High Speed Rail (West Midlands to Crewe): Proof of evidence of Trevor Parkin

1. Introduction

1.1 Background

- 1.1.1 My name is Trevor Parkin and I am a Chartered Mining Engineer and Environmental Consultant, with approximately 30 years' experience in the field of Environmental Impact Assessment (EIA) on medium to large-scale developments.
- 1.1.2 I am also a resident of Yarnfield, near Stone in Staffordshire, where I have lived for over 21 years, and am one of the founder members of the Stone Railhead Crisis Group (SRCG), which was formed in November 2016.

1.2 Purpose of this report

1.2.1 I will be giving evidence on behalf of the parish councils of Stone and Chebsey, who object to the proposals to construct a Railhead and Infrastructure Maintenance Base – Rail (IMB-R) on land to the west of Stone, Staffordshire. I will also give evidence to address the multitude of problems that the Stone Railhead/IMB-R will cause by proposing that it be moved to Aldersey's Rough, near to the M6 Keele Services. Further details of my case are provided in the Sift analysis review report dated April 2018.

2. Objections to the Bill

2.1 Introduction

- 2.1.1 My main proof of evidence specifies the works within the Hybrid Bill that I object to. However, here I will focus on the key engineering constraints of the Stone Railhead/IMB-R, which have not been addressed by HS2 Ltd; either in its original design for the site, as submitted in July 2017.
- It has also come to the Parish Council's attention that HS2 Ltd has made substantive changes to the design of the HS2 mainline as it passes the Stone Railhead/IMB-R, together with the reception tracks of the facility. This has occurred following the publication of HS2 Ltd's *Supplementary Environmental Statement (SES), Additional Provisioning Environmental Statement (APES)*' dated 23 March 2018. Indeed the latter, which is likely to be the subject of a second petition by the Parish Councils, appears to have made the proposed development even more unacceptable from an engineering and environmental perspective.
- 2.1.3 In summary the Parish Councils have concluded that with respect to that proposed Stone Railhead/IMB-R:
 - The location and proposed layout of the proposed development is so poorly designed from an engineering, environmental and economic perspective that its construction, and subsequent operation, will have a profound and damaging effect on the local area and the people who live there.

- It will cause unacceptable local traffic problems during construction because large volumes of HGVs that would unavoidably need to access the site via Yarnfield Lane and other local roads.
- Once operational, the Stone IMB-R will so constrain the local rail network that it will jeopardise the future HS2 Classic Compatible rail service serving Staffordshire that will threaten the future economic prosperity of Stafford, Stoke-on-Trent and Staffordshire as a whole.
- 2.1.4 Conversely with respect to Aldersey's Rough, the evidence that the Parish Councils will give will demonstrate that it is a much better location to site a Railhead/IMB-R because:
 - It is more centrally located to maintain the HS2 Phase 2a and Phase 2b mainline railways.
 - It will be easier and cheaper to construct for many reasons not least because, unlike Stone, the key individual major construction opportunities are mostly geographically independent from each other, resulting in less programme and therefore cost risk to the project.
 - It can more readily be connected to the M6 motorway in both directions by relatively straightforward adaptations of the existing slip roads at Keele Services, with much less impact on the local roads than Stone.
 - The site is much more remotely located and will result in substantially reduced environmental effects, achieving an improvement against Stone with respect to most environmental criteria.
 - It can be readily connected to both the HS2 mainline and the West Coast Mainline (WCML), with the latter connections offering the opportunity to increase Staffordshire's rail connectivity.
 - It also has the potential to provide direct access to the HS2 satellite construction compounds in the Whitmore Heath and Madeley areas; thereby offering the potential to reduce construction traffic on local roads and at J15 of the M6.
- 2.1.5 My colleagues Gordon Wilkinson and Trevor Gould will deal with the main road and rail related objections, and I will touch upon these where they form part of HS2 Ltd's strategic case for locating the Railhead/IMB-R, as well as in terms of the engineering feasibility and construction layout of the two sites.
- I will also deal with the inaccurate statements that are contained in HS2 Ltd's promoter's response letter to the Parish Councils dated 15 March 2018, which mostly repeat the incorrect and misleading points that are made in the Phase 2a Information Paper entitled *'F3: Infrastructure Maintenance and Rail Systems Construction Facilities.*

2.2 Stone Railhead/IMB-R

Site layout issues

- The Stone Railhead/IMB-R will involve the excavation of 1.6 million m³ of material, over 90% of which HS2 Ltd is claiming can be reused on site. However, it has no ground investigation information or data on which to base its design, which involves the construction of a large (up to 1.5km long by 250m wide) elevated man-made platform that will bridge Yarnfield Lane and sit up 12m high in the Filly Brook floodplain. **[Slide 1]**.
- The construction of this earthwork will require Yarnfield Lane to be diverted onto a new alignment and a new M6 overbridge to be provided. These works will take 2½ years to complete and will not be finished until June 2023, after which the existing M6 overbridge will be demolished, despite being renovated as part of the ongoing J13-15 M6 Smart motorway works.

- 2.2.3 We had been told by HS2 Ltd that for the first 9 months of operations, construction traffic serving HS2 Ltd's multiple construction bases accessed from Yarnfield Lane will need to use the eastern section of the lane as far as its junction with the A34. However, it was disclosed to Swynnerton Parish Council by HS2 Ltd in its petitioners response issued on 18 April 2018 (point 1 in page 9) that it will now take 15 months (i.e. March 2022) before its new northbound and southbound slips will be completed.
- 2.2.4 Thereafter, 50% of the construction traffic serving these facilities will have to use up to 900m of the existing (or realigned) Yarnfield Lane to access/egress the northbound carriageway of the M6, alongside the residents of, and visitors to the village of Yarnfield. HS2 Ltd had remained i in denial on this point and is still stating (within its SES/APES submission of 23 March 2018) that it has direct access to the M6. However, once again this issue has also been clarified in (point 3) of the petitioners response to Swynnerton PC, where it is stated that "Once the permanent construction access to the railhead from the M6 to the railhead is available, the majority of construction HGVs would use it instead of Yarnfield Lane." It then continues that "It should also be noted that use of a short section of Yarnfield Lane between the Proposed Scheme and the northbound slip road would continue to be required to enable access to the M6 northbound".
- 2.2.5 Because the cut and fill areas located at the northern end of the Stone site are located on either side of Yarnfield Lane, internal construction traffic will need to cross the lane, with the consequential added disruption to local road users.
- In addition to Yarnfield Lane, the Stone Railhead construction site will be severely constrained by the physical barrier of the operational Norton Bridge to Stone Railway, which is used by six passenger train services per hour, and which crosses the footprint of the site at right angles thereby effectively cutting the site in half. This structure sits on an embankment and is electrified by overhead cables that are carried by overhead structures that stand at least six metres above the tracks. The crossing of the Norton Bridge to Stone Railway by internal haulage vehicles is therefore quite an undertaking, and will not be possible for the first two years (until January 2023) of the construction programme. **[Slide 2]**
- 2.2.7 The third physical barrier that crosses the site at right angles is the B5026 Eccleshall Road, which will also be realigned and require a new 150m long overbridge to be constructed. This bridge is approximately 40% (60m) longer than it would otherwise need to be to serve the HS2 mainline, if the Railhead/IMB-R was located elsewhere. Until the cutting is excavated beneath it, construction traffic from the satellite compound on the northern side of the B5026 will need to cross the road to access the HS2 construction corridor on the southern side, via temporary traffic control arrangements.
- 2.2.8 The construction of the Stone Railhead/IMB-R is not only constrained by these three physical barriers, but also the congested nature of the layout of this narrow construction site, which results in numerous major structures needing to be built in very close proximity to each other. This and the potentially conflicting nature of the internal haul arrangements (north to south) and external HGV movements (east to west) will cause practical operational problems. This will especially be the case at the very constrained footprint of the Transfer Node that is located to the south of Yarnfield Lane, which is where internal and external transportation vehicles will need to be loaded and unloaded.
- 2.2.9 With HGVs entering and exiting the Transfer Node at a frequency of approximately 1 per minute in each direction, before rejoining the public highway, there is a very realistic possibility chance that traffic chaos will ensue, with queues of HGVs likely to occur on Yarnfield Lane. This is especially likely because road going HGVs carrying bulk earthworks materials that use the transfer node will need to be sheeted and pass through wheel-washing facilities.

Site location relative to the remainder of the HS2 mainline

2.2.10 It has been claimed by HS2 Ltd on numerous occasions, including in paragraph 4.4 of the F3 paper, which is repeated in the promoter petitioning response, that the Stone Railhead/IMB-R



is located midway along the route or in a central position to maintain the railway. However, as demonstrated in the Sift analysis review, and in my main proof of evidence, this is not strictly correct. Whilst the Stone Railhead/IMB-R is more centrally located than the Aldersey's Rough Railhead would be for Phase 2a alone, i.e. until 2033 when Phase 2b opens, the Aldersey's Rough IMB-R would sit on the midpoint of the Phase 2a/ Phase 2b mainline railway that it would maintain in perpetuity. **[Slide 3]**.

- Furthermore, with HS2 Ltd confirming that the maintenance liability on Phase 2b, which is expected to be mostly built using ballasted track, compared to the slab-track proposed for Phase 2a, it is clear that the more northerly location of Aldersey's Rough makes it the much better location at which to build and operate an IMB-R.
- A proper appreciation of the location of Aldersey's Rough also dispels the myth, which has been routinely voiced by HS2 Ltd, that the Aldersey's Rough IMB-R (234km) potentially needs to be accompanied by the installation of maintenance loops at Pipe Ridware (193km), at a provisional additional cost of £33 million to the proposed scheme. This has been suggested because of the need to achieve a minimum 3-hour maintenance window at the southern boundary of Phase 2a. However, not only can Aldersey's Rough achieve a maintenance window of over 4-hours at this location, but 3 hours and 35 minutes at the Delta Junction, which is where Phase 1 meets the Phase 2b East (West Midlands to Leeds) HS2 mainline railway. **[Slide 4]**.
- It is also clear from Slide 4 that Alderseys' Rough can reach the northern terminus of Phase 2b at Manchester Piccadilly within the same 3 hours and 35 minutes timescale, which is 15 minutes quicker than can be achieved by the Stone IMB-R (221km). It is therefore clear that the Aldersey's Rough IMB-R is the more centrally located maintenance location.
- In terms of the length of railway requiring to be maintained from each IMB-R, Table 4.2 from the Parish Councils Sift analysis clearly shows that Aldersey's Rough is the more centrally located regardless of whether Fradley (the boundary between Phase 1 and 2a) or Delta Junction (on Phase 1) is considered to be the southern maintenance limit for the Phase 2a IMB-R. [Slide 5]

3. What can be done in response

3.1 Aldersey's Rough/IMB-R

3.1.1 The only practicable solution to the multitude of engineering and environmental problems faced by the Stone Railhead/IMB-R site is to relocate the facility to Aldersey's Rough.

Misleading and incorrect criticism from HS2 Ltd

- 3.1.2 HS2 Ltd has repeatedly criticised and rejected the Aldersey's Rough IMB-R option on the basis of numerous spurious, false or misleading claims, the first two of which I have addressed already, i.e. that it is not centrally located and requires maintenance loops to be constructed at Pipe Ridware.
- 3.1.3 It is also claimed by HS2 Ltd, in its promoters petitioning response, that it *"does not have ready access to the existing rail network"*. As can be seen by Figure 1.1 **[Slide 6]** from the Sift review, our original preliminary design suggests otherwise. Furthermore, and as my colleague Trevor Gould will explain in more detail, Aldersey's Rough is located immediately adjacent to the still (officially) active former Newcastle to Market Drayton Railway. The fact that this railway is currently unused presents major advantages over the currently operational Norton Bridge to Stone line, to which very convoluted connection arrangements would be required to facilitate the use of the Stone IMB-R.
- 3.1.4 It is also incorrectly claimed by HS2 Ltd that Aldersey's Rough *"does not have ready access to the M6"*. As my colleague Gordon Wilkinson will explain, connection to the M6 from



Aldersey's Rough is much more straightforward than can be achieved by the Stone Railhead/IMB-R. It also will cause far less impact to the local road network and disruption to road users, and does not require a new motorway overbridge to be constructed, or an existing overbridge to be demolished, with all of the associated negative consequential effects on the motorway and the Smart motorway upgrade that would have been completed on the section adjacent to the Stone Railhead/IMB-R.

- 3.1.5 HS2 Ltd also states that because Aldersey's Rough *"is bounded by complex infrastructure (tunnels) which are technically challenging and could affect the overall construction timescale if they were delayed."* As we have explained in the Sift review and my main proof of evidence, the most northerly tunnel to which HS2 Ltd is concerned, no more affects Aldersey's Rough Railhead than it does the Stone Railhead. As for the southern tunnel at Whitmore Heath, if HS2 Ltd is so concerned about the risks of constructing it, why does it not start the two-year long construction operation earlier than the scheduled date of January 2023 to ensure that it is finished well in advance of the railway systems installation programme beginning?
- It is also difficult to understand why the Whitmore Heath tunnel is such a programme risk, when HS2 has several major individual construction projects **[Slide 1 again]** (i.e. Yarnfield Lane overbridge, Norton Bridge to Stone Railway Viaduct and separate bridge (to connect the reception tracks), together with the B5026 Eccleshall Road overbridge to build, any of which could delay the construction and railway installations programme. Furthermore, the programme for the M6 Meaford Viaduct lasts for 2³/₄ years and is not due to be completed until just 3 months before the Stone Railhead construction is due to be completed. A delay of this project, or to the construction programme of any of the other major structures, will delay the railway installation and subsequent commissioning works. Therefore, it must be concluded that this point is misplaced.
- 3.1.7 HS2 Ltd has also claimed that Yarnfield Lane would still be adversely affected by the need for the HS2 mainline to cross it, even if the Railhead/IMB-R is not built at Stone. This is no different to numerous other roads and is reluctantly accepted by most local people. However, the important point is that, the adverse effects would be much less than the far greater disruption that would be caused by the accompanying construction of the Stone Railhead/IMB-R.

HS2 Sift analysis: Aldersey's Rough versus Stone

- ^{3.1.8} In order to compare the option of using Aldersey's Rough, as the Railhead/IMB-R location, to Stone, HS2 Ltd undertook a Sift analysis. This was completed in November 2017 and is the subject of a detailed review by myself and colleagues representing Stone Town Council and Chebsey Parish Council, as part of this Select Committee process.
- 3.1.9 It would appear that the HS2 Ltd Sift analysis has been used to inform the promoter's response to our petition, and some of the points that it raised, with regard to the relative location of the two option sites, have already been addressed above. However, there were many more criticisms that have been made by HS2 Ltd of the Aldersey's Rough Railhead/IMB-R site, which cannot go unchallenged, because they give a completely false or misleading picture of the evidence of the situation.
- Before going into the detail, it is important to note that the Aldersey's Rough option that has been assessed by HS2 Ltd in its Sift analysis is known as Option 9.5. **[Slide 7]** However, the design of this option has been undertaken by HS2 Ltd, and not the Parish Councils. Furthermore, it represents HS2 Ltd's fifth design iteration, although unfortunately it does not represent the very best design that could be achieved and is therefore considered to be deficient in a multitude of ways. **[Slide 8]** Although many of these points have been communicated to HS2 Ltd by representatives of the SRCG during meetings held in 2017, HS2 Ltd decided not to take these points into consideration and refused to develop the design further before undertaking its Sift analysis.

- HS2 Ltd has also not provided detailed to-scale engineering drawings and sections of its Option 9.5 design, nor a 'Costs schedule' to explain how it had reached its conclusions. If we do not know how HS2 Ltd has calculated its cost estimates, we are denied the opportunity of subjecting them to proper analysis. The absence of a schedule of cut and fill quantities and a transport logistics profile for the two option sites, together with explicit details of its assumptions adds to the difficulty of checking HS2 Ltd's assertions.
- In terms of the conclusions HS2 Ltd has drawn in its Sift analysis, these are mainly based on commentary that is then summarised in two matrices that have used RAG (Red, Amber Green) colour coding to illustrate its findings. This is based on how the option (i.e. Aldersey's Rough) compares to HS2 Ltd's base case, i.e. the Stone Railhead/IMB-R.
- In its Sift analysis review, the Parish Councils have used the same approach to summarise its findings. The results of this review are presented in Tables 3.1 and 3.2 below. **[Slide 9]**.
- 3.1.14 Starting with the Engineering elements, it can be seen that there is no consensus between HS2 Ltd and the Parish Councils. This has not been helped by the use by HS2 Ltd of its suboptimal Option 9.5 design as the basis of its assessment. Notwithstanding this point, the SRCG is confident that, if there were opportunity for Aldersey's Rough to be designed to its optimum capability, it would outscore the Stone IMB-R in 8 out of the 10 (80%) criteria assessed, and be neutral with respect to the remaining two criteria, as shown in Table 3.1.

Table 3.1	Comparison of findings of Engineering Option Comparison Matrix relating to
	Aldersey's Rough Railhead/IMB-R compared to Stone Railhead IMB-R

Appraisal Criteria	HS2 Ltd	SRCG	Commentary
Highways			
Bisect existing roads	Neutral	Major	Aldersey's Rough bisects no roads, whereas Stone bisects two important roads and an operations railway
Disruption to highways	Minor	Major	Three Mile Lane has a fraction of the traffic compared to Yarnfield Lane, and no other local roads are affected at Aldersey's Rough
Access to site	Moderate	Moderate	Access to the Stone construction compounds is difficult and involves multiple sites. Aldersey's Rough is much more straightforward and would require a singular access point
Water and Flood Risk	Major	Moderate to Major	Stone involves constructing major embankments and bridge structures in a flood plain, whereas Aldersey's Rough effects are related to one existing chord to the WCML of minimum height, which is not required, whist the other represents a sub- optimal design.
Utilities	Moderate	Neutral	HS2 Ltd presents no evidence for the diversion needs, which are driven by sub-optimal design of Option 9.5, the need for which could be removed by value engineering.
Structures	Major	Moderate to Major	Multiple structures are required at Stone, but the need is much more limited at Aldersey's Rough.
Complexity of Construction	Neutral	Major	Stone is a very complex construction project with major activities interdependent and required to be undertaken within a small geographical footprint.
Programme	Neutral	Major	The complexity of the Stone design makes it much more vulnerable to programme risk.



Appraisal Criteria	HS2 Ltd	SRCG	Commentary
Costs	Moderate	Minor	Costs withheld from the Sift analysis, but the multiple complex structures and programme risks are likely to make Stone more expensive to build and operate.
Safety	Minor	Neutral	Safety risks are similar as both are construction sites.
OVERALL RATING	Minor	Moderate	Aldersey's Rough is a far simpler construction prospect with the key activities spread out across the site allowing them to be built independently.

- ^{3.1.15} Furthermore, and using the HS2 Ltd Sift analysis terminology, in overall terms the Parish Councils considers that the Aldersey's Rough Railhead/IMB-R to be a moderate engineering improvement compared to the Stone alternative. Of course such terminology is a product of the approach used by HS2 Ltd, although, in other words, I would describe Aldersey's Rough as the far better engineering prospect, with likely reduced construction costs and much easier buildability, with the resultant benefits in terms of programme risk.
- One final important point is that the use of Aldersey's Rough would also enable direct access to be provided to the HS2 compounds in the Whitmore Heath area, as well as potentially the Madeley area; thereby reducing the amounts of HGVs needing to use local roads, including the A5182, A53, A519, A51 and A525, which would significantly reduce the pressure on J15 of the M6. **[Slide 10]**
- ^{3.1.17} Turning to the environmental criteria, it is similarly clear to the Parish Councils' that the HS2 Ltd assessment is wrong. The Parish Councils' assessment demonstrates that Aldersey's Rough represents an improvement compared to Stone on 12 out of the16 (75%) criteria assessed, with only one being worse, and then only at a minor level. The two options scored neutral in the remaining three criteria. **[Slide 11]**

Table 3.2	Comparison of findings of Environmental Option Comparison Matrix relating to
	Aldersey's Rough Railhead/IMB-R compared to Stone Railhead IMB-R

Commentary

SRCG

Landscape	Major	Minor	The landscape character sensitivity of the Aldersey's Rough site is exaggerated and in practice the Railhead/IMB-R footprint will be similar to Stone.
Visual	Major	Major	The Aldersey's Rough site is well screened by topography and vegetation from all settlements, whereas the Stone site will be elevated above the M6.
Cultural Heritage	Minor	Minor	HS2 Ltd confirms that Stone will result in significant adverse effects at Darlaston Park, and yet cites the setting of a listed building at Stoney Low farm with no view of the development, as an adverse effect.
Biodiversity	Major	Neutral	An accurate comparison of the two sites would require an optimal design of Aldersey's Rough to be available. In reality both developments will affect habitats and local wildlife sites. The HS2 mainline already adversely affects Whitmore Wood Ancient Wood, and the part of Hey Sprink that would potentially be affected by Aldersey's Rough mainly comprises coniferous plantation.



Appraisal Criteria

HS2 Ltd

Appraisal Criteria	HS2 Ltd	SRCG	Commentary
Water and Flood Risk	Major	Moderate to Major	As per the Engineering matrix (see Table 3.1)
Air quality	Minor	Neutral	No substantive evidence presented by HS2 Ltd to support its conclusion which is based on conjecture. The more remote location of Aldersey's Rough should be a significant factor, but a safe conclusion without evidence is no difference.
Sound and vibration	Minor	Moderate	Again no evidence and only conjecture provide by HS2 Ltd, but the proximity of a new 500 property housing estate at Walton Hill to the Norton Bridge to Stone Railway sidings and use by materials supply trains overnight could be a significant noise and vibration problem. In contrast Aldersey's Rough is remotely located from settlements.
Community integrity	Minor	Major	A very odd assessment by HS2 Ltd. The Stone Railhead will cause major disruption, especially for the 2200 strong community of Yarnfield, and its major community facilities, notably the Yarnfield Park Conference Centre, Stone Dominoes FC, Springfield Primary School etc. Conversely Aldersey's Rough is remotely located with only a handful of isolated properties affected.
Transport accessibility/ severance	Minor	Major	Incomprehensible assessment from HS2 Ltd, as the Stone site effectively severs and then disrupts two important roads, most notably Yarnfield Lane for a period of 4 years, would cause serious congestion on the A34 in Stone and would lead to serious constraints to the future local rail network once Phase 2a opens.
Health and well-being	Neutral	Major	The Stone Railhead/IMB-R will negatively impact large numbers of people in Stone and Yarnfield from increased traffic, with Aldersey's Rough being so remote from settlements that few people will be adversely affected.
Socio-economics	Minor	Major	Stone will have significant adverse effects on the people who live and work in Stone and Yarnfield and their ability to get to work. The Yarnfield Park Conference Centre and other local businesses will be impacted.
Agriculture, soil and and use	Moderate	Moderate	HS2 Ltd concludes a moderate improvement compared to Stone.
Land quality	Minor	Moderate	HS2 Ltd concludes a minor improvement compared to Stone, because of the presence of historic landfills at Stone which will need to be dealt with. With only minor contamination likely to be associated with the former Newcastle to Market Drayton Railway the difference is likely to be greater.
Waste material and resources	Neutral	Major	HS2 Ltd has acknowledged that there will be less excavation than Stone given its Option 9.5 design, and with more contamination present from landfill, and the likelihood of substantial volumes of geotechnically unsuitable material at Stone, Aldersey's Rough must be an improvement.
Committed development	Neutral	Major	There are no committed developments in the vicinity of Aldersey's Rough, but 500 houses are being constructed at Walton Hill immediately adjacent to the Stone Railhead/ IMB-R sidings of the Norton Bridge to Stone Railway.

Appraisal Criteria	HS2 Ltd	SRCG	Commentary
OVERALL RATING	Moderate	Moderate	Aldersey's Rough is an outstanding site from an environmental perspective compared to Stone because of its remote location.

4. Conclusions

4.1.1 It is clear to the Parish Councils me that Aldersey's Rough represents a far better location in which to build the HS2 Phase 2a Railhead and Phase 2a/Phase 2b IMB-R. This is because it will be more centrally located than Stone to undertake its long-term maintenance duties, but also because it will be far easier and cost efficient to construct and then operate from an engineering perspective. It is also located in a remote location, which will result in reduced environmental effects compared to Stone, and offers the opportunity to reduce the environmental effects on other communities in North Staffordshire, as well as provide a positive legacy for the future.

5. Request of the Parliamentary Select Committee

- 5.1.1 It is requested that the Aldersey's Rough option be reconsidered and taken forward as the preferred option for the Railhead and IMB-R instead of Stone.
- ^{5.1.2} To achieve this outcome I also request that the SRCG technical team be afforded access to the detailed design and costs information held by HS2 Ltd relating to Aldersey's Rough, so that we can work with independently appointed and funded engineering and environmental experts, to achieve the optimum design for the scheme.

Trevor Parkin April 2018



Appendix A – Figures

Figure 1.1 - Aldersey's Rough Layout Proposal





Figure 3.2 - Proposed NE Chord from WCML





Figure 3.3 - Suggested Aldersey's Rough Layout





Figure 3.4 - M6 J15 and Haul Roads.png







High Speed Rail (West Midlands to Crewe): Review of Aldersey's Rough Sift Analysis

1. Introduction

1.1 Background

- 1.1.1 The Stone Railhead Crisis Group (SRCG) first conceived of the idea of an alternative Railhead and Infrastructure Maintenance Base–Rail (IMB-R) to HS2 Ltd's draft proposals for Stone in December 2016 and provided outline details of its proposals to HS2 Ltd in a report entitled *Proposed Stone Railhead: Initial Review of Benefits and Drawbacks assessed against a Potential Alternative Railhead Solution'* dated January 2017. The SRCG's preliminary concept design of land at Aldersey's Rough that could be used to build a railhead/IMB-R, together with how this could be accessed by road from the M6 via Keele Services, and access the existing WCML and the proposed HS2 mainline, by rail is shown in Figure 1.1.
- 1.1.2 As part of its submission to HS2 Ltd, the SRCG requested a meeting with the company's technical specialists to discuss the proposals. Unfortunately, HS2 Ltd was unable to attend a first meeting until 23 May 2017. However, as part of the process of subsequent consultation between the two parties, HS2 Ltd agreed to investigate the SRCG's alternative site at Aldersey's Rough, located immediately south of the M6 Motorway near Keele Services.
- 1.1.3 Despite being provided with the SRCG's preliminary proposals, HS2 Ltd's early attempts presented at a second meeting between the parties on 27 June 2016) to design a practical layout at Aldersey's Rough were very disappointing. However, its fifth iteration (known as Option 9.5), which was presented to the SRCG at the third meeting held between the parties held on 20 September 2017, was the closest to SRCG's vision for the site, especially in terms of the layout of the main footprint of the railhead and IMB-R, as well as connections to the M6 via extensions and upgrades to the existing slip roads.
- 1.1.4 Notwithstanding the above, the SRCG considered that HS2 Ltd's proposals for connecting to the existing West Coast Mainline (WCML) to be much less impressive, as well as overly complicated, especially in terms of facilitating a legacy local railway connection beyond Aldersey's Rough.
- HS2 Ltd also informed the SRCG, during the second meeting held on 27 June 2017, of its intention to compare its design (ultimately Option 9.5), with its design for the Stone Railhead (known as Option 8). At the time it expected a draft of this report to be made available to the SRCG for comment at the beginning of August 2017, and then finalised by the end of that month. However this report, which HS2 Ltd has called a *'Sift analysis'*, was not presented to the SRCG until the fourth meeting between the parties, which took place on 8 November 2017.
- 1.1.6 It is also worth noting that at the fourth meeting, HS2 Ltd referred to the report was a draft, even though, when it was finally received on 29 November, it was evident that most parts of the report were completed in early October 2017. It is also of note that despite requests from the SRCG for comparative information regarding the provisional costings of the component parts of the two alternative railhead/IMB-R schemes, that information has not been provided in any form. Further details regarding the importance of this information is outlined throughout this report.





1.2 Recent developments

Supplementary and Additional Provision Environmental Statements

- 1.2.1 It has also come to the Parish Council's attention that HS2 Ltd has made substantive changes to the design of the HS2 mainline as it passes the Stone Railhead/IMB-R, together with the reception tracks. This has occurred following the publication of HS2 Ltd's Supplementary Environmental Statement (SES), Additional Provision Environmental Statement (APES) on 23 March 2018.
- 1.2.2 The key changes resulting from the SES/APES, which affect this report, are outlined in the CA3 Community Area report, and relate to embankments that will replace viaduct and bridge structures in the valley of the Filly Brook. This in turn will have a knock on effect on the fill quantities required to build the embankments, which HS2 Ltd has acknowledged will increase the number of HGVs that will need to access/egress the site. These changes will also affect some of the conclusions drawn by HS2 Ltd in its Sift analysis, which is the subject of this review, and where this is the case we have drawn attention to it.
- 1.2.3 However, because of the timing of the release, there is insufficient time to give a full and detailed consideration to all of the potential implications, and therefore it is possible that this report will need to be updated to accompany a second round of petitioning by Stone Town Council and Chebsey Parish Council.

Promoter's Response to Swynnerton Parish Council Petition

- 1.2.4 In addition to the changes proposed by HS2 Ltd as part of the SES/APES submission, it has now belatedly made some further clarifications that are relevance to the Sift analysis. These were released as part of its petitioner's response to Swynnerton Parish Council on 18 April 2018.
- 1.2.5 The first point to note is that HS2 Ltd has finally acknowledged that it has to use Yarnfield Lane for the full duration of the 4-year construction period. This is because it has conceded in point 3 (page 9) of the petitioners response to Swynnerton PC it has that "*It should also be noted that use of a short section of Yarnfield Lane between the Proposed Scheme and the northbound slip road would continue to be required to enable access to the M6 northbound*".
- 1.2.6 This short-section is up to 900m and covers the existing length of Yarnfield Lane where visibility is poor due to the change in elevations, and the realigned Yarnfield Lane where visibility may even be worse. It is also of note (from point 1 on page 9) that the eastern section of Yarnfield Lane will now be the only means of accessing the HS2 construction sites until March 2022. The period of 15 months is therefore six months longer than previously advised. Furthermore, even after the M6 connections are available, HS2 Ltd is now confirming that it is still intending to use the eastern section of Yarnfield Lane *"where HGVs are accessing from local suppliers."* This appears to represent a departure from its previous position

1.3 Purpose of this report

1.3.1 The purpose of this report is to critically review HS2 Ltd's Sift analysis, which was received in pdf format via email on 29 November 2017. This report also represents an important part of the evidence base being used by Stone Town Council and Chebsey Parish Council to support their joint petition (P2A-000128) with respect to the High Speed Rail (West Midlands to Crewe) Bill House of Commons Select Committee.

1.4 Structure of this report

1.4.1 Section 2 comprises the main part of the technical review of the HS2 Sift analysis. The review considers the main report entitled the '*Phase 2A C862 Strategic Evaluation of Railhead and*



IMB--R Locations – post CP3 design', together with the accompanying comparison matrices (Appendices A and B) and the various accompanying maps (Appendices C to G).

- 1.4.2 Reference is made in Section 3 to the engineering (Appendix A) and environment (Appendix B) comparison matrices, although only insofar that the findings of the comparison assessments are particularly in need of challenge. Since this review covers some of the same ground as the review in Section 2, it is not intended to be exhaustive in nature.
- 1.4.3 Appendix H, which contains a report on the maintenance aspects of the various options, is considered separately in Section 4.
- 1.4.4 Appendix I, the *"Aldersey's Rough Railhead/IMB-R Technical Note"* is referenced, as appropriate, in Section 2, but the key comments will be made in Section 5.
- 1.4.5 Section 6 then summarises what is missing from the report, and in Section 7, final conclusions are drawn on the Sift analysis.

2. Strategic Evaluation of Railhead and IMB-R Locations

2.1 Initial considerations

- 2.1.1 This report, which is dated 27 November 2017, has been produced by WSP with review input from Arup.
- 2.1.2 Section 1 contains an 'Executive Summary' and Section 2 'Abbreviations and descriptions'. No comment is made in respect of these sections, but instead this review will focus its review on Sections 3, 4, 5, 8, 10 and 11.

2.2 Section 3: Introduction

Section 3.1: Route Announcement

- 2.2.1 WSP's introduction in Section 3 provides some background regarding the route announcement in November 2015; the Working Draft Environmental Impact Assessment Report (WDEIAR) issued for consultation in September 2016; the Hybrid Bill (July 2017); Post Hybrid Bill (effectively ongoing) and Railhead Principles.
- 2.2.2 Paragraph 3.1.1 confirms HS2 Ltd's original intention to construct an Infrastructure Maintenance Depot (IMD) to the west of the existing Basford Hall freight yard at Crewe, with paragraph 3.1.2 stating that *"The Route announcement also included the introduction of maintenance loops at Pipe Ridware as part of the wider HS2 maintenance strategy envisaged at that point in time."*

Section 3.2: Working Draft Environmental Impact Assessment Report (WDEIAR)

- 2.2.3 Paragraph 3.2.1 refers to the fact that the WDEIAR introduced the idea of a temporary railhead facility at Stone, with paragraph 3.2.5 stating that *"The identification of the preferred location for the railhead followed a two staged Sift process."*
- 2.2.4 The 'Sift' process is then described in paragraphs 3.2.6 to 3.2.8, with reference to the following documents:
 - 'Phase 2A C862 Strategic Evaluation of Railhead Locations (C862-PBR-CL-REP-000-000012)';
 - Phase 2A C862 Stone Railhead SIFT (C862-PBR-CL-REP-000-000015);
 - C861 HS2 IMD Location Options Study (Sift 2) (C861-ARP-EN-REP-WS08-000001.
- It is interesting to note that none of these documents have been made available for public scrutiny as part of the Phase 2A consultation process, either in September 2016 for the



WDEIAR, or part of the final EIAR following the depositing of the Hybrid Bill in July 2017. Furthermore, the WDEIAR was so lacking in transparency that a member of the SRCG sought to be provided with details of the assessment process that led to the selection of railhead Option 8: Stone Railhead, only to be refused by HS2 Ltd, who cited the Freedom of Information Act. To refer to these documents in this report is surprising because they are still unavailable to the public from the HS2 Ltd website.

Section 3.3 Hybrid Bill (July 2017)

- ^{2.2.6} It is noted from paragraph 3.3.2 that "An IMD is a much larger facility which provides more functionality than an IMB-R. It was concluded that an IMB-R maintenance facility located inside the temporary Stone Railhead footprint was taken forward for the CP3 design."
- 2.2.7 Paragraph 3.3.4 then states that "After careful consideration, the option near Stone was taken forward into the Proposed Scheme. Basford, in comparison to Stone, would be significantly more expensive to construct requiring the development of a second rail connected facility, the requirement for maintenance loops at Pipe Ridware and realignment works to the existing road network."
- 2.2.8 Setting aside the claimed need for maintenance loops at Pipe Ridware if the Basford (Crewe) site had been developed, this begs the question as to why HS2 Ltd believes that it now only needs the smaller IMB-R facility, rather than the larger IMD, especially since it is proposed in paragraph 6.11, with reference to Figure 1 of that report (Figure 4.3 of this report) of HS2 Ltd's Phase 2a Information Paper entitled *'F3: Infrastructure Maintenance and Rail Systems Construction Facilities'* (dated 17 July 2017) that the Stone IMB-R would be used to maintain Phase 2b, as well as Phase 2a.
- Another point to note, which we will come back to during this review, is that paragraph 3.3.5 of the Sift report includes the statement "Another aspect which affects the construction and maintenance strategy is the adopted track form for the HS2 Phase 2A route. The hybrid bill has been prepared on the assumption of slab track as the adopted track form; however a final decision on the track form will be made during later detailed design of HS2 Phase 2A." This, effectively means that whilst there is currently an intention to use slab track along the Phase 2a route, the final decision might well be different, especially if this is what the appointed design and build contractor(s) decide(s).

Section 3.4: Post Hybrid Bill

- The contents of paragraph 3.4.3 are also important in the context of the debate between the use of slab and ballasted track. This is because it is confirmed that, at the time the IMD sift was undertaken (no date is provided unfortunately see 2.2.4 above), it was also proposed that ballasted track would be used from the beginning of the Phase 2a route until the southern portal of the Whitmore Heath tunnel, and slab track from that point northwards. However, we know from paragraph 5.1.2 of the 'C862: Maintenance Aspects of Phase 2a Railhead/IMB-R Sift', which forms Appendix H of this Sift analysis (see section 3 below), that it is currently proposed that Phase 1 and Phase 2a are assumed to "...be constructed using slabtrack-form throughout", whereas conversely "Phase 2b (West) and Phase 2b (East) will be constructed using a ballasted track-form other than in the bored tunnels and at the terminus stations."
- This only goes to demonstrate that HS2 Ltd has changed its mind on the subject in the past, as well as still preserving its options for the future. Consequently this would suggest that choosing the most flexible site for an IMB-R (or IMD) to maintain both Phases 2a and 2b would be a wise course of action.
- 2.2.12 Paragraph 3.4.4 confirms that "The currently assumed route configuration for the Phase 2b Western Leg was not available during the [preparation of the] Sifts mentioned above [i.e. summarised in 2.2.4] and hence the need to include that in the updated HS2 maintenance strategy and re-evaluate the most appropriate IMB-R location. This appears to suggest that HS2 Ltd has not properly considered the likely maintenance needs of Phase 2b in this report, which would seem a major omission.



- 2.2.13 Paragraph 3.4.5 confirms that "The current Phase One design assumes that the trackform will be slab track; however a final decision on the track form will be made during the detailed design stage". With the same caveat equally applying to Phase 2a and 2b, this would seem only to reinforce the need for IMB-R design flexibility.
- 2.2.14 Paragraph 3.4.7 claims that *"This Sift also evaluates 'Aldersey's Rough' in detail, a suggestion received from the public."* The reference to the *'public'* presumably means the SRCG, which is the fact of the situation.
- 2.2.15 Paragraphs 3.4.8 and 3.4.9 confirm that, for the purposes of its report, the Railhead and IMB-R at Stone is considered the base case, to which the other options are compared.
- Paragraph 3.4.15 confirms that the northernmost Phase 1 railhead was not taken into account in this analysis. *"This was due to its location further south than the Phase 2A route and therefore the transit times and associated programme would be longer."* It is strange that the report is not clearer about the location of the Phase 1 railhead to which it refers.

Section 3.5: Railhead Principles

- 2.2.17 It is noted that paragraph 3.5.4 states that "The location of the Railhead affects the construction programme of the HS2 Railway Systems, as the number of the construction faces, the construction sequence and the construction planning are all affected by its location." Paragraph 3.5.5 then adds that "Therefore the exact location of the Railhead will have a major impact on the traffic created during both the construction and the operation of the Railhead, depending on how the Railhead connects to the local road network and the rail network."
- At this stage these statements are left hanging there as facts, but this review will demonstrate (in Section 5 below) why Aldersey's Rough is just as well located as Stone to meet these principles for the 18-month long period of construction and 15-month long period of commissioning, but much better located than Stone when it comes to the maintenance of Phase 2a (from October 2027) and Phase 2b West (from 2033) for the life of the railway.

2.3 Section 4: Pipe Ridware Maintenance Loops

- 2.3.1 Section 4 deals with the maintenance loops and HS2 Ltd claims (in paragraph 4.1.6) that the loops previously planned at Pipe Ridware, when the proposed Infrastructure Maintenance Depot (IMD) was at Crewe, needed to be evaluated. This is disputed by the SRCG, in the context of Aldersey's Rough, for reasons that will become apparent later in this review.
- 2.3.2 Section 4.2, which deals with the Stone IMB-R then refers to the Washwood Heath RSD, and describes it as a maintenance facility. However, in the context of maintaining the HS2 railway infrastructure, it is irrelevant. This is because the purpose of an RSD (or Rolling Stock Depot to give its full title) is only to maintain trains. What is much more relevant is the length of HS2 railway that needs to be maintained by an infrastructure maintenance facility (be it an IMD or an IMB-R).
- 2.3.3 Section 4.3 deals with what is described as the Crewe IMB-R. However, the Crewe site was never going to be an IMB-R, but an IMB-R which, as paragraph 5.11 of the F3 Information Paper acknowledges, is a much smaller facility than an IMD. Since the Crewe site near West Basford is no longer an option on the grounds that the land is no longer available, it begs the question why it is relevant to mention it in a sift analysis that is about comparing Stone with Aldersey's Rough.
- 2.3.4 Section 4.4 then refers to Aldersey's Rough in the context of the distance to Washwood Heath, before suggesting that its location "...would require the installation of maintenance loops at Pipe Ridware" in paragraph 4.4.2. This statement is subsequently contradicted in the Sift analysis prepared by HS2 Ltd, most notably in its Appendix H report although, more importantly, the SRCG will demonstrate in Section 4 below of this review why this statement is not only misleading, but factually incorrect. Indeed, there are actually no circumstances at



all based on the criteria used by HS2 Ltd (i.e. transit times to, and the minimum working time at, the southern end of the Phase 2a mainline, or even beyond to the Delta Junction on Phase 1), when the maintenance loops at Pipe Ridware are required.

Of even more concern is the statement made by HS2 Ltd in paragraph 4.4.5, which implies "...that the minimum maintenance working window was increased to 3 hours 10 minutes", with reference to Appendix H. Once again this is misleading because not only is this not mentioned in Appendix H, but actually it is not relevant as Aldersey's Rough can achieve a 3 hours 35 minute long minimum maintenance working window at both Delta Junction (far end of southwards transit) and Manchester Piccadilly (far end of northwards transit. This is discussed in more detail in Section 3 below.

2.4 Section 5: Option A8: (Base Case) Railhead and IMB-R at Stone

Section 5.1: Option Description

- 2.4.1 The Stone Railhead/IMB-R is briefly described in Section 5.1.
- Paragraph 5.1.7 claims that "Direct access will be provided to the Railhead via a new roundabout off the new M6 slip roads." However, this statement is misleading, because it only applies to the southbound carriageway, and not the northbound carriageway, which is located on the western side of the motorway and is therefore not directly connected to the Stone Railhead.
- In the second sentence of paragraph 5.1.8 HS2 Ltd confirms that "Option A8 requires the provision of both permanent and temporary slip roads which will be for works traffic access only. However, the 'temporary' northbound slips can only be accessed by using the existing Yarnfield Lane and its M6 overbridge until June 2023, and thereafter the realigned Yarnfield Lane and its new overbridge. It therefore must be concluded that HS2 Ltd is proposing to put 50% of its post October 2021 construction traffic onto Yarnfield Lane, and that this arrangement would continue for over 3 years.
- In paragraph 5.1.8, HS2 Ltd then makes the claim that *"Temporary slip roads off the M6 at this location would be recommended to construct HS2 mainline, even if the Railhead/IMB-R was not located here."* However, whilst it is appreciated that HS2 Ltd is simply making a recommendation, the SRCG can demonstrate that without the need to build a railhead/IMB-R at Stone, and the amount of construction traffic that goes with it, it should be possible to accommodate the remaining HS2 (mainline railway only related) construction traffic by the use of slightly upgraded versions of the extant sliproad infrastructure. Accordingly, it would incorporate the M6 Smart motorway emergency southbound and northbound slips that will be built by Highways England before the end of 2019.
- ^{2.4.5} Furthermore, since the Smart motorway works near Yarnfield Lane would not be operational until 2022, there is opportunity to lengthen the emergency slips as part of those ongoing motorway carriageway restrictions.

Section 5.2: Engineering Feasibility

Highways

- Paragraph 5.2.1 refers to the planned Smart Motorway works on the M6 adjacent to the Stone Railhead/IMB-R. HS2 Ltd asserts that no adverse comments have been received from Highways England's consultant regarding the proposed sliproads to serve the Railhead/IMB-R, and that it is "…receptive to the incorporation of the Railhead / IMB-R proposals to upgrade the M6 as far as is reasonably possible."
- 2.4.7 Although it is appreciated that this text was written in 2017, it is clear now that Highways England and its contractors are not taking any account of HS2 Ltd's proposals for the construction of the Stone Railhead/IMB-R, or apparently even the M6 Meaford Viaduct. This was confirmed to representatives of the SRCG who attended the Smart motorway



consultation event that was held at Stone railway station in March 2018. The Smart motorway works began, with night-time carriageway closures on Monday 26 March 2018, and it was confirmed by representatives of Highways England that the section of M6 between J15 and the Stafford Services was programmed to be completed before the end of 2019.

- This Smart motorway works include repair and upgrade works to the existing Yarnfield Lane overbridge, together with the construction of new emergency slips roads that will connect from/to the new inside carriageways in both directions, and pass under the existing overbridge on the embankment side, to effectively create a 5th lane. This will be achieved by digging out the toe of each embankment under the overbridge on each side of the M6, and replacing it with a new retaining wall. The new slip roads would then connect to the two existing emergency access roads, which in turn will connect with Yarnfield Lane at the same locations as present.
- As part of the early stage works of the Smart motorway works, i.e. to be started in spring/summer 2018, the existing central reservation will be upgraded. These works are expected to be completed in 2018 or early 2019.
- 2.4.10 With the Stone Railhead/IMB-R construction works due to start in January 2021, it will occur over a year after the Smart motorway works would have been completed on the adjacent stretch of M6. It will therefore not only result in further disruption works to the M6, but effectively render the emergency slip road works and improvement works to the existing Yarnfield Lane overbridge abortive, and a waste of tax payers' money.
- It is claimed in paragraph 5.2.2 that the proposed realignment of Yarnfield Lane "...matches or betters the existing geometry." This statement references an HS2 Ltd report (C861-SA-REG-000-000002), which is not currently available for scrutiny. This is not accepted. Mr Wilkinson, highways expert for the Parish Councils will show that the realigned highway will not operate safely.
- It is also claimed by HS2 Ltd that *"The new realignment for the Railhead/IMB-R allows construction traffic to be limited on Yarnfield Lane."* The Parish Councils have to take issue with this statement, which is misleading. This is because there is no way that Stone Railhead construction traffic can access/egress the northbound M6 without using the existing or realigned Yarnfield Lane or the existing or proposed new overbridge. The only way of reducing the levels of proposed construction traffic is to remove the main source, i.e. the Stone Railhead, and relocate it to Aldersey's Rough.
- ^{2.4.13} The final sentence of paragraph 5.2.2 then states that "*If no Railhead/IMB-R facility is provided* access would still be required onto the M6 at this location, but the existing Yarnfield Lane would likely be impacted by HS2 mainline construction more than under Option A8 with the Railhead/IMBR." However, it provides no evidence to support the claim, which the Parish Councils will clearly demonstrate is false.
- In paragraph 5.2.3, HS2 Ltd acknowledges that "Option A8 requires a lengthening of *Eccleshall Road overbridge than that required for just the HS2 alignment due to the headshunt and S&C* [Switches and Crossings] *required.*" However, it does not provide further details of the lengthening required, and despite providing details of its height relative to existing ground level and future track level in bullet 11 of paragraph 2.2.20 of the CA3 Community Area Report, length and width dimensions are not provided. However, it has been estimated that the Yarlet North Cutting is 40% wider than it would otherwise need to be to just accommodate the HS2 mainline, and therefore it is reasonable to assume that the B5026 Eccleshall Road overbridge, which is approximately 150m long), is 40% longer than it would otherwise need to be.

Water and Flood Risk

2.4.15 It is claimed in paragraph 5.2.7 that HS2 Ltd's proposals for the Filly Brook valley and associated flood plain are not made any worse by its proposals. This is despite the fact that these include the installation of the following major physical structures:



- The infilling by up to 12m to accommodate the Stone Railhead/IMB -R raised platform of the marshalling yards;
- The Yarnfield North and South, and other unnamed embankments that have just been subject to major extensions as part of the SES/APES submission of 23 March 2018; and
- The Norton Bridge to Stone Railway overbridges to accommodate the HS2 Mainline and Railhead/IMB-R reception tracks, across the floodplain.
- 2.4.16 Whilst HS2 Ltd has sought to provide replacement flood storage to compensate for these changes, its claims that the situation will not be any worse needs to be questioned by detailed review by qualified hydrologists.
- 2.4.17 It is also of note that HS2 Ltd's latest proposals (SES/APES dated 23 March 2018) for infilling the Filly Brook with additional embankments have not been considered in the Sift analysis. Unfortunately, the Parish Councils have not had time to investigate these changes in detail, but will attempt to do so as part of a second petition that will be submitted in respect of the SES/APES by 27 April 2018.

Geotechnics

- Paragraph 5.2.8 makes a brief acknowledgement that the underlying ground conditions at the footprint of the Stone Railhead/IMB-R are not ideal, especially in the Filly Brook valley, where both Soft alluvium and River Terrace Deposits are present, as well as some infilled pits, which are potential sources of contamination. Paragraph 5.2.9 then claims that *"The majority of the excavated materials would be Class 2 railway embankment fill (if it can be stabilised) or, more likely, highway embankment fill. It is expected that this excavated material can largely be used in the platform for the IMB-R." However, HS2 Ltd has not provided a shred of reliable evidence to support such claims, and is totally relying on high level desk-based information to draw such conclusions, instead of target ground investigation that would enable it to assess both the ability of the underlying geology to support its major structures, as well as provide suitable excavated materials from its cuttings to supply its fill areas, including the platform of the Stone Railhead IMB-R, and potentially more importantly the sub-base material that would be required for the embankments of the HS2 mainline.*
- In terms of the evidence that HS2 Ltd has provided to support its development proposals, paragraph 4.3.2 of the CA3 Community Area report, this is all high level and vague and simply refers to viewer information on the British Geological Survey (BGS) website. Given the intensive construction operations and major structures that are planned at the Stone Railhead/IMB-R this is totally inadequate, and completely undermines HS2 Ltd's claims made in paragraph 5.2.9.
- It is also important to note that in paragraph 1.5.1 of HS2 Ltd's information paper 'E3: Excavated Material and Waste Management', it states (in the context of HS2 as a whole) that "The construction of the Proposed Scheme will lead to the generation of approximately 128 million tonnes of excavated material, over 90% of which will be reused within the project for the construction of engineering and environmental mitigation earthworks. The remaining excavated material is surplus to requirements or is unsuitable for reuse due to contamination and cannot be remediated."
- In the context of the Stone Railhead/IMB-R site, although HS2 Ltd originally indicated that 600,000 m³ of the total excavation volume of 1.6 million m³ would need to be transported off-site, it has since revised its position and reduced the total to just 150,000m³, which represents approximately 9.4% of the total. It is therefore clear that HS2 Ltd's latest position is consistent with its claims at a national level. However, as outlined above this assessment is simply based on a high level desk study, and not any intrusive ground investigation.
- 2.4.22 Notwithstanding the above, it is understood that intrusive ground investigation is finally being carried out with respect of Phase 1 (London to Birmingham), and has been ongoing for some months. Although not directly related to the ground conditions that will be found under the



footprint of the Stone Railhead/IMB-R, which should be subject to its own detailed ground investigation before the scheme is confirmed, the results of intrusive ground investigations should at least be used to enable HS2 Ltd to revisit its current assertion that over 90% of excavated material will be able to be reused within the project.

In this context it is worth reviewing what it will mean if ground investigation show that just 1% more of the excavated material that it will encounter is unsuitable for reuse. At a local level the estimated 1.6 million m³ excavation at the Stone Railhead/IMB-R would result in an additional 16,000 m³ requiring disposal, and this alone would generate an addition 3200 HGV movements. At a national level, 1% of 128 million tonnes equates to an additional 1.28 million HGV movements. The importance of this issue, in the context of the environmental effects, together with the cost, of constructing both the Stone Railhead/IMB-R and the HS2 mainline, cannot therefore be overstated.

Structures

- Paragraphs 5.2.13 and 5.2.14 mention only two structures that are required for the Stone Railhead, i.e. the Yarnfield Lane M6 overbridge, and the Filly Brook Viaduct, which has now (by virtue of the SES/APES of 23 March 2018) been renamed the Norton Bridge to Stone Railway viaduct, and substantially reduced in length, i.e. from 449m to 80m. However, HS2 Ltd omits to mention the following structures, that would need to be constructed to support the use of the Stone Railhead/IMB-R, which would either no longer be required, or significantly reduced in scale, if the facility was moved from this location:
 - The realignment of Yarnfield Lane over a distance of 1.2km (this could be reduced in length by at least 50%);
 - The proposed M6 southbound and northbound on- and off-slips, together with 350m of connecting roads and junctions with Yarnfield Lane;
 - Yarnfield Lane IMB-R underbridge;
 - The sidings that connect the railhead/IMB-R to the Norton Bridge to Stone Railway and the need for the reception tracks and headshunt constructed on the southern side of the Norton Bridge to Stone Railway, together with the northbound connection to the HS2 mainline railway, and the associated foundations over a linear distance of approximately 3km;
 - The removal of any need for the Stone retaining wall 1;
 - The Norton Bridge to Stone Railway underbridge, embankments and reception tracks required to connect the headshunt to the Stone Railhead/IMB-R marshalling yards
 - The removal of the 1.65km long loops adjacent to the HS2 mainline that would serve the Stone Railhead/IMB-R; and
 - A significant reduction in the width extent of the Yarlet North Cutting and the corresponding reduction in the length of the proposed B5026 Eccleshall Road overbridge, i.e. from approximately 150m to 90m and the need to demolish Little Micklow Farm.
- 2.4.25 In addition, the temporary construction facilities could either be reduced in scale or removed altogether. These include:
 - Yarnfield Lane North Transfer Node;
 - Yarnfield Lane North Satellite Compound and Temporary Accommodation; and
 - Stone Connection Satellite Compound.

Section 5.3: Railway Systems

^{2.4.26} In paragraph 5.3.1 it is stated by HS2 Ltd, with respect to the HS2 mainline connection, that *"The access can be direct by using a parallel loop hence removing the need for any headshunt movements."* However, this is not strictly correct, because the only crossover to the southbound mainline is at the very southern end of the loop. This means that if the loop is being used to assemble two halves of a northbound ballast train, or for the storage of other trains, it will not be possible to access the southbound mainline. Furthermore, depending on the location of any trains in the loop, it may also not be possible to shunt them into the loop far enough to enable a maintenance train to access the northbound crossover, thereby necessitating the use of the headshunt connection.

Section 5.4: Environmental Impacts

- 2.4.27 The environmental impacts of constructing the Stone Railhead/IMB-R are played down and confined to brief discussion about the impacts on landscape character; the loss of best and most versatile (BMV) agricultural land; two local wildlife sites (LWSs) and the supposed de-culverting of the Filly Brook, which has now been largely reversed by virtue of the changes made in the SES/APES dated 23 March 2018. There is also only passing reference to the new committed development at Walton Hill, i.e. adjacent to the proposed HS2 sidings from the Norton Bridge to Stone Railway.
- 2.4.28 With respect of road traffic, the impacts are grossly understated and dismissed in the context of some localised lane restrictions and speed reductions on Yarnfield Lane, together with the inevitable disruption on the M6.

Section 5.5: Construction Feasibility and Programme

Civil Engineering

- 2.4.29 The Sift analysis contains only one paragraph relating to civil engineering and this simply states that "The main element of construction complexity is the need for a HS2 parallel access loop which will require additional embankment widening. However, this is not considered a significant engineering issue."
- ^{2.4.30} The complacency of this statement is clear because, by any impartial measure, the Stone Railhead/IMB-R will be very difficult and complex to construct and is fraught with major construction feasibility and programme risk. Further details are provided in Trevor Parkin's proof of evidence, but the main reasons for this are summarised as follows:
 - The Stone Railhead/IMB-R needs to be constructed within a very narrow footprint that ranges from approximately 130m to 300m in width.
 - This narrow corridor crosses three important transport routes at right angles, all of which require major civil engineering structures to be constructed to cross them. This is not just in terms of the HS2 mainline, but to enable the Stone Railhead to be constructed function on time to avoid adversely affecting the construction programme of the Stone Railhead to avoid delaying the wider railway systems installation and commissioning programme from January 2025.
 - Each of these three important transport routes, which will need to be crossed, have detailed engineering complications of their own that need to be overcome:
 - Yarnfield Lane requires a 1.2km long realignment; to be excavated 2-3m below existing ground level and a new M6 overbridge that will take over two years to construct, with the existing overbridge then requiring demolition. HS2 construction traffic using the M6 northbound needs to share a 0.9km length of Yarnfield Lane with local traffic for over 3¹/₂ years.
 - Eccleshall Road Bridge requires 21 months to construct, whilst the Yarlet North Cutting is being excavated below it over a common period of 15 months.
 - The Norton Bridge to Stone Railway is an operational railway that is used by six passenger services per hour during weekdays. It stands above the Filly Brook floodplain on an embankment and has 6+m high overhead catenary above the tracks. It cannot be crossed by construction traffic until the Norton Bridge to Stone Railway Viaduct and adjacent embankments are constructed and, according to HS2 Ltd's programme, this will not be until January 2023, which is halfway through the construction programme.
 - It is clear from the above, that any delay to the construction programme of key civil engineering elements of the project has the potential to have adverse knock-on effects

on other elements, and this represents an important construction programme risk which the Sift analysis fails to acknowledge.

Railway Systems

- 2.4.31 Paragraph 5.5.3 states that "The Stone Railhead is located at the middle of the HS2 Phase 2A route and it can support two workfronts. It is situated away from complex engineering works (Whitmore Heath and Madeley tunnels and HS2/NR tie-in works at Crewe) hence this railhead provides high robustness to the HS2 construction programme."
- 2.4.32 Whilst it is acknowledged that the Stone Railhead is more centrally located for the construction of Phase 2a than Aldersey's Rough, which is located 13km further north, what is omitted to be mentioned here is that Aldersey's Rough is more centrally located than Stone when both Phase 2a and Phase 2b (Crewe to Manchester) are taken into account, in relation to their future maintenance. Furthermore, the construction and commissioning of Phase 2a is for a total period of just 2 years and 9 months, whereas the maintenance of Phase 2a and Phase 2b is for the lifetime of the HS2 railway. In this context the value of being halfway along the Phase 2a is grossly overstated in this Sift analysis. Further details are provided in Section 4 of this report.
- 2.4.33 With regard to the second point and the robustness of the HS2 construction programme, since the works at the Madeley tunnel and the Crewe HS2/NR tie in works are located to north of both of the two railhead options, Aldersey's Rough cannot be more adversely affected than Stone. Indeed, if HS2 Ltd considers the Whitmore Heath tunnel to be such a complex engineering project that it represents a programme risk, why is it not starting this work earlier than the CA4 programme (i.e. from January 2023 over 2 years) is currently proposing? Furthermore, if it does represent such a risk, it would increase the difficulty of the Stone Railhead serving the Madeley tunnel and Crewe tie works, compared to Aldersey's Rough, as the latter would not need to negotiate the Whitmore Heath tunnel to access those sites.
- HS2 Ltd also fails to acknowledge that the whole route of Phase 2a is potentially constrained by major engineering works that will take years to complete and are also therefore at risk from overrunning the programme. For instance in addition to having three communication links (i.e. two important roads and an operational railway), within its own geographical footprint, the Stone IMB-R is located immediately south of the M6 Meaford Viaduct and within a few kilometres of the A34 temporary realignment and permanent A34 dual carriageway overbridge works. Any of these could delay the operational use of the Stone Railhead from January 2025 and therefore it is clear that this claimed programme risk for Aldersey's Rough as compared to Stone is grossly overstated.

Section 5.6: Maintenance

Nothing of substance is provided in the Sift analysis under this heading. However, as mentioned above we will be later examining both the location and potential capability of the Stone IMB-R against a maintenance facility based at Aldersey's Rough and proving that the latter provides the more centrally located and greater capability to maintain Phase 2a and Phase 2b (West), which is HS2 Ltd's aim.

Section 5.7: Costs

- Paragraph 5.7.1 simply says that the cost of Option 8 (Stone Railhead/IMB-R) forms the basis by which the other options are compared. However, by not providing any details of what HS2 Ltd has included for the Stone Railhead/IMB-R and what would be saved by its re-location in terms of the component costs, it is not possible to scrutinise the comparison of costs. This represents such a fundamental omission of the Sift analysis that the validity of the report, is completely undermined.
- The omission of a schedule of works for the key potential railhead sites under consideration, i.e. notably Stone and Aldersey's Rough, together with costs that can be adequately scrutinised, was raised by the SRCG technical team at the meeting with HS2 Ltd held on 8 November 2017, where the Sift analysis was presented. The reason given by the HS2 Ltd



team, and specifically Harry Rolfe, was that the information was commercially sensitive. In response to this the SRCG requested that (as a minimum) a schedule of works needed to be provided, together with broad costs. Whilst this point was acknowledged at the meeting, this vital information was clearly withheld by HS2 from the final Sift analysis. Until such information is provided, it is the Parish Councils' opinion that no weight should be given to the claimed costs differential between the Stone and Aldersey's Rough site.

^{2.4.38} The issue has also been raised by the Parish Councils (Item 3.1) in their petition to the Parliamentary Select Committee dated 26 February 2018. Unfortunately in HS2 Ltd's petitioners response letter (from Oliver Payne – Director, Hybrid Bill Delivery) no mention was made of this point and no cost information has (to date) been forthcoming to adequately address the petition request that a *"fully detailed breakdown of the differential costs should be made available in advance of the Select Committee hearings to allow full and proper scrutiny by all parties."*

Key Risks

The clear partiality of this report is obvious from the fact that, despite the very clear construction feasibility risks that the Stone Railhead/IMB-R will face, a Section 5.8: Key Risks is not included, when an equivalent is included for all of the alternative sites. This is simply not credible and again undermines the reliability of the report.

2.5 Section 8: Option A9.5* Railhead and IMB-R at Aldersey's Rough

Introduction

- The so-called Option 9.5* is the Aldersey's Rough option without the installation of maintenance loops at Pipe Ridware. In Section 4 of this report, the SRCG will demonstrate that the idea that maintenance loops might be required in combination with Aldersey's Rough is unnecessary distraction of the Sift analysis
- It is also important to note that the Parish Councils do not consider HS2 Ltd's Option 9.5 to be the optimum design for a Railhead/IMB-R at Aldersey's Rough. Indeed we consider that significant design improvements could be made, which will not only give it greater functionality both in the short- and longer-term, but could also result in reduced construction costs.
- 2.5.3 During the technical conditions that the SRCG held with HS2 Ltd between May and November 2017, this position was made clear on several occasions by the SRCG technical team and, although HS2 Ltd did make some adjustments to its design during this process to take account of the SRCG's advice, its last iteration (Option 9.5) falls well short of what potentially could be achieved.

Section 8.1: Option Description

- 2.5.4 Since HS2 Ltd's design for Option 9.5 does not include any levels or sections along the rail connections it is very difficult to ascertain the degree of cut and fill required to construct HS2 Ltd's version of Aldersey's Rough. However, from the drawing that has been produced, it can be seen that the marshalling yards, together with the main body of the Railhead/IMB-R seems to be constructed at the same level within an area that is cut to some extent into the topography. Whether this is the optimal design in the context of cut and fill, or precise location remains to be seen and will require detailed engineering design drawings to be made available for scrutiny.
- It is interesting that in both paragraph 8.1.1 and paragraph 8.1.2 HS2 Ltd's configuration for Aldersey's Rough is described as single-ended. This is no different to the Stone Railhead, although this is not mentioned in the equivalent description section (5.1). Furthermore, what HS2 Ltd does not mention, is that the Option 9.5 provides for completely separate connections to the WCML and the HS2 mainline, which the Stone Railhead does not. This is because the latter incorporates a headshunt arrangement, which both Network Rail freight delivery and HS2 maintenance trains will effectively share, at least for some Railhead/IMB-R operations.



- HS2 Ltd's proposed headshunt arrangement on the former Newcastle to Market Drayton Railway (or Silverdale line) is described in paragraph 8.1.3. This arrangement is considered to be sub-optimal. Instead the SRCG has proposed a new direct link between the WCML and the section of the Newcastle to Market Drayton line north of Madeley Chord Junction, i.e. in the NW quadrant (see Figure 3.2 of this report). HS2 Ltd's argument against doing this was mainly based on the number, and the associated costs, of Network Rail possessions required on the WCML to make this connection.
- 2.5.7 The WCML is comprised of four tracks at this point and carries considerably less traffic at night due to the very limited number of passenger trains. The number and cost of total possessions can therefore easily be mitigated by planning most possessions to occupy just two tracks and for the work to be undertaken at night. Rail traffic will continue to operate on the remaining tracks, albeit at lower speeds, as night time capacity is sufficient to handle that traffic on two tracks.
- 2.5.8 Paragraph 8.1.3 also states that "*vehicular access to the railhead made via connections to the local road network and then to the M6.*" Whilst this is factually correct it hardly represents a description of the road connections that are available at Aldersey's Rough, which are numerous and far superior in engineering and environmental terms, than what can be achieved at the Stone Railhead from Yarnfield Lane.
- At Aldersey's Rough there are plenty of options as to where to locate the site access from Three Mile Lane. HS2 Ltd has chosen to locate this much further south than the SRCG considers necessary. Instead we would locate it much further north to reduce the length of the lane affected by the development. Indeed, it is potentially possible to reduce the total length of local road affected (i.e. Three Mile Lane) to approximately 500m. This compares very favourably to what will happen to Yarnfield Lane for the Stone Railhead/IMB-R, where virtually the whole length of this public road is adversely affected at one time or another, and the whole nature of the road will be altered forever.
- HS2 Ltd's site access option also results in a longer connecting access road, and therefore it can only be concluded that the Option 9.5 design is sub-optimal in this respect.
- 2.5.11 Reference is made in paragraph 8.1.4 to building temporary slip roads around Keele Services and this point is reinforced in paragraph 8.2.1. This is yet another sub-optimal design feature, and the SRCG's plans for creating permanent access using as much as the existing infrastructure will provide better and more sustainable access at lower cost. Further details are given under the Highways section review below.
- 2.5.12 With regard to the connections to the WCML and the HS2 mainline, the description provides no details. However, this will be commented up, as appropriate, throughout the remainder of this part of the review, with specific reference to Appendix G of the Sift analysis, which contains HS2 Ltd's layout for the Aldersey's Rough Railhead/IMB-R.

Section 8.2 Engineering Feasibility

Highways

- ^{2.5.13} The Parish Councils do not accept the constraints outlined by HS2 Ltd in paragraphs 8.21 to 8.2.3 of the Sift analysis.
- 2.5.14 With respect to the southbound connections, we consider that the best solution is to utilise the southbound off-slip, where existing HGV traffic immediately diverges from the rest of the traffic at the point of entry. HS2 HGV traffic could then access Three Mile Lane via the existing rear service access, at least initially, or alternatively, a new access road could be built of the existing external circulatory HGV route without affecting most of the woodland. This is illustrated on Figure 2.1.
- 2.5.15 The options for the southbound on-slip would simply involve accessing the service via three Mile Lane as a reversal of the proposals outlined for the off-slip above, to join the external circulatory system before joining the motorway.



- As for the northbound off-slip, there are several options available that utilise the existing slip road and would have far less impact than HS2 Ltd's current sub-optimal proposals. These are also shown on Figure 2.2. One solution would be to use the existing Motorway highways depot within the Keele services area for access/egress onto Three Mile Lane with minimal disruption to all traffic. Alternatively, a new section of access road could be constructed from the northwestern side of the highways depot to create a new access onto Three Mile Lane at the same or point location that is advocated by HS2 Ltd. If a new roundabout was constructed here, this junction could also form the main access to the Aldersey's Rough Railhead/IMB-R, which would be especially advantageous if the current HS2 Ltd sub-optimal design for the layout of the site, was revisited.
- 2.5.17 Potential arrangements for the northbound on-slip would utilise the connections from Three Mile Lane that are proposed above, and then the existing slip road to gain entry to the M6.

Water and Flood Risk

- ^{2.5.18} Paragraphs 8.2.4 and 8.2.5 refer to the need for the existing culverts under the Newcastle to Market Drayton line to the north of Madeley Chord Junction to require lengthening, replacing and/or upgrading to accommodate the new railway connections and this is understandable.
- 2.5.19 It is interesting that paragraph 8.2.6 refers to the reinstatement of Madeley Chord causing the possible need to introduce flood defences because of a 1 in 1000 year requirement due to its design of the new northbound spur from the WCML, as well as the reuse of the existing northbound chord, for which new flood defences are proposed. Indeed, paragraph 8.2.7 makes the statement that *"The new WCML spur causes significant impact on the floodplain of the River Lea as it effectively blocks the area off with the only possible crossing being the three cell culvert proposed for the 14m wide drainage system for the field."* Unfortunately the Option 9.5 plan does not provide sufficient detail to illustrate what is meant by HS2 Ltd's commentary, but it appears that the crossing of the minor artificial watercourses in the floodplain is at least partly due to HS2 Ltd's alignment for the WCML spur (see below). In addition, the SRCG's proposals for this a northbound connection, do not require the use of the existing chord.
- 2.5.20 Similar points are repeated in paragraph 8.4.6 under the heading of *'Environmental Impacts'*, but the Parish Councils consider that it is unnecessary to review these in detail separately.
- It also has to be noted that HS2 Ltd is introducing massive earthworks that stand up to 15m high and occupy large areas of floodplain, together with bridge/viaduct structures into the valley of the Filly Brook to create the Stone Railhead/IMB-R. Such structures not only dwarf what is proposed in the valley of the River Lea, but these are only apparently being designed to deal with 1 in 100 year event, plus climate change (see fourth bullet of paragraph 15.4.14 of the CA3 Community Area report), compared to a 1 in 1000-year event at Aldersey's Rough.
- 2.5.22 With respect to HS2 Ltd's design for the northbound spur from the WCML, it is difficult to see how such a small earthworks feature can reasonably be compared to what HS2 Ltd is planning for the Stone Railhead/IMB-R, which is much larger. Notwithstanding this point, HS2 Ltd's design is once again sub-optimal in a number of respects. Firstly, and in terms of its practicality to connect to the Newcastle to Madeley Railway, the Parish Councils consider that HS2 Ltd's proposed headshunt arrangement along the stub end of the railway to the west of Madeley Chord Junction to be sub-optimal and that a more sustainable solution is to align the WCML spur differently so that it initially moves onto higher ground in the west before curving round in an easterly direction to link to the former railway.
- In addition to providing a quicker connection from the WCML slow lines into Aldersey's Rough, it would also enable the spur to move onto higher ground more quickly, thereby reducing any potential flood related impact on the valley of the River Lea, together with a simplification of the local drainage arrangements.
- 2.5.24 Given the above, it is the Parish Councils' contention that, little weight can be given to the claims made by HS2 Ltd that this option would see an increase in flood risk when compared



to the base case of the Stone Railhead/IMB-R proposals in the floodplain of the Filly Brook. There is also no detail provided as to what is meant by a departure from HS2 standards in this context and the Parish Council therefore request that a detailed examination of the comparative flood risks posed by the two options is carried out by qualified independent hydrological consultants.

Geotechnics

- In common with its approach elsewhere, HS2 Ltd only provides a brief commentary on its knowledge and assumptions regarding the site geology and the geotechnical characteristics of any fill, which it expects to comprise of Class 2 Railway or Highway fill. This is the same commentary as provided in respect of Stone, and yet whilst it is expecting over 90% of the cutting material at Stone to be reused within the Project Scheme, here it finishes paragraph 8.2.11 with the statement that since " most of the IMB-R is cut here, it is expected that the site would be likely to yield a large net-surplus of cohesive fill which would need to disposed of."
- Given that HS2 Ltd is relying on nothing more than a high level geological desk study on which to base its geotechnical opinion, little weight should be given to such statements and the Parish Councils call for a full ground investigation of the geological and geotechnical characteristics of both the Stone and Aldersey's Rough sites and, if appropriate, an independent assessment of the data so that decisions can be made based on detailed scientific information/data, instead of conjecture.

Utilities

- HS2 Ltd has identified the presence of some major utilities, but with the exception of the 132kv overhead power line, which is evident on the Ordnance Survey base map, its Appendix G drawing does not show where these are located and why these are affected by its Option 9.5 development proposals.
- In paragraph 8.2.14, HS2 states that "There is an element of uncertainty regarding the need to divert the overhead lattice tower [i.e. 132kv], as a full survey has not been completed to confirm if the required clearance to the new embankment is achieved. The potential need for a diversion appears to be based on the possibility that the overhead cables might sag low enough to interfere with the northern end of its new HS2 connection from the IMB-R, which it has designed to sit on an embankment several metres above existing ground level. However, instead of looking to value engineer its design to remove such a need, it seems to have simply assumed that the diversion is required, and therefore presumably included what is likely to be quite a significant additional expense into its costs for constructing Option 9.5.

Structures

- 2.5.29 Paragraph 8.2.15 states that "The replacement of the Silverdale line [Newcastle to Market Drayton Railway] over Network Rail WCML tracks with a 'like-for-like' structure will result in a structure that is non-compliant with HS2 standards as the structure at current is an open structure." It is unclear what exactly is intended by this statement, but it is obvious to the Parish Councils that the existing railway track and underlying trackbed would need to be upgraded.
- It is also unclear why any structure on the Newcastle to Market Drayton Railway should be required to be to 'HS2 standard'. This line is Network Rail owned and would remain so up to the point at which the turnout to the Aldersey's Rough IMB-R is situated. No HS2 trains, or maintenance trains accessing HS2, will be required to use this line, so all structures need be to Network Rail standards, not HS2 standards.
- HS2 Ltd then claims that "The structure also has inadequate spatial clearance (both horizontally and vertically) to the Network Rail tracks. If Network Rail requires to meet the latest spatial requirements a 'special structure' will be required as to provide adequate clearance between the Network Rail lines at the Silverdale Line above." In this context it is assumed that the author is referring to the existing WCML overbridge of the Newcastle to



Market Drayton Railway and suggesting that its existing vertical clearance to the WCML is inadequate. However, the fact that it remains in-situ, would suggest that it does not seem to be causing Network Rail any problems at present, and with the WCML ultimately likely to see much less rail traffic, especially express trains in the future once HS2 is open, it again appears that the authors of this report are overstating the importance of this issue.

- Notwithstanding the above point, it is recognised that the integrity of this overbridge would need to be assessed and upgrade works undertaken as appropriate. However, with the Parish Councils' proposals to access the northern section of the Newcastle to Market Drayton Railway across the NW quadrant, it would be possible for the section of railway using this overbridge to remain as single-track.
- ^{2.5.33} The final sentence refers to the need to raise the height of the Whitmoor (should be Whitmore) Wood retaining wall to a maximum of 25m. The Parish Councils challenge this assumption, and therefore consider that the resultant adverse effects on Whitmore Wood to be unnecessary. Further details are given in Section 3 below.
- 2.5.34 Paragraph 8.2.16 then states that *"Multiple structures are required to be replaced along the disused Stoke* [Newcastle] *to Market Drayton Line."* Whilst such a statement would suggest that this issue represents a major undertaking, the work mainly comprises the upgrading the trackbed and replacement/refurbishment and installation of some new minor drainage culverts and new double track. Apart from any works in respect of the WCML overbridge at Madeley Chord Junction (see above), the exception is the need to create a replacement underbridge to facilitate a track access to the farm at Netherset Hey.
- 2.5.35 The Parish Councils' suggestions in relation to the HS2 connection from Aldersey's Rough, may avoid any other structures having to be replaced. This cannot be accurately identified until examination of the detail drawings is undertaken.

Assessment

- Paragraph 8.2.17 states that "Option A9.5* has been assessed as a moderate worsening compared to the baseline." HS2 Ltd then gives an insight in the paragraphs that follow as to how it has drawn such a conclusion. Although it then accepts (in paragraph 8.2.17) that "Option 9.5* reduces the work required at Stone, including the realignment of Yarnfield Lane and Ecclestone [should be Eccleshall] Road", it then cites the following reasons:
 - The need for **three additional slip roads at Keele Services**. This is only required because HS2 Ltd's design idea is poorly thought out and therefore sub-optimal.
 - There would be **major worsening in relation to water and flood risk**. This is an incomprehensible statement in the context of what is proposed at Stone in the Filly Brook floodplain, and requires examination by independent consultants.
 - Additional impact on already significant structures, particularly the **Whitmore Wall** retaining wall, which will increase in height by an additional 5m. Further design information needs to be provided by HS2 Ltd, so that this claim can be independently verified.
 - *"Replacement of multiple structures along the disused Silverdale line."* These multiple structures comprise a handful of minor structures, especially when compared to the major engineering structures that will be required at Stone.
 - *"The particular risk associated with the re-provision of a like for like structure over the WCML"*. It is not even clear whether this structure needs to be replaced, especially given the Parish Councils' optimal design for Aldersey's Rough.
 - *"A significant* **132kv lattice tower HV overhead line diversion** is required." By its own admission, it is not even clear to HS2 Ltd that this would be required and, based on the evidence contained in the Sift analysis, it looks likely that the connecting HS2 line from the Railhead could be value engineered to remove this need.

In addition to the above, and despite the fact that the assessment of HS2's Option 9.5*, does not incorporate the maintenance loops at Pipe Ridware, it is referred to as a negative reason in paragraph 8.2.22. This only serves to illustrate the paucity of HS2 Ltd's case against Aldersey's Rough on the ground of engineering feasibility and effectively undermines the credibility of the Sift analysis. This issue is addressed in more detail in Section 3.1 below.

Section 8.3: Railway Systems

- HS2 Ltd acknowledges that access to the HS2 network can be achieved to/from both directions, although there would need to be a headshunt provided to access the northbound HS2 mainline. The Parish Councils' accept this point, although query the design of the headshunt on two grounds. The first of these relates to the arrangement for the crossovers to the HS2 up line, which are wasteful of space and effectively result in moving the headshunt sidings much further south than should be necessary. The second point is that consideration should be given to designing the connection line so that it passes under the River Lea viaduct so that the headshunt sidings could be located adjacent to the northbound down line.
- In addition, HS2 has also proposed in paragraph 8.3.1 that, given its sub-optimal design, northbound *"trains would need to travel on the HS2 Up line until the north end of Madeley tunnel (approximately 4km) where they would use a facing perturbation crossover to cross on to the HS2 Down line*", adding *"That this needs to be active provision for this crossover."* The Parish Council considers this to be an unnecessary worsening as there is no reason why an 80m long crossover could not be installed just north of Madeley Chord Junction. However, the need to use a crossover could be removed altogether if the headshunt was moved to the southwestern side of the HS2 mainline following some value engineering work, which in turn would potentially further reduce the impacts on Whitmore Wood.
- 2.5.40 It is also noted that HS2 Ltd claims that the rail systems arrangements at Aldesey's Rough represents a minor worsening compared to Stone. However, it is difficult to see how such an outcome can be concluded. Indeed with the Parish Council's proposed design improvements to both the HS2 and WCML taken into account, we would expect Aldersey's Rough to at least score a **moderate improvement** compared to Stone, which will have a detrimental impact on the future operation of the Norton Bridge to Stone Railway.

Section 8.4: Environmental Impacts

- 2.5.41 Paragraph 8.4.1 includes the claim that "The area of land near Stone required for the railhead / IMB-R in the Proposed Scheme would be largely utilised for construction activity and would still retain the M6 access during construction." However, no evidence is included to support this statement because HS2 Ltd has failed to provide details of what the Stone area would require in terms of construction infrastructure for the HS2 mainline if the Railhead/IMB-R was relocated away from Stone. Furthermore, it will be demonstrated in Section 3.1 of this report that if this occurred not only could much of the construction infrastructure be removed, but also it would not be necessary to build new slip roads onto the M6.
- 2.5.42 It is also interesting to note that this paragraph includes the statement that "Yarnfield Lane would likely be retained as per its existing alignment." However, with the Yarnfield Lane underbridge for the HS2 mainline taking 18 months to construct, it is difficult to see how this could take place without at least some realignment of Yarnfield Lane, even if it were only temporary.

Landscape character

Paragraph 8.4.2 suggests that "...locating the railhead and IMB-R to Aldersey's Rough would result in a greater impact on the landscape character of the area, introducing construction effects into an area of wooded farmland currently unaffected by the Proposed Scheme." Whilst it is obviously correct to say that this would result in change on the local landscape character, the question is whether it is of such magnitude, given the Landscape Character Area already includes the M6 and the WCML corridors, and in the future will also include the HS2 mainline, so as to be significant in EIA terms. The Parish Councils would contend that the answer to



this is no, and therefore the point is of limited relevance. This is revisited in Table 3.2 in Section 3.2 below.

Loss of habitats/impacts on protected species

- 2.5.44 Paragraph 8.4.2 also refers to "An increase in the loss of mature hedgerows and trees is evident within this option, including the loss of trees within Hey Sprink and Whitmore Wood, both of which are ancient woodland inventory sites." However, there is no attempt to quantify the changes on put them in the context of what is already proposed to be lost by HS2 Ltd's proposals at Stone or indeed, even at Whitmore Wood, where the HS2 mainline will already result in the loss of 6.4ha of woodland.
- 2.5.45 Paragraph 8.4.4 again refers to the losses of small areas of woodland from Whitmore Wood and Hey Sprink; this time with reference to them being designated sites, i.e. Local Wildlife Sites ((LWSs). Brief mention is also given to an "...increase in the loss of habitats and likely protected species, including floodplain grazing marsh, including the loss of grassland priority habitats (floodplain grazing marsh), ponds, hedgerows, bat assemblage, terrestrial habitats and likely otter habitats with the Aldersey's Rough area." However, whilst some minor magnitude of change may occur, HS2 Ltd makes provides no factual evidence, or quantify the change or, more importantly, put this into context. Furthermore, whilst it is acknowledged that some limited effects are likely on the footprint of Hey Sprink Ancient Woodland, it needs to be acknowledged that the southwestern tip affected appears to be predominantly comprise coniferous plantation.

Visual impacts

- 2.5.46 Paragraph 8.4.2 also comments on visual receptors, but apart from mentioning a few locations where the site might be visible from, provides no evidence to support its case against Aldersey's Rough. Furthermore, the Parish Councils' contend that the proposed Aldersey's Rough Railhead/IMB-R site is remote and well screened from settlements, especially when compared to the Stone Railhead/IMB-R alternative favoured by HS2 Ltd.
- 2.5.47 Paragraph 8.4.3 refers to the loss of agricultural land and on forestry at Aldersey's Rough, but once again fails to quantify the details. However, the former is comparable with the losses at Stone, and the latter minimal in areal extent.

Ground contamination

2.5.48 It is interesting to note the HS2 Ltd acknowledges in paragraph 8.4.6 that in terms of the risk of ground contamination at Aldersey's Rough *"the overall likelihood and severity is much lower in comparison"* compared with Stone.

Traffic movements

- HS2 Ltd's claims in respect of overall traffic movements in paragraph 8.4.7 that there would be an increase compared to Stone are not supported by any evidence at this point. Little weight can be given to this point without the provision of a schedule of site quantities and a transport logistics profile for both option sites.
- 2.5.50 However, even if this was correct, the comments in respect of the need for new accesses off the M6 at Keele Services are purely based on the fact that HS2 Ltd has developed a poorly considered sub-optimal design, and such a situation could be avoided if the SRCG's design ideas were adopted. Furthermore, the idea that this would cause additional disruption on the M6 are not credible, given the disruption that is proposed at Stone, where following the completion of the Smart motorway works on the section of M6 adjacent to the Stone Railhead IMB-R, HS2 Ltd is proposing to carry out a series of highly disruptive works that will undo the work that would have just been completed by Highways England. Further details on this are given in Section 3.1.

Community impacts

2.5.51 Paragraph 8.4.8 claims that *"There would be an increase in community impacts with this option during the operational phase."* This seems to be on the basis that a handful of



properties would be affected by the operation of the Aldersey's Rough Railhead and subsequent IMB-R. However, no consideration is given in this Community assessment to the substantial Community effects that the construction and operation of the Stone Railhead would have on the population of Yarnfield, Stone and neighbouring villages and hamlets. This is specifically related to the inability of people to travel to work and school due to the volume of construction traffic needing to use the Yarnfield Lane, the A34, Eccleshall Road and the wider network, and the congestion that will cause at peak times. The Yarnfield Park Conference Centre, which has over 70,000 delegates/year, and Stone Dominoes Football Club, which has a similar number of visitors per year, which are both very important community facilities to the locality, are not even referenced in the HS2 Ltd assessment.

^{2.5.52} Furthermore, no consideration has been given to the substantial Community benefits that would potentially accrue to the settlements of Whitmore, Baldwins Gate, Madeley and Woore, together with villages and hamlets along the HS2 Ltd's primary construction routes, by using Aldersey's Rough to provide direct access to numerous construction sites.

Section 8.5. Construction Feasibility and Programme

Civil Engineering

- HS2 Ltd concludes that Option 9.5* will lead to a minor worsening compared with Option 8 (Stone). Its reasoning for this seems mainly to do with possessions on the WCML, together with its proposals for access to the M6 via Keele Services and what it claims is a need for 160,000 additional HGV movements. This is all despite acknowledging that there would be reduced earthworks and therefore need for internal haulage, and the absence of evidence in the form of a schedule of quantities and transport logistics schedule to support its claims.
- HS2 Ltd's conclusions appear to ignore the engineering difficulties at Stone, which will result in many programme risks. The fact that most of the engineering works at Stone are interdependent and required three active communication links, including a very busy operational railway line to be crossed, without any such crossings existing at present, is also ignored by the author(s) of this Sift analysis.
- 2.5.55 Furthermore, because the geographic footprint of the key components of Aldersey's Rough are separated from each other, and are therefore much less inter-dependent, it will be much easier to construct, with the result that programme risk should be reduced.
- ^{2.5.56} The Parish Councils are therefore confident that any independent and impartial assessment of construction feasibility and programme would show that Aldersey's Rough would result in a **major improvement**' compared to Stone.

Railway Systems

- 2.5.57 It is claimed in paragraph 8.5.7 that Aldersey's Rough would lead to a moderate worsening on rail systems compared to Stone. However, this is not consistent with the rating that HS2 Ltd concluded in paragraph 8.3.2, which is discussed with reference to Section 8.3 above. Furthermore, and as discussed in that section, the Parish Councils consider that the conclusion that there would be any worsening with respect to the rail systems criterion is wrong
- 2.5.58 In addition, paragraph 8.5.8 states that "a significant amount of railway systems works are required on the out-of-use Silverdale railway and the WCML." However, the Stone site would require a completely new railway to be built over a distance of approximately 5.3km to reach the railhead, as well as six 54-hour possessions of the Norton Bridge to Stone Railway. By any measure it must be reasonably concluded that Aldersey's Rough represents a major improvement compared to Stone on this point.
- It is unclear why HS2 Ltd believes the former Newcastle to Market Drayton Railway (Silverdale line) needs to be used as a site haul road, although clearly it will need to be accessed by construction plant to upgrade it for reuse. Indeed, it would make sense to construct an internal haul road around the eastern and southern side of Hey Sprink to access the works near to



Madeley Chord Junction. As HS2 appears to recognise in paragraph 8.5.9, other Aldersey's internal haul roads could also be used to access the various HS2 mainline construction sites that are located between Whitmore Heath and Madeley Chord junction. This would have the added benefit of reducing construction traffic on the A5182 and A53, and reduce the burden on J15 of the M6 caused by this HS2 construction traffic.

- Subject to an assessment of the existing overbridge, it should also be possible to use the existing structure, or alternatively a replacement structure, to cross the WCML at Madeley Chord Junction to undertake the limited northbound spur and connection works. It might then also be possible to consider using the overbridge to access some of the HS2 mainline construction compounds in the Madeley area, again reducing the adverse effects predicted on the local road network to the benefit of residents at Woore and Madeley.
- ^{2.5.61} The Option 9.5 layout would also need a Satellite Compound and accompanying Transfer Node, which would be located near the main body of the Railhead IMB-R along the access road from/to Three Mile Lane.
- The Parish Councils' response in Section 4.3 below ('Section 3.3: Aldersey's Rough'), addresses the issue of the perturbation crossover north of Madeley Tunnel. Notwithstanding this, all of the Sift IMB-R options require crossovers between the up and down lines of HS2, so it is unclear why this should be highlighted as adding *"construction complexity and maintenance"* for the Aldersey's Rough IMB-R.
- ^{2.5.63} In paragraph 8.5.13 HS2 Ltd claims with respect to Aldersey's Rough that "...being located between the Whitmore Heath and Madeley tunnels this railhead does not provide robustness to the HS2 construction programme. A potential delay to the tunnels construction will block the railhead from feeding all the railway systems construction activities. Therefore, by locating the railhead at Aldersey's Rough the construction programme risk is high." This issue has been comprehensively addressed previously in this report and has not only been shown to be misleading and overstated, but that the Stone Railhead/IMB-R may present a much greater risk to the HS2 Phase 2a construction and railway installations and commissioning programme.

Section 8.6: Maintenance

In common with previous statement with the Sift analysis, paragraph 8.6.2 once again makes the claim that maintenance loops would need to be installed at Pipe Ridware with this option; this time in the context that of an IMB-R being located at Aldersey's Rough. However, this is factually incorrect; a point that will be explained further in Section 4 below, where it will be demonstrated that not only are maintenance loops not required to support Aldersey's Rough, but that it is actually more centrally located than Stone for the maintenance of Phase 2a and Phase 2b West.

Section 8.7: Costs

- Paragraphs 8.7.1 and 8.7.2 then state that the civil engineering and railway systems elements required by Option 9.5* would add £38 million and £3 million respectively to the costs compared to Stone. However, once again no factual evidence is provided to support these figures. This is despite requests from the SRCG, during the meeting of 8 November 2017 when the draft Sift analysis was presented by HS2 Ltd that such claims would need to be substantiated.
- 2.5.66 Based on our knowledge of both sites, we find the idea that Aldersey's Rough would be more expensive to build than Stone not credible and therefore, without the provision of a detailed costed schedule of works, such claims are worthless.

Section 8.8: Key Risks

As previously noted in respect of HS2 Ltd's assessment of Option 8 (Stone), there is no equivalent Section 5.8 covering the key risks of that development. The Parish Councils would



contend that the construction and operation of the Stone Railhead/IMB-R would need to overcome many more major risks to be delivered to time and budget.

- 2.5.68 With respect to Aldersey's Rough, HS2 Ltd has identified 3 key risks.
- The first of these is an apparent concern that an agreement could not be reached with the operators of Keele Services (Welcome Break) and Highways England to use its sliproads and site to create a direct access from the M6. As we have highlighted previously in this report, it is considered that the optimum design being put forward by the Parish Councils for using Keele Services to gain access/egress to/from the M6 would minimise the effects on the day to day operation of this facility. Furthermore, Aldersey's Rough could provide a significant additional income stream to the MSA from its use by the HS2 Ltd workforce, which it is likely to find financially attractive. With regard to the impacts on the M6 itself, the costs of Parish Councils' proposals for Keele Services would be much reduced compared to HS2 Ltd's sub-optimal proposals at this location, as well as at Stone, where expensive Smart motorway works would be rendered abortive.
- 2.5.70 The second risk relates to HS2 Ltd's proposal to lower the stub western end of the Newcastle to Market Drayton Railway to accommodate a headshunt, with the concern relating to the amount of excavation required to achieve this design. However, we consider this headshunt arrangement to be a sub-optimal design, which would not be necessary with our design to ensure a direct northbound and southbound connections directly into the Aldersey's Rough Railhead/IMB-R. Accordingly the Parish Councils' design would remove this risk.
- 2.5.71 The third perceived risk arises from an assumption by HS2 Ltd that the handover between Network Rail and HS2 infrastructure will occur in the reception sidings west of Madeley Chord Junction, thereby putting the former Newcastle to Market Drayton Railway line under HS2 Ltd control and threatening any legacy potential arising from the line's reopening. This assumption is completely false because the line would remain in Network Rail control until the point at which it diverges off the route and into the Aldersey's Rough IMB-R. Under the Parish Councils' track layout proposals the reception lines do not exist and trains simply head straight off the WCML and along the Newcastle branch to the Aldersey's Rough site entrance.

2.6 Section 10: Summary

- 2.6.1 Section 10 of the Sift analysis simply summarises the points that it has raised previously, and therefore no further review time has been expended here repeating our previous concerns about the lack of robustness of Sift analysis.
- 2.7 Section 11: Conclusions
- 2.7.1 HS2 Ltd concludes that its Option 8 at Stone represents its preferred option. However, the SRCG categorically rejects the findings of the report, and will summarise why it has concluded this in Section 7 of this report.

3. Review of Sift matrices

3.1 Engineering matrix

Highways

Site bisected by major canal or road criteria

3.1.1 It is claimed that with respect to the base case (Option 8) at Stone that no major roads are bisected. Although it is then admitted that both Yarnfield Lane and the B5026 will be bisected, clearly HS2 Ltd does not consider these to be major roads.



- The problem here is one of the criteria, which is loaded in favour of the base case. The criteria should be based on transport links or all types and, if this was the case, then the fact that the Stone Railhead/IMB-R will bisect two roads, together with the Norton Bridge to Stone Railway, would represent a significant negative when compared to the non-Stone options.
- 3.1.3 Given the above, in the context of comparing Aldersey's Rough to Stone against this criteria, it must score green using the colour coding used as the basis of the matrix and the SRCG would propose that a **major improvement** is appropriate.

Relative disruption to highways

- The matrix concludes that Aldersey's Rough would result in a minor worsening (pale red) compared to the base case at Stone. This is on the basis that the Yarnfield Lane diversion will be constructed offline, and the fact that Aldersey's Rough would require new slips road from Keele Services and a new junction on Three Mile Lane.
- The assessment is wholly wrong. With regard to Stone, not only will both Yarnfield Lane and Eccleshall Road be subject to major realignments that will take 24 months and 21 months to implement respectively, compared to the Three Mile Lane access works (less than 3 months), but the works will take place over much larger distances (1.2km at Yarnfield Lane and 900m at Eccleshall Road). The character of Yarnfield Lane will also be changed forever by placing it in a cutting up to 12m below the Stone Railhead/IMB-R marshalling yards. In addition, and as has been highlighted by this Sift review, it is not possible for HGV construction traffic accessing/egressing the Stone Railhead to do so without travelling along up to 900m of Yarnfield Lane to access the northbound carriageway of the M6. Conversely, whilst a section of Three Mile Lane would also need to be used to connect to the southbound M6 sliproads, it does not serve a village the size of Yarnfield and the community and business facilities that it contains.
- 3.1.6 Given the above, an impartial assessment would conclude that Aldersey's Rough would represent a **major improvement** compared to Stone.

Site access during construction and operation of the railhead/IMB-R

- 3.1.7 With respect to the base case, HS2 Ltd claims that the Stone Railhead/IMB-R has direct access off the M6. However, the reality is that it does not to/from the northbound carriageway of the M6. Indeed the only way it can access the northbound M6 is via the use of the existing Yarnfield Lane and its overbridge, or via the realigned Yarnfield Lane and overbridge, which will not be ready for use until July 2023.
- 3.1.8 With regard to constructing the new access slip roads, HS2 Ltd seems to assume that this is straightforward. However, the Parish Councils are aware that Highways England is not taking any account of HS2 Ltd's proposals for the Stone Railhead/IMB-R, or indeed the M6 Meaford Viaduct, in the delivery of its Smart motorway works, which will be completed by the end of 2019. HS2 Ltd's proposals will therefore cause some of Highways England improvement works, which include repairs to the existing Yarnfield Lane overbridge, to be disturbed or made redundant, causing both further disruption to the public and a significant waste of public money.
- With respect to Aldersey's Rough, HS2 Ltd suggests that getting agreement with Highways England and the Motorway Services Operator (MSO) to use the existing slip roads is a significant risk. However, the works proposed by the Parish Councils would be more straightforward to undertake than those proposed by HS2 Ltd in its sub-optimal design for Keele Services. Furthermore, it is difficult to see why works that would prove less disruptive than those planned at Stone, which will have a negative impact on the recently completed Smart motorway improvements and make these redundant and a waste of money, would cause more concern from Highways England.
- 3.1.10 HS2 also cites a significant impact on local roads near Aldersey's Rough as a reason for its scoring. However, any impact on Three Mile Lane (the only road affected) could be limited to



less than 500m in length of carriageway with the SRCG design and would be significantly less disruptive than what HS2 Ltd plans for Yarnfield Lane.

3.1.11 Taking all of the above evidence into account, it can only reasonably be concluded that Aldersey's Rough represents an improvement on Stone against this criteria, with a **moderate improvement** being an appropriate outcome.

Water and flood risk

Major water features on site

- It is claimed that the Filly Brook will be deculverted and a natural channel created, which almost seems to suggest that the effects of the Stone Railhead/IMB-R would be beneficial. However, the diversion around the southern side of the railhead platform in an open channel, which formed part of the proposals in the July 17 submission, did not really represent a natural environment warranting praise. Furthermore, no reference is made to the huge earthworks and other structures that were planned to be constructed in the valley of the Filly Brook.
- 3.1.13 Since the Sift analysis was completed in November 2017, HS2 Ltd has amended its proposals for the Filly Brook valley and replaced the Filly Brook Viaduct (449m long) with an 80m long viaduct and embankments totalling 385m in length, which will be up to 15m high. The Filly Brook underbridge for the reception tracks has also been replaced by an embankment extension, with the Filly Brook being culverted underneath both embankments, which are within 140m. As a consequence the previously lauded open channel arrangement will mostly now be culverted.
- At Alderseys' Rough, HS2 Ltd's Option 9.5 includes some sub-optimal design features, which HS2 Ltd is now suggesting represent a major worsening of the water features situation compared to Stone. Apart from some very limited extensions to minor watercourses, the effects of which have been greatly exaggerated, HS2 Ltd is claiming that the new spur of the WCML downline will increase the flood risk in the River Lea floodplain. The new spur that it has designed would be less than 2m above existing ground level on a small embankment, and once again the situation in terms of the water environment seems greatly exaggerated. However, the Parish Councils' design for this spur would involve it being moved further to the west onto higher ground and out of the floodplain more quickly and this, together with its realignment, would remove most of the overstated concerns of HS2 Ltd.
- 3.1.15 The Parish Councils are confident that an impartial analysis of the hydrology and flood risk between the two options would find that the Aldersey's Rough option would result in a **moderate to major improvement** on the effects on water features and flood risk, rather than the unrealistic and biased proposition that the reverse is the case.

Utilities

- 3.1.16 HS2 Ltd has concluded that it will be necessary to divert/raise the elevation of the 132kv overhead line (OHL) and a 300mm diameter sewer to accommodate its Options 9.5 proposals, and for this reason it has concluded that Aldersey's Rough represents a moderate worsening compared to Stone.
- 3.1.17 We cannot comment in respect of the 300mm sewer, because HS2 Ltd has not provided any information about its location in the Sift analysis.
- With respect to the 132kv OHL diversion work (which HS2 Ltd is unable to confirm is needed), the apparent need for this is because HS2 Ltd has designed the connection between the IMB-R and the HS2 mainline in such a way that it has been raised above existing ground level by an embankment that appears to be approximately 3m high. As we have indicated elsewhere in this report, the Parish Councils consider the HS2 Ltd's Option 9.5 design to be sub-optimal in a number of respects, including the layout arrangements for the IMB-R, and its connection to the HS2 mainline. We therefore believe that it should be possible to lower the elevation of the connection where it passes beneath the OHL, and therefore avoid the need for is cost.



3.1.19 Without access to detailed scale drawings of the Option 9.5 design, it is not possible to fully evaluate the issue of utilities, or undertake a value engineering exercise to amend the Option 9.5 design. In the absence of this information, it is only reasonable to conclude that the comparison between the two sites is **neutral**.

Structures

- 3.1.20 With respect to the Stone IMB-R, the matrix only mentions the realigned Yarnfield Lane overbridge and the Filly Brook Viaduct, the latter of which relates to the HS2 mainline railway and only peripherally the Stone Railhead/IMB-R. However, it omits to mention the many other structures that will be required to build in the Stone facility including:
 - The realignment of Yarnfield Lane over a distance of 1.2km;
 - The proposed M6 southbound and northbound on- and off-slips, together with 350m of connecting roads and junctions with Yarnfield Lane;
 - The Yarnfield Lane IMB-R underbridge;
 - The sidings that connect to the Norton Bridge to Stone Railway and the need for the reception tracks and headshunt constructed on the southern side of the Norton Bridge to Stone Railway, together with the northbound connection to the HS2 mainline railway, and the associated foundations, which in total amount to over 10km of railway track;
 - The Stone retaining wall 1;
 - The Norton Bridge to Stone Railway overbridge, embankments and reception tracks required to connect the headshunt to the stone Railhead/IMB-R marshalling yards; and
 - The approximately 60m of additional B5026 Eccleshall Road overbridge, required to bridge the wider Yarlet North Cutting because of the provision of the headshunt.
- In contrast at Aldersey's Rough it cites the replacement of the Silverdale line, the potential need to great greater spatial clearance on the Madeley Chord overbridge, even though it is functioning adequately at present, together with the replacement/upgrade of a few minor culverts as major constraints from a structures perspective. However, the upgrade of the Silverdale line represents significantly less work than is required at Stone.
- 3.1.22 With regard to the increasing the height of the Whitmore Wood retaining wall to 25m, HS2 Ltd neglects to mention that there will already be a retaining wall in this location, albeit of less height. However, the key point is that the need to increase its height to 25m only results from HS2 Ltd's Option 9.5. sub-optimal design of the HS2 mainline connection. The Parish Councils consider that a much simpler, more practicable and potentially cheaper connection could be made that would either reduce the length and height of the Whitmore Wood retaining wall, but possibly remove its need altogether.
- 3.1.23 Given the very many complex and large structures required for the Stone design, which are much more significant that the structures that would be needed at Aldersey's Rough if an optimum design was adopted, it is considered that Aldersey's Rough would result in a **moderate to major improvement** compared to Stone for this criteria.

Complexity of construction

Network Rail possessions

- 3.1.24 HS2 Ltd suggests that *"The Aldersey location requires a relatively more complex engineering solution particularly with additional possession requirements required on the WCML to build the crossovers."* However, nowhere does it say how many possessions will be required and why this would be a problem given the 4-year construction period that is available to HS2 Ltd to build the Railhead/IMB-R.
- ^{3.1.25} Furthermore, whilst the Parish Councils recognise that the WCML is a busier railway than the Norton Bridge to Stone railway, we already know from the contents of the paragraph 14.4.29 of the CA3 Community Area report that HS2 Ltd will require *"six weekend possessions of up to 54 hours"* to build the Stone railhead and the Filly Brook (now Norton Bridge to Stone Railway) Viaduct.



3.1.26 Whilst the Parish Councils also acknowledge that their proposals for Aldersey's Rough will require some possessions on the WCML, we consider these to be more straightforward than at Stone, especially if the Parish Councils optimal design ideas were adopted instead of HS2 Ltd's flawed Option 9.5 alternative. These possessions could also be timed to coincide with the possessions that HS2 Ltd will require to construct the River Lea viaduct at the same location.

Internal haul movements

- 3.1.27 It is interesting to note that HS2 Ltd believe that Aldersey's Rough will result in fewer internal haul movements, but a greater level of imports. However, it provides no further information in its Sift analysis to justify this conclusion.
- In the absence of any evidence to substantiate its claim, it can only be assumed by the Parish Councils that HS2 Ltd's sub-optimal Option 9.5 design requires more fill (for the construction of embankments), than cut. However, as explained previously, the Parish Councils believe that some of the need for embankments (notably for the HS2 connection line) can be reduced, and given the apparent imbalance between the cut and fill calculations, there is clearly an opportunity to value engineer the Aldersey's Rough design to achieve the best engineering outcomes.
- 3.1.29 It is also important to note that, since HS2 Ltd has designed the Stone Railhead/IMB-R without any ground investigation information, it really does not know how suitable the in-situ excavated material will be for use as engineering fill, and therefore how much good quality engineering fill will need to be imported, and waste excavated material exported, or appropriately disposed of on site.
- Another important factor is that since the Sift analysis was produced, HS2 Ltd as decided to amend its design of the Filly Brook and Norton Bridge to Stone Railway crossings at Stone, with the result that it is replacing a large viaduct structure with embankments. In so doing it has acknowledged that this will increase the amount of imported fill (paragraph SES/APES CA3 Community Area report dated 23 March 2018), but has neglected to say by how much. However, it is estimated that the extra demand for fill to achieve this could amount to 160,000 m³. If this has to be imported, it would add 64,000 HGV movements to the Stone proposals, 50% of which would need to use Yarnfield Lane.

Additional HGV movements

- HS2 Ltd has stated with respect to this criterion, as well as in paragraph 8.5.4 of the main Sift report, that Aldersey's Rough would create an additional 160,000 HGV movements. Translating this number into bulk HGV haulage numbers suggests that HS2 Ltd is predicting that an additional 800,000 m³ of material would need to be imported to Aldersey's Rough to construct the Railhead/IMB-R, compared to Stone. This is a very high number that does seem to not fit with the design information provided in the Sift analysis, including the Appendix G drawing that illustrates Option 9.5.
- ^{3.1.32} In the absence of evidence, and indeed a full road transportation logistics profile for both option sites, little credence should be given to HS2 Ltd's claims regarding cut and fill and import and export quantities.

Summary regarding complexity of construction

3.1.33 HS2 Ltd has concluded that in comparison to Stone, Aldersey's Rough would be neutral in the context of the complexity of construction criteria. In coming to this conclusion, not only has it provided no substantive evidence, but it has omitted to mention the very important point that the individual construction activities at Stone will all be carried out within a highly constrained footprint located mainly between the M6 motorway and the HS2 mainline. The existing three important communication links (two roads and one railway) also constrain internal movement through the lateral construction corridor that is the Stone Railhead IMB-R. These issues also mean that a number of major construction activities have to be completed before others can commence, which adds programme and cost risk.



- In comparison, the main construction activities at Aldersey's Rough are geographically well separated and mostly not independent with one another. This makes the Aldersey's Rough Railhead/IMB-R far less complex to construct, with the consequence that the programme and cost overrun risks will be much less.
- 3.1.35 Given, all of the points above, it can only reasonably be concluded with respect to the construction complexity criteria that Aldersey's Rough represents a **major improvement** compared to Stone.

Construction programme

Once again HS2 Ltd understates the programme complexities associated with Stone, and the clear programme related advantages, which are discussed in the sub-section above. Rather than the neutral comparison rating that has been concluded by HS2 Ltd, it is clear that the Aldersey's Rough would represent a moderate to **major improvement** compared to Stone as various construction activities can be carried out mostly independent from each other, rather than most sequentially, which is the case at Stone.

Costs

- 3.1.37 HS2 Ltd refers to a cost difference of £38 million between Stone and Aldersey's Rough, but provides no evidence to support this claim, despite being asked to do so by the SRCG prior to the completion of the Sift analysis report. It is therefore not possible to provide a detailed assessment of the comparable costs.
- However, with respect to Stone, it would appear that HS2 Ltd is in denial about the amount of complex structures that need to be built at Stone, many of which are intertwined and interdependent in terms of HS2 Ltd's proposed construction programme. We also know that HS2 Ltd has stated on several occasions that it would still need to create new M6 motorway connections even if the Stone Railhead/IMB-R is not constructed. The Parish Councils have analysed this claim and dispute it because the amount of major internal site infrastructure, together with the accompanying size of temporary workforce, required would be substantially reduced if the Railhead/IMB-R was located elsewhere.
- ^{3.1.39} Furthermore, since the Norton Bridge to Stone Railway in particular, as well as the M6 motorway itself, represent major barriers to internal access through the site and external access from it, HS2 Ltd has needed to propose that expensive structures, which will take considerable time to construct, need to be built to achieve access.
- It is also important to note that the Parish Councils have derived a way in which the upgraded M6 emergency links could potentially be used to access/egress the remaining more limited construction sites, located to the north of the Norton Bridge to Stone Railway, from Yarnfield Lane without the cost of building new M6 connections, because of the inevitable reduction in HGV demand. This is discussed in more detail in Gordon Wilkinson's proof of evidence that has been prepared on behalf of the Parish Councils.
- Add to this the fact that the construction works located to the south of Eccleshall Road could potentially be supplied via an internal haul road from the Yarlet South Satellite Compound and Transfer node via the A34, and it is clear that, with some sensible value engineering, the additional costs that appear have been built into the cost comparison between the two sites by HS2 Ltd are no longer needed. The location of the various satellite compounds in the Stone area, relative to the local road network, are shown on Figure 3.1, together with how a haul road that emerges at Yarlet on the A34 could reduce traffic using these roads.
- Turning to the costs of building Aldersey's Rough, from the limited commentary that has been provided by HS2 Ltd in respect of its Option 9.5, it is apparent that its sub-optimal design will result in substantial additional costs. Although it is not possible to accurately cost these without being provided with HS2 Ltd's outline schedule of costs, we believe that the following structures which are summarised on Figure 3.2, have contributed to its differential cost calculations:



- Inclusion of additional lengths of slip roads and more complex design arrangements at Keele Services.
- Unnecessary headshunt arrangements and associated excavation on the stub Newcastle to Market Drayton line to the west of Madeley Chord junction.
- Assumption that Madeley Chord Junction overbridge will need to be replaced to create double track arrangement over the WCML, when new spurs can be created between the WCML up line and the Newcastle to Market Drayton Railway to the northeast of the overbridge.
- Inclusion of unnecessary flood defences as part of the upgrade of the existing northern chord to the WCML, which would not be necessary with the Parish Councils' design.
- Several minor watercourse diversions to create HS2 Ltd's sub-optimal design for the southern chord to the WCML.
- Creation of overly long HS2 connection sidings and headshunt due to sub-optimal design of crossover links to HS2 mainline, which results in greater impact on Whitmore Wood and the need for a higher retaining wall.
- The potential need to replace and demolish the existing Manor Road overbridge.
- A sub-optimal design for the HS2 mainline connection from the Railhead/IMB-R leading to greater requirement for embankments than is necessary and the resultant potential need for a 132kv OHL diversion or raising of the lines by the erection of replacement towers.
- An unnecessarily long access road from Three Mile Lane.
- The highly questionable assumption that 160,000 more HGV movements will be required for imports.
- 3.1.43 Outline amendments to HS2 Ltd's Option 9.5 design are shown in the annotated aerial photograph that is included as Figure 3.3. These include one alternative design option for achieving access to the M6 at Keele Services. Other alternative designs are described in the proof of evidence prepared by Gordon Wilkinson on behalf of the Parish Councils.
- 3.1.44 Alternative arrangements are also shown for connecting to the WCML, but further details are given in the proof of evidence prepared by Trevor Gould on behalf of the Parish Councils. It is also considered that a better engineering design for connecting the Aldersey's Rough Railhead/IMB-R to the HS2 mainline could be achieved, with reduced environmental impacts, but the detailed engineering design drawings would need to be provided by HS2 Ltd before these could be confirmed.
- 3.1.45 In addition to the above listed construction infrastructure, what also does not appear to have been taken into account is the reduced construction complexities that will accrue from Aldersey's Rough in comparison to Stone. In addition, and related to this point, it is clear that the reduced construction and programme risks should enable the assumed contingency elements to be reduced in respect of Aldersey's Rough.
- Another factor, which has not been accounted for is that Aldersey's Rough could be used to provide internal access to other HS2 mainline construction sites in the Whitmore Heath and potentially Madeley areas, which has the potential to reduce traffic on local roads and reduce the inevitable traffic congestion and risk of daily gridlock at M6 Junction 15. Figure 3.4 shows the location of Aldersey's Rough, with its access to the M6, relative to HS2 Ltd's road satellite compounds at Whitmore Heath and Madeley and how these could potentially be accessed by the use of internal access roads.
- 3.1.47 Given the body of evidence outlined above, the Parish Councils would expect an independent and impartial analysis of the comparative costs of construction to demonstrate that Aldersey's Rough would cost less to construct than the Stone site, especially when the latter without the Railhead/IMB-R is appropriately designed and costed.
- ^{3.1.48} In summary it is therefore concluded that with respect to the costs criteria, Alderseys Rough would be at least a **minor improvement** compared to Stone.



Safety

Although not previously discussed in this Sift analysis review, HS2 Ltd has stated, without any justification, suggests that some of the operations that it believes are required at Aldersey's Rough, are more risky than those that are required at Stone. Both sites require their construction workforce to work at height, and in close proximity to water and active railway lines and the only sensible conclusion regarding this criteria, is that the comparison rating should be **neutral**.

Overall rating

- 3.1.50 HS2 Ltd concludes its engineering option comparison matrix with an overall rating and concludes that Aldersey's Rough represents a major worsening compared to Stone.
- 3.1.51 The Parish Councils have done their own assessment based on their review throughout this report and the commentary provided in Section 3.1 and the results comparable results against each criteria are summarised in Table 3.1 below.
- The results are presented using the same key as that used by HS2 Ltd, i.e. three levels of worsening (i.e. major, moderate and minor), though neutral to three levels of improvement. However, rather than show these with different shades and symbols, they are shown here in simplified colours with the rating levels. A brief commentary is also provided to briefly highlight why the Parish Councils have reached different conclusions to HS2 Ltd.

Table 3.1Comparison of findings of Engineering Option Comparison Matrix relating to
Aldersey's Rough Railhead/IMB-R compared to Stone Railhead IMB-R

Appraisal Criteria	HS2 Ltd	Parish Councils	Commentary
Highways			
Bisect existing roads	Neutral	Major	Aldersey's Rough bisects no roads, whereas Stone bisects two important roads and an operations railway.
Disruption to highways	Minor	Major	Three Mile Lane has a fraction of the traffic compared to Yarnfield Lane, and no other local roads are affected at Aldersey's Rough.
Access to site	Moderate	Moderate	Access to the Stone construction compounds is difficult and involves multiple sites. Aldersey's Rough is much more straightforward and would require a singular access point.
Water and Flood Risk	Major	Moderate to Major	Stone involves constructing major embankments and bridge structures in a flood plain, whereas Aldersey's Rough effects are related to one existing chord to the WCML of minimum height, which is not required, whist the other represents a sub-optimal design.
Utilities	Moderate	Neutral	HS2 Ltd presents no evidence for the diversion needs, which are driven by sub-optimal design of Option 9.5, the need for which could be removed by value engineering.
Structures	Major	Moderate to Major	Multiple structures are required at Stone, but the need is much more limited at Aldersey's Rough.
Complexity of Construction	Neutral	Major	Stone is a very complex construction project with major activities interdependent and required to be undertaken within a small geographical footprint.
Programme	Neutral	Major	The complexity of the Stone design makes it much more vulnerable to programme risk.



Appraisal Criteria	HS2 Ltd	Parish Councils	Commentary
Costs	Moderate	Minor	Costs withheld from the Sift analysis, but the multiple complex structures and programme risks are likely to make Stone more expensive to build and operate.
Safety	Minor	Neutral	Safety risks are similar as both are construction sites.
OVERALL RATING	Minor	Moderate	Aldersey's Rough is a far simpler construction prospect with the key activities spread out across the site allowing them to be built independently.

- 3.1.53 It can be seen from Table 3.1 that there is no agreement between HS2 Ltd"s ratings and those presented by the Parish Councils. However, we consider that we have given full justification for our findings, despite HS2 Ltd having failed to disclose important design and cost information for the two options sites.
- 3.1.54 It is clear from the large body of evidence that we have presented that Aldersey's Rough represents a far better site to construct and operate a Railhead and IMB-R from than the existing HS2 Ltd preferred site at Stone.

3.2 Environmental matrix

^{3.2.1} Instead of undertaking a full analysis of the environmental matrix under the heading of each environmental topic, we have used the approach adopted in Table 3.1 to compare the findings of the Parish Councils against those assessed by HS2 Ltd. This is summarised in Table 3.2.

Table 3.2 Comparison of findings of Environmental Option Comparison Matrix relating to Aldersey's Rough Railhead/IMB-R compared to Stone Railhead IMB-R

Appraisal Criteria	HS2 Ltd	Parish Councils	Commentary
Landscape	Major	Minor	The landscape character sensitivity of the Aldersey's Rough site is exaggerated and in practice the Railhead/IMB-R footprint will be similar to Stone.
Visual	Major	Major	The Aldersey's Rough site is well screened by topography and vegetation from all settlements, whereas the Stone site will be elevated above the M6.
Cultural Heritage	Minor	Minor	HS2 Ltd confirms that Stone will result in significant adverse effects at Darlaston Park, and yet cites the setting of a listed building at Stoney Low farm with no view of the development, as an adverse effect.
Biodiversity	Major	Neutral	An accurate comparison of the two sites would require an optimal design of Aldersey's Rough to be available. In reality both developments will affect habitats and local wildlife sites. The HS2 mainline already adversely affects Whitmore Wood Ancient Wood, and the part of Hey Sprink that would potentially be affected by Aldersey's Rough mainly comprises coniferous plantation.
Water and Flood Risk	Major	Moderate to Major	As per the Engineering matrix (see Table 3.1).
Air quality	Minor	Neutral	No substantive evidence presented by HS2 Ltd to support its conclusion which is based on conjecture. The more remote location



Appraisal Criteria	HS2 Ltd	Parish Councils	Commentary
			of Aldersey's Rough should be a significant factor, but a safe conclusion without evidence is no difference.
Sound and vibration	Minor	Moderate	Again no evidence and only conjecture provide by HS2 Ltd, but the proximity of a new 500 property housing estate at Walton Hill to the Norton Bridge to Stone Railway sidings and use by materials supply trains overnight could be a significant noise and vibration problem. In contrast Aldersey's Rough is remotely located from settlements.
Community integrity	Minor	Major	A very odd assessment by HS2 Ltd. The Stone Railhead will cause major disruption, especially for the 2200 strong community of Yarnfield, and its major community facilities, notably the Yarnfield Park Conference Centre, Stone Dominoes FC, Springfield Primary School etc. Conversely Aldersey's Rough is remotely located with only a handful of isolated properties affected.
Transport accessibility/ severance	Minor	Major	Incomprehensible assessment from HS2 Ltd, as the Stone site effectively severs and then disrupts two important roads, most notably Yarnfield Lane for a period of 4 years, would cause serious congestion on the A34 in Stone and could lead to serious constraints to the future local rail network once Phase 2a opens.
Health and well-being	Neutral	Major	The Stone Railhead/IMB-R will negatively impact large numbers of people in Stone and Yarnfield from increased traffic, with Aldersey's Rough being so remote from settlements that few people will be adversely affected.
Socio-economics	Minor	Major	Stone will have significant adverse effects on the people who live and work in Stone and Yarnfield and their ability to get to work. The Yarnfield Park Conference Centre and other local businesses will be impacted.
Agriculture, soil and land use	Moderate	Moderate	HS2 Ltd concludes a moderate improvement compared to Stone.
Land quality	Minor	Moderate	HS2 Ltd concludes a minor improvement compared to Stone, because of the presence of historic landfills at Stone which will need to be dealt with. With only minor contamination likely to be associated with the former Newcastle to Market Drayton Railway the difference is likely to be greater.
Waste material and resources	Neutral	Major	HS2 Ltd has acknowledged that there will be less excavation than Stone given its Option 9.5 design, and with more contamination present from landfill, and the likelihood of substantial volumes of geotechnically unsuitable material at Stone, Aldersey's Rough must be an improvement.
Committed development	Neutral	Major	There are no committed developments in the vicinity of Aldersey's Rough, but 500 houses are being constructed at Walton Hill immediately adjacent to the Stone Railhead/ IMB-R sidings of the Norton Bridge to Stone Railway.
Planning policy	Moderate	Neutral	Both sites are located in the Green Belt.
OVERALL RATING	Moderate	Moderate	Aldersey's Rough is an outstanding site from an environmental perspective compared to Stone because of its remote location.

The HS2 Ltd comparison of environmental topics grossly exaggerates the negative environmental effects of its version (Option 9.5) of Aldersey's Rough to such extent that it simply demonstrates its inability to undertake an impartial assessment of the facts. This will become evident to anyone who visits the two sites and compares the two development proposal, especially once HS2 Ltd's sub-optimal design elements are value engineered and



replaced by more practical proposals from an engineering perspective that will both reduce costs and the environmental effects of the proposals.

In conclusion, it is clear from the summary assessment that the Parish Councils have carried out with regard to the environmental effects that Aldersey's Rough represents a **moderate improvement** on Stone overall and therefore the far better site at which to construct and operate a Railhead and IMB-R from an environmental perspective.

4. Appendix H: Maintenance Aspects of Phase 2a Railhead/ IMB-R Sift

- 4.1.1 The maintenance aspects of the Phase 2a Railhead/IMB-R are the subject of a separate HS2 Ltd report, which is contained in Appendix H of the Sift analysis, as Revision 1b dated 18 September 2017.
- 4.2 Section 1: Introduction
- 4.2.1 The basis of the assessment of maintenance aspects is set out in section 1.3 of the report.

Section 1.3: Basis of Assessment

Options

- ^{4.2.2} In paragraph 1.3.1 it refers to three potential IMB-R locations, i.e. at Stone (221km), Aldersey's Rough (234km) and Crewe Basford Hall (247km). However, since Crewe is no longer a viable option, due a lack of land availability, only the Stone and Aldersey's Rough options will be considered further in this review of the Sift analysis.
- 4.2.3 Consideration will also be given to the relevance of the maintenance loops at Pipe Ridware (193km), which have the ability to stable engineering trains and *'On-track Machines'* (OTMs) between shifts.

Assumptions

- 4.2.4 Paragraph 1.3.4 sets out the key assumptions that HS2 Ltd has used in its assessment. Those assumptions that are particularly important to the Parish Councils' review include the following:
 - "Phase 2a will be constructed using slab track form.
 - Main Maintenance periods will be available from 00:00 to 04:59 Monday to Saturday (with an extended period from 00:00 to 07:59 available on Sundays).
 - Preferred minimum working time on site is 3 hours.
 - Maximum length of engineering trains operating on HS2 main lines will be approximately 800m for a ballasted track-form (high-output track renewal trains); 300m for a slab track-form (long welded rail (LWR) delivery trains)."
- 4.2.5 Another important assumption is contained in paragraph 1.3.5, which confirms that *"It is HS2's intention to procure a fleet of OTMs with a maximum transit speed of at least 120km/hr. These are assumed to have an average end-to-end journey speed of approximately 100 km/hr, including an allowance for acceleration and braking. This is a change to the assumptions used in earlier maintenance documents."* This will be important in calculating how quickly maintenance trains can travel between the two principal IMB-R option sites at Stone and Aldersey's Rough and the far ends of the HS2 mainline requiring maintenance.
- 4.2.6 Paragraph 1.3.6 also includes an important statement regarding the supply to the IMB-Rs and states that "The opportunity for the potential use of Network Rail (NR) facilities, such as the yard at Crewe Basford Hall, to stable trains and plan delivery to HS2 infrastructure on a "just-



in-time" basis for the start of the maintenance period, has not been included in this analysis. Further work is required to fully consider the potential impacts and risks."

4.3 Section 3: Potential Phase 2a IMB-R Location

Section 3.2: Stone

- 4.3.1 It is of note that the report identifies a number of constraints that apply to Stone. The first of these is that there a number of gradients within the site. However, the impact of these is not considered further. Indeed no details have been provided in the Community Area report.
- 4.3.2 It is acknowledged in paragraph 3.2.4 that *"It is not possible to include any 800m length sidings* within the site. A number of shorter sidings have been included and, if support of a ballasted track-form is required on Phase 2b (West), the long length renewal trains will need to be moved in sections from these sidings and assembled in the loop prior to dispatch."
- 4.3.3 Paragraph 3.2.5 then states that *"This is not a significant issue as train assembly can be achieved prior to the start of the maintenance periods with the provision of suitable safe areas alongside the loop."* The Parish Councils are of the opinion that despite HS2 Ltd's apparent relaxed attitude to this issue, it does represent a significant constraint to the efficient operation of the Stone IMB-R that will take up valuable time within the available overnight maintenance period if ballast trains are required, a position that has been confirmed by HS2 Ltd with respect to the trackbed form to be used on Phase 2b West (Crewe to Manchester). There is also the possibility the ballasted track could be used on Phase 2a, if the design and build contractors prefer it.
- 4.3.4 The need to assemble 800m long trains in the loop constructed alongside the western side of the HS2 mainline also seems to be an important factor in HS2 Ltd's change to its design immediately adjacent to the Stone IMB-R, which formed part of its SES/APES submission of 23 March 2018. The change now means that both the southbound and northbound links from the Stone IMB-R will join the mainline on the Yarnfield North Embankment, whereas previously the northbound connection was onto the now replaced Filly Brook Viaduct.
- 4.3.5 Notwithstanding the above, not being able to accommodate 800m ballast trains with the IMB-R, but instead needing two trains to be assembled in the loop the lies adjacent to the HS2 mainline in an elevated position, must be considered to be sub-optimal and much less practicable than stabling 800m long trains in the IMB-R sidings.
- In paragraph 3.2.6, it is stated that rail connections to Network Rail's infrastructure are available in both directions. However, this can only be achieved by undertaking conflicting moves when accessing or egressing the Norton Bridge to Stone Railway (an intensively used operational railway) via the proposed sidings that connect to the Stone IMB-R. Once again this is a time consuming manoeuvre that must be considered a constraint and sub-optimal, rather than something that can be achieved *'without delay'* as is claimed by HS2 Ltd here. This is discussed in more detail in Trevor Gould's proof of evidence.

Section 3.3: Aldersey's Rough

- ^{4.3.7} In paragraph 3.3.3, HS2 Ltd identifies two constraints that it believes apply to Aldersey Rough. However, both of these are entirely of HS2 Ltd's making given its design of Option 9.5.
- ^{4.3.8} The first relates to the idea that the 800+m long headshunt that it has designed to be located adjacent to the HS2 mainline needs a crossover to be located 4.7km further north. This is incorrect, and once again it is due to HS2 Ltd producing a sub-optimal design for the sidings and headshunt that would connect from Aldersey's Rough to the HS2 mainline.
- Evidence for this can be seen in the Figure 2 access configuration and the way in which the connections are made to the HS2 up (southbound) mainline. This arrangement could shorten the total length of the sidings/headshunt and effectively move them 160m further away from the northern portal of the Whitmore Tunnel. This change can be made because, unlike Stone,



with its loops, there is no need to stable 800m long ballast trains next to the HS2 mainline because these trains can simply wait in the Aldersey's Rough IMB-R fully assembled before moving out onto the HS2 mainline.

- 4.3.10 The gradient in this headshunt is only 0.352, compared to 0.82 at the loops adjacent to the mainline at Stone, so receiving and despatching trains from Aldersey's Rough is safer than at the Stone Railhead/IMB-R, especially as the Stone operations would require ballast trains not only to be stabled, but also to be assembled and disassembled on this steeper gradient, which Aldersey's Rough does not.
- 4.3.11 With respect to southbound trains, these can simply join the mainline as shown with no need to be held in the headshunt at all. As for northbound trains, which is the proposed destination for ballast trains (i.e. to maintain Phase 2b), although these trains would need to move into the headshunt for a short period before joining the up line to travel north, this is simply for manoeuvring and not for stabling and therefore they would be able to avoid any conflicts with southbound maintenance trains.
- ^{4.3.12} In terms of the location of the northbound aligned connection from the up line to the down line, we cannot see any reason why this could not be accommodated, with minimum impact on the HS2 mainline, between the River Lea Viaduct and Madeley Tunnel, on the Lea North Embankment.
- 4.3.13 There is also the possibility of relocating the headshunt to the southwest side of the HS2 mainline, which would give direct access to the northbound (down) line of HS2 and removes the necessity for the crossover north of Madeley Tunnel. This option also reduces the impact on Whitmore Wood ancient woodland and removes any conflicting moves with maintenance trains accessing the HS2 up line. Examination of the detail drawings is required to progress this idea further.
- ^{4.3.14} This arrangement would also provide a further value engineering opportunity with respect to the connecting line from Aldersey's Rough to the HS2 mainline to be lowered to the extent that there is no longer any need to divert the 132kv OHL or affect any other major structures, thereby reducing the cost.
- 4.3.15 The second apparent constraint, according to HS2 Ltd, is that *"Branch lines are required from both the HS2 and NRCI mainlines that will only be used by infrastructure maintenance traffic."* Although we cannot see why this is a problem, not least because this is the arrangement at the Calvert IMD on Phase 1.
- Furthermore, the Parish Councils' design would ensure much better and direct connection with the WCML so that the reopening of the Newcastle to Market Drayton Railway between Madeley Chord Junction and Aldersey's Rough could become the first step of a plan that could involve reopening this line to the north of the IMB-R to connect the network back to the villages of Keele and Silverdale, together with the town of Newcastle-under-Lyme itself.

4.4 Section 4: Assessment of Phase 2a Site Time

Section 4.1: Transit Times

Introduction

- Figure 4 in the report (at section 4 of Appendix H) (which is reproduced as Figure 4.2 in this report) shows the position of the key locations along the HS2 Phase 2a and Phase 2b mainline, including the relative location of Stone (221km) and Aldersey's Rough (234km) IMB-Rs to the Phase 2a southern boundary (188.25km), Hoo Green Junction on Phase 2b (277km) and two separate Phase 2b end points at Lily Lane (301.5km) on the Golborne branch, and Manchester Piccadilly (304.7km).
- 4.4.2 Figure 4 (Figure 4.2 of this report) includes transit times, which are based on the average speed of maintenance trains of 100km/h, which is reported by HS2 Ltd in paragraph 1.3.5 of



its maintenance report. However, these transit times do not align with the details provided in Table 1 on the same page, especially with respect to the southwards transit.

^{4.4.3} To address this issue, we have calculated the transit times between the Stone and Aldersey's Rough IMB-Rs and the southern and northern ends of the railway and this information is presented in Table 4.1 below.

Table 4.1	Summary of Transit Times from the Stone and Aldersey's Rough IMB-Rs to key
	Phase 2a and Phase 2b destinations

Location	Phase	Chainage (km)	Relative Distance (km)	Transit times (mins)	Minimum Working Time from (Hrs/mins)	
			Stone/AR	Stone/AR	Stone	Aldersey's Rough
Manchester Piccadilly	2b	305	84	50.4/42.6	3h 20m	3h 35m
Lily Lane (Golborne)	2b	302	81	48.6/40.8	3h 23m	3h 39m
Hoo Green Junction	2b	277	56	33.6/25.8	3h 53m	4h.8m
2a/2b Boundary at Basford	2b/2a	247	26	15.6/7.8	4h 29m	4h 44m
Aldersey's Rough IMB-R	2a	234	13	7.8/7.8	n/a	n/a
Stone IMB-R	2a	221	13	7.8/7.8	n/a	n/a
Pipe Ridware (loops)	2a	193	28	16.8/24.6	4h 24m	4h 12m
1/2a Boundary at Fradley	2a/1	188	33	19.8/27.6	4h 21m	4h 5m
Delta Junction	1	163	58	34.8/42.6	3h 50m	3h 35m
Washwood Heath RSD	1	n/a	78	47.0/54.8	3h 26m	3h 10m

Southwards Transit

- 4.4.4 It is evident from Table 4.1 above and HS2 Ltd's Figure 4 (Figure 4.2 of this report) that, based on the average maintenance train speed of 100km/h, a maintenance train leaving the Stone IMB-R would take only 19.6 minutes to reach the southern Phase 2a boundary at Fradley (188km). Accordingly this should amount to a minimum working time of 4 hours and 21 minutes and not the 3 hours 40 minutes stated by HS2 Ltd in its Table 1. Notwithstanding this, it is appreciated that it might take a few minutes for maintenance trains to join the HS2 mainline from the marshalling yards at the Stone IMB-R, although this is more of an issue for northbound trains, than those needing to travel to the southern boundary.
- ^{4.4.5} Using the same method of calculation, it will take only an additional 7.8 minutes for a maintenance train based at Aldersey's Rough to reach the same destination, i.e. the Phase 2a southern boundary at Fradley, i.e. a transit time of 27.4 minutes in each direction. Based on this, it is clear that the total working time for Aldersey's Rough based maintenance teams would be 4 hours and 5 minutes out of a 5 hour window and not the 3 hours 0 minutes stated by HS2 Ltd in its Table 1.
- ^{4.4.6} In terms of an overall maintenance strategy across all phases of HS2, these details are set out in HS2 Ltd's Information Paper *'F3: Infrastructure Maintenance and Rail Systems Construction Facilities'.* Specifically, it refers to the need for the Phase 2a IMB-R to fulfil the *'system wide'* requirements alongside the maintenance facilities provided in Phase 1.



- 4.4.7 The system wide needs of Phase 1 and the western leg of HS2 (Phase 2a and Phase 2b West) are shown on Figure 1 of the F3 report, which is reproduced with some additional annotations in this report as Figure 4.3. This effectively divides the network into two halves with each major maintenance facility (Calvert IMD and the Phase 2a IMB-R) covering a distance of 151km or more. In the case of Calvert IMD, it would maintain all of the southern half of Phase 1, and as far as Washwood Heath at 171km. In practice it makes no sense to not maintain the Phase 1 railway from Calvert IMD at least as far as Curzon Street Station (176km), since it is within range to achieve a minimum 3 hour long maintenance window. Indeed, until Phase 2a opens in 2027, the Calvert IMD would have to maintain all of Phase 1 as far at Fradley 188km, as well as the Handsacre link.
- At a distance of 108km, and using an average maintenance train speed of 100km/hour, it would take maintenance trains from Calvert 64.8 minutes to travel to Fradley, meaning that the minimum working time would be under the 3 hours minimum working time target of HS2. However, since Fradley is just 33 km from Stone and 46km from Aldersey's Rough it would make sense to have the northern part of Phase 1 maintained from the Phase 2 IMB-R once Phase 2a opens.
- 4.4.9 With this in mind, we have suggested that it makes sense for the southern limit of the Phase 2a maintenance requirement to move as far south as the Delta Junction at 163km. This point is 83km from Calvert, but only 71km from Aldersey's Rough and therefore well within its range to achieve the minimum maintenance period of 3 hours. Indeed, as can be seen from Table 4.1 above, maintenance trains based at Aldersey's Rough could reach Delta Junction in 42.6 minutes and therefore achieve a minimum working time of 3 hours 35 minutes, which is same amount of time as could be achieved by Aldersey's Rough when maintaining Phase 2b to the termination point at Manchester Piccadilly, and 15 minutes more than Stone could achieve to the same destination, which is the farthest point north on Phase 2b West.
- Throughout the main Sift analysis report ('C862 Strategic Evaluation of railhead and IMB-R Locations –post CP3 design' report), which was reviewed by the SRCG in Section 2 of this report, it has been suggested that maintenance loops are required in combination with Aldersey's Rough IMB-R, because there would be insufficient working time. Indeed paragraph 4.4.1 of the aforementioned report states confirms that 3 hours "...is the minimum working time on site based on the currently envisaged time required to complete the typical maintenance activities."
- 4.4.11 Paragraph 4.4.2 of that same report then concludes that "Therefore, locating the IMB-R at Aldersey's Rough would require the installation of maintenance loops at Pipe Ridware." However, given the evidence that has been outlined above, this is incorrect. Moreover, the actual minimum working time at the southern boundary of Phase 2a is a whole 1 hour 5 minutes longer than the minimum period required and 35 minutes longer even if the railway to be maintained was moved as far south as Delta Junction on Phase 1. Therefore, even if it took a few minutes to access the HS2 mainline at Aldersey's Rough, this would not represent a problem, and there is simply no need for maintenance loops to be installed at Pipe Ridware to support the use of Aldersey's Rough.
- Bizarrely paragraph 4.4.1 of the main Sift analysis also states in the opening sentence that "The distance between the Stone IMB-R to the northernmost maintenance facility of Phase One (Washwood Heath RSD) is 78.3km. Why the Washwood Heath facility is relevant to the debate is difficult to fathom, because as a Rolling Stock Depot (RSD), its role is to maintain HS2 trains and not the railway. In addition, and as mentioned above, the Phase 1 infrastructure facility is at Calvert IMD, and it can clearly maintain all of the Phase 1 railway as far as both Calvert and Curzon Street.
- 4.4.13 Although Washwood Heath RSD has no relevance to the calculation of transit times, it is possible that HS2 Ltd has mistakenly used it in its calculations over minimum maintenance time in its Table 1 Phase 2a Transit Times. However, even when it is factored into the calculations (see Table 4.1 above), it is clear that the transit times from Aldersey's Rough is



still less than 55 minutes in each direction, meaning that there would still be sufficient minimum working time to exceed HS2 Ltd's stated 3 hour minimum.

4.4.14 Given the above, it must be concluded that the installation of maintenance loops is not required under any circumstances to support the operation of an IMB-R located at Aldersey's Rough.

Northwards Transit

- Table 4.1 also below provides details regarding transit times for the Northwards Transit, which includes the maintenance. In this case it is clear that HS2 Ltd's calculation in respect of transit time between the Stone IMB-R and Manchester Piccadilly is accurate; giving a minimum working time of 3 hours and 20 minutes. With respect to Aldersey's Rough, we calculate that the minimum working time would be 3 hours 35 minutes and not 3 hours 50 minutes.
- 4.4.16 Notwithstanding the above, we believe that a more important consideration is to look at the amount of HS2 mainline railway that needs to be maintained along the northwards transit, and then compare it to the southwards transit. The details are summarised in Table 4.2 below.

Table 4.2Length of HS2 mainline railway by type to be maintained from Stone and
Aldersey's Rough IMB-Rs

Transit		Stone IM	Stone IMB-R (km)			Aldersey's Rough IMB-R (km)			
	Slab	Ballast	Total	%	Slab	Ballast	Total	%	
Southern maintenance limit at Fradley (188km)									
South Transit	33	0	33	28.4	46	0	46	39.7	
North Transit	29	54	83.0	71.6	16	54	70	60.3	
Total	62	54	116	100.0	62	54	116	100.0	
Southern maintenance limit at Delta Junction (163km)									
South Transit	58	0	58	41.1	71	0	71	50.4	
North Transit	29	54	83.0	58.9	16	54	70	49.6	
Total	87	54	141.0	100.0	87	54	141	100.0	

4.4.17 Table 4.2 shows that once Phase 2b opens, each Phase 2a IMB-R option would need to maintain approximately 116km of HS2 mainline railway, as well as the Crewe South Network Rail connection, if the southern maintenance boundary was decided to be Fradley (188km). In the case of Stone, it is evident that only 33km (28.4%) of HS2 mainline railway is located on the southwards transit, compared to 83km (71.6%), that lies on the northwards transit. Alternatively, if the southern maintenance boundary was moved to Delta junction (163km), then each Phase 2a IMB-R option would need to maintain approximately 141km of HS2 mainline railway. Under this scenario, the amount of railway in the southwards transit would increase to 58km (41.4%) with the northwards distance remaining the same (83km), but this would now represent 58.6% of the railway to be maintained.

4.4.18 Conversely, when the maintenance requirements are considered in terms of Aldersey's Rough, which is located 13km further north than Stone, it can be seen that in the first scenario (i.e. southern maintenance boundary at Fradley) the southwards/ northwards split would be



39.7%/60.3% and in the second (i.e. southern maintenance boundary at Delta Junction) the split would be 50.4%/49.6%.

- 4.4.19 It is therefore difficult to understand how HS2, or anyone else could conclude that the Stone IMB-R has a central position, when in fact it is clearly Aldersey's Rough that is much more centrally located in the context of maintaining the Phase 2a/Phase 2b (West) railway-whether the southern maintenance boundary was at Fradley or Delta Junction.
- It also important to note that since the northwards transit for both IMB-R options primarily comprises the Phase 2b mainline, which predominantly to be constructed using ballasted track that is generally accepted to require more maintenance than slab track, it has to be concluded that the balance of need for maintenance work is even more in favour for the northwards transit. If one then factors in that the Stone IMB-R marshalling sidings cannot accommodate 800m long ballast trains, without having to take additional time to put them together in the adjacent loop, whilst Aldersey's Rough would potentially have long enough sidings to stable 800m long ballast trains within the site, it is clear that locating the IMB-R at Aldersey's Rough is the far better option from an locational and practical operational maintenance perspective.
- 4.4.21 Given the above, HS2 Ltd is not giving the full story when it states in its formal response to the Stone Town Council and Chebsey Parish Council petition response dated 15 March 2018, which it repeats in the responses to the petitions of Sir Bill Cash MP and Jeremy Lefroy MP, that "Once all phases of HS2 are complete (with the route from Crewe extended to Manchester and Golborne), the location near Stone would be well positioned between the northern ends of this western leg and the maintenance facilities proposed for Phase 1 of HS2, to fulfil the 'system wide' maintenance requirements." This is because Aldersey's Rough is much more centrally located than Stone, when it comes to maintaining HS2 Ltd's Phase 2a and 2b.

Section 4.2: Number of Departures/Arrivals per Shift

- ^{4.4.22} In paragraph 4.2.1, HS2 states that "Based on a high-level assessment of the activity level it is anticipated that no more than two trains per day (on average) are likely to depart an IMB-R in the same direction, irrespective of the proposed IMB-R location."
- The Parish Councils cannot accept this statement as it defies all logic, and HS2 Ltd has provide no evidence to back it up. During its meetings with HS2 Ltd's engineering teams something similar was claimed on the basis that the HS2 mainline would be a new railway. However, it will only be new for a limited period of time, and since it is proposed to take the highest loading of any railway that has been constructed in the world, i.e. 60 million tonnes per km per annum, it is reasonable to assume that it will need more maintenance than any railway in the world.
- 4.4.24 Furthermore, with just under half (46.6%) of the railway to be maintained estimated to comprise ballasted track, with all of this located on the northward transit for both IMB-R options, it is clear that it will not be too long before the need for maintenance trains leaving the IMB-Rs will exceed the two per day predicted by HS2 Ltd, even if its number is correct before Phase 2b has opened. Indeed, because Stone cannot stable full length (800m) ballast trains from the outset, and will need to assemble the two halves in its adjacent loop, then it will be at HS2 Ltd's predicted number of trains in each direction, soon after Phase 2b opens in 2033 (again, assuming, for which there is no evidence, that HS2 Ltd's number was correct to begin with).
- HS2 Ltd concludes this section with the statement that it "...is not envisaged to cause a significant constraint at any of the three identified options for location of the IMB-R (Stone, Aldersey's Rough and Crewe)." The Parish Councils cannot accept the validity of this because HS2 Ltd simply does not know how much maintenance will be required going forward. In addition, given the additional distance that Stone is from the higher maintenance HS2 Phase 2b, together with its inability to be able to stable 800m long maintenance trains, as well as its more convoluted headshunt and connection arrangements to the HS2 mainline, it must be



concluded that it is more constrained than Aldersey's Rough in this respect, especially once the sub-optimal design proposals of HS2 Ltd's Option 9.5 are rectified.

Section 4.3: Alternative Scenarios

In our review outlined above, we have comprehensively demonstrated that there is no need to combine Aldersey's Rough with a loop at Pipe Ridware and that there is no need to consider alternative scenarios at this stage. However, carrying out certain maintenance operations at the furthest ends of the Phase 2a or 2b mainline railways, or using faster maintenance trains, would clearly extend the maintenance window for both IMB-R options.

4.5 Section 5: Use of Slab Track

Section 5.1: Introduction

4.5.1 Paragraph 5.1.2 confirms that HS2's latest position is that the assumption is that both Phase 1 and Phase 2a will use slab-track form throughout, with Phase 2b, being based on ballasted track-form, other than within bored tunnels or at terminus stations. In terms of Phase 2b (West), the details provided in paragraph 5.1.3 suggests this amounts to 54km of railway, or 108km of track. This is the assumption that has also been used in this review of the Sift analysis, although it is understood that in practice, the positions could change, especially when the JV contractors who will be responsible for building HS2 Ltd have completed their detailed designs.

Section 5.2: Impact on Maintenance Activities

^{4.5.2} This section provides some brief details of the generally reduced maintenance requirements associated with slab track-form compared to ballasted track-form. The Parish Councils agree that maintenance will be less with slab track-form, although it should be noted that when maintenance is required, this is likely to be more complicated, time-consuming, expensive and disruptive to undertake.

Section 5.3: Impacts on Functional Requirements of Maintenance Facilities

- This section sets out the reduction in facilities that are required at an IMB-R if it is to maintain a slab-track form railway. However, in the context of Stone and Aldersey's Rough, the commentary is largely irrelevant given that both the IMB-Rs will be required to maintain Phase 2b, which it is assumed will use ballasted track.
- 4.5.4 Table 2 which is referenced from paragraph 5.3.6, sets out the differences in the requirements between a full IMB-R and that if slab track is adopted. The key differences relate to the lengths of sidings required and the availability of storage areas for ballast and spoil (1200 tonnes each). However, as mentioned previously, the proposed Stone IMB-R cannot accommodate 800m long sidings and is relying on coupling two shorter trains together on the nearby loop.

Section 5.4: Impact on Phase 2a

4.5.5 Paragraph 5.4.1 states that "Construction of Phase 2a using slab-track will enable the revised IMB-R specification indicated in Table 2 above to be broadly adopted for the selected site." However, this statement is then contradicted by the contents of paragraph 5.4.2, which says that "...the requirement for an 800m long siding will need to be retained unless sufficient suitable locations on NRCI can be identified to support future HS2 renewal requirements", which to the SRCG's knowledge has not. However, even if this achieved, it would still be suboptimal compared to having 800m long sidings available at the IMB-R, which only Aldersey's Rough could potentially achieve.

4.6 HS2 Ltd Conclusions

Section 6.1: Configuration

^{4.6.1} In paragraph 6.1.2 it is suggested that the site constraint at Stone, that will result in it needing to stabling two trains instead of one 800m long train and then assembling them on the loop



adjacent to the HS2 mainline, *"is not significant an issue"*. It is indeed a significant issue, not least because it will slow down the process of dispatching ballast trains, which over time as more maintenance is requires may become an increasing problem. This approach therefore must be seen as sub-optimal compared to the arrangements that could be provided at Aldersey's Rough.

- ^{4.6.2} The conclusion drawn in paragraph 6.1.3, which has not previously been mentioned in the body of the preceding text, is also incorrect and misleading in a number of respects. This is because in order to connect the Stone IMB-R to the Norton Bridge to Stone Railway, HS2 Ltd needs to construct at least 10km¹ of additional dedicated track, albeit the sidings from the Norton Bridge to Stone Railway, will be adopted by Network Rail.
- However, at Aldersey's Rough this amount of dedicated track would be considerably less, especially if HS2' Ltd's sub-optimal Option 9.5 design was subject to the Parish Councils' redesign ideas for connecting practically to the WCML and doing away with the HS2 Ltd's sub-optimal proposals for a headshunt on the disused stub end of the Newcastle to Market Drayton line to the west of Madeley Chord Junction. Indeed, the Parish Councils estimate that only just over 5km of new track would be required to connect successfully to the WCML, and less than 3km of HS2 track to connect to the HS2 mainline.
- 4.6.4 It is also worth noting that given the Parish Councils' idea to create a potential legacy railway that would in future have the potential to reconnect the WCML to Keele and Newcastle-under-Lyme, the responsibility for maintaining the connections to the WCML and the Newcastle to Market Drayton line would pass to Network Rail.
- It is also noted that in paragraph 6.1.6 it is stated that "No concerns have been identified with respect to the minimum site working time of 3 hours if the IMB-R is located at either Aldersey's Rough or Stone." Whilst the Parish Councils are delighted to see this admission, which we entirely agree with because it supports the comprehensive evidence that we have given on this subject above, it is a pity that this conclusion has not been acknowledged elsewhere in the Sift analysis, as well as in many misleading public statements that HS2 Ltd has made, including the numerous petitioners responses.

Section 6.3: Summary

- ^{4.6.6} Table 3, which represents the comparison summary table between the IMB-R options, makes interesting reading in a number of respects including:
 - Only Aldersey's Rough can fit 800m long sidings;
 - The red highlighting in respect of only Aldersey's Rough and Crewe (Basford Hall) is misleading, because as discussed above, the Stone IMB-R will need at least 10km of new connecting track (twice as much connecting railway as Aldersey's Rough) to make it function.
 - It is accepted that in respect of Aldersey's Rough, connections to M6 are available, despite HS2 Ltd repeatedly stating that this is not the case; and
 - With respect to the 'Reduction in Working Time' criteria, HS2 Ltd accepts that like Stone, Aldersey's Rough could operate within acceptable limits.



¹¹ The >10km estimate does not include the sidings and connections on the IMB-R platform, but does include the Norton Bridge to Stone sidings (initially 3 track and then double); the reception tracks and headshunt (double track); the north and soundbound connections to the HS2 mainline (single track), and the mainline loop that is required to assemble ballast trains and its connections to the HS2 mainline.

5. Appendix I: Aldersey's Rough Design Iteration Process

5.1 Section 1.1: Design requirements

- It is noted that the third bullet of paragraph 1.1.2 states that "Access to the WCML will be required on both directions and will be provided by using a connection to the Slow lines". Whilst the Parish Councils do not disagree with this aspiration, and this can certainly be achieved for northbound trains accessing the site and southbound trains leaving the site via the Madeley Chord Junction overbridge, the Parish Councils believe that the best approach for southbound trains to access the site and return northbound is to crossover the fast lines and access the Newcastle to Market Drayton line via two new spurs as shown on Figure 3.3. This design also represents an important component of providing a legacy railway connection beyond Aldersey's Rough.
- 5.1.2 Capacity will be available, once HS2 is open, for supply trains to use the southbound slow lines then cross to the fast lines, as most of the trains currently using the fast lines will be withdrawn in favour of trains on HS2. Aldersey's Rough can also receive supply trains overnight directly from the fast lines, as usage of those lines overnight is very low and capacity is not an issue.

5.2 Section 1.3: Option 3

- It is unclear exactly which iteration Option 3 is because HS2 Ltd does not provide any plans. However, it is assumed that it represents the extremely large Railhead/IMB-R footprint design that was presented to the SRCG on 27 June 2017, which was heavily criticised by the SRCG for being totally unrealistic and unacceptable. However, given the accompanying Image 1 appears to represent the same means of connecting to the HS2 mainline as Option 5, a commentary is provided on a number of the points made.
- ^{5.2.2} Paragraphs 1.3.2 to 1.3.4 refer to the need for crossovers to allow trains to access the HS2 up line in both directions. However, whilst these crossovers are needed the arrangement proposed by HS2 Ltd effectively unnecessarily increases the length of the HS2 reception sidings and headshunt. This is because 800m ballast long trains would only need to travel north to maintain Phase 2b and anything other than very short-term manoeuvring of such trains, i.e. in and then out of the headshunt is all that is required.
- ^{5.2.3} With respect to the points made in paragraph 1.3.5 and the gradient of the HS2 reception sidings/ headshunt needing to have a gradient of <0.2%, as mentioned above, The Parish Councils do not see why 800m long trains need to be parked here. However, since HS2 Ltd has not provided us with its to-scale engineering drawings it is very difficult to comment on the detail as to how further improvements can be made to the design. Notwithstanding this, everything should be done to consider how the 1.2m higher elevation of the reception tracks can be reduced or eliminated altogether, and its length reduced.
- 5.2.4 Paragraph 1.3.6 refers to the potential need to increase the height of the retaining wall between the two tracks (reception and HS2 up line) and increase the track interval from 7.5 to 13.5m) and the consequences of doing so. Paragraph 1.3.7 addresses this by increasing the gradient of the headhunt to 0.352%.
- 5.2.5 Paragraph 1.3.8 then refers to the perceived need to move the retaining wall laterally to the northeast by 12m and the additional impact that this would have on Whitmore Wood. However, the need for this should be reviewed in the context of the commentary provided above in order to optimise the design to reduce adverse engineering impacts, and the consequential environmental effects.



^{5.2.6} Paragraph 1.3.11 confirms why the HS2 connection track between the Railhead/IMB-R are raised 10m above the Newcastle to Market Drayton (Silverdale) line with the associated need for an embankment along most of its route, including through Hey Sprink. However, without being provided with the engineering details, including elevations and gradients it is difficult for the Parish Councils to comment and propose definitive solutions. Notwithstanding this we consider the design to be sub-optimal and request that the detailed engineering plans be provided for scrutiny by the Parish Councils' technical advisors.

5.3 Section 1.4: Option 4

5.3.1 We believe that Option 4 was the second completely unrealistic and unacceptable design that was presented to the SRCG on 27 June 2017, and therefore it is not worthy of comment.

5.4 Section 1.5: Option 5 (known as 9.5)

- It is noted from the first of the bullet points included in paragraph 1.5.3 that a third reception siding has been included on the western section of the stub end of Newcastle to Market Drayton Railway. However, this is not highlighted on the Option 9.5 drawing contained in Appendix G and the whole of this section of track between Madeley Chord Junction and the end of the reception sidings is also considered unnecessary given the Parish Councils' alternative proposals for accessing the WCML.
- ^{5.4.2} The addition of headshunt lines between Hey Sprink and Aldersey's Rough, with the consequential impact on the width of the embankment designed here, also need further scrutiny as to whether it represents the most appropriate design solution.
- ^{5.4.3} In paragraph 1.5.4 it is correctly identified that the changes made to produce Option 9.5 would add operational complexity and more shunting movements. This is one of the reasons why it is considered that these changes to be sub-optimal, a point that seems to be lost on HS2 Ltd, and should have prompted a rethink.

6. Summary of Missing Information

- ^{6.1.1} The Sift analysis omits to provide vital information that would enable the Aldersey's Rough Option 9.5 design to be fully assessed and the design improved upon. The key information that is missing relates to the detailed engineering layout and long-section/cross-section drawings with levels, based on Ordnance Survey background data for the overall scheme and at the following key locations:
 - Keele Services and the neighbouring Three Mile Lane;
 - Aldersey's Rough Railhead/IMR footprint;
 - Newcastle to Market Drayton Railway and parallel HS2 connection railway between Aldersey's Rough and Madeley Chord Junction and HS2 mainline;
 - WCML and Newcastle to Market Drayton Railway in the vicinity of Madeley Chord Junction, including connection spurs between the two.
- 6.1.2 In addition to the missing design information, HS2 Ltd has not provided cost information to enable verification of its stated cost differences between Stone and Aldersey's Rough options. The absence of a detailed comparison cost schedule therefore complete undermines the validity of the Sift analysis.
- ^{6.1.3} There are many other aspects of the Sift analysis where claims made by HS2 Ltd are unsubstantiated. This includes the excavated quantities relating to the various component parts of each development and the assumptions made. The provision of the information should include a detailed schedule of excavation and fill quantities, and should clearly



demonstrate the basis of the assumed import and export quantities for each option by the use of a transport logistics profile.

7. Conclusions and Recommendations

- The HS2 Ltd Sift analysis in respect of the Aldersey's Rough alternative to the proposed Stone Railhead/IMB-R should have given the company the opportunity to re-evaluate its proposals to select the best engineering, environmental and economic facility to undertake railway installation and commissioning works for the Phase 2a mainline railway, followed by the maintenance of both the Phase 2a and Phase 2b western section of the HS2 mainline between the West Midlands and Manchester Piccadilly, and the WCML connection at Golborne, near Wigan.
- 7.1.2 Unfortunately, HS2 Ltd has not taken this opportunity, with the result that its assessment of the two alternatives is flawed. It has therefore elected to underplay the clear problems with both building and operating the Stone Railhead/IMB-R, whilst exaggerating relatively minor issues associated with the Parish Councils' alternative at Aldersey's Rough.
- 7.1.3 In order to address this problem, this report as sought to undertake a comprehensive review of the engineering design and environmental assessments presented in respect of Stone, together with the limited design and cost information that HS2 Ltd has provided in respect of Aldersey's Rough. In so doing we have been able to comprehensively demonstrate that Aldersey's Rough is a much superior location at which to construct and operate a Railhead/IMB-R than Stone.
- 7.1.4 We therefore request that the evidence that the Parish Councils' have provided in this report be considered in detail by the High Speed Rail (West Midlands – Crewe) House of Commons Select Committee, together with the other evidence that will be presented on 25 April 2018, and accept our findings, and adopt Aldersey's Rough as the preferred location for locating the Railhead/IMB-R via Additional Provisioning.









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Slide 3

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Table 4.1Summary of Transit Times from the Stone and Aldersey's Rough IMB-Rs to
key Phase 2a and Phase 2b destinations

Location	Phase	Chainage (km)	RelativeDista nce (km)	Transit times (mins)	Minimum Working Time from (Hrs/mins	
			Stone/AR	Stone/AR	Stone	Aldersey's Rough
Manchester Piccadilly	2b	305	84	50.4/42.6	3h 20m	3h 35m
Lily Lane (Golborne)	2b	302	81	48.6/40.8	3h 23m	3h 39m
Hoo Green Junction	2b	277	56	33.6/25.8	3h 53m	4h.8m
2a/2b Boundary at Basford	2b/2a	247	26	15.6/7.8	4h 29m	4h 44m
Aldersey's Rough IMB-R	2a	234	13	7.8/7.8	n/a	n/a
Stone IMB-R	2a	221	13	7.8/7.8	n/a	n/a
Pipe Ridware (loops)	2a	193	28	16.8/24.6	4h 24m	4h 12m
1/2a Boundary at Fradley	2a/1	188	33	19.8/27.6	4h 21m	4h 5m
Delta Junction	1	163	58	34.8/42.6	3h 50m	3h 35m
Washwood Heath RSD	1	n/a	78	47.0/54.8	3h 26m	3h 10m

Table 4.2Length of HS2 mainline railway by type to be maintained
from Stone and Aldersey's Rough IMB-Rs

Transit	Stone IMB-R (km)			Aldersey's Rough IMB-R (km)				
	Slab	Ballast	Total	%	Slab	Ballast	Total	%
Southern maintenance limit at Fradley (188km)								
South Transit	33	0	33	28.4	46	0	46	39.7
North Transit	29	54	83.0	71.6	16	54	70	60.3
Total	62	54	116	100.0	62	54	116	100.0
Southern maintenance limit at Delta Junction (163km)								
South Transit	58	0	58	41.1	71	0	71	50.4
North Transit	29	54	83.0	58.9	16	54	70	49.6
Total	87	54	141.0	100.0	87	54	141	100.0

<mark>A43 (6)</mark>n 1.0

Table 3.1Comparison of findings of Engineering Option Comparison Matrix relating to
Aldersey's Rough Railhead/IMB-R compared to Stone Railhead IMB-R

Appraisal Criteria	HS2 Ltd	Parish Councils	Commentary
Highways			
Bisect existing roads	Neutral	Major	Aldersey's Rough bisects no roads, whereas Stone bisects two important roads and an operations railway.
Disruption to highways	Minor	Major	Three Mile Lane has a fraction of the traffic compared to Yarnfield Lane, and no other local roads are affected at Aldersey's Rough.
Access to site	Moderate	Moderate	Access to the Stone construction compounds is difficult and involves multiple sites. Aldersey's Rough is much more straightforward and would require a singular access point.
Water and Flood Risk	Major	Moderate to Major	Stone involves constructing major embankments and bridge structures in a flood plain, whereas Aldersey's Rough effects are related to one existing chord to the WCML of minimum height, which is not required, whist the other represents a sub-optimal design.
Utilities	Moderate	Neutral	HS2 Ltd presents no evidence for the diversion needs, which are driven by sub-optimal design of Option 9.5, the need for which could be removed by value engineering.
Structures	Major	Moderate to Major	Multiple structures are required at Stone, but the need is much more limited at Aldersey's Rough.
Complexity of Construction	Neutral	Major	Stone is a very complex construction project with major activities interdependent and required to be undertaken within a small geographical footprint.
Programme	Neutral	Major	The complexity of the Stone design makes it much more vulnerable to programme risk.
Costs	Moderate	Minor	Costs withheld from the Sift analysis, but the multiple complex structures and programme risks are likely to make Stone more expensive to build and operate.
Safety	Minor	Neutral	Safety risks are similar as both are construction sites.
OVERALL RATING	Minor	Moderate	Aldersey's Rough is a far simpler construction prospect with the key activities spread out across the site allowing them to be built independently.

Table 3.2 Comparison of findings of Environmental Option Comparison Matrix relating to Aldersey'sRough Railhead/IMB-R compared to Stone Railhead IMB-R

Appraisal Criteria	HS2 Ltd	Parish Councils
Landscape	Major	Minor
Visual	Major	Major
Cultural Heritage	Minor	Minor
Biodiversity	Major	Neutral
Water and Flood Risk	Major	Moderate to Major
Air quality	Minor	Neutral
Sound and vibration	Minor	Moderate
Community integrity	Minor	Major

Appraisal Criteria	HS2 Ltd	Parish Councils
Transport accessibility/ severance	Minor	Major
Health and well-being	Neutral	Major
Socio-economics	Minor	Major
Agriculture, soil and land use	Moderate	Moderate
Land quality	Minor	Moderate
Waste material and resources	Neutral	Major
Committed development	Neutral	Major
Planning policy	Moderate	Neutral

OVERALL RATING Moderate Moderate

To the Chair of the Select Committee

Contact Direct Dial E-Mail Our Ref Your Ref Date Leader of the Council 01785 619000 pfarrington@staffordbc.gov.uk PMMF/KJ

19 April 2018

Chair of the Parliamentary Select Committee

Stafford Borough Council has never supported a railhead / IMB-R being located in Stone for the delivery of HS2.

We acknowledge the very hard work that the Stone Railhead Crisis Group has done in presenting alternative proposals to the Select Committee and we share their concerns regarding the increase in traffic and significant disruption that the building and operation of the railhead will bring to our communities.

The Borough Council has petitioned to seek to ensure that everything is done to mitigate the impact to our communities if the railhead is to be sited in Stone.

Yours sincerely

Councillor Patrick Farrington Leader of the Council

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