PREPARED: 08/06/2023

FITZROY HOTEL, 41 FITZROY STREET, LONDON
NOISE IMPACT ASSESSMENT

CONTENTS

LIST OF ATTACHMENTS

Project Ref:	AS12954	**Title:**	Fitzroy Hotel, 41 Fitzroy Street, London
Report Ref:	AS12954.230605.NIA	**Title:**	Noise Impact Assessment
Client Name:	CMT Construction		
Project Manager:	Daniel Saunders		
Report Author:	Daniel Saunders		
Clarke Saunders Acoustics London SE1 1DN		This report has been prepared in response to the instructions of our client. It is not intended for and should not be relied upon by any other party or for any other purpose.	

1.0 INTRODUCTION

1.1 Planning approval is sought for the installation of new air conditioning units at Fitzroy Hotel, 41 Fitzroy Street, London.

1.2 Clarke Saunders Acoustics (CSA) has been commissioned by CMT Construction to undertake a noise impact assessment, in accordance with the planning requirements of London Borough of Camden (LBC).

1.3 This report describes the assessment undertaken, including acoustic calculations, and its findings.

1.4 A glossary relevant to the terminology used in this report is presented in Appendix A.

2.0 SITE DESCRIPTION

2.1 41 Fitzroy Street, London is a listed building being stripped out and refurbished as a hotel on Fitzroy Street with Richardson's Mews to the rear. The site is primarily surrounded by residential properties and a mixture of retail and residential properties are located on Warren Street approximately 20m to the north.

2.2 The proposed plant is to be installed within a rear ground floor lightwell, adjacent Richardson's Mews.

2.3 The proposed plant area is shown in the attached site plan AS12954/SP1.

2.4 The closest noise sensitive receptors to the proposed plant area are located at the upper floors of 2 Richardson's Mews and the upper floors of 39 Fitzroy Street.

2.5 Self-impact to the ground floor of the application building has also been considered.

3.0 LOCAL AUTHORITY REQUIREMENTS

3.1 The LBC *'Local Plan 2017'* refers to the *'National Planning Policy Framework'* and *'Planning Practice Guidance'* on the matter of noise impact assessment., stating the following:

A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion).

3.2 The document also provides targeted numerical values broadly corresponding to the LOAEL and SOAEL effect levels, as shown in Table 1.

NOISE SIGNIFICANCE RISK	GREEN LOAEL	AMBER LOAEL TO SOAEL	RED SOAEL
Camden Local Plan	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background

Table 1: Excerpt from LBC Local Plan 2017

3.3 The following description is also provided with regard to acceptability of the green, amber and red designations:

- Green – where noise is considered to be at an acceptable level.
- Amber – where noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development.
- Red – where noise is observed to have a significant adverse effect.

4.0 ENVIRONMENTAL NOISE SURVEY & EQUIPMENT

4.1 A survey of existing noise levels was undertaken at the rear of the site as presented in the attached indicative site plan AS12954/SP1. Measurements of consecutive 5-minute L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels were taken between 12:00 Tuesday, 21 March and 10:00 Thursday, 23 March 2023.

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

- 1 no. Rion data logging sound level meter type NL52;
- 1 no. Rion sound level calibrator type NC74.

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

4.4 The weather during the survey was noted on site at installation and retrieval of the meter. There were short periods of light showers and rain reported during the survey period. However, overall conditions were suitable to determine the background levels during the survey period, from which the external plant sound criteria are set.

4.5 Measurements were made following procedures in BS 7445-2:1991 (ISO1996-2:1987) *Description and measurement of environmental noise – Part 2: Acquisition of data pertinent to land use* and BS4142:2014+A.1:2019.

5.0 RESULTS

5.1 Figures AS12954/TH1-TH2 show the L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels as time histories at the measurement position.

5.2 Table 2 provides a summary of the measured average noise levels and the typical background noise levels (derived as the 10th percentile of the L_{A90} dataset) at the rear façade monitoring location during the survey.

MONITORING PERIOD	TYPICAL BACKGROUND $L_{A90,5MINS}$	AVERAGE $L_{Aeq,T}$
07:00 to 23:00 hours	50 dB	58 dB
23:00 to 07:00 hours	45 dB	54 dB

Table 2: Summary of environmental noise survey results (dB re. 20μPa)

6.0 PREDICTED NOISE IMPACT

6.1 PROPOSED PLANT

6.2 The selected plant has been confirmed as:

- 2 no. Samsung AM060NXMDGR

6.3 The proposed location of these units is presented in the attached indicative site plan AS12954/SP1.

6.4 Sound power levels generated by the air conditioning plant has been confirmed by the manufacturer and are presented in Table 3.

TYPE	63	125	250	500	1K	2K	4K	8K	dB(A)
Samsung AM060NXMDGR	67*	67	71	63	62	54	57	60	68

Table 3: Sound power levels of proposed plant (dB re. 20µPa)
**Not provided by manufacturer, assumed value.*

6.5 The condensers have been proposed to be installed within acoustic enclosure.

6.6 Insertion losses for the proprietary acoustic enclosure has been confirmed by the manufacturer and are presented in Table 4.

TYPE	63	125	250	500	1K	2K	4K	8K
Environ ELV1.1.25AC Acoustic Enclosure – Insertion Losses	11	13	19	28	34	36	36	37

Table 4: Insertion losses of acoustic enclosure

6.7 PREDICTED NOISE LEVELS

6.8 Noise emission levels have been predicted to the most affected receptors. These are compared against the 24-hour plant noise target based on achieving 10dB below the typical background noise level.

6.9 A summary of the predictions is presented in Table 5 The results are tabulated below as predicted at the closest receptors.

RECEPTOR	LEVEL AT THE RECEPTORS	LBC 24-HOUR TARGET	RISK LEVEL
2 Richardson's Mews 1st Floor	28 dB	35 dB	Green
39 Fitzroy Street 1st Floor	23 dB	35 dB	Green
39 Fitzroy Street 2nd Floor	21 dB	35 dB	Green

RECEPTOR	LEVEL AT THE RECEPTORS	LBC 24-HOUR TARGET	RISK LEVEL
Self-Impact GF 41 Fitzroy Street	35 dB	35 dB	Green

Table 5: Summary of predicted noise levels at the most affected receptors (dB re. 20µPa)

6.10 Calculations assume operation at full capacity during the night-time period, in reality it could be expected to operate at a reduced duty and therefore the predicted noise levels shown above represent a robust assessment of potential impact.

6.11 Plant noise emissions to other receptor buildings and windows are expected to be lower.

6.12 A summary of the calculations is shown in Appendix B of this report.

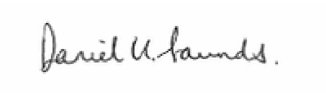
7.0 CONCLUSIONS

7.1 A noise impact assessment has been undertaken by Clarke Saunders Acoustics for the installation of new building services plant at Fitzroy Hotel, 41 Fitzroy Street, London.

7.2 Results of an environmental noise survey have established the current background noise climate, which has enabled an assessment of 24-hour plant noise emissions to noise sensitive receptors in accordance with the planning requirements of LBC.

7.3 The scheme has been demonstrated that the proposed plant installed in the proprietary enclosures are compliant with the "Green LOAEL" criterion.

7.4 No further mitigation measures are required.



Daniel Saunders MIOA
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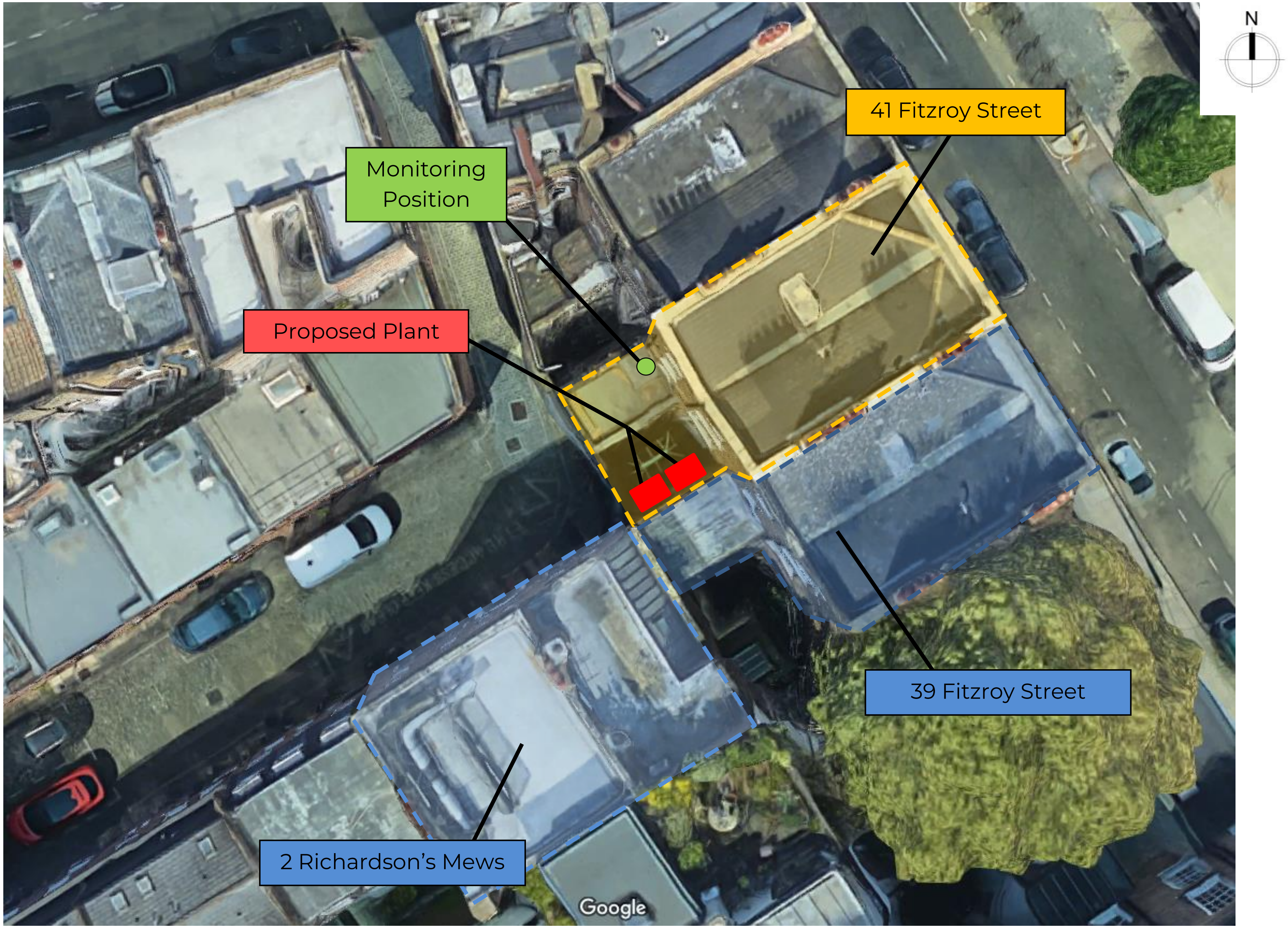
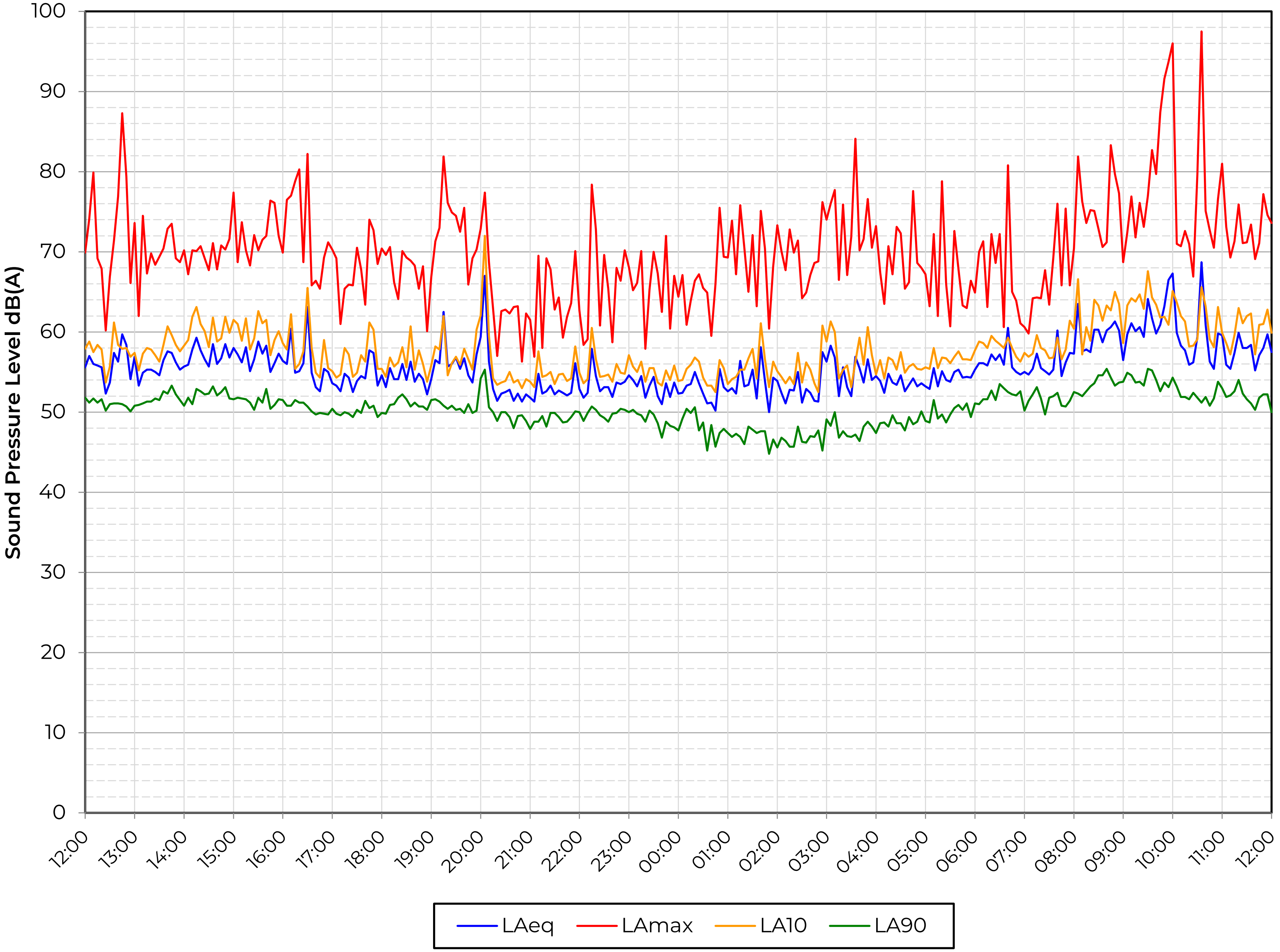


Figure AS12954/SP1

Fitzroy London

Position Rear Façade



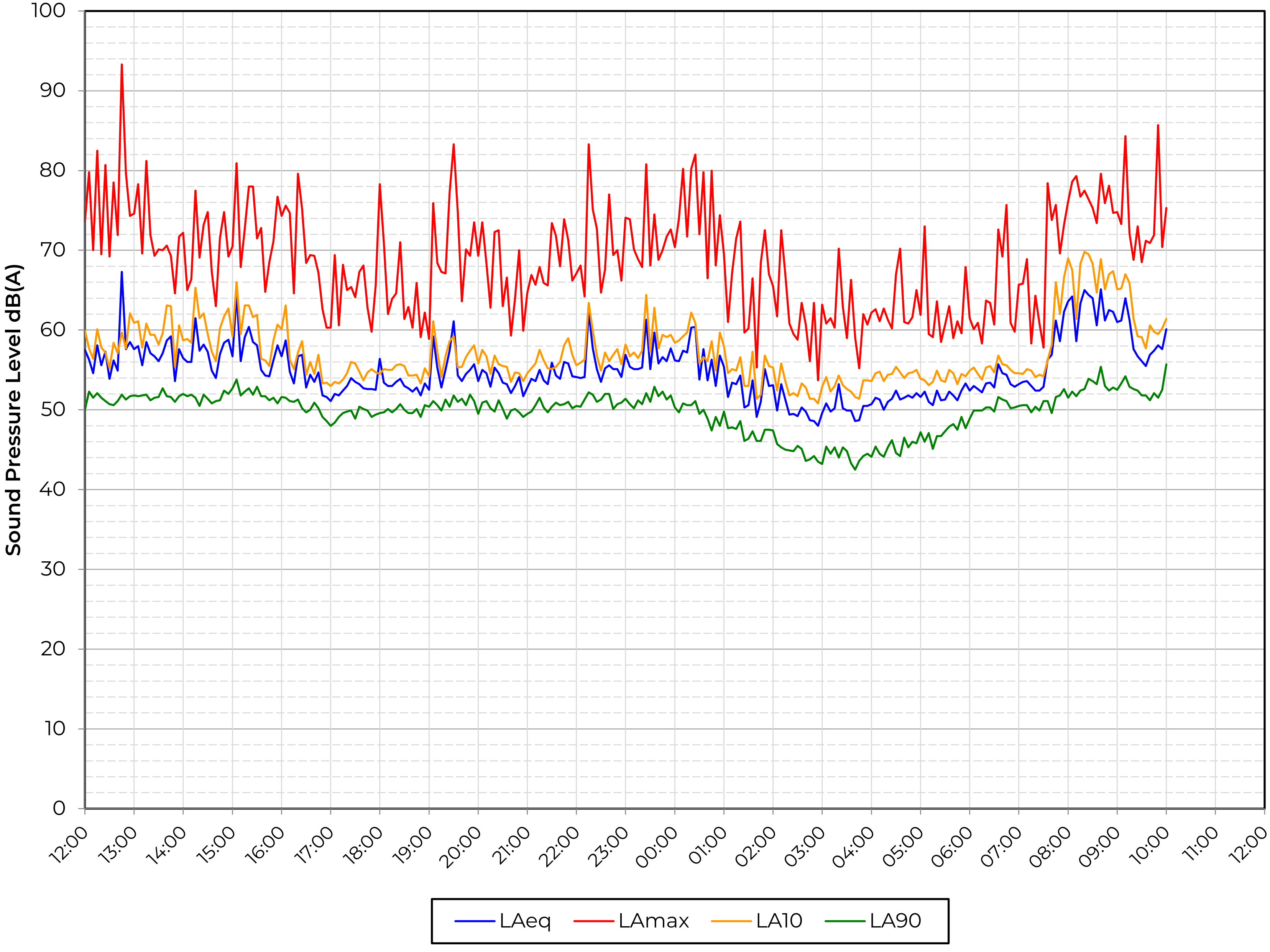
Tue 21 Mar to Wed 22 Mar

Figure AS12954/TH1

clarke saunders acoustics

Fitzroy London

Position Rear Façade



Wed 22 Mar to Thu 23 Mar

Figure AS12954/TH2

APPENDIX A

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.

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

Human Perception of Broadband Noise

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

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.

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APPENDIX B
AS12954.Fitzroy Hotel
PLANT SOUND CALCULATIONS

Ground Plant to 2 Richardson Mews		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Samsung AM060NXMD*R/EU L	Lw	67	67	71	63	62	54	57	60	68
Lw to Lp Correction	Q = 4	-5	-5	-5	-5	-5	-5	-5	-5	
Number of	1no	0	0	0	0	0	0	0	0	
Screening Loss		0	0	0	0	0	0	0	0	
Distance Loss	5m	-13	-13	-13	-13	-13	-13	-13	-13	
ENVIRONLITE T8 1700 Samsung		-11	-13	-19	-28	-34	-36	-36	-37	
	Subtotal	**38**	**36**	**34**	**17**	**10**	**0**	**3**	**5**	**27**
Samsung AM060NXMD*R/EU L	Lw	67	67	71	63	62	54	57	60	68
Lw to Lp Correction	Q = 4	-5	-5	-5	-5	-5	-5	-5	-5	
Number of	1no	0	0	0	0	0	0	0	0	
Screening Loss		-5	-5	-5	-5	-5	-5	-5	-5	
Distance Loss	5m	-14	-14	-14	-14	-14	-14	-14	-14	
ENVIRONLITE T8 1700 Samsung		-11	-13	-19	-28	-34	-36	-36	-37	
	Subtotal	**33**	**31**	**29**	**12**	**5**	**0**	**0**	**0**	**22**
Specific sound level at receptor	$L_{eq\ 15min}$	**39**	**37**	**35**	**18**	**11**	**3**	**5**	**6**	**28**

Typical Background (Night) 45 dBA

Criterion 35 dBA

Ground Plant to 39 Fitzroy Street		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Samsung AM060NXMD*R/EU L	Lw	67	67	71	63	62	54	57	60	68
Lw to Lp Correction	Q = 4	-5	-5	-5	-5	-5	-5	-5	-5	
Number of	1no	0	0	0	0	0	0	0	0	
Screening Loss		-7	-9	-11	-13	-16	-18	-18	-18	
Distance Loss	6m	-15	-15	-15	-15	-15	-15	-15	-15	
ENVIRONLITE T8 1700 Samsung		-11	-13	-19	-28	-34	-36	-36	-37	
	Subtotal	**29**	**25**	**21**	**2**	**0**	**0**	**0**	**0**	**15**
Samsung AM060NXMD*R/EU L	Lw	67	67	71	63	62	54	57	60	68
Lw to Lp Correction	Q = 4	-5	-5	-5	-5	-5	-5	-5	-5	
Number of	1no	0	0	0	0	0	0	0	0	
Screening Loss		-5	-5	-5	-6	-6	-7	-9	-11	
Distance Loss	5m	-13	-13	-13	-13	-13	-13	-13	-13	
ENVIRONLITE T8 1700 Samsung		-11	-13	-19	-28	-34	-36	-36	-37	
	Subtotal	**33**	**31**	**29**	**11**	**4**	**0**	**0**	**0**	**22**
Specific sound level at receptor	$L_{eq\ 15min}$	**34**	**32**	**29**	**12**	**5**	**3**	**3**	**3**	**23**

Typical Background (Night) 45 dBA

Criterion 35 dBA

Ground Plant to 39 Fitzroy Street (2ND)		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Samsung AM060NXMD*R/EU L	Lw	67	67	71	63	62	54	57	60	68
Lw to Lp Correction	Q = 4	-5	-5	-5	-5	-5	-5	-5	-5	
Number of	1no	0	0	0	0	0	0	0	0	
Screening Loss		-5	-5	-5	-5	-5	-5	-5	-5	
Distance Loss	10m	-20	-20	-20	-20	-20	-20	-20	-20	
ENVIRONLITE T8 1700 Samsung		-11	-13	-19	-28	-34	-36	-36	-37	
	Subtotal	**26**	**24**	**22**	**5**	**0**	**0**	**0**	**0**	**16**
Samsung AM060NXMD*R/EU L	Lw	67	67	71	63	62	54	57	60	68
Lw to Lp Correction	Q = 4	-5	-5	-5	-5	-5	-5	-5	-5	
Number of	1no	0	0	0	0	0	0	0	0	
Screening Loss		0	0	0	0	0	0	0	0	
Distance Loss	10m	-20	-20	-20	-20	-20	-20	-20	-20	
ENVIRONLITE T8 1700 Samsung		-11	-13	-19	-28	-34	-36	-36	-37	
	Subtotal	**31**	**29**	**27**	**10**	**3**	**0**	**0**	**0**	**20**
Specific sound level at receptor	$L_{eq\ 15min}$	**32**	**30**	**28**	**11**	**5**	**3**	**3**	**3**	**21**

Typical Background (Night) 45 dBA

Criterion 35 dBA

Ground Plant to Self (GF Rear Bedroom		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Samsung AM060NXMD*R/EU L	Lw	67	67	71	63	62	54	57	60	68
Lw to Lp Correction	Q = 4	-5	-5	-5	-5	-5	-5	-5	-5	
Number of	1no	0	0	0	0	0	0	0	0	
Screening Loss		0	0	0	0	0	0	0	0	
Distance Loss	4m	-11	-11	-11	-11	-11	-11	-11	-11	
ENVIRONLITE T8 1700 Samsung		-11	-13	-19	-28	-34	-36	-36	-37	
	Subtotal	**40**	**38**	**36**	**19**	**12**	**2**	**5**	**7**	**29**
Samsung AM060NXMD*R/EU L	Lw	67	67	71	63	62	54	57	60	68
Lw to Lp Correction	Q = 4	-5	-5	-5	-5	-5	-5	-5	-5	
Number of	1no	0	0	0	0	0	0	0	0	
Screening Loss		0	0	0	0	0	0	0	0	
Distance Loss	2m	-6	-6	-6	-6	-6	-6	-6	-6	
ENVIRONLITE T8 1700 Samsung		-11	-13	-19	-28	-34	-36	-36	-37	
	Subtotal	**45**	**43**	**41**	**24**	**17**	**7**	**10**	**12**	**34**
Specific sound level at receptor	$L_{eq\ 15min}$	**47**	**45**	**43**	**26**	**19**	**9**	**12**	**14**	**35**