clarke saunders | acoustics
specialist consultants

REPORT AS10588.180724.NIA.1.0

FLAT 1, NORTHWAYS PARADE, LONDON

NOISE IMPACT ASSESSMENT

Prepared: 13 September 2018

Sedley Place
68 Venn Street,
London,
SW4 0AX

Head Office -
Westgate House
39 - 41 Romsey Road
Winchester
SO22 5BE
mail@clarkesaunders.com

London Office -
103 Gaunt Street
London
SE1 6DP
london@clarkesaunders.com

Exeter Office -
Sowton Business Park
Capital Court
Bittern Road
Sowton, Exeter
EX2 7FW
exeter@clarkesaunders.com

Tel: +44 (0) 1962 872130
mail@clarkesaunders.com

www.clarkesaunders.com

CONTENTS

List of Attachments

1.0 INTRODUCTION

Planning approval is being sought for the installation of new air conditioning plant at Flat 1, Northways Parade, London, NW3 5EN.

Clarke Saunders Associates has been commissioned by Sedley Place on behalf of the Client to undertake an environmental noise survey in order to measure the prevailing background noise climate at the site.

The background noise levels measured will be used to determine daytime and night-time noise emission limits for new building services plant in accordance with the planning requirements of Camden Council.

2.0 SITE DESCRIPTION

The site is currently occupied by a 7-storey mixed use building that is bounded to the east by College Crescent, a 'B'-road, and to the south-west by Finchley Road, a busy dual carriageway with a reduced speed limit.

The ground floor of the building consists of shop fronts leading on to Finchley Road, whilst the remainder of the building is occupied by residential flats.

The building structure is shaped like the capital letter 'I', with a forecourt on the south side. On the northern side of the structure lies a car garage/ service centre rising to first floor height. The rear facing windows of Flat 1, look directly onto the roof of this garage.

The garage roof contains existing plant, where the proposed air conditioning unit for Flat 1 is expected to be installed as well.

The primary noise sources at site are traffic noise from Finchley Road and College Crescent as well as noise from the car garage. Due to the 'I' shaped structure of the building, significant screening is expected from the road noise, and so a lower background noise level is expected on the south-west façade of Flat 1 than at its north-east façade.

3.0 SURVEY PROCEDURE & EQUIPMENT

A survey of the existing background noise levels was undertaken at first floor level on top of the aforementioned garage roof as shown in site plan AS10588/SP1.

Camden Council typically ask for noise measurements to be logged with 15-minute intervals. However, for a more robust assessment, 5-minute intervals have been used to address smaller fluctuations in the night-time noise level from intermittent passing cars on Finchley Road. Measurements of consecutive 5-minute L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels were taken between 14:30 hours on Friday, 20th July 2018 and 09:50 hours on Tuesday, 24th July 2018.

These measurements will allow suitable noise criteria to be set for the new building services plant, dependent on hours of operation.

The following equipment was used during the course of the survey:

- 1 no. Rion data logging sound level meter type NL-32;
- 1 no. Rion sound level calibrator type NC-74.

The calibration of the sound level meter was verified before and after use. No significant calibration drift was detected.

The weather during the survey was dry with light winds, which made the conditions suitable for the measurement of environmental noise.

Measurements were made following procedures in BS 7445:1991 (ISO1996-2:1987*) Description and measurement of environmental noise Part 2- Acquisition of data pertinent to land use* and BS4142:2014 *Methods for rating and assessing industrial and commercial sound*

Please refer to Appendix A for details of the acoustic terminology used throughout this report.

4.0 RESULTS & ANALYSIS

Figures AS10588/TH1-TH4 show the L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels as time histories at the measurement position.

The background noise climate at the property is determined by some existing roof-mounted plant, as well as road traffic noise from Finchley Road and College Crescent.

Measured typical background noise levels are shown in Table 4.1 below.

Monitoring period	Typical $L_{A90,5mins}$
07:00 - 23:00 hours	51 dB
23:00 - 07:00 hours	41 dB
24 hours	41 dB

Table 4.1 - Minimum measured background and average noise levels **[dB ref. 20µPa]**

**typical background calculated as 10th percentile of $L_{A90,5min}$ data measured during this period*

5.0 DESIGN CRITERIA

5.1 Local Authority Requirements

Camden Council adopted the new Local Plan on 3 July 2017 which describes 'noise thresholds' in Appendix 3.

Discussion with Edward Davis, Environmental Health Officer at Camden Council on Thursday 14th December 2017 has confirmed that:

Survey measurement procedures for fixed plant noise assessments and determination of the typical background noise level should follow the methodology set out in BS4142:2014 *Methods for rating and assessing industrial and commercial sound*. The subsequent assessment of fixed plant noise emissions does not need to be in accordance with BS4142:2014 where character penalties could be imposed. Instead the policy requires the plant noise emissions at the nearest residential receptor to be 10dB below the typical background ($L_{A90,15min}$) during the proposed operational period, and if tonal, 15dB below the typical background ($L_{A90,15min}$) during the proposed operational period.

The assessed plant is not expected to have tonal content. On this basis, the plant noise emissions criteria are shown in Table 5.1.

Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)	24 Hours
L_{Aeq} 41 dB	L_{Aeq} 31 dB	L_{Aeq} 31 dB

Table 5.1 - Proposed design noise criteria **[dB ref. 20µPa]**

6.0 PREDICTED NOISE IMPACT

6.1 Proposed plant

The selected air conditioning unit has been confirmed as:

- 1 no. Mitsubishi Outdoor Heat Pump Type MXZ-2F53VF

The approximate location of the plant to be installed is shown in site plan AS10588/SP1.

Highest operational noise levels generated by the type MXZ-2F53VF unit have been confirmed by the manufacturer as follows:

Freq (Hz)	63	125	250	500	1000	2000	4000	8000	dB(A)
Lp @ 1m (dB)	54	55	51	49	46	42	36	27	51

Table 6.1 - Source noise data for the type MXZ-2F53VF Heat Pump **[dB ref. 20µPa]**

6.2 Predicted noise levels

Following an inspection of the site, the nearest noise sensitive receiver is the window at Northways Parade Park Road at 2nd floor level, as shown on the indicative site plan AS10588/SP1. This window is at least 7 metres away from the proposed plant location.

The cumulative noise level at the nearest noise sensitive receiver has been calculated based on manufacturer's plant data and drawings available at the time of writing.

Predicted plant noise emissions at nearest receptor, $L_{Aeq,T}$, dB	24-hour design criterion, $L_{Aeq,T}$, dB
31	31

Table 6.2 - Predicted cumulative plant noise levels at receptor, compared to design criterion **[dB ref. 20 µPa]**

A summary of the calculations is shown in Appendix B.

7.0 CONCLUSION

An environmental noise survey has been undertaken at Flat 1, Northways Parade, London by Clarke Saunders Associates between 14:30 hours on 20th July and 09:50 hours on 24th July 2018.

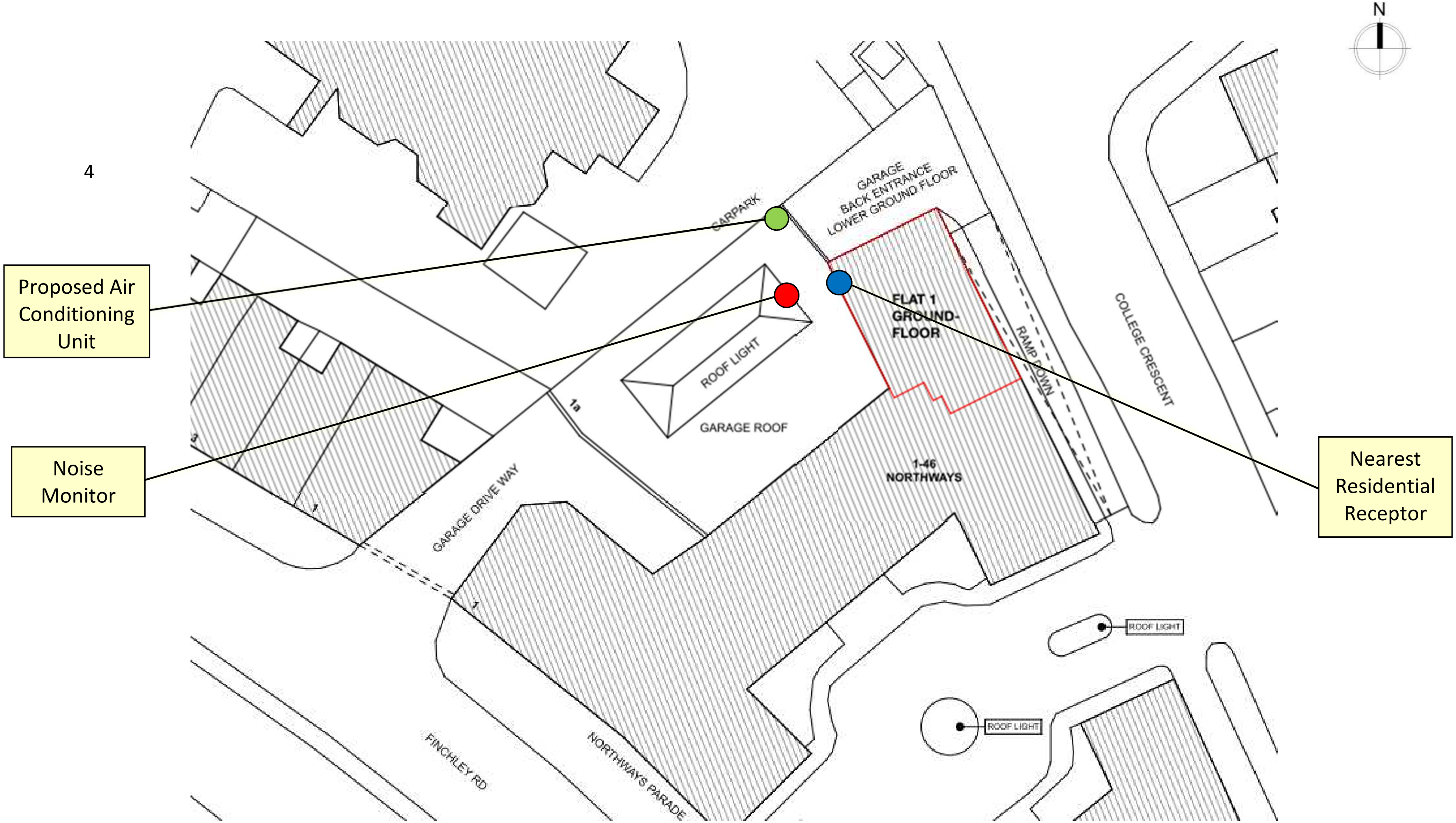
Measurements have been made to establish the current background noise climate. This has enabled a 24-hour design criterion to be set for the control of plant noise emissions to noise sensitive properties, in accordance with Camden Council's requirements.

Data for the new Mitsubishi MXZ heat pump unit has been used to predict the noise impact of the new plant on neighbouring residential properties.

Compliance with the noise emission design criterion has been demonstrated. No further mitigation measures are, therefore, required for external noise emissions.

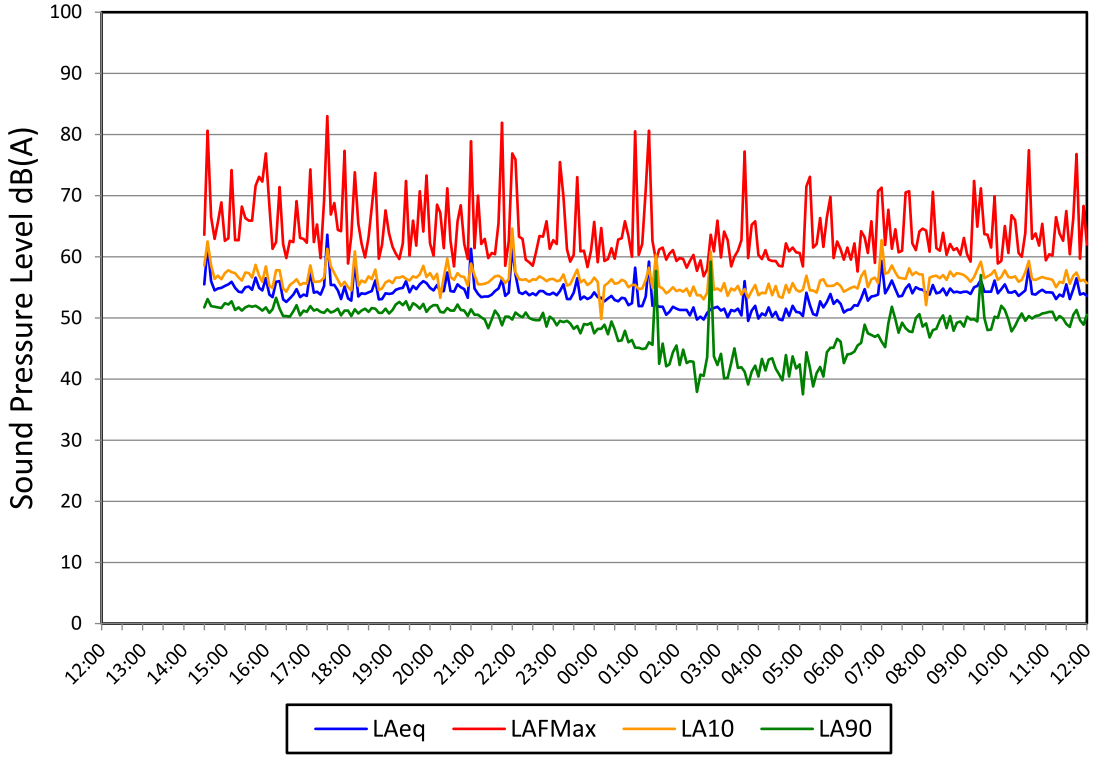
Daniel Saunders MIOA

CLARKE SAUNDERS ASSOCIATES


N
4
Proposed Air Conditioning Unit
Noise Monitor
Nearest Residential Receptor
CARPARK
GARAGE BACK ENTRANCE LOWER GROUND FLOOR
FLAT 1 GROUND-FLOOR
RAMP DOWN
COLLEGE CRESCENT
ROOF LIGHT
GARAGE ROOF
1a
1-46 NORTHWAYS
GARAGE DRIVE WAY
FINCHLEY RD
NORTHWAYS PARADE
ROOF LIGHT
ROOF LIGHT

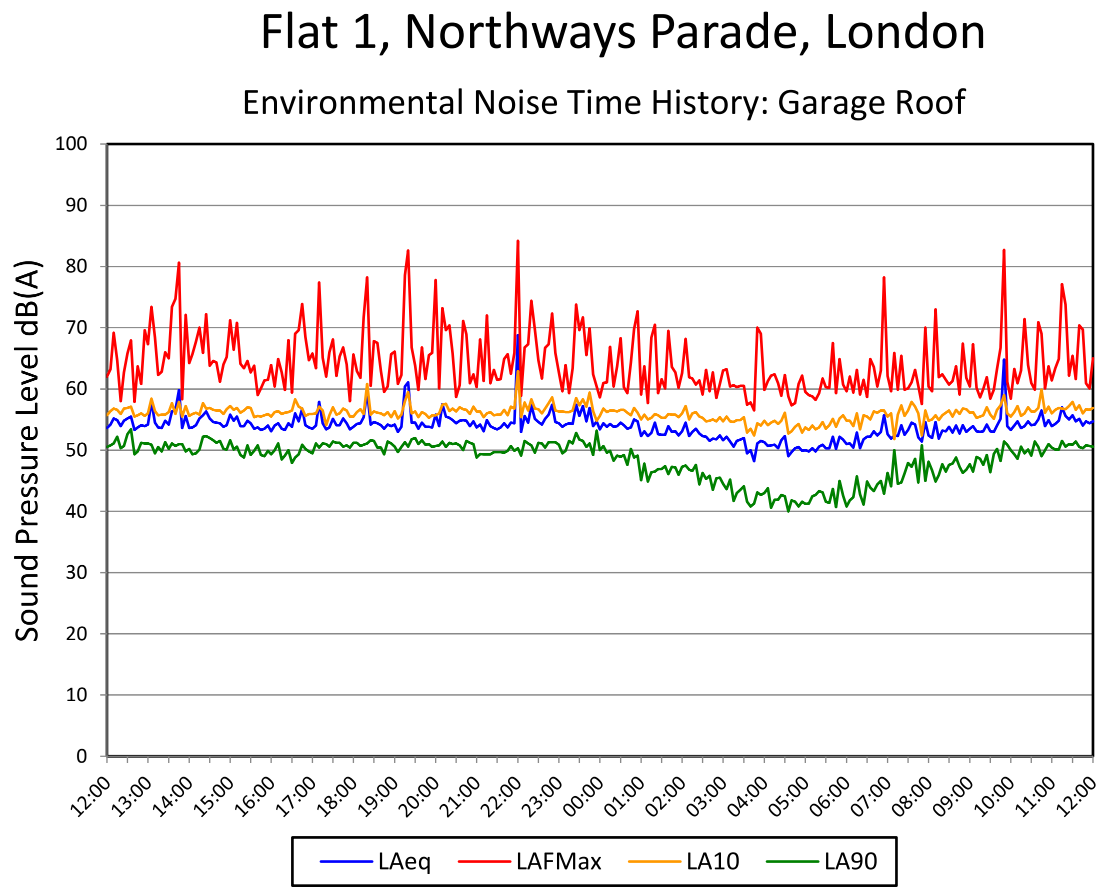
Flat 1, Northways Parade, London

Environmental Noise Time History: Garage Roof



Friday 20 July to Saturday 21 July 2018

Figure AS10588/TH1

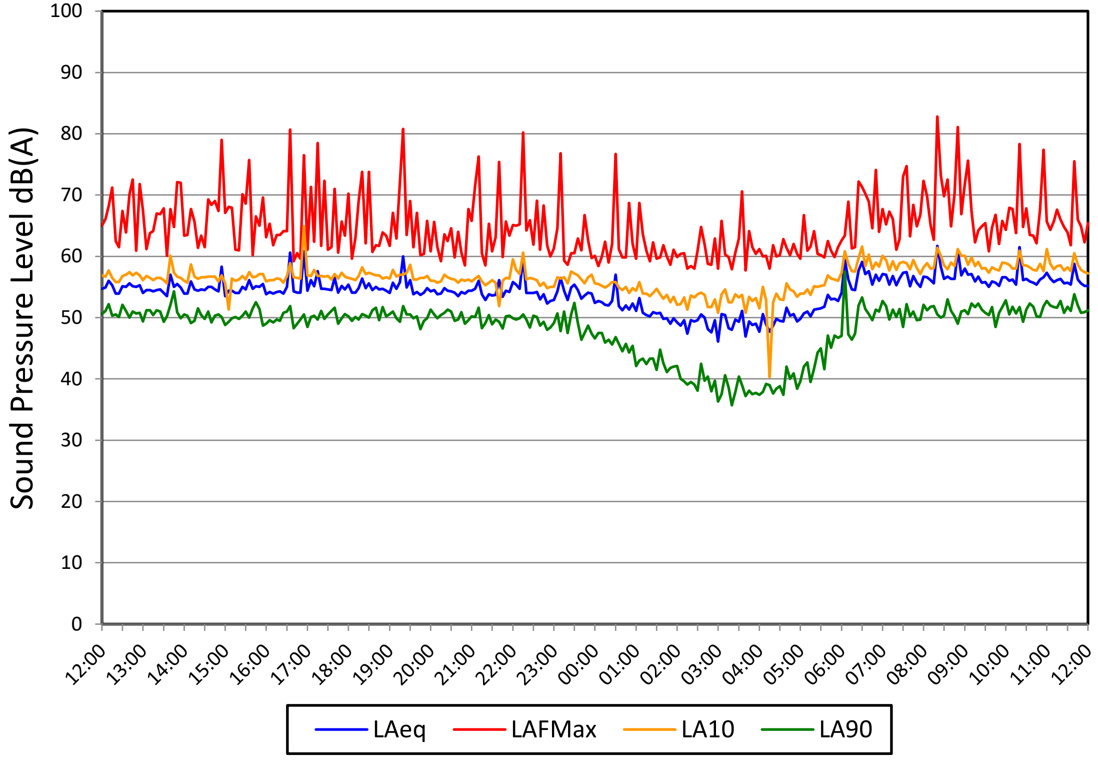


Saturday 21 July to Sunday 22 July 2018

Figure AS10588/TH2

Flat 1, Northways Parade, London

Environmental Noise Time History: Garage Roof

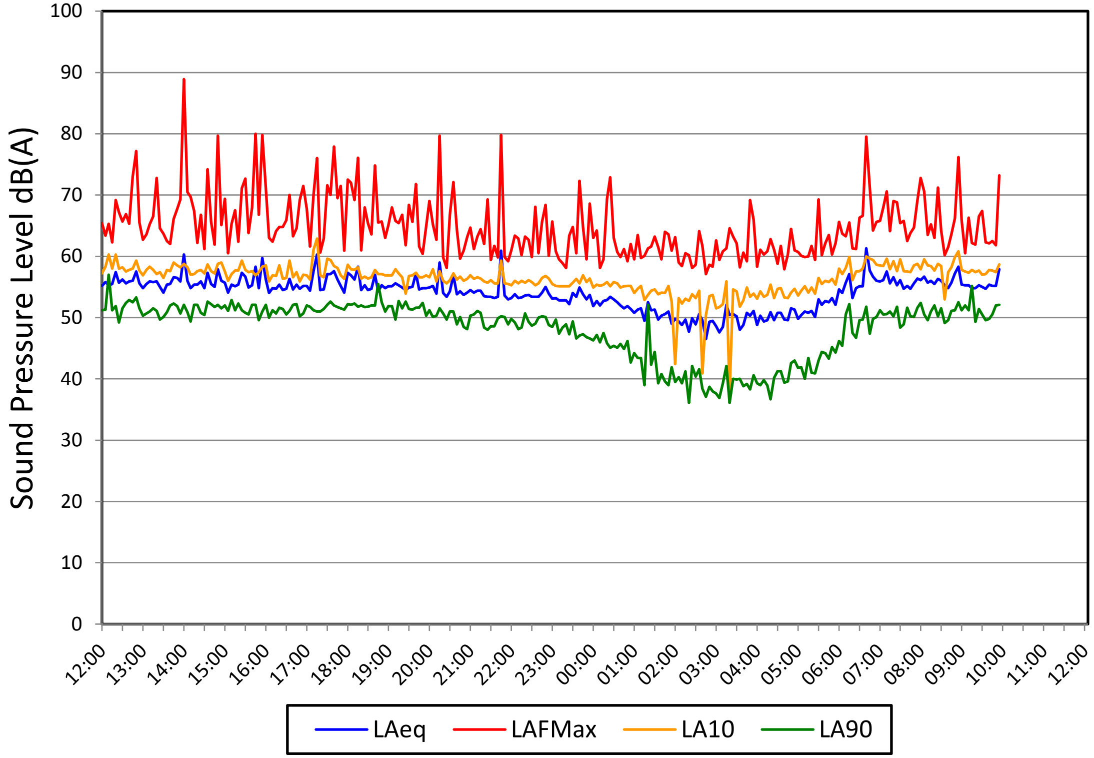


Sunday 22 July to Monday 23 July 2018

Figure AS10588/TH3

Flat 1, Northways Parade, London

Environmental Noise Time History: Garage Roof



Monday 23 July to Tuesday 24 July 2018

Figure AS10588/TH4

APPENDIX A

clarke saunders | acoustics

ACOUSTIC TERMINOLOGY & HUMAN RESPONSE TO BROADBAND SOUND

1.1 Acoustic Terminology

The human impact of sounds is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and variation in level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

Sound	Vibrations propagating through a medium (air, water, etc.) that are detectable by the auditory system.
Noise	Sound that is unwanted by or disturbing to the perceiver.
Frequency	The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.
dB(A):	Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A.
L_{eq} :	A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc). The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction. Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.
L_{10} & L_{90} :	Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise. It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.
L_{max} :	The maximum sound pressure level recorded over a given period. L_{max} is sometimes used in assessing environmental noise, where occasional loud events occur which might not be adequately represented by a time-averaged L_{eq} value.

1.2 Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz. The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000

1.3 Human Perception of Broadband Noise

APPENDIX A

ACOUSTIC TERMINOLOGY & HUMAN RESPONSE TO BROADBAND SOUND

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

INTERPRETATION

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

1.4 Earth Bunds and Barriers - Effective Screen Height

When considering the reduction in sound level of a source provided by a barrier, it is necessary to establish the "effective screen height". For example if a tall barrier exists between a sound source and a listener, with the barrier close to the listener, the listener will perceive the sound as being louder if he climbs up a ladder (and is closer to the top of the barrier) than if he were standing at ground level. Equally if he sat on the ground the sound would seem quieter than if he were standing. This is explained by the fact that the "effective screen height" is changing with the three cases above. In general, the greater the effective screen height, the greater the perceived reduction in sound level.

Similarly, the attenuation provided by a barrier will be greater where it is aligned close to either the source or the listener than where the barrier is midway between the two.

AS10588 - Flat 1, Northways Parade, London

APPENDIX B

PLANT NOISE ASSESSMENT

To Nearest Residential Receiver

Night-time		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Mitsubishi MXZ-2F53VF	Lp @ 1m	54	55	51	49	46	42	36	27	**51**
Distance Loss	7m	-17	-17	-17	-17	-17	-17	-17	-17	
Night-time diversity (50% duty)		-3	-3	-3	-3	-3	-3	-3	-3	
Sound Level at Receiver	$L_{eq\ 15mins}$	**34**	**35**	**31**	**29**	**26**	**22**	**16**	**7**	**31**

Night-time Criterion 31 dB(A)