Scottish & Southern Electricity Networks

TRANSMISSION

Dunoon to Loch Long 132 kV OHL Rebuild

Environmental Impact Assessment

Volume 4 | Technical Appendix

Appendix 11.1 – Glossary of Acoustic Terms

Term	Description
Airborne Sound:	Sound that reaches the point of interest by propagation through air.
Ambient Sound:	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.
A-weighting, dB(A):	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Background sound:	Underlying level of sound over a period, T, which might in part be an indication of relative quietness at a given location.
Basic Noise Level (BNL):	The measure of road traffic sound at a reference distance of 10 m from the nearside carriageway edge. It is determined from obtaining the estimated sound level from the 18 hour flow and then applying corrections for vehicle speed, percentage of heavy vehicles, gradient and road surface as described in the Calculation of Road Traffic Noise (1988).
Calibration:	The measurement system/ chain should be periodically calibrated, within a laboratory, against traceable calibration instrumentation, to either National Standards or as UKAS-Accredited, as required. The calibration of the system should also be checked in the field using a portable calibrator before and after each short term measurements, and periodically for longer term monitoring.
Class 1:	The Class of a sound level meter describes its accuracy as defined by the relevant international standards – Class 1 is more accurate than Class 2. The older standard IEC 60651 referred to the grade as "Type", whereas the new standard IEC 61672 refers to it as the "Class". The most accurate meters used in the field (as opposed to a laboratory) are Class 1. Class 2 meters can be used in some instances; however WSP use Class 1 (or Type 1) meters by default, as required by BS 4142:2014, for example.
Decibel (dB):	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds (s^1 and s^2) is given by 20 log10 (s^1/s^2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20 Pa.
Dwelling:	A building used for living purposes. A mobile home used for permanent living should be included in an assessment. If calculations are being conducted for compensation purposes, then some mobile homes are dealt with under the Highways Noise Payments and Moveable Homes Regulations.
Façade/ Façade Level:	At a distance of 1 m in front of a large sound reflecting object such as a building façade. According to BS 8233:2014, "Façade level measurements of LpA are typically 1 dB to 2 dB higher than corresponding free-field measurements because of the reflection from the façade." The Calculation of Road Traffic Noise (1988) uses 2.5 dB, whilst BS 5228-1:2009+A1:2014

Term	Description
	recommends 3 dB. Owing to the latter examples, together with other historical documents, it is more usual to apply 3 dB.
Free-field/ Free-field Level:	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5 m away.
Fast time-weighting (F):	Averaging time used in sound level meters. Defined in BS EN 61672-2:2013 Electroacoustics. Sound level meters. Pattern evaluation tests.
Heavy Goods Vehicle (HGV):	According to the Calculation of Road Traffic Noise (1988), 'heavy vehicles' are vehicles with unladen weight greater than 1.525 tonnes. The classification assumes that vehicles within each group are acoustically similar. However, since this classification system was first introduced in 1975, the proportion of vehicles within the range 1.525 tonnes to 3.5 tonnes has grown significantly and the maximum permissible weight of heavy vehicles has increased from 38 to 44 tonnes. Therefore, the range in vehicle noise emissions within the heavy vehicle category has increased. To address this problem, it is recommended in the Design Manual for Roads and Bridges (2011) that the heavy vehicle category is redefined as vehicles with unladen weight greater than 3.5 tonnes. Those vehicles with an unladen weight between 1.525 and 3.5 tonnes should be treated as light vehicles.
IOA:	The Institute of Acoustics is the UK's professional body for those working in acoustics, noise and vibration. It was formed in 1974 from the amalgamation of the Acoustics Group of the Institute of Physics and the British Acoustical Society (a daughter society of the Institution of Mechanical Engineers). It is a nominated body of the Engineering Council, offering registration at Chartered and Incorporated Engineer levels. WSP is a Sponsor Member of the Institute of Acoustics, and all our acoustic consultants/ engineers are individual Members.
$L_{AF10,18h}$:	The $L_{AF10,18h}$ level is the arithmetic mean of all the levels of L_{AF10} during the period from 06:00 to 24:00. From research, it has been found that subjective response to road traffic noise is closely linked to higher sound levels experienced and is correlated well with the $L_{AF10,18h}$ index. Unless stated otherwise, it should be measured/ presented using the fast time-weighting (F).
$L_{AF90,T}$:	The 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 fast time-weighting (F). Generally used to describe the 'background' sound conditions.
L_{AFmax}:	The maximum A-weighted sound pressure level during a given time period. L_{max} is sometimes used for the assessment of occasional loud sounds, which may have little effect on the overall L_{Aeq} noise level, but could still affect the sound environment. Unless described otherwise, it is measured using the fast time-weighting (F).

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$L_{Aeq,T}$:	A sound level index called the equivalent continuous sound level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded. Where the value is A-weighted, is will be presented '$L_{Aeq,T}$' or 'dBA $L_{eq,T}$', otherwise is should be an un-weighted (or linear) value.
Noise:	A noise can be described as an unwanted sound. Noise can cause nuisance.
Noise Sensitive Receptors (NSRs):	Any identified receptor likely to be affected by noise or vibration. These are typically human receptors or occupied buildings, which may include residential dwellings, work places, schools, hospitals, community facilities, places of worship and recreational spaces.
Octave:	In reference to the frequency of a sound or vibration, an octave describes the difference between a given frequency and that which is double that frequency, e.g. 125 Hz to 500 Hz, or 4 kHz to 8 kHz.
Octave Band / Third Octave Bands:	A sound made up of more than one frequency can be described using a frequency spectrum, which shows the relative magnitude of the different frequencies within it. The possible range of frequencies is continuous, but can be split up into discrete bands, often an octave or third-octave in width. Each octave band is referred to by its centre frequency, generally 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz etc.
L_{10}, L_{90} and other L_n percentile measures	Percentile measures express statistical measures of noise, in this case the sound pressure level exceeded for a N % of a specified time interval: L_{10} represents the sound pressure level exceeded for 10% of the time period considered; L_{10} is often used to describe typical noise levels of road traffic. L_{90} represents the sound pressure level which is exceeded for 90% of the time, expressed in dB or dB(A); L_{A90} is used to quantify underlying 'background sound' levels. Other percentile-based measures are sometimes used for various types of noise assessment. These include L_1, L_{50}, L_{99}. Also see entry for $L_{AF90,T}$.
Sound Level Metrics, Indices or Parameters:	Sound levels usually fluctuate over time, so it is often necessary to consider an average or statistical sound level. This can be done in several ways, so a number of different metrics have been defined, according to how the averaging or statistics are carried out.
Sound Power:	The sound energy radiated per unit time by a sound source. Measured in Watts (W).
Sound Power Level, L_W:	Sound power measured on a decibel scale, relative to a reference value of 10^{12} W.
Sound Pressure Level (Sound Level), L_p:	The sound level is the sound pressure relative to a standard reference pressure of 20 Pa ($20x10^{-6}$ Pascals) on a decibel scale.

Term	Description
Sound Pressure:	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
UKAS:	United Kingdom Accreditation Service, recognised by government to assess organisations that provide certification, testing, inspection and calibration services against internationally agreed standards.