

Acoustic assessment of installed mechanical services equipment

43A Tottenham Lane, Hornsey, London N8 9BD



Client: Twin Estates

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0. SUMMARY

- 0.1. ACA Acoustics Limited has been commissioned to assess the acoustic impact of recently installed AC condenser units at 43A Tottenham Lane, London.
- 0.2. The assessment is required to support a retrospective planning application to demonstrate that noise emissions from the equipment are not detrimental to the amenity of nearby noise-sensitive properties and complies with the Local Authority's requirements for such a development.
- 0.3. A survey has been carried out in the vicinity to establish existing background sound levels. The measured representative background sound levels over the more sensitive night period are LA90 36dB. The calculated Rating level should be 10dB below this level at the NSR.
- 0.4. The most noise-sensitive residential receptor (NSR) has been assessed as the windows of the adjacent dwellings. The windows are around 5m from the plant with no acoustic screening, but will benefit from off-axis directivity attenuation.
- 0.5. Calculations using manufacturer's sound level data for the new equipment, allowing for the recommendations as set out in this report, confirm that the rating level from the new equipment at the receptor is LAr 26dB. This is at least 10dB below the measured background sound level.
- 0.6. Noise from the proposed new equipment will not be disturbing or detrimental to the amenity of any nearby residential occupants and complies with the planning requirements of Haringey Borough Council.

1. INTRODUCTION

The client has recently installed 2 x AC condenser unit for a domestic property at 43A Tottenham Lane, London. An acoustic assessment is to be undertaken to ensure noise emissions from the plant are not detrimental to the amenity of nearby residential occupants.

ACA Acoustics Limited has been commissioned to carry out an assessment of noise emissions from the plant and, where necessary, make recommendations to reduce sound transmission to ensure compliance with appropriate criteria.

This report presents results of background sound level survey, assessment, and recommendations for any required noise mitigation measures.

2. ACOUSTIC CRITERIA

Based on previous similar projects on the public planning portal, the author understands that Haringey Borough Council will require the rating level from new mechanical equipment to be 10dBA below the background sound level at 1m outside the closest noise-sensitive properties, when assessed in accordance with British Standard BS 4142:2014+A1:2019.

The assessment method of BS 4142:2014+A1:2019 corrects the specific noise from the source under investigation to account for operating time periods and any tonal or intermittent features of the noise source to obtain a rating level. This rating level is compared against the prevailing background sound level outside the noise-sensitive property. Section 11 of the Standard provides a commentary of the assessment result and states that:

- *Typically, the greater this difference [between the rating level and background sound level], 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.*

The Local Authority criterion is significantly more stringent than the standard suggests is necessary, therefore by adopting the criteria the protection of nearby residents amenity is ensured.

3. REVIEW OF SITE LOCATION & DEVELOPMENT PROPOSALS

Figure 1 below indicates plant in relation to the nearest noise-sensitive receptor.

The most noise-sensitive residential receptor (NSR) has been assessed as the windows of the adjacent dwellings. The windows are around 5m from the plant with no acoustic screening, but will benefit from off-axis directivity attenuation.

As the units are installed at a private dwelling, they have the potential to run 24 hours a day. Therefore, the criteria will be based on the representative measured background level during the more sensitive night period. The condensers were not running during the survey.

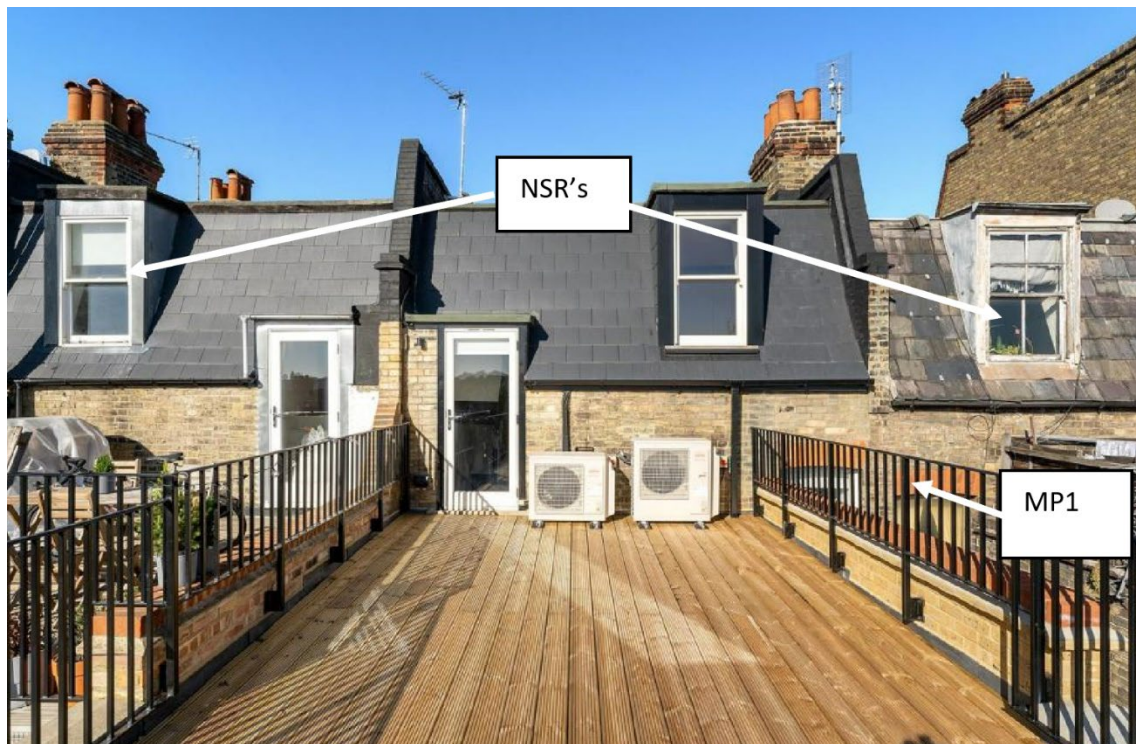


Figure 1: Photograph showing equipment location and most noise-sensitive receptors

4. BACKGROUND SOUND LEVEL

To assess sound levels from the new mechanical equipment, it is necessary to establish the representative background sound levels in the vicinity during the proposed plant operating times.

The background sound level was measured via an unattended survey at the position indicated in Figure 1 above (MP1). This position is assessed as being representative of the R1 receptor. The

survey was conducted between the 16th – 17th August 2023. The soundscape included distant and local road traffic and the occasional overhead aircraft. The current plant associated with the premises was not running during the survey.

The following equipment was used during the survey; the sound level meter was calibrated before the survey and checked after with no deviation noted.

Equipment	Serial Number
Rion Class 1 sound level meter type NL-52 complete with weatherproof and lockable outdoor environmental kit	00564867
Svantek calibrator type SV33B. Compliant to IEC 60942-1:2003	83826

Table 1: Equipment used

Weather conditions at the time of setting up the survey consisted of a temperature of around 19°C, 20% cloud cover with a 1-2ms⁻¹ southerly wind and dry ground conditions. Weather conditions have been reviewed at www.worldweatheronline.com. The extended nature of the survey ensures that a reasonable sample of results have been recorded with appropriate weather conditions.

Results of the survey are shown in Figure 2 below.

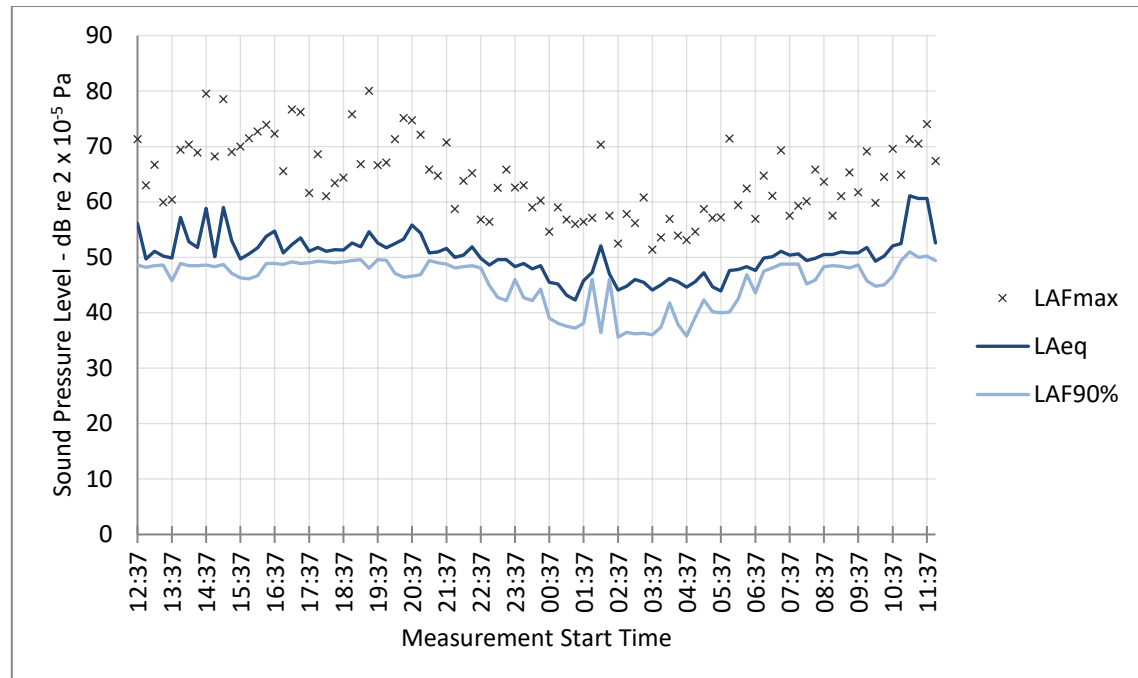


Figure 2: Sound level survey results at Position MP1 16th – 17th August 2023

In accordance with BS 4142:2014+A1:2019 the prevailing background sound level is not necessarily taken to be the lowest recorded values, but rather the level that best represents the typical background sound level in the area over a defined period. A statistical analysis of the measured background sound levels over the evening has been carried out, generally following suggested

guidance contained in Section 8 of the Standard. Distribution of the measured LA90 sound levels during anticipated operating times of the new equipment are shown in Figure 3 below.

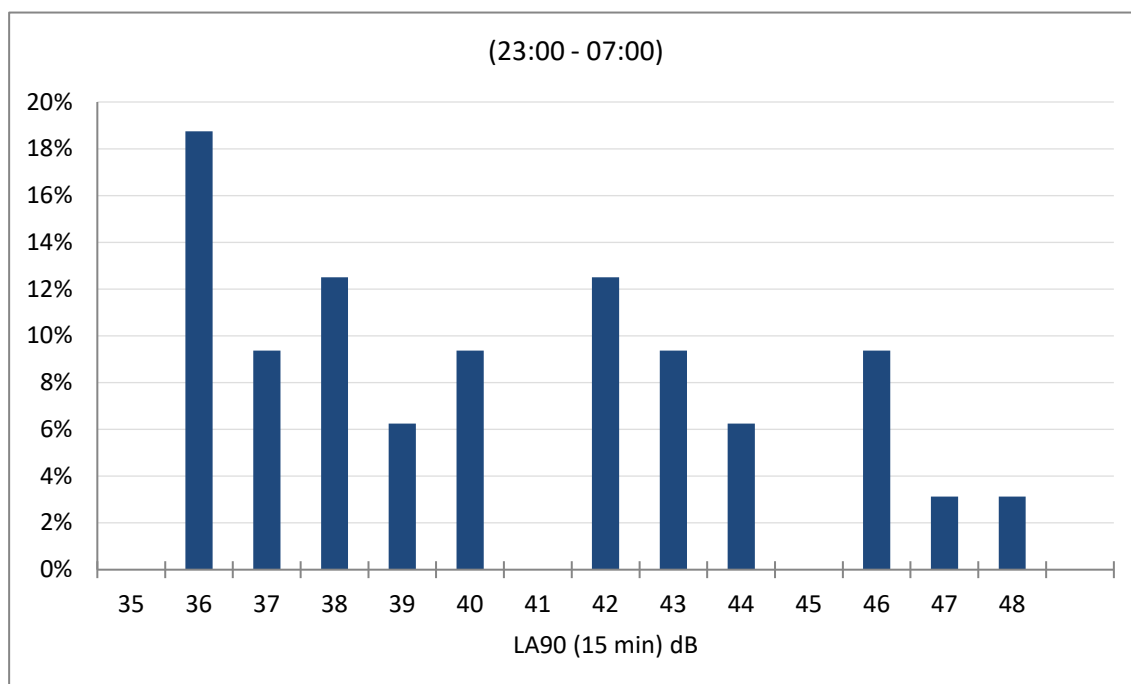


Figure 3: Statistical analysis of measured daytime LA90 sound levels

Following guidance in BS 4142:2014+A1:2019, the statistical analysis of Figures 3 confirms that the representative background sound levels in the vicinity of the receptor is LA90 36dB during the night-time. In accordance with loca authority guidance the criteria shall be LAr 26dB.

The pertinent results of the survey are summarised in Table 2 below.

Receptor	Period	Lowest Background Sound Level During Operating Period LA90	Criteria LAr
R1	23:00 – 07:00	36dB	26dB

Table 2: Summary sound level survey results

5. ACOUSTIC ASSESSMENT

The development includes the installation of 2 new air conditioning condenser units. Confirmation of the equipment models used in the assessment is provided in Table 3 below.

Description/Reference	Equipment Model	Sound Power Level (LwA)	Quantity
AC Condenser 1	Fujitsu AOYG30KBTA4	68dB	1
AC Condenser 2	Fujitsu AOYG24KBTA4	66dB	1

Table 3: Proposed new mechanical equipment used in the assessment

Sound emissions from the mechanical equipment can be determined from manufacturer's published data.

A computer model has been used to calculate the noise contribution from the proposed plant to outside nearest noise-sensitive windows. Environmental corrections are based on the methodology in ISO 9613-2:1996.

The assessment includes the mitigation measures outlined in Section 6 of this report. Summary printouts from the calculation models are included in Appendix A.

Assessment of the calculated rating levels in accordance with BS 4142:2014+A1:2019 is provided in Table 4 below.

Description	R1 Receptor (All Plant)	Relevant Clause	Commentary
Calculated specific sound level to receptor	LAeq 26dB	7.1 7.3.6	New equipment operating. Refer to calculation sheets in Appendix A.
Background sound level	LA90 36dB	8.1.3 8.3	Measured lowest background sound level.
Acoustic feature correction	0dB	9.2	The calculated specific sound levels do not indicate any tonal/impulsivity/intermittency component and the equipment will be significantly below the background and residual sound levels.
Rating level	LAr 26dB	9.2	

Excess of rating level over background sound level	-10dB	11	Assessment indicates low likelihood of adverse impact
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Table 4: BS 4142:2014+A1:2019 Assessment

Table 4 shows the rating level of the proposed new equipment will be at least 10dB below the background LA90 sound level to outside the closest noise-sensitive properties. This fully complies with the requirements of the Local Authority.

BS 4142:2014+A1:2019 requires an assessment to consider the context of the development, rather than simply adhering to numerical values. Considering the calculated numerical value of the specific sound, allowing a reduction through partially open windows of 15dBA, as recommended in BS 8233:2014, sound levels inside the neighbouring dwellings due to the proposed new equipment will be approximately 10dBA (25dBA – 15dBA). This is significantly below guideline levels for sleeping in bedrooms of LAeq 30dB, set out in BS 8233:2014 and is further confirmation that sound levels from the new mechanical equipment should not be detrimental to the amenity of any noise-sensitive receptors in the vicinity.

The author considers that the context of the assessment does not alter the initial estimate of the impact, and that sound levels from the new mechanical equipment should not be detrimental to the amenity of any residential occupiers in the vicinity.

6. ACOUSTIC MITIGATION TREATMENTS

6.1. Bespoke Acoustic Enclosure

A bespoke acoustic enclosure is required for both AC condenser units. Minimum insertion loss performance for the enclosure is shown on the schedule in Appendix B.

Structural supports/steelwork and access panels or doors may be required and should be determined by the successful supplier accordingly.

6.2. Vibration Isolators

The plant is indirectly structurally connected to residential dwellings and therefore it is recommended that the condensers are installed on vibration isolators.

The condensers should be installed on rubber or neoprene turret type mounts or pads, providing minimum 6mm deflection at the working load.

7. CONCLUSION

A retrospective planning application is to be submitted for the installation of recently installed mechanical plant equipment for a residential dwelling at 43A Tottenham Lane, London.

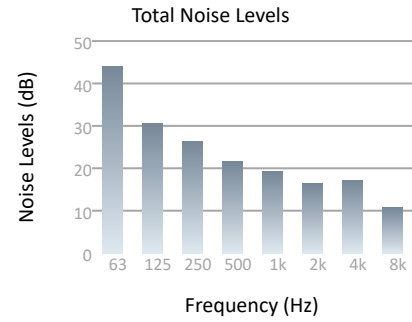
ACA Acoustics have undertaken an assessment of noise from the proposed equipment using manufacturer's published acoustic data. Calculated rating level for the new plant is at least 10dB below the background sound level during operating times of the new equipment when assessed at 1m from the closest noise-sensitive receptors.

The author considers that allowing for the proposed mitigation scheme in this report, the proposed new condensers and extraction equipment achieve the Local Authority's planning requirements for this development and will not be detrimental to the amenity of nearby residential occupants.

Appendix A

Acoustic Calculations

Project Name	43A Tottenham Lane
Project Reference	230803
Reference	R1
Description	Adjacent Dwelling Windows
Noise Limit	26
dBA	26.3



Calculated Lp at Receptor

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
AC 1	1	41.1	27.4	23.3	18.5	16.2	13.3	14.2	7.7
AC 1	1	41.1	27.4	23.3	18.5	16.2	13.3	14.2	7.7

230803-1

Calculation Sheet

AC 1 to R1

	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Noise Source								
Noise Source - AC 1								
Sound Power Levels	76.0	67.0	65.0	63.0	62.0	56.0	52.0	46.0
Noise Control Treatments								
Treatment - AE	-13.0	-12.0	-12.0	-15.0	-17.0	-14.0	-9.0	-9.0
Dc - Condenser Directivity								
	0.7	-1.7	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Adiv - Geometrical Divergence								
	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6
Aatm - Atmospheric Absorption								
	0.0	0.0	0.0	0.0	0.0	-0.1	-0.2	-0.6
Agr - Ground Attenuation								
	3.0	-0.2	-1.1	-0.9	-0.2	0.0	0.0	0.0
Abar - Barrier Attenuation								
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
External Receiver								
External Receiver - R1								
Sound Pressure, Lp:	41.1	27.4	23.3	18.5	16.2	13.3	14.2	7.7

Calculation Sheet

AC 1 to R1

	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Noise Source								
Noise Source - AC 1								
Sound Power Levels	76.0	67.0	65.0	63.0	62.0	56.0	52.0	46.0
Noise Control Treatments								
Treatment - AE	-13.0	-12.0	-12.0	-15.0	-17.0	-14.0	-9.0	-9.0
Dc - Condenser Directivity								
	0.7	-1.7	-3.0	-3.0	-3.0	-3.0	-3.0	-3.0
Adiv - Geometrical Divergence								
	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6	-25.6
Aatm - Atmospheric Absorption								
	0.0	0.0	0.0	0.0	0.0	-0.1	-0.2	-0.6
Agr - Ground Attenuation								
	3.0	-0.2	-1.1	-0.9	-0.2	0.0	0.0	0.0
Abar - Barrier Attenuation								
	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
External Receiver								
External Receiver - R1								
Sound Pressure, Lp:	41.1	27.4	23.3	18.5	16.2	13.3	14.2	7.7

Appendix B

Noise Control Treatments

Schedule of Noise Control Treatments

Reference	Location	Description	Insertion Losses (dB)							
			63	125	250	500	1k	2k	4k	8k
AE		Bespoke Acoustic Enclosure	13	12	12	15	17	14	9	9