Appendix B Terminology

This section provides explanations and definitions for terms which may be used in this report.

B.1.1 The decibel scale, A-weighting & typical sound levels

A logarithmic scale is used when defining sound level measurements, the scale used is the decibel (dB). This is due to the ratio between the lowest audible sound and the highest being a million to one in terms of change in sound pressure. The human response to airborne sound pressure level is typically between 0 – 140 dB.

Due to the sensitivity of the ear in terms of pitch and frequency, A-weighting is applied to instrument measured sound which accounts for the relative loudness perceived by the human ear. Therefore, these measurements with this correction factor are written as dBA or dB(A).

The dB(A) unit is internationally accepted and has been found to correspond well with people's subjective reaction to sound. Typical dB(A) sound levels for familiar sounds are given in **Table B.1**.

Table B.1 Typical sound levels[1]

Approximate noise level dB(A)	Example
0	Threshold of hearing for normal young people.
20	Recording studio, ambient level.
40	Quiet residential neighbourhood, ambient level.
60	Department store, restaurant, speech levels.
80	Next to busy highway, shouting.
100	Textile mill; press room with presses running; punch press and wood planers, at operators' position.
120	Ship's engine room, rock concert, in front and close to speakers.
140	Moon launch at 100m; artillery fire, gunner's position.

B.1.2. Sound power, sound level indices and other descriptors

The sound levels given in Table A.1 are sound pressure levels (L_p) and describe the sound level at a measurable distance from a source. Sound power level (L_w) is the total acoustic energy emitted by a source and are intrinsic.

Sound pressure levels vary over time depending on sound generating activities. The following indices are used to take account of these variations:

$L_{Aeq,\,T}$ - the equivalent continuous sound level. This is the sound level of a steady sound having the same energy as a fluctuating sound over the same period. Ambient sound levels are described with this index. $L_{Aeq,\,T}$ is considered the best general-purpose index for

[1] Bies, D.A., Hansen, C.H., 2009. Engineering Noise Control: Theory & Practice. 4th Edition. Abingdon: Spon Press.

environmental sound, as it is the index which generally best represents how sound levels are perceived;

$L_{A90,\,T}$ - this noise index represents the sound level exceeded for 90% of the measurement period and is used to indicate quieter times during the measurement period. In BS 4142 assessments it is usually referred to as the background sound level, and describes the quietest 10% of a measurement period; and

L_{Amax} - is the maximum recorded sound level during the measurement period.

In addition, the following descriptors are often used in noise assessments:

Ambient sound is the totally encompassing sound in a given situation, at a given time, usually composed of sound from many sources near and far;

Fast time weighting is where a sound pressure level measurement using a 125 ms moving average time weighting period has been used;

Free field signifies that a sound measurement has been undertaken in 'free field' conditions i.e., away from any reflecting facades, other than the ground, e.g., building facades, close boarded fence work etc.; and

Façade level: A standard correction of +3 dB may be added to a free field sound level to estimate the sound level 1 m away from a façade to account for both the sound upon the façade and the reflected sound from the façade. When considering the break in of external sound into a room, the sound level which is incident upon the façade, rather than the façade level, is considered because only the incident sound will pass through the fabric of the building, whilst reflected sound travels away from the building. The standard +3 dB façade correction is most applicable in situations where the façade has a relatively unobstructed angle of view of the source (i.e., an uninterrupted 180° angle of view of the source in the horizontal plane).