construction programme:</u> <ul style="list-style-type: none"><li>Approx. 10month construction duration for the haul road envisaged.</li><li>An assumed access requirement of May 2017 would be required to start haul road works to ensure construction completion as Option A.</li><li>Alternative design, assessment and planning process to acquire the necessary land and powers would need to be completed ahead of May 2017; this is considered unlikely to be achievable.</li></ul>	---
	Assess the relative disruption to existing infrastructure, e.g. rail, highways etc	<ul style="list-style-type: none"><li>The haul road will connect to the Great Missenden roundabout, limited temporary traffic management will be required during construction and removal.</li><li>Junction improvements will be required at the Great Missenden roundabout to accommodate construction traffic and mitigate delays.</li></ul>	O	<ul style="list-style-type: none"><li>A new, temporary traffic junction will be required to provide access from the A413 to the proposed haul road.</li><li>Additional junction improvements may still be required at the Great Missenden roundabout to accommodate construction traffic and mitigate delays.</li></ul>	--	<ul style="list-style-type: none"><li>A new, temporary traffic junction will be required to provide access from the A413 to the proposed haul road.</li><li>Additional junction improvements may still be required at the Great Missenden roundabout to accommodate construction traffic and mitigate delays.</li></ul>	--
HS2 Operation Feasibility – Trains (HS2 and Network Rail)	Assess the relative flexibility and reliability of the track layout Assess the relative train maintenance and servicing arrangements	N/A – no impact on track layout or maintenance and servicing arrangements.	O	N/A – no impact on track layout or maintenance and servicing arrangements.	O	N/A – no impact on track layout or maintenance and servicing arrangements.	O
HS2 Operation Feasibility – Operations (Stations, Depots etc)	Assess the effectiveness of Location and space for station control Location and space for accommodating staff, catering, transport police and other “back of house” activities Location and space for passenger facilities such as ticket office, travel information, toilets, left luggage etc Location of ticket barriers	N/A – no impact on Operation Feasibility	o	N/A – no impact on Operation Feasibility	o	N/A – no impact on Operation Feasibility	o



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HS2 Operation Feasibility – Passengers	Assess Passenger Dispersal covering road (right of way), rail and public transport Assess the relative Passenger Connectivity at stations between high speed rail, classic rail, bus, coach, car, taxi, bicycle and pedestrians Assess the relative passenger flow characteristics during emergency evacuation and normal operation at stations Assess the relative ‘Way Finding’ of station layouts i.e. logical flow Assess the relative security or perception of security of station layouts	N/A – no impact on Operation Feasibility	o	N/A – no impact on Operation Feasibility	o	N/A – no impact on Operation Feasibility	o
Demand	Likely Relative Passenger Numbers Likely Journey Times Likely Demand	N/A – no impact on demand	o	N/A – no impact on demand	o	N/A – no impact on demand	o
Costs	Estimated whole life cycle costs to give relative assessment	N/A – capital costs include removal of all temporary access roads on completion of construction.	O	N/A – capital costs include removal of all temporary access roads on completion of construction.		N/A – capital costs include removal of all temporary access roads on completion of construction.	
	Estimated initial capital costs to give relative assessment (The capital costs include construction, land and compensation costs)	£9.00M Includes: Construction, A413/A4128 and A413/B485 junction improvement works and permanent access road from Frith Hill. Excludes: Land and property costs. Costs include indirect costs, less ECP/VE	o	£12.49M Includes: Construction, temporary A413/haul road junction, A413/B485 junction improvement works and permanent access road from Frith Hill. Excludes: Any required A413/A4128 junction improvement works. Costs include indirect costs, less ECP/VE	---	£12.91M Includes: Includes: Construction, temporary A413/haul road junction, A413/B485 junction improvement works and permanent access road from Frith Hill. Excludes: Any required A413/A4128 junction improvement works. Costs include indirect costs, less ECP/VE	---
Environment	Input from ENVIRONMENTAL APPRAISAL MATRIX	Refer to environmental appraisal sift assessment table 7-2.	o	Refer to environmental appraisal sift assessment table 7-2.	--	Refer to environmental appraisal sift assessment table 7-2.	--
Safety	Assess the relative safety during construction,	Standard construction of haul road and highways. Interface with general traffic to be considered and appropriate traffic management measures to be put in place.	o	Standard construction of haul road and highways. Interface with general traffic to be considered and appropriate traffic management measures to be put in place.	o	Standard construction of haul road and highways. Interface with general traffic to be considered and appropriate traffic management measures to be put in place.	o
	Assess the relative safety during Operations, maintenance and decommissioning , and Emergency access	Decommissioning - haul road to be removed and land reinstated on completion of construction.	o	Decommissioning - haul road and temporary junction to be removed and land reinstated on completion of construction.	o	Decommissioning - haul road and temporary junction to be removed and land reinstated on completion of construction.	o
	Previous explicit or implicit public assurances or commitments to third parties	Assurance to BCC regarding Great Missenden haul road on 29 January 2016.	o	Assurance to BCC regarding Great Missenden haul road on 29 January 2016.	o	Assurance to BCC regarding Great Missenden haul road on 29 January 2016.	o
Commercial Development	Does the option provide opportunities for development in particular for over station development	N/A	o	N/A	o	N/A	o
		Overall Rating	o	Overall Rating	---	Overall Rating	---
Preferred Option:		Option A – Proposed Scheme					
Reason:		Options B and C increase the costs (construction and development) and add significant additional programme risk compared to the Proposed Scheme.  Works to the A413/A4128 Great Missenden junction can mitigate the effects of the HS2 construction traffic and not introduce new delay.  The concerns regarding visual impact of the haul road shown for the Proposed Scheme are based on the potential visibility of the haul road; however the design would include screening and much of the route would lie in cutting as it rises up to the HS2 alignment. The Proposed Scheme will avoid the loss of known prehistoric archaeological finds adjacent to the A413 and Leather Lane junction. The Proposed Scheme will avoid additional delays to vehicular users of Leather Lane accessing and egressing the A413.  It is envisaged that the concerns regarding safety at the roundabout with the addition of construction traffic and the haul road addition would be addressed through detailed design and road safety assessments.					



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---	Major worsening on the Comparator Scheme
--	Minor worsening on Comparator Scheme
o	Neutral / no change to Comparator Scheme
+	Minor improvement on Comparator Scheme
+++	Major improvement on Comparator Scheme
N/A	Not applicable



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Table 7-2 Great Missenden Haul Road environmental appraisal sift assessment table

Location:				Great Missenden, Buckinghamshire					
Option name and description:				Great Missenden Haul Road					
OPTIONS CONSIDERED:				A		B		C	
OPTION DESCRIPTION				Proposed scheme – haul road from A413 Aylesbury Road / A4128 Link Road roundabout.		Alternative haul road running parallel to Leather Lane with rail systems compound (Chiltern tunnel north portal satellite compound) as per the Proposed Scheme.		Alternative haul road running parallel to Leather Lane with rail systems compound (Chiltern tunnel north portal satellite compound) located at track level near to Leather Lane.	
Key Sustainability Issue	Topic	STAGE: Construction or Operation	Environmental Design Aim considered (incl. Topic and Ref no.) Comment	QUALITATIVE IMPACT DESCRIPTION and/or QUANTITIVE ASSESSMENT	RATING	QUALITATIVE IMPACT DESCRIPTION and/or QUANTITIVE ASSESSMENT	RATING	QUALITATIVE IMPACT DESCRIPTION and/or QUANTITIVE ASSESSMENT	RATING
Greenhouse gas emissions and climate change	Climate adaptability	Const	CC-7 HL-7	N/A – Not assessed		N/A – Not assessed			
		Op		N/A – Not assessed		N/A – Not assessed			
	Greenhouse gas emissions	Const		N/A – Not assessed		N/A – Not assessed			
		Op		N/A – Not assessed		N/A – Not assessed			
	Energy use	Const		N/A – Not assessed		N/A – Not assessed			
		Op		N/A – Not assessed		N/A – Not assessed			
Natural and cultural resource protection and environmental enhancement	Landscape/townscape	Const	HL-10 LV-1 LV-2 LV-3 LV-6	<p>The AP4 ES reported a moderate adverse significant effect on the Misbourne Upper North LCA as a result of the introduction of new features within the rural setting and the disruption of field patterns, altering key characteristics of the landscape and a major adverse significant effect on the Lee and Buckland Common Farmland LCA during construction due to the presence of construction activities and the Leather Lane and Footpath GMI/2 accommodation overbridges, altering key characteristics of the landscape.</p> <p>Significant effects on a number of visual receptors were reported in the AP4 ES relating to the presence of construction activity changing the rural outlook for the following viewpoints to the south and west of the HS2 alignment: Views from Public Right of Way (PRoW) (Footpath GMI/12/1); view from PRoW (Footpath GMI/13/3); and view Bury Field House.</p>	o	<p>The proposed haul road of Option B from the Chiltern tunnel north portal running west parallel to the HS2 alignment will be largely within the land potentially required during construction as set out in the Proposed Scheme. Given the scale of the proposed construction activities in this area the realignment of the haul road would not alter the effects predicted for the Proposed Scheme on landscape character. The omission of the haul road opposite to Bury Field House would remove construction activities from a relatively prominent location on the rising ground. The revised access point off the A413 for the proposed haul road would be a new temporary feature in the landscape with loss of existing A413 highway boundary features. The Great Missenden Haul Road Satellite Compound and temporary material stockpiles would be visible from the A413. Access points to Leather Lane and the A413 would result in some limited loss of mature hedgerow trees.</p> <p>The construction activities would be prominent elements in the views from the footpaths (and their diversion) Viewpoint 091.3.002: view north-east from PRoW (Footpath GMI/12/1) and 091.3.001: view north-east from PRoW (Footpath GMI/13/3) although the Proposed Scheme haul road, Chiltern tunnel north portal access road satellite compound and some temporary material stockpiles would be omitted compared to the Proposed Scheme. The impact on Viewpoint AP4.091.2.003: view north-east from Bury Field House would be reduced. However, views of the proposed haul road, temporary stockpiles and Great Missenden Haul Road Satellite Compound</p>	o	<p>The proposed haul road of Option C from the Chiltern tunnel north portal running west parallel to the HS2 alignment and the Chiltern tunnel North Portal (Rail Systems) Satellite Compound will be largely within the land potentially required during construction as set out in the Proposed Scheme. Given the scale of the proposed construction activities in this area the realignment of the haul road would not alter the effects predicted for the Proposed Scheme on landscape character. The omission of the haul road opposite to Bury Field House would remove construction activities from a relatively prominent location on the rising ground. The revised access point off the A413 for the proposed haul road would be a new temporary feature in the landscape with loss of existing A413 highway boundary features. The Great Missenden Haul Road Satellite compound and temporary material stockpiles would be visible from the A413. Access points to Leather Lane and the A413 would result in some limited loss of mature hedgerow trees.</p> <p>The construction activities would be prominent elements in the views from the footpaths (and their diversion) Viewpoint 091.3.002: view north-east from PRoW (Footpath GMI/12/1) and 091.3.001: view north-east from PRoW (Footpath GMI/13/3) although the haul road, Chiltern tunnel north portal access road satellite compound and some temporary material</p>	o



Great Missenden Haul Road Sift Report

Location:				Great Missenden, Buckinghamshire					
Option name and description:				Great Missenden Haul Road					
OPTIONS CONSIDERED:				A		B		C	
OPTION DESCRIPTION				Proposed scheme – haul road from A413 Aylesbury Road / A4128 Link Road roundabout.		Alternative haul road running parallel to Leather Lane with rail systems compound (Chiltern tunnel north portal satellite compound) as per the Proposed Scheme.		Alternative haul road running parallel to Leather Lane with rail systems compound (Chiltern tunnel north portal satellite compound) located at track level near to Leather Lane.	
						would be possible from Laurel Lodge to the south.  Overall impacts relatively similar in magnitude to the Proposed Scheme.		stockpiles would be omitted compared to the Proposed Scheme. The impact on Viewpoint AP4.091.2.003: view north-east from Bury Field House would be reduced. However, views of the proposed haul road, temporary stockpiles and Great Missenden Haul Road Satellite Compound would be possible from Laurel Lodge to the south.  Overall impacts relatively similar in magnitude to the Proposed Scheme.	
		Op		The AP4 ES reported that the Misbourne Upper North LCA would not be significantly affected during operation as the majority of temporary work areas would be reinstated. Moderate adverse and significant effects on the Lee and Buckland Common Farmland LCA during operation are reported due to the presence of new infrastructure in the landscape, reducing to non-significant in years 15 and 60 when mitigation planting has established.  The AP4 ES reported significant effects on a number of visual receptors to the south and west of the HS2 alignment due to the cutting, the tunnel portal and the Footpath GMI/12 and Footpath GMI/2 accommodation overbridges and the Leather Lane overbridge. These include: Views from PRoW (Footpath GMI/12/1); view from PRoW (Footpath GMI/13/3); and view Bury Field House.	o	Changes to the haul road and temporary material stockpiles will not change the operational assessment for the Proposed Scheme assuming all temporary works are reinstated to the existing condition.	o	Changes to the haul road and temporary material stockpiles will not change the operational assessment for the Proposed Scheme assuming all temporary works are reinstated to the existing condition.	o
	Cultural heritage	Const	HL-12 CH-1 CH-4 CH-5 CH-7 CH-8	The closest designated heritage asset is the Parsonage Wood Ancient Woodland (CC062). The haul road runs against the edge of the woodland but does not encroach upon it. The setting of the wood is not important to its value and therefore there are no predicted impacts on the woodland.  There are no known archaeological remains within the footprint of the scheme, however there have been no specific archaeological surveys done in this area to date and as such there is the potential for archaeological remains from the prehistoric period onwards to be removed by the construction of the scheme.	o	Grim’s Ditch scheduled monument (CC107) and Cottage Farm listed buildings are located c. 300m to the northwest of the proposed haul road. However given that construction activities will take place closer to these assets than the haul road, no additional significant effects are predicted. A milestone (CC096) is located c. 100m to the north-west of the junction of the haul road with the A413, however the milestone won’t be affected by the Proposed Scheme. There are known prehistoric archaeological finds (CC083) in the area of the A413 junction and proposed Great Missenden Haul Road Satellite Compound. The removal of these archaeological remains is likely to cause a new significant effect and therefore a worsening over the Proposed Scheme.	--	Grim’s Ditch scheduled monument (CC107) and Cottage Farm listed buildings are located c. 300m to the northwest of the proposed haul road. However given that construction activities will take place closer to these assets than the haul road, no additional significant effects are predicted. A milestone (CC096) is located c. 100m to the north-west of the junction of the haul road with the A413, however the milestone won’t be affected by the Proposed Scheme. There are known prehistoric archaeological finds (CC083) in the area of the A413 junction and proposed Great Missenden Haul Road Satellite Compound. The removal of these archaeological remains is likely to cause a new significant effect and hence a worsening over the Proposed Scheme.	--



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								The new location of the Chiltern tunnel North Portal (Rail Systems) Satellite Compound is within the land required for the Proposed Scheme, and as such there will be no additional significant effect.	
		Op		As the haul road will be temporary and only used during construction there will be no operational effects.	o	As the haul road will be temporary and only used during construction there will be no operational effects.	o	As the haul road will be temporary and only used during construction there will be no operational effects.	o
	Biodiversity	Const	HL-10, HL-11, EC-2, EC-3, EC-4, EC-5, EC-7, WR-9	<p><b>Sites</b></p> <p>There is no effect on statutory or non-statutory sites designated for nature conservation.</p> <p><b>Habitats</b></p> <p>Ancient woodland of Jenkin’s Wood and Stocking’s Wood are both adjacent to the temporary haul route. However, no effects from emissions or dust are likely due to implementation of the Code of Construction Practice (CoCP) and the temporary nature of the construction phase.</p> <p>The temporary haul route crosses hedges likely to be habitats of principal importance (HPI) throughout. Hedges will also be affected by temporary material stockpiles.</p> <p>The haul route passes through scattered trees and semi-improved grassland near Park Farm.</p> <p><b>Species</b></p> <p>Bats – the woodland to north of the haul road holds several trees with high roosting potential. A confirmed roost is also found within a building on Potter Row. Construction of the haul road may impact flight lines.</p> <p>Minimal impact on all other known protected species.</p>	o	<p><b>Sites</b></p> <p>There is no effect on statutory or non-statutory sites designated for nature conservation.</p> <p><b>Habitats</b></p> <p>Ancient woodland of Havenfield Wood is close to the alternative temporary haul road of Option B. However, no effects from emissions or dust are likely due to implementation of the CoCP and the temporary nature of the construction phase. The extent of hedges crossed by Option B is comparable to that in the Proposed Scheme but temporary material stockpiles as indicated would not result in the loss of hedges.</p> <p><b>Species</b></p> <p>Bats – Lessened impact of route running to the south of scheme due to diversion away from flight lines linking woodland habitat and known roost site.</p> <p>Badger – Potential for slight increase in impact on badgers found in Havenfield Wood due to the proximity of Option B increasing the impact on foraging areas and possible fragmentation of territory.</p> <p>Assessment of Option B running parallel to Leather Lane and associated compound and temporary material stockpiles limited due to lack of survey data for the area (not previously surveyed as outside of Consolidated Construction Boundary (CCB)).</p> <p>Minimal impact on all other known protected species.</p> <p>Impacts of Option B similar to those of the Proposed Scheme.</p>	o	<p><b>Sites</b></p> <p>There is no effect on statutory or non-statutory sites designated for nature conservation.</p> <p><b>Habitats</b></p> <p>Ancient woodland of Havenfield Wood is close to the temporary haul road of Option C. It would remove approximately 0.03 hectares of the wood (equating to approximately 1%) which is HPI, but not a part considered to be ancient, however the national data set is not always accurate. The extent of hedges crossed by Option C is comparable to that in the Proposed Scheme but temporary material stockpiles or the satellite compound as indicated would not result in the loss of hedges.</p> <p><b>Species</b></p> <p>Bats – Lessened impact of route running to the south of the Proposed Scheme due to diversion away from flight lines linking woodland habitat and known roost site.</p> <p>Badger – Potential for increased impact on badgers found in Havenfield Wood due to the proximity of Option C has increasing the impact on foraging areas and possible fragmentation of territory.</p> <p>Assessment of Option C running parallel to Leather Lane and associated compound and temporary material stockpiles limited due to lack of survey data for the area (not previously surveyed as outside of CCB).</p> <p>Minimal impact on all other known protected species.</p> <p>Impacts of Option C similar to those of the Proposed Scheme</p>	o



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Creating sustainable communities	Water and flood risk	Op	HI-9, HL-10, WR-1, WR-2, WR-3, WR-4, WR-6, WR-8	N/A – construction only.	o	N/A – construction only.	o	N/A – construction only.	o
		Const		No significant temporary adverse effects on surface water resources during the construction period.	o	No change from the Proposed Scheme.	o	No change from the Proposed Scheme.	o
		Op		N/A – construction only.	o	N/A – construction only.	o	N/A – construction only.	o
	Air quality	Const	AQ-1, AQ-3	N/A – Not assessed		N/A – Not assessed		N/A – Not assessed	
		Op		N/A – Not assessed		N/A – Not assessed		N/A – Not assessed	
	Sound and vibration	Const	HL-13, SE-1, SV-1	The nearest noise sensitive receptors to the haul road are dwellings on Frith Hill and on Potter Row, approximately 300m and 80m from the haul road at closest approach respectively.  No dwellings in the vicinity of the haul road are forecast to experience noise levels higher than noise insulation trigger levels during construction.  No significant construction noise effects on residential communities have been identified in the vicinity of the haul road.  No likely significant construction noise or vibration effects on non-residential receptors have been identified in the vicinity of the haul road.  No significant indirect noise effects on residential and non-residential receptors have been identified in the vicinity of the haul road.	o	The nearest noise sensitive receptors to Option B are Cottage Farm Lodge on Aylesbury Road and Laurel Lodge, approximately 200m and 250m from the Option B at closest approach respectively.  No new or different significant construction noise effects are likely due to the Option B haul road.  While noise levels from the Proposed Scheme at properties to the south west of Frith Hill do not lead to significant effects, moving the haul road will reduce noise levels at these dwellings as the construction of the haul road is the construction activity leading to the highest forecast noise levels at these properties.  While noise from operation of the haul road is likely to reduce at properties on Potter Row with Option B compared to the Proposed Scheme, the highest forecast noise levels from construction are from other activities associated with construction of the cutting so are not likely to change.  Cottage Farm Lodge on Aylesbury Road and Laurel Lodge are likely to experience additional noise compared to the Proposed Scheme from construction and operation of Option B haul road, however the highest forecast noise level is unlikely to lead to a significant effect.  Overall, magnitude impacts are similar to the Proposed Scheme.	o	The nearest noise sensitive receptors to Option C are Cottage Farm Lodge on Aylesbury Road and Laurel Lodge, approximately 200m and 250m from the Option C at closest approach respectively.  No new or different significant construction noise effects are likely due to the alternative location of the haul road and satellite compound.  While noise levels from the Proposed Scheme at properties to the south west of Frith Hill do not lead to significant effects, moving the haul road will reduce noise levels at these dwellings as the construction of Option C is the construction activity leading to the highest forecast noise levels at these properties with the Proposed Scheme.  While noise from operation of the haul road is likely to reduce at properties on Potter Row with Option C compared to the Proposed Scheme, the highest forecast noise levels from construction are from other activities associated with construction of the cutting so are not likely to change.  Cottage Farm Lodge on Aylesbury Road and Laurel Lodge are likely to experience additional noise compared to the Proposed Scheme from construction and operation of Option C, however the highest forecast noise level is unlikely to lead to a significant effect.  Overall, magnitude impacts are similar to the Proposed Scheme.	o
		Op		N/A – construction only.	o	N/A – construction only.	o	N/A – construction only.	o



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	Community integrity	Const	HL-4, SE-1, SE-3, CO-1, CO-2, CO-3, CO-4, CO-10, CO-11	No significant temporary adverse effects on community during the construction period of the haul road.	o	No change from the Proposed Scheme.	o	No change from the Proposed Scheme.	o
		Op		N/A – construction only.	o	N/A – construction only.	o	N/A – construction only.	o
	Transport accessibility / severance	Const	TT-1, TT-3, TT-4, TT7, TT9	Major adverse impact identified with regard to delays to users, within the HS2 ES, due to construction traffic using the A413/A4128/HS2 haul road junction. This would impact upon vehicular users of the junction and accessibility into and out of Great Missenden.  Junction improvements will be required at the Great Missenden/Link Road and B485 Chesham Road roundabouts to accommodate construction traffic and mitigate delays.  Junction improvement designs have been tested and show a nil detriment impact (and indeed some improvement with regard to delay) upon users of the junction, during construction of the Proposed Scheme.  Footpath GMI/13 will be temporarily stopped up and diverted via Footpath GMI/12 during the construction phase, leading to additional travel distance to non-motorised users of Footpath GMI/13.	o	It is considered that junction improvements would still be required at the B485 Chesham Road junction as for the Proposed Scheme and that improvements may still be required at the Great Missenden/Link Road roundabout to accommodate construction traffic and mitigate delays.  A new signalised junction would be required on the A413 by Leather Lane. The junction would add a new control point on the A413, leading to some additional delay to vehicular users. There will also be some additional delay to vehicular users of Leather Lane (overall worsening in comparison to the Proposed Scheme).  There is no significant change with regard to non-motorised user severance (ability for non-motorised users to cross public highways), in comparison to the Proposed Scheme.  Footpath GMI/12 will be temporarily stopped up and diverted via Footpath GMI/13 during the construction phase. Improvement (in comparison to the Proposed Scheme) for users of Footpath GMI/13, but worsening for users of Footpath GMI/12. Overall, it is considered there is no significant change in comparison to the Proposed Scheme, with regard to additional travel distances and journey times for ProW users.  Overall a minor worsening due to new delays to road users.	--	It is considered that junction improvements would still be required at the B485 Chesham Road junction as for the Proposed Scheme and that improvements may still be required at the Great Missenden/Link Road roundabout to accommodate construction traffic and mitigate delays.  A new signalised junction would be required on the A413 by Leather Lane. The junction design would add a new control point on the A413, leading to some additional delay to vehicular users. There will also be some additional delay to vehicular users of Leather Lane (overall worsening in comparison to the Proposed Scheme).  There is no significant change with regard to non-motorised user severance (ability for non-motorised users to cross public highways), in comparison to the Proposed Scheme.  Footpath GMI/12 will be temporarily stopped up and diverted via Footpath GMI/13 during the construction phase. Improvement (in comparison to the Proposed Scheme) for users of Footpath GMI/13, but worsening for users of Footpath GMI/12. Overall, it is considered there is no significant change in comparison to the Proposed Scheme, with regard to additional travel distances and journey times for ProW users.  Overall a minor worsening due to new delays to road.	--
		Op		N/A – construction only. No significant impact upon traffic and transport.	o	Assuming the new junction is removed, and existing A413/Leather Lane junction re-instated, no significant difference to the Proposed Scheme.	o	Assuming the new junction is removed, and existing A413/Leather Lane junction re-instated, no significant difference to the Proposed Scheme	o
	Health & wellbeing	Const	HL-13, SE-1, SV-1	N/A – Not assessed		N/A – Not assessed			
		Op		N/A – Not assessed		N/A – Not assessed			



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	Socio-economic factors	Const	CO-8	N/A – Not assessed		N/A – Not assessed			
		Op		N/A – Not assessed		N/A – Not assessed			
Sustainable consumption and production	Agriculture, soil & land use	Const	HL16, AS-1	<p>The Proposed Scheme haul road extends for approximately 800m with a constructed width (including soil bunds) of some 50-150m. It will require the temporary use of some 8.0ha of best and most versatile (BMV) agricultural land. Overall, in this local area the temporary impact on BMV land was assessed as major/moderate and significant.</p> <p>Current information suggests that 2 (possibly 3) holdings will be affected:</p> <ul style="list-style-type: none"><li>Bury Farm (CFA09/6), 35ha grassland farm let for grazing; temporary effect of construction already assessed as moderate significant due to the proportion of the holding required and severance.</li><li>Mulberry Park Hill (CFA09/7) a grassland farm used for livestock grazing; temporary effect of construction assessed as moderate and significant.</li><li>A third holding is potentially affected at the southern end of the haul road for which no data is available.</li></ul>	o	<p>Option B haul road extends for approximately 2,000m with a constructed width of between 50-150m (including soil bunds). However, much of this land was already included in the original construction area such that the <u>additional</u> area of temporary land required is estimated to be approximately 6ha – and the temporary impact on BMV land remains major/moderate and significant.</p> <p>In terms of the holdings affected these will be:</p> <ul style="list-style-type: none"><li>Bury Farm (CFA09/6) – the area of land required remains as previously reported (18.5ha) and the overall assessment of effect remains as previously assessed - moderate significant due to the proportion of the holding required and severance.</li><li>Springfield Farm (CFA09/8) a 24ha grassland farm let for grazing. There would a marginal increase in the area of land required for the haul route but the overall effect remains as previously assessed - moderate adverse (which is significant) due to the proportion of the holding required.</li><li>Strawberry Hill Farm (CFA10/2), a 220ha arable and grassland farm. The area of agricultural land required on a temporary basis for the Proposed Scheme was 43ha and assessed as a major/moderate significant effect. Option B would increase the area of land required by a further 1-2ha but the impact would remain major/moderate which is significant.</li><li>Mulberry Park Hill (CFA09/7) would lose the use of a further approximately 6ha of agricultural land alongside Leather Lane for a temporary period. Overall, the temporary effect remains as previously assessed – moderate and significant.</li></ul> <p>Overall, the magnitude of impacts is considered a minor worsening over the Proposed Scheme due to the additional land required during construction.</p>	--	<p>Option C is very similar to Option B.</p> <p>The haul road extends for approximately 2,000m with a constructed width of between 50-150m (including soil bunds). However, much of this land was already included in the original construction area such that the <u>additional</u> area of temporary land required is estimated to be approximately 6.5ha – and the temporary impact on BMV land remains major/moderate and significant.</p> <p>In terms of the holdings affected these will be:</p> <ul style="list-style-type: none"><li>Bury Farm (CFA09/6) – the area of land required remains as previously reported (18.5ha) and the overall assessment of effect remains as previously assessed - moderate significant due to the proportion of the holding required and severance.</li><li>Springfield Farm (CFA09/8) a 24ha grassland farm let for grazing. There would a slightly greater increase (0.5ha) in the area of land required for the haul route and satellite compound but the overall effect remains as previously assessed moderate due to the proportion of the holding required.</li><li>Strawberry Hill Farm (CFA10/2) a 220ha arable and grassland farm. The area of agricultural land required on a temporary basis for the Proposed Scheme was 43ha and assessed as a major/moderate significant effect. Option C would increase the area of land required by a further 1-2ha but the impact would remain a major/moderate which is significant.</li><li>Mulberry Park Hill (CFA09/7) would lose the use for a temporary period of a further approximately 6ha of agricultural land alongside Leather Lane. Overall, the temporary effect remains as previously assessed –</li></ul>	--



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										moderate and significant.		
										Overall, the magnitude of impacts is considered a minor worsening over the Proposed Scheme due to the additional land required during construction.		
		Op		N/A – construction only.	o	N/A – construction only.	o	N/A – construction only.	o			
	Land quality	Const	LQ-1, LQ-7	N/A – Not assessed		N/A – Not assessed						
		Op		N/A – Not assessed		N/A – Not assessed						
	Waste & material resources	Const	HL-14, HL15, WM-1	N/A – Not assessed		N/A – Not assessed						
Op			N/A – Not assessed		N/A – Not assessed							
				Overall Rating	o		Overall Rating	--		Overall Rating	--	
Reason for overall rating:				The Proposed Scheme.			Overall a minor worsening over the Proposed Scheme due to worsening of impacts to cultural heritage assets due to the removal known prehistoric archaeological finds (CC083) in the area of the A413 junction and proposed Great Missenden Haul Road Satellite Compound likely resulting in a new significant effect; additional agricultural land temporarily required; a worsening for traffic impacts due to new temporary signalised junction on the A413 and additional delays to Leather Lane traffic. Improvement may still be required at the Great Missenden/Link Road roundabout to accommodate construction traffic and mitigate delays.			Similar to Option B, a minor worsening over the Proposed Scheme due to worsening of impacts similar to Option B to heritage assets, likely resulting in a new significant effect; additional agricultural land temporarily required; a worsening of traffic impacts due to new temporary signalised junction on the A413 and additional delays to Leather Lane traffic. Improvement may still be required at the Great Missenden/Link Road roundabout to accommodate construction traffic and mitigate delays.		



[insert title] Sift Report

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## 8 Level of sift

8.1.1 This report applies to Sift Level 5.

## 9 Conclusions and recommendations

### 9.1 Conclusions

9.1.1 The assessment indicates that the most appropriate alternative option for a haul road near Leather Lane would be Option B, which would achieve the same outcome as Option C but with less impact on final earthworks and with slightly less cost.

9.1.2 For Option B to be considered an acceptable alternative to Option A then it must demonstrate that it could provide an appropriate equivalent construction access which could be delivered in-line with the assurance requirements as provided by the Promoter to BCC; namely no additional cost, no new significant environmental impacts and no impact on programme. The sift assessment indicates the following:

- Cost – Option B is assessed at £12.49m construction cost, compared to £9.00m for Option A (the Proposed Scheme). This cost difference would increase if improvement works were required at the A413/A4128 Great Missenden roundabout as part of the mitigation works, as Option B currently excludes any works at this junction. Option B thus fails the assurance on cost grounds.
- A new likely adverse significant effect through the removal of known prehistoric archaeological finds in the area of the A413 junction and proposed Great Missenden Haul Road Satellite compound. Option B thus fails the assurance on environmental grounds;
- Additional delays to vehicular users of the A413 and Leather Lane.
- Programme – The current HS2 programme assumptions assume land access is required for haul road construction in September 2017, as part of the Early Works Contract. Option B & C construction activities to install the temporary haul road are estimated to take approx. 10months or some 4 months longer than the Proposed Scheme. Together with the development time to acquire the land necessary before construction commences, it is likely that there would be a delay to availability of the haul road for construction purposes affecting the HS2 construction programme. Options B & C would thus add significant risk to, and likely extend, the construction programme, thus failing the assurance on programme grounds.



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[insert title] Sift Report

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- 9.1.3 In addition to the point cost estimate comparison between options, there would be significant additional costs to be incurred in the development of the appropriate planning application, necessary to acquire the additional land necessary for any alternative option. This would need to be developed and promoted by BCC and which is envisaged would need to be progressed through a Transport & Works Act Order (TWAo). This would require detailed environmental appraisal, land acquisition and appraisals which could take approximately 9 months to complete and submit to a Planning Inquiry. Associated costs would be high, likely >£1m based on previous experience.

## 9.2 Recommendations

- 9.2.1 Given the increased cost of the alternative options, the high development costs that would be incurred and significant additional programme risk, it is not recommended to change the Proposed Scheme.
- 9.2.2 The Promoter has submitted information to BCC indicating that works to the A413/A4128 Great Missenden junction can mitigate the effects of the HS2 construction traffic and not introduce new delay; this would provide a legacy benefit to the operation of this junction. It would refute concerns regarding additional congestion due to HS2 traffic
- 9.2.3 The concerns regarding visual impact of the haul road shown for the Proposed Scheme are based on the potential visibility of the haul road; however the design would include screening and much of the route would lie in cutting as it rises up to the HS2 alignment. The Proposed Scheme will avoid the loss of known prehistoric archaeological finds adjacent to the A413 and Leather Lane junction. The Proposed Scheme will avoid additional delays to vehicular users of Leather Lane accessing and egressing the A413 and avoid introducing an additional junction onto the A413.
- 9.2.4 It is envisaged that the concerns regarding safety at the roundabout with the addition of construction traffic and the haul road addition would be addressed through detailed design and road safety assessments.



## Appendices

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# Appendix A Option Sketches

## A.1 C222-ATK-EV-DPL-020-250906-PET000000

Great Missenden Haul Road Option A – Proposed Scheme, Construction Phase

## A.2 C222-ATK- EV-DPL-020-251906-PET000000

Great Missenden Haul Road Option B – Construction Phase

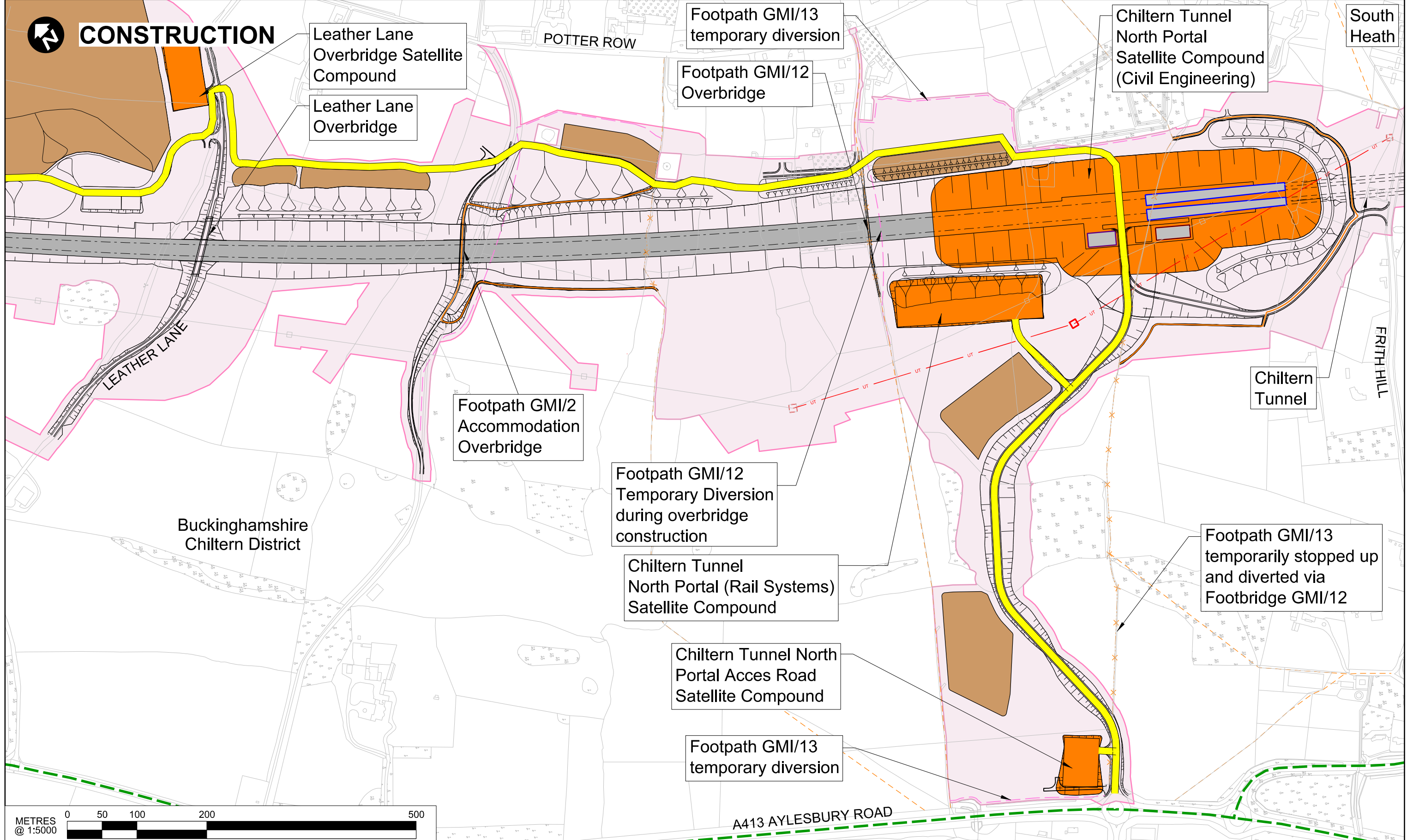
## A.3 C222-ATK- EV-DPL-020-252906-PET000000

Great Missenden Haul Road Option C – Construction Phase

## A.4 C222-ATK- EV-DPL-020-260906-PET000000

Great Missenden Haul Road Options A, B & C – Operation Phase





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745 (34)						
Description		Drawn	Checked	Con App	HS2 App	

Legends/Notes:	
Satellite construction compound	Temporary site access route / haul route
Main construction compound	Construction traffic route
Tunnel portal	Existing public right of way (PRoW)
Rail alignment formation	New, diverted or realigned PRoW
Tunnels external extent	Stopped-up PRoW
Rail alignment	Temporary PRoW
Engineering earthworks	Temporary material stockpile
Landscape earthworks	
Land potentially required during construction	

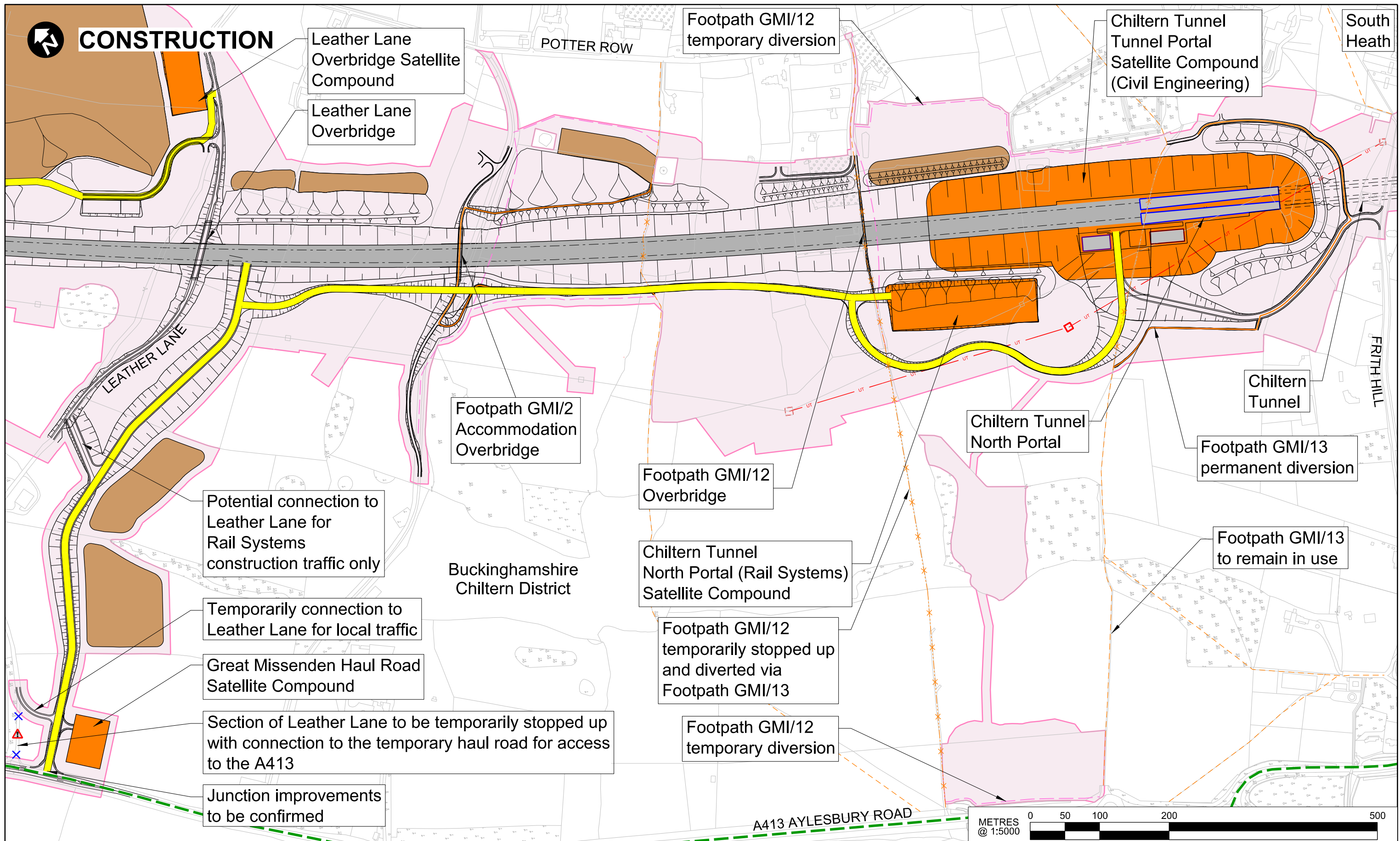
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Registered office:  
One Canada Square,  
London, E14 5AB

Creator/Originator  
Atkins

Zone	Country South	Project/Contract	Country South Design				
Design Stage	DESIGN-FOR-PETITION	Discipline/Function	Environmental				
Drawing Title	Great Missenden Haul Road  Option A - Proposed scheme  Construction Phase	Drawn	IE	Checked	Approved		
		Date	11/07/2016	Scale	AS SHOWN	Size	A3
		Drawing No.	C222-ATK-EV-DPL-020-250906-PET000000			Rev.	P00.1

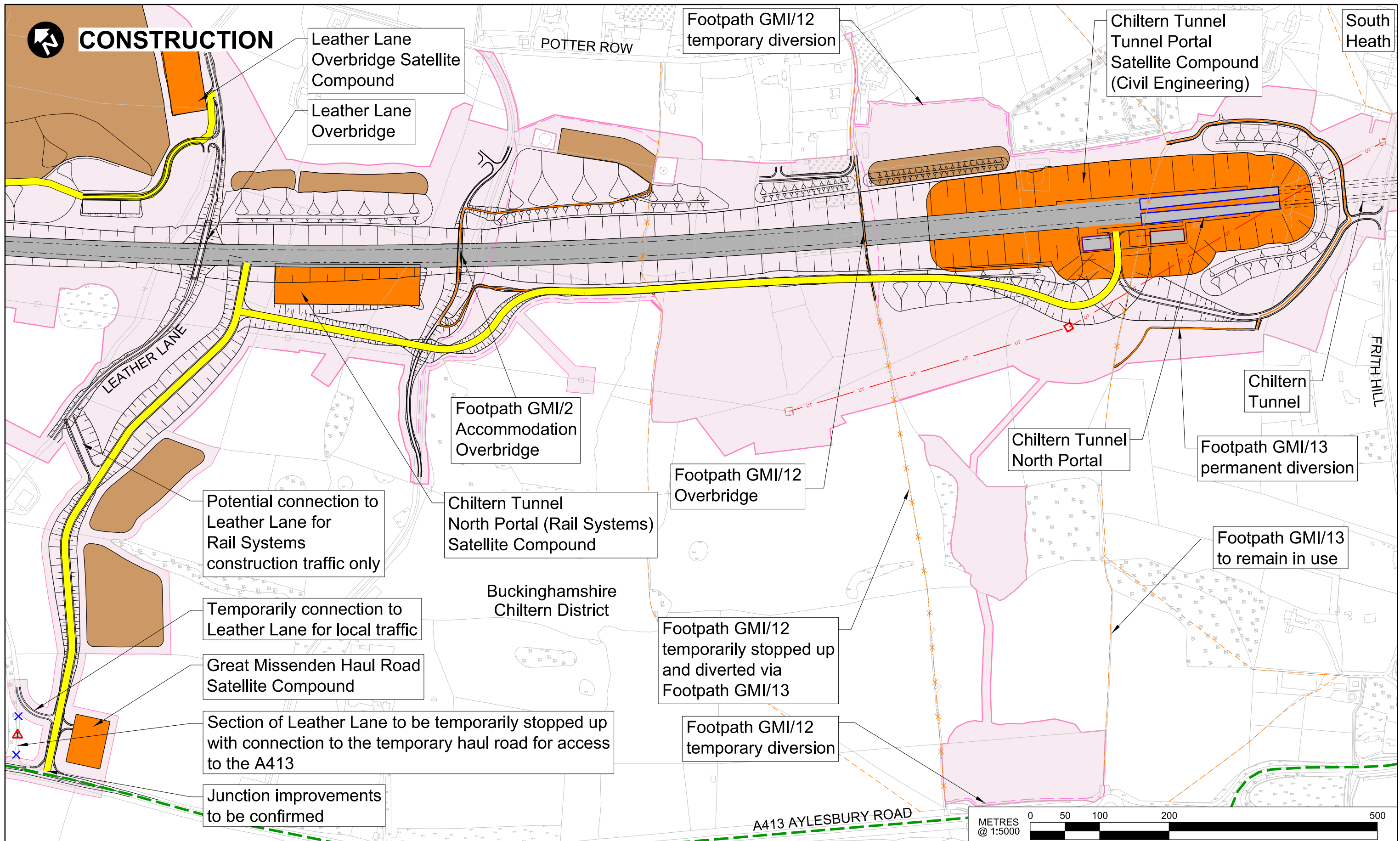
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				<div><div><div>hs2</div><div>Registered in England Registration No. 06791686 Registered office: One Canada Square, London, E14 5AB</div></div><div>Creator/Originator Atkins</div></div>																																									
				<table><tr><td colspan="2">Zone</td><td colspan="2">Country South</td><td colspan="2">Project/Contract</td><td colspan="2">Country South Design</td></tr><tr><td colspan="2">Design Stage</td><td colspan="2">DESIGN-FOR-PETITION</td><td colspan="2">Discipline/Function</td><td colspan="2">Environmental</td></tr><tr><td colspan="2">Drawing Title</td><td colspan="2">Great Missenden Haul Road  Option B  Construction Phase</td><td>Drawn  IE</td><td>Checked</td><td colspan="2">Approved</td></tr><tr><td colspan="2"></td><td colspan="2"></td><td>Date  12/07/2016</td><td>Scale  AS SHOWN</td><td colspan="2">Size  A3</td></tr><tr><td colspan="2"></td><td colspan="2"></td><td>Drawing No.  C222-ATK-EV-DPL-020-251906-PET000000</td><td colspan="2">Rev.  P00.1</td><td rowspan="2">HOL/10024/007</td></tr></table>		Zone		Country South		Project/Contract		Country South Design		Design Stage		DESIGN-FOR-PETITION		Discipline/Function		Environmental		Drawing Title		Great Missenden Haul Road  Option B  Construction Phase		Drawn  IE	Checked	Approved						Date  12/07/2016	Scale  AS SHOWN	Size  A3						Drawing No.  C222-ATK-EV-DPL-020-251906-PET000000	Rev.  P00.1		HOL/10024/007
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				Scale with caution as distortion can occur.	
				<b>Legends/Notes:</b> Satellite construction compound Main construction compound Tunnel portal Rail alignment formation Tunnels external extent Rail alignment Engineering earthworks Landscape earthworks Land potentially required during construction	
				Temporary site access route / haul route Construction traffic route Existing public right of way (PRoW) New, diverted or realigned PRoW Stopped-up PRoW Temporary PRoW Temporary material stockpile Temporary Road Closure	
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				Zone Country South Design Stage DESIGN-FOR-PETITION Drawing Title Great Missenden Haul Road Option C Construction Phase	
				Project/Contract Country South Design Discipline/Function Environmental Drawn IE Checked Approved Date 12/07/2016 Scale AS SHOWN Size A3 Drawing No. C222-ATK-EV-DPL-020-252906-PET000000 Rev. P00.1	
				Description Drawn Checked Con App HS2 App	





# POTTER ROW

# Chiltern Tunnel North Portal

South  
Heath

## South Heath Mid Point Auto-transformer Station

Leather Lane  
Overbridge

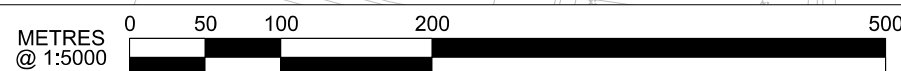
Footpath GMI/2  
Accommodation  
Overbridge

Footpath GI  
Overbridge

Chiltern Tunnel

# Buckinghamshire Chiltern District

A413 AYLESBURY ROAD



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745 (37)	Description	Drawn	Checked	Con App	HS2 App	

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Scale with caution as distortion can occur.

Legends/Notes:


Legends/Notes:


- Depot, station, headhouse or portal building
- Tunnel portal

-  Balancing pond
-  Land drainage area

Replacement floodplain storage  
Landscape mitigation planting  
(scrub / woodland)

Grassed areas  
Engineering earthworks




 Landscape earthworks


 Grassland habitat creation  
 — — · Tunnels external extent    — · Rail alignment

 Noise fence barrier  
 Ditches - new

○○○○ Hedgerow habitat creation

— HS2 Access road

 152 Access Road  
 Existing public right of way (PRoW)  
 New, diverted or realigned PRoW  
 Stopped up PRoW

-  - Stopped-up PRoW
-  UT - Main utility works

 Sustainable placement



Registered In England  
Registration No. 06791686  
Registered office:  
One Canada Square,  
London, E14 5AB

Creator/Originator	
--------------------	--

Atkins

Zone	Country South	Project/Contract			Country South Design
Design Stage	DESIGN-FOR-PETITION	Discipline/Function			Environmental
Drawing Title	Great Missenden Haul Road	Drawn	Checked	Approved	
	Options A, B and C	IE			
	Operation Phase	Date	Scale	Size	
		11/07/2016	AS SHOWN	A3	
		Drawing No.			Rev.
		C222-ATK-EV-DPL-020-260906-PET000000			P00.1

—HOL/10024/0073

P3745 (37)



## Appendices

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# Appendix B Summary of Option A, B & C Costs



**Great Missenden haul road sift - summary of Option costs**

	<b>Option A</b>	<b>Option B</b>	<b>Option C</b>
	<b><u>£m Q2 2011</u></b>	<b><u>£m Q2 2011</u></b>	<b><u>£m Q2 2011</u></b>
Surfaced temp access road from A413 to north portal including subsequent removal and reinstatement of area on completion	4.75		
Surfaced temp access road from A413 to trace by Leather Lane including subsequent removal and reinstatement of area on completion		3.34	3.34
Unsurfaced temp haul road from north portal to Leather Lane along east side of trace including subsequent removal and reinstatement of area on completion	0.95		
Surfaced temp access road from Leather Lane to north portal along west side of trace including subsequent removal and reinstatement of area on completion		5.20	5.59
Permanent access road from Frith Hill	2.15	2.15	2.15
Provide temporary signalised junction on A413 for Leather Lane options including subsequent removal and reinstatement of area on completion		0.90	0.90
Junction Mitigation Works A413/A4128 roundabout as Option M1	0.46	None included*	None included*
Junction Mitigation Works A413/B485 roundabout as Option M1	0.11	0.11	0.11
Sub Total	<b>8.43</b>	<b>11.69</b>	<b>12.09</b>
Indirect costs	1.53	2.12	2.20
Less ECP/VE	-0.96	-1.33	-1.37
Total	<b>9.00</b>	<b>12.49</b>	<b>12.91</b>

Notes:

\* No allowance has been included at this stage for any necessary improvement works to the A413/A4128 Gt Missenden roundabout. Any necessary works would further increase the cost differential of this Option against the Proposed Scheme.