RSK Acoustics

Crowndale Centre, Camden

Plant Noise Assessment

Report 206/0457/R1

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Frankham Consultancy Group

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Revision	Description	Date	Prepared	Approved
0	First Issue	24th August 2021	Henry Stead	Richard Masey

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Plant Noise Assessment

1 Introduction

1.1 It is proposed to install new mechanical services plant items on the roof of Crowndale Health Centre, Camden.

1.2 This report details a noise survey undertaken at the site to quantify the existing noise climate and derive atmospheric plant noise limits in accordance with the requirements of the Local Authority. A subsequent assessment of the plant noise emission levels of the proposed installation has been undertaken to determine if any mitigation is required to meet the plant noise limits.

2 Site Description

2.1 The site is located at the Crowndale Centre, 218 Eversholt street, London NW1 1BD and is shown within the context of the surrounding area in the attached figure 206/0475/SP1.

2.2 Crowndale Road (B512) runs to the north of the site and is a well trafficked road comprising a mixture of commercial and residential properties.

2.3 Eversholt Street runs to the east of the site and is similarly well trafficked and comprising of a mixture of residential and commercial properties.

2.4 Camden High Street runs to the east of Eversholt Street and is a heavily trafficked road.

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

3 Noise Emission Criteria

3.1 **Local Authority Criteria**

3.1.1 Policy A4 of the London Borough of Camden *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."

3.1.2 Appendix 3 of the Local Plan sets out the following with regards to noise from new mechanical services plant:

"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 BS 4142:2014 'Methods for rating and assessing industrial and commercial sound' will be used. For such cases, a 'Rating Level' of 10 dB below the background (15 dB if tonal components are presented) should be considered as the design criterion."

3.2 Operating Times

3.2.1 Generally, Camden Council require plant noise limits to be established for both daytime (07h00-23h00) and night-time (23h00-07h00) periods. However, the Local Plan states the following regarding alternative operating times:

"The Council will take into account the likely times of occupation for types of development and [the day and night periods] will be amended according to the times of operation of the establishment under consideration."

3.2.2 We have been informed the plant is expected to operate during office hours between 07h00 and 20h00 and thus plant noise limits have been derived for this period in accordance with the above.

3.2.3 Should the operating times vary from those described above, a revision of our assessment will be required.

3.3 BS 4142:2014+A1:2019

3.3.1 When considering noise emission from plant, it is normal to follow guidance in BS 4142:2014+A1:2019[1], section 1.1 of this standard 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."

[1] British Standard 4142:2014+A1:2019 - Methods for rating and assessing industrial and commercial sound.

3.3.2 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.

3.3.3 The higher the excess of rating level over background noise level, the greater the likelihood of an adverse noise impact. BS 4142:2014+A1:2019 gives the following guidance:

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

A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.

A difference of around +5dB 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 Environmental Noise Survey

4.1 Methodology & Instrumentation

4.1.1 An unattended noise survey was undertaken at the site between 1300 hours on Tuesday 17th August and 1300 hours on Wednesday 18th August 2021.

4.1.2 Measurements of the noise levels were taken from a single measurement position indicated as MP1 on the attached site plan 206/0475/SP1 and described below:

- MP1: free-field measurement position outside 2nd floor site window, approximately 1.5m away from the façade and 3m above the envisaged location of the plant items.

4.1.3 Measurements of L_{Aeq}, L_{A90}, L_{Amax} were recorded over consecutive 15-minute periods (see Glossary of Acoustic Terms for an explanation of the noise units used) for the duration of the survey using the equipment listed within table T1 below.

Item	Manufacturer	Type
Sound Level Analyser	Norsonic	118
Acoustic Calibrator	Norsonic	1251
Weatherproof windshield	Norsonic	1212

T1 Equipment used during unattended noise survey.

4.1.4 The microphone was enclosed within a weatherproof windshield and the sound level meter was calibrated before and after the survey to confirm an acceptable level of accuracy. No significant drift was noted to have occurred.

4.1.5 The weather conditions when setting up the equipment were overcast and still with no rain and on collection were sunny and still. It is understood that weather conditions throughout the survey were suitable for noise measurements.

4.2 Results

4.2.1 The results of the noise survey measurements are presented in the attached time-history graph **Error! Reference source not found.**.

4.2.2 The measured background noise levels derived following guidance in BS 4142:2014+A1:2019[2] can be seen in table T2 below.

Location	Representative Measured Background Noise Level $L_{A90,15min}$, dB(A) Proposed Operating Hours (07h00-20h00)
MP1: 2nd floor site window	51

T2 Representative measured background noise levels, $L_{A90,15min}$.

4.2.3 The noise climate at this window was dominated by road noise from Crowndale Road and other nearby roads. Also noted was existing plant noise from various locations surrounding the site and construction noise from the north and the south of the site.

5 Plant Noise Limits

5.1 Based on the guidance outlined in section 3, the noise limits are to apply here:

[2] British Standard BS4142:2014 - Methods for rating and assessing industrial and commercial sound

Location	Plant Noise Emission Limits, $L_{Ar,Tr}$ dB (for plant with no distinguishing feature) Night-time (24-Hours)
Residential receivers on Crowndale Road	41

T3 Plant noise emission limits at the nearest residential receivers.

5.2 The noise limits are to apply at 1m from the nearby residential windows. Any plant with a tonal component would be subject to a further penalty, in line with BS4142:2014 and Camden's requirements. These limits apply to all mechanical services items being installed when running at duty with all items running concurrently during the relevant period.

6 Plant Noise Assessment

6.1 Proposed Installation

6.1.1 The proposed plant items to be installed are listed in table T4 below:

Reference	Unit	Model
CON-01-02	x2 Condenser Unit	Mitsubishi PUMY-P250YBM
CON-03	Condenser Unit	Mitsubishi PKA-M50LA TH

T4 Proposed equipment installation.

6.1.2 All plant items are to be installed externally on the roof of the building and is expected to run during office hours only.

6.1.3 Manufacturers' noise data has been used in this assessment and can be found in the attached sheet 206/0475/PNS1.

6.2 Methodology

6.2.1 Noise levels have been calculated at a single assessment position labelled as AP1 on the attached site plan 206/0475/SP1, and described below:

- AP1 – 1m from residential façade on the 1st floor of 45 Crowndale Road.

6.2.2 The most noise-sensitive windows at AP1 are the upper floor windows on the rear façade of the building.

6.2.3 The assessment has taken into account radiation, distance losses, directivity and façade reflections, where each is appropriate.

6.2.4 Summary calculation sheets are provided in the attached sheet 206/0475/CS1.

6.3 Mitigation

6.3.1 Mitigation will be required to meet the plant noise limits. This is expected to take the form of an acoustic enclosure.

Acoustic Enclosure

6.3.2 It will be necessary to install acoustic enclosures around each condenser. Specifications for these enclosures are set out in table T5 below.

Enclosure Specification *Location*	**Insertion Loss in dB at Octave Band Centre Frequency (Hz)**							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
ENC01-03 *condenser units*	4	3	4	6	11	13	12	10

T5 Enclosure insertion loss.

6.3.3 This insertion loss can typically be achieved using an enclosure with 100-150 mm deep acoustic louvres. The supplier of the enclosure should confirm that the insertion loss can be met.

6.4 Results

6.4.1 With the proposed mitigation measures in place, the noise levels shown in table T6 below have been calculated at the nearest residential receiver:

Location	**Rating Noise Level, dB(A)** *Plant Noise Emission Limit, dB(A)* **Night-time (24-Hours)**
AP1 – 45 Crowndale Road, 1st floor rear window	41*(41)*

T6 Predicted plant noise emission levels at the nearest residential receivers.

6.4.2 The above table shows that noise emissions from the proposed plant items are predicted to meet the noise criterion at all times with the stated mitigation in place. Summary calculation sheets are provided in the attached sheet 206/0475/CS1. Full calculation sheets are available upon request.

6.4.3 This assessment position is the closest and most exposed window and thus represents the worst-case receptor. Any other receptors can therefore expect to be subject to lower noise levels

7 Conclusions

7.1 It is proposed to install new mechanical services plant items on the roof of Crowndale Health Centre, Camden.

7.2 A noise survey has been undertaken at the site to quantify the existing noise levels and set noise limits in line with the local authority criteria.

7.3 An assessment of atmospheric plant noise from the plant items has been undertaken for the proposed plant items and mitigation has been specified for the items to meet these limits.

7.4 Mitigation is to take the form of acoustic enclosures. Specifications and indicative locations have been set out in full within this report.

7.5 Employing the proposed acoustic mitigation measures outlined in this report, the noise levels at the nearest residential receptor have been shown to meet the criteria of the Local Authority at all times.

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

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Figure 206/0475/SP1

Title:

Site plan showing measurement and assessment positions.

Key:

- MP Measurement Position
- AP Assessment Position
- Site Outline

North

Project:

Crowndale Centre, Camden

Date: August 2021

Revision: -

Scale: Not to scale

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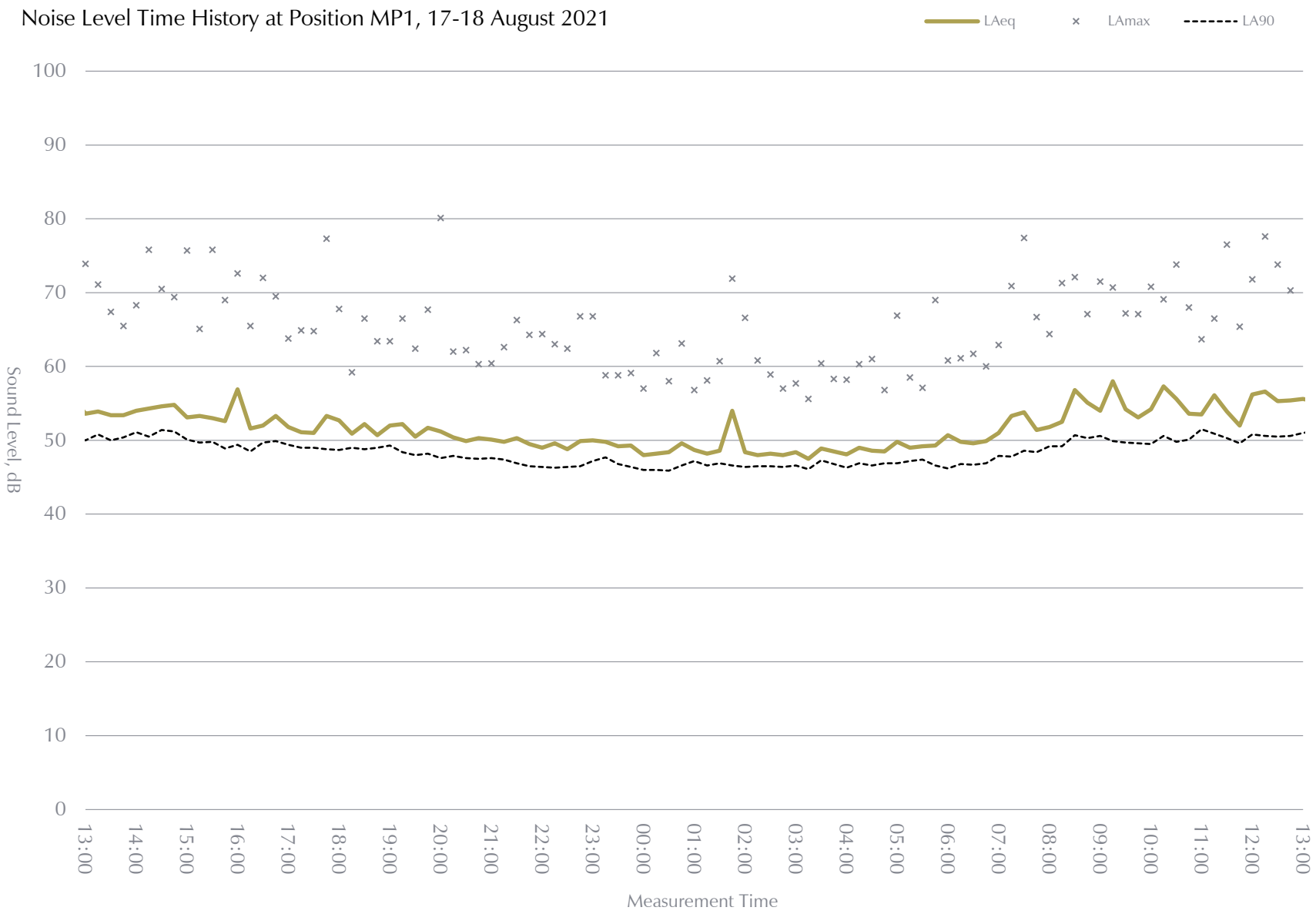


Figure 206/0475/TH01

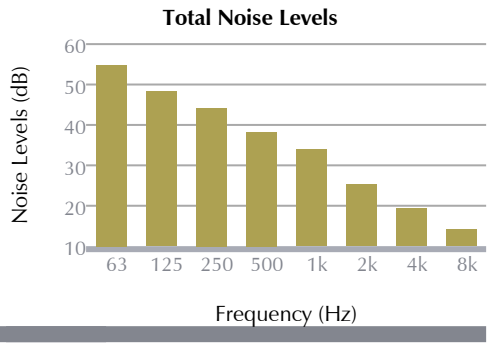
Schedule of Plant and Air Handling Equipment Sound Levels, dB

Reference	Description	Volume (m^3/s)	Data Source[1]	Noise Level Type	Noise Levels (dB)							
					63	125	250	500	1k	2k	4k	8k
CON-01	PUMY-P250YBM cooling		Man	Sound Power, Lw	83.7	76.0	72.9	68.7	69.6	62.7	55.8	48.4
CON-02	PUMY-P250YBM cooling		Man	Sound Power, Lw	83.7	76.0	72.9	68.7	69.6	62.7	55.8	48.4
CON-03	PUZ-ZM50VKA cooling		Man	Sound Power, Lw	70.9	65.9	63.9	62.9	59.9	56.9	48.9	43.9

Notes

1 - Man refers to data supplied by the equipment manufacturer or supplier, Emp refers to data calculated using empirical formulae, and Meas refers to data measured by Cole Jarman

Project Name	Crowndale Centre, Camden
Project Reference	206-0475
Receiver Reference	AP1
Description	45 Crowndale Road rear window
Noise Limit	41
dBA	40.9



Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
CON-01	51.7	45.0	40.9	34.7	30.6	21.7	15.8	10.4
CON-02	51.7	45.0	40.9	34.7	30.6	21.7	15.8	10.4
CON-03	38.9	34.9	31.9	28.9	20.9	15.9	8.9	5.9

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