



Manchester Academy

ASHP Plant Noise Verification Survey

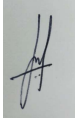
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24106-R01-JT
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Date: 29/11/2024

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REVISION HISTORY

Revision	Date	Revision Details	Author	Checked
R01	29/11/2024	Original Issue	 Joseph Tony BTech MIOA	 Susan Witterick BSc MIOA

1 INTRODUCTION

- 1.1 dBx Acoustics has been appointed by United Learning Trust to carry out a verification noise survey of the ASHP plant installed at Manchester Academy, Moss Lane East, Moss Side, Manchester M14 4PX.
- 1.2 Planning Condition 4 requires that prior to operation of the scheme, a verification report shall be provided to confirm that the noise criteria presented within dBx Acoustics' report reference *23053-R01A-SW* dated 4th July 2023 are met.
- 1.3 A glossary of acoustic terminology has been supplied in Appendix A i to assist the reader.

2 BASIS OF ASSESSMENT

Manchester City Council (MCC)

- 2.1 The noise impact assessment within this report is intended to satisfy Condition 4 of planning permission reference 137313/FO/2023.

- 2.2 Condition 4 states:

Prior to the operation of the scheme a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall also undertake post completion testing to confirm that the noise criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.

Reason - To minimise the impact of the development and to prevent a general increase in pre-existing background noise levels around the site pursuant to policy DM 1, SP 1, EN 1 of the Manchester Core Strategy and DC26 of the Extant Unitary Development Plan.

- 2.3 The approved acoustic report referenced in this condition is dBx Acoustics' report reference 23053-R01A-SW dated 4th July 2023.
- 2.4 The measured background sound level during the typical daytime period and night-time period, in the submitted planning noise impact assessment, was 46dB_{LA90,1hr} and 43dB_{LA90,15mins}, respectively.
- 2.5 On this basis, the building services noise emission limits when assessed at the nearest noise sensitive receptors (NSRs) in accordance with BS4142:2014 and the requirements of Manchester City Council are 41dB_{LAf,Tr} during the daytime (07:00h-23:00h) and 38dB_{LAf,Tr} at night (23:00h-07:00h).

3 SITE DESCRIPTION

- 3.1 Nine Strebel S-ASX-21 air source heat pumps (ASHP) have been installed within a compound to the west of the existing buildings, with a further unit located on the roof close to the main building plant room.
- 3.2 The locations are indicated in Figure 1, below.

Figure 1: ASHP Location



Nearest Noise Sensitive Receptors

- 3.3 The nearest noise sensitive receptors (NSRs) are residential properties at Moss Lane East, to the south and south west of the compound, as indicated on Figure 1 above.

4 VERIFICATION NOISE SURVEY

Methodology

- 4.1 A noise survey was carried out at the site on Friday 29th November 2024, to measure noise from the ASHP units in operation.
- 4.2 At the time of testing, all units were set to operate simultaneously to represent a worst-case for potential noise impact.
- 4.3 Measurements were taken close to the plant with the plant both running and switched off.

Weather Conditions

- 4.4 Weather conditions during the measurement period were generally cloudy and dry. Wind speeds were within suitable parameters for the measurement of environmental noise (i.e., generally under 5 ms⁻¹). The microphone was protected with a windshield for the duration of the survey.

Equipment

- 4.5 The equipment used in the measurements is detailed in Table 1, below;

Table 1: Equipment Used in the Survey

Equipment	Manufacturer & Part No	Serial Number
Sound Level Meter	NOR 140	1403443
Microphone	NOR 1225	18437
Calibrator	B&K 4231	1821323

- 4.6 The sound level meter was calibrated before and after measurements, with no significant drift recorded. An accredited laboratory calibrated the equipment not more than two years prior to the measurements being made, except for the calibrator, which had been calibrated not more than one year prior to the survey.

Measured Data

- 4.7 The noise measurements were undertaken at 2m from ASHP compound on the ground floor and 1m from the roof ASHP unit. All measurements were 5 minutes in duration.
- 4.8 The measured noise levels are shown in Table 2, below.

Table 2: Measurement Results

Plant Location	Plant On or Off	Start Date and Time (hh:mm)	Duration (hh:mm)	Ambient Noise Level (dBL _{Aeq,T})	Background Noise Level (dBL _{A90,T})
ASHP - Roof	ON	29/11/2024 09:31	05:00	60	59
		29/11/2024 09:36		60	59
	OFF	29/11/2024 09:46	05:00	57	56
		29/11/2024 09:52		56	55
ASHP Compound	ON	29/11/2024 10:47	05:00	65	64
		29/11/2024 10:53		64	63
	OFF	29/11/2024 10:10	05:00	49	47
		29/11/2024 10:18		48	47

- 4.9 Due to the forced running of the plant which allowed full operation for only 15 minutes, it was not possible to undertake extended measurements at the NSRs. The surveyor attended this location whilst the plant was in full operation, and noted that plant noise was subjectively inaudible.
- 4.10 The specific sound pressure level arising from the units in operation is established by subtracting the ambient noise level with plant inoperable (the residual sound level) from the data measured with the units in operation. The specific sound level of the plant is presented in Table 3, below.

Table 3 : Specific Sound Level

Plant	Unit SPL (dBL _{Aeq,T})
ASHPs - Ground Floor	65dBL _{Aeq,T} at 2m
ASHP - Roof	59dBL _{Aeq,T} at 1m

5 ASSESSMENT

Manchester City Council Requirements

- 5.1 Condition 4 of planning application reference 137313/FO/2023 requires that external plant items should be designed to a rating noise level of no higher than 5dB below existing background noise levels.
- 5.2 The measured background sound level as used in the approved planning noise impact assessment, was 46dB_{LA90,1hr} during the daytime and 43dB_{LA90,15mins} at night.
- 5.3 Therefore, the cumulative plant noise rating level should not exceed 41dB_{LA,r,T} during the daytime period and 38dB_{LA,r,T} during the night-time period when assessed at the noise sensitive receptors in accordance with BS4142:2014.

Calculations

- 5.4 The measured specific sound pressure level at a known distance from the units, as presented in Table 3, above, can be distance corrected to derive the specific sound level at the NSRs on Moss Lane East as shown in Table 4, below.
- 5.5 The ASHP unit located on the roof has no direct line of sight to the NSR and therefore a correction has been made for screening.

Table 4: Predicted Plant Noise Levels at NSR

Plant	Unit SPL (dB _{LAeq,T})	Approximate Distance to NSRs (m)	Distance Attenuation (dB)	Screening Attenuation (dB)	Specific Noise Level at NSRs (dB _{LA,r,T})
ASHPs-Ground Floor	65dB _{LAeq,T} at 2m	80	-32	0	33
ASHP-Roof Floor	59dB _{LAeq,T} at 1m	39	-32	-10	17
Cumulative specific noise level at NSR					33

- 5.6 On this basis, a BS4142 assessment for the plant as installed is presented in Table 5, below.

Table 5 : BS4142 Assessment- NSR - Moss Lane East

Item	Calculation	Relevant Clause	Comments
Measured background sound level - daytime	46dBL _{A90, 1hr}	8.3	The typical background sound level measured during the daytime period.
Measured background sound level – night-time	43dBL _{A90, 15min}	8.3	The typical background sound level measured during the night-time period.
Specific sound level	33dBL _{Aeq, 1hr}	7.3.3	A prediction made using the methodology outlined above, includes all sources, screening and distance corrections.
Assessment made during the daytime and night-time periods so reference period is 1 hour and 15 minutes respectively		7.2	-
Acoustic Feature Correction	+3dB	9.2	Intermittent operation
Rating Level	36dBL _{Ar, Tr}	9.2	The predicted Rating Level during the daytime and night-time period.
Excess of Rating Level over background sound level - daytime	-10dB	11	-
Excess of Rating Level over background sound level -night-time	-7dB	11	-
Assessment indicates low likelihood of adverse impact		11	Predicted Rating Level does not exceed the measured typical background level. This is an indication of the development having a low impact.
Uncertainty of the assessment	Minor	10	Background sound level based on repeatable measurements. The predicted Rating Level is based on established prediction methodologies.

- 5.7 It is be seen from Table 5 that the rating level of the installed plant is at least 10dB lower than the existing daytime background noise level and 7dB lower than the existing night-time background noise level.
- 5.8 This is an indication of a low likelihood of adverse impact, and meets Manchester City Council's requirement for the rating level to be 5dB lower than the background noise level.
- 5.9 On this basis, Planning Condition 4 can be discharged.

6 CONCLUSION

- 6.1 dBx Acoustics has been appointed by United Learning Trust to carry out a verification noise survey for ASHP plant installed externally to Manchester Academy at Moss Lane East, Moss Side, Manchester M14 4PX.
- 6.2 A verification noise survey of the installed plant units was undertaken on Friday 29th of November 2024.
- 6.3 The measured data confirms that the requirements of Manchester City Council as set in Planning Condition 4 of application reference 137313/FO/2023 are achieved by the installation.
- 6.4 This condition can therefore be discharged.

APPENDIX A – GLOSSARY OF ACOUSTIC TERMINOLOGY

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (L_p) the reference quantity is 2×10^{-5} N/m ² . The sound pressure level existing when microphone measured pressure is 2×10^{-5} N/m ² is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p) or Sound Power Level (L_w).
Frequency	Number of cycles per second, measured in hertz (Hz), related to sound pitch.
A-weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
L_{Fmax}	The instantaneous maximum sound pressure level which occurred during the measurement. F indicates that the fast time-weighting is used.
L_{AFmax}	The instantaneous maximum A weighted sound pressure level which occurred during the measurement. F indicates that the fast time-weighting is used.
$L_{Ar,Tr}$	The rating level: the equivalent continuous A-weighted sound pressure level of the noise, plus any adjustment for the characteristic features of the noise.
Insertion Loss, IL	The reduction of noise level due to the presence of a noise control device such as an attenuator, excluding any regeneration noise created by its presence.

This report (including any enclosures and attachments) has been prepared by dBx Acoustics with reasonable skill and care in accordance with generally accepted acoustic principles and the terms agreed between dBx Acoustics and our Client. Any information provided by third parties and referred to herein may not have been checked or verified by dBx Acoustics unless expressly stated otherwise. This document contains confidential information, and no part of this report should be reproduced, distributed or communicated to any third party without express prior written consent from dBx Acoustics. We do not accept any liability if this report is used for an alternative purpose from that for which it is intended, nor to any third party in respect of this report. Where a noise survey has been undertaken, this report is based on the noise climate at the site at the time of the survey and no warranty is given as to the possibility of changes at differing times.

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