98 MAYGROVE ROAD, NW6

Plant Noise Assessment

Reference: 14023.RP01.PNA.0
Prepared: 17 December 2024
Revision Number: 0

Scenario Architecture
10b Branch Place
London
N1 5PH

Plant Noise Assessment

98 MAYGROVE ROAD, NW6

Reference: 14023.RP01.PNA.0
Prepared: 17 December 2024

Revision	Comment	Date	Prepared By	Approved By
0	First issue of report	17 December 2024	Matt Wildman	David Johnston

Terms of contract:

RBA Acoustics Ltd have prepared this report in accordance with our Scope of Work 14023.SW01.0 dated 17 October 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.

RBA ACOUSTICS

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. INTRODUCTION

It is proposed to locate a new air source heat pump in the rear garden of 98 Maygrove Road, NW6. As part of the 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 Council'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).

98 Maygrove Road is a three-storey residential property located within the predominantly residential area of Kilburn, north-west London, approximately 360m to the east of Kilburn Underground station. The property is adjoined by residential receptors on either side, with a rear garden that also directly adjoins the neighbouring gardens by fences approximately 1.5m high.

3. ENVIRONMENTAL NOISE SURVEY

3.1 Survey Methodology

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

- 11:00 Thursday 7 November to 10:30 Monday 11 November 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 – Flat Roof*

  Measurements were undertaken in free field conditions with the microphone on a tripod positioned on the flat roof to the rear of the house which overlooks the rear garden at first floor level. The microphone was elevated approximately 1.2m above the flat roof and approximately 4m above ground level. During our time on site, the noise climate at this position was noted to mainly consist of distant road traffic noise, noise from items of plant belonging to adjacent properties and occasional plane flyovers.

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

Selection of an appropriately representative background sound level is discussed in BS 4142:2014 *Methods for Rating and Assessing Industrial and Commercial Sound* as follows:

> *"In practice, there is no "single" background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed.*
>
> *[...] A representative level should account for the range of background sound levels and should not automatically be assumed to be either the minimum or modal value."*

Graph 3 in Appendix E presents the range of background sound levels measured and, on this occasion, the 'typical' background noise level has been chosen as representative for all periods. The 'typical' level can be determined statistically as the most commonly occurring $L_{A90,\,15mins}$ noise level occurring over the assessment period.

The representative 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) – Flat Roof	
	Typical Background Noise Level $L_{A90,15min}$ (dB)	Period-Averaged Noise Level $L_{Aeq,T}$ (dB)
Daytime (07:00 – 23:00)	39	49
Night-time (23:00 – 07:00)	29	42

4. PLANT NOISE CRITERIA

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

"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)
Daytime (07:00 – 23:00)	29
Night-time (23:00 – 07:00)	19

It should be noted that these levels are extremely low. Section 1 of BS ISO 4142: 1997, states:

> *"The method is not suitable for assessing the noise measured inside buildings or when the background and rating noise levels are both very low…For the purposes of the standard, background noise levels below about 30dB…are considered to be very low"*

Under such circumstances, we propose that, for an urban site such as 98 Maygrove Road, a maximum level of 25 dBA is often considered a realistic criterion outside existing residential receptors. Achieving this limit can be expected to result in internal noise levels no higher than 15 dBA, assuming a conservative 10 dBA reduction through a partially open window. Notwithstanding this, all reasonable efforts should be made to reduce noise levels as much as is reasonably practicable.

This alternative criterion has not been agreed with Camden Council, and therefore mitigation has been specified to achieve the limits in Table 2, however it should be noted that the criterion is very onerous, and alternatives could be considered, in consultation with the Local Authority, that would still result in acceptable protection of amenity.

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 Scenario Architecture, the project architects, 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
ASHP1	NIBE F2050-10	Air Source Heat Pump

5.2 Plant Locations

It is proposed to locate ASHP1 near the end of the rear garden of 98 Maygrove Road against the garden fence that is shared with 96 Maygrove Road. The equipment positions are indicated on the site plans in Figure 1 & Figure 3 of Appendix E.

5.3 Plant Noise Levels

Octave band noise levels are not available for the unit, however, information regarding the overall dBA noise level of the proposed unit has been provided by the manufacturer of the unit, NIBE, 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	
ASHP1	L_p at 1m	-	-	-	-	-	-	-	-	48

5.4 Noise-Sensitive Receptors (NSRs)

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

- *NSR1 – 100 Marygrove Road*
  The worst affected noise sensitive receptor is understood to be the rear south facing second floor window of 100 Maygrove Road, which has a direct line of sight to the proposed location of ASHP1 at a distance of 13m to the east.

- *NSR2 – 96 Maygrove Road*
  The nearest noise sensitive receptor to the proposed location of ASHP1 is the rear south facing second floor window of 96 Maygrove Road at a distance of approximately 10m to the east. This receptor is closer than NSR1 is to the proposed ASHP1 location, however this receptor is expected to benefit from screening from the garden fence between the window and the unit as well as a greater directivity loss.

The receptors are shown in the site plan in Figure 1 Appendix E.

5.5 Acoustic Enclosure

It is proposed to situate ASHP1 within an acoustic enclosure in order to sufficiently attenuate noise levels from the unit to achieve the requirements of Camden Council.

The Environ SC100 is a louvred acoustic enclosure designed for small and medium sized condenser units that has achieved 7-9 dBA of attenuation when tested with a similar sized Daikin air source heat pump.

For the purposes of the calculations, we have a assumed a modest estimate of 7dBA of reduction can be achieved by the enclosure.

5.6 Predicted Noise Levels at NSRs

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 (L_p at 1m)
- Distance Attenuation
- Directivity
- 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 5 – Predicted Plant Noise Levels

Operating Period	Noise Level (dB) at NSR1 – 100 Maygrove Road		Noise Level (dB) at NSR2 – 96 Maygrove Road	
	Prediction	Criterion	Prediction	Criterion
Daytime (07:00 – 23:00)	18	29	12	29
Night-time (23:00 – 07:00)	18	19	12	19

Noise from the proposed plant installations is below the criterion at each receptor, therefore, the proposed installations are acoustically acceptable.

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 ASHP 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 98 Maygrove Road, NW6. 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 Camden Council. As such, the proposed plant installations should 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	1403226	U42991	18 January 2025
Norsonic Pre Amplifier	1209	12556	U42992	18 January 2025
Norsonic ½“ Microphone	1225	25179		
Norsonic Sound Calibrator	1251	31988	U42989	18 January 2025

Appendix C - Plant Calculations

Table C1 - Example Calculation – NSR1

Parameter	dBA
L_p at 1m	**48**
Reflections	+3
Directivity losses	-4
Distance losses @ 13m	-22
Screening	0
Environ SC100 Enclosure	-7
Noise level at receiver	**18**

Table C2 - Example Calculation – NSR2

Parameter	dBA
L_p at 1m	**48**
Reflections	+3
Directivity losses	-7
Distance losses @ 13m	-20
Screening	-5
Environ SC100 Enclosure	-7
Noise level at receiver	**12**

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 Plan

98 Maygrove Road, NW6

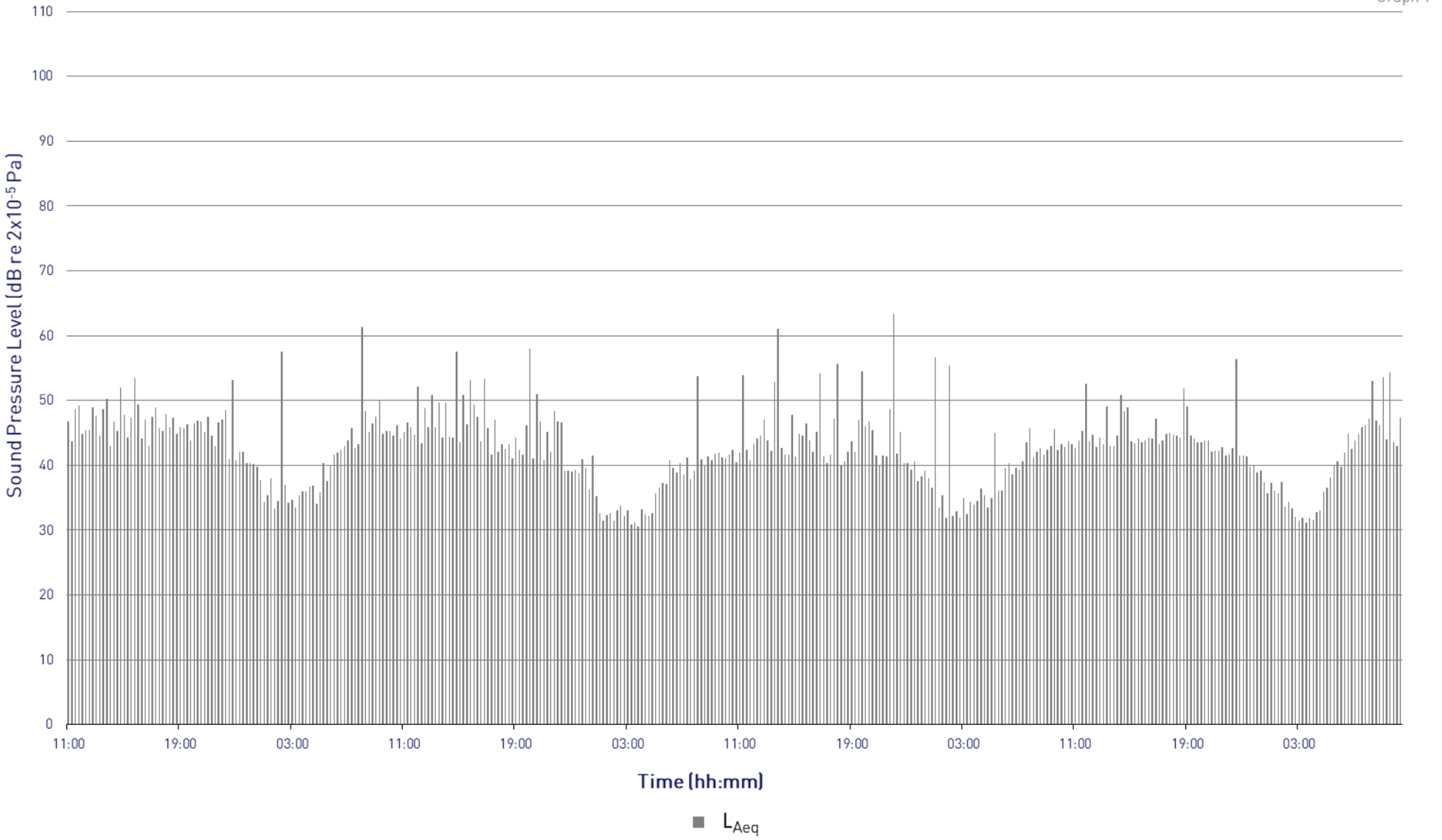
L_{Aeq} Time History

MP1 - Flat Roof, Thursday 7th November to Monday 11th November 2024

RBA ACOUSTICS

Project: 14023

Graph 1



98 Maygrove Road, NW6

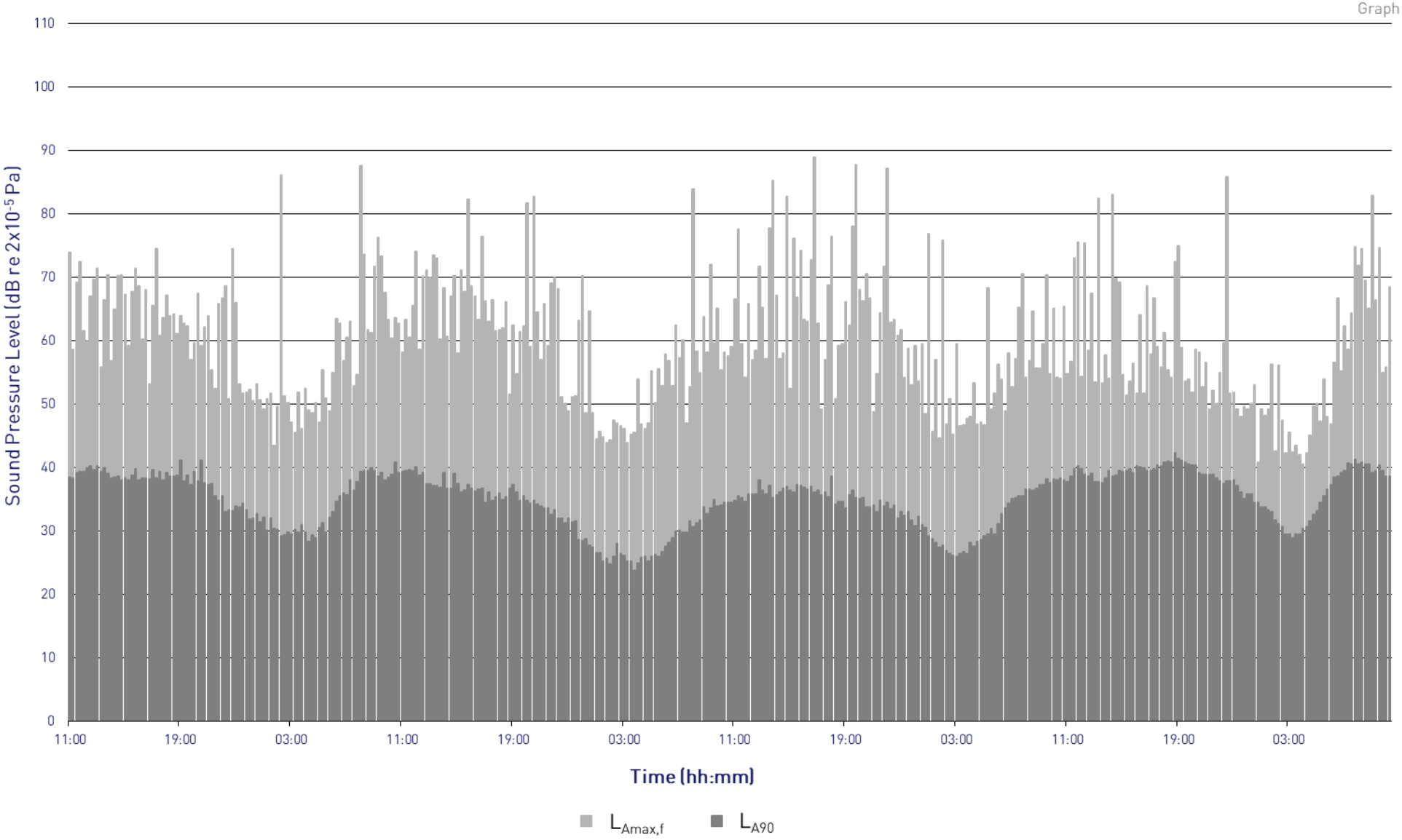
$L_{Amax,f}$ and L_{A90} Time History

MP1 - Flat Roof, Thursday 7th November to Monday 11th November 2024

RBA ACOUSTICS

Project: 14023

Graph 2



98 Maygrove Road, NW6

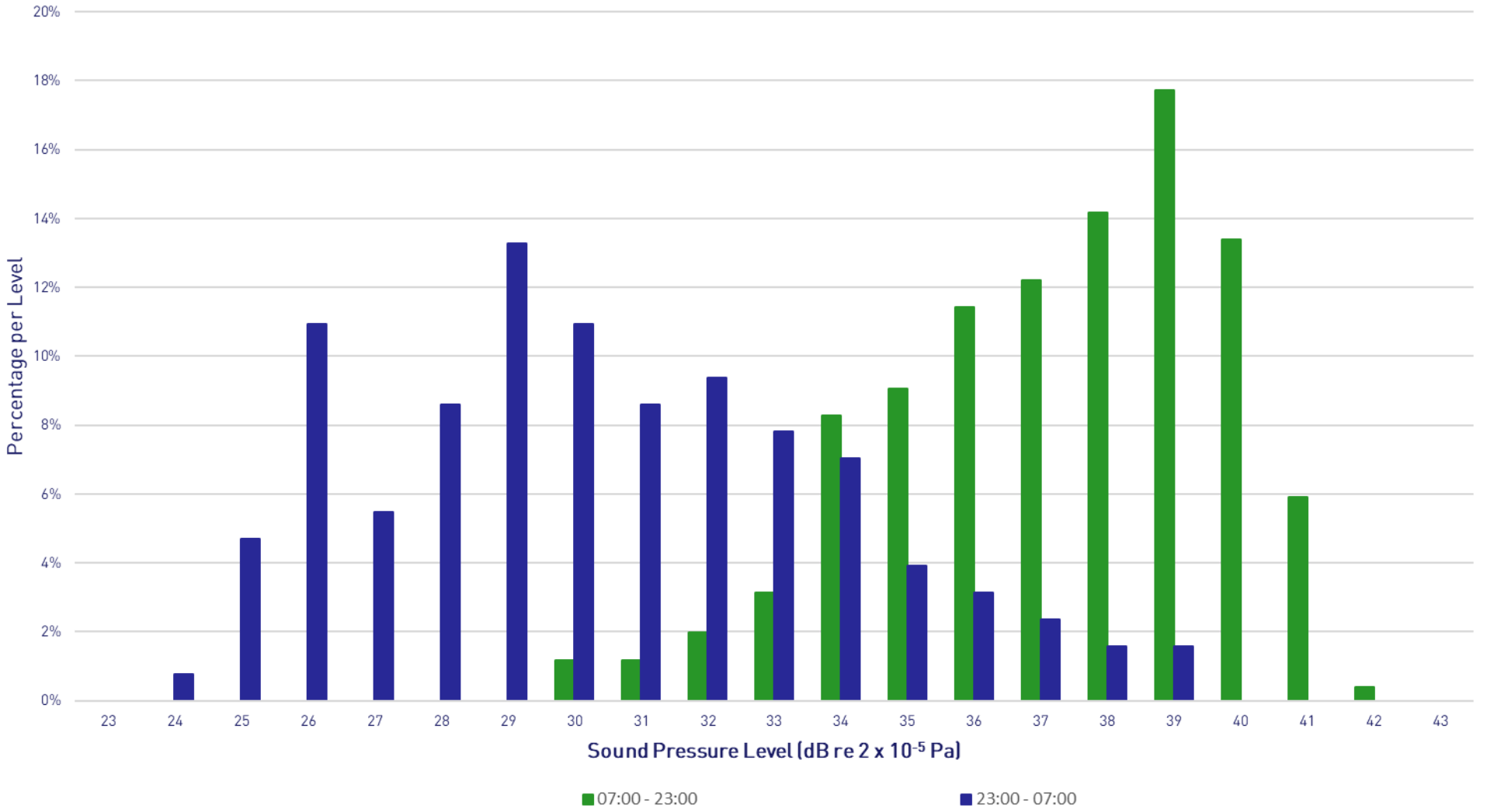
$L_{A90,15\ minutes}$ Histogram

MP1 - Flat Roof, Thursday 7th November to Monday 11th November 2024

RBA ACOUSTICS

Project: 14023

Graph 3



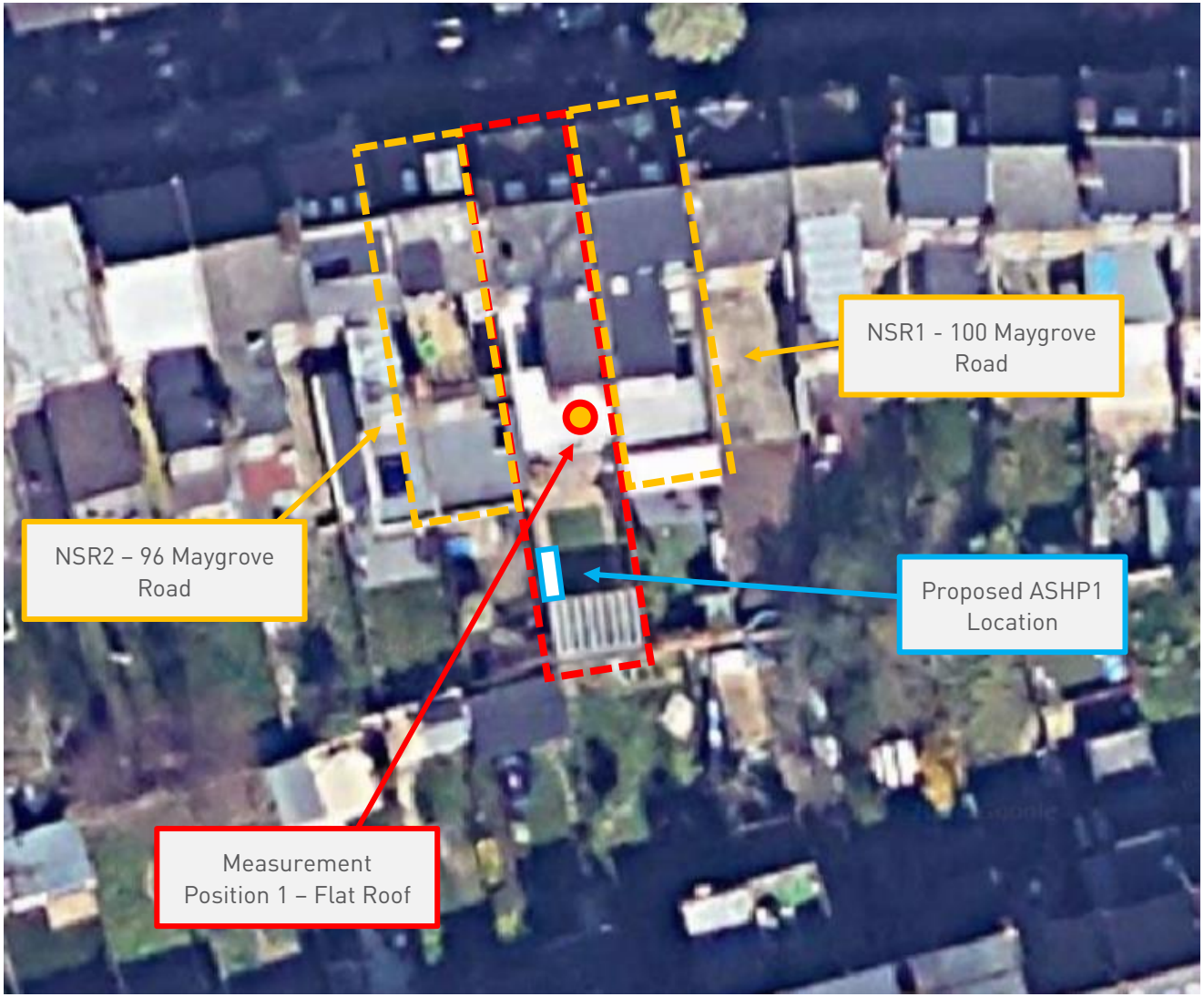


Figure 1 – Site Plan

98 Maygrove Road, NW6

Project 14023

17 December 2024

Not to Scale

RBA ACOUSTICS

Figure 2 – Photographs of Measurement Position

98 Maygrove Road, NW6

Project 14023

17 December 2024

Not to Scale

RBA ACOUSTICS

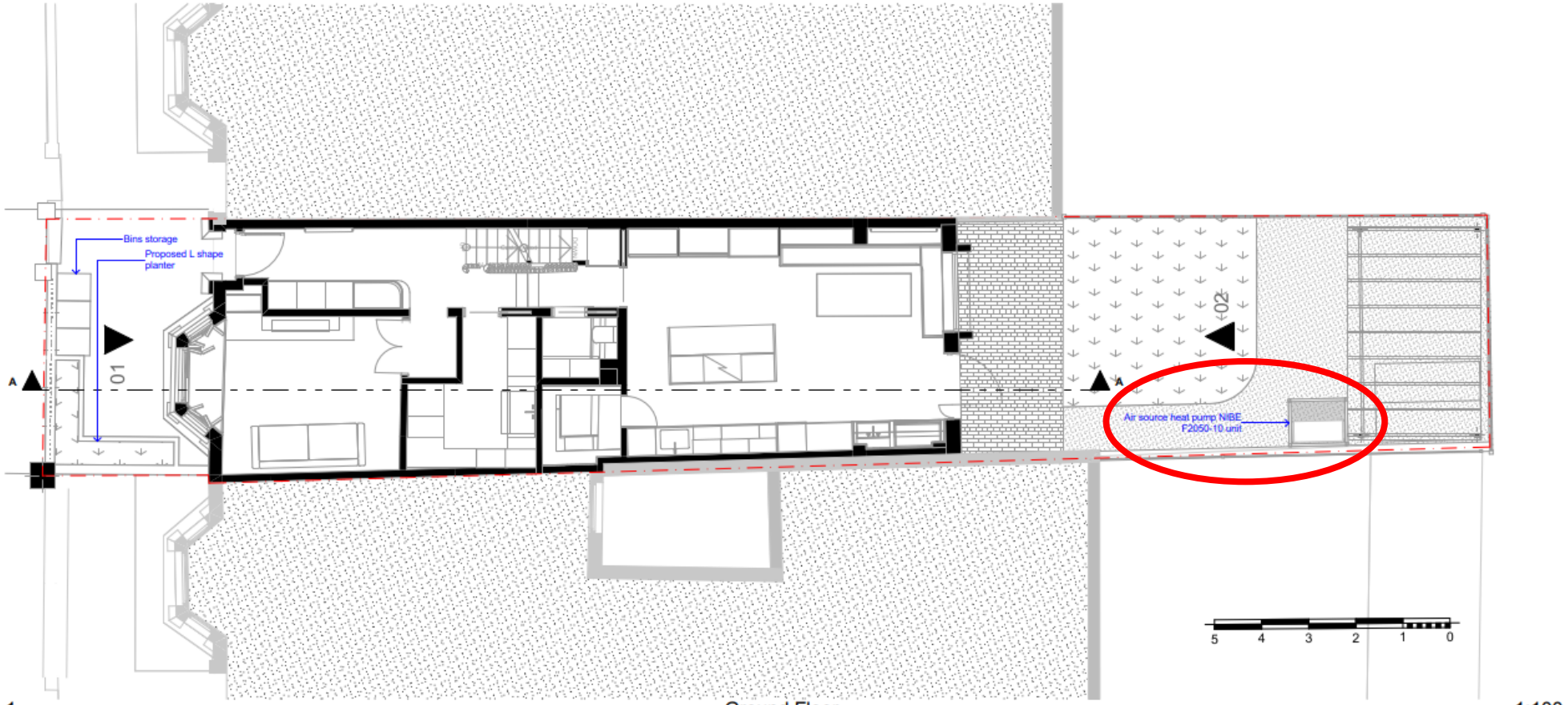


Figure 3 – Site plan showing ASHP1 location

98 Maygrove Road, NW6

Project 14023

17 December 2024

Not to Scale

RBA ACOUSTICS

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