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PROJECT TECHNICAL MEMORANDUM

JOB TITLE : 4 Hardman Square
REF : HT:29822/PTM2
DATE : 6 December 2024
FROM : Will Robertson
ISSUED TO : Design Team

RE: BREEAM POL05 AND PLANNING CONDITION 7b DISCHARGE LETTER 4 HARDMAN SQUARE

1.0 Introduction

This report relates to the development at 4 Hardman Square, which was granted planning permission in January 2023 (app ref: 135123/FO/2022). This application was subsequently amended via the approval of a Section 73 application (app ref: 139146/JO/2024). This report seeks to discharge Condition 7b) attached to the application 139146/JO/2024 and is as follows:

“Condition 7b) Prior to first use of the development a verification report shall be submitted to and approved in writing by the City Council as local planning authority to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. The report shall undertake post completion testing to confirm that the noise criteria have 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 and timescales for the implementation of those measures.”

Condition 7a (desktop assessment) was previously discharged through the issue of “29822-RP-PNA1-Rev3-WR Plant Noise Assessment Report”. This discharge of conditions application reference number is CDN/24/0322 and was approved by Manchester City Council on the 16 July 2024.

This intention of this letter is to assist in the discharge of the above Part b of Condition 7 by presenting measured results of the completed scheme with a direct comparison against noise limits set out in the Hann Tucker assessment submitted as part of the 7a Condition discharge.

Sponsor Member of The Institute of Acoustics; Members of UKELA & IEMA, The Association of Noise Consultants,
A UKAS Accredited testing laboratory No.4083 for Sound Insulation and Air Tightness Testing; ISO 9001 Accredited
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2.0 BREEAM 2014

2.1 Suitably Qualified Persons

A prerequisite of the BREEAM assessment is that a suitably qualified acoustician is appointed to carry out the assessment.

The assessment was compiled by Firas Farhan and Will Robertson of Hann Tucker Associates. The qualifications and professional statuses for the main assessor are summarised below:

Professional Qualifications and Status	
Name Position	Qualifications
Firas Farhan Associate	BSc (Hons) Member of the Institute of Acoustics (MIOA) 15+ Years
Hann Tucker Associates Limited Company Credits	
Sponsor Members of the Institute of Acoustics Members of the Association of Noise Consultants ISO9001 accredited UKAS accredited for Sound Insulation Testing (No. 4083) Members of the Institute of Environmental Management and Assessment	

2.2 Pol 05 – Noise Pollution

There is one available credit for Pol 05 under BREEAM UK Refurbishment and Fit-out 2014. The requirements are provided below:

1. Where there are, or will be, no noise-sensitive areas or buildings within 800m radius of the assessed site.

OR

2. Alternatively, where the building does have noise-sensitive areas or buildings within 800m radius of the site, one credit can be awarded as follows:

- a. Where a noise impact assessment in compliance with BS74451 has been carried out and the following noise levels measured/determined:

- i. Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background conditions can be argued to be similar.

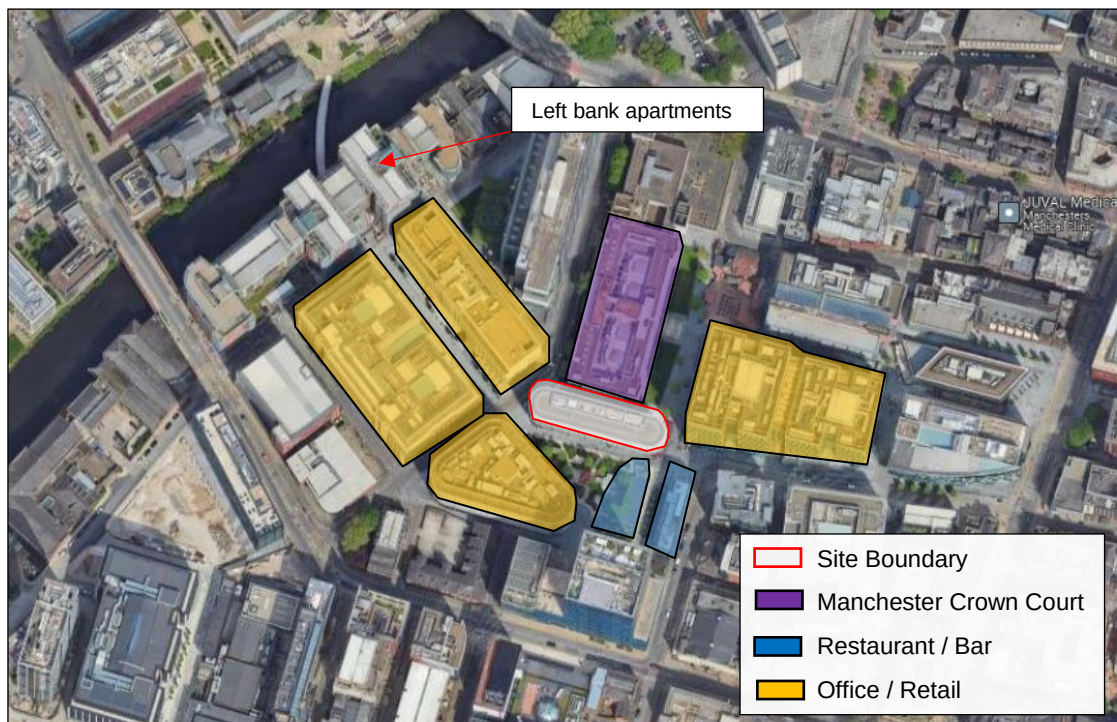


- ii. The rating noise level resulting from the new noise source (see CN7).
- 3. The noise impact assessment must be carried out by a suitably qualified acoustic consultant holding a recognised acoustic qualification and membership of an appropriate professional body (see Relevant definitions in the Additional information section).
- 4. The noise level from the proposed site/building, as measured in the locality of the nearest or most exposed noise sensitive development, is a difference no greater than +5dB during the day (07:00 to 23:00) and +3dB at night (23:00 to 07:00) compared to the background noise level.
- 5. Where the noise source(s) from the proposed site/building is greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with criterion 4.

3.0 Site Description

4 Hardman Square is a 6-storey building which lies on the north side of Hardman Square, Manchester. It is bounded by office and commercial properties. To the east (approximately 20 metres away) is an office block with commercial units on the ground floor, such as The Alchemist and Thaikhun. To the southeast is The Ivy Spinningfields. To the south is a building with ground floor commercial units and 8No additional storeys of office space above. To the north and west are additional office buildings, including Manchester Crown Court. To the immediate west of the building is Gartside Street.

Identified in a previous noise impact assessment “*29822-RP-NIA1-R1-TJEB Noise Impact Assessment*”, the nearest residential receptors are the apartments in the building approximately 125 metres to the northwest of the site, along Left Bank. See Site Plan below.

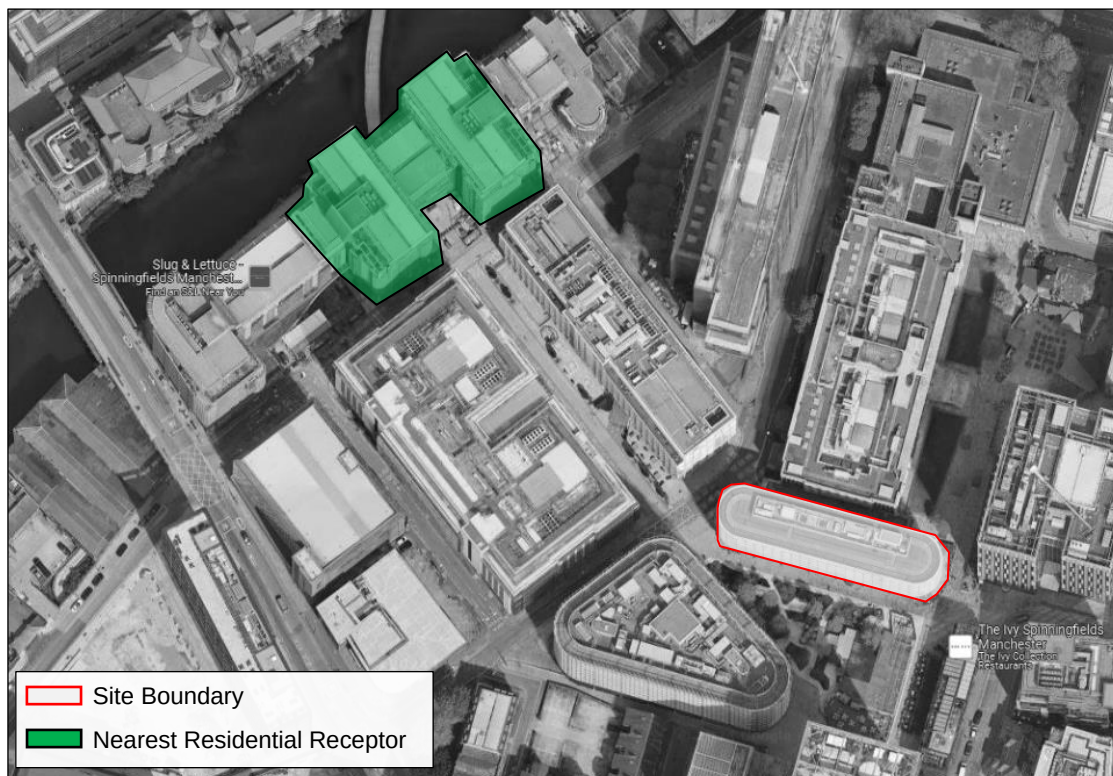


Site Plan (©2024 Google Images)

4.0 Plant Noise Criteria

The criteria for the terrace area to the differing receptors are discussed in the sections below and relate to those detailed in “29822-RP-PNA1-Rev3-WR Plant Noise Assessment Report”.

The nearest residential receptors are the apartments in the building approximately 125 metres to the northwest of the site, along Left Bank. This was concluded as all local receptors (e.g. surrounding offices) have fixed windows. This is shown on the plan below.



Plan detailing nearest residential receptors (Map data ©2024)

4.1 Fixed Plant & Equipment

It is proposed that the following plant noise emission criteria be achieved incident at the nearest noise sensitive residential windows, in free-field conditions, with all plant operating simultaneously.

BS 4142 Plant Noise Rating Limit, $L_{A,T,r}$ (dB)	
Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
46	44

The above criteria are in line with the Local Authority requirements of 5 dB below the representative background noise level, however the requirements for BREEAM 2014 compliance are less onerous. As such, achieving the above criteria would both be compliant with Planning Condition 7 and BREEAM 2014 PoI05.

Based on the results of the 2022 noise survey and communication with the Local Environmental Health Officer, the criteria at the nearest commercial have been relaxed by 5 dB. As such, it is proposed that the following noise levels are achieved at the nearest commercial receptor, which has been identified as 3 Hardman Street, approximately 10 metres from the perimeter of 4 Hardman Square.



BS 4142 Plant Noise Rating Limit, $L_{Ar,Tr}$ (dB)	
Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
51	49

Noise shall be assessed in accordance with BS 4142:2014 with corrections applied for any plant emitting noise of a tonal or irregular quality. The above limits shall be subject to the final approval of the Local Authority.

4.2 Emergency Plant

Based on the limits set on previous schemes within Manchester City Council's jurisdiction, it is proposed that the noise level from any emergency plant is no more than 10 dBA greater than the ambient noise level (measured as an L_{Aeq} noise level) at any proposed or existing residential receptor.

As there is no measured data at the nearest noise sensitive receptor, the proposed plant noise rating limits are based off of the measured L_{Aeq} levels at previous measurement positions as described below.

Position	BS 4142 Plant Noise Rating Limit, $L_{Ar,Tr}$ (dB)	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
Northwest edge	67	65
Southeast edge	69	66

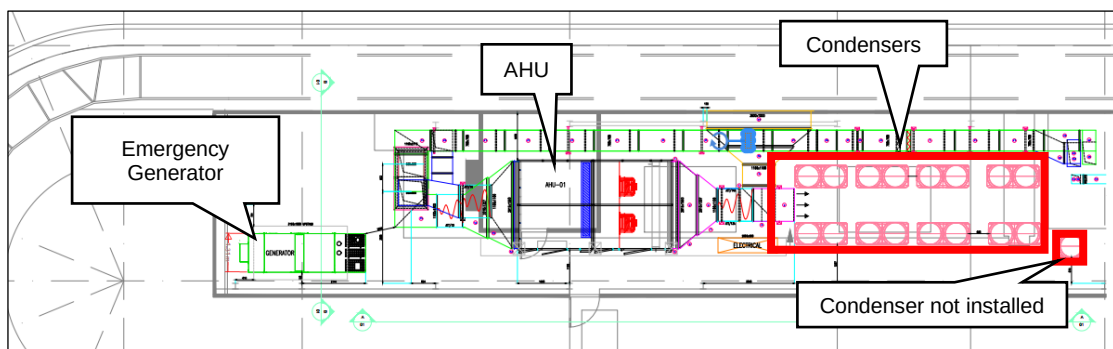


5.0 Plant Noise Survey

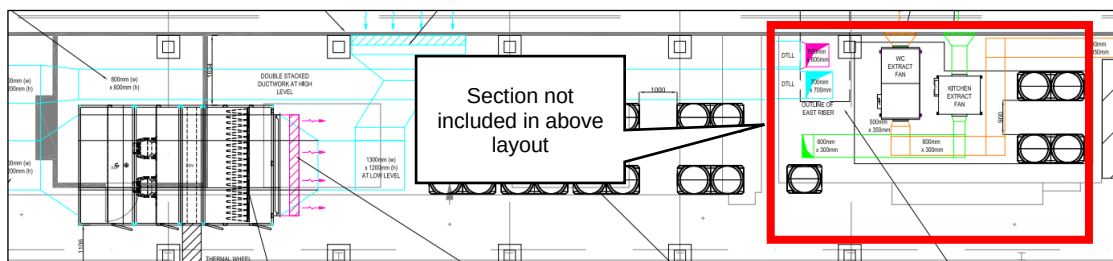
5.1 Procedure

Hann Tucker visited site on Tuesday 03 December 2024 to capture the noise levels from the newly installed and commissioned plant on the rooftop plant area. Fully attended noise measurements were undertaken between the period of approximately 10:30 to 12:15 hours.

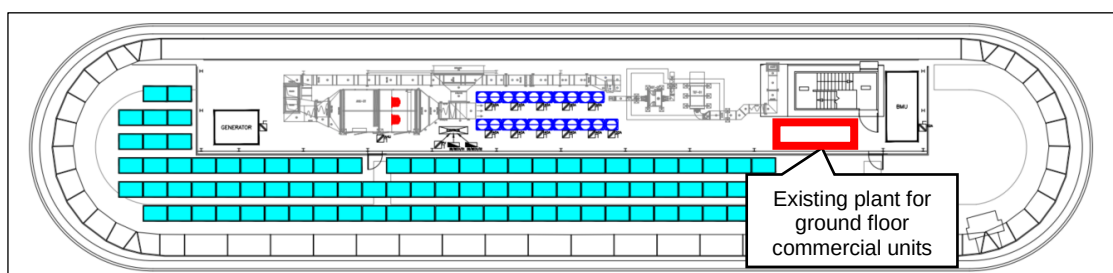
The latest drawings of the rooftop plant layouts can be seen in the drawing below.



Proposed Building Services Layout (c/o Gerrard Building Services Engineers LTD)



Proposed Building Services Layout (c/o Gerrard Building Services Engineers LTD)



Proposed Roof Layout (c/o H&O Electrical)

It should be noted that during HTA's time on site the installed plant locations differed slightly to that seen in the layouts above. As noted in the first layout above, the end condenser was not installed and there were noted to be 3No rows of condensers as opposed to the 2No rows illustrated above.



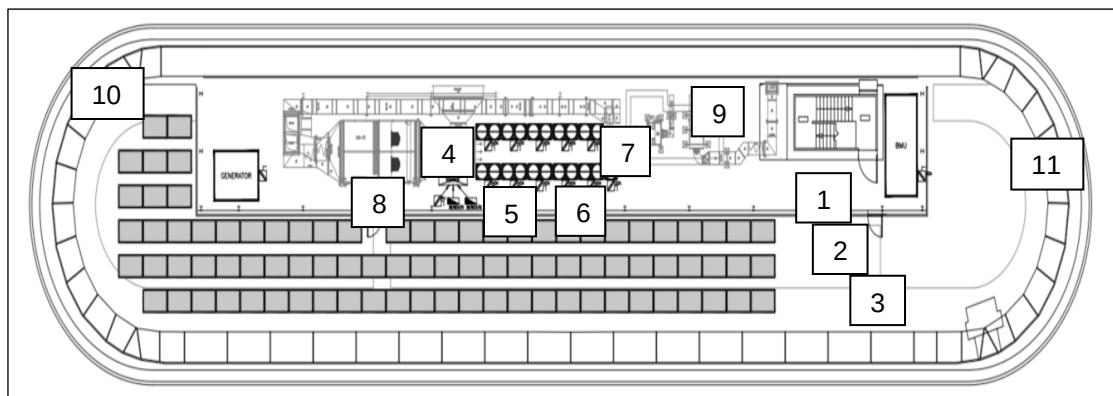
5.2 Equipment

The following equipment was utilised for the environmental noise monitoring:

Description	Manufacturer	Type	Serial Number	Last Calibration
Type 1 Data Logging Sound Level Meter	Brüel & Kjær	2250	3025254	Calibration on 21/02/2024
Type 1 ½" Condenser Microphone	Brüel & Kjær	4189	3004879	Calibration on 21/02/2024
Type 1 Preamp	Brüel & Kjær	ZC0032	28066	Calibration on 21/02/2024
SLM Calibrator	Brüel & Kjær	4231	2308993	Calibration on 20/02/2024

5.3 Measurement Positions

The following figure details the measurement positions on the rooftop plant area. The layout has been stretched in order to more accurately detail the measurement positions.



Rooftop Plant Floor Plan (c/o H&O Electrical)

For clarity, a description of the measurement positions can be seen in the table below:

Position	Description
1	Source measurements of the existing plant items supplying the ground floor commercial units at a distance of approximately 1-metre. No new plant items operational.
2	Measurements of the existing plant items supplying the ground floor commercial units at a distance of approximately 1-metre at the opposite side of the louvre. No new plant items operational.
3	Measurements of the existing plant items supplying the ground floor commercial units at a distance of approximately 4-metres at the opposite side of the louvre. No new plant items operational.



Position	Description
4	Source measurements of the new AHU grille (AHU only operational) at a distance of approximately 1-metre. Also source measurements of the west side of the condenser area (all condensers operational only) at a distance of 1-metre.
5, 6, and 7	Source measurements of the condenser area with all condenser units operational only at a distance of 1-metre.
8	Source measurements of the south side of the AHU (AHU only operational) at a distance of 1-metre from the case.
9	Source measurements of the Toilet and Kitchen Extract fans at a distance of 1-metre.
10	Measurements at the northwest edge of the rooftop area.
11	Measurements at the southeast edge of the rooftop area.

6.0 Attended Survey Results

The measured levels presented in this section have been used to calculate the noise level at the nearby sensitive receptors, discussed in Section 3.0. It was informed to the HTA engineer that all commissioned plant items were operating at design duty; however, the condensers may have been working at a higher duty due to the external temperature being approximately 3 degrees centigrade and the units having to “ramp up” once initially turned on.

6.1 Background Noise Levels

When on site, the HTA engineer measured multiple ambient levels on the perimeter of the rooftop plant area, with the purpose of establishing the prevailing noise climate without the addition of plant noise from the new plant.

Whilst measuring the external ambient levels, the noise climate was noted to be dominated by road traffic as well as construction noise from surrounding sites, notably from Hardman Square. The table below outlines the measured free-field levels:

Measurement Position	Free-field Sound Pressure Level (L_{eq} dB)								
	63	125	250	500	1000	2000	4000	8000	dBA
10	64	58	53	50	50	45	35	21	54
	64	58	53	50	50	45	35	22	54
	64	58	54	50	49	45	35	22	54
11	64	60	56	51	49	46	38	28	54



Measurement Position	Free-field Sound Pressure Level (L _{eq} dB)								
	63	125	250	500	1000	2000	4000	8000	dBA
11	64	60	57	52	50	45	36	24	55
	64	60	57	52	50	46	38	24	55

6.2 Source Noise Measurements

Whilst on site, the HTA engineer undertook source noise measurements of each of the new plant items with the exception of the emergency generator to the northwest of the rooftop plant area. These source level measurements were all taken at a distance of approximately 1-metre as detailed in the table in Section 5.3.

Measurement Position	Plant Item(s)	Free-field Sound Pressure Level (L _{eq} dB)								
		63	125	250	500	1000	2000	4000	8000	dBA
1	Existing	80	73	73	70	65	60	53	43	71
		73	68	70	66	64	57	51	43	68
2		68	69	69	64	60	56	49	45	66
3		68	68	65	60	57	52	42	33	62
		68	69	64	60	57	52	42	33	62
		68	69	65	60	57	52	42	33	63
4	AHU (Grille)	66	66	56	47	46	54	54	57	61
		67	69	61	53	49	56	56	64	65
		66	69	61	53	50	57	57	64	65
5	Condensers	78	69	72	70	65	62	62	64	72
78		75	74	70	66	65	61	61	73	
6		78	78	73	71	67	65	61	62	73
7		78	74	75	71	66	66	60	55	73
8	AHU (Side)	74	81	60	53	54	53	51	48	65
		73	81	60	53	53	53	51	49	64
9	TEF	71	77	74	62	58	55	48	38	68
		71	78	74	62	58	55	49	38	68
	KEF	68	71	68	55	53	46	39	35	62



It should be noted that during the measurement of the kitchen extract fan, it was subjectively inaudible over the prevailing ambient noise as well as breakout from the toilet extract fan which was operational during the measurement period. All other measurements were taken with all other plant items disabled, excluding the existing plant.

6.3 Perimeter Measurements

Whilst on site, the HTA engineer undertook further measurements on the perimeter of the rooftop area in the same locations as the ambient measurements with all of the newly commissioned plant in operation. The results can be seen in the table below.

Measurement Position	Free-field Sound Pressure Level (L _{eq} dB)								
	63	125	250	500	1000	2000	4000	8000	dBA
10	65	65	57	54	51	48	42	34	57
	65	65	57	53	50	46	38	27	56
	64	64	56	52	51	46	36	26	55
11	64	65	58	52	50	45	37	25	55
	65	64	58	51	49	44	35	24	55
	64	65	59	51	49	44	34	22	55

By comparing the ambient results at the perimeter of the site to the measured levels with all plant in operation, the level in the southeast position is largely unaffected and the level in the northwest position is only increased by a maximum of 3 dB. As such, the measurements at the perimeter of the site have been background corrected in the table below.

Measurement Position	Free-field Sound Pressure Level (L _{eq} dB)							
	63	125	250	500	1000	2000	4000	8000
10	60	64	54	51	45	45	41	34
	52	64	54	50	40	40	36	26
	50	63	52	46	44	41	30	24
11	50	63	53	45	41	36	28	18
	54	62	54	42	40	35	26	14
	53	64	54	42	40	36	28	14



Where a cell is highlighted in the table above, the initial ambient noise level was louder than the level measured with the plant on, and as such it is assumed that the level of the plant in these octave bands was 10 dB below the measured background level. However, it is important to consider the context of Position 11 as the plant may have been screened by the stair core. Subsequently, the above levels displayed provide useful context but not utilised during the assessment section of this report.

As such, the following assessment in Section 7.0 uses the measured source levels to calculate the level at the previously identified receptors.

7.0 Assessment

This section discusses the impacts of the plant noise from the rooftop plant area to each of the previously identified noise sensitive receptors, using the measured noise data. As the criteria is a broadband level, the following assessment utilises the measured dBA level of each unit. As previously discussed in Section 6.0 the condenser units throughout the measurement period were running at a higher than standard duty and thus provides a more robust assessment. The normal operational hours are to be between 07:00 and 18:00, with the exception of the Emergency Generator which is expected to run for a short servicing period once per annum and in emergency situations.

7.1 Residential Receptor Assessment

The following table summarises our predictions of the cumulative atmospheric noise emissions from the measured plant, in conjunction with the mitigation measures, to 1m from the nearest noise sensitive residential window at the residencies along Left Bank. As previously calculated, to be robust, screening from the buildings in between the rooftop plant area and the receptor have not been considered in this assessment. More detailed calculations can be found in Appendix A.

Roof Plant	Plant Noise Rating Level, $L_{A,r,Tr}$ (dB)
	Daytime (07:00 – 18:00 hours)
Combined Calculated Noise Level of Condensers at Receptor	42
Calculated Noise Level of Toilet and Kitchen Extract Fan at Receptor	29
Calculated Noise Level of AHU at Receptor	38
Combined Calculated Noise Level of All Roof Plant at Receptor	44
Criteria	46



Roof Plant	Plant Noise Rating Level, $L_{A,T,r}$ (dB)
	Daytime (07:00 – 18:00 hours)
Criteria Achieved	✓

Our calculations above indicate that the newly installed plant, is demonstrably capable of achieving both requirements of BREEAM 2014 Pol05 and Planning Condition 7b imposed by Manchester City Council as outlined in Section 1.0.

7.2 Commercial Receptor Assessment

As previously discussed, the site is surrounded by commercial buildings and the worst-affected commercial building which is deemed to be 3 Hardman Street has been assessed below as there is a clear line of site to the proposed plant. As before, no screening losses have been applied, however, it was noted on site that some screening loss could be expected due to the positioning of the plant items and height of rooftop platforms. More detailed calculations are available upon request.

Roof Plant	Plant Noise Rating Level, $L_{A,T,r}$ (dB)
	Daytime (07:00 – 18:00 hours)
Combined Calculated Noise Level of Condensers at Receptor	48
Calculated Noise Level of Toilet and Kitchen Extract Fan at Receptor	38
Calculated Noise Level of AHU at Receptor	46
Combined Calculated Noise Level of All Roof Plant at Receptor	51
Criteria	51
Criteria Achieved	✓

Our calculations above indicate that the newly installed plant, is demonstrably capable of achieving both requirements of BREEAM 2014 Pol05 and Planning Condition 7b imposed by Manchester City Council.

7.3 Manchester Crown Court Noise Impact Assessment

Manchester Crown Court to the north of the site is screened by the roof and as such the predicted level at the court windows will be much lower than the levels assessed above. The following table details the calculated noise level from the measured plant at Manchester Crown Court's windows.



Roof Plant	Plant Noise Rating Level, $L_{A,T,r}$ (dB)
	Daytime (07:00 – 19:00 hours)
Combined Calculated Noise Level of Condensers at Receptor	41
Calculated Noise Level of Toilet and Kitchen Extract Fan at Receptor	23
Calculated Noise Level of AHU at Receptor	44
Combined Calculated Noise Level of All Roof Plant at Receptor	46
Criteria	46
Criteria Achieved	✓

Our calculations above indicate that the newly installed plant, is demonstrably capable of achieving both requirements of BREEAM 2014 Pol05 and Planning Condition 7b imposed by Manchester City Council.

7.4 Emergency Plant Noise

It has been confirmed to HTA that the previously proposed emergency generator has been installed. The following table summarises our predictions of atmospheric noise emissions from the proposed emergency generator to 1m from the neighbouring premises.

Emergency Plant	Sound Pressure Level (dBA)	
	Daytime (07:00 – 23:00 hours)	Night-time (23:00 – 07:00 hours)
Calculated Noise Level of Emergency Generator at Receptor	50	
Criteria	69	66
Criteria Met	✓	✓

To adhere with the comments from the MCC Environmental Health Officer a control of testing schedule between 10:00 hours and 16:00 hours from Monday to Friday shall need to be implemented.

Due to the nature of this plant and the number of workers on site, it was not possible to measure this unit, however, the previous assessment was pessimistic and in reality, levels lower than those predicted above could be expected.



8.0 Conclusion

Considering the measured results in Section 6.0 and the subsequent assessment in Section 7.0, Condition 7b is suitable to be discharged as the demonstrated noise levels fall within the criteria discussed in “29822-RP-PNA1-Rev3-WR *Plant Noise Assessment Report*”. The installed plant therefore also complies with the BREEAM 2014 Pol05 criteria and as such should be awarded the targeted credit.

We hope the above is clear and of use.

Yours sincerely

Will Robertson

for HANN TUCKER ASSOCIATES



Appendix A

Atmospheric Noise Emission to Residential Calculations

Condenser Units	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz) at 1 metre								dBA
	63	125	250	500	1k	2k	4k	8k	
Measured Sound Pressure Level at 1m	79	67	66	62	56	53	50	44	64
Distance Correction (to 125 metres)	-33	-33	-33	-33	-33	-33	-33	-33	-
Barrier Correction	0	0	0	0	0	0	0	0	-
Intermittency Correction	+3	+3	+3	+3	+3	+3	+3	+3	-
Calculated Noise Level at Receptor	48	39	42	40	35	32	32	34	42

Toilet Extract Fan	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz) at 1 metre								dBA
	63	125	250	500	1k	2k	4k	8k	
Measured Sound Pressure Level at 1m	71	78	74	62	58	55	49	38	68
Distance Correction (to 125 metres)	-42	-42	-42	-42	-42	-42	-42	-42	-
Barrier Correction	0	0	0	0	0	0	0	0	-
Intermittency Correction	+3	+3	+3	+3	+3	+3	+3	+3	-
Calculated Noise Level at Receptor	32	39	35	23	19	16	10	0	29

AHU	Sound Pressure Level (dB re 2x10 ⁻⁵ Pa) at Octave Band Centre Frequency (Hz)								dBA
	63	125	250	500	1k	2k	4k	8k	
Measured Sound Pressure Level at 1m (Grille)	66	69	61	53	50	57	57	64	66
Distance Correction (to 125 metres)	-42	-42	-42	-42	-42	-42	-42	-42	-
Barrier Correction	0	0	0	0	0	0	0	0	-
Intermittency Correction	+3	+3	+3	+3	+3	+3	+3	+3	-
Calculated Noise Level of the Grille at Receptor	27	30	22	14	11	18	18	25	27
Measured Sound Pressure Level at 1m (Breakout)	73	81	60	53	53	53	51	49	66
Distance Correction (to 125 metres)	-31	-31	-31	-31	-31	-31	-31	-31	-
Barrier Correction	0	0	0	0	0	0	0	0	-
Intermittency Correction	+3	+3	+3	+3	+3	+3	+3	+3	-
Calculated Noise Level of breakout noise at Receptor	45	53	32	25	25	25	23	21	38
Combined Calculated Noise Level of the AHU at Receptor	45	53	32	25	25	26	24	26	38



Emergency Generator	Sound Pressure Level (dBA)
Sound Pressure Level at 7m	68
Distance Correction (to 125m)	-23
Calculated Noise Level of Generator at Receptor	45