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Ref: P4171/L04a/DMT 23 September 2025

To:	Matthew Smith	of:	Vinci Construction UK Ltd
From:	David Terry (AEC)	Checked:	Paul Knowles (AEC)

TECHNICAL NOTE

Manchester Royal Infirmary - Wards 6&7 Rooftop Plant – Noise Assessment for Planning [UPDATED]

1.0 INTRODUCTION

1.1 New external building services plant is proposed relating to the Ward 6 & 7 development at Manchester Royal Infirmary (MRI). The plant items will be located on the roof of an existing building at the MRI. AEC has been instructed by Vinci IHP to provide a noise assessment and report to support the planning application submission.

1.2 As part of the wider redevelopment works being undertaken by Vinci IHP at the MRI, AEC undertook a baseline noise survey in September 2020 at the nearby residential receptors and reported the findings in a noise assessment report (Ref: P4171/R01a/DMT). These measurements and findings are summarised in this letter and used as the basis for this assessment.

1.3 In addition, as the original baseline noise survey was undertaken several years ago, updated night-time noise measurements have been undertaken on Thursday 3rd October 2024 and most recently on Sunday 21st September 2025 at the request of the Local Authority. These measurements are also presented in this updated Technical Note.

1.4 This Technical Note presents baseline noise levels, design criteria, and an assessment of the proposed rooftop plant noise emissions at the nearby residential receptors.

2.0 PROPOSED DEVELOPMENT

2.1 This assessment relates specifically to the rooftop plant items only. The two main items of plant are an Air Handling Unit (AHU) (AIR FLEX 110 F), and a chiller unit (see image below). The location of the plant items is indicated on Figures 2.1 and 2.2 below.

2.2 The nearest residential receptor is the Sanctuary Student building which is located on the corner of Grafton Street, approximately 100m from the proposed plant, see Figure 2.2.

Unit Overview		
Range	Sintesis Advantage	
Chiller model	Air-Water Cooling only Scroll	
Model	CGAF 060 HE XLN EC R454B	
Unit Application	Low ambient (-20C to 46C)	
Compressor type	Scroll	
Refrigerant Type	Full charge R454B	
Eta s,c / SEER	187.40 % / 4.76	
SEPR HT	5.73	Compliant
SEPR MT	3.91	Compliant
Type of free cooling	No Free Cooling	
Type of pump	Dual pump high pressure	
Pump configuration	HDM VAR	
Electrical supply	400V/50Hz/3Ph	



Chiller

Figure 2.1 – Rooftop Plant Layout

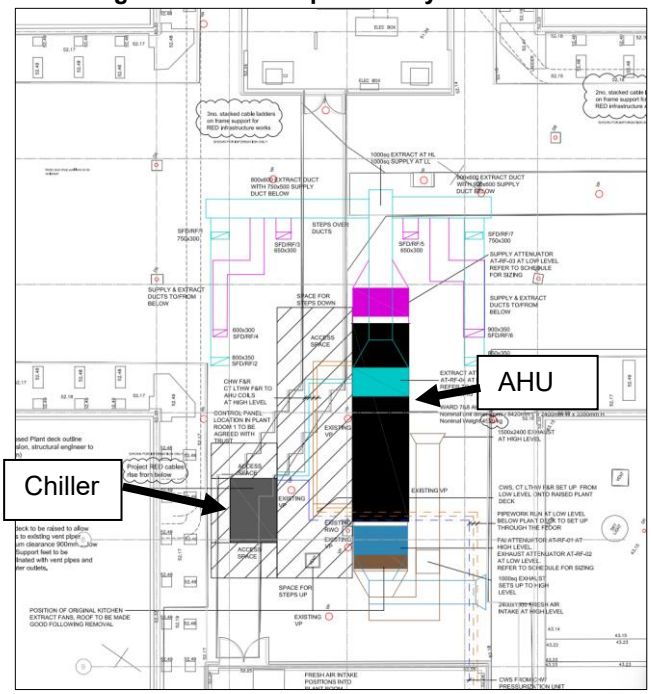
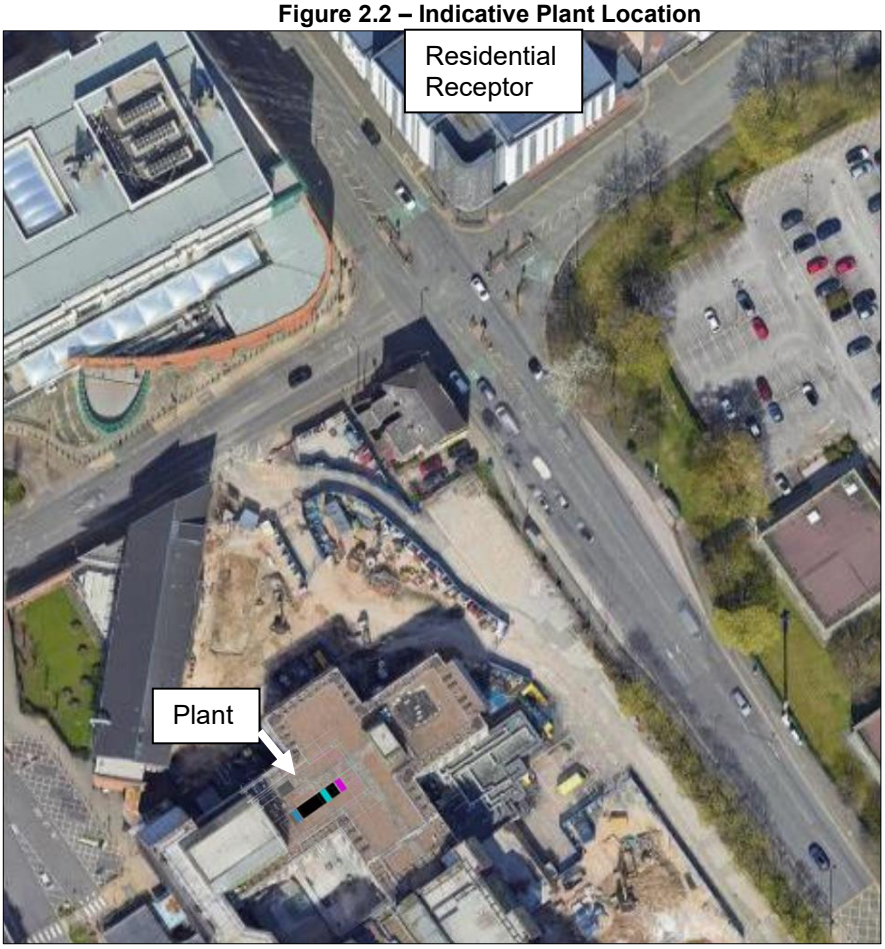


Figure 2.2 – Indicative Plant Location



2.3 The plant operates relatively consistently at all times of the day and night. The technical specifications have been provided to AEC and the relevant noise data has been extracted and is presented in Section 5 below.

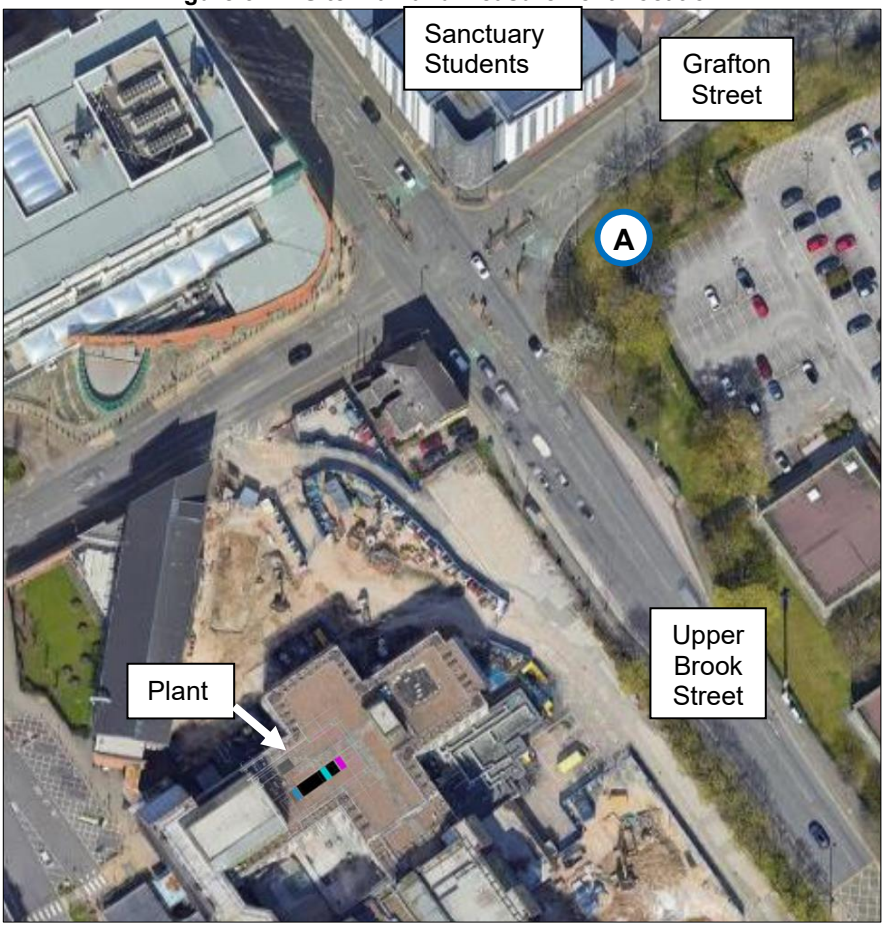
3.0 BASELINE NOISE SURVEYS

3.1 The baseline noise levels were monitored at Location A (see Figure 3.1) by AEC in September 2020, October 2024, and September 2025. The results are summarised below with further details provided in Appendix A.

3.2 The 2020 baseline background noise levels were undertaken during covid restrictions, and are slightly lower than the 2024 levels. However, the most recent 2025 night-time noise levels, measured on a Sunday night-time, are comparable with the 2020 noise levels and have been used as a representative worst case.

3.3 The average background noise levels measured at the Sanctuary Students buildings (Location A) were **57dBL$_{A90,15mins}$ and 49dBL$_{A90,15mins}$** during the daytime and night-time periods, respectively. This background noise was mostly due to road traffic noise on Upper Brook Street, and other surroundings roads, and building services noise from the existing nearby buildings.

Figure 3.1 – Site Plan and Measurement Location



Imagery @2024 Google, Imagery @2024 Infoterra Ltd & Bluesky, Maxar Technologies, The Geoinformation Group, Map Data @2024

4.0 ASSESSMENT CRITERIA

Manchester City Council's Noise Policy Guidance

4.1 Section 3.7.1.5 of the "*Planning & Noise Technical Guidance*" (PNTG) document issued by Manchester City Council (MCC) in October 2022 states the following:

"Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (LA90) level at the nearest noise sensitive location.

By designing the sound pressure level of any plant items to generate a noise impact of at least 5dB below the existing background level, any plant noise impact should be of a negligible level which should not give rise to complaints from users or occupiers of existing noise-sensitive usages."

BS 4142-2014

4.2 A 'rating level' ($dBL_{Ar,Tr}$), as defined in BS 4142-2014+A1-2019 *'Methods for rating and assessing industrial and commercial sound'* (BS4142), is obtained by applying a character correction to the 'specific noise level' ($dB_{Aeq,Tr}$) of a noise source (e.g. plant noise). The correction is applied if the noise has a defined acoustic character such as being tonal, impulsive, distinctive or intermittent in nature.

5.0 NOISE ASSESSMENT

Source Noise Data

5.1 The three main noise sources in this assessment are:

- AHU
  - Supply Fan Intake
  - Extract Fan Exhaust
- Chillers

5.2 The spectrum sound power data was provided for each item and is summarised below.

AHU Supply Intake:

Sound Power Lw	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Fan Inlet (dB)	70	83	74	73	71	69	69	63
Fan Outlet (dB)	74	86	75	78	79	76	72	65

Note : Fan manufacturer data used in accordance with DIN 463 Part 38 & 39, BS 848 Part 2 & ISO 5136. A correction of +6dB should be applied across all octave bands for unit casing adjustment

AHU Extract Exhaust:

Sound Power Lw	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Fan Inlet (dB)	68	73	68	69	68	67	67	59
Fan Outlet (dB)	71	76	69	75	75	73	70	62

Note : Fan manufacturer data used in accordance with DIN 463 Part 38 & 39, BS 848 Part 2 & ISO 5136. A correction of +6dB should be applied across all octave bands for unit casing adjustment

Chiller:

	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Sound power spectrum (Lwa)	96 dB	92 dB	88 dB	85 dB	83 dB	77 dB	72 dB

A chiller sound pressure level of 59dBA at 10 metres is also provided by the manufacturer.

Calculation of Noise Levels at Receptor

5.3 Using the above data and corrections for distance and directivity the following noise levels have been calculated at the residential receptor:

AHU Supply Fan Intake:	38 $dBL_{Aeq,T}$
AHU Extract Fan Exhaust:	40 $dBL_{Aeq,T}$
Chillers:	39 $dBL_{Aeq,T}$
Total:	**44 $dBL_{Aeq,T}$**

5.4 The resulting specific noise level at the nearest receptor, when all plant is operating at full duty, will be approximately 44$dBL_{Aeq,T}$.

Assessment

5.5 The plant will be relatively broadband and will be practically inaudible, therefore, plant noise should not be distinctive from the existing noise climate. On this basis it is not considered appropriate to apply any rating correction.

5.6 Therefore, the resulting rating noise level at the nearest noise sensitive receptors would be up to **44$dBL_{Ar,Tr}$**.

5.7 This level is -13dB below the existing daytime background noise levels and -5dB below the existing background noise level at night.

5.8 Based on the above assessment, the rooftop plant meets MCC's required noise level limit, stated in paragraph 4.1.

5.9 There is relatively low uncertainty in this assessment. Several worst-case assumptions are made in terms of highest operating duty, minimal directivity and screening attenuation, and using the measured background noise levels on a Sunday night-time.

Assessment Summary

5.10 Based on the above assessment, noise from the rooftop plant will not exceed -5dB below background noise and would meet Manchester City Council's requirements. Hence, noise should not be a limiting factor when considering planning permission.

APPENDIX A – Noise Survey Details

<table>
<tr><td>Date & Time of Survey:</td><td colspan="6">Night - Thursday 10 September 2020, 2300 to 0100h.
Day - Friday 11 September 2020, 1100 to 1400h.

Night - Thursday 03 October 2024, 2300 to 0100h.
Night – Sunday 21 September 2025, 2300 to 0100h.</td></tr>
<tr><td>Personnel:</td><td colspan="6">Michael Ridley (AEC) - 2020.
David Terry (AEC) – 2024, 2025.</td></tr>
<tr><td>Equipment Used:</td><td colspan="6">B&K 2250 lite Real Time Analyser (AEC Kit 4) 2020.
B&K 2260 Real Time Analyser (AEC Kit 2) - 2024.
B&K 2250 lite Real Time Analyser (AEC Kit 4) 2025.</td></tr>
<tr><td>Calibration:</td><td colspan="6">The sound level analysers, which conform to BS EN 61672-1: 2003 ‘Electro acoustics – sound level meters - Part 1 Specifications’ for Class 1 Type Z meters, were in calibration and check calibrated before and after the measurement periods using a Brüel & Kjær type 4231 (94dB) calibrator. There was no significant drift of calibration. Calibration certificates are available on request.</td></tr>
<tr><td rowspan="6">Weather Conditions:</td><td>Date</td><td>Period</td><td>Wet/Dry</td><td>Temp°C</td><td>Wind Speed & Direction</td><td>Cloud Cover</td></tr>
<tr><td>10/09/2020</td><td>Night</td><td>Dry</td><td>10°C</td><td>Northerly and 0-2m/s (negligible)</td><td>20%</td></tr>
<tr><td>11/09/2020</td><td>Day</td><td>Dry</td><td>18°C</td><td>Northerly and 0-3m/s (negligible)</td><td>70%</td></tr>
<tr><td>03/10/2024</td><td>Night</td><td>Dry</td><td>9°C</td><td>Easterly and 0-2m/s (negligible)</td><td>50%</td></tr>
<tr><td>21/09/2025</td><td>Night</td><td>Dry</td><td>8°C</td><td>Negligible</td><td>20%</td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>Measurement Locations:</td><td colspan="6">Attended measurements were undertaken at Location A, as indicated on Figure 3.1 and described below.

A – 8m from nearest edge of Grafton Street.</td></tr>
<tr><td>Measurement Details:</td><td colspan="6">Measurements were undertaken over various periods in terms of L_{eq}, $L_{90,}$ and L_{max}.</td></tr>
<tr><td rowspan="2">Façade / Free-Field:</td><td colspan="6">Free-field.</td></tr>
<tr><td colspan="6">Full results for the attended measurements are given in Tables A.1 and A.2 for 2020, Table A.3 for 2024, and Table A.4 for 2025.</td></tr>
<tr><td>Measured Data:</td><td colspan="6">Full octave band centre frequency data was obtained for all measurements.</td></tr>
</table>

Table A.1 – Measured Daytime Noise Levels – (Friday 11/09/2020)

Location	Period, h	Noise Level, dB				Comments
		L_{Aeq}	L_{A10}	L_{A90}	$L_{Amax, F}$	
A	1136 – 1151	63.5	67.3	56.8	74.6	Road traffic dominant. Max from road traffic 74.7dBL_{Amax}.
	1238 – 1253	64.1	67.9	56.6	74.7	
	1335 – 1350	64.9	67.9	56.9	84.5	

Table A.2 – Measured Night-Time Noise Levels – (Thursday 10/09/2020)

Location	Period, h	Noise Level, dB			Comments
		L_{Aeq}	L_{A90}	$L_{Amax, F}$	
A	2331 – 2341	60.7	49.4	74.2	Road traffic dominant. Maximum levels due to road traffic.
	0010 – 0020	60.4	49.8	74.3	
	0048 – 0058	58.4	47.8	71.0	

Table A.3 – Measured Night-Time Noise Levels – (Thursday 03/10/2024)

Location	Period, h	Noise Level, dB			Comments
		L_{Aeq}	L_{A90}	$L_{Amax, F}$	
A	2300 – 2315	62.1	54.8	74.0	Road traffic dominant. Maximum levels due to road traffic.
	2350 – 0005	60.5	54.2	70.3	
	0015 – 0030	58.8	52.2	69.0	

Table A.4 – Measured Night-Time Noise Levels UPDATED – (Sunday 21/09/2025)

Location	Date	Period, h	Noise Level, dB			Comments
			L_{Aeq}	L_{A90}	$L_{Amax, F}$	
A	21/09/2025	2310 – 2325	60.3	51.3	68.4	Road traffic dominant. Maximum levels due to road traffic. Some distant building services plant noise just audible.
		2325 – 2340	58.6	51.1	71.1	
		2340 – 2355	57.3	49.9	66.2	
	22/09/2025	0010 – 0025	57.6	49.7	68.5	
		0035 – 0050	58.8	48.8	70.4	
		0101 – 0116	57.0	48.4	69.4	
		0120 – 0135	57.1	47.9	69.5	