



Project: J 05713
Plant Noise Assessment v1.2:
49 Beach Road, PO11 0JB

Consultants: Sound Planning Ltd
25a Vicarage Hill
Lower Bourne
Farnham
Surrey
GU10 3QS

TEL: 01252 711972

Client: Oak View Care Home

Prepared by: J. Willmott

Signed:

J. Willmott MSc M.I.O.A
Senior Acoustic Consultant

Dated: 8th December 2025



CONTENTS

Section		Page Number
1	BACKGROUND	3
2	ASSESSMENT CRITERIA	4
3	NOISE SURVEY METHODOLOGY	8
4	NOISE CALCULATION METHODOLOGY	9
5	NOISE MEASUREMENT RESULTS	10
6	NOISE LEVEL CALCULATION RESULTS	10
7	BS4142 ASSESSMENT	11
8	NOISE MITIGATION STRATEGY	11
9	CONCLUSIONS	11
	APPENDIX 1 – Glossary of Terms	13
	APPENDIX 2 – Site Location/Plans	17
	APPENDIX 3 – Site Photographs	20
	APPENDIX 4 – Noise Measurement Data	21
	APPENDIX 5 – Levels of Uncertainty	27
	APPENDIX 6 – Plant Data Sheets	28
	APPENDIX 7 – Noise Map	230



1. BACKGROUND

- 1.1. The application concerns re-location of 6 existing external AC units as part of a 1st floor extension of an existing care home at the site. The units are associated with cooling of the common parts of the care home and will not be active at night.

See APPENDIX 2 - Site Location/Plans.

- 1.2. Sound Planning understands that the following equipment will contribute to the noise emissions from the proposed installation:

- Unit 1 - Mitsubishi MUZ-AP25VG external AC unit
- Unit 2 - Mitsubishi MUZ-AP50VG external AC unit
- Unit 3 - Mitsubishi PUZ-M100VKA2 external AC unit
- Unit 4 - Hitachi RAC 50 WPB external AC unit
- Unit 5 - Mitsubishi MUZ-AP60VG external AC unit
- Unit 6 - Hitachi RAC-25-WPB external AC unit

See APPENDIX 6 – Plant Data Sheets

- 1.3. The AC units will be located on the central recessed flat roof in the centre of the building. There is no line of sight from residential windows within the site to the units on the roof, which is surrounded by a pitched roof extending approximately 1m above the height of the units and providing a significant amount of acoustic screening.
- 1.4. Sound Planning has been retained to evaluate potential noise impact on the nearest noise sensitive receiver using appropriate methodologies and assessment criteria, and to design a suitable noise mitigation strategy if required.
- 1.5. Jake Willmott is a Member of the Institute of Acoustics (M.I.O.A) having attained appropriate qualifications in acoustics and has seven years' experience undertaking acoustic assessments including significant experience of BS4142 assessments in the context of planning applications.

Jake has attained the following qualifications within the field of acoustics:

- Institute of Acoustics (IOA) Diploma



- Masters Degree - Applied Acoustics (Solent University)

1.6. Site and Location

- 1.6.1. The site is in a predominantly residential area. See APPENDIX 2 - Site Location/Plans.
- 1.6.2. The nearest noise sensitive receiver to the proposed plant installation is a residential window within the site at 1st floor level. See APPENDIX 2 - Site Location/Plans.

1.7. Proposed Operation Times:

- Monday – Sunday: 07:00 - 23:00 hours

2. ASSESSMENT CRITERIA

- 2.1. The plant noise assessment should be carried out in accordance with relevant standards and guidelines in conjunction with National Planning Policy (from the National Planning Policy Framework and the Noise Policy Statement for England), and the requirements of Havant Borough Council.

2.2. National Planning Policy Framework

- 2.2.1. The National Planning Policy Framework (NPPF) was released in March 2012 and last updated in December 2023.
- 2.2.2. Paragraph 174 of the NPPF states: *'Planning policies and decisions should contribute to and enhance the natural and local environment by... preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of... noise pollution...'*
- 2.2.3. Paragraph 185 of the NPPF states that; *'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:*
 - *mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to*



significant adverse impacts on health and the quality of life (see Explanatory Note to the Noise Policy Statement for England (DEFRA)).

- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

2.2.4. Paragraph 193 of the NPPF states that; *‘Planning policies and decisions should ensure that new development⁴ can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.’*

2.2.5. Therefore, the NPPF requires that significant impacts are avoided, adverse impacts be mitigated and reduced to a minimum, and places an obligation on developers to not unduly constrain the operation of existing businesses and other noise sources in the area (the ‘agent of change’ principle).

2.3. Noise Policy Statement for England (NPSE)

2.3.1. The NPSE requires that developments:

- ‘Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life; and
- Where possible contribute to the improvement of health and quality of life’

2.4. Local Planning Policy (Havant Borough Council)

2.4.1. Havant Borough Council have requested that the requirements of the following condition are achieved:

“1. Noise emitted from any fixed building services plant and equipment shall be controlled to at least 5 dB(A) below the lowest representative background



sound level, when assessed in accordance with BS4142:2014+A1:2019 at a position 1m outside any habitable window of any residential or other noise-sensitive property. This criterion applies to the total contribution of noise from all plant and equipment associated with the development operating during any given period.

Prior to commencement of construction works above ground, full details shall be submitted to and approved in writing by the Local Planning Authority, demonstrating how noise will be controlled to meet this condition. The scheme shall be fully implemented in accordance with the approved details and thereafter retained and maintained for its designated purpose.

The baseline noise survey must cover a period sufficient to faithfully represent the prevailing noise climate at the nearest noise-sensitive premises during the plants operating hours. In most cases this will cover survey during the weekday and weekend period. The typical minimum background sound level should be defined at the 10th percentile value for daytime (07:00-23:00) and night-time (23:00-07:00) when the plant may operate. The assessment must include valid prediction and valid assessment of any acoustic features.

2.5. Noise Measurement Protocol - British Standard 7445-1: 2003¹

- 2.5.1. The methods and procedures described in BS 7445 are intended to be applicable to sounds from all sources, individually and in combination, which contribute to the total noise at a site.
- 2.5.2. The aim of the BS 7445 series is to provide authorities with material for the description of noise in community environments. Based on the principles described in this standard, acceptable limits of noise can be specified and compliance with these limits can be controlled.
- 2.5.3. BS 7445 does not specify limits for environmental noise.

2.6. BS 4142: 2014+A1: 2019 – Assessment of Impacts

- 2.6.1. 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.

¹ Description and measurement of environmental noise. Part 1 – Guide to quantities and procedures.



2.6.2. Evaluation of Adverse Impact

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

2.6.3. 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.

2.6.4. The specific sound source level has character corrections applied during the assessment which account for the specific nature of the sound and whether it is more or less likely to be disruptive to the receptor. The available character corrections within the standard are:

Tonality

A correction of up to +6 dB may be applied for a sound which is likely to have discernible tonal elements at the receptor location. Tonality may be assessed via subjective (i.e. perceived on-site) or objective methods, with the subjective method given preference in the standard, where possible. The objective method may be calculated in either 1/3 octave or octave bands based, with the 1/3rd octave calculation given preference in the standard.

Impulsivity

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of +3 dB for impulsivity which is just perceptible at the noise receptor, +6 dB where it is clearly perceptible, and +9 dB where it is highly perceptible. A reference method is provided in the standard if a subjective assessment is inconclusive or not possible to undertake.



Intermittency

When the specific sound has identifiable on/off conditions a penalty of +3 dB can be applied.

Other sound characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of +3 dB can be applied.

3. NOISE SURVEY METHODOLOGY

3.1. Sound Planning attended the site on Wednesday 5th March to Monday 10th 2025, to undertake a background noise survey at the site.

3.2. Background Noise Measurements

3.2.1. Sound Monitoring equipment was installed within the site at a reasonably secure location in the grounds of the existing care home in a sheltered location which is representative of the noise environment in adjacent residential gardens which are at similar distances from and feature similar levels of screening from nearby noise sources, most notably Beach Road.

See APPENDIX 2 – Site Location & APPENDIX 3 – Site Photographs.

3.2.2. The background noise measurements were carried out over a six-day period including a full weekend and two full weekdays when background levels were be representative of the typical noise environment in the area

3.2.3. The sound level meter was Class 1 – details provided in 3.3. The microphone was positioned 1.5m above ground level and at least 3.5m from any vertical reflective façade.

3.3. Sound Level Measurement Equipment

Equipment	Make	Model	Class	Serial Number	UKAS Calibration
SLM	Norsonic	NOR140	1	1406716	U44212 (11/5/23)
Field Calibrator	Norsonic	NOR1255	1	125525638	U47907 (24/5/24)



- 3.4. The Sound Level Meter (SLM) was field calibrated before and after the on-site noise measurements. No deviation was detected (1kHz). UKAS accredited calibration certificates are available on request.
- 3.5. The noise measurements were undertaken in accordance with BS 7445 and BS 4142.
- 3.6. Full background noise measurements are provided in APPENDIX 4 - Background Noise Levels.

4. NOISE LEVEL CALCULATION METHODOLOGY

- 4.1. A noise model using SoundPLAN Essentials 6.0 has been created to predict sound propagation between the AC units and the NSR. SoundPLAN Essentials implements ISO 9613-2, CRTN, and CRN for noise propagation calculations. ISO 9613-2 accounts for meteorological conditions for noise propagation by calculating noise levels with the receiver always 'downwind' from the noise source to give a worst-case result.
- 4.2. Ground effects have been modelled based on a site inspection and available satellite imagery available for the site.
- 4.3. The reflection order for the model has been set to 4.
- 4.4. The noise sources have been modelled as point sources at a height of 0.5m above the first-floor flat roof.
- 4.5. The NSR has been modelled with a receiver point 1m outside of the nearest habitable room window of the closest adjacent residential property to the south of the site. The receiver point has been modelled at a height of 1.5m from the ground.
- 4.6. Acoustic Feature Corrections – see 2.6.4 The feature corrections to be applied to the noise sources are as follows:
 - 4.6.1. +3 dB for '*other sound characteristics*' as noise from AC units is not expected to be tonal or intermittent but may be readily distinctive against the prevailing acoustic environment due to the low frequency bias of noise common from similar units.
- 4.7. The resultant (combined) Rating Level (dB L_{Aeq}) will be compared to the existing background noise levels and evaluated against criteria in BS 4142: 2014+A1: 2019



5. NOISE MEASUREMENT RESULTS

5.1. Background Noise Levels – see APPENDIX 2

Noise Sensitive Receiver	10 th Percentile Lowest Background Noise Level dB L _{A90, hr}
NSR 1 (South)	32

6. NOISE CALCULATION RESULTS

6.1. NSR 1 – Neighbouring residential property – noise model output:

Equipment / Activity	Specific Sound Level	BS 4142 Penalties	Rating Level
	dB L _{Aeq}	(dB)	(dB)
Unit 1	7	+3	10
Unit 2	10	+3	13
Unit 3	15	+3	18
Unit 4	9	+3	12
Unit 5	10	+3	13
Unit 6	5	+3	8

6.2. NSR 2 – Nearest bedroom window within care home – noise model output:

Equipment / Activity	Specific Sound Level	BS 4142 Penalties	Rating Level
	dB L _{Aeq}	(dB)	(dB)
Unit 1	10	+3	13
Unit 2	14	+3	17
Unit 3	18	+3	21



Unit 4	13	+3	16
Unit 5	15	+3	18
Unit 6	8	+3	11

7. BS4142:2014 ASSESSMENT

7.1. NSR 1 – nearest adjacent residential property:

Equipment / Activity	Rating	Background Level	Excess	
	(dB)	dB L _{A90}	(dB)	
Unit 1	10	32	-22	
Unit 2	13	32	-19	
Unit 3	18	32	-14	
Unit 4	12	32	-20	
Unit 5	13	32	-19	
Unit 6	8	32	-24	
Combined	21	32	-11	<i>Low Impact / Meets LA Criteria</i>

7.2. NSR2 – nearest bedroom window within care home:

Equipment / Activity	Rating	Background Level	Excess
	(dB)	dB L _{A90}	(dB)
Unit 1	13	32	-19
Unit 2	17	32	-15
Unit 3	21	32	-11
Unit 4	16	32	-16
Unit 5	18	32	-14
Unit 6	11	32	-21



Combined	26	32	-6	<i>Low Impact / Meets LA Criteria</i>
----------	----	----	----	---

8. NOISE MITIGATION STRATEGY

- 8.1. The rating level of the re-located AC units meets the criteria set by Havant Borough Council that noise emissions should be at least 5 dB below existing background noise levels at the nearest noise sensitive receiver.
- 8.2. No further noise mitigation strategy is therefore required.

9. CONCLUSIONS

- 9.1. Sound Planning has carried out an environmental noise impact assessment in accordance with the requirements of BS 4142: 2014+A1: 2019 and BS 7445: 2003.
- 9.2. The predicted combined noise rating level (BS 4142) of all the relocated AC units is at least 5 dB below the existing background noise level.
- 9.3. The evaluation shows that the predicted noise rating level at the nearest noise sensitive receiver is '*low impact*' in accordance with BS 4142:2014+A1:2019.
- 9.4. Installation of the AC units on the central recessed flat roof of the building should therefore be considered to satisfy the criteria set by Havant Borough Council.



APPENDIX 1

Glossary of Acoustic Terms

The Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of 2×10^{-5} pascals) and the threshold of pain is around 120 dB. The sound energy radiated by a source can also be expressed in decibels. The sound power is a measure of the total sound energy radiated by a source per second, in watts. The sound power level, L_w is expressed in decibels, referenced to 10^{-12} watts.

Frequency, Hz

Frequency is analogous to musical pitch. It depends upon the rate of vibration of the air molecules that transmit the sound and is measure as the number of cycles per second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is normally divided up into discrete bands. The most commonly used bands are octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency, and one-third octave bands, in which each octave band is divided into three. The bands are described by their centre frequency value and the ranges which are typically used for building acoustics purposes are 63 Hz to 4 kHz (octave bands) and 100 Hz to 3150 Hz (one-third octave bands).

Noise Rating

The Noise Rating (NR) system is a set of octave band sound pressure level curves used for specifying limiting values for building services noise. The Noise Criteria (NC) and Preferred Noise Criteria (PNC) systems are similar.

A-weighting

The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A).



Noise Descriptors

Where noise levels vary with time, it is necessary to express the results of a measurement over a period of time in statistical terms. Some commonly used descriptors follow.

- $L_{Aeq, T}$ *The most widely applicable unit is the equivalent continuous A-weighted sound pressure level ($L_{Aeq, T}$). It is an energy average and is defined as the level of a notional sound which (over a defined period of time, T) would deliver the same A-weighted sound energy as the actual fluctuating sound.*
- L_{AE} *Where the overall noise level over a given period is made up of individual noise events, the $L_{Aeq, T}$ can be predicted by measuring the noise of the individual noise events using the sound exposure level, L_{AE} (or SEL or L_{AX}). It is defined as the level that, if maintained constant for a period of one second, would deliver the same A-weighted sound energy as the actual noise event.*
- L_{A1} *The level exceeded for 1% of the time is sometimes used to represent typical noise maxima.*
- L_{A10} *The level exceeded for 10% of the time is often used to describe road traffic noise.*
- L_{A90} *The level exceeded for 90% of the time is normally used to describe background noise.*

Sound Transmission Descriptors

- D_{nT} Standardised level difference
- $D_{nT, w}$ Weighted standardised level difference
- L_1 The average sound pressure level in the source room
- L_2 The average sound pressure level in the receiving room
- T Reverberation time (receiving room)
- T_0 Reference reverberation time = 0.5s
- C_{tr} Adaption spectrum which takes account for low to medium speed road/rail/air traffic; disco music; and factory noise (medium to low frequency noise).
- C Adaptation spectrum which takes account of domestic activities including speech, music, radio and television.



Frequency Analysis

Octave Band	<i>A band of frequencies the upper limit of which is twice the lower limit. They are known by their centre frequency, e.g., 63, 125, 250, 500, 1000, 2000 Hz...</i>
One Third Octave	<i>The logarithmic frequency interval between a lower frequency f_2, when f_2/f_1 equals $2^{1/3}$ apart. Frequencies include: 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000Hz.</i>

Sound Transmission in the Open Air

Most sources of sound can be characterised as a single point in space. The sound energy radiated is proportional to the surface area of a sphere centred on the point. The area of a sphere is proportional to the square of the radius, so the sound energy is inversely proportional to the square of the radius. This is the inverse square law.

In decibel terms, every time the distance from a point source is doubled, the sound pressure level is reduced by 6 dB. Road traffic noise is a notable exception to this rule, as it approximates to a line source, which is represented by the line of the road. The sound energy radiated is inversely proportional to the area of a cylinder centred on the line. In decibel terms, every time the distance from a line source is doubled, the sound pressure level is reduced by 3 dB.

Factors Affecting Sound Transmission in the Open Air

Reflection

When sound waves encounter a hard surface, such as concrete, brickwork, glass, timber or plasterboard, it is reflected from it. As a result, the sound pressure level measured immediately in front of a building façade is approximately 3 dB higher than it would be in the absence of the façade.

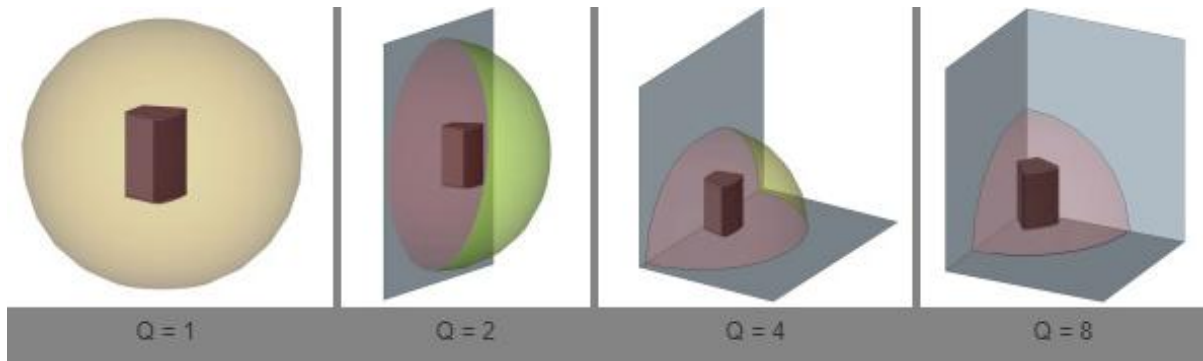
Screening and Diffraction

If a solid screen is introduced between a source and receiver, interrupting the sound path, a reduction in sound level is experienced. This reduction is limited, however, by diffraction of the sound energy at the edges of the screen. Screens can provide valuable noise attenuation however. For example, a timber boarded fence built next to a motorway can reduce noise levels on the land beyond, typically by around 10 dB(A). The best results are obtained when a screen is situated close to the source or close to the receiver.

Meteorological Effects

Temperature and wind gradients affect noise transmission, especially over large distances. The wind effects range from increasing the level by typically 2 dB downwind, to reducing it by typically 10 dB upwind – or even more in extreme conditions. Temperature and wind gradient are variable and difficult to predict.

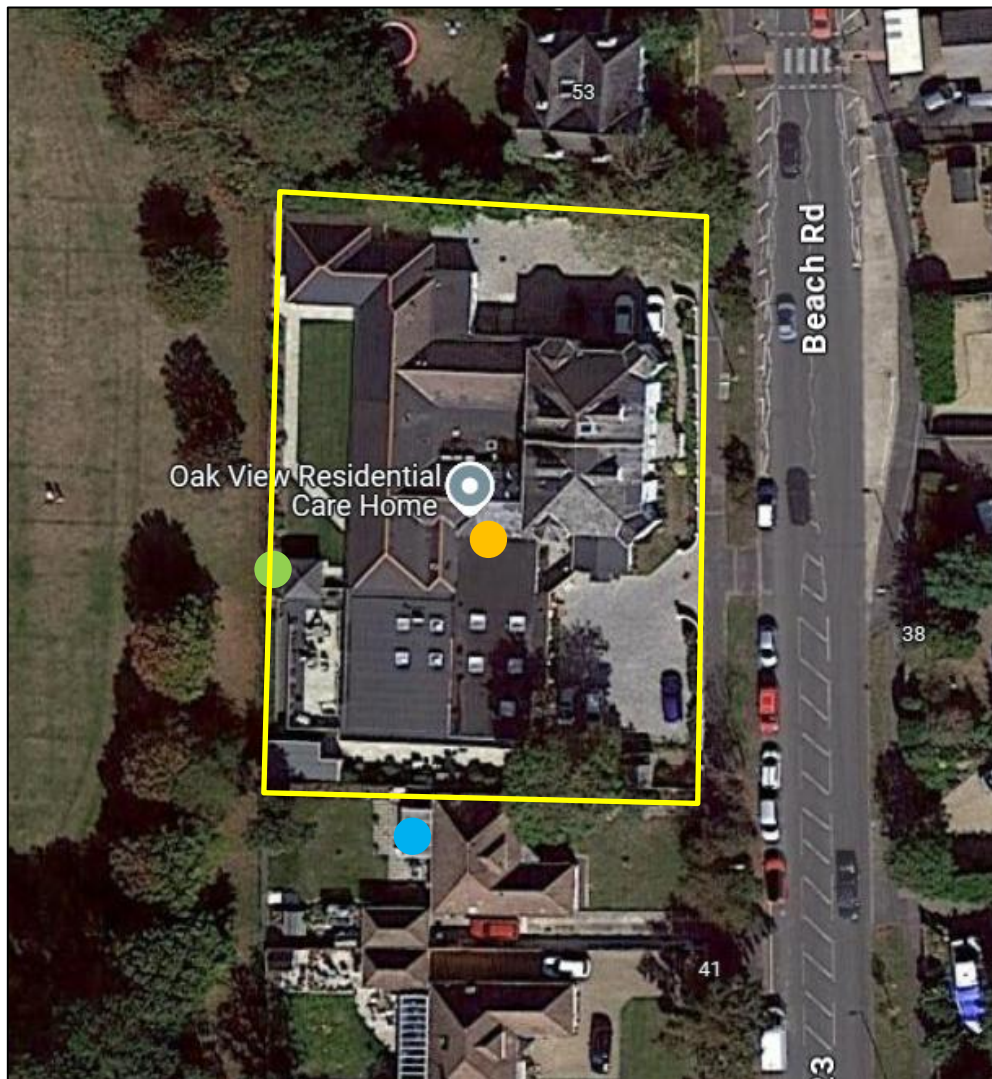
Directivity Index



APPENDIX 2

Site Location/Plans

Google Earth

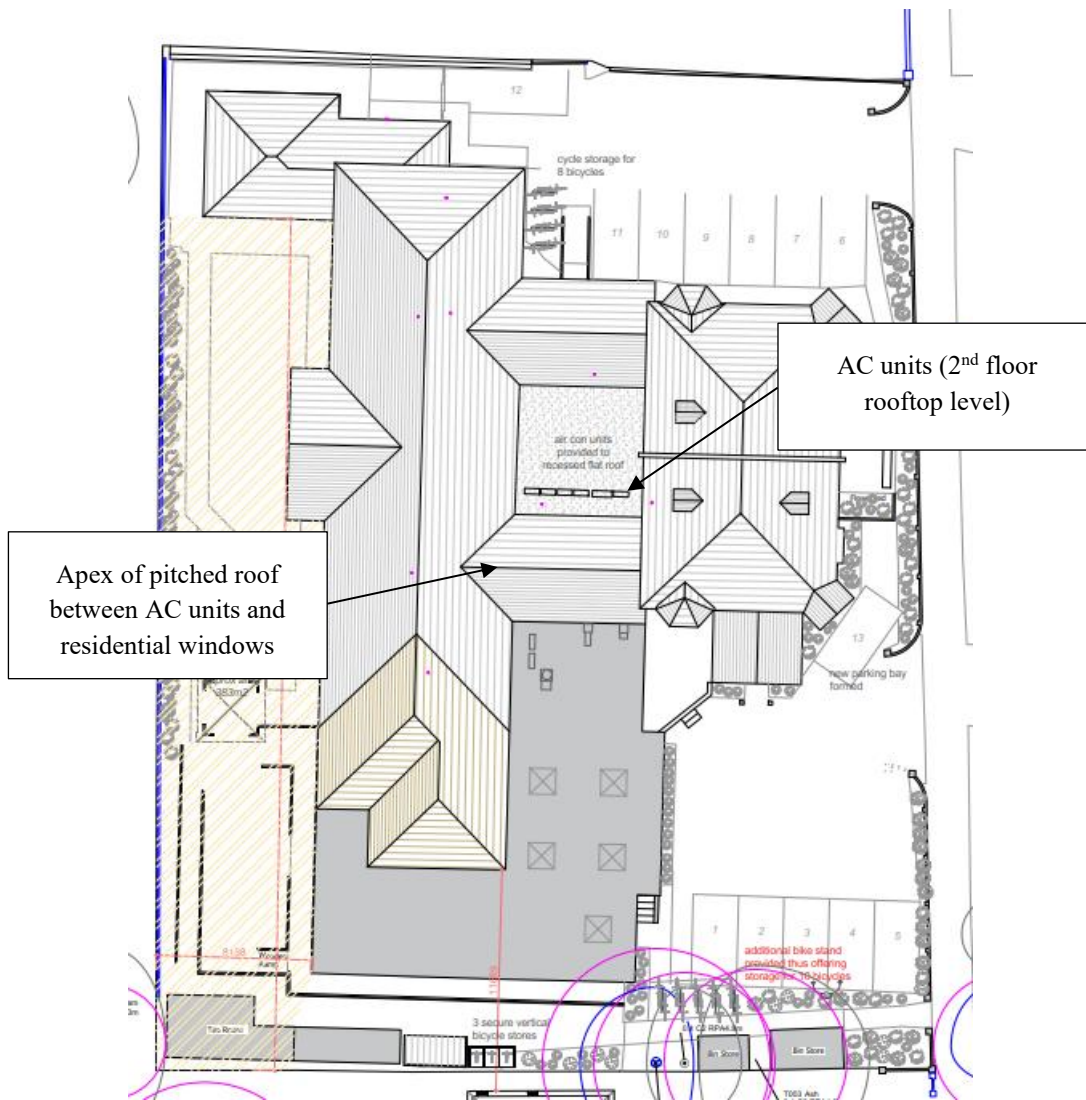


Key:

-  NSR 1 – Residential Property
-  NSR 2 – nearest bedroom window within care home
-  Site Boundary (approx.)
-  Noise Monitoring Position (MP1)

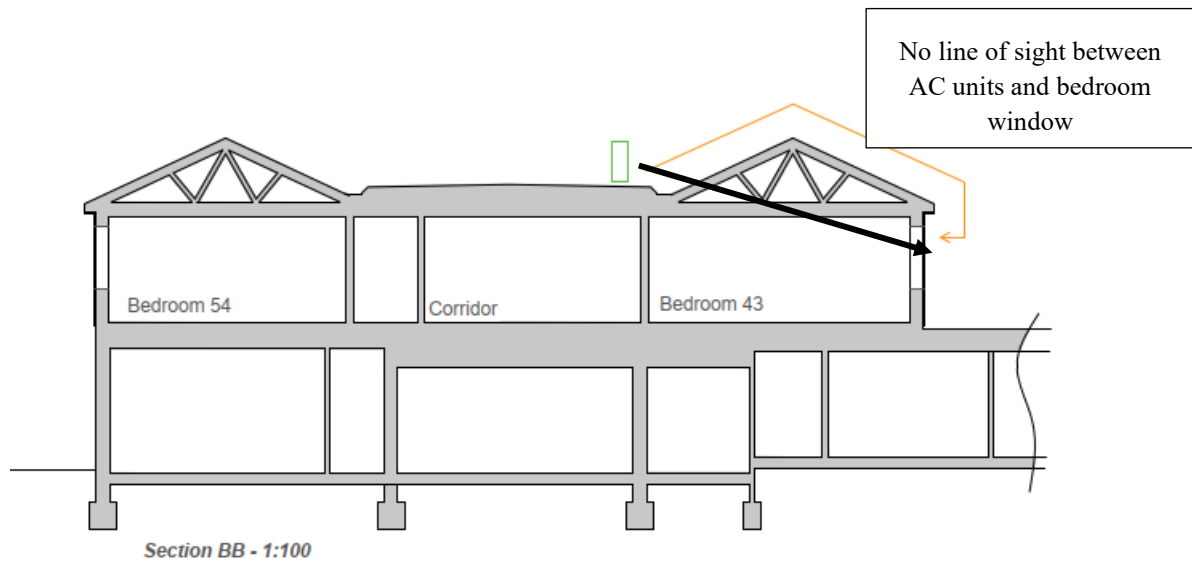
Site Location/Plans

Site Layout Drawing



Site Location/Plans

Section Drawing



APPENDIX 3

Site Photographs

Existing Plant Location





APPENDIX 4

Noise Measurement Data

Background Noise Levels – MPI

Date	Time	L _{Aeq}	L _{AFmax}	L _{AF10}	L _{AF90}
(d/m/y)	(hrs:mins)	(dB)	(dB)	(dB)	(dB)
05/03/2025	10:00	55.5	82.1	47	40.4
05/03/2025	11:00	43.7	70.4	43.7	37.7
05/03/2025	12:00	45.6	69.7	43.9	38.4
05/03/2025	13:00	45.8	66.4	46.5	39.7
05/03/2025	14:00	49.0	76.2	43.5	40.2
05/03/2025	15:00	48.3	68.5	48.5	40.5
05/03/2025	16:00	44.9	67.2	44.9	39.7
05/03/2025	17:00	44.7	70.2	43.9	38.8
05/03/2025	18:00	44.6	68.6	40.5	35.6
05/03/2025	19:00	37.2	54.8	38	33.9
05/03/2025	20:00	40.0	72.8	36.3	31.7
05/03/2025	21:00	35.4	55.6	36.7	31.5
05/03/2025	22:00	33.4	52.9	33.8	30.7
05/03/2025	23:00	31.9	49.7	31.7	29.3
06/03/2025	00:00	32.4	53.8	32.4	30.0
06/03/2025	01:00	34.3	52.1	32.5	31.0
06/03/2025	02:00	33.8	55.7	31.3	29.8
06/03/2025	03:00	36.5	53.8	35.6	32.6
06/03/2025	04:00	38.8	60.0	35.8	33.7
06/03/2025	05:00	51.1	73.1	39.1	37.6
06/03/2025	06:00	45.6	67.5	44.2	39.8



Date	Time	L _{Aeq}	L _{AFmax}	L _{AF10}	L _{AF90}
06/03/2025	07:00	49.1	69.1	46.1	41.1
06/03/2025	08:00	44.7	66.3	44	41.2
06/03/2025	09:00	49.6	74.4	44.8	41.4
06/03/2025	10:00	47.6	69.7	43.2	39.7
06/03/2025	11:00	50.1	75.4	51.5	41.4
06/03/2025	12:00	45.0	68.1	43.7	40.4
06/03/2025	13:00	45.3	68.6	43.5	40.0
06/03/2025	14:00	48.7	69.9	47	42.3
06/03/2025	15:00	54.5	85.3	50.4	43.7
06/03/2025	16:00	47.4	72.6	46.4	41.9
06/03/2025	17:00	46.2	64.5	46.7	43.6
06/03/2025	18:00	44.4	64.9	42.9	42.6
06/03/2025	19:00	40.7	56.1	41.8	39.2
06/03/2025	20:00	44.9	61.4	44.3	43.5
06/03/2025	21:00	45.8	59.3	46	44.7
06/03/2025	22:00	44.2	62.8	44.1	42.8
06/03/2025	23:00	42.4	63.0	42.9	41.4
07/03/2025	00:00	41.4	47.9	41.8	40.6
07/03/2025	01:00	41.7	49.2	42.2	40.8
07/03/2025	02:00	40.4	48.7	40.5	39.4
07/03/2025	03:00	39.0	52.2	39	36.9
07/03/2025	04:00	39.3	53.5	39.2	37.9
07/03/2025	05:00	54.8	75.4	45.7	40.8
07/03/2025	06:00	49.2	68.1	48.7	43.5
07/03/2025	07:00	50.6	77.6	46.6	42.9



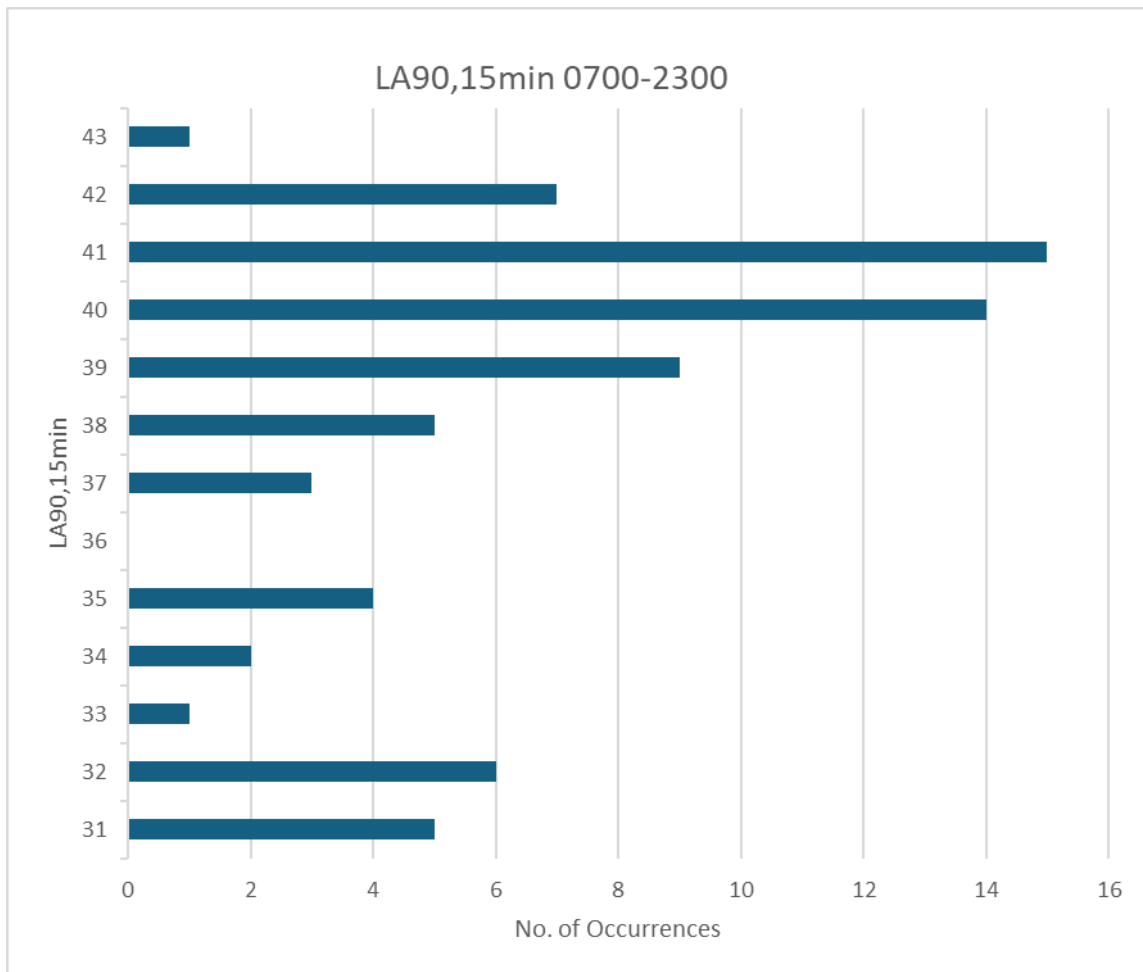
Date	Time	L _{Aeq}	L _{AFmax}	L _{AF10}	L _{AF90}
07/03/2025	08:00	49.7	68.2	45.3	41.4
07/03/2025	09:00	53.8	80.2	53.5	42.5
07/03/2025	10:00	48.6	66.2	46.6	43.3
07/03/2025	11:00	49.1	76.2	49.8	43.8
07/03/2025	12:00	48.1	66.3	47.1	43.4
07/03/2025	13:00	47.9	72.7	46.6	41.0
07/03/2025	14:00	47.3	76.5	47	41.4
07/03/2025	15:00	47.5	67.3	46.3	40.9
07/03/2025	16:00	44.5	69.8	44.5	40.2
07/03/2025	17:00	44.1	69.4	43.6	39.1
07/03/2025	18:00	41.1	66.8	40.8	37.2
07/03/2025	19:00	40.1	61.6	40.7	37.8
07/03/2025	20:00	40.5	71.9	40.7	37.5
07/03/2025	21:00	40.8	63.9	40.8	37.7
07/03/2025	22:00	38.9	54.2	39.5	37.1
07/03/2025	23:00	37.4	56.2	38.3	35.6
08/03/2025	00:00	35.2	50.6	35.2	33.2
08/03/2025	01:00	34.6	52.4	34.9	33.2
08/03/2025	02:00	35.0	55.5	35.4	33.4
08/03/2025	03:00	34.7	53.0	34.5	32.5
08/03/2025	04:00	34.5	52.1	35.8	32.1
08/03/2025	05:00	51.2	71.9	42.3	34.3
08/03/2025	06:00	45.4	65.1	43.2	35.6
08/03/2025	07:00	45.3	68.2	44.2	37.1
08/03/2025	08:00	48.3	79.4	43.4	38.6



Date	Time	L _{Aeq}	L _{AFmax}	L _{AF10}	L _{AF90}
08/03/2025	09:00	47.2	66.4	48.8	40.9
08/03/2025	10:00	52.0	73.7	52.2	42.7
08/03/2025	11:00	51.2	76.2	49.7	39.8
08/03/2025	12:00	46.5	66.7	46.7	39.7
08/03/2025	13:00	45.7	65.9	45.7	38.8
08/03/2025	14:00	48.1	74.1	48.4	40.2
08/03/2025	15:00	48.2	79.2	48.6	40.0
08/03/2025	16:00	46.2	72.6	46.9	39.9
08/03/2025	17:00	44.2	65.8	41.3	38.0
08/03/2025	18:00	47.7	82.7	40.6	35.8
08/03/2025	19:00	37.1	55.0	38.1	34.1
08/03/2025	20:00	35.9	51.7	37.1	32.8
08/03/2025	21:00	35.4	49.3	36.7	32.2
08/03/2025	22:00	34.9	50.7	36.7	31.1
08/03/2025	23:00	35.0	49.7	35.5	30.1
09/03/2025	00:00	33.1	56.3	32.9	28.9
09/03/2025	01:00	32.2	54.6	31.3	29.5
09/03/2025	02:00	31.5	56.2	32.9	29.0
09/03/2025	03:00	34.6	62.4	32.8	29.5
09/03/2025	04:00	34.3	57.5	34.3	29.8
09/03/2025	05:00	52.7	72.4	43.4	32.6
09/03/2025	06:00	50.0	71.4	46.1	35.8
09/03/2025	07:00	45.3	69.1	45.6	35.5
09/03/2025	08:00	47.9	71.3	43.8	36.6
09/03/2025	09:00	46.5	75.9	43.9	37.9



Date	Time	L _{Aeq}	L _{AFmax}	L _{AF10}	L _{AF90}
09/03/2025	10:00	45.6	70.3	45.3	39.0
09/03/2025	11:00	50.1	73.2	45.1	39.5
09/03/2025	12:00	50.0	75.8	46.2	38.3
09/03/2025	13:00	50.8	76.2	45.4	38.2
09/03/2025	14:00	45.8	66.5	46.8	39.4
09/03/2025	15:00	47.6	72.1	46.1	39.1
09/03/2025	16:00	50.4	86.2	43.8	38.1
09/03/2025	17:00	41.5	60.6	42.3	35.9
09/03/2025	18:00	45.4	68.1	37.9	33.3
09/03/2025	19:00	39.2	69.9	37.8	32.1
09/03/2025	20:00	35.7	54.8	36.2	31.2
09/03/2025	21:00	33.3	53.2	34.1	28.8
09/03/2025	22:00	31.7	53.5	32.5	27.9
09/03/2025	23:00	29.8	43.3	31.5	26.8
10/03/2025	00:00	30.9	56.7	29.5	25.2
10/03/2025	01:00	28.1	47.4	27	24.7
10/03/2025	02:00	27.0	49.0	27.7	25.3
10/03/2025	03:00	28.2	46.2	27	25.5
10/03/2025	04:00	45.3	70.2	33.9	27.9
10/03/2025	05:00	52.9	69.6	48.6	34.1
10/03/2025	06:00	44.7	65.9	44.4	36.7
10/03/2025	07:00	44.6	65.1	43.2	38.6
10/03/2025	08:00	46.4	71.3	43.5	38.4
10/03/2025	09:00	50.9	79.3	53.7	43.1





APPENDIX 5

Levels of Uncertainty

Category	Notes
Complexity of Sound Source	6 AC units installed externally
Complexity of Acoustic Environment (Residual)	Residual environment is shielded from nearby noise sources and controlled by road traffic noise on Beach Road
Level of Residual Sound (including Specific)	N/A
Measurement Location	Representative of closest receptors due to similar distance and screening from dominant noise source
Distance Between Sound Source & Measurement Position	n/a
Number of Measurements Taken	6-day noise survey including 2 weekdays and full weekend period
Measurement Time Intervals	15-minute measurements
Range of Times	Includes quietest likely times of proposed operation
Range of Suitable Weather Conditions	1 measurement period – Suitable weather conditions
Measurement Method/Practitioners	1 measurement period (Jake Willmott) measurements taken in line with BS7445
Level of Rounding	Rounded to nearest DP; 0.5 rounded up
Instrumentation	Class 1 SLM (suitable)

APPENDIX 6

Plant Datasheets

Outdoor Unit		RAC-18WPB	RAC-25WPB	RAC-35WPB	RAC-50WPB	RAC-60WPA	RAC-70WPA
Noise level cooling (sound pressure) (night mode)	dB(A)	46	48	49	51	50	52
Noise level heating (sound pressure) (night mode)	dB(A)	47	49	50	51	53	54
Dimensions (H x W x D)	mm	530 x 660 x 278	530 x 660 x 278	548 x 750 x 288	600 x 792 x 299	650 x 850 x 298	800 x 850 x 298
Weight	Kg	27.5	27.5	34.0	40.0	45.0	55.0
Working Range (cooling / heating)	°C	-10°C~43°C / -15°C~21°C	-10°C~43°C / -15°C~21°C	-10°C~43°C / -15°C~21°C	-10°C~43°C / -15°C~21°C	-10°C~43°C / -15°C~21°C	-10°C~43°C / -15°C~21°C
Piping diameter (Liquid / Gas)	Inch	1/4 - 3/8	1/4 - 3/8	1/4 - 3/8	1/4 / 1/2	1/4 / 1/2	1/4 / 5/8
	mm	6.35 - 9.52	6.35 - 9.52	6.35 - 9.52	6.35 - 12.70	6.35 - 12.70	6.35 - 15.88
Power supply		230V / 1Ph / 50Hz	230V / 1Ph / 50Hz	230V / 1Ph / 50Hz	230V / 1Ph / 50Hz	230V / 1Ph / 50Hz	230V / 1Ph / 50Hz
Recommended fuse size	A	15	15	15	15	15	25
Starting current	A	5.0	5.0	5.0	10.0	8.5	10.0
Running current (cooling / heating)	A	2.65 / 2.84	3.58 / 4.25	5.00 / 5.03	6.56 / 7.00	7.80 / 7.90	9.10 / 9.30
Interconnecting Cables	No.	3 + E	3 + E	3 + E	3 + E	4 + E	4 + E

⁽¹⁾ Value includes the defrost ratio.

⁽²⁾ Sound power level is the A-weighted sound power level [dB(A)] measured at standard rated conditions for the "cooling" mode operation in accordance to EN12102

⁽³⁾ Data calculated in accordance to prEN14825 and the Commission Communication 2012/C 172/01

⁽⁴⁾ Nominal load efficiency (Cooling 35°C/27°C, Heating 7°C/20°C)

Standard Inverter Heat Pump

- Increased comfort levels through advanced airflow and smart defrost features
- 14°C set point option; ideal for applications where a specialist ambient condition is required (requires PAR-41MAA or PAR-SL101A-E controller)
- 'Backup and rotate' feature to reduce load on individual units and prolong product life (requires PAR-41MAA controller)
- Internal pipe connection for ease of installation
- Compatible with Plasma Quad Connect - an innovative, bolt-on air purifying device which neutralises viruses, bacteria, allergens, PM2.5, mould and dust. For more information, please refer to page 1.1.7

R32



PKA-M - INDOOR UNITS		PKA-M100KA2	PKA-M100KA2
CAPACITY (kW)	Heating (nominal)	11.2 (2.8-12.5)	11.2 (2.8-12.5)
	Cooling (nominal)	9.5 (4.0-10.6)	9.5 (4.0-10.6)
	Heating (UK)	9.63 (2.41-10.75)	9.63 (2.41-10.75)
	Cooling (UK)	8.65 (3.64-9.65)	8.65 (3.64-9.65)
SHF (nominal)		0.73	0.73
COP / EER (nominal)		3.41 / 3.33	3.41 / 3.23
SEER / SCER (BS EN14825)		4.00 / 5.80	4.00 / 5.80
EPR ENERGY EFFICIENCY CLASS	Heating/Cooling	A+ / A+	A+ / A+
APR LOW (l/s)	Lo-M-Hi	333-383-433	333-383-433
PIPE SIZE (mm (in))	Gas	15.88 (5/8")	15.88 (5/8")
	Liquid	9.52 (3/8")	9.52 (3/8")
SOUND PRESSURE LEVEL (dBA)	Lo-M-Hi	41-45-49	41-45-49
SOUND POWER LEVEL (dBA)		65	65
DIMENSIONS (mm)	Width x Depth x Height	1170 x 295 x 365	1170 x 295 x 365
WEIGHT (kg)		21	21
ELECTRICAL SUPPLY		Fed by Outdoor Unit	Fed by Outdoor Unit
FUSE RATING (BS88) - HRC (A)		6	6
INTERCONNECTING CABLE No. Cores		4	4
WIRED REMOTE CONTROLLER REFERENCE		PAR-41MAA	PAR-41MAA
WIRELESS REMOTE CONTROLLER REFERENCE		PAR-SL101A-E / PAR-FL32MA	PAR-SL101A-E / PAR-FL32MA
PUZ-M - OUTDOOR UNITS		PUZ-M100VKA2	PUZ-M100VKA2
SOUND PRESSURE LEVEL (dBA)	Heating/Cooling	51 / 54	51 / 54
	Cooling	70	70
WEIGHT (kg)		76	76
DIMENSIONS (mm)	Width x Depth x Height	1050 x 330 x 981	1050 x 330 x 981
ELECTRICAL SUPPLY		220-240V, 50Hz	380-415V, 50Hz
PHASE		Single	Three
SYSTEM POWER INPUT (kW)	Heating/Cooling (nominal)	3.28 / 2.34	3.28 / 2.34
	Heating/Cooling (UK)	2.85 / 2.44	2.85 / 2.44
STARTING CURRENT (A)		7.1	3.5
SYSTEM RUNNING CURRENT (A)	Heating/Cooling [MAX]	14.2 / 12.7 [20]	5.1 / 4.6 [11.5]
FUSE RATING (BS88) - HRC (A)		32	16
MAINS CABLE No. Cores		3	5
MAX PIPE LENGTH (m)		55	55
MAX HEIGHT DIFFERENCE (m)		30	30
CHARGE REFRIGERANT (KG) / CO ₂ EQUIVALENT (T)	R32 (GWP 675) - 30m	3.10 / 2.09	3.10 / 2.09
MAX ADDITIONAL REFRIGERANT (KG) / CO ₂ EQUIVALENT (T)	R32 (GWP 675)	4.10 / 2.77	4.10 / 2.77

■ Three Phase



MUZ-AP - OUTDOOR UNITS		N/A MULTI-SPLIT ONLY	N/A MULTI-SPLIT ONLY	MUZ-AP25VG	MUZ-AP35VG	MUZ-AP50VG
SOUND PRESSURE LEVEL (dBA)	Heating/Cooling	-	-	48 / 47	50 / 49	52 / 52
SOUND POWER LEVEL (dBA)	Cooling	-	-	59	61	64
WEIGHT (kg)		-	-	31	31	40
DIMENSIONS (mm)	Width x Depth x Height	-	-	800 x 285 x 550	800 x 285 x 550	800 x 285 x 714
ELECTRICAL SUPPLY		-	-	220-240v, 50Hz	220-240v, 50Hz	220-240v, 50Hz
PHASE		-	-	Single	Single	Single
SYSTEM POWER INPUT (kW)	Heating/Cooling (nominal)	-	-	0.78 / 0.60	1.03 / 0.99	1.60 / 1.55
	Heating/Cooling (UK)	-	-	0.70 / 0.56	0.93 / 0.93	1.44 / 1.46
STARTING CURRENT (A)		-	-	3.6	4.7	7.0
SYSTEM RUNNING CURRENT (A)	Heating/Cooling [MAX]	-	-	3.6 / 2.9 [7.06]	4.7 / 4.5 [8.46]	7.0 / 6.9 [13.6]
FUSE RATING (BS88) - HRC (A)		-	-	10	10	16
MAINS CABLE No. CORES		-	-	3	3	3
MAX PIPE LENGTH (m)		-	-	20	20	20
MAX HEIGHT DIFFERENCE (m)		-	-	12	12	12
CHARGE REFRIGERANT (kg) / CO ₂ EQUIVALENT (t)		-	-	0.55 / 0.37	0.55 / 0.37	1.00 / 0.68
MAX ADDITIONAL REFRIGERANT (kg) / CO ₂ EQUIVALENT (t)		-	-	0.26 / 0.18	0.26 / 0.18	0.26 / 0.18

APPENDIX 7

Noise Map

