

Design note.

To: Willmott Dixon Construction

Cc:

From: Al Plail, Associate

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Project: TMC Phase 2

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Planning Condition 14b – Plant noise verification report.

Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	26/02/2025	First issue	AP	PM	PM
01	06/05/2025	Updated to include calculations in Appenidx A	AP	PM	PM

1. Introduction.

Hoare Lea has been appointed to provide a report suitable for submission to Manchester City Council for the discharge of Planning Condition 14b of Application reference 136492/FO/2023.

2. Acoustic criteria.

2.1 Planning Condition 14.

"Notwithstanding the Planning Noise Assessment Report prepared by Hoare Lea received by the City Council, as Local Planning Authority, on the 16 March 2023 (a) Prior to the first use of the development hereby approved, details of any externally mounted ancillary plant, equipment and servicing shall be submitted for approval. Externally mounted 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 5 db (L_{aeq}) below the typical background (L_{a90}) level at the nearest noise sensitive location.

(b) The approved scheme shall be implemented and prior to the first use of the development, a verification report will be required to validate that the work undertaken conforms to the recommendations and requirements approved as part of part (a) of this planning condition. The verification report shall include post completion testing to confirm the noise criteria has been met. In instances of non conformity, these shall be detailed along with mitigation measures required to ensure

compliance with the noise criteria. Any mitigation measures shall be implemented in accordance with a timescale to be agreed with the City Council, as Local Planning Authority, and thereafter retained and maintained in situ."

2.2 Plant noise limits.

The key requirement within Condition 14 is for noise from all external plant to achieve *5 dB below the typical background level at the nearest noise sensitive location*.

It is understood that all plant will not operate between 23:00 – 07:00 and so the night-time condition will be met without assessment. For completeness, both the daytime and night-time noise limits are presented below:

Period	Representative background sound level, $L_{A90,Tr}$ dB	Plant noise limit, $L_{A,Tr}$ dB
Daytime (0700-2300)	49	44
Night-time (2300-0700)	42	37

Table 1: Plant noise limits to be achieved to meet requirements of Planning Condition 14.

These limits are to be achieved with all the equipment running simultaneously and at maximum normal operational duty.

3. Closest noise-sensitive receptors.

The proposed development is located beside the Great Ducie Street site and the Old Brewery Gardens site which are currently under development. Further from the proposed development are the Travelodge Hotel and Beaumont Building which are pre-existing. These receptors are considered to be the closest noise-sensitive receptors. For the purposes of the assessment, only the Great Ducie Street site has been considered as it is the closest of the nearby noise-sensitive receptors and therefore if the criteria are met at this location, the additional distance attenuation and acoustic screening would ensure compliance at all other receptors. For completeness, assessment is also carried out to the Old Brewery Gardens site.

A mark-up of the local area has been presented with Figure 1, showing the proposed development site and the nearby receptors.



Figure 1: 3D rendered image of development site and nearby noise-sensitive receptors.

4. Post completion testing.

4.1 Methodology.

The Planning Condition requires post completion testing to be undertaken. Due to the low noise levels to be achieved at the closest noise-sensitive receptors, measurements have been undertaken close to the external plant units, with calculations undertaken to determine the resultant noise level at the closest noise-sensitive receptors.

It is understood that the plant equipment was all set to operate at maximum design duty by the project building services engineer.

Measurements were undertaken of each plant item, or multiple plant items where these were in close proximity, at a distance of 0.5 – 1 m from the plant. Due to the steady, continuous nature of the plant noise, measurements were carried out over 30 second intervals per location.

4.2 Measured external plant noise levels.

The results of the external attended sample measurements are presented in Table 2.

Table 2 Attended sample measurement results from rooftop plant survey

Measurement location / plant item measured	Approx. measurement distance	L _{Aeq,T} (dB)	L _{A90,T} (dB)
Ventilation plant			
AHU/RF/01	1 m	61	60 ^[1]
AHU/RF/02	1 m	59	57 ^[1]
EF/RF/01	1 m	63	62 ^[1]

Measurement location / plant item measured	Approx. measurement distance	L _{Aeq,T} (dB)	L _{A90,T} (dB)
Condensers / VRF units			
EC/RF/01 & 02	0.5 m	68	68
EC/RF/03a & 03b	0.5 m	68	67
EC/RF/04 & 05	0.5 m	68	68
EC/RF/06 & 07	0.5 m	67	67
EC/RF/08 & 09	0.5 m	65	65
EC/RF/10 & 11	0.5 m	70	70
EC/RF/12 & 13	0.5 m	67	66
EC/RF/14 & 15	0.5 m	70	70
EC/RF/16 & 17	0.5 m	67	66
EC/RF/18 & 19	0.5 m	69	67
EC/RF/20-22	1 m	60 ^[1]	56 ^[1]
EC/RF/23	0.5 m	56 ^[1]	54 ^[1]
EC/RF/24 & 25	0.5 m	62 ^[1]	56 ^[1]
EC/RF/26	0.5 m	57 ^[1]	55 ^[1]
ASHPs			
ASHP/RF/01 & ASHP/RF/02	1 m	65	65
Background – no plant operating / audible			
Background noise measured at various points across the rooftop	N / A	56 – 64	54 - 61

^[1] Measurements were background limited due to general background noise being higher than plant noise being measured. A lower noise level from the plant is expected without contributions from background noise .

4.3 Plant noise emissions assessment.

A desktop assessment of the rooftop plant measurements has been carried out to assess cumulative plant noise egress from the proposed development at the nearest noise sensitive receptors. The results of the plant noise assessment are summarised in Table 3. Calculations are presented in Appendix A.

Table 3 Calculated plant noise levels at nearest noise sensitive premises

Receptor	Plant noise source	Sound pressure level at receptor L_{Aeq} dB	Cumulative plant noise at receptor, L_{Aeq} dB
Future Great Ducie Street site (Great Ducie St side)	Ventilation plant	26	42
	Condensers / VRF	40	
	ASHPs	38	
Future Great Ducie Street site (rear side)	Ventilation plant	26	43
	Condensers / VRF	42	
	ASHPs	32	
Future Old Brewery Gar4dens site	Ventilation plant	18	36
	Condensers / VRF	35	
	ASHPs	28	

As noted above, it is understood that no plant will be running at night which will be implemented through time scheduling functionality. The predicted noise levels should therefore be compared to the daytime noise limits only.

The results of the plant noise assessment therefore indicate that the measured building services contributions are compliant with the 44 dB L_{Aeq} daytime plant noise limit set out in Section 2.2.

5. Summary.

Hoare Lea has carried out post completion testing to determine whether the plant noise emissions from the new items of plant equipment achieve the plant noise limits.

Based on the measurements undertaken, it is shown that the plant noise limits are achieved and therefore the requirements of Planning Condition 14b have been achieved.

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Appendix A: Calculations.

Unit	Measurement distance	Great Ducie (Receptor 1)				Great Ducie (Receptor 2)				Old Brewery Gardens			
		Lp (measured)	Lp (background corrected)	Distance	Noise level at receptor	Distance	Distance correction	Noise level at receptor	Distance	Distance	Distance correction	Noise level at receptor	Noise level at receptor
AHU/RF/01	1m	61	51	45	18	22	-33	24	75	75	-38	13	13
AHU/RF/02	1m	59	49	28	20	39	-29	17	82	82	-38	11	11
EF/RF/01	1m	63	53	32	23	41	-30	21	80	80	-38	15	15
EC/RF/01 & 02	0.5m	68	68	35	31	37	-37	31	67	67	-43	25	25
EC/RF/03a & 3b	0.5m	67	67	44	28	30	-39	32	75	75	-43	24	24
EC/RF/04 & 05	0.5m	68	68	35	31	37	-37	31	67	67	-43	25	25
EC/RF/06 & 07	0.5m	67	67	44	28	30	-39	32	75	75	-43	24	24
EC/RF/08 & 09	0.5m	65	65	35	28	37	-37	28	67	67	-43	22	22
EC/RF/10 & 11	0.5m	70	70	44	31	30	-39	35	75	75	-43	27	27
EC/RF/12 & 13	0.5m	66	66	32	30	26	-36	32	78	78	-44	22	22
EC/RF/14 & 15	0.5m	70	70	40	32	27	-38	35	77	77	-44	26	26
EC/RF/16 & 17	0.5m	66	66	32	30	26	-36	32	78	78	-44	22	22
EC/RF/18 & 19	0.5m	67	67	39	29	33	-38	31	72	72	-43	24	24
EC/RF/20-22	1m	56	56	27	27	37	-29	25	67	67	-37	19	19
EC/RF/23	0.5m	54	54	48	14	22	-40	21	82	82	-44	10	10
EC/RF/24 & 25	0.5m	56	56	48	16	22	-40	23	82	82	-44	12	12
EC/RF/26	0.5m	55	55	29	20	40	-35	17	64	64	-42	13	13
ASHP 01 & 02	1m	65	65	22	38	43	-27	32	68	68	-37	28	28

TOTAL		42	43	36
Vent only		26	26	18
Condenser & VRF		40	42	35
ASHP		38	32	28