Explanatory Note - Noise

HS2 Ltd commissioned an appraisal of sustainability (AoS) of a high speed line between London and the West Midlands. The AoS is a necessarily high level study of the potential environmental impacts of the HS2 scheme, designed to allow comparison of different routes as well as give an indication of where mitigation of impacts may be needed. The appraisal is ongoing, as work continues on possible further mitigation. The new Government may wish additional work to be undertaken. The full AoS will be published in advance of public consultation.

A non technical summary (NTS) of this work was published in March 2010. It identified potential noise impacts for HS2 Ltd's recommended route which are set out below.

	No. of dwellings impacted	
Predicted potential noise impacts	**Engineered Route** **Column 1**	**With additional mitigation** **Column 2**
High HS2 noise levels (over 73 dbl)	350	50
Noticeable increase in railway noise (over 50dbl +3dbl)	21,300	9,700

For this appraisal, an industry recognised computer software[1] was used which included the following information:

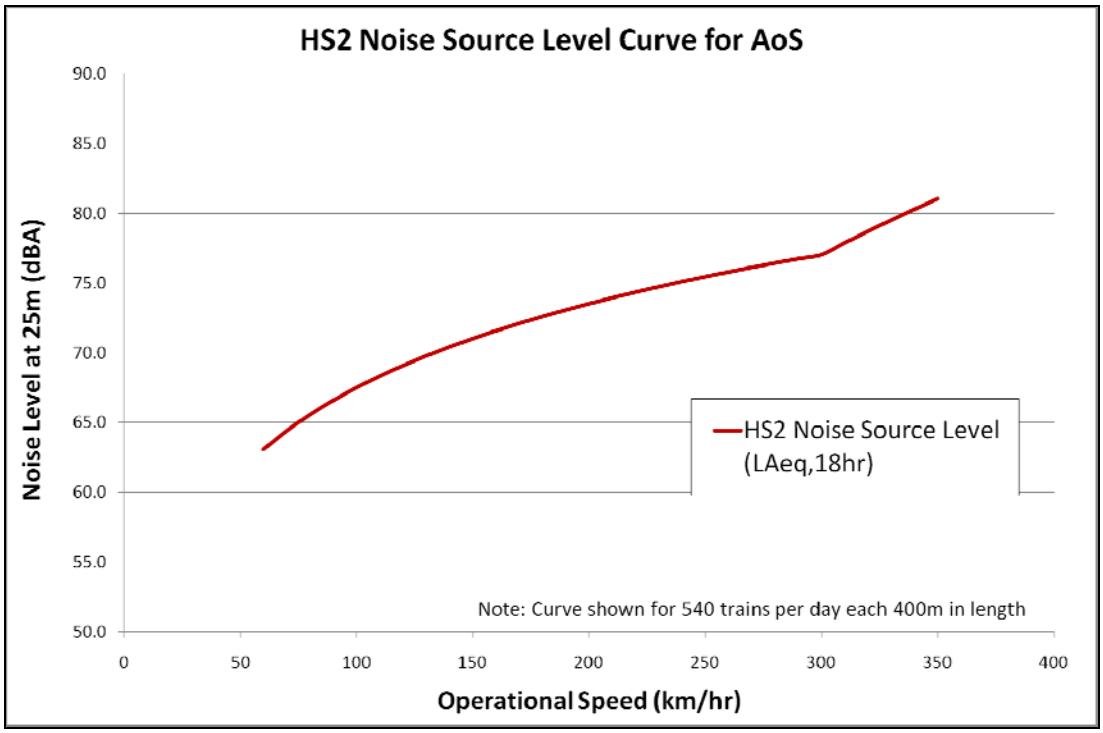
- Noise levels of high speed trains. This was based on the noise levels of currently operated high speed trains[2] and the current noise level requirements for new trains from European Specifications[3];
- Information from HS2 Ltd's project specification on number, length and frequency of the proposed HS2 service;

[1] CadnaA (Computer Aided Noise Abatement) software version 3.72.129 (64bit) - DataKustik GmbH using the normal UK method for prediction of railway noise and adopting the international standard method for calculating how sound travels in built up areas where appropriate.

[2] Gautier, P.-E., Létourneaux, F., & Poisson, F. (2007). High Speed Trains External Noise: A Review of Measurements and Source Models for the TGV Case up to 360km/h. SNCF, Innovation and Research Department, France.

[3] Official Journal Of The European Communities (2002) Commission Decision 30 May 2002 Concerning the Technical Specification for Interoperability Relating to the Rolling Stock Subsystem of the Trans-European High-Speed Rail System Referred to in Article 6(1) of Directive 96/48/EC.

- HS2 Ltd's assumption on the speed of the trains on different sections of the route; and
- Existing rail noise levels based on Government noise maps.
- The proposed HS2 alignment, including proposed embankments, cuttings, tunnels and viaducts and the surrounding landscape.



The assumed HS2 noise source level for the model can be seen in the above figure. This graph presents the daytime 'average' noise level[4] at a distance of 25m from the centreline for train speeds between 60 and 350km/hr.

The model was first used to predict levels of noise ('average' noise for a typical day operation) at dwellings within 3km of the centreline of the proposed engineered route – see column 1.

To understand the potential improvements in reducing the noise impacts which are likely to be realised with the final scheme design a mitigation scenario was developed based on two assumptions - firstly, that future trains will be quieter than current trains and secondly, that noise barriers will be used to protect groups of dwellings in areas potentially experiencing higher noise impacts. The model was then rerun and the results are presented in Column 2.

[4] The daytime 'average' noise level ($L_{Aeq,18h}$) is the A-weighted equivalent continuous sound pressure level over the 18 hour daytime period (06:00 to 24:00 hrs). The A-weighted level (dBA) is the logarithmic scale of sound pressure which takes into account the increased sensitivity of the human ear at some frequencies.

Limitations to this high level appraisal

This approach gives general and indicative rather than specific results;-

- Given this is a strategic appraisal, no site noise measurements have been included in the appraisal. In this appraisal, the change in noise is the change in the railway noise environment based on average noise levels from the Government noise maps. As a result, local impacts may be over or under estimated.

- Shielding effects of buildings have been included in the model as a standardised value and further work is required to understand local effects.

- Numbers of potential properties affected were estimated using current ordnance survey data which is based on groups of one or more addresses.

All of these limitations would be addressed in future in the production of the Environmental Impact Assessment (EIA) on the final route. We would expect work to start on the EIA once the Government had made a decision on whether to proceed and the route following public consultation and when further engineering design is complete.

May 2010