TECHNICAL APPENDIX 13.1: ACOUSTIC GLOSSARY

APPENDIX 13.1 ACOUSTICS GLOSSARY

1.1.1 Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

1.1.2 Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source

1.1.3 The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or LAeq, LA90 etc., according to the parameter being measured.

1.1.4 The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

Table 0-1: Acoustic Terminology

Term in full	Abbreviations	Definition
Ambient Noise Level	-	The all encompassing noise level measured in $L_{Aeq,T}$. The Ambient Noise Level incorporates background sounds as well as the industrial source noise under consideration.
Background noise	BGN	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels. Described using the metric LA90 (t).
British Standard	BS	-
Construction noise impact assessment	CNIA	-
Decibel	dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value and the scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2x10^{-5}$ Pa).
A-weighted decibel.	dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
Enviornmental Impact Assessment	EIA	-
Free-field Level	-	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
International Organisation for Standardisation	ISO	-

Term in full	Abbreviations	Definition
L_{10} & L_{90}	-	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
$L_{Aeq,T}$	-	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
Lowest observable adverse effect level	LOAEL	The lowest level of a substance that has been observed to cause harm in an exposed population.
Noise Rating	NR	Noise Rating curves were first published in ISO Recommendation ISO/R 1996-1971 and is used to determine acceptable indoor environment for hearing preservation, speech communication and annoyance.
Noise Sensetive Receptor	NSR	Refers to premises that is used for purposes sensitive to noise and requires protection.
Peak particle velocity	PPV	Ground vibration is measured in terms of Peak Particle Velocity (PPV) with units in mm/s or mm/s-1
Residual Noise Level	-	The Ambient Noise Level in the absence of the industrial source noise under consideration, measured in $L_{Aeq,T}$.
Significant Observed Adverse Effect Level	SOAEL	This is the level above which significant adverse effects on health and quality of life occur.
Specific Noise Level	-	The noise level measured in $L_{Aeq,T}$ attributed to the industrial noise source under consideration alone.