Report Ref. **CLI0604/R1/Rev.A**

DRAFT Noise Impact Assessment of Proposed ASHP Plant

68 King Henry's Road, London NW3 3RR

06 August 2024

Report prepared for:
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Document Information

Key information	
Client	Mr Neal Manuel
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Summary

The residential property at 68 King Henry's Road, London NW3 3RR is installing outdoor air source heat pump units on the property's flat roof. Climate Acoustics has been appointed to complete a background noise survey, noise impact assessment, and technical acoustic report showing the maximum noise emission limit on the nearest noise-sensitive residential premises.

London Borough of Camden Council has plant noise emission criteria detailed in Section 2 of this report. Based on the measured background noise levels at the site.

Appendix A1 of this report shows the noise survey was carried out from Friday 9th February 2024 to Thursday 15th February 2024. The proposed air source heat pump unit(s) are expected to operate 24 hours, Monday to Sunday. *Note: Typically, noise from the plant would be more noticeable during the night when the existing background noise is lower.*

ASHP Plant Noise Criteria/ Threshold to Condition (Section 4): The noise level from the air source heat pump unit(s) will be required to meet a rating noise level of 10dB(A) or greater below the minimum background.

As the minimum measured background noise level at daytime/ evening equals 42 dB $L_{A90,1\text{-hour}}$ and 32 dB $L_{A90,15\text{-minutes}}$ at night at 1 metre from the window to the nearest noise-sensitive premises. **Therefore, the proposed air source heat pump unit(s) will need to achieve a rating noise criteria level equal to or below 32 dB $L_{Ar,Tr,1\text{-hour}}$ during the daytime/ evening and equal or below 22 dB $L_{Ar,Tr,15\text{-minutes}}$ at night.**

	Day	Night
Maximum rating noise levels at 1 metre from the window to the nearest noise-sensitive premises, $L_{Ar,Tr,T\ (Day/\ Night)}$, dB	**32**	**22**

If the cumulative noise emission limits ($L_{Ar,Tr}$) outlined in the above table (≤10 dB below the external background noise level) are adhered to at 1 metre from the nearest noise-sensitive residential receptor(s) window, the requirements of London Borough of Camden Council's plant noise emission limits should be met.

Any proposed residential fixed plant will need to be adequately controlled by a suitable planning condition for noise.

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Table of Contents

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1 Introduction

The residential property at 68 King Henry's Road, London NW3 3RR is installing outdoor air source heat pump units on the property's flat roof. Climate Acoustics has been appointed to complete a background noise survey, noise impact assessment, and technical acoustic report showing the maximum noise emission limit on the nearest noise-sensitive residential premises.

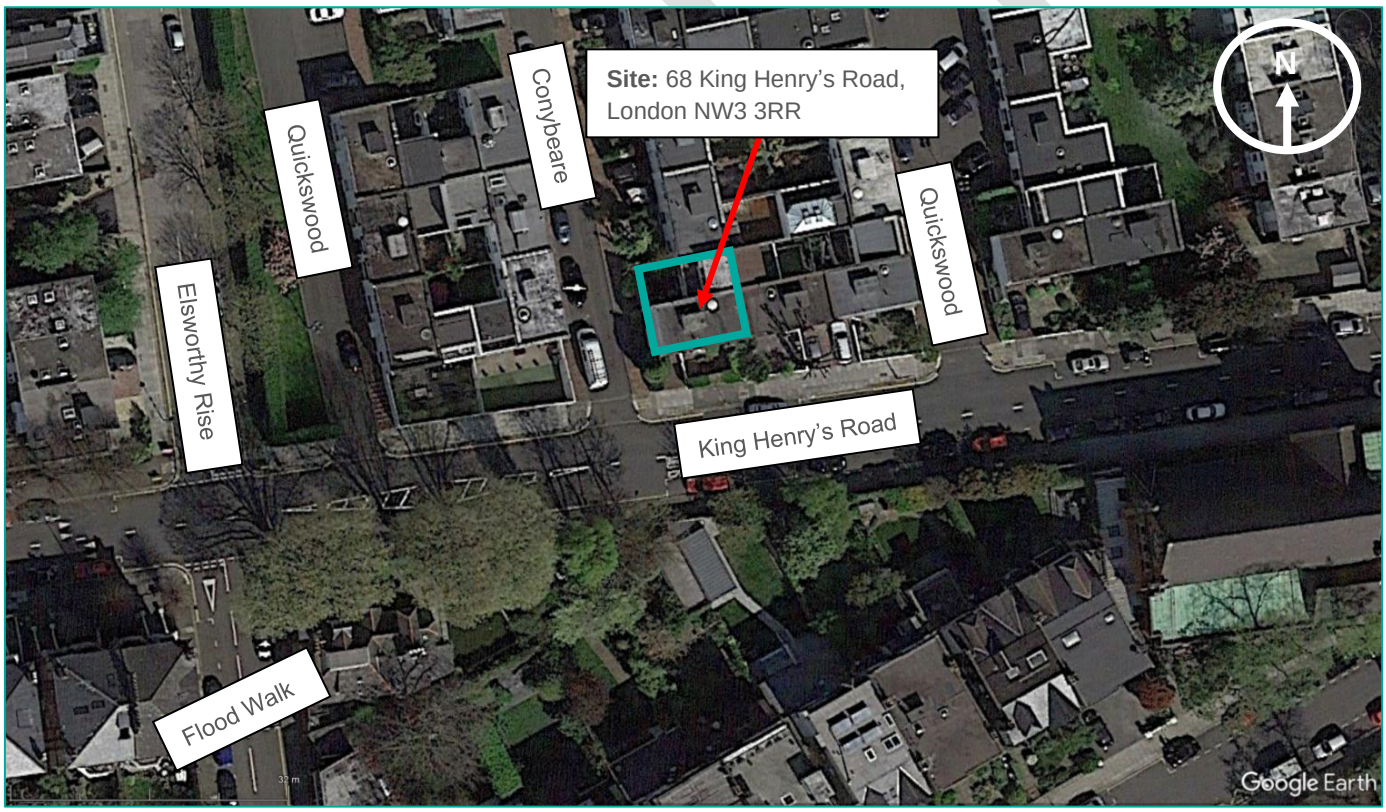
London Borough of Camden Council has plant noise emission criteria detailed in Section 2 of this report. Based on the measured background noise levels at the site.

1.1. Site Description

Figure 1 shows where the site is at 68 King Henry's Road, London NW3 3RR is located, highlighted in **green**.

Section 3.2 of this report discusses the site's noise climate. The noise climate is dominated by noise from the surrounding road networks. *Note: The proposed plant units have not yet been installed but are expected to operate 24 hours a day.*

Figure 1 – Google Earth™ view showing the location of the site.



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2 Noise Criteria

London Borough of Camden Council's Noise Guidance: For the proposed ASHP Unit, Camden Council has detailed that they have concerns that the noise emitted from the plant will need a comprehensive noise impact assessment and an acoustic report should be submitted, as per London Borough of Camden Council's standard conditions for noise:

London Borough of Camden Council has threshold noise criteria set to control the plant noise to demonstrate that the plant won't cause noise disturbance and harm the local residential environment. Specific noise guidance for the fixed plant is highlighted **bold** below, and reference is made to *'Camden Planning Guidance – Amenity 2021'* and *"Camden Local Plan 2017"*:

Specific Noise Guidance:

"As the proposals involve the installation of new noise generating machinery in a residential area sensitive to noise, it is the thresholds set out in relation to the second point which is relevant in the assessment of the proposals. Table C of Appendix 3 sets out noise levels applicable to plant and machinery and requires noise levels to be 10dB below background levels and no events exceeding 57dBL$_{Amax}$."

Camden Planning Guidance – Amenity 2021:

"6.1 Noise and vibration can have a significant impact on amenity, quality of life and wellbeing. This section provides guidance regarding the application of Local Plan Policies A4 Noise and vibration and A1 Managing the impact of development, which seek to protect residents of both existing and new residential developments and the occupiers of other noise-sensitive developments from the adverse effects of noise and vibration. Appendix 3 of the Local Plan supports these policies and sets out expected standard in terms of noise and vibration.

6.17 Assessments should be carried out and produced by a suitably qualified and competent consultant and conform to the standards in BS7445 1-3:2003 Description and measurement of environmental noise (or any later replacement guidance).

Plant and other noise generating equipment

6.27 Developments proposing plant, ventilation, air extraction or conditioning equipment and flues will need to provide the system's technical specifications to the Council accompanying any acoustic report. 'BS4142 Method for rating Industrial and Commercial Sound' contains guidance and standards which should also be considered within the acoustic report.

6.29 Plant, ventilation, air extraction or conditioning equipment and flues can cause disturbance to residential properties. The Council would therefore welcome the use of long-term maintenance agreements to ensure that equipment maintains acceptable noise levels over its lifetime and the use of timers to limit any unnecessary operation of the equipment."

Camden Local Plan 2017:

Policies A1 & A4 and Appendix C of the London Borough of Camden Local Plan 2017 are referred to here:

"Policy A1 Managing the impact of development

The Council will seek to protect the quality of life of occupiers and neighbours. We will grant permission for development unless this causes unacceptable harm to amenity.

The factors we will consider include:

j. noise and vibration levels;

k. odour, fumes and dust;

Policy A4 Noise and vibration

The Council will seek to ensure that noise and vibration is controlled and managed.

Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for:

a. development likely to generate unacceptable noise and vibration impacts; or

b. development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.

We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development."

Appendix 3: Noise Thresholds

Proposed Developments likely to be Sensitive to Noise

Special consideration will need to be given to noise sensitive developments that are proposed in areas which are, or expected to become, subject to levels of noise likely to have an adverse effect. The threshold of acceptability of the noise will primarily depend on two factors: the intended use of the noise sensitive development and the source of the noise experienced, or likely to be experienced.

Table B: Noise levels applicable to noise sensitive residential development proposed in areas of existing noise

Dominant Noise Source	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAEL (Red)
Anonymous noise such as general environmental noise, road traffic and rail traffic ~	Noise at 1 metre from noise sensitive façade/free field	Day	<50dB$L_{Aeq,16hr}$*	50dB to 72dB$L_{Aeq,6hr}$*	>72dB$L_{Aeq,16hr}$*
		Night	<45dB$L_{Aeq,8hr3}$ <40 dB$L_{Aeq,8hr}$**	45dB to 62dB$L_{Aeq,8hr}$* >40dBL_{night}**	>62dB$L_{Aeq,8hrs}$*
	Inside a bedroom	Day	<35dB$L_{Aeq,16hr}$	35dB to 45dB$L_{Aeq,16hr}$	>45dB$L_{Aeq,16hr}$
		Night	<30dB$L_{Aeq,8hr}$ 42dB$L_{Amax,fast}$	30dB to 40dB$L_{Aeq,16hr}$ 40dB to 73dB$L_{Amax,fast}$	>40dB$L_{Aeq,8hr}$ >73dB$L_{Amax,fast}$
	Outdoor living space (free field)	Day	<50dB$L_{Aeq,16hr}$	50dB to 55dB$L_{Aeq,6hr}$	>55dB$L_{Aeq,16hr}$
Non-anonymous noise	See guidance note on non-anonymous noise				

*LAeq, T values specified for outside a bedroom window are façade levels
**Lnight values specified for outside a bedroom window are free field levels

The levels given above are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises. The Council will also take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

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).

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dB L_{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dB L_{Amax}

*10dB should be increased to 15dB if the noise contains audible tonal elements. (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.

**levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require a NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted Leq,5mins noise levels in octave bands) 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area.

British Standard BS 8233: 2014: British Standard BS 8233:2014 *'Guidance on Sound Insulation and Noise Reduction for Buildings'* contains guidance for internal design criteria, as shown in the following table.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq, 16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq, 16hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16hour}$	30 dB $L_{Aeq, 8hour}$

British Standard BS 4142:2014+A1:2019: British Standard BS 4142:2014+A1:2019 *"Methods for Rating and Assessing Industrial and Commercial Sound"* is used to assess the potential for adverse impact due to the agricultural noise sources at the relevant noise-sensitive property. The noise source levels are measured/calculated and compared to the existing background noise level (L_{A90}).

Depending on the noise source characteristics (tonal, intermittent, or impulsive), the noise source is given a rating noise level (penalty additions) and compared to the *'lowest'* background noise level (during operating hours). The significance of the existing noise sources can then be given a likelihood of adverse impact, which follows British Standard BS 4142:2014+A1:2019 advice:

"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs.

- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context. The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact.*
- *Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

Subjective method

Tonality: *For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.*

Impulsivity: *A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.*

Other sound characteristics: *Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.*

NOTE 2 Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant, then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

Intermittency: *When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."*

3 Existing Noise Climate

3.1. Noise Survey Details

Appendix A1 shows the noise survey details, including personnel, instrumentation used, calibration information, calibration procedure, uncertainty, equipment operation time & dates, and weather conditions.

3.2. Noise Climate

Appendix A3 shows the unattended noise data. The noise climate is dominated by noise from the surrounding road networks. *Note: The proposed plant units have not yet been installed but are expected to operate 24 hours a day.*

3.3. Background Noise Measurement Results

The current background noise readings were completed at the location shown in Appendix A2. The table below details the average ambient noise levels and the minimum external background noise levels at Location U1, equivalent to the nearest noise-sensitive residents' window(s). The noise survey graph is shown in Appendix A3.

Position	Period	Average Measured Ambient Noise Level, $L_{Aeq,T}$, dB	Minimum Measured Background Noise Level, $L_{A90,T}$, dB
Location U1	Day 0700 to 2300 (16hr)	55	42
	Night 2300 to 0700 (8hr)	45	32

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4 Plant Noise Criteria/ Threshold

In order to address potential noise concerns from the proposed air source heat pumps, a noise impact assessment and acoustic report are needed based on the findings of the noise survey in Section 3.3. The minimum background noise levels measured at the nearest residential premises during the day/evening and night are **42 dB $L_{A90,1\text{-}hour(day)}$** and **32 dB $L_{A90,15\text{-}minutes(night)}$**, respectively.

Section 2 of this report shows that the London Borough of Camden Council has local planning policy and guidance for plant noise, as set out below:

"noise levels applicable to plant and machinery and requires noise levels to be 10dB below background levels and no events exceeding 57dBL_{Amax}"

Therefore, the noise level from the air source heat pump unit(s) will be required to meet a rating noise level of 10dB(A) or greater below the minimum background.

As the minimum measured background noise level at daytime/ evening equals 42 dB $L_{A90,1\text{-}hour}$ and 32 dB $L_{A90,15\text{-}minutes}$ at night at 1 metre from the window to the nearest noise-sensitive premises. **Therefore, the proposed air source heat pump unit(s) will need to achieve a rating noise criteria level equal to or below 32 dB $L_{Ar,Tr,1\text{-}hour}$ during the daytime/ evening and equal or below 22 dB $L_{Ar,Tr,15\text{-}minutes}$ at night.**

	Day	Night
Maximum rating noise levels at 1 metre from the window to the nearest noise-sensitive premises, $L_{Ar,Tr,T\ (Day/\ Night)}$, dB	**32**	**22**

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Appendix A – Noise Survey Details and Result Table & Graph

Appendix A1 – Noise Survey Details

Personnel present:

Alex Hancock (PG Dip (IOA), MIOA) – Climate Acoustics

Instrumentation used and calibration info:

Svantek 971A – Sound Level Meter (**calibration certificates available upon request.)*.

Larson Davis CAL200 – Calibrator (**calibration certificates available upon request.)*.

Climate Acoustics Calibrated Equipment	
Unattended Noise Meter (Svantek 971A) – Location U1 - Rear Balcony Area (North-East Façade)	
Class 1 Sound Level Meter	Svantek 971A – Serial Number 127611 (Date of Calibration: 15/03/2023*)
Microphone	ACO 7152E – Serial Number 82011 (Date of Calibration: 15/03/2023*)
Preamplifier	Svantek SV 18A – Serial Number 130497 (Date of Calibration: 15/03/2023*)
Calibrator (Larson Davis CAL200)	
Calibrator	Larson Davis – CAL200 - Serial Number 6003 (Date of Calibration: 27/10/2023*)

Calibration procedure:

The calibration procedure before and after the noise survey involved calibrating the Svantek 971A sound level meters using the Larson Davis CAL200. No significant drift was measured before and after the survey (accuracy within ±0.3 dB).

Uncertainty:

For accurate measurements, the noise monitoring equipment is calibrated by traceable lab calibration:

- a Class 1 sound level meter and microphone are calibrated once every two years.
- a Class 1 calibrator is calibrated once every year.

Note: any measurement is taken by a Class 1 sound level meter, a margin on uncertainty of +/- 1.1 decibels typically apply because of the equipment's tolerances. The uncertainty with the noise prediction calculations is limited, as using our experience and factors including distance, line of sight and reflections have been considered.

Equipment operation times and dates:

12 pm on Monday 29th July 2024 to 10:30 am Friday 2nd August 2024.

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Weather conditions:

Weather conditions during the operation of noise monitoring equipment.

Date	Temperature (°C)	Weather Conditions	Wind
Monday 29 July 2024	18 to 29 Degrees	Warm/ Hot. Dry. Sunny, Clear.	**Calm to Gentle Breeze (1-5m/s).**
Tuesday 30 July 2024	15 to 31 Degrees	Cool/ Warm/ Hot. Dry. Sunny, Clear/ Passing Clouds/ Overcast.	**Calm to Gentle Breeze (0-4m/s).**
Wednesday 31 July 2024	19 to 29 Degrees	Warm/ Hot. Dry. Sunny/ Partly Sunny, Clear/ Passing Clouds/ Overcast.	**Light Air to Gentle Breeze (2-5m/s).**
Thursday 1 August 2024	18 to 29 Degrees	Warm/ Hot. Dry/ Wet. Sunny/ Partly Sunny, Clear/ Passing Clouds/ Broken Clouds/ Overcast and Occasional Drizzle and Thunderstorms.	**Calm to Gentle Breeze (0-4m/s).**
Friday 2 August 2024	17 to 20 Degrees	Warm/ Hot. Dry. Partly Sunny, Fog/ Low Clouds/ Passing Clouds/ Mostly Cloudy.	**Calm to Light Breeze (0-3m/s).**

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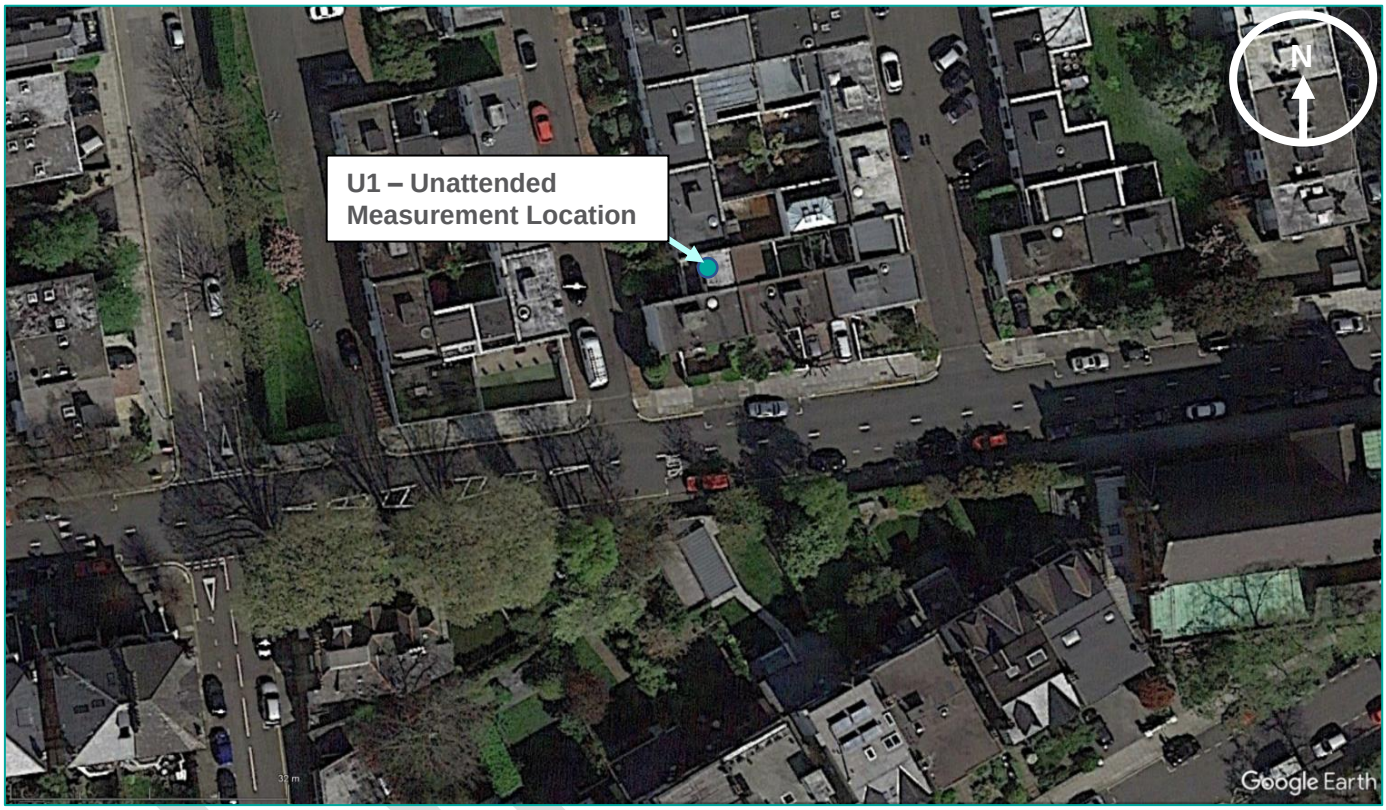
Appendix A2 – Noise Survey Locations

The Google Earth™ image (Figure 2) below shows the unattended sound level meter locations at position U1. A description of each position is provided below:

- **Position U1:** The sound level meter microphone was set up on a tripod at the height of 1.5 metres to the 1st-floor flat roof to the rear of the premises at 68 King Henry's Road and is in 'free field' conditions.

Figure 2 - Noise Measurement Location U1 (Source: Google Earth™)



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Appendix A3 – Position U1 - Unattended Noise Survey Graph — 1st Floor Flat Roof to the Rear of Property.