

132 Uxbridge Road, Hayes London

Planning Compliance Report
Report 22552.PCR.01

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1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by Fahran Mahmood, 14 Gloucester Avenue, Chelmsford, CM2 9LE, to undertake a noise impact assessment for operations of a shisha bar at 132 Uxbridge Road, Hayes. Background noise levels measured from a previous noise survey will be used to determine daytime and night-time noise emission criteria for patron noise and a Kitchen Extraction Fan, in agreement with the planning requirements of London Borough of Hillingdon.

This report presents the overall methodology and results from the environmental survey, followed by calculations to demonstrate the feasibility of the plant unit installation to satisfy the emissions criterion at the closest noise-sensitive receiver. Mitigation measures will be outlined as appropriate.

2.0 SITE SURVEYS

2.1 Site Description

The site is bounded by residential and commercial premises to the North and East, and Uxbridge Road to the South and West. Entrance to the site is located on Uxbridge Road. Initial inspection of the site revealed that the background noise profile at the monitoring location was typical of an urban cityscape environment, with the dominant source being road traffic noise from the surrounding roads.



Figure 2.1 Site Location Plan (Image Source: Google Maps)

Due to repercussions of the Covid-19 lockdown measures vehicular traffic and general pedestrian movements are reduced during this period, therefore noise levels on site would be anticipated to be lower than 'normal' representative levels.

We have therefore used noise data from a KP Acoustics environmental noise survey taken in 2018 for a planning application at the same site.

Initial inspection of the site revealed that the background noise profile at the monitoring location was typical of an urban cityscape environment, with the dominant source being road traffic noise from the surrounding roads.

2.2 Environmental Noise Survey Procedure

Continuous automated monitoring was undertaken for the duration of the survey between 16:54 on 18/10/2018 and 16:00 on 19/10/2018.

The environmental noise measurement position, shisha lounge location, and the closest noise sensitive receiver relative to the plant & shisha lounge are described within Table 2.1 and shown within Figure 2.2.

Icon	Descriptor	Location Description
	Noise Measurement Position	The meter was installed on a window on the 1st floor of the rear façade, as shown in Figure 2.1. A correction of 3dB has been applied to account for non-free field conditions
	Closest Noise Sensitive Receiver	Rear façade. 1 st Floor window. Residential house to the West
	Proposed Shisha Lounge Location	Proposals are outlined in Section 5.1

Table 2.1 Measurement position and description

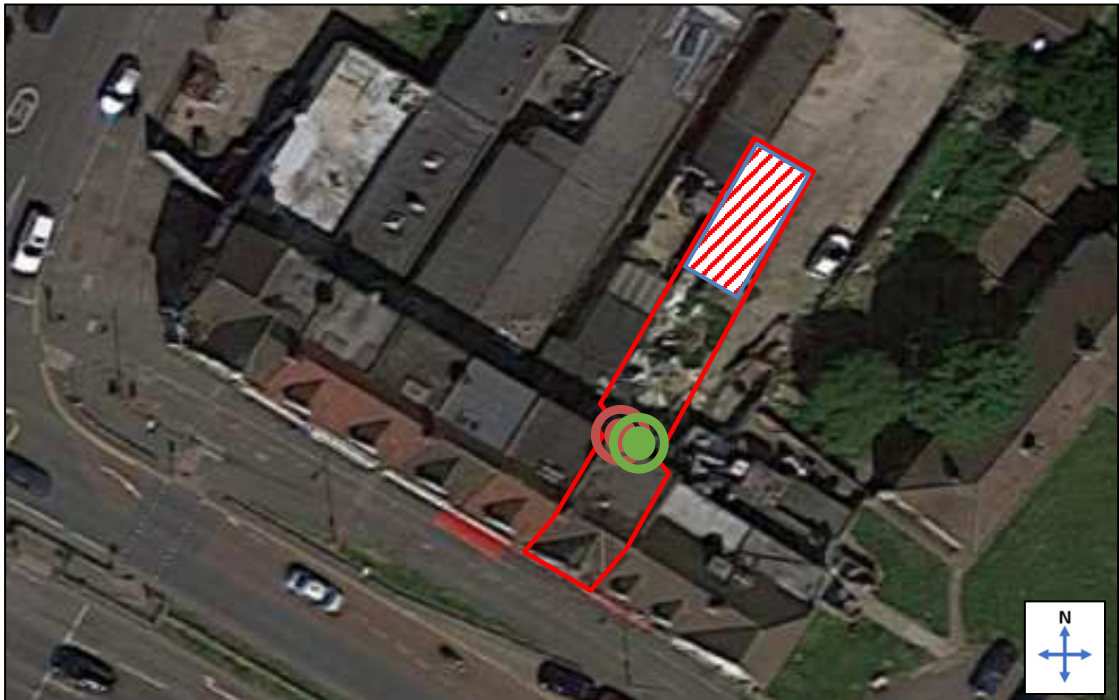


Figure 2.2 Site measurement position, identified receiver and proposed Shisha Bar installation (Image Source: Google Images)

The choice of the position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receiver relative to the proposed Shisha Lounge.

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*'.

Report any particular weather conditions that could raise questions. Ensure they are still within ISO1996-2:2007 acceptable tolerances.

2.3 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed. The equipment used is described within Table 2.3.

Measurement instrumentation
Svantek Type 958A Class 1 Sound Level Meter
Svantek 2v12L free-field microphone
B&K Type 4231 Class 1 Calibrator
Svantek External windshield

Table 2.3 Measurement instrumentation

3.0 RESULTS

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 22552.TH1.

Averaged Ambient and Minimum background noise levels are shown in Table 3.1 for daytime and night-time.

Time Period	Average ambient noise level L_{Aeq} dB(A)	Minimum background noise level L_{A90} dB(A)
Daytime (07:00-23:00)	53	51
Night-time (23:00-07:00)	49	44
Hours of Operation (Extract Fan) (12:00-00:00)	53	45

Table 3.1 Minimum background noise levels and average ambient noise levels

4.0 NOISE ASSESSMENT GUIDANCE

4.1 BS4142: 2014 “Methods for rating and assessing industrial and commercial sound”

British Standard BS4142:2014 ‘Methods for rating and assessing industrial and commercial sound’ describes a method for rating and assessing sound of an industrial and/or commercial nature, which includes:

- Sound from industrial and manufacturing processes
- Sound from fixed installations which comprise mechanical and electrical plant and equipment

- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises, and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes.

This Standard compares the noise levels in terms of a L_{Aeq} for a one-hour period during the daytime (07:00 – 23:00 hours) and a fifteen-minute period during the night-time (23:00 – 07:00 hours) due to the noise source, the “Specific Noise Level”, with the existing background noise level in terms of an L_{A90} when the noise source is not operating.

The resultant background sound level is subtracted from the Rating Level to obtain an initial estimate of the impact.

- 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 could be an indication of an adverse impact, depending on the context.

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

The initial estimate of the impact may then be modified by taking consideration of the context in which the sound occurs.

4.1 IMEA Guidelines for Environmental Noise Impact Assessment Version 1.2 (November 2014)

There is no specific standard for assessment with regards to external play areas or patron noise emissions. However, it is in our professional opinion that the set noise criterion should be based on the noise profile of the area at the receiver as per IMEA Guidelines for Environmental Noise Impact Assessment Version 1.2 (November 2014) in order to ensure that the amenity of the noise sensitive receiver is protected.

To determine the overall noise impact, the aforementioned document presents the combination of magnitude and sensitivity criteria into a Degree of Effect matrix as shown in Figure 5.1 with the corresponding descriptor in Table 4.1.

		IMPORTANCE/SENSITIVITY OF RECEPTOR			
		High	Medium	Low	Negligible
MAGNITUDE/SCALE OF CHANGE	Large	Very Substantial	Substantial	Moderate	None
	Medium	Substantial	Substantial	Moderate	None
	Small	Moderate	Moderate	Slight	None
	Negligible	None	None	None	None

Table 4.1 Degree of effect matrix

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	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 Effect descriptor

4.2 Local Authority Guidance

The criterion of the London Borough of Hillingdon for noise emissions of new plant in this instance is as follows:

“The proposed plant and machinery shall be operated so as to ensure that any noise generated is “not audible” outside the nearest noise sensitive premises. To demonstrate inaudibility, you will need to provide calculations that show that the plant noise level is 10dBA below the lowest background level (LA90 (15minutes)) 1m from the nearest noise sensitive window, over the proposed operating hours.”

4.3 Noise Emissions Criterion

Kitchen Extract Noise

It is understood that the Kitchen Extraction Fan is proposed to be used between 12.00 – 00.00hrs, and therefore the criterion has been set as shown in Table 4.3 in order to comply with the Local Authority requirements.

Time Period	Noise Criterion at Nearest Residential Receiver
Night-time (23:00 to 07:00)	35 dB(A)

Table 4.3 Proposed plant noise emissions criterion

Shisha Lounge Patron Noise

Considering that the residential building would be considered as Medium-High sensitive receiver, we would recommend that the noise generated by the proposed external area should not change moderately or substantially the current ambient noise of the area.

So that the hours of operation are not limited by noise, the shisha lounge has been assumed to be operating at any time during the day or night, therefore we propose to set the noise criteria as shown in Table 4.4, based on the measured ambient night-time noise in the area presented (as shown in Table 3.1).

Time Period	Noise Criterion at Nearest Residential Receiver
Night-time (23:00 to 07:00)	51.9 dB(A)

Table 4.4 Proposed Shisha Lounge noise emissions criterion

5.0 PLANT NOISE IMPACT ASSESSMENT

5.1 Proposed Plant Installations

It is understood that the proposed plant installation is comprised of the following unit:

- 1 no. Woods 40 MaXfan Compact Extract Fan Unit

The proposed unit will be situated within the kitchen and connected to a flue that will terminate at the first-floor level above the new flat roof to the rear of the building, as shown in Figure 5.1 below.

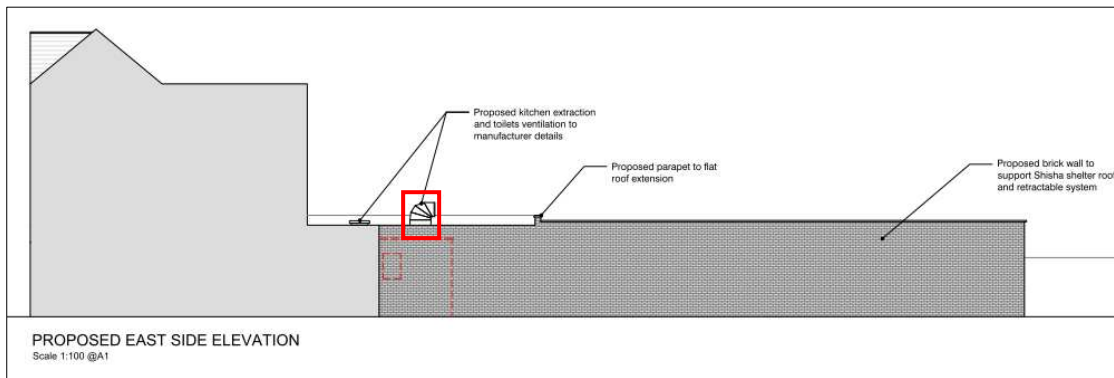


Figure 5.1 Proposed Shisha Lounge extract flue location

The noise emission levels as provided by the manufacturer for the unit are shown in Table 5.1.

Unit	Descriptor	Octave Frequency Band (Hz)								Overall (dBA)
		63	125	250	500	1k	2k	4k	8k	
MaXfan Compact Extract Fan Unit	Outlet SWL@1m (dB)	77	77	85	84	71	78	74	69	85
	Breakout SWL@1m (dB)	67	62	65	59	53	48	50	48	61

Table 5.1 Plant Units Noise Emission Levels as provided by the manufacturer

5.2 Closest Noise Sensitive Receiver

The closest noise sensitive receiver to the proposed installation location has been identified as being a residential window of 132 Uxbridge Road, located approximately 6 metres from the proposed plant installation location at the rooftop level, as shown in Figure 2.2.

5.3 Calculations

Taking all acoustic corrections into consideration, the noise level contribution expected at the closest residential window from the kitchen extract system would be as shown in Table 5.2. Detailed calculations are shown in Appendix B1.

Receiver	Criterion	Noise Level at 1m From the Closest Noise Sensitive Window
132 Uxbridge Road, 1 st Floor Rear	35dB(A)	36dB(A)

Table 5.2 Predicted noise level and criterion at nearest noise sensitive location

As shown in Appendix B and Table 5.2, transmission of noise to the nearest sensitive windows due to the effects of the Kitchen Extract unit installation satisfies the emissions criterion of

London Borough of Hillingdon (with a negligible increase of 1dB), providing that the mitigation measures outlined in Section 6 are implemented.

6.0 SHIHA BAR NOISE IMPACT ASSESSMENT

6.1 Proposed Shisha Lounge

As the proposed shisha lounge is yet to be constructed, noise levels have been predicted based on the number of patrons within the Shisha Lounge.

Calculations have been undertaken to assess external noise levels within the external amenity area against noise data measured during the environmental noise survey.

Representative data of a single person talking has been taken from ANSI 3.5-1997 '*Methods for Calculation of the Speech Intelligibility Index*'. A correction has been added in order to consider the maximum number of pupils within the amenity area.

Source	Sound Power Level (dB) in each Frequency Band							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Level of a raised voice as per ANSI 3.5-1997	48	59	70	75	72	64	57	48

Table 6.1 Sound power Level of a single person talking

The above spectra has been corrected to match the overall sound power level for a group of people talking, determined from the following formula taken from *Prediction of Noise from Small to Medium Sized Crowds M.J.Hayne et al Proceedings of ACOUSTICS 2011, November 2011*, which approximates the sound power level of a group based on a series of crowds measurements:

$$L_{wAeq} = 15\log(N) + 64\text{dB}(A)$$

where *N* is the number in the group,

Calculations have considered breakout from a total of **70 patrons** withing the Shisha bar through the proposed retractable roof shown in Figure 6.1, to the nearest noise sensitive receivers at the 1st floor level of 132 Uxbridge Road.

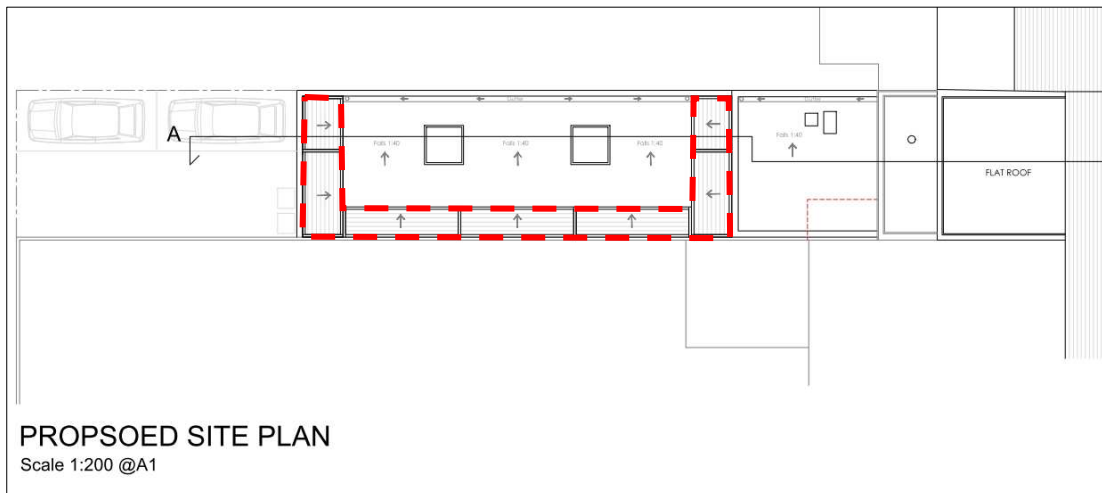


Figure 6.1 Proposed Shisha Lounge retractable roof location

6.2 Noise Impact from Shisha Lounge

Taking all acoustic corrections into consideration, the noise level contribution expected at the closest residential window from the proposed shisha lounge would be as shown in Table 6.2. Detailed calculations are shown in Appendix B2.

Descriptor	Level (dB)
L_{Aeq} Shisha Bar noise breakout (at 1m from façade of 132 Uxbridge Road)	48.8
$L_{Aeq,8hr}$ Current ambient noise level	49.0
$L_{Aeq,8hr}$ Current Ambient + Patron breakout noise level	51.9
Proposed criterion (current ambient noise level + 4.9dB)	≤ 51.9

Table 6.2: Predicted noise level and criterion at nearest noise sensitive location

As shown in Appendix B2 and Table 6.2, transmission of noise to the nearest sensitive windows due to the effects of the proposed shisha lounge would be expected to meet the proposed criteria and would result in 'No'/'Negligible' change in accordance with IEMA guidance.

7.0 NOISE CONTROL MEASURES

In order to achieve the specific sound level and subsequent rating level shown in the assessment above, the following noise control strategy should be adopted.

7.1 Kitchen Extraction System

In order to control the noise emissions from the kitchen extraction system duct termination point, an acoustic silencer should be installed providing the minimum insertion loss values outlined in Table 6.1 below.

Unit	Insertion Loss Levels (dB) in each Octave Frequency Band							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Acoustica Silencer CP03 - C*P - 0400 - 2D	3	10	14	24	30	29	28	21

Table 6.1 Insertion loss figures to be provided by acoustic silencer

In order to control the noise breakout from the casing of the extract fan installed, we would recommend that either an enclosure is installed around the fan casing, or lagging is installed (e.g. Superlag Original 10, CMS Danskisn or similar) which should provide the minimum insertion loss levels shown in Table 6.2.

Unit	Insertion Loss Levels (dB) in each Octave Frequency Band							
	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
Panels of enclosure	0	5	4	7	15	25	34	39
CMS Danskisn Superlag Original 10	0	5	4	7	15	25	34	39

Table 6.2 Insertion loss figures to be provided by acoustic enclosure

8.0 CONCLUSION

An environmental noise survey has been undertaken at 132 Uxbridge Road, Hayes, by KP Acoustics Ltd between 16:54 on 18/10/2018 and 16:00 on 19/10/2018. The results of the survey have enabled criteria to be set for noise emissions.

Using predicted patron noise levels and plant manufacturer noise data, noise levels are predicted at the nearby noise sensitive receivers for compliance with current requirements.

Calculations show that noise emissions from the Kitchen Extract unit installation would meet the requirements of London Borough of Hillingdon, providing that the mitigation measures outlined in Section 7 are implemented.

Predicted levels show that noise emissions from the Shisha Bar would meet the proposed criteria and cause 'Negligible' impact in accordance with IEMA criteria.

132 Uxbridge Road, Hayes, London
Environmental Noise Time History
From 18 October 2018 To 19 October 2018

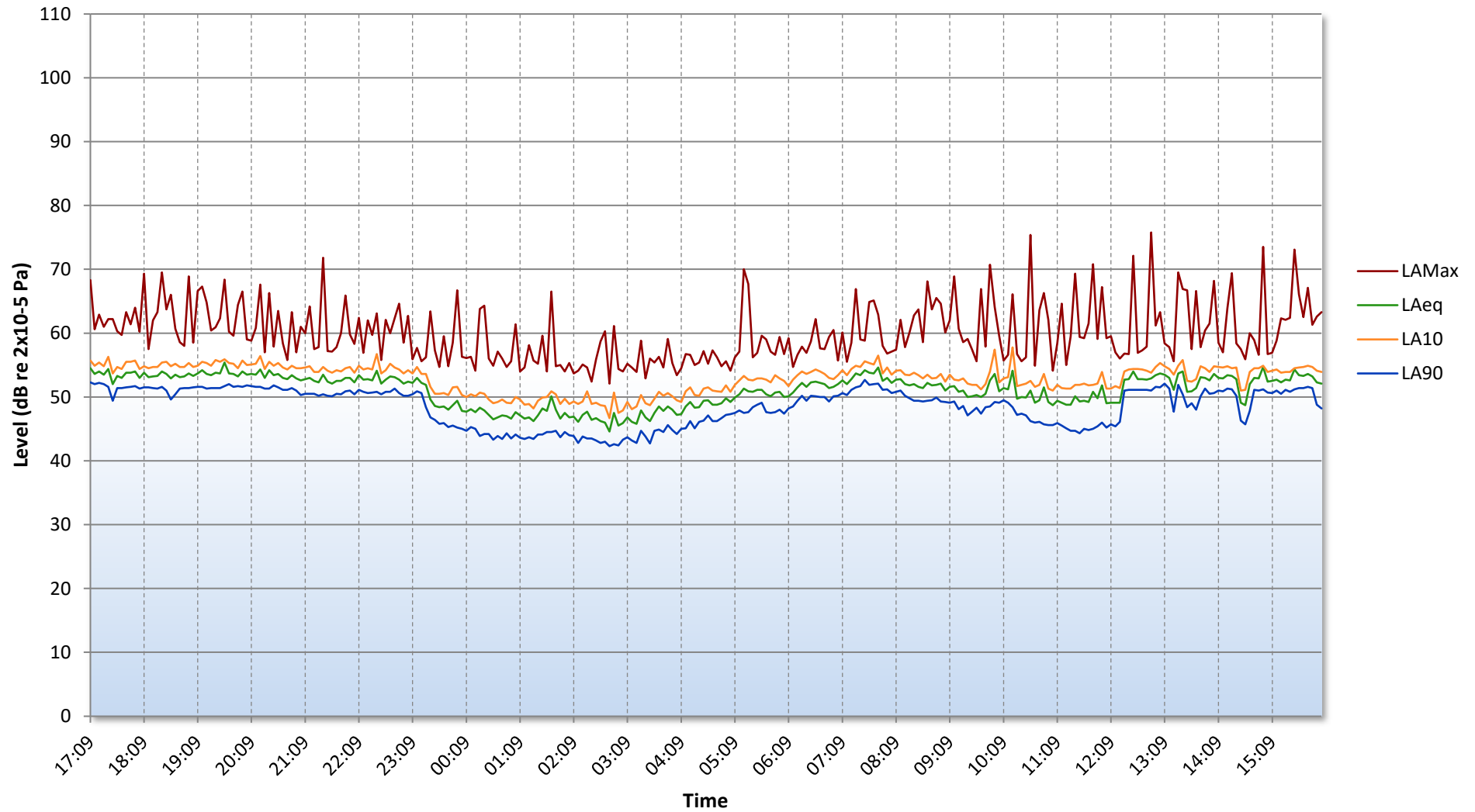


Figure 18326.TH1

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 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.

APPENDIX B1 132 Uxbridge Road

PLANT NOISE EMISSIONS CALCULATIONS

Source: 132 Uxbridge Road, Kitchen Extract Receiver: 1st Floor Residential	Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Extraction Fan - Noise Emissions from Duct Termination Point									
MaXfan Compact Extract Fan Unit (Sound Power Level)	77	77	85	84	71	78	74	69	85
Attenuation due to duct bends (1), dB	0	0	0	-1	-2	-3	-3	-3	
Correction due to duct end reflection, dB	-8	-4	-1	0	0	0	0	0	
Conversion to SPL@1m	-11	-11	-11	-11	-11	-11	-11	-11	
Correction due to surface reflections (1), dB	3	3	3	3	3	3	3	3	
Minimum attenuation provided by the building envelope, dB	0	0	0	0	0	0	0	0	
Minimum attenuation provided by distance (6m), dB	-16	-16	-16	-16	-16	-16	-16	-16	
Directivity Correction dB	-1	-2	-5	-5	-5	-5	-5	-5	
Minimum attenuation required from proposed silencer, dB	-3	-10	-14	-24	-30	-29	-28	-21	
Total Noise Emissions from Extraction Fan Duct Termination Point, dB	41	37	41	30	10	17	14	16	34
Extraction Fan - Noise Breakout from Fan Casing Breakout									
MaXfan Compact Extract Fan Unit (Sound Power Level)	67	62	65	59	53	48	50	48	61
Conversion to SPL@1m	-11	-11	-11	-11	-11	-11	-11	-11	
Correction due to surface reflections (1), dB	3	3	3	3	3	3	3	3	
Minimum attenuation provided by the building envelope, dB	0	0	0	0	0	0	0	0	
Minimum attenuation provided by distance (6m), dB	-16	-16	-16	-16	-16	-16	-16	-16	
Minimum attenuation required from proposed lagging to casing, dB	0	-5	-4	-7	-15	-25	-34	-39	
Total Noise Emissions from Fan Casing Breakout, dB	43	33	37	28	14	-1	-8	-15	31
Sound Pressure Level at Receiver due to Extract Unit, dB	46	39	43	33	16	18	15	16	36

Design Criterion	35
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APPENDIX B

132 Uxbridge Road, Hayes

PLANT NOISE EMISSIONS CALCULATIONS

Source: Patron Noise, Shisha Bar, 132 Uxbridge Road Rear Receiver: 1st Floor, 132 Uxbridge Road Rear	Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Sound Power level within Shisha Lounge (70 People - Raised Voice)	64	75	86	91	88	80	73	64	92
Approximate Sound Pressure level within Shisha Lounge	53	64	75	80	77	69	62	53	81
Partial barrier correction from flat roof & wall	-5	-5	-6	-6	-7	-9	-11	-13	
Correction for average distance from shisha bar to receptor (18m), dB	-25	-25	-25	-25	-25	-25	-25	-25	
Sound Pressure Level at Receiver due to Patrons, dB	23	34	44	49	45	35	26	15	48.8

Design Criterion	49
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