

Memo

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Cc: Phil Mann, Al Plail (Hoare Lea)

From: Sam Garne, Senior Acoustics Engineer

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Project: The Manchester College CC

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The Manchester College – Condition 16 verification report.

1. Introduction.

Hoare Lea has been appointed to provide a report suitable for submission to Manchester City Council for the discharge of Planning Condition 16 of Application reference 124995/FO/2019.

2. Acoustic requirements.

2.1 Planning Condition 16.

The full planning condition is presented below:

'16) Notwithstanding the acoustic report stamped as received by the City Council, as Local Planning Authority, on the 1 October 2019 and Revised acoustic assessment Rev 03 stamped as received by the City Council, as Local Planning Authority on the 28 November 2019

(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. For the avoidance of doubt, 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 (Laeq) below the typical background (La90) 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.

Reason - To minimise the impact of plant on the occupants of the development pursuant to policies SP1 and DM1 of the Manchester Core Strategy (2012) and saved policy DC26 of the Unitary Development Plan for the City of Manchester (1995).'

2.2 Criteria.

The planning noise assessment report (dated 28/11/2019) includes the following results from the noise survey carried out at the site.



Figure 1: Annotated 3D rendered image indicating measurement positions and prevalent sound levels -courtesy of Google Earth (from planning report dated 28/11/2019).

The two closest noise-sensitive receptors considered are the Travelodge on Great Ducie Street to the north-west of the development, and the Beaumont Building apartments on Mirabel Street to the south west.

The roof mounted plant equipment is only proposed to be in operation during daytime hours. On this basis, only the daytime noise levels have been considered.

The noise survey position considered to be representative of the Travelodge is Position L5, and the noise survey position considered representative of the Beaumont Building Apartments is Position L1. On this basis, the applicable plant noise emissions limits for these two receptors are to be based on the daytime background sound levels measured at these receptors.

Receptor	Background sound level captured at representative location ($L_{A90,T}$, dB)	Maximum allowable sound pressure level at 1 m from the closest noise sensitive premises ($L_{Aeq,T}$, dB)
Travelodge	51	46
Beaumont Building Apartments	61	56

Table 1: Plant noise emissions limits applicable at 1 m from the closest noise-sensitive receptors.

3. Post completion testing.

3.1 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, and 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 'design duty' by the project building services engineer. Measurements were undertaken in four conditions:

- VRF units on, all other equipment off
- General extract fans and air handling units on, all other equipment off
- Local extract ventilation on, all other equipment off
- All equipment off (to be used as a background at each measurement location)

To capture the noise emissions from plant equipment more accurately and to provide a detailed assessment of plant noise at the receptor locations, measurements were undertaken of each group of items separately, at a distance of 1 m from the dominant item of equipment, as presented below:

- 14 groups of VRF units
- 11 groups of general extract fans & air handling units
- 5 groups of local extract ventilation units

The measured plant noise levels along with plant measurement locations are presented in Appendix A.

All items of equipment not measured were very quiet and were not dominant over the background noise present at roof level.

There is a louvred plant screen surrounding many of the items of plant equipment. Measurements were undertaken either side of the screen, close to nearby units in operation. A sound level difference of c. 3 dB was measured across the screen. This was used as a correction for all units fully enclosed behind the louvred screen.

3.2 Assessment.

Based on the measurements undertaken at each group of plant equipment, the noise levels acting on the closest noise-sensitive receptors has been established as presented in Table 2. The calculations to determine these noise levels are presented in Appendix B.

Receptor	Travelodge, $L_{Aeq,T}$ dB	Beaumont Building Apartments, $L_{Aeq,T}$ dB
VRF units	33	35
General extract fans and air handling units	42	50
Local extract ventilation units	41	45
<u>Total</u>	<u>45</u>	<u>51</u>

Table 2: Plant noise emissions calculated at 1 m from the closest noise-sensitive receptors based on measurements undertaken.

The noise levels at 1 m from the closest noise sensitive receptors has been compared with the daytime limits below:

Receptor	Maximum allowable sound pressure level at 1 m from the closest noise sensitive premises ($L_{Aeq,T}$, dB)	Total noise level predicted at 1 m from closest noise sensitive premises based on measurements undertaken ($L_{Aeq,T}$, dB)
Travelodge	46	45
Beaumont Building Apartments	56	51

Table 3: Total noise level predicted at closest noise sensitive premises based on measurements undertaken compared with noise limits.

As presented, the measurements undertaken show that the noise emissions from the plant equipment operating on the roof of the new building achieves the plant noise limits at the two closest noise sensitive receptors.

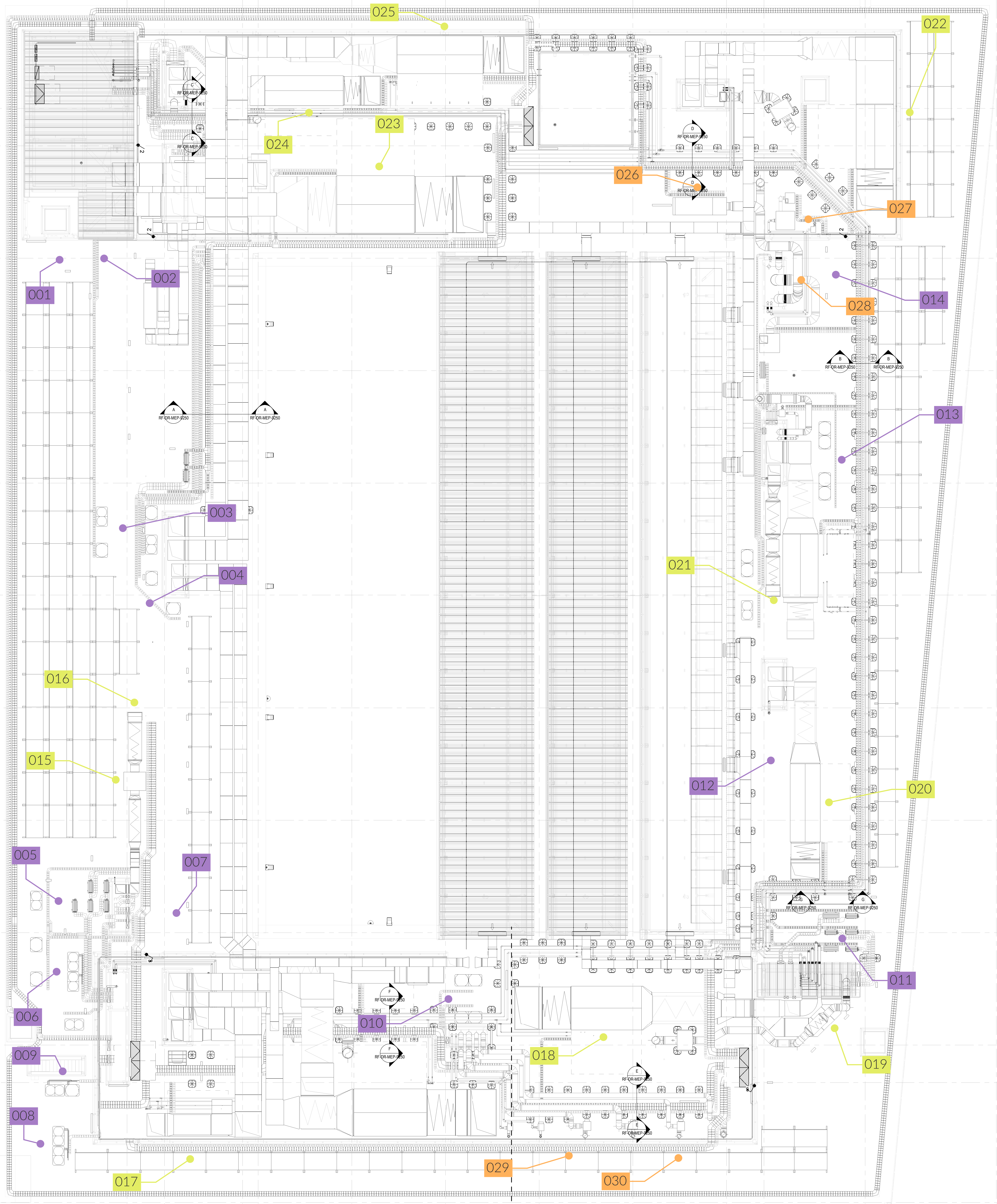
4. Summary.

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 16 have been achieved.



Appendix A - Plant noise measurement locations & results.



	Measurement at 1 m from plant									Measured background level (no plant running)									Background corrected plant noise level, 1m									
	LAeq	63	125	250	500	1k	2k	4k	8k	LAeq	63	125	250	500	1k	2k	4k	8k	LAeq	63	125	250	500	1k	2k	4k	8k	
VRF unit measurements																												
1	51	58	53	49	48	48	41	36	32	49	55	56	47	46	46	39	27	15	50	57	52	48	47	47	39	35	32	
2	51	59	55	51	48	47	40	35	30	49	55	56	47	46	46	39	27	15	50	58	53	49	46	46	39	35	30	
3	63	67	64	63	62	58	53	49	48	49	55	56	47	46	46	39	27	15	63	67	63	63	62	58	53	49	48	
4	62	67	65	57	59	57	49	50	53	49	55	56	47	46	46	39	27	15	62	67	64	57	59	57	48	50	53	
5	56	64	58	55	52	50	48	45	44	54	61	52	50	50	51	44	32	21	55	63	57	54	51	49	47	45	44	
6	54	64	61	55	50	49	45	41	33	54	61	52	50	50	51	44	32	21	53	63	61	54	49	48	44	40	33	
7	52	57	56	52	51	48	40	31	22	48	57	52	48	46	43	38	38	28	51	55	55	51	50	47	38	29	21	
8	62	65	65	58	57	56	52	52	53	54	61	52	50	50	51	44	32	21	61	64	65	57	57	54	51	52	53	
9	55	62	64	55	52	50	45	44	36	54	61	52	50	50	51	44	32	21	55	61	64	54	51	48	43	44	36	
10	59	60	57	66	50	47	42	36	35	48	57	52	48	46	43	38	38	28	58	59	56	66	49	46	40	35	34	
11	49	59	49	49	46	46	38	30	25	50	63	53	49	47	46	41	32	19	48	58	48	47	45	44	37	29	24	
12	47	58	50	49	45	41	36	26	20	50	63	53	49	47	46	41	32	19	46	57	49	47	44	40	34	25	18	
13	56	59	61	61	50	47	47	43	39	50	63	53	49	47	46	41	32	19	55	58	60	61	49	46	46	43	39	
14	60	68	66	62	59	53	51	46	39	50	63	53	49	47	46	41	32	19	60	67	66	62	59	53	50	46	39	
AHUs & fans																												
15	63	65	69	72	54	49	42	37	30	49	55	56	47	46	46	39	27	15	64	64	69	72	53	47	41	36	30	
16	56	70	68	60	50	47	42	40	36	49	55	56	47	46	46	39	27	15	56	70	68	60	49	46	40	40	36	
17	62	62	60	61	59	59	51	44	36	54	61	52	50	50	51	44	32	21	61	61	59	61	58	58	50	44	36	
18	78	65	63	61	62	62	71	73	76	48	57	52	48	46	43	38	38	28	78	65	63	61	62	62	71	73	76	
19	51	64	62	50	47	46	42	35	32	50	63	53	49	47	46	41	32	19	50	63	61	48	45	45	40	33	32	
20	66	70	65	56	62	56	51	63	59	50	63	53	49	47	46	41	32	19	66	69	65	55	62	56	51	63	59	
21	53	65	57	50	49	49	45	39	32	50	63	53	49	47	46	41	32	19	52	63	55	49	48	47	44	38	32	
22	55	67	64	55	52	50	45	42	27	54	67	56	51	50	51	46	40	23	54	66	63	54	51	48	44	41	26	
23	56	66	68	56	52	48	44	39	35	48	57	52	48	46	43	38	38	28	55	65	68	55	51	46	43	38	35	
24	56	64	67	55	52	48	44	40	37	48	57	52	48	46	43	38	38	28	55	64	67	54	51	47	43	39	36	
25	56	72	62	55	52	52	47	40	26	54	67	56	51	50	51	46	40	23	55	71	60	54	51	51	46	39	25	
Local extract ventilation fans																												
26	73	79	82	70	69	65	64	61	59	49	60	53	48	45	45	41	31	18	73	79	82	70	69	65	64	61	59	
27	71	82	78	71	66	68	61	57	58	49	60	53	48	45	45	41	31	18	71	82	78	71	66	68	61	57	58	
28	80	84	88	81	76	74	72	66	62	50	63	53	49	47	46	41	32	19	80	84	88	81	76	74	72	66	62	
29	65	66	62	63	61	61	56	50	41	54	60	56	51	50	51	44	33	21	65	65	61	63	61	61	56	50	41	
30	65	64	65	66	61	61	57	50	41	54	60	56	51	50	51	44	33	21	65	63	64	66	61	61	57	50	41	



Appendix B - Plant noise calculations.

	Measurement ref	Measured background corrected sound pressure level, 1m. LAeq,T	10logS (5- sided box to correct to sound power level)	Sound power level, Lw	Travelodge			Resultant sound pressure level, LAeq	Beaumont Building			Resultant sound pressure level, LAeq
					Screening correction	Distance, m	Distance correction		Screening correction	Distance, m	Distance correction	
VRF units	1	50	14	64	0	116	-52	12	0	114	-52	12
	2	50	14	64	0	116	-52	12	0	114	-52	12
	3	63	17	80	0	111	-52	28	0	104	-51	28
	4	62	17	79	0	111	-52	27	0	104	-51	27
	5	55	17	72	0	109	-52	20	0	92	-50	21
	6	53	17	70	0	111	-52	18	0	88	-50	20
	7	51	15	66	-3	121	-53	10	-3	78	-49	14
	8	61	17	78	0	110	-52	26	0	87	-50	28
	9	55	17	72	0	110	-52	20	0	87	-50	22
	10	58	17	75	-3	136	-54	18	-3	65	-47	25
	11	48	14	62	0	156	-55	7	0	57	-46	16
	12	46	15	61	-3	156	-55	3	-3	66	-47	10
	13	55	17	72	0	160	-55	17	0	78	-49	23
	14	60	17	77	0	158	-55	22	0	95	-51	26
TOTAL								33	TOTAL			35
AHUs and Fans	15	64	15	79	0	109	-52	27	0	100	-51	28
	16	56	15	71	0	109	-52	19	0	100	-51	20
	17	61	20	81	0	123	-53	29	0	74	-48	33
	18	78	20	98	-3	146	-54	41	-3	59	-46	49
	19	50	20	70	0	158	-55	15	0	55	-46	25
	20	66	20	86	0	156	-55	32	0	66	-47	39
	21	52	15	67	-3	158	-55	9	-3	75	-48	15
	22	54	20	74	0	163	-55	19	0	106	-51	23
	23	55	20	75	-3	132	-53	19	-3	117	-52	20
	24	55	20	75	-3	132	-53	19	-3	117	-52	20
	25	55	20	75	0	140	-54	22	0	113	-52	23
TOTAL								42	TOTAL			50
Local extract ventilation fans	26	73	15	88	-5	152	-55	28	-5	101	-51	32
	27	71	17	88	-5	158	-55	28	-5	102	-51	32
	28	80	15	95	0	158	-55	40	0	95	-51	44
	29	65	15	80	0	145	-54	26	0	56	-46	34
	30	65	15	80	0	145	-54	26	0	56	-46	34
TOTAL								41	TOTAL			45
ALL UNITS								45	ALL UNITS			51