

# **Author's response to Comment on 'Application of noise guidance to the assessment of industrial noise with character on residential dwellings in the UK', D. Baker 93 (2015) 88-96**

## **1.0 Introduction**

The *Comment* on the Technical Note (TN) raises issues regarding the application of the NPSE, BS4142, BS8233 and World Health Organization (WHO) Guidelines for Community Noise (1999). Post publication of the TN I have undertaken further research into the effects of (site specific) neighbourhood noise on humans in dwellings. This further work includes discussion with representatives of the WHO Noise Guideline Committee regarding real-life application of WHO 1999 and 2009 documents and their guideline values. This letter provides clarification on the scope and scientific intent of the TN.

## **2.0 Technical note**

### *2.1 Background and 'the problem'*

The misapplication of noise guidance is common in the UK. Professor Waddington identified "...parts of guidance may be used selectively highlighting features favourable to clients and ignoring footnotes and qualifying information".[1] For over a decade I have reviewed noise impact assessments on humans in dwellings. For cases of noise impact from specific sites (non-transportation) my experience mirrors that of Professor Waddington. The non-reporting of caveats, limitations or absence of penalties and adjustments for noise character is common. Guidance commonly misapplied to impact from non-transportation noise include WHO 1999/2009 and BS8233. The focus of the TN was on those documents. The principles of BS4142 were applied as a comparator. The TN highlighted the importance of non-acoustic factors which affect interpretation and reaction to noise.

### *2.2 Scope*

The TN considers industrial noise from a specific site affecting humans in dwellings. It aims to compare how different guidance documents would judge the acceptability of a site specific noise based on a single exposure scenario. It replicates the analysis commonly found in many noise impact assessments, including use of guidance that is not appropriate for the type of noise. My findings showed that guidance for transportation/anonymous noise (BS8233, WHO 1999 etc) underestimated impact when applied to site specific noise impact (e.g. industrial noise). This was based both on a comparison against decibel criteria set in various guidance documents but also when considering non-acoustic factors and context based on my observations of impact at each site.

### 3.0 Comment

The *Comment* interprets phrases in the TN altering emphasis and meaning. A reader unfamiliar with the topic could be misdirected to unrelated matters. For example, the *Comment* refers to an assessment at the highest (societal) level that would balance various economic, environmental and social factors. On this there is no dispute and I accept the principles of sustainability. However, this misinterprets the primary assessment being made in the TN i.e. whether or not noise will give rise to significant adverse impacts. This is the first stage of assessment in relation to wider economic, environmental and social factors. If at this first stage the assessment underestimates impact (as shown in the TN) then there are clearly wide reaching effects e.g. planning decisions made on flawed assumptions. The assessment of adverse impact is specifically required at NPPF paragraph 180.

The NPSE also requires assessment of adverse effects and states that these should be considered within the context of Government policy on sustainable development. An assessment of noise impact is the first stage, the findings of which can then be judged against other factors but critically, is not itself influenced by these factors. Otherwise, the NPSE effectively changes thresholds of acceptability set in British Standards and internationally accepted guidance.

#### 3.1 Application of the NPSE

The *Comment* suggests "*The starting point for any noise assessment should be the national noise policy*". For England this would be the NPSE. The NPSE was applied, in practice, to the case studies within the TN but not reported. The NPSE was not relevant to the scope of the TN. The TN highlights the NPSE provides no quantitative guidance, in terms of decibel levels, to assess noise impact.

Only two of the case studies relate to planning where the NPSE is a material consideration via the NPPF. Two case studies relate to established industrial noise impact situations. There is no duty to apply the NPSE to these cases. This is supported by correspondence from Defra and expert evidence submitted to the High Court in 2017 by a co-author of the *Comment*.<sup>[2,3]</sup> The NPSE is a useful starting point where it applies.

#### 3.2 Application of the WHO 1999 and 2009 to industrial noise

There is a dearth of research into the health and other effects of non-transportation noise sources including industrial noise. This has been identified in discussions with representatives of the WHO and research by Defra who identify "*...there is insufficient robust information on people's response to industrial noise it is not possible to derive a LOAEL and SOEAL (sic) for industrial sources. Therefore, a quantitative and qualitative assessment will always be required to be undertaken to assess the significance of the impact...*"<sup>[4]</sup> This statement relates to the introduction of

or changes to industrial/commercial noise or the introduction of new dwellings i.e. where NPSE is a material consideration.

The *Comment* suggests "...the WHO guidance levels can be considered representative or indicative of LOAELs in situations where the WHO guidelines are applicable." I have demonstrated within the TN discussion and empirical assessment that the WHO guidelines are not applicable for the site specific scenarios assessed in the TN. Fundamentally the guideline values ( $\text{dB } L_{\text{Aeq,T}}, L_{\text{Amax,f}}$ ) within the WHO (and through association BS8233) are derived from systematic reviews of evidence relating to transportation noise impacts on health (road, rail, air traffic and combinations). There is a growing body of evidence that high levels of transportation noise ( $>50\text{-}55\text{dB } L_{\text{Aeq,T}}$ ) increase the likelihood of adverse health outcomes. Typically the higher the decibel level the greater the adverse response.

The definition of '*Community Noise*' covers industrial noise but the WHO 1999 makes reference to a number of caveats on use of their guideline values. These are outlined in the WHO 1999 (sections 2.2.1 and 2.3.1 to 2.3.5). There is no reason to apply the decibel guideline values for dwellings to all types of noise individually in non-transportation noise impact situations. This is due to a number of factors including noise character, perception of person responsible for the noise, personal circumstances, expectation of noise within the locale i.e. the non-acoustic and situational factors and lack of total noise dose assessment. It is instructive the revised WHO Environmental noise guidelines for the European Region focus primarily on transportation noise (road, rail and aircraft) and not neighbourhood (industrial noise) and neighbour noise (as defined by the NPSE). The TN applies noise guidance as observed in the UK i.e. no adjustments or penalties.

### 3.3 Application of BS4142

The TN refers to situations where one source of industrial neighbourhood noise, when occurring, dominates the acoustic environment at a dwelling. In those cases transportation noise levels were low with transient events causing no reported annoyance or sleep disturbance effects. I considered the application of decibel penalties, in accordance with the methodology of BS4142, to be appropriate. A link was provided to the audio samples.

Regarding 'context', the scope of the TN is wider than the three examples provided within BS4142 section 11 bullets 1-3. The term 'context' within the TN relates to all the situational factors that could affect the perception, interpretation and reaction to noise at the individual level e.g. respite from noise, expectation of the specific sound in the locale, time of occurrence etc. The wider benefits to society of a supermarket having earlier deliveries is unlikely to affect the perception, interpretation and reaction to noise within a home. Therefore, the economical, social and environmental balance is irrelevant to the individual, though entirely relevant in governmental level decision making e.g. implementation of sustainable development.

## 4.0 Conclusion

Fundamentally, it is well recognised that decibel levels alone are incapable of adequately characterising psycho-acoustic factors, perception of source operator, level of interference etc. Beyond psycho-acoustics, contextual factors (non-acoustic and situational) are responsible for strong modification of individual response.

The *Comment* raises a number of points regarding the application of noise guidance and planning policy. The NPSE was not considered within the scope of the TN as it was inappropriate to the circumstances but was applied in the real-life assessments of noise contained within the case studies (where relevant).

Although not its intention the *Comment* supports the misapplication of guidance with references to how the WHO guideline values are a 'reasonable' starting point in each case. This represents a leap of faith and such a generalised approach to the assessment of non-transportation noise should be resisted. It is inconsistent with my experience of observing non-transportation noise impact within dwellings and a previous report by the WHO (1995).

Further research is required into the effects of noise from neighbours and neighbourhood noise. Qualitative rather than quantitative (epidemiological) studies which focus on 'single exposure' scenarios are required. Research into the importance of acoustic, non acoustic and situational factors in the perception, interpretation and reaction to noise at the individual level is ongoing.

## References

- [1] Clayton T & Waddington D, 2011. Some implications of the Noise Policy Statement for England for the Regulation and Permitting of Industry by the Environment Agency of England. In *ICBEN*. London, UK. pp 1065-1072.
- [2] Department for Environment, Food & Rural Affairs. Response to EIRs request for information about the Noise Policy Statement for England (NPSE). 21 January 2015. Accessed at <https://www.gov.uk/government/publications/noise-policy-statement-for-england-npse> (Accessed 27/04/18)
- [3] Grant J. Expert Report: Noise dated 19/12/16. Submitted to the High Court Queen's Bench Division on 19/09/17 in the case of Malvern Hills District Council v Tidmarsh, Adams, Grimley Oval Raceway Ltd and persons unknown. Claim No. C90BM276. [available on request dbaker@masenv.co.uk]
- [4] Department for Environment Food & Rural Affairs, 2014. Possible Options for the Identification of SOAEL and LOAEL in Support of the NPSE. NANR316. Page 5.