

Land Adjacent to The Load of Hay Villier Street, Uxbridge



Noise Impact Assessment Report
Report 21907.NIA.02

Villier Street Developments
73 Cornhill
London EC3V 3QQ

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SUMMARY

KP Acoustics Ltd has been commissioned by Villier Street Developments 73 Cornhill London EC3V 3QQ to assess the suitability of the land adjacent to The Load of Hay, Villier Street, Uxbridge UB8 2PU for a residential development in accordance with the provisions of the National Planning Policy Framework and the Noise Policy Statement for England (NPSE).

This report assesses the noise impact from the garden of the public house to the proposed development site and recommends mitigation measures as necessary to inform a revised planning application.

An environmental noise survey has been undertaken on site in order to establish the current ambient and background noise levels, as shown in Table 3.1. These measured noise levels have been used to provide an assessment of impact due to patron noise from the nearby pub outdoor seating area on the proposed residential development.

The predicted impact of patron noise has been assessed at nearest windows required for either ventilation or potential overheating mitigation of the proposed residential receiver against IEMA guidance criteria, as is shown in Tables 6.2 and 6.3. This methodology was not carried out for windows that would not need to be openable for overheating or ventilation purposes, as the glazing specification would provide a significant reduction to the noise at the façade.

Additionally, sound reduction performance calculations have been undertaken based on typical glazing specifications at the closest closed windows within the nearest bedroom to determine the compliance against the requirements of BS8233:2014 guidance, taking into consideration the non-glazed external building fabric elements. The results of these calculations are shown in Table 6.5.

We have recommended that ventilation to the nearest bedroom is provided by attenuated trickle vents on the east façade facing away from the beer garden. Purge ventilation would be achievable by an openable rooflight on the north roof pitch. It is understood that any potential overheating within this bedroom would be mitigated by the openable rooflight.

No further mitigation measures should be required in order to protect the proposed habitable spaces from external noise intrusion.

1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by Villier Street Developments 73 Cornhill London EC3V 3QQ, to assess the suitability of the land adjacent to The Load of Hay, at 33 Villier Street, Uxbridge, UB8 2PU, for a residential development in accordance with the provisions of the National Planning Policy Framework and the Noise Policy Statement for England (NPSE).

This report presents the results of an environmental survey and the assessment of noise impact of the nearby pub outdoor seating area at the proposed residential development.

2.0 SITE SURVEYS

2.1 Site Description

The site is bounded by The Load of Hay outdoor seating area to the North, The Load of Hay pub to the West, existing residential dwellings to the East, and Villier Street to the South. Entrance to the site is located on Villier Street. At the time of the survey, the background noise climate was dominated by road traffic noise from surrounding roads.

2.2 Environmental Noise Survey Procedure

A noise survey was undertaken on the proposed site as shown in Figure 2.1. The location was chosen in order to collect data representative of the typical levels expected on the site due to all nearby sources.

Continuous automated monitoring was undertaken for the duration of the survey between 14.17hrs on 07/01/2021 and 13.47hrs on 08/01/2021.

Weather conditions were generally dry with light winds and therefore suitable for the measurement of environmental noise. The measurement procedure complied with ISO 1996-2:2017 Acoustics '*Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels*'.

2.3 Measurement Position

The measurement position is as described within Table 2.1 and shown within Figure 2.1.

Icon	Descriptor	Location Description
	Noise Measurement Position	The microphone was installed on a window on the 1st floor of the east façade, as shown in Figure 2.1. A correction of 3dB has been applied to account for non-free field conditions

Table 2.1 Measurement positions and descriptions



Figure 2.1 Site measurement position (Image Source: Google Maps)

2.4 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used is described within Table 2.2.

Measurement instrumentation		Serial no.	Date	Cert no.
Noise Kit 6	Svantek Type 977A Class 1 Sound Level Meter	59632	26/09/2019	14012956
	Free-field microphone Aco Pacific 7052E	76533		
	Preamp Svantek 2v12L	64847		
	Svantek External windshield	-	-	-
Larson Davis CAL200 Class 1 Calibrator		8932	11/02/2020	04624/2

Table 2.2 Measurement instrumentation

3.0 RESULTS

3.1 Noise Survey

The L_{Aeq} : 5min, L_{Amax} : 5min, L_{A10} : 5min and L_{A90} : 5min acoustic parameters were measured throughout the duration of the survey. Measured levels are shown as a time history in Figure 21907.TH1. Measured noise levels are shown in Table 3.1.

Time Period	Noise Measurement Position 1 (Measured Noise level – dBA)
Daytime $L_{Aeq,16\text{hour}}$ (07.00 – 23.00hrs)	53
Evening $L_{Aeq,4\text{hour}}$ (19.00 – 23.00hrs)	50
Night-time $L_{Aeq,8\text{hour}}$ (23.00 – 07.00hrs)	45

Table 3.1 Site average noise levels for daytime and night time

It is understood¹ that the beer garden is in use between (12.00 – 23.00), and that patrons are asked to start vacating the area at 10.30pm. The average ambient noise level during the evening period has been included in Table 3.1 to assess against the anticipated period of typical use. As the pub beer garden would not be in use during the night-time period, the night-time averaged ambient noise level is not relevant to this assessment and has been provided for context only.

4.0 NOISE ASSESSMENT GUIDANCE

4.1 Noise Policy Statement For England 2019

The National Planning Policy Framework (NPPF) has superseded and replaces Planning Policy Guidance Note 24 (PPG24), which previously covered issues relating to noise and planning in England. Paragraph 170 of the NPPF states that planning policies and decisions should aim to:

- preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans

In addition, Paragraph 180 of the NPPF states that *‘Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should’:*

- Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life

¹ Email from Rachel White, Boyer Planning to Oliver Packman KP Acoustics, 03.02.2021

- Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason

The Noise Policy Statement for England (NPSE) was developed by DEFRA and published in March 2010 with the aim to 'Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development.'

Noise Policy Statement England (NPSE) noise policy aims are as follows:

Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life*

The Noise Policy Statement England (NPSE) outlines observed effect levels relating to the above, as follows:

- NOEL – No Observed Effect Level
 - 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.
- LOAEL – Lowest Observed Adverse Effect Level
 - This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL – Significant Observed Adverse Effect Level
 - This is the level above which significant adverse effects on health and quality of life occur.

As stated in The Noise Policy Statement England (NPSE), it is not currently possible to have a single objective based measure that defines SOAEL that is applicable to all sources of noise in all situations. Specific noise levels are not stated within the guidance for this reason, and allow flexibility in the policy until further guidance is available.

4.2 BS8233:2014

BS8233:2014 ‘Sound insulation and noise reduction for buildings’ describes recommended internal noise levels for residential spaces. These levels are shown in Table 4.1.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB(A)	-
Dining	Dining Room/area	40 dB(A)	-
Sleeping (daytime resting)	Bedrooms	35 dB(A)	30 dB(A)

Table 4.1 BS8233 recommended internal background noise levels

It should be noted that the recommended internal noise levels outlined above are not applicable under “purge ventilation” conditions as defined by Approved Document F of the Building Regulations, as this should only occur occasionally (E.G. to remove odour from painting or burnt food). However, the levels above should be achieved whilst providing sufficient background ventilation, either via passive or mechanical methods.

The external building fabric would need to be carefully designed to achieve these recommended internal levels.

4.3 IEMA ‘Guidelines for Environmental Noise Impact assessment’

The Guidelines for Environmental Noise Impact Assessment, published by the Institute of Environmental Management & Assessment (IEMA) in October 2014, provide support on how noise impact assessments fit within the Environmental Impact Assessment (EIA) process. It outlines the environmental survey, prediction of change in noise levels as a result of implementing the proposed development and the evaluation of the significance of the effect of changes. Noise impact is defined as follows:

‘The difference in the acoustic environment before and after the implementation of the proposals (also known as the magnitude of change). This includes any change in noise level and in other characteristics/features, and the relationship of the resulting noise level to any standard benchmarks’

The guidance states that factors such as Time of Day/Night/Week, Frequency of Occurrence, Spectral Characteristics and the Nature of the noise source will affect the noise effect i.e. the consequence of noise impact. Considering all factors, the significance of impact can be assessed with the anticipated change in acoustic environment.

IEMA guidance outlines effect descriptors for predicted changes in noise level as follows:

Effect	Descriptor
Very Substantial	Greater than 10 dB L_{Aeq} change in sound level perceived at a receptor of great sensitivity to noise
Substantial	Greater than 5 dB L_{Aeq} change in sound level at a noise-sensitive receptor, or a 5 to 9.9 dB L_{Aeq} change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB L_{Aeq} change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB L_{Aeq} change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB L_{Aeq} change in sound level at a receptor of some sensitivity
None/Not Significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals

Table 4.2 IEMA Guidelines effect descriptors

Magnitude	Description of Effect
Very Substantial	Receptor perception = Physically Harmful Significant changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.
Substantial	Receptor perception = Disruptive Causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area.
Moderate	Receptor perception = Intrusive Noise impact can be heard and causes small changes in behaviour and/ or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Potential for non-awakening sleep disturbance ⁸¹ . Affects the character of the area such that there is a perceived change in the quality of life.
Slight	Receptor perception = Non-intrusive Noise impact can be heard, but does not cause any change in behavior or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.
None/Not Significant	N/A = No discernible effect on the receptor

Table 4.3 Generic relationship between noise impact and noise effect, including the evaluation of significance

4.4 Patron Noise Emissions Criterion

It is understood that the beer garden is in use between (12.00 – 23.00), and that patrons are asked to start vacating at 10.30pm. Therefore, IEMA criterion has been set to achieve a “None/Not Significant” impact as shown in Table 4.4 in order to comply with the above requirements.

Time period	Averaged Measured L_{eq} (22:00 – 23:00)	Cumulative Noise Criterion at Nearest Residential Receiver
Evening (22:00 – 23:00)	48 dB(A)	≤ 50.9 dB(A)

Table 4.4 Proposed noise emissions criterion

5.0 PROJECT PROPOSALS AND SITE LAYOUT

5.1 Proposed Site

Plans of the proposed site are shown in Figure 5.1 along with the location of the existing pub outdoor seating area.

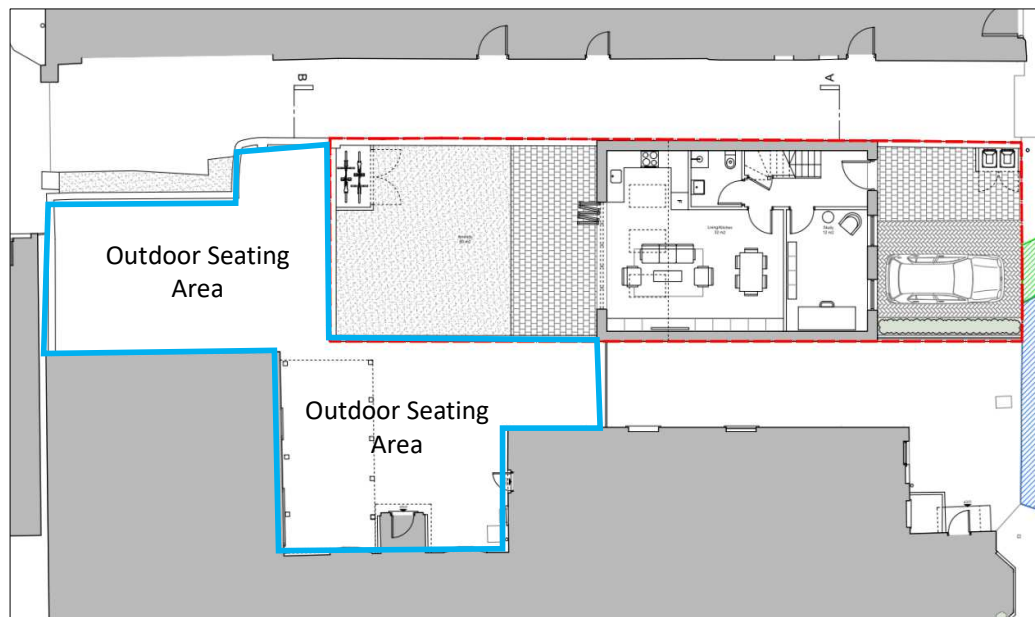


Figure 5.1 Site Layout, Ground Floor

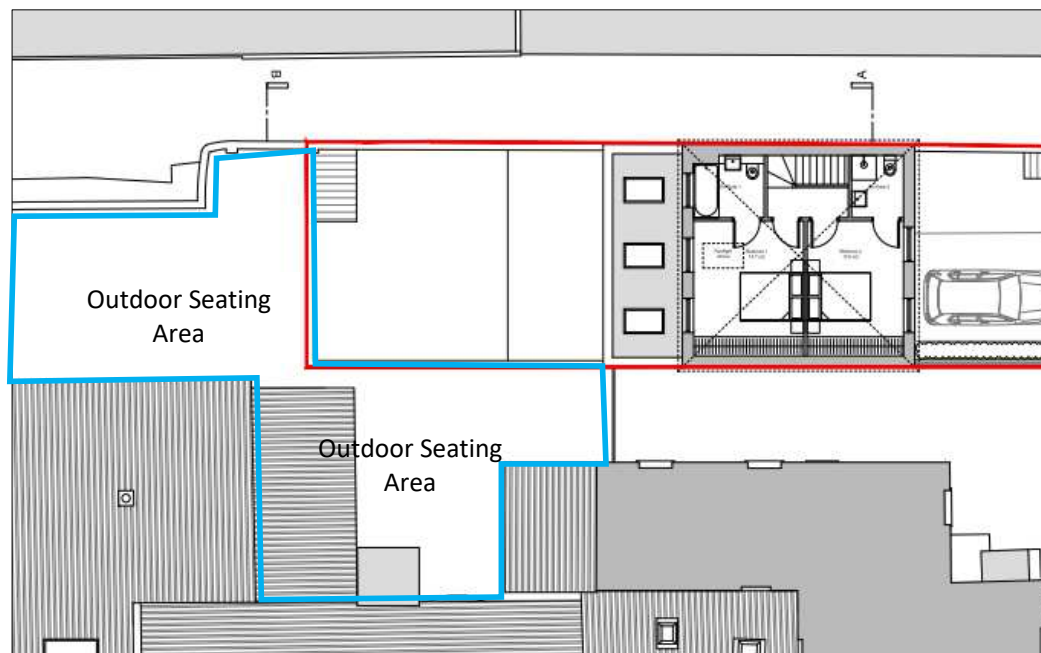


Figure 5.2 Site Layout, First Floor

A 2.0m brick wall is proposed at the boundary of the proposed residential property and the pub seating area.

6.0 PATRON NOISE ASSESSMENT

6.1 IEMA Noise Assessment to Openable Windows

Due to the Covid-19 lockdown measures at the time of this assessment, The Load of Hay pub was closed. Therefore, the impact of noise at the proposed residential development due to patrons within the pub beer garden has been assessed using in house noise level data taken at a similar site, shown in Table 6.1.

Noise Source	Octave band centre frequency ambient noise level, L _{Aeq} , 1min dB					
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
Front beer garden (30 people), with some traffic noise in the background	65	66	72	69	64	56

Table 6.1 Overall measured L_{Aeq} levels for different operations

The IEMA assessment was carried out to the nearest windows that may need to be opened for either purge ventilation or potential overheating purposes at habitable spaces within the proposed dwelling. These were deemed to be the ground floor living space and the rooflight of the 1st floor bedroom closest to the beer garden.

An IEMA assessment was not carried out at windows not required for overheating/ventilation purposes, as these can remain closed during busy periods of the beer garden, with natural ventilation able to be provided by the fully openable rooflight. The glazing specification would provide a significant reduction to the noise at the façade. The assessment of noise at closed windows was carried out based on with BS8233:2014 internal noise criteria in Section 6.2.

Tables 6.2 and 6.3 show the results of the predicted noise level at the ground floor living room, and the openable rooflight of the first floor closest bedroom of the proposed residential development.

Results		Comments
Patron Noise	$L_{Aeq, 1min} 73dB(A)$	In-house patron noise data
Distance correction from seating area to new residential façade	-19dB	Approx. 9 meters from centre point of the closest outdoor seating area
Barrier attenuation from boundary wall	-10dB	Calculated noise reduction from 2m boundary wall
Noise Level at Ground Floor of Residences (A)	$L_{Aeq} 44dB$	Calculated source level, minus corrections
Hourly ambient noise level	$L_{Aeq, 1 hour} 48dB(A)$	L_{Aeq} during 22:00 - 23:00
Predicted noise level (B)	$(48+44) dB = 59.5dB$	Logarithmic addition of existing and predicted patron noise level
Change in ambient noise level (B – A)	+1.5dB	Corresponds to an effect descriptor of 'None/Negligible'

Table 6.2 IEMA assessment, Ground Floor Living room

Results		Comments
Patron Noise	$L_{Aeq, 1min}$ 73dB(A)	In-house patron noise data
Distance correction from seating area to new residential façade	-23dB	Approx. 11 meters from centre point of the outdoor seating area
Attenuation from building façade & angle of window	-5dB	Grazing line of sight to beer garden
Noise Level at First Floor of Residences (A)	L_{Aeq} 45dB	Calculated source level, minus corrections
Hourly ambient noise level	$L_{Aeq, 1 hour}$ 48dB(A)	L_{Aeq} during 22:00 – 23:00
Predicted noise level (B)	(45+48) dB = 49.8dB	Logarithmic addition of existing and predicted patron noise level
Change in ambient noise level (B – A)	+1.8dB	Corresponds to an effect descriptor of 'None/Negligible'

Table 6.3 IEMA assessment, First Floor Bedroom rooflight

As shown in Tables 6.2 & 6.3, patron noise within the adjacent outdoor seating area would be expected to have a 'negligible' impact at the nearest fully openable windows, i.e. ground floor windows and first floor roof light of the proposed development in accordance with IEMA descriptors.

6.2 BS8233 Assessment to Closest Bedroom

Further calculations have been undertaken to assess whether the noise from the pub outdoor seating area would be expected to meet the recognised British Standard recommendations internally within the closest bedroom, in order to further ensure the amenity of the proposed dwelling.

The predicted noise emission value of 53dB(A) (considering only distance attenuation) has been determined externally at 1m from the receiving first floor bedroom windows. Two windows are proposed at the 1st floor bedroom, with a fully openable rooflight on the north pitch.

British Standard 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' provides recommendations for acceptable internal noise levels in residential properties, as shown in Table 6.4.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Rooms	35 dB(A)	-
Dining	Dining Room/area	40 dB(A)	-
Sleeping (daytime resting)	Bedrooms	35 dB(A)	30 dB(A)

Table 6.4 BS8233 recommended internal background noise levels

Therefore, BS8233 recommends 35dB(A) for internal resting conditions during day-time hours within the closest bedroom.

With a calculated external level of 53dB(A), the residential window itself would need to provide an additional 15dB attenuation in order for the recommended internal noise conditions to be achieved.

Assuming that typical double-glazed windows with an overall Sound Reduction Index of 31dB R_w (i.e. 4mm pane / 12mm cavity / 4mm pane) are installed, the interior noise level has been predicted in accordance with simplified BS8233:2014 calculation methodology and is shown in Table 6.5.

Receiver	BS8233 Criterion for Night-time	Noise Level Inside Nearest Residential Receiver
1 st Floor Window of Proposed Residential Development	35dB(A)	22dB(A)

Table 6.5 Noise levels and criteria inside nearest bedroom

As shown Table 6.5, in predicted levels would be expected to meet the recommendations of BS8233 within the nearest bedroom with windows closed.

7.0 VENTILATION AND OVERHEATING

7.1 Ventilation Strategy

Based on the noise levels measured on site and the pub beer garden noise assessment, appropriate ventilation systems are outlined in Table 7.1 below in order to ensure the internal noise environment is not compromised.

Ventilation System	Whole Dwelling Ventilation	Extract Ventilation
ADF System 1	Northerly Bedroom - Trickle vents providing a minimum performance of 35dB D_{n,e,w} Other Habitable spaces - Trickle vents providing a minimum performance of 30dB D_{n,e,w}	Intermittent extract fans

Table 7.1 Ventilation systems

In all cases, purge ventilation would be provided by openable windows (or rooflight in the case of the northerly bedroom). The internal noise level requirement would not be applicable during purge conditions as this would only occur occasionally.

8.0 CONCLUSION

An environmental noise survey has been undertaken at 33 Villier Street, Uxbridge UB8 2PU allowing the assessment of levels of predicted patron noise likely to be experienced by the proposed development.

Predicted patron noise within the adjacent outdoor seating area would be expected to have a negligible impact at the openable windows of the proposed dwellings in accordance with IEMA descriptors, which is deemed acceptable.

Predicted noise levels allowed a typical glazing specification to be proposed which would provide internal noise levels for all residential environments of the development commensurate to the design range of BS8233.

No further mitigation measures should be required in order to protect the proposed residential units from external noise intrusion from the adjacent pub outdoor seating area.

Land Off 33 Villier Street
Environmental Noise Time History
From 07 January 2021 To 08 January 2021

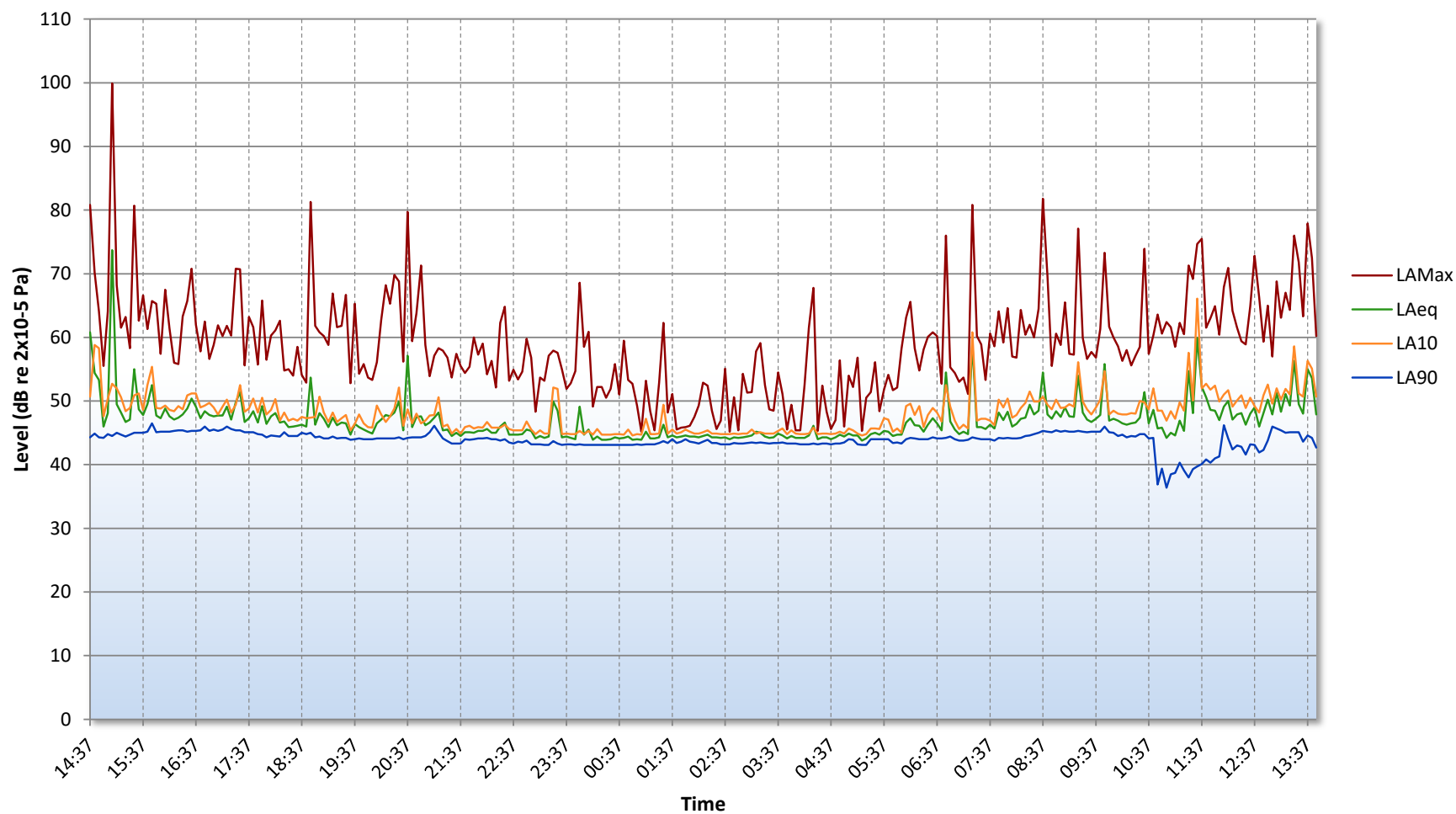


Figure 21907.TH1

GENERAL ACOUSTIC TERMINOLOGY

Decibel scale - dB

In practice, when sound intensity or sound pressure is measured, a logarithmic scale is used in which the unit is the 'decibel', dB. This is derived from the human auditory system, where the dynamic range of human hearing is so large, in the order of 10^{13} units, that only a logarithmic scale is the sensible solution for displaying such a range.

Decibel scale, 'A' weighted - dB(A)

The human ear is less sensitive at frequency extremes, below 125Hz and above 16Khz. A sound level meter models the ears variable sensitivity to sound at different frequencies. This is achieved by building a filter into the Sound Level Meter with a similar frequency response to that of the ear, an A-weighted filter where the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq} . The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for no more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise.

L_{90}

This is the level exceeded for no more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 11 such octave bands whose centre frequencies are defined in accordance with international standards. These centre frequencies are: 16, 31.5, 63, 125, 250, 500, 1000, 2000, 4000, 8000 and 16000 Hertz.

Environmental noise terms are defined in BS7445, *Description and Measurement of Environmental Noise*.

APPLIED ACOUSTIC TERMINOLOGY

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than a single source and 4 sources produce a 6dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Hearing perception is highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a guide to explain increases or decreases in sound levels for many scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud

Transmission path(s)

The transmission path is the path the sound takes from the source to the receiver. Where multiple paths exist in parallel, the reduction in each path should be calculated and summed at the receiving point. Outdoor barriers can block transmission paths, for example traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and construction.

Ground-borne vibration

In addition to airborne noise levels caused by transportation, construction, and industrial sources there is also the generation of ground-borne vibration to consider. This can lead to structure-borne noise, perceptible vibration, or in rare cases, building damage.

Sound insulation - Absorption within porous materials

Upon encountering a porous material, sound energy is absorbed. Porous materials which are intended to absorb sound are known as absorbers, and usually absorb 50 to 90% of the energy and are frequency dependent. Some are designed to absorb low frequencies, some for high frequencies and more exotic designs being able to absorb very wide ranges of frequencies. The energy is converted into both mechanical movement and heat within the material; both the stiffness and mass of panels affect the sound insulation performance.