cass allen

Architectural & Environmental Consultants

Noise | Vibration | Air Quality

Noise Assessment

Former Friends' School Fields

Noise Assessment

Project: FORMER FRIENDS' SCHOOL FIELDS

Report reference: RP01-23493-R3

Client:
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Document control:

REVISION	ISSUE DATE	REPORT BY	CHECKED BY	NOTES
0	18 June 2024	[redacted], Senior Acoustics Consultant	[redacted], Technical Director	Initial issue
1	01 July 2024	[redacted] Senior Acoustics Consultant	-	Minor amendments
2	08 July 2024	[redacted], Senior Acoustics Consultant	[redacted], Technical Director	Minor amendments
3	11 April 2025	[redacted] Consultant	[redacted] Senior Acoustics Consultant	Minor amendments

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1. EXECUTIVE SUMMARY

1.1 Cass Allen has been instructed by Chase New Homes Ltd to assess the following noise sources as part of the proposed new development 'Former Friends' School Fields' on Mount Pleasant Road, Saffron Walden:

- road traffic noise affecting the new sensitive receptors
- noise from a proposed air source heat pump (ASHP) affecting new and existing sensitive receptors

1.2 The assessment was carried out in accordance with relevant local and national planning guidance.

1.3 A noise survey was carried out at the site. Noise levels at the site are dictated by road traffic noise emissions from Mount Pleasant Road.

1.4 A 3D noise model of the development was constructed based on the results of the site noise survey. The noise model was used to calculate road traffic noise levels at worst-case facades of the development.

1.5 Appropriate limits for noise from mechanical plant have been calculated based on measured noise levels at the site and guidance given in BS4142. It is envisaged that it will be straightforward to achieve the plant noise limits. This will be investigated further at the detailed design stage.

1.6 In summary, it is our view that the site is suitable for the development in terms of noise levels and that planning permission may be granted.

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3. PROJECT DESCRIPTION

3.1 The site is currently undeveloped and is located in a mixed-use area, bounded to the east and south by a residential development, and to the west by the former Friends' School buildings. The site is bounded to the north by Mount Pleasant Road.

3.2 The site location is shown in Figure 1 below.

Figure 1 Site Location and Surrounding Area

3.3 The proposal is to develop the site into residential properties with an area at the south of the site allocated for sport pitches (for which it has current lawful use). A current drawing of the proposed development layout is shown in Appendix 1.

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4. PLANNING POLICY

National Policy

4.1 Outline guidance for the assessment of noise affecting new developments is given in the National Planning Policy Framework (NPPF) (December 2024). Relevant sections in this case are highlighted below:

> *187. Planning policies and decisions should contribute to and enhance the natural and local environment by … preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of …noise pollution.*
>
> *198. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
>
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

Local Policy

4.2 Uttlesford District Council's Local Plan 2005 provides the following outline guidance on the assessment of noise and vibration affecting new development in the district.

> ***Policy GEN4 - Good neighbourliness***
>
> *Development and uses, whether they involve the installation of plant or machinery or not, will not be permitted where:*
>
> *a) noise or vibrations generated, or*
>
> *b) smell, dust, light, fumes, electro magnetic radiation, exposure to other pollutants; would cause material disturbance or nuisance to occupiers of surrounding properties*
>
> ***Policy ENV11 - Noise Generators***
>
> *Noise generating development will not be permitted if it would be liable to affect adversely the reasonable occupation of existing or proposed noise sensitive development nearby, unless the need for the development outweighs the degree of noise generated.*

4.3 To address the requirements of the national and local policies, the following key acoustic matters have been assessed:

- noise affecting the habitable areas of the proposed development
- noise emissions from a proposed ASHP at the position of existing sensitive receptors in the area

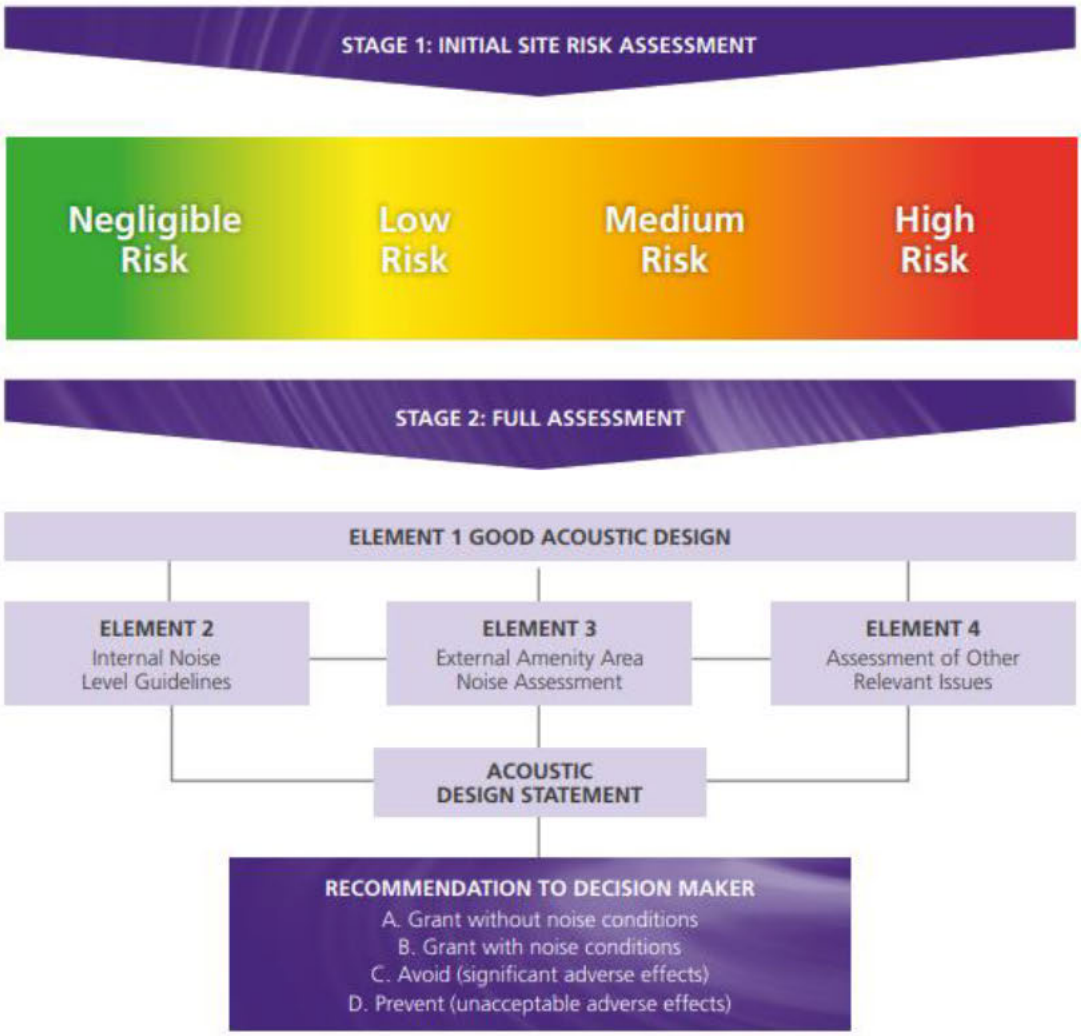
5. ROAD TRAFFIC NOISE AFFECTING THE DEVELOPMENT

5.1 Specific guidance on the assessment of noise affecting new residential development is given in ProPG: Planning and Noise for New Residential Development, May 2017 (ProPG). The process within the ProPG guidance for the appraisal of noise levels affecting new residential development is considered to be current 'best practice' and has, therefore, been followed for the assessment. The assessment process can be summarised as follows:

- Stage 1 – measure noise levels at the site and carry out an initial noise risk assessment of the proposed development site based on the measured levels.
- Stage 2 – where a higher noise risk is identified, carry out a detailed assessment including the following four considerations:
    - Element 1 – the overall acoustic design and layout of the site
    - Element 2 – internal noise levels in habitable areas
    - Element 3 – noise levels in external amenity areas
    - Element 4 – consideration of other relevant issues
- Based on the results of the Stage 2 assessment, provide a recommendation to the decision maker on whether planning permission can and should be granted.

5.2 The process is shown visually in Figure 2 below.

Figure 2 ProPG Assessment Process



5.3 It should be noted that the guidance in ProPG relates primarily to noise from transportation sources, i.e. road traffic, aircraft, rail etc. Any significant noise from other sources (e.g. industrial, commercial or entertainment sources) is outside the scope of the ProPG guidance and, therefore, requires separate consideration. This is discussed further below in relation to noise from the sports pitches and clubhouse to the south of the site.

Stage 1 – Noise survey and initial assessment

5.4 A noise survey was carried out at the site from 10th to 14th May 2024 to assess existing noise levels in the area. The full methodology and results of the noise survey are provided in Appendix 2.

5.5 Average (LAeq), maximum (LAmax), and background noise levels (L90) across the site were generally dictated by road traffic on Mount Pleasant Road.

5.6 Areas of the development at the northern edges of the site will be subject to the highest noise levels. The 3D modelling results show that noise levels at these positions are as follows:

- Northern facades of the site facing Mount Pleasant Road:
  - Average noise levels during the daytime – 60 dB LAeq,0700-2300hrs
  - Average noise levels during the night-time - 51 dB LAeq,2300-0700hrs
  - Typical maximum noise levels during the night-time - 66 dB LAmax

5.7 Based on the results of the site noise survey, a 3D computer noise model was developed to predict and assess the noise levels that will exist across the entire development.

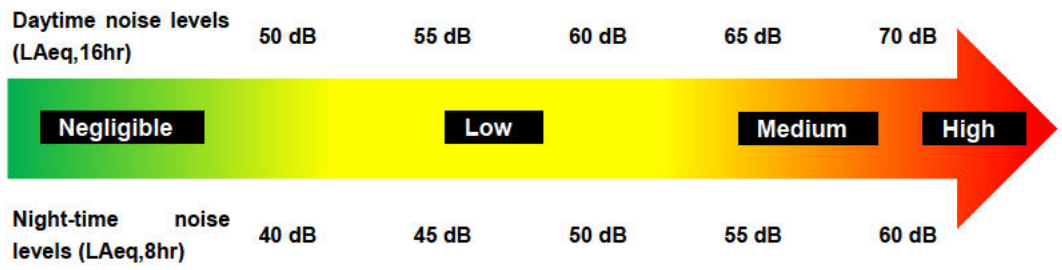
5.8 The 3D noise model was developed using Cadna/A 2024 environmental noise modelling software. Cadna/A incorporates the calculation methodology outlined in the Department of Transport Welsh Office - Calculation of Road Traffic Noise (CRTN) for the assessment of road traffic noise propagation.

5.9 The layout of the development and surrounding area was input into the model. To calculate the spread of noise levels around the site, day-time average noise levels were input for Mount Pleasant Road and calibrated to the results of the on-site noise measurements.

5.10 The methodology and results of the noise modelling are provided in Appendix 3. It can be seen from the modelling results that road traffic noise levels will be highest on facades of the development facing Mount Pleasant Road and lowest on facades in the centre and south of the site.

5.11 The noise levels can be compared with Figure 3 below to assess the 'noise risk' of the site. Where the noise risk is high, significant acoustic design measures may be required to achieve acceptable noise levels in the development. Where the noise risk is low, acceptable noise levels may be achievable with no specific acoustic design measures.

Figure 3 Noise Risk Assessment (Adaption of Figure 1 from ProPG)



5.12 It can be seen from a comparison of the measured noise levels in paragraph 5.6 above with Figure 3 that the site is 'Low' risk in relation to daytime noise levels and 'Low' risk in relation to night-time noise levels. Therefore, ProPG requires that a more detailed 'Stage 2' assessment is carried out.

Stage 2 – Element 1 – Overall acoustic design of the site

5.13 The acoustic design of development has been reviewed in relation to the measured noise levels at the site. The layout of the development is considered to represent good acoustic design since gardens are positioned behind dwellings such that they will be acoustically screened from the dominant noise source.

5.14 As this development includes a new ASHP associated with the clubhouse, noise from this needs to be assessed. Mitigation options include limiting hours when the ASHP is in use and/or acoustic barriers/louvers enclosing the unit. This is addressed in section 6.

Stage 2 – Element 2 - Internal noise levels

5.15 Appropriate design criteria for acceptable noise levels in acoustically sensitive areas of new developments are given in BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*'.

5.16 Relevant BS8233 design criteria are summarised in Table 1 below.

Table 1 BS8233:2014 Internal Noise Criteria

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB LAeq,16hour	-
Dining	Dining room/area	40 dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hour	30 dB LAeq,8hour

5.17 Full construction details for the development have not been finalised as the project is at an early design stage. It has therefore been assumed that the external walls of the development will be constructed using a standard masonry construction (e.g. 102mm brick, 100mm insulated cavity, 100mm concrete block) or a light-weight construction designed to achieve a similar level of sound insulation (this is technically achievable subject to detailed design).

5.18 The ventilation strategy for the development has not yet been confirmed and therefore it is assumed that background ventilation will be provided via trickle ventilators in the building facade. This is a 'worst case' assumption from an acoustic perspective as trickle ventilators are often an acoustic weak point in the facade.

5.19 Calculations were carried out using facade modelling software in accordance with the methodology given in BS8233:2014 to calculate the sound insulation performance required of the glazing and ventilation to achieve the nominated internal noise criteria in the 'worst-case' habitable rooms of the development (i.e. the habitable rooms that will be subject to the highest external noise levels).

5.20 If acceptable internal noise levels can be achieved in 'worst case' habitable rooms then it follows that acceptable internal noise levels can be achieved in all other habitable rooms of the development using similar glazing and ventilator types.

5.21 The calculations were carried out based on the following typical dimensions/details for facade elements:

- glazing – 1.5m^2 for bedrooms and 2m^2 for living rooms
- external walls – 8m^2 for bedrooms and 15m^2 for living rooms
- 2 in-frame trickle ventilators in bedrooms and 3 in-frame trickle ventilators in living rooms

5.22 The results of the calculations are shown in Appendix 4. Due to the quiet nature of the site and surrounding area, "standard" thermal double glazing and ventilation can be used on all facades on the site. Table 2 below shows the assumed "standard" acoustic performance of glazing and ventilation used for the calculations.

Table 2 Acoustic Requirements for Habitable Rooms

'Worst Case' Rooms	Glazing Performance Requirements (inc. Frames)	Ventilator Performance Requirements (in Open Position)
Bedrooms in development	27 dB Rw+Ctr	31 dB Dne,w + Ctr
Living rooms in development	27 dB Rw+Ctr	31 dB Dne,w + Ctr

Note The requirements given are approximate only and should be confirmed at the detailed design stage when full design details are available.

5.23 The required sound insulation performance values in Table 2 could typically be achieved by the glazing and ventilator types shown in Table 3.

Table 3 Typical Glazing / Ventilator Acoustic Performances

Glazing (in Good Quality Sealed Frames)	Typical Weighted Sound Reduction (Rw + Ctr)
4/16/4mm standard thermal double glazing	27
Ventilators	**Typical Acoustic Performance (Dnew + Ctr)**
Standard 'hit & miss' in-frame trickle ventilator	31

Note The acoustic performance of the glazing systems (including frames) should always be confirmed with the manufacturer before selection for installation on site.

5.24 It can be seen from the above that acceptable internal noise levels will be achievable in the development subject to the specification of suitable glazing and ventilation systems at the detailed design stage. It is our view therefore that the proposed development is, in principle, acceptable with regards to the noise levels that will exist within the habitable rooms.

5.25 The above ProPG assessment for planning purposes is based on internal noise levels with windows closed (assumed to be "normal" circumstances). However, it is anticipated that residents will open their windows at times for thermal comfort (e.g. to prevent overheating in warmer months). Noise levels in the rooms will increase under these circumstances.

Stage 2 – Element 3 – Noise levels in external amenity areas

5.26 BS8233 states that it is desirable that noise levels in external amenity areas of residential developments do not exceed 50 dB LAeq and that 55 dB LAeq,T should be regarded as an upper guideline value. However, BS8233 recognises that these guideline values will not always be achievable in city centres or urban areas adjoining main roads or other transport sources. In these cases, BS8233 states that the development should be designed to achieve the lowest practicable noise levels in the amenity spaces.

5.27 The noise survey and 3D noise modelling results indicate that noise levels in external amenity areas are predicted to achieve the BS8233 recommended levels. The proposed development is therefore also considered to be acceptable based on noise levels in external amenity areas.

Stage 2 – Element 4 – Other relevant issues

5.28 In our view the design and acoustic approach outlined above is in line with both local and national noise policy.

Recommendation to decision maker

5.29 It is our view that planning permission may be granted in relation to noise affecting habitable areas of the development.

6. PLANT NOISE ASSESSMENT

Design criteria – Mechanical plant noise

6.1 BS4142:2014+A1:2019 – *Methods for rating and assessing industrial and commercial sound* (hereafter BS4142) can be used to assess the impact of noise from external industrial and/or commercial noise sources on nearby sensitive receptors.

6.2 The BS4142 assessment methodology can be summarised as follows:

1. Measure the existing background noise levels (LA90,T dB) at the locations of nearby noise sensitive receptors during the quietest periods when the noise source(s) under investigation will operate
2. Predict or measure the noise emissions (LAeq,T dB) from the noise source(s) under investigation at the location(s) of the nearby sensitive receptors, and add corrections for any distinguishable acoustic features (e.g. tones, whines, screeches, hisses etc)
3. Subtract the measured background noise levels (item 1 above) with the measured or predicted rating noise levels (item 2 above) at each sensitive receptor. BS4142 states that:

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.

NOTE 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.

6.3 Rated plant noise levels that are "equal to background levels" at sensitive receptors are of low impact according to BS4142. This criterion has therefore been adopted for the assessment of noise emissions from the plant associated with the development.

6.4 The external mechanical plant associated with the development comprises one ASHP which serves the proposed clubhouse. It has been confirmed by the Client that it will only operate during daytime hours i.e. 7am-11pm. A night-time assessment is therefore not required.

6.5 Background noise levels (LA90) at the site were measured as part of the site noise survey outlined in Appendix 2. The measured background noise levels have been used to develop limits for plant noise emissions from the new development at the positions of the surrounding residential properties in accordance with the BS4142 assessment methodology. The limits are shown in Table 4 below.

Table 4 BS4142 Noise Limits - Free-field Levels

Location	Day-time/Evening (0700-2300hrs)
Nearest residential properties to proposed ASHP	35 dB LAr,Tr

Note 1 The above limits are 'rated' noise levels. Any mechanical plant noise emissions should have appropriate corrections for the character of the noise applied and still meet these limits.

Proposed mechanical plant design

6.6 The proposed location of the ASHP is shown in Figure 4 below.

Figure 4 Proposed ASHP Location

6.7 Details of the current proposed ASHP are provided below. The manufacturer's data sheet is provided in Appendix 5.

- ASHP – CAHV-R450YA-HPB – 72 dBA at 1m from the unit operating at typical maximum duty (capacity priority mode)

6.8 The 3D noise model was used to predict noise emissions from the ASHP at the locations of surrounding noise sensitive positions. The predictions assumed that the ASHP was running in the louder 'capacity priority' mode and that some form of acoustic mitigation was installed (for example a louvered enclosure or bolt-on attenuators – this is discussed further in Paragraphs 6.9-6.9 below). The results of the predictions are shown in Table 5.

Table 5 Predicted Plant Noise Emissions from New Building - Free-field Levels

Location	Predicted Plant Noise Levels (dB LAr,Tr)	BS4142 Criteria (dB LAr,Tr)
Nearest and 'worst case' new sensitive receptors	35	35
Nearest and 'worst case' existing sensitive receptors	26	35

Note 1 The predicted rated levels provided above include the benefit of acoustic attenuation. This is discussed further below.

6.9 It can be seen from Table 5 that the predicted plant noise level at the nearest new and existing sensitive receptors is equal to or lower than the daytime BS4142 noise criteria. The currently proposed outline details for the ASHP are therefore considered to be acceptable with regards to noise, providing acoustic mitigation is installed with performance requirements specified in Table 6 below.

Table 6 Mitigation – Min. Performance Requirements of Acoustic Mitigation

63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
5	5	13	17	17	17	13	12

6.10 It is envisaged that it will be straightforward to specify acoustic mitigation with the above insertion loss requirements, either in the form of a full louvered enclosure or bolt on attenuators. This can be investigated further at the detailed design stage.

6.11 As the design of the plant system is developed in more detail, Cass Allen will be reviewing details to ensure compliance with the nominated BS4142 noise limits.

7. CONCLUSIONS

7.1 Cass Allen has been instructed by Chase New Homes Ltd to assess the following noise sources as part of a proposed new development 'Former Friends' School Fields' on Mount Pleasant Road, Saffron Walden:

- road traffic noise affecting the new sensitive receptors
- noise from a proposed air source heat pump (ASHP) affecting new and existing sensitive receptors

7.2 It is our view that the site is suitable for the development in terms of noise levels and that planning permission should be granted.

Appendix 1 Proposed Site Drawings

Appendix 2 Survey Results

Survey Summary:

The survey comprised short-term operator attended noise measurements and longer-term unattended noise monitoring at the site. Noise levels at the site were generally dictated by road traffic on Mount Pleasant Road.

Survey Period:

10/05/2024 to 14/05/2024

Survey Objectives:

- To identify noise sources that contribute to ambient noise levels at the site;
- To measure noise levels around the site over a typical day and night-time period.

Equipment Used:

Type	Manufacturer	Model	Serial Number
Sound level meter[1]	Bruel & Kjaer	2250	3029152
Calibrator	Bruel & Kjaer	4231	2115551
Sound level meter[1]	NTi Audio	XL2	A2A-24252-E1
Calibrator	Larson Davis	Type CAL200	15011
Sound level meter[1] (noise logger)	Rion	NL-32	00251125
Calibrator	Rion	NC-74	34551703

Note 1: All sound level meters were calibrated before and after measurement periods and no significant drift in calibration was found to have occurred. The results of the measurements are therefore considered to be representative.

Weather Conditions:

The observed weather conditions were acceptable for acoustic measurement throughout the attended survey periods (low-medium wind speeds and no rain). Weather records for the area confirmed that weather conditions were also generally acceptable for acoustic measurement during the unattended monitoring.

Measurement Positions:

Position (refer plan below)	Description
N1	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby roads
N2	Attended noise monitoring position. 1.5m above ground. Free-field. Direct line of sight to nearby roads
L1	Unattended noise logging position. 3m above ground level. Free-field. Direct line of sight to nearby roads
L2	Unattended noise logging position. 2m above ground level. Free-field. Direct line of sight to nearby roads

Site Plan showing Measurement Positions:

Attended Noise Monitoring Results:

Date	Position	Time	Meas. Length	LAeq, dB	LAmax, dB	LA90, dB	Observations
10/05/2024	N1	15:02	7 secs	57	65	-	Noise dictated by road traffic from Mount Pleasant Road
		15:04	4 secs	67	76	-	
		15:05	5 secs	61	66	-	
10/05/2024	N2	14:03	1 min 40 secs	42	59	36	Average noise level dictated by nature sounds. Background noise level dictated by Mount Pleasant Road.

Unattended Noise Monitoring Results:

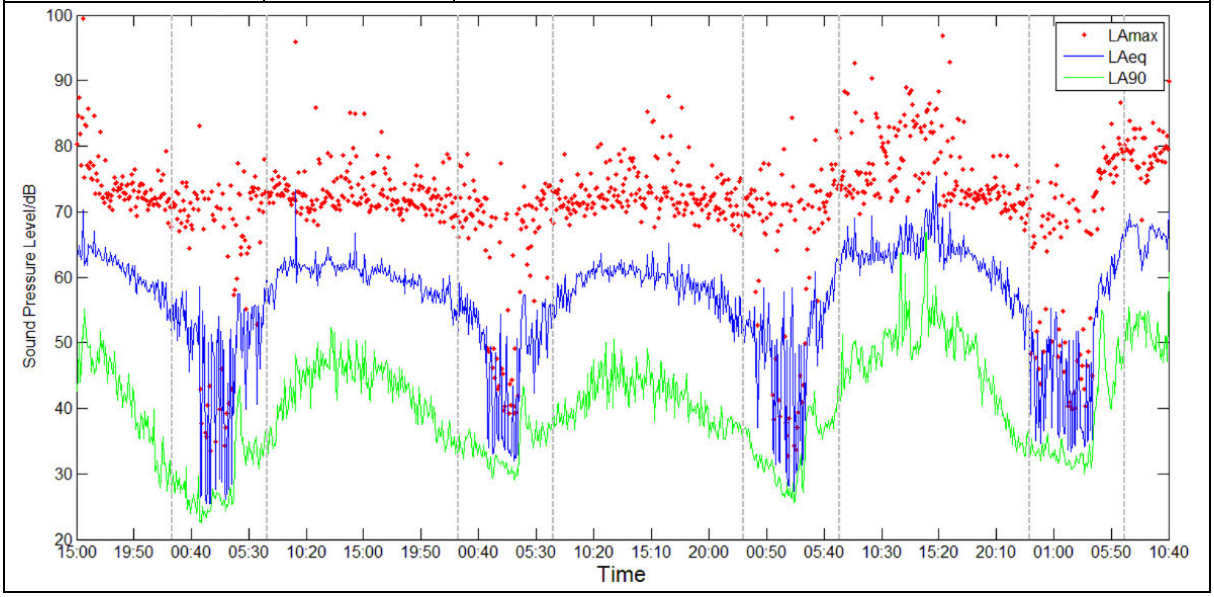
Meas. Period	Position	Daytime (0700-2300hrs)		Night-time (2300-0700hrs)		
		LAeq,16hr, dB	LA90,1hr dB[1]	LAeq,8hr, dB	LA90,5mins, dB[1]	LAmax, dB[2]
10/05/2024 to 14/05/2024	L1	62	35	53	31	74-76
10/05/2024 to 14/05/2024	L2	51	35	47	25	74-76

Note 1: Typical lowest measured during the period shown.

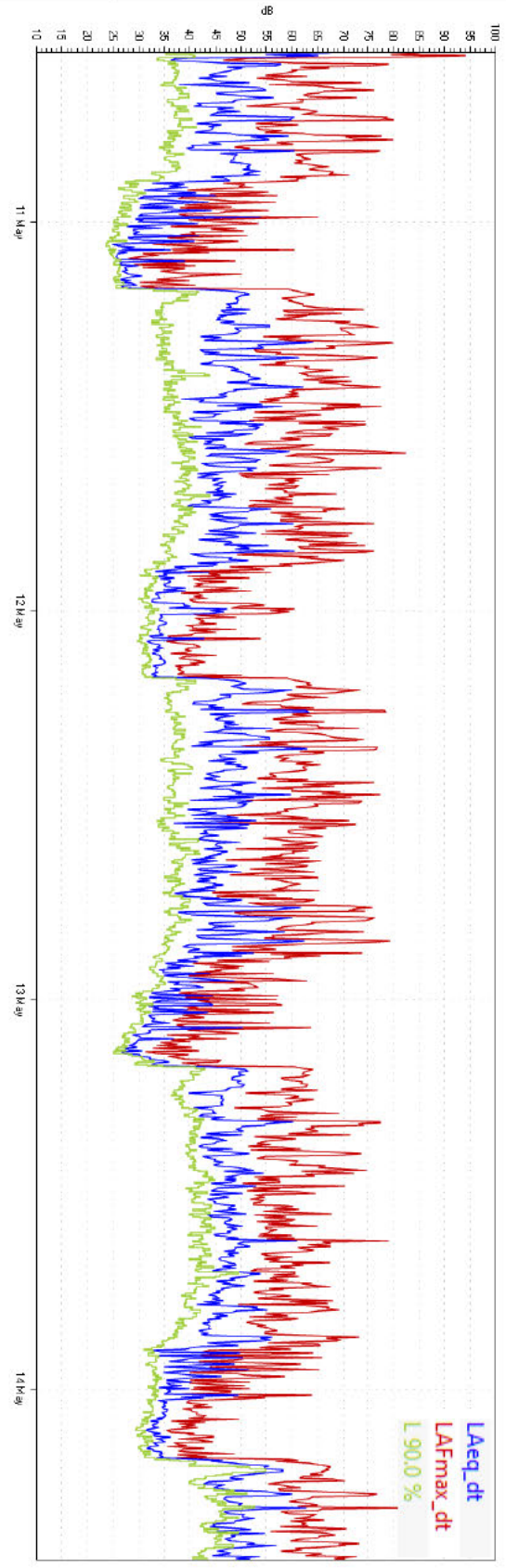
Note 2: Highest typical maximum noise level during the night-time (not exceeded more than 10-15 times per night).

Unattended Noise Monitoring Results:

Meas. Period	Position	
10/05/2024 to 14/05/2024	L1	



Meas. Period	Position	
10/05/2024 to 14/05/2024	L2	



Appendix 3 Modelling Results

Modelling Software:	CADNA/A Version 2024
Modelled Scenarios:	• Day and night-time average noise levels across the site • Plant noise levels at sensitive receptors
Data inputs:	• Noise survey results • Topographical data for the site • Development layout
Calculation Algorithms Used:	• Calculation of Road Traffic Noise 1988 – Department of Transport • ISO 9613-1:1993 Acoustics-Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere • ISO 9613-2:1996 Acoustics-Attenuation of sound during propagation outdoors – Part 2: General method of calculation

Modelling Printout:

Scenario	Daytime 'average' noise levels (LAeq,16hr)

Scenario	Night-time 'average' noise levels (LAeq,8hr)

Scenario	Night-time maximum levels (LAmax)

Scenario	Daytime noise levels (LAeq,16hr). Garden levels.

Scenario	ASHP noise emissions (LAr,1hr). Includes benefit of acoustic attenuation.

Appendix 4 Facade Simulation Calculations

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FACSIM V2.7.9 - MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

PROJECT:	Former Friends School Fields
ROOM:	Bedroom
VARIANT:	Night-time average (LAeq,8hr)
NOTES:	

Room Dimensions [m]	W		L		H
	3.0	X	4.0	X	2.4

Room Volume =	28.8	m3
Partition Area =	9.5	m2
Ventilation ref area =	10.0	m2
Free Field SPL K =	3	dB

SELECT Free Field or Façade SPL for model input >>>

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ---->	-								No data
Road traffic spectrum (according to BS 8233:1999 section 6)	51.0								
		32.8	36.9	40.4	43.8	47.0	44.2	39.0	Reference spectrum

REVERBERATION TIME

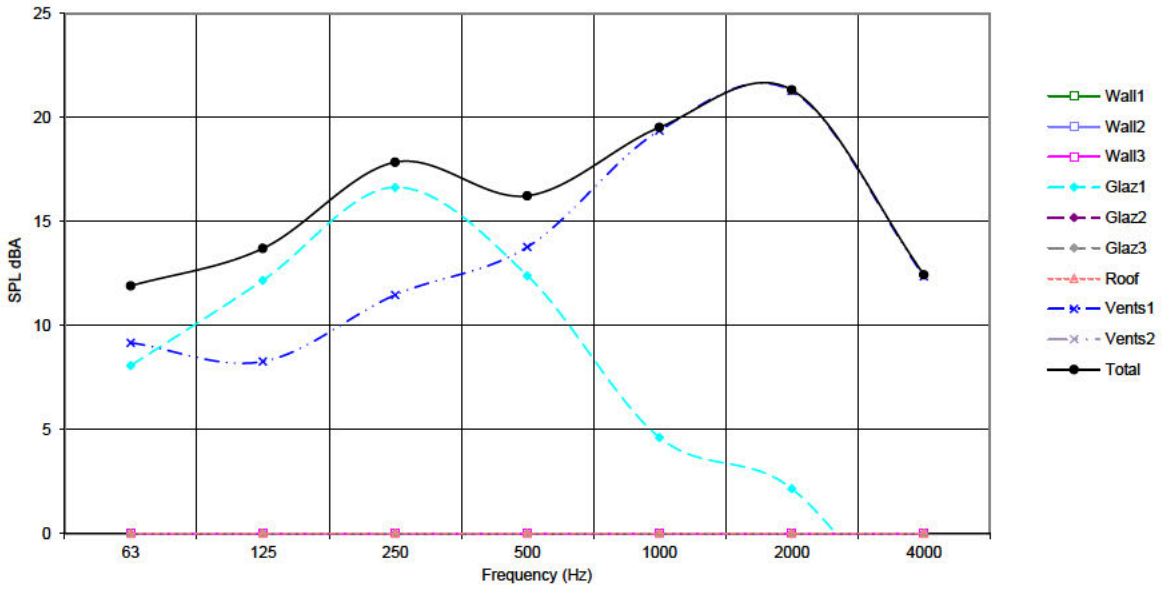
DIRECT INPUT ---->								No data
EQUAL RT for all bands ---->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	8.0	36	45	44	47	57	67	77	0%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	1.5	20	20	19	27	38	37	40	24%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		27	28	27	34	45	45	48				
	Resultant SPL inside room excluding ventilators dB	19.7	9	12	17	13	5	2	-5	24%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Hit and miss trickle (4000mm^2) e.g. Titon Trimvent XS13	2	30	35	35	36	34	29	33	75%	32	0	-1
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	24.6	9	8	11	14	19	21	12	76%			

Total SPL inside room	25.8	12	14	18	16	20	21	12

Element contribution to total internal noise level



FACSIM V2.7.9
- MODELLING OF FACADE ACOUSTIC INSULATION TO BS12354-3 and BS8233

PROJECT:	Former Friends School Fields
ROOM:	Bedroom
VARIANT:	Night-time max (LAmax)
NOTES:	

Room Dimensions [m]: W 3.0 X L 4.0 X H 2.4

Room Volume = 28.8 m3
Partition Area = 9.5 m2
Ventilation ref area = 10.0 m2
SELECT Free Field or Façade SPL for model input >>>
Free Field SPL K = 3 dB

NOTES:
-11.2

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ---->	66.0	22.8	43.7	50.6	57.6	60.8	61.2	58.5	
Road traffic spectrum (according to BS 8233:1999 section 6)									
		22.8	43.7	50.6	57.6	60.8	61.2	58.5	Direct input

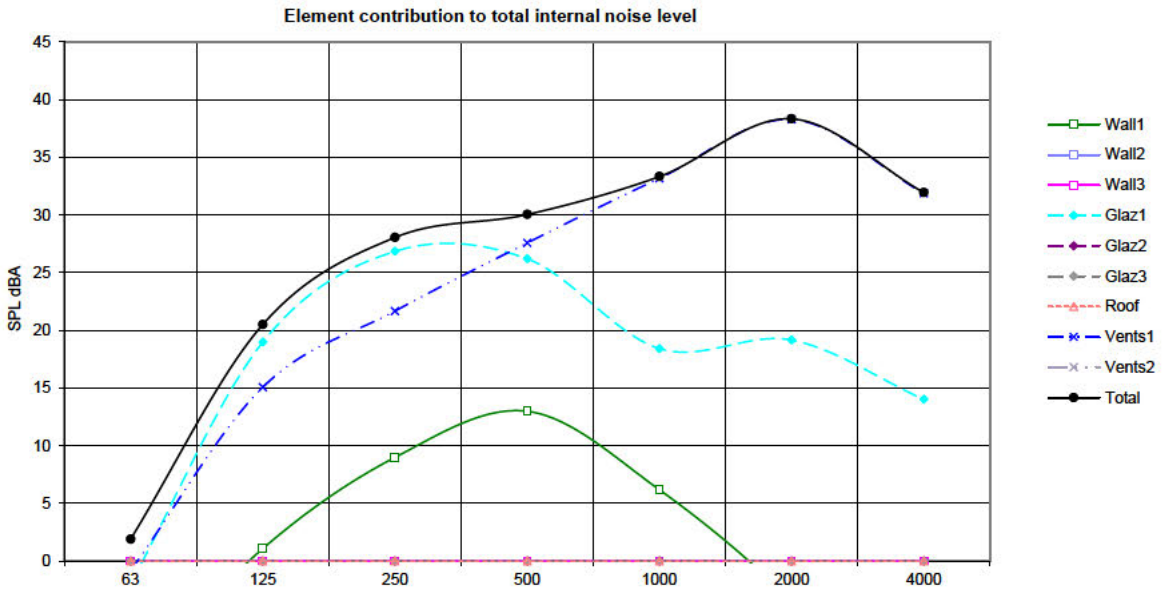
REVERBERATION TIME

DIRECT INPUT ---->									No data
EQUAL RT for all bands ---->									
		0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	8.0	36	45	44	47	57	67	77	0%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	27 dB Rw + Ctr - Standard Thermal Double Glazing	1.5	20	20	19	27	38	37	40	9%	27 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		27	28	27	34	45	45	48				
	Resultant SPL inside room excluding ventilators dB	30.8	-1	19	27	26	19	19	14	10%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Hit and miss trickle (4000mm^2) e.g. Titon Trimvent XS13	2	30	35	35	36	34	29	33	90%	32	0	-1
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	40.4	-1	15	22	28	33	38	32	90%			

Total SPL inside room	40.9	2	21	28	30	33	38	32



PROJECT:	Former Friends School Fields
ROOM:	Living room
VARIANT:	Daytime average (LAeq,16hr)
NOTES:	

Room Dimensions [m]: W 4.0 X L 5.0 X H 2.4

Room Volume = 48.0 m3
Partition Area = 14.5 m2
Ventilation ref area = 10.0 m2
SELECT Free Field or Façade SPL for model input >>>
Free Field SPL K = 3 dB

NOTES:

EXTERNAL SPECTRUM (A weighted)

	dBA	63	125	250	500	1000	2000	4000	
Direct input - Free Field SPL (A weighted octave bands) dB ---->	-								No data
Road traffic spectrum (according to BS 8233:1999 section 6)	59.0								
		40.8	44.9	48.4	51.8	55.0	52.2	47.0	Reference spectrum

REVERBERATION TIME

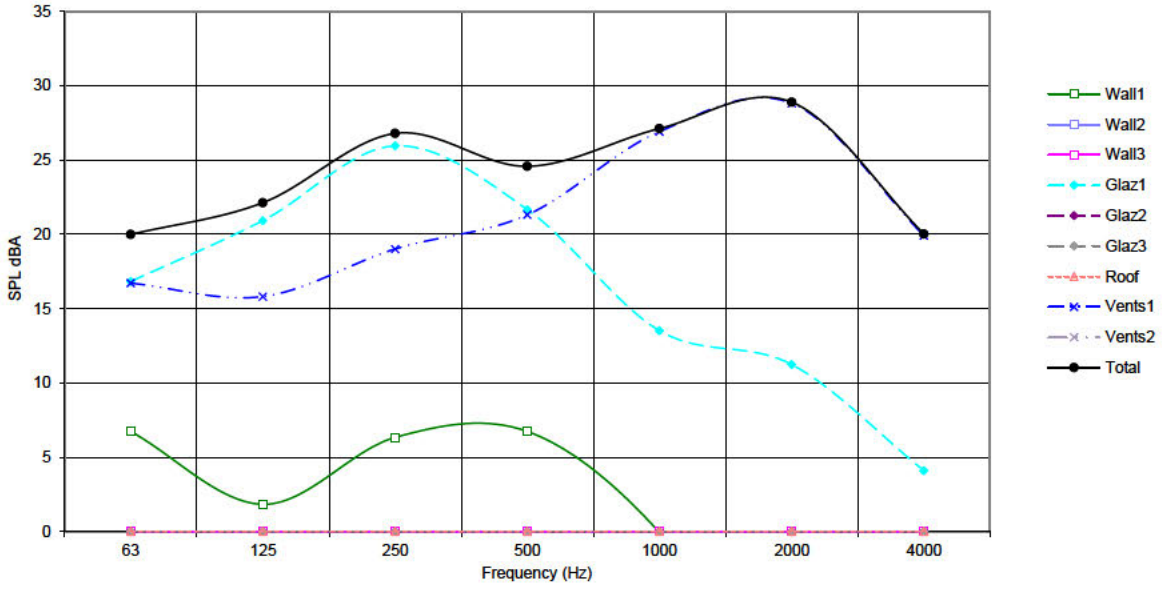
DIRECT INPUT ---->								No data
EQUAL RT for all bands ---->								
	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Default - RT set to 0.5s

Façade Element		Area [m2]	SRI dB to BS EN ISO 140-3:1995								Rw	C	Ctr
Wall 1	Typical - 102mm brick/50mm cavity/100mm block	12.0	36	45	44	47	57	67	77	1%	54	0	-4
	ATTENUATION												
Wall 2	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Wall 3	WALLS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 1	26 dB Rw + Ctr - Standard Thermal Double Glazing	2.5	19	19	18	25	37	36	38	31%	26 (inc Ctr)	-	-
	ATTENUATION												
Glazing 2	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Glazing 3	GLAZING		0	0	0	0	0	0	0	0%			
	ATTENUATION												
Roof	ROOF / FLOOR		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant composite Façade SRI		26	27	25	33	44	44	46				
	Resultant SPL inside room excluding ventilators dB	28.8	17	21	26	22	14	11	4	32%			

Ventilator Type		Num	$D_{n,e}$ dB to BS EN 20140-10:1992								Dnew	C	Ctr
Ventilation	Hit and miss trickle (4000mm^2) e.g. Titon Trimvent XS13	3	30	35	35	36	34	29	33	68%	32	0	-1
	ATTENUATION												
Ventilation	VENTS		0	0	0	0	0	0	0	0%			
	ATTENUATION												
	Resultant SPL inside room through ventilators dB	32.2	17	16	19	21	27	29	20	68%			

Total SPL inside room	33.8	20	22	27	25	27	29	20

Element contribution to total internal noise level



Appendix 5 ASHP data sheet

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CAHV-R450YA-HPB

Ecodan Air Source Heat Pump

The Mitsubishi Electric Ecodan **CAHV air source heat pump** uses low GWP R454C refrigerant, offering a robust, low carbon system for the provision of sanitary hot water and space heating. This innovative heat pump solution can operate as a single system or form part of a multiple unit system, making it suitable for most commercial applications.

The multiple unit system has the ability to cascade available units to both on and off mode to meet the load from a building. As an example of this unique modulation, a 16 unit system allows 0.5kW increments of capacity, from 7.8kW all the way up to 640kW*. With cascade and rotation built in as standard, the Ecodan CAHV system is perfectly suited to commercial applications including schools and hospitals.

R454C

*At nominal conditions A7W35

Key Features & Benefits:

- Low GWP R454C refrigerant and reduced embodied carbon helps achieve CSR targets
- Achieves 70°C outlet temperature down to -20°C ambient temperature for continuous heating provision
- Multiple unit cascade control from 7.8kW to 640kW capacity provides design flexibility for a wide range of commercial applications
- Water flow temperatures from 24°C to 70°C without boost heaters results in cost and energy savings
- Advanced heat exchange design combined with the properties of R454C refrigerant enables a shorter defrost time
- Low frequency compressor control improves energy efficiency and product operation
- Ability to rotate units based on accumulated run hours offers extended product life
- Requires only water and electrical connections, for ease of installation
- Hermetically-sealed monobloc design, requiring low maintenance

CAHV-R450YA-HPB
Ecodan Air Source Heat Pump

MODEL			CAHV-R450YA-HPB
Power source			3-phase 4-wire 380-400-415V 50/60 Hz
Capacity(EN14511) *1		kW	40
	Power input	kW	14.03
	Current input	A	23.7-22.5-21.7
	COP (kW/kW)		2.85
	SCOP Low/Medium		3.57/3.24
Capacity *2		kW	33.4
	Power input	kW	16.6
	Current input	A	28.0-26.6-25.7
	COP (kW/kW)		2.01
Maximum current input		A	44.0-41.8-40.3
Water pressure drop *1			10.2 kPa (1.47 psi)
Temperature range *5	Outlet water temperature		24-70°C
	Outdoor temperature	D.B.	-25-43°C
Circulating water volume range *5			25 l/min-250 l/min
Sound pressure level (measured 1m below the unit in an anechoic room) *1*4		dB (A)	64
Sound pressure level (measured 1m below the unit in an anechoic room) *3*4		dB (A)	72
Water pipe diameter and type	Inlet	mm (in)	38.1 (1 1/2"), housing type joint
	Outlet	mm (in)	38.1 (1 1/2"), housing type joint
External finish			Acrylic painted steel sheet <Munsell 5Y 8/1 or similar>
External dimensions H × W × D		mm	1710 × 1750 × 740
Net weight		kg (lbs)	359 (791)
Design pressure	R454C	MPa	3.85
	Water	MPa	1.0
Heat exchanger	Water-side		Copper brazed stainless steel sheet
	Air-side		Plate fins and copper tubes
Compressor	Type		Inverter scroll hermetic compressor
	Manufacturer		MITSUBISHI ELECTRIC CORPORATION
	Starting method		Inverter
	Motor output	kW	12.1
	Lubricant		FVC32EA
Fan	Air flow rate	L/s	2500 × 2
	External static pressure		10 Pa (1mm H2O)
	Type and quantity		Propeller fan × 2
	Control and driving mechanism		Inverter control, direct driven by motor
	Motor output	kW	0.92 × 2
HIC (Heat inter-changer) circuit			Copper pipe
Protection devices	High pressure		High-pressure sensor and switch set at 3.85 MPa (643 psi)
	Inverter circuit		Overheat and overcurrent protection
	Compressor		Overheat protection
	Fan motor		Thermal switch
Defrosting method			Auto-defrost mode (Reversed refrigerant cycle)
Refrigerant	Type and factory charge	kg	R454C, 9.0 kg
	Flow and temperature control		LEV and HIC circuit

Notes:

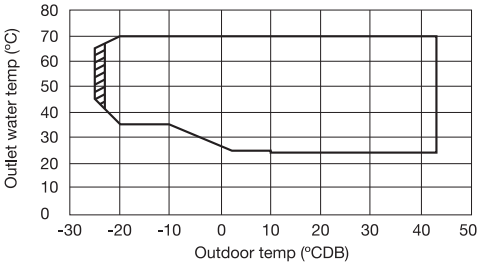
*1 Under normal heating conditions at the outdoor temperature of 7°CDB/6°CWB, the outlet water temperature of 45°C, and the inlet water temperature of 40°C.

*2 Under normal heating conditions at the outdoor temperature of -5°CDB/-6°CWB and the outlet water temperature of 55°C.

*3 Under normal heating conditions at the outdoor temperature of 7°CDB/6°CWB when the unit is set to the "Capacity Priority" mode through the dry NC-contact.

*4 The sound pressure level is a value measured in an anechoic room in accordance with the conventional method in JRA4060.

*5



Outdoor temp. -25°CDB/Outlet water temp. 45~65°C
Outdoor temp. -20°CDB/Outlet water temp. 35~70°C
Outdoor temp. 43°CDB/Outlet water temp. 24~70°C

*6 4.0 - 15.0 m^3/h under the following conditions:

a. When the outdoor temperature is below 0°C,

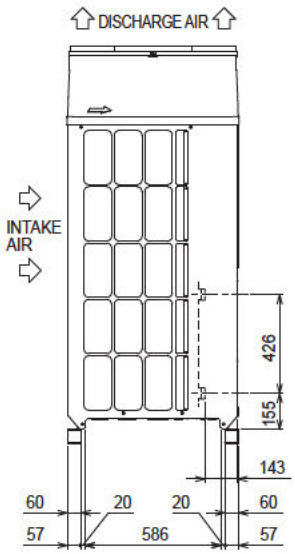
b. When the outlet water temperature is 30°C or below AND the outdoor temperature is 6°C or below.

Commercial Heating | **Product Information**

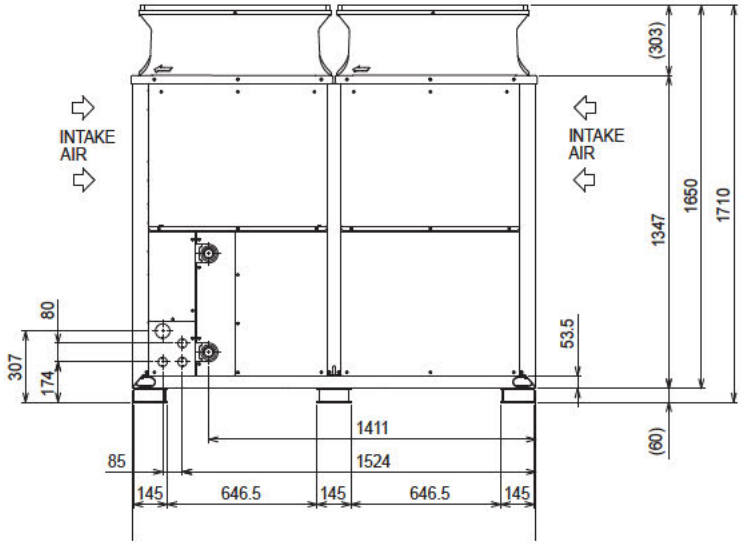
CAHV-R450YA-HPB
Ecodan Air Source Heat Pump

CAHV-R450YA-HPB DIMENSIONS

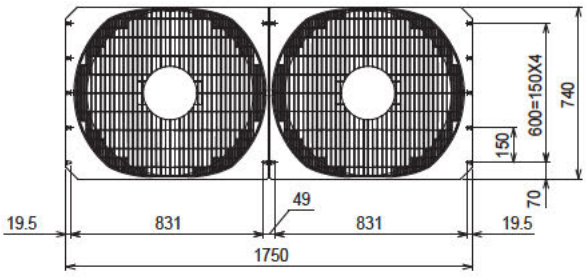
SIDE VIEW



FRONT VIEW



UPPER VIEW



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Changes for the Better

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Note: Refer to 'Installation Manual' and 'Instruction Book' for further 'Technical Information'. The fuse rating is for guidance only and please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R32 (GWP:675), R407C (GWP:1774), R134a (GWP:1430), R513A (GWP:631), R454B (GWP:466), R1234ze (GWP:7) or R1234yf (GWP:4). *These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No.626/2011 from IPCC 3rd edition, these are as follows. R410A (GWP:1975), R32 (GWP:550), R407C (GWP:1650) or R134a (GWP:1300).

Effective as of November 2022

Green Gateway greengateway.mitsubishielectric.co.uk

cass allen

Architectural & Environmental Consultants

Noise | Vibration | Air Quality

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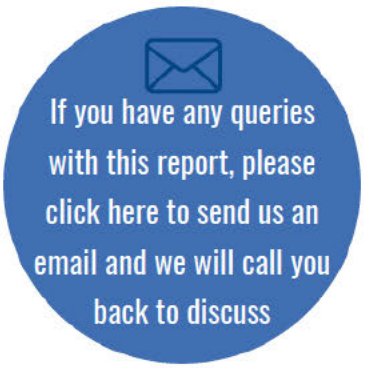

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