Deansgate South, Manchester

Noise Assessment of External Plant

8512.9A

5th June 2026

Revision A

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2 Summary

2.1 The new student residential building on Deansgate South requires validation of the noise levels of the external plant associated with the development.

2.2 This is required for both planning and BREEAM evidence of compliance.

2.3 Apex has undertaken noise measurements of the roof top plant and predicted the noise levels at the nearby noise sensitive receptors.

2.4 The predicted levels have been assessed following BS4142 and are at least 9dB below the background noise levels at the nearby receptors.

2.5 This meets with the proposed Planning Condition 19 criteria and the BREEAM Pol 05 criteria which both require the noise rating level to be at least 5 dB below the background noise level.

2.6 On that basis the Planning Condition 19 can be discharged, and the BREEAM Pol 05 construction stage credit can be awarded.

3 Introduction

3.1 This report includes the noise assessment for the external plant and details of the on-site measurements to validate the installation of the plant.

3.2 It addresses both the Planning and BREEAM Pol 05 requirements which have the same criteria and assessment methodology.

3.3 **Planning Condition 19**

3.4 The Appeal Decision Notice (reference no. *APP/B4215/W/21/3287525*) includes the following condition

19. a. Before first occupation of the development the building, together with any externally mounted ancillary equipment, shall be acoustically insulated in accordance with a scheme to be submitted to and approved in writing by the local planning authority in order to secure a reduction in the level of noise emanating from the equipment.

b. Upon completion of the development and prior to first occupation a verification report to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report shall be submitted to and approved in writing by the local planning authority. The verification report shall also undertake post completion testing to confirm that acceptable criteria has 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. Those measures shall be implemented in full before any of the units are first occupied.

3.5 This requires a noise impact assessment to be undertaken of the external plant for approval by the local authority and a validation that the proposed plant has been appropriately installed with any necessary noise control measures.

3.6 This report addresses both 19a and 19b of Planning condition 19,

3.7 **BREEAM Pol 05 Credit**

3.8 One BREEAM credit , Pol05, is available for the reduction of noise pollution.

3.9 A design stage noise assessment for BREEAM credit Pol05 has been issued[1] which sets the required noise limits at the nearby receptors.

3.10 This report is to be submitted as construction stage evidence that the installed plant meets the required criteria.

3.11 **BS 4142**

3.12 The noise assessment follows the guidance of BS 4142[2] which provides a methodology for assessing industrial and commercial sound. This is the appropriate methodology for assessing sound from mechanical plant associated with the development.

3.13 The BS 4142 assessment methodology can be summarised as follows:

- Determine the specific sound level at the assessment location by measurement or calculation, accounting for source 'on-time' if necessary.
- Determine a representative background sound level based on measurements at the noise-sensitive location, or at a suitable alternative location with appropriate justification where this is not possible.
- Calculate the rating level from the specific sound level by adding character corrections for distinctive features of the sound.
- Determine an initial estimate of the noise impact by subtracting the background sound level from the rating level.
- Consider all relevant contextual factors such as the character and level of the sound source and prevailing sound environment to reach a final assessment of the impacts.

4 Noise Limits at Nearby Receptors

4.1 The original planning application for the site[3] included an environmental statement which detailed the baseline survey undertaken by Apex Acoustics.

4.2 The site location , noise measurement locations and relative location of nearby noise sensitive receptors is shown in Figure 1.



Figure 1: Site location outlined in red, noise sensitive receptors in yellow and measurement locations

4.3 The baseline noise environment was measured continuously for 24 hours starting on 19th October 2020 at the following two positions (as shown in Figure 1):

- Position LT1: at the rear of Stay Deansgate
- Position LT2: at the proposed development site

4.4 The measured baseline noise levels are shown in Table 1. The measured noise levels include the road traffic from the nearby road network, construction noise from the

[1] Apex report reference 8512.5A ISSUED 15TH May 2024
[2] BS 4142 2014: A1+2019, Method for rating and assessing industrial and commercial sound.
[3] Application Reference 129406/FO/2021

residential development to the north of the site and building services plant noise from the east (Stay Deansgate) and from the south (North Tower).

4.5 The representative background sound levels (L_{A90}) reported in Table 1 have been determined via statistical analysis of the measured data following the guidance of BS 4142:2014.

Position	Daytime $L_{Aeq,16hr}$ (dB)	Night time $L_{Aeq,8hr}$ (dB)	Representative background sound levels (dB)	
			L_{A90}, day	L_{A90}, night
LT1	63	55	58	51
LT2	73	64	65	47

Table 1: Measured noise levels

4.6 **Required Criteria**

4.7 Planning condition 19 requires an assessment of noise from the operation of plant and equipment to be carried out, although no specific criterion is included in the condition.

4.8 Supporting guidance is provided in the Manchester City Council Planning & Noise Technical Guidance Note, [4], requires that an assessment is carried out in accordance with BS 4142:2014 and that plant and equipment should achieve a rating level of at least 5 dB below the typical background noise level at the nearest noise sensitive receptor (NSR).

4.9 This is the proposed criteria for the noise assessment relating to Planning Condition 19.

4.10 The BREEAM Pol 05 credit follows the same assessment methodology and also requires that the plant noise rating level is 5 dB below the existing background noise level.

4.11 Based on the measured background noise levels and the requirement for the noise rating of the new plant to be at least 5 dB below the existing background levels, the criteria for the nearby receptors are summarised in Table 2.

NSR	Assessment period	Plant noise rating limit $L_{Ar,Tr}$ (dB)
West Tower	Daytime (07:00 – 23:00)	≤ 53
	Night time (23:00 – 07:00)	≤ 46
Stay Deansgate	Daytime (07:00 – 23:00)	≤ 53
	Night time (23:00 – 07:00)	≤ 46
Castle Wharf	Daytime (07:00 – 23:00)	≤ 60
	Night time (23:00 – 07:00)	≤ 42

Table 2: Required noise limits at nearby receptors for Planning and BREEAM Pol05

[4] Manchester City Council Planning & Noise Technical Guidance Note, published in December 2015

5 External Plant Details

5.1 The roof mounted external plant is shown in Figure 2 and the details are shown in Table 3.

Plant Type	Manufacturer	Model	Quantity
Air conditioning condensers	Mitsubishi	PURY-P350	2
	Mitsubishi	PURY-P200	9
	Mitsubishi	PUZ-ZM100	2
Air Source Heat Pump	Mitsubishi	EAHV-M1500	4

Table 3: Detail of roof mounted plant

5.2 The manufacturers noise data provided for the equipment is summarised in Table 4.

Plant Type	Model	Sound Power Level L_{WA} dB	Sound Pressure level at 1m L_{Aeq} dB
Air conditioning condensers	PURY-P350	81 dB	64 dB at 1m
	PURY-P200	76 dB	59 dB at 1m
	PUZ-ZM100	69 dB	51 dB at 1m
Air Source Heat Pump (ASHP)	EAHV-M1500	83 dB	65 dB at 1m

Table 4: Manufacturers noise data for the roof top plant

5.3 The noise levels are presented as both sound power level and the sound pressure level measured at 1m from the units.

5.4 The levels at 1m are either at a set position from the plant, or are assumed to be an average level over a measurements area 1m from the plant.

5.5 All of plant with have some directivity associated with the propagation and for both the ASHPs and Condensers the fans are mounted on the tops of the unit, and we assume that half of the sound power would be directed above the unit and half would be directed below.

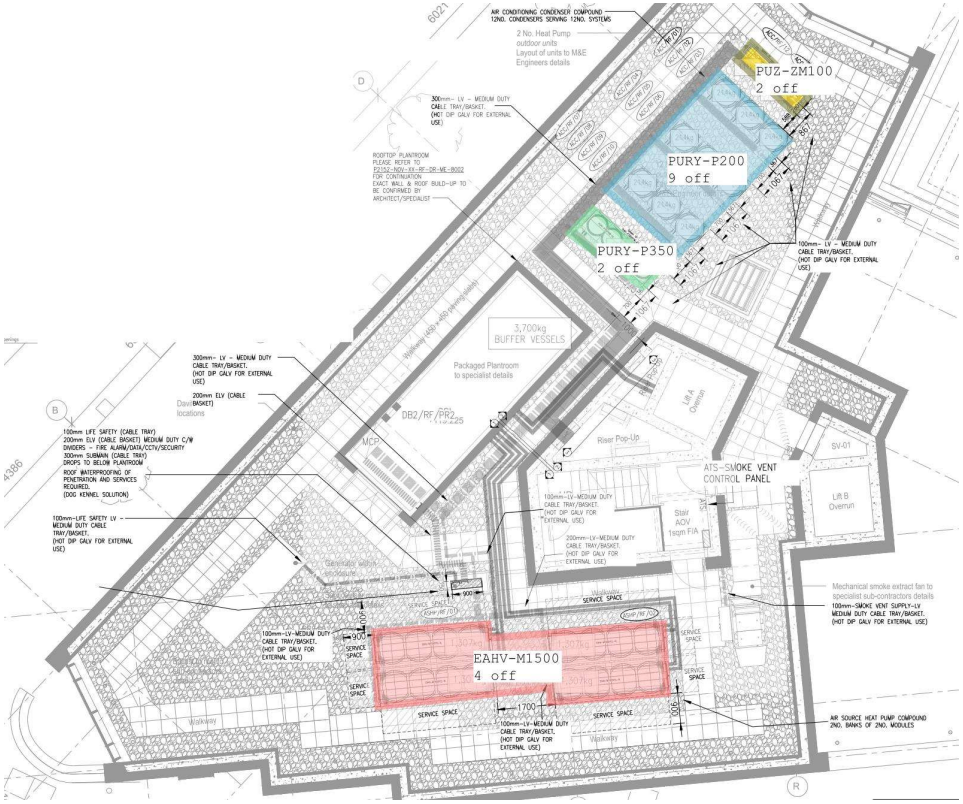


Figure 2: Roof plant showing location of roof mounted plant

5.6 **Operating periods**

5.7 The plant can operate at any time over 24 hrs, but it is understood that the air conditioning for the communal spaces is not expected to run during the night-time and the air conditioning for the bedrooms would run at lower duty that at the peak cooling load during the afternoons and early evening.

5.8 The ASHPs can run throughout the night to provide hot water for the morning, but they have some redundancy in the design, so that they can operate with just three units running, or four units running at a reduced rate.

6 Verification Measurements

6.1 Measurements of the roof top plant were undertaken on Thursday 21st May and Tuesday 2nd June 2026.

6.2 Details of the equipment used for the measurements are included in Table 5. All equipment was calibrated before and after the measurements and there was no drift in the calibrated levels.

Equipment	Model	Serial no.
Sound level meter	NTi XL2	A2A-14205-E0
Calibrator	Larson Davis CAL 200	15308
Sound level meter	NTi XL3	A2A-20287-E0
Calibrator	Larson Davis CAL 200	19379

Table 5: Equipment used for the measurements

6.3 The measurements above the ASHPs were undertaken at 1 m above the top of the plant.

6.4 The measurement above the condensers were taken at 1m above the top of the units, mid-way between the rows of condensers.

6.5 During the surveys the plant was understood to be operating under normal conditions.

6.6 The measurements at the condensers were influenced by other roof top noise sources and are a worst case.

6.7 The noise monitoring locations are shown in Figure 3.

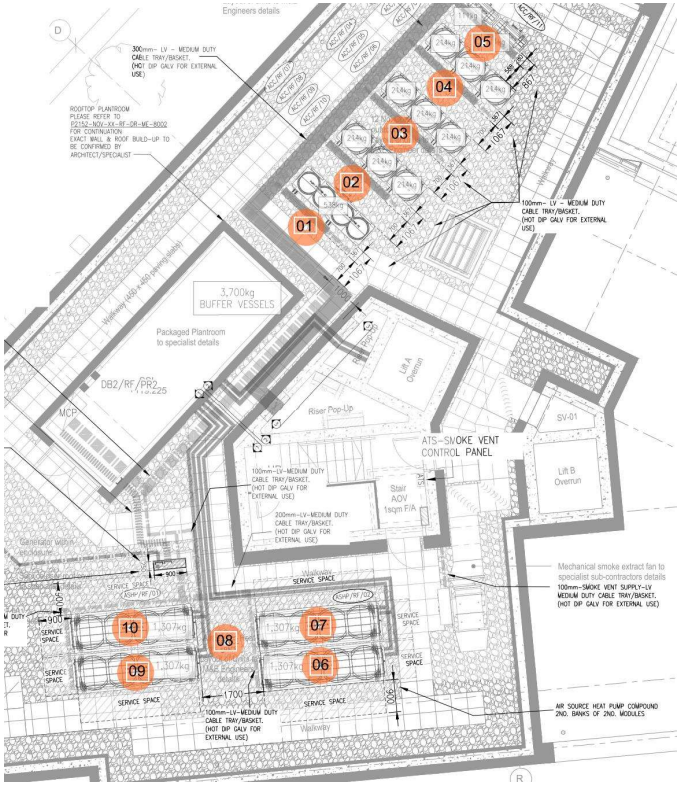


Figure 3: Noise monitoring locations

6.8 The measured levels are summarised in Table 6.

Condensers		ASHPs	
Location	Noise level $L_{Aeq,T}$ dB	Location	Noise level $L_{Aeq,T}$ dB
01	68 dB	06	63 dB
02	70 dB	07	62 dB
03	70 dB	08	63 dB
04	69 dB	09	66 dB
05	69 dB	10	67 dB

Table 6: Measured levels of roof top plant

7 Assessment of plant noise

7.1 The noise levels at the receptors have been predicted using CadnaA noise modelling software and an image of the model arrangement is shown in Figure 4.

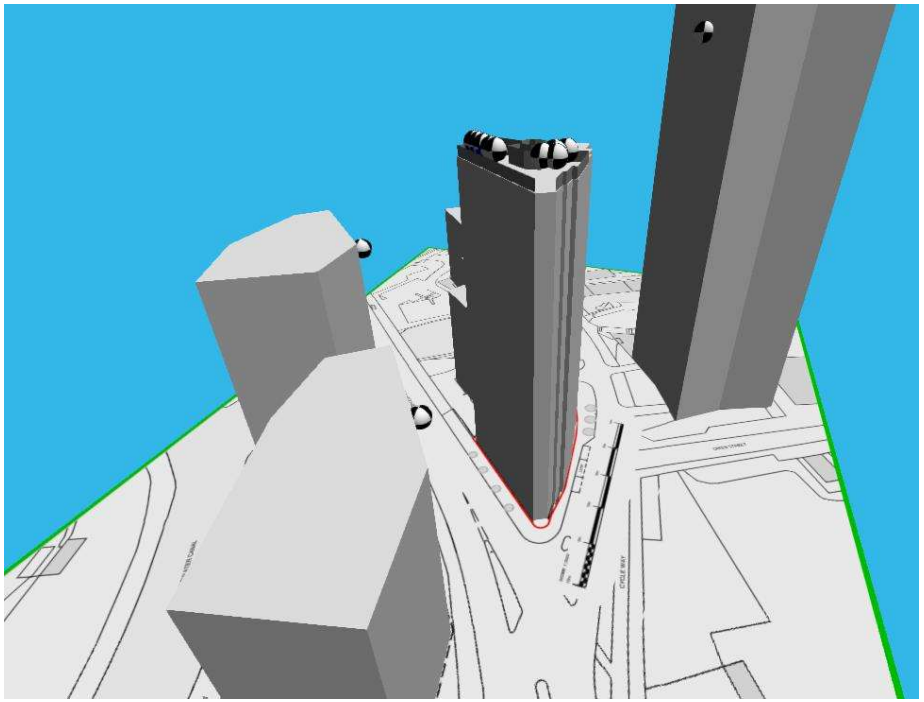


Figure 4: 3D View of CadnaA model

7.2 The noise model has been 'calibrated' to match the measured noise levels, by using receptor locations at the position of the noise measurements, and adjusting the sound power of the plant until meets the measured level.

7.3 **Condensers**

7.4 The measured noise levels of the condensers are very similar to the manufacturers data and are higher at 1m above the plant due to the contribution from several units at one time and the directivity of the units.

7.5 The sound power level used in the noise model are equal to the sound power levels provided by the manufacturers and the predicted noise levels at 1m above the plant are up to 72dB, which is within 2 dB of the measured levels.

7.6 This is considered to a robust representation of the actual levels from the condensers.

7.7 **ASHPs**

7.8 The noise levels above the ASHPs varied slightly, and the highest level of 67 dB at 1m above the units has been used for the model.

7.9 This equates to a sound power level of 80 dB from the top of each unit, which is line with the assumption that half of the sound power would be directed above the units due to the fans being top mounted.

7.10 **Predicted Level at Receptors**

7.11 The predicted noise levels at each receptor are summarised in Table 7.

7.12 The noise rating level does not include any character corrections as the individual items of plant are 10 dB below the lowest background levels at night and it is unlikely that there would be any noticeable characteristic from the ASHPs or the condensers.

Receptor	Daytime		Night-time	
	Predicted L_{Aeq} (dB)	Criteria $L_{Ar,Tr}$ (dB)	Predicted L_{Aeq} (dB)	Criteria $L_{Ar,Tr}$ (dB)
West Tower	43	≤ 53	42	≤ 46
Stay Deansgate	27	≤ 53	26	≤ 46
Castle Wharf	34	≤ 60	32	≤ 43

Table 7: Predicted noise levels nearby receptors, based on validated measurements

7.13 All of the predicted noise level are at least 5 dB below the background noise levels and meet with the Planning Condition 19 criteria, and the BREEAM Pol 05 criteria.

8 Conclusion

8.1 Apex has undertaken noise measurements of the roof top plant and predicted the noise levels at the nearby noise sensitive receptors.

8.2 The predicted levels have been assessed following BS4142 and are at least 9 dB below the background noise levels at the nearby receptors.

8.3 This meets with the proposed planning condition 19 criteria and the BREEAM Pol 05 criteria which are both require the noise rating level to be at least 5 dB below the background noise level.

8.4 On that basis the Planning Condition 19 can be discharged, and the BREEAM Pol 05 construction stage credit can be awarded.