ENVIRONMENTAL NOISE

IMPACT ASSESSMENT

ZICHRON REUVEN AHARON LTD

T/A EITZ HACHAIM

43 GLENGALL ROAD

BARNET

EDGWARE HA8 8SZ

DECEMBER 2023

by

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DOCUMENT CONTROL. .

ENVIRONMENTAL

NOISE IMPACT ASSESSMENT

1. Introduction

Planning consent was granted by Appeal APP/N5090/W/23/3321620 for change of use from C3 (Residential) to F.1(f) (Synagogue) at 43 Glengall Road, Barnet, Edgware HA8 8SZ, in accordance with the terms of the application, Ref 22/4612/FUL, dated 13 September 2022, and the plans submitted with it, subject to the conditions set out in the attached schedule.

Condition 5 of the Appeal is that within one month of the date of the decision a scheme for soundproofing of the building is submitted in writing to the local planning authority for approval.

2. Description of the Site.

The site was formerly a private residence and has now been converted to a synagogue.

The building is at the corner of Kenilworth and Glengall Roads.

Houses on the far side of Kenilworth Road are about 25 metres distant and those on the opposite side of Glengall Road about 20 metres.

The house to the west is 41 Glengall Road and to the north is 97a Kenilworth Road both about 5 metres from the applicant building.

An aerial view of the site with the new provision of entrance gate and two air conditioning condensing units is show in Figure 1 of this report.

3. Acoustic Requirements of the London Borough of Barnet.

The Appeal Condition 4 limits occupation and use of the premises to 7 am to 10 pm. Condition 5 says

> *Unless within one month of the date of this decision a scheme for sound-proofing of the building is submitted in writing to the local planning authority for approval, and unless the approved scheme is implemented within one month of the local planning authority's approval, the use of the site as a Class F.1(f) (Synagogue) shall cease and all equipment and materials brought onto the land*

for the purposes of such use shall be removed until such time as a scheme is approved and implemented.
Upon implementation of the approved sound-proofing in this condition, that provision shall thereafter be maintained.

In the event of a legal challenge to this decision, or to a decision made pursuant to the procedure set out in this condition, the operation of the time limits specified in this condition will be suspended until that legal challenge has been finally determined.

the Barnet Local development Policy (Adopted) 2012 DM04 (d) that states,

"Proposals to locate development that is likely to generate unacceptable noise levels close to noise sensitive uses will not normally be permitted. Proposals to locate noise sensitive development in areas with existing high levels of noise will not normally be permitted. Mitigation of noise impacts through design, layout, and insulation will be expected where appropriate."

The policies reference National Planning Policy Framework (NPPF) and the Mayor of London Noise Strategy 2004.

BS 8233 2014

These documents rely on the guidance published in British Standard 8233 which was revised in 2014 to accompany the NPPF.

The recommendations of BS 8233 with respect to effect of noise of developments upon existing buildings are given in Section 7.

Table 4 in Paragraph 7.7.2 recommends the following criteria of noise inside dwellings:

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35dB $L_{Aeq,16\ hour}$	
Dining	Dining room/area	40dB $L_{Aeq\ 16\ hour}$	
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq\ 16\ hour}$	30dB $L_{Aeq\ 16\ hour}$

Paragraph 7.7.3.2 makes recommendations for noise levels in amenity spaces such as gardens. The recommendations are reproduced in part here:

Design criteria for external noise
For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB LAeq,T, with an upper guideline value of 55 dB LAeq,T which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In

higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.

The other part of 7.7.3.2 relates to balconies and terraces not relevant to this report.
The value of the time period T for the time average of Leq should be appropriate for the activity involved. It is the same as the values used in Table 4 above.

This guidance of BS 8233 is primarily intended for noise by industrial premises or roads, there is no specific guidance for noise from synagogues or places of assembly in the guidance from the local authorities, the London Plan, British Standards or the Institute of Acoustics. The reason for this omission is probably that these authorities do not consider noise from such premises to be a nuisance.

For the purpose of this report the standards of BS 8233 are, however, used.

BS 4142 2019.

BS 4142 "Methods for rating and assessing industrial and commercial sound" is appropriate for assessing the impact of noise from the air conditioning units.

The BS defines background noise as LA90, the noise that is present for more than 90% of the time when the machine is not running.

Section 11 of the BS provides guidance on the assessment of the noise.

Previous edition of the BS (2011) recommended that the machine noise should be 5 or 10dB below the background. This recommendation has been changed in the newer version because it was not practical or necessary. The old 2014 criterion would render the provision of heat pumps instead of gas boilers impossible.

The recommendation of the BS 2019 is in paragraph 11(d) that says:

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around +5 dB 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.

4. Instrumentation

The surveys of ambient noise have been conducted using the following equipment:

Sound level meter.

- Manufacturer Pulsar Instruments Limited
- Instrument type Dosemeter
- Model Model 30 Sound Level Meter and Spectrum Analyser
- Serial number T222059
- Standards EN 60651:94/A1:97 / A2:01 type 1
  IEC 61260:1995/A1:01 type 1
- Calibration Cirrus Research Certificate 228976
- Measurement range 0-137.0 dB
- Site Calibrator Cirrus CR:513A 94/104 dB

Analysis programme Cesva Capture Studio Version 2.2.0. and Microsoft Excel.

5 Method:

For this development it is necessary to consider noise from:

a. People inside the building praying or chanting.
b. People coming and going to the building.
c. Any new external ventilation or air conditioning equipment.

5.1. Recording location:

The greatest anticipated external noise level for the site was considered to be when people enter or leave the synagogue, Busiest period around dusk on Friday or Saturday evening. The recordings were in December with dusk around 4 to 5 pm.

The recorder was installed near the entrance at the location shown in Figure 1 of this report at a height of 2 metres.

5.2. Procedure:

The instrument was site calibrated and showed error of less than 0.1 dB.
The recording instrument was manned for the whole monitoring period.

The synagogue was operating as normal but with extra visits for Hanukkah festival on 7th December.

Measurements were taken continuously of the A weighted noise level with integration time of 1 minute for 6 days commencing 5th December 2023 at 12:18 and ending Monday 11th December at 11:36.

Instrument was set for fast response with exponential averaging time constant of 125 milliseconds.

The recorded values were downloaded to a computer running Cesva Capture Studio.

The equivalent continuous sound values for periods in excess of 1 minute were calculated by summation of the square of the sound pressure levels taken at 1 second intervals using the form

$L_{eq(T)} = 10 \log 1/n \left(\sum^{n=T}_{n=1} \text{Antilog}\ (0.1\ L_{eq}\right)$

Where n is the number of readings taken during time T.

The results from these readings are presented in graphical form to be more illustrative of the noise experienced.

It was not possible to measure noise output of the air conditioning condensing units, but reliable manufacturers data is used for this report.

6. Calculations

6.1. General.

In order to establish noise levels at nearby buildings it is necessary to carry out the following calculations:

6.2. Calculation of Noise by Air Conditioning Units

There are two outdoor air conditioning condensing units located as shown in Figure 1. AC1 is facing Kenilworth Road and is more than 10 metres from any other building. AC2 is in proximity of the house at 41 Glengall Road and is therefore analysed for noise.

The unit is Daikin RXM71R2V1B.

The manufacturers data sheet (Figure 5 of this report) shows sound power level of the unit when running at its highest condition as 67dBA.

The closest window of the house at 41 is 5 metres distant.
The general equation for attenuation with distance from a sound source is
Lp = Lw -20Log r -11dB +Dc

Where Lp = sound pressure level at the receiver
Lw= sound power level of source 67dBA from Daikin.
R = distance between source and receiver = 5 metres
11dB = correction assuming spherical propagation= 10 Log ($1/4\pi r^2$)
Dc Direction Coefficient. 3DB in this case because the unit is close to a wall.

Sound pressure level outside the window arising from the unit is then

Lp= 67dBA – 20 Log 5-11 +3 = **43dBA**

7. Results

The noise readings are given in graphical form in Appendices to this report. Tabulated values are available on request.

Figure 3 gives the LAeq 1 minute values for the 6 days set against the same time scale for each day so that the difference between normal weekdays and Friday and Saturday can be compared. The graph shows little difference between days except a short peaks of about 1 minute duration on Friday at 16.37 and 22.14. These might be attributable to someone passing close to the microphone.

Figure 4 is the same data with noise averaged in 15 minute blocks as LAeq15mins. There is a peak around 16.37 on Friday that might be attributable to people arriving and at 22.15 for unknown reasons.

Figure 5 is recording of LA90, the quietest 10% of noise. Averaged for same times of each of the 6 days of the recording between hours of 7 am and 10 pm. This period is chosen because occupation of the premises is limited to those hours by Condition 4 of the Appeal consent.
The averaged background noise level for the period of 13 hours is 53.3dBA

8. Discussion

The planning appeal consent Condition 4 limits the operation of the premises to 7 am to 10 pm except for the Jewish Pentecost.

The background noise level expressed as LA90 (in accordance with the recommendations of BS 4132(2019) is 53.3dBA

The Air Conditioning Units.

Noise from the air conditioning unit AC2 in Figure 1 is 43dBA at the nearest window in 41 Glengall Road.

This is 10dB below the background LA90. BS4142 (2109) 11(d) recommends that noise levels equal to the background LA90 is unlikely to have any significant adverse impact. Clearly a noise source 10dB below LA90 will have no adverse impact at all.

People Coming and Going.

The graph in Figure 3 shows that there is a period of about 15 minutes at 16.34 when the noise is about 4dB above the norm for that time of day, reaching 61dBA.

The noise peak at 22.10 to 22.25 recorded at 60dBA We have reviewed extracts of CCTV footage for the period and can see that there was no person entering or leaving the synagogue at that time. There was a very noisy car racing along the street at 22.14 and that might have resulted in the recorded noise anomaly. This CCTV footage is available on request.

If the noise peak at 16.34 is indeed from people in the pathway or gate it will be within the path from the entrance door to gate illustrated in Figure 1. This is 12 metres from the windows of 41 at which distance the noise will be reduced by 20 dB to about 41dB which is lower than the general background.

People Inside.

The recording was taken outside the windows of the synagogue and show no elevated noise at all during the normal hours of worship on Friday or any other evening.
The premises is provided with two large efficient modern air conditioning units that can by used to provide good internal temperatures with windows closed if ever there is any noise inside that might affect neighbours.

9. Conclusion

This synagogue has a time restriction under Condition 4 of the Planning Appeal that limits occupation and use to between 7 am and 10 pm. There is no provision for any religious celebration (Kiddush) and use will be limited to the usual religious meetings.

Worshipers live locally and come and go to the premises on foot. Motorised transport is expressly forbidden on the Friday/ Saturday sabbath.

Recordings were taken 24 hours per day for 6 days that include the busiest time of Hanukkah. There is no exceptional noise greater than the normal background.

The two air conditioning units are of modern quiet construction and will not be significantly audible at any nearby house. The units will not be used at night.

The noise emitted by the units is far below that recommended in the relevant British Standards and planning guidance.

Terence A Rook Bsc C.Eng., MIMechE, FCIBSE
19th December 2023

Figure 1 Site Location.

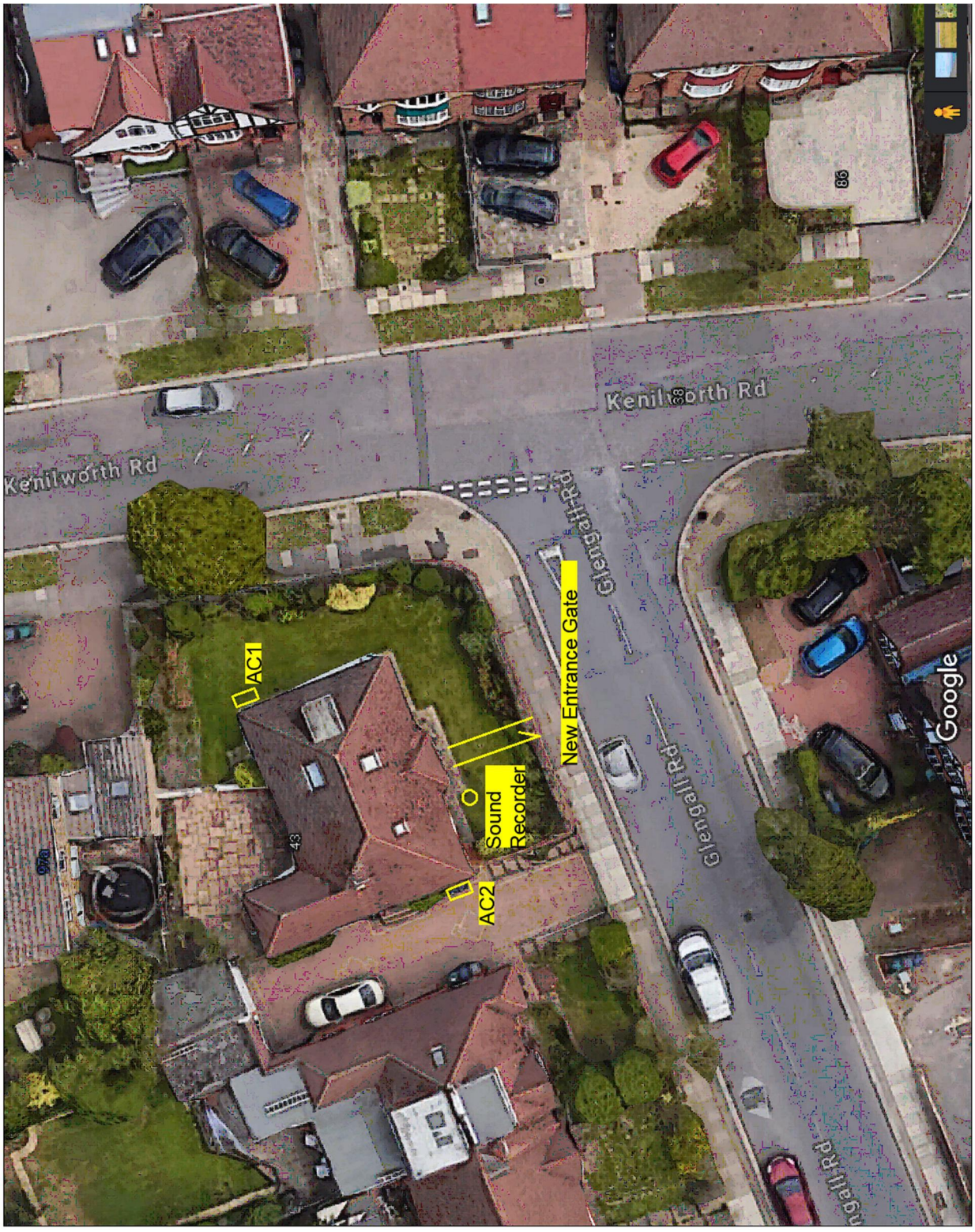

Figure 2 Recording for 7 days Friday and Saturday plus average of other days.

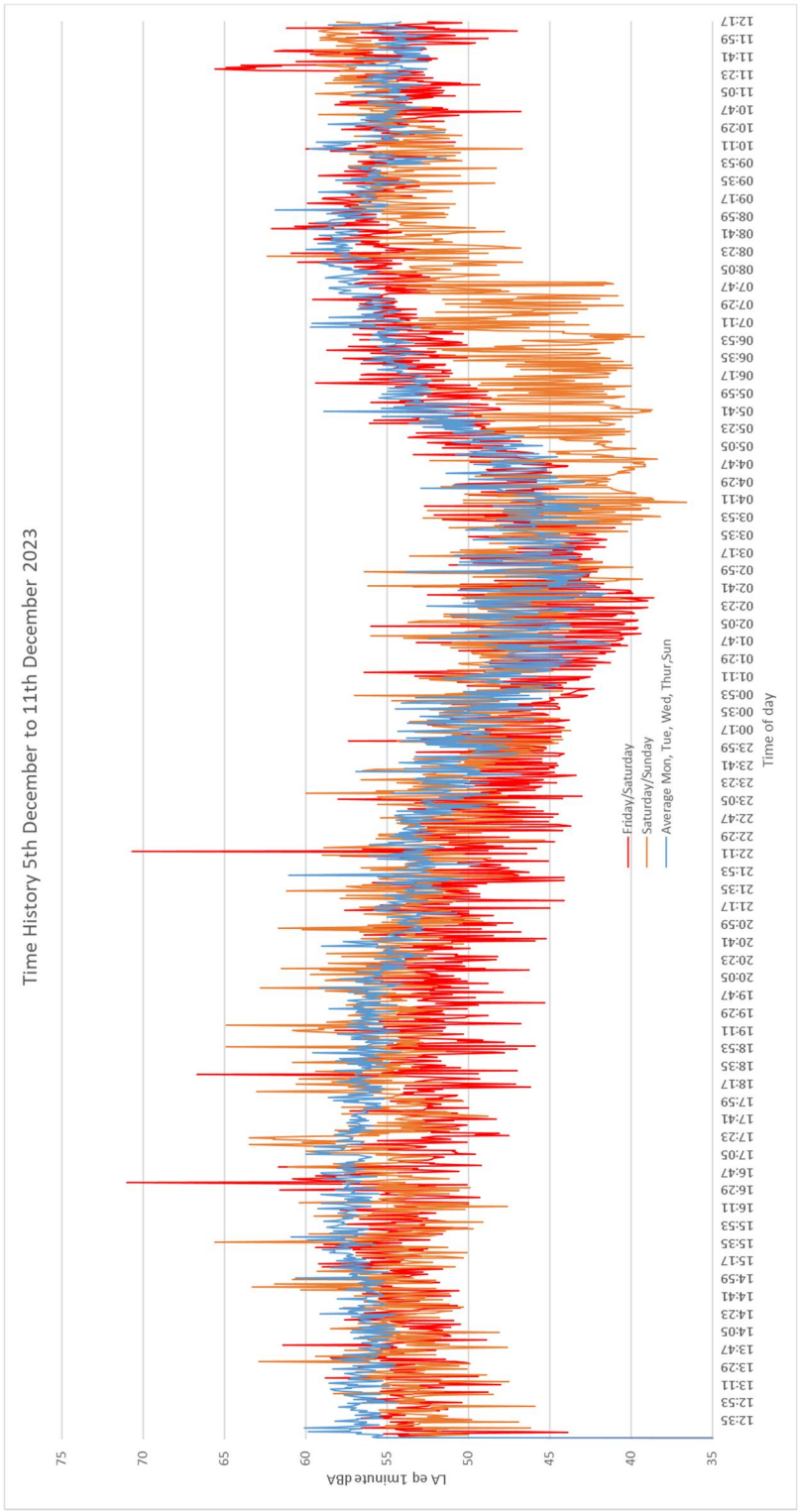

Figure 3 Recording for 6 Days. LAeq 15 minutes. Friday, Saturday and Average Other Days

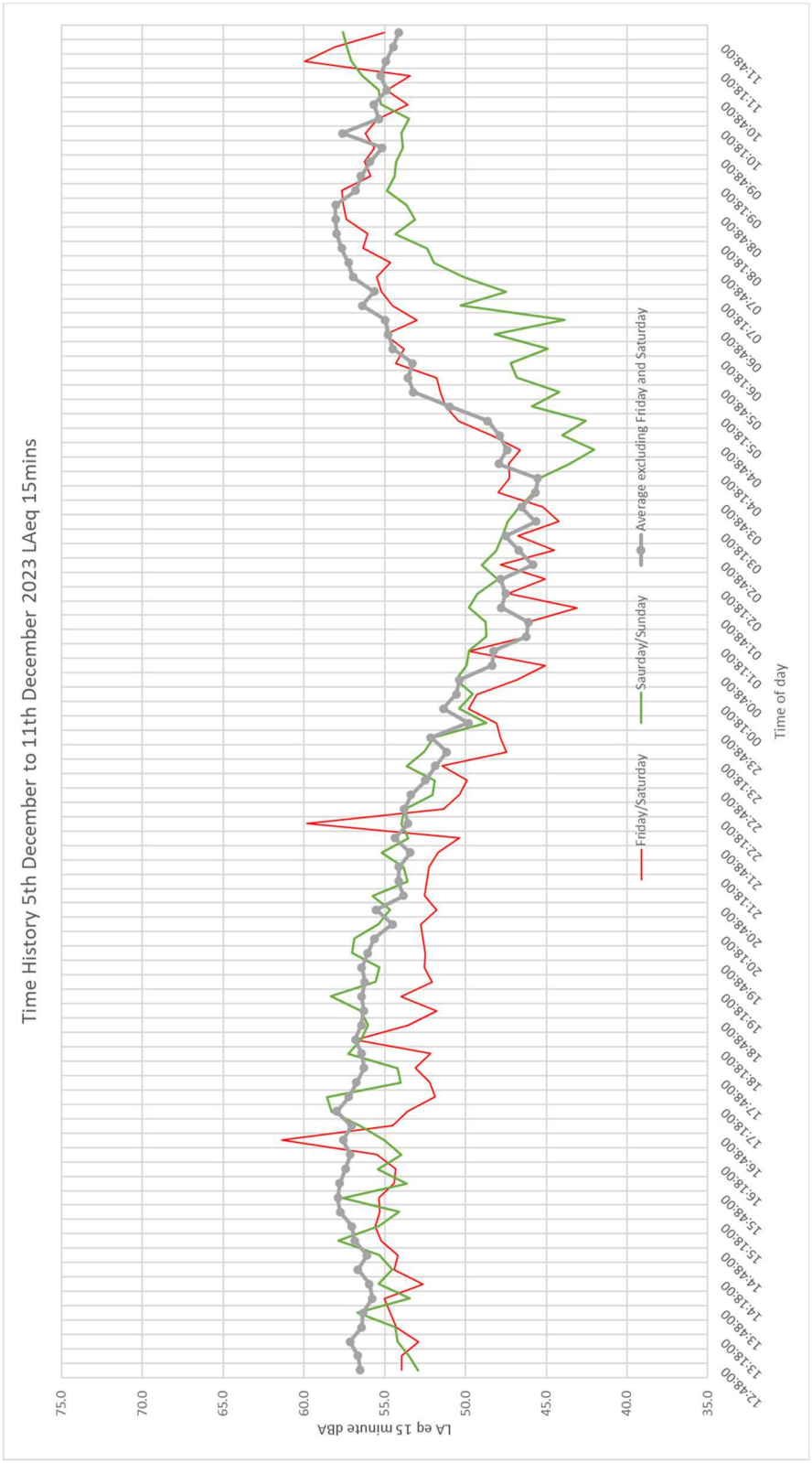

Figure 4. LA 90 Averaged over 6 days 7 am to 10 pm. 53.3dBA

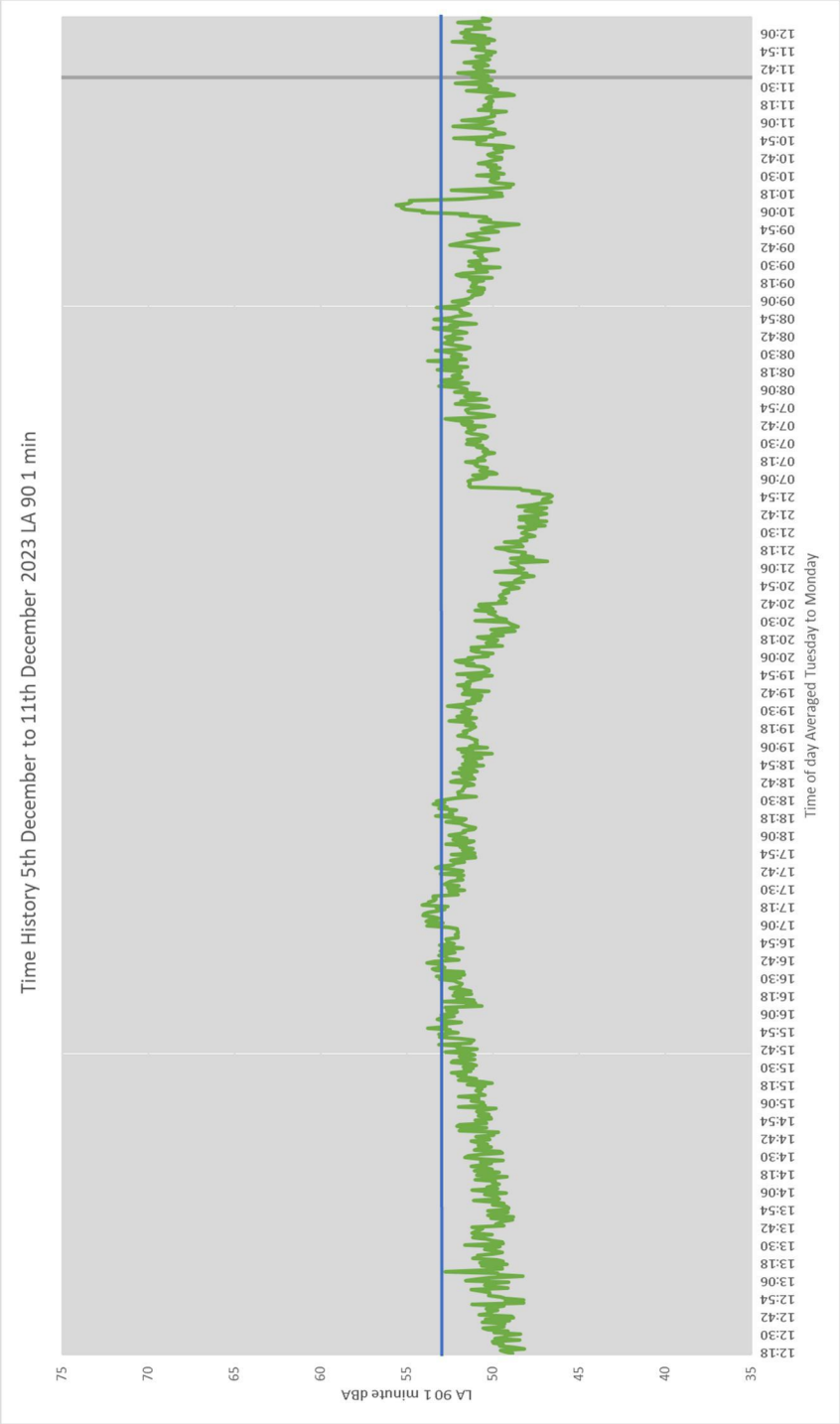

Figure 5. Noise Level of Air Condition Unit

2 Specifications

2 - 1 Specifications

Technical Specifications					RXM25R	RXM35R	RXM50R	RXM60R	RXM20R	RXM42R	RXM71R
Heat exchanger	Length			mm	805		920		805	920	
	Rows	Quantity			2						
	Fin pitch			mm	1.4		1.40		1.4	1.40	
	Stages	Quantity			24		32		24	32	
	Passes	Quantity			3.0		2.0		3.0	2.0	
	Tube type				ø7 HI-XD		7.0 HI-XD		ø7 HI-XD	7.0 HI-XD	ø7 HI-XD
	Fin	Type			Waffle fin (PE)						
Fan	Type				Propeller fan						
	Air flow rate	Cooling	Nom.	m^3/min	28.3	36.0	46.6		36.0	46.6	-
				cfm	999	1,271	1,645		1,271	1,645	1,730
			Medium	m^3/min	-						49.0
		Heating	Nom.	m^3/min	28.3		44.1		28.3	44.1	-
				cfm	999		1,557		999	1,557	1,632
			Medium	m^3/min	-						46.2
Fan motor	Model				DFC05A3VA		D55F-31		DFC05A3VA	D55F-31	D90B-37
	Output			W	50		55		50	55	128
	Speed	Cooling	High	rpm	860	920	760		920	760	880
			Nom.	rpm	800	860	740		800	740	780
			Low	rpm	400		640		400	640	700
		Heating	High	rpm	860		720		860	720	780
			Nom.	rpm	800		720		800	690	740
			Low	rpm	400		660		400	500	680
Compressor	Model				1YC25GXD#C		2YC40JXD#C		1YC25GXD#C	2YC40JXD#C	2YC71DXD#C
	Oil Amount			cm^3	375		650		375	650	900
	Type				Hermetically sealed swing compressor						
	Output			W	800		1,300.0		800	1,300.0	2,400.0
Compressor	Oil Type				FW68DA						
Operation range	Cooling	Ambient	Min.	°CDB	-10						
			Max.	°CDB	50 (1) / 46 (2)		50 (4) / 46 (5)		50 (1) / 46 (2)	50 (4) / 46 (5)	46
	Heating	Ambient	Min.	°CWB	-15		-21		-15	-21	-15
				°CDB	-20 (1) / -15 (2)		-20 (4) / -15 (5)		-20 (1) / -15 (2)	-20 (4) / -15 (5)	-15
			Max.	°CWB	18						
				°CDB	24						
Sound power level	Heating	Nom.		dBA	-		62.0	63.0	-	62.0	67.0
Sound pressure level	Cooling	Nom.		dBA	46	49	48.0		46	48.0	47.0
	Heating	Nom.		dBA	47	49	49.0		47	48.0	
Refrigerant	Type				R-32						
	Charge			kg	0.76		1.15		0.76	1.10	1.15
	Charge			TCO2Eq	0.52		-		0.52	-	
	Control				Expansion valve						
	GWP				675		675.0		675	675.0	
Piping connections	Liquid	OD		mm	6						
	Gas	OD		mm	9.50		12.7		9.50		15.9
	Drain	OD		mm	18		16		18	16	18
	Piping length	OU - IU	Max.	m	20		30		20	30	
		System	Chargeless	m	10						
	Additional refrigerant charge			kg/m	0.02 (for piping length exceeding 10m)						
	Level difference	IU - OU	Max.	m	15		20.0		15	20.0	
	Heat insulation				Both liquid and gas pipes						
Capacity control	Method				Variable (inverter)						

Standard accessories: Drain plug;Quantity: 1;

Standard accessories: Installation manual;Quantity: 1;

Standard accessories: Refrigerant charge label;Quantity: 1;

Standard accessories: Multilingual fluorinated greenhouse gases labels;Quantity: 1;

Standard accessories: Drain cap (1);Quantity: 6;

Standard accessories: Drain cap (2);Quantity: 3;

Electrical Specifications				RXM25R	RXM35R	RXM50R	RXM60R
Power supply	Phase			1~			
	Frequency		Hz	50			
	Voltage		V	220-240			
Wiring connections	For power supply	Quantity		3			
		Remark		Earth wire included			
	For connection with indoor	Quantity		4			
		Remark		Earth wire included			
Current - 50Hz	Maximum fuse amps (MFA)		A	13		16	

Appendix Glossary of Terms used in this Report

Decibel (dB): a unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 Pa, the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.

dB(A): decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about100 dB(A).

Hertz (Hz): unit of frequency, equal to one cycle per second. Frequency is related to the pitch of a sound.

L*A10,T :* the A weighted level of noise exceeded for 10% of the specified measurement period (T). It gives an indication of the upper limit of fluctuating noise such as that from road traffic.

LA10,16h is the arithmetic average of the 18 hourly LA10,1h values from 07.00 to 23.00.

L*A90,T* : the A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 1990 it is used to define background noise level.

L*Aeq,T* : the equivalent continuous sound level -the sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). LAeq,T is used to describe many types of noise and can be measured directly with an integrating sound level meter.

L*Amax:* the highest A weighted noise level recorded during a noise event. The time weighting used (F or S) should be stated.

Rw: single number rating used to describe the sound insulation of building elements (also see Annex 6). It is defined in BS 5821: 1984.