# Noise Assessment

## Land at Hawthorns, Danaway

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## Non-Technical Summary

| | |
|---|---|
| What is Proposed? | Three new residential dwellings are proposed on the land at Hawthorns Danaway by Maidstone Road. |
| What is the Problem? | The proposed site is in proximity of two busy roads (the M2 and A249) and could therefore potentially be exposed to elevated noise, which could adversely affect future residents. |
| What is the Result? | With adequate noise mitigation measures in place, i.e. suitably specified façade constructions and closed windows, suitable internal noise levels can be achieved even at worst-affected A249/M2 facing façades.<br>The assessment has shown that with standard double glazing/ventilation, closed windows at the front of the properties, noise levels in line with the guidance in BS 8233 for indoor noise levels can be achieved.<br>The proposed dwellings will provide shielding. Future noise levels in the gardens are therefore also expected to be generally compliant with BS 8233:2014. |

## Report Record

| | |
|---|---|
| Project Name | Land at Hawthorns, Danaway |
| Client | Wyndham Property Group LTD |
| Report Type | Noise Assessment |
| Report Ref | 5182_AC_1.0 |
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| Author | Finnlay Hasler-Stott, Graduate Acoustic Consultant – BSc |
| Checked by | Stephan Booi, Principal Acoustics Consultant |

## Report Revisions

| Revision Ref | Date | Author | Details |
|---|---|---|---|
| | | | |
| | | | |

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# 1.0 Introduction

1.1 Three new residential dwellings are proposed on Land at Hawthorns Danaway, Sittingbourne, Kent. The site is accessed via a pre-existing property's gate (Hawthorns).

1.2 The site is in proximity of two busy roads (the M2 and A249) and could therefore potentially be exposed to elevated noise. It is also understood that the Council has made comments requesting indoor and external noise level compliance at the proposed developments to be assessed in line with BS 8233:2014 guidance (see Planning Ref: 24/504082/FULL).

1.3 In light of the above, a noise assessment has been conducted, the findings of which are presented in this report.

## What is a Noise Assessment?

1.4 A Noise Assessment will determine if and to what extent existing or future noise sources could affect noise-sensitive receptors, and importantly, if those noise sources could have an adverse impact. If the Noise Assessment finds that the level of risk or impact is unacceptable, mitigation measures will need to be applied to the development.

1.5 The Noise Assessment will consider the prevailing sound environment to determine potential noise sources including traffic, aircraft or other noise generating activities, such as mechanical plant, generators etc. The report will provide an impact assessment and give actionable recommendations. Recommendations may include solutions involving changes to design, layout and construction methods, so that the impacts from noise can be reduced to acceptable levels. Often these mitigation measures can be incorporated into standard construction practices. Find out more about how we undertake Noise Assessments including FAQ here.

1.6 Understanding and reducing the impacts ensures that you have a safe and compliant site. When dealing with planning, the National Planning Policy Framework (NPPF) and associated policies require an appropriate noise assessment at the initial planning stage, whilst the ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development May 2017 requires delivery of sustainable development by promoting good health and wellbeing through the effective management of noise.

## The Subject Site

| Table 1 Site Details | |
|---|---|
| Address | Land at Hawthorns, Danaway, Sittingbourne, Kent, ME9 7QA |
| Eastings, Northings | 585985, 162694 |
| Area | 0.39 ha |
| Local Planning Authority | Swale Borough Council |

1.7 The site comprises vacant grassland in the village of Danaway. The site application area is shown in Figure 1 below.


Figure 1 Site Location

## The Proposed Development

| Table 2 Site Details | |
|---|---|
| Address | Land at Hawthorns, Danaway, Maidstone Rd, ME9 7QA |
| Eastings, Northings | 585985, **162694** |
| Local Planning Authority | Swale Borough Council |

1.8 It is understood that proposals involve the clearance of the site for a residential construction development totalling three detached houses. Proposed development plans involve the retention of some natural landscaping to the south part of the site, as seen in Figure 2 below. Additionally, the site is surrounded by elevated farmland to the south/east, an existing dwelling (Hawthorns) to the north and sits adjacent to Maidstone Road. External areas will include a garden, an access road, parking drives and soft landscaping.

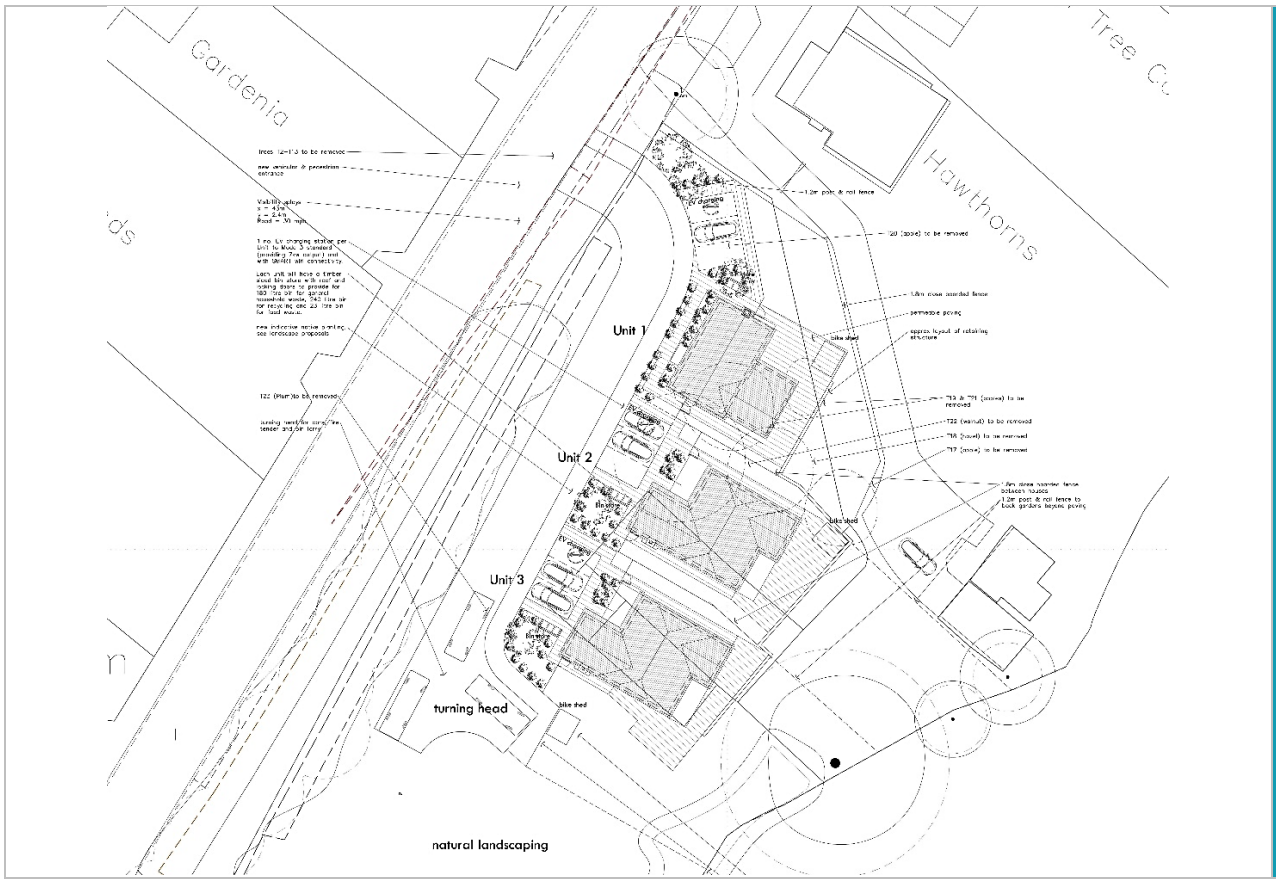



Figure 2 Proposed Development

## Report Structure, Limitations & Changes

1.9 Chapter 2.0 of the report sets out the assessment methodology. Chapter 3.0 discusses the baseline noise survey results with the acoustic design statement presented in Chapter 4.0. Report conclusions and recommendations are set out in Chapter 5.0.

1.10 There are a lot of technical terms in this report and definitions are provided in Appendix A. Appendix B details some of the relevant guidance that this assessment is based on as well as acoustic criteria/thresholds. Extracts of survey data are provided in Appendix C.

1.11 This assessment has been undertaken in accordance with our Terms & Conditions. Full details on limitations and reliance are provided in those Terms. Third party information which has been reviewed and used to inform the assessments presented herein, including public records held by various regulatory authorities and environmental database data has been assumed to be true and accurate.

1.12 This assessment has been carried out to determine the potential risks posed to future end users, along with other key receptors, based on the current development. Should revisions in the development proposals result in a change in any assessment parameters detailed in this report, a re-assessment of the risk should be carried out.

# 2.0 Assessment Methodology

## Introduction

2.1 This chapter lists the target noise sources identified from a review of Google Earth / Street View, from any client or regulator information and from observations made during deployment of monitoring equipment / site visits. In addition, this section details the methodology for the noise monitoring equipment deployment and survey standards.

## Acoustic Criteria

2.2 Reference has been made to a number of design requirements/guidance to determine the acoustic design criteria for the proposed development. In summary, these include:

- British Standard 8233:2014 (internal/external amenity noise levels and building envelope specification),
- Professional Practice Guidance on Planning & Noise (ProPG)

2.3 The above are discussed in more detail below.

### BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings

2.4 BS 8233 'Guidance on sound insulation and noise reduction for buildings' provides guidance on indoor ambient noise levels for various situations.

2.5 The relevant guideline limits for dwellings are shown in Table 3.

Table 3 BS 8233 Indoor Ambient Noise Levels for Dwellings

| Activity | Location | Daytime (07:00 – 23:00) | Night-time (23:00 – 07:00) |
|---|---|---|---|
| Resting | Living room | 35 dB $L_{Aeq,16h}$ | — |
| Dining | Dining room/area | 40 dB $L_{Aeq,16h}$ | — |
| Sleeping (daytime resting) | Bedroom | 35 dB $L_{Aeq,16h}$ | 30 dB $L_{Aeq,8h}$ |

2.6 It is important to note that the above guideline noise level limits are applicable to 'anonymous' noise sources such as steady traffic and general distant urban noise.

2.7 In terms of the guideline noise limits, BS 8233 guidance does state that a 5 dB relaxation may be applied where a development is necessary or desirable:

> *Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.*

2.8 In terms of outdoor amenity spaces, BS 8233:2014 offers the following guidance:

> *"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB LAeq, with an upper guideline value of 55dB LAeq which would be acceptable in noisier environments. However, it is also recognised that these 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, a 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, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited."*

### Professional Practice Guidance on Planning & Noise (ProPG) – New Residential Development

2.9 Professional Practice Guidance on Planning & Noise (ProPG) is guidance for new residential development that aims to protect people from noise through encouraging better acoustic design. The guidance has been jointly prepared by the Institute of Acoustics (IOA), Chartered Institute of Environmental Health (CIEH), and the Association of Noise Consultants (ANC).

2.10 ProPG draws upon legislation and other guidance and standards such as WHO and BS 8233:2014 (discussed above). In terms of the BS 8233:2014 guidance, ProPG provides supplementary advice with respect to night-time maximum noise levels stating:

*"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 LAmax,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"*

## Baseline Noise Survey

### Methodology

2.11 A long-term (LT) unattended baseline noise survey was undertaken from Tuesday 12nd November 2024 to Thursday 14th November 2024 using a Norsonic Nor-140 precision Class I sound level meter (serial no. 1405197). The meter was set to log sound levels in contiguous 5-minute periods.

2.12 The microphone was mounted on a tripod at a height of approximately 1.5 m. This measurement position was roughly centre of the site. When factoring land elevation, the survey position is considered representative of both future garden and first floor level.

2.13 The approximate noise monitoring positions are shown in Figure 3.


Figure 3 Approximate Noise Survey Locations

2.14 The photos below show the LT noise survey set up.

LT monitoring position

LT monitoring position

2.15 Pre- and post-survey calibration checks were carried out which confirmed that no significant drift (0 dB) had occurred during the survey. The calibration checks were undertaken using a Norsonic Nor1255 calibrator (serial no. 125525497).

2.16 All equipment used for the baseline noise survey had valid calibration certificates at the time of the survey, which are available upon request. The survey also conformed to the best practice data acquisition methodologies as set out in BS 7445[1].

### Meteorological Conditions

2.17 Meteorological conditions during the measurement period were generally in line with recommendations for environmental noise surveys. An air temperature generally between 10°C and 23°C was noted during the survey. The conditions were noted as mostly partly sunny, except for Thursday 14th November when during collection, conditions were slightly damp from light precipitation.

[1] British Standard 7445 – Description and measurement of environmental noise

# 3.0 Baseline Survey Results

## Existing Environment

3.1 At the time of setting up and collecting the noise survey, the main noise source affecting the site was observed to be the A249 dual carriageway along with contributions from the M2 motorway and occasional traffic on Maidstone Road. Note that this observation was made at the centre of the sites mostly linear elevation changes. Therefore, this can be thought of as representative for road noise levels at the first floor and garden amenity areas.

3.2 Road traffic noise from the A249 dominated and the M2 contributed generic distant traffic noise. Maidstone Road contributed the least due to it having less cars and the site being slightly elevated improving distances/shielding, however, as the road is still close it still provided some observed peaks.

## Noise Survey Results Summary

3.3 The baseline noise level measurement results and derived values are presented below in Table 4. An overview of the survey results in graphical format and background sound analysis are also available in Appendix C, with full data available if required upon request.

Table 4 Summary of Measured Noise Levels at the LT Survey Location

| Period | Noise Levels (dB) | | |
|---|---|---|---|
| | Ambient, $L_{Aeq}$ [1] | Maximum, $L_{AFmax}$ | Background, $L_{A90}$[2] |
| Daytime (07:00 – 23:00) | 57 | 70[2] | 52 |
| Night-time (23:00 – 07:00) | 54 | 70[3] | 44 |

*Notes to Table 4:*
*[1] Logarithmic average, [2] Arithmetic average of the 5-minute values, [3] Arithmetic average of the 10th highest night-time values.*

3.4 As can be seen from the noise survey results in the above table, the weekday daytime (07:00 – 23:00) ambient noise level is in the region of 57 dB $L_{Aeq}$ with the average of 5-minute maximum noise levels being around 70 dB $L_{Amax}$. The average background daytime sound level is 52 dB(A).

3.5 In terms of the night-time period, an ambient noise level of around 54 dB $L_{Aeq}$ and 70 dB $L_{AF,max}$ maximum noise from discrete events can be expected at the LT measurement position with the average background sound level around 44 dB(A).

# 4.0 Acoustic Design Statement

4.1 This chapter sets out the minimum acoustic mitigation measures which will be required to ensure that the site is compliant with the criteria set out in Section 2 of this report.

4.2 The project is still at a relatively early design stage and therefore it is expected that the design will be developed accordingly through the various RIBA stages. This assessment is therefore considered preliminary in this regard.

## Building Envelope Assessment

4.3 This section sets out the octave spectrum data, interpreted from the measured noise levels detailed in Chapter 3.0 and the resultant recommended building exterior make-up or external building envelope specification to mitigate the observed noise levels.

4.4 The information in this Chapter regarding mitigation represents both the preliminary and minimum building envelope specification, i.e. the minimum design criteria for glazing, walls and roof build-ups.

## Design Assumptions

4.5 A number of values and parameters have been used as the basis of this appraisal. Façade, roof build-ups and bedroom sizes have been adopted based on typical construction for the type of development, as detailed in the table below.

Table 5 Parameters for Assessment

| Element | Properties/Parameters |
|---|---|
| Façade Wall | Typical Masonry |
| Roof | Standard Typical Roof Tiles |
| Floor Area (approximate) | 15 $m^2$ |
| Glazing Area (approximate) | 3 $m^2$ |
| Ventilation | 1 no. trickle vent per room |
| Reverberation Time | 0.6 s |

### Design Appraisal Noise Data

4.6 Spectral $L_{eq}$ day and night noise levels along with the night $L_{F,max}$ data used for the building envelope calculations are presented in Table 6.

Table 6 Spectral Noise Data for Building Envelope Assessment (Façade)

| Façade | Period | Noise level (dB) per octave band centre frequency (Hz) | | | | | | | Overall, dB(A) |
|---|---|---|---|---|---|---|---|---|---|
| | | 63 | 125 | 250 | 500 | 1k | 2k | 4k | |
| Facing Road | Day $L_{eq}$ | 61 | 54 | 50 | 52 | 55 | 46 | 34 | 57 |
| | Night $L_{eq}$ | 58 | 50 | 45 | 48 | 52 | 44 | 31 | 54 |
| | Night $L_{F,max}$ | 75 | 68 | 61 | 64 | 69 | 60 | 51 | 70 |

### Building Envelope Appraisal

4.7 A partially open window is generally taken to provide around 13 dB sound reduction. When considering this and the noise levels in Table 6 above average internal noise levels in the region of 44 dB and 41 dB can be expected within rooms at the front side of the dwellings (i.e. west facing windows with a direct line of sight to the A249) with partially open windows during the day and night respectively. These noise levels would exceed guidance levels of 35 dB and 30 dB $L_{Aeq}$ for 'reasonable' acoustic conditions during the day and night respectively (see Table 3), by a reasonably large margin.

4.8 In terms of maximum noise levels from discrete events, with a partially open window it is estimated that noise levels of around 57 dB would occur more than 10 times per night. This would exceed the generally accepted limit of 45 dB $L_{AF,max}$.

4.9 Notwithstanding the above, calculations indicate that desirable internal noise levels would be achievable even in the worst-affected bedrooms with windows closed and through the use of suitable building envelope specifications.

4.10 Noise break-in calculations in line with the 'more rigorous' BS 8233:2014 methodology and taking into consideration the proposed design have been undertaken.

4.11 The following table illustrates the initial example façade specifications to provide sufficient resistance against external noise. Alternative build-ups could be considered but they generally should meet the recommended minimum performance requirements as detailed in this report.

Table 7 Preliminary Building Envelope Specification

| Element | Minimum sound insulation (dB) per octave band centre frequency (Hz) | | | | | | | Overall sound Insulation |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1k | 2k | 4k | |
| Trickle Vent | 33 | 36 | 38 | 36 | 32 | 37 | 40 | 35 (0) dB $D_{ne,w}(C_{tr})$ |
| Glazing | 18 | 23 | 20 | 24 | 35 | 41 | 36 | 30 (-4) dB $R_w(C_{tr})$ |
| Walls | Standard wall construction should be suitable | | | | | | | |

4.12 It shall be noted that the acoustic specification values for the glazing elements apply to the combined glass pane, window/door frame, spandrels (where applicable) and the like. Trickle vent specifications are representative of being in 'open' position.

4.13 Suitable example glazing and ventilation specifications for the building façades would include:

- Standard double glazing, e.g. 4 / 10 / 4, and standard trickle vent, e.g. Titon V25 / Std. Canopy (or similar)

4.14 Any updated acoustic specifications should be forwarded to Lustre Consulting for review to ensure they are acoustically suitable.

4.15 It is also important to note that the recommendations above are intended to demonstrate compliance with relevant acoustic guidance/requirements only. Further analysis may be required during the project design stage, for example, to verify potential changes to the design, ensuring proposed build-ups and products used (including ventilation) meet the acoustic requirements, etc.

### Ventilation

4.16 Approved Document F (ADF) of the Building Regulations stipulates the requirement for rapid intermittent ventilation for occupants to have the ability to quickly expel fumes in dwellings.

4.17 Whilst windows at some locations would have to remain closed to ensure adequate acoustic conditions, the use of open windows for rapid ventilation is considered acceptable as any increase in noise would be for a short period only and expected by the occupant. The overall exposure to noise would therefore be relatively small.

### Noise during Overheating Conditions

4.18 The requirement for having closed windows at some locations to achieve satisfactory acoustic conditions could also have ramifications on other aspects of the design. The interdependent nature of acoustics, ventilation and overheating, i.e. windows would have to be opened to mitigate overheating which would then temporarily result in excessive noise, may necessitate these to be considered in an integrated approach during the project's detailed design stage.

4.19 As previously discussed, with a slightly open window, night-time internal noise levels of around 41 dB $L_{Aeq}$ (ambient) and 57 dB $L_{AF,max}$ (maximum more than 10 times per night) can be expected in the worst-affected west-facing rooms. These noise level estimates are just above the 40 dB average and the 55 dB maximum Part O noise limits.

4.20 In light of these estimates, there may be the potential for the Part O noise limits to be exceeded. However, as the results are close and estimated, it will be worth revisiting these as the project progresses.

### Noise within External Amenity Areas

4.21 As mentioned previously, a daytime ambient $L_{Aeq}$ value of 57 dB(A) has been determined from the baseline noise survey (see Table 4). This level is representative of existing conditions where the future gardens are proposed.

4.22 The proposed dwellings will provide a physical barrier with respect to traffic noise egress from the A249. Shielding can be expected to reduce noise levels in the future gardens by

around 5-10 dB. Therefore, external amenity area noise levels can be expected to reduce to around 47 to 52 dB(A).

4.23 Hence, future noise levels in the gardens are expected to be generally compliant with BS 8233:2014 guideline value for outdoor amenity spaces.

# 5.0 Conclusions & Next Steps

5.1 This report has presented the findings of a Noise Assessment, which identified key sources of noise, monitored noise levels, assessed conditions against Local and British guidance, and outlined suitable specifications for the building façades.

5.2 Assessment of prevailing environmental noise levels has been undertaken over what is deemed to have been a typical period. The main noise source at the proposed development site was observed to be road traffic noise from the busy A249 dual carriageway with some contribution from the M2 motorway as well as Maidstone Road when present.

5.3 The assessment has shown that with a standard specified building fabric, albeit with closed windows, internal noise levels in line with British Standard guidance can be achieved.

5.4 External amenity area noise levels are also expected to fall within the upper limit guidance set out in BS 8233:2014. This would be achieved as a result of the proposed buildings providing a physical barrier shielding the main noise source (A249) affecting the site.

# APPENDIX A: Acoustic Terminology

| Parameter | Description |
|---|---|
| Sound | A sound wave can be viewed as small pressure fluctuations in an elastic medium such as air. When the frequencies of the pressure fluctuations are within the audible range, the human ear responds to sound waves which produces the sensation of hearing.<br><br>There are two basic characteristics of sound: amplitude and frequency. Amplitude relates to the perceived loudness of a sound whereas the pitch of a sound corresponds to the frequency. |
| Noise | Noise, a subjective term, is essentially unwanted sound. It is very much dependent on the receptor's perception of the sound. |
| Decibel (dB) | The sound pressure is measured in Pascals. The human ear responds to a wide range of sound pressures, from 0.00002 to 20 Pascals. Given this wide range of values, it is convenient to express these in a logarithmic scale, the decibel (dB).<br><br>The decibel is a logarithmic scale representing the measurement unit of sound pressure levels or noise levels relative to the threshold of hearing ($20x10^{-6}$ Pascals).<br><br>Zero decibel represents the threshold of hearing. The higher the value the louder the sound, with the value around 110 decibel being the level at which hearing becomes uncomfortable. Around 130 decibel is the threshold of pain at which hearing becomes painful. |
| Frequency (Hz) | The pitch of a sound relates to the frequency, which is expressed in Hertz (Hz). The audible range for human hearing typically ranges from 20 Hz to 20 kHz, but this tends to decrease with age.<br><br>A pure tone, e.g. as produced by a tuning fork, contains sound of a single frequency (440 Hz). In real life, most sound consists of complex waves containing sound waves of multiple frequencies. |
| A-weighting | Human hearing is not linear, i.e. the perceived loudness of sound varies with both frequency and amplitude. To better represent the human hearing response, frequency 'weightings' are applied to sound.<br><br>There are various weighting networks best suited to specific conditions. However, in practice, the A-weighting network has become the generally accepted 'correction' for representing loudness.<br><br>When a weighting filter has been applied to a value, the weighting type is added to the descriptor, $L_{Aeq}$, $L_{pA}$, etc, or just after the decibel, dBA or dB(A) |

| Parameter | Description |
|---|---|
| Octave Bands or 1/3-Octave Bands | Whilst single figure values are useful, often spectral data is required for analysis and/or acoustic specification. To represent the frequency content, sound level or acoustic properties are presented in specific frequency bands, also known as octave bands.<br><br>The frequencies of octave bands have been internationally standardised. For example, the 500 Hz octave band (500 Hz being the centre frequency) has a range from 354 Hz to 707 Hz.<br><br>Where finer spectral detail is required, 1/3-octave band data can be used. Each octave band is divided into three 1/3-octave bands. |
| Sound Pressure Level (SPL or $L_p$) | The sound pressure level is indicative of the sound wave strength and has good correlation with perceived loudness. Sound pressure is expressed in Pascals and, for convenience, is expressed |
| Sound Power Level (SWL or $L_w$) | The sound power is the overall acoustic energy radiated by a source over a specific period and is expressed in Watts. It is an inherent property of the source and, unlike sound pressure, does not depend on the distance to the source.<br><br>As sound power values vary greatly, it is convenient to express these as a level in decibels, the sound power level, SWL or $L_w$ (referenced to $10^{-12}$ Watts). |
| $L_{Aeq,T}$ | The A-weighted equivalent continuous sound level over the period T. Often also referred to as the ambient noise level.<br><br>This is the sound level that is equivalent to the total average energy of noise recorded over a given period. |
| $L_{Amax}$ | The A-weighted maximum instantaneous noise level. |
| $L_{A10}$ | The A-weighted statistical sound level which is exceeded 10% of the given measurement period. In the UK, this level is usually used to describe road traffic noise. |
| $L_{A90}$ | The A-weighted statistical sound level which is exceeded 90% of the given measurement period. This level is usually synonymous with the background sound level and generally describes the underlying level of sound that is experienced when specific events are not taking place. |
| $R_w$ | The weighted (w) sound reduction index (R), a single figure rating of the laboratory airborne sound insulation performance of a construction, usually measured across the frequency range 100-3150Hz.<br><br>The higher the value, the greater the sound insulation, and the more onerous the requirement. |

| Parameter | Description |
|---|---|
| $D_{nT,w}$ | The weighted (w) sound insulation (*D*), a single figure rating of the in-situ airborne sound insulation performance of a construction. The sound insulation value is standardised (n*T*) to a reference reverberation time for typical conditions.<br><br>The higher the value, the greater the sound insulation. |
| $L'_{nT,w}$ | The weighted (w) impact sound pressure level (*L*), a single figure rating of the in-situ impact sound insulation performance of a construction. The sound insulation value is standardised (n*T*) to a reference reverberation time for typical conditions.<br><br>The lower the value, the greater the sound insulation. |
| *C or* $C_{tr}$ | These are spectrum adaptation terms for taking into account the effect of different sound spectra. *C* and $C_{tr}$ are corrections for pink noise and traffic noise respectively and are added to single figure quantities, e.g. $R_w + C_{tr}$ |
| $D_{n,ew}$ | The weighted (w) element (e) normalised (n) level difference (D), an indicator of the ability of a small building element (such as a trickle ventilator) to reduce sound in a particular frequency band.<br><br>The higher the value, the greater the sound reduction, and vice versa. |
| Reverberation Time (RT60 or T60) | Reverberation time relates to the echoing decay of sound in a room. More specifically, the reverberation time (RT60) is the time it takes for the sound pressure level to drop by 60 dB after excitation. The value is expressed in seconds.<br><br>In many situations, conditions do not allow for the entire 60 dB decay time to be measured. Where this is the case, a reduced part of the decay can be measured and the results extrapolated; typically these are the T20 or T30.<br><br>The higher the value, the more reverberant a space is. |

# APPENDIX B: Planning Policy and Guidance

# NATIONAL PLANNING POLICY FRAMEWORK, 2023 (NPPF)

The National Planning Policy Framework (NPPF) includes the following statements relating to noise and the requirement to take it into account in the planning process.

Section 15, paragraph 180 (e) of NPPF states:

- *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.*

Section 15, paragraph 191 of NPPF states:

- (a) *mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life.*
- (b) *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;*

Paragraph 193 of NPPF further elaborates on the consideration of existing businesses, as follows:

- *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, 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.*

The NPPF does not provide absolute limits on noise that are acceptable or unacceptable in a given situation. It does, however, set out the "need to ensure that developments do not give rise to significant adverse impacts on health and the quality of life". In addition, the operations of existing businesses are also protected, with reference to ensuring new developments do not have an adverse effect on their operations.

# NOISE POLICY STATEMENT FOR ENGLAND, 2010 (NPSE)

The Noise Policy Statement for England (NPSE) applies to all forms of noise including environmental noise, neighbour noise and neighbourhood noise but does not apply to noise in the workplace. The Government recognizes that the effective management of noise requires a coordinated and long-term approach that encompasses many aspects of modern society.

The long-term vision of Government noise policy is set out 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. This long-term vision is supported by three aims:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.

The NPSE introduces the concept of NOEL, LOAEL and SOAELs, which are described below:

- NOEL – No Observed Effect Level – This is the level below which no observable effect can be detected.
- LOAEL – Lowest Observed Adverse Effect Level – This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL – Significant Observed Adverse Effect Level - This is the level above which significant effects on health and quality of life can be detected.

# PLANNING POLICY GUIDANCE – NOISE, 2014

This guidance is provided online within the UK Government Planning System. The guidance expands upon the concepts of Observed Effect Levels and the following table is provided.

Planning Policy Guidance - Noise exposure hierarchy

| Perception | Examples of Outcomes | Increasing Effect Level | Outcome |
|---|---|---|---|
| No Observed Effect Level | | | |
| Not Noticeable | No Effect | No Observable Effect | No specific measures required |
| Noticeable but not Intrusive | Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area, but not such that there is a perceived change in the quality of life. | No Observed Adverse Effect | No specific measures required |
| Lowest Observed Adverse Effect Level | | | |
| Noticeable and Intrusive | Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life. | Observed Adverse Effect | Mitigate and reduce to a minimum |
| Significant Observed Adverse Effect Level | | | |
| Noticeable and disruptive | The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area. | Significant Observed / Adverse Effect | Avoid |
| Noticeable and very disruptive | Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory | Unacceptable Adverse Effect | Prevent |

# ProPG: PLANNING & NOISE PROFESSIONAL PRACTICE GUIDANCE ON PLANNING & NOISE NEW RESIDENTIAL DEVELOPMENT MAY 2017

The primary goal of ProPG is to assist the delivery of sustainable development by promoting good health and wellbeing through the effective management of noise. It seeks to do that through encouraging a good acoustic design process in and around proposed new residential development having regard to national policy on planning and noise.

ProPG advocates a systematic, proportionate, risk based, 2-stage, approach. The approach encourages early consideration of noise issues, facilitates straightforward accelerated decision making for lower risk sites, and assists proper consideration of noise issues where the acoustic environment is challenging. It is envisaged that following the guidance contained in this document will increase the likelihood of success of planning applications for new residential development, yet it also provides a clear basis for recommending refusal of new housing development on noise grounds where necessary.

Stage 1: Initial Site Noise Risk Assessment

An initial noise risk assessment of the proposed development site should be conducted by a competent noise practitioner at the earliest opportunity, before any planning application is submitted. The noise risk assessment should provide an indication of the likely risk of adverse effects from noise were no subsequent mitigation to be included as part of the development proposal. It should indicate whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective.

Stage 2: Full Assessment – the four key elements

- Element 1 – Good Acoustic Design Process Stage 2:
- Element 2 – Internal Noise Level Guidelines Stage 2:
- Element 3 – External Amenity Area Noise Assessment Stage 2:
- Element 4 – Assessment of Other Relevant Issues

Figure: Summary plan for ProPG planning advice

| NOISE RISK ASSESSMENT | POTENTIAL EFFECT WITHOUT NOISE MITIGATION | PRE-PLANNING APPLICATION ADVICE |
|---|---|---|
| Indicative Daytime Noise Levels $L_{Aeq,16hr}$ / Indicative Night-time Noise Levels $L_{Aeq,8hr}$<br>  <br> | Increasing risk of adverse effect | 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. Applicants are strongly advised to seek expert advice.<br><br>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 is demonstrated in an ADS which 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.<br><br>At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development. |
| | No adverse effect | These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds. |

The following British Standards and Building Regulations have been considered for this assessment.

## BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

This standard provides information and guidance on sound insulation and noise reduction for buildings. It deals with the control of external noise and outlines recommendations for occupied rooms.

The following table is taken from the document outlining requirements for internal noise levels in residential accommodation.

Indoor Ambient Noise Levels for Dwellings (BS 8233:2014)

| Activity | Location | 07:00 to 23:00 | 23:00 to 07:00 |
|---|---|---|---|
| Resting | Living Room | 35dB $L_{Aeq,16Hr}$ | - |
| Dining | Dining Room/Area | 40dB $L_{Aeq,16Hr}$ | - |
| Sleeping | Bedroom | 35dB $L_{Aeq,16Hr}$ | 30dB $L_{Aeq,8Hr}$ |

The noise levels presented are based on existing WHO guideline values. The document further recommends that guideline value may be set in terms of SEL or $L_{Amax,F,}$ if systematic individual noise events are happening. The values are depending on the character and number of events per night. Sporadic noise events could require separate values. In this instance a target value of 45 dB $L_{Amax}$ has been established as the average $L_{Amax}$ level not to be exceeded in bedrooms at night.

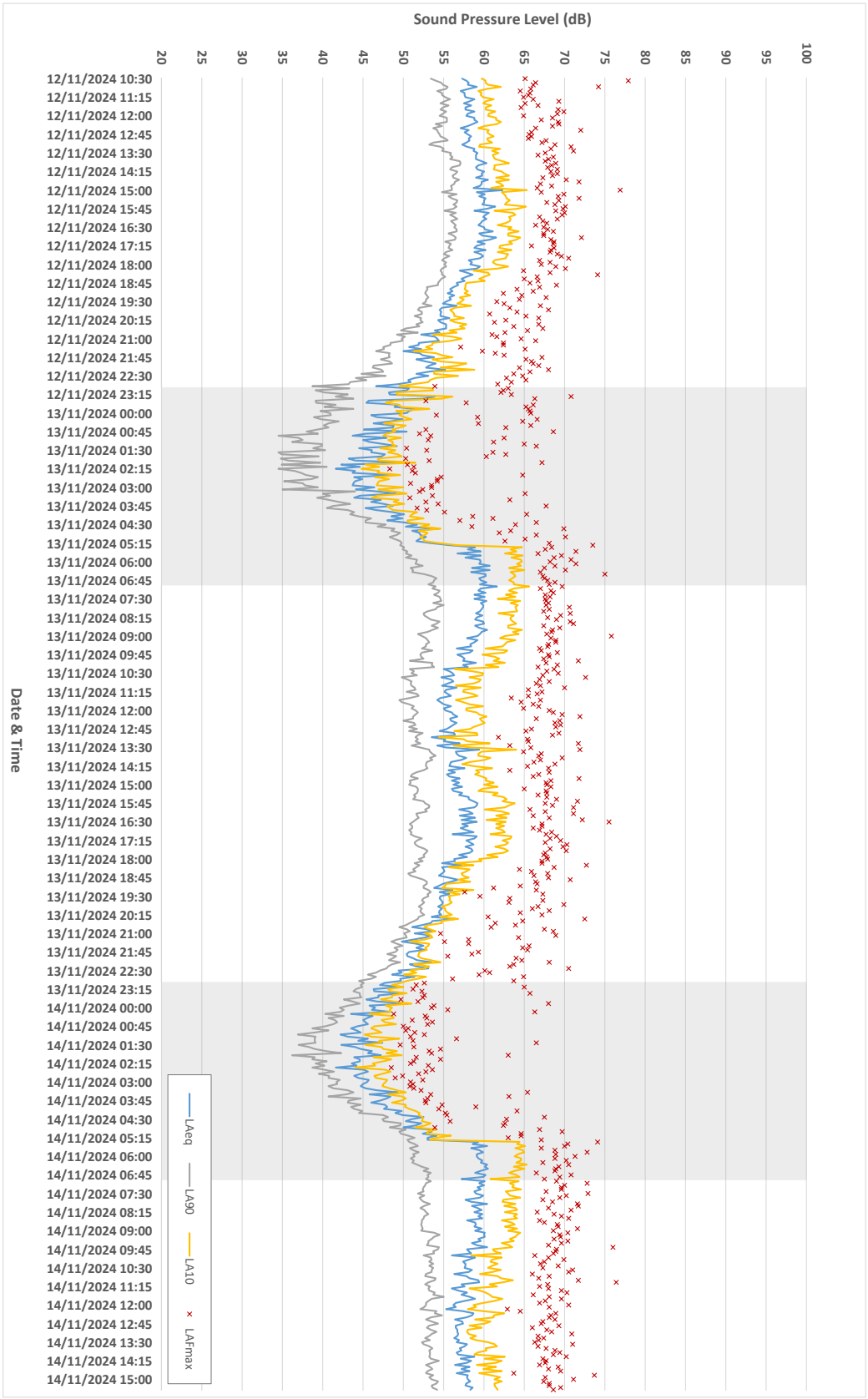
External Amenity Space

BS 8233:2014 offers the following guidance regarding outdoor amenity space:

> *"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB LAeq, with an upper guideline value of 55dB LAeq which would be acceptable in noisier environments. However, it is also recognised that these 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, a 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, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited."*

# APPENDIX C: Noise Survey Data

# Long Term Noise Survey (LT)



LUSTRE
CONSULTING

Units 42 & 43, The Joiners Shop,
The Historic Dockyard, Chatham, Kent, ME4 4TZ
e: info@lustreconsulting.com | t: 01634 757 705
**www.lustreconsulting.com**