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Noise Impact Report

Project Details	
Client	Jaspreet Narang
Client Address	2 Verdun Road Barnes London SW13 9AY
Site Address	House at the junction of Verdun Road & Ullswater Road Barnes London SW13 9AY
Reference	22267E

Quality Assurance	
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Revision History			
Version	Date	Editor	Notes
V1	08/11/2024	Justyna Lubas	First issue
V2	13/11/2024	Justyna Lubas	Revision to conclusion section

Contents

1 Introduction

Jaspreet Narang has instructed Spratt and Hamer Limited to undertake a noise survey to assess the impact of the proposed Air Source Heat Pump on nearby occupants.

The proposal includes installing an Air Source Heat Pump (ASHP) unit at a terraced house, which is planned to be combined with the adjoining house to create a larger single residential dwelling.

The assessment is to be submitted as part of a planning application for the development site to the London Borough of Richmond Upon Thames Council in response to pre-application advice.

This report is prepared solely for Jaspreet Narang. Spratt and Hamer Limited accepts no responsibility for its use by any third party.

This document has been prepared using the various documents listed within the appendices of this report, together with drawings, technical information and additional verbal representations made by third parties. We have not audited nor independently verified the content or accuracy of any of the documents and information provided to us in the preparation of this report.

If additional information comes to light subsequent to the production of this report, we reserve the right to revise our opinions, and the conclusions reached within this report.

1.1 Environmental Noise Assessment

Spratt and Hamer Limited have undertaken a noise impact assessment at the above site with noise levels measured externally over a 24-hour period, consisting of a 16-hour day (07:00 – 23:00) and eight-hour night (23:00 – 07:00) in order to establish background levels around the vicinity. The measurements were carried out during weekdays (Thursday to Friday).

This report will state the measured noise levels and will refer to guidance relevant to the nature of this survey whilst considering possible Local Planning Authority guidance and conditions.

2 Assumptions, Limitations & Uncertainty

a. All suggested specifications require a good level of workmanship and for materials to be installed as the manufacture intends. Any poor workmanship may lead to weaknesses in the sound attenuation provided by the building elements.
b. It is assumed that the sound pressure levels measured on site during the environmental noise survey are typical of the site.
c. It is assumed that the technical data provided by deUNIT is up to date and correct.
d. It is assumed that all information supplied by deUNIT is up to date and correct.

3 Planning Policies, Guidance and Criteria

The planning policies and criteria listed below are taken from associated relevant guidance documents, all of which should be considered for the internal and external noise and vibration levels.

3.1 National Planning Policy

The National Planning Policy Framework (NPPF) December 2023 set out the Government's planning policies for England and how they are expected to be applied. It provides a framework within which the Local Authorities are to prepare local plans and use their planning powers to minimise the adverse impact of noise. It should contain the following in relation to noise impacts.

180. 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 soil, air, water or noise pollution or land instability.'

191. 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 impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life*'

NPPF previously characterised noise by grading and recommending actions and different effect levels as reproduced in Table 1.

Perception	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Table 1: Noise exposure hierarchy based on likely average response.

3.2 Criteria

3.2.1 Local Planning Authority Criteria

Pre-application reference: 24/P0148/PREAPP

The London Borough of Richmond Upon Thames has commented on the proposed development, which states:

"Policy LP8 states that development must protect the amenity and living conditions of existing, adjoining and neighbouring occupants. Design must allow for good daylight standards, avoid overlooking or noise disturbance, avoid visual intrusion, overbearing impacts or harm to the reasonable enjoyment of the uses of buildings and gardens. Harm may arise from various impacts such as noise, air pollution, odours or vibration."

Additionally, the Local Authority provides the SPD which states:

- $L_{A,Tr} - L_{A90,T} \leq -5$ *Where the rating level of noise is below the background noise level by at least 5dB, this indicates that the proposed NGD is likely to be acceptable from a noise perspective. The Borough will seek this level of compliance in most noise-sensitive areas and/or where there is a requirement to mitigate creeping background effects.*
- $L_{A,Tr} - L_{A90,T}$ *is* $> -5 \& \leq 0$ *Where the rating level of noise is equal to, or below the background noise level by up to 5dB, this indicates that the proposed NGD may be acceptable from a noise perspective but will be more context-dependent, i.e. extent and effect on noise sensitive receivers (externally and internally). Compliance within this range is more applicable to less sensitive sites or where there is no requirement to mitigate creeping background effects.*

Therefore, the following noise impact assessment will be undertaken in order to meet the criteria of BS4142:2014 with the sound rating level being equal or lower to the representative background noise level.

3.2.2 BS 4142 Method for rating and assessing industrial and commercial sound

BS 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound is routinely used by local authorities in assessing noise associated with industrial and/or commercial activity.

In brief, BS 4142 provides a means of assessment whereby noise from industrial and commercial sources (the "specific sound level", $L_{Aeq,t}$) is compared with background noise ("background sound level", L_{AF90}).

The specific sound level may be corrected by a numerical penalty if it includes acoustic features that are considered to be distinctive. The corrected specific sound level is termed a "rating level" ($L_{Aeq,t}$) and is designed to reflect people's subjective reaction to noise characteristics that may be considered annoying.

The rating level is then compared to the background sound level to assess its impact. BS 4142 describes an indication of the impact according to the numerical difference between the rating level and the background sound level. This is shown below in Table 2.

Rating Level – Background Sound Level	Indication of Impact
+ 10dB	Significant Adverse Impact
+ 5dB	Adverse Impact
≤ 0dB	Low Impact

Table 2: BS 4142 Rating Level Impact

3.3 Criteria Summary

To meet the requirements of the Local Authority, the assessment and recommendations will be made in reference to *BS 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound* and the *Supplementary Planning Document: Development Control for Noise Generating and Noise Sensitive Development*.

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4 Site Description

The proposed development site is associated with a residential property, located at the intersection of Verdun Road and Ullswater Road in Barnes, South London. The area is predominantly residential, featuring nearby green spaces and local amenities such as Castelnau Recreation Ground.

The front façade overlooks The Harrodian School's field, and the south façade overlooks Ullswater Road. The rear façade overlooks the garden and residential properties. The proposed development is adjoined from the north with a house by the wall.

The closest noise-sensitive receptors are approximately 12m north and 16m south of the proposed location of the ASHP.

The predominant noise source within the environment is produced by road traffic, mixed with other noise sources secondary in nature.

4.1 Subjective Observations

During site attendance, subjectively the noise was mostly dominated by distant traffic, pedestrians, frequent plane passes and bus passes near the site.

4.2 Weather

31/10 – 01/11/2024	Thursday	Friday
Temperature (^{0}C)	12.9 – 16.0	12.1 – 14.1
Wind Speed (m/s)	0.0 – 0.3	0.0 – 0.3
Wind Direction	S	SE
Precipitation (mm/h)	0.0	0.0
Damp road/ wet ground	No	No
Fog/snow/ice	None	None

Table 4: Weather Conditions

All weather data was taken from the on-site weather station. The weather station was located in the garden of the proposed development.

5 Noise Measurement Procedure

5.1 Survey Dates

31/10/2024 – 01/11/2024

5.2 Personnel Present

Luke Owen BSc

5.3 Survey Equipment Used

Manufacturer	Model	Serial No.	Description
Rion	NL-52	01032413	Integrating Sound Level Meter and Real Time Analyser
Pulsar	Model 105	86702	Acoustic Calibrator
ClimeMET	CM2000	-	Weather Station

Table 7: Survey Equipment Used

5.4 Calibration

The sound level meter was calibrated with the field calibrator to a level of 94.0 dB @ 1 kHz prior to and on completion of the survey. No significant drift in calibration was observed. The meter used during the survey is precision grade Class 1.

Calibration certificates are available on request.

5.5 Background Sound Measurements

The measurement location chosen during the survey was deemed suitable for the determination of the baseline noise levels of the area.

The sound level meters were set to measure A-weighted broadband and 1:1 octave frequency bands L_{Aeq}, L_{A90}, in 5-minute periods.

5.5.1 Monitoring Position 1

A microphone was placed 1.5m above the ground surface in the garden. The meter was set to measure the complete 24-hour period.

See the Appendix for further details of the monitoring position.

5.6 Location Plan of Measurement Positions

The location plan below shows the proposed development and positions of the monitoring equipment and noise sensitive receptors.

Figure 1: Indicative Site Map. Image taken from www.google.com/maps

6 Survey Results and Analysis

6.1 External Background Measurement Results

The following table presents the measured $L_{A90,1\text{-}hr}$ background results from the monitoring position during the daytime period 07:00 – 23:00 and $L_{A90,15\text{-}mins}$ background results during the night-time period 23:00 – 07:00.

All values are rounded to integers such that 0.5 is rounded up. Data charts can be found in the appendix.

Monitoring position	Time Period *t*	$L_{Aeq,t}$ (dB)	Min $L_{A90,t}$ (dB)	Max $L_{A90,t}$ (dB)	Modal $L_{A90,t}$ (dB)
1	Daytime	56.5	29	43	38
	Nighttime	53.0	24	45	28

Table 6: Measurement Results

Only nighttime will be assessed, representing a worst-case scenario. Therefore, the following histograms present the measured $L_{A90,15\text{-}minutes}$ background results from the monitoring position during the nighttime period.

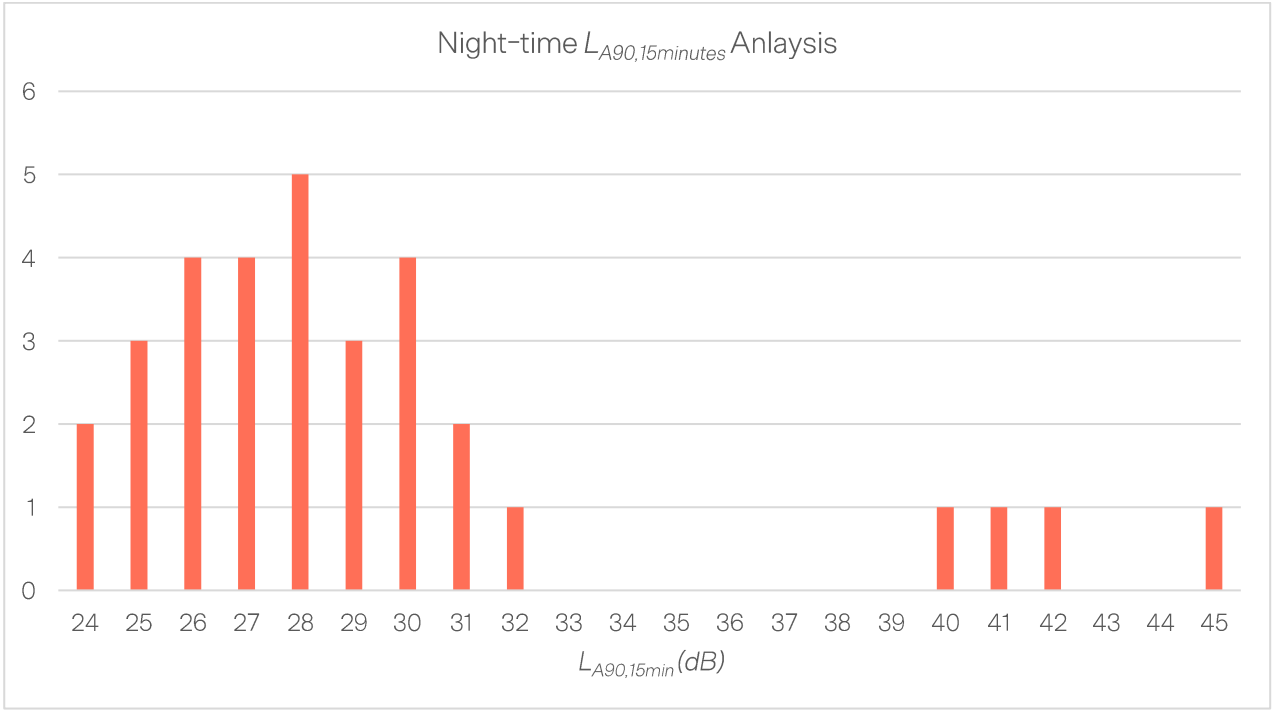


Figure 2: $L_{A90,15minutes}$ Histogram

As can be seen, the modal SMR (statistically most repeated) $L_{A90,t}$ during the nighttime period is 28 dB. Therefore, this value will be used in the assessment as a representative of the existing environment.

7 Noise Impact Assessment

7.1 Assessment of Mechanical Plant in Accordance with BS4142:2014

The client has confirmed that the Mitsubishi Electric 11.2kW Ecodan PUZ-WM112VAA-BS air source heat pump (ASHP) will be installed in the rear garden, near the southern fence.

7.2 Subjective Assessment

BS 4142:2014 states that where appropriate a rating penalty should be established for a sound on a subjective assessment of its characteristics and to correct the Specific Sound Level if a tone, impulse or other characteristics occur e.g intermittency.

BS4142:2014 says of Impulsivity:

"A correction of up to +9dB 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 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible."

BS4142 says of tonality:

"... a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible."

BS4142 says of intermittency:

"... If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

Due to insufficient data from the Air Source Heat Pump unit manufacturer and the unit not being installed to measure in situ; it is unclear as to whether the units will be considered impulsive, tonal or to have any other detrimental acoustic characteristics. Modern ASHP units are typically designed to not be tonal during their operation. It is unlikely that there will be any of the above acoustic characteristics present in the operational noise of the proposed ASHP unit and so long as the unit is regularly maintained this should remain the case.

7.3 Numerical Assessment

The datasheet shows that the sound power level for heating is 60 dBA.

The following assumptions have been made based on our understanding of where the plant is to be located:

- The plant will be installed in the corner of the garden so the nearby reflecting surfaces will be the floor and two walls. Therefore, a Q = 8, equating to a DI of 9dB will be accounted into calculations, using the equation:

$$\boldsymbol{Lp = Lw - 10 \times \log\left(\frac{4\pi r^2}{Q}\right)}$$

- The nearest residential dwellings (noise-sensitive receptor) are houses located approximately 12m north and 16m south away (r).
- The unit will be positioned out of the line of sight, resulting in a -10dB reduction for shielding.

The lowest background $L_{A90,15\text{-}min}$ of 28 dB will be used for the assessment during the night-time.

The following table demonstrates the impact of the ASHP unit on the nearest noise sensitive dwelling.

Description	NSR1 (dBA)	NSR2 (dBA)
Sound Level *Lw* on manufacturer's data sheet	60	60
Calculated L_p at 1m	58	58
Distance attenuation 12m / 16m	-22	-24
Screening	-10	-10
Sound Pressure Level at Receptor	26	24
Representative Background Noise Level L_{A90} Daytime / Nighttime	28	28
Difference	-2	-4

Table 5: BS4142 Impact Assessment

The table above indicates that the noise impact due to the ASHP plant will be at least 2 dB below the background noise level and with a resultant 'Low Impact' according to BS 4142 definitions reproduced in Table 2, Section 3.2.2.

It is also worth mentioning that the noise emissions at the receptor fall 19dB below the criteria of 45dB $L_{Aeq,t}$ as defined in the Richmond Council SPD, which outlines that in certain circumstances such as the installation of a single plant unit, a desktop assessment may be submitted.

7.4 Context

The noise levels used for the assessment assume that the unit is always operating at full capacity and continuously. As such, the likelihood is that the difference between plant noise and background noise will be even greater for the majority of the time resulting in an even lower level of impact on nearby receptors.

8 Conclusion

The report concludes that, based on the understanding of the manufacturer's data and the proposed location of the plant, noise from the plant will have a low impact on the amenity of the residents of neighbouring dwellings and should be acceptable from a noise perspective.

The noise emissions at the nearest receptors adhere to *BS 4142:2014+A1:2019* as well as the Local Authority's *Development Control for Noise Generating and Noise Sensitive Development* SPD criteria.

9 References

National Planning Policy Framework (NPPF)

BS 4142:2014+A1:2019 Method for rating and assessing industrial and commercial sound

BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures

www.google.co.uk/maps

wow.metoffice.gov.uk

LBRUT SPD: Development Control for Noise Generating and Noise Sensitive Development (2018)

9.1 Drawings

2VR_P1000_location-block-plan

2VR_planning_240916-DRAFT

Appendix

Figure 1: Monitoring Position

Figure 2: Site Plan

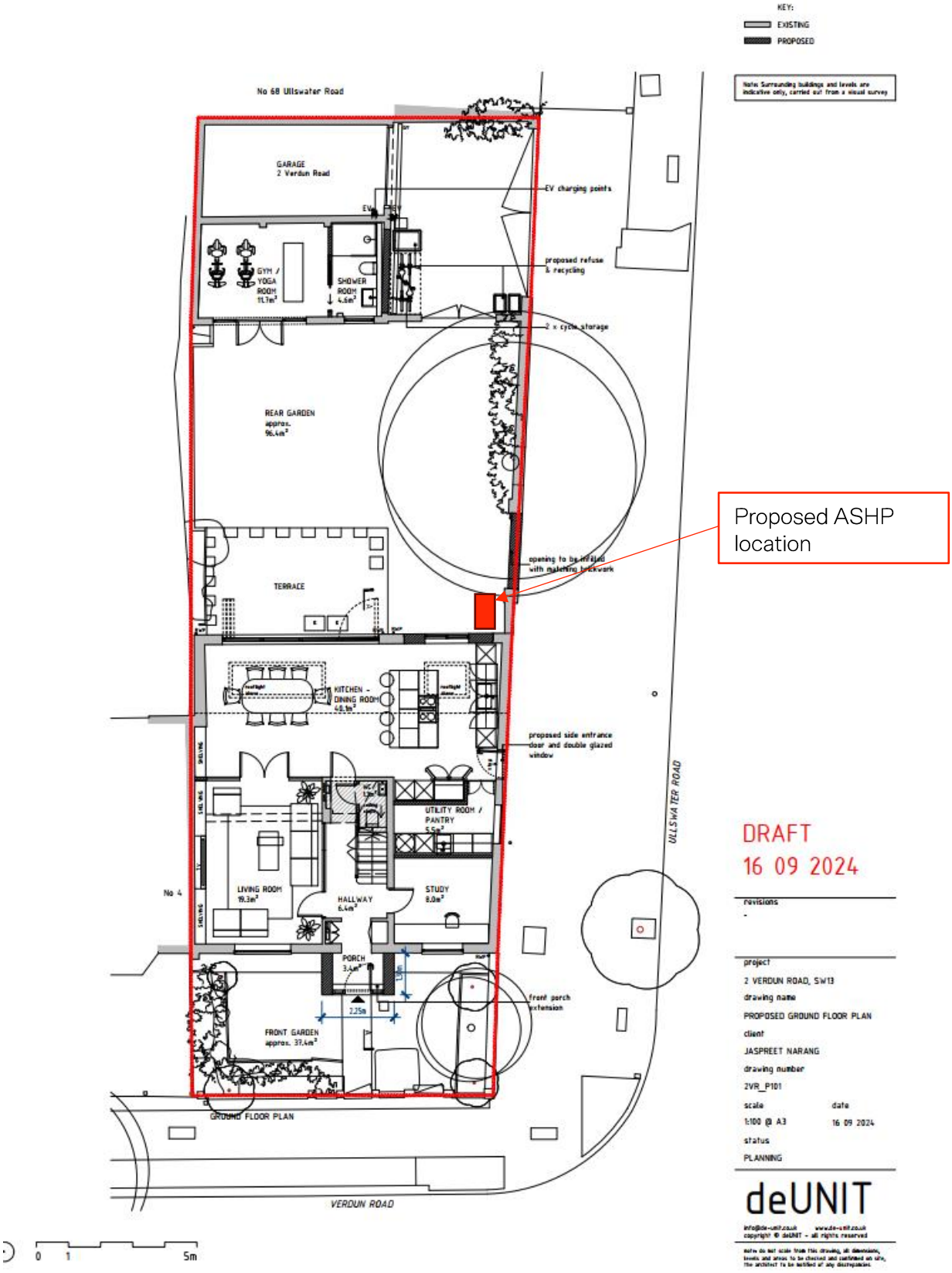


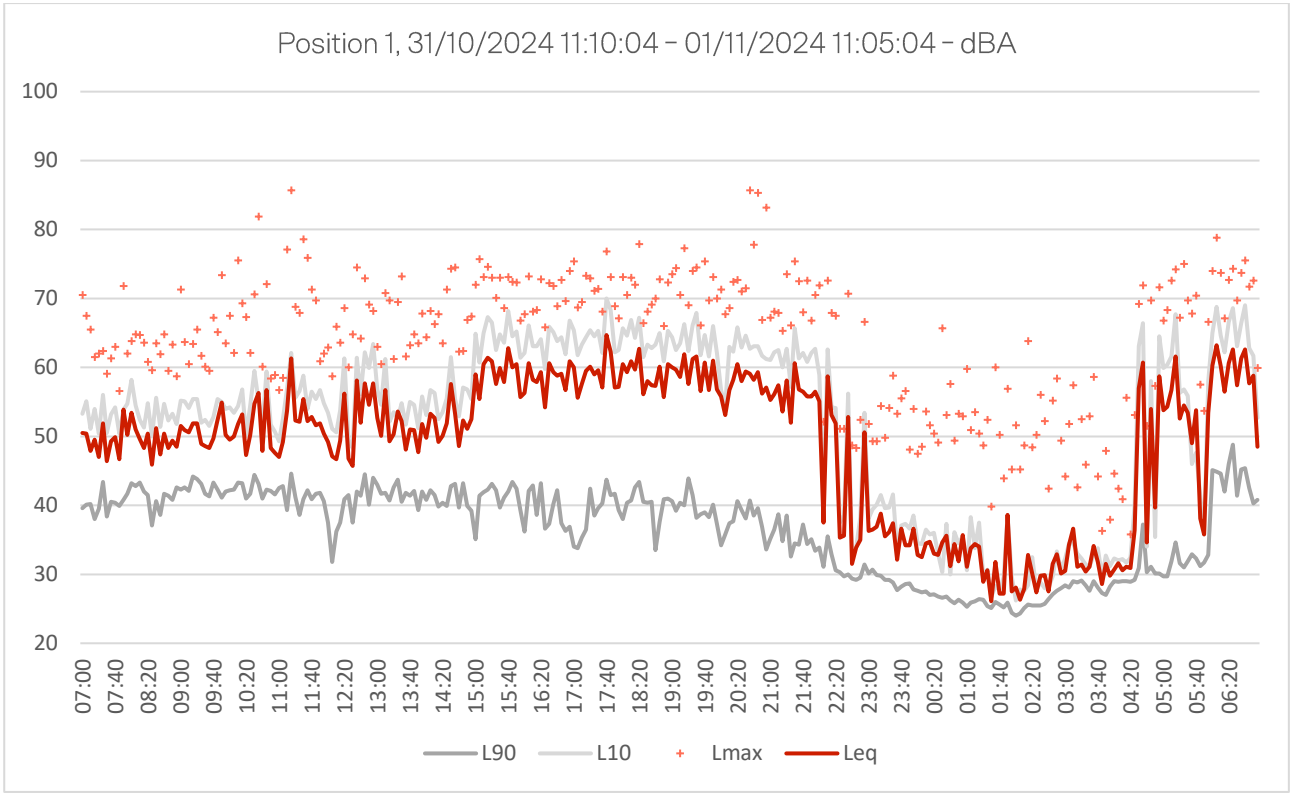
Figure 3: Technical Datasheets

OUTDOOR UNIT		PUZ-WM112VAA(-BS)
HEAT PUMP SPACE HEATER - 55˚C	ErP Rating	A++
	η_s	134%
	SCOP (MCS)	3.34
HEAT PUMP SPACE HEATER - 35˚C	ErP Rating	A+++
	η_s	191%
	SCOP (MCS)	4.74
HEAT PUMP COMBINATION HEATER - Large Profile*1	ErP Rating	A+
	η_{wh}	148%
HEATING*2 (A-7/W35)	Capacity (kW)	11.2
	Power Input (kW)	3.73
	COP	3.00
OPERATING AMBIENT TEMPERATURE (°C DB)		-25 ~ +35
SOUND DATA*3	Pressure Level at 1m (dBA)	45
	Power Level (dBA)*4	60
WATER DATA	Pipework Size (mm)	28
	Flow Rate (l/min)	32
	Water Pressure Drop (kPa)	24.0
DIMENSIONS (mm)	Width	1050
	Depth	480
	Height	1020
WEIGHT (kg)		119
ELECTRICAL DATA	Electrical Supply	220-240v, 50Hz
	Phase	Single
	Nominal Running Current [MAX] (A)*5	10.9 [28]
	Fuse Rating - MCB Sizes (A)*6	32
REFRIGERANT CHARGE (kg) / CO_2 EQUIVALENT (t)	R32 (GWP 675)	3.0 / 2.03

Measurement Results

Monitoring Position 1

Monitoring position	Time Period	Time Base T (hours)	$L_{Aeq,T}$ (dB)	L_{Amax} (dB)	L_{A90} (dB)	L_{A10} (dB)
1	Daytime	16	56.5	48.3 - 85.7	34.3	60.5
	Nighttime	8	53.0	35.8 - 78.8	25.5	58.7



Glossary of Acoustical Terms

A-weighting

Noise levels are corrected to represent human response to sound.

L_{Aeq}

This is a continuous equivalent of time varying noise, or effectively the average measured (A weighted) noise level over a defined period of time.

$L_{Aeq,16hour}$

A 16 hour long measurement of the L_{Aeq} over the period between 07:00 and 23:00, also known as a daytime measurement.

$L_{Aeq,8hour}$

An 8 hour long measurement of the L_{Aeq} over the period between 23:00 and 07:00, also known as a night time measurement.

L_{AFmax}

The highest, or maximum A-weighted sound pressure level measured over a specified time period. The 'F' defines a time weighting in Fast.

L_{A90}

The A-weighted noise level or average level which is exceeded for 90 percent of the measured time period. Also known as a background level.

L_{A10}

The A-weighted noise level or average level which is exceeded for 10 percent of the measured time period.

1:1 & 1:3 octave spectrum analysis

A single measurement that is separated into frequency bands to allow for a more detailed analysis of the noise source in question.

R_W

The weighted sound reduction index of a partition or facade. A single number value based on the performance of a partition between two rooms across the frequency range 100Hz to 3150Hz. The level is adjusted for the effects of reverberation and background noise.

$D_{n,e,w}$

The weighted level difference of a partition or façade which takes into account a small element such as a grill or vent.

SEL (sound exposure level)

A measure of A-weighted sound energy used to describe a particular event, such as a train pass. It is the sound energy, which, if occurring over one second would contain the same energy as the event.

Free field sound pressure

Is where the radiation or spread of sound is completely unaffected by the presence of any reflecting surfaces or boundaries.

Low Frequency Noise

A term generally used for sound below a frequency of 100 to 150Hz.

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