

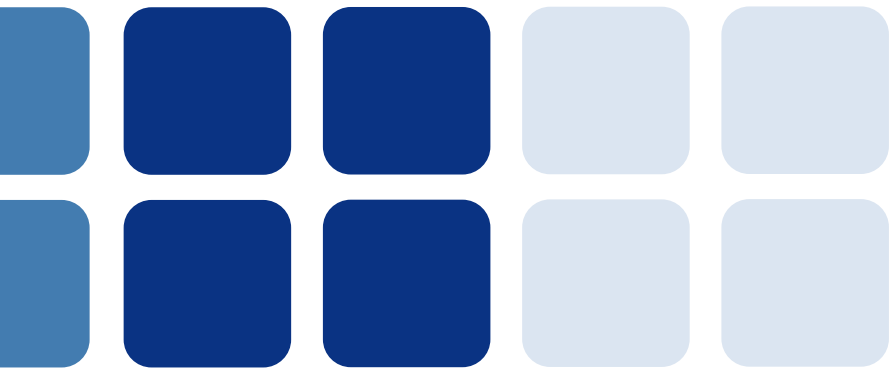


38 QUEEN ANNE
STREET, LONDON W1

Plant Noise
Assessment

Reference: 11351.RP01.PNA.0
Prepared: 22 September 2021
Revision Number: 0

Wimpole Street Dental Clinic
55 Wimpole Street
Marylebone
London
W1G 8YL



Plant Noise Assessment



38 QUEEN ANNE STREET, LONDON W1

Reference: 11351.RP01.PNA.0

Prepared: 22 September 2021

Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	22 September 2021	Daniel Flood	Robert Barlow

Terms of contract:

RBA Acoustics Ltd has prepared this report in accordance with our general terms and conditions. RBA Acoustics Ltd shall not be responsible for any use of the report or its contents for any purpose other than that for which it was provided. Should the Client require the distribution of the report to other parties for information, the full report should be copied. No professional liability or warranty shall be extended to other parties by RBA Acoustics Ltd without written agreement from RBA Acoustics Ltd.

The recommendations within this report relate to acoustics performance only and will need to be integrated within the overall design by the lead designer to incorporate all other design disciplines such as fire, structural integrity, setting-out, etc. Similarly, any sketches appended to this report illustrate acoustic principles only and again will need to be developed in to full working drawings by the lead designer to incorporate all other design disciplines.

In line with our Environmental Policy, up to two hard copies of the report will be provided upon request. Additional copies of the report, or further hard copies of revised reports, would be subject to an administrative cost of £20.00 (+VAT) per copy.



LONDON
44 Borough Road
London SE1 0AJ
T. +44 (0) 20 7620 1950

MANCHESTER
Bloc, 17 Marble Street
Manchester, M2 3AW
T. +44 (0) 161 661 4504

Contents

1.0	INTRODUCTION.....	1
2.0	ENVIRONMENTAL NOISE SURVEY.....	1
3.0	RESULTS.....	2
4.0	CRITERIA.....	2
5.0	ASSESSMENT.....	3
6.0	VIBRATION CONTROL.....	4
7.0	CONCLUSION.....	5

APPENDIX A - ACOUSTIC TERMINOLOGY

APPENDIX B - INSTRUMENTATION

APPENDIX B - INSTRUMENTATION

APPENDIX D – GRAPHS AND SITE PLANS

1.0 INTRODUCTION

It is planned to locate a new item of plant at 38 Queen Anne Street, associated with the proposed dental surgery. Westminster City Council requires consideration be given to atmospheric noise emissions from the proposed equipment to the nearest noise-sensitive receptors.

RBA Acoustics have been commissioned to undertake measurements of the prevailing noise conditions at the site and to determine the atmospheric noise limits of the proposed plant, in accordance with Westminster City Council's requirements. This report presents the results of the noise measurements, associated criteria and includes the proposed plant noise limits.

A summary of acoustic terminology is included in Appendix A.

2.0 ENVIRONMENTAL NOISE SURVEY

2.1 General

Monitoring of the prevailing background noise was undertaken over the following period:

- 10:45 hours Thursday 19 September to 11:00 hours Friday 20 September 2019.

During the survey periods the weather conditions were generally appropriate for the noise measurement exercise, it being dry with light winds.

Measurements were made of the L_{A90} , L_{Amax} and L_{Aeq} noise levels over sample periods of 15 minutes duration.

2.2 Measurement Location

The measurement was undertaken on a first floor flat roof area which overlooks the rear light-well. The microphone was mounted on a tripod at height of 1.5m. This measurement position was considered as being representative of the noise climate as experienced at the closest residential receptors to the proposed plant to the rear of the property. The prevailing noise climate was affected by noise from an existing condenser located at the rear of 17 Wimpole Street. Aside from this minimal direct noise sources were noted on site.

The measurement positions are also illustrated on the site plan in Figure 1 in Appendix D.

2.3 Instrumentation

Details of the instrumentation used to undertake the survey are provided in Appendix B.

The sound level meter was calibrated both prior to and on completion of the survey with no significant calibration drift observed.

3.0 RESULTS

The noise levels at the measurement positions are shown as time-histories on the attached Graphs 1 to 2.

In order to ensure a worst case assessment the lowest background L_{A90} noise levels measured have been used in our analyses. The lowest L_{A90} and the period averaged L_{Aeq} noise levels measured are summarised below.

Table 1 – Measured Levels

Measurement Period	Sound Pressure Levels	
	L_{90} (dBA)	L_{eq} (dBA)
Daytime (07:00 – 19:00)	41	51
Evening (19:00 – 23:00)	38	53
Night-time (23:00 – 07:00)	36	52

4.0 CRITERIA

The requirements of Westminster City Council's Environmental Health Department regarding new building services plant are understood to be as follows.

Residential Receptors

Any noise generated by new building services plant should be designed to a level either 5dB or 10dB below the lowest background L_{A90} 15 minute sample during operational hours, as measured 1m outside the nearest affected residential window.

Whether the criterion is a 5dB or 10dB reduction is dependent on the existing external noise levels at the nearest noise sensitive properties, at the quietest time during which the plant operates. If the measured $L_{Aeq, period}$ is found to be above the World Health Organisation (WHO) criteria a reduction of 10dB is applied. A less stringent 5dB reduction is required where existing $L_{Aeq, period}$ noise levels are currently below WHO criteria.

It is understood that the proposed plant will be in use during the daytime period only.

The specific WHO guideline levels are detailed as follows:

- Daytime (07:00 - 19:00) $L_{Aeq, 12 \text{ hours}}$ 55 dB

The measured L_{Aeq} levels are below the criteria for the daytime period. As such, a plant noise emission limit of 5dB below the lowest measured L_{A90} level is applied.

In line with the above requirements we would propose that new items of mechanical services be designed so that noise emissions from the plant do not exceed the following levels when assessed at the nearest noise sensitive location:

- Daytime 36 dB

Non-residential Receptors

For commercial receptors, the requirements of Westminster City Council's Environmental Health Department regarding new building services plant are typically as follows.

Any noise generated by new building services plant should be designed to a limit of 50-55 dB at the nearest affected commercial window, in order to achieve approximately 35dBA internally, assuming a partially open window.

In line with BS 4142: 2014, should the proposed plant be identified as having intermittent or tonal characteristics, a further penalty should be subtracted from any of the above proposed noise emission limits.

5.0 ASSESSMENT

Our assessment has been based upon the following information:

5.1 Proposed Plant Item

The following plant is proposed for the scheme:

Table 2 – Plant Type

Ref.	Manufacturer/Model/Duty	Plant Type
C1	Dental Compressor – PTS 200/03	Compressor

5.2 Position of Unit

It is understood that the plant item will be located within the rear light-well, at basement level. The equipment position is indicated on the site plan in Figure 1 in Appendix D.

5.3 Plant Noise Levels

Information regarding the noise levels of the proposed plant has been provided by the manufacturer of the unit. The associated plant noise levels are detailed as follows:

Table 3 – Plant Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)							dBA
		63	125	250	500	1k	2k	4k	
C1	L _p at 1m	Single figure data available							53

5.4 Location of Nearest Windows

Receptor 1

The closest residential windows to the plant were advised as belonging to the rear of 17 Wimpole Street, at an approximate distance of 7m. These windows are located at first floor level and are fully screened from the proposed plant area by the light-well.

Receptor 2

The closest windows to the plant were advised as belonging to the commercial premises of 40 Queen Anne Street, at the rear of the building. The closest window to the proposed plant is at basement level, and appears to belong to an internal corridor, at an approximate distance of 2m.

5.5 Calculation of Noise Levels at Nearest Noise-Sensitive Receptors

Our calculation method for predicting noise levels from the proposed plant at the nearest noise-sensitive receptors, based on the information above, is summarised below.

- Source Term SPL
- Distance Attenuation
- Reflections
- Screening

Calculation sheets are attached for further information in Appendix C.

The results of the calculations indicate the following noise levels at the nearest affected residential windows:

Table 4 – Predicted Noise Levels

Operating Period	Noise Level (dB) at Receptor 1 – 17 Wimple Street		Noise Level (dB) at Receptor 2 – 40 Queen Anne Street	
	Prediction	Criterion	Prediction	Criterion
Daytime (07:00 – 19:00)	32	36	53	55

Noise from the proposed plant installation is expected to meet the requirements of Westminster City Council.

6.0 VIBRATION CONTROL

In addition to the control of airborne noise transfer, it is also important to consider the transfer of noise as vibration to adjacent properties (as well as to any sensitive areas of the same building).

We would typically advise that the compressor unit be isolated from the supporting structure by means of either steel spring isolators or rubber footings. For particularly sensitive locations, or when on lightweight structures the mounts should ideally be caged and be of the restrained type.

It is important the isolation is not “short-circuited” by associated pipework or conduits. To this end, any conduits should be looped and flexible connectors should be introduced between the condenser and any associated pipework. Pipework should be supported by brackets containing neoprene inserts.

7.0 CONCLUSION

RBA Acoustics have undertaken noise monitoring at 38 Queen Anne Street. The measured noise levels are presented within this report. The resultant noise levels have been used to determine the required criteria for atmospheric noise emissions from the proposed plant installations.

The results of the assessment indicate atmospheric noise emissions from the proposed plant are within the criteria required by Westminster City Council. As such, the proposed plant installations should be considered acceptable in terms of noise

Appendix A - Acoustic Terminology

dB	Decibel - Used as a measurement of sound pressure level. It is the logarithmic ratio of the noise being assessed to a standard reference level.
dB(A)	The human ear is more susceptible to mid-frequency noise than the high and low frequencies. To take account of this when measuring noise, the 'A' weighting scale is used so that the measured noise corresponds roughly to the overall level of noise that is discerned by the average human. It is also possible to calculate the 'A' weighted noise level by applying certain corrections to an un-weighted spectrum. The measured or calculated 'A' weighted noise level is known as the dB(A) level. Because of being a logarithmic scale noise levels in dB(A) do not have a linear relationship to each other. For similar noises, a change in noise level of 10dB(A) represents a doubling or halving of subjective loudness. A change of 3dB(A) is just perceptible.
L_{eq}	L_{eq} is defined as 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 (1 hour).
L_{Aeq}	The level of notional steady sound which, over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measured over that period.
L_{An} (e.g. L_{A10} , L_{A90})	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and 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 the 'average maximum level'. Similarly, L_{90} is the average minimum level and is often used to describe the background noise.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during the measurement period, T. It is commonly used to measure the effect of very short duration bursts of noise, such as for example sudden bangs, shouts, car horns, emergency sirens etc. which audibly stand out from the general level of, say, traffic noise, but because of their very short duration, maybe only a very small fraction of a second, may not have any effect on the L_{eq} value.

Appendix B - Instrumentation

The following equipment was used for the measurements

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1406971	U32753	2 September 2021
Norsonic Pre Amplifier	1209	21571		
Norsonic ½" Microphone	1225	335306	32752	2 September 2021
Norsonic Sound Calibrator	1251	35016	U32751	2 September 2021

Appendix B - Instrumentation

Assessment to first floor of 17 Welbeck Street

Detail	Noise Level (dBA)
C1 – Compressor – Lp at 1m	53
Reflections (Lightwell)	+6
Distance Loss (7m)	-17
Screening	-10
Total at Receiver	32

Assessment to rear of 40 Queen Anne Street

Detail	Noise Level (dBA)
C1 – Compressor – Lp at 1m	53
Reflections (Lightwell)	+6
Distance Loss (2m)	-6
Total at Receiver	53

Appendix D – Graphs and Site Plans

38 Queen Anne Street

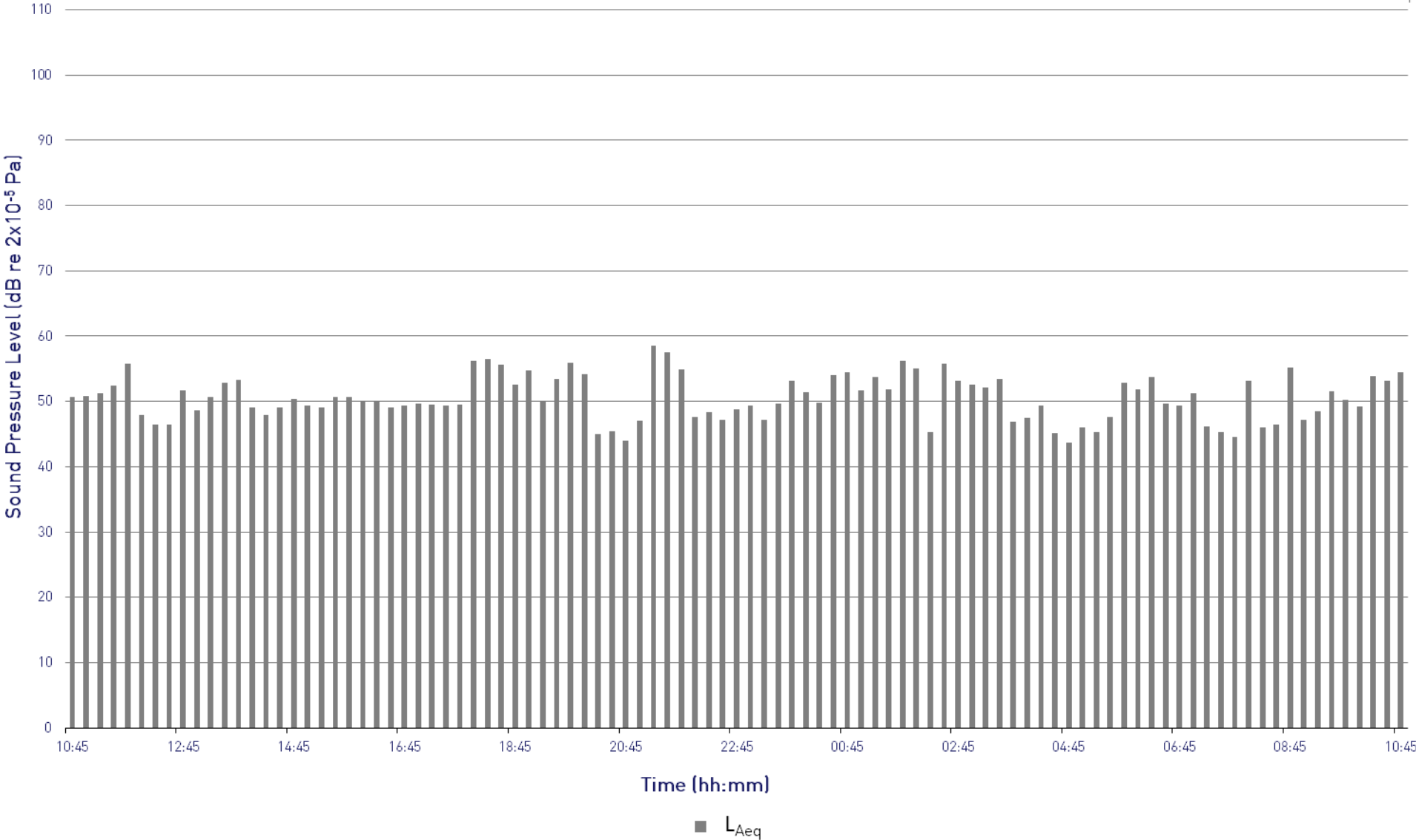
L_{Aeq} Time History 19-20 September 2019

1st floor balcony, rear elevation



Project: 9700

Graph 1



38 Queen Anne Street

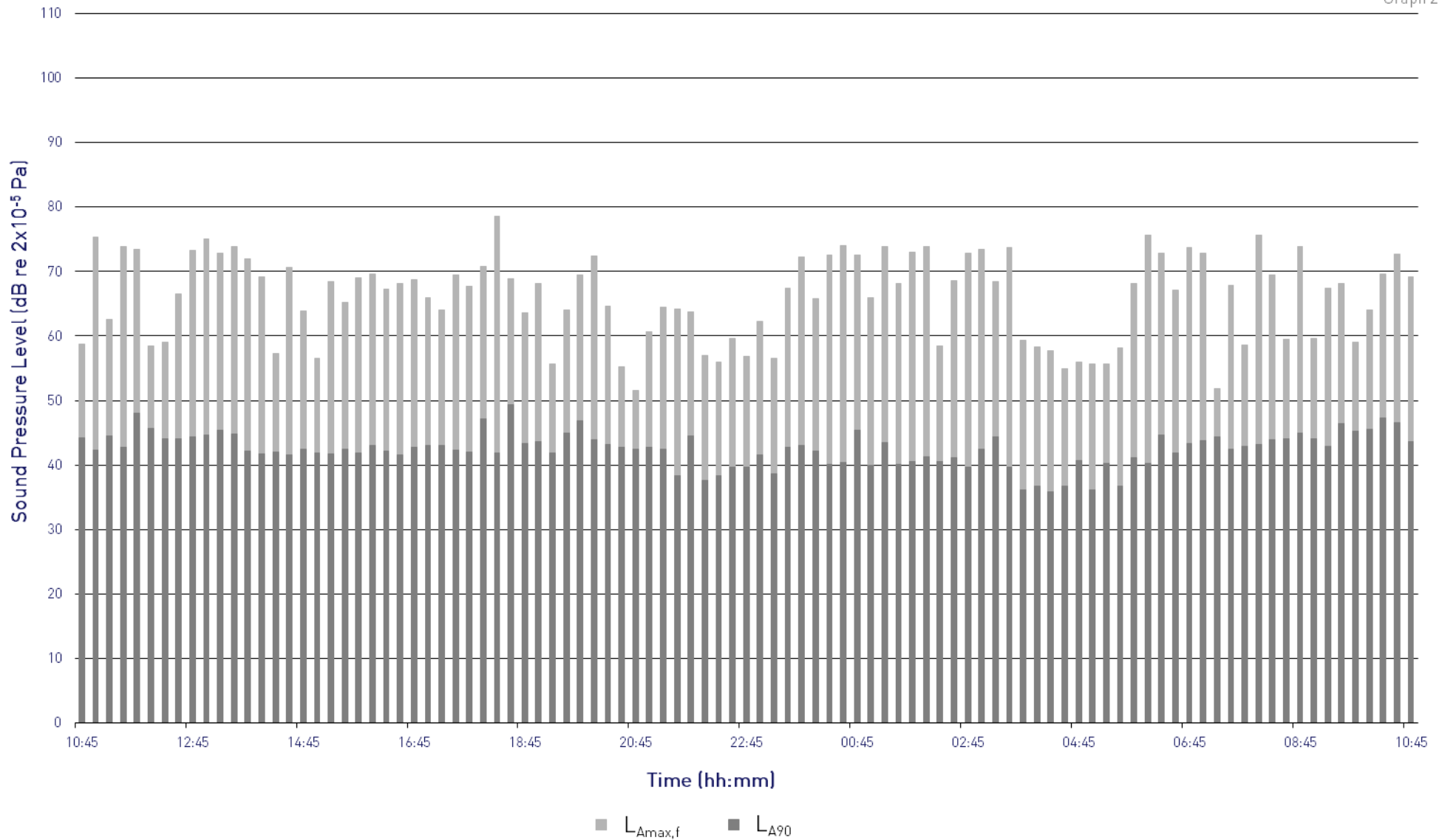
$L_{Amax,f}$ and L_{A90} Time History 19- 20 September 2019

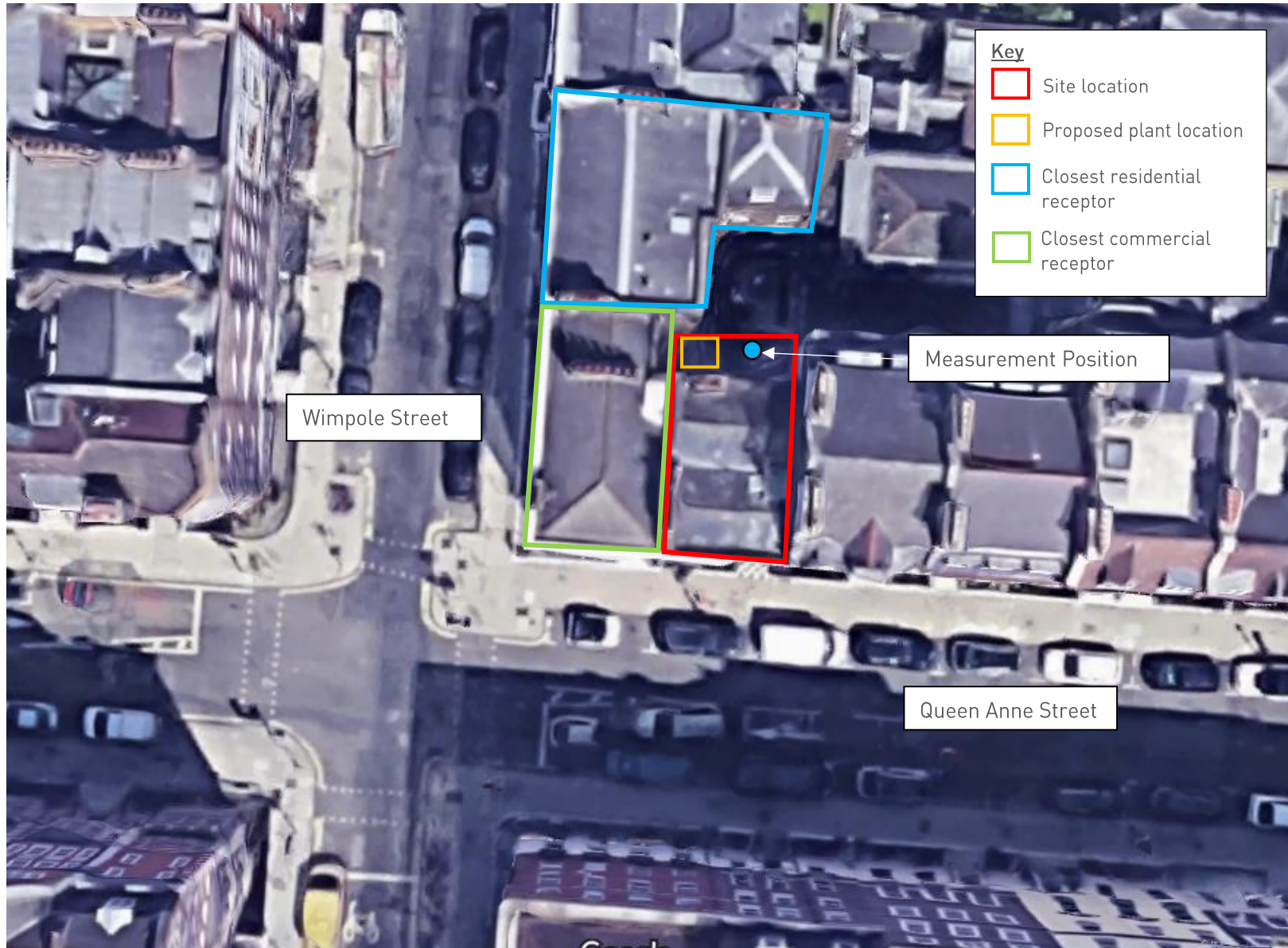
1st floor balcony, rear elevation



Project: 9700

Graph 2





38 Queen Anne Street, London W1
Site Location Plan
Project 11351

Figure 1
22 September 2021
Not to Scale

RBA ACOUSTICS

W. www.rba-acoustics.co.uk

E. info@rba-acoustics.co.uk

London:

44 Borough Road

London SE1 0AJ

T. +44 (0) 20 7620 1950

Manchester:

Lowry House, 17 Marble Street

Manchester M2 3AW

T. +44 (0) 16 1661 4504

