Mitigation to HS2 route through the Chilterns.

Proposal for a Tunnel from the M25 to Wendover

(Prepared by the Chiltern Ridges Group, 2011)

The HS2 route through the Chilterns as proposed in the Consultation documents (Route 3) will cause permanent damage to the Chilterns AONB; the section from Amersham to Wendover in particular will create a major permanent blight on the countryside and will have a long lasting adverse impact on the local environment. If the tunnel already proposed for the section from the M25 to Amersham were to be extended to Wendover this would immediately remove the worst aspects of the impact on this area. There is a good economic and environmental case for such an extension.

Current Proposal

The route from the M25 as currently proposed by HS2 Ltd passes in succession through twin bored tunnels, retained excavated sections, a single large and difficult Sprayed Concrete Lining tunnel, an area of embankments, a “Green tunnel”, open excavation sections, over 2 viaducts, through a cut and cover tunnel and finally at ground level passed Wendover. This requires several different methods of construction and the need for constant change adds to the complexity and cost.

During construction there will be considerable disruption all along the A413 corridor and where the contractors set up their site offices, workshops, stores, labour camps and temporary stockpiles of excavated material. The noise, dust and road closures will cause great inconvenience to local residents. Although the published documents give no indication as to the way in which construction traffic is intended to gain access to these various work-sites and indeed there is no indication on any of the route plans as to the locations of the intended work-sites, it is clear they will have a major impact along the Misbourne valley.

The removal and handling of some 11 million cubic metres (loose) of excavated spoil will be a major problem with serious adverse effects on the whole of the area in question. The 2.5 million cubic metres of spoil arising from the boring machines during the 9.6km drive from the M25 to Amersham is likely to be removed from the tunnel portal adjacent the M25 and will not impact the AONB. However, approximate 8.5m cubic metres

of spoil will be excavated from the mainly open cut 14 km section of the route from Amersham to Wendover. Some 700,000 cubic metres will be needed for embankments on this section but as the line is to be in a deep cutting for much of this there will be little need for bunds for noise mitigation.

Most of the spoil will have to be moved by road at some stage. Whatever solutions are used for spoil removal, the costs are likely to be vast, possibly of the order of £0.5 billion.

The costs of access roads into the construction sites and the modification of the local road network system to cope with handling the excavated material, with potential vehicle movements in excess of 120 per hour, will be very high.

Intrusive and unsightly facilities will be needed for security and safety purposes. The viaducts and embankments between Bowood Lane and Wendover are going to be unsightly, costly and a major source of noise pollution.

Tunnel Alternative

A continuous tunnel for the route from the M25 through to a position beyond Wendover would provide the optimum solution for passing through an Area of Outstanding Natural Beauty. This could allow economies of scale for the pre-cast concrete tunnel segments, the supply of TBMs and other tunnel equipment, reduced quantities of spoil, reduced number of worksites, reduced number of bridges and roadworks and reduced vehicle movements through the Chilterns area.

For tunnelling operations a large proportion of the cost is in the procurement of the Tunnel Boring Machines (TBM), setting up the pre-cast tunnel segment fabrication facility, establishing the portals and setting up the construction sites. The incremental cost of driving an additional length of tunnel is significantly lower than the average costs per metre considered in the cost estimates prepared to date. The total length of tunnel envisaged is not exceptional and is commonplace on the London Underground, Channel Tunnel and Channel Tunnel Rail Link

Whilst it is possible to drive this length of tunnel as a single drive, there could be programme restraints because of the time needed to drive the tunnels. If an overall average rate of driving of 70m/week is assumed the total duration for each drive would be of the order of 337 weeks or 7 years. This duration is unlikely to be considered reasonable

An alternative approach which would still keep the disruption to the Chiltern AONB to a minimum would be to drive a second pair of TBMs from Wendover to Amersham. Although this would be more expensive it would simplify spoil disposal and facilitate a temporary rail link to Chiltern Rail if this were required. There is space in this area to set up the TBM drive site and the associated tunnelling facilities. Indeed, HS2 Ltd has already examined tunnelling round Wendover as an option for mitigating the impacts on the village.

It is likely that additional shafts would be required at intervals of 2km along the extended route for emergency lifts and ventilation purposes. In the majority of cases the shafts could be constructed alongside existing roads, and with careful and sensitive design the head-houses could be built into the ground with minimum long-term visual effects. The volume of excavated material will be of the order of 20,000m3 per shaft (2,000 loads spread over say 4 months at daily rate of approximately 30 per day).

Apart from the construction of the shafts and a temporary TBM reception facility north of Amersham there need be no visible construction activity in the AONB.

The overall difference in cost between the current proposal and extending the tunnel from Amersham to Wendover is likely to be small when all factors are considered and due allowance is made for the preservation of an Area of Outstanding Natural Beauty. The attached cost/benefit comparison shows that even when employing two extra TBMs the increase in the main civil engineering costs is only some £400m. This would be more than off-set by the unquantified cost savings and other benefits listed in the attachment.

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Drawings showing potential vertical alignment for alternative tunnel – prepared by Peter Brett Associates