

APPENDIX 11.1

BASELINE NOISE MONITORING

RESIDENTIAL DEVELOPMENT ON LAND AT STAKEHILL

BASELINE NOISE MONITORING

Report prepared by:
Hepworth Acoustics Ltd
21 Little Peter Street
Manchester
M15 4PS

On behalf of:
Redrow Homes Lancashire

Report prepared by:
David Thurstan BSc MIOA - Senior Consultant



Report checked by:
Graham Bowland BSc MIOA – Technical Director



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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Ltd was commissioned by Redrow Homes Lancashire to prepare a noise chapter as part of an Environmental Statement for the Development on land at Stakehill.
- 1.2 This report sets out the results of a baseline noise survey that has been carried out to determine appropriate noise limits for the control of noise during the construction phase of the Development.
- 1.3 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 GUIDANCE

BS 5228:2009+A1:2014

- 2.1 British Standard 5228:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites – Part 1: Noise’ is the appropriate guidance for assessing/evaluating the potential noise impact from construction or open sites. This includes sites where demolition, remediation, ground treatment or related civil engineering works are being carried out, and open sites, where work activities/operations generate significant noise levels.
- 2.2 BS 5228:2014 E.3.2 provides an example of the threshold of potential significant effect at dwellings when the construction noise level, rounded to the nearest decibel, exceeds the relevant value in Table 1 (Table E.1 of BS 5228:2014). This is known as the ABC method which is most commonly adopted for large construction projects.
- 2.3 Threshold values at residential locations are based on the ambient ($L_{Aeq,T}$) noise level measured in the absence of construction noise. Table E.1 is reproduced in Table 1.

Table 1: The ABC Method Example of Threshold of Potential Significant Effect at Dwellings (dB)

Assessment category and threshold value period	Threshold value, $L_{Aeq,T}$		
	Category A ^A	Category B ^B	Category C ^C
Daytime (07:00-19:00) and Saturday (07:00-13:00)	65	70	75

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

- 2.4 However, it should be noted that the BS 5228 criteria relate to the main long term works i.e. those operations that are carried out on a daily or regular basis. Higher noise levels may be necessary to enable some short-term operations to be undertaken such as piling and ground preparation works.

3.0 NOISE SURVEY

3.1 Baseline noise measurements were carried out at three locations that are representative of the nearest dwellings to the Development. The purpose of the noise survey was to ascertain the prevailing ambient noise climate of the area in the absence of noise from construction works. The measurement locations are indicated in Figure 1 and are described below:

- Location 1: 5m from Thornham New Road;
- Location 2: To rear of dwellings on Chatburn Avenue;
- Location 3: 5m from Thornham Lane.

3.2 Automated noise measurements were carried out at Location 1 in consecutive 5-minute periods between approximately 10:40 hours on Wednesday 17 and 11:00 hours on Thursday 18 August 2022. The automated noise measurements were supplemented with attended noise measurements which were carried out in the daytime on the Wednesday.

3.3 The noise measurements were taken in ‘free-field’ conditions and at a microphone height of approximately 1.4m above the ground. Calibration checks were carried out both before and after the measurement periods with no variance in levels noted. Audio was also recorded at Location 1 during the unattended monitoring period in order to identify sources of noise making up the noise climate.

3.4 The weather conditions during the noise survey were suitable for the purposes of the survey and subsequent assessment.

3.5 The results of the noise survey are summarised in Table 2. Full results along with details of the equipment used, and the weather conditions during the survey, are shown in Appendix II.

Table 2: Summary of Measured Noise Levels (dB)

Location	Average $L_{Aeq,T}$	$L_{Aeq,5\text{ min}}$
1. 5m from Thornham New Road	57	52 – 61
2. To rear of dwellings on Chatburn Avenue	60	59 – 61
3. 5m from Thornham Lane	53	51 – 55

3.6 The predominant noise in the area during the survey was road traffic and birdsong. The logarithmic average of the ambient noise levels measured at Locations 1 to 3 were 57 to 60 dB $L_{Aeq,T}$.

3.7 Therefore, in terms of control of impact of construction noise using the ABC threshold approach of BS 5228, the lowest threshold value of 65 dB $L_{Aeq,T}$ for daytime construction site works would apply.

4.0 SUMMARY

- 4.1 Hepworth Acoustics Ltd carried out an ambient noise survey at three locations that are representative of the nearest dwellings to the Development.
- 4.2 The results of the ambient noise measurements have been used to establish the thresholds of significant effect of construction noise impact outside the nearest dwellings in line with the ABC method set out in BS5228: 2009+A1:2014.

**Key:**

Not to scale

- Noise Measurement
Position

- Site Boundary

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Title: Figure 11.1: Site Location
& Noise Monitoring
Positions

Project: P22-220

Appendix I: Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

$L_{Aeq,T}$ This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, $L_{Aeq,T}$ is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

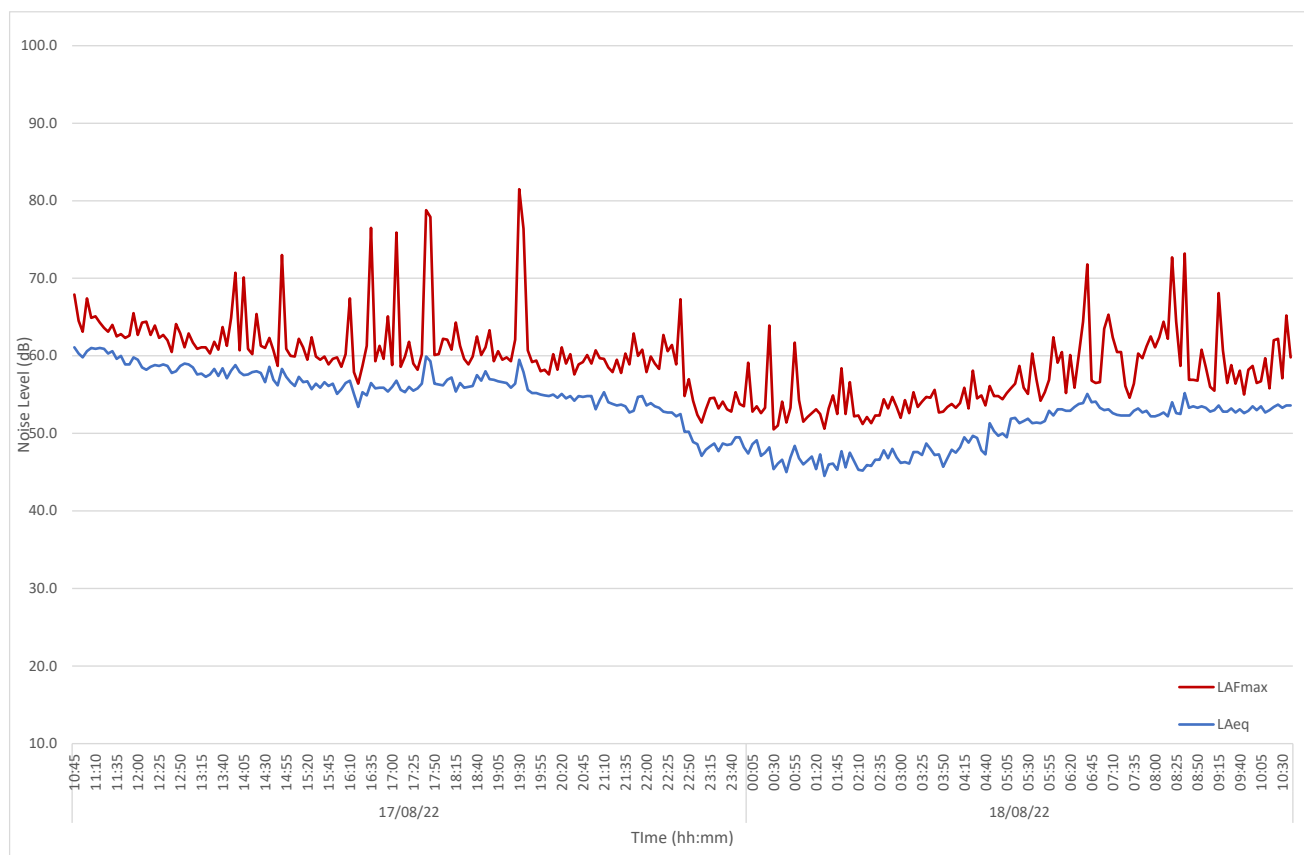
L_{AFmax} This is the maximum A-weighted noise level that was recorded during the measurement period in terms of 'Fast' time weighting.

Appendix II: Noise Survey Results

Date(s):	Wednesday/Thursday 17/18 August 2022
Equipment	B&K 2260 'Type 1' sound analyser (serial no. 2467016) with tripod and associated calibrator NTi XL2 'Class 1' sound level meters (s/n: A2A-20228-E0) with associated calibrator and environmental outdoor monitoring kit
Weather	Dry, ~17-20°C and partly overcast with an occasional NE breeze <4 m/s

All levels in dB(A)

Location 1: 5m from Thornham New Road



Location 2: To rear of dwellings on Chatburn Avenue

Time		Measured Noise Levels (dB)		Comments
Start	End	L_{AeFmax}	$L_{Aeq,T}$	
10:55	11:00	62.1	59.1	Road traffic from M62
11:00	11:05	61.3	58.9	
11:05	11:10	63.2	60.2	
11:10	11:15	62.7	60.5	
11:15	11:20	63.0	59.3	

Location 3: 5m from Thornham Lane

Time		Measured Noise Levels (dB)		Comments
Start	End	L_{AeFmax}	$L_{Aeq,T}$	
11:30	11:35	61.7	51.4	Distant road traffic, occasional vehicle on Thornham Lane
11:35	11:40	69.3	54.9	
11:40	11:45	62.2	52.4	
11:45	11:50	55.8	51.6	
11:50	11:55	54.4	51.3	