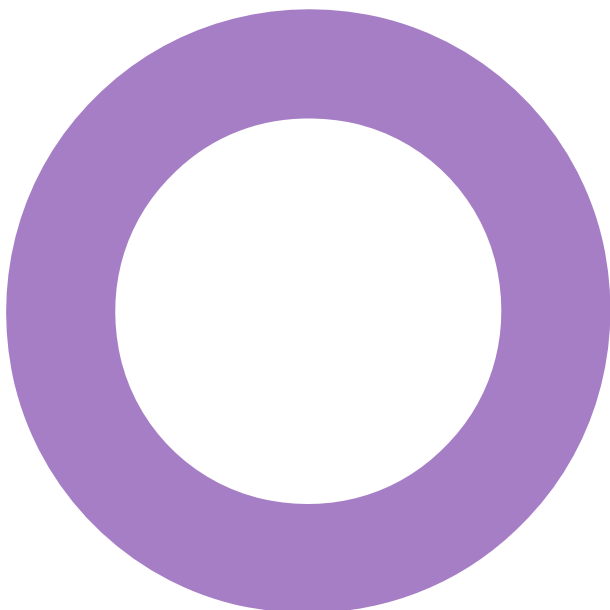


Christie TIF Wards. Manchester. Vinci Construction.

ACOUSTICS

PLANNING CONDITION DISCHARGE REPORT

REVISION 01 – 20 SEPTEMBER 2024



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
00	07/05/2024	Initial draft.	SGi	SRG	PM
01	20/09/2024	Amended to include post-completion measurements.	SRG	PM	PM

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Project number: 10/15436

Document reference: REP-1015436-05-SG-20240507-Planning condition discharge report-Rev01.docx

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Executive summary.

Hoare Lea has been appointed to provide acoustic advice for the proposed refurbishment and extension to the existing TIF Ward at Christie Hospital, Withington.

An environmental noise survey has previously been undertaken by Hoare Lea in December 2022 and is detailed within the acoustic planning report for the proposed development. This noise survey has been used as the basis of the noise assessment.

Details of the proposed external plant equipment have been received from the project mechanical engineers, including plant locations and noise data from the manufacturers.

Detailed plans and elevation drawings have been received from the project architects.

The resultant sound levels at the nearest residential receptors have been calculated based on the information received.

The assessment concludes that the rating levels from the proposed external plant equipment are calculated to achieve the noise limits as required by Planning Condition 5b at all receptors.

Following completion of the works, noise measurements have been taken at close proximity to each of the new plant items. These have then been used to calculate the noise levels acting on the nearby noise-sensitive façades. The assessment concludes that the external plant equipment achieves the noise limits required by Planning Condition 5b at all receptors, based on the measurements undertaken.

This report is considered suitable for the full discharge of Planning Condition 5b on this basis.

1. Introduction.

Hoare Lea has been appointed to act as acoustic consultant in relation to the proposed extension and refurbishment to the existing TIF Ward at Christie Hospital, Withington.

This report provides details of the plant noise assessment undertaken and is considered suitable for the discharge of Planning Condition 5b.

2. Planning Condition.

Planning Condition 5b of planning application reference 136095/FO/2023 is presented below:

“5) b) Prior to the operation of the scheme 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 also undertake post completion testing to confirm that the noise criteria have been met. Any instances of nonconformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.”

3. Environmental noise survey.

An environmental noise survey has previously been carried out to assess the existing noise climate. Full details of the noise survey undertaken are included within the referenced acoustic planning report (REP-1014578-5A-AP-20221215-Acoustic planning report-Rev00).

The key parameter from the noise survey that is required for the assessment included herein is the background sound level (L_{A90}). This has been measured at the development site, and is presented below:

Period	Representative background sound level, $L_{A90,Tr}$ dB
Daytime (0700-2300)	46
Night-time (2300-0700)	43

Table 1: Representative background sound levels.

4. Performance requirements.

The full wording of the planning condition is presented in Section 2. The key requirement within Planning Condition 5b is to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic report. This recommends that noise from all external plant shall achieve at least 5 dB below the pre-existing background sound level, in line with Manchester City Council's criteria for noise from fixed plant/equipment (Planning & Noise Technical Guidance (Oct 2022)).

It is assumed that external plant may run at full duty during daytime and night-time periods, and on this basis, both the daytime and night-time criteria are considered to be appropriate. The noise limits are presented below:

Period	Representative background sound level, $L_{A90,Tr}$ dB	Plant noise limit, $L_{A,Tr}$ dB
Daytime (0700-2300)	46	41
Night-time (2300-0700)	43	38

Table 2: Plant noise limits to be achieved to meet requirements of the Planning Condition.

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

5. Proposed external plant equipment.

The proposed development includes eight items of plant proposed external to the building. These are presented below:

Equipment reference	Equipment type	Number	Sound power level, dB L_{wA}	Sound pressure level at 1 m, dB L_{pA}
Airedale AHU/01 Level 03	Air Handling Unit	1	82	72
Airedale AHU/02 Level 02	Air Handling Unit	1	83	73
Toshiba RAV-GM2241AT8	Condensing Unit	4	-	60
Toshiba RAV-GM561ATP	Condensing Unit	2	-	48

Table 3: Proposed external plant equipment – sound levels from manufacturers data.

Manufacturers data for the proposed external plant equipment is provided as an appendix.

The locations of the equipment are presented in the drawing below:

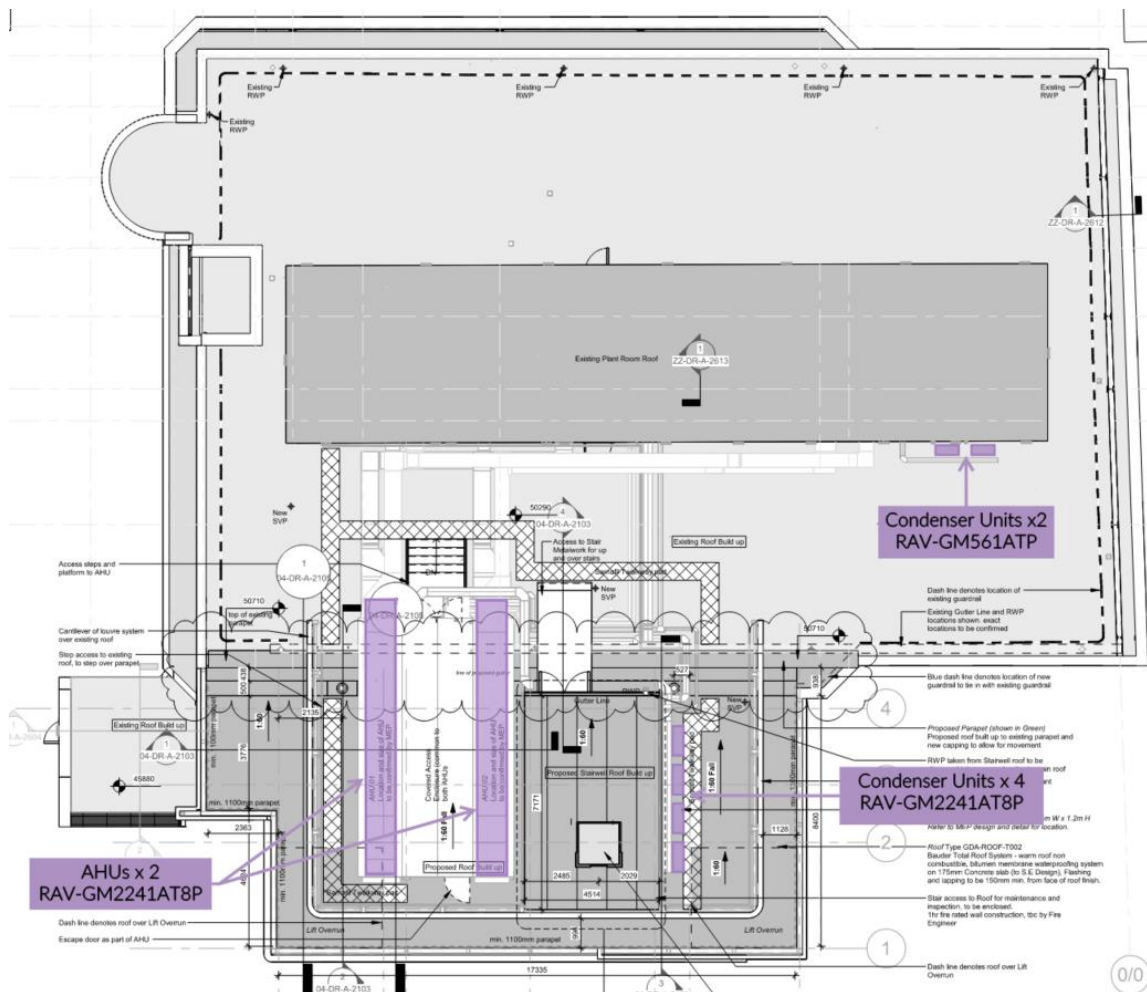


Figure 1: Proposed site plan with external plant equipment on the roof level identified.

6. Closest noise-sensitive receptors.

The proposed development site is bordered by residential areas to the south and east, with further hospital buildings to the north and west. The residential dwellings to the south, along Oak Road, are considered to be the closest noise-sensitive receptors to the site.

The assessment focuses on the closest receptors to the south which constitutes a worst-case assessment, as all other receptors are at greater distances to the plant and as such will experience lower noise levels.

A mark-up of the local area has been presented within Figure 2, showing the proposed development site and the nearby local receptors.

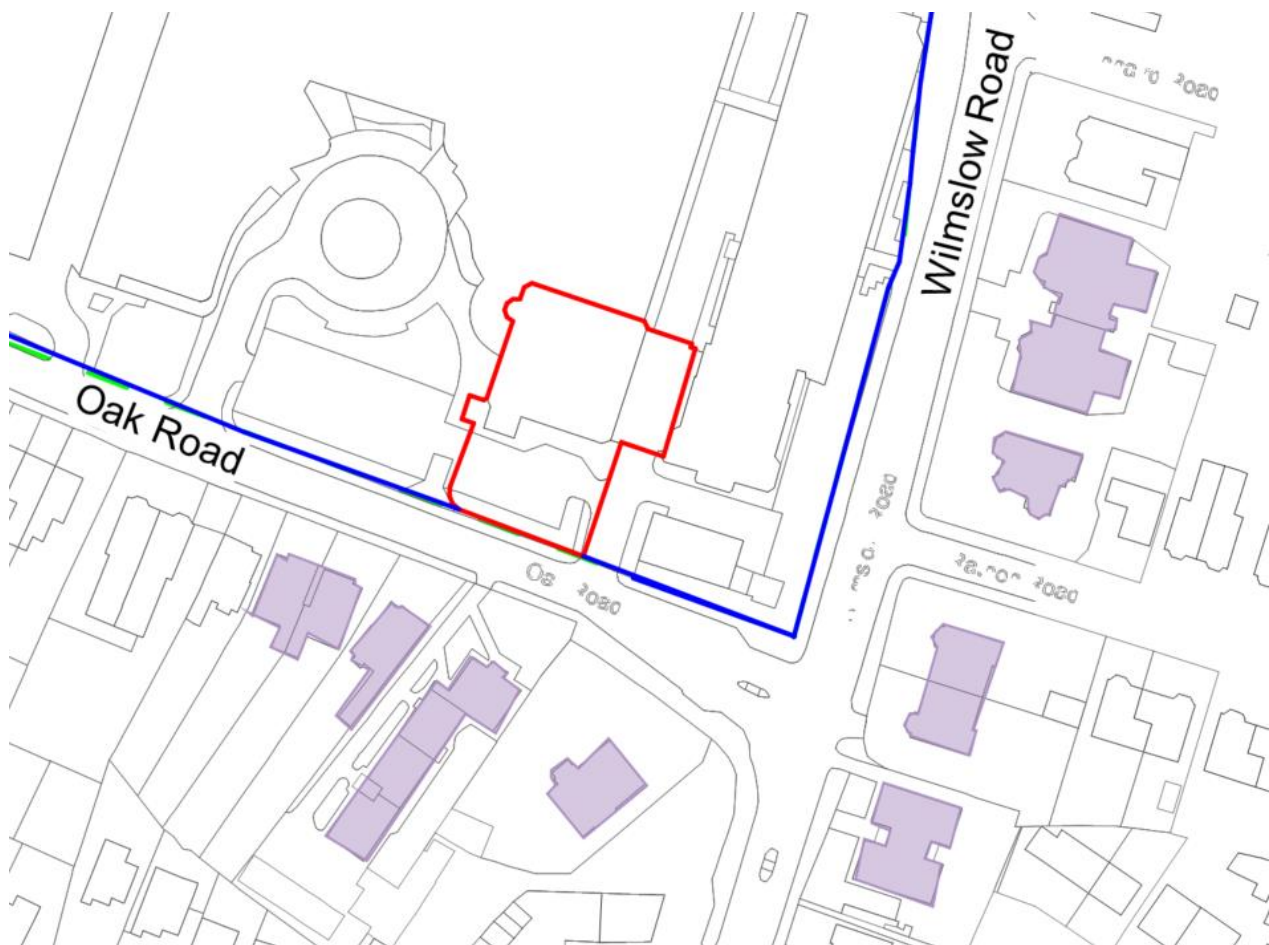


Figure 2: Local area plan with proposed site and nearby noise-sensitive receptors identified.

7. Noise assessment.

7.1 Assessment based on manufacturers data.

Based on the sound pressure levels presented in Table 3 (using the manufacturers data presented within Appendix A), and the architect's drawings, the noise levels at the closest noise-sensitive receptors to the south have been calculated.

The calculations include attenuation due to distance, screening provided by the proposed building parapet, and reflections from the existing plant room building, where applicable.

The resultant noise levels calculated at the worst-affected property is presented in Table 4. This only considers the night-time limit as this is the most onerous. The full methodology is presented within Appendix B.

Receptor	Plant noise limit, dB $L_{A,Tr}$	Calculated noise level, dB $L_{Aeq,T}$	Difference, dB
South Receptors	38	33	- 5

Table 4: Calculated noise level at the closest noise-sensitive receptors – from manufacturers data.

The requirement within Planning Condition 5b to meet the criteria set out in the approved acoustic planning report is for the *rating level* to achieve the above noise limit. This is as presented above but includes any corrections for acoustic character such as intermittency, impulsivity, and tonality. It is considered unlikely that the equipment selected will be audibly tonal or intermittent at the receiver location, therefore no character corrections have been applied.

On this basis and as presented above, the rating levels from the proposed external plant equipment are calculated to achieve the noise limits as required by Planning Condition 5b at all receptors.

7.2 Assessment following on-site measurements.

Measurements of the air handling units was carried out on Thursday 12th September 2024 and measurements of the condenser units was carried out on Friday 13th September 2024. As the noise limits are to achieve 5 dB below the existing background sound level during the quietest night-time periods, it is not possible to accurately measure the plant directly at the receptor locations. On this basis, measurements have been undertaken at one metre from each item of equipment, and corrections applied due to distance and screening from the building parapet.

The sound pressure level at one metre from each item of plant is presented below:

Plant equipment	Sound pressure level at 1 m	Comments
AHU 01	Casing: 58 dB L_{pA} Intake: 54 dB L_{pA} Discharge: 61 dB L_{pA}	-
AHU 02	Casing: 56 dB L_{pA} Intake: 56 dB L_{pA} Discharge: 59 dB L_{pA}	It was not possible to measure the intake and casing in isolation, therefore the maximum measured value has been used for both contributions as a worst-case.
Condenser unit (RAV-GM2241AT8)	57 dB L_{pA} (for 2x units) 54 dB L_{pA} (for 2x units)	Units close together, therefore measured in pairs. One pair was operating at a reduced duty, therefore the higher value has been taken for both pairs.
Condenser unit (RAV-GM561ATP)	47 dB L_{pA} (for 2x units)	Units close together, therefore measured in pairs.

Table 5: Measured sound pressure levels at 1 m from each item of plant equipment.

A summary of the assessment is presented below, with the full methodology presented within Appendix B. This has been carried out in octave band resolution, with single values presented for clarity.

Receptor	Plant noise limit, dB $L_{A,T,r}$	Calculated noise level, dB $L_{A,T,r}$	Difference, dB
South Receptors	38	26	- 12

Table 6: Calculated noise level at the closest noise-sensitive receptors – from measured values.

As presented above, the measured sound pressure levels from the equipment installed on site are calculated to meet the requirements of Planning Condition 5b at all receptors.

Appendix A: Manufacturer's data.

The following pages are the pertinent pages from the manufacturers' datasheets for each of the items of external plant equipment.

The AHU data used in the assessment consists of the 'Fan inlet' data for the supply side (Sections 006), and the 'Fan outlet' data for the exhaust side (Sections 0018). See screenshots below. Casing breakout data was provided; however noise levels are particularly low at 48-49 dB L_{WA} . Consideration was given to this element, but they contribute a negligible effect on overall levels, therefore they have not been considered further.

The Condenser Unit data used in the assessment is the data shown for the 'Heating' modes, as these levels were higher than the Cooling mode in both instances.



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AIR HANDLING UNIT TECHNICAL SPECIFICATION

Project:	Christie Hospital TIF Wards	Unit ref.:	AHU/01 Level 03
Project Ref.:	BK054548/Z	UnitNo./Revision:	1/H
Quantity:	1		

PHE (HTM) - Bypass damper with no plastic parts.

COMPONENT - Internal LED bulkhead light wired to switch

COMPONENT - View Port

COMPONENT - Plastic test point

DOOR - Premium lockable high pressure door furniture

COMPONENT - Plastic test point

SUPPLY SECTION C

006 DIRECT DRIVE FAN

Air Volume	1.15 m ³ /sec	Pressure Drop	25 Pa
External Static	300 Pa	Total Static	661 Pa
		Total Fan Pressure	686 Pa
Fan:			
Type	Backward Curve	Model	PFP A3-0400 2.6kW 400V-3F M6F5
Fan Speed	1850 RPM	Fan Max Speed	2485 RPM
Fan Absorbed Power	1.23 kW	Fan Efficiency	62.00 %
		Fan Arrangement	Single Fan
Motor:			
Type	WithFan	Quantity	1
Rated Power	2.80 kW	Power Input	1.23 kW
Motor Speed	1850 RPM	Motor Pole	TBA
Frame Size		Starting Method	0-10V Signal
		Electric Supply	400V / 3 / 50Hz
		Full Load Current	4.20 A
		Control Voltage	TBA V
		Max Voltage	10 V

Fan noise levels per fan

Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Fan inlet sound power level (dB)	72	74	80	75	69	67	62	56
Fan outlet sound power level (dB)	74	75	81	77	78	75	69	63



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AIR HANDLING UNIT TECHNICAL SPECIFICATION

Project:	Christie Hospital TIF Wards	Unit ref.:	AHU/01 Level 03
Project Ref.:	BK054548/Z	UnitNo./Revision:	1/H
Quantity:	1		

0018 DIRECT DRIVE FAN

Air Volume	1.18 m ³ /sec	Pressure Drop	25 Pa
External Static	300 Pa	Total Static	563 Pa
		Total Fan Pressure	590 Pa
Fan:			
Type	Backward Curve	Model	PFP A3-0400 2.6kW 400V-3F M6F5
Fan Speed	1767 RPM	Fan Max Speed	2485 RPM
Fan Absorbed Power	1.09 kW	Fan Efficiency	61.00 %
		Fan Arrangement	Single Fan
Motor:			
Type	WithFan	Quantity	1
Rated Power	2.80 kW	Power Input	1.09 kW
Motor Speed	1767 RPM	Motor Pole	TBA
Frame Size		Starting Method	0-10V Signal
		Electric Supply	400V / 3 / 50Hz
		Full Load Current	4.20 A
		Control Voltage	TBA V
		Max Voltage	10 V

Fan noise levels per fan

Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Fan inlet sound power level (dB)	71	73	79	74	68	66	61	55
Fan outlet sound power level (dB)	73	74	80	76	77	74	68	62



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AIR HANDLING UNIT TECHNICAL SPECIFICATION

Project:	Christie Hospital TIF Wards	Unit ref.:	AHU/02 Level 02
Project Ref.:	BK054548/Z	UnitNo./Revision:	2/H
Quantity:	1		

PHE (HTM) - Bypass damper with no plastic parts.
COMPONENT - Internal LED bulkhead light wired to switch
COMPONENT - View Port
COMPONENT - Plastic test point
DOOR - Premium lockable high pressure door furniture
COMPONENT - Plastic test point

SUPPLY SECTION C

006 DIRECT DRIVE FAN

Air Volume	1.26 m ³ /sec	Pressure Drop	25 Pa
External Static	300 Pa	Total Static	679 Pa
Fan:		Total Fan Pressure	708 Pa
Type	Backward Curve	Model	PFP A3-0400 2.6kW 400V-3F M6F5
Fan Speed	1920 RPM	Fan Max Speed	2485 RPM
Fan Absorbed Power	1.38 kW	Fan Efficiency	62.00 %
Motor:		Fan Arrangement	Single Fan
Type	WithFan	Quantity	1
Rated Power	2.80 kW	Electric Supply	400V / 3 / 50Hz
Motor Speed	1920 RPM	Power Input	1.38 kW
Frame Size		Motor Pole	TBA
		Starting Method	0-10V Signal
		Full Load Current	4.20 A
		Control Voltage	TBA V
		Max Voltage	10 V

Fan noise levels per fan

Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Fan inlet sound power level (dB)	73	75	81	76	70	68	63	57
Fan outlet sound power level (dB)	75	76	82	78	79	76	70	64



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AIR HANDLING UNIT TECHNICAL SPECIFICATION

Project:	Christie Hospital TIF Wards	Unit ref.:	AHU/02 Level 02
Project Ref.:	BK054548/Z	UnitNo./Revision:	2/H
Quantity:	1		

0018 DIRECT DRIVE FAN

Air Volume	1.30 m ³ /sec	Pressure Drop	25 Pa
External Static	300 Pa	Total Static	574 Pa
Fan:		Total Fan Pressure	606 Pa
Type	Backward Curve	Model	PFP A3-0400 2.6kW 400V-3F M6F5
Fan Speed	1847 RPM	Fan Max Speed	2485 RPM
Fan Absorbed Power	1.23 kW	Fan Efficiency	61.00 %
Motor:		Fan Arrangement	Single Fan
Type	WithFan	Quantity	1
Rated Power	2.80 kW	Electric Supply	400V / 3 / 50Hz
Motor Speed	1847 RPM	Power Input	1.23 kW
Frame Size		Motor Pole	TBA
		Starting Method	0-10V Signal
		Full Load Current	4.20 A
		Control Voltage	TBA V
		Max Voltage	10 V

Fan noise levels per fan

Frequency (Hz)	63	125	250	500	1K	2K	4K	8K
Fan inlet sound power level (dB)	72	74	80	75	69	67	62	56
Fan outlet sound power level (dB)	74	75	81	77	78	75	69	63

RBC-AHU1 Air Handling Unit Applications Digital Inverter - R32 (continued)

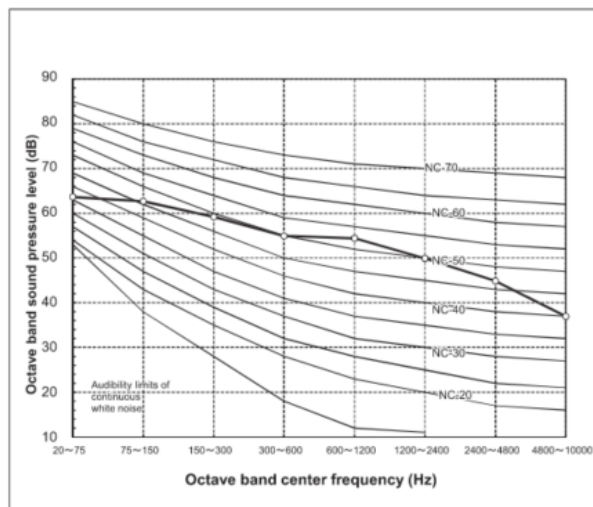
CODE			140	140	200
Outdoor Unit		RAV-	GM1601ATP-E	GM1601AT8P-E	GM2241AT8-E
Cooling Range (Min. - Max.)		kW	3.0 - 16.0	3.0 - 16.0	4.6 - 22.4
Heating Range (Min. - Max.)		kW	3.0 - 18.0	3.0 - 18.0	4.6 - 25.0
Ambient Operating Range Cooling/Heating		°C	-15 to 46/-15 to 15	-15 to 46/-15 to 15	52 to -15/15 to -27
Fan(s)	Motor Power	W	100+100	100+100	200 + 200
	Standard Air Flow	l/s	1916	1916	2550
	Standard Air Flow	m³/min	115	115	153
	Standard Air Flow	m³/h	6900	6900	9150
Sound	Pressure Level C/H	dB(A)	53/55	53/55	58/60
	Power Level C/H	dB(A)	70/72	70/72	76/76
Unit	Appearance		Silky Shade (Muncel 1Y 8.5/0.5)	Silky Shade (Muncel 1Y 8.5/0.5)	Silky Shade (Muncel 1Y 8.5/0.5)
	Heat Exchanger		Finned tube	Finned tube	Finned tube
	Compressor Type		Hermetic Twin Rotary	Hermetic Twin Rotary	Hermetic Twin Rotary
	Compressor Power	kW	3.75	3.75	5.6
	Height x Width x Depth	mm	1340 x 900 x 320	1340 x 900 x 320	1550 x 1010 x 370
	Total Weight	kg	95	94	142
Refrigerant	Control		Pulse motor valve	Pulse motor valve	Pulse motor valve
	Gas Type		R32	R32	R32
	Base Charge/Chargeless To	kg/m	2.4/30	2.4/30	5.0/30
	Additional Charge Main Liquid Side	g/m	35	35	80
	Replacement Technology		Yes	R22, R407C, R410A, R417A, R134a, R12	R22, R407C, R410A, R417A, R134a, R12
Pipe Connections	Min.-Max. Length	m	5-50	5-50	5-60
	Height Difference Outdoor To AHU	m	±30	±30	±30
	Gas Side	inch	5/8	5/8	1-1/8*
	Liquid Side	inch	3/8	3/8	1/2
	Drain Port Connector Hose Inner Diameter	mm	16	16	16
Electrical	Power Supply	V/ph/Hz	220-240/1/50	380-415/3/50	380-415/3/50-16
	Maximum Run Current	A	21.71	7.23	9.52
	Suggested Fused Supply	A	32	16	16

Rated operation

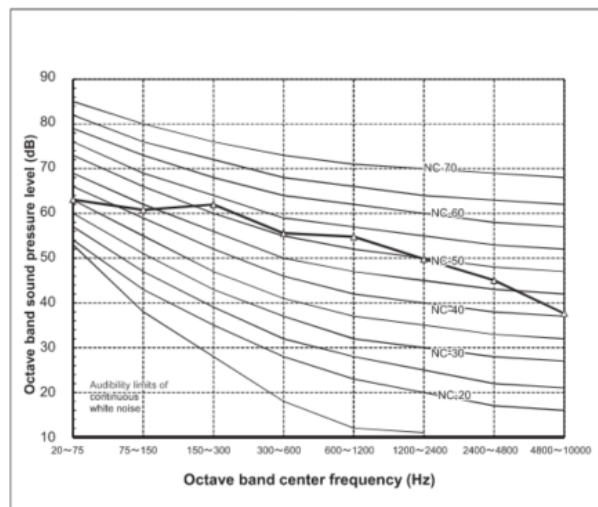
RAV-GM2241AT8-E1

Sound pressure level (dB(A))	Cooling	Heating
	58	60

Cooling



Heating



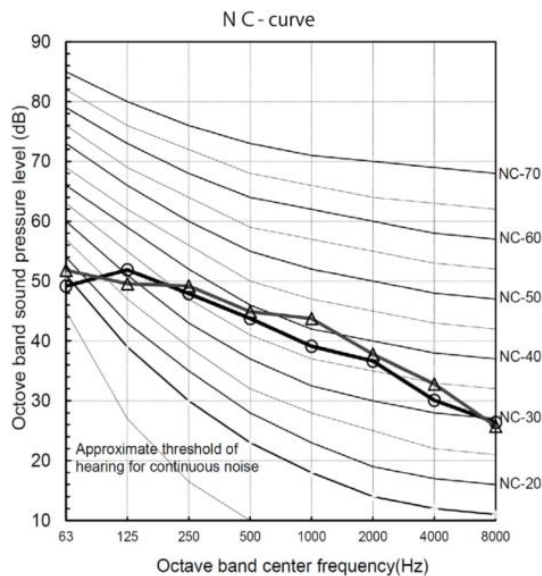
RBC-AHU1 Air Handling Unit Applications Digital Inverter - R32

CODE		25	35	50	
Outdoor Unit		RAV-	GM301ATP-E	GM401ATP-E	GM561ATP-E
Cooling Range (Min. - Max.)		kW	0.9 - 3.0	0.9 - 4.0	1.5 - 5.6
Heating Range (Min. - Max.)		kW	0.8 - 4.5	0.8 - 5.0	1.5 - 6.3
Ambient Operating Range Cooling/Heating		°C	-15 to 46/-15 to 15	-15 to 46/-15 to 15	-15 to 46/-15 to 15
Fan(s)	Motor Power	W	43	43	43
	Standard Air Flow	l/s	500	611	667
	Standard Air Flow	m³/min	30	37	40
	Standard Air Flow	m³/h	1800	2200	2400
Sound	Pressure Level C/H	dB(A)	46/47	49/50	46/48
	Power Level C/H	dB(A)	61/62	64/65	63/65
Unit	Appearance		Silky Shade (Muncel 1Y 8.5/0.5)	Silky Shade (Muncel 1Y 8.5/0.5)	Silky Shade (Muncel 1Y 8.5/0.5)
	Heat Exchanger		Finned tube	Finned tube	Finned tube
	Compressor Type		Hermetic Twin Rotary	Hermetic Twin Rotary	Hermetic Twin Rotary
	Compressor Power	kW	0.75	1.1	1.1
	Height x Width x Depth	mm	550 x 780 x 290	550 x 780 x 290	550 x 780 x 290
	Total Weight	kg	29	34	40
Refrigerant	Control		Pulse motor valve	Pulse motor valve	Pulse motor valve
	Gas Type		R32	R32	R32
	Base Charge/Chargeless To	kg/m	0.63/15	0.9/15	0.9/20
	Additional Charge Main Liquid Side	g/m	20	20	20
	Replacement Technology	Yes	R22, R407C, R410A, R417A, R134a, R12	R22, R407C, R410A, R417A, R134a, R12	R22, R407C, R410A, R417A, R134a, R12
Pipe Connections	Min.-Max. Length	m	2-20	2-20	5-30
	Height Difference Outdoor To AHU	m	±10	±10	±30
	Gas Side	inch	3/8	1/2	1/2
	Liquid Side	inch	1/4	1/4	1/4
	Drain Port Connector Hose Inner Diameter	mm	16	16	16
Electrical	Power Supply	V/ph/Hz	220-240/1/50	220-240/1/50	220-240/1/50
	Maximum Run Current	A	4.17	5.60	7.31
	Suggested Fused Supply	A	10	10	16

Digital Inverter R32 : 1 Phase

RAV-GM561ATP-E/TR (*ATJP-E)

Sound pressure level (dB(A))	Cooling	Heating
	46	48



Appendix B: Methodology and calculations.

Sound pressure levels.

The sound power levels and sound pressure levels of the equipment are presented in Section 5 and Appendix A. Assuming point source and hemispherical propagation, the sound pressure level at 1 m from each Air Handling Unit can be calculated. This is presented below:

Equipment reference	Equipment type	Sound power level, dB L _{WA}	Sound pressure level, dB L _{pA,1m}
Airedale AHU/01 Level 03	Air Handling Unit	82	72
Airedale AHU/02 Level 02	Air Handling Unit	83	73
RAV-GM2241AT8	Condensing Unit	-	60
RAV-GM561ATP	Condensing Unit	-	48

Table B1: Sound power levels and sound pressure levels of the various items of proposed external plant equipment.

Receptors.

The resultant sound pressure level at the façade of the worst-affected receptor has been calculated. This is presented in Table B2. As the plant equipment has the potential to run at full duty during daytime and night-time periods, the assessment has only been presented for the more onerous night-time period. If the requirements of the Planning Condition are achieved during the night-time, they will also be achieved during the daytime by default.

All screening has been calculated in accordance with ISO 9613-2 in octave band resolution. Where multiple barriers are present between source and receiver, only a single barrier has been considered as a conservative assessment.

The distances are not necessarily the shortest distance between the source and receiver group, but the distance between the source and the worst-affected property considering all three noise sources.

Parameter	Calculated sound level
Sound pressure level - Airedale AHU/01 Level 03 (dBA @ 1 m) – 1 x unit	72
Distance attenuation – 40 m (dB)	-32
Screening loss (dB)	-11
No reflections (dB)	0
Resultant sound pressure level – Airedale AHU/01 Level 03 (dB, $L_{Aeq,T}$)	29
Sound pressure level - Airedale AHU/02 Level 02 (dBA @ 1 m) – 1 x unit	73
Distance attenuation – 40 m (dB)	-32
Screening loss (dB)	-11
No reflections (dB)	0
Resultant sound pressure level – Airedale AHU/02 Level 02 (dB, $L_{Aeq,T}$)	30
Sound pressure level - RAV-GM2241AT8 (dBA @ 1 m) – 4 x units	66
Distance attenuation – 42 m (dB)	-32
Screening loss (dB)	-11
No reflections (dB)	0
Resultant sound pressure level – Toshiba RAV-GM2241AT8 (dB, $L_{Aeq,T}$)	23
Sound pressure level - RAV-GM561ATP (dBA @ 1 m) – 2 x units	51
Distance attenuation – 56 m (dB)	-35
Screening loss (dB)	-11
Reflection from backwall – 1 reflection (dB)	+3
Resultant sound pressure level – Toshiba RAV-GM561ATP (dB, $L_{Aeq,T}$)	8
TOTAL SOUND PRESSURE LEVEL (dB, $L_{Aeq,T}$)	33
Acoustic character correction – no discernible acoustic character (dB)	0
TOTAL RATING LEVEL (dB, $L_{A,r,Tr}$)	33
Background sound level – night-time (dB, $L_{A90,T}$)	43
Condition requirement – 5 dB below background (dB)	-5
Plant noise limit – night-time (dB, $L_{A,r,Tr}$)	38
Difference, dB	-5
Planning Condition criteria achieved at South Receptors, and therefore at all receptors	

Table B1: Noise assessment at South Receptors – from manufacturers data.

Parameter	Calculated sound level
Sound pressure level Airedale AHU/01 Level 03 (dBA @ 1 m) - Casing	58
Sound pressure level Airedale AHU/01 Level 03 (dBA @ 1 m) - Intake	54
Sound pressure level Airedale AHU/01 Level 03 (dBA @ 1 m) - Discharge	61
Sound pressure level - Airedale AHU/01 Level 03 (dBA @ 1 m) – TOTAL	64
Distance attenuation – 40 m (dB)	-32
Screening loss (dB)	-9
Resultant sound pressure level – Airedale AHU/01 Level 03 (dB, $L_{Aeq,T}$)	23
Sound pressure level - Airedale AHU/02 Level 02 (dBA @ 1 m) – Casing	56
Sound pressure level - Airedale AHU/02 Level 02 (dBA @ 1 m) – Intake	56
Sound pressure level - Airedale AHU/02 Level 02 (dBA @ 1 m) – Discharge	59
Sound pressure level - Airedale AHU/02 Level 02 (dBA @ 1 m) – TOTAL	62
Distance attenuation – 40 m (dB)	-32
Screening loss (dB)	-8
Resultant sound pressure level – Airedale AHU/02 Level 02 (dB, $L_{Aeq,T}$)	22
Sound pressure level - RAV-GM2241AT8 (dBA @ 1 m) – 2 x units	57
Number of units correction, $10\log(4/2)$ (dB)	+3
Sound pressure level - RAV-GM2241AT8 (dBA @ 1 m) – 4 x units	60
Distance attenuation – 42 m (dB)	-32
Screening loss (dB)	-11
Resultant sound pressure level – Toshiba RAV-GM2241AT8 (dB, $L_{Aeq,T}$)	17
Sound pressure level - RAV-GM561ATP (dBA @ 1 m) – 2 x units	47
Distance attenuation – 56 m (dB)	-35
Screening loss (dB)	-7
Resultant sound pressure level – Toshiba RAV-GM561ATP (dB, $L_{Aeq,T}$)	5
TOTAL SOUND PRESSURE LEVEL (dB, $L_{Aeq,T}$)	26
Acoustic character correction – no discernible acoustic character (dB)	0
TOTAL RATING LEVEL (dB, $L_{A,r,Tr}$)	26
Background sound level – night-time (dB, $L_{A90,T}$)	43
Condition requirement – 5 dB below background (dB)	-5
Plant noise limit – night-time (dB, $L_{A,r,Tr}$)	38
Difference, dB	-12
Planning Condition criteria achieved at South Receptors, and therefore at all receptors	

Table B2: Noise assessment at South Receptors – from measured values.



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