

Technical Letter – BS4142 Validation Assessment

Site Address:	74 King Street, Manchester, M2 4NJ
Project Reference No:	NP-013108
Subject:	Validation Testing for Installed AC Units
Client:	Manchester Building Society
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Date:	19/08/2025

Introduction

NOVA Acoustics Ltd has been commissioned to provide a validation assessment for the installation of air conditioning units ('AC') at the above address.

The original proposal was assessed by NOVA Acoustics in January 2025 (report ref. NP-012089) under planning application 141165/LO/2024 for Manchester City Council. None of the conditions are noise-related, however, this report has been prepared to accompany the planning application submitted to the Local Planning Authority ('LPA').

A noise survey has been undertaken to establish the operational noise levels of the installed plant and to compare them to previously stated target criteria.

Assessment Criteria

The background noise level that was used as the baseline for the original acoustic assessment was **61dB** ($L_{A90,15min}$). This was measured in the vicinity of the closest NSR and proposed plant installation area during operational hours period (08:00 – 18:00 hours).

The *Manchester City Council 'Planning & Noise Technical Guidance – December 2015 – Section 3.6.1.5 Industrial / Commercial Developments'* comments the following:

"BS 4142 should be used to assess the likely impact of noise from industrial and commercial sources at noise sensitive premises (section 3.5). One of the indications of the impact of a BS 4142 assessment is 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 Council consider that new developments should contribute and enhance the area in which they are located and where possible, contribute to the improvement of people's health and quality of life as per the NPSE. With this in mind, the design objective should be:

'The development should be designed so as to achieve a rating level of 5dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location'.

Where this criterion cannot be achieved, the various noise control measures considered as part of the assessment should be fully explained (i.e. relocation of noise sources, use of quieter equipment, enclosures, screening, restriction of the hours of operation) and the achievable noise level should be identified. This information will allow us to make a judgement concerning the application and its likely impact on the surrounding area."

To achieve the criteria defined by the LPA, the rating noise level of the ASHP unit should not exceed **56dBA** at a distance of 1m from the façade of the adjacent noise-sensitive receptor(NSR1).

Subjective Impression and Context

The immediate surrounding areas comprise of commercial properties with residential dwellings on upper levels. The site is bounded to the east by a mixed-use development building with commercial units and apartments. These apartments have windows into the lightwell and, hence, these windows have been identified as the closest noise sensitive receptors ('NSR').

During the previous site visits, the acoustic environment was considered high in level, and the noise profile was dominated by noise emissions from non-associated fixed plant units located within the lightwell (AC units and an extraction system which during the recent site visit was inactive). This was further corroborated when assessing the noise survey time history shown in the previous report, where it can be seen that plant noise is dominant throughout the daytime and night-time periods.

Plant noise from the non-associated units located on the flat roof to the east was also audible. Road traffic noise emissions were also just perceptible although secondary in nature.

The proposed plant has been located below the existing non-associated plant units attached to the wall. This wall breaks the line of sight between the units and those lower NSRs windows, thus providing a degree of acoustic shielding.

BS4142 Noise Assessment

Measurements were taken on the applicant's property between 14:20 and 17:00 hours on the 13/08/25. All measurements were taken with a class 1 sound level meter which was field calibrated with a class 1 calibrator (calibration certificates available upon request).

During the monitoring period, weather conditions were favourable with windspeeds of less than 5m/s and no precipitation. A 130mm diameter windshield was fitted to the microphone and the meter was set to record in 1-second integration periods (with fast time-weighting) in 1/3rd octave frequency bands.

Measured Short Term Levels

The recorded 1/1 octave frequency band sound pressure levels recorded on site are summarized in the table below. All measurements at the NSR window have had a façade correction applied.

Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
ST1 – 1m from NSR window, Ambient associated plant on (Unassociated plant active)	62	62	60	58	55	52	46	41	60
ST2 – 1m from NSR window, Residual no associated plant active (Unassociated plant active)	59	59	55	53	50	49	41	32	56
ST4 – 1m from NSR window, all plant off.	59	58	54	53	49	47	39	28	54
ST5 – 1m from AM060BXMDGR/EU Unit 1 Q2	56	64	58	52	55	42	49	34	58
ST6 – 1m from AM060BXMDGR/EU Unit 2 Q2	63	57	54	55	50	49	40	30	56
ST8 – 1m from AM060BXMDGR/EU Unit 3 Q2	62	58	55	56	51	48	42	32	57
ST9 – 1m from AM060BXMDGR/EU Unit 4 Q4	66	68	62	61	58	53	48	40	63
ST10 – 1m from AC052BXAPKG/EU Unit 1 Q8	61	56	52	53	48	44	39	36	53

Table 1 – Attended Measurements Sound Pressure Levels

As can be seen in the table above, the ambient and residual noise levels measured at the NSR window (ST1 & ST2) are within 3dB of one another. It is stated in BS4142 that in such circumstances, calculating a specific sound level would give rise to elevated levels of uncertainty due to who close the ambient and residual levels are. As such, it recommends that the calculations rely on alternative methods. The cumulative specific sound level has been calculated at the NSR based on the source spot measurements (ST5 – ST10).

As one AC052BXAPKG/EU unit could not be activated, the sound power levels and propagation to the NSR will be calculated based on the levels recorded of the other unit.

This will consider façade corrections and a propagation distance of 3.2m, but no shielding will be considered to present the most robust assessment.

The full calculations can be found in Appendix E and BS4142 assessment is shown in the following table.

Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Cumulative Sound Level at NSR1 (L _{eq})	59	59	54	53	50	45	42	32	55
Acoustic Feature Correction	No acoustic feature corrections are deemed applicable considering the absolute predicted specific sound level and that the noise emissions are akin to the existing noise profile. In addition, the predicted specific sound level falls 2dB below the lowest measured L _{A90,15min} (58dB).								0
Rating Sound Level at NSR1 (L _{Ar,T})									55
Background Sound Level (Operational Period L _{A90,15min})									61
Exceedance of Background at NSR1									-6
BS4142 Assessment Outcome	'Low Impact, dependent on context'.								
NPPF & NPSE Outcome	'No Observed Adverse Effect level ('NOAEL').								
LPA Criteria Outcome	The rating sound level is within the LPA criteria.								
No further mitigation measures are deemed necessary.									

Table 2 – BS4142 Assessment

There is a high degree of certainty in the result given that the predicted overall impact is 55dBA, which when logarithmically summed with the residual overall level (ST2) of 56dBA, the resultant overall ambient is predicted at 59dBA. This result closely matches the reading (ST1) of 60dBA, which also included unassociated plant noise.

Conclusion

As can be seen, the cumulative rating sound level is greater than 5dB below the prevailing background sound level during the operational period. This is classed as 'No Observed Adverse Effect Level' ('NOAEL') when assessed with the NPPF and NPSE and is within the Local Authority criteria. Given this, it is thought that the relevant criteria have been satisfied.

Appendix A – Specific Sound Level Calculations

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit	AM060BXMDGR EU Un	Octave-Band Lp	Lp at 1m, Q factor (Q=2)	58	63	125	250	500	1k	2k	4k	8k	1	2
No. of	1													
Data Type	Empirical Data		Total Lw	66	64	72	66	60	63	50	57	42		
Source Mitigation No														
Description														
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period	Correction (dB)											
	60	Day	0	66	64	72	66	60	63	50	57	42		
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor	Loss (dB)											
	3.2	2	-18											
Specific Sound Level at NSR1				48	46	54	48	42	45	32	39	24		

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit	AM060BXMDGR EU Un	Octave-Band Lp	Lp at 1m, Q factor (Q=2)	56	63	125	250	500	1k	2k	4k	8k	1	2
No. of	1													
Data Type	Empirical Data		Total Lw	64	71	65	62	63	58	57	48	38		
Source Mitigation No														
Description														
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period	Correction (dB)											
	60	Day	0	64	71	65	62	63	58	57	48	38		
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor	Loss (dB)											
	3.2	2	-18											
Specific Sound Level at NSR1				46	53	47	44	45	40	39	30	20		

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit	AM060BXMDGR EU Un	Octave-Band Lp	Lp at 1m, Q factor (Q=2)	57	63	125	250	500	1k	2k	4k	8k	1	2
No. of	1													
Data Type	Empirical Data		Total Lw	65	70	66	63	64	59	56	50	40		
Source Mitigation No														
Description														
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period	Correction (dB)											
	60	Day	0	65	70	66	63	64	59	56	50	40		
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor	Loss (dB)											
	3.2	2	-18											
Specific Sound Level at NSR1				47	52	48	45	46	41	38	32	22		

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit	AM060BXMDGR EU Un	Octave-Band Lp	Lp at 1m, Q factor (Q=4)	63	66	125	250	500	1k	2k	4k	8k	1	4
No. of	1													
Data Type	Empirical Data		Total Lw	68	71	73	67	66	63	58	53	45		
Source Mitigation No														
Description														
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period	Correction (dB)											
	60	Day	0	68	71	73	67	66	63	58	53	45		
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor	Loss (dB)											
	3.2	2	-18											
Specific Sound Level at NSR1				50	53	55	49	48	45	40	35	27		

Description	Item	Source Term	Parameter	dBA	1/1 Octave Frequency Band (Hz, dB)								Lp Dist (m)	Q Factor
Model / Unit	AC052BXAPKG EU Un	Octave-Band Lp	Lp at 1m, Q factor (Q=8)	54	61	125	250	500	1k	2k	4k	8k	1	8
No. of	2													
Data Type	Empirical Data		Total Lw	59	66	61	57	58	53	49	44	41		
Source Mitigation No														
Description														
Time Corrected Lw of Fixed Plant	On-Time (min)	Time Period	Correction (dB)											
	60	Day	0	59	66	61	57	58	53	49	44	41		
Propagation Loss to NSR1 (Point Source)	Distance (m)	Q Factor	Loss (dB)											
	3.2	8	-12											
Specific Sound Level at NSR1				47	54	49	45	46	41	37	32	29		



Specific Sound Levels at NSR1

Description	dB(A)	63	125	250	500	1k	2k	4k	8k
AM060BXMDGR EU Unit 1	48	46	54	48	42	45	32	39	24
AM060BXMDGR EU Unit 2	46	53	47	44	45	40	39	30	20
AM060BXMDGR EU Unit 3	47	52	48	45	46	41	38	32	22
AM060BXMDGR EU Unit 4	50	53	55	49	48	45	40	35	27
AC052BXAPKG EU Units	47	54	49	45	46	41	37	32	29
Cumulative Specific Sound Level	55	59	59	54	53	50	45	42	32

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