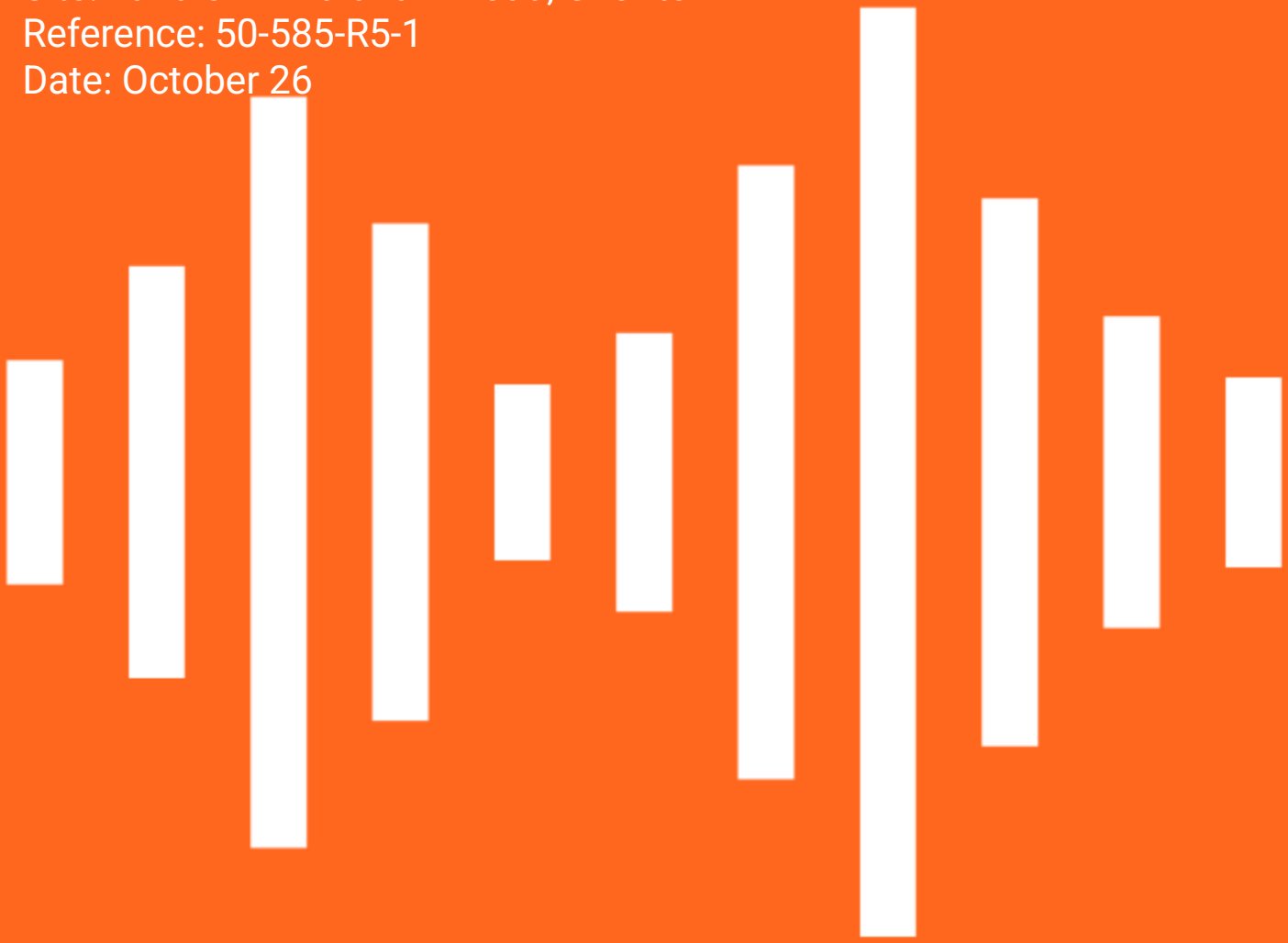
Post Completion Noise Testing and Verification Report – Plots 29 and 38

Site: Land off Wilbraham Road, Chorlton
Reference: 50-585-R5-1
Date: October 26



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Report reference	50-585-R5

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R4-2					

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EXECUTIVE SUMMARY

Site Address	Wilbraham Road, Chorlton M21 0UX
National Grid Reference	E 382643, N 394254.
Background	Post completion acoustic testing is required in order to discharge a planning condition in relation to the residential development at the above address.
Surveys Completed	E3P have undertaken unattended measurements inside a worst-case living room and bedroom of selected plots during a typical weekday period. Verification of the Air Source Heat Pump was also conducted at the time whilst in operation.
Assessments Completed	Measured internal noise levels at Plots 29 and 38 relate to the unfurnished rooms and are then compared to BS 8233 and WHO guidelines for internal habitable rooms. The surveys determined compliance with the applicable criteria in the living rooms and bedrooms of both plots. The noise output of the ASHPs at Plot 29 were found to be compliant with those assessed in the NIA. Noise levels at Plot 38 were predicted to be sufficient, allowing for extraneous noise from on-site works.
Remedial Mitigation Measures	Due to the outcome of the survey and verification, no remedial measures are required. All currently installed mitigation measures are as recommended in the original Noise Assessment.

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1. INTRODUCTION

1.1. BACKGROUND

E3P were commissioned by Kellen Homes to undertake Post Completion Noise Testing for Plots 29 and 38 at the development site off Wilbraham Road in Chorlton, to be referred to hereafter as 'the Site'.

Following submission of the Nosie Impact Assessment (50-585-R1-4) by E3P, planning permission was granted with a condition attached that required post completion noise testing for worst-case plots along with verification of mitigation and the installed Air Source Heat Pumps.

1.2. REPORT OBJECTIVES

The objectives of this report are as follows.

- Establish and measure the existing sound levels within affected rooms during typical weekday periods.
- Assess internal noise levels in accordance with criteria given in BS 8233.
- Measure noise from the ASHPs and compare to those assessed.
- Verify any mitigation measures, where required.

2. ASSESSMENT METHODOLOGY

2.1. BRITISH STANDARD BS 8233:2014+A1:2019 – GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

The scope of this standard is the provision of recommendations for the control of noise in and around buildings including residential dwellings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

The standard suggests suitable internal noise levels within different types of buildings, including residential dwellings, as shown in Table 1.

Table 1 BS 8233:2014 Recommended Internal Noise Levels

Criterion	Typical situation	Design criterion, $L_{Aeq,t}$ (dB)
Suitable resting and sleeping conditions	Living Room	35
	Bedroom	30

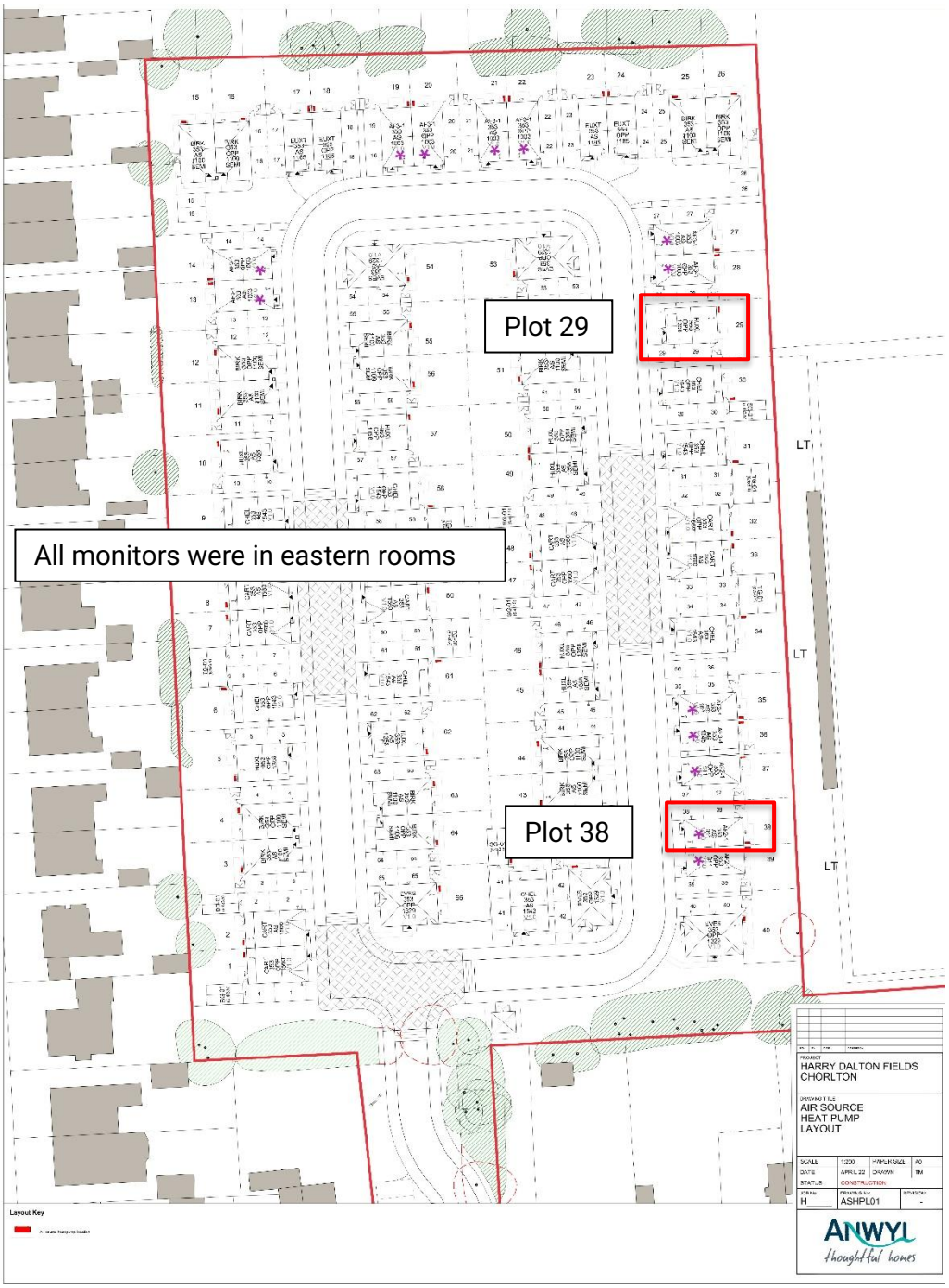
3. SURVEY RESULTS

It was noted at installation that mechanical ventilation was not required for the plot with only extract provided in the wet rooms. Trickle ventilators to the habitable rooms were open at the time of the test.

The rooms were unfurnished and so a correction to the measured values may be required.

The location of Plots 29 and 38 and the Nosie Measurement Positions are given below:

Figure 1 Noise Measurement Positions



3.1. PLOT 29

3.1.1. LIVING ROOM – INTERNAL SOUND MEASUREMENT

E3P has conducted an internal sound survey within the living room with all windows and doors closed. The survey was conducted during the following periods to encompass a full weekday and weekend period:

- 12:00 Thursday 8th October to 08:00 Monday 12th October 2026.

The following noise measurement position was chosen for the Noise Survey:

- Noise Measurement Position 1 (NMP1): Located in the centre of the living room at a height of 1.5 m above floor level. Noise sources were noted to be distant road traffic, and on-site construction works, intermittently.

A summary of the hourly measured sound pressure levels inside the living room are presented in Table 2. Data in italics denote when decorators entered the room and worked.

Table 2 Living Room – Unfurnished – Plot 29

Measurement Start Time	Measured ambient noise level, $L_{Aeq,T}$ (dB)
08/10/2026 12:00	30.2
08/10/2026 13:00	*50.3*
08/10/2026 14:00	*34.8*
08/10/2026 15:00	*46.7*
08/10/2026 16:00	*55.3*
08/10/2026 17:00	30.6
08/10/2026 18:00	30.2
08/10/2026 19:00	30.3
08/10/2026 20:00	30.2
08/10/2026 21:00	30.4
08/10/2026 22:00	30.3
08/10/2026 23:00	30.1
09/10/2026 00:00	29.9
09/10/2026 01:00	29.7
09/10/2026 02:00	29.5
09/10/2026 03:00	29.5
09/10/2026 04:00	29.3
09/10/2026 05:00	29.1
09/10/2026 06:00	28.9
09/10/2026 07:00	29.2
09/10/2026 08:00	29.6
09/10/2026 09:00	*56.2*
09/10/2026 10:00	*58.3*
09/10/2026 11:00	*64.5*
09/10/2026 12:00	*54.1*
09/10/2026 13:00	*51.9*
09/10/2026 14:00	*44.3*
09/10/2026 15:00	*57.6*
09/10/2026 16:00	*44.9*
09/10/2026 17:00	26.9

Measurement Start Time	Measured ambient noise level, $L_{Aeq,T}$ (dB)
09/10/2026 18:00	29.1
09/10/2026 19:00	27.5
09/10/2026 20:00	25.0
09/10/2026 21:00	26.1
09/10/2026 22:00	25.8
09/10/2026 23:00	26.1
10/10/2026 00:00	25.6
10/10/2026 01:00	26.3
10/10/2026 02:00	26.8
10/10/2026 03:00	27.4
10/10/2026 04:00	26.6
10/10/2026 05:00	27.7
10/10/2026 06:00	27.4
10/10/2026 07:00	27.4
10/10/2026 08:00	27.3
10/10/2026 09:00	26.7
10/10/2026 10:00	27.2
10/10/2026 11:00	29.7
10/10/2026 12:00	30.7
10/10/2026 13:00	31.2
10/10/2026 14:00	32.4
10/10/2026 15:00	31.1
10/10/2026 16:00	31.3
10/10/2026 17:00	29.3
10/10/2026 18:00	29.8
10/10/2026 19:00	27.8
10/10/2026 20:00	26.4
10/10/2026 21:00	25.4
10/10/2026 22:00	25.8
10/10/2026 23:00	26.2
11/10/2026 00:00	24.8
11/10/2026 01:00	24.8
11/10/2026 02:00	25.5
11/10/2026 03:00	25.5
11/10/2026 04:00	25.5
11/10/2026 05:00	25.7
11/10/2026 06:00	25.9
11/10/2026 07:00	25.7
11/10/2026 08:00	23.9
11/10/2026 09:00	23.8
11/10/2026 10:00	25.3
11/10/2026 11:00	25.5
11/10/2026 12:00	25.7
11/10/2026 13:00	25.5
11/10/2026 14:00	25.9
11/10/2026 15:00	26.3
11/10/2026 16:00	26.8
11/10/2026 17:00	24.9
11/10/2026 18:00	24.8
11/10/2026 19:00	25.2

Measurement Start Time	Measured ambient noise level, $L_{Aeq,T}$ (dB)
11/10/2026 20:00	24.8
11/10/2026 21:00	24.7
11/10/2026 22:00	24.6
11/10/2026 23:00	24.5
12/10/2026 00:00	24.5
12/10/2026 01:00	24.7
12/10/2026 02:00	24.4
12/10/2026 03:00	22.6
12/10/2026 04:00	22.6
12/10/2026 05:00	23.3
12/10/2026 06:00	23.7
12/10/2026 07:00	24.2

The resultant 16-hour noise level is noted to be:

- Thursday – 46.2 dB (31.1 dB with internal works removed).
- Friday – 54.9 dB (26.8 dB with internal works removed).
- Saturday – 29.2 dB.
- Sunday – 25.2 dB.

All the above are applicable to the unfurnished room. If furnishing corrections were applied, the noise level would be lower. As such, this is considered acceptable and within tolerance.

The noise levels with internal works removed fall below the 35 dB internal criterion by at least 3 dB on all days. As such, the installed glazing and façade insulation are acceptable.

3.1.2. BEDROOM – INTERNAL SOUND MEASUREMENT

E3P has conducted a full 24-hour survey within the bedroom with all windows and doors closed. The survey was conducted during the following periods:

- 12:00 Thursday 8th October to 08:00 Monday 12th October 2026.

The following noise measurement position was chosen for the Noise Survey:

- Noise Measurement Position 2 (NMP2): Located in the centre of the bedroom at a height of 1.5 m above floor level. Noise sources were noted to be distant road traffic and on-site construction works, intermittently.

A summary of the hourly measured sound pressure levels inside the bedroom are presented in Table 3.

Table 3 Bedroom – Unfurnished – Plot 29

Measurement Start Time	Measured ambient noise level, $L_{Aeq,T}$ (dB)	Measured maximum noise level, $L_{Amax,fast}$ (dB)
08/10/2026 12:00	37.3	62.2
08/10/2026 13:00	26.6	46.2
08/10/2026 14:00	50.8	71.4
08/10/2026 15:00	42.5	65.7
08/10/2026 16:00	26.1	35.9
08/10/2026 17:00	25.8	33.2
08/10/2026 18:00	26.1	35.2
08/10/2026 19:00	26.8	37.4
08/10/2026 20:00	27.8	43.1
08/10/2026 21:00	26.4	37.0
08/10/2026 22:00	26.2	34.4
08/10/2026 23:00	26.1	28.8
09/10/2026 00:00	25.7	27.5
09/10/2026 01:00	26.1	32.9
09/10/2026 02:00	25.3	27.6
09/10/2026 03:00	25.1	41.7
09/10/2026 04:00	24.9	27.3
09/10/2026 05:00	24.8	26.4
09/10/2026 06:00	24.8	29.0
09/10/2026 07:00	25.3	35.9
09/10/2026 08:00	39.5	67.1
09/10/2026 09:00	63.5	76.3
09/10/2026 10:00	48.3	79.6
09/10/2026 11:00	56.8	82.1
09/10/2026 12:00	48.1	79.1
09/10/2026 13:00	31.6	47.7
09/10/2026 14:00	41.4	61.5
09/10/2026 15:00	31.2	56.2
09/10/2026 16:00	27.6	40.7
09/10/2026 17:00	28.0	41.5
09/10/2026 18:00	27.9	39.5
09/10/2026 19:00	27.2	36.1
09/10/2026 20:00	27.8	45.1
09/10/2026 21:00	28.2	38.1
09/10/2026 22:00	27.4	41.5
09/10/2026 23:00	27.0	41.4
10/10/2026 00:00	27.6	42.4
10/10/2026 01:00	28.2	42.7
10/10/2026 02:00	28.3	41.3
10/10/2026 03:00	28.2	42.0
10/10/2026 04:00	28.6	43.4
10/10/2026 05:00	28.8	46.5
10/10/2026 06:00	28.6	41.8
10/10/2026 07:00	28.7	44.0
10/10/2026 08:00	28.3	38.6
10/10/2026 09:00	27.6	41.0
10/10/2026 10:00	29.4	43.1
10/10/2026 11:00	29.6	45.3

Measurement Start Time	Measured ambient noise level, $L_{Aeq,T}$ (dB)	Measured maximum noise level, $L_{Amax,fast}$ (dB)
10/10/2026 12:00	29.8	46.6
10/10/2026 13:00	30.2	48.8
10/10/2026 14:00	29.5	47.5
10/10/2026 15:00	29.5	47.0
10/10/2026 16:00	29.9	47.0
10/10/2026 17:00	30.3	44.1
10/10/2026 18:00	29.7	40.7
10/10/2026 19:00	29.2	39.4
10/10/2026 20:00	29.3	41.5
10/10/2026 21:00	28.0	37.4
10/10/2026 22:00	27.9	44.0
10/10/2026 23:00	29.5	35.1
11/10/2026 00:00	29.9	34.5
11/10/2026 01:00	29.4	30.8
11/10/2026 02:00	29.4	33.6
11/10/2026 03:00	29.3	31.7
11/10/2026 04:00	29.4	34.9
11/10/2026 05:00	29.7	44.3
11/10/2026 06:00	29.5	33.3
11/10/2026 07:00	26.7	33.8
11/10/2026 08:00	21.5	31.7
11/10/2026 09:00	26.7	37.8
11/10/2026 10:00	27.4	33.2
11/10/2026 11:00	27.4	39.3
11/10/2026 12:00	27.1	37.0
11/10/2026 13:00	27.3	39.2
11/10/2026 14:00	28.0	41.4
11/10/2026 15:00	28.9	46.2
11/10/2026 16:00	28.4	38.8
11/10/2026 17:00	29.0	40.3
11/10/2026 18:00	29.5	36.9
11/10/2026 19:00	29.9	35.7
11/10/2026 20:00	29.8	33.2
11/10/2026 21:00	29.1	32.1
11/10/2026 22:00	28.7	32.2
11/10/2026 23:00	28.8	38.5
12/10/2026 00:00	29.2	32.8
12/10/2026 01:00	29.0	33.2
12/10/2026 02:00	21.6	28.9
12/10/2026 03:00	21.3	23.5
12/10/2026 04:00	21.1	24.5
12/10/2026 05:00	21.2	29.6
12/10/2026 06:00	22.2	44.4
12/10/2026 07:00	26.7	37.1
12/10/2026 08:00	36.1	67.0

The resultant 16-hour noise levels are noted to be:

- Thursday – 40.9 dB (30.1 dB with internal works removed).
- Friday – 52.8 dB (33.2 dB with internal works removed).
- Saturday – 29.3 dB.
- Sunday – 28.3 dB.

The noise levels fall below the 35 dB internal criterion by at least 2 dB on all days. As such, the installed glazing and façade insulation are acceptable.

The resultant 8-hour night-time noise levels are noted to be:

- Thursday – 25.3 dB.
- Friday – 28.3 dB.
- Saturday – 29.5 dB.
- Sunday – 25.2 dB.

The noise levels fall below the 30 dB internal criterion by at least 2 dB on all days. As such, the installed glazing and façade insulation are acceptable.

The 10th highest maximum noise levels on each night are noted to be:

- Thursday – 27.9 dB.
- Friday – 41.3 dB.
- Saturday – 32.6 dB.
- Sunday – 30.9 dB.

The noise levels fall below the 45 dB internal criterion by at least 4 dB on all nights. As such, the installed glazing and façade insulation are acceptable.

With considering the tolerances and reduction for furnishings, these fall below the 35 dB, 30 dB and 45 dB internal criterion respectively. As such, the installed glazing and façade insulation are acceptable.

3.2. PLOT 38

3.2.1. LIVING ROOM – INTERNAL SOUND MEASUREMENT

E3P has conducted an internal sound survey within the living room with all windows and doors closed. The survey was conducted during the following periods to encompass a full weekday and weekend period:

- 12:00 Thursday 8th October to 08:00 Monday 12th October 2026.

The following noise measurement position was chosen for the Noise Survey:

- Noise Measurement Position 3 (NMP3): Located in the centre of the living room at a height of 1.5 m above floor level. Noise sources were noted to be distant road traffic, and on-site construction works, intermittently.

A summary of the hourly measured sound pressure levels inside the living room are presented in Table 4. Data in italics denote when decorators entered the room and worked.

Table 4 Living Room – Unfurnished – Plot 38

Measurement Start Time	Measured ambient noise level, $L_{Aeq,T}$ (dB)
08/10/2026 12:00	*42.1*
08/10/2026 13:00	*39.2*
08/10/2026 14:00	*43.8*
08/10/2026 15:00	*42.6*
08/10/2026 16:00	32.5
08/10/2026 17:00	26.3
08/10/2026 18:00	26.6
08/10/2026 19:00	26.7
08/10/2026 20:00	26.4
08/10/2026 21:00	26.1
08/10/2026 22:00	26.2
08/10/2026 23:00	26.0
09/10/2026 00:00	25.7
09/10/2026 01:00	26.6
09/10/2026 02:00	25.7
09/10/2026 03:00	26.6
09/10/2026 04:00	26.6
09/10/2026 05:00	26.2
09/10/2026 06:00	26.1
09/10/2026 07:00	*38.4*
09/10/2026 08:00	*42.7*
09/10/2026 09:00	*40.3*
09/10/2026 10:00	*42.5*
09/10/2026 11:00	*42.9*
09/10/2026 12:00	*40.0*
09/10/2026 13:00	*39.1*
09/10/2026 14:00	35.5
09/10/2026 15:00	34.4
09/10/2026 16:00	28.2
09/10/2026 17:00	31.1
09/10/2026 18:00	26.8
09/10/2026 19:00	26.5
09/10/2026 20:00	26.6
09/10/2026 21:00	26.7
09/10/2026 22:00	26.3
09/10/2026 23:00	26.2
10/10/2026 00:00	29.9
10/10/2026 01:00	26.4
10/10/2026 02:00	27.8
10/10/2026 03:00	26.7
10/10/2026 04:00	27.4
10/10/2026 05:00	26.9

Measurement Start Time	Measured ambient noise level, $L_{Aeq,T}$ (dB)
10/10/2026 06:00	26.7
10/10/2026 07:00	26.7
10/10/2026 08:00	27.1
10/10/2026 09:00	26.8
10/10/2026 10:00	27.2
10/10/2026 11:00	28.3
10/10/2026 12:00	27.8
10/10/2026 13:00	28.8
10/10/2026 14:00	29.5
10/10/2026 15:00	28.9
10/10/2026 16:00	28.8
10/10/2026 17:00	27.9
10/10/2026 18:00	27.0
10/10/2026 19:00	26.8
10/10/2026 20:00	28.9
10/10/2026 21:00	26.3
10/10/2026 22:00	27.3
10/10/2026 23:00	25.9
11/10/2026 00:00	25.7
11/10/2026 01:00	27.4
11/10/2026 02:00	26.4
11/10/2026 03:00	27.7
11/10/2026 04:00	25.1
11/10/2026 05:00	25.2
11/10/2026 06:00	25.3
11/10/2026 07:00	26.6
11/10/2026 08:00	27.4
11/10/2026 09:00	26.4
11/10/2026 10:00	25.9
11/10/2026 11:00	26.1
11/10/2026 12:00	25.9
11/10/2026 13:00	25.9
11/10/2026 14:00	26.9
11/10/2026 15:00	27.6
11/10/2026 16:00	27.2
11/10/2026 17:00	26.5
11/10/2026 18:00	26.1
11/10/2026 19:00	26.2
11/10/2026 20:00	27.3
11/10/2026 21:00	26.5
11/10/2026 22:00	26.0
11/10/2026 23:00	29.8
12/10/2026 00:00	25.6
12/10/2026 01:00	25.3
12/10/2026 02:00	27.4
12/10/2026 03:00	25.6
12/10/2026 04:00	25.0
12/10/2026 05:00	25.2
12/10/2026 06:00	29.3
12/10/2026 07:00	36.0

The resultant 16-hour noise level is noted to be:

- Thursday – 37.4 dB (28.0 dB with internal works removed).
- Friday – 38.0 dB (32.7 dB with internal works removed).
- Saturday – 27.9 dB.
- Sunday – 26.6 dB.

All the above are applicable to the unfurnished room. If furnishing corrections were applied, the noise level would be lower. As such, this is considered acceptable and within tolerance.

The noise levels with internal works removed fall below the 35 dB internal criterion by at least 2 dB on all days. As such, the installed glazing and façade insulation are acceptable.

3.2.2. BEDROOM – INTERNAL SOUND MEASUREMENT

E3P has conducted a full 24-hour survey within the bedroom with all windows and doors closed. The survey was conducted during the following periods:

- 12:00 Thursday 8th October to 08:00 Monday 12th October 2026.

The following noise measurement position was chosen for the Noise Survey:

- Noise Measurement Position 4 (NMP4): Located in the centre of the bedroom at a height of 1.5 m above floor level. Noise sources were noted to be distant road traffic and on-site construction works, intermittently.

A summary of the hourly measured sound pressure levels inside the bedroom are presented in Table 5.

Table 5 Bedroom – Unfurnished – Plot 38

Measurement Start Time	Measured ambient noise level, $L_{Aeq,T}$ (dB)	Measured maximum noise level, $L_{Amax,fast}$ (dB)
08/10/2026 12:00	42.1	64.3
08/10/2026 13:00	39.2	63.9
08/10/2026 14:00	43.8	66.8
08/10/2026 15:00	42.6	61.6
08/10/2026 16:00	32.5	54.9
08/10/2026 17:00	26.3	36.0
08/10/2026 18:00	26.6	36.4
08/10/2026 19:00	26.7	35.7
08/10/2026 20:00	26.4	32.3
08/10/2026 21:00	26.1	33.9
08/10/2026 22:00	26.2	32.1
08/10/2026 23:00	26.0	45.6
09/10/2026 00:00	25.7	33.2
09/10/2026 01:00	26.6	39.3
09/10/2026 02:00	25.7	33.2
09/10/2026 03:00	26.6	30.9
09/10/2026 04:00	26.6	35.6
09/10/2026 05:00	26.2	30.6
09/10/2026 06:00	26.1	36.4
09/10/2026 07:00	38.4	59.4
09/10/2026 08:00	42.7	63.9
09/10/2026 09:00	40.3	61.5
09/10/2026 10:00	42.5	64.9
09/10/2026 11:00	42.9	61.3
09/10/2026 12:00	40.0	60.1
09/10/2026 13:00	39.1	54.6
09/10/2026 14:00	35.5	57.9
09/10/2026 15:00	34.4	60.0
09/10/2026 16:00	28.2	47.9
09/10/2026 17:00	31.1	49.8
09/10/2026 18:00	26.8	33.9
09/10/2026 19:00	26.5	35.9
09/10/2026 20:00	26.6	34.7
09/10/2026 21:00	26.7	34.8
09/10/2026 22:00	26.3	32.3
09/10/2026 23:00	26.2	30.1
10/10/2026 00:00	29.9	62.6
10/10/2026 01:00	26.4	37.8
10/10/2026 02:00	27.8	43.4
10/10/2026 03:00	26.7	35.6
10/10/2026 04:00	27.4	37.3
10/10/2026 05:00	26.9	35.8
10/10/2026 06:00	26.7	38.6
10/10/2026 07:00	26.7	35.8
10/10/2026 08:00	27.1	41.3
10/10/2026 09:00	26.8	37.1
10/10/2026 10:00	27.2	41.9
10/10/2026 11:00	28.3	48.6

Measurement Start Time	Measured ambient noise level, $L_{Aeq,T}$ (dB)	Measured maximum noise level, $L_{Amax,fast}$ (dB)
10/10/2026 12:00	27.8	43.0
10/10/2026 13:00	28.8	46.3
10/10/2026 14:00	29.5	45.9
10/10/2026 15:00	28.9	47.0
10/10/2026 16:00	28.8	41.3
10/10/2026 17:00	27.9	45.2
10/10/2026 18:00	27.0	39.0
10/10/2026 19:00	26.8	37.3
10/10/2026 20:00	28.9	60.1
10/10/2026 21:00	26.3	33.9
10/10/2026 22:00	27.3	45.9
10/10/2026 23:00	25.9	35.0
11/10/2026 00:00	25.7	34.6
11/10/2026 01:00	27.4	33.6
11/10/2026 02:00	26.4	31.0
11/10/2026 03:00	27.7	59.4
11/10/2026 04:00	25.1	28.6
11/10/2026 05:00	25.2	32.6
11/10/2026 06:00	25.3	28.7
11/10/2026 07:00	26.6	32.3
11/10/2026 08:00	27.4	33.8
11/10/2026 09:00	26.4	39.3
11/10/2026 10:00	25.9	38.6
11/10/2026 11:00	26.1	38.3
11/10/2026 12:00	25.9	37.1
11/10/2026 13:00	25.9	38.3
11/10/2026 14:00	26.9	42.8
11/10/2026 15:00	27.6	46.1
11/10/2026 16:00	27.2	44.5
11/10/2026 17:00	26.5	40.2
11/10/2026 18:00	26.1	41.0
11/10/2026 19:00	26.2	40.9
11/10/2026 20:00	27.3	53.0
11/10/2026 21:00	26.5	31.3
11/10/2026 22:00	26.0	31.8
11/10/2026 23:00	29.8	62.3
12/10/2026 00:00	25.6	35.5
12/10/2026 01:00	25.3	31.7
12/10/2026 02:00	27.4	36.1
12/10/2026 03:00	25.6	35.3
12/10/2026 04:00	25.0	37.0
12/10/2026 05:00	25.2	31.5
12/10/2026 06:00	29.3	61.4
12/10/2026 07:00	36.0	53.4
12/10/2026 08:00	51.1	81.0

The resultant 16-hour noise levels are noted to be:

- Thursday – 31.8 dB.
- Friday – 32.0 dB.
- Saturday – 28.8 dB.
- Sunday – 27.6 dB.

The noise levels fall below the 35 dB internal criterion by at least 3 dB on all days. As such, the installed glazing and façade insulation are acceptable.

The resultant 8-hour night-time noise levels are noted to be:

- Thursday – 25.4 dB.
- Friday – 24.7 dB.
- Saturday – 26.3 dB.
- Sunday – 27.4 dB.

The noise levels fall below the 30 dB internal criterion by at least 2 dB on all days. As such, the installed glazing and façade insulation are acceptable.

The 10th highest maximum noise levels on each night are noted to be:

- Thursday – 35.2 dB.
- Friday – 39.1 dB.
- Saturday – 36.9 dB.
- Sunday – 39.1 dB.

The noise levels fall below the 45 dB internal criterion by at least 5 dB on all nights. As such, the installed glazing and façade insulation are acceptable.

With considering the tolerances and reduction for furnishings, these fall below the 35 dB, 30 dB and 45 dB internal criterion respectively. As such, the installed glazing and façade insulation are acceptable.

3.3. AIR SOURCE HEAT PUMP SOURCE SURVEY – PLOTS 29 AND 38

Due to intermittent works around plots 29 and 38 especially, a measurement of ASHP noise at these plots was affected by extraneous noise. As such, post processing has bene undertaken to ascertain an actual level of noise from the ASHPs to ensure compliance with the noise assessment, as detailed in E3P Technical Note (50-585-R3-3), appended to the rear of the report. Plot 29 and 38 was assessed with the following ASHP model:

- Plot 29 - Daikin EDLA06EV3 with a sound power level of 60 dB L_{wA} which would result in a sound pressure level of 52 dB L_{Aeq} at 1 m.
- Plot 38 - Daikin EDLA04EV3 with a sound power level of 58 dB L_{wA} which would result in a sound pressure level of 50 dB L_{Aeq} at 1 m.

E3P have conducted an attended measurements prior to the above sound tests with 10 minute measurements collected for each ASHP.

The following noise measurement positions were chosen for the Noise Survey:

- Noise Measurement Position 5 (NMP5): Located 1 m from the ASHP at the rear of Plot 29. The microphone was positioned 1.5 m above floor level.
- Noise Measurement Position 6 (NMP6): Located 1 m from the ASHP at the rear of Plot 38. The microphone was positioned 1.5 m above floor level.

A summary of the 5 minute measured sound pressure levels external to Plots 29 and 38, 1 m from the ASHP are presented in Table 6. Note that heavy works took place around Plot 38 and the values below include construction noise.

Table 6 ASHP Source Levels

Measurement Start Time	Measured ambient noise level, $L_{Aeq,T}$ (dB)	Adopted Sound Level from Data Sheet/Sound Power Level (dB)
Plot 29		
10:37	52.4	52
10:42	51.8	
Plot 38		
11:00	55.2	50
11:05	57.5	

As noted above, the sound levels from the ASHP at Plot 29 equal that from the Technical Sheet and so achieve the required sound level.

For Plot 38, the measurement was heavily influenced by plant movements and construction works, as noted by the variance in the sound level. E3P have reviewed the background sound level during the survey and note this was 53 dB at its lowest. Assuming as a worst-case that construction sound was equal to that of the ASHP, this would result in a corrected level of 50 dB, which achieves the required sound level.

Weather conditions during the survey were calm and dry. The equipment outlined in Table 7 was used for the noise survey.

Table 7 Noise Measurement Equipment and Calibration Dates

Measurement position	Equipment description	Manufacturer & type number	Serial number	Calibration due date
NMP3 and ASHP	Sound Level Meter	01dB Fusion	14226	17th December 2027
	Pre-amplifier	01dB Pre22	2135072	
	Microphone	GRAS 40CD	470570	
	Calibrator	Cirrus CR 515	99204	19th August 2027
NMP2	Sound Level Meter	CR:171A	G303884	13th April 2027
	Pre-amplifier	MV:200F	12731F	
	Microphone	MK:224	215899D	
	Calibrator	CR:515	99403	
NMP1	Sound Level Meter	Svantek SV 971A	159408	12th March 2028
	Microphone	ACO 7152	95340	
	Calibrator	Cirrus CR515	109417	20th November 2026
NMP4	Sound Level Meter	01dB Fusion	14616	6th June 2028
	Pre-amplifier	01dB Pre22	20951	
	Microphone	GRAS 40CD	494264	
	Calibrator	Cirrus CR 515	99206	6th June 2027

The sound level meters were field calibrated before and after measurements with no significant drift witnessed.

END OF REPORT

APPENDIX I
LIMITATIONS



GENERAL

1. This report and any associated works (together comprising the "Services") were compiled and carried out by E3P for the client (as present in Section 1) under the E3P “Terms of Business” or with those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.

2. Unless explicitly agreed otherwise, in writing, this report has been prepared under E3P Standard Terms and Business as included within our proposal to the Client.

3. Project-specific appointment documents may be agreed upon at our discretion and a charge may be levied for both the time to review and finalise appointment documents and also for associated changes to the appointment terms. E3P reserves the right to amend the fee should any changes to the appointment terms create an increased risk to E3P.

4. The report needs to be considered in light of the proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

NOISE AND VIBRATION IMPACT ASSESSMENTS

5. Where a noise or vibration survey is required to inform an assessment, E3P will endeavour to ensure that all noise and vibration measurements taken are robust, representative and reliable in order to inform an accurate assessment.

6. Where mitigation measures are specified in this report, it should be noted that these measures are relative to a specific sound or vibration source, both in terms of the measured sound pressure and vibration level and the character of the sound source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, E3P cannot be held responsible for any subsequent variations in the proposed mitigation performance.

7. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walkover inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. E3P cannot be held responsible for any disclosures that are provided post-production of our report and will not automatically update our report.

8. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, E3P reserves the right to review such information and, if warranted, to modify the opinions accordingly.

9. E3P does not warrant work/data undertaken/provided by others.

APPENDIX II
GLOSSARY



NOISE

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source. The most widely used weighting mechanism that best corresponds to the response of the human ear is the "A"-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or LAeq, LA90 etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective but, as a general guide, a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 8 Typical Sound Pressure Levels

SOUND PRESSURE LEVEL	LOCATION/EXAMPLE
0	Threshold of hearing
20-30	Quiet bedroom at night
30-40	Living room during the day
40-50	Typical office
50-60	Inside a car
60-70	Typical high street
70-90	Inside a factory
100-110	Burglar alarm at 1 m away
110-130	Jet aircraft on take off
140	Threshold of pain

ACOUSTIC TERMINOLOGY

Table 9 Terminology

DESCRIPTOR	EXPLANATION
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2E-05 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. "A" weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
LAeq, T	LAeq is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
LAmax	LAmax is the maximum A-weighted sound pressure level recorded over the period stated. LAmax is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the "fast" sound level meter response.
L10 and L90	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L10 is the level exceeded for 10% of the time and as such can be regarded as the "average maximum level". Similarly, L90 is the "average minimum level" and is often used to describe the background noise. It is common practice to use the L10 index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Fast	A time weighting used in the root-mean-square section of a sound level meter with a 125-millisecond time constant.
Slow	A time weighting used in the root-mean-square section of a sound level meter with a 1000-millisecond time constant.
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2E-05 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. "A" weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.