

# **ZONA ACOUSTICS**

**24 John Street  
London**

## **Plant Noise Assessment**

6 March 2023

**For**  
Monica Coombs and Richard Morgan

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## Summary

Zona Acoustics has been appointed to carry out a noise assessment in relation to the proposed mechanical plant installation at 24 John Street in London. Proposals are for the installation of one external heat pump unit.

The local authority, Camden Council, has requirements in relation to building services noise affecting noise sensitive properties.

A noise limit has been proposed for the plant, based on the existing background noise levels and the Camden Council requirements.

The predicted rating level of the proposed plant was found to be in line with the Camden Council requirements by a comfortable margin. This is seen to relate to the No Observed Effect Level (NOEL), under national planning guidelines.

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## 1.0 Introduction

Zona Acoustics has been appointed to carry out a noise assessment in relation to the proposed mechanical plant installation at 24 John Street in London. Proposals are for the installation of one external heat pump unit.

This report presents the methodology and results of a noise survey to determine background noise levels that are representative of the nearest noise sensitive receptor, as well as an assessment of noise from the proposed plant in relation to the Camden Council requirements.

The report is technical in nature, and such, a summary of noise units and acoustic terminology are included in Appendix A for reference.

## 2.0 Description of Site

The site is located at 24 John Street, London, WC1N 2BH.

The proposed heat pump unit will be located externally on the rooftop of the building.

The nearest noise sensitive receptors are taken to be the top floor windows on the south west facing facades of the neighbouring properties.

Figure 2.1 shows the site extent in **red**, the approximate proposed plant location in **green**, and the nearest noise sensitive windows in **blue**.

**Figure 2.1 Site and Surroundings**



## 3.0 Noise Policy and Guidance

### 3.1 Camden Council Requirements

The Camden Council typical requirements for noise from fixed external plant are included in the Camden Local Plan 2017.

The requirement is for the rating level of the plant to be at least 10 dB below the existing background noise level (15dB if tonal components are present) at the assessment location, when assessed in accordance with British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound'.

### 3.2 British Standard 4142: 2014

British Standard (BS) 4142: 2014 (superseded by BS 4142: 2014+A1: 2019) provides a procedure for the measurement and rating of noise levels from industrial and commercial noise sources. A methodology for predicting the likelihood of adverse impact is provided in the document.

The rating level ( $L_{A,r,T,r}$ ) is defined in BS 4142 and is used to rate the industrial source (known as the specific noise source) at the assessment location. This level is obtained by adding a correction of between 0 and 6 dB, for tonal noise sources, and a correction of between 0 and 9 dB for impulsive sources. Additionally, corrections of 3 dB can be made for other sound characteristics and intermittency of the noise source.

The rating level is assessed in terms of  $L_{A,r,T,r}$ , where 'T' is a reference period of one hour during the daytime period (07:00 - 23:00) and fifteen minutes during the night-time period (23:00 – 07:00).

The method for predicting the likelihood of complaints is based on differences between the rating level and the background  $L_{A90,T}$  noise level. The standard states that:

- a) "Typically, the greater this difference, the greater the magnitude of the impact.
- b) A difference of around +10dB 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 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 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."*

In this case, the rating level requirement is 10 dB below the existing background noise level, as required by Camden Council.

## 4.0 Noise Survey

### 4.1 Methodology

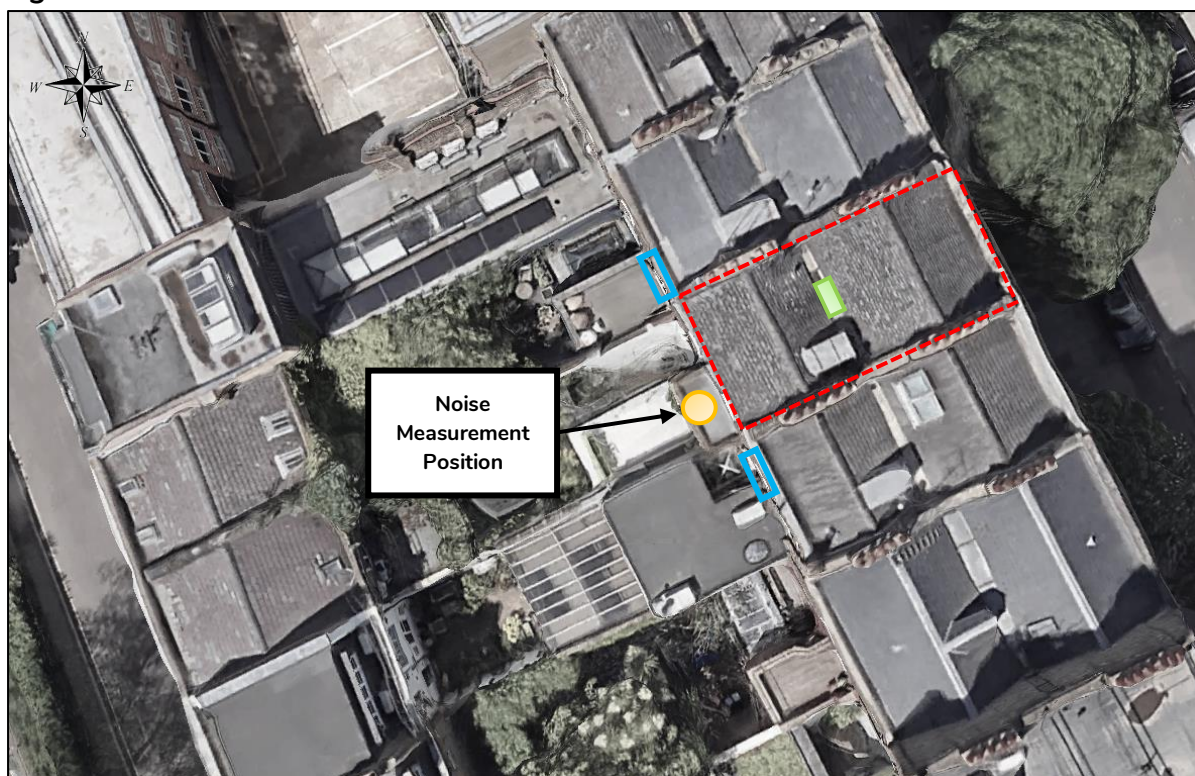
An unattended noise survey was carried out over an approximate 72 hour period between 14:00 on Friday 17 February and 13:00 on Monday 20 February 2023 to determine existing background noise levels at a position representative of the nearest noise sensitive windows.

The measurement microphone was positioned 1m outside a third-floor window on the south west facing façade.

The measurement position is considered representative of the nearest noise sensitive windows.

The approximate location of the measurement position is shown in **orange** in Figure 4.1 below.

**Figure 4.1 Noise Measurement Position**



The equipment used for the noise survey is summarised in Table 4.1



**Table 4.1 Noise Survey Equipment**

Item	Make & Model	Serial Number
Type 1 automated logging sound level meter	Casella CEL 633B	0221364
Type 1 ½" microphone	CEL 252	21198
Calibrator	Casella CEL 120-1	113251

$L_{Aeq}$  and  $L_{A90}$  sound pressure levels were measured throughout the noise survey over continuous 15-minute intervals.

The noise monitoring equipment was calibrated before and after the noise survey period. No significant change was found. Laboratory equipment calibration certificates can be provided upon request.

Due to the nature of the noise survey, i.e. unattended, we are unable to comment on the weather conditions throughout the entire noise survey period, however at the beginning and end of the survey, there was noted to be no rainfall and only light wind. These conditions are understood to be representative of the survey period. Weather conditions are not considered to have had any significant effect on the measured noise levels.

## 4.2 Results

Appendix B presents a time history graph showing the sound pressure levels measured throughout the noise survey.

The measurement position was located 1m from the nearest façade (acoustically reflective surface), therefore we have corrected the measured noise levels by –3 dB to equate to free-field conditions, in accordance with guidance given in BS 4142.

Due to the nature of the noise survey, i.e. unattended, we are unable to comment on the exact noise climate throughout the entire survey period. However, at the beginning and end of the survey period, the noise climate at the measurement position was noted to be dominated by distant road traffic noise.

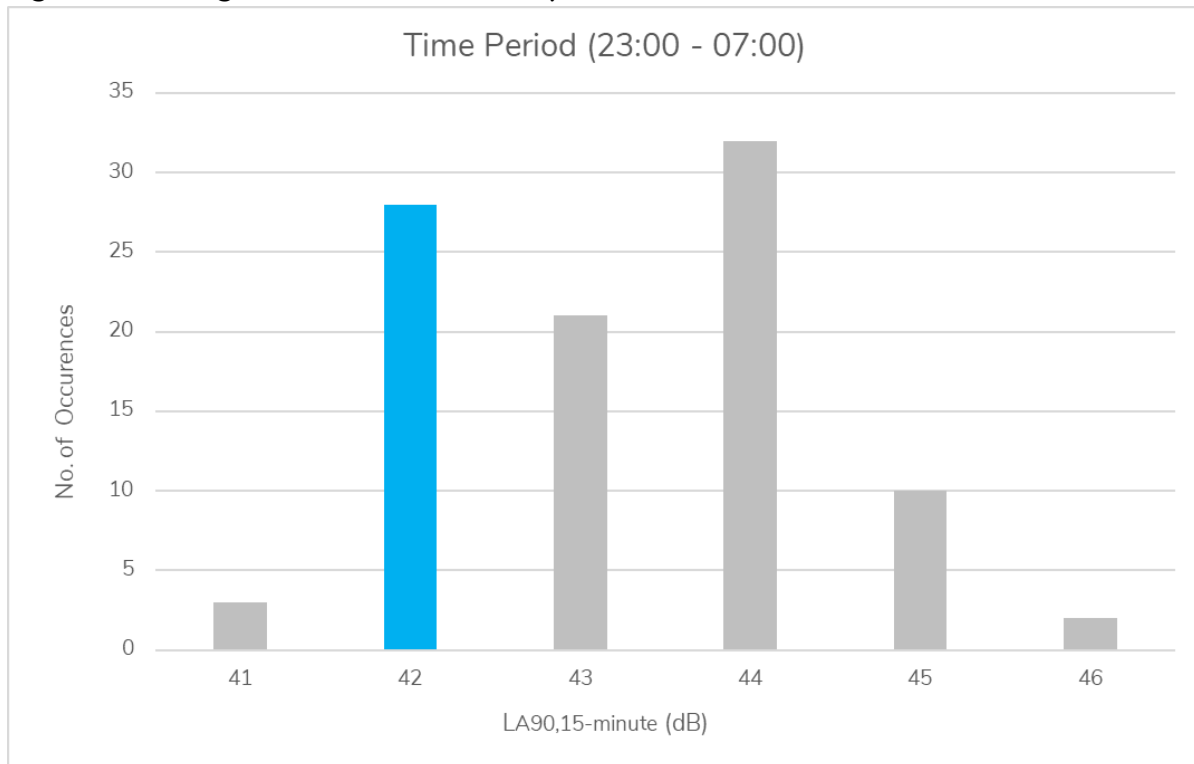
The proposed plant has the potential to operate at any time during the day or night-time periods. Our assessment therefore considers the background noise levels during the night-time period, which provides a worst-case assessment.

In accordance with BS 4142, the rating level should be assessed against a ‘representative’ background level.

BS 4142 states that “a representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either minimum or modal value”.

Figure 4.2 below presents an analysis of the measured background noise levels during the night-time periods of the noise survey.

**Figure 4.2 Background Noise Level Analysis**



Based on the analysis above, we have considered **42 dB  $L_{A90}$  (15-minute)** as the representative back background noise level for this assessment.

## 5.0 Plant Noise Assessment

### 5.1 Plant Noise Limit

Based on the representative background noise level determined above and the Camden Council requirements (as detailed in Section 3.1), the plant noise limit is **32 dB  $L_{A,r,Tr}$**  at the nearest noise sensitive windows.

### 5.2 Proposed Plant

The proposal is for the installation of one Mitsubishi PUMY-SP112VKM - Manufacture's operating sound pressure level at 1m 54 / 52 dBA (Heating/Cooling).

The unit will be used for both heating and cooling. Our assessment has therefore considered the higher heating operation noise level as a worst case.

The octave band noise levels of the unit are included in the detailed plant noise calculations in Appendix C. Analysis of the manufacturer's octave band data indicate that the noise is non-tonal in character. The plant is also expected to operate continuously i.e., non-intermittently. No additional rating level character corrections are therefore considered necessary.



The unit is to be located on the roof of building which will provide a considerable amount of screening between the unit and the nearest noise sensitive windows.

### 5.3 Assessment

We have carried out calculations to predict the plant noise emissions at the nearest noise sensitive window.

A summary of the assessment results are presented in Table 5.1 below. Detailed plant noise calculations are included in Appendix C.

**Table 5.1 Plant Noise Assessment**

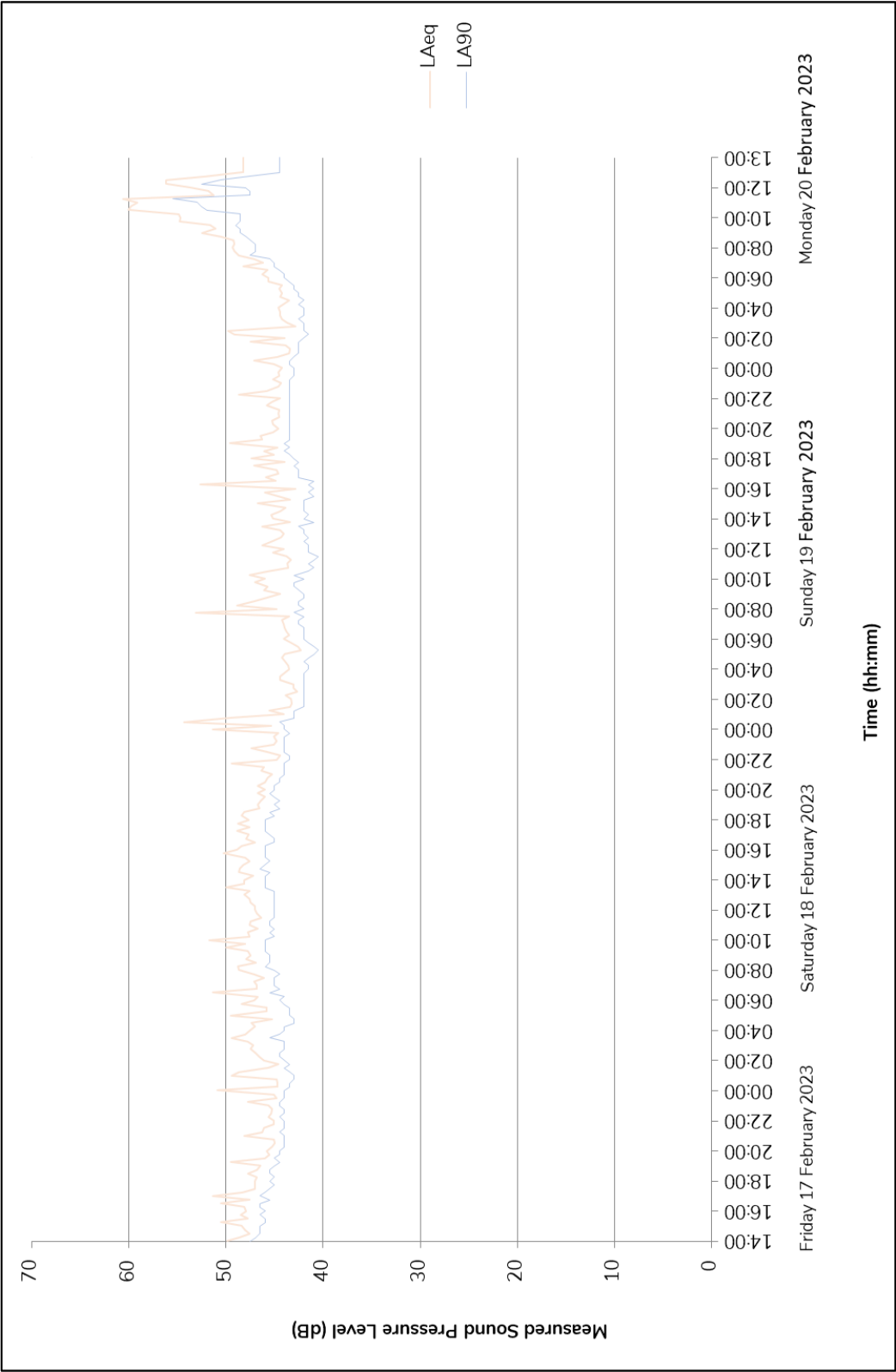
Element	Noise Level (dB)
Calculated Rating Noise Level at the Nearest Noise Sensitive Window ( $L_{Ar,Tr}$ )	29
Noise Limit	32
Difference	-3

As can be seen in Table 5.1 above - The predicted rating level of the proposed plant installation is in line with the Camden Council requirements. The proposed installation is in fact compliant by a comfortable margin. This is seen to relate to the No Observed Effect Level (NOEL), under national planning guidelines.

## Appendix A – Acoustic Terminology

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing ( $20 \times 10^{-6}$ Pascals).
Sound Pressure Level ( $L_p$ )	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
Sound Power Level ( $L_w$ )	A measure of the acoustic energy emitted from a source of noise, expressed in decibels.
A-weighting (dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
$L_{Aeq,T}$	<p>The A-weighted equivalent continuous noise level over the time period T (typically T= 16 hours for daytime periods, T = 8 hours for night-time periods).</p> <p>This is the sound level that is equivalent to the average energy of noise recorded over a given period.</p>
$L_{A90}$ (15 min)	The noise level exceeded for 90% of the time (also referred to as the background noise level), measured over a 15-minute period

Appendix B – Time History Graphs



## Appendix C – Detailed Plant Noise Calculations

24 John Street	ZONA ACOUSTICS								
Plant Noise Calculations									
Mitsubishi PUMY-SP112VKM	dBA	63	125	250	500	1k	2k	4k	8k
Derived Sound Power Level based on Sound Pressure Level at 1m	68	71	70	68	66	63	59	52	46
Acoustic Reflections		+3	+3	+3	+3	+3	+3	+3	+3
Distance Attenuation (7m)		-25	-25	-25	-25	-25	-25	-25	-25
Screening (Roof)		-10	-12	-14	-17	-20	-20	-20	-20
Sound Pressure Level at Nearest Noise Sensitive Window	29	40	36	32	27	22	17	10	4
Noise limit	32								
Difference	-3								