

HS2

Woore Parish Council Proposal - Alternative Construction Routes Appraisal

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1 Introduction

1.1 Background

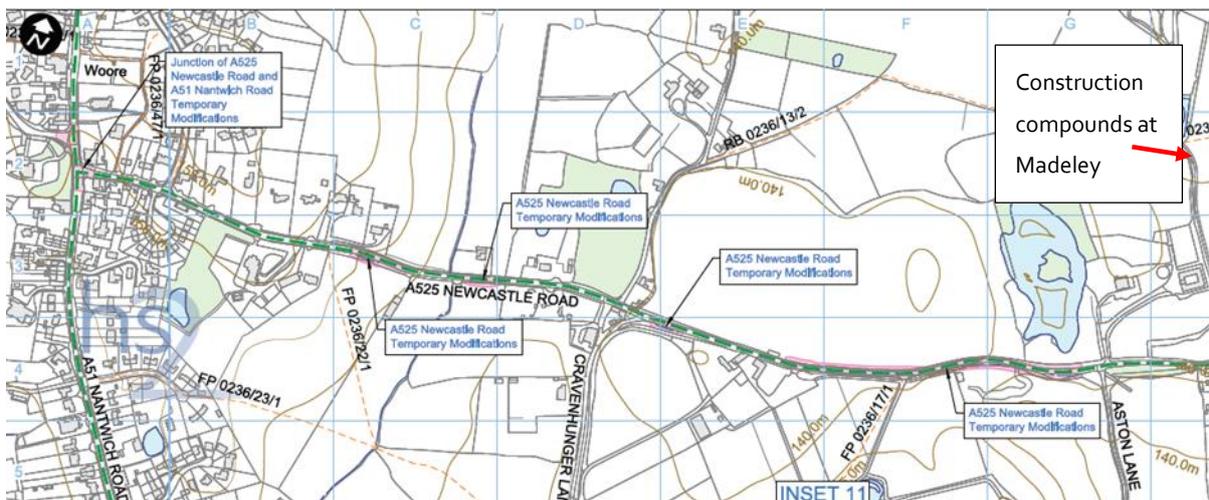
- 1.1.1 Woore village lies on the HS2 Phase 2a Proposed Scheme construction traffic route which utilises the A525 and A51, both roads passing through the village. The use of the A51 London Road and the A525 Newcastle Road is primarily to provide construction traffic access to the Madeley Cutting and Madeley Tunnel South satellite compounds during the periods when they are to be established, being operated as construction compounds and, at the end of the construction phase, when they are to be removed. The main construction traffic route for construction vehicles will be along site haul roads constructed along the trace once the satellite compounds are established. This will minimize the amount of construction traffic using the local road network.
- 1.1.2 Woore Parish Council and Woore Primary School raised concerns with respect to the construction traffic proposal with Select Committee in May 2018. The Select Committee's interim report July 2018 recommended (as regards Woore primary and nursery schools) that HS2 should engage with Shropshire County Council and introduce traffic calming measures outside the school and along the highway, conducting further work on road safety and parking issues.
- 1.1.3 Through subsequent engagement with Shropshire County Council and Woore Parish Council, a proposed package of measures has been developed in response to the key points of concern with respect to traffic speed on the A51 and safe pedestrian access. More details can be found in HS2 report '*Traffic Calming and Road Safety Provision Options – Woore village*' (2019).
- 1.1.4 As part of this engagement Woore Parish Council requested that HS2 review their proposals to construct a new temporary site construction traffic route to allow construction traffic to avoid the village of Woore. The options are referred to as:
- 'Short Route - option 1'; and
 - 'Long Route - option 2'.
- 1.1.5 The review of these options in this report concludes that there is no justification for either option, on the basis that both options would result in an increase in the environmental impacts within Woore Parish, engineering challenges resulting in significant costs, impacts on land owners and the introduction of uncertainty to the construction programme.
- 1.1.6 Neither of these options would remove the need for HS2 construction traffic to use the A51 and pass through Woore village, in order to access satellite compounds to the north of the village. That being the case, Woore village would continue to experience a moderate adverse traffic severance effect. The development of additional traffic severance mitigation described above may therefore still be required.

- 1.1.7 As a result of either option, construction traffic would increase through other settlements to the south and east of Woore village including, but not limited to, Whitmore, Baldwins Gate, Pipe Gate, and Ireland’s Cross.
- 1.1.8 HS2 is confident that the recommended package of measures within the ‘*Traffic Calming and Road Safety Provision Options – Woore village*’ (2019), are the correct, proportionate means of providing further mitigation for the reported effects of the scheme on the village of Woore.

1.2 The Study

- 1.2.1 The alternative options proposed by Woore Parish Council were presented in a meeting with HS2 Ltd on the 31st July 2018. Illustrations of the two suggested alternative construction routes were provided at this meeting and are included in Appendix A.
- 1.2.2 The Proposed Scheme passes south-west of Madeley through the Madeley cutting and crosses below the A525 Bar Hill Road to the north east of the village of Woore village. To gain access to the construction compounds in Madeley construction traffic has to route through the village of Woore as shown in Figure 1. Both options seek to remove the majority of this construction from the village.

Figure 1: Annotated extract from CT-05-253 map (ES, Volume 4) showing the construction route local to Woore Village.



- 1.2.3 Some engineering rationalisation of these suggested alignments has been undertaken, as presented in Section 3.2 of this report. A high-level appraisal (desk-based assessment of aerial photography and information in the public domain) of options has been undertaken at this stage of evaluation. This highlights likely impacts as a result of any future potential detailed environmental assessment. Where possible, the environmental appraisal compares the likely impact of the two options with the Proposed Scheme. Where direct comparison is not possible, comment is provided on what potential environmental effect may result. Likely impacts are split into two categories:

- Impacts related to construction of the temporary construction route itself and its reinstatement; and
- Impacts related to operation of the construction route during construction of HS2.

1.2.4 The study has been informed by a site visit in early September 2018. The data collected on site was limited to that which could be observed from the public highway. This visit focused primarily on the connection of the proposed construction route options with the existing highway.

1.3 Limitations of this report

1.3.1 Following this review, sufficient work has been completed to inform a decision concerning the viability of both options. However, the following points should be considered when reading this report.

1.3.2 The appraisal of alternatives is high-level and based only on aerial imagery at this time. No environmental data has been obtained for this area nor have surveys or engagement with potentially effected landowners been undertaken. Reporting is based on assessed likely outcomes in turn based on the information available which at this stage should be treated as precautionary.

1.3.3 The appraisal of alternatives uses traffic figures from the Environmental Statement (2017) Traffic Assessment, including changes as a result of Supplementary Environmental Statement 1 and Additional Provision 1 (2018). The traffic figures as a result of the construction of the Proposed Scheme are subject to change as a result of Supplementary Environmental Statement 2 and Additional Provision 2 (2019) Traffic Assessment, which will result in a reduction of peak traffic figures through Woore. Woore Parish Council and Shropshire County Council will be updated accordingly with this new information, once published.

1.3.4 The construction and reinstatement of both options will as a consequence increase traffic on A roads to the south of the entrance to the construction route. Although referenced within this report, no assessment has been carried out on the potential environmental impacts of these increases.

2 Summary of the Proposed Scheme with respect to construction traffic at Woore village

2.1 Proposed Construction Route

2.1.1 It is proposed for HS2 construction traffic to pass through Woore village to access the construction area to the east off the A51 London Road. In addition, construction traffic will also pass through Woore village along the A51 both to the north and south of the junction with the A525 in the centre of Woore village. This is to provide access to construction compounds to the north of Woore village, but primarily to connect the construction route from the River Lea viaduct, Madeley tunnel and Madeley cutting satellite compounds on A roads to the M6 motorway which runs to the east of the HS2 alignment and Woore village.

2.2 The Environmental Statement for the Proposed Scheme

Introduction

2.2.1 The following sections summarise data supporting the traffic assessment for Woore village presented in the Environmental Statement for the Proposed Scheme as well as a summary of the finding of wider environmental assessment of the Proposed Scheme specific to Woore village.

Traffic assessment

2.2.2 The increase in HS2 construction traffic over and above the determined future baseline traffic in Woore village may result in adverse environmental effects and impacts in Woore village. The HS2 construction traffic is added to the future baseline level of traffic which is determined by adding planned and committed traffic growth to the existing baseline. The existing baseline has been informed by traffic surveys undertaken in 2016 and 2018.

2.2.3 Details of the proposed construction route 2023 future baseline traffic figures, peak month average daily 'all construction traffic' and heavy goods vehicles 'HGV' movements, and the percentage increase in traffic flows during the peak month of construction route traffic are included in Appendix B.

2.2.4 Appendix B also includes HS2 Phase 2a construction traffic histograms on the A51 London Road north as well as south of the A525 Newcastle Road and on the A525 Newcastle Road in Woore village. Each histogram shows average daily HGV combined two-way traffic flows.

2.2.5 Increases in construction traffic greater than 30% for either HGVs or all vehicles are likely to result in significant adverse traffic severance effects being reported in the

Environmental Statement (2017). Below these transport impact and severance thresholds, the potential impact on transport facilities, congestion, air quality, sound, noise and vibration and community are likely to be negligible¹.

- 2.2.6 The Environment Statement (2017) reported major adverse effects for traffic severance on the A51 and A525 through Woore village. This was caused by an increase in HGV traffic of 120%, for 5 months of the construction programme, outside of this period the predicted increases are half of this level, and the overall change of total traffic in the peak month is 10% on the A51, south of the A525 and, 14% on the A525, and 3% on the A51 north of the A525.

Noise, Sound and Vibration

- 2.2.7 The assessment of noise, sound and vibration reported in the Environmental Statement (2017) was related to the outcome of the traffic assessment.
- 2.2.8 Changes in traffic flows on the existing road have been used to calculate changes, at source, in equivalent continuous sound levels as a result of the introduction of construction road traffic. The assessment considers the 'peak' and 'typical' monthly construction traffic flows.
- 2.2.9 The assessment of predicted effects due to changes in 'Basic Noise Level' as defined in Calculation of Road Traffic Noise has focused on changes of 3 dB or greater. A change of less than 3dB are not identified as being impacted. The 'peak' monthly construction traffic flows on the A525 at Woore village result in a less than 3dB change compared to the current road traffic flow. Therefore, the assessment does not identify an impact, or a likely significant effect.

Air Quality

- 2.2.10 The assessment of construction traffic emissions² used traffic data based on an estimate of the average daily flows at the peak year during the construction period (2020-2026)³.
- 2.2.11 Five modelling receptor locations in Woore village were included in the Environmental Statement⁴. All receptor locations reported negligible impacts and no significant effects.

Other Environmental Impact as a result of construction traffic passing through Woore Parish.

- 2.2.12 The Environmental Statement (2017) reports road modifications associated with the construction traffic passing through Woore Parish and therefore associated

¹ 1 Environmental Statement Volume 4 Off -route effects report 2.2.5

² Refer to Environmental Statement Vol5 Air Quality 6.3.7 for list of emissions assessed

³ 3 Environmental Statement Vol5 Air Quality 6.3.1

⁴ 4 Environmental Statement - Woore location map AQ-01-104 Vol5 Air Quality and Vol 5 Air Quality Table 15,16,17

environmental impacts. Reference to Woore and surrounding area include the following points:

- there is no significant effect associated with a temporary modification (for safety) at the A51/A525 junction; and
- potential for likely significant effects are reported for temporary provision of passing bays on the A525 within the Woore Parish. These include heritage, ecological and landscape/visual effects arising from loss of parts of a sunken lane, permanent loss of vegetation and changes in landform.

2.2.13 In addition, community and socio-economic assessment is not triggered for Woore village Parish due to the minor impact of dependent environmental considerations (as reported above and in the Environmental Statement). There is no assessed community or socio-economic impact as a result of construction traffic passing through Woore village in the Proposed Scheme.

3 Alternative Construction Routes

3.1 Options put forward by Woore Parish Council

3.1.1 In July 2018 two options were put forward by Woore Parish Council for the provision of a temporary construction route alignment that would bypass Woore village. These options, referred to as the 'Short Route – option 1' and the 'Long Route – option 2', both are presented in Appendix A.

3.2 Refinement of alternative construction route options

Approach

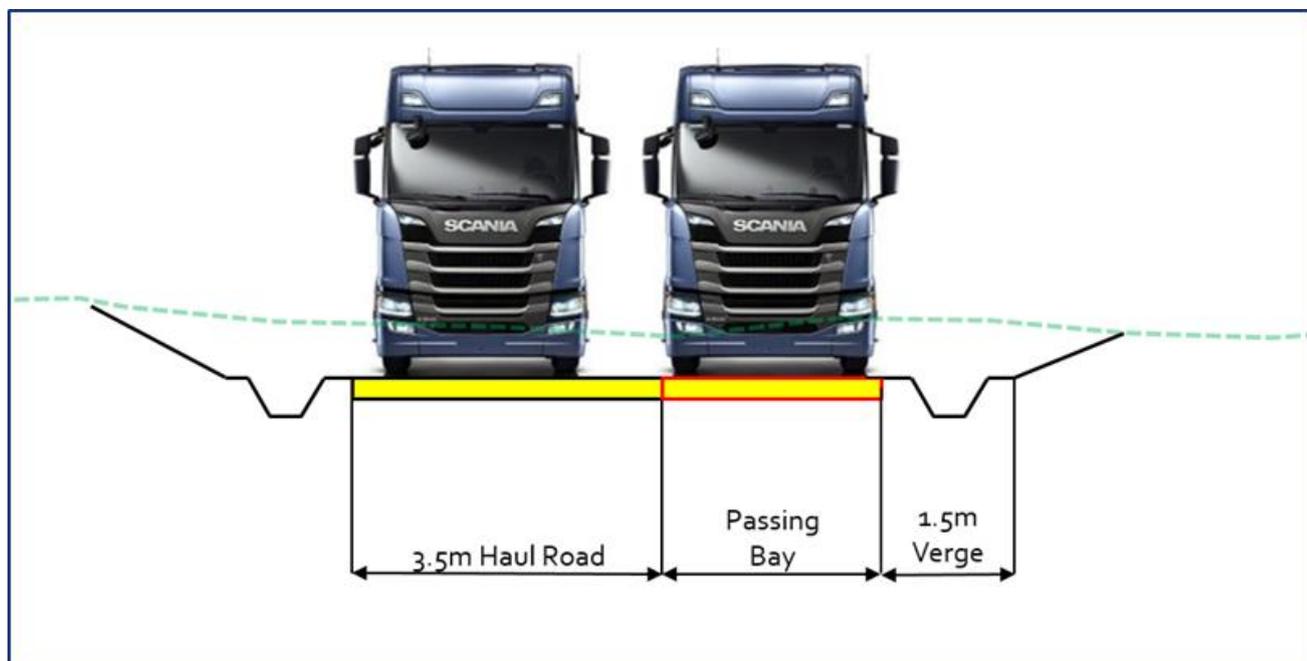
- 3.2.1 Prior to appraisal a refinement of the two routes was undertaken which considered engineering constraints and efficiencies.
- 3.2.2 Desk based data was utilised to review the routes. The alignments were adjusted to suit local features and promote efficient design in terms of construction and operation and minimize the environmental impact.
- 3.2.3 An early version of the option refinement layouts was provided to Woore Parish Council in September 2018. As a result of the receipt of further data and following further assessment as the review progressed, the final refined layouts shown in Figure 3 and Figure 5 were developed.
- 3.2.4 The two options have been appraised at a high-level for comparison to the Proposed Scheme with respect to engineering requirements and environmental effects. On a precautionary basis, assumptions have been made regarding the likely works required in order to ensure that the associated costs are identified in the cost estimate. Refer to individual line items within the cost estimate to identify these assumptions. A summary of this appraisal for each option is presented in the following chapters.
- 3.2.5 The outline description and engineering basis of the two options are presented in the following sections. The engineering and construction basis that supports both options is also presented.
- 3.2.6 Both options are assumed to be temporary for the purposes of construction requirements.

Construction Traffic Route Specifications

- 3.2.7 The refined construction route would bypass Woore village and would join onto the existing A51 and A525 roads using priority junctions.
- 3.2.8 The Short Route - option 1 route would be approx. 650m in length. The Long Route - option 2, route would be approximately 2,570m in length.

- 3.2.9 The refined route alignments have been selected to minimise the impact to land owners whilst avoiding the watercourse's running through the area. Field boundaries have been followed where possible when considering the alignments.
- 3.2.10 The junctions onto the major roads take into account the required visibility of other vehicles at the junction for safety and minimise land take. The northern junction onto the A525 utilises a short section of Aston Lane to negate the need to have two priority junctions on the A525 in close proximity.
- 3.2.11 The construction route would consist of a temporary track constructed of a compacted unbound material for the majority of its length, with a bound surface on the approaches to the major A road junctions. The track would be wider on the approaches to the junctions to allow for two-way movements in / out of the junctions and minimise the impact on existing traffic flow on the A roads.
- 3.2.12 The construction route specification to meet construction traffic requirements in this location would consist of a 3.5m wide single track with 1.5m verges and passing places for HGVs. The passing places would be designed on a case-by-case basis to enable HGVs to pass safely at each location. A simple illustration of a cross section of the construction route requirements is shown in Figure 2.

Figure 2: Illustrative cross section of construction route



- 3.2.13 Adopting a design speed of 30kph, the alignment geometry and corridor would take in consideration a compliant design approach.
- 3.2.14 The construction route interface with the existing roads would be managed with new priority junctions on the A525 and A51. A two-dimensional assessment has been carried out on the available visibility of other vehicles for these junctions to ensure they would

comply with TD 42/95⁵. Where visibility splays cross existing verges, there may be a need to cut back existing vegetation to the highway boundary. The visibility splays have been represented in the figures using a circle with the appropriate radius; i.e. 120m centred at the proposed junction.

Environmental Appraisal

3.2.15 The following topics are scoped in for environmental appraisal of both construction traffic route options. These are as follows:

- Traffic and Transport;
- Ecology and biodiversity;
- Landscape and visual;
- Heritage;
- Agriculture;
- Water and flooding;
- Noise and vibration;
- Air quality;
- Community; and
- Socio economic.

3.2.16 The appraisal looks at both construction and reinstatement impact as well as impact during the operation of a temporary construction route at Woore village. The appraisal looks specifically at comparison of the option with the Proposed Scheme, on impacts at Woore village and Woore Parish as a result of each option.

3.2.17 An exercise has been undertaken in which the volume of additional construction traffic generated by the building of an alternative construction route at Woore village has been estimated. The route to the Strategic Road Network is assumed to be the previously defined construction traffic routes reported in the Environment Statement (2017). This route from Woore village to the Strategic Road Network includes the following roads:

- A51 London Road;
- A53 Newcastle Road;
- A5182 Trentham Road;
- A519 Newcastle Road;
- A500 Queensway; and
- M6 junction 15.

Construction Methodology

3.2.18 A simplified construction sequence has been assumed in order to undertake an appraisal of both options.

⁵ TD 42/95 Department of Transport 'Geometric Design of Minor/Major Priority Junctions' Jan 1995.

- 3.2.19 The two routes would be constructed using standard construction plant and techniques, such as excavators, vibratory rollers and possibly dozers for grading the construction route fill materials.
- 3.2.20 Sufficient land take has been included within the design to accommodate the import and export of road material during construction and removal. All the main earthworks movement will be along the construction route which will be constructed along the trace. Re-instatement would need to be managed under the reinstatement plan and will require temporary stockpiling of topsoil within the land take locally and for the duration of operation.

Programme and programme risk

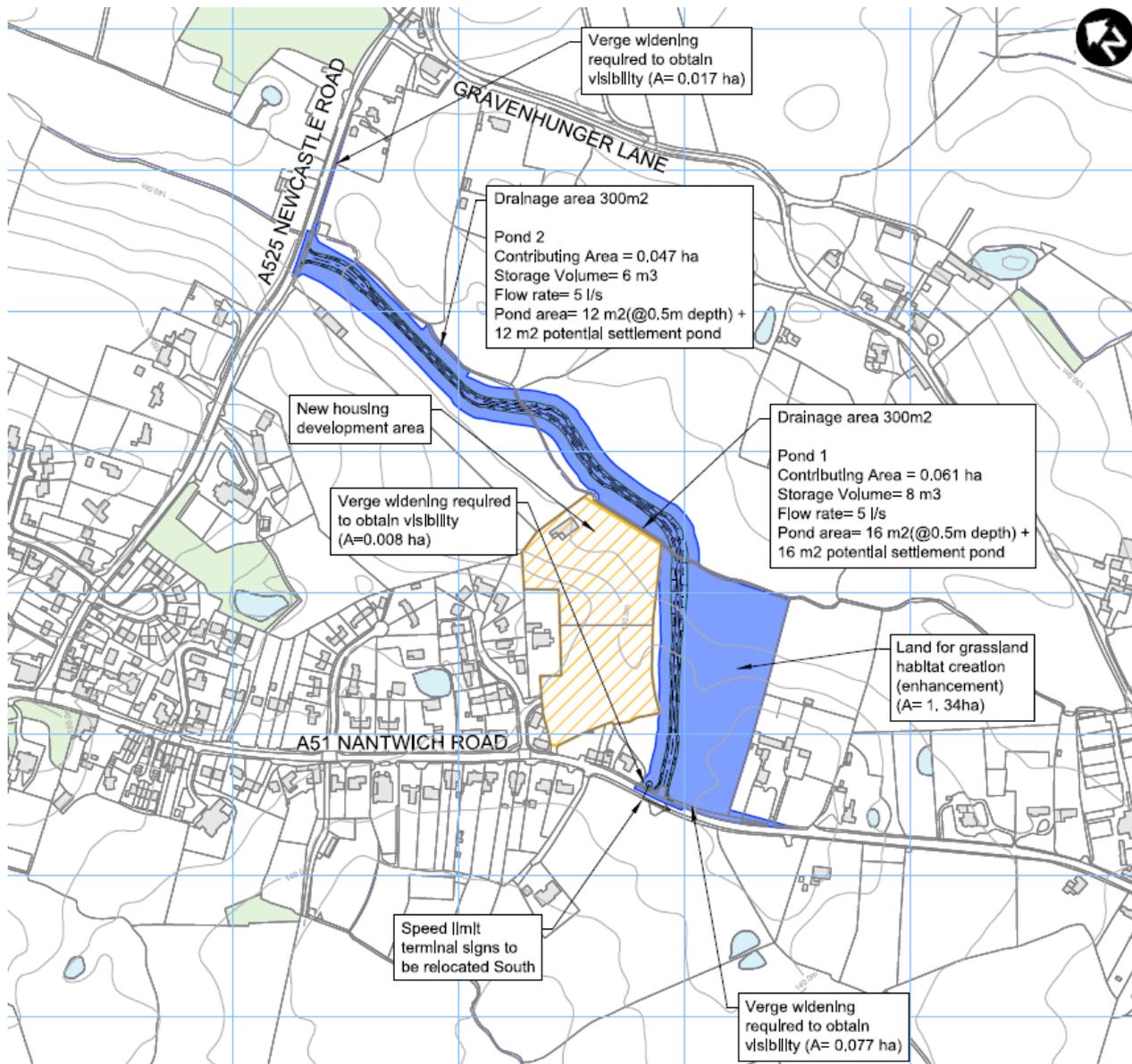
- 3.2.21 The programme on both routes has been estimated (at a high level) to account for reduced construction outputs of working within a narrow site corridor, challenging ground conditions and sensitive ecological receptors. With increased land take the programme durations could possibly be reduced, however local HGV movements would increase and a portion of these may travel through Woore village.
- 3.2.22 Further information on the programme constraints and the programme risk associated with planning applications and additional legal requirements are detailed in the route option appraisal sections within this report.

4 Appraisal of Short Route – Option 1

4.1 Introduction

4.1.1 Option 1 would connect with the A51 and A525 on the outskirts of Woore Village as shown in the sketch extract illustrated in Figure 3. (See Drawing C861-ARP-SKE-000-100238 (Poo.4) in Appendix D for full details)

Figure 3: Short Route - option 1 refined alignment considered in the appraisal for a by-pass to Woore village for construction traffic (housing development highlighted in orange)



4.2 Engineering Considerations and Design

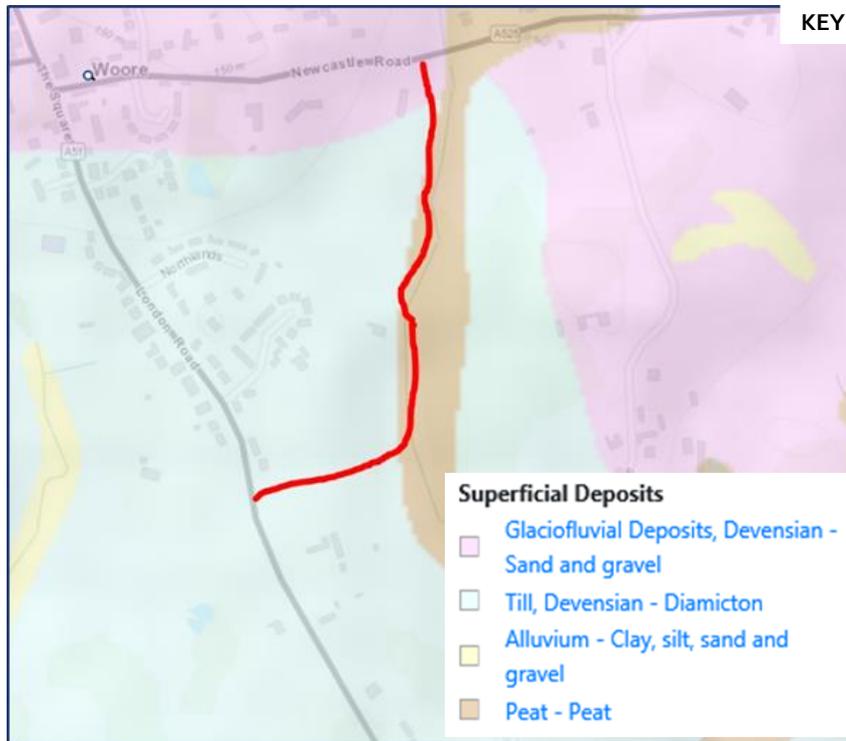
Outline approach to associated civils works

- 4.2.1 The refined alignment and land take requirements are shown in Figure 3 and accommodate a temporary construction route 650 metres long, 3.5metres wide and with 1.5 metre verges and passing places.
- 4.2.2 The outline engineering considerations and civil design considerations relevant to both temporary construction routes are presented in Section 3.
- 4.2.3 There would be a maintenance liability with temporary construction route and some assumptions are made with respect to scale of maintenance and associated costs.
- 4.2.4 There would be works and costs associated with reinstatement of the environment during demobilisation. Some allowance for topsoil storage has been incorporated in the land take presented in Figure 3.

Ground conditions influencing design

- 4.2.5 The Short Route - option 1 temporary construction route crosses the Woore Moraine. This is a well-studied glacial geological feature.
- 4.2.6 Publicly available geology information indicates glacial superficial deposits comprising a mixture of sands, gravel and clay. These deposits overly a mudstone bedrock. An area of peat is identified running along the existing field drain. Figure 4 shows an extract of the BGS geological map for the area including the approximate alignment of Short Route - option 1.

Figure 4: Extract of BGS geological map identifying Short Route - option 1



4.2.7 The design of a temporary construction route would need to take account of poor ground conditions in particular the peat. A 'float road' design has been assumed for Short Route - option 1 across the sections where the alignment crosses peat on the geological map. Further details are provided in the construction section below.

Existing Utilities

4.2.8 There are no major utilities constraints on the Short Route – option 1 alignment. However, a number of existing minor utility services exist on the A51 and A525 which will need to be protected during the tie-in works to connect to these roads.

Drainage provision

4.2.9 The drainage proposals for the temporary construction route include for a linear channel positioned within the verge in areas of cutting, at the bottom of the embankment when in fill or a combination of both to suit the existing ground profiles. These channels will convey surface water runoff to attenuation features shown in the illustration in the construction logistics mark up in Appendix D. The attenuation volume of pond 1 needs to be in the order of 8m³ and pond 2 needs to be in the order of 6m³. This will restrict runoff to a maximum of 5 l/s for all storm events up to a 1 in 20 year return period. Additional area has been allowed for potential silt treatment and outfalls to existing field drains.

4.3 Construction and logistics

- 4.3.1 A summary of the key considerations and assumptions with respect to the Short Route – option 1 are presented on the drawing 'Refined construction route alignments for Woore village including construction logistics requirements – Option 1' included in Appendix C.
- 4.3.2 The presence of aquifers/groundwater is not envisaged to be a major construction constraint as the proposed route is mainly on shallow embankments. As discussed in the geotechnics section above, in areas of peat it may be necessary to adopt a 'floating road' solution for construction, depending on the depth of the peat layer. The construction route construction would be stabilised with one or two layers of geogrid. This approach leads to several advantages:
- reduced road thickness (and subsequently less weight);
 - better distribution of pressure;
 - untouched surface layer, lesser impact on vegetation;
 - less construction material needed; and
 - usually more cost effective (than excavation and replacement of soft deposits).
- 4.3.3 Detailed surveys would be needed to define the hydrology of the area and the peat type and in situ peat strength. The design of the construction route would be based on this data and the expected traffic loadings. For the purposes of costing in support of this study, some assumptions have been made with respect to floating road provision across peat sections below the Short Route - option 1 alignment.
- 4.3.4 The preliminary earthworks design gives a surplus of cut material to retain for reinstatement after HS2 construction phase. It is not deemed necessary to obtain any additional land for stockpiling as the proposed corridor should be sufficient to retain any materials alongside the track, this approach reduces the overall land take.
- 4.3.5 Reinstatement would need to be managed under the reinstatement plan and will require temporary stockpiling of topsoil which would be reinstated on demobilisation.
- 4.3.6 Drainage assumptions in support of construction logistics requirements are presented under the above drainage provision section.
- 4.3.7 Welfare and logistics areas would be accommodated within the corridor width.
- 4.3.8 Two potential minor utility diversions are identified, a sewer diversion at the A525 junction and lowering of a low voltage power cable. The works would be undertaken during the mobilising period and should not impede construction of the main track. Utilities are noted to exist within the verges of the A51 and A525 at the tie-ins with the construction route. These may require temporary protection or adjustment.
- 4.3.9 The visibility at the short route junctions (with A51 and A525) may require some vegetation clearance to be undertaken to avoid temporary speed limit reductions during construction phase. Some trees in a residential property on the A51 entrance may be

affected by this requirement. An alternative may be to reduce speed limits locally i.e. a change in the speed limit (30/40mph) on the A51 may require relocating east towards Pipe Gate in order to meet safety requirements and standards.

- 4.3.10 Construction of the short route junctions with the A51 and A525 would be undertaken under single lane traffic controlled by two-way lights for tie-ins. The existing road widths are insufficient to maintain two lanes running (down to 6m wide). It is envisaged this could be implemented within a 4-week period to minimise impact to road users. Street furniture could be relocated during off-peak lane closures. The existing footpath would cross the A525 entrance to the construction route. This would require maintaining during operation via dropped tactile crossing of the bell mouth. Insufficient land is available to divert the footpath across the road.

4.4 Programme

- 4.4.1 The estimated duration for construction of this option would be 6 months. Re-instatement is expected to take 3 months.
- 4.4.2 The earliest date for operation of the temporary construction route would be during Q4 2021, this is based on a start date after the (Proposed Scheme programme) ecology species translocations (end Q2 2021). Figure 5 relates this date to peak traffic flows through Woore Village along the A525.
- 4.4.3 The Proposed Scheme programme indicates species translocations works being undertaken during 2021. There are possibly similar ecology works associated with the construction route construction. The Short Route – option 1 may require species translocation works. The feasibility of constructing the Short Route - option 1 construction route for the start of the HS2 HGV movements (Q4 2020 - Figure 5 Peak A) is therefore extremely low due to the requirement to undertake advanced ecology works prior to the main construction phase. The Short Route – option 1 would require ecology works species translocations for the site construction route local to Woore village to occur potentially early 2019, which is considered unfeasible.
- 4.4.4 The temporary construction route would be in operation until construction traffic volumes through Woore village are scheduled to reduce in 2025/2026.
- 4.4.5 Powers for the proposed temporary construction route would not be sought through the Phase 2a Bill. Land required for the works would therefore have to be obtained without the availability of compulsory purchase powers, and rely upon landowners being willing to make the land available at an acceptable price. Separate powers would need to be obtained for the road and any associated environmental works. Given the powers that would be needed it is likely that an order under the Transport and Works Act would be required. The time required for an application for such an order to be prepared, considered and a decision is substantial. The timeframe for this process would be outside of HS2's control and therefore is likely not align with the HS2 delivery programme. It is therefore not possible to guarantee that a temporary construction

route at Woore village could be constructed prior to establishment of the satellite compounds at Madeley off the A525 during mobilisation (the peak traffic flow period) i.e. the peak traffic flow through Woore village.

4.4.6 The key risks to the programme are planning applications and potential advanced ecological works to mobilise for construction.

4.4.7 The corresponding baseline online distance between the proposed junction points is 1,000m. This may translate to improved journey times but is unlikely to influence programme.

4.5 Cost

4.5.1 The estimated engineering cost of the Short Route – option 1 is £946k, including provisional environmental mitigation but excluding land and property costs.

4.6 Environmental Appraisal of Short Route - Option 1

Traffic and transportation

Impact during construction and reinstatement

4.6.1 Traffic associated with the construction of the temporary construction route would not increase construction traffic flows within Woore village, but would increase traffic flow in Woore Parish to the south of the construction route entrance.

4.6.2 It is estimated that construction of the construction route would take six months and generate 1580 combined HGV movements or 14 combined HGV movements per day. However, during peak periods of construction, the daily figure could increase to more than 40 combined HGV movements per day. Construction would require eight full time staff and therefore generate at least a further 16 combined worker trips travelling to and from home to the construction site.

4.6.3 It is estimated that removal of the construction route would take a further three months and generate 1326 combined HGV movements or 22 combined HGV movements per day. However, during peak periods of activity, the daily figure could increase to more than 60 combined HGV movements per day. Removal would require similar staffing to construction and therefore require eight full time staff and therefore generate at least a further 16 combined worker trips travelling to and from home to the construction site.

4.6.4 Construction traffic would increase through other settlements to the south and east of Woore village including, but not limited to, Whitmore, Baldwins Gate, Pipe Gate, and Ireland's Cross.

Impact during operation of the temporary construction route

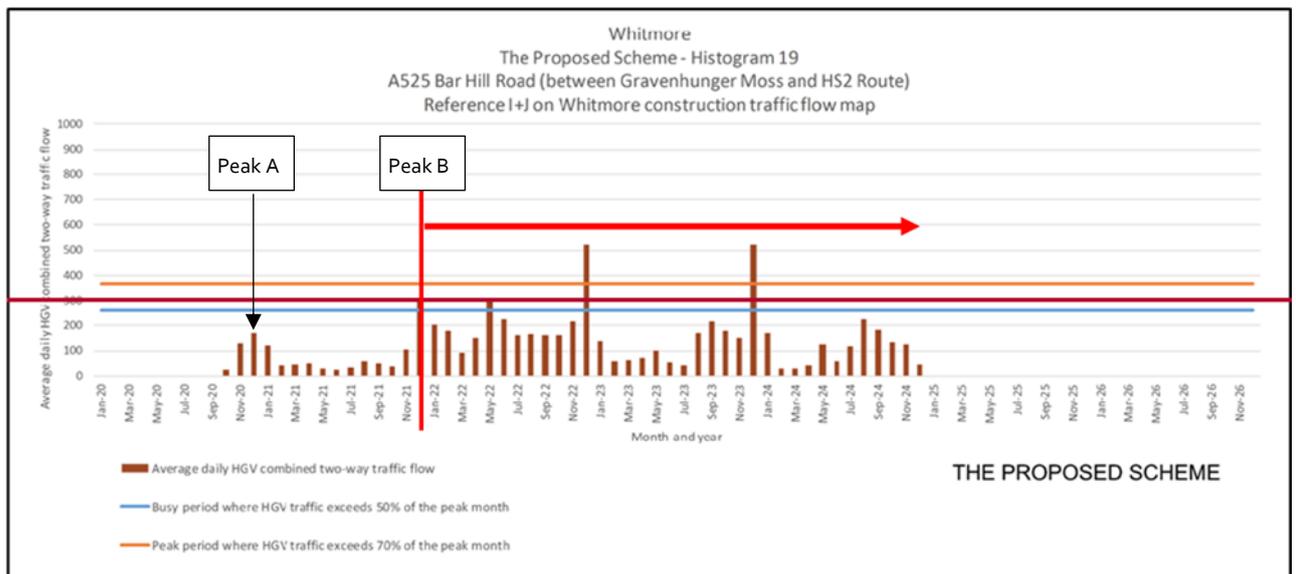
4.6.5 The Short Route - option 1 would substantially reduce the volume of construction HGV vehicles travelling through Woore village. However the indicative construction programme for option 1, see Figure 5, shows that completion of the construction route

would not be possible before the end of 2021 and therefore there would still be some construction traffic routing through Woore village via the A51 and the A525 towards the Madeley construction compounds during this period.

4.6.6 The Short Route - option 1, once operational, would reduce the need for construction HGV vehicles to travel through Woore village and turn on to/from the A525 Newcastle Road. The construction route would not remove all construction HGVs that travel through Woore village. A number of vehicles would travel through Woore village on the A51 London Road travelling to and from Checkley Lane and the associated satellite compound. Appendix B shows traffic flows reported in the Environmental Statement (2017).

4.6.7 The histograms shown in Appendix B show an early peak in HGV construction traffic in 2020 (figure 5, peak A). This is associated with site compound mobilisation. Given the programme constraints, the temporary construction route could not be in operation until after peak A indicated in figure 5. This would none the less mean that most of the construction traffic between the A51 and A525 (from peak B onwards) the temporary construction route would be available.

Figure 5: Indicative earliest operation date of option 1 temporary construction route



4.6.8 Traffic histograms included in Appendix B show that during the peak month of construction average daily HGV flows along the A51 passing north south through Woore village are 66 HGVs in each direction and 97 all vehicles in each direction. This traffic would still route through Woore village if a temporary construction route was constructed and assuming no other change to the Proposed Scheme.

4.6.9 Notwithstanding other constraints there are considerable programming risks associated with constructing a construction route around Woore village prior to the construction of the HS2 route in this vicinity. Therefore there could be lengthy delays in constructing

the construction route resulting in some construction traffic continuing to routing through Woore village along the A51 London Road and A525 Newcastle Road.

- 4.6.10 The indicative programme indicates that Option 1 would not be completed until the end of December 2021. This means that there would still be a major adverse traffic severance effect on the A51 and A525 in Woore village. However, the volume of construction traffic would reduce substantially once the construction of the construction route was completed.

Ecology & biodiversity

Impact during construction and reinstatement

- 4.6.11 The route of Short Route - option 1 would follow a minor watercourse and series of field boundaries for much of the road's length. It has been assumed that the watercourse, the hedgerows and trees associated with the field boundaries would not be directly impacted by the access road. The exception would be where the road crosses field boundaries, such as where it doglegs back down to the A51 Nantwich Road as shown in and the junctions (as discussed below).
- 4.6.12 The construction access road would result in the loss of small areas of grassland and arable habitats (at this stage of unknown ecological value) and this is likely to be as a minimum a temporary impact and possibly a permanent impact. Based upon a review of aerial photography of the area, the grass field within which the road would then join the A51 appears to be of some ecological interest.
- 4.6.13 Adequate mitigation for ecological losses would be required. This is likely to be primarily focused on reinstating or enhancing existing grassland habitats (as well as potential enhancements to the adjacent watercourse). An additional area of land take is required and is identified Figure 3. Approximately 1.3ha has been proposed on a precautionary basis for grassland habitat creation to mitigate for this loss of habitat as a result of the scheme.
- 4.6.14 It is not known at this stage whether any protected or notable species are likely to be present within the proposed road corridor. No information reviewed has indicated this to be the case.
- 4.6.15 The proposed verge widening at the A525 northern junction involves the removal of a section of (likely species-poor) hedgerow. Mitigation would comprise of reinstated hedgerow that ties in with vegetation to either side of the widening area.
- 4.6.16 The proposed verge widening A51 southern junction involves the removal of a section of ruderal vegetation, with a total area of loss of 0.1ha, no mitigation will be required beyond reinstatement.
- 4.6.17 The Short Route - option 1 is less preferable than the Proposed Scheme construction route, which is limited to the existing carriageway (and localised widening for passing

bays etc.), and thus this alternative could generate new significant effects when compared to the Proposed Scheme.

- 4.6.18 Ecology impact is considered likely to be a permanent minor worsening for the Short Route – option 1 compared to the Proposed Scheme, which has no ecological effects noted in the centre of Woore village and no change to the adverse effects related to the removal of hedgerows for the passing bays in the Environmental Statement (2017).

Impact during operation of the temporary construction route

- 4.6.19 There are no biodiversity or ecological impacts identified during operation of the temporary construction route to date.

Landscape and visual

Impact during construction/ reinstatement and operation of temporary construction route

- 4.6.20 The proposed location for the Short Route – option 1 is in a location characterised by pastoral and arable farmland with dispersed farmsteads and properties. Small to medium-scale irregular fields are bounded by mostly robust hedgerows with mature hedgerow trees that connect to shelterbelts and coppices in the wider area. The introduction of the Short Route - option 1 would potentially have a temporary impact on the existing character of the area.
- 4.6.21 The Short Route - option 1 also has the potential to have a temporary visual impact on residential receptors on Northlands and Grove Crescent.
- 4.6.22 The Short Route -option 1 has the potential to introduce new landscape and visual adverse impacts on an area previously unaffected by the Proposed Scheme.
- 4.6.23 Landscape and visual impact is considered likely to be a temporary moderate worsening for the Short Route – option 1 compared to the Proposed Scheme (which uses the existing road network in the centre of Woore village).

Heritage

Impact during construction/ reinstatement and operation of temporary construction route

- 4.6.24 The Short Route - option 1 would have a direct impact on two non-designated assets: an area of ridge and furrow and a linear stone feature of unknown origin during construction. A site visit would be needed to further review the stone feature. It is also possible that Short Route - option 1 would result in a temporary impact on the setting of Gravenhunger Hall (Grade II).
- 4.6.25 This is a potential new adverse heritage impact of the Proposed Scheme where only historic hedgerows are impacted by the construction of passing places on the A525 in the Proposed Scheme.

- 4.6.26 Heritage impact is considered likely to be a potentially permanent minor worsening for the temporary Short Route – option 1 compared to the Proposed Scheme (which uses the existing road network in the centre of Woore village).

Agriculture

Impact during construction/reinstatement and operation of the construction route

- 4.6.27 For the Short Route – option 1, five land holdings appear to be affected by the proposal (two of which are unregistered parcels), see Appendix E.
- 4.6.28 The affected land appears to be low grade grassland used for grazing. The Short Route - option 1 alignment generally follows field boundaries but does sever a land parcel in the centre.
- 4.6.29 No detailed Agricultural Land Classification data are available at the time of writing. The land is shown on the Provisional ALC as all Grade 3 land. This land is unlikely to be best and most versatile (BMV) land.
- 4.6.30 Some provision may be required for crossing the construction route when land ownership and usage is established.
- 4.6.31 Reinstatement would need to be managed under the reinstatement plan and will require temporary stockpiling of topsoil which would be reinstated on demobilisation.
- 4.6.32 Short Route - option 1 would introduce a new temporary impact on agricultural land during construction and also operation of the construction route.
- 4.6.33 Agriculture impact is considered likely to be a temporary minor worsening for the temporary Short Route – option 1 compared to the Proposed Scheme (which uses the existing road network in the centre of Woore village).

Water and Flooding

Impact during construction/reinstatement and operation of the construction route

- 4.6.34 Short Route - option 1 crosses over two watercourses. The alignment is within a surface water flood zone of 1 in 30 years and greater. This could impact the use of the carriageway during moderate storm events which could affect the construction programme.
- 4.6.35 Watercourse crossings could have implications for Water Framework Directive status of waterbodies. Appropriate mitigation would need to be designed in consultation with the Environment Agency. Requirements would be influenced by the temporary nature of the temporary construction routes.
- 4.6.36 The embedded mitigation measures outlined in the draft Code of Construction Practice would ensure negligible pollution risks to the watercourses.

- 4.6.37 The construction route overlies superficial deposits and bedrock which are classified by the Environment Agency as Unproductive and Secondary A, and Secondary B aquifers respectively. There are no licensed groundwater abstractions or registered unlicensed private groundwater abstractions in proximity to the route. There are also no mapped springs or water dependent ecological sites in this area. Based on the information available, it is anticipated that embedded mitigation measures outlined in the draft Code of Construction Practice would ensure negligible pollution risks to the aquifers.
- 4.6.38 Due to two culverts being required over a minor watercourse for the temporary construction route, there may be localised flood risk impacts immediately upstream of these culverts in a flood event. Therefore, the Short Route – option 1 introduces a new temporary potential adverse impact with respect to flood risk.
- 4.6.39 With respect to ground water risk, the Short Route - option 1 is comparable to the Proposed Scheme (no change). With respect to flood risk the Short Route - option 1 is a minor worsening compared to the Proposed Scheme.

Noise & vibration

- 4.6.40 The assessment of traffic noise levels on the existing road network during construction considers the change in noise levels as a result of the introduction of the additional construction traffic movements on these routes. This is compared to the existing traffic flows and are reported, where appropriate, as indirect effects.
- 4.6.41 The Short Route - option 1 would be located within a construction worksite (i.e. not a public road network). Noise and vibration would need to be assessed as a direct effect associated with this specific worksite. Therefore, the Proposed Scheme construction route on existing roads and the Short Route - option 1 would be assessed using different approaches.
- 4.6.42 For further information on the duration of the direct and indirect noise impacts, refer to Section 4.4, which provides information on the programme for the construction, reinstatement and operation of the construction route.

Direct noise impact during construction/ reinstatement and operation of the construction route

- 4.6.43 The Short Route - option 1 is unlikely to result in a new direct noise and vibration effect on a community or individual basis at residential properties within the scoping area, which includes the community of Woore (with the possible exception of the new housing development currently under construction identified in Figure 3, outlined in orange).
- 4.6.44 The properties furthest from the existing A51 and A525, approximately 5 properties, on the outskirts of Woore village and the outlining farms, would be subject to new direct construction noise effect during the construction of the construction route and subsequent construction traffic during operation. However, the anticipated noise level is below the lowest observed adverse effect level.

Indirect noise impact on Woore village during operation of the construction route

- 4.6.45 The Environmental Statement (2017) assessment does not identify an impact, or a likely significant effect of construction traffic noise effect at Woore village.
- 4.6.46 The 5 properties close to the A525 and A51 which already experience noise from road traffic, including contributions from heavy vehicles, will be subject to reductions in indirect noise (1-2dB). These minor reductions (less than 3dB) are insufficient to change the reported effect, and therefore the Short Route – option 1 is considered as no change, for construction traffic local to Woore village.

Air Quality

Impact on sensitive receptors during construction and reinstatement and operation

- 4.6.47 The Short Route – option 1 would increase traffic flows in Woore Parish leading up to the construction route entrance. However, this increase would be have a negligible effect on air quality, and is comparable with the Proposed Scheme (no change).

Impact on Woore village during operation of the construction route

- 4.6.48 The Environmental Statement reports negligible impacts and no significant effects on Woore village for air quality.
- 4.6.49 The adoption of the temporary construction route option would reduce construction traffic through Woore village, with the impacts in Woore village remaining negligible (no change).

Community

Impact on sensitive receptors during construction and reinstatement and operation

- 4.6.50 The alignment of Short Route – option 1 does not require any new land take from Community resources. However, it is situated within close proximity to residential properties on the A525 Newcastle Road, A51 Nantwich Road, Grove Crescent (new development on the Land Adjacent to The Grove London Road) and Northlands. This introduces the potential for new or different in-combination temporary effects on these localised properties in Woore village from landscape and visual and HGV effects when comparing to the Proposed Scheme.
- 4.6.51 In addition, it is possible that the impact of construction traffic associated with the construction of a construction route may cause adverse environmental effects along the road network south of Woore village. Therefore, during construction and reinstatement of the construction route there is potential for new in combination temporary effects outside Woore Parish when compared to the Proposed Scheme.

- 4.6.52 Overall, it is anticipated that Short Route – option 1 would result in a minor worsening to the community impacts when compared to the Proposed Scheme.

Socio Economic

Impact on Woore village during operation of the construction route

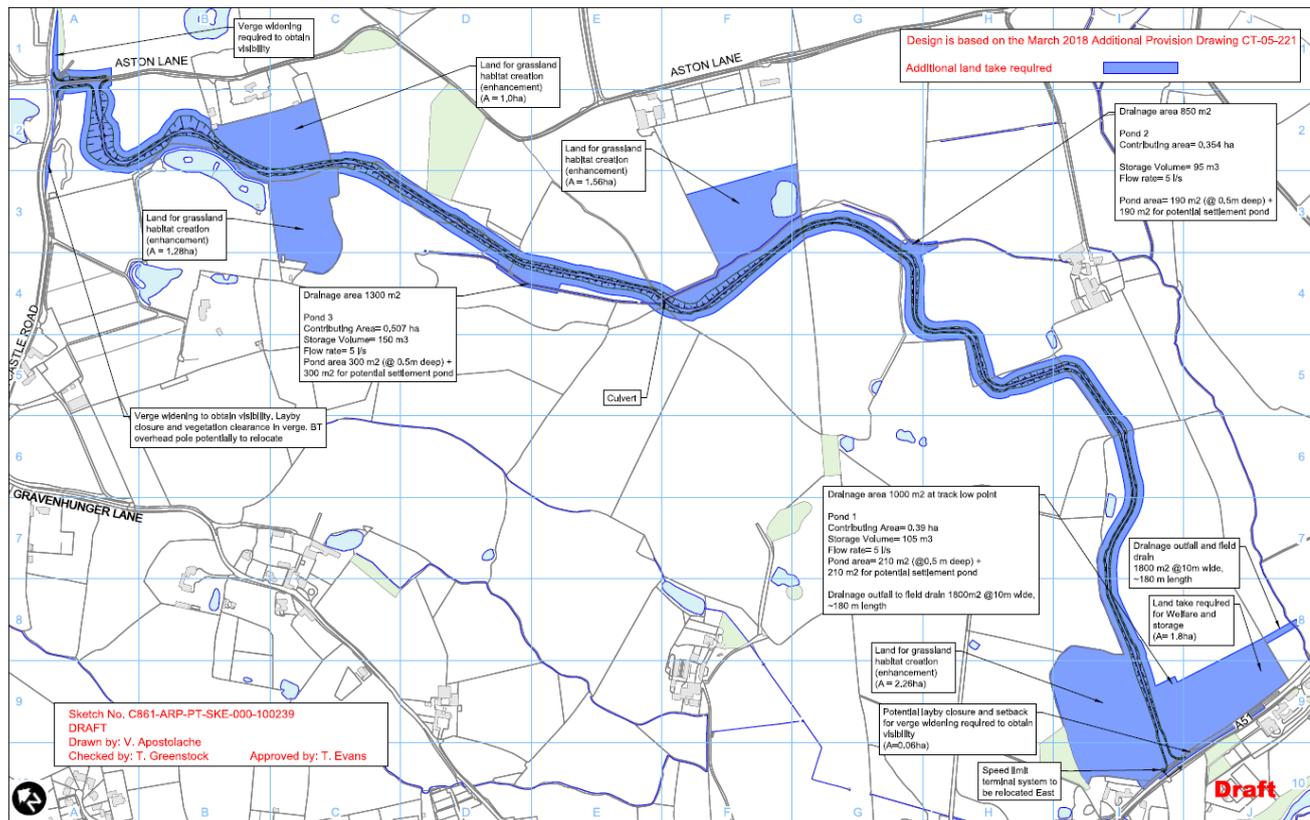
- 4.6.53 The alignment of the Short Route – option 1 does not require any new land take from Socio-Economic resources and moves some of the construction traffic further away from sensitive business receptors within Woore village. It is therefore unlikely that the Short Route - option 1 would result in the introduction of new or different in-combination effects on sensitive businesses within Woore village
- 4.6.54 Therefore, the Short Route – option 1 is comparable to the Proposed Scheme (no change)

5 Appraisal of Long Route - Option 2

5.1 Introduction

5.1.1 The Long Route - option 2 would connect with the A51 and A525 on the outskirts of Woore Parish as shown in Figure 5. (See Drawing C861-ARP-SKE-000-100239 (Poo.4) in Appendix D for full details)

Figure 5: Long route – option 2 refined alignment considered in the appraisal for a by-pass to Woore village for construction traffic.



5.2 Engineering considerations and design

Outline approach to associated civil works

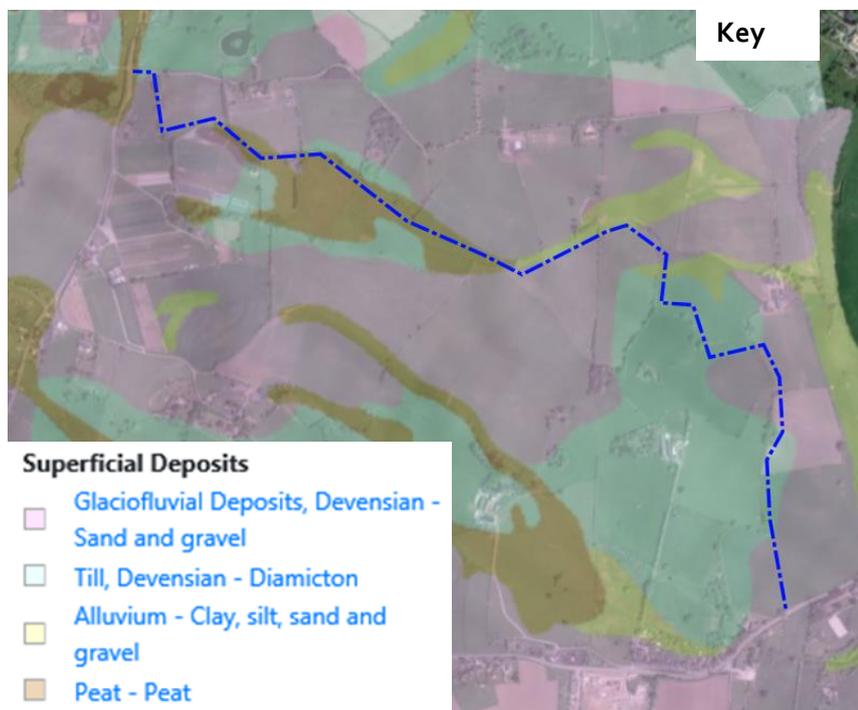
- 5.2.1 The refined alignments and land take requirements are shown in Figure 5 and accommodate a temporary construction route approximately 2,570 metres long and 3.5 metres wide with 1.5 metre verges and passing places for HGVs.
- 5.2.2 The outline engineering considerations and civil design considerations relevant to both site construction route options are presented in Section 3.
- 5.2.3 The Long Route - option 2 has a number construction challenges and passes a number of potentially environmentally sensitive areas which are considered in the engineering design approach described below.

- 5.2.4 Earthworks would be generally cut and fill close to existing ground (2.5m max height), except at Aston Lane approach to A525 requiring an average 5m cut for 70m with earthwork side slopes.
- 5.2.5 The Long Route - option 2 would affect the northern end of the existing Aston Lane which would probably require a temporary road closure for the works to be constructed.
- 5.2.6 This route passes a number of water receptors and a large section of the access road is parallel to an existing watercourse with a number of crossings required.
- 5.2.7 There would be works and costs associated with reinstatement of the environment during demobilisation. Some allowance for topsoil storage has been incorporated in the land take presented in Figure 5.

Ground conditions influencing design

- 5.2.8 The Long Route - option 2 temporary construction route crosses the Woore Moraine. This is a well-studied glacial feature. Publicly available geology information indicates glacial superficial deposits comprising a mixture of sands, gravel and clay. These deposits overly a mudstone bedrock. An area of peat is identified along the north western area of the Long Route - option 2 alignment. Figure 6 shows an extract of the BGS geological map for the area sketch showing the approximate alignment of Long Route option 2.

Figure 6: Extract of BGS geological map identifying Long Route Option 2



- 5.2.9 The design of a temporary construction route would need to take account of poor ground conditions in particular the peat. A design of a 'floating road' would be assumed for Long Route - option 2 across the sections where the alignment crosses peat on the

geological map. Further comment is made in the Construction section related to the Long Route - option 2 and considerations with respect to the ground condition challenges. The road construction along wetland sections of the alignment along the option 2 route would need more granular material than a solution proposed for relatively thin deposits of peat.

Existing utilities

- 5.2.10 Utility information is incomplete within the scope of the Long Route – option 2, and therefore there may be unknown utilities in the area. A number of existing minor utilities are present along the A51 and A525 which will need to be protected during the tie-in works to connect to these roads.
- 5.2.11 The Long Route - option 2 alignment would pass under an existing overhead electricity cable route, currently crossing Aston Lane south of the proposed connection. A minimum clearance of 5.8m is required from the 11kV overhead line to the road surface (or 6.9m if a high load route). The existing level of the existing overhead line is unknown, the conservative assumption would be that a localised in line raising would be required for option 2. There would be a cost associated with requirement.
- 5.2.12 The Long Route - option 2 alignment makes multiple crossings of two existing high-pressure gas pipelines which could require diversion or protection works as part of this option. It has been currently assumed the design of alignment would be sufficient to pass over the gas main and as this is a temporary construction route, the gas pipeline could be protected. If the road is to become permanent, a diversion design is considered likely to be required by the asset owner. This will need to be validated as the design develops.
- 5.2.13 Further comment on the construction requirements with respect to the above gas pipelines can be found in Section 5.4.

Drainage provision

- 5.2.14 The drainage proposals for the temporary construction route include for: a linear channel positioned within the verge in areas of cutting, at the bottom of the embankment when in fill or a combination of both to suit the existing ground profiles. These channels would convey surface water runoff to attenuation features shown in the sketch Woore village bypass alternatives, option 2, in Appendix D. The assumed attenuation volume of pond 1 is 105m³, pond 2 is 95m³ and pond 3 is 150m³. This would restrict runoff to a maximum of 5l/s for all storm events up to a 1 in 20 year return period. Additional area would be allowed for potential silt treatment and outfalls to existing field drains.

5-3 Construction and logistics

- 5.3.1 A summary of the key considerations and assumptions with respect to the Long Route – option 2 are presented on the drawing 'Refined site construction route alignments for

Woore village including construction logistics requirements – Option 2' included in Appendix C.

- 5.3.2 Long Route - option 2 significantly increases the construction complexity, scale and scope of works compared to Short Route - option 1.
- 5.3.3 The risk of a high-water table, poor drainage and watercourses over the length may require further land take or special attenuation systems to manage flooding within the corridor. The unbound road and trafficking may give rise to silt to manage from surface water run-off, over a significant length of track with limited outfalls. The presence of aquifers and source protection zones adds complexity to construction and management of surface water. Further requirements and considerations are reported in earlier engineering and environmental sections.
- 5.3.4 In areas of peat it may be necessary to construct a 'floating road' depending on the depth of the peat layer. Further details on a floating road solution are presented in the construction logistic section for the Short Route - option 1.
- 5.3.5 Detailed surveys would be needed to define the hydrology of the area and the peat type and in situ peat strength. The design of the construction route would be based on this data and the expected traffic loadings. For the purpose of this study (and costing) some assumptions have been made with respect to floating road provision across peat sections below the option 2 alignment.
- 5.3.6 A potential minor utility diversion is identified, the raising of a 11kv overhead power cable. The works would be undertaken during the mobilising period and should not impede construction of the main track.
- 5.3.7 Two high pressure gas pipelines (major utilities) cross the route at three locations. The 30m proximity of two of the pipelines adds complexity to the potential temporary works design and construction. The vertical alignment of the temporary construction route would need to further consider the gas pipelines at detailed design which respect to crossing provision. The three pipeline crossings could take up to 9 months to install dependant on the pipeline and ground conditions and available utility supplier resources.
- 5.3.8 The preliminary earthworks design gives a surplus of cut material to retain for reinstatement after HS2 construction phase. The approximate volume of 14,000m³ would require storage on site. As the earthworks corridor is limited in width then a separate logistics area would be required for storage of materials, turning of vehicles and provision of welfare facilities. This combined area would ideally be located adjacent the southern A51 site entrance as shown on Figure 6 and drawing C861-ARP-SKE-000-100239 attached to this report summarising construction key considerations.
- 5.3.9 The construction route is designed to be unbound with exception to the junction works which are bound surfacing. In the vicinity of the Woore fruit farm it may be prudent to surface the construction route to further reduce the risk of dust contaminating the fruit crops (this would be in addition to general site dust suppression measures as outlined in

the draft CoCP). For the purpose of costing an unbound surface has been assumed at this stage of assessment.

- 5.3.10 The visibility at the junctions may require some vegetation clearance to be undertaken to avoid temporary speed limit reductions during the construction phase. Several trees and BT overhead lines alongside the A525 may be affected by this requirement. An alternative may be to reduce speed limits locally i.e. change in speed limit on the A 525 and A51 local to the junction with the Long Route - option 2.
- 5.3.11 Construction of the junctions with the A51 and A525 would be undertaken under single lane traffic, controlled by two-way lights, for tie-ins as the existing road widths are insufficient to maintain two-lane running (down to 6m wide). It is envisaged this could be implemented within a 4-week period to minimise impact to road users. Street furniture could be relocated during off-peak lane closures. The Aston Lane/A525 junction would likely require short duration full closures to reconfigure the current layout and form the junction with the temporary construction route. Road users could be potentially diverted east through Aston village, but further study would be required to confirm suitability.

5.4 Programme

- 5.4.1 The estimated duration for the construction of this option would be 12 months. It is expected that re-instatement would take a further six months.
- 5.4.2 The key risks to the programme are planning applications, potential advanced ecological works to mobilise for construction. An additional risk to option two is the high-pressure gas mains protection, works generally are restricted to summer seasons where pressures are reduced, if this window is missed then operation could be delayed by nine months to one year. The current assumption is that 3 months of protection works to the high-pressure gas mains can be undertaken in the summer period of 2021.
- 5.4.3 The earliest date for operation of the temporary construction route would be during Q2 2022, this is based on a start date after the (proposed scheme programme) ecology species translocations (end Q2 2021). Figure 8 above relates this date to peak traffic flows through Woore Village along the A525.
- 5.4.4 The Proposed Scheme programme indicates species translocations works being undertaken during 2021. There are possibly similar ecology works associated with the temporary construction route construction. The feasibility of constructing the Long Route - option 2 temporary construction route for Q4 2020 and the start of the main HS2 HGV movements is extremely low unless any required advanced ecology works have been undertaken prior to the main construction phase. This would require a change in the current ecology works programme species translocations, potentially to early 2019.

- 5.4.5 The corresponding baseline online distance between the proposed junction points is 3,290m. This may translate to improved journey times for construction traffic but is unlikely to reduce the HS2 construction programme.
- 5.4.6 The temporary construction route would be in operation until construction traffic volumes through Woore village are scheduled to reduce in 2025/2026.
- 5.4.7 Powers for the proposed temporary construction route would not be sought through the Phase 2a Bill. Land required for the works would therefore have to be obtained without the availability of compulsory purchase powers, and rely upon landowners being willing to make the land available at an acceptable price. Separate powers would need to be obtained for the road and any associated environmental works. Given the powers that would be needed it is likely that an order under the Transport and Works Act would be required. The time required for an application for such an order to be prepared, considered and a decision is substantial. The timeframe for this process would be outside of HS2's control and therefore is likely not align with the HS2 delivery programme. It is therefore not possible to guarantee that a temporary construction route at Woore village could be constructed prior to establishment of the satellite compounds at Madeley off the A525 during mobilisation (the peak traffic flow period) i.e. the peak traffic flow through Woore village.

5.5 Cost

- 5.5.1 The estimate engineering cost of the Long Route – option 2 is £3.04 million, including provisional environmental mitigation but excluding land and property costs.

5.6 Environmental Appraisal of Long Route - Option 2

Traffic and transportation

Impact during construction and reinstatement

- 5.6.1 Traffic associated with the construction of the temporary construction route would not increase construction traffic flows within Woore village but would increase traffic flows in Woore Parish leading up to the south of the construction route entrance.
- 5.6.2 It is estimated that construction of the construction route would take 12 months and generate 4458 combined HGV movements or 18 combined HGV movements per day. However, during peak periods of construction, the daily figure could increase to more than 50 combined HGV movements per day. Construction would require 14 full time staff and therefore generate at least a further 28 combined worker trips travelling to and from home to the construction site.
- 5.6.3 It is estimated that removal of the construction route would take a further six months and generate 2706 combined HGV movements or 22 combined HGV movements per day. However, during peak periods of activity, the daily figure could increase to more than 60 combined HGV movements per day. Removal would require similar staffing to

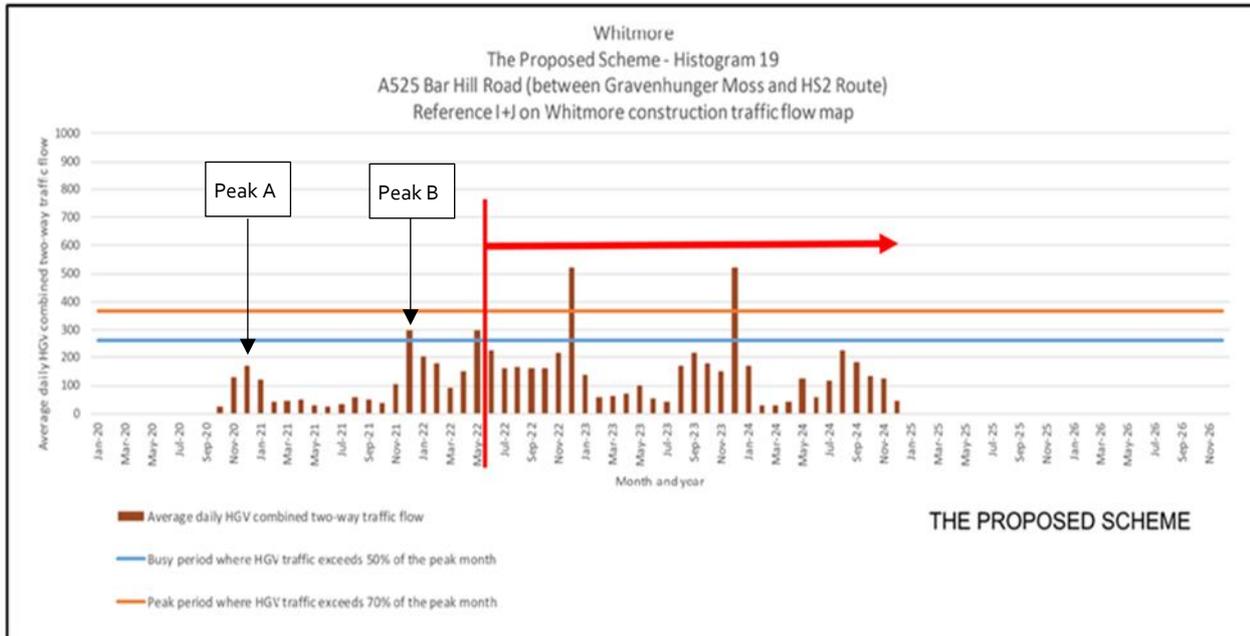
construction and therefore require eight full time staff and therefore generate at least a further 28 combined worker trips travelling to and from home to the construction site.

- 5.6.4 Construction traffic would increase through other settlements to the south and east of Woore village, including, but not limited to, Whitmore, Baldwins Gate, Pipe Gate, and Ireland's Cross.

Impact during operation of the temporary construction route

- 5.6.5 The Long Route - option 2 would substantially reduce the volume of construction HGV vehicles traveling through Woore village. However, the indicative construction programme for option 2, see Figure 8, shows that completion of the construction route would not be possible before the end of May 2022 and therefore there would still be some construction traffic routing through Woore village via the A51 and the A525 towards the Madeley construction compounds during this period.
- 5.6.6 The Long Route - option 2, once operational, would reduce the need for construction HGV vehicles to travel through Woore village and turn on to/from the A525 Newcastle Road. The construction route would not remove all construction HGVs that travel through Woore village. A number of vehicles would travel through Woore village on the A51 London Road travelling to and from Checkley Lane and associated satellite compound. Appendix B shows traffic flows reported in the Environmental Statement (2017).
- 5.6.7 The histograms shown in Appendix B show an early peak in HGV construction traffic in 2020 (figure 8, peak A). This is associated with site compound mobilisation. Given the programme constraints, the temporary construction route could not be in operation until after peak A indicated in figure 8. This would none the less mean that most of the construction traffic between the A51 and A525 (from peak B onwards) the temporary construction route would be available.

Figure 8: Indicative earliest operation date of option 2 temporary construction route.



- 5.6.8 Traffic histograms included in Appendix B show that during the peak month of construction average daily HGV flows along the A51 passing north south through Woore village are 66 HGVs in each direction and 97 all vehicles in each direction. This traffic would still route through Woore village if a temporary construction route was constructed and assuming no other change to the Proposed Scheme.
- 5.6.9 Notwithstanding other constraints, there are considerable programming risks associated with constructing a construction route around Woore village prior to the construction of the HS2 route in this vicinity. Therefore there could be delays in constructing the construction route resulting in some construction traffic continuing routing through Woore village along the A51 London Road and A525 Newcastle Road.
- 5.6.10 The indicative programme indicates that option 2 would not be completed until the end of May 2022. This means that there would still be a major adverse traffic severance effect on the A51 and A525 in Woore village. However, the volume of construction traffic would reduce substantially once the construction of the construction route was completed.

Ecology & biodiversity

Impact during construction and operation

- 5.6.11 The Long Route - option 2 alignment follows a minor watercourse for much of the road’s length. It has been assumed that most of the watercourse would not be directly impacted by the access road, except where the road crosses the watercourse. At least one crossing location is located approximately mid-way along the route.

- 5.6.12 The construction of the access road would result in the loss of numerous areas of grassland and arable habitats (at this stage of unknown ecological value). In addition, there would be loss of several sections of hedgerow and groups of mature or scattered trees (in particular adjacent to Aston Lane).
- 5.6.13 Adequate mitigation for ecological losses would be required. This is likely to be focused on reinstating or enhancing existing grassland habitats and the creation of smaller areas of tree and woodland planting (as well as potential enhancements to the adjacent watercourse). Approximately 6.1ha has been proposed on a precautionary basis to mitigate for this loss of habitat as a result of the option 2, and is identified Figure 6
- 5.6.14 It is not known at this stage whether any protected or notable species are likely to be present within the proposed option 2 road corridor. The route would pass close to 4 existing ponds and larger waterbodies so impacts to terrestrial habitats used by great crested newts may occur.
- 5.6.15 The proposed verge widening at the A525 northern junction involves the removal of sections of scrub and mature trees, hedgerow (likely species-poor) and ruderal vegetation within a total area of loss of 0.1 ha). Areas of scrub and tree loss should be mitigated by new tree planting (woodland habitat creation) and hedgerow loss by hedgerow reinstatement between vegetation to either side of the widening area.
- 5.6.16 The proposed verge widening at the A51 junction involves the removal of sections of hedgerow (likely species-poor) and ruderal vegetation within a total area of loss of 0.1ha. Mitigation will be required to compensate for the loss and should comprise a reinstated hedgerow that ties in with vegetation to either side of the widening area.
- 5.6.17 The Long Route - option 2 is less preferable than the Proposed Scheme construction route, which is limited to existing carriageway (and localised widening for passing bays etc.), and thus this alternative could generate new significant effects when compared to the Proposed Scheme.
- 5.6.18 Ecology impact is considered likely to be a permanent moderate worsening for the Long Route – option 2 compared to the Proposed Scheme, which has no ecological effects noted in the centre of Woore village.

Impact during operation of the temporary construction route

- 5.6.19 There are no biodiversity or ecological impacts identified during operation of the temporary construction route to date.

Landscape and visual

Impact during construction/ reinstatement and operation of temporary construction route

- 5.6.20 The proposed location of the Long Route - option 2 is in a location characterised by pastoral and arable farmland with dispersed farmsteads and properties. Small to medium-scale irregular fields are bounded by mostly robust hedgerows with mature

hedgerow trees that connect to shelterbelts and coppices in the wider area. The introduction of the Long Route - option 2 temporary construction route would potentially have an impact on the existing character of the area.

- 5.6.21 The Long Route - option 2 would also have a potential visual impact on residential receptors and the dispersed farmsteads along the route.
- 5.6.22 The Long Route - option 2 has the potential to introduce new temporary landscape and visual adverse impacts on an area previously unaffected by the Proposed Scheme.
- 5.6.23 Landscape and visual impact is considered likely to be a moderate worsening for the Long Route - option 2 compared to the Proposed Scheme, which uses the existing road network in the centre of Woore village.

Heritage

Impact during construction and reinstatement

- 5.6.24 The Long Route - option 2 alignment has a direct impact on the non-designated former line of the Market Drayton Line of the North Staffordshire Railway.
- 5.6.25 This is a potential new adverse heritage impact of the Proposed Scheme where only historic hedgerows are impacted by the construction of passing places on the A525 in the Proposed Scheme.
- 5.6.26 Heritage impact is considered likely to be a potentially permanent moderate worsening for the temporary Long Route – option 2 compared to the Proposed Scheme (which uses the existing road network in the centre of Woore village).

Impact during operation of the construction route.

- 5.6.27 There is currently no identified temporary heritage impacts during operation of the construction route.

Agriculture

Impact during construction/reinstatement and operation of the construction route

- 5.6.28 For the Long Route – option 2 sixteen land holdings are affected by the temporary construction route proposal (two of which are unregistered), see Appendix E
- 5.6.29 Landowners affected by Long Route - option 2 would include Woore Fruit Farm in the north; some horse paddocks at Shenton Hill; agricultural grassland possibly associated with The Grange Farm (and possibly another farm); a cattle farm with some buildings off Aston Lane to the north of Larksfield and arable land/grassland at Lanco Barn.
- 5.6.30 The route generally follows field boundaries but there would be severance at Lanco Barn and the agricultural grassland to the south of the horse paddocks (possibly land associated with The Grange).

- 5.6.31 Long Route - option 2 has the potential to substantially impact Woore Fruit Farm, considering issues such as dust.
- 5.6.32 No detailed Agricultural Land Classification data is available at the time of writing. The land is shown on the Provisional ALC as all Grade 3 land, although there are areas of Grade 2 land shown in the locality. It is likely that some of the land could be BMV land, especially at Woore Fruit Farm and Lanco Barn.
- 5.6.33 Some provision may be required for crossing the construction route when land ownership and usage is established.
- 5.6.34 Reinstatement would need to be managed under the reinstatement plan and will require temporary stockpiling of topsoil which would be reinstated on demobilisation.
- 5.6.35 The Long Route - option 2 would introduce a new temporary impact on agricultural land use.
- 5.6.36 Agriculture impact is considered likely to be a moderate worsening for the temporary Long Route – option 2 compared to the Proposed Scheme (which uses the existing road network in the centre of Woore village).

Water and Flooding

Impact during construction/reinstatement and operation of the construction route

- 5.6.37 Option 2 passes very close to a number of watercourses and is therefore within a surface water flood zone of 1 in 30 years and greater. This could impact the use of the carriageway during moderate storm events and therefore affect the construction programme.
- 5.6.38 Watercourse crossings could have implications for Water Framework Directive status of waterbodies and appropriate mitigation would need to be designed in consultation with the Environment Agency. Requirements would be influenced by the temporary nature of the temporary construction route.
- 5.6.39 The construction route overlies superficial deposits, some of which are classified by the Environment Agency as Secondary A aquifers by the Environment Agency. The underlying bedrock is classified as Secondary A and Principal aquifers. Based on the information available, it is anticipated that embedded mitigation measures outlined in the draft Code of Construction practice would ensure negligible pollution risks to the aquifers.
- 5.6.40 The Long Route - option 2 crosses a source protection zone 3 (SPZ₃) associated with a public water abstraction. There are no licensed private groundwater abstractions or registered unlicensed private groundwater abstractions in proximity to the route. There is however a nearby potential spring and marshy area which could be impacted by the construction route. The significance of the disruption would be dependent the nature of the required earthworks for the route.

- 5.6.41 The Long Route – option 2 has the potential to introduce a new temporary potential adverse impact with respect to flood risk and ground water although no specific impacts are identified at this stage of assessment.
- 5.6.42 With respect to ground water and flood risk at this stage of assessment, the Long Route - option 2 is comparable (no change) to the Proposed Scheme.

Noise & vibration

- 5.6.43 The assessment of traffic noise levels on the existing road network during construction considers the change in noise levels as a result of the introduction of the additional construction traffic movements on these routes compared to the existing traffic flows. These are reported, where appropriate, as indirect effects.
- 5.6.44 The Long Route - option 2 would be located within a construction worksite (i.e. not a public road network). Noise and vibration would need to be assessed as a direct effect associated with this specific worksite. Therefore, the Proposed Scheme and the Long Route - option 2 would be assessed using different approaches.
- 5.6.45 For further information on the duration of the direct and indirect noise impacts, refer to Section 5.4, which provides information on the programme for the construction, reinstatement and operation of the construction route.

Direct noise impact during construction/ reinstatement and operation of the construction route

- 5.6.46 The properties furthest from the existing A51 and A525, on the outskirts of Woore village, and the outlining farms and the community of Aston, will now be subject to new temporary direct noise impact from traffic and during the construction of the construction route. The anticipated noise level is below the lowest observed adverse effect level, and is therefore comparable to the Proposed Scheme (no change).

Indirect noise impact on Woore village during operation of the construction route

- 5.6.47 The Environmental Statement (2017) assessment does not identify an impact, or a likely significant effect of construction traffic noise effect at Woore village. The Long Route - option 2 is unlikely to result in a new direct noise and vibration effect on a community or individual basis at residential properties within the scoping area, which includes the community of Woore.
- 5.6.48 The 5 properties close to the A525 and A51 which already experience noise from road traffic, including contributions from heavy vehicles, will be subject to reductions in indirect noise (1-2dB). These minor reductions (less than 3dB) are insufficient to change the reported effect, and therefore the Short Route – option 1 is considered as no change, for construction traffic local to Woore village.

Air Quality

Impact on sensitive receptors during construction and reinstatement and operation

5.6.49 The Long Route – option 2 would increase traffic flows in Woore Parish leading up to the construction route entrance. However, this increase would have a negligible effect on air quality, and is comparable with the Proposed Scheme (no change).

Impact on Woore village during construction and reinstatement and operation

5.6.50 The Environmental Statement reports negligible impacts and no significant effects on Woore village for air quality.

5.6.51 The adoption of the temporary construction route option would reduce construction traffic through Woore village, with the impacts in Woore village remaining negligible (no change).

Community

Impact on sensitive receptors during construction and reinstatement and operation

5.6.52 The Long Route - option 2 does not require any new land take from Community resources. The nearest properties on Aston Lane and Gravenhunger Lane may be subject to new or different in-combination effects from landscape and visual and HGV effects when comparing to the Proposed Scheme.

5.6.53 In addition, it is possible that the impact of construction traffic associated with the construction of a temporary construction route may cause adverse environmental effects along the road network south of Woore village and therefore there is potential for new in combination temporary effects outside Woore village Parish when compared to the Proposed Scheme.

5.6.54 Overall, it is anticipated that option 2 would result in a minor worsening to the community impacts when compared to the Proposed Scheme.

Socio Economic

Impact on Woore village during operation of the construction route

5.6.55 The route of the construction access road does not require any new land take from Socio-Economic resources and Long Route - option 2 moves the construction access road further away from sensitive business receptors within Woore village.

5.6.56 Therefore, the Long Route - option 2 is comparable to the Proposed Scheme (no change)

6 Conclusion

- 6.1.1 In requesting a temporary construction route, Woore Parish Council's aim was to allow HS2 construction traffic to avoid Woore village as a construction route. Neither the Short nor Long Option achieve this aim, since neither option would avoid the need for HS2 construction traffic to use the A51 and pass through Woore village.
- 6.1.2 Any improvement in adverse impacts associated with traffic in Woore village resulting from a temporary construction route solution would be partially off-set by some increase in construction traffic along the road network south of Woore village, resulting from the construction of either option. There is also the potential for new adverse impacts with respect to traffic, noise and vibration, air quality and community to be introduced for sensitive receptors along the road network.
- 6.1.3 The land take requirements for both options would affect a number of land owners within Woore Parish, that are currently unaffected by the Proposed Scheme. The construction of the temporary construction route would result in new likely adverse environmental impact in the wider Woore Parish and potential for new significant effects. The introduction of either option would not remove the significant environmental effects reported as result of the Proposed Scheme.
- 6.1.4 HS2 are not proposing any further Additional Provisions to the Phase 2a Bill, and therefore it has been assumed that either option would require separate planning consent. Due to the creation of additional environmental effects as a result of the scheme and the need of temporary and permanent works on third party land, the likelihood of objection by local residents, landowners and the planning authority is high. The risks that occur as a result of the planning process include the application of restrictive conditions by the local authority, programme risk from a delay in the decision making, increase in cost to options as a result of the planning process, and risk of refusal.
- 6.1.5 For the reasons set out in this review and summarised above, HS2 considered that the benefits as a result of an introduction of a temporary construction route for Woore village are insufficient, and outweighed by the additional impacts which would result from either option. HS2 are confident that the proposed recommended measures within the '*Traffic Calming and Road Safety Provision Options – Woore village*' (2019), will be sufficiently and appropriate in mitigating the reported effects of the Proposed Scheme on the village of Woore.
- 6.1.6 A summary of the evaluation of engineering, environmental impact, construction logistics and cost with respect to construction route options compared to the Proposed Scheme are included in the table in Appendix FF.

Appendix A – Early Alignment References

A.1.1 The following options put forward by Woore Parish Council in July 2018 a temporary construction route road at Woore village.

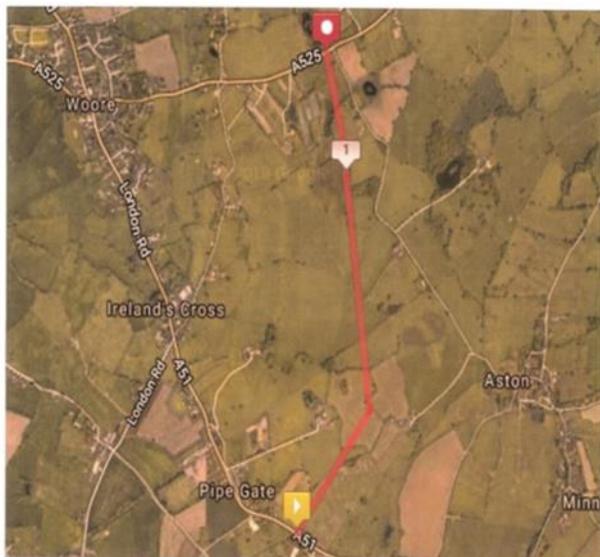
SHORT HAUL

0.44miles, Woore to A525.



LONG HAUL

1.32miles, Shropshire boundary on A51 to A525.



Appendix B - Proposed Scheme Traffic Assessment Data

B.1.1 Histograms showing the increase of average daily, HS2, HGV construction traffic flows over the full construction period along the A525 and A51 (the combined, 2-way flow) are shown in Figures 9 to 11 respectively.

Figure 7: Construction Phase, Peak Month Average Daily HGV Traffic for Whitmore, Woore and Madeley

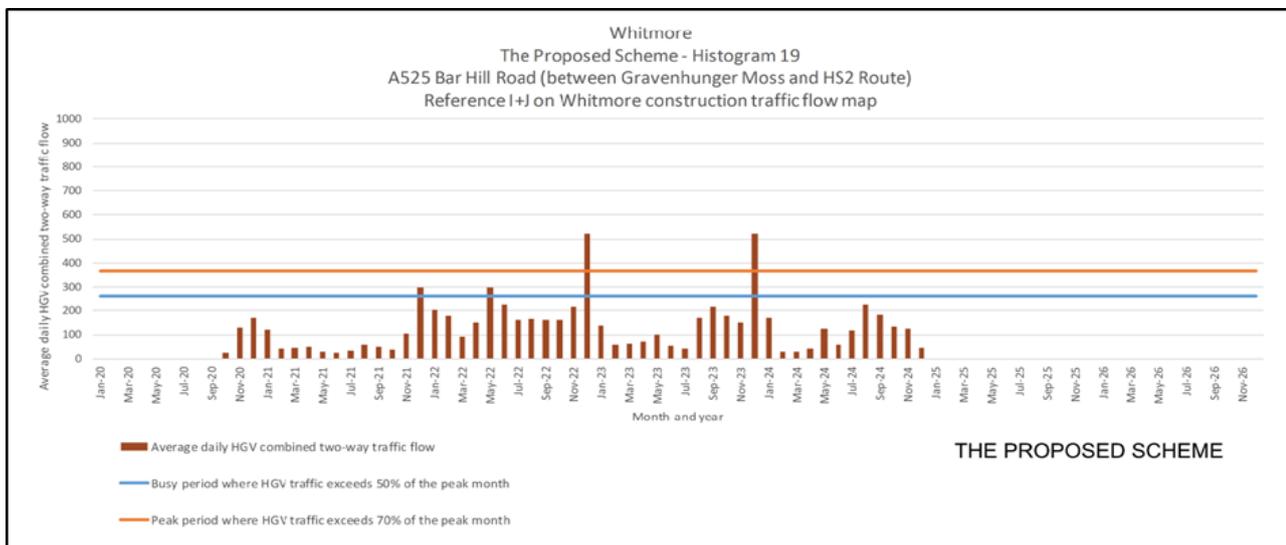
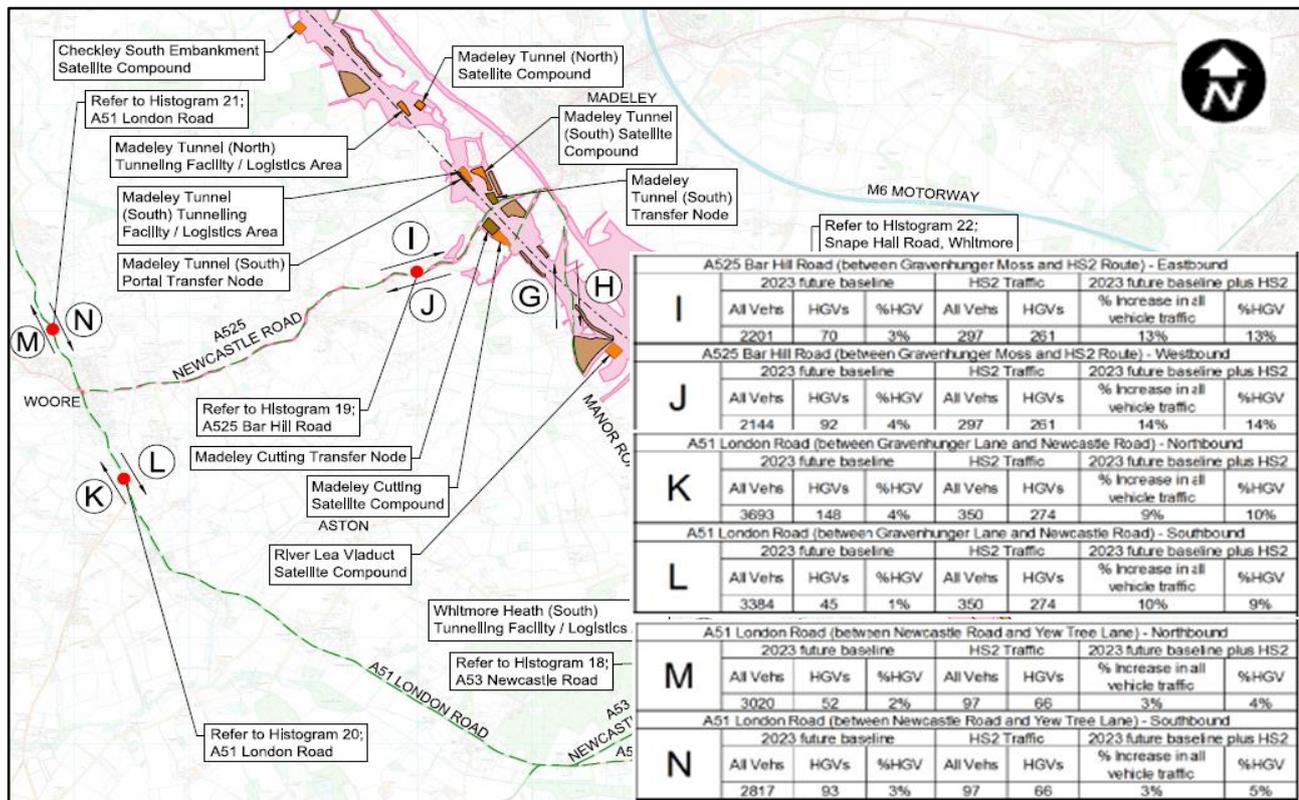


Figure 8: Average daily Construction HGV combined two-way traffic flow for A51 London Road (south of Woore village centre)

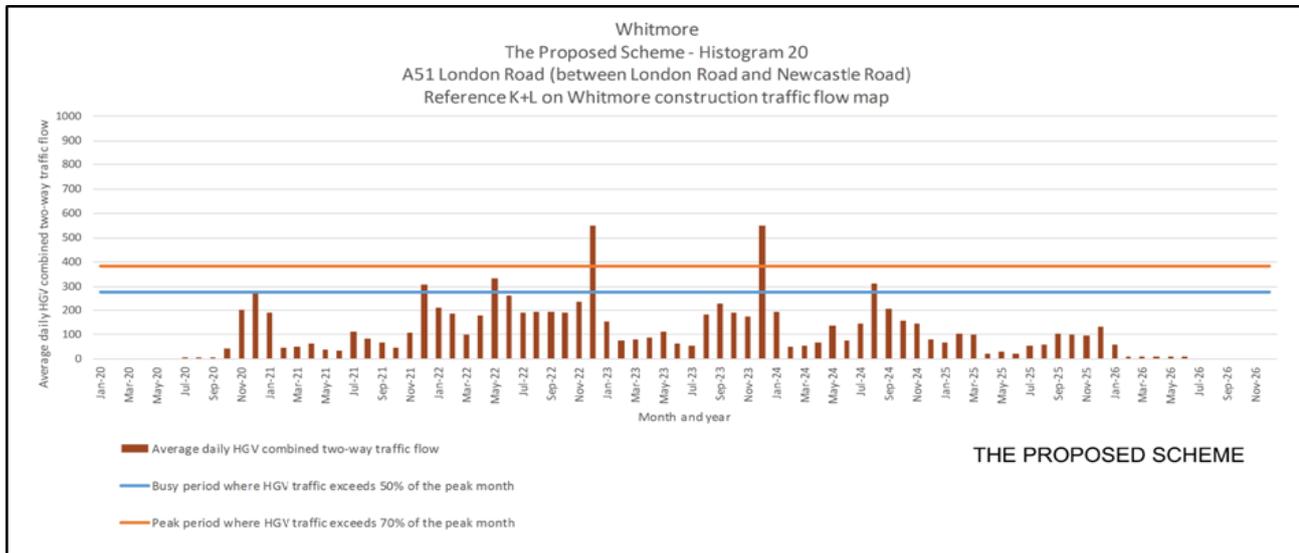
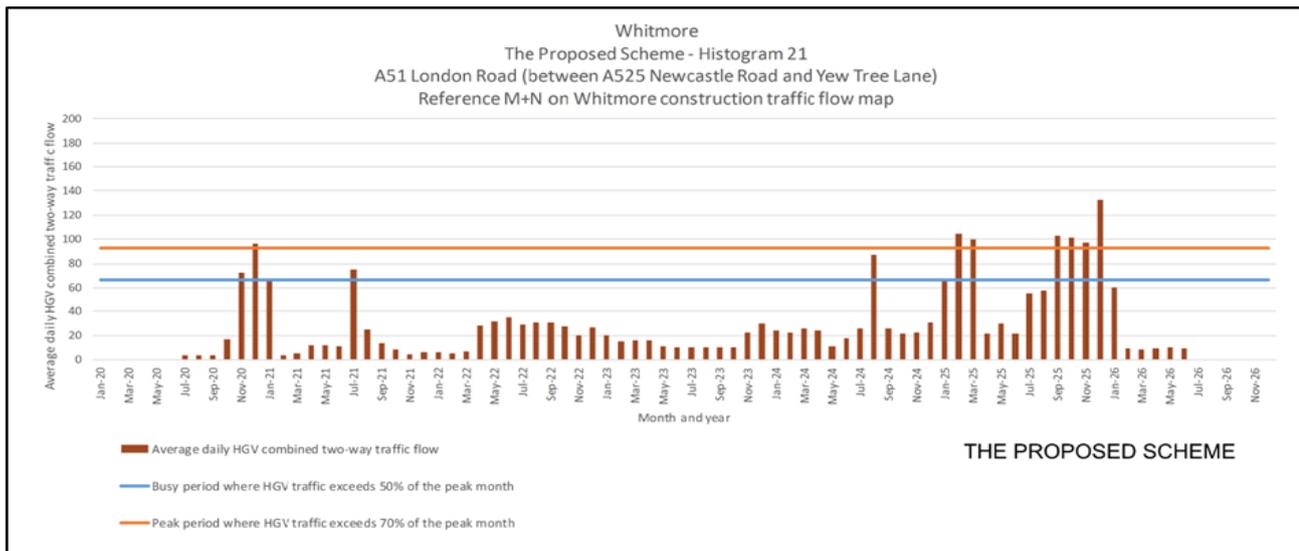


Figure 9: Average daily Construction HGV combined two-way traffic flow for A51 London Road (north of Woore village centre)



B.1.2 In summary, the use of the local road network for HS2 construction traffic will increase traffic flows from the current highway traffic flow baseline by 14% during the peak construction period on the A525 and 10% during the peak construction period on the A51. Peak construction HGVs are reported as 548 total vehicle movements on the A525 at Woore village in the peak month of construction.

Appendix C - Engineering Assumptions

C.1 Short Route Option 1

C.1.1 Adopting a design speed of 30kph, the alignment geometry and corridor would take in consideration:

- 6 bends of radii varying from 50m to 100m;
- Gradients varying from 0.9% to 3%;
- 3 sags (Ks min 3.0) and 2 crests (Kc min 3.0); and
- A low point at Ch.280m and high point at Ch.32m.

C.2 Long Route Option 2

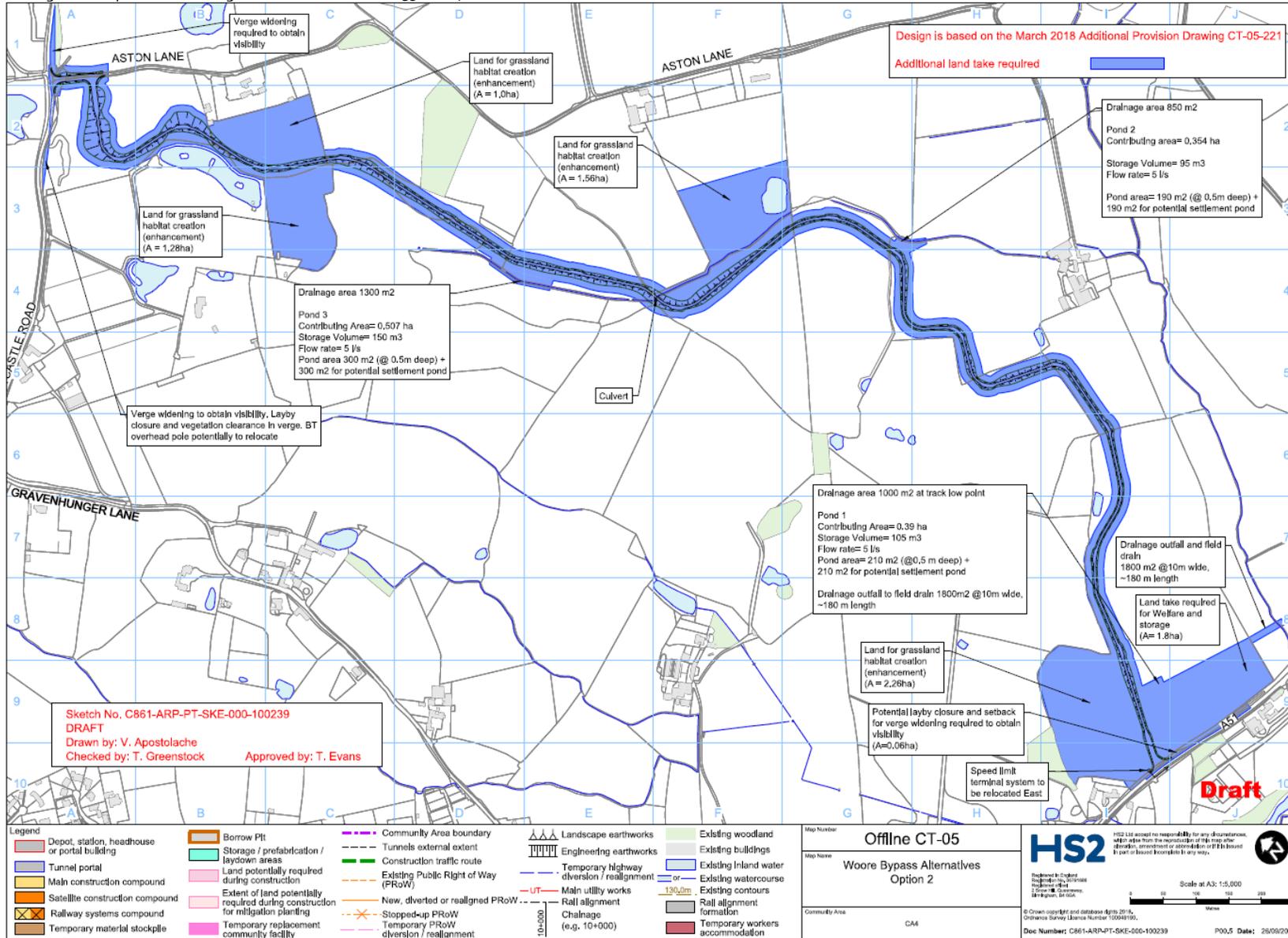
C.2.1 Adopting a design speed of 30kph, the alignment geometry and corridor would take into consideration:

- 18 bends of radii varying from 30m to 100m;
- Gradients varying from 0.5% to 8%;
- 6 sags (Ks min 3.0) and 6 crests (Kc min 3.0); and
- Low points at Ch.115m, Ch.1075m, Ch.1750m and high points at Ch.17m, Ch.950m, Ch.1425m & Ch.2510m.

Appendix D - Refined site construction route alignments for Woore including construction logistics requirements

D.1 Drawings C861-ARP-SKE-000-100238 (P00.4), C861-ARP-SKE-000-100239 (P00.4)

Figure 11: Long Route Option 2 - Drawing C861-PT-SKE-000-100239 P00.4



Appendix E - Land holdings in locations of temporary construction route options

E.1.1 The maps below present the understanding of the extent of land holdings potentially affected by the two temporary construction route options. Refer to Figure 12 for the Short Route Option 1 map and to Figure 13, Figure 14 and Figure 15 for the Long Route Option 2 maps. The land holdings information was sourced from the HM Land Registry database. The registered land parcels are highlighted in pink in the maps below. Some of the affected land parcels are unregistered. Owners or interests in these land holdings is not known at this time.

Figure 12: Land Holdings potentially affected by Short Route Option 1 (Map 1 of 1)

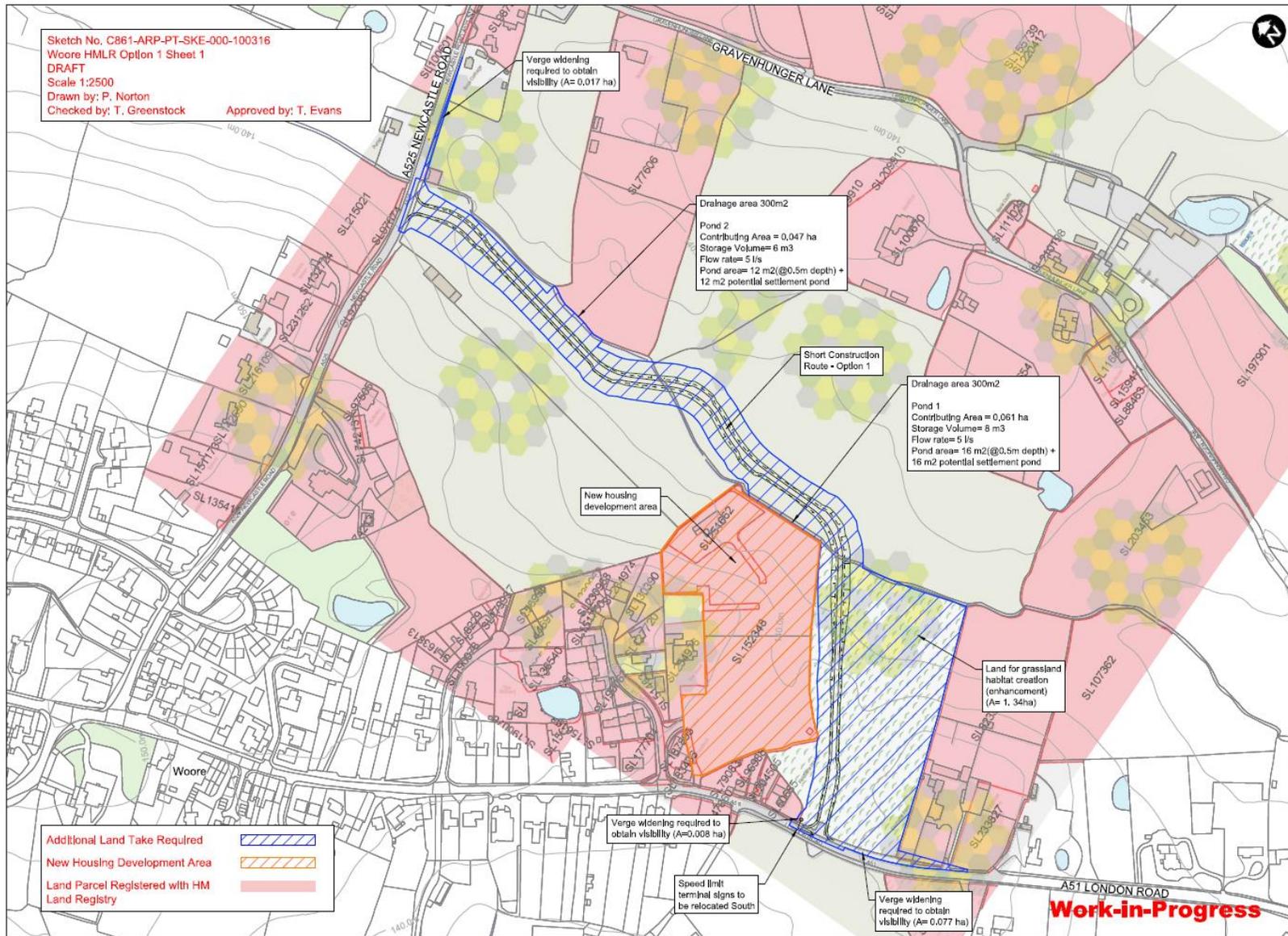


Figure 14: Land Holdings potentially affected by the Long Route Option 2 (Drawing 2 of 3)

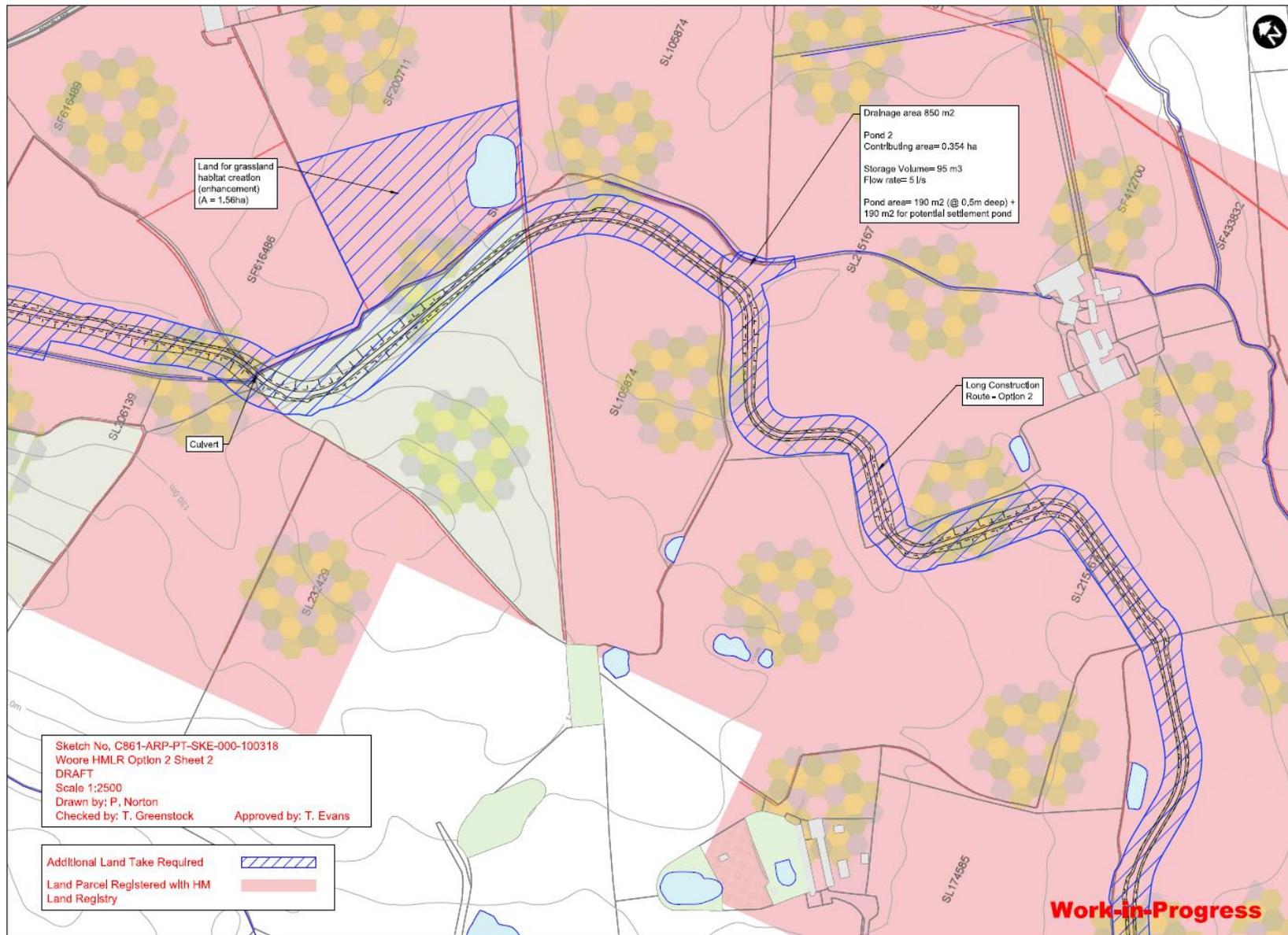
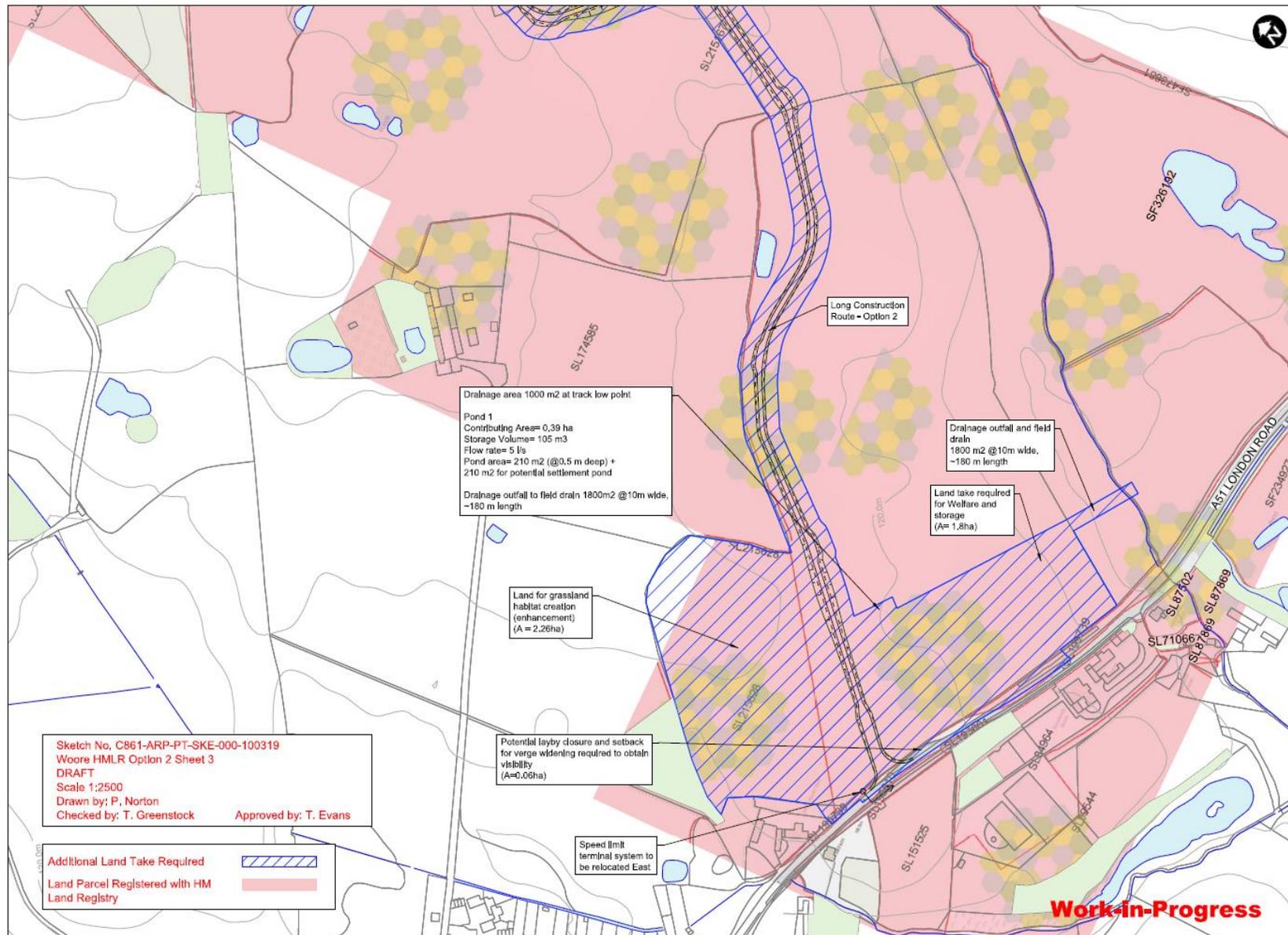


Figure 15: Land Holdings potentially affected by the Long Route Option 2 (Drawing 3 of 3)



Appendix F - Comparison summary of temporary construction route options for Woore village

F.1.1 The table below summarises the evaluation of engineering and environment with respect to each temporary construction route option for Woore village composed to the Proposed Scheme. In addition, a summary of key considerations with respect to construction logistics are presented together with the outcome of the cost assessment.

F.1.2 The Option Appraisal Assessment Criteria:

---	Major worsening on the Comparator Scheme
--	Moderate worsening on Comparator Scheme
-	Minor worsening to Comparator Scheme
O	No Change o the Comparator Scheme
+	Minor improvement on Comparator Scheme
++	Moderate improvement on Comparator Scheme
+++	Major improvement on Comparator Scheme

Topic	Proposed Scheme	Short Route – Option 1: a temporary construction route approximately 0.7km metres long connecting the A51 to the A525		Long Route – Option 2: a temporary construction route approximately 2.6km metres long connecting the A51 to the A525	
		Appraisal outcome	Rating	Appraisal outcome	Rating
Engineering (route civils, geotechnics and drainage)	Simple solution comprising temporary removal of traffic furniture and passing bay installation	Additional works relatively simple engineering solutions.	-	Additional works simple engineering solutions which may have complexity associated with deep peat deposits.	-
Construction logistics	Uses existing road network with very little associated improvement works.	Increases the construction, scale and scope of works to provide construction access more significant. Influences programme.	--	Increases the construction, scale and scope of works to provide construction access more significant. Influences programme.	---
Cost (excluding land and property)	-	Increase engineering cost.	---	Increase engineering cost.	---
Traffic and Transport (Woore village)	Construction traffic below threshold for significant impact	Due to reduction in traffic (although not all removed on the A51). The indicative programme for constructing Option 1 construction route means that there would still be construction traffic travelling through Woore village for the period up to December 2021. This means we would still report a major adverse traffic severance effect on the A51 and A525 in Woore village. However, the overall volume of construction traffic through Woore village would substantially reduce from January 2021 onwards subject to completion of any construction route matching the estimated construction completion date. No change in adverse severance effects between the bypass and the HS2 route.	++	Due to reduction in traffic (although not all removed). The indicative programme for constructing Option 2 construction route means that there would still be construction traffic travelling through Woore village for a period up to May 2022. This means we would still report a major adverse traffic severance effect on the A51 and A525 in Woore village. However, the overall volume of construction traffic through Woore village would substantially from June 2022 onwards subject to completion of the construction route matching the estimated construction completion date. No change in adverse severance effects between the bypass and the HS2 route.	++
Traffic and Transport (South of Woore)	Construction traffic below threshold for significant impact	Increase in traffic due to construction of bypass.	-	Increase in traffic due to construction of bypass.	-
Ecology & biodiversity Heritage	Some adverse impact on hedgerows at passing bays	Minor temporary/permanent worsening resulting from potential impact for bypass.	-	Moderate temporary/permanent worsening resulting from potential impact for bypass.	--
Landscape & visual	No effect	Temporary worsening on a number of newly effected local receptors resulting from construction and operation of the construction route.	--	Temporary worsening on a number of newly effected local receptors resulting from construction and operation of the construction route.	--
Agriculture	No concerns for Proposed Construction Route	Introduction of a new temporary impact on agricultural land.	-	Introduction of a new temporary impact on agricultural land.	--
Flood Risk	No concerns for Proposed Construction Route	The need to culvert a minor may introduce localised temporary flood risk impacts.	-	The potential to introduce a new temporary potential adverse impact with respect to flood risk although no specific impacts are identified at this stage of assessment.	O

Topic	Proposed Scheme	Short Route – Option 1: a temporary construction route approximately 0.7km metres long connecting the A51 to the A525		Long Route – Option 2: a temporary construction route approximately 2.6km metres long connecting the A51 to the A525	
		Appraisal outcome	Rating	Appraisal outcome	Rating
Groundwater risk	No concerns for Proposed Construction Route	The potential to introduce a new temporary potential adverse impact with respect to ground water although no specific impacts are identified at this stage of assessment.	O	The potential to introduce a new temporary potential adverse impact with respect to ground water although no specific impacts are identified at this stage of assessment.	O
Noise and Vibration (Woore indirect impact)	Adverse impact but below significant effect threshold	No change in the reported effects.	O	No change in the reported effects.	O
Noise and Vibration (Woore direct impact)	No effects	No change in the reported effects.	O	No change in the reported effects.	O
Air Quality (Woore village)	Adverse impact but below significant effect threshold	No change in the reported effects.	O	No change in the reported effects.	O
Community	No impact	In-combination of temporary effects.	-	In-combination of temporary effects.	-
Socio Economic (Woore village)	No impact	No change in the reported effects.	O	No change in the reported effects.	O
Overall rating		<p>The Short Route - option 1 would substantially reduce the volume of construction HGV vehicles travelling through Woore village, but would not remove construction HGVs that travel through Woore village, or the predicted significant severance effect on the A51 and A525 in Woore village.</p> <p>Construction of the construction route would also increase the construction, scale and scope of works, resulting in additional environmental impacts for ecology, landscape, cultural heritage, agriculture, flood risk and community.</p> <p>As a result it is considered a moderate worsening compared to the Proposed Scheme, and not a recommended alternative.</p>	--	<p>The Long Route – option 2 would substantially reduce the volume of construction HGV vehicles travelling through Woore village, but would not remove construction HGVs that travel through Woore village, or the predicted significant severance effect on the A51 and A525 in Woore village.</p> <p>Construction of the construction route would also further increase the construction, scale and scope of works, resulting in increased additional environmental impacts for ecology, landscape, cultural heritage, agriculture, flood risk and community.</p> <p>As a result it is considered a major worsening compared to the Proposed Scheme, and not a recommended alternative.</p>	---