

EXTERNAL AIR SOURCE HEAT PUMP ACOUSTIC ASSESSMENT REPORT – REVISION A

Project: 8 Middle Lane, Crouch End, London N8

Client: Mr Alec Harrison

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Our reference: 90908/A

Revision: A

Notes: additional ASHP unit added and units relocated to main roof (13/8/26)

1. INTRODUCTION

1.1 A noise survey has been carried out at 8 Middle Lane, Crouch End, London, N8 8PL. Previously the property was office/commercial use and is now to be remodelled and refurbished for residential use. Each new residential unit will be served by an air source heat pump (ASHP) system and as such a total of FIVE external units are required. The noise survey and assessment report are required to accompany a Planning Application for the installation of the external air source heat pump equipment. The units are to be positioned on the roof of the property. The nearest neighbouring noise sensitive windows for the assessment are (a) the rear windows of the neighbouring property, 10 Middle Lane, which are approximately 8m from the units' location and completely screened by the roofline of 8 Middle Lane, and (b) the window in the front façade of the property opposite in Middle Lane (5 Middle Lane) which are approximately 20m from the units' location and partially screened by the roofline of 8 Middle Lane. The internal vibration generating equipment (fan, compressor) within the ASHP unit are fitted on anti-vibration mountings. To further prevent vibration transmission into the supporting structures, the proposed condenser unit will also be located on anti-vibration mountings

1.2 The measurements and assessment have shown that the noise levels at the nearest noise sensitive windows are significantly lower than the existing background noise level and therefore the proposed installation is unlikely to give rise to noise complaints from the adjacent properties. The site location is given in Figure 1 below.

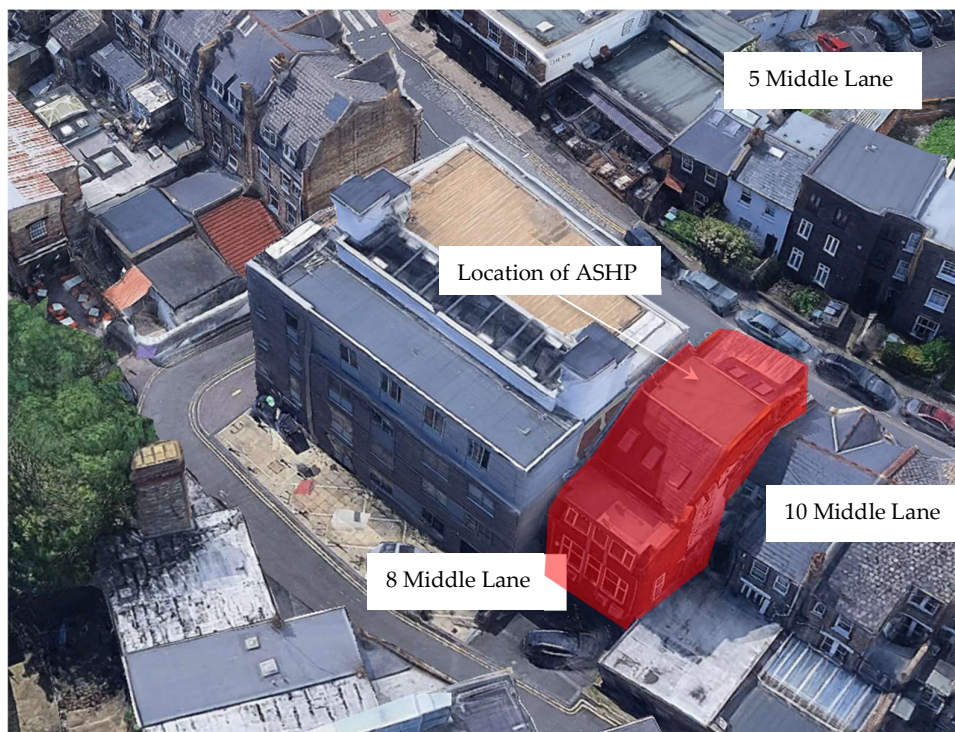


Figure 1: Site Location: 8 Middle Lane highlighted © Google Earth

2. NOISE MEASUREMENTS

2.1 Environmental noise measurements were carried out from Monday, 28th July to Friday, 1st August 2025. Sound level measurement equipment was installed at the rear of 8 Middle Lane and used to log noise levels over the four-day period. The measurement equipment is listed below in Table 1.

No	Description
1	Larson Davis Model 820 Class 1 Sound Level Meter with Model 377B02 ½" Diameter Condenser Microphone
2	Larson Davis Model CAL200 Sound Level Meter Calibrator.

Table 1. Environmental Noise Measurement Instrumentation

- 2.2 All acoustic equipment conforms to the relevant parts of BS EN 60651:1994 (equivalent to BS 5969:1981) for the requirements of Type 1 acoustic accuracy. Additionally, the relevant equipment conforms to the specifications contained within BS EN 60804:1994 (equivalent to BS 6698:1976) for integrating sound level meters.
- 2.3 In order to verify the correct operation of the equipment on site, an acoustic calibrator was applied during the course of the measurements. A maximum change of 0.1 dB(A) was noted, this can be considered as an insignificant change. The calibrator complies with the specifications of IEC 942:2003. The instrumentation was previously laboratory calibrated in October 2024.
- 2.4 Fast meter response was used for all measurements carried out during the course of the survey.
- 2.5 Noise levels are expressed in terms of continuous equivalent noise levels (L_{Aeq}) over an appropriate time period. The use of L_{Aeq} allows non-steady and non-continuous noise to be assessed and compared to the existing noise climate. L_{Aeq} is referred to as the ambient noise level. In addition to this background noise levels have also been measured and are expressed as L_{A90} . A full explanation of terminology commonly used in the measurement and assessment of noise levels is given in Appendix B at the end of this report.

3. RESULTS

3.1 Noise level measurements were carried out at 15-minute intervals during the survey period. Ambient (L_{Aeq}) and background (L_{A90}) noise levels were measured. Average noise levels for the day-time (0700 to 2300 hrs) and night-time period (2300 to 0700 hrs) have been determined.

	<u>Day</u>	<u>Night</u>
<u>L_{AeqT}</u>	50.6	45.6

Table 2: Summary Results

3.2 Although the survey was not attended on a full-time basis, it was noted during site visits to deploy and collect the noise monitor, that environmental noise levels in the area are dominated by road traffic on the surrounding roads. Weather, during the course of the survey, was variable with some periods of light rain. A full listing of 15-minute interval noise data is given in the graph at the end of this report (Figure A1). The location of the noise monitor is shown in Figure A2. Figure A1 shows that environmental noise levels vary throughout the day and night. This is to be expected. To determine the representative day-time and night-time background noise levels, histograms are produced and shown in Figure 2 below.

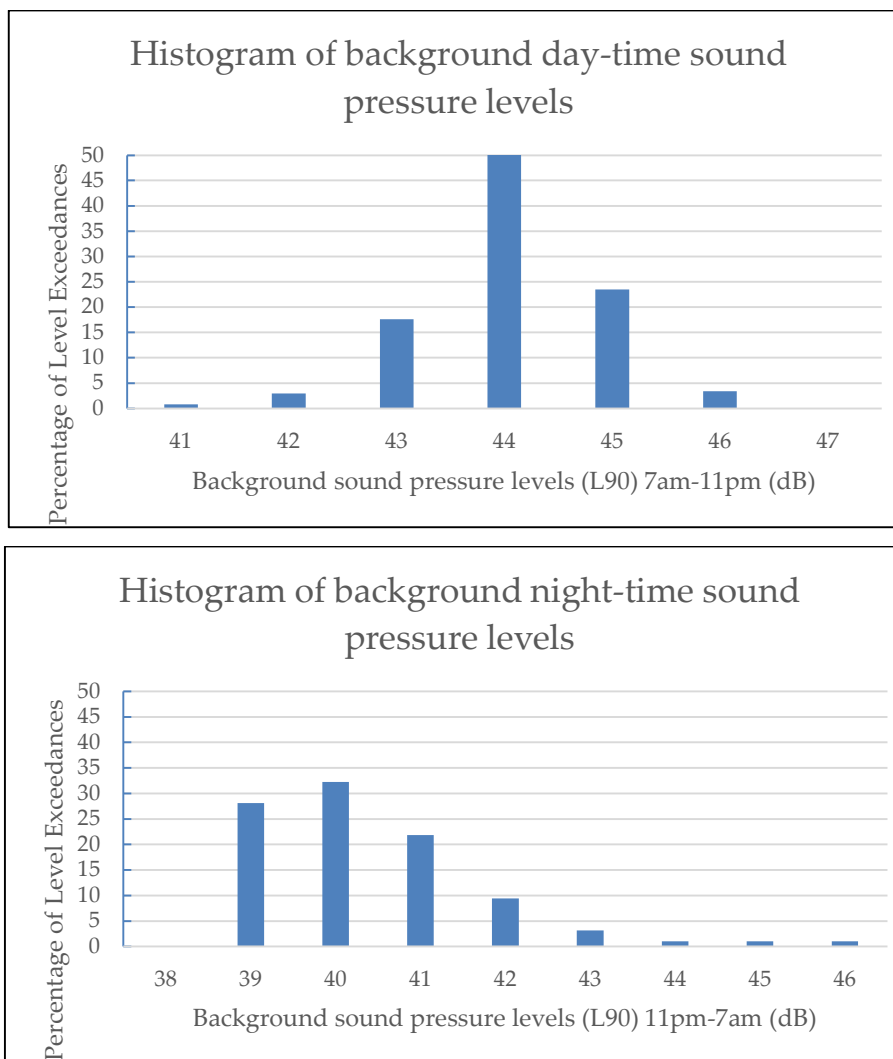


Figure 2: Background Noise Level Histograms

3.3 The resulting representative background noise levels, as required by BS4142:2014

	Day (7am to 11pm)	Night (11pm to 7am)
<u>L_{A90,15min}</u> (dB)	44	39

Table 3: Representative Background Noise Levels

3.4 BS4142:2014 has been used to assess the proposed external ASHP at 8 Middle Lane. Noise is assessed in terms of NOAEL, LOAEL and SOAEL¹. A number of corrections may be needed due to the nature of the equipment as described in BS4142 (see Table 4 below):

	<u>Tonal Correction</u>	<u>Impulsivity</u>	<u>Correction for "other sound characteristics"</u>	<u>Intermittency Correction</u>
Not Perceptible	0 dB	0 dB		
Just Perceptible	+2 dB	+3 dB		
Clearly Perceptible	+4 dB	+6 dB	Where neither tonal nor impulsive but clearly perceptible + 3 dB	Where intermittency is readily identifiable + 3 dB
Highly Perceptible	+6 dB	+9 dB		

Table 4: BS4142 Subjective Method Rating Corrections

3.5 Noise level data for the proposed ASHP equipment is given in Figure A3. The proposed external units are Samsung Gen 12kW (5 units). Each unit has L_{pA} at 1m of 47 dB(A) – Figure A3 also gives octave band spectra information. Further details, showing the proposed location with respect to the neighbouring properties are also given in Figure A4 at the end of this report. Calculated noise levels are as follows:

10 Middle Lane		<u>63</u>	<u>125</u>	<u>250</u>	<u>500</u>	<u>1k</u>	<u>2k</u>	<u>4k</u>	<u>8k</u>	<u>A</u>
1. Samsung Gen 12kW										
1.1	SPL at 1m	55	52	52	45	44	40	35	20	52
A-weighting		-26	-16	-9	-3	0	1	1	-1	
	5 units	7	7	7	7	7	7	7	7	

¹ NOAEL: No Observed Adverse Effect level LOAEL: Lowest Observed Adverse Effect level. SOAEL: Significant Observed Adverse Effect Level

SPL at Window	Barrier	0.1m	-7	-8	-9	-10	-12	-14	-14	-12
	Distance	8m	-18	-18	-18	-18	-18	-18	-18	-18
			11	17	23	21	21	16	11	-4

5 Middle Lane		63	125	250	500	1k	2k	4k	8k	A
1. Samsung Gen 12kW										
1.1	SPL at 1m	55	52	52	45	44	40	35	20	52
A-weighting		-26	-16	-9	-3	0	1	1	-1	
	5 units	7	7	7	7	7	7	7	7	
	Barrier	-4	-4	-3	-2	-1				
	Distance	20m	-26	-26	-26	-26	-26	-26	-26	
	SPL at Window	6	13	21	21	24	22	17	0	29

Table 5: Calculated Noise Levels

3.6 The assessment of noise impacts at the closest receptor is shown in Table 6 below. The proposed ASHP units may operate during both day and night-time periods but do NOT exhibit any of the acoustic feature corrections listed in Table 4 above.

	10 Middle Lane (Nighttime)	5 Middle Lane (Nighttime)	Relevant clause of BS4142:201 4	Comments
Background Noise Level (LA90,15min)	39	39	8.1, 8.2	Representative lowest background noise levels based on measured survey data
Specific sound level (at receiver).	27 dB LAeq,15min	29 dB LAeq,15min	7.3	Detailed noise model prediction based on ISO9613 outdoor noise propagation
Acoustic Feature Correction	-	-	9.2	A zero acoustic feature correction is used in the assessment of the AC plant as noise is

				broadband in nature and contains no impulsive characteristics
Rating Level Excess of Rating Level over Background	27 dB -12 dB	29 dB -10 dB	11	
Assessment of Uncertainty	A zero acoustic feature correction is used in the assessment of AC plant as noise is broadband in nature and contains no impulsive characteristics. Although the units may run intermittently, the noise at neighbouring receptors will be inaudible and hence no additional correction is included.			

Table 6: BS4142: 2014 Noise Assessment

3.7 Previous reports compiled for London Borough of Haringey state *"The design and installation of new items of fixed plant shall be such that, when in operation, the cumulative noise level L_{Aeq} arising from the proposed plant, measured or predicted at 1m from the facade of any residential premises shall be a rating level of at least 5dB(A) below the background noise level $L_{AF90,15min}$. The measurement and/or prediction of the noise should be carried out in accordance with the methodology contained within BS 4142: 2014"*. The results in Table 6 confirm this criterion is satisfied.

4. CONCLUSION

4.1 A noise measurement survey and assessment has been carried out for the proposed external ASHP equipment that is to be installed at 8 Middle Lane, Crouch End, London N8 8PL. The assessment is required as part of the application for planning consent.

4.2 The assessment shows that noise levels produced will be 10 dB below the existing lowest background noise level, therefore there will be no observed adverse effect on the neighbouring properties.

APPENDIX A: GRAPHS & FIGURES.

Figure A1: 8 Middle Lane Environmental Noise Data – Monday 28th July to Friday 1st August 2025

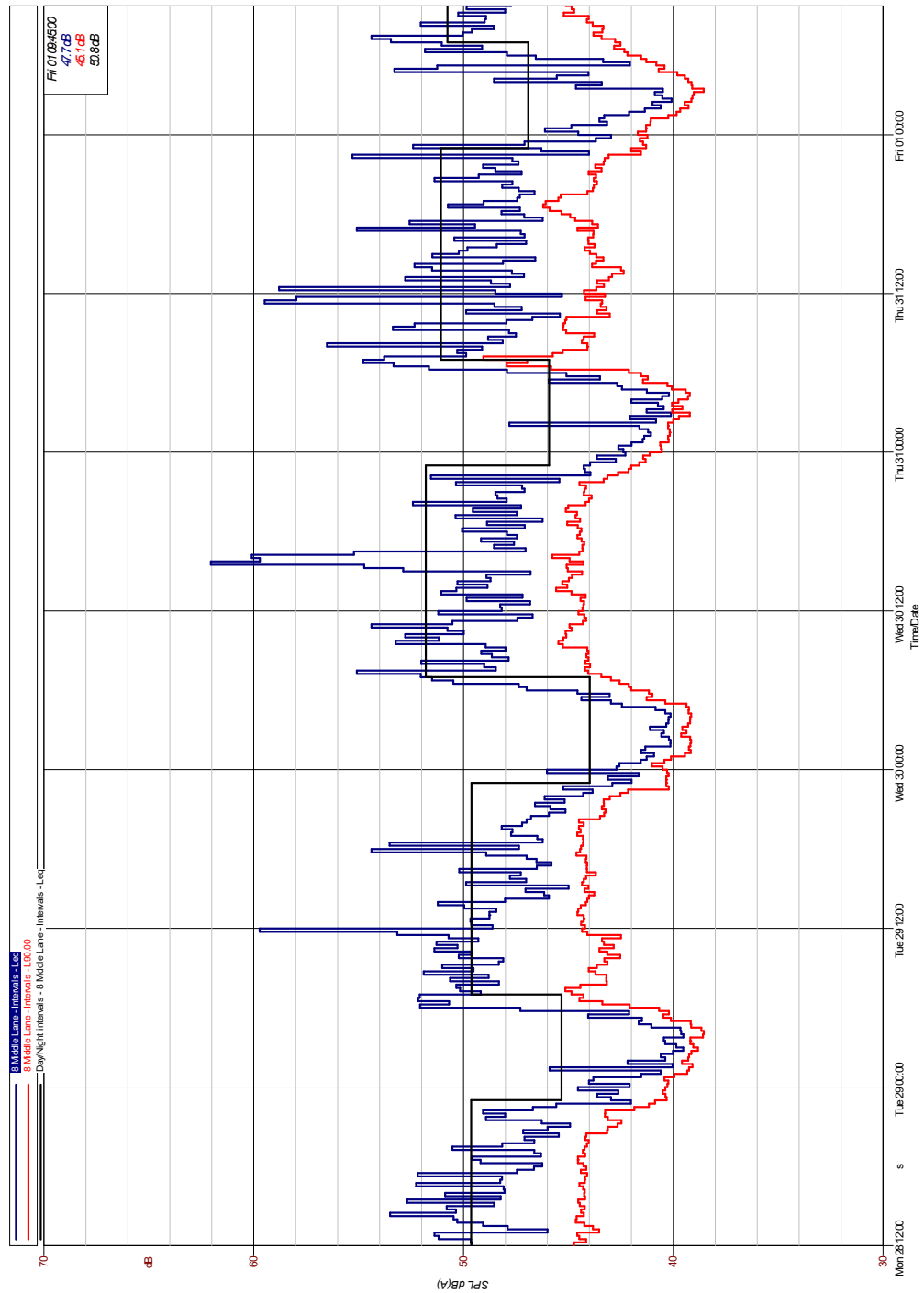


Figure A2: Noise Monitor Location



Figure A3: Equipment Noise Datasheet
Samsung EHA Gen 7: 12kW (AE120CXYDEK/EU)



			AE050CXYDEK	AE080CXYDEK	AE120CXYDEK
Capacity					
Capacity*	Heating (A7/W35)	kW	5.0	8.0	12.0
	Cooling (A35/W18)	kW	5.0	8.0	12.0
Performance					
Leaving Water Temperature	Heating	°C	15-75	15-75	15-75
	Cooling	°C	5-25	5-25	5-25
Efficiency	SCOP Class (35°C)		A+++	A+++	A+++
	SCOP Class (55°C)		A++	A++	A++
Sound Pressure**	Normal	dB(A)	41	45	47

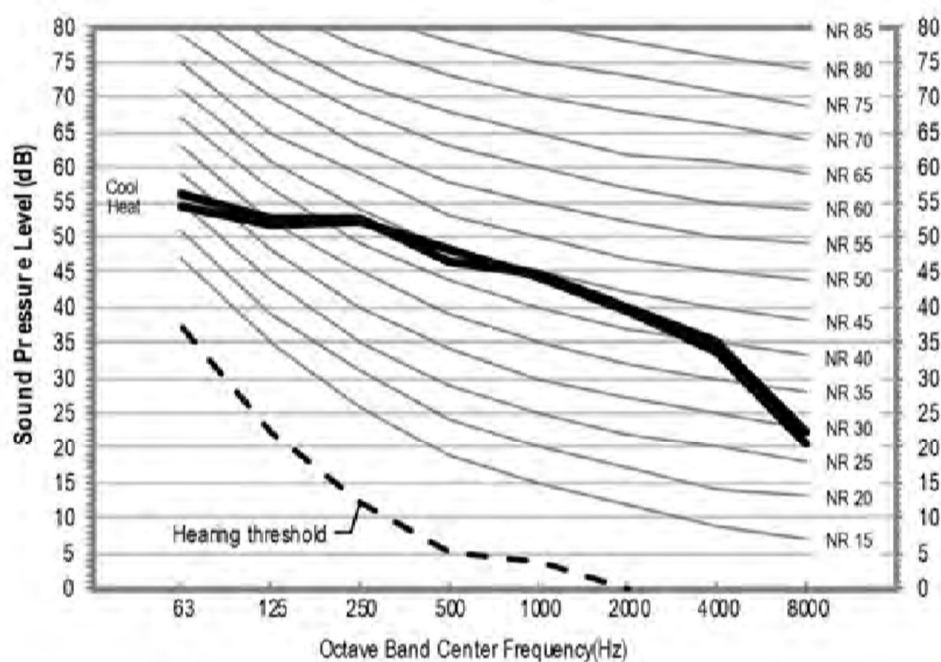
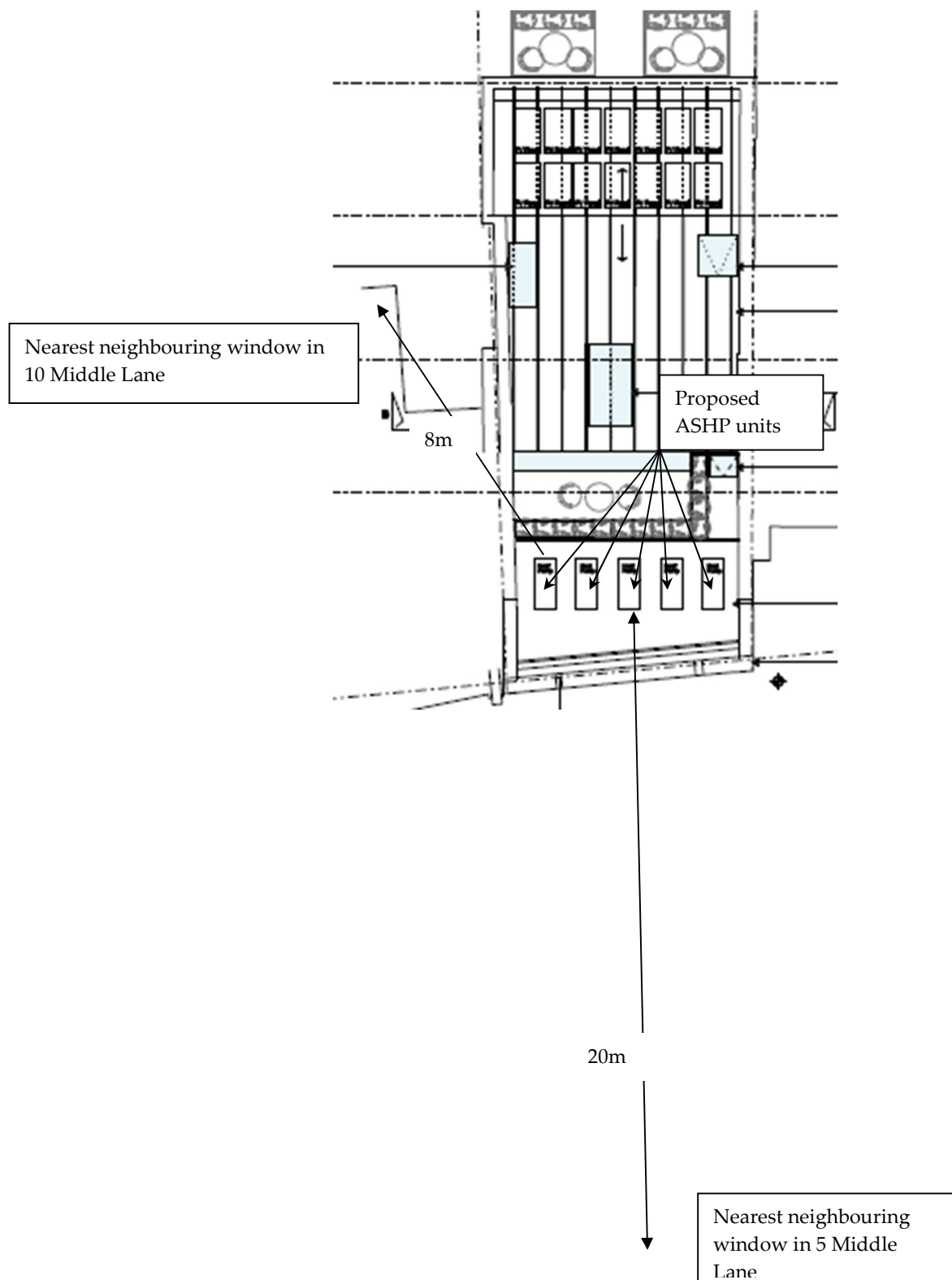


Figure A4: Site Layout



APPENDIX B: DESCRIPTION OF NOISE TERMS AND UNITS.

- 1.1 The sounds that we hear are as a result of successive air pressure changes. These air pressure changes are generated by vibrating sources, such as train engines or wheels, and they travel to a receiver, i.e. the human ear, as air pressure waves.
- 1.2 The human ear is capable of detecting a vast range of air pressures, from the lowest sound intensity that the normal ear can detect (about 10^{-12} watts/m²) to the highest that can be withstood without physical pain (about 10 watts/m²). If we were to use a linear scale to represent this range of human sensitivity it would encompass more than a billion units. Clearly this would be an unmanageable scale yielding unwieldy numbers.
- 1.3 The scale can be compressed by converting it to a logarithmic or Bel scale, the number of Bels being the logarithm to the base 10 of one value to another (as applied by Alexander Graham Bell to measure the intensity of electric currents). The Bel scale gives a compressed range of 0 to 12 units which in practice is a little too compressed. A more practical operating range of 0 to 120 is obtained by multiplying by 10, ie. 10 x Bel, which produces the scale units known as decibels or dB.
- 1.4. *Examples of typical sound intensity levels within the decibel range of 0 to 120 dB are listed below:*

Commercial four-engine jet aircraft at 100m	120dB
Riveting of steel plate at 10m	105dB
Pneumatic drill at 10m	90dB
Circular wood saw at 10m	80dB
Heavy road traffic at 10m	75dB
Male speech, average, at 10m	50dB

Whisper at 10m 25dB

Threshold of hearing, 100Hz 0dB

- 1.5. Due to this logarithmic scale noise levels have to be combined logarithmically rather than arithmetically. For example, two equal sound sources of 70 dB each, when operated simultaneously, do not produce a combined level of 140 dB but instead result in a level of 73 dB, ie. A rise of 3dB for each doubling of sound intensity. Subjectively, a 3dB change does not represent a doubling or halving of loudness; to make a sound appear twice as loud requires an increase in sound pressure level of about 10dB.
- 1.6. The subjective loudness of noise can be measured by applying a filter or weighting which equates to the frequency response of the human ear. This is referred to as an A-weighting and when applied results in noise levels expressed as dB(A).
- 1.7. dB(A) noise levels can be measured using a variety of noise indices. The index which correlates best with human response due to machinery noise is the L_{Aeq} this is the A-weighted L_{eq} which is referred to as the 'equivalent continuous noise level' and is a measure of the total sound energy generated by a fluctuating sound signal within a given time period.