



ABERDEEN HARBOUR
EXPANSION PROJECT
November 2015

*Volume 3:
Technical
Appendices*

APPENDIX 20-A ACOUSTIC GLOSSARY



20-A ACOUSTIC GLOSSARY

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|-----------------------------------|---|-----------------------------------|--------|---------------------------------|--------|-------------------------|-------|---------------------------|-------|----------------------------|------|------------------------|-------|------------------------------|-------|-----------------|-------|-------------------------------|------|
| Ambient sound | The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far. | | | | | | | | | | | | | | | | | | |
| Assessment period | The period in a day over which assessments are made. Daytime is usually taken as the period between 07:00 to 23:00 and the night-time period between 23:00 to 07:00. | | | | | | | | | | | | | | | | | | |
| A-weighting | A frequency weighting applied to measured or predicted sounds levels in order to compensate for the non-linearity of human hearing. | | | | | | | | | | | | | | | | | | |
| Background noise | Background noise is the term used to describe the noise measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L ₉₀ noise level (see below). | | | | | | | | | | | | | | | | | | |
| Broadband | Containing the full range of frequencies. | | | | | | | | | | | | | | | | | | |
| Decibel [dB] | <p>The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed to mimic the operation of the human ear. The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sound that is heard.</p> <p>The range of pressure variations associated with everyday living may span over a range of a million to one. On the top range may be the sound of a jet engine and on the bottom of the range may be the sound of a pin dropping.</p> <p>Instead of expressing pressure in units ranging from a million to one, it is found convenient to condense this range to a scale 0 to 120 and give it the units of decibels. The following are examples of the decibel readings of every day sounds;</p> <table border="0" style="margin-left: 20px;"> <tr> <td>Four engine jet aircraft at 100 m</td> <td>120 dB</td> </tr> <tr> <td>Riveting of steel plate at 10 m</td> <td>105 dB</td> </tr> <tr> <td>Pneumatic drill at 10 m</td> <td>90 dB</td> </tr> <tr> <td>Circular wood saw at 10 m</td> <td>80 dB</td> </tr> <tr> <td>Heavy road traffic at 10 m</td> <td>5 dB</td> </tr> <tr> <td>Telephone bell at 10 m</td> <td>65 dB</td> </tr> <tr> <td>Male speech, average at 10 m</td> <td>50 dB</td> </tr> <tr> <td>Whisper at 10 m</td> <td>25 dB</td> </tr> <tr> <td>Threshold of hearing, 1000 Hz</td> <td>0 dB</td> </tr> </table> | Four engine jet aircraft at 100 m | 120 dB | Riveting of steel plate at 10 m | 105 dB | Pneumatic drill at 10 m | 90 dB | Circular wood saw at 10 m | 80 dB | Heavy road traffic at 10 m | 5 dB | Telephone bell at 10 m | 65 dB | Male speech, average at 10 m | 50 dB | Whisper at 10 m | 25 dB | Threshold of hearing, 1000 Hz | 0 dB |
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| dB(A): A-weighted decibels | <p>The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the 'A' filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.</p> | | | | | | | | | | | | | | | | | | |
| Façade Noise Level | A noise level measured or predicted at the façade of a building, typically at a distance of 1 m, containing a contribution made up of reflections from the façade itself (+3dB). | | | | | | | | | | | | | | | | | | |
| Free-Field Noise Level | A noise level measured at least 3.5 m from reflective surfaces. | | | | | | | | | | | | | | | | | | |

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| L_{Amax} noise level | This is the maximum noise level recorded over the measurement period. |
| $L_{Aeq,T}$ noise level | <p>This is the 'equivalent continuous A-weighted sound pressure level, in decibels' and is defined in British Standard 7445 as the 'value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time'.</p> <p>It is a unit commonly used to describe construction noise, noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise.</p> |
| L_{A90} noise level | This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise. |
| L_{A10} noise level | This is the noise level which is achieved for 10% of the monitoring period and is often used to describe road traffic noise |
| Peak Particle Velocity PPV | PPV is the greatest instantaneous Particle Velocity during a given time interval. If measurements are made in 3-axis then the resultant PPV is the vector sum = the square root of the summed squares of the maximum velocities, regardless of when in the time history those occur. |
| Rating Level dB $L_{Ar,Tr}$ | The rating level is the specific sound level plus any adjustment for the characteristic features of the sound. |
| Residual Sound | Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound. |
| Residual Sound Level L_r | Equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$) of the residual sound at the assessment location over a given time interval, T. |
| Weighted Sound Reduction Index SRI (R_w) | <p>A single-number quantity which characterises the airborne sound insulation of a material or building element over a range of frequencies.</p> <p>Laboratory measurements - so R_w may be used to compare building elements. Ctr spectrum adaptation term for urban traffic noise spectrum. Also used to take account of low frequency noise.</p> |
| Specific Sound Level $L_{Aeq,Tr}$ | The specific sound level ($L_{Aeq,Tr}$) is the continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval. |
| Vibration | Mechanical oscillations occur about an equilibrium point. The oscillations may be periodic such as the motion of a pendulum or random. Vibration is commonly expressed in terms of Acceleration, Velocity, Displacement and Frequency which are related. |