

222 Archway Road London

Noise Impact Assessment Report Report 22515.NIA.02

Papa Architects
222 Archway Road
London
N6 5AX

Report 22515.NIA.01			
Revision History			
First Issue Date: 14/05/2021			
A		D	
B		E	
C		F	
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1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by Papa Architects Ltd to assess the suitability of the site at 222 Archway Rd, London N6 5AX for a residential development in accordance with Permitted Development rights as outlined in Class O (offices to dwelling/houses) of The Town and Country Planning (General Permitted Development) (England) Order 2015.

This report presents the results of the environmental survey undertaken in order to measure prevailing background noise levels and outlines any necessary mitigation measures.

2.0 SITE SURVEYS

2.1 Site Description

The site located within a parade of retail units to the north and south, and is bounded by Archway to the west/south-west. At the time of the survey, the background noise climate was dominated by road traffic noise from Archway. No significant noise was associated with the retail units within the parade over and above the prevailing road traffic noise.

2.2 Environmental Noise Survey Procedure

Noise surveys were undertaken on site as shown in Figure 2.1. The locations were chosen in order to collect data representative of the worst-case levels expected on the site due to all nearby sources, including those from nearby commercial premises.

Continuous automated monitoring was undertaken for the duration of the survey between 10:56 on 12/05/2021 and 10:56 on 13/05/2021.

Weather conditions were generally dry with light winds and therefore suitable for the measurement of environmental noise. The measurement procedure complied with ISO 1996-2:2007 Acoustics '*Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels*'.

2.3 Measurement Positions

Measurement positions are as described within Table 2.1 and shown within Figure 2.1.

Icon	Descriptor	Location Description
	Noise Measurement Position 1	The microphone was installed at the parapet of the first-floor flat roof overlooking Archway as shown in Figure 2.1. A correction of 3dB has been applied to account for non-free field conditions. Additional manual measurements were undertaken at ground floor level to correct the levels measured at first floor level

	Noise Measurement Position 2	The microphone was installed on a tripod at 1.2m above ground level, at 1 metre from the rear façade of the building
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Table 2.1 Measurement positions and descriptions

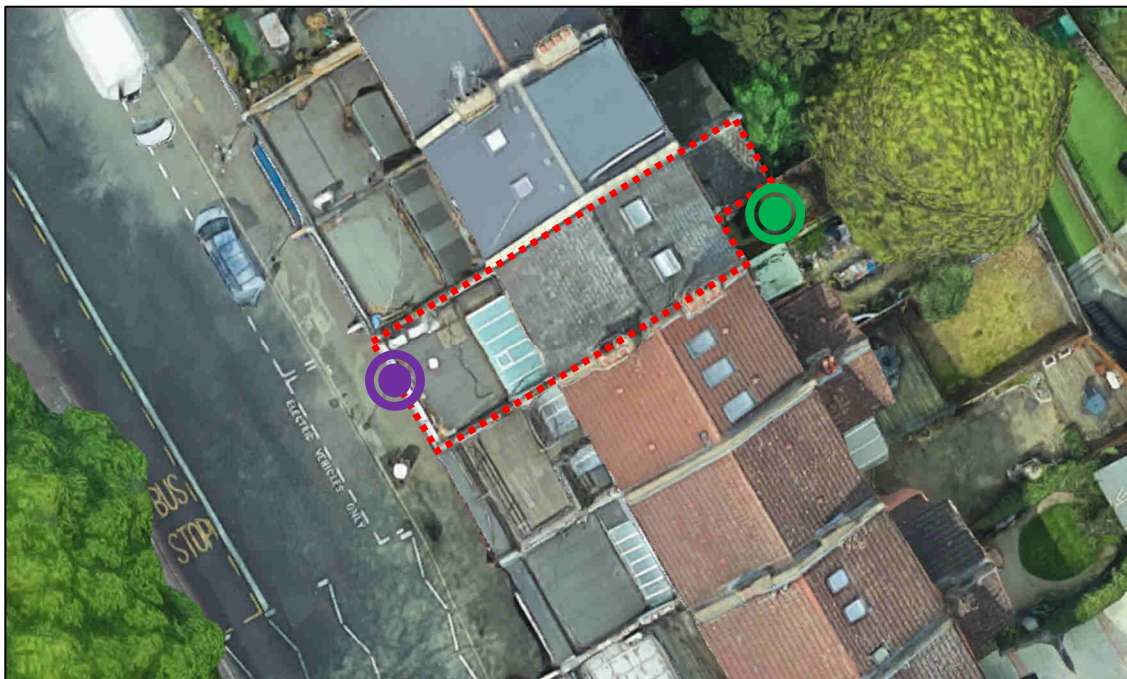


Figure 2.1 Site measurement positions (Image Source: Google Maps)

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 4	Svantek Type 977B Class 1 Sound Level Meter	36453	27/02/2020	14015014-1
	Free-field microphone Aco Pacific 7052E	54143		
	Preamp Svantek 2v12L	41508		
	Svantek External windshield	-	-	-
Noise & Vibration Kit 1	Svantek Type 958A Class 1 Sound Level Meter	45579	03/09/2020	14012949-02
	Free-field microphone MTG MK255	11697		
	Preamp Svantek 2v12L	41535		
	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 time histories in Figures 22515.TH1-2 for noise monitoring positions 1 and 2 respectively.

Measured noise levels are representative of noise exposure levels expected to be experienced by all façades of the proposed development, and are shown in Table 3.1.

Time Period	Noise Measurement Position 1 (Measured & Corrected Noise level – dBA)	Noise Measurement Position 2 (Measured Noise level – dBA)
Daytime $L_{Aeq,16hour}$	70	51
Night-time $L_{Aeq,8hour}$	69	45

Table 3.1 Site average noise levels for daytime and night time

It should be noted that the L_{Aeq} noise levels presented in Table 3.1 include a 2dB uplift due to the manual measurement correction applied.

4.0 NOISE ASSESSMENT GUIDANCE

4.1 Permitted Development Rights

It is understood that the office development would be converted into residential units under the Permitted Development Rights. Therefore, this assessment would be targeted to demonstrate the noise requirement as per Citation 7.1.c “*Amendments in relation to change of use of offices to dwelling houses*” of The Town and Country Planning (General Permitted Development) (England) (Amendment) Order 2016:

“Development under Class O is permitted subject to the condition that before beginning the development, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—

(a) transport and highways impacts of the development,

(b) contamination risks on the site,

(c) flooding risks on the site, and

(d) impacts of noise from commercial premises on the intended occupiers of the development”

It should be noted that whilst the premises is located within a parade of shops, the adjacent units would not be considered to be a significant noise generators, and there is no noise generating facility nearby that could potentially impact the amenity of future residents. Therefore, the impacts of noise from commercial premises on the intended occupiers of the development would be considered non-significant.

However, as good practice, the measured external noise levels would be used to ensure that the building fabric is upgraded such that the recommendations of the British Standard BS8233:2014 “*Sound insulation and noise reduction for buildings*” are met.

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

5.0 EXTERNAL BUILDING FABRIC SPECIFICATION

Sound reduction performance calculations have been undertaken in order to specify the minimum performance required from the glazed elements in order to achieve the recommended internal noise levels shown in Table 4.1, taking into account average and maximum noise levels monitored during the environmental noise survey. It should be noted that as the existing office frontage is fully glazed, and therefore there is no non-glazed element to consider on the front elevation.

5.1 Glazed Elements

Minimum octave band sound reduction index (SRI) values required for all glazed elements to be installed are shown in Table 5.1. The performance is specified for the whole window unit, including the frame and other design features such as the inclusion of trickle vents. Sole glass performance data would not demonstrate compliance with this specification.

Glazing performance calculations have been based both on average measured night-time noise levels as well as verified against the L_{Amax} spectrum of individual events in order to comply with a maximum internal noise level of 45dB(A) in bedrooms as recommended by

World Health Organisation Guidelines. The combined most robust results of these calculations are shown in Table 5.1.

Elevation	Octave band centre frequency SRI, dB						$R_w (C;C_{tr})$, dB
	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	
Front Elevation	30	30	39	44	48	51	42 (-1;-5)
Rear Elevation	22	20	26	36	39	31	31 (-1;-4)

Table 5.1 Required glazing performance

The existing glazing of the front elevation is currently comprised of good quality double-glazed system. However, this alone would not be sufficient to achieve the necessary sound reduction to meet the requirements of BS8233 for residential dwellings, particularly due to the presence of the entrance door.

As changes to the external façade are not permitted under Permitted Development rights, we would recommend that a secondary glazing system is installed to enhance the current performance, as follows:

- 4mm glass space at a minimum distance of 100mm from the primary window
- Fixed panel system such as Series 46 Slimline from Selectaglaze or hinged casement system such as Series 45 Slimline from Selectaglaze

The above systems would provide a minimum of 45dB R_w , therefore meeting the required sound reduction index values presented in Table 5.1.

In addition to the enhanced glazing, a lobbied entrance would also be required behind the existing entrance door to ensure that the performance of the door section is also enhanced. This should be constructed as follows:

- Additional lobby entrance door to provide a minimum of 35dB R_w performance
- Drywall forming the lobby constructed from 70mm Gypsum 'C studs', with 50mm Rockwool RWA45 between the studs and 2x12.5mm Soundbloc either side

The existing glazing of the rear elevation would be sufficient to meet the sound reduction requirements noted in Table 5.1, and therefore no enhancements would be required in this area.

As noted in Section 4.1, the above recommendations are for the sole purpose of providing internal noise levels compliant with the recommendations of BS8233 with windows closed.

No upgrades would be required due to noise from nearby commercial premises. The impacts of noise from commercial premises on the intended residential occupiers of the development would therefore be considered non-significant.

5.2 Ventilation Requirements

As the windows onto Archway Road are non-openable, ventilation would be provided via an MVHR system for this façade. Natural ventilation would be available via the northeast facing windows in the rear façade of the building which has a quieter noise environment, as the noise measurements in shown in Table 3.1 demonstrate.

In the case of mechanical ventilation, systems should be designed to meet the internal noise levels as defined in CIBSE Guide A (2015), as shown in Table 5.2.

Room Type	LAeq, dB	NR
Bedrooms	30	25
Living Rooms	35	30
Kitchen	45-50	40-45

Table 5.2 CIBSE Guide A 2015 guidance levels for mechanical building services

6.0 CONCLUSION

An environmental noise survey has been undertaken at 222 Archway Rd, London N6 5AX allowing the assessment of daytime and night-time levels likely to be experienced by the proposed development.

Measured noise levels allowed a robust 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 habitable spaces from external noise intrusion.

No upgrades would be required due to noise from nearby commercial premises. The impacts of noise from commercial premises on the intended residential occupiers of the development would therefore be considered non-significant.

We have assessed the proposed layouts of this application against the previously submitted layouts of application ref: HGY/2021/1508 and can confirm that the layouts will not alter any of our recommendations or our conclusion.

Therefore 'the proposal would not result in unacceptable levels of noise and disturbance to the future occupiers of the unit with the windows facing the street remaining closed' as sated in the planning officers report under chapter 5.4.'

222 Archway, London - Monitoring Position 1
Environmental Noise Time History
From 12 May 2021 To 13 May 2021

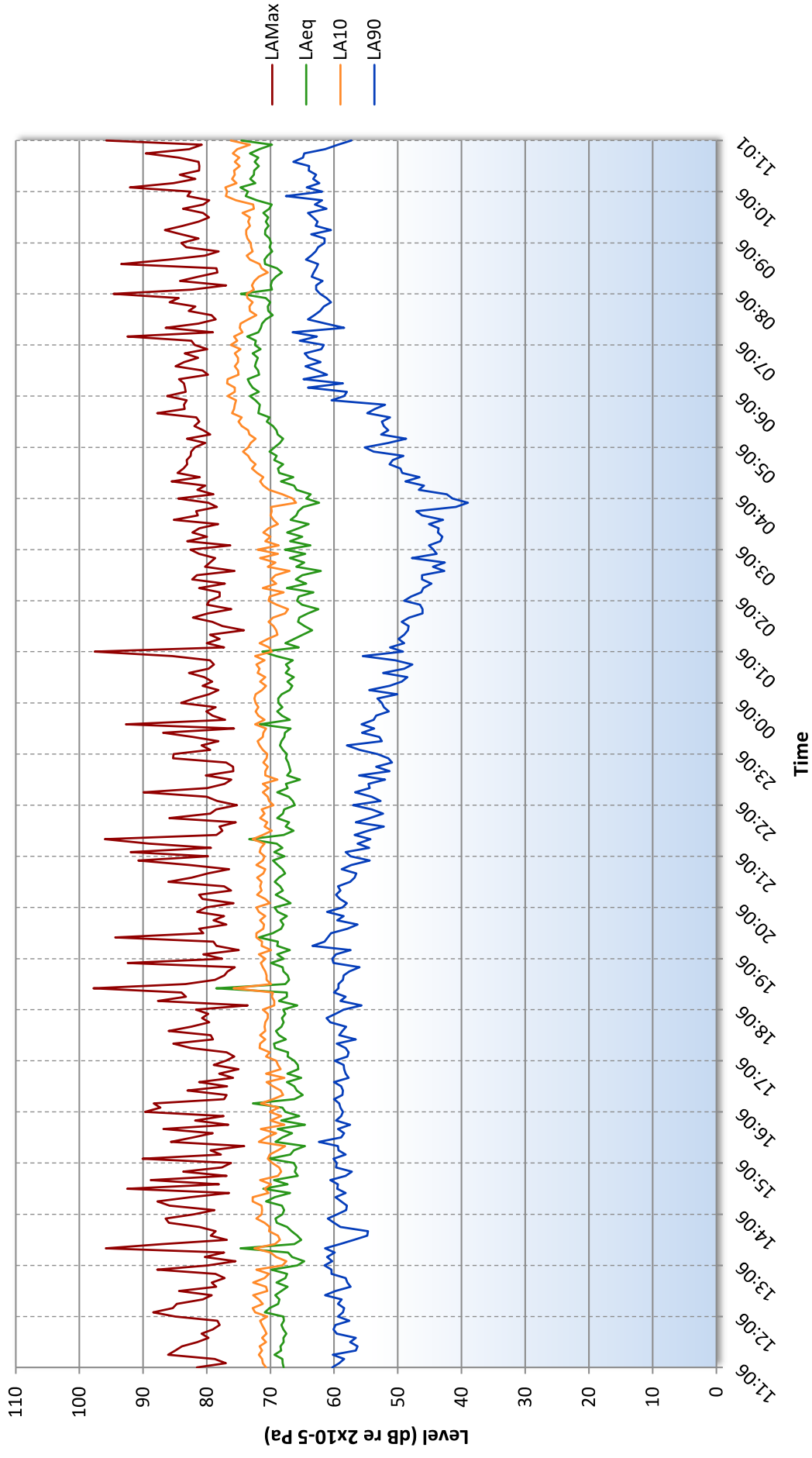


Figure 22515.TH1

222 Archway, London - Monitoring Position 2
Environmental Noise Time History
From 12 May 2021 To 13 May 2021

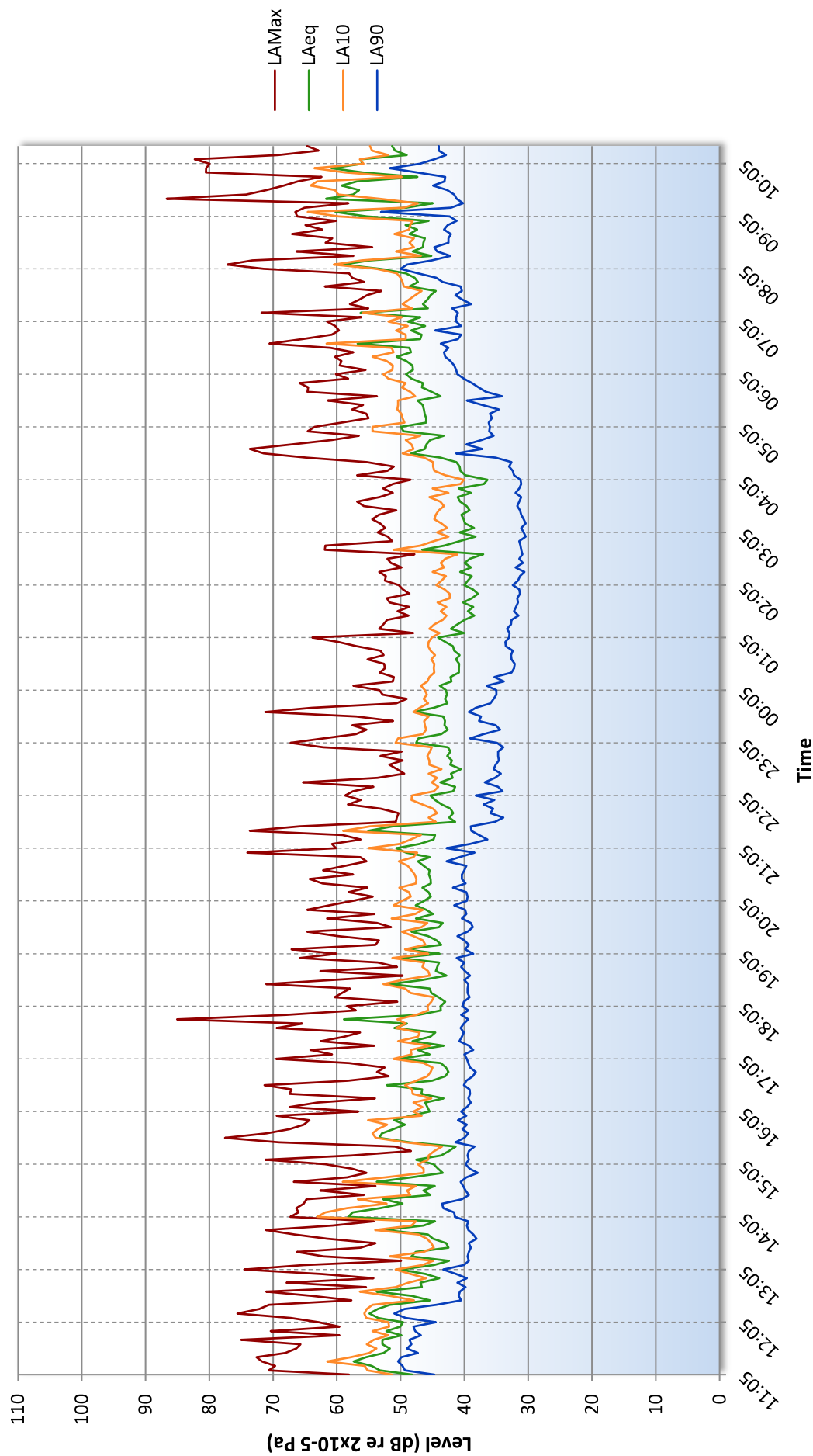


Figure 22515.TH2

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 absorbents, 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.