

Partridge Way, London

ASHP Noise Assessment

Client: Formation Design and Build Ltd
Ref: TN01-22323-R0
Date: 1 August 2023
Note by: Fabio Lassandro, MSc BEng MIOA, Associate Director

1. INTRODUCTION

- 1.1 Cass Allen has assessed the acoustic design of the air source heat pump (ASHP) unit that will serve the Partridge Way development in London.
- 1.2 This technical note will be included in the main report for the discharge of Planning Condition 6 provided by the M&E Team.
- 1.3 The ASHP design is controlled by Planning Condition 6 of the development's planning consent (HGY/2021/2075). The condition states:

The development hereby approved shall be constructed in accordance with the Energy Statement (dated 6 September 2021) prepared by Sweco, delivering a minimum 67% improvement on carbon emissions over 2013 Building Regulations Part L, with SAP10 emission factors, high fabric efficiencies (min. 13% reduction), air source heat pumps (ASHPs) and minimum 8.4 kWp solar photovoltaic (PV) energy generation.

(a) Prior to above ground construction, details of the proposed ventilation and heating systems and solar PV shall be submitted to and approved by the Local Planning Authority. This must include:

- Location, specification and efficiency of the proposed ASHPs (Coefficient of Performance, Seasonal Coefficient of Performance, and the Seasonal Performance Factor), with plans showing the ASHP pipework and noise and visual mitigation measures;

... (the remainder of Planning Condition 6 is not relevant to acoustics).

2. CRITERIA

- 2.1 Planning Condition 6 does not contain specific criteria to be achieved and therefore BS4142:2014+A1:2019 – *Methods for rating and assessing industrial and commercial sound* (BS4142) has been adopted for this assessment.
- 2.2 The BS4142 assessment methodology can be summarised as follows:
1. Measure the existing background noise levels (LA90,T dB) at locations of nearby noise sensitive receptors during the quietest periods when the mechanical plant is expected to operate.
 2. Predict the noise emissions (LAeq,T dB) from the plant items at locations of the nearby sensitive receptors and add corrections for any distinguishable acoustic features (e.g., tones, whines, screeches, hisses etc) to determine the rating noise level (LAr,Tr dB).
 3. Subtract the measured background noise levels with the predicted rating noise levels at each sensitive receptor.
- 2.3 Background noise levels were measured at the site from the 19th to the 20th October 2020 by MLM Consulting Engineers Ltd as part of a site noise survey to support the planning application, and by Cass Allen on the 24th February 2023 to validate noise data from MLM Consulting Engineers Ltd. The lowest typical measured background noise levels (LA90,T) at the site are:
- 56 dB during the daytime (0700-2300hrs); and
 - 39 dB during the night-time (2300-0700hrs).
- 2.4 In line with the experience of previous similar developments, a criterion of 5 dB below background noise levels during the daytime and night-time at the location of existing residential facades has been adopted. The noise limits shown in Table 1 have therefore been developed based on the measured background noise levels.

Table 1 BS4142 Noise Limits – Free-field Levels

Location	Period	
	Daytime (0700-2300hrs)	Night-time (2300-0700hrs)
Existing sensitive facades	51 dB LAr,Tr	34 dB LAr,Tr

3. ASSESSMENT

- 3.1 The ASHP unit will be installed on the top roof of the development as shown in Appendix 1 and is located about 32m away from the nearest existing receptors with no line of sight due to screening provided by the roof edge and parapet.
- 3.2 Technical details of the ASHP units were provided by the project M&E team and are shown in Appendix 2. The sound power levels for the ASHP are summarised in Table 2 below.

Table 2 ASHP Technical Details

Model	No. of units	A-weighted SWL (cooling/heating)
Panasonic U-250PZH2E8	1	78/82 dB

- 3.3 The ASHP units will be powered by modern, inverter-driven, high specification fan components which are expected to generate broadband noise with no distinctive characteristics. No additional character corrections are therefore required to calculate the noise rating level in accordance with BS4142.
- 3.4 The calculated rating noise levels from the ASHP at the location of nearest existing noise sensitive receptors are shown in Table 3 below.

Table 3 Calculated Free-field Noise Levels

Receiver	Noise Level Cooling Mode (L _{Ar} ,Tr)	Noise Level Cooling Mode (L _{Ar} ,Tr)
Existing nearest receptor (32m away)	30 dBA	34 dBA

- 3.5 Calculation results shown in Table 3 above and in Appendix 3 confirm that the noise levels from the proposed ASHP at the location of nearest noise sensitive receptors comply with the criteria in Table 1 above.

4. CONCLUSIONS

- 4.1 The ASHP unit is predicted to comply with the adopted criteria and therefore it is our view that this technical note contains all the required noise-related information to recommend the discharge of Condition 6.

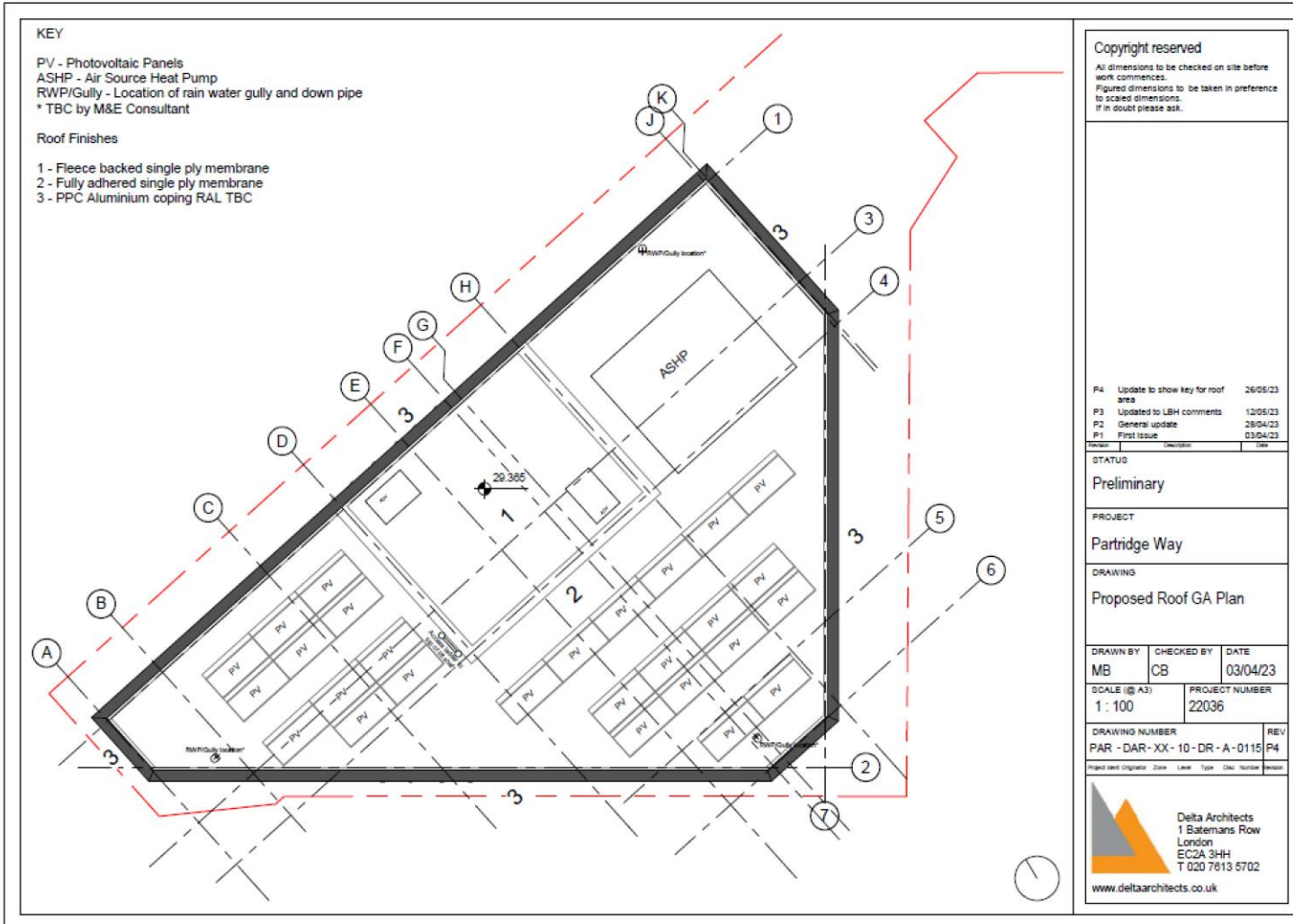
Quality Assurance

CHECKED BY

Henry Cox, BEng AMIOA,
Acoustics Consultant

Appendix 1 Roof Layout with ASHP Location

Roof Layout with ASHP Location



Specifications

Outdoor unit

Single Split Outdoor Unit (R32)

Model Name		U-200PZH2E8	U-250PZH2E8
Power source		380 - 400 - 415 V 3N~ 50 Hz	
Cooling capacity (High Static Pressure Ducted / 4-Way Cassette)	kW	19.5 / 20.0	23.2 / 25.0
	BTU/h	66,500 / 68,200	79,200 / 85,300
Heating capacity	kW	22.4	28.0
	BTU/h	76,400	95,500
Sound pressure level (Cooling / Heating)	dB(A)	59 / 61	59 / 63
Sound power level (Cooling / Heating)	dB(A)	77 / 79	78 / 82
Unit dimensions (H×W×D)	mm	1,500×980×370	1,500×980×370
Net weight	kg	117	128

Appendix 3

ASHP Calculations

Distance Correction Calculation

Heating

Sound Power Level (dBA)	82
Distance to Receiver (m)	32
Sound Pressure Level (dBA)	44
Corrected for screening (dBA)	34
(due to building edge)	

$$SPL = SWL - 20\log r - N$$

where N=11 for point source in space and 8 for radiation over non-abs ground

on non-absorbptive ground

Cooling

Sound Power Level (dBA)	78
Distance to Receiver (m)	32
Sound Pressure Level (dBA)	40
Corrected for screening (dBA)	30
(due to building edge)	

$$SPL = SWL - 20\log r - N$$

where N=11 for point source in space and 8 for radiation over non-abs ground

on non-absorbptive ground