MAX FORDHAM

101 Bayham Street, Camden

Noise Impact Assessment

Issue 01

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Max Fordham LLP
Max Fordham LLP
42/43 Gloucester Crescent
London
NW1 7PE

T 020 7267 5161

maxfordham.com

ISSUE HISTORY

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1.0 EXECUTIVE SUMMARY

As part of the redevelopment of 101 Bayham Street, external plant is proposed to be installed on the roof of the building. This report assesses the impact of the proposed plant on the noise environment in the surrounding area.

An unattended noise survey was undertaken between 15:00 on Friday 30th June and 15:00 on Friday 7th July 2023 to determine current background noise levels representative of those at nearest noise-sensitive receptors (NSRs). The noise monitoring equipment was installed in two positions on either side of the roof of 101 Bayham Street, which are taken to be representative of the NSRs at each respective side of the building.

These measurements suggest that the representative existing night-time (23:00-07:00) background noise levels at the two nearest NSRs are 45dBA and 46dBA, and the representative existing daytime (07:00-23:00) background noise levels are 52dBA and 57dBA. The plant noise limits have been set by determining the Lowest Observable Adverse Effect Level (LOAEL) and the Significant Observable Adverse Effect Level (SOAEL). In accordance with the Camden Local Plan, these are taken to be 10dB below the existing background noise level and 5dB above the existing background noise level respectively. The LOAEL has been used as the plant noise limit.

The proposed plant has been modelled as running at full capacity during the day period, and 90% capacity during the night period. It is understood that the plant is not likely to exceed these operating capacities.

A noise model was produced using the software SoundPLAN. With the plant running at 100% capacity, the resultant noise rating levels at the nearest NSRs are predicted to be at least 2dB below the daytime LOAEL. With the plant running at 90% capacity, the resultant noise rating levels are predicted to be no greater than the night-time LOAEL.

The proposed units are therefore not considered to have a significant adverse effect on the nearest noise-sensitive receptors, and meet the requirements of the Camden Local Plan.

2.0 INTRODUCTION

Max Fordham LLP have been appointed to provide advice on acoustic matters relating to the refurbishment of an office building at 101 Bayham Street, London. Max Fordham LLP (Acoustics Team) are full members of the Association of Noise Consultants (ANC).

This noise impact assessment aims to evaluate the likely impact of new permanent plant equipment associated with the development on the noise environment at the nearest identified noise-sensitive receptors (NSRs).

A glossary of the common acoustic terms used in this report is given in Appendix B, for reference.

2.1 Site Overview

The site is 101 Bayham Street, located in the London Borough of Camden. Figure 1 shows the location of the site, as well as the assumed nearest noise-sensitive (residential) receptors.

Figure 1: Overview of site showing the assumed location of nearest noise sensitive receptors, NSR1 and NSR2.

The main source of noise at the site is traffic noise from Bayham Street, as well as plant noise emanating from the area adjacent to NSR 2. The nearest noise-sensitive receptors are identified to be the houses on the opposite side of Bayham Street (NSR 1), as well as 113 Bayham Street / 16 Greenland Street (NSR 2), which are assumed to be residential.

3.0 ASSESSMENT CRITERIA

The following is a summary of the planning policy which applies to the proposed development, and which the results of the noise survey have been assessed against.

3.1 National Planning Policy

3.1.1 National Planning Policy Framework
Planning Policy Guidance Note 24 (PPG24), which was generally used for overall guidance to planners regarding environmental noise, particularly for residential sites, was replaced in March 2012 by the more general advice given in the National Planning Policy Framework (NPPF).

The NPPF (last updated September 2023) states in paragraph 174e), that planning policies and decisions should contribute to and enhance the natural and local environment by "preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability." Furthermore, it states in paragraphs 185 and 187 that planning policies and decisions should:

- mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life [paragraph 185 a)],
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason [paragraph 185 b)], and
- be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established [paragraph 187].

3.1.2 Noise Policy Statement for England
The NPPF document also refers to the Noise Policy Statement for England (March 2010). The Noise Policy Statement for England (NPSE) sets out (paragraph 1.6) the long term vision of Government noise policy: "Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."

The NPSE also states: "Excessive noise can have wide-ranging impacts on the quality of human life, health (for example owing to annoyance or sleep disturbance) and use and enjoyment of areas of value such as quiet places and areas with high landscape quality."

The NPSE also cites (in the Explanatory Note section) the following three aims:

- First aim of the NPSE: Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Second aim of the NPSE: Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Third aim of the NPSE: Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

The NPSE also states (paragraph 2.2) that "examples of noise management can be found in many areas including reducing noise source; the use of the land use and transport planning systems, compensation measures, the statutory nuisance and licensing regimes and other related legislation."

The NPSE (in the Explanatory Note section) also introduces guidance to assist in defining the adverse impacts:

- NOEL – No Observed Effect Level: this is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to noise.
- LOAEL – Lowest Observed Adverse Effect Level: this is the level above which adverse effects on health and quality of life can be detected.
- SOAEL – Significant Observed Adverse Effect Level: this is the level above which significant adverse effects on health and quality of life occur.

These categories are discussed further in the Planning Practice Guidance section below. The NPSE acknowledges (paragraph 2.15) that it is not possible to have a single objective noise-based measure that is mandatory and applicable to all sources of noise in all situations.

3.1.3 Planning Practice Guidance (PPG – Noise)

The government's Planning Practice Guidance web pages provide advice on various issues, including noise (https://www.gov.uk/guidance/noise--2). The noise advice (March 2014, last update July 2019) states in the context of considering when noise is relevant to planning, "noise needs to be considered when new development may create additional noise, or would be sensitive to the prevailing acoustic environment (including any anticipated changes to that environment from activities that are permitted but not yet commenced)." (Paragraph: 001, Reference ID: 30-001-20190722, Revision date: 22-07-2019.)

The Planning Practice Guidance pages also include more explanation of the effect level categories noted above, providing an explanatory Noise Exposure Hierarchy Table, which explores how actions such as a requirement for noise mitigation, or prevention of a development, might be assessed with respect to whether noise levels are considered above the category thresholds. The Noise Exposure Hierarchy Table (Paragraph: 005, Reference ID: 30-005-20190722, Revision date: 22-07-2019) is reproduced here:

Response	**Examples of outcomes**	**Increasing effect level**	**Action**
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heared, but does not cause any change in behaviour, attitute or other physicological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitute or other physicological response e.g. turning up volume of television; speaking more loudly, where this no alternaive ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affect the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitute or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windeows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate the effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

In summary, with respect to National Planning Policy, neither the Planning Practice Guidance pages, nor the National Planning Policy Framework or Noise Policy Statement for England documents, provide quantitative advice such as the use of absolute noise limits. Thus, authorities still generally interpret and express national and local non-quantitative policies by issuing quantitative noise-related planning conditions.

3.2 BS 4142:2014

BS 4142:2014+A1:2019 "Methods for Rating and Assessing Industrial and Commercial Sound" addresses the likelihood of adverse impact from noise generated by plant equipment. A noise rating is determined and compared with the existing local background sound level, and several cumulative acoustic feature corrections to the noise rating are available to apply where appropriate. For example, if the noise includes a distinguishable tone, impulse, intermittency, or other readily distinguishable sound characteristic.

BS 4142:2014 seeks to determine a "representative" background sound level, stating that "…the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods".

The assessment of the impact depends upon the margin by which the rating level of the specific sound source exceeds the background sound level but also promotes a consideration of the context in which the sound occurs when making an assessment. BS 4142:2014 states that an initial estimate of the impact of the specific sound is made by subtracting the measured background sound level from the rating level, while considering the following points:

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
d) 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.

Note then, a BS 4142:2014 assessment may deduce a low impact where the specific sound level is approaching the background sound level, and thus may conclude that the specific noise is acceptable.

3.3 Camden Local Plan (2017)

Policy A1 of the Camden Local Plan outlines how the council aims to protect quality of life and how development will consider, amongst other factors, noise and vibration levels. The local plan also states that the Council will require an acoustic report to accompany any development that is likely to generate noise. The general guidance is given in Policy A4:

"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."

The character of the noise for any noise generating uses must be taken into consideration. As well as the general guidance, the following specific thresholds are set out for industrial and commercial noise sources.

Existing noise sensitive receptor	Assessment location	Design Period	LOAEL	LOAEL to SOAEL	SOAL
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 increase to 15dB if the noise contains audible tonal elements. However if it can demonstrated that there is no significant different in the character of the residual background noise then this reduction may not be required.*
***Levels are given for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.*

The LOAEL/SOAEL definitions correspond to those given in NPPF and PPG – Noise.

The council will take into account the likely times of occupation for types of development.

4.0 NOISE SURVEY

To determine typical ambient (L_{Aeq}) and background (L_{A90}) noise levels at locations representative of the nearest NSRs, a noise survey was undertaken between 30th June 2023 and 6th July 2023.

4.1 Methodology

An unattended noise survey has been undertaken at the proposed site on 30 June – 6 July 2023 by Max Fordham LLP. The survey consisted of a 6-day (144 hour) measurement at the location marked LT1 on Figure 2 from 30 June to 5 July, and a 1-day (24 hour) survey at the location marked LT2 from 5 July to 6 July.

Details of the equipment are given in Appendix A. The assessment was carried out in accordance with the principles of BS7445-1.

Figure 2: Location of long-term survey, and locations of existing sources of plant noise at the site.

The results from these surveys are provided in Section 4.4.

4.2 Noise Climate

The noise climate at the site is dominated by Bayham Street, a busy road on which operate several bus routes. This road is also frequently used by lorries and motorbikes. In addition, there was mechanical plant situated around the car park behind 101 Bayham Street, which could be heard at LT2. In particular, there is an exhaust flue directly adjacent to NSR 2, opposite LT2. The results from LT1 are taken to be representative of the levels at NSR 1, and those from LT2 are taken to be representative of NSR 2.

4.3 Weather

Rain was recorded between the hours of 01:00 and 06:00 on Thursday 06/07/2023. This period has been excluded from the results, as shown in the survey graph (Figure 3). Aside from that, no rain was recorded throughout the measurement period, and local weather data indicates that windspeeds did not exceed 5m/s.

4.4 Survey Results

Key results are presented in Table 1, with time histories for LT1 and LT2 presented in Figures 3 and 4 respectively.

Table 1: Summary of background noise measurements.

Survey Location	Period	Minimum background noise level / dB L_{A90}	Representative* background noise level / dB L_{A90}
LT1	Daytime (07:00-23:00)	44	52
	Night-time (23:00-07:00)	40	45
LT2	Daytime (07:00-23:00)	48	57
	Night-time (23:00-07:00)	45	46

**40th percentile used*

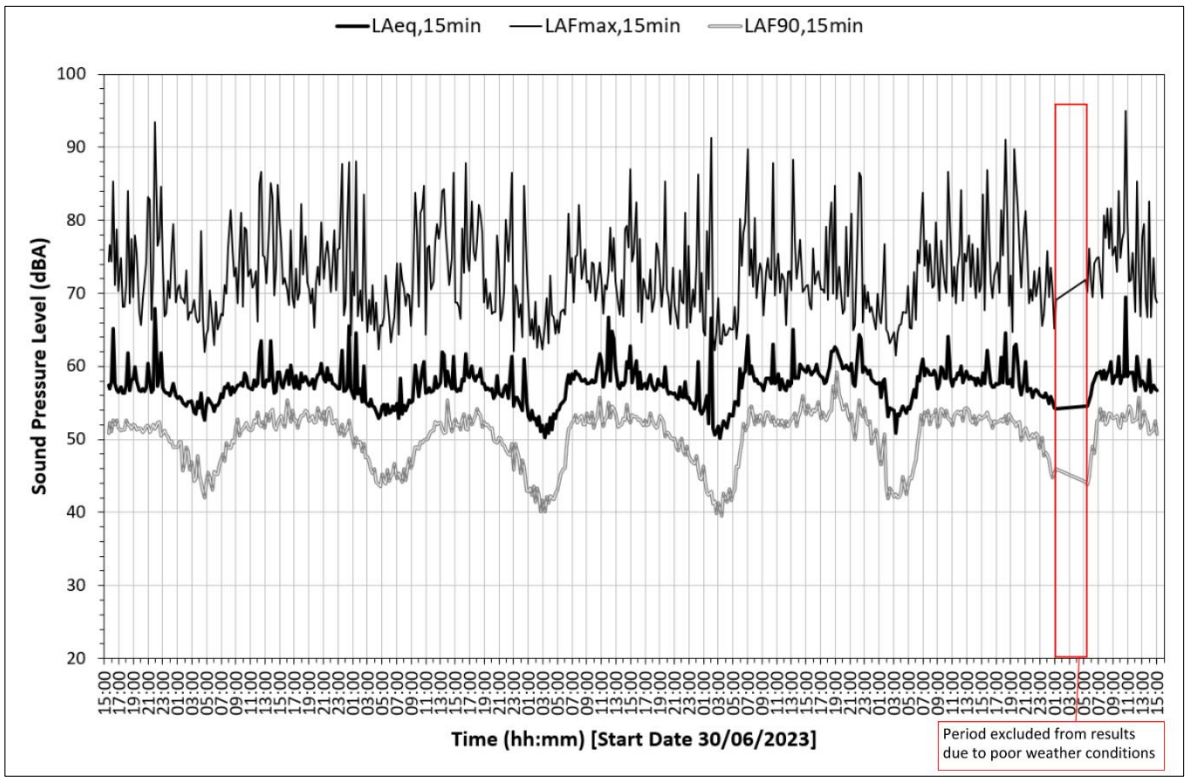

Figure 3: Time history for the unattended noise survey at location LT1.

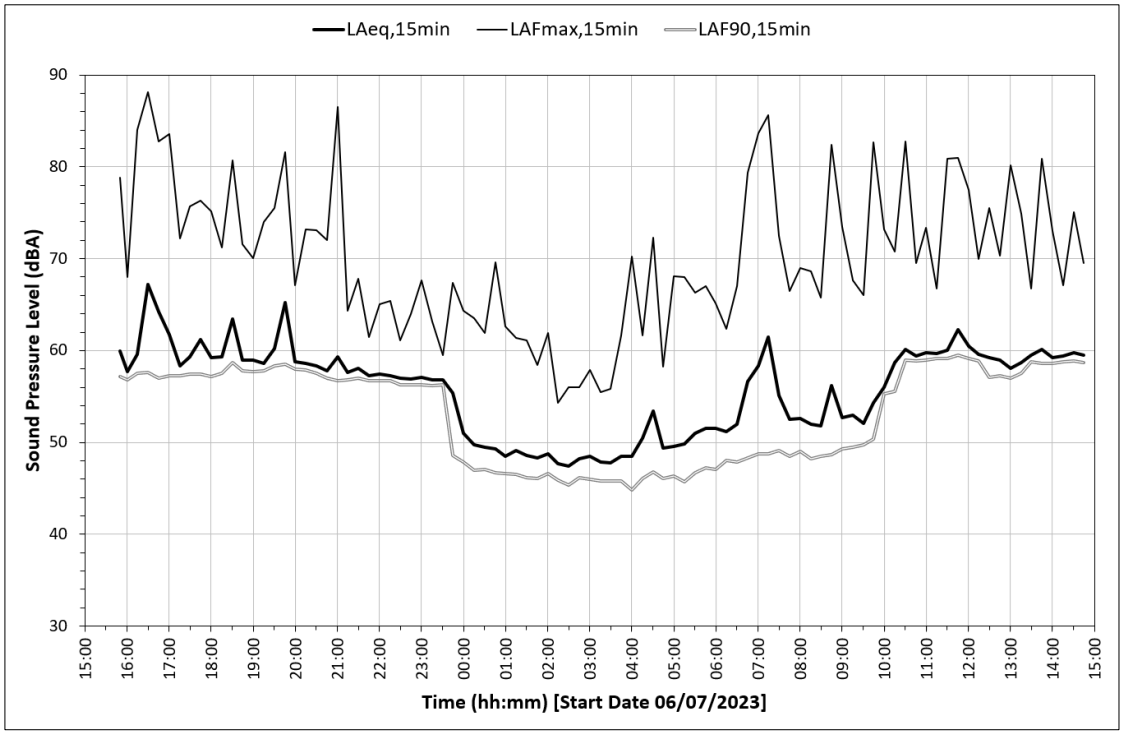

Figure 4: Time history for the unattended noise survey at location LT2.

Figure 4 clearly shows the noise environment is dominated by plant noise related to surrounding buildings, which switches off at approximately 23:30. This plant is expected to continue to operate into the future.

5.0 NOISE IMPACT ASSESSMENT

5.1 Proposed External Plant Noise Emission Limits

The plant noise emissions are considered at the nearest noise-sensitive receptors, which are taken to be the houses on the opposite side of Bayham St (NSR 1) and the residential windows backing onto the car park at the rear of the building (NSR 2). These are identified on Figure 2.

Plant noise emission limits (noise rating level) are set at 10dB below the existing representative background at the nearest noise-sensitive receptor, corresponding to the Lowest Observable Adverse Effect Level (LOAEL). This is in accordance with the Camden Local Plan.

Table 2 shows the LOAEL and SOAEL levels at the nearest NSRs, for both the daytime and night-time periods.

Table 2: LOAEL and SOAEL levels at the nearest noise-sensitive receptors.

Location	Period	Representative background noise level / dB L_{A90}	Lowest Observable Adverse Effect Level (LOAEL) / dB L_{Aeq}	Significant Adverse Effect Level (SOAEL) / dB L_{Aeq}
NSR1	Daytime (0700-2300)	52	42	57
	Night-time (2300-0700)	45	35	50
NSR2	Daytime (0700-2300)	57	47	62
	Night-time (2300-0700)	46	36	51

5.2 Proposed Fixed Plant Equipment

The following plant equipment has been proposed for the roof:

- 1No. Mitsubishi PURY-P250YNW-A2 (air source heat pump)
- 2No. Mitsubishi PURY-P300YNW-A2 (air source heat pump)
- 3No. Mitsubishi PURY-P350YNW-A2 (air source heat pump)
- 2No. Mitsubishi PURY-P450YNW-A2 (air source heat pump)
- 1No. Nuaire BPS Unit 32 (air handling unit)

It is acknowledged that the proposed equipment may be subject to change. If a change in the equipment is proposed, and the total noise output of the new plant exceeds the total noise output of the currently proposed plant, the mitigation requirements may also be subject to change.

A solid 2.2m tall barrier has been assumed surrounding the proposed ASHPs.

5.3 Proposed Plant Location and Location of NSRs

The approximate location of the proposed plant is shown in Figure 5, as well as the locations of the nearest noise-sensitive receptors.

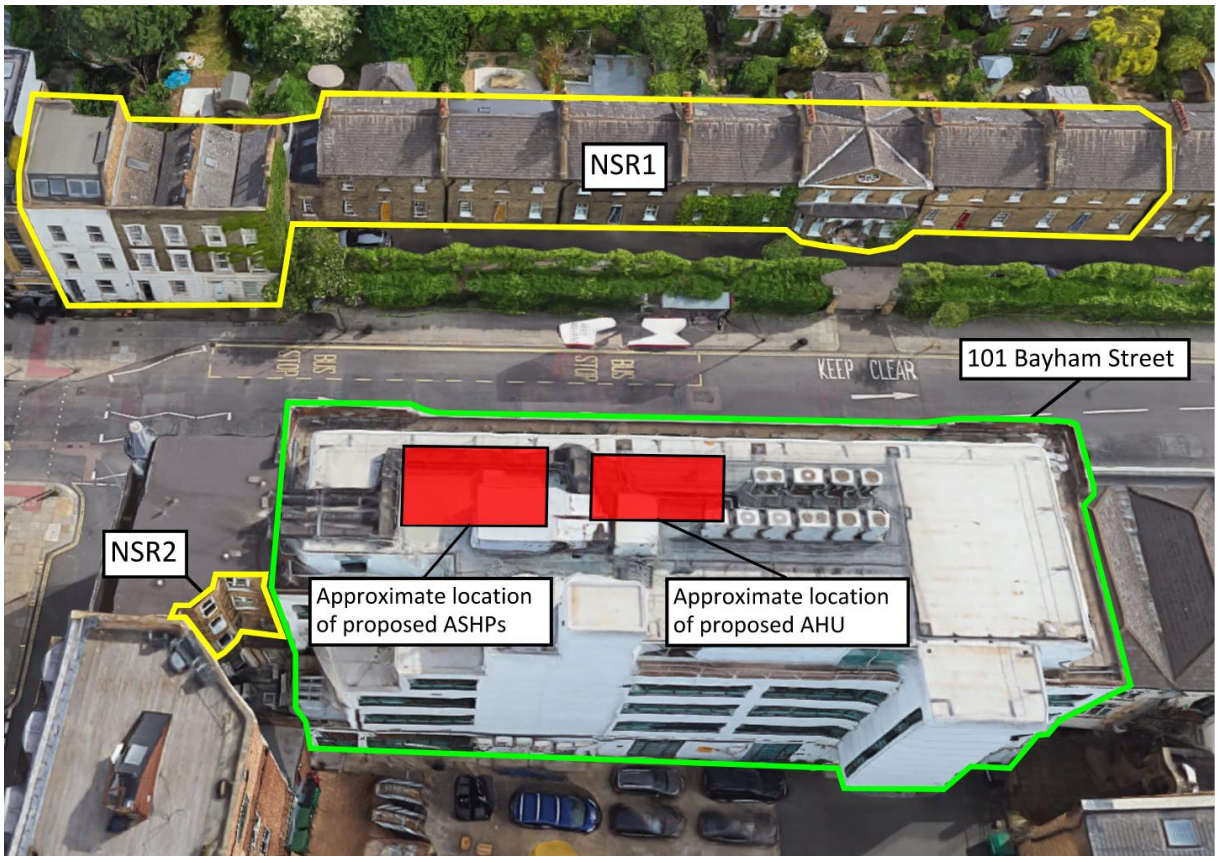

Figure 5: The location of the proposed rooftop plant.

5.4 Predicted Plant Noise Levels and Assessment

The impact of the proposed units was modelled using SoundPLAN, a commercially available noise mapping software. The maximum noise levels at 1m from the facades of the nearest noise sensitive receptors are listed in Tables 3 and 4.

It is understood that the air source heat pumps would not be required to run at greater than 90% capacity during the night-time period. The plant has therefore been modelled as running at 90% capacity, using data provided by Mitsubishi. The predicted plant noise levels in this case are provided in Table 3, which shows that the resultant noise levels at 1m from the façades of the nearest NSRs are within the night-time plant noise limit (LOAEL).

Table 3: Predicted noise levels at the nearest NSRs, with the plant running at 90% capacity.

Location	Night-time plant noise rating limit / dB L_{Ar}	Predicted Plant noise rating level / dB L_{Ar}	Criterion Met?
NSR1	≤ 35	35	Yes
NSR2	≤ 36	36	Yes

Table 4 provides the noise levels at 1m from the façades of the nearest NSRs when all of the units are running at 100% capacity. The resultant noise levels are shown to be below the daytime plant noise limit (LOAEL).

Table 4: The predicted plant noise levels at the nearest NSRs when running at 100% capacity.

Location	Daytime plant noise rating limit / dB L_{Ar}	Predicted Plant noise rating level / dB L_{Ar}	Criterion Met?
NSR1	≤ 42	40	Yes
NSR2	≤ 47	41	Yes

It is also noted that with all the units running at 100% capacity the resultant noise rating levels are a maximum of 5dB above the night-time LOAEL, and at least 10dB below the night-time SOAEL.

Tables 3 and 4 show that, at the stated operating capacities, the units are at least 10dB below the representative background noise levels and are therefore compliant with the requirements in the Camden Local Plan.

6.0 CONCLUSION

- The noise emissions from proposed units at 101 Bayham Street have been assessed.
- When the air source heat pumps are operating at 90% capacity, the noise from the proposed units at the nearest noise-sensitive receptors is at least 10dB below the current night-time background noise levels.
- When running at 100% capacity, the noise from the proposed units at the nearest noise-sensitive receptors is at least 10dB below the current daytime background noise levels.
- This complies with the requirements of the Camden Local Plan and is therefore expected to result in no significant impact at the identified noise-sensitive (residential) receptors.

7.0 APPENDICES

Appendix A – Noise Monitoring Equipment Details

Item	Make	Type	Serial no.	Calibration Intervals	Last Calibrated	Next Due Calibration	Calibration Certificate Number
Class 1 sound level meter	Norsonic	140	1405942	2 years	22/02/23	22/02/25	U43414
Microphone preamplifier	Norsonic	1209	15804	2 years	22/02/23	22/02/25	U43414
Microphone	Norsonic	1225	208215	2 years	22/02/23	22/02/25	43413
Calibrator	Norsonic	1251	34059	1 year	09/01/23	09/01/24	U42886

Appendix B – Glossary of Acoustic Terminology

SOUND POWER LEVEL, or L_W (decibels, dB)
The total amount of sound energy per unit of time generated by a particular sound source. This corresponds to a reference sound power of 10 pW.

SOUND PRESSURE LEVEL, SPL or L_P (decibels, dB)
A measure of the instantaneous sound pressure at a point in space. The threshold of hearing occurs at approximately L_P=0 dB (which corresponds to a reference sound pressure of 20 μPa).

A-WEIGHTED SOUND PRESSURE LEVEL, L_A (dBA)
A-weighted sound pressure level values are frequency-weighted in a way that approximates the frequency response of the human ear and allows sound levels to be expressed as a single figure value.

EQUIVALENT CONTINUOUS A-WEIGHTED SPL, $L_{Aeq,T}$ (dBA)
Energy average of the A-weighted sound pressure level over a time period, T. The level of a notional continuous sound that would deliver the same A-weighted sound energy as the actual fluctuating sound over the course of the defined time period, T.

MAXIMUM A-WEIGHTED SPL, L_{AFmax} (dBA)
Maximum A-weighted sound pressure level measured with fast time weighting.

BACKGROUND SOUND LEVEL, $L_{A90,T}$ (dBA)
The A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90% of a given time interval ,T, measured using time weighting, and quoted to the nearest whole number of decibels.

NOISE RATING LEVEL, $L_{Ar,Tr}$ (dBA)
The A-weighted specific sound level plus any adjustment for characteristic features of the sound (for example if the sound features impulsive or tonal components). Used in BS 4142:2014 assessments.

SPECIFIC SOUND LEVEL, $L_s = L_{Aeq,Tr}$ (dBA)
The equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.