76 SOUTHAMPTON ROW, LONDON WC1B

Plant Noise Assessment

Reference: 13897.RP01.PNA.0
Prepared: 19 September 2024
Revision Number: 0

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Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	19 September 2024	Robert Gurney	Patrick Spiers

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RBA Acoustics Ltd have prepared this report in accordance with our Scope of Work 13897.SW01.0 dated 27 August 2024. 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 will need to be developed into full working drawings by the lead designer to incorporate all other design disciplines.

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1. INTRODUCTION

It is proposed to locate new items of plant at 76 Southampton Row, London WC1B. As part of a retroactive planning application, Camden 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 emission limits in accordance with Camden Counsil's requirements. This report presents the results of the noise measurements, associated criteria and provides the required assessment.

2. SITE DESCRIPTION

The site is shown in relation to its surroundings in the site plan in Figure 1 (Appendix E).

The site occupies the ground floor at 76 Southampton Row. It makes up part of a row of 5 storey terraced properties with commercial premises at ground floor and residential premises above. To the front of the site is Southampton Row. To the rear of the site is a small area containing plant items which service the site.

3. ENVIRONMENTAL NOISE SURVEY

3.1 Survey Methodology

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

- 11:30 Tuesday 10 September to 11:30 Wednesday 11 September 2024.

As the survey was unattended it is not possible to comment with certainty regarding meteorological conditions throughout the entire survey period. However, based on observations during the site visits and weather reports for the area, conditions were generally considered suitable for obtaining representative noise measurements, being predominantly dry with little wind.

Measurements were made of the L_{A90}, L_{Amax} and L_{Aeq} noise levels over 15-minute sample periods. A summary of acoustic terminology is included in Appendix A.

3.2 Measurement Position

To determine the existing noise climate around the site measurements were undertaken at the following location:

- *Measurement Position 1 – Rear*

  The microphone was attached to a pole and mounted to a drainage pipe approximately 0.5m from the nearest noise sensitive receptor.

The measurement position is also illustrated on the site plan and photo attached in Figure 1 and Figure 2 in (Appendix E).

3.3 Instrumentation

For information regarding the equipment used for the measurements please refer to Appendix B.

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

3.4 Survey Noise Levels

The noise levels measured are shown as time-histories on the attached Graphs presented in Appendix E.

The lowest background L_{A90} and the period averaged L_{Aeq} noise levels measured are summarised in Table 1.

Table 1 - Measured Baseline Noise Levels

Measurement Period	Measurement Position 1 (MP1) – Rear Roof	
	Lowest Background Noise Level $L_{A90,15min}$ (dB)	Period-Averaged Noise Level $L_{Aeq,T}$ (dB)
Daytime (07:00 – 23:00)*	51	55
Night-time (23:00 – 07:00)	43	51

* It is understood that the units were in operation during operating hours (10:30 – 22:30). and, as such, these hours have been excluded from our analysis.

4. PLANT NOISE CRITERIA

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

> ***Industrial and Commercial Noise Sources***
>
> *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).*

In line with the above requirements, we would propose 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:

Table 2 – Plant Noise Limits at NSR

Assessment Period	Plant Noise Criteria to be achieved at 1m outside the window of the nearest Noise-Sensitive Receptor (NSR), L_{Aeq} (dB)
	NSR1
Operating Hours (10:30 – 22:30)	41

It should be noted that the above requirements are applied at the nearest residential adjacencies and alternative criteria should be incorporated if there are also commercial properties affected by the proposed plant installations.

5. PLANT NOISE ASSESSMENT

This assessment has been based on the information provided to RBA by MZA Planning and is described in the following sections.

5.1 Proposed Plant Items

The following plant is proposed for the scheme:

Table 3 – Proposed Plant Items

Ref.	Manufacturer/Model/Duty	Plant Type
CU1	Mitsubishi FDC125VNA	Condenser Unit
CU2	Mitsubishi FDC125VNA	Condenser Unit
CU3	J&E Hall JEHS 0300 B2 L 3	Condenser Unit
CU4	Silensys SILAJ4519ZFZ	Condenser Unit

5.2 Plant Locations

The plant is located to the rear of the site at ground floor level. CU1 & CU2 are located perpendicular to each other, with CU3 located next to this with CU4 located above CU3.

The equipment positions are indicated on the site plan in Figure 1 in Appendix E.

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 4 – Plant Noise Levels

Unit	Parameter	Sound Level (dB) at Octave Band Centre Frequency (Hz)								dBA
		63	125	250	500	1k	2k	4k	8k	
CU 1-2	L_P at 1m	64	63	56	55	53	48	44	41	**58**
CU3	L_P at 1m	-	50	54	52	46	41	35	35	**52**

CU4 has an overall sound level of 59dBA, however octave band data was not available for this unit.

Review of the octave band data provides no indication of any tonal characteristics associated with the proposed plant.

5.4 Nearest Noise-Sensitive Receptor

Based on observations made on site and discussions with the design team we understand the nearest noise-sensitive receptor (NSR) to the proposed plant to be as follows:

- *NSR1 – 80 Southampton Row (Rear Ground Floor Window)*
  The nearest noise sensitive receptor is located approximately 2.5m from the nearest items of plant (CU3 & CU4), approximately 3m from CU2 and approximately 3.5m from CU1

The receptor is shown in the site plan in Figure 1 in Appendix E.

5.5 Predicted Noise Levels at NSR

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

- Source Term SPL / SWL
- Distance Attenuation

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 5 – Predicted Plant Noise Levels

Operating Period	Noise Level (dB) at NSR – 80 Southampton Row (Rear Ground Floor Window)	
	Prediction	Criterion
Operating Hours (10:30 – 22:30)	52	41

Noise from the proposed plant installations is in exceedance of the local authority criteria.

We therefore recommend the following mitigation measures be included in the design and installation.

5.6 Acoustic Mitigation

An attenuation package capable of achieving the minimum insertion losses in Table 6 should be fitted to each unit.

These reductions are able to be achieved by means of accommodating the units within a bespoke acoustic enclosure, within attenuated openings to maintain sufficient airflow and heat rejection from the units. A typical enclosure is illustrated in Figure 3 in Appendix E.

Table 6 – Minimum Insertion Loss Specification

Attenuation Package	Insertion Loss (dB) at Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Acoustic Enclosure	2	5	8	13	16	16	14	12

Suitable suppliers of acoustic enclosures are:

- https://www.noisesolutions.co.uk/hardware/acoustic-enclosures-2/
- https://www.environ.co.uk/commercial/

5.7 Predicted Noise Levels at NSR with Mitigation

With the above mitigation measures included, the resultant predicted noise levels are as follows:

Table 7 – Predicted Plant Noise Levels with Mitigation

Operating Period	Noise Level (dB) at NSR – 80 Southampton Row (Rear Ground Floor Window)	
	Prediction	Criterion
Operating Hours (10:30 – 22:30)	41	41

Noise from the proposed plant with the mitigation measures incorporated is within the Local Authority criteria.

6. 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 condensing units 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. CONCLUSION

RBA Acoustics have undertaken noise monitoring at 76 Southampton Row. 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 following mitigation measures are proposed within this report:

- The installed units should be fitted with attenuation packages capable of achieve the minimum static insert losses detailed in Table 6.

Provided the above mitigation measures are included in the design and installation, the results of the assessment indicate atmospheric noise emissions from the proposed plant are within the criteria required by Camden Council and, as such, can be considered acceptable in terms of noise.

Appendix A - Acoustic Terminology

A-weighting (e.g. dB(A))	A correction applied across the frequency bands to take into account the response of the human ear, and therefore considered to be more representative of the sound levels people hear.
DeciBel (dB)	Unit used for many different acoustic parameters. It is the logarithmic ratio of the level being assessed to a standard reference level.
L_{eq}	The level of a notional steady sound which, over a stated period of time, *T*, would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
$L_{Aeq,T}$	The A-weighted level of a notional steady sound which, over a stated period of time, *T*, would have the same acoustic energy as the fluctuating noise measured over that period. Typically used to represent the average or ambient noise level.
L_{An} (e.g. L_{A10}, L_{A90})	The sound level exceeded for n% of the time. E.g. L_{A10} is the A-weighted level exceeded for 10% of the time and as such can be used to represent a typical maximum level. Similarly, L_{A90} is the level exceeded for 90% of the measurement period, and is often used to describe the underlying background noise.
NR	Noise Rating – A single figure term to describe a measured noise level which considers the frequency content of the noise, generally used for internal noise level measurements (particularly mechanical services plant).

Appendix B - Instrumentation

The following equipment was used for the acoustic measurements.

Table B1 - Equipment Calibration Details

Manufacturer	Model Type	Serial No.	Calibration	
			Certificate No.	Valid Until
Norsonic Type 1 Sound Level Meter	Nor140	1407962	UCRT24/1149	24 January 2026
Norsonic Pre Amplifier	1209	23790		
Norsonic ½“ Microphone	1225	496129		
Norsonic Sound Calibrator	1255	125526426	UCRT24/1140	24 January 2026

Appendix C - Plant Calculations

Table C1 - Example Calculation – CU1

Parameter	Octave-band Noise Levels (dB) at Octave-band Centre Frequency (Hz)								dBA
	63	125	250	500	1000	2000	4000	8000	
L_P at 1m	64	63	56	55	53	48	44	41	-
Distance losses @ 3.5m	-11	-11	-11	-11	-11	-11	-11	-11	-
Acoustic Enclosure	-	-4	-6	-11	-13	-13	-12	-11	-
Noise level at receiver	53	48	39	33	29	24	21	19	**37**

Table C2 - Summary Noise Levels

Unit	Received noise level (dB) at 1m from NSR1
CU1	31
CU2	35
CU3	39
CU4	37
Total Received Level	**42**

Appendix D - CDM Considerations

The Likelihood (**L**) the harm will occur can be assessed by applying an indicative score (from 1 to 5) as follows:

1 – Remote (almost never)
2 – Unlikely (occurs rarely)
3 – Possible (could occur, but uncommon)
4 – Likely (recurrent but not frequent)
5 – Very likely (occurs frequently)

The Severity of harm (**S**) can be assessed by applying an indicative score (from 1 to 5) as follows:

1 – Trivial (e.g. discomfort, slight bruising, self-help recovery)
2 – Minor (e.g. small cut, abrasion, basic first aid need)
3 – Moderate (e.g. strain, sprain, incapacitation for more than 3 days)
4 – Serious (e.g. fracture, hospitalisation for more than 24 hours, incapacitation for more than 4 weeks)
5 – Fatal (single or multiple)

The rating value is obtained by multiplying the two scores and is then used to determine the course of action.

Table D1- Risk Ratings

Rating Bands (Likelihood x Severity)		
Low Risk (1 – 8)	Medium Risk (9 -12)	High Risk (15 – 25)
May be ignored but ensure controls remain effective	Continue, but implement additional reasonable practicable controls where possible	Avoidance action is required; therefore alternative design solutions must be examined. Activity must not proceed until risks are reduced to a low or medium level

The following hazards pertinent to our design input have been identified and control measures suggested:

Table D2 – Risk Assessment

Hazard	Risk Of	At Risk	Rating			Control Measures	Controlled		
			L	S	R		L	S	R
Vibration Isolators	Injury to hands	Contractors	3	3	9	Care needs to be taken during adjustment. Follow manufacturers guidance	1	3	3

L: Likelihood S: Severity R: Rating

Appendix E - Graphs and Site Plans

76 Southampton Row

L_{Aeq} Time History

Tuesday 10 to Wednesday 11 September 2024

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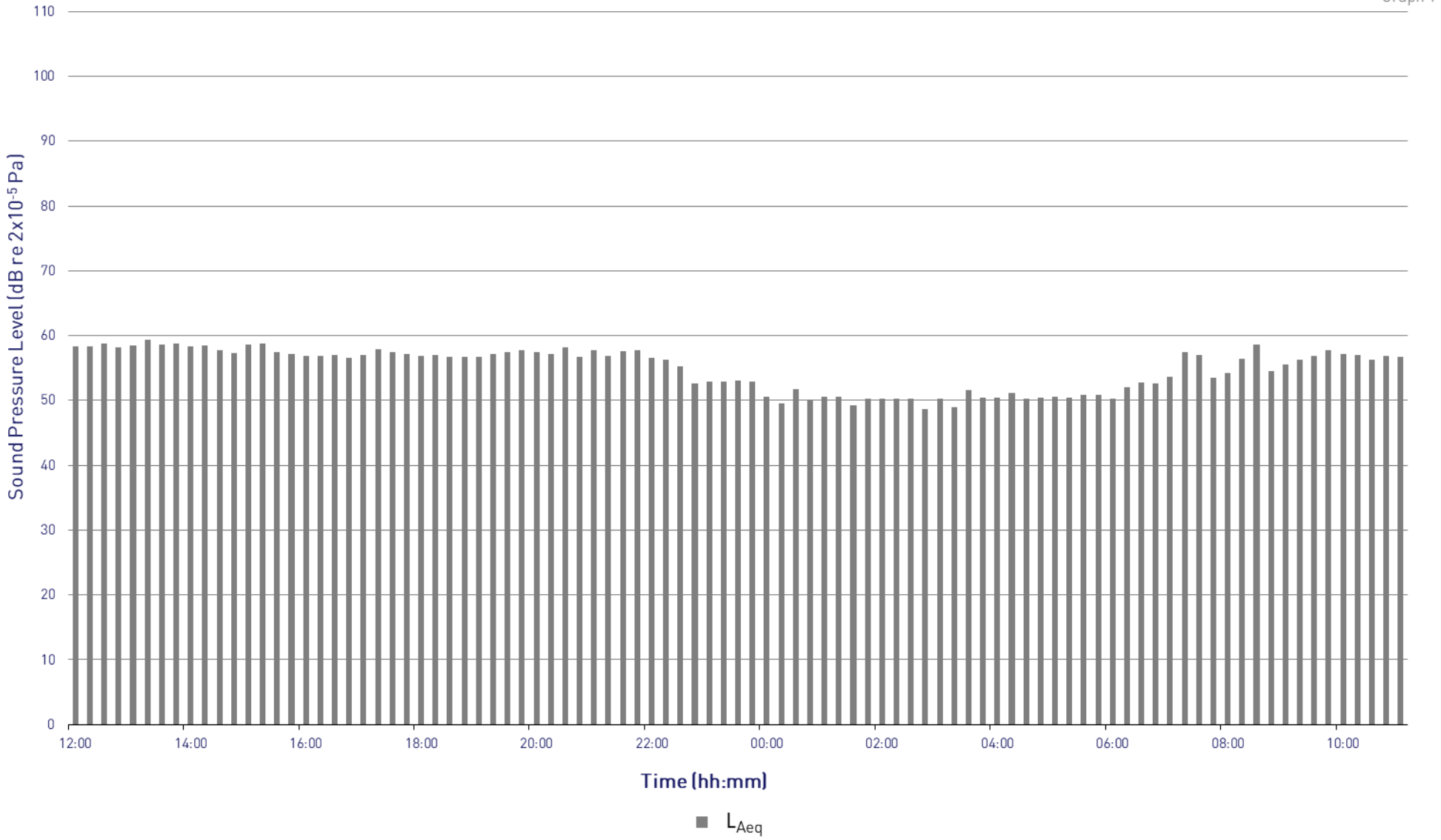
Graph 1



76 Southampton Row

$L_{Amax,f}$ and L_{A90} Time History

Tuesday 10 to Wednesday 11 September 2024

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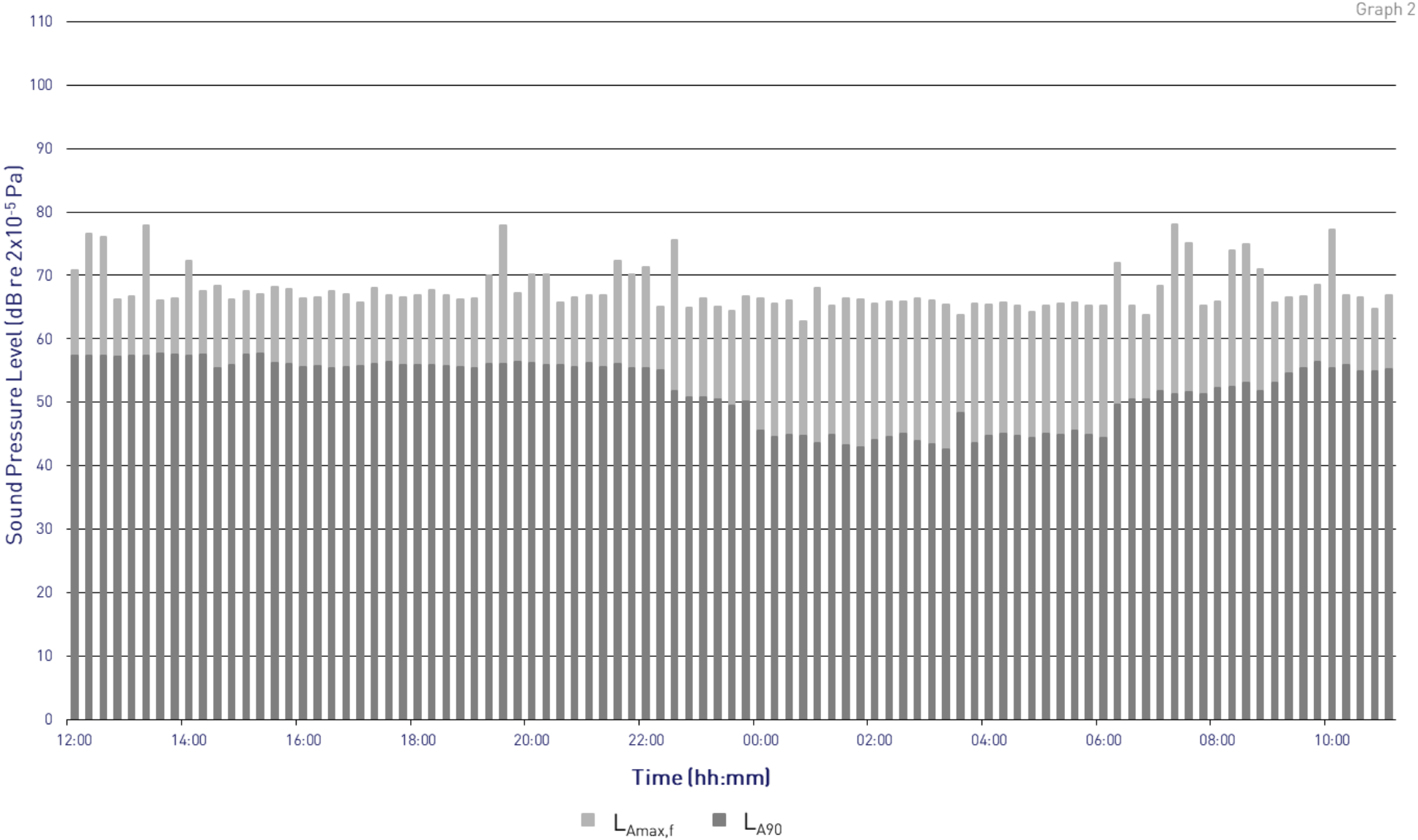
Graph 2



76 Southampton Row

$L_{A90,15\ minutes}$ Histogram

Tuesday 10 to Wednesday 11 September 2024

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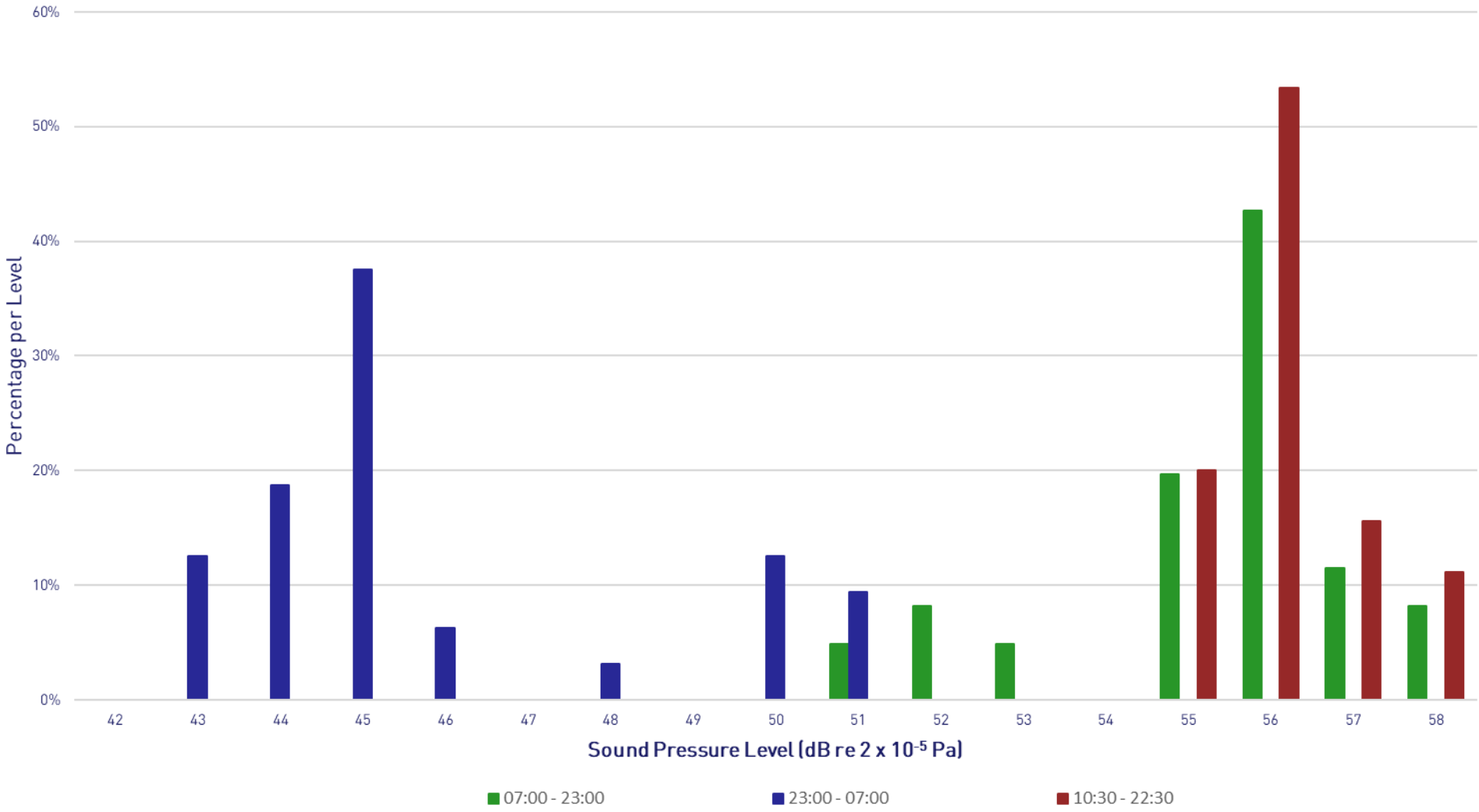
Graph 3



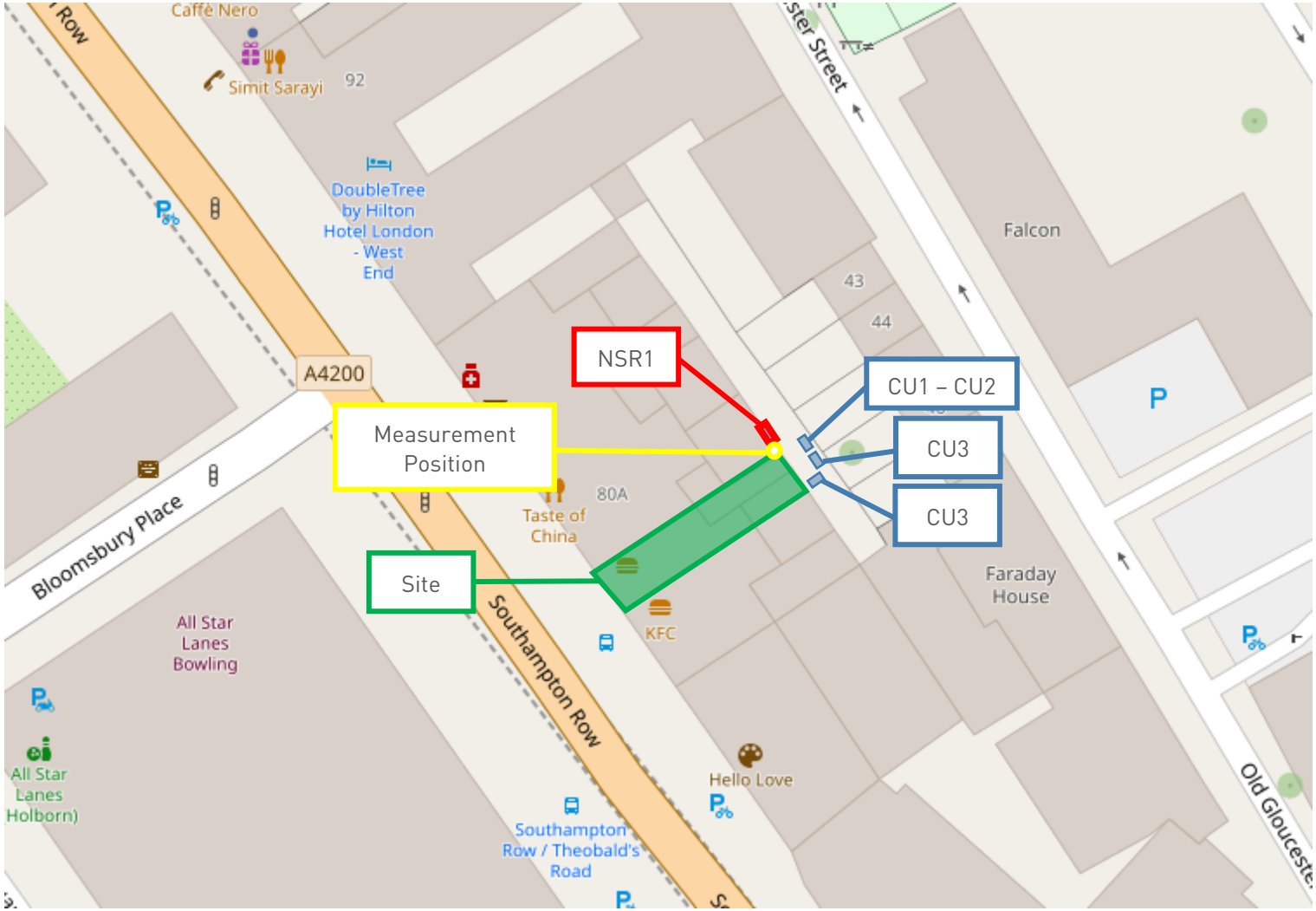


Figure 1 – Site Plan

76 Southampton Row, London WC1B

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Not to Scale

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Figure 2 – Photo of Measurement Location

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Not to Scale

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Figure 3 – Typical Acoustic Enclosure

76 Southampton Row, London WC1B

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Not to Scale

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