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Dear Nick

A417: Potential Improvements to Option 30

Further to our earlier letters, we offer the following suggestions for considering how the landscape impacts of Option 30 might potentially be avoided and reduced. They include:

- the incorporation of a tunnel rather than a land bridge to reduce the substantial landscape impact of a deep cutting through the main escarpment of the Cotswolds in one of its most sensitive locations.
- an examination of the options for the location of the A436 junction with the A417 and associated approach roads.

We attach a set of indicative plans with long sections using Google Earth, and a plan showing strategic junction options¹. While these plans are no more than sketches, we believe that serious consideration should be given to the alignments and structures indicated. They highlight how the Natural Beauty of the Cotswolds AONB can be conserved and enhanced by ensuring that the serious negative impacts of option 30 are avoided and reduced and the potential for benefits maximised.

The Board would not normally make suggestions in this manner, but is seriously concerned that tunnel options have been dismissed too lightly and that junction options have not been fully addressed.

Having now looked at these issues in the context of Option 30 it is even more apparent to us that the currently proposed approach to the A436 junction is not satisfactory and warrants re-consideration.

As you are aware from earlier correspondence, we have looked at other UK highways tunnels in terms of context and traffic throughput relative to their length, (attached spreadsheet). This indicates that all our variants fit within the range of highways tunnels that have been built or proposed in schemes for landscape and other environmental purposes.

We do not believe the proposals for the A417 should proceed to a preferred route stage without such reasonable alternatives being considered.

This is an area we would like to discuss further. We have reinforced recently that the Board is a critical friend who wants to help Highways England (HE) deliver the vision, principles and objectives that we all jointly agreed and signed up to last year.

¹ The plans are only diagrammatic, but as far as possible alignment geometry avoids curves as substandard as those included in option 12; all slip road lengths for the A436 junction are generally c.400m and most finish some way short of tunnel portal positions; tunnel gradients are circa 6% or a little less.

Conserving, enhancing, understanding and enjoying the Cotswolds Area of Outstanding Natural Beauty

Tunnel alternatives

These have been identified to illustrate differences of both length and relationship to the landscape and are in no sense definitive. The summary of each variant is explained in the appendix and accompanying plans. Each one would clearly need refinement and optimisation. Lengths are illustrative, but are mostly constrained by minimising impacts at the foot of the escarpment, encroachment into designated land at the western end and junction constraints at the eastern end.

For all the variants we envisage the following elements:

- The refined main alignment of the A417 south of the suggested A436 junction, which achieves better fit with fields, topography and settlements; but with additional refinement to skirt Shab Hill to the east.
- A tunnel taking both A417 and A436 traffic through the escarpment providing effective landscape mitigation, visual and noise screening, creation of an unbroken landscape and wildlife corridor along the escarpment, reduced impacts on heritage settings – coupled with measures to avoid or minimise intrusion from any lighting required.
- The A436 approach to its junction with the A417
 - routed from further east, off the road from Seven Springs; or
 - from the vicinity of the Air Balloon roundabout skirting the west side of Ullen Wood.

Please note that we have shown both these approaches on the sketch plans to illustrate their potential compatibility.

- Vertical alignments aimed at 6% or less; assumption that in terms of landscape impact it is more acceptable to have a deep quarry-like hole in the top of the hill that is not readily viewed, than a substantial embankment (or cutting) spreading out over the sensitive escarpment landscape which is in full view from above.
- A junction with the A417 somewhere between the western side of Ullen Wood and Shab Hill, or in one case south of Shab Hill, based on a horizontal alignment minimising landscape impacts on Shab Hill to the west and the head of dry valley to the east, see separate analysis of options in the appendix.
- Creation of a wide, tranquil car-free stretch of the escarpment, with removal of cars from Barrow Wake to a better screened car park; reinstatement of old roads to agriculture or wildlife.
- Retention of Air Balloon as a pub for walkers, riders and cyclists, with no car/vehicle access except for local residents and deliveries.
- Provision of plenty of space over the top of the tunnel as a tranquil corridor for both people and wildlife, including the Cotswold Way National Trail and Gloucestershire Way.
- In the vicinity of the Air Balloon and Birdlip Hill the existing A417 cuttings would be restored to original landform using surplus fill, with improved access to and management of Emria's Grove scheduled monument.

Different A436 – A417 junction arrangements and approaches

There appear to be three approaches to a junction with the A436 in the vicinity of the southern end of Ullen Wood and Shab Hill. These locations are shown on the various tunnel variants.

- Option 30 base case: circa. 3km, circa.1km new build plus bridge over A417.
 - Very circuitous route.
 - Requires major bridge over A417 at Air Balloon.
 - Re-uses existing road in part but significant new build across to Shab Hill.
 - Least challenging topographically.
 - Crosses open farmland avoiding woodland.
 - Visually quite exposed.

- West of Ullen Wood: circa.2 to 2.5km; circa.1 to 1.5km new build.
 - Somewhat circuitous route with awkward turn back at west end of Ullen Wood which might be dealt with as roundabout serving access to country park, access etc.
 - Avoids extra bridge over A417.
 - Quite challenging topographically, but also potentially well-screened.
 - Crosses open farmland avoiding woodland.
 - Visually quite exposed at western end; otherwise well screened.
 - Detailed relationship with the deep main route cutting through the hillside next to Emma's Grove is a critical factor for landscape and visual impact.

- Seven Springs Road east of Ullen Wood; circa 1 to 1.5km; all new build.
 - Least circuitous route.
 - Avoids extra bridge over A417.
 - Eastern end quite challenging topographically, exact alignment needing careful consideration; sidelong up dry valley side or direct through hill in deeper cutting.
 - Well screened from the west by woodland but exposed visually from north-east e.g. golf course.
 - Crosses area of semi-parkland and woodland; edge of open farmland.
 - Visible from rising ground to the north.

The Ullen Wood and Seven Springs options appear to be better than the base case in terms of their combination of directness, overall length and new build. The pros and cons between these two options appear more balanced, with the trade-off being between better alignment for traffic and higher landscape and visual impact.

Pros and cons of different A436 junction locations

These locations are shown in broad location in the overall plan of approaches and junction positions and more specifically on the various tunnel variants. The key issues are:

- Proximity to domestic/ business premises: those further north or south generally not as intrusive.
- Detailed topography: those further north and southernmost are further into cuttings and so likely to be better hidden within landscape.
- HE base case would appear to take out c. 50 % of Shab Hill, a locally prominent feature.

These are substantially issues of detailed design of the alignments but the HE base case through Shap Hill rather than skirting it needs to be addressed.

Birdlip to A436 Link

We have not suggested any particular arrangement for linking Birdlip to the A436 and Seven Springs. There are various options compatible with the tunnel variants outlined above/below. One option is a link from the A436 junction to Birdlip reusing the existing minor road past the radio station and kennels i.e. widening to C road standard. Another might be the use of a junction near the current Cowley roundabout and reusing part of the existing A417 and / or old A417. Any such route will raise important landscape considerations as well as cost and traffic flow implications that will need detailed consideration.

Cost and value for money

The major reason for HE not including any tunnel option in the public consultation process to date has been budgetary cost, not value for money performance, on which some discarded tunnel options out-performed Options 30 and 12. Since most of the variants we have identified are shorter than those previously considered, we believe that this should be revisited.

We also urge that consideration be given to the possible ways in which the cost of a tunnel compared with Options 30 and 12 could in part be offset by the potential savings and improved value for money arising from:

- No need for a bridge for the A436 over the A417,
- Reduced volume of open cutting and fill material needing to be disposed,
- Improved value for money from a more direct A436 approach,
- Major gains from less traffic disruption during construction ,
- Economies from 'buildability' arising from greater segregation from existing traffic use during construction.

This is without any consideration of the so far absent assessment of the Natural Capital value of the significantly greater environmental enhancements that these suggestions would offer, and the more emphatic achievement of the vision, principles and objectives that we all jointly agreed.

I trust these suggestions for Option 30 are helpful.

Yours sincerely

Martin Lane
Director

Appendix 1: Tunnel Variants

a. Red variant (c.440m long):

- Focusses on medium length section of especially steep gradient (and deep cutting) at Air Balloon; A436 junction mainly in cutting.
- Challenges:
 - Continued intrusion of A417 down lower parts of Crickley Hill.
 - A417 still close to Cotswold Way along southern side of Crickley Hill.
 - Eastern portal close to Emma's Grove Scheduled Ancient Monument, but well screened.
 - Potentially intrusive cutting in the hillside seen from access road in Crickley Hill Country Park.
 - Gloucestershire Way would need to re-cross in vicinity of suggested A436 junction (including slip roads at different heights) or be rerouted.
 - Lighting of tunnel approaches and A436 junction.

b. Green variant (c.685m long):

- Focusses on medium-long section at right-angles to the escarpment south of Air Balloon beneath Barrow Wake with western portal at the foot of the steepest section of the escarpment and away from Crickley Hill.
- Challenges:
 - Some continued intrusion of A417 down lower parts of Crickley Hill.
 - A417 still quite close to Cotswold Way along southern side of Crickley Hill.
 - A436 intersection squeezed closer to buildings.
 - Gloucestershire Way would need to be re-routed over eastern end of tunnel and along northern edge of deep cutting to the suggested A436 junction (including slip roads at different heights) or be rerouted.
 - Especially deep cutting at top; A436 junction mainly in cutting.
 - Lighting of tunnel approaches and A436 junction.

c. Blue variant (c.875m long):

- Focusses on longish section at right-angles to the escarpment slightly south of Air Balloon beneath Barrow Wake with western portal at the foot of the steepest section of escarpment and further away from Crickley Hill than red variant. A436 junction same as red variant.
- Challenges:
 - Aligned with main view out from Barrow Wake.
 - Some continued intrusion of A417 down lower parts of Crickley Hill.
 - A417 quite close to Cotswold Way along south side of Crickley Hill.
 - Especially deep cutting at top of escarpment; A436 junction mainly in cutting.
 - A436 intersection squeezed closer to buildings.
 - Gloucestershire Way would need to re-cross in vicinity of suggested A436 junction (including slip roads at different heights) or be rerouted.
 - Lighting of tunnel approaches and A436 junction.

d. Pale Blue variant (c.1100m long):

- Focusses on longer tunnel but with much straighter alignment of A417. More or less at right-angles to escarpment south west of Air Balloon beneath Barrow Wake with western portal at foot of the steepest escarpment and away from Crickley Hill (would need sensitive treatment).
- Challenges:
 - Some continued intrusion of A417 down lower parts of Crickley Hill.

- Western tunnel portal obliquely facing Crickley Hill.
- Much longer approach for A436, from whichever direction, with Seven Springs road east of Ullen Wood option least circuitous.
- Very deep cutting at top; A436 junction mainly in cutting
- Gloucestershire Way would cross A436 near end of Ullen Wood.
- Lighting of tunnel approaches and A436 junction.

e. Purple variant (c.1250m long):

- Focusses on long section at right-angles to escarpment well south of Air Balloon beneath Barrow Wake with western portal at the foot of the steepest section of the escarpment and away from Crickley Hill (would need sensitive treatment). No very deep cuttings.
- Challenges:
 - Aligned with main view out from Barrow Wake.
 - Some continued intrusion of A417 down lower parts of Crickley Hill.
 - A436 would still use Crickley Hill for traffic to and from Gloucester etc close to Cotswold Way along south side of Crickley Hill.
 - A436 western intersection involves road crossing the A417, over or under tunnel portal.
 - A436 eastern intersection and new road still needed for traffic to and from Cirencester, Swindon etc, rather intrusive location between buildings.
 - Gloucestershire Way would cross A436 near end of Ullen Wood.
 - Lighting of tunnel approaches and A436 junction.

f. Gold variant (c.1575m long):

- Focusses on very long tunnel beneath Crickley Hill, avoiding area of Air Balloon and further from Emma's Grove than red variant.
- Removes trunk roads entirely from close proximity to Cotswold Way National Trail.
- Much enlarged scope for land restoration.
- Removing road from vicinity of Crickley Farm Listed buildings close to present A417.
- Big reduction in noise for Crickley Hill, Air Balloon and escarpment.
- Challenges:
 - Some intrusion of A417 out beyond foot of Crickley Hill.
 - Potentially intrusive cutting in hillside seen from access road in Crickley Hill Country Park.
 - Gloucestershire Way would need to re-cross in vicinity of the suggested A436 junction (including slip roads at different heights) or be rerouted.
 - Lighting of tunnel approaches and A436 junction.

A417 and A436 Option 30: Review of Possible Tunnel Options and Potential Landscape Effects— Figures

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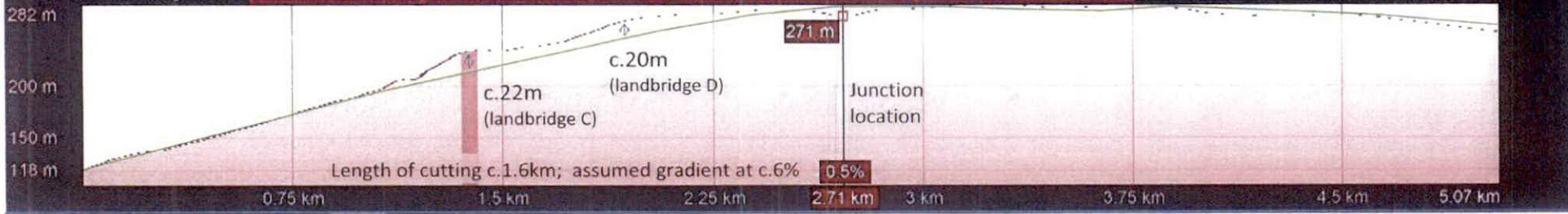
Image © 2018 Getmapping plc

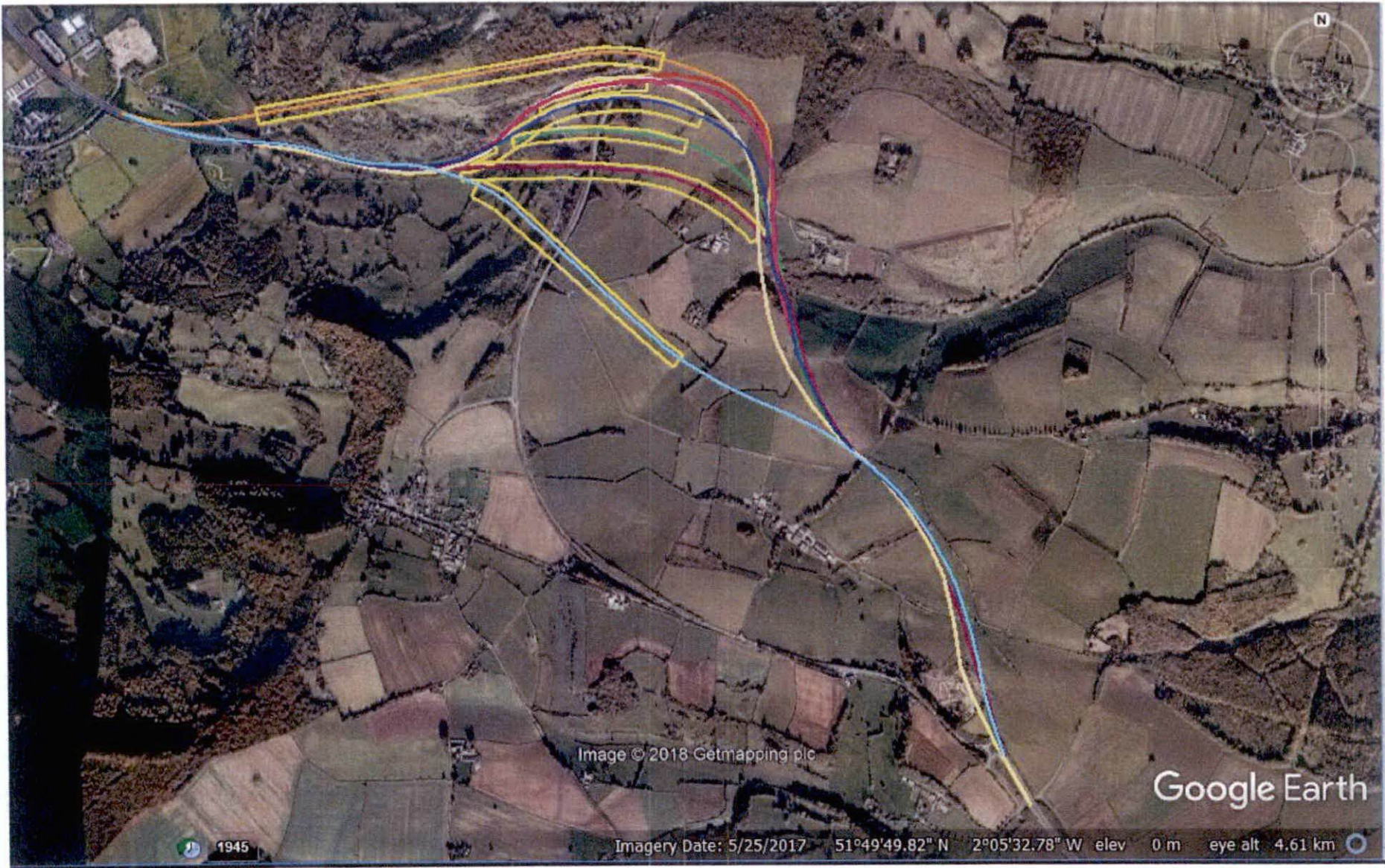
Google Earth

1945

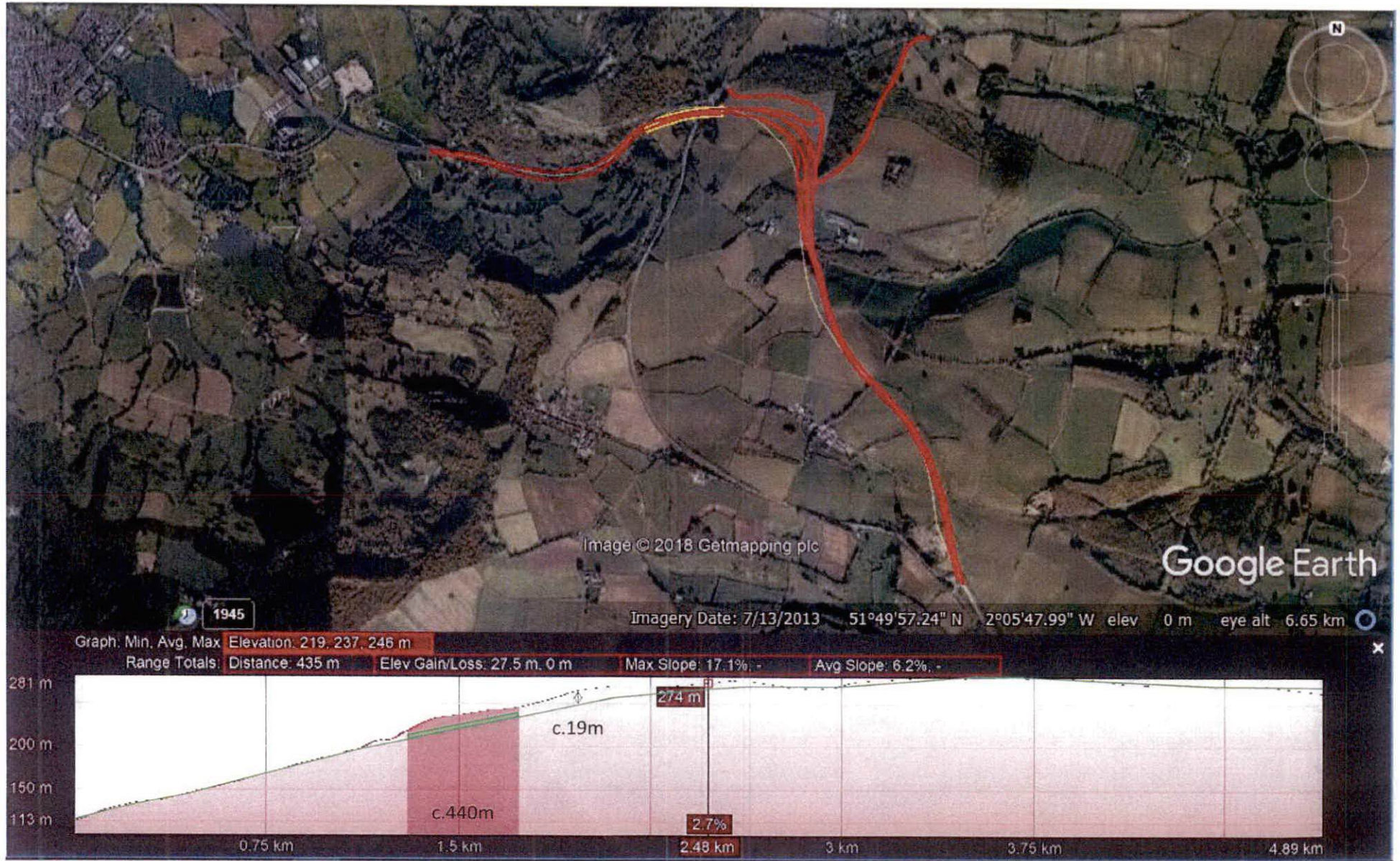
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Graph: Min, Avg, Max Elevation: 235, 236, 237 m
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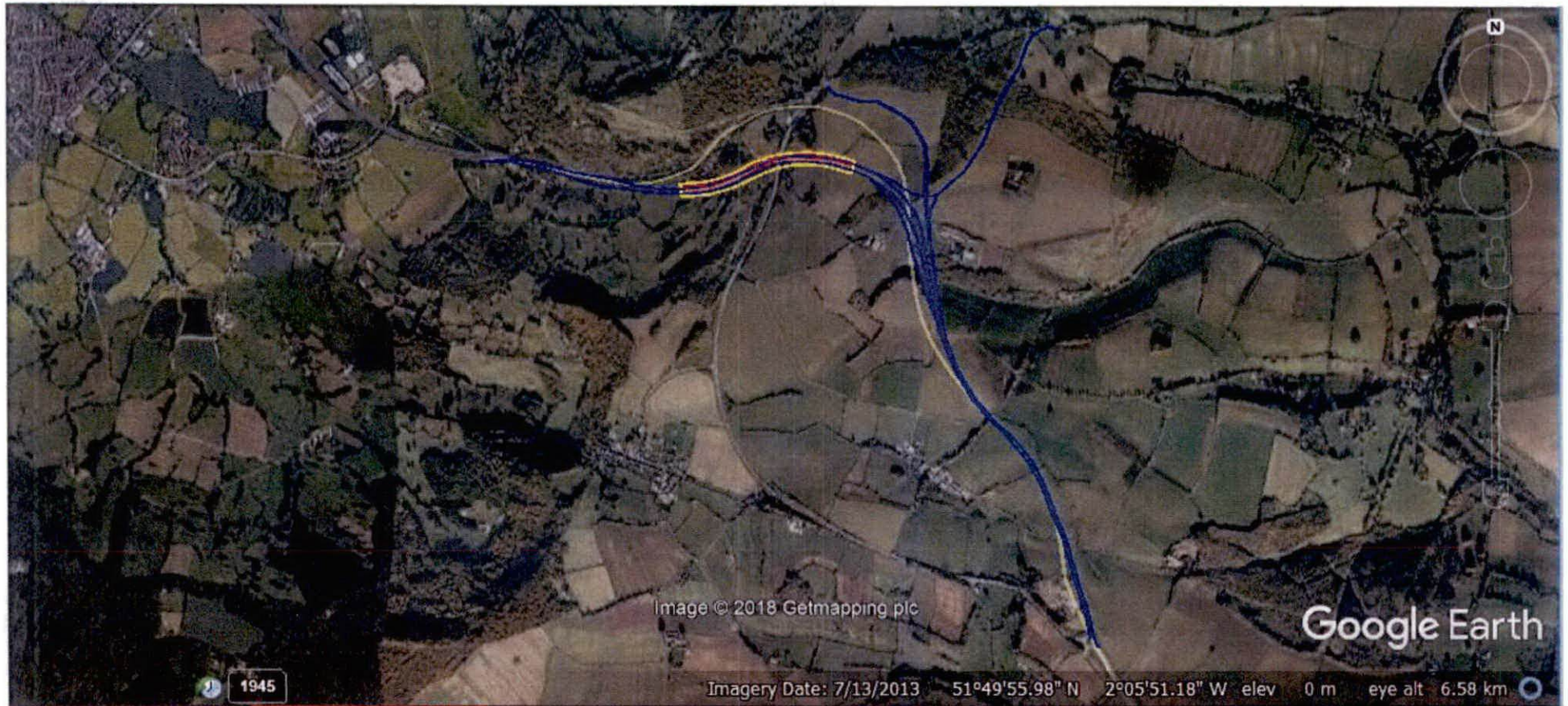




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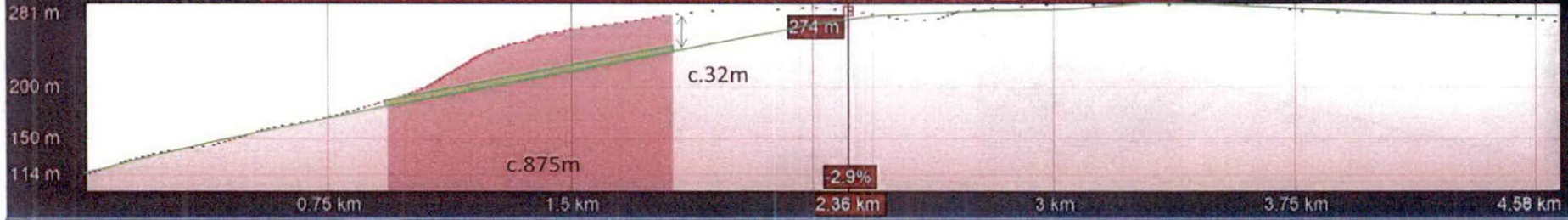




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Graph: Min, Avg, Max Elevation: 187, 239, 270 m

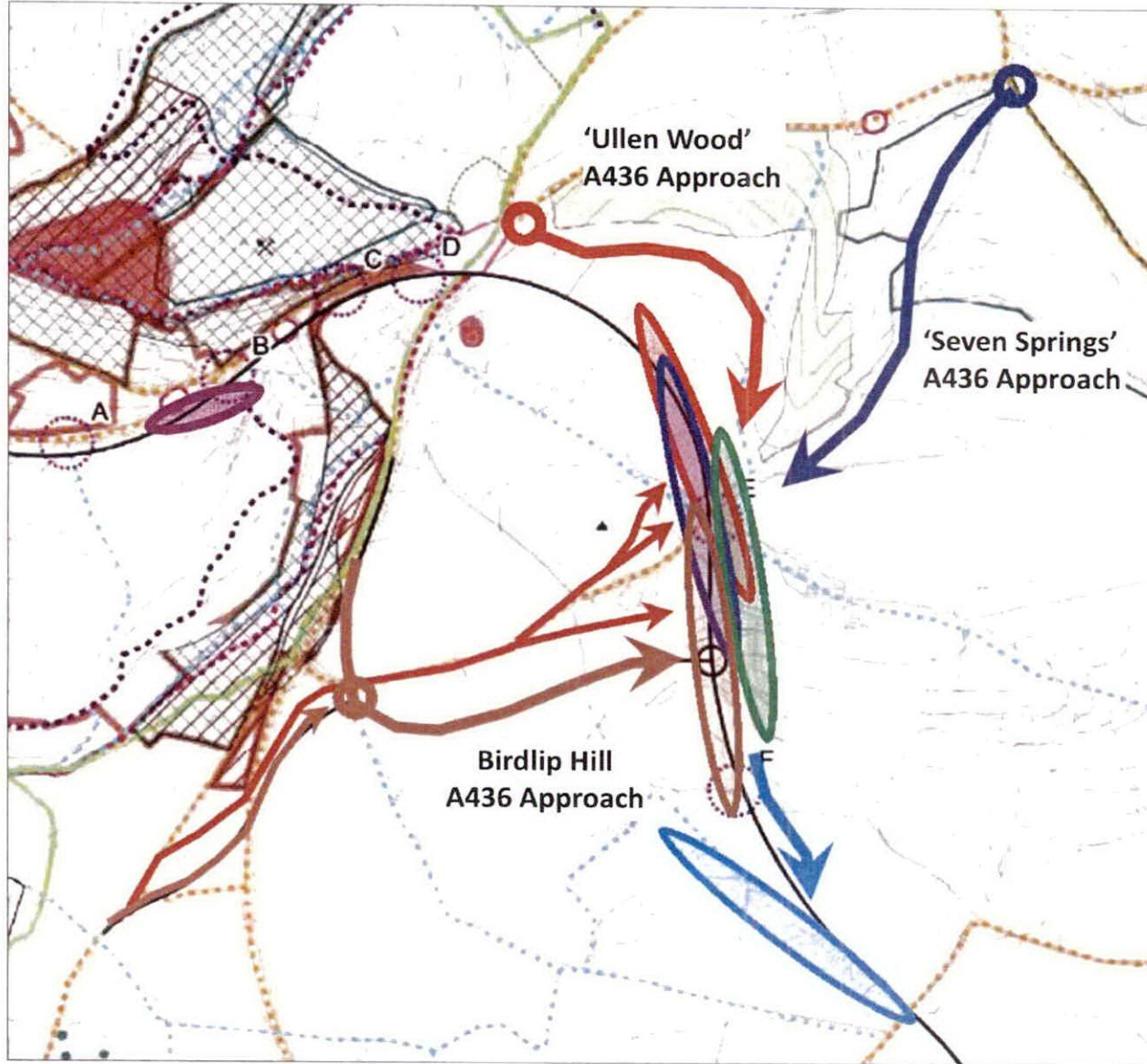
Range Totals:	Distance: 896 m	Elev Gain/Loss: 83.2 m, 0 m	Max Slope: 19.6%, -	Avg Slope: 9.3%, -
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**STRATEGIC OPTIONS FOR
LOCATION OF A417 / A436
JUNCTION AND OF A436
APPROACHES**

-  **Ullen Wood W**
Poss Red tunnel variant
Poss Gold tunnel variant
-  **Kennels North**
Red tunnel variant
Gold tunnel variant
-  **Kennels South**
Green tunnel variant
Blue tunnel variant
Purple tunnel variant S
-  **Shab Hill**
Option 30 Base Case
-  **Stockwell**
Pale blue tunnel variant
-  **Crickley Hill**
Purple tunnel variant N

A417 Option 30 tunnel variants compared to UK tunnel locations and traffic throughputs per tunnel length

(sources: <http://www.rtoa.org.uk/Directory.html>; HE A417 and A303 consultation documents; HE Cross Pennine strategic study reports)

Tunnels (Road No. and Location) - ranked by traffic throughput per metre	Context	Daily traffic	Annual traffic	Length (m)	Annual traffic per tunnel m	Tunnels (Road No. and Location) - rural only ranked by traffic throughput	Context	Daily traffic	Annual traffic	Length (m)	Annual traffic per tunnel m
A2 Eltham	urban		21,900,000	156	140,385	M25 Bell Common	rural COMMON		48,830,000	515	94,816
A12 Green Man	urban		21,900,000	170	128,824	A27 Southwick Hill	rural NAT PARK		17,110,000	510	33,549
M25 Bell Common	rural COMMON		48,830,000	515	94,816	A20 Roundhill	rural AONB		14,600,000	370	39,459
A40 Hangar Lane	urban		21,900,000	240	91,250	A417 Option 3 (HE shortest tunnel)	rural AONB	39,000	14,235,000	1,300	10,950
A50 Meir Stoke	urban		25,000,000	284	88,028	A3 Hindhead	rural AONB NT	35,000	12,775,000	1,830	6,981
M4 Brynglas	suburb		29,000,000	360	80,556	A40 Gibraltar Hill	rural		11,000,000	188	58,511
A12 George Green	urban		21,900,000	295	74,237	A505 Baldock	rural	27,000	9,855,000	224	43,996
M25 Holmesdale	suburb		46,830,000	684	68,465	A303 Stonehenge	rural WHS	24,000	8,760,000	2,900	3,021
A13 East India Dock	urban		23,725,000	350	67,786						
A40 Gibraltar Hill	rural		11,000,000	188	58,511	<i>Rural tunnels ranked by length</i>					
A505 Baldock	rural	27,000	9,855,000	224	43,996	A40 Gibraltar Hill	rural		11,000,000	188	58,511
A20 Roundhill	rural AONB		14,600,000	370	39,459	A505 Baldock	rural	27,000	9,855,000	224	43,996
A3211 Upper Thames St	urban		10,950,000	320	34,219	A20 Roundhill	rural AONB		14,600,000	370	39,459
A27 Southwick Hill	rural NAT PARK		17,110,000	510	33,549	A27 Southwick Hill	rural NAT PARK		17,110,000	510	33,549
A417 (Op 30 Red variant)	rural AONB	39,000	14,235,000	440	32,352	M25 Bell Common	rural COMMON		48,830,000	515	94,816
A739 Clyde	estuary		22,000,000	756	29,101	A417 Option 3 (HE shortest tunnel)	rural AONB	39000	14235000	1300	10950
A38 Queensway	urban	42,000	15,330,000	550	27,873	A3 Hindhead	rural AONB NT	35,000	12,775,000	1,830	6,981
A1(M) Hatfield	urban		29,510,000	1,147	25,728	A303 Stonehenge	rural WHS	24,000	8,760,000	2,900	3,021
A417 (Op 30 Green variant)	rural AONB	39,000	14,235,000	685	20,781						
A289 Medway	estuary		15,300,000	725	21,103						
Dartford	estuary		25,350,000	1,430	17,727						
A417 (Op 30 Blue variant)	rural AONB	39,000	14,235,000	875	16,269						
A13 Limehouse	urban		23,725,000	1,553	15,277						
A417 (Op 30 Pale Blue variant)	rural AONB	39,000	14,235,000	1,100	12,941						
A102 Blackwall	estuary		18,250,000	1,350	13,519						
A417 (Op 30 Purple variant)	rural AONB	39,000	14,235,000	1,250	11,388						
A417 HE Option 3 (HE shortest tunnel)	rural AONB	39,000	14,235,000	1,300	10,950						
A417 (Op 30 Gold variant)	rural AONB	39,000	14,235,000	1,575	9,038						
A3 Hindhead	rural AONB NT	35,000	12,775,000	1,830	6,981						
(A59) Kingsway Wallasey	estuary (WHS)		15,640,000	2,260	6,920						
A55 Conwy	estuary WHS		5,500,000	1,089	5,051						
(A41) Queensway Birkenhead	estuary (WHS)		11,000,000	3,260	3,374						
A303 Stonehenge	rural WHS	24,000	8,760,000	2,900	3,021						
Cross Penine	rural NAT PARK		48,830,000	16,000	3,052						

NOTE: Traffic throughput for Cross Pennine scheme unknown. For illustrative purposes the following is used to maximise traffic per tunnel metre: shortest option (10 miles) and maximum throughput above (Bell Common)