Units 2 & 3
No.8 First Street
Manchester

Plant Sound
Assessment Report
1381/PSA1
Revision 1

3 June 2025

For:

Hammond Projects

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1381/PSA1 Revision 1

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Lighthouse Acoustics is the trading name of Lighthouse Enterprises UK Limited
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1.0 Introduction

Lighthouse Acoustics has been appointed by Hammond Projects to review atmospheric plant noise emissions to the nearest noise sensitive receptors and to propose mitigation measures where required in order to achieve the requirements of the Local Authority and Landlord.

The survey methodology, results and assessments are presented in this report.

2.0 Objectives

To establish the Local Authority's and Landlord's acoustic requirements for the proposed items of building services plant.

To visit site to undertake a detailed environmental sound survey in order to establish existing environmental sound levels at the site.

To undertake an assessment of atmospheric sound emissions from the proposed items of building services plant to the nearest noise sensitive receptors and to propose mitigation measures where required in order to achieve the requirements of the Local Authority.

3.0 Site Description

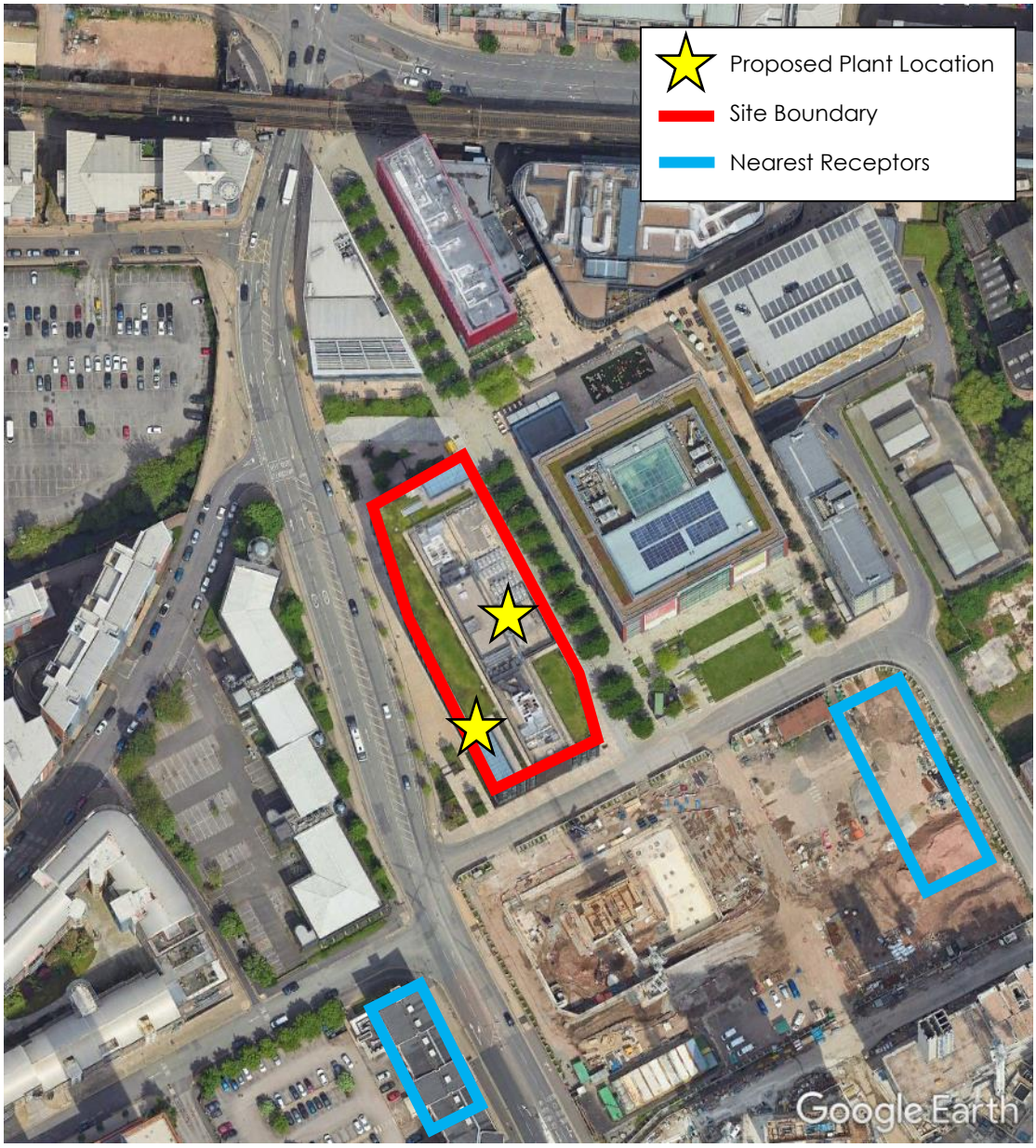
Units 2 & 3 are situated at ground floor level of No.8 First Street, Manchester and adjoins the reception space at ground floor and mezzanine levels, office space at mezzanine level and office space at 1st floor level.

No.8 First Street, Manchester is bound by First Street to the north and east, River Street to the south and Medlock Street (A5103) to the west.

The proposed items of building services plant are to be situated at 7th floor roof level and ground floor loading bay.

The nearest affected noise sensitive receptors are understood to be the windows of the student accommodation situated to the east of the site (House of Social) and the windows of the proposed student accommodation situated to the south of the site (old Premier Inn site).

The site plan below indicates the extent of the site, the proposed plant location and the surrounding environment.



Site plan indicating the extent of the site and the surrounding environment

4.0 Local Authority Requirements

With regard to noise and vibration from fixed plant/equipment, Section 3.7.1.5 of the Planning & Noise Technical Guidance document (dated October 2022) produced by Manchester City Council states the following:

> *"The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that:*

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 (L_{A90}) level at the nearest noise sensitive location."

5.0 Landlord Requirements

Should any building service plant items be situated/intake/discharge within the loading bay they shall achieve an additional requirement of not to exceed a cumulative plant noise emission limit of L_{Aeq} 55dB at 1m.

6.0 Environmental Sound Survey

6.1 Measurements

Automated environmental sound measurements were undertaken from 16:00 hours on Tuesday 21 January 2025 to 16:00 hours on Wednesday 22 January 2025. During this period the L_{Amax}, L_{Aeq} and L_{A90} sound pressure levels were measured continuously over 15 minute periods.

6.2 Weather Conditions

At the start of the survey period the wind conditions were calm (<1m/s) and the sky was overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 6°C.

At the end of the survey period the wind conditions were calm (<1m/s) and the sky was overcast. There was no rainfall and road surfaces were dry. The temperature was approximately 5°C.

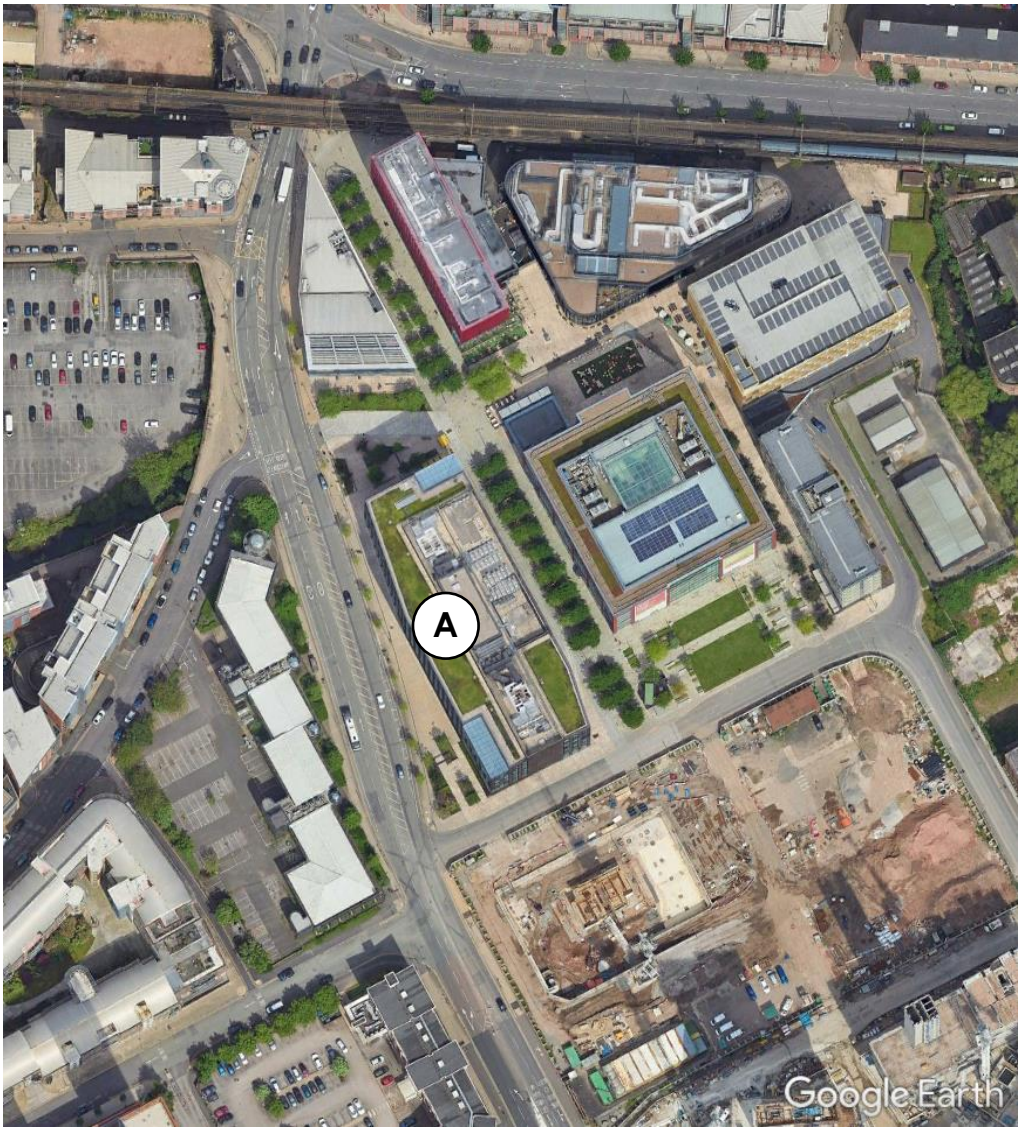
Based on publicly available weather data for the survey period it is understood that weather conditions remained similar for the duration of the survey with no periods of significant rainfall or strong breezes. The weather conditions during the survey period are therefore considered to be suitable for undertaking measurements of sound levels.

6.3 Measurement Position

Environmental sound levels were measured at a single position on-site as described in the table below.

Position	Description
A	Microphone situated at 3m above roof level towards the western façade of the building overlooking Medlock Street (A5103) in free field conditions.

The measurement position is shown on the site plan below.



Site plan showing measurement position

Measurement Position A was selected in order to assess typical environmental sound levels representative of those at the nearest noise sensitive receptors to the south and west of the site.

6.4 Equipment

The following equipment was used to undertake the environmental sound survey.

Equipment	Manufacturer	Model	Serial No.	Calibration Date
Class 1 Sound Level Meter	Casella	633C	2811231	25/07/2023
Preamplifier	Casella	495	001239	25/07/2023
Microphone	Casella	251	1841	25/07/2023
Class 1 Sound Calibrator	Casella	120/1	3864878	31/10/2024
Environmental Noise Kit	Casella	6847	-	-
Microphone Extension Cable	Casella	C6717/5	-	-
Weather Protection System	Casella	6737	-	-

Field calibration checks were performed on the sound level meter prior to and on completion of the survey and were found to be within acceptable tolerance limits.

6.5 Results

6.5.1 Time History Graph

The results of the environmental sound survey are presented on Time History Graph 1352/THG1 enclosed at the rear of the report.

6.5.2 L_{A90} Background Sound Levels

The lowest representative $L_{A90,15min}$ background sound levels measured for the daytime and night-time periods during the survey period are detailed in the table below.

Position	Lowest Representative $L_{A90,15min}$ Background Sound Levels (dB)	
	Daytime (07:00–23:00)	Night-time (23:00–07:00)
A	59	49

6.5.3 Discussion of Sound Climate

At the start and end of the survey period the dominant sound source at Position A was noted to be road traffic along the surrounding road network.

Whilst we are unable to comment on dominant sound sources or individual sound events during the survey period, based on the surrounding environment it is likely that road traffic remained the dominant sound source.

7.0 BS 4142: 2014

BS 4142: 2014 "Methods for rating and assessing industrial and commercial sound", describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

Sound of an industrial and/or commercial nature does not include sound from the passage of vehicles on public roads and railway systems.
It should be noted that the determination of noise amounting to a nuisance is beyond the scope of BS 4142.

The likely impact is indicated by subtracting the existing background sound level from the rating level of the industrial and/or commercial sound. The standard states that:

> *"a) Typically, the greater this difference, the greater the magnitude of the impact.*
> *b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
> *c) A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.*
> *d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*
>
> *Note 2 Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."*

The industrial and/or commercial sound is expressed as the specific sound level and given as a $L_{Aeq,Tr}$ sound level. Should the specific sound level exhibit any acoustic features (i.e. tonality, irregularity or impulsiveness) a character correction is applied. The rating level is the specific sound level with character correction applied (if applicable) and is given as a $L_{Ar,Tr}$ sound level.

The existing background sound level is given as a L_{A90}, T sound level.

The reference time interval, T_r, is 1 hour during the daytime period (07:00 to 23:00 hours) and 15 minutes during the night-time period (23:00 to 07:00 hours).

8.0 Plant Sound Emission Assessment

8.1 Plant Sound Data

Atmospheric building services sound levels have been assessed based on the manufacturers noise data detailed in the Plant Schedule 1020/PS1 enclosed at the rear of the report.

Whilst it is not possible to assess plant irregularity or impulsiveness based on manufacturer's sound data, BS 4142: 2014 provides an objective method for assessing the audibility of tones in sound. The one-third octave method states that if the level of a one third octave band exceeds the level of both adjacent one third octave bands by the following amounts, then a tonal component may be identified as present:

- 15dB in the low-frequency one-third-octave bands (25Hz to 125Hz);
- 8dB in the mid-frequency one-third-octave bands (160Hz to 400Hz);
- 5dB in the high-frequency one-third-octave bands (500Hz to 10kHz).

However, one third octave band sound data is rarely available from manufacturers as is the case in this instance.

By applying the same principal to the octave band sound data in the enclosed Plant Schedule, a review indicates that these items are unlikely to exhibit a tonal component. As such, no character correction has been applied to the specific sound level for these items. Should one third octave band sound data become available a revised assessment should be undertaken.

8.2 Attenuation Proposals

The 2No. HVAC units, 1No. toilet supply fan, 2No. toilet extract fans, 1No. kitchen supply fan and 1No. kitchen extract fan are proposed to be fitted with the FAI & Exhaust silencers specified in the Silencer Schedule 1381/SS1 enclosed at the rear of the report in order to achieve the Landlord requirements.

In addition, all proposed items of building services plant/ductwork should be mounted on appropriate anti-vibration mounts in order to minimise structure borne noise to the adjoining spaces.

8.3 Operating Hours

It is understood that the proposed items of building services plant have the potential to operate 24 hours a day.

In order to undertake a worst case assessment, it is assumed that the proposed items of building services plant will operate for the full 1 hour daytime and 15 minute night-time assessment periods.

8.4 Plant Locations

The location of the proposed items of building services plant has been taken from the following drawing.

Author	Drawing No.	Revision	Date
Cyclone Ventilation	CV24-1285 003	-	Oct 2024
Refrigeration Ltd	HPMRGF2025	02	25/02/2025
	HPMRMF2025	02	25/02/2025
-	Roof Plant	-	-

These indicate that the proposed 2No. HVAC units, 1No. toilet supply fan and 2No. toilet extract fans are situated within the loading bay, the 1No. kitchen supply fan and 1No. kitchen extract fan are situated at mezzanine floor level and ducted to the loading bay whilst the 4No. condenser units are situated at 7th Floor roof level.

8.5 Nearest Noise Sensitive Receptors

The nearest affected noise sensitive receptors are understood to be the windows of the student accommodation situated approximately 75m to the east of the site (House of Social) and the windows of the proposed student accommodation situated approximately 60m to the south of the site (old Premier Inn site).

8.6 Assessment

8.6.1 Receptor to the east (House of Social)

The table below details the calculated L_{Ar} rating levels for the proposed items of building services plant at the nearest noise sensitive receptor along with the lowest representative daytime and night-time L_{A90} background sound levels and the differences between them.

Descriptor	Period	
	Daytime	Night-time
Rating Level $L_{Ar,Tr}$ at Receptor (dB)	34	34
Lowest Representative Background Sound Level $L_{A90,Tr}$ at Receptor (dB)	59	49
Difference (dB)	-25	-15

The calculated L_{Ar} rating levels for the proposed items of building services plant at the nearest noise sensitive receptors are 25dB and 15dB below the lowest representative daytime and night-time L_{A90} background sound levels respectively.

The assessment therefore indicates that atmospheric plant sound emissions from the proposed items of building services plant are likely to have a low impact at the nearest noise sensitive receptors whilst achieving the requirements of the Local Authority for the daytime and night-time periods.

8.6.1 Receptor to the south (Old Premier Inn site)

The table below details the calculated L_{Ar} rating levels for the proposed items of building services plant at the nearest noise sensitive receptor along with the lowest representative daytime and night-time L_{A90} background sound levels and the differences between them.

Descriptor	Period	
	Daytime	Night-time
Rating Level $L_{Ar,Tr}$ at Receptor (dB)	33	33
Lowest Representative Background Sound Level $L_{A90,Tr}$ at Receptor (dB)	59	49
Difference (dB)	-26	-16

The calculated L_{Ar} rating levels for the proposed items of building services plant at the nearest noise sensitive receptors are 26dB and 16dB below the lowest representative daytime and night-time L_{A90} background sound levels respectively.

The assessment therefore indicates that atmospheric plant sound emissions from the proposed items of building services plant are likely to have a low impact at the nearest noise sensitive receptors whilst achieving the requirements of the Local Authority for the daytime and night-time periods.

9.0 Context

BS 4142: 2014 states the following with regard to the context of the industrial/commercial sound:

> *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context."*

In order to place the industrial sound in context the following points have therefore been considered:

- Proposed industrial sound is in excess of 5dB below the lowest representative daytime and night-time L_{A90} background sound levels;
- BS 4142:2014 only uses outdoor sound levels to assess the likely effects of sound.

Based on the above, it is considered that the proposed industrial sound is likely to have a have a low impact at the nearest noise sensitive receptors with the incorporation of the proposed attenuation proposals. This conclusion is reached by professional judgement, taking context into consideration.

10.0 Uncertainty

Weather conditions during the survey period are considered to be suitable for undertaking measurements of sound levels. The measurement position was selected that was representative of the nearest noise sensitive receptors. Measurements were undertaken over a 24-hour period to establish the lowest representative environmental sound levels. Whilst environmental sound levels have the potential to be lower than those measured on some occasions, they are likely to be similar to those measured for the vast majority of the time. As such, uncertainty in the survey methodology is considered to be of marginal significance.

The survey was undertaken using Class 1 equipment which had been calibrated within the required intervals. In addition, field calibration checks were performed on the sound level meters prior to and on completion of the survey and were found to be within acceptable tolerance limits. As such, uncertainty in the survey equipment is considered to be of negligible significance.

Assessment data including sound data and operating hours has been based on manufacturers sound data, measured sound data and information received from others. A character correction has been applied as deemed appropriate. As such, uncertainty in the assessment data is considered to be of marginal significance.

Calculations have been undertaken in accordance with recognised procedures and have been performed in a spreadsheet. As such, uncertainty in the assessment is considered to be of negligible significance.
Based on the above, overall uncertainty in the assessment is considered to be of marginal significance.

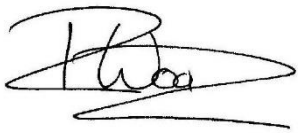
11.0 Conclusion

The Local Authority's and Landlord's acoustic requirements for the proposed items of building services plant have been established.

A detailed environmental sound survey has been undertaken in order to establish existing environmental sound levels at the site.

An assessment of atmospheric sound emissions from the proposed items of building services plant to the nearest noise sensitive receptors has been undertaken.

The assessment indicates that atmospheric plant sound emissions from the proposed items of building services plant are likely to have a low impact at the nearest noise sensitive receptors whilst achieving the requirements of the Local Authority and Landlord.



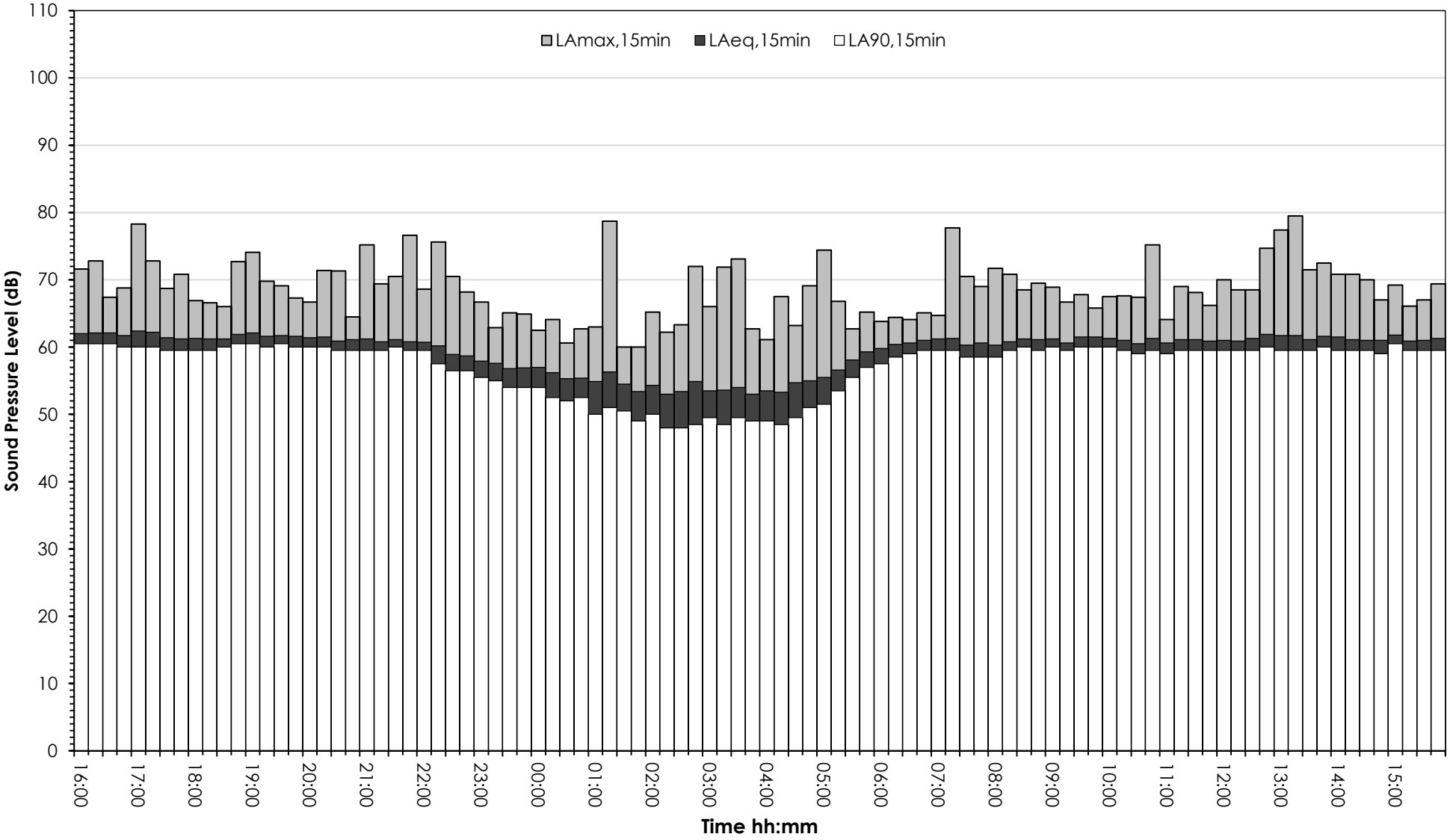
Robin Wood
LIGHTHOUSE ACOUSTICS

1352/THG1

No.8 First Street, Manchester

Time History Graph - Tuesday 21 January 2025 to Wednesday 22 January 2025

$L_{Amax,15min}$, $L_{Aeq,15min}$ & $L_{A90,15min}$ Noise Levels at Position A



Ref: 1381/PS1

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Plant Ref.	Description	Location	Duty		Data (Inlet/Outlet/Casing)	L_w / L_p at dist. (m)	Sound Level (dB) at Octave Band Centre Frequency (Hz)							
			m^3/s	Pa			63	125	250	500	1k	2k	4k	8k
-	1No. Condenser Unit Mitsubishi FDC400KXZRE2	Rooftop	-	-	Casing	Lp at 1m	68	66	60	58	58	54	50	43
-	1No. Condenser Unit Mitsubishi FDC670KXZRE2	Rooftop	-	-	Casing	Lp at 1m	70	69	64	62	62	58	56	49
-	2No. Condenser Units Danfoss OP-MCRN048	Rooftop	-	-	Casing	Lp at 10m	48dBA							
-	2No. Condenser Units Danfoss OP-MSTM018	Rooftop	-	-	Casing	Lp at 10m	39dBA							
-	1No. Toilet Extract Fan Lindab ILC100	Ground Floor Loading Bay	0.05	100	Extract	Lw	-	63	68	60	59	58	51	44
					Exhaust	Lw	-	65	69	59	59	58	51	44
					Casing	Lw	-	55	49	37	42	41	35	29
-	1No. Toilet Extract Fan Lindab ILC200	Mezzanine Floor Loading Bay	0.20	150	Extract	Lw	-	69	71	69	66	61	61	56
					Exhaust	Lw	-	71	75	67	69	66	63	55
					Casing	Lw	-	64	52	51	50	47	43	37
-	1No. MVHR Unit Mitsubishi LGH-200RVX3-E	Ground Floor Loading Bay	Speed 4		Casing*	Lp at 1.5m	58	49	42	39	32	26	22	14
-	1No. MVHR Unit Mitsubishi LGH-200RVX3-E	Mezzanine Floor Loading Bay	Speed 4		Casing*	Lp at 1.5m	58	49	42	39	32	26	22	14

* Manufacturers noise data limited to 1.5m beneath unit – inlet/outlet data not provided.

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Plant Ref.	Description	Location	Duty		Data (Inlet/Outlet/Casing)	L_w / L_p at dist. (m)	Sound Level (dB) at Octave Band Centre Frequency (Hz)							
			m^3/s	Pa			63	125	250	500	1k	2k	4k	8k
-	1No. Toilet Supply Fan Lindab ILC200	Mezzanine Floor Loading Bay	0.20	150	FAI	Lw	-	69	71	69	66	61	61	56
					Supply	Lw	-	71	75	67	69	66	63	55
					Casing	Lw	-	64	52	51	50	47	43	37
-	1No. Kitchen Extract Fan Systemair MUB/T-S 100 630D4	Mezzanine Floor Units 2 & 3	4.06	655	Extract	Lw	88	99	95	91	87	82	79	73
					Exhaust	Lw	90	100	96	92	88	84	80	74
					Casing	Lw	67	81	65	57	55	52	44	36
-	1No. Kitchen Supply Fan Systemair MUB 062 630D4	Mezzanine Floor Units 2 & 3	3.66	369	FAI	Lw	85	95	91	88	86	82	79	73
					Supply	Lw	86	96	92	89	87	83	80	74
					Casing	Lw	65	79	63	55	56	53	46	38

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Plant Ref.	Description	Inlet/Outlet	Vol. (m^3/s)	Typical Length (mm)	Face Velocity (m/s)	Pressure Drop (Pa)	Insertion Loss (dB) at Octave Band Centre Frequency (Hz)							
							63	125	250	500	1k	2k	4k	8k
-	1No. Toilet Extract Fan Lindab ILC100	Exhaust	0.05	900	<6.0	<55	3	5	9	15	22	21	13	9
-	1No. Toilet Extract Fan Lindab ILC200	Exhaust	0.20	900	<6.0	<55	3	5	9	15	22	21	13	9
-	1No. Toilet Supply Fan Lindab ILC200	FAI	0.20	900	<6.0	<55	3	5	9	15	22	21	13	9
-	1No. MVHR Unit Mitsubishi LGH-200RVX3-E	FAI	Speed 4	900	<6.0	<55	3	5	9	15	22	21	13	9
		Exhaust	Speed 4	900	<6.0	<55	3	5	9	15	22	21	13	9
-	1No. MVHR Unit Mitsubishi LGH-200RVX3-E	FAI	Speed 4	900	<6.0	<55	3	5	9	15	22	21	13	9
		Exhaust	Speed 4	900	<6.0	<55	3	5	9	15	22	21	13	9
-	1No. Kitchen Extract Fan Systemair MUB/T-S 100 630D4	Exhaust	4.06	2100	<3.5	<55	11	20	33	47	49	47	45	31
-	1No. Kitchen Supply Fan Systemair MUB 062 630D4	FAI	3.66	1800	<3.5	<55	10	19	29	45	48	47	42	28