Cole Jarman

11 Holly Walk

# Plant Noise Assessment

Report 19/0497/R1

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11 Holly Walk
Camden
NW3 6RA

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## Attachments



End of Section

# Plant Noise Assessment

## 1 Introduction

1.1 It is proposed to install mechanical services plant items at 11 Holly Walk, Camden as part of the refurbishment works being undertaken.

1.2 This report contains full details of the noise survey, assessment methodology and required mitigation measures in order to meet the derived plant noise limits set for the site, in accordance with relevant local authority and national guidance.

## 2 Site Description

2.1 The site is located at 11 Holly Walk, Camden, NW3 6RA and can be seen on attached figure 19/0497/F1.

2.2 The property is two storeys tall at the front and steps down as the ground falls away to the west. It is bounded by a footpath to the north and Holly Walk to the east. Residences lie beyond these and to the south and west.

## 3 Background Noise Survey

### 3.1 **Methodology and Instrumentation**

3.1.1 An unattended noise survey was undertaken from 1130 on 28th August until 1130 on 29th August 2019.

3.1.2 The survey time period captures the typical noise climate during the quietest hours of the night and daytime period during the week.

3.1.3 The measurement position can be seen on attached figure 19/0497/F1 and is described below:

- MP1 – 2.0 m above local ground level on the northern boundary of the garden.

3.1.4 The measurement position was selected to be best representative of the noise climate surrounding the site in relation to the nearest noise-sensitive receivers.

3.1.5 Measurements of the $L_{Aeq}$, $L_{Amax}$ and $L_{A90}$ indices were taken over consecutive 15 minute periods over the full duration of the survey (see Glossary of Acoustic Terms for an explanation of the noise units used).

3.1.6 Noise measurements were taken using the equipment listed in the table below:

| Item | Manufacturer | Type |
|---|---|---|
| Sound Level Analyser | Rion | NL-52 |
| Acoustic Calibrator | Rion | NC-74 |
| Weatherproof windshield | Rion | WS-15 |

T1 Equipment used during noise survey

3.1.7 The microphone was fitted with a windshield and was calibrated before and after the survey to ensure consistent and acceptable levels of accuracy were maintained throughout. No significant drift was noted to have occurred.

3.1.8 The weather whilst setting up and collecting the equipment was sunny and warm with no wind. Publically available weather data indicates no precipitation occurred and that wind speeds were below 5 m/s over the duration of the survey.

3.1.9 The existing noise climate was made up of general neighbourhood noise, such as lawn mowing. Background noise consisted of distant road traffic noise. Noise levels at the beginning of the survey were dominated by works being undertaken at the front of the property – these have been omitted from the assessment.

## 3.2 Results

3.2.1 Measurements taken during the noise survey can be seen within the attached time history graph figure 19/0497/TH1.

3.2.2 The representative background noise levels taken during the survey can be seen in the table below:

| Location | Background noise levels ($L_{A90}$), dB | |
|---|---|---|
| | Daytime (0700-2300 only) | Night time (24-hour) |
| MP1 | 40 | 33 |

T2 Representative background noise levels during relevant periods

# 4 Mechanical Services Plant Noise Criteria

## 4.1 Local Authority Criteria

4.1.1 The site falls under the jurisdiction of the London Borough of Camden.

4.1.2 Policy A4 of the London Borough of Camden's *Local Plan 2017* relates specifically to noise:

*We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity.*

*Planning conditions will be imposed to require that plant and equipment which may be a source of noise is kept working efficiently and within the required noise limits and time restrictions.*

*Conditions may also be imposed to ensure that attenuation measures are kept in place and are effective throughout the life of the development.*

4.1.3 With regard to noise from new mechanical services plant, Appendix 3 of the Local Plan sets out the following:

4.1.4 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 (15 dB if tonal components are present) should be considered as the design criterion).

## 4.2 BS 4142:2014

4.2.1 Section 1.1 of BS 4142:2014 states the following:

*This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:*

*a) sound from industrial and manufacturing processes;*

*b) sound from fixed installations which comprise mechanical and electrical plant and equipment*

*c) sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and*

*d) sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.*

4.2.2 The methodology in the standard compares the measured or calculated rating level of the noise from the source and compares it to the representative existing measured $L_{A90}$ background noise level for the period concerned.

4.2.3 The higher the excess of rating level over background noise level, the greater the likelihood of an adverse noise impact. BS 4142:2014 gives the following guidance:

*Typically, the greater this difference, the greater the magnitude of the impact.*

*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.*

4.2.4 In instances of low background noise, it is not considered reasonable to design plant noise levels to 10 dB beneath the $L_{A90}$ background; we would in these circumstances recommend a reasonable minimum plant noise emission limit in absolute terms of 30 dB(A). In the previous version of BS 4142 (1997) it noted that "*rating levels below 35 dB are considered very low*". The current version of BS 4142 states:

*"Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."*

4.2.5 Taking the typical loss through a partially open window of 10-15 dB(A), the proposed minimum plant noise limit of 30 dB(A) would result in levels no greater than 20 dB(A) within any nearby property, which is 10 dB(A) lower than the standard for bedrooms indicted in BS 8233:2014[1].

4.2.6 Criteria at relevant times will therefore be set at 5 dB below representative $L_{A90}$ background noise levels with a minimum cap of 30 dB(A).

### 4.3 Plant Noise Limits

4.3.1 Based on the background noise levels and the above guidance, the following plant limit will apply:

[1] British Standard 8233:2014 - Guidance and sound insulation and noise reduction for buildings

| Location | Noise Emission Limit, dB |
|---|---|
| | Night time (24-hour) |
| All noise-sensitive receptors | 30 |

T3 Plant noise emission limits at the nearest residential properties

4.3.2 This limit applies to all mechanical services being installed when running at duty with all items running concurrently during the relevant period. In this instance, the daytime limits are the same as the night-time.

# 5 Plant Noise Assessment

## 5.1 Proposed Plant Items

5.1.1 There scheme has both a heating and a cooling aspect, which would not run at the same time; both aspects have been assessed. The following plant items are proposed to be installed and can be seen alongside the provided manufacturers' noise data:

| Sound Level | Octave Band Centred Frequency (Hz) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| Cooling: | | | | | | | | |
| 2x Mitsubishi MXZ-3F54VF2 *(SWL for single unit)* | 62 | 62 | 57 | 58 | 55 | 46 | 40 | 34 |
| Heating: | | | | | | | | |
| 2x Mitsubishi PUHZ-HW140VHA2 *(SPL for single unit at 1m)* | 56 | 56 | 51 | 52 | 49 | 40 | 34 | 28 |

T4 Proposed plant items

5.1.2 The cooling units are proposed to be located on the northern façade of the existing building, stacked so one is below the height of the brick wall encompassing the site and the other is approximately level with the top of the wall.

5.1.3 The heating units are proposed to be located on the southern side of the brick wall encompassing the site at low level.

## 5.2 Methodology

5.2.1 Noise levels have been calculated at one position, which is described below:

- AP1 – 1m from 1st floor window of redbrick residential property to north of site, as shown on figure 19/0497/F1.

5.2.2 The assessment has taken into account, radiation, screening and distance losses and façade reflections as appropriate.

## 5.3 Mitigation

5.3.1 It will be necessary to install an absorptive acoustic lining behind the cooling units to mitigate reflections off the wall. The lining should be constructed in accordance with attached specification 19/0497/SPC1.

## 5.4 Assessment Results

5.4.1 The noise levels shown in the table below have been calculated at the assessment position:

| **Noise levels at AP1** | **Predicted Noise Level, dB(A)**<br>***Plant Noise Emission Limit, dB(A)*** |
|---|---|
| Cooling scenario | 30 (30) |
| Heating scenario | 27 (30) |

T5 Predicted plant noise emission levels at assessment positions

5.4.2 The table shows that noise levels are predicted to meet the noise emission criteria at all times with the acoustic lining mitigation in place.

# 6 Conclusions

6.1.1 It is proposed to install mechanical services plant items in the form of two cooling condenser units and two air source heat pumps at 11 Holly Walk.

6.1.2 Cole Jarman have undertaken a noise survey on site and used the results of this to set mechanical services plant noise emissions limits. An assessment of noise emissions has been undertaken for the units for both heating and cooling scenarios.

6.1.3 The assessment has concluded that mitigation is required in order for the plant noise limits to be met; this is expected to take the form of an acoustic lining to the wall that the cooling condensers are mounted on and a specification for this has been provided.

End of Section

# Glossary of Acoustic Terms

$L_{Aeq}$:

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) $L_{eq}$.

$L_{Amax}$:

The maximum A-weighted sound pressure level recorded over the period stated. $L_{Amax}$ is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the $L_{Aeq}$ noise level. Unless described otherwise, $L_{Amax}$ is measured using the "fast" sound level meter response.

$L_{A10}$ & $L_{A90}$:

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The $L_{An}$ indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. $L_{A10}$ is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly $L_{A90}$ gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

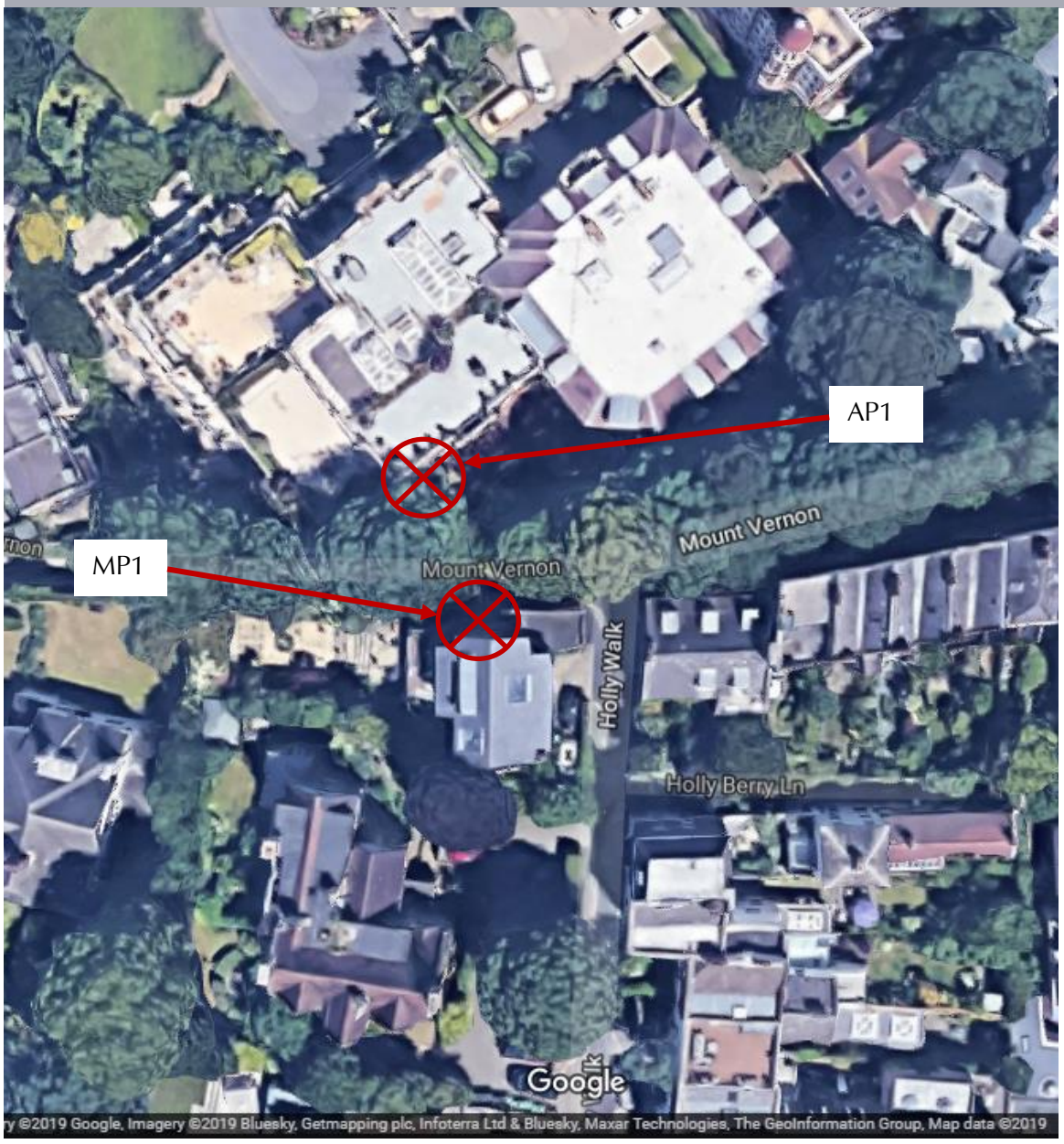
$L_{A10}$ is commonly used to describe traffic noise. Values of dB $L_{An}$ are sometimes written using the alternative expression dB(A) $L_n$.

$L_{AX}$, $L_{AE}$ or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. $L_{AX}$ values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of $L_{Aeq}$ for the total noise. The $L_{AX}$ term can sometimes be referred to as Exposure Level ($L_{AE}$) or Single Event Level (SEL).

End of Section

# Figure 19/0497/F1




Title: Location of Measurement Position and Assessment Position

Project: 11 Holly Walk

Date: September 2019

Scale: Not to scale

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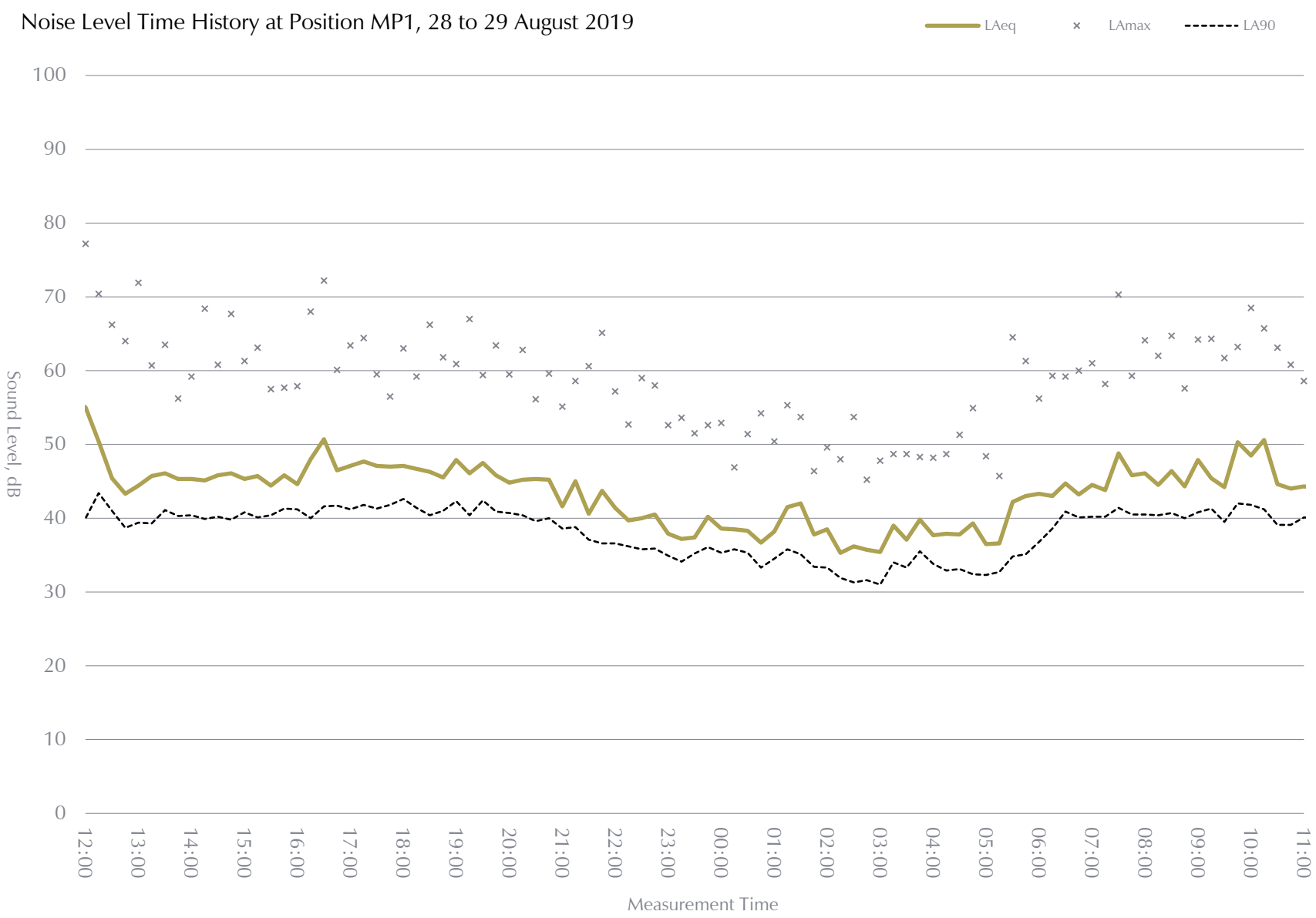


Figure 19/0497/TH01

# Specification 19/0497/SPC1

**Project:** **11 Holly Walk, Camden**
**Subject:** **Acoustic Lining**
**Date:** **December 2019**

## 1 General

This specification defines the applicable requirements for black faced, mineral fibre lining to the wall to which the condensers are mounted. The suppliers of the materials shall provide the necessary information and data to verify the required performance.

The supplier shall be responsible for ensuring that all the performance criteria set out herein are met by the product being offered.

## 2 Products

The acoustic lining is to be supplied in the minimum thickness stated and shall be inorganic glass fibre material with a minimum density of 48 kg/m$^3$. The material shall be provided with an erosion resistive acoustically transparent coating suitable for airflow velocities up to 15 m/s.

The sound absorption provided by the material (with and/or without the erosion resistive facing) shall meet or exceed the values tabulated below:

| **Minimum Thickness (mm)** | **Octave Band Centred Frequency (Hz)** | | | | | |
|---|---|---|---|---|---|---|
| | **125** | **250** | **500** | **1k** | **2k** | **4k** |
| 50 | 0.20 | 0.45 | 0.70 | 0.90 | 0.95 | 0.95 |

T1 Absorption Coefficients of Acoustically Absorbent Plant Area Lining

## 3 Execution

3.1 Attach to the surface of the wall located behind the condenser unit(s) to cover the area directly behind and extending along the wall some 300mm to each side and 300mm beyond the height of the unit.

3.2 All available portions of the area designed to receive the acoustic liner shall be completely covered. All joints shall be neatly butted and there shall be no interruptions or gaps.

3.3 The erosion resistive face shall be orientated toward the atmosphere (not the wall).

3.4 The acoustic liner shall be secured with mechanical fasteners which shall compress the liner sufficiently to hold it firmly in place.

3.5 Liner shall be compressed to assure overlapped and compressed longitudinal corner joints.

End of Section

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