

CALDECOTE FARM

NEWPORT PAGNELL · MILTON KEYNES

APPENDIX 9

ENVIRONMENTAL STATEMENT

NOISE AND VIBRATION

APPENDIX 9.1

GLOSSARY OF ACOUSTIC TERMS

APPENDIX 9.1 – GLOSSARY OF ACOUSTIC TERMS

DECIBELS DB

Noise is commonly defined as unwanted sound. The range of audible sound is from 0dB to 140dB, which is taken to be the threshold of pain. The sound pressure detected by the human ear covers an extremely wide range. The decibel (dB) is used to condense this range into a manageable scale by taking the logarithm of the ratio of the sound pressure and a reference sound pressure.

'A' WEIGHTED DECIBELS DB(A)

The frequency response of the ear is usually taken to be about 18Hz (number of oscillations per second) to 18,000Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than at the lower and higher frequencies, and because of this, the low and high frequency component of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most used, and which correlates best with the subjective response to noise, including that of music, is the dB(A) weighting. This electronic filter matches the variation in the frequency sensitivity of the meter to that of the human ear. This is an internationally accepted standard for noise measurements.

EQUIVALENT CONTINUOUS SOUND LEVEL LAEQ

The subjective response to a noise is dependent not only upon the sound pressure level and its frequency, but also its intermittency. Various indices have been developed to try and correlate annoyances with the noise level and its fluctuations. The parameter used for this measure is the Equivalent Continuous Sound Pressure Level (LAeq). The A-weighted sound pressure level of a steady sound that has, over a given period, the same energy as the fluctuating sound under investigation. In essence, the LAeq provides a single value to express the average sound energy over the measurement period and is the most widely used indicator for environmental noise.

The decibel scale is logarithmic and therefore when two noise sources are present together, they have to be combined logarithmically. Therefore, when

two sound sources of the same sound pressure level are combined the resultant level is 3dB(A) higher than the single source. However, in subjective terms the ear can distinguish a difference in 'loudness' between two simple noises sources when there is a 3dB(A) difference between them. Loudness, not a measure of annoyance. Again, for simple sources, when two sounds differ by 10dB(A) one is said to be twice as loud as the other.

OTHER NOISE UNITS:

L_{A90,T}: This is the 'A' weighted noise level exceeded for 90% of the measurement period, T. This is normally used to describe the background noise.

Façade Level: The sound level at a position 1 m in front of a reflecting façade of a building. The façade noise level is assumed to be 3 dB(A) higher than the level measured or predicted at an equivalent position away from the noise reflected from the building façade i.e. in the free-field.

Free-field Level: The sound level in an open area well away from any buildings or other sound reflecting surfaces other than the ground. Generally, the minimum distance from building facades for free-field measurements is taken to be 3.5 m.

BS414 TERMINOLOGY

Background Sound Level: The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval. Expressed as LA90,T and generally considered to be the average minimum noise level.

Ambient Noise Level: Totally encompassing sound in a given situation at any given time interval and usually composed of sound from many sources near and far. Usually expressed in terms of LAeq,T

Residual Noise Level: The ambient noise remaining at a given position in a given situation where the specific noise source is suppressed to such a degree that it does not contribute to the ambient noise. Expressed in terms of LAeq,T

Specific Noise Level: The equivalent continuous A-weighted sound pressure level at the assessment position produced by the specific noise source (source being assessed) over a given reference time interval (LAeq,Tr)

Rating Noise Level: The specific noise level plus any adjustment for the characteristic features of the noise. Expressed in terms of L_A,Tr.

OBSERVED EFFECTS

The Noise Policy Statement for England (2010) defines several key terms in relation to the observed effects of noise. The three key terms are defined below;

No Observed Effect Level (NOEL): This is 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.

Lowest Observed Adverse Effect Level (LOAEL): This is the level above which adverse effects on health and quality of life can be detected.

Significant Observed Adverse Effect Level (SOAEL): This is the level above which significant adverse effects on health and quality of life occur.