

9. OPTIONS FOR THE HS1 TO HS2 CONNECTION

9.1. THE INCREMENTAL NATURE OF THE STUDY

The Government's Brief to HS2 Ltd required the consideration of options for connecting HS2 to HS1. Three options were prepared for this link:

- Option 1: a single track bi-directional link via NLL to the portal north of St Pancras;
- Option 2: a double track link via the NLL to the portal north of St Pancras;
- Option 3: a double track 'fast' link to a new grade-separated junction east of the St Pancras portal.

This report addresses these options as incremental additions to Route 3.

An option to connect HS1 below ground between St. Pancras and Rainham were considered impractical, as a high-speed, tunnelled, grade-separated underground junction in an operational high-speed railway would be required.

An option to connect at the Stratford Box was rejected as impracticable because of the proximity of the Olympic Power Lines Upgrade (PLUG) tunnels.

9.2. OPTION 1

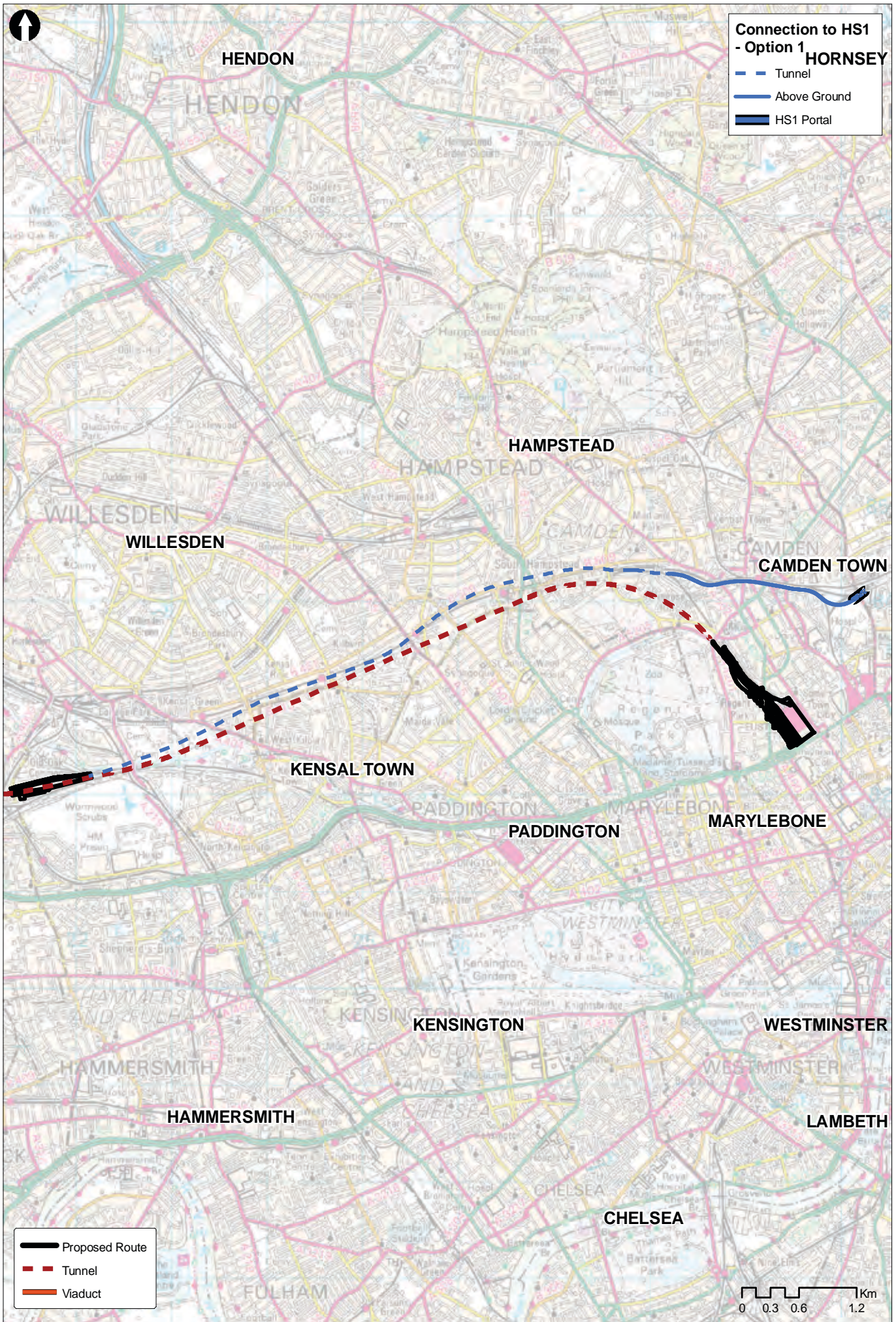
This option would provide a single GC gauge track from Old Oak Common to the existing grade-separated junction from the North London Line (NLL) to the St Pancras portal.

The single track would leave Old Oak Common station via a central tunnel to Camden Junction where a new portal would be constructed immediately south of slewed NLL lines. The Old Oak Common station layout would be adapted to create a non-conflicted junction.

From Camden Junction, the bi-directional GC link would occupy the southern line across the Camden viaducts through Camden Market. The proposed NLL scheme would be modified from Camden Station to the link chord by building a third track to the north of the existing two tracks (together with bridges) which would serve a new platform edge at Camden Station. Platform

1 at Camden Station would be taken out of commission to provide the bi-directional line with GC gauge and the three bridges east of the station rebuilt.

The HS2 track would follow the existing link to the junction at the tunnel portal immediately north of St Pancras.



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9.3. OPTION 2

This option would provide two tracks at GC gauge connecting Old Oak Common to the existing grade-separated junction at the portal north of St Pancras.

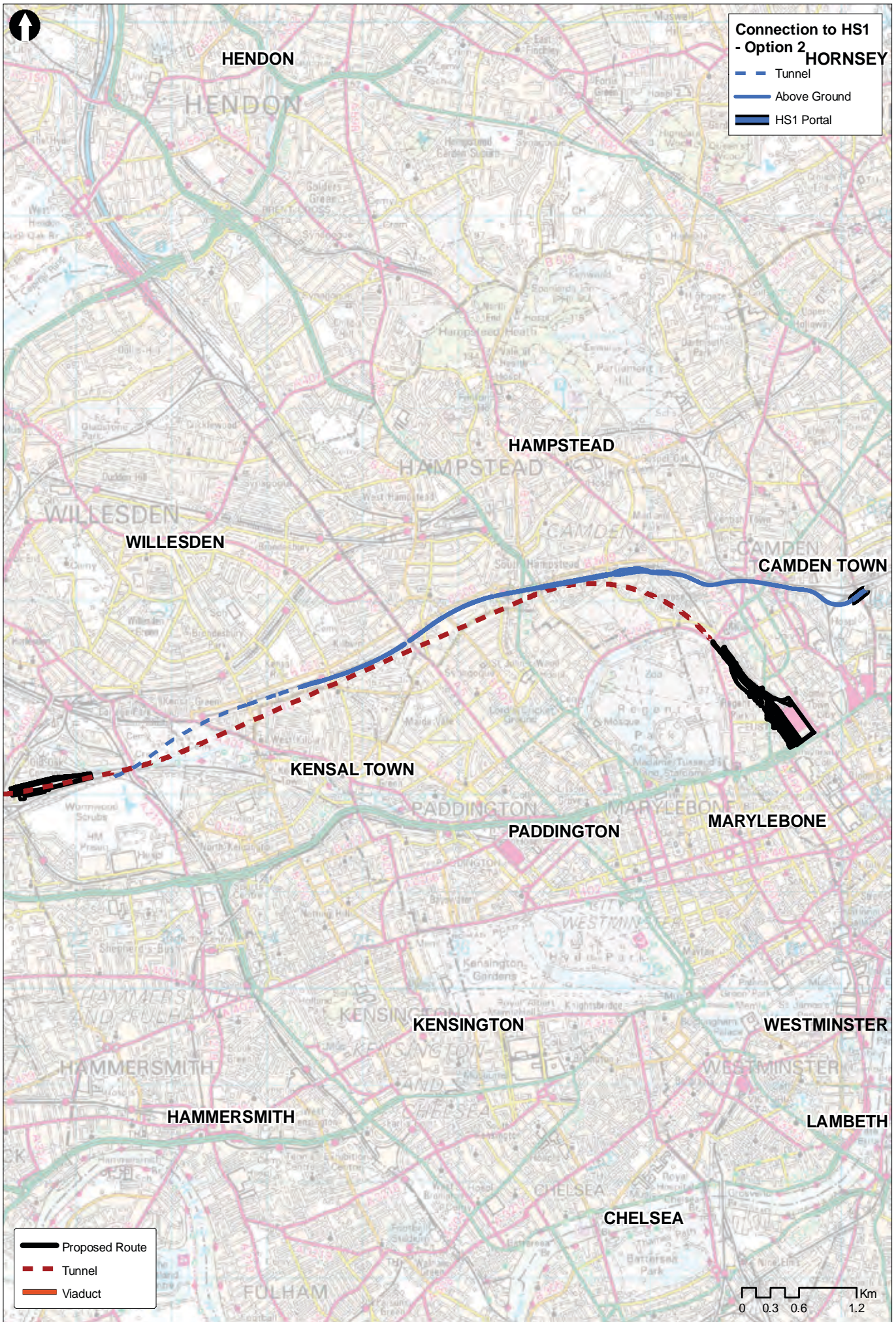
Old Oak Common station layout would be modified to create effective non-conflicting junctions with two dedicated link tunnels leaving the box and emerging immediately west of the disused Primrose Hill Station, at which point an elevated grade separation would be achieved. This option would minimise new tunnelled lengths, and make maximum use of Primrose Hill Tunnels.

A two-track GC-gauge route would then be provided through Primrose Hill Tunnels (major widening works to part of the Stephenson Tunnel) and then a further grade separation in the Camden Junction area to facilitate a twin-track, GC, elevated route through Camden Market. (The viaduct would need extensions for new walkways.)

The NLL proposals would be modified such that both NLL tracks would occupy the vacant track beds to the north of the existing from west of Camden Road Station to the St Pancras portal zone. This would necessitate building three new bridges and two new platforms at Camden Station.

The HS2 tracks would follow the existing NLL to the existing grade-separated junction north of St Pancras which has provision for twinning. This would require decommissioning of two platforms at Camden Station, construction of a larger junction west of Camden Station and reconstruction of three bridges east of Camden Station.

The line speed associated with this option is approximately 60kph. However, it does not reduce significantly line capacity through the Camden Market Zone as Option 1.



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9.4. OPTION 3

This solution would provide a twin-track fast connection from Old Oak Common to a new portal in the Rainham area (29km of tunnel). Old Oak Common Station would be modified to provide a non-conflict junction as Option 2.

An assessment of an alternative junction at Stratford Box was carried out, which would reduce the tunnel length by approximately 13km. This would be achieved by bringing the HS2 tunnels up through the floor of the cut-and-cover box. However, this would not be feasible as:

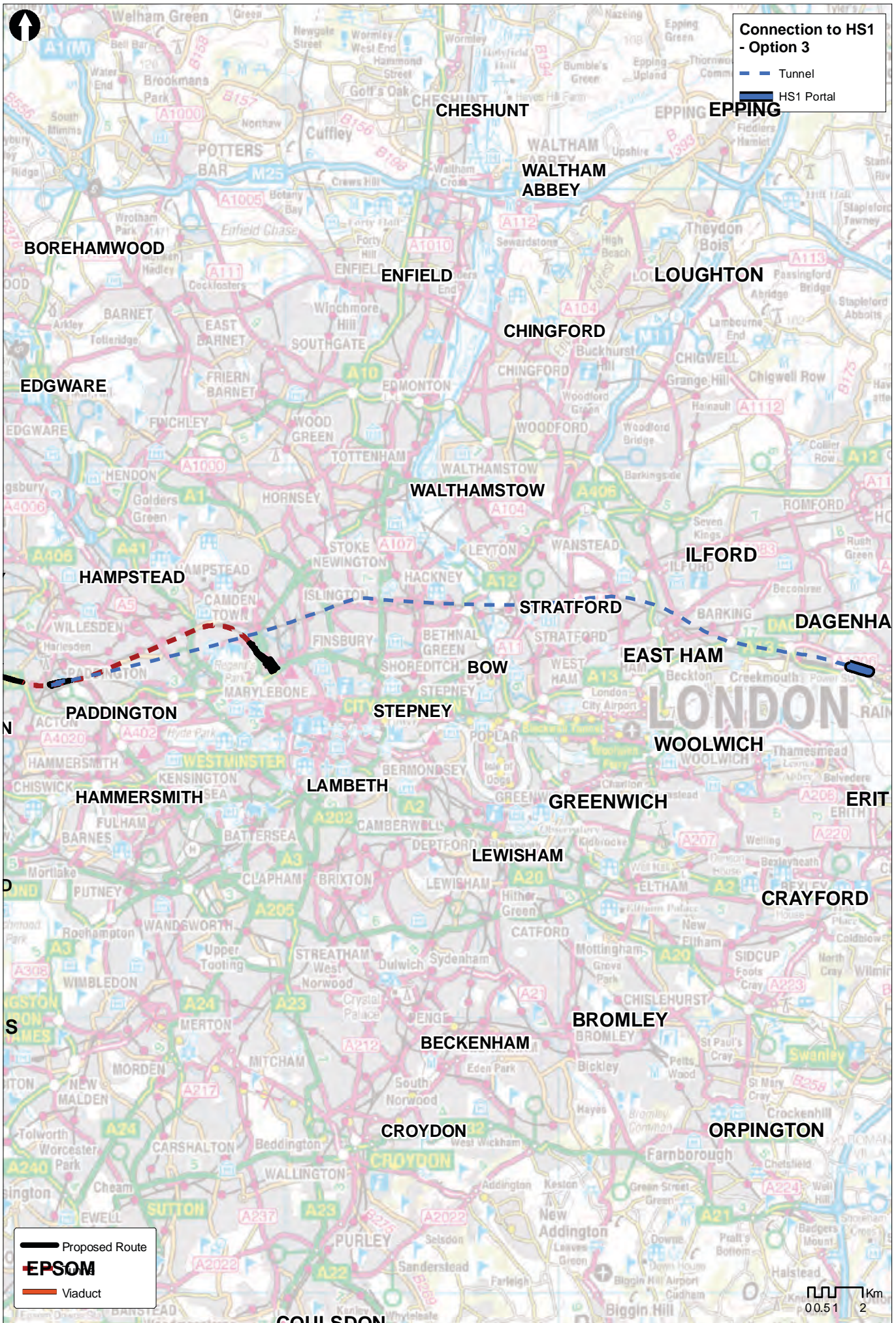
- Tunnel Reception Chamber. The proposed northern track alignment for the HS2 would clash with the foundations for the Temple Mills connection. This may be avoided if the sideways slew was tighter than 1 in 20 but this could not accommodate the required line speed. Hence the northern track could not work from this point. An alternative to slew the northern track to the south would also not work as it would still clash with the Temple Mills foundations.
- Tunnel Clearances. To construct the new tunnels the following clearances would be required due to the ground movements associated with settlements:
 - Horizontal clearance = 9m
 - Vertical clearance 4.5m
 - Hence with an excavated face of 9m the tunnel space proofing dimensions are:
 - Horizontal = 27m (3 x 9m)
 - Vertical = 18m (2 x 4.5m + 9m)

At the west end of the Stratford Box the 'Plug' tunnels pass below the box. The crown of these tunnels is approx -20mOD, and the Box base slab SSL is approx -10mOD. Hence there is only a 10m gap for the HS2 tunnels to pass over the Plug tunnels and below the box base slab. This would be impracticably tight.

9.5. CAPITAL COST OF THE HS1 CONNECTION

The capital cost of the options for connecting to HS1 are presented below.

- Option 1 = £457,730,400
- Option 2 = £812,165,920
- Option 3 = £3,595,290,000



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