



Rob Butler MP,
House of Commons,
London SW1A 1AA

Dear Rob,

Thank you for providing us with a copy of the HS2 Minister's response to your letter of 18th December regarding additional noise mitigation for Wendover.

While the DfT letter responds to the six points raised in our correspondence, it regrettably does not address the principal questions that you posed to the Minister on our behalf. This reinforces the view that we formed during the technical meetings on noise, that:

- Our expectation that HS2 train noise will be worse in Wendover than the community was led to believe during development of the Act was justified and ...
- It now seems unlikely that, if this turns out to be the case, the situation would be ameliorated in practice.

Our grounds for these points are given in the Annex to this letter.

We sought meaningful dialogue with HS2 and EKFB regarding the design and operation of the railway in our locality, including evaluation of the solutions that we proposed that would entail no additional cost to the project. In practice, the information we sought has been withheld and there is no indication that our proposed solutions will be considered. Indeed, at our Technical Meeting on 29 January, HS2/EKFB reconfirmed that they were not considering the mitigations we were proposing on the grounds that they did not need to.

We seek to get the best long term outcome for both HS2 and the community, but this is consistently thwarted by positions taken by HS2 which disable effective collaboration.

HS2's dogged determination to continue on their current trajectory will result in a sub-optimal solution for the high speed railway past Wendover. The resulting noise and visual blight is expected to reduce the value of property in the area, prompting claims under the Land Compensation Act 1973. As pointed out to the Parliamentary Select Committees, the value (in 2014) of properties thus affected was of the order of £1.1 billion, of which those houses located in areas expected to routinely experience night-time noise over 60dB from the trains was put at £175 million (Source: Christopher Pallet).

While settlement of compensation claims from the Public Purse may placate the current property owners, our concern is that a far smaller amount of money could be used to protect the entire community for the long term by establishing more appropriate mitigation from the outset.

We note that the only question answered directly by the Minister was the establishment of a meeting to facilitate discussion of the aquifer issues, for which we are grateful.

We also note that pump testing work is ongoing and that further consideration of the flood modelling assessment for South Aylesbury will follow. We would anticipate that the results from the testing will need analysis to determine the impact on the sizing of the flows to and from the Nash Lee attenuation ponds. This needs to be done to establish the increased flood risk prior to any Schedule 17 submission for South Aylesbury, or further downstream in North Aylesbury.

Finally, we note the Minister's hope that providing a forum "continues to build a healthy working relationship for all concerned". We share that lofty goal, but must point out that the relationship appeared to founder in 2019 when EK were apparently directed by HS2 not to discuss technical design progress with us. It has taken escalation to the Minister to restart the conversation though not, unfortunately, to cause HS2/EKFB to disclose any meaningful new information relating to noise in Wendover.

We believe that the Wendover HS2 Mitigation Action Group can provide significant value to the HS2 project, with our local experience, developed over the last 10 years, enabling early identification of and mitigation of risks that could extend the project's timescale and costs. We note that HS2 is not legally required to consult with us, but we believe that there would be significant mutual benefit in doing that.

We will provide a further update when all of the aquifer and flooding discussions have taken place. In the meantime, we would be grateful if you could press the HS2 Minister for further feedback about progress in evaluating our suggested mitigation options, which address both the noise and hydrogeology issues.

Yours sincerely,

Ron Petersen,
Chairman
Wendover HS2 Mitigation Action Group

Annex - HS2 Train Noise in the Wendover Area.

This document reviews the available evidence regarding the expected HS2 train noise impact on Wendover: it is divided into three sections covering

1. Why the train noise will be worse than expectations
2. How excess noise should be managed in the future
3. Managing excess noise at the outset

It identifies the areas where insufficient evidence has been made available to dispel the Wendover HS2 (WHS2) conclusions that:

- HS2 train noise will be worse in Wendover than the community was led to believe during development of the Act.
- Should this turn out to be the case, that the situation is unlikely to be ameliorated in practice.
- The requirements of the Act would be best met by establishing options for better mitigation in the initial design.

1. Train noise worse than expectations

There are seven points identified that lead us to the conclusion that Train noise experienced by households in Wendover will be louder than anticipated in the Act.

- No validation of the HS2 Noise Prediction Model
- Inaccuracy of the HS2 NPM at low levels
- Noise levels from use of HS2 Conventional Compatible trains
- Noise levels from use of “slab” track
- Additional reasonable worst case issues
- Change in LOAEL target
- System Integration risk

1.1 No Validation of the HS2 Noise Prediction Model

HS2 claim that their Noise Prediction Model (NPM) is accurate as it has been validated by measurements on trains similar to those being procured, and have informed the Planning Authorities that they should assume use of the associated algorithms and source terms.

- When asked, HS2 refused to make the measurements available to WHS2, but suggested that these had been made on HS1 trains (which could be extrapolated to operation at 360 kph). Minutes of the Independent Planning Forum Environmental Health Sub-group suggest measurement have also been made of Spanish trains operating at 360kph.
- Reference made to documentation covering validation of the HS1 model (with principles reused for HS2) is not in the public domain.
- Details of the validation measurements are required by the HS2 Independent Planning Forum Note 14 (PFN 14) to be provided as an annex to the Noise Demonstration Reports submitted as part of Schedule 17(3) submissions. On examination of two recent submissions (West Ruislip Tunnel Portal and Colne Valley Viaduct) the validation measurements are missing.

Since the NPM is an empirical model based on observed data, its accuracy will only be known over a range of scenarios covered by those observations. To assess its accuracy in the Wendover context it would be essential to know whether this situation falls within the range of measured scenarios. Since this validation information is not published, it is impossible to assess the accuracy of any specific predictions from the NPM.

WHS2 has not seen sufficient evidence to consider the HS2 Noise Prediction Model as accurate.

1.2 Inaccuracy of the HS2 NPM at low levels

WHS2 presented alternative modelling of HS2 trains using the draft Industry standard RMR96 algorithm to HS2. This is more complex than the HS2 algorithm, as it includes parameters to handle the frequency spectrum of train noise sources and ground effects close to receptors. This appears to better represent the measurements used to underpin

the HS1/HS2 NPM at sound levels close to 60dB, where the figure shown in the Environmental Statement (ES) demonstrates that the algorithm typically underestimates the actual levels. WHS2 and HS2 agreed that this showed that the sound level experienced in central Wendover (at 1000m from the line) could be 3dB higher than that predicted by the HS2 model. Using data from the ES, WHS2 estimated that 485 homes (residential impacts) in the Wendover conurbation would experience noise over the 60dB at the facade level from Conventional Compatible trains using the HS2 algorithm, which would rise to 590 homes with the RMR96 approach.

- HS2 concluded that this was not a problem, as if the WHS2 results were found to be correct that the levels would still be within the 3dB “standard error” (which would suggest a tolerance of up to ± 6 dB, covering more than 95% of expected measurements).
- WHS2 considered an offset of 3dB for the average measurement to challenge the limits of HS2’s standard error.
- HS2 declined to provide details of which elements of the HS2 system contribute to standard error, or what allowance is made for modelling errors. Numerous other issues need to be allowed for, including an allowance for extra noise near concrete viaducts (with a 1dB correction added in the DfT Calculation of Railway Noise memo), and both pantograph recesses on the roof of trains.
- HS2 declined to release details of the specific frequency spectra assumptions used for the various source terms to WHS2, despite these having previously been made available to Arup in development of the “SoundLab” demonstration used with the Select Committees and public.

WHS2 has not seen any evidence to counter the conclusion that the HS2 Noise Prediction Model is inaccurate at levels close to the 60dB level used as a target for peak noise in the Act.

1.3 Noise levels from use of HS2 Conventional Compatible trains

HS2 are procuring “Conventional Compatible” (CC) trainsets for use on Phase 1 of HS2, which have the ability to use both dedicated HS2 tracks at speeds of up to 360kph, and also the conventional rail network to allow services to extend across to northern cities. HS2 have informed the Planning Authorities that they should assume that these trains will have a noise performance 2dB quieter than the European TSI requirement. However EU procurement legislation now incorporated in UK law post Brexit means that HS2 can only mandate the TSI specification, and seek better noise performance through commercial incentives.

At the time of writing the contract value is shown (<https://www.hs2.org.uk/contract-opportunities/>) as being in the range of £500m to £3b; with procurement decisions in Q2 of 2021.

WHS2 considers that there is a significant risk that the Treasury will impose budget constraints to allow handling of Covid-19 related expenditure, and HS2 will come under

pressure to simply acquire cheaper TSI compatible trains at lower cost. This could result in train noise being in line with TSI specifications, 2dB noisier than the HS2 assumption.

PFN 14 anticipates this situation and makes it clear that since the actual train specification will not be known at the Schedule 17(3) stage, the use of reasonable worst case assumptions should ensure that the actual mitigation needed at Bringing into Use can be expected to be less than that based on these assumptions. It seems clear from this that TSI trains represent such a reasonable worst case, though HS2 appear to be basing their estimates on CC trains.

WHS2 has not seen any evidence that use of trains meeting the TSI noise specifications are accommodated within the current "reasonable worst case" assumptions.

1.4 Noise levels from use of "slab" track

Following Royal Assent of the Act a decision was made by HS2 to change the type of track used from a classic "ballasted" approach with individual sleepers to "slab track" which would be more cost effective over the life of the railway. This is recognised as increasing the noise due to reflections from the slab and the DfT "Calculation of Railway Noise" (CRN) memorandum instructs designers to add 2dB to the expected sound level. This was incorporated into the HS2 Phase 2a documentation with the relevant noise "source term" increased accordingly. Subsequently HS2 have informed the Planning Authorities to assume that this additional 2dB can be removed, based on further assumptions about methods of rail fixing and train wheel design; along with associated maintenance regimes to manage rail and wheel roughness.

Use of Classic Compatible trains causes specific issues relating to the rail/wheel interface where a relatively flat wheel is needed for stability at 360kph working. By contrast when used on the rest of the "Conventional Rail Network" a more conical shape is generally used for stability on bends. It is not clear what compromise will be achieved in practice with safety being a priority in this novel hybrid requirement, and the resulting noise implications.

HS2 define rolling sound is expected to be the most dominant of the four HS2 noise sources given in the ES at speeds up to 360kph, and so maintenance of wheel and rail roughness will be critical.

As with paragraph 1.3 above, PFN 14 recognises that there are uncertainties regarding the eventual track design and maintenance regime and again calls for reasonable worst case assumptions. It would appear from the above that this should include some allowance for additional noise from slab track, though HS2 have issued NPM source terms that do not include this.

WHS2 has not seen any evidence that there is any allowance for the use of slab track accommodated within the current "reasonable worst case" assumptions.

1.5 Additional reasonable worst case issues

PFN 14 requires the contractor to make predictions in 'all reasonably foreseeable circumstances' and includes a number of examples including those covered in 1.3 and 1.4 above and also train speed and prediction model accuracy. HS2 state that the noise levels are based on the reasonable worst case, but this does not appear to be defined.

We might anticipate that this would involve trains operating at their maximum permitted speed of 360kph, allowing trains to catch up to the operational schedule and timetable based on running at 330 kph. However there are a number of other aspects having a significant effect (such as train and track maintenance and the weather). and it is not clear if these have been accounted for.

Noise model errors were discussed in paragraph 1.2 above, and one would expect that noise (say) one standard error or more above anticipated would be a reasonably foreseeable circumstance as it has a probability of more than 15%, though HS2/EKFB do not include predictions covering this.

In discussion HS2 did not clarify what constitutes their Reasonable worst case, but suggested that WHS2's view that this should incorporate a 6dB allowance for their "standard error" as being excessive.

1.6 Change in LOAEL target

The issue of key concern to the Wendover community is night time noise intrusion, and E20 includes a Lowest Observed Adverse Effect Level (LOAEL) target of 60 dB LpAFMax at the façade, from any nightly noise event. In practice the noise levels from a series of passby events will vary due to actual speed and other causes. LpAFMax figures for individual receptors are defined in the ES; but the figure quoted is the "average" value produced by the NPM, and subject to the "standard error" of 3dB.

WHS2 has analysed the anticipated HS2 Service Pattern and concluded that there would be 49 pass-by events at Wendover during the night time period between 23:00 and 07:00 following the opening of Euston station. From the ES we note that 1 in 10 trains would be expected to operate at up to 360kph, suggesting that 5 trains per night will generate the highest peak noise levels.

To avoid breaching the "60dB from any nightly noise event" target, the average peak noise level from the 49 trains needs to be lower than 60dB to accommodate the standard error. If the events follow a "normal" statistical distribution, a 1 in 50 failure rate implies that the 98th percentile level should be 60dB. To achieve this the "average" LpAFMax would need to be 2 standard deviations lower. Noting the 3dB "standard error" in the NPM, WHS2 proposed that the design of the line should be based on an average level of not more than 54 dB LpAFMax.

HS2 confirmed that they accepted the target defined in E20, but rejected this proposal as unreasonable, as it would "overestimate the noise impact across the population of Wendover for use in mitigation decisions".

HS2 indicated that the design of the line was based on use of the 60dB LpAFMax (average) value from the NPM, which means that 50% of all pass-by events would be higher than the target. HS2 have effectively redefined the design target making it easier to deliver, but in operation will prove harder to meet the target defined in the Act. However, WHS2 have been unable to find any statement in any noise demonstration reports they have seen, or elsewhere, explaining that the target has been changed, the reasons for the change and the impact of the change. This is surprising as PFN14 is clear that the original E20 target is the one which should be used.

WHS2 concludes that more Wendover houses will experience peak noise events over 60dB LpAFMax than suggested by the tables in the ES. Quantification of the actual number of houses affected is frustrated by lack of evidence from HS2 regarding the allowances for each of the elements included in the standard error.

1.7 System Integration risk

The HS2 “system” comprises a number of components separately specified and procured, such as the trains, the track, and the line and associated noise barriers. Each of these contribute to the overall noise performance. While each component may have an assumed noise budget, it is not clear what the actual sound levels will be when all the parts are brought together.

HS2 as the overall client will be responsible for the integration, but declined to comment when and if there is any overhead allowance to handle excess noise if all the components do not perform as well as expected.

The Local Planning Authority is focussed on approval of the design of the line, and is guided by HS2 Independent Planning Forum notes (PFNs). It is not clear if the assumptions embedded in these notes have been developed with disclosure of supporting evidence, which might ensure that any subsequent decision can be shown to meet the requirements of the Act.

WHS2 considers that there is a significant risk that planning decisions focussed on the design of the line will not manage the subsequent impact of noise generated by the entire system.

Conclusions

Given all seven factors above, and in the absence of evidence to the contrary, Wendover HS2 concludes that it is very likely that the noise levels experienced locally will be in excess of those defined in the Act.

2. Managing excess noise in future

Following construction of the railway there is a “Bringing into Use” period where the entire system will be commissioned and the actual noise levels will be capable of being measured. Management of excess noise is dependent on two factors, being the agreement that the noise is excessive, and having mitigation available to resolve the issue through Design or Operational solutions.

2.1 Lack of definition of Noise Monitoring method

HS2 have agreed that the noise level targets are as defined in Information Paper E20, which incorporates Undertakings and Assurances agreed during development of the Hybrid Bill. The issue of concern to the community is night time noise intrusion, and E20 includes a Lowest Observed Adverse Effect Level (LOAEL) target of 60 LpAFMax at the façade, from any nightly noise event (see 1.6 above). There is a lack of clarity about what a nightly event is; and if measurements are only valid if the wind is “downwind”, in line with the criteria used in establishing the predicted levels at receptors.

HS2 point to the Information Paper F4 as the Operational Noise and Vibration Monitoring Framework reference, but this is currently a very high level statement and lacks the detail necessary to determine how the train noise will actually be measured, and how this will be correlated to the impact on a community requiring corrective action.

HS2 indicated that developing that detail would be undertaken over the next years prior to Bringing into Use period with the Independent Planning Forum Environmental Health Sub-Group. However, this will be several years after the Local Planning Authority has given approval to build the line.

WHS2 considers that there is a significant risk that in the absence of clear trigger criteria being available at the time of the initial Schedule 17(3) planning decision; that the adequacy of any “Indicative Mitigation” proposed at that time cannot be determined.

2.2 Indicative Mitigation

Because of uncertainties about eventual noise levels, planning approval for mitigation is not sought until the Schedule 17(9) stage (Bringing into Use). However at the Schedule 17(3) stage, the contractor is required to “provide an indication or outline of the appropriate mitigation measures (if any) which it intends to submit subsequently under paragraphs 9 or 12 of the Planning Conditions Schedule”. This is known as Indicative Mitigation (IM), and described in PFN10.

An IM proposal needs to be “Reasonably practicable”, including a Value for Money hurdle evaluating how the incremental mitigation provides benefits exceeding costs using the DfT WebTAG analysis. This is to be considered alongside three other criteria including Stakeholder Engagement. PFN 14 does not prioritise any of these four factors and requires that they are considered in combination.

Analysis of the Schedule 17(3) submissions for the West Ruislip Tunnel Portal (SCS JV) and the Colne Valley Viaduct (Align JV) shows that no IM proposals have been made that add any mitigation. Discussion with HS2 regarding Wendover suggested that it is unlikely that any IM proposal would pass the commercial hurdle.

WHS2 concludes that it is unlikely that there would be any available mitigation solution involving design options in future if value for money is mandated over other criteria in contradiction of PFN14.

2.3 Future train speed reduction

An alternative means of reducing noise would be to reduce the speed of the trains.

Discussion with HS2 regarding Wendover suggested that it is unlikely that any speed reduction proposal would be acceptable on commercial grounds.

Conclusions

Given the three factors above, and in the absence of evidence to the contrary, Wendover HS2 concludes that it is very unlikely that there would be any means by which the Planning Authority could invoke future additional noise mitigation, regardless of the anticipated adverse noise levels experienced locally being in excess of those defined in the Act, as identified in the previous section.

3. Managing excess noise at the outset

During development of the detailed design EKFB are required to investigate alternative options to reduce noise as far as reasonably practicable, and “optioneering” is undertaken to consider Performance, Cost and Visual impact to determine which solution should be incorporated. This is set against a policy that HS2 defined that contractors should use the noise assumptions embedded in the HS2 source terms and algorithms for noise; which results in the performance of the design being “good enough”.

However if other system components do not achieve their assumed performance the result will be noise in excess of the figures identified in the Act, and this may not be capable of rectification given the findings of the previous section.

One solution would be for the Planning Authority to seek evidence from the Contractor of any alternative options considered during the initial design phase that have higher performance, noting that as being reasonably practicable offerings they should meet the four criteria outlined in PFN 14 including the WebTAG cost limit.

There could be justification to deploy a higher performance option from the outset, especially if it could be partially deployed with the ability to be upgraded to full performance later if needed.

WHS2 has proposed two potential solutions to provide additional noise mitigation in the locality, being redesign of the Wendover North Cutting with retaining walls and use of an arched noise fence barrier on the Small Dean Embankment and Viaduct. The first of these (a retained cutting) appears to offer a cost saving compared with an open cutting with noise barriers, meet two of the other PFN 14 criteria (better visually and community preference) and meet the specific obligation in PFN 14 to “maximise the sustainable opportunity to replace noise fence barriers by landscape earthworks”. These options taken together appear to be a reasonably practicable solution at no overall project cost increase; reducing the number of houses affected by noise in excess of the 60dB LOAEL target from 590 to 67.

WHS2 has not received any indication that these are being considered by EKFB as options despite escalation of the opportunity to the HS2 Minister.

In summary, WHS2 concludes:

- that with the evidence available that the noise experienced in Wendover will be worse than the levels identified in the ES;
- that there is little that the Local Authority will be able to do to rectify this situation once the line has been built; and
- that the requirements of the Act would be best met by establishing options for better mitigation in the initial design.