

**PROPOSED CARE HOME DEVELOPMENT AT
LAND AT LONGFORD PARK ROAD AND CANAL LANE, BODICOTE
NOISE ASSESSMENT**

**On behalf of:
Mercian Developments Ltd**

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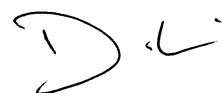
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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics was commissioned to carry out a noise assessment relating to a proposed care home development at Land at Longford Park Road and Canal Lane, Bodicote, near Banbury.
- 1.2 The noise assessment was required to evaluate potential break-in of prevailing noise from sources around the site to habitable areas of the proposed development, and also to quantify typical background noise levels at existing neighbouring residences to assist with assessment of suitable noise emissions limits for any fixed plant associated with the development.
- 1.3 The site is currently an open, flat, rectangular field, bounded to the northeast by Longford Park Road, with Longford Park Primary School immediately beyond. To the northwest the site is bounded by Canal Lane, which is a farm lane not accessible to general traffic, with existing residential frontages beyond. To the southwest and south the site is bounded by the rear of properties on Linnet Road and Robins Way. To the southwest the site is bounded by another small vacant site, which we understand is likely to be redeveloped to form a 'local centre' comprising commercial floorspace and a nursery with residential apartments above.
- 1.4 Proposals are for a single H-shaped care home building, which will be 2-storey height to each wing, and 3-storey height at the central core, with parking and communal landscaped gardens. A plan showing the site location and proposed building footprint is provided in Figure 1.
- 1.5 The main plant location is expected to be within a second-floor plant room to the rear part of the central core, hence away from the boundary to existing residences.
- 1.6 The various noise 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 NOISE CRITERIA

- 2.1 The *National Planning Policy Framework (NPPF) 2021* states at paragraph 174 that *“Planning policies and decisions should contribute to and enhance the natural and local environment by: ... e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of ... noise pollution ...”*.
- 2.2 Further, paragraph 185 states that *“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life ...”*.
- 2.3 Paragraph 187 states that: *“Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”*
- 2.4 The Noise Policy Statement for England (NPSE) 2010, which is referred to in the NPPF, includes three aims:
- i. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
 - ii. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
 - iii. Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

2.5 However, there is as yet no specific guidance on numerical acoustic assessment/design criteria for proposed new housing developments provided in the NPPF and the accompanying Technical Guidance document, National Planning Practice Guidance 'Noise', not in the NPSE.

ProPG: Planning & Noise

2.6 ProPG: Planning & Noise '*Professional Practice Guidance on Planning & Noise*' 2017 provides "guidance on a recommended approach to the management of noise within the planning system in England", predominantly for proposed new residential developments on land that is exposed to transportation noise.

2.7 It is noted that the guidance has no legal status. It does not constitute an official government code of practice and does not provide an authoritative interpretation of the law or government policy.

2.8 The ProPG recommends a staged approach to assessment. Stage 1 is an initial site noise risk assessment, indicating whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective.

2.9 At low noise levels, the more likely the site is to be acceptable from a noise perspective provided that a good acoustic design process is followed and an ADS (Acoustic Design Statement) confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.

2.10 As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and an ADS confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.

2.11 High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS.

2.12 Stage 2 of the recommended approach in ProPG is a full assessment to consider good acoustic design. The guidelines of ProPG in terms of suitable acoustic design criteria are broadly consistent with the guidance of BS 8233, and the sound insulation recommendations made later in this report have been designed to achieve the BS 8233 guidelines, as described below. These recommendations are also generally consistent with those set out in the World Health Organisation document '*Guidelines for Community Noise*' 1999.

2.13 The scope of the ProPG is restricted to sites that are exposed predominantly to noise from transportation sources. However, the recommended approach is stated as being suitable where some industrial or commercial noise contributes to the acoustic environment provided that it is “*not dominant*”.

BS 8233

2.14 British Standard 8233: 2014 *Guidance on sound insulation and noise reduction for buildings*, which carries the full weight of an adopted British Standard, recommends guidance on design criteria for acceptable noise levels within residential accommodation, as summarised in Table 1.

Table 1 : BS 8233 Recommended Acoustic Design Criteria

Activity	Location	Internal Noise Levels	
		Daytime 0700-2300hrs	Night-time 2300-0700hrs
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

2.15 BS 8233 also states that, “*where development is considered necessary or desirable ... the internal target levels [i.e. those in Table 1] may be relaxed by up to 5dB and reasonable internal conditions still achieved*”.

2.16 BS 8233 clarifies that the above guidance relates only to noise without specific character (e.g. such as that which has a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content) and that where such characteristics are present, lower noise limits might be appropriate.

2.17 Further, BS 8233 states that if there is a reliance on closed windows to meet the guide values, “*there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level*”. Further, it is stated that assessments should be based on a room with “*adequate ventilation provided (e.g. trickle ventilators should be open)*”.

2.18 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{Amax} values and these can be highly variable and unpredictable. ProPG states that “*in most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night*”.

2.19 Regarding outdoor living areas, BS 8233 states that *“it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB L_{Aeq} , which would be acceptable in noisier environments. However, it is recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas such as city centres or urban areas adjoining the strategic transport network, compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, developments should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”*

BS 4142

2.20 British Standard 4142: 2014 +A1: 2019 ‘Methods for rating and assessing industrial and commercial sound’ provides methods for rating and assessing sound of an industrial and/or commercial nature and requires the ‘rating’ sound level for the operation to be compared with the L_{A90} background sound level in the absence of the operational noise.

2.21 The ‘rating’ level is derived based on the ‘specific’ L_{Aeq} sound level attributable to the operation with an ‘acoustic feature’ penalty added for any sound sources which give rise to tonal, impulsive, intermittent, or other characteristics readily distinctive against the residual acoustic environment.

2.22 BS 4142 stipulates that noise impacts should be assessed over a reference time interval of 1-hour during the daytime (0700-2300hrs) and 15-minutes during the night-time (2300-0700hrs).

2.23 An initial estimate of the impact of the operation is determined by subtracting the background level from the ‘rating’ level. BS 4142 states that:

- Typically, the greater this difference, the greater the magnitude of the impact
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context
- A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context
- The lower the ‘rating’ level is relative to the measured background level, the less likely it is that the operation will have an adverse impact or a significant adverse impact. Where the ‘rating’ level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

2.24 Where the initial estimate of the impact needs to be modified due to the context, BS 4142 states that all pertinent factors should be taken into account in determining whether the initial estimate of the impact needs to be modified, including the absolute level of sound, the character and level of the residual sound and sensitivity of the receptor, e.g. whether dwellings will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as: i) façade insulation treatment, ii) ventilation and/or cooling, and iii) acoustic screening.

3.0 NOISE SURVEY

- 3.1 Noise monitoring was undertaken at the site on Thursday 15 – Friday 16 September 2022.
- 3.2 The purpose of the monitoring was twofold: a) to quantify prevailing ambient noise levels at the site to assist with assessment of potential noise ingress to the proposed noise-sensitive development, and b) to quantify typical background noise levels at existing neighbouring residences to assist with assessment of suitable noise emissions limits for any fixed plant associated with the development.
- 3.3 The measurement locations are identified in Figure 1.
- 3.4 Continuous noise monitoring was carried out at Locations 1 and 2, in sequential 5-minute samples, over a complete 24-hour period commencing at 1530hrs on Thursday 16 September 2022.
- 3.5 The actual daytime $L_{Aeq,16hr}$ and night-time $L_{Aeq,8hr}$ noise exposure levels at Locations 1 and 2 have been obtained from the logarithmic average of all the $L_{Aeq,5min}$ noise measurement samples over each of those periods. To provide a robust interpretation of ProPG guidelines relating to L_{Amax} , the overall night-time L_{Amax} noise level has been determined for assessment purposes as the measured $L_{Amax,5min}$ exceeded no more than 5 times over the full night-time period at each location.
- 3.6 Further to this, analysis of the measured background $L_{A90,15min}$ noise levels was undertaken to summarise prevailing background noise conditions over key periods.
- 3.7 The overall daytime and night-time noise levels at Locations 1 and 2 are summarised in Table 2.

Table 2 : Summary of Noise Levels at Locations 1 and 2

Location	Measured Noise Levels (dB)								
	Daytime 0700-2300hrs					Night-time 2300-0700hrs			
	dB $L_{Aeq,16hr}$	dB $L_{A90,5min}$				dB $L_{Aeq,8hr}$	dB $L_{Amax,T}$	dB $L_{A90,5min}$	
		Day 0700-1900hrs		Evening 1900-2300hrs				Range	Average (Mean / Mode)
Range		Average (Mean / Mode)	Range	Average (Mean / Mode)					
1	52	40-61	44/43	38-42	40/40	44	69	33-42	36/34
2	50	44-50	47/48	44-48	46/47	46	65	39-48	43/43

- 3.8 The noise climate at the site is primary due to occasional local traffic noise on Longford Park Road, steady distance road traffic on the surrounding highway network, noise generation from external activities at Longford Park Primary School, and occasional aircraft and animal noises.

3.9 Additional noise measurements were undertaken at Location 3 over the periods 1530-1550hrs on Thursday 15 September 2022 and 1010-1045hrs, 1220-1330hrs and 1500-1530hrs on Friday 16 September 2022. The purpose of these measurements was to observe any appreciable difference in noise generation from external activities at Longford Park Primary School, towards the south of that site boundary area, compared to the levels at Location 1, which is toward the north of the same boundary. The additional measurements hence cover key periods at the school, i.e. morning break, lunchtime, and pick-up, as well as periods before and/or after those periods. Combining the two mid-afternoon measurement periods on the consecutive survey days, the measured noise levels at Location 3 for the above school periods are summarised in Table 3. The table also includes a comparison of the overall L_{Aeq} noise levels for these periods at Locations 1 and 3.

Table 3 : Summary of Noise Levels at Location 3

Time Period	Measured Noise Levels				
	dB $L_{Aeq,5mins}$			dB $L_{A90,5mins}$	
	Range	Average (Logarithmic)	Comparison to Location 1	Range	Average (Mean / Mode)
1010-1045hrs (incorporating morning break)	50-54	52	+1	43-48	45
1220-1330hrs (incorporating lunchtime)	51-56	53	+2	44-49	46
1500-1550hrs (incorporating pick-up)	51-56	53	0	44-51	47
Average of Above		53	+1		46

3.10 The noise measurements at Location 1 were undertaken using a Norsonic 140 Class 1 Integrating Sound Level Meter (serial no. 1406529), at Location 2 using a Norsonic 118 Class 1 Integrating Sound Level Meter (serial no. 31617), and at Location 3 using a Bruel & Kjaer 2260 Type 1 Integrating Noise Level Meter (serial no. 2467014). Calibration checks were carried out to all equipment using a Bruel & Kjaer Acoustic Calibrator, Type 4231 (serial no. 2389221) before and after the survey, and no variation in calibration level was observed.

3.11 Weather conditions during the survey were dry and clear with a very breeze.

3.12 The measurement microphones at all locations were fitted with a windshield and mounted at 1.4m above local ground in 'free-field' conditions.

3.13 All measured noise levels are detailed in Appendix II. It is noted that a prominent uplift in noise is evident in the graph for Location 1 in Appendix II for the approximate period 1130-1200hrs. This is attributable to use of a lawnmower at the nearest existing residence to the measurement location. For a robust assessment, this data has been included in the analysis of overall noise levels.

4.0 ASSESSMENT OF NOISE IMPACT

- 4.1 Based on the noise exposure levels summarised in Tables 2 and 3, noise levels across the site are within the low risk category of the ProPG guidance.
- 4.2 Considering specifically the data presented in Table 3, it is demonstrated that the overall noise levels from Longford Park School related activity do not differ appreciably along the boundary of the site to the school.
- 4.3 On this basis of the noise survey results and the current development proposals, no special acoustic mitigation measures are necessary to control the break-in of prevailing noise levels from existing sources around the site.
- 4.4 In most areas, the internal noise limit values in BS 8233 will be achieved with windows partially open. Even in worst case areas closest to Longford Park Road the values will be achieved based on a provision of standard thermal double glazing (closed) and standard non-acoustic trickle vents (open).
- 4.5 No private amenity space is proposed, however in all areas away from the Longford Park Road external noise levels will be within the 'desirable' level recommended in BS 8233 of 50dB $L_{Aeq,T}$, and even in close proximity to the road they are within the 'upper guideline value' of 55dB $L_{Aeq,T}$. The communal landscaped areas will be positioned away from the road such that a 'desirable' level will be achieved.
- 4.6 It is therefore demonstrated that 'good acoustic design', as described in ProPG has been achieved, and that 'adverse impacts' are mitigated by design, bringing the development in line with the aims of the NPPF and NPSE.
- 4.7 With respect to any externally noise generating plant to be installed at the development, it is recommended that overall noise emissions should be limited to the rating sound levels, as defined in BS 4142, at any nearby existing residences, as set out in Table 4.

Table 4 : Recommended Noise Rating Limits at Nearest Existing Residences

Rating Level Limit (dB $L_{Ar,T}$)		
Daytime 0700-2300hrs		Night-time 2300-0700hrs
Day 0700-1900hrs	Evening 1900-2300hrs	
44	40	36

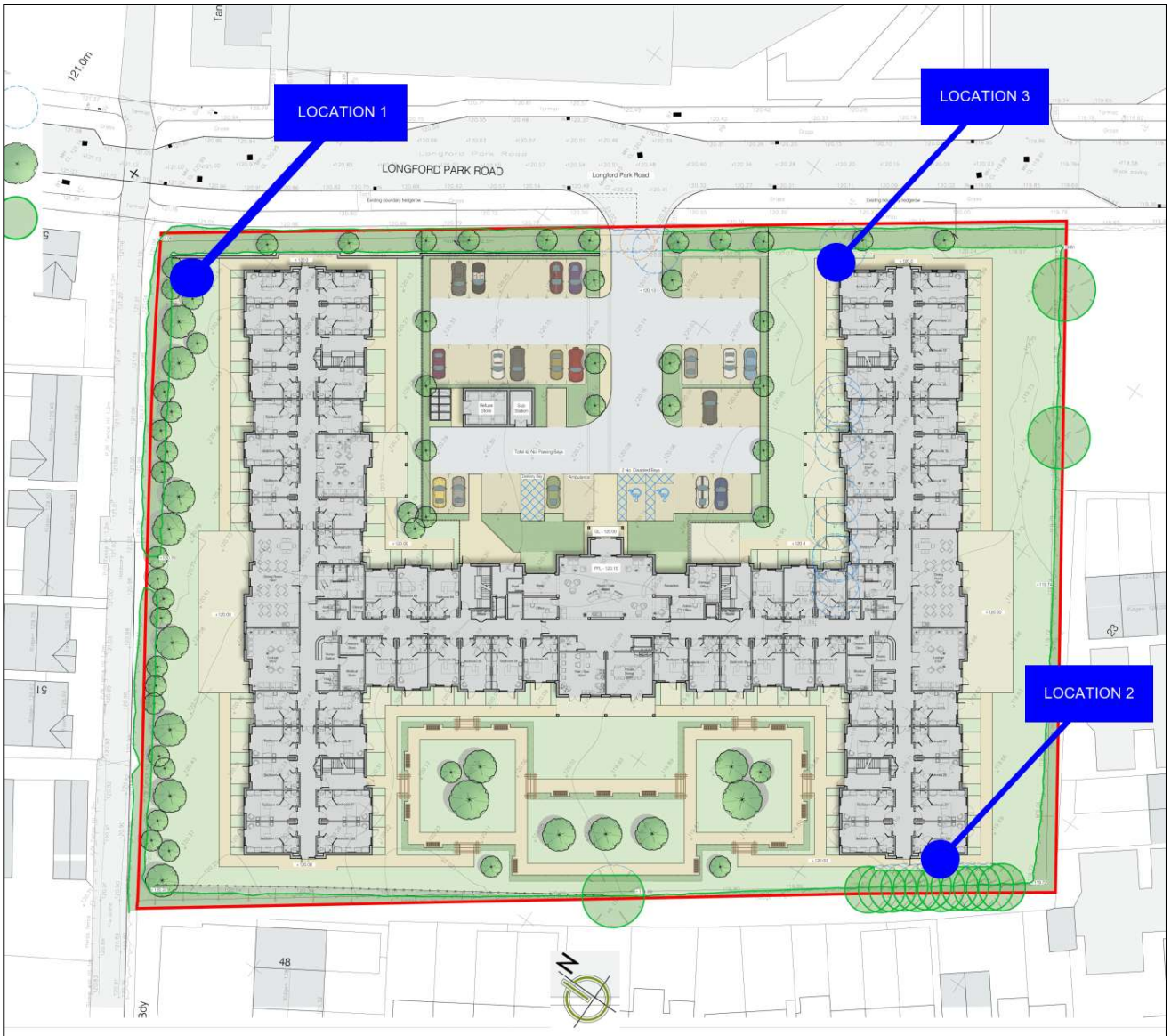
- 4.8 It must be noted that the above recommended limits are in terms of the 'rating' level, as defined in BS 4142. Therefore, account must be taken of any acoustic characteristics of any plant noise emissions.

- 4.9 Also, it must be noted that the recommended limits apply cumulatively to the development as a whole. Care would be required to ensure that the cumulative level of noise of all plant does not exceed the overall limit.
- 4.10 The main plant location is expected to be within a second-floor plant room to the rear part of the central core. It is anticipated that any necessary equipment can be readily controlled to within the recommended limits by way a conventional noise control methods. These include careful location/orientation of noise sources away from the nearest existing residences, selection of low-noise equipment, localised acoustic screening and physical noise control apparatus such as acoustic attenuators/louvres, etc. It is also recommended that any plant to be mounted to the building structure should be via suitable anti-vibration mountings.
- 4.11 The recommended noise limits may be readily enshrined and enforced for planning purposes via application of a suitable standard planning condition. It is suggested that a compliance condition is appropriate in this case, to state that the recommended rating levels set out in Table 4 of this report should not be exceeded by noise from fixed plant attributable to the development.

5.0 SUMMARY AND CONCLUSIONS

- 5.1 Hepworth Acoustics has undertaken a noise assessment relating to a proposed care home development at Land at Longford Park Road and Canal Lane, Bodicote, near Banbury.
- 5.2 A noise survey has been undertaken at the site and the prevailing daytime and night-time noise levels have been determined.
- 5.3 It has been concluded that no special acoustic mitigation measures are necessary to control noise at the development to within recommended acoustic criteria in line with relevant British Standard guidelines.
- 5.4 On this basis, it is concluded that 'good acoustic design', as described in ProPG has been achieved, and that 'adverse impacts' are mitigated by design, bringing the development in line with the aims of the NPPF and NPSE.
- 5.5 With respect to any externally noise generating plant to be installed at the development, recommendations have been provided with regard to appropriate noise emissions limits, which may be readily enshrined and enforced for planning purposes via application of a suitable standard compliance condition, to state that the recommended rating levels set out in Table 4 of this report should not be exceeded by noise from fixed plant attributable to the development.

Figure 1: Site Layout Plan



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.

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.

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.

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} 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} 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.

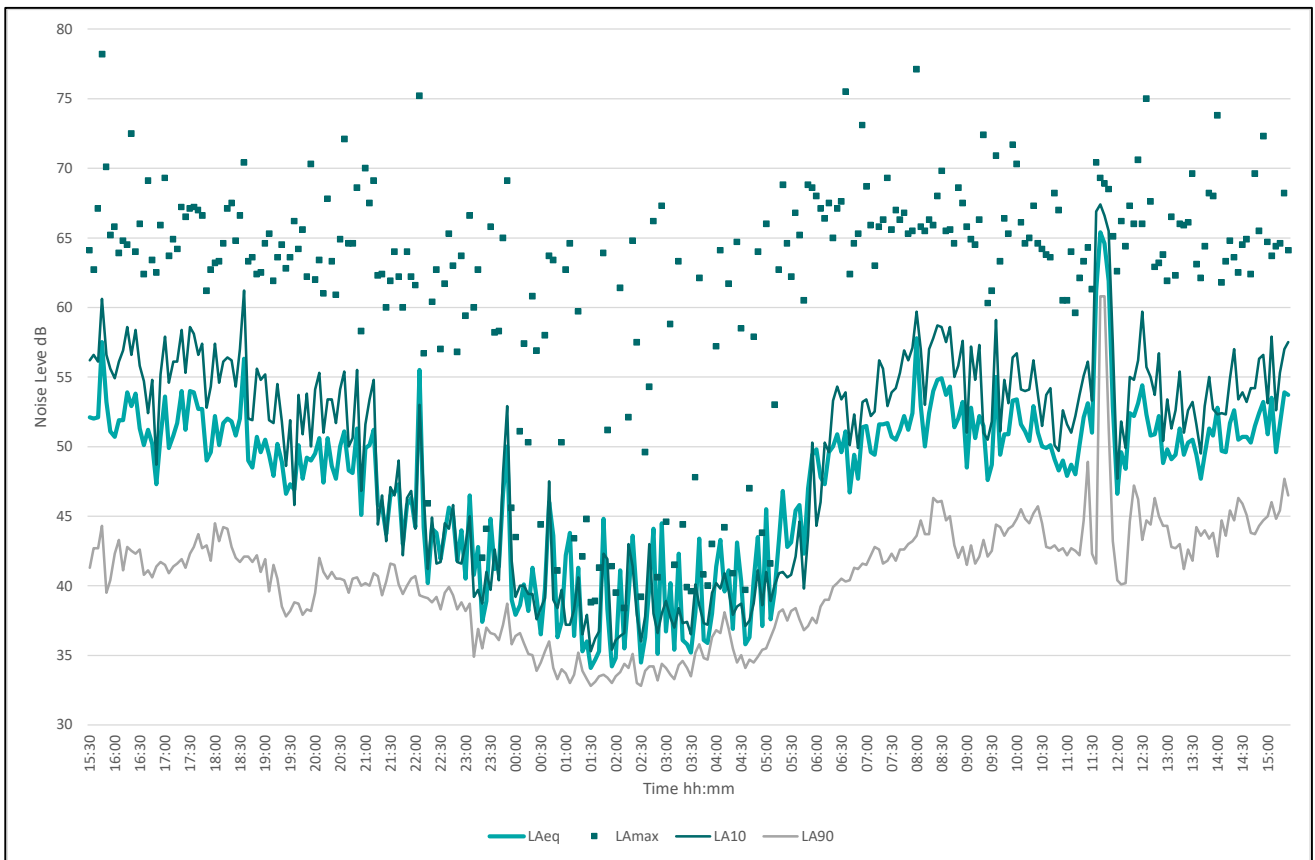
L_{Amax} This is the maximum A-weighted noise level that was recorded during the monitoring period.

L_{A10} This is the A-weighted noise level exceeded for 10% of the time period. L_{A10} is used as a measure of road traffic noise.

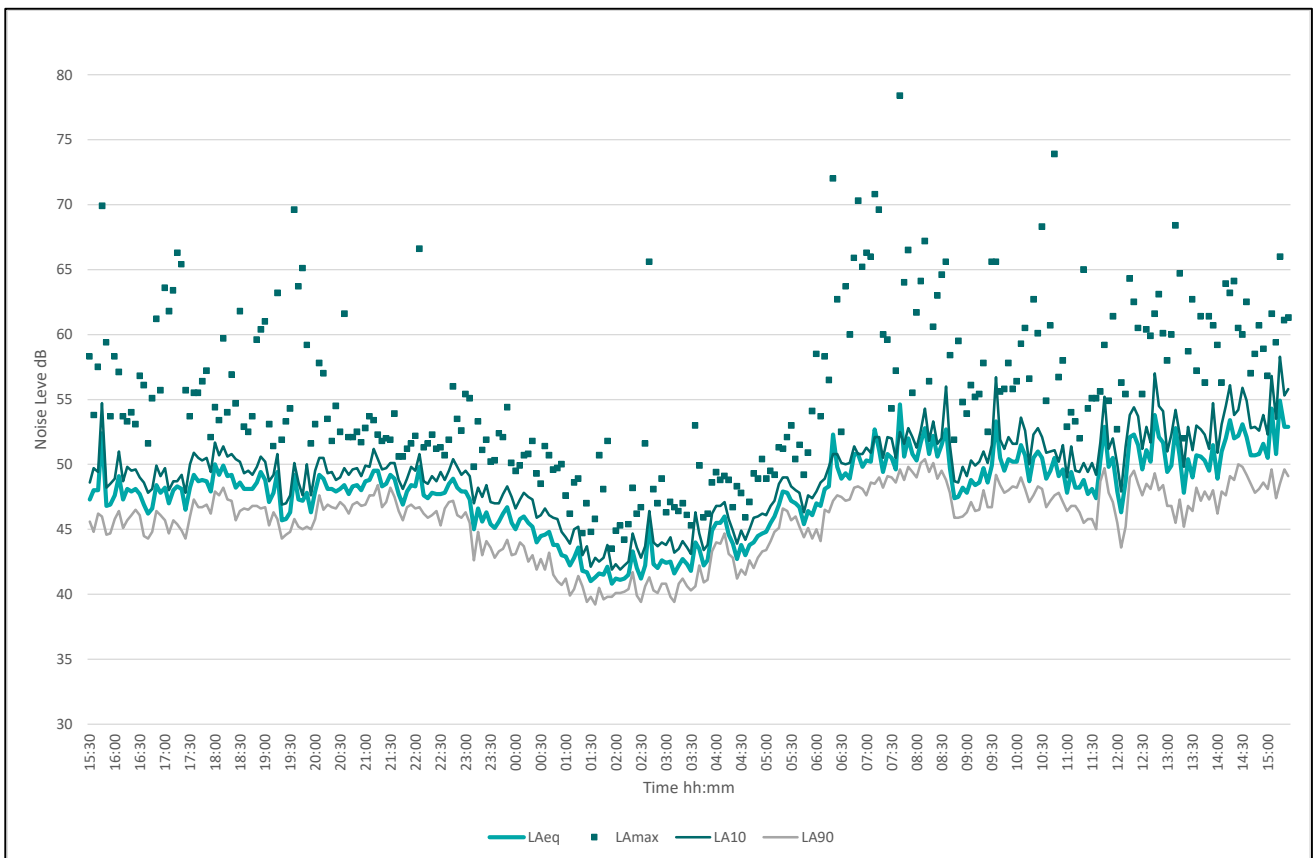
L_{A90} This is the A-weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

Appendix II: Noise Survey Results

Location 1



Location 2



Location 3

Date	Time	Noise Level			
		dB L_{Aeq}	dB L_{Amax}	dB L_{A10}	dB L_{A90}
15/09/2022	15:30	53	64	57	46
15/09/2022	15:35	52	65	55	45
15/09/2022	15:40	52	66	55	45
15/09/2022	15:45	52	64	56	44
16/09/2022	10:10	51	61	55	45
16/09/2022	10:15	51	63	54	45
16/09/2022	10:20	54	67	57	46
16/09/2022	10:25	53	65	56	48
16/09/2022	10:30	51	63	54	45
16/09/2022	10:35	51	64	55	43
16/09/2022	10:40	50	64	54	44
16/09/2022	12:20	54	66	58	49
16/09/2022	12:25	55	67	58	48
16/09/2022	12:30	53	66	57	46
16/09/2022	12:35	56	68	60	48
16/09/2022	12:40	52	62	55	46
16/09/2022	12:45	52	64	55	48
16/09/2022	12:50	53	66	57	47
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16/09/2022	15:00	53	67	56	46
16/09/2022	15:05	53	63	56	48
16/09/2022	15:10	51	61	54	46
16/09/2022	15:15	53	68	56	47
16/09/2022	15:20	55	67	57	51
16/09/2022	15:25	56	69	58	50