Acoustics Planning Report

Kingsway House Aparthotel

GMS Estates

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Contents

Executive Summary

This document has been prepared by Hilson Moran for GMS Estates in support of a planning application that seeks permission for the change of use of the existing building at 99-103 Kingsway, London, WC2B 6SX from Commercial use (Class E) to Aparthotel (Class C1).

To facilitate the production of this report and the assessment presented herein, a baseline noise survey was undertaken between Thursday 30th May 2024 and Monday 3rd June 2024 to establish the existing noise climate around the development and at the nearest noise sensitive premises.

Based upon the measured environmental noise levels, external building services noise emissions limits have been set in accordance with London Borough of Camden's planning requirements. These are fundamental noise limits to be achieved at nearest or most affected noise sensitive receptors (nearby hotels) by the combined operation of all fixed building services installations.

The building services design is not yet developed sufficiently to enable an outline noise assessment of their emissions to be undertaken. However best practice recommendations are provided herein, which will be considered during the development of the design during subsequent stages.

Environmental noise and vibration ingress in hotels is usually a concern for the hotel operator, driven by their business goals and customer expectations, rather than a requirement for planning approval due to the temporary nature of hotel stays and consequent lower risk to health and quality of life. As such, these factors are not covered in this report, but will be addressed during the design development phase, considering the guidance of applicable industry standards.

1. Introduction

Hilson Moran has been commissioned by GMS Estates to conduct an acoustic assessment in support of a planning application for the proposed change of use and development works at Kingsway House, 99-103 Kingsway, London, WC2B 6QX, (hereafter "the Site").

The planning application seeks planning permission for the change of use of the existing building to create an aparthotel use (Use Class C1 Hotels) (hereafter "the Proposed Development"). The objective is to retain the external envelope and the major structural elements to deliver a more environmentally and economically viable use for the Site.

In the production of this report, the following works have been conducted:

- A baseline environmental noise survey to establish and quantify the prevailing noise climate in the area, including at the nearest noise sensitive receptors (hereafter "NSRs").
- Calculation of external noise emission limits to which new fixed building services plant should adhere to, based on London Borough of Camden (hereafter "LBC") standard plant noise requirements.
- Provision of outline recommendations for the control of noise emission from building services plant to minimise potential adverse impacts and meet the specified limits. These will be used as a basis to influence the design of the Proposed Development during the subsequent project stages.

Environmental noise and vibration ingress in hotels is usually a concern for the hotel operator, driven by their business goals and customer expectations, rather than a requirement for planning approval due to the temporary nature of hotel stays and consequent lower risk to health and quality of life. As such, these factors are not covered in this report, but will be addressed during the design development phase, considering the guidance of applicable industry standards.

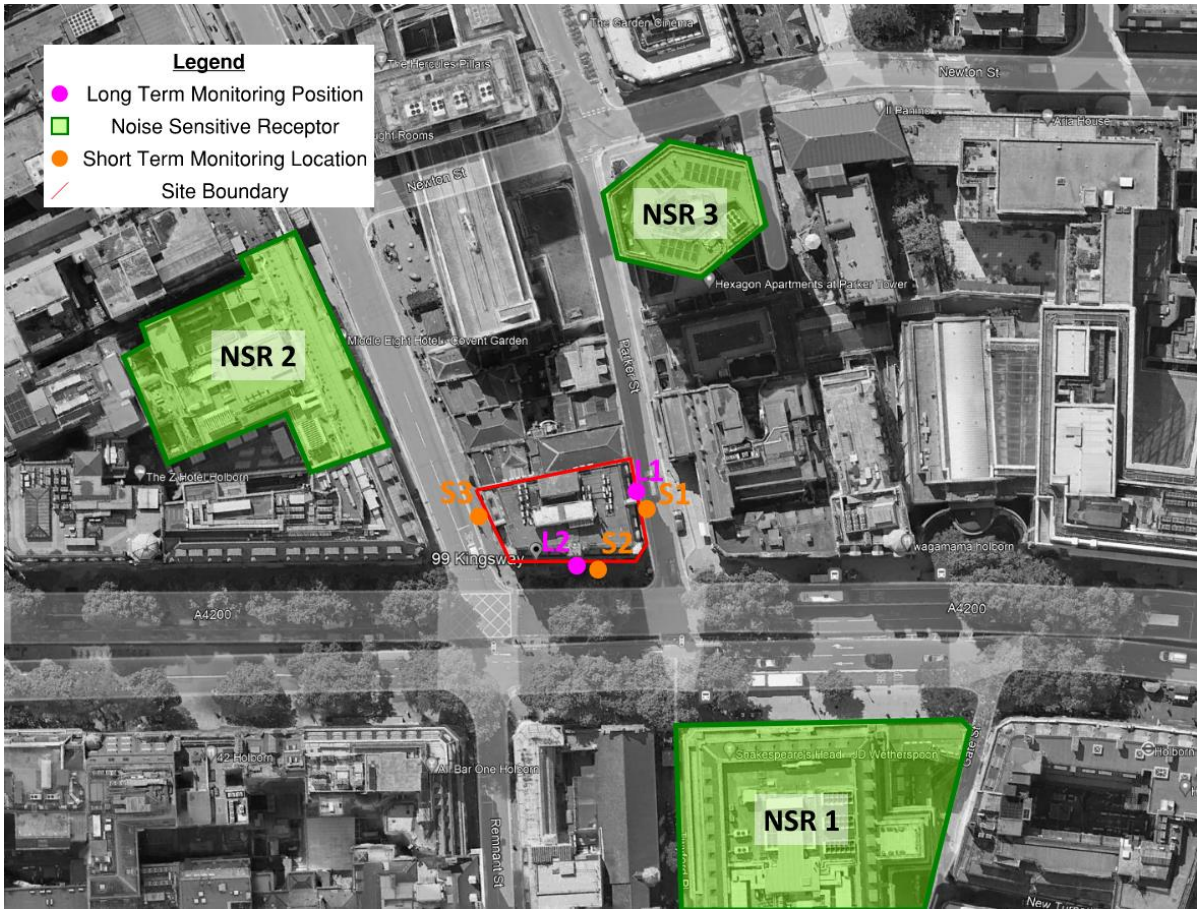
To aid the reader, Appendix A presents an explanation of the acoustic terminology used in this report.

2. Site, Site Setting and Proposed Development

The Site is located within the LBC Kingsway Conservation Area and is located on Kingsway A4200, near Holborn Station. The Site is bound by A4200 to the east, Parker Street to the north and Great Queen Street to the south. It is surrounded by predominantly commercial buildings and hotels, however a private residential apartment building is located to the west.

The existing building comprises of 9 storeys over lower ground, ground floor to 7th floor. The property has been without a commercial office tenant for several years and is currently let to a charity on a peppercorn basis. A location plan showing the site and its surroundings, identified NSRs and noise monitoring locations are illustrated in Figure 2:1 below.

Figure 2:1: Site Location Plan of the Site, NSRs and Survey Locations



2.1. Summary of Noise Climate

The noise climate at the Site is dominated by traffic movement and human activity from Kingsway A4200. Noise from other nearby buildings and noise from the wider local road network contributed to the noise climate to some degree.

2.2. Noise Sensitive Receptors

The area surrounding the Site appears to be mainly commercial, although two hotels and a private residential apartment block is located near to the Site boundary. The nearest sensitive properties to the Site have been identified, as described in Table 2.1 below and highlighted in Figure 2.1 above.

Table 2.1: Description of Noise Sensitive Receptors (NSRs)

Receptor location (Figure 2.1)	Description/Name	Minimum distance from Site boundary to NSR window
NSR 1	Hotel, *Africa House*, 64-68 Kingsway, London WC2B 6BG	35 m away from the southeastern Site boundary
NSR 2	Hotel, *Middle Eight*, 66 Great Queen St, London WC2B 5BX	12 m away from the southwestern Site boundary
NSR 3	Residential, *Hexagon Apartments at Parker Tower,* 33 Newton Street, London, WC2B 5EL	36 m away from the western Site boundary

2.3. Proposed Development

The Proposed Development comprises the change of use of the existing building from Commercial use (Class E) to Aparthotel (Class C1) alongside extension and remodelling of the upper storeys, please refer to the Planning Statement for the formal Description to Development.

3. Guidelines and Assessment Criteria

When selecting appropriate criteria for assessment, consideration was given to relevant planning policy and regulations, as follows:

- The National Planning Policy Framework (NPPF)[1]
- The Noise Policy Statement for England (NPSE)[2]
- Camden Local Plan 2017[3]
- Draft Camden Local Plan 2024[4]

With regard to acoustic design and noise control, the NPPF provides a set of overarching aims, broadly reflecting those already contained in the NPSE. They are directed towards the avoidance of significant adverse impacts and reduction of other adverse impacts on health and quality of life; set within the context of the Government's policy on sustainable development.

3.1. British Standard 4142:2014

It is common industry practice for noise from fixed building services installations to be assessed in accordance with BS 4142 *'Method for rating and assessing industrial and commercial sound'*[5] and therefore this standard has also been considered in this report.

This standard document describes methods for rating and assessing sound of an industrial and/or commercial nature for the purposes of: (a) investigating complaints, (b) assessing sound from proposed, new, modified, or additional sources of sound of an industrial/commercial nature, and (c) assessing sound at proposed new residential premises.

In summary, the procedure compares the measured (or predicted) sound level from the source (known as the specific sound level - notated $L_{Aeq,T}$) immediately outside of the dwellings with the background sound level (notated $L_{A90,T}$) that exists in the absence of the source in question. If the sound is tonal, impulsive, intermittent or otherwise distinctive in character at the assessment location then a character correction of between 0dB and +9dB is added to the specific sound level (correcting for the influence from any residual sound) to obtain the rating level (notated $L_{Ar,Tr}$).

After making any relevant corrections, the background sound level is subtracted from the rating level and an initial estimate of the potential impact of the sound source in question is made with consideration to the following:

- typically, the greater this difference, the greater the magnitude of the impact;
- a difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- a difference of around +5 dB or more is likely to be an indication of an adverse impact, depending on the context; and

[1] Department for Communities and Local Government (DCLG) (2023); '*The National Planning Policy Framework*', TSO.
[2] Department for Environment, Food and Rural Affairs (DEFRA) (2010); 'Noise Policy Statement for England', DEFRA
[3] London Borough of Camden (LBC) (2017); 'Camden Local Plan 2017'.
[4] London Borough of Camden (LBC) (2024); 'Draft New Local Plan 2024'.
[5] British Standards Institution (BSI) (2014); BS 4142 *'Methods for rating and assessing industrial and commercial sound',* BSI.

- the lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

3.2. London Borough of Camden Policy

Based on our review of planning conditions related to similar, recent developments in the jurisdiction of LBC, we propose noise emissions from the building services equipment associated with the development are controlled in line with the following:

"The external noise level emitted from plant equipment at the development hereby approved along with specified noise mitigation shall be lower than the lowest existing background noise level by 10 dBA as assessed according to BS 4142:2014 at the nearest and/r most affected noise sensitive premises, with all machinery operating together at maximum capacity.

Reason: To safeguard the amenities of the adjoining premises and the area generally in accordance with the requirements of policies A1 and A4 of the Camden Local Plan 2017."

4. Baseline Noise Survey

A baseline noise survey was undertaken at the Site between Thursday 30th May and Monday 3rd June 2024 to establish and quantify the prevailing noise levels incident on the Site and at locations representative of the NSRs. Short-term attended noise measurements were conducted on Thursday 30th May 2024 to aid understanding of the variation of noise across the Site.

The noise monitoring locations are presented in Figure 2.1 above, whilst a description of each is presented in Table 4.1 below.

Table 4.1: Description of Noise Monitoring Positions

Position	Description	Observations of Noise Climate
L1 (Parker Street)	Unattended façade measurement at 3rd floor overlooking Parker Street. Microphone set on balcony railing approximately 10 m above ground level (AGL).	Road traffic and human activity along Kingsway A4200 dominate. Building services noise from surrounding buildings also contributes.
L2 (Kingsway A4200)	Unattended façade measurement at 3rd floor overlooking Kingsway A4200. Microphone set on balcony railing approximately 10 m above ground level (AGL).	Road traffic and human activity along Kingsway A4200 dominate.
S1 (Parker Street)	Attended free-field, short-term measurements undertaken on Parker Street. Microphone fixed to a tripod 1.5 m AGL.	Road traffic and human activity along Kingsway A4200 dominate. Two aircraft movements overhead were noted during the measurement.
S2 (Kingsway A4200)	Attended free-field, short-term measurements undertaken on Kingsway A4200. Microphone fixed to a tripod 1.5 m AGL.	Road traffic and human activity along Kingsway A4200 dominate. Measurement was undertaken near a traffic light. The mixture of vehicles included buses and HGV. An average of 40No. vehicles per minute was noted during measurement period and 30No. HGV movements were noted during the attended survey period.
S3 (Great Queen Street)	Attended free-field, short-term measurements undertaken on Great Queen Street. Microphone fixed to a tripod 1.5 m AGL.	Road traffic and human activity along Kingsway A4200 dominate. Road traffic noise from Great Queen Street contributes to a certain degree. An average of 10No. vehicles per minute was noted during measurement period.

All measurements of noise were undertaken in accordance with BS 7445-1:2003[6] which defines parameters, procedures and instrumentation required for noise measurement and analysis. Each Class 1 sound level meter was set up to continuously record, integrating over 125 ms fast response time constant internals the L_{eq}, L_{90}, L_{10}, and L_{Fmax} noise indices in the A-weighting network for the duration of the survey. These indices describe, in turn, the average, background, road traffic, and

[6] BS British Standards Institution (BSI) (2003); 7445-1:2003 Description and measurement of noise Part 1 Guide to quantities and procedures, BSI.

maximum noise level. Full details of the instrumentation used for the noise measurements, including equipment calibration certificates are available upon request.

Weather conditions, whilst not actively measured during the survey period, have been retrospectively checked. During the survey period weather conditions were generally suitable for the measurement of environmental noise, with just light winds (<5 ms^{-1}) prevailing, except periods on Thursday 30th May, Friday 31st May and Saturday 1st June 2024, when higher wind speeds (6-7 ms^{-1}) have been recorded. Where instances of wind speed above 5 ms^{-1} occurred, the data was checked to verify its suitability for use, with no data requiring removal from the dataset as there was no evidence of interference by weather conditions. Additionally, no significant calibration drift was noted at either position (less than 0.2 dB).

4.1.1. Noise Survey Results

A summary of the measured daytime (07:00 to 23:00 hours) and night-time (23:00 to 07:00 hours) noise levels for the survey period is provided in Table 4.2, while time histories of the noise data at the long-term survey positions are provided in Figure 4:1 and Figure 4:2 below.

Table 4.2: Summary of baseline noise survey results

Position	Period	$L_{Aeq,10mins}$ dB Range (Log Ave)	$L_{A10,10mins}$ dB Ave	$L_{A90,10mins}$ dB Range (10th%ile)[1]	$L_{AFmax,30s}$ dB Range
L1[3]	Daytime 07.00 to 23.00	58-80 (65)	65	50-65 (53)	68-102
	Night-time 23.00 to 07.00	56-74 (65)	65	46-67 (49)	66-100
L2[3]	Daytime 07.00 to 23.00	62-82 (69)	69	53-65 (56)	73-105
	Night-time 23.00 to 07.00	61-77 (67)	68	51-63 (53)	70-102
S1	Daytime 15 minutes	54-92 (67)	70	59	55-96
S2	Daytime 15 minutes	60-96 (69)	72	64	61-99
S3	Daytime 15 minutes	59-82 (68)	71	63	59-87

Notes: [1]10th percentile L_{A90} noise levels considered to represent typical lowest background levels, whilst discounting absolute minima. [2]10th-15th highest L_{AFmax} noise level analysed on 30 seconds periods, to align with the guidance from ProPG:2017. [3]Measured façade noise levels have been reduced by 2 dB in accordance with BS 8233:2014 to correct for reflections from the existing façade and provide free-field results.

Figure 4:1: Noise Level Time History Graph at Position L1 (Parker Street)

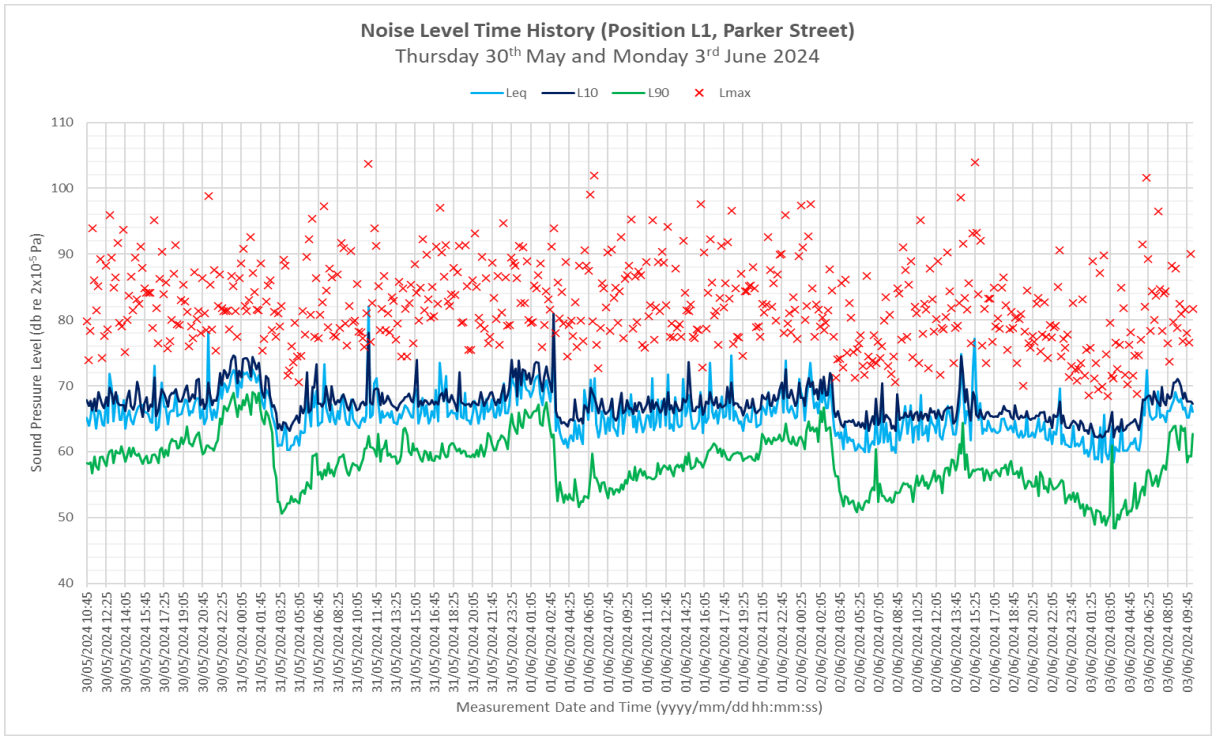
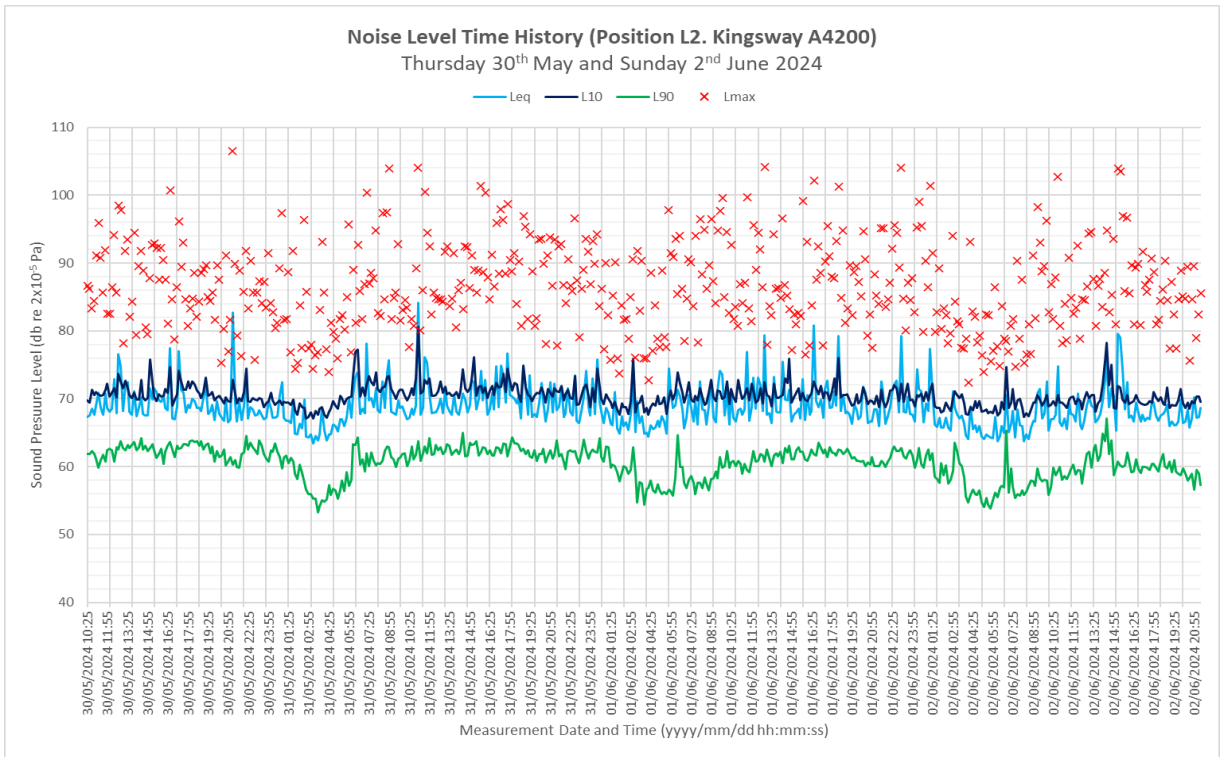


Figure 4:2: Noise Level Time History Graph at Position L2 (Kingsway A4200)



5. External Noise Emission Limits

Based on the measured baseline noise levels presented in Table 4.2, and LBC planning requirements, the proposed building services shall adhere to the external noise limits that have been derived and presented in Table 5.1 below.

Table 5.1: Plant Noise Emission Limits

NSR	Period	Representative Background Noise Level (L_{A90}, dB)	Noise Emission Limit ($L_{Ar,Tr}$, dB)
NSR 1 (Hotel)	Daytime 0700 to 2300	56	46
	Night-time 23.00 to 0700	53	43
NSR 2 (Hotel)	Daytime 0700 to 2300	53	43
	Night-time 23.00 to 0700	49	39
NSR 3 (Resi)	Daytime 0700 to 2300	53	43
	Night-time 23.00 to 0700	49	39

5.1.1. Outline Mitigation

At this stage, the building services design is considered sufficiently flexible to incorporate noise control measures necessary to comply with the noise emission limits presented in Table 5.1. As preliminary design advice, we recommend the following measures are considered and incorporated into the MEP design where necessary:

- Selection of high-quality, low-noise building services equipment with night set-back modes, generally situated away from, and shielded from the identified NSRs. It should be ensured that the noise output from the selected plant items can be accurately demonstrated by the supplier to allow confidence in subsequent noise emission predictions.
- Orientation of significant external plant items and duct terminations to exploit natural directionality characteristics and direct noise away from noise sensitive receptors.
- All ductwork connecting to the external environment should be provided with in-duct attenuation, appropriately sized to achieve the external noise limits. This also applies to emergency/life-safety systems.
- Attenuators should be placed as near to the associated fan as practical. Should significant lengths of ductwork remain exposed between the fan and attenuator, a suitable acoustic lagging product would be required to minimise noise breakout.
- Emergency generator sets should be provided with a proprietary acoustic enclosure, or situated in a purpose-built, acoustically treated room to control external noise emissions. Room treatments may include attenuated intake/discharge points, acoustic wall linings and doorsets, and absorptive surface finishes to reduce reverberant noise build-up.
- Roof plant items may require solid acoustic screening to meet the applicable noise emission limits.
- Acoustic louvres, if required, should be selected based on a 1/1 octave sound reduction index assessment.

- Vibration mounts should be installed. Plant items should be sufficiently isolated to ensure that the frequency and amplitude of groundborne vibration shall not exceed 0.01 m/s^2 during daytime (16 hours) and 0.005 m/s^2 during night-time (8 hours) within residential buildings as defined in BS 6472:2008[7].

[7] BS British Standards Institution (BSI) (2008); BS 6472 1: Guide to evaluation of human exposure to vibration in buildings Part 1 Vibration sources other than blasting, BSI.

Appendix A: Glossary of Acoustic Terminology

This document provides a layperson's explanation of the acoustics terms that commonly appear in reports. It is not intended to give full scientific definitions and explanations or go into detail on how and why things are as they are. Some obsolete terms and abbreviations have been included as they still appear in documents from time to time.

Term	Description
Decibel, dB	The decibel is a logarithmic unit of measurement used for quantifying sound. It is derived from the logarithm to base 10 of the ratio of two quantities. Use of a logarithmic scale has the advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers.
Frequency, Hz	In sound, the number of cycles per second of a pressure fluctuation and frequency in sound is proportional to its pitch. Different frequencies are divided into octave and one third octave bands.
Sound Pressure Level, *Lp*	This is the unweighted or linear level which is measured prior to any weightings being applied. The sound pressure level is 20 times the logarithm to base 10 of the ratio of the reference sound pressure ($2x10^{-5}$) and the measured sound pressure.
Sound Power Level, L_w	This is the total sound energy radiated from a given source. The sound power Level is 10 times the logarithm to base 10 of the ratio of the reference sound power level ($1x10^{-12}$) and the measured power.
Frequency Weightings	Weightings can be applied to a spectrum of sound and act as a filter to account for different sensitivities and conditions.
Time Weightings	A time weighting to denote the response of the sound level meter. For most measurements the Fast time weighting is selected (F) however, a slow time weighting (S) is often used to for the measurement train noise and vibration.
A-weighted sound pressure level, L_{pA}	The sound pressure level with the A-weighting applied. The A-weighting is used for most environmental noise measurements and is used to weight a spectrum of sound to match the sensitivity of the human ear.
Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$	The L_{Aeq} is an energy average and defined as the level of sound which, over a given period of time, would equate to the same A-weighted sound energy as the actual fluctuating sound.
Octave Bands	A band of frequencies in which the upper limit of the band is twice the frequency of the lower limit.
Maximum noise Level, L_{AFmax}	The maximum instantaneous noise level measured during a given period of time. The time weighting to which the meter is set for this measurement parameter is always indicated by either an F or S.

Term	Description
Minimum Noise level, L_{AFmin}	The minimum instantaneous noise level measured during a given period of time. The time weighting to which the meter is set for this measurement parameter is always indicated by either an F or S.
Percentile level, $L_{AN,T}$	A-weighted sound pressure level obtained using time-weighting F, which is exceeded for N% of a specified time interval. An example of this is background noise which is quantified with the L_{A90} descriptor, which is the A-weighted level which is exceeded for 90% of the measurement period.
Sound exposure level, L_{AE}	A level of a sound, of 1 s duration, that has the same sound energy as the actual noise event considered.
Rating Level, $L_{Ar,Tr}$	The equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise.
Ambient Noise Level	The noise level in a given environment whilst it is subject to all of its normal sources of noise.
Background Sound / Noise Level, L_{A90}	These are amongst the lowest noise levels measured over a given period of time and exclude short term, intermittent noise sources. The background noise level is quantified by the L_{A90} descriptor and is therefore the level which is exceeded for 90% of a given period of time.
Reverberation Time, *T*	The time that would be required for the sound pressure level to decrease by 60 dB after the sound source has stopped. The descriptor *T,* often includes other nomenclature to describe the type of reverberation time measurement or if the reverberation time is an average taken for specific frequencies. For example a T_{mf} is the mid-frequency reverberation time.
Absorption Coefficient, α	The fraction of reverberant sound energy absorbed by a material. It is expressed as a value between 1.0 which equates to perfect absorption and 0 which equates to zero absorption.
Absorption, A	The acoustic absorption derived from the multiplication of the absorption coefficient by the surface area of a given material.
Acoustic Class, A - E	Classification of sound absorbers into Sound Absorption Classes A-E, according to BS EN ISO 11654, including frequencies 200-5000 Hz
NRC	A single-number rating system used to compare the sound-absorbing characteristics of building materials. A measurement of the acoustical absorption performance of a material, calculated by averaging its Sound Absorption Coefficients at 250, 500, 1000 and 2000 Hz
Sound Reduction Index, *R*	The laboratory measured sound insulation properties of a material or building element in octave or third octave bands.

Term	Description
Weighted Sound Reduction Index, R_w	A single number which represents the sound reduction of a material. It is derived by plotting the sound reduction index against a set of reference curves. The curves are shifted until a best-fit is established and the curve which best fits the sound reduction spectrum is used to represent the single figure value.
Weighted Level Difference, D_w	The weighted level difference between a pair of rooms, stated as a single figure.
Standardized Weighted Level Difference, $D_{nT'w}$	The standardized, weighted difference in sound level between a pair of rooms, stated as a single figure. The level difference in octave bands is first normalized to a reference reverberation time and then plotted against a set of reference curves to establish a single figure value.
Weighted, Normalised Flanking Level Difference, D_{nFw}	The normalised, weighted difference in sound level between a pair of rooms via a flanking element, such as mullion or ceiling detail. The level difference in octave bands is first normalized to a reference amount of absorption and then plotted against a set of reference curves to establish a single figure value.
Normalised Element Level Difference, D_{ne}	The normalised difference in sound level between a pair of rooms via a small element such as a trickle ventilator. The level difference in octave bands is normalized to a reference amount of absorption.
Weighted, Normalised Element Level Difference, D_{new}	The normalised, weighted difference in sound level between a pair of rooms via a small element such as a trickle ventilator, stated as a single figure. The level difference in octave bands is normalized to a reference amount of absorption and then plotted against a set of reference curves to establish a single figure value.
C_{tr}	A correction term applied to the sound insulation single-number values (R_w, D_w, and $D_{nT,w}$). Applying the C_{tr} penalises a construction's performance if its low frequency performance is poor in relation its performance at higher frequencies.
Impact Sound	The noise generated by an impact on a structure. This is normally used to describe the noise created by people walking on a floor structure.
Weighted standardized impact sound pressure level, $L_{nT,w}$	A single-number quantity used to characterize the impact sound insulation of floors over a range of frequencies.
Cross-talk	Noise transmission between one room and another room or space via a duct or other path.
Insertion Loss, IL	The reduction of noise level due to the presence of a noise control device such as an attenuator, excluding any regeneration noise created by its presence.
Dynamic Insertion Loss, DIL	The reduction of noise level due to the presence of a noise control device such as an attenuator, including any regeneration noise created by its presence.
NR	The Noise Rating level. This is a single figure value derived by plotting a noise spectrum against a set of curves. The curve under which the spectrum fits is the resulting NR level.

Term	Description
Vibration	The vibratory motion of a surface can be characterised by: (a) displacement (m), (b) velocity (m/s), or (c) acceleration(m/s^2). The magnitude of the vibration can be quantified in several ways: **Peak to Peak** - The total excursion of the oscillation about the zero datum. **Peak** - This value gives the maximum excursion of the oscillation above or below the zero datum. **r.m.s.** - This value gives the root mean square of the time history over a specific time interval (time constant). **dB** - Vibration levels can be expressed in dB. A reference level of 10-6 m/s^2 r.m.s. is usually used for acceleration.
Ground borne noise	Audible noise caused by the vibration of elements of a structure, for which the vibration propagation path from the source is partially or wholly through the ground
Structure borne noise	Audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.
V.D.V,	The VDV is the Vibration Dose a person is expected to be exposed to over the course of the day or night. The VDV is given by the fourth root of the time integral of the fourth power of the acceleration after it has been frequency-weighted.
eVDV	The estimated vibration dose value based on short duration measurements of transients with known durations and occurrences

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