2A Merton Road
Technical Note – Air Source Heat Pump Assessment

Date: 12th June 2025
Ref: A2291 TN01
To: [redacted] Missiato Design and Build
From: [redacted] Acoustic Consultant

Scheme: **2A Merton Road, Bristol**
Title: **Air Source Heat Pump Noise Emissions**

Introduction

Ion Acoustics is appointed by Missiato Design and Build provide a noise assessment for the planning application for a building to be converted into six flats. The proposal is to refurbish the existing building to provide residential accommodation on the ground, first, and second floors. This report is to support a planning application. The scheme includes six number Air Source Heat Pumps (ASHP) and this note addresses the noise emissions of these. We understand the Bristol City Council has requested information on their noise levels for the planning application.

The site is on Merton Road and there are several commercial buildings that surround the proposed development. The site is reasonably close to Gloucester Road and therefore exposed to road noise. Similar schemes where planning permission has been sought have had noise conditions imposed, and it is expected that similar conditions may apply for this scheme.

This note includes the assessment of noise emissions from the new Air Source Heat Pumps associated with the proposed development to third party receptors. In particular, at this stage no specific ASHP plant has been selected and that will not happen until the scheme is developed assuming that planning is granted. So, it is not possible to assess the specific proposed plant. Therefore, we have prepared calculations to assess the maximum allowable sound power, L_{WA}, associated with each ASHP for the noise emissions not to exceed the limit. We then consider noise of ASHPs provided for other schemes to demonstrate that in principle ASHP plant is available which could meet the limit.

The ASHP plant is assessed against fixed noise limits set out in the MCS Planning Standard MCS-20 for ASHPs.

Scheme Details

There are six ASHP proposed for 2A Merton Road. The heat pumps would be installed in a courtyard at the rear with receptors (AP1 – AP4) being the rear of upper floor flats of properties fronting Gloucester Road. The distances range from 20.5m to 22.8m from the assumed noise source location.

The heat pumps will be installed against a wall providing a degree of shielding to some receptors. The layout is given in Figure 1. We note that this indicates more than six units, but only six units are proposed for this scheme as there are only six flats.

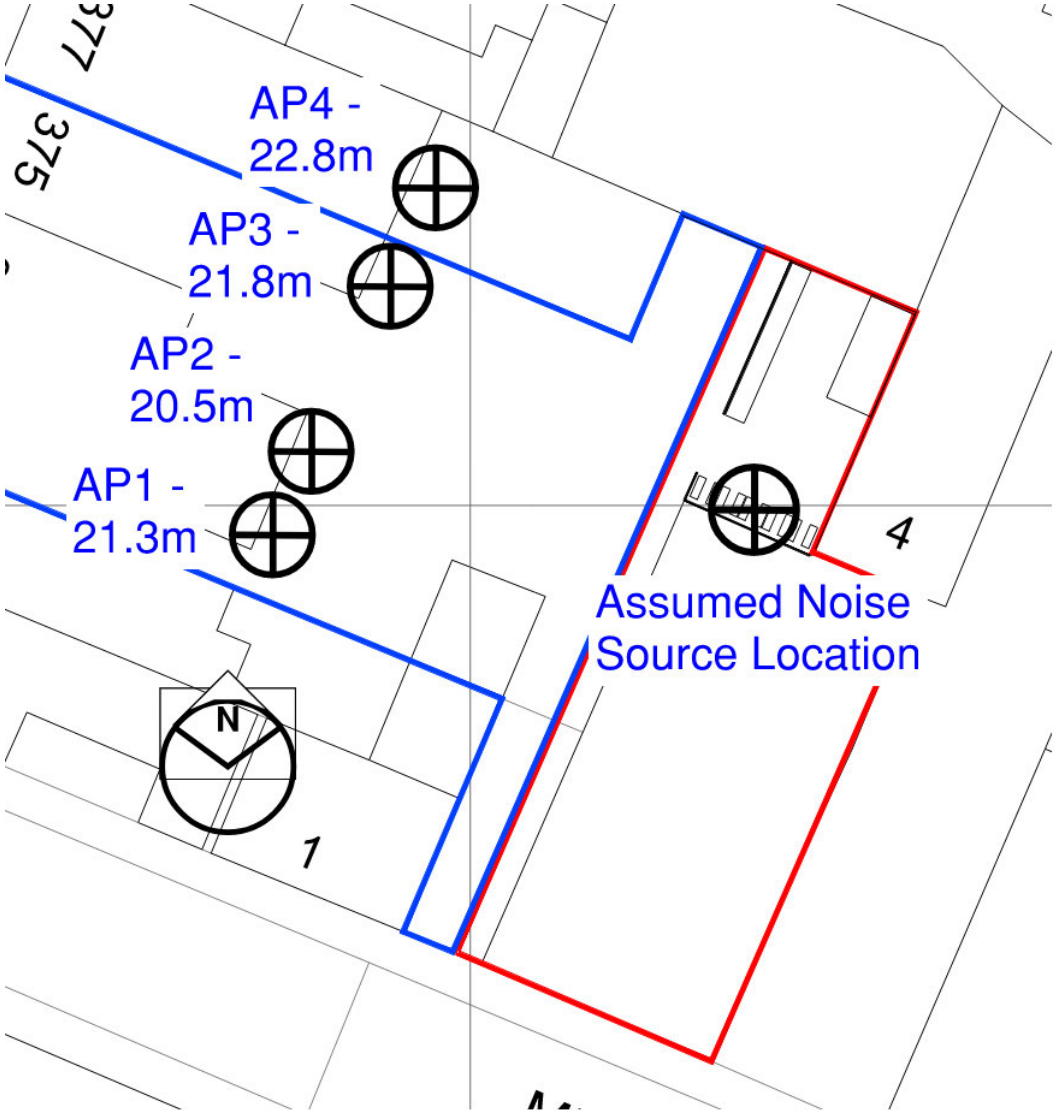

Figure 1 – Site Layout with Measured Distances

Planning Standard MCS 020

MCS Planning Standard MCS-20 has recently been revised in April 2025 to provide a calculation method and noise limits for individual domestic ASHPs that could be installed as part of permitted development. It sets an effective fixed noise limit of L_{Aeq} 37 dB for noise from ASHPs.[1]

Calculations

The heat pumps have not been selected at the time of writing, and calculations have been made to determine the maximum allowable sound power level of a single heat pump for the plant not to exceed noise emission limits.

The calculations were made using the MCS 020a planning guidance methodology and the limit taken from that guidance (37dBA). The calculations include for radiation, distance correction, and barrier

[1] [redacted]

screening effects. The sound pressure level used at the assessment positions was 37dBA in line with the MCS 020a limit The calculations are given at the end of this note.

The derived sound power level for a single ASHP using the MCS 020 limit, L_{Aeq} 37dB, is L_{WA} 61dB given below in Table 1. We note that the overall sound power level allowable for the plant is L_{WA} 69 dB (the sound power of the six units operating simultaneously), so if fewer units were used for example, L_{WA} 69dB is the overall limit for all units.

Table 1: Allowable Sound Power Level for a Single ASHP (assuming 6 units in total)

Sound Pressure at Receptor, L_{Aeq} dB	Maximum Allowable Sound Power Level per unit, L_{WA} dB
37	61

Further Notes

Therefore, if the ASHP is selected at L_{WA} 61dB or lower, then the noise limit can be met with no further mitigation. Such units are available, for example, Daikin ERGA08EVA has sound power L_{WA} 55.6dB. We cannot state that this unit is suitable in this instance, but this demonstrates that sufficiently quiet plant is available. A sample calculation using the Daikin ASHP is included at the end of this note as an example.

If plant has higher sound power than L_{WA} 61dB, then they may still be acceptable but may need some form of mitigation. For example the angle of orientation can reduce noise levels by 3-5dB, or installing a barrier around the plant could reduce noise levels.

Character corrections have not been assumed in the calculations. It is assumed that the ASHP do not have any tonal, impulsive, intermittent, or other characteristics that are identifiable against the residual sound. Factors such as directivity have not been included in the calculations.

Summary

This note is produced to determine the maximum allowable noise emissions from the ASHPs to meet the standard noise limits. A sound power for a single air source heat pump has been derived based on 6 units and given the site and the proximity of the receptors.

Calculations have been made from the permissible limits to derive a sound power. There are ASHPs with suitable sound power levels. Therefore, acceptable noise levels can be achieved.

$$L_{WA} = L_p - 10.\log\left(\frac{Q}{4.\pi.r^2}\right) + A_B$$

Calculations showing maximum allowable sound power for one ASHP

Using MCS 020 Limits (37dBA)

10/06/2025	2A Merton Road	AP1	AP2	AP3	AP4
Sound Pressure Level at AP (dBA)	MCS 020 Limits	37	37	37	37
'Q'	Q	4	4	4	4
Measured distance (m)		18.00	17.20	18.50	19.50
Correction to noise source (m) (+6.5/2)	r	21.25	20.45	21.75	22.75
Barrier correction dBA	AB	5	5	0	0
LWA dB (6 units)		73.52	73.19	68.72	69.11
Correction [10LOG(6)]	-7.78	-7.78	-7.78	-7.78	-7.78
LWA dB (1 unit)		65.74	65.40	**60.94**	61.33

$$L_p = L_w + 10.log\left(\frac{Q}{4.\pi.r^2}\right) - A_B$$

Example Calculation using less than maximum sound power level

Date	10/06/2025				
Location	2A Merton Road	AP1	AP2	AP3	AP4
Daikin ERGA08EVA	LWA dB	55.6	55.6	55.6	55.6
No. of ASHP	6	6	6	6	6
Correction [10LOG(6)]	7.8	7.8	7.8	7.8	7.8
LWA dB Corrected		63.4	63.4	63.4	63.4
'Q'	Q'	4	4	4	4
Distance	r	21.3	20.5	21.8	22.8
Barrier	AB	5	5	0	0
Sound Pressure Level at APX	LpA dB	26.9	27.2	31.7	31.3
Below 37 dBA		yes	yes	yes	yes