CPU Reprovision
Hulme Hall
University of Manchester

Plant Sound
Assessment Report
1559/PSA1
Revision 2

16 September 2026

For:

Wilson Mason LLP
Upland House
Spring Lane
Samlesbury
PR5 0UX

2nd Floor 3 Hardman Square
Spinningfields Manchester M3 3EB

☏ 0161 457 0515 ▪ 07415 151 901
✉ Enquiry@LighthouseAcoustics.co.uk
🌍 www.LighthouseAcoustics.co.uk

Acoustic Planning Report
1559/PSA1 Revision 2

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Registered Office: 2nd Floor 3 Hardman Square Spinningfields Manchester M3 3EB
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1.0 Introduction

Lighthouse Acoustics has been appointed by Wilson Mason LLP to undertake an environmental sound survey at CPU Reprovision, Hulme Hall, University of Manchester and to assess atmospheric plant sound emissions from the proposed plant items to serve the proposed facility.

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

2.0 Objectives

To establish the Local Authority's acoustic requirements for the proposed plant items.

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

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

3.0 Site Description

The proposed facility is to be situated at the existing Hulme Hall, University of Manchester.

The site is bound by Oxford Place to the north and student accommodation buildings to the east, south and west.

Residential properties are situated to the north of the site opposite Oxford Place.

The proposed plant items are to be situated externally at 1st floor roof level to the north of the building.

The site plan overleaf indicates the extent of the site 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 Environmental Sound Survey

5.1 Measurements

Automated environmental sound measurements were undertaken from 12:00 hours on Wednesday 27 May 2026 to 12:00 hours on Thursday 28 May 2026. During this period the L_{Amax}, L_{Aeq} and L_{A90} sound pressure levels were measured continuously over 15 minute periods. Environmental sound measurements were undertaken in general accordance with BS 7445 "Description and measurement of environmental noise".

5.2 Weather Conditions

At the start of the survey period there was a light easterly breeze (<3.0m/s) and the sky was scattered cloud. There was no rainfall and road surfaces were dry. The temperature was approximately 21°C.

At the end of the survey period the wind conditions were calm (<1.0m/s) and the sky was scattered cloud. There was no rainfall and road surfaces were dry. The temperature was approximately 22°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.

5.3 Measurement Position

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

Position	Description
A	Microphone situated towards the north of the site at 1.5m above ground level.

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 incident upon the facades of the nearest noise sensitive receptors.

5.4 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	15/09/2025
Preamplifier	Casella	495	001239	15/09/2025
Microphone	Casella	251	1841	15/09/2025
Class 1 Sound Calibrator	Casella	120/1	3864878	05/11/2025
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.

5.5 Results

5.5.1 Time History Graph

The results of the environmental sound survey are presented on Time History Graph 1559/THG1 enclosed at the rear of the report.

5.5.2 L_{A90} Background Sound Levels

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

Position	Lowest Representative $L_{A90,15min}$ Background Sound Level (dB)	
	Daytime (07:00–23:00)	Night-time (23:00-07:00)
A	47	44

5.5.3 Discussion of Sound Climate

At the start and end of the survey period the dominant sound source was noted to be frequent road traffic along Oxford Place and the surrounding road network. Low level building services noise from existing plant items serving the building also contributed towards the measured sound climate.

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

6.0 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).

7.0 Atmospheric Plant Sound Emission Assessment

7.1 Plant Sound Data

Atmospheric building services sound levels have been assessed based on the manufacturers sound data received for the proposed plant items as detailed in the Plant Schedule 1559/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 tables above, 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.

7.2 Operating Hours

It is understood that the ground floor kitchen operates 07:00 to 16:00 hours and that proposed plant items have the potential to operate 24 hours per day at the following duties.

Plant Item	Duty (%) During Period	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
3No. Large ASHPs	100	50
2No. Small ASHPs	100	100
9No. Condensers	100	100
1No. Supply AHU	100	30
2No. Canopy 1 Extract Fans	100	OFF
1No. Canopy 2 Extract Fan	100	50
1No. Dishwash Extract Fan	100	100
1No. Allergen Extract Fan	100	100
1No. Dishwash Extract Fan Mez	100	100
1No. Canopy Extract Fan Mez	100	50
1No. COSHH Extract Fan Mez	100	100

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

7.3 Plant Locations

The locations of the proposed plant items have been taken from the following drawings.

Author	Drawing No.	Revision	Date
Stantec	10386-ME-SK-900107	P01	11/06/2026
	10386-ME-SK-900108	T.B.C.	T.B.C.
	10386-ME-SK-900109	P01	11/06/2026

These indicate that the proposed 3No. large ASHPs, 2No. Small ASHPs, 9No. Condensers, 1No. Supply AHU and 3No. Canopy EFs are situated at 1st floor roof level.

These indicate that the proposed 1No. Dishwash discharge louvre (EF situated internally) and 1No. Allergen discharge louvre (EF situated internally) are situated at Ground floor in the west facade.

These indicate that the proposed 1No. Dishwash EF (and discharge cowl) and 1No. Canopy EF (and discharge cowl) are situated at 2nd floor roof level along with the 1No. COSHH EF discharge cowl (EF situated internally).

7.4 Nearest Noise Sensitive Receptors

The nearest noise sensitive receptors are the existing student accommodation blocks situated to the east and west and existing residential properties situated to the north of the site opposite Oxford Place.

Of these receptors, the existing student accommodation block situated to the east is the nearest.

7.5 Attenuation Proposals

7.5.1 Screening Attenuation

The 1st floor roof area will require extensive acoustic treatment in order to attenuate plant noise emissions to acceptable levels at the nearest noise sensitive receptors.

The photo below shows the 1st floor roof area and the adjacent brick walls to the hall and plantroom.



Acoustic screens will be required at both 'open' ends of the 1st floor roof area to fully enclose the plant area and should be equal height to that of the northern brick wall to the plantroom. The acoustic screens should be acoustically absorbent on the plant side.

Any ventilation openings that are required in these acoustic screens must be acoustic louvres that offer a sound insulation performance of at least 15dB. Acoustic louvres with a depth of 150mm to 300mm would typically be expected to provide this level of attenuation.

In addition, the existing brick walls to the hall and plantroom should feature acoustically absorbent panels to all available wall space facing the plant area.

Proposals should be forwarded for review prior to installation.

7.5.2 Silencer Attenuation

The proposed AHU and EFs will require the fitment of silencers as specified in the Silencer Schedule 1559/SS1 enclosed at the rear of the report in order to achieve the Local Authority requirements.

The following extract fans and any ductwork between the extract fan and exhaust/extract silencers should be acoustically lagged comprising 50mm (min.) mineral wool slab (min. 16kg/m^3) wrapped with a polymeric heavy mass barrier material of at least 10kg/m^2.

Plant Item
2No. Canopy 1 Extract Fans S-CUBE P KAT 63
1No. Canopy 2 Extract Fan S-CUBE P KAT 63
1No. Dishwash Extract Fan Mez S-CUBE P KAT 63
1No. Canopy Extract Fan Mez S-CUBE P KAT 50

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.

7.6 Calculation

The assessment has been undertaken in accordance with generally accepted acoustic principles for building services plant items.

7.7 Assessment

The results of the assessment for the proposed plant items are summarised in the following tables.

Daytime Assessment

Nearest Noise Sensitive Receptor	Rating Level $L_{r,T}$ at Receptor (dB)	Lowest Representative Background Sound Level $L_{A90,15min}$ at Receptor (dB)	Difference (dB)	BS 4142: 2014 Likely Impact
Student accommodation to the east	42	47	-5	Low Impact

The assessment indicates that atmospheric plant sound emissions from the proposed plant items are likely to have a low impact at the nearest noise sensitive receptor with the incorporation of the proposed attenuation measures. The requirements of the Local Authority are also achieved.

Night-time Assessment

Nearest Noise Sensitive Receptor	Rating Level $L_{r,T}$ at Receptor (dB)	Lowest Representative Background Sound Level $L_{A90,15min}$ at Receptor (dB)	Difference (dB)	BS 4142: 2014 Likely Impact
Student accommodation to the east	39	44	-5	Low Impact

The assessment indicates that atmospheric plant sound emissions from the proposed normal plant items are likely to have a low impact at the nearest noise sensitive receptor with the incorporation of the proposed attenuation measures. The requirements of the Local Authority are also achieved.

8.0 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:

- Calculated rating levels are at least 5dB below the lowest representative daytime and night-time background sound levels with the incorporation of the proposed attenuation measures;
- Proposed industrial sound is a constant broadband sound;
- 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 measures. This conclusion is reached by professional judgement, taking context into consideration.

9.0 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 receptor. 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.

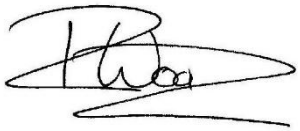
10.0 Conclusion

The Local Authority's acoustic requirements for the proposed plant items have been established.

A detailed environmental sound survey has been undertaken in order to establish existing environmental sound levels at the nearest noise sensitive receptors.

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

The assessment indicates that atmospheric plant sound emissions from the proposed normal plant items are likely to have a low impact at the nearest noise sensitive receptors and achieve the requirements of the Local Authority with the incorporation of the proposed attenuation measures.



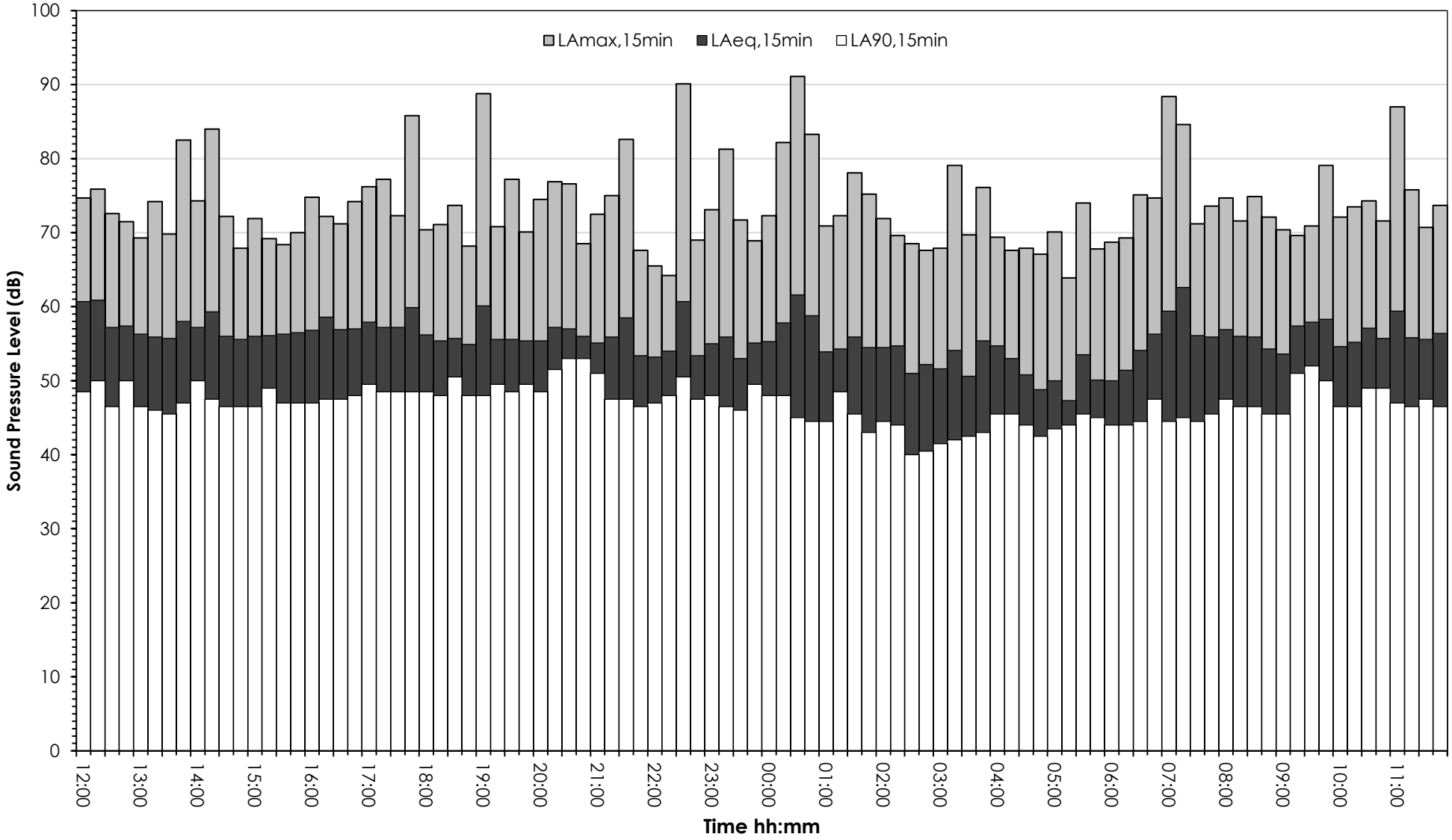
Robin Wood
LIGHTHOUSE ACOUSTICS

1559/THG1

CPU Reprovision, The University of Manchester, Hulme Hall

Time History Graph - Wednesday 27 May 2026 to Thursday 28 May 2026

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



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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)							
			m³/s	Pa			63	125	250	500	1k	2k	4k	8k
ASHP/01/01 ASHP/01/02 ASHP/01/03	3No. Large ASHPs EAHV-M1500YCL 50HP	1st Floor Roof Level	100%		Casing	Lp at 10m	38	42	47	48	50	46	40	24
			50%		Casing	Lp at 10m	22	31	39	42	40	36	29	20
ASHP/01/04 ASHP/01/05	2No. Small ASHPs QAHV	1st Floor Roof Level	100%		Casing	Lp at 1m	56dBA*							
LT-CU01	1No. Condenser - Level 01 - 3.01 - Freezer	1st Floor Roof Level	100%		Casing	Lp at 10m	35dBA*							
HT-CU02	1No. Condenser - Level 01 - 2.01 - Chiller	1st Floor Roof Level	100%		Casing	Lp at 10m	28dBA*							
HT-CU03	1No. Condenser - Level 01 - 5.01 – Holding Coldroom	1st Floor Roof Level	100%		Casing	Lp at 10m	28dBA*							
LT-CU04	1No. Condenser - Level 0 CPU - 2.0 Freezer Room	1st Floor Roof Level	100%		Casing	Lp at 10m	37dBA*							
HT-CU05	1No. Condenser - Level 0 CPU - 4.0 Meat & Fish Coldroom	1st Floor Roof Level	100%		Casing	Lp at 10m	28dBA*							
HT-CU06	1No. Condenser - Level 0 CPU - 1.0 G.Purpose Coldroom	1st Floor Roof Level	100%		Casing	Lp at 10m	33dBA*							
HT-CU07	1No. Condenser - Level 0 CPU - 15.0 Holding Coldroom	1st Floor Roof Level	100%		Casing	Lp at 10m	33dBA*							
HT-CU08	1No. Condenser - Level 0 CPU 19.0 External Coldstore	1st Floor Roof Level	100%		Casing	Lp at 10m	39dBA*							
HT-CU09A	1No. Condenser - Level 00 - Option 1 - MBC250	1st Floor Roof Level	100%		Casing	Lp at 10m	54dBA* Δ							

*It is understood that octave band noise data is not available. Δ 5dB attenuation applied – mfr.to confirm.

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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. Supply AHU	1st Floor Roof Level	100%		FAI	Lw	89	84	76	85	73	73	70	71
					Supply	Lw	90	88	88	85	81	79	71	69
					Casing	Lw	78	75	62	53	52	54	50	49
			30%		FAI	Lw	84	72	66	59	58	55	48	43
					Supply	Lw	87	75	72	72	66	59	50	43
					Casing	Lw	73	63	49	37	37	36	30	30
-	1No. Canopy 2 Extract Fan S-CUBE P KAT 63	1st Floor Roof Level	100% 1440rpm		Extract	Lw	78	81	80	78	76	73	68	61
					Exhaust	Lw	78	81	80	78	76	73	68	61
					Casing	Lw	-	-	-	-	-	-	-	-
			50%		Extract	Lw	Assumed 15dB reduction T.B.C.							
					Exhaust	Lw	Assumed 15dB reduction T.B.C.							
					Casing	Lw	Assumed 15dB reduction T.B.C.							

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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
-	2No. Canopy 1 Extract Fans S-CUBE P KAT 63	1st Floor Roof Level	100% 1440rpm		Extract	Lw	78	81	80	78	76	73	68	61
					Exhaust	Lw	78	81	80	78	76	73	68	61
					Casing	Lw	-	-	-	-	-	-	-	-
-	1No. Dishwash Extract Fan KVK Silent 500	Ground Floor Level (Internal)	1440rpm		Extract	Lw	85	89	74	57	53	52	47	42
					Exhaust	Lw	61	88	75	69	69	65	61	54
					Casing	Lw	61	72	67	50	44	38	37	26
-	1No. Allergen Extract Fan VL200	Ground Floor Level (Internal)	2100rpm		Extract	Lw	72	69	66	61	55	51	45	40
					Exhaust	Lw	69	69	64	58	54	52	48	47
					Casing	Lw	-	-	-	-	-	-	-	-
-	1No. Dishwash Extract Fan Mez S-CUBE P KAT 63	2nd Floor Roof Level	1440rpm		Extract	Lw	78	81	80	78	76	73	68	61
					Exhaust	Lw	78	81	80	78	76	73	68	61
					Casing	Lw	-	-	-	-	-	-	-	-

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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. Canopy Extract Fan Mez S-CUBE P KAT 50	2nd Floor Roof Level	1055rpm		Extract	Lw	68	68	71	68	66	62	55	48
					Exhaust	Lw	68	68	71	68	66	62	55	48
					Casing	Lw	-	-	-	-	-	-	-	-
			50%		Extract	Lw	Assumed 15dB reduction T.B.C.							
					Exhaust	Lw	Assumed 15dB reduction T.B.C.							
					Casing	Lw	Assumed 15dB reduction T.B.C.							
-	1No. COSHH Extract Fan Mez VL150	1st Floor Level (Internal)	2565rpm		Extract	Lw	75	82	74	72	64	61	54	49
					Exhaust	Lw	74	81	74	64	64	60	52	47
					Casing	Lw	-	-	-	-	-	-	-	-

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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. Supply AHU	FAI	-	1200	<4.5	<55	7	12	19	35	40	36	27	17
		Supply	Stantec UK Limited to specify roomside silencers											
-	2No. Canopy 1 Extract Fans S-CUBE P KAT 63	Extract	Stantec UK Limited to specify roomside silencers											
		Exhaust	-	900	<6.0	<55	5	7	13	23	25	20	15	10
-	1No. Canopy 2 Extract Fan S-CUBE P KAT 63	Extract	Stantec UK Limited to specify roomside silencers											
		Exhaust	-	900	<4.5	<55	5	9	15	29	34	30	22	14
-	1No. Dishwash Extract Fan KVK Silent 500	Extract	Stantec UK Limited to specify roomside silencers											
		Exhaust	-	1200	<4.5	<55	7	12	19	35	40	36	28	17
-	1No. Allergen Extract Fan VL200	Extract	Stantec UK Limited to specify roomside silencers											
		Exhaust	-	900	<6.0	<55	5	7	13	23	25	20	15	10
-	1No. Dishwash Extract Fan Mez S-CUBE P KAT 63	Extract	Stantec UK Limited to specify roomside silencers											
		Exhaust	-	1200	<4.0	<55	6	9	19	34	44	43	27	19

Ref: 1559/SS1

Date: 16 September 2026

Revision: 2

Comments:

CPU Reprovision
Hulme Hall
University of Manchester

LIGHTHOUSE ACOUSTICS

2nd Floor 3 Hardman Square
Spinningfields Manchester M3 3EB

☎ 0161 457 0515 ▪ 07415 151 901
✉ Enquiry@LighthouseAcoustics.co.uk
🌍 www.LighthouseAcoustics.co.uk

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. Canopy Extract Fan Mez S-CUBE P KAT 50	Extract	Stantec UK Limited to specify roomside silencers											
		Exhaust	-	900	<6.0	<55	5	7	13	23	25	20	15	10
-	1No. COSHH Extract Fan Mez VL150	Extract	Stantec UK Limited to specify roomside silencers											
		Exhaust	-	900	<6.0	<55	5	7	13	23	25	20	15	10