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**PROPOSED RESIDENTIAL DEVELOPMENT
CRAVEN ROAD, READING**

NOISE ASSESSMENT

Technical Report: R6072-1 Rev 1

Date: 26th October 2017

For: McCarthy and Stone
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1.0 INTRODUCTION

- 1.1 McCarthy and Stone Retirement Lifestyles Ltd intends to apply for planning permission to construct retirement accommodation at a site on Craven Road, Reading.
- 1.2 Noise from surrounding roads is the dominant source of noise across the site. This report presents the results of a noise assessment, following site visits and a background noise survey undertaken between 16th and 23rd December 2015.
- 1.3 An explanation of acoustical terms used in this report is provided in Appendix A. All sound pressure levels in this report are given in dB re: 20 μ Pa.

2.0 SITE DESCRIPTION

- 2.1 McCarthy and Stone intends to apply for planning permission to construct new residential properties on Craven Road, Reading, comprising 40 apartments in a single block over four storeys. Car parking will be provided in allocated spaces on the southern boundary with vehicular access via the existing site access from Craven Road. This report has considered the noise impact and proposed mitigation from external noise sources where required within the proposed residential properties.
- 2.2 The proposed development site is located at No. 3 - 5 Craven Road, Reading. The existing buildings on the site which are to be demolished are currently in use by the NHS.
- 2.3 Craven Road bounds the site to the west with the Royal Berkshire Hospital buildings and multi-storey car park to the west of Craven Road. Erleigh Road lies to the north-east with residential properties to the south and the Reading School to the south-east. Noise arising from surrounding road traffic sources is the primary source of ambient noise at the proposed development site.
- 2.4 A site location plan is provided in Figure 1. A site layout plan for the proposed development can be seen in Figure 2.

3.0 CRITERIA

National Planning Policy Framework and Noise Policy Statement for England

3.1 The National Planning Policy Framework (NPPF) [Reference 1] was published by the Department for Communities and Local Government in 2012. For noise, the NPPF policy states that planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions, while recognising that many developments will create some noise.

3.2 The NPPF also refers to the Noise Policy Statement for England (NPSE) [Reference 2] which is intended to apply to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise. The NPSE sets out the Government's long-term vision to 'promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development' which is supported by the following aims.

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life;
- Where possible, contribute to the improvement of health and quality of life.

3.3 The NPSE defines the concept of a 'significant observed adverse effect level' (SOAEL) as 'the level above which significant adverse effects on health and quality of life occur'. The following guidance is provided within the NPSE:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

- 3.4 In 2014 the Planning Practice Guidance (PPG) was finalised [Reference 3]. This is written to support the NPPF with more specific planning guidance. The PPG reflects the NPSE and states that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also states that opportunities should be taken, where practicable, to achieve improvements to the acoustic environment. The PPG states that noise can override other planning concerns but should not be considered in isolation from the other economic, social and environmental dimensions of the proposed development.
- 3.5 The PPG expands upon the concept of SOAEL (together with Lowest Observable Adverse Effect Level, LOAEL and No Observed Effect Level, NOEL) as introduced in the NPSE and provides a table of noise exposure hierarchy for use in noise impact assessments in the planning system.
- 3.6 There is currently a major discontinuity between the above guidance and objective technical criteria for use in planning noise impact assessments. For this site it is considered that the appropriate (technical and objective) standard for use in assessing the noise impact is those of British Standard 8233 [Reference 4] along with the World Health Organisation Community Noise Guidelines [Reference 5]. These are described below.

BS 8233: 2014 and World Health Organisation

- 3.7 BS 8233:2014 provides design guidance for dwelling houses, flats and rooms in residential use and recommends that internal noise levels in dwellings do not exceed 35 dB $L_{Aeq,16 \text{ hour}}$ in living rooms and bedrooms during the day, 40 dB $L_{Aeq, 16 \text{ hour}}$ in dining rooms during the day and 30 dB $L_{Aeq, 8 \text{ hour}}$ in bedrooms at night.
- 3.8 BS 8233 also notes that *“Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$, depending on the character and number of events per night.”* In this case an upper internal value of 45 dB $L_{Amax,f}$ is seen as desirable.
- 3.9 The World Health Organisation (WHO) provides guidance on desirable internal noise levels to minimise the risk of sleep disturbance. The WHO 2000 guidelines suggest internal noise levels not exceeding 30 dB $L_{Aeq,8hr}$ or regularly exceeding 45 dB $L_{Amax,f}$ for ‘a good night’s sleep’.

4.0 ENVIRONMENTAL NOISE MEASUREMENTS

Measurement Instrumentation and Procedure

- 4.1 An ambient noise survey was carried out at the site over the period 16th – 23rd December 2015. Noise monitors were set up to measure ambient noise levels at the site. Noise levels were measured using the following equipment:

Svan Type 1 precision sound level meter	Type 957;
Rion Type 1 precision sound level meter	Type NL31;
Brüel and Kjær acoustic calibrator	Type 4231.

- 4.2 The noise monitors were equipped with environmental microphones and windshields and stored in weatherproof cases. The microphone height was approximately 3 m above local ground level overlooking Craven Road at Location 1 and approximately 2 m height at Location 2 adjacent to Erleigh Road. The calibration of the instrumentation was checked before and after the tests and no signal variation occurred. Calibration of 24 Acoustics' equipment is traceable to National Standards.
- 4.3 The weather during the survey period was generally dry with light winds. Data for periods during which weather was unsuitable for noise measurement have been removed prior to analysis.
- 4.4 The noise monitors were configured to continuously measure and store overall A-weighted statistical parameters such as L_{Aeq} , L_{Amax} and L_{A90} (all measured on fast response) in 5 minute intervals. Measurements were made in accordance with BS 7445 "Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use" [Reference 6].
- 4.5 The noise monitoring locations were chosen to be representative of noise levels at the site boundaries. They can be seen in Figure 1 and are described as follows:
- Location 1: To the west of the site overlooking Craven Road;
 - Location 2: On the north-eastern site boundary overlooking Erleigh Road.

5.0 RESULTS AND ASSESSMENT

Noise Survey Results

- 5.1 The results of the noise monitoring are presented graphically in Appendix B and are summarised in Tables 1 and 2. For periods when the weather was unsuitable for noise measurement, data was removed prior to analysis. 24 Acoustics take the typical L_{Amax} to be the 10th highest L_{Amax} value.

Date	Daytime (07.00 – 23.00)	Night-time (23.00 – 07.00)	
	$L_{Aeq, 16\text{ hr}}$ dB	$L_{Aeq, 8\text{ hr}}$ dB	Typical $L_{Amax,f}$
Wednesday 16th December	62.2	53.2	76
Thursday 17th December	60.6	53.2	76
Friday 18th December	62.0	53.5	72
Saturday 19th December	61.7	51.4	71
Sunday 20th December	57.8	52.6	73
Monday 21st December	60.2	54.2	74
Tuesday 22nd December	64.2	53.7	72
Wednesday 23rd December	60.3	-	-
Average	61.5	53.2	76 (max)

Table 1: Ambient Noise Survey Results, Location 1

*partial sample

Date	Daytime (07.00 – 23.00)	Night-time (23.00 – 07.00)	
	$L_{Aeq, 16\text{ hr}}$ dB	$L_{Aeq, 8\text{ hr}}$ dB	Typical $L_{Amax,f}$
Wednesday 16th December	61.7	53.9	74
Thursday 17th December	60.9	55.1	76
Friday 18th December	61.6	53.4	73
Saturday 19th December	61.4	53.8	74
Sunday 20th December	59.5	54.3	76
Monday 21st December	62.2	55.9	78
Tuesday 22nd December	61.6	55.2	76
Wednesday 23rd December	61.3	-	-
Average	61.3	54.6	78 (max)

Table 2: Ambient Noise Survey Results, Location 2

*partial sample

Assessment – Internal Noise Levels

- 5.2 The analysis given below has been based on 24 Acoustics' understanding of the envelope construction to be used for this scheme (based on a masonry construction). Internal layout and façade/window dimensions have been obtained from layout plans and elevations provided on 9th February 2016. If the layout alters, these calculations should be revised accordingly.
- 5.3 Noise levels incident upon the proposed facades have been determined by correcting noise survey results for distance, façade reflections and line of sight of the road. Calculations have been undertaken using façade and window dimensions to determine the glazing requirements for the proposed new building which will ensure that, with windows closed, the noise level inside the properties does not exceed 35 dB $L_{Aeq,16hr}$ in habitable rooms during the day and 30 dB $L_{Aeq,8hr}$ at night (and also does not regularly exceed 45 dB $L_{Amax,f}$ at night). It is understood the proposed properties will be ventilated via an MVHR system.
- 5.4 The acoustic requirements for the glazing apply to all habitable rooms within Zones 1, 2 & 3 as indicated in Figure 3, and are given in Table 3. The requirements within each zone apply on all floors.

Zone	Rooms	Glazing Requirement
1	Living/Dining Rooms	Type A
2	Bedrooms	Type A
	Living/Dining Rooms	Type B
3	Bedrooms	Type B
	Living/Dining Rooms	Type B

Table 3: Glazing Requirements

- 5.5 The required glazing specifications are shown in Table 4.

Description	SRI (dB) per Octave Band Centre Frequency (Hz)					
	125	250	500	1k	2k	4k
Type A	22	21	28	38	40	47
Type B	21	17	25	35	37	31

Table 4: Required Glazing Performances

5.6 In making a comparison with the values in Table 4, it is important that the glazing figures used are the result of tests in accordance with ISO 140, Part 3: 1998 and that the quoted minimum sound reduction specifications are met by the window as a whole, including frames, seals, any insulated panels and not just the glass. The requirements also apply to any external glazed doors to habitable rooms.

5.7 In order to assist with the selection process, the following glazing configurations, if installed properly, are capable of achieving the required sound reduction performance:

Type A: 8 mm glass: 6-16 mm cavity (minimum): 4 mm (or equivalent);

Type B: 4 mm glass: 6-16 mm cavity (minimum): 4 mm glass (or equivalent).

5.8 On the above basis, assuming glazing and ventilation measures are provided as described above, it is considered internal noise levels within the proposed residential properties will be acceptable.

Noise Levels in External Amenity Areas

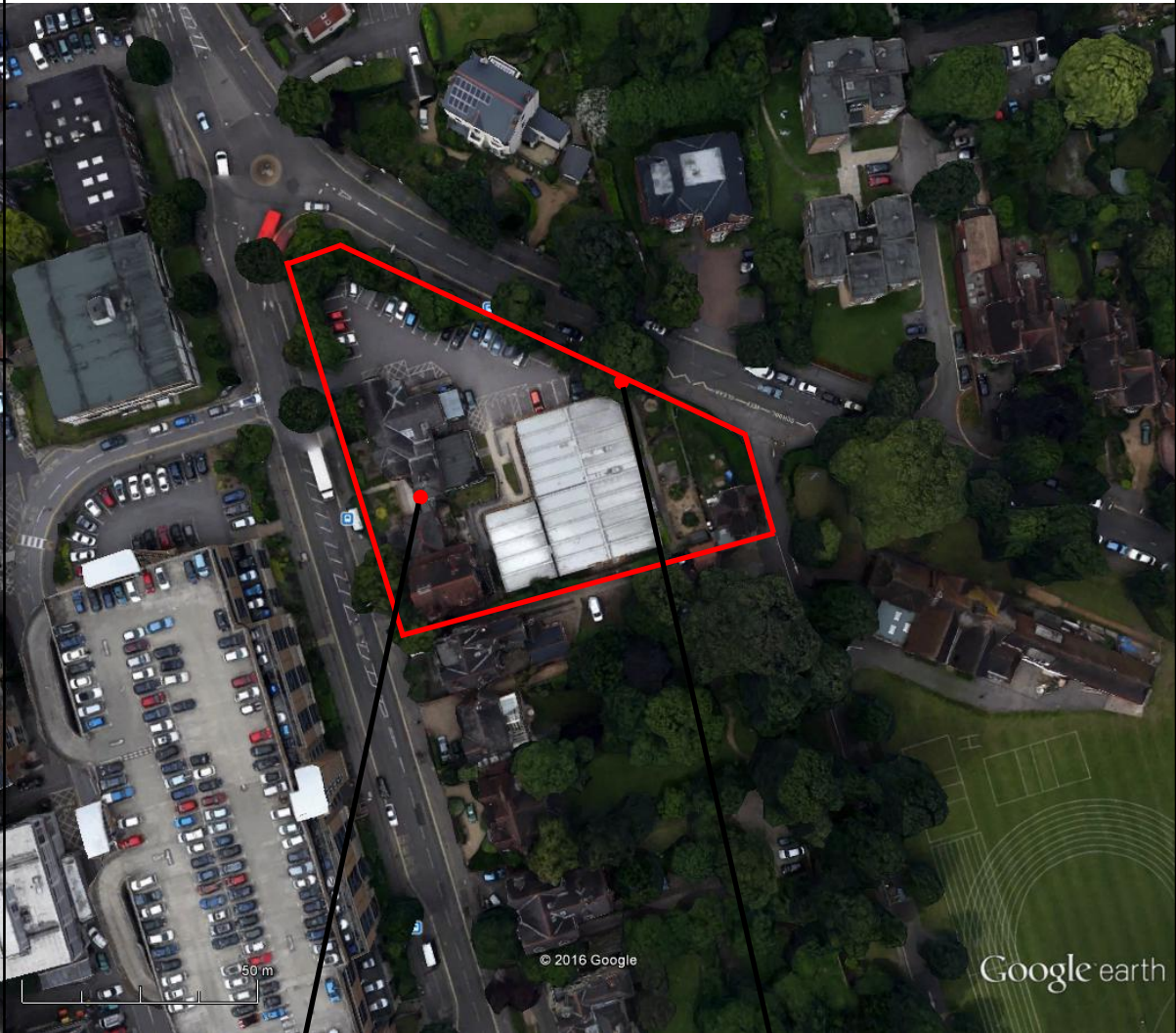
5.9 The proposed courtyard area will be screened from road traffic on Erleigh Road by the existing brick wall which will be retained as well as the proposed buildings. It is considered noise levels in that area will be less than 55 dB $L_{Aeq,16hr}$ which is considered to offer a satisfactory level of amenity.

6.0 CONCLUSIONS

- 6.1 McCarthy and Stone has instructed 24 Acoustics Ltd to undertake a noise impact assessment for a proposed new residential development at Craven Road, Reading. This report has addressed the impact of noise from road traffic sources.
- 6.2 Ambient noise surveys have been carried out at the site to determine existing noise levels.
- 6.3 Recommendations have been provided to achieve suitable internal noise levels for proposed properties. It is concluded that with the recommended measures proposed properties would comply with maximum internal levels of 35 dB $L_{Aeq, 16 \text{ hour}}$ during the daytime and 30 dB $L_{Aeq, 8 \text{ hour}}$ and not to regularly exceed 45 dB $L_{Amax, f}$ at night.
- 6.4 On the basis of the above, it is concluded that noise levels at the development will be acceptable for future occupiers of the scheme.

REFERENCES

1. Department for Communities and Local Government. The National Planning Policy Framework (NPPF), 2012.
2. DEFRA, Noise Policy Statement for England, March 2010.
3. Planning Practice Guidance, Department of Communities and Local Government, March 2014.
4. British Standards Institution. British Standard 8233: Guidance on sound insulation and noise reduction for buildings, 2014.
5. World Health Organisation. Guidelines for Community Noise, 2000.
6. British Standards Institution. British Standard 7445: 1991 Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use.



Measurement Location 1

Measurement Location 2

Project: Craven Road, Reading		Title: Site Location showing Noise Measurement Locations	 24Acoustics
DWG No: Figure 1	Scale: N.T.S.	Rev: A	
Date: February 2016	Drawn By: AR	Job No: 6072-1	



Project:
Craven Road, Reading

Title:
Proposed Site Plan

DWG No: Figure 2

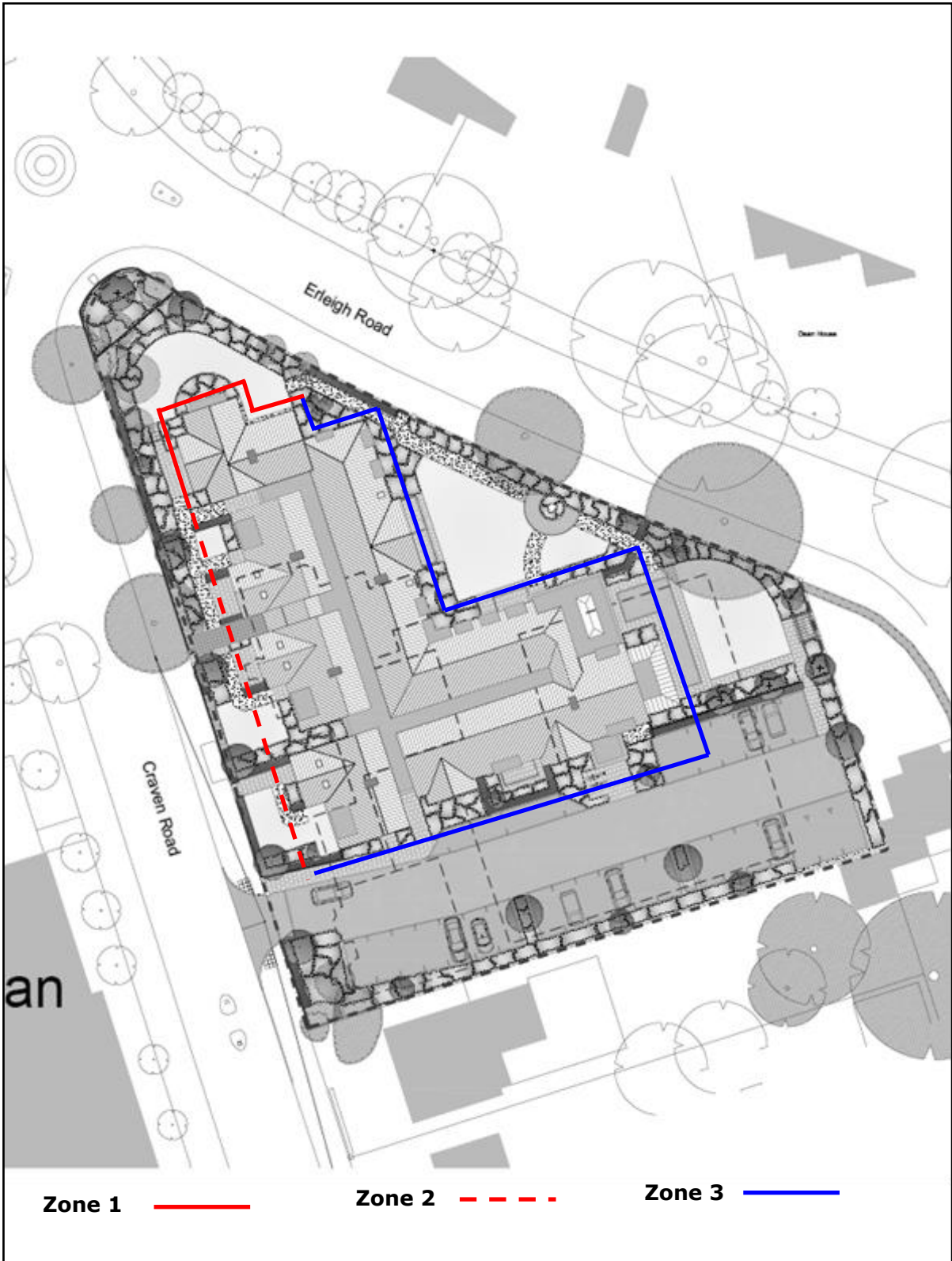
Scale: N.T.S.

Rev: A

Date: October 2017

Drawn By: KE

Job No: 6072-1



Project: Craven Road, Reading	Title: Noise Mitigation Zones		 24Acoustics
DWG No: Figure 3	Scale: N.T.S.	Rev: A	
Date: October 2017	Drawn By: KE	Job No: 6072-1	

APPENDIX A: NOISE UNITS

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dB(A) is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dB(A). The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dB(A) corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady, but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

APPENDIX B: NOISE SURVEY RESULTS

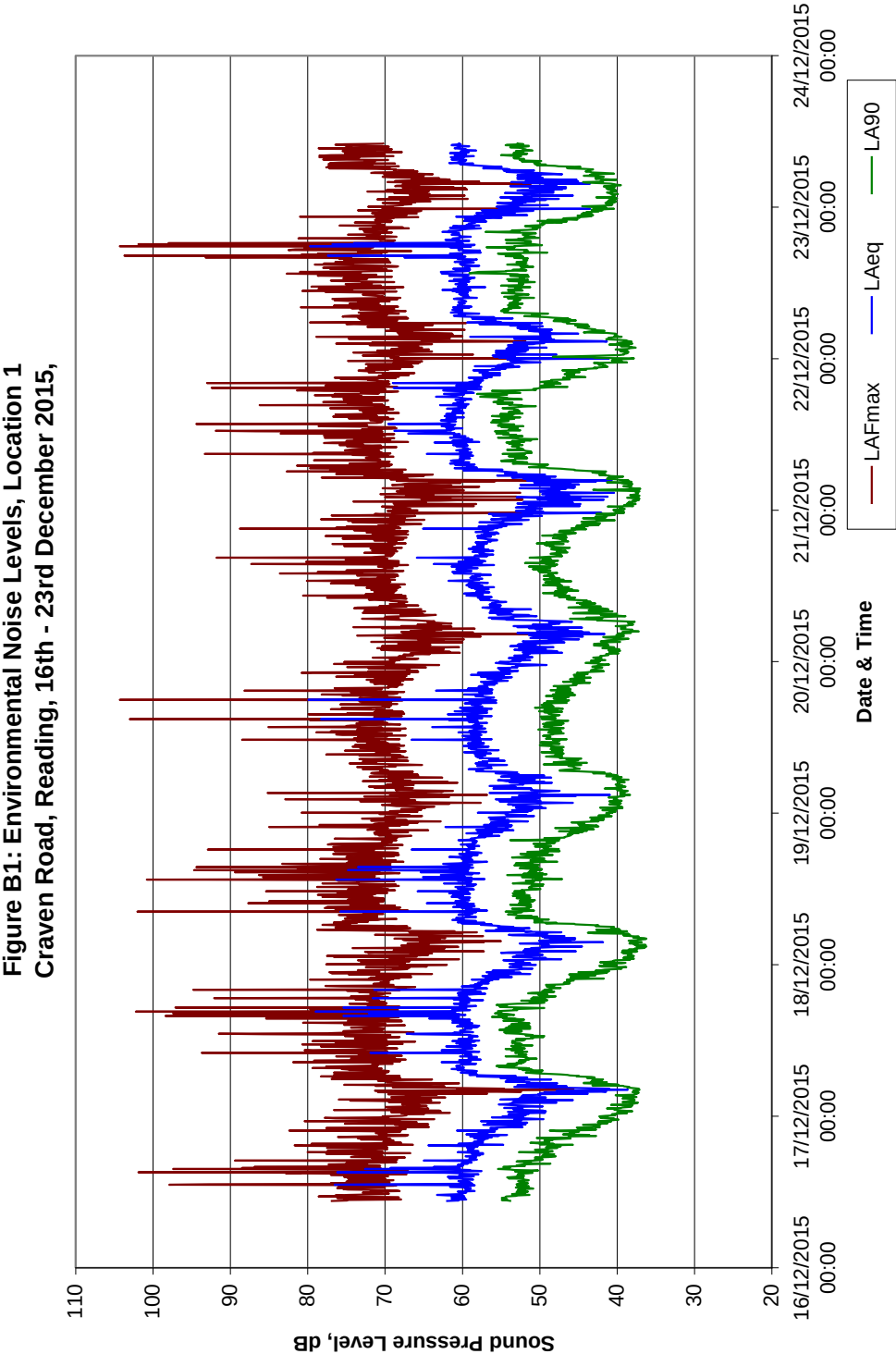


Figure B2: Environmental Noise Levels, Location 2,
Craven Road, Reading, 16th - 23rd December 2015

