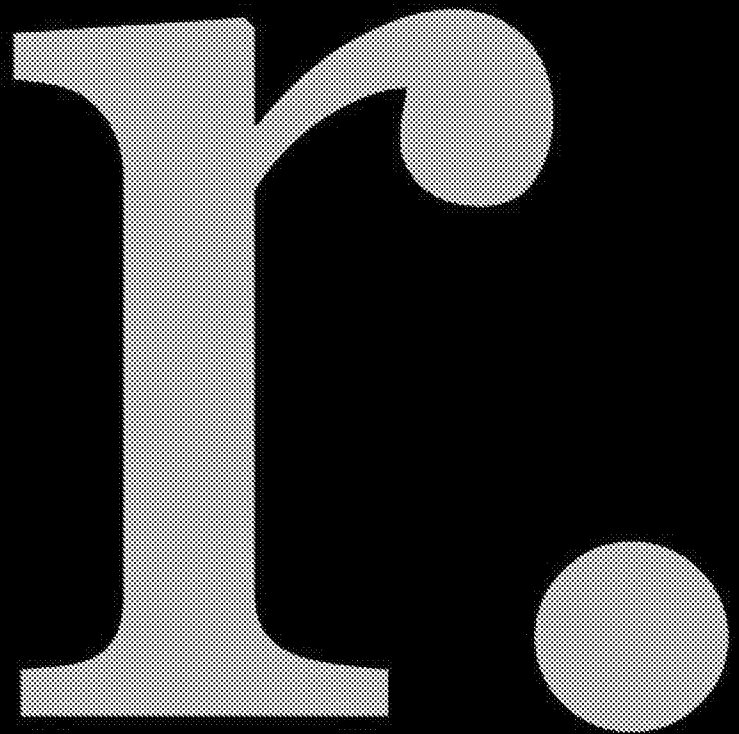


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Land west of Fontwell Avenue, Eastergate

Road Traffic Noise Assessment



**PROPOSED RESIDENTIAL DEVELOPMENT AT
LAND WEST OF FONTWELL AVENUE, EASTERGATE**

ROAD TRAFFIC NOISE ASSESSMENT

On behalf of:
Reside Developments Limited

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LAND WEST OF FONTWELL AVENUE, EASTERGATE**

ROAD TRAFFIC NOISE ASSESSMENT

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1.0 INTRODUCTION

- 1.1 Hepworth Acoustics Ltd was commissioned to carry out a road traffic noise assessment relating to a proposed residential development at Land to the West of Fontwell Avenue, Eastergate.
- 1.2 The site, which is currently in use as paddocks, is bound by the A29 Fontwell Avenue to the east, an existing residential property to the south, other existing paddocks to the west, and Level Mare Lane to the north, with the grounds of Fontwell Racecourse beyond.
- 1.3 Level Mare Lane is a very lightly trafficked lane, not considered to present any noise constraint to the proposed development, whereas the A29 is a busy thoroughfare and is hence the focus of this assessment.
- 1.4 The noise survey that informs this assessment was undertaken during government enforced social restrictions relating to the Covid-19 emergency. Inevitably therefore road traffic activity on the A29 may not have been typical of normal current conditions. Accordingly, a robust assessment has been provided based on a survey of noise levels and traffic flows over a representative period at the site, in combination with pre-existing 2018 transport statement data.
- 1.5 Furthermore, the transport statement has been used to predict anticipated growth in road traffic noise for the year 2025, accounting for projected natural growth and, more significantly, the A29 Realignment Scheme.
- 1.6 A plan of the development layout, in context of the surroundings, is provided in Figure 1.
- 1.7 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 ACOUSTIC CRITERIA

- 2.1 The *National Planning Policy Framework (NPPF)* 2019 states at paragraph 170 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 Paragraph 180 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 182 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 However, there is as yet no specific guidance on numerical acoustic assessment/design criteria for proposed new housing developments provided in the NPPF, accompanying Technical Guidance National Planning Practice Guidance ‘Noise’, nor the NPSE.

ProPG: Planning & Noise

- 2.5 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.
- 2.6 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.

- 2.7 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.
- 2.8 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.
- 2.9 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.
- 2.10 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.
- 2.11 The scope of ProPG is restricted to sites that are exposed predominantly to noise from transportation sources. However, the recommended approach is also stated as being suitable where some industrial or commercial noise contributes to the acoustic environment provided that it is “*not dominant*”.

BS 8233

- 2.12 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. BS 8233 guidelines for the daytime (0700-2300hrs) and night-time (2300-0700hrs) periods are 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 LAeq,16hr	-
Dining	Dining room / area	40 dB LAeq,16hr	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hr	30 dB LAeq,8hr

- 2.13 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”*.
- 2.14 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.
- 2.15 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)”*.
- 2.16 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. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events”*.
- 2.17 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”*.

3.0 ROAD TRAFFIC NOISE SURVEY

- 3.1 As noted, the noise survey that informs this assessment was undertaken during government enforced social restrictions relating to the Covid-19 emergency. Inevitably therefore road traffic activity on the A29 may not have been typical of normal current conditions. Nonetheless, there was still a fairly steady flow of daytime traffic at the time of the survey, although a more pronounced reduction would be expected during evening and night-time periods as a result of the restrictions.
- 3.2 To account for this, an assessment has been undertaken based on a 3-hour daytime road traffic noise survey and manual traffic count at the site. The data has been subsequently processed alongside reference to pre-Covid-19 road traffic flows, set out in a Transport Statement provided by Paul Basham Associates Ltd in relation to the development, as per report ref: 020.0360/TS/1, dated 2020.
- 3.3 Daytime road traffic noise measurements and traffic counts were undertaken in sequential 5-minute periods at two locations, as identified in Figure 1 as Location 1 and Location 2, which are set-back 8m and 14m respectively from the nearside edge of the A29 carriageway, towards the south of the site, with a clear 180-degree view to the road. The measurements / counts were undertaken over the period 1200-1500hrs on Monday 21 April 2020.
- 3.4 The overall noise level measured at Location 1 over the 3-hour period was 62dB $L_{Aeq,3hr}$. Over the same 3-hour period, a total of 1104 vehicles were counted, hence at an average of 368 per hour.
- 3.5 Based on the Transport Statement, ATC traffic data for the same segment of the A29 collected over the period Monday 16 – Friday 21 September 2018 gives averaged 2-way weekday flows for the 16-hour daytime (0700-2300hr) of 9877, hence at an average of 618 per hour, and for the 8-hour night-time (2300-0700hrs) of 906, hence at an average of 113 per hour.
- 3.6 Further, we have confirmed with Paul Basham Associates Ltd that an overall increase of 72%, compared to the 2018 baseline, may be taken as a robust worst-case scenario for assessment purposes to derive future flows for the year 2025, accounting for projected natural growth and, more significantly, the A29 Realignment Scheme. This gives averaged 2-way weekday flows for the 16-hour daytime (0700-2300hr) of 16988, hence at an average of 1062 per hour, and for the 8-hour night-time (2300-0700hrs) of 1558, hence at an average of 195 per hour.

- 3.7 Further, the noise survey data provides a good and representative resolution of L_{Amax} noise levels from passing vehicles. Typically, to provide a robust interpretation of ProPG guidelines, the overall night-time L_{Amax} value may be determined based on the $L_{Amax,5min}$ noise level exceeded no more than 5 times over the full night-time period. Given that the magnitude of peaks of noise due to passing vehicles would tend to be within similar ranges at any time of day or night, accounting for the shorter measurement period offset against the heavier traffic flow, this corresponds to the $L_{Amax,5min}$ noise level exceeded no more than 3 times over the 3-hour survey period.
- 3.8 From the above, the predicted 2025 road traffic noise levels at Locations 1 and 2, accounting for anticipated growth, and normal (i.e. non-lockdown) conditions are set out in Table 2.

Table 2 : Overall Predicted 2025 Road Traffic Noise Levels at Locations 1-2

Location	Daytime (0700-2300hrs)	Night-time (2300-0700hrs)	
	dB LAeq,16hr	dB LAeq,8hr	dB LAmax
1	67	60	78
2	64	57	75

- 3.9 All measured road traffic noise levels are presented in Appendix II, alongside the manual traffic counts.

Survey Details

- 3.10 The noise measurements were undertaken at Location 1 using a Norsonic 140 Type 1 Integrating Sound Level Meter (serial no. 1406529) and at Location 2 using a Norsonic 118 Type 1 Integrating Sound Level Meter (serial no. 31617).
- 3.11 Calibration checks were carried out on both Sound Level Meters before and after use using a Norsonic 1251 class 1 acoustical calibrator (serial no. 20804), and no variation in the calibration levels was observed.
- 3.12 The measurement microphones were fitted with windshields and mounted in 'free-field' conditions at 1.4m above local ground at both locations.
- 3.13 The weather throughout the surveys was generally dry with north-easterly winds of speeds typically 5-8m/s.

4.0 NOISE ASSESSMENT AND MITIGATION MEASURES

- 4.1 Considering the predicted 2025 road traffic noise in Table 2, for both Locations 1 and 2 these fall into the 'medium' risk category for both the daytime and night-time periods, as set out in the Stage 1 guidance of ProPG.
- 4.2 Accordingly, some mitigation measures will be necessary for proposed plots adjacent to the A29, to ensure good acoustic design and a suitable acoustic environment for future occupants.
- 4.3 It is understood that the external building fabric of the proposed dwellings will be formed using conventional brick and block walls and solid tiled roofing. The principle method of mitigation to control road traffic noise within proposed dwellings will be to incorporate glazing and ventilation systems of suitable specification.
- 4.4 To achieve internal noise levels consistent with the relevant BS 8233 / ProPG guidelines, and based on the overall daytime and night-time noise levels set out in Table 2, a scheme of glazing and ventilation systems has been determined for plots closest to the A29 boundary of the site. The areas to which each of the following mitigation schemes apply, for habitable rooms only, are identified in Figure 1.
- 4.5 The highest specification applies in worst-case areas, closest to the A29 and with a direct line-of-site across that road. For habitable rooms in these areas Mitigation Scheme 1 (below) applies.

Mitigation Scheme 1 - Acoustic glazing system providing the minimum Sound Reduction Indices (SRIs) set out in Table 2, typically achievable using a system comprising one 10mm standard pane and one 8mm thick standard pane on a minimum 12mm air cavity (i.e. 10-12-8). Ventilation to be provided via acoustically attenuated trickle ventilators rated at not less than 42dB $D_{n,e,w}$.

Table 2 : Mitigation Scheme 1 – Sound Reduction Indices

	Octave Band Centre Frequency, Hz					
	125	250	500	1k	2k	4k
dB SRI	29	27	35	37	36	45

- 4.6 A secondary scheme, Mitigation Scheme 2 (below), applies for habitable rooms close to the A29, yet set a little further back and/or where the line-of-sight to the carriageway is restricted, either due to partial screening provided by adjacent plots, or due to the orientation of the façade.

Mitigation Scheme 2 - Acoustic glazing system providing the minimum Sound Reduction Indices (SRIs) set out in Table 3, typically achievable using a system comprising one 10mm thick standard pane and one 4mm thick standard pane on a minimum 12mm air cavity (i.e. 10-12-4). Ventilation to be provided via acoustically attenuated trickle ventilators rated at not less than 42dB $D_{n,e,w}$.

Table 3 : Mitigation Scheme 2 – Sound Reduction Indices

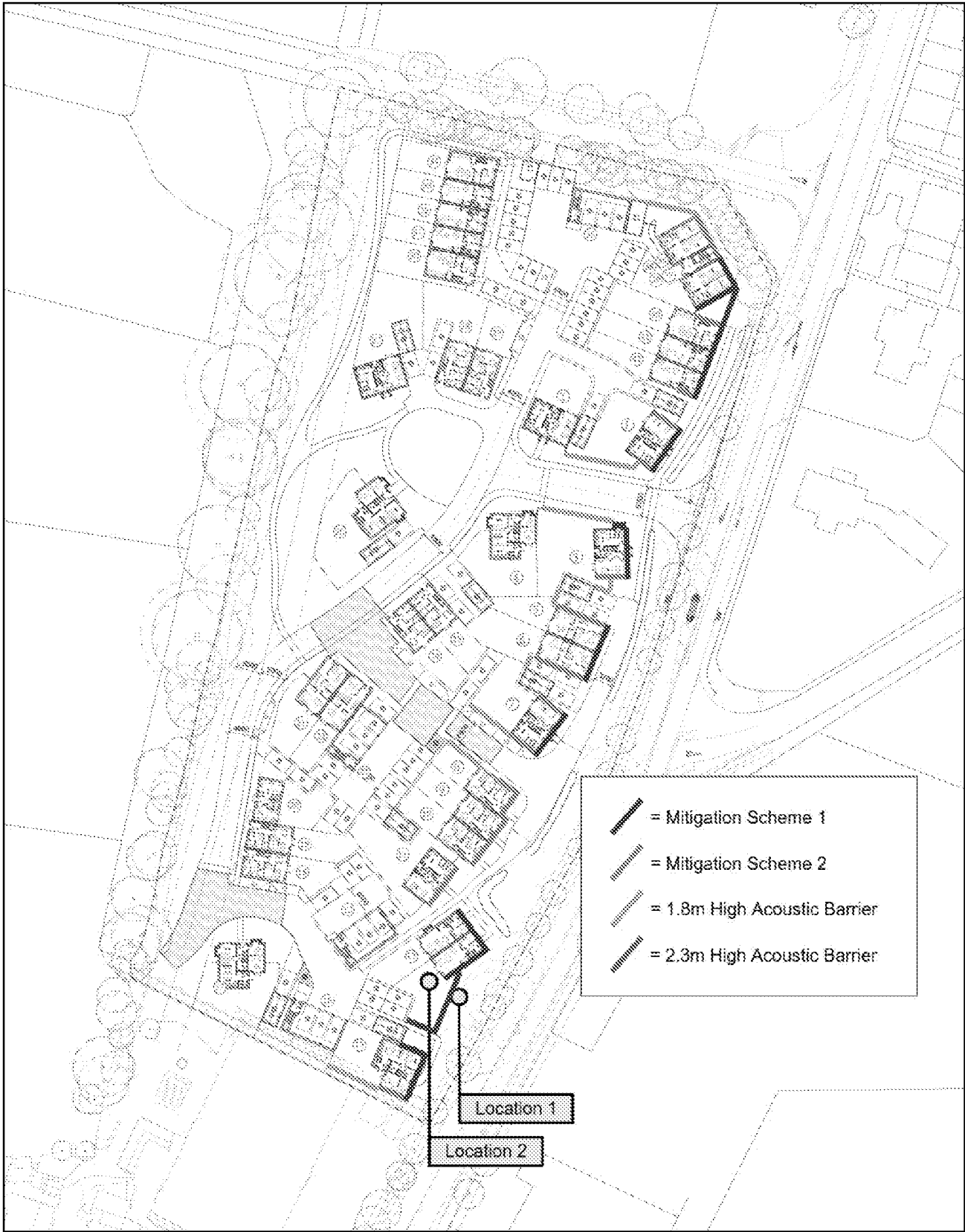
	Octave Band Centre Frequency, Hz					
	125	250	500	1k	2k	4k
dB SRI	25	22	33	40	43	44

- 4.7 Further to above, to adequately protect garden areas of proposed plots closest to the A29, purpose-built acoustic barriers are recommended. In many areas, where gardens are not fully exposed to the A29 (i.e. some protection will be provided by the development building), then 1.8m high barriers will be adequate, however where gardens are to be fully exposed at the boundary of the A29 then 2.3m high barriers are recommended. The lateral extents of recommended acoustic barriers, of varying heights, are identified in Figure 1.
- 4.8 Any acoustic barriers should be of overall mass not less than 10kg/m² and nominal thickness not less than 20mm (e.g. proprietary acoustic fencing, solid masonry wall). The construction should be imperforate with no holes or gaps and should be sealed at the base.

5.0 SUMMARY AND CONCLUSIONS

- 5.1 Hepworth Acoustics has undertaken a road traffic noise assessment relating to a proposed residential development at Land to the West of Fontwell Avenue, Eastergate.
- 5.2 A noise survey has been undertaken at the site. This was carried out during the Covid-19 emergency and inevitably therefore road traffic activity on the A29 may not have been typical of normal current conditions. Accordingly, a robust assessment has been provided based on a survey of noise levels and traffic flows over a representation period at the site, in combination with pre-existing 2018 transport statement data. Furthermore, the transport statement has been used to predict anticipated growth in road traffic noise for the year 2025, accounting for projected natural growth and, more significantly, the A29 Realignment Scheme.
- 5.3 Recommendations of appropriate noise mitigation measures have been made in order to achieve appropriate acoustic criteria in line with relevant British Standard guidelines, to secure good acoustic conditions for future residences.

Figure 1: Site 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.

Appendix II: Noise Survey Results

Time	Vehicle Count	Noise Level dB					
		Location 1			Location 2		
		LAeq	L _A max	LA10	LAeq	L _A max	LA10
12:00	33	63	75	68	60	71	64
12:05	33	65	86	68	63	82	65
12:10	34	63	75	67	60	70	64
12:15	36	64	78	68	61	74	65
12:20	33	62	77	66	59	73	63
12:25	34	62	74	67	59	70	64
12:30	22	60	72	64	57	72	62
12:35	29	63	78	67	60	75	64
12:40	29	63	76	67	60	72	64
12:45	29	61	73	66	58	68	63
12:50	33	63	75	68	60	70	64
12:55	27	62	77	66	59	72	63
13:00	32	63	76	68	60	72	64
13:05	19	60	74	65	58	69	62
13:10	34	63	75	67	60	70	64
13:15	23	61	75	66	58	70	63
13:20	28	62	74	67	60	71	64
13:25	30	62	73	66	59	69	63
13:30	39	64	75	68	61	73	64
13:35	26	61	73	66	59	79	63
13:40	36	62	74	67	59	69	63
13:45	37	62	74	67	60	70	64
13:50	25	62	77	67	60	74	64
13:55	25	62	74	67	59	70	64
14:00	38	64	77	68	61	73	65
14:05	33	63	79	67	60	75	64
14:10	40	63	74	67	60	72	64
14:15	22	60	73	64	57	68	62
14:20	21	60	72	65	58	68	63
14:25	20	60	74	65	58	74	62
14:30	29	61	73	66	58	68	62
14:35	27	61	75	66	59	71	62
14:40	40	63	75	68	60	70	64
14:45	39	63	74	68	60	71	64
14:50	29	62	77	66	59	73	63
14:55	40	63	75	68	61	71	64

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