

## HS2 Environmental Statement and Noise

in the “Environmental Statement” there are four documents that describe the process of estimating the noise levels and the defining the outcome for Wendover:

In the Technical Appendices Volume 5 of the ES there is a document that covers the [Route-wide Methodology](#)

There are also three documents that describe the impact for Wendover in what is known as the “Community Focus Area 10” (CFA10). These are:

[CFA10 sound, noise and vibration Baseline](#), which defines the existing noise levels at a number of “receptors” in the area. Each receptor represents a group of “impacts”, being houses or commercial premises in a small geographic area which are expected to have the same sound levels.

[CFA10 sound, noise and vibration Construction assessment](#), which describes the expected noise levels at each receptor resulting from the construction works, including the associated Road Traffic.

[CFA10 sound, noise and vibration Operational assessment](#), which describes the expected noise levels at each receptor from the operation of the trains.

Additionally there are “Environmental Minimum Requirements” (EMRs), and the Information Paper E20: [Control of Airborne Noise from altered Roads and the Operational Railway \(E20\)](#). The annexes to this document define the required noise levels and how they relate to other legislation.

E20 describes three noise levels related to the Noise Policy Statement for England.

- NOEL - No Observed Effect Level - the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise
- LOAEL - Lowest Observed Adverse Effect Level - the level above which adverse effects on health and quality of life can be detected.
- SOAEL - Significant Observed Adverse Effect Level - the level above which significant adverse effects on health and quality of life occur.

It also notes that the “*World Health Organisation Guidelines for Community Noise also identify 60 dB LpAFMax outside as the guideline value for sleep disturbance with windows open. For this reason, sound levels of 60 dB LpAFMax at the façade is also considered the LOAEL for operational railway noise at night*”.

The measurement description “LpAFMax at the façade” can be broken down as follows:

Lp means Sound pressure level

A means “A weighted”, which requires the noise measurement to be varied by frequency to match human experience, where low and high frequencies are not heard as having the same “loudness” as mid range sounds.

Fmax means “Fast”, which specifies that samples of the energy need to be assessed over periods of one eighth of a second (125 milliseconds), used to determine the maximum or peak noise typically used to assess for disturbance.

“At the façade” means that the measurement is taken 1m in front of a wall, and in the expectation that reflections will increase the noise level experienced over the “freefield” value. In the HS2 case this allowance is set at 2.5dB.

E20 Appendix B provides a LOAEL requirement that during the Night period (23:00 to 07:00) the 60dB at the façade level should not be exceeded “from any nightly event”. The level of commitment to meet this requirement was discussed during the Parliamentary Select Committee and resulted in DfT agreeing specific Undertaking 73, that:

*“The nominated undertaker will take all reasonable steps to design and construct altered roads, and to design, construct, operate and maintain the operational railway so that the combined airborne noise from these sources, predicted in all reasonably foreseeable circumstances, does not exceed the lowest observed adverse effect levels set out in Table 1 of Appendix B”* in Information paper E20.

In practice the [Noise profile presentations](#) made to the Select Committee do not show this peak LOAEL impact, but demonstrate the receptors affected by the less stringent night time average LOAEL requirement of 40dB LpAeq,8hr.

LpA still means the A weighted Sound pressure level, but “eq” refers to the equivalent continuous sound level assessed over a period. In this case that period is the 8 hours between 23:00 and 07:00, noting that the railway is not expected to handle any operational services between Midnight and 05:30 to allow for infrastructure maintenance.

The use of the peak measurement for sleep disturbance can be illustrated by the example of someone firing a gun outside your bedroom window (which would wake most people) and which would trigger a peak reading. However if this was an isolated incident over an 8 hour period it would not exceed the averaged threshold level with low ambient noise.

When HS2 do present information for the maximum the 60dB at the façade level, they ignore the “from any nightly event” part of the requirement - instead they just present numbers for a typical nightly event which are about 6db lower.