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Land Rear of 687 Green Lanes
Enfield, London

BS4142 Assessment Report
Report 27723.BS4142.01 Rev.A

Simply Planning
8-9 Stephen Mews
London
W1T 1AF

Report 27723.BS4142.01 Rev.A Revision History			
First Issue Date: 30/01/2024			
A	**08/03/2024** Noise Sensitive Receptor changed location.	D	
B		E	
C		F	

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1.0 INTRODUCTION

KP Acoustics Ltd has been commissioned by Simply Planning, 8-9 Stephen Mews, London, W1T 1AF to undertake a noise impact assessment of existing HGV movements serving the storage facility at the land to the rear of 687 Green Lanes.

A baseline environmental noise survey has been undertaken on site to allow the assessment of the noise impact from the existing noise source in accordance with BS4142:2014 '*Method for rating and assessing industrial and commercial sound*'.

This report presents the methodology and results from the environmental survey, followed by calculations in accordance with BS4142 to provide an indication as to the likelihood of the noise emissions from the storage site having an adverse impact on the closest noise sensitive receiver. Mitigation measures will be outlined as appropriate.

2.0 SITE SURVEYS

2.1 Site Description

As shown in Figure 2.1, the site is bounded by storage facilities to the north, residential properties to the west, commercial shops to the south, and Green Lanes to the east.

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

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 Green Lanes.

2.2 Environmental Noise Survey Procedure

Continuous automated monitoring was undertaken for the duration of the noise survey between 11:45 on 15/12/2023 and 11:30 on 18/12/2023.

The environmental noise measurement position and the closest noise sensitive receiver relative to the site activity are described within Table 2.1 and shown within Figure 2.2.

Icon	Descriptor	Location Description
1	Noise Measurement Position 1	The microphone was installed on a tripod at ground floor level. The microphone was positioned within free-field conditions at least approx. 1.5 metres from the nearest surface.
	Nearest noise sensitive receptors	Rear façade. 1st Floor window. Residential house to the east, 687 Green Lanes.

Table 2.1 Measurement positions and descriptions

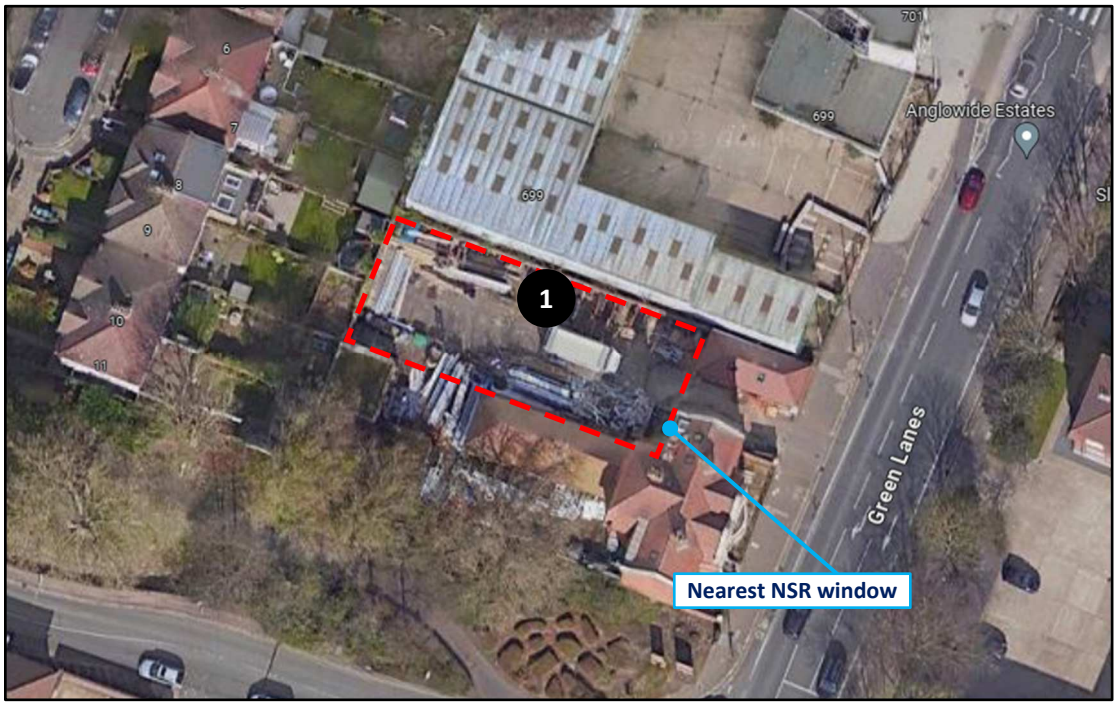

Figure 2.2 Site measurement position (Image Source: Google Maps)

The choice of the position was based both on accessibility and on collecting representative noise data in relation to the nearest noise sensitive receiver and activity within the site.

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 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 27	NTI Audio XL2 Class 1 Sound Level Meter	A2A-21174-E0	21/07/2022	UK-22-070
	Free-field microphone NTI Acoustics MC230A	A23539		
	Preamp NTI Acoustics MA220	11025		
	NTI Audio External Weatherproof Shroud	-	-	-
Larson Davis CAL200 Class 1 Calibrator		17148	21/03/2023	UCRT23/1363

Table 2.2 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 27723.TH1.

Representative background noise levels are shown in Table 3.1 for daytime and night-time.

It should be noted that the representative background noise level has been derived from the most commonly occurring $L_{A90,5\ min}$ levels measured during the environmental noise survey undertaken on site, as shown in 27723.Daytime L90.TH1 and 27723.Daytime L90.TH1 attached.

Time Period	Representative background noise level L_{A90} dB(A)	Representative background noise level $L_{Aeq,T}$ dB(A)
Daytime (07:00-23:00)	44	49
Night-time (23:00-07:00)	37	47

Table 3.1 Representative background 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 Rating Level due to the noise source/s under assessment 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) with the existing background noise level in terms of an L_{A90} when the noise source is not operating.

It should be noted that the Rating Level is the Specific Sound Level in question ($L_{Aeq,\ Tr}$), including any relevant acoustic feature corrections, as follows:

- **Tonality** – '*For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible'*
- **Impulsivity** – '*A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB f.*
- *or impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible'*
- **Intermittency** – '*If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied'*

- **Other sound characteristics** – '*Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied*'

Once the Rating Level has been obtained, the representative background sound level is subtracted from the Rating Level to obtain an initial estimate of the impact, as follows:

- 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 or significant 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

NOTE: Adverse impacts may include but not be limited to annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

5.0 BS4142 ASSESSMENT

5.1 Noise Assessment from various operations

Noise from HGV Vehicles traveling in and out of the delivery area has been considered. To inform our assessment we have considered noise levels from typical vehicle movements measured on previous sites, as described in Table 5.1 below.

Source Noise		Octave Band Centre Frequency								dB(A)
		63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
1	Full Delivery Operation L_{Zeq} SPL@2m	72	74	69	67	69	69	69	62	75
2	Lorry Driving at Low Speed entering site SPL@1m L_{Zeq}	66	61	57	60	60	58	53	46	64

Table 5.1 Assessment source levels

The closest noise sensitive receiver of proposed development has been identified as being a first floor window of 687 Green Lanes, as indicated in Figure 2.2.

We understand deliveries take place between 07:00 and 17:00, so the period from 07:00 to 08:00 has been chosen to represent a worst-case hour, where background noise levels are lowest. The duration of each delivery has been taken to be 15 minutes. Corrections have been applied to determine the impact over a one-hour assessment period as per BS4142.

Source Noise		SPL from Table 5.1 dB(A)	Distance Loss		Time Correction		Specific Sound Level at Receptor $L_{Aeq,1hour}$
			Distance (m)	Corr (dB)	Duration	Corr (dB)	
1	Full Delivery Operation $L_{eq\ 15\ mins}$ SPL@2m	75dB(A)	20m	-20dB	1 hr	-6dB	$L_{eq,1hour}$ 49 dB
2	Lorry Driving at Low Speed entering site SPL@1m $L_{eq\ 15mins}$	64 dB(A)	35m	-26dB	1 hr	-6dB	$L_{eq,1hour}$ 32 dB

Table 5.2 Determination of Specific Sound Level at receptor

The background noise levels measured on site are detailed in Table 5.3 below.

Measurement Position	Time Period	Representative background noise level L_{A90} dB(A)	Residual Sound Level L_{Aeq} dB(A)
Noise Measurement Position	07:00 – 08:00	44	52

Table 5.3 Representative background noise levels

BS4142 Assessment			
Source:	Delivery operations outlined above.		
Operating Period:	Day-time (07:00 – 08:00).		
Reference time interval (*Tr*):	1 h		
Receiver:	First floor residential window of the proposed development on the west façade, as outlined in Figure 2.2.		
	Level (dB)		
Element	**1**	**2**	**Comment**
Specific Sound Level $L_{Aeq,1hour}$	49 dB(A)	32 dB(A)	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.
Acoustic Features	+3 dB	+3 dB	A +3dB impulsivity correction has been applied for a slight impulsivity from the unloading operations.
Rating Level	52dBA	35dBA	Rating Level = Specific Sound Level + Acoustic Feature Corrections.
Cumulative Rating Level	52dBA		Logarithmic addition of above.
Representative Background Sound Level $L_{A90,\,T}$	44dBA		Sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, *T*. Derived using the most common occurring levels $L_{A90,\,5min}$ during the environmental noise survey undertaken on site.
Excess of rating over background sound level	(52-44) dB = **+8 dB**		Difference of the Rating Level – Background Sound Level
Measured residual sound level $L_{Aeq,\,T}$	52dBA		Equivalent continuous A-weighted sound pressure level of the totally encompassing sound including residual sound and specific sound.
Assessment Indication			
Assessment Indication	Adverse Impact		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. The rating level is 8dB greater than the background sound level which, based on BS4142, is an indication of adverse impact.

		However, as stated in BS4142, context should be taken into consideration when assessing the likelihood of adverse impact. We note the receiver is subject to other industrial noise sources such as that from 699 Green Lanes, which are likely of a similar nature and magnitude. Additionally, the ambient noise climate which includes these sources and road traffic equates to 52dBA. This is equal to the rating level, also predicted at 52dBA.The predicted noise from the HGV movements does not exceed the existing residual noise on site. Therefore, considering the site context and assessment above, the assessment undertaken indicates a low impact at the receptor. The noise emitted from the HGV movement would be similar to that of the traffic noise generated outside the nearest receptor at Green Lanes.

Table 5.4 BS4142 Assessment

6.0 NOISE CONTROL MEASURES

To mitigate the impact of noise at closest noise sensitive receivers, we recommend the following noise management plan is implemented. All staff and delivery drivers must be made aware of the following:

- Adequate signs to be installed displaying a speed limit for vehicles when entering the site. Explanations to staff on the impact on noise of high speeds must be made.
- Minimal shouting or raised voices within the storage facility.
- No music to be played within the storage facility.
- No work to be undertaken within the period of 17:00 – 07:00.
- All vehicles to be switched off when loading/unloading materials, including engines and radios.

7.0 CONCLUSION

An environmental noise survey has been undertaken at the storage site serving the land to the rear of 687 Green Lanes, allowing the assessment of daytime levels likely to be experienced by the nearby residences.

The calculations have allowed the likelihood of any adverse impact upon nearby residents of the adjacent residential delivery site to be predicted.

Given the context of the site and the existing ambient noise levels, the rating level exceeding the representative day-time background noise level by 8dB has been determined to be indicative of a low adverse impact on nearby receivers, in accordance with BS4142 guidance.

Land of Rear of 687 Green Lanes London - Position 1
Environmental Time History
15/12/2023 to 18/12/2023

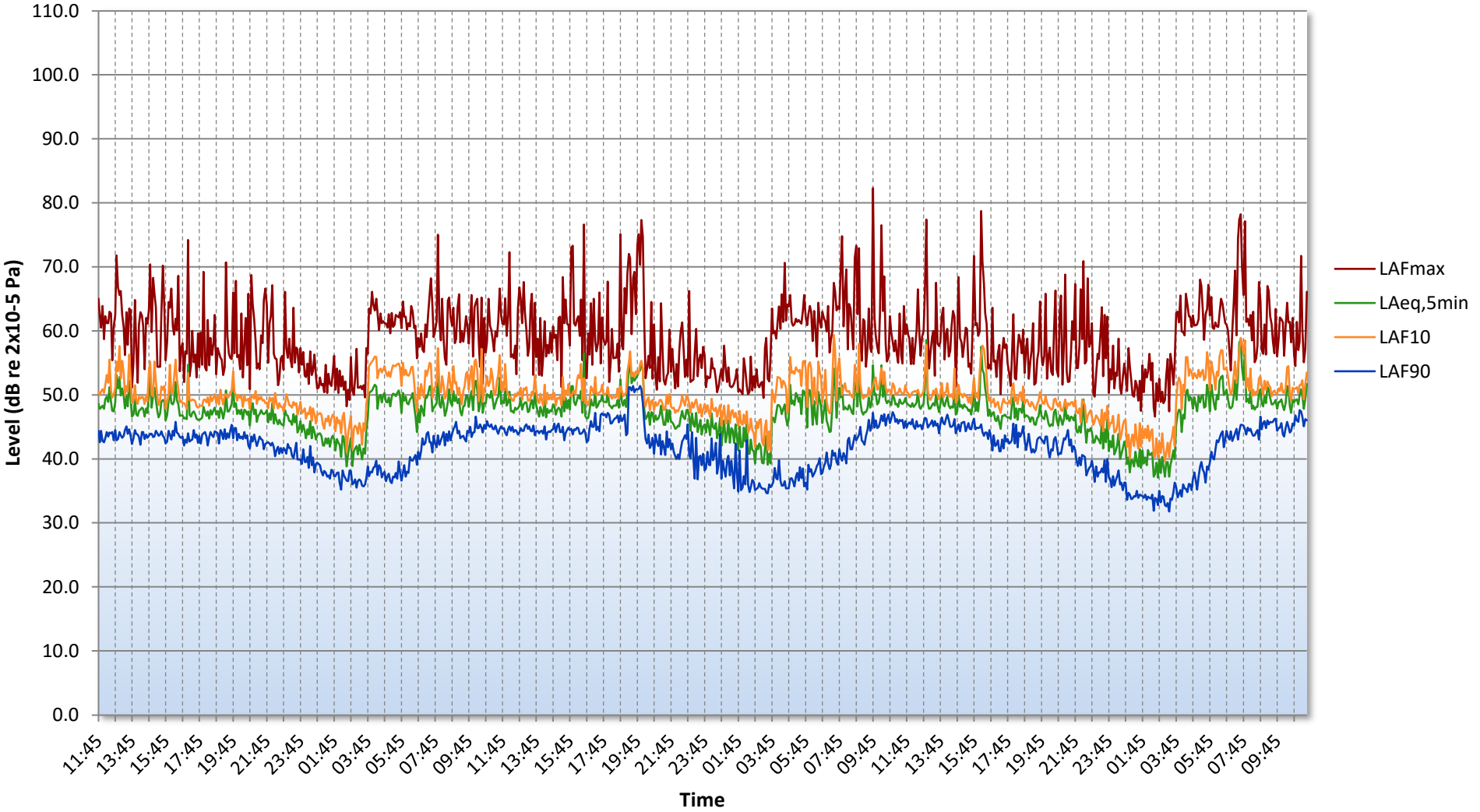

Figure 27723.TH1

Land of Rear of 687 Green Lanes London - Position 1
Representative Daytime Background Noise Level
15/12/2023 to 18/12/2023

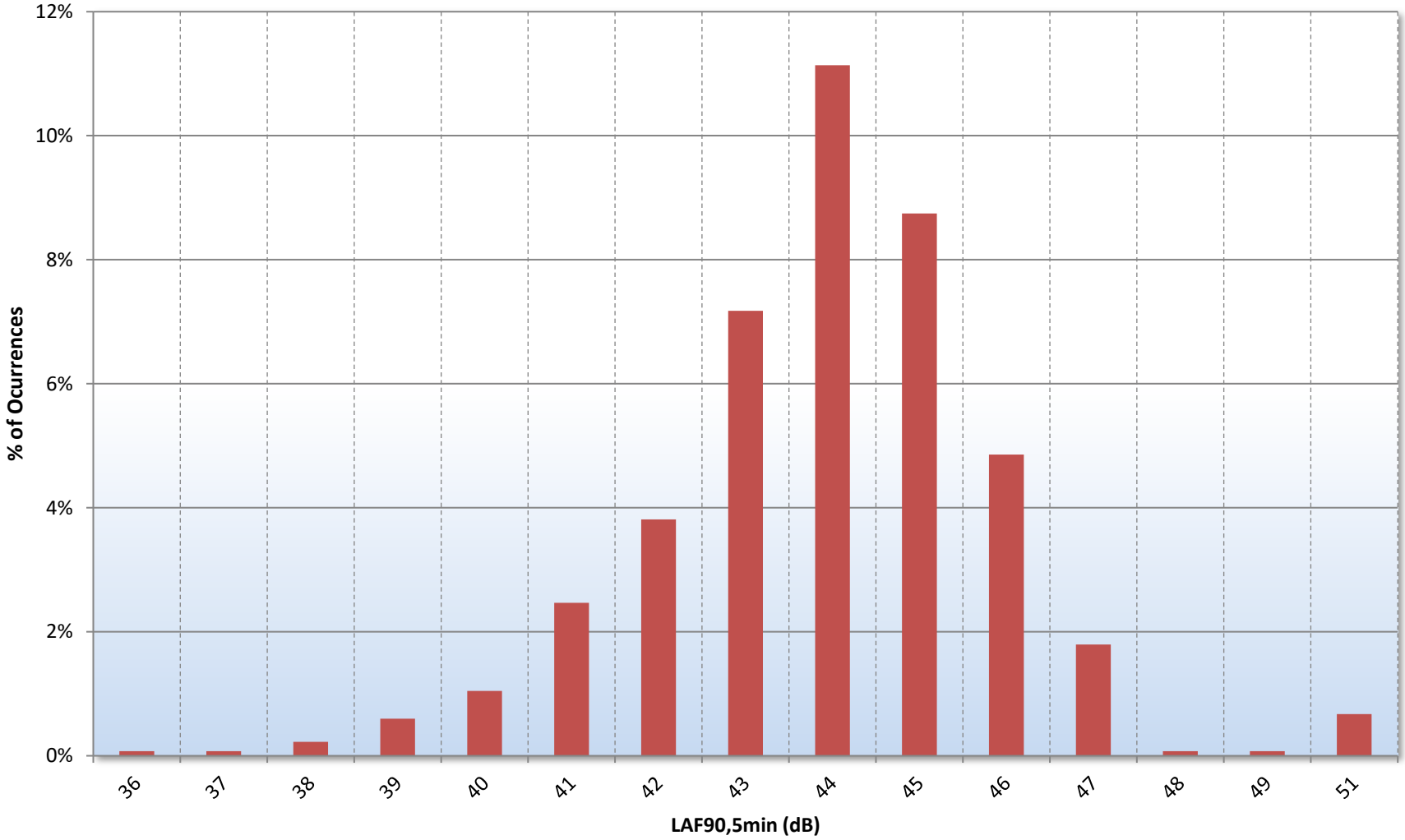

Figure 27723.Daytime L90.TH1

Land of Rear of 687 Green Lanes London - Position 1
Representative Night-time Background Noise Level
15/12/2023 to 18/12/2023

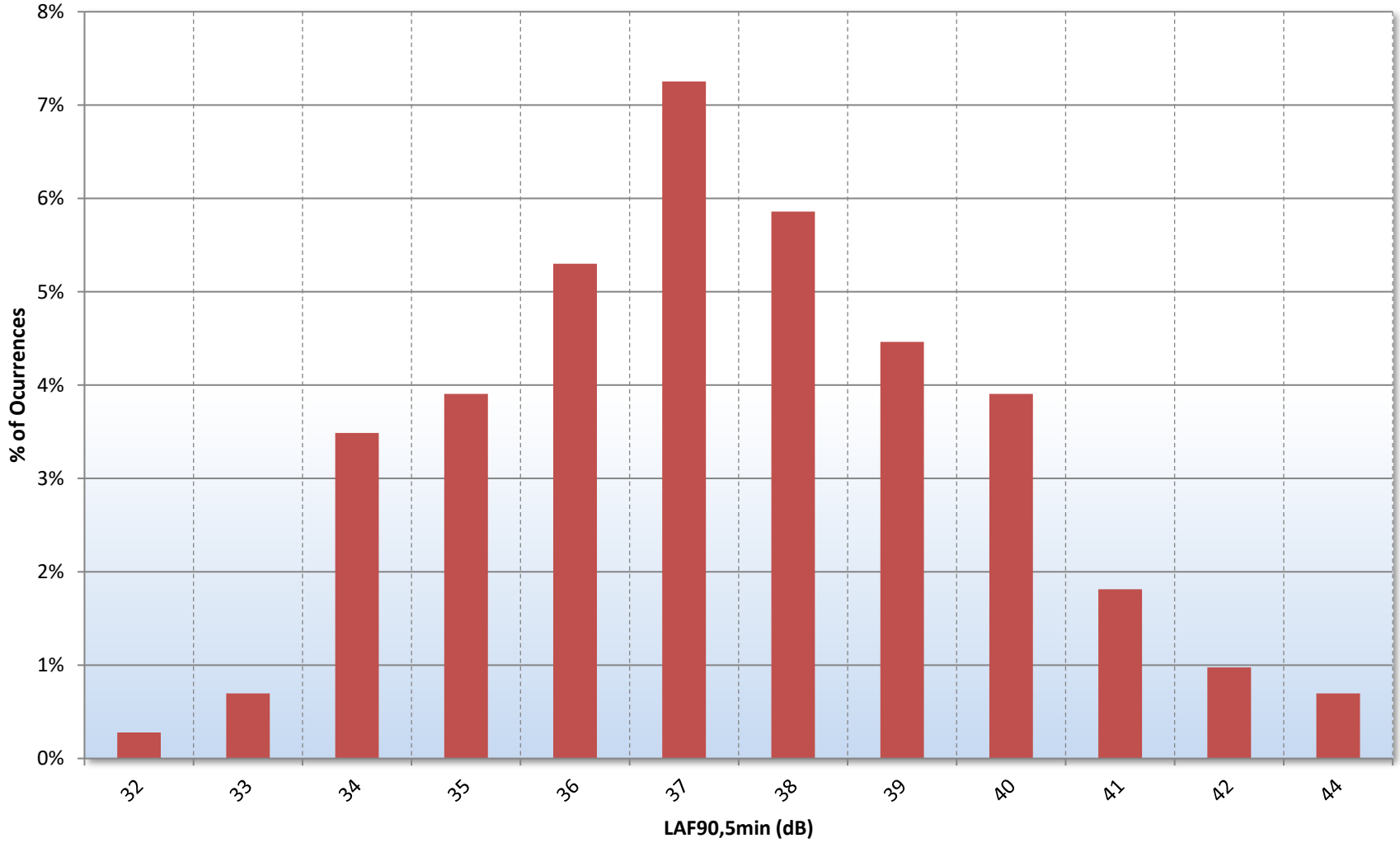

Figure 27723.Night-time L90.TH1

APPENDIX A

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*.

APPENDIX A

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.