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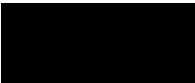
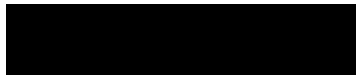
Environmental Noise Assessment

Prepared: 26th June 2025

Report No	23221-1
Client	W H Brakspear & Sons Ltd
Site	Hope & Anchor Station Road Wokingham

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1. Quality Management

Report Number	23221-1
Issue	Issue 1
Prepared	26 th June 2025
Prepared By	 Jonathan Seiffert BSc, MIOA
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3. Executive Summary

3.1.1. An environmental noise assessment has been carried out for a proposed residential development at Hope and Anchor, Station Road, Wokingham ("Proposed Development").

3.2. Measurement, Assessment and Evaluation

3.2.1. The survey was carried out to BS7445-1:2003,¹ BS7445-2:1991² and BS4142:2014³.

3.3. Scope

3.3.1. This report covers all aspects of the noise survey, including:

- the identification of acoustic design criteria;
- the identification of specific sound sources;
- an objective sound pressure level survey of the existing site;
- calculation of the ambient, residual and specific sound levels;
- calculation of appropriate acoustic feature corrections and determination of the rating level ;
- assessment of the specific sound sources based on guidance contained in BS4142:2014; and
- the design of any mitigation to meet the required internal noise criteria.

3.4. Results Summary

3.4.1. A numerical BS4142 assessment shows that the specific sound is likely to have a low impact on the proposed new residential receivers during the daytime; and that the specific sound is likely to have a significant adverse impact on proposed new residential receivers during the night-time.

3.4.2. It is important to consider the context of the assessment as there are several contextual factors which support a downward modification of the estimated numerical assessment, particularly during the night-time. The contribution of the commercial/industrial noise is not significant compared to the dominant source which is the road traffic noise.

3.4.3. In this context the new residential receivers are being introduced close to existing commercial/industrial sources. This is likely to result in reduced impact when compared to the situation where new sources are being introduced close to existing residential receivers. In this situation, facade sound insulation is within the development.

3.5. Mitigation

3.5.1. Facade sound insulation has been specified in order to mitigate and minimise the sound from all sources and is detailed in Table 1 overleaf.

3.5.2. The facade sound insulation required to meet the guideline values from BS8233:2014 are summarised in Table 1. The glazing performance has been specified in terms of the road traffic corrected weighted sound reduction index, $R_w + C_{tr}$, and the ventilator performance has been specified in terms of the road traffic corrected element normalised level difference $D_{ne,w} + C_{tr}$.

¹ BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Description of quantities and procedures"

² BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"

³ BS4142:2014 "Methods for rating and assessing industrial and commercial sound"

	Living rooms	Bedrooms
	Specification 1	
Glazing Performance	27dB $R_w + C_{tr}$	27dB $R_w + C_{tr}$
Ventilator Performance	33dB $D_{ne,w} + C_{tr}$	33dB $D_{ne,w} + C_{tr}$
	Specification 2	
Glazing Performance	33dB $R_w + C_{tr}$	33dB $R_w + C_{tr}$
Ventilator Performance	39dB $D_{ne,w} + C_{tr}$	39dB $D_{ne,w} + C_{tr}$

Table 1 – Required facade sound insulation (Glazing/Ventilator)

Internal Sound Insulation

- 3.5.3. It should be ensured that existing walls which are proposed to form separating walls meet the appropriate sound insulation specification set out in building regulation Approved Document E.
- 3.5.4. There is a proposed new separating wall on the ground floor between the bar and the entrance hall of the proposed dwelling. The matrix in Table 3 in BS8233:2014 has been used to determine a specification for on-site sound insulation of 47dB $D_{nT,w}$.

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5. Background

5.1. Noise Policy Statement for England

- 5.1.1. The Noise Policy Statement for England (NPSE), published in March 2010, states the long-term vision of Government noise policy is 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”*.
- 5.1.2. This long-term vision is supported by the following aims; through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
- Avoid significant adverse impacts on health and quality of life;
 - Mitigate and minimise adverse impacts on health and quality of life;
 - Where possible, contribute to the improvement of health and quality of life.
- 5.1.3. The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

5.2. National Planning Policy Framework

- 5.2.1. The National Planning Policy Framework (NPPF) was published on the 27th of March 2012 and is updated regularly. It sets out the Government’s planning policies for England and how these are expected to be applied. The framework states that the planning system should contribute to and enhance the natural and local environment by:

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

- 5.2.2. The NPPF requires that new developments be appropriate to their locations such that the effects of pollution on health have been taken into account. Planning policies and decisions should aim to:
1. avoid noise giving rise to significant adverse impacts on health and the quality of life;
 2. mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development; and,
 3. identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value.
- 5.2.3. Existing businesses near to proposed development 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.

5.3. National Planning Practice Guidance

- 5.3.1. The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) which was published on the 29th November 2016 and is regularly updated to reflect the changes made to the NPPF and make it more accessible.⁴

⁴ <http://planningguidance.communities.gov.uk/>

- 5.3.2. There are a number of factors that determine whether a noise could be a concern to a receptor. These include: the absolute level of the noise and when it occurs, whether it is existing or new to the area, temporal characteristics, spectral content and the acoustic absorption in the area.

Perception	Examples of outcomes	Effect level	Action
Not noticeable	No effect	No observed effect	No specific measures required
Noticeable and 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 (NOAEL)	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
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 (SOAEL)			
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 intrusive	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

Table 2 – Noise exposure hierarchy

- 5.3.3. It is emphasised in the PPG that the planning process should be used to mitigate and minimise the impact of noise. This could include: engineering the noise sources to be quiet, minimising the impact of noise through layout, using conditions/obligations to restrict activities, mitigating the impact in places where noise is likely to be experienced (e.g. using facade sound insulation).

PPG and Agent of Change

- 5.3.4. Where residential development is proposed close to existing commercial premises. Suitable mitigation measures may need to be put in place to avoid those activities having a significant adverse effect on future residents.
- 5.3.5. Where this is the case, the developer (or 'agent of change') would need to identify commercial premises that could cause a noise nuisance. This should include potential future noise sources that may not be present at the time a planning application is made. The agent of change will also need to mitigate and minimise noise to avoid potential significant adverse effects.

"Adopting this approach may not prevent all complaints from the new residents/users about noise or other effects, but can help to achieve a satisfactory living or working environment, and help to mitigate the risk of a statutory nuisance being found if the new development is used as designed (for example, keeping windows closed and using alternative ventilation systems when the noise or other effects are occurring)."

NPPG 009 Reference ID: 30-009-20190722 - Revision date: 22nd July 2019

- 5.3.6. What constitutes noise, as opposed to sound, is subjective and there is not a simple relationship between the level of a sound and the impact on those affected but could be dependent on:
- the source and absolute level of the noise;
 - the time of day it occurs;
 - how a new noise source and/or receiver relates to the existing sound environment; and,
 - the time and frequency characteristics of the noise
- 5.3.7. It is emphasised in the PPG that the planning process should be used to mitigate and minimise the impact of noise. This could include:
- engineering the noise sources to be quiet;
 - minimising the impact of noise through layout;
 - using conditions/obligations to restrict activities; and,
 - mitigating the impact in places where noise is likely to be experienced (e.g. using facade sound insulation).

"More specific factors to consider when relevant include:"

"whether any adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations."

Paragraph: 006 Reference ID: 30-006-20190722 Revision date: 22nd July 2019

- 5.3.8. Care should be taken when considering mitigation to ensure the envisaged measures do not make for an unsatisfactory development.
- 5.3.9. It is possible that noise effects may be counteracted by providing: quiet facades containing habitable rooms, quiet private gardens or balconies, or quiet public amenity space within 5-minute walking distance.

6. Introduction

6.1.1. An environmental noise assessment has been carried out for a proposed residential development at Hope and Anchor, Station Road, Wokingham.

6.2. Proposed Development

6.2.1. An image showing the proposed location and layout of the Proposed Development is given in Figure 1 and Figure 2.

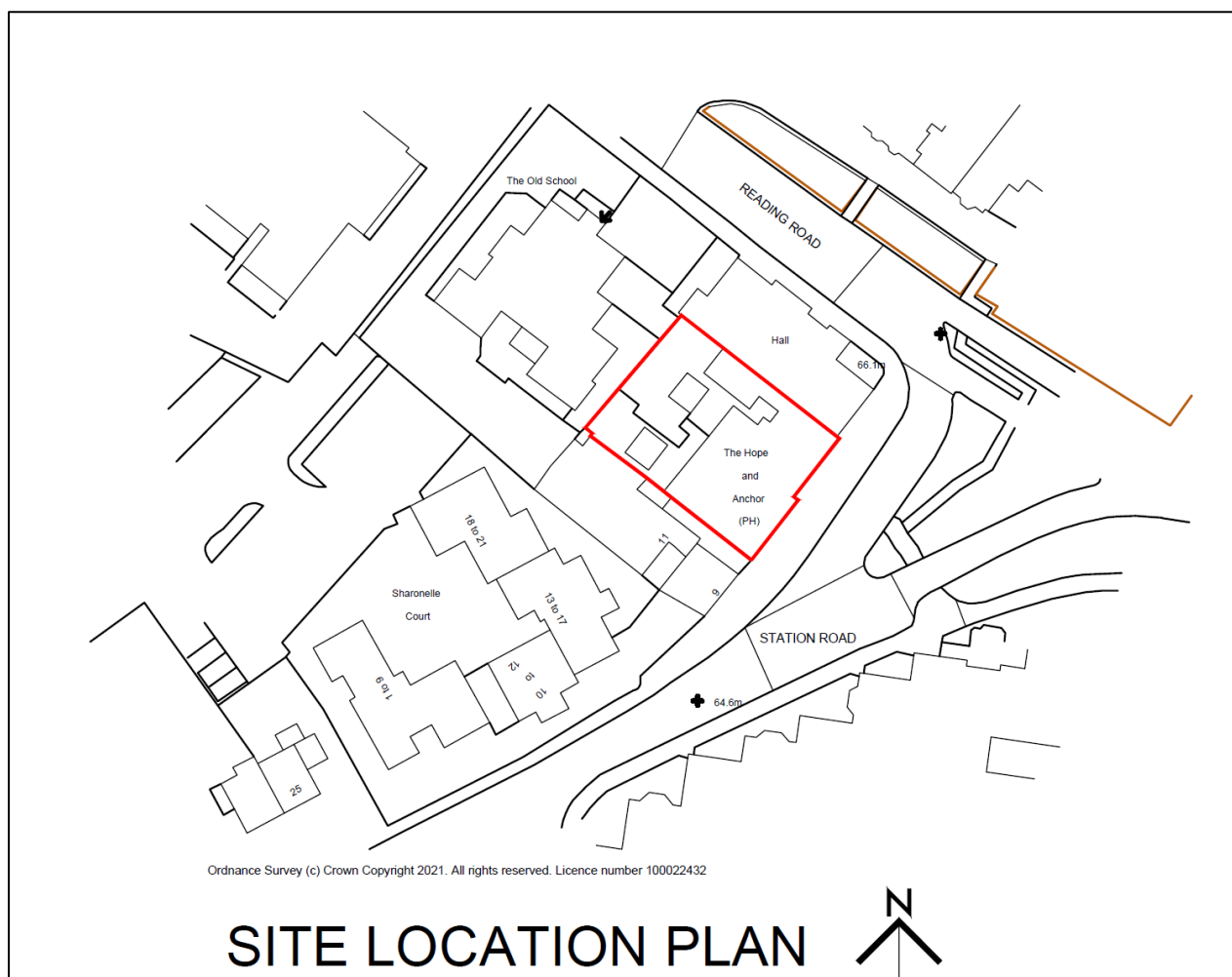


Figure 1 - Plan showing the location the Proposed Development

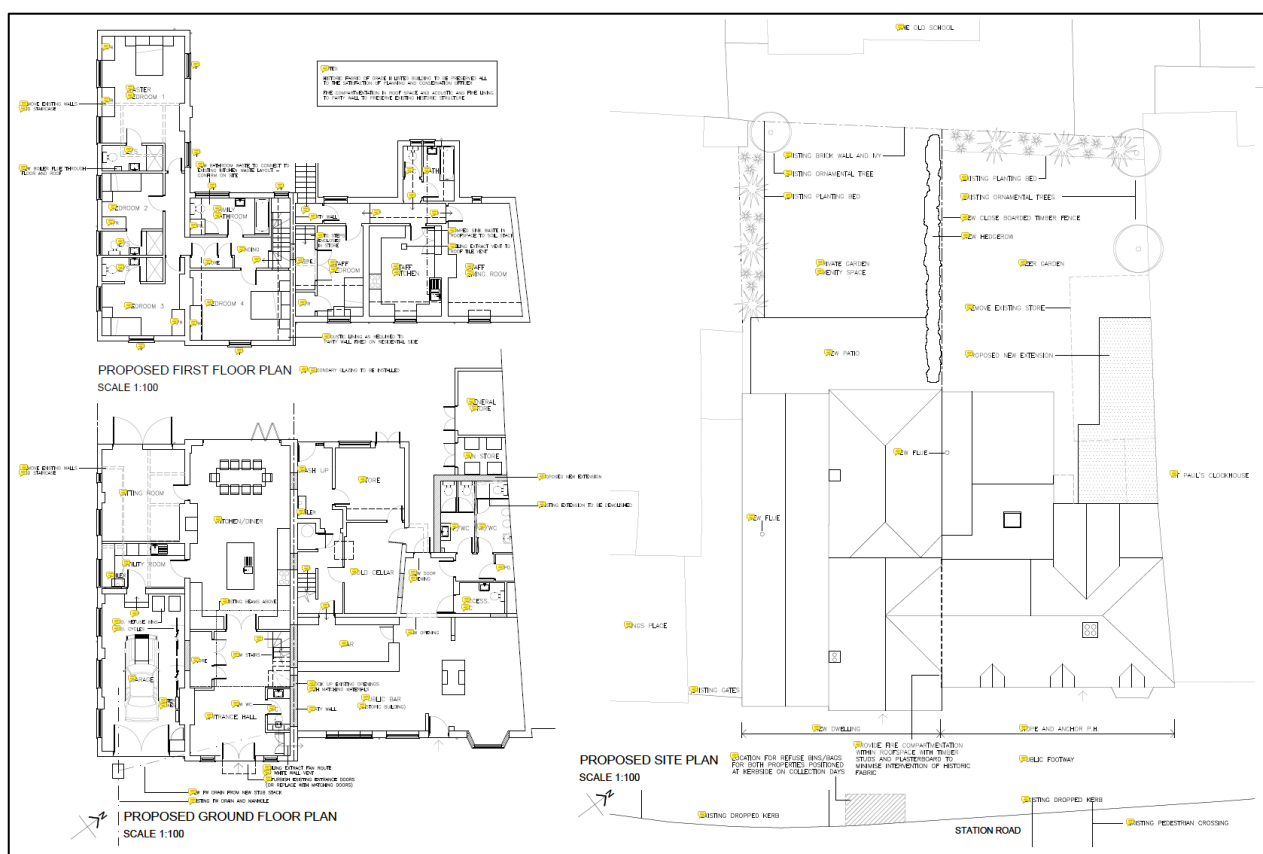


Figure 2 – Plan showing the layout of the Proposed Development

6.3. Specific Sound Sources

- 6.3.1. During the survey visits it was noted that there were a number of industrial/commercial sources operating near to the proposed development. The specific sound sources, the business that they are associated with and the likely operating times have been summarised in Table 3.
- 6.3.2. It is noted that the pub currently hosts live music events, however it is understood that the performance area is being removed as part of the proposed plans, therefore music noise has not been assessed.
- 6.3.3. It should also be noted that pub patron noise has also not been included in this assessment.

Business	Illustration	Specific Sound Source
Hope & Anchor Pub <i>Opening hours:</i> <i>Monday 12:00 - 23:00</i> <i>Tuesday 12:00 - 23:00</i> <i>Wednesday 12:00 - 23:00</i> <i>Thursday 12:00 - 23:00</i> <i>Friday 12:00 - 00:00</i> <i>Saturday 12:00 - 01:00</i> <i>Sunday 12:00 - 23:00</i>		Refrigeration Fixed Plant Operating hours unspecified Sound Pressure Level $L_p = 61.7\text{dB(A) } 1\text{m}$
St Paul's Clockhouse <i>Opening hours unspecified</i>		Air Conditioning fixed plant Fujitsu Airstage AJY072LELDH Operating hours unspecified Sound power from manufacturer data sheet¹ $L_w = 66.0\text{ dB(A)}$

Wokingham Borough Council

Opening hours:

Monday to
Friday 09:00 - 17:00

Saturday &
Sunday Closed



Heating & Cooling fixed
plant

AIRBLADE (model
unknown)

Operating hours
unspecified

Sound Pressure Level
LP = 64.1dB(A) 1m



Heating & cooling fixed
plant

Toshiba Air Conditioner
RAV-SP404AT-E

Operating hours
unspecified

Sound power from
manufacturer data sheet¹

L_W = 62.0 dB(A)

		Heating & cooling fixed plant Daikin REYQ8U7Y Operating hours unspecified Sound power from manufacturer data sheet¹ $L_W = 72.0 \text{ dB(A)}$
		Plant Room Extract Operating hours unspecified Sound Pressure Level $L_p = 59.2 \text{ dB(A) } 1\text{m}$
		Flue Vent Extract Operating hours unspecified Sound Pressure Level $L_p = 67.1 \text{ dB(A) } @1\text{m}$

¹Data sheet provided in appendix

Table 3 – Description of the specific sound sources local to the proposed development

7. Assessment Criteria

7.1. BS4142:2014

- 7.1.1. BS4142 provides methods for rating and assessing **specific sound sources** of an industrial and/or commercial nature, which includes: industrial and manufacturing processes, fixed services plant, sound generated by the loading/unloading of goods and sound from mobile plant/vehicles associated with industrial/commercial premises (e.g. fork-lift trucks). The **assessment location** is outside a residential receptor.
- 7.1.2. The standard is specifically precluded from being used to assess the likely impact inside a building or from the assessment of various sound sources for which other (more relevant) guidance exists, including: music/entertainment noise, noise from people and construction noise.
- 7.1.3. The foundation of the assessment is to establish the following quantities, either by measurement or prediction:
- **Ambient sound:** The overall sound at the assessment location
 - **Residual sound:** The ambient sound without the specific sound source operating
 - **Specific sound:** The ambient sound with the specific sound source operating, corrected for residual sound
 - **Background sound:** Residual sound present for 90% of the time
- 7.1.4. How these quantities relate to the sound that would be measured during a survey has been illustrated in Figure 3.

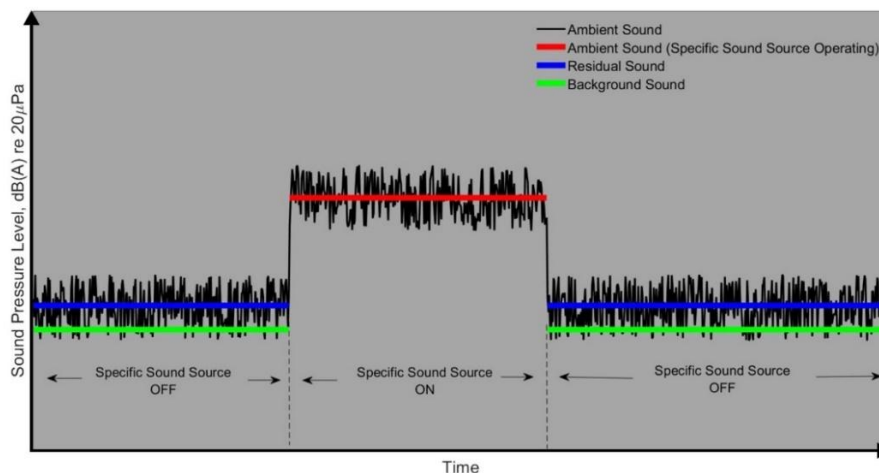


Figure 3 –
Diagrammatic
illustration of the
definitions of ambient,
residual, specific and
background sound

- 7.1.5. Once the specific sound level has been determined, this must be corrected for the presence of acoustic features that are audible at the assessment location to determine the **rating level**:

$$\text{Rating Level} = \text{Specific Sound Level} + \text{Character Corrections}$$

- 7.1.6. Normally it is possible to carry out a subjective assessment of characteristics, based on the following correction guidelines:
- Tonality: +2dB for a 'just perceptible' tone, +4dB for 'clearly perceptible', and rising to +6dB for 'highly perceptible' tones.
 - Impulsivity (rapidity of change and overall change in level): +3 dB for 'just perceptible' impulsivity, +6dB for 'clearly perceptible', rising to +9 dB for 'highly perceptible' impulsivity.
 - Intermittency: if the on/off-time of the specific sound is readily distinctive at the noise-sensitive receivers, +3dB.

- 7.1.7. It should be noted that, where one feature is clearly perceived as dominant, it may be appropriate to apply a single correction. Where multiple features are likely to affect perception and response, each should be added arithmetically.
- 7.1.8. An estimate of the magnitude of the impact is evaluated by subtracting the measured background sound level at the assessment location from the rating level

Assessment Level = Rating Level – Background Sound Level

- 7.1.9. Typically, the greater the difference between the background and rating level, the greater the magnitude of impact, although BS 4142 emphasises that this is highly context-specific. As an initial estimate, BS4142 states that:
- A difference (between the background and rating level) of around +10 dB or more is likely to be indicative of significant adverse impact, depending on context
 - A difference (between the background and rating level) of around +5 dB or more is likely to be indicative of adverse impact, depending on context
 - Where the rating level does not exceed the background level, this is an indication that the specific sound will have a low impact, depending on context
- 7.1.10. Where the initial estimate of the impact needs to be modified due to the context, other factor should be considered, including: absolute sound levels, the character and level of the residual sound and the sensitivity of the receiver, which includes the effect of building façade sound insulation.

7.2. Guideline Internal Sound Levels

- 7.2.1. BS8233:2014 draws on the results of research and experience to provide information on the design of buildings that have internal acoustic environments appropriate to their function. The standard provides guideline internal values for dwellings for steady external noise sources. These have been summarised in Table 4.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35dB $L_{Aeq,16hour}$	-
Dining	Dining Room	40dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$

Table 4 – BS8233:2014 guideline values for internal ambient noise levels from steady external noise sources

- 7.2.2. The guideline values are issued by the World Health Organisation (WHO) and assume normal diurnal fluctuations in external noise. They are expected to be achieved based on normal annual data and not in all circumstances. For example, it is normal to exclude occasional events such as fireworks night or New Year's Eve.
- 7.2.3. 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 $L_{Aeq,T}$ with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In such cases, the lowest practicable levels should be achieved in external amenity areas but the development should not be prohibited.

7.3. Local Planning Authority Criteria

- 7.3.1. The local planning authority has provided specific noise-related planning requirements for the Proposed Development. The noise-related requirements have been reproduced in Table 5.

4. Noise Mitigation

Prior to commencement of development, details of noise attenuation taking account of the historic fabric of the building and all nearest and affected noise sensitive receptors together with a method statement for installation and operation are to be submitted to and approved by the Local Planning Authority. The development must be implemented in accordance with the approved details prior to occupation.

Reason: To protect the occupiers of the dwelling and neighbouring properties from noise. Relevant policy: Core Strategy policies CP1 and CP3 and Managing Development Delivery Local Plan policy CC06.

Table 5 – Noise related planning requirements provided by the local planning authority

8. Survey

8.1. Measurement Locations

- 8.1.1. Fixed position monitoring took place at 7 positions to account for the likely dominant noise sources. The monitoring equipment was located 1.5m from the ground and at least 3m from the next nearest reflecting surface. The monitoring position is shown in Figure 4.

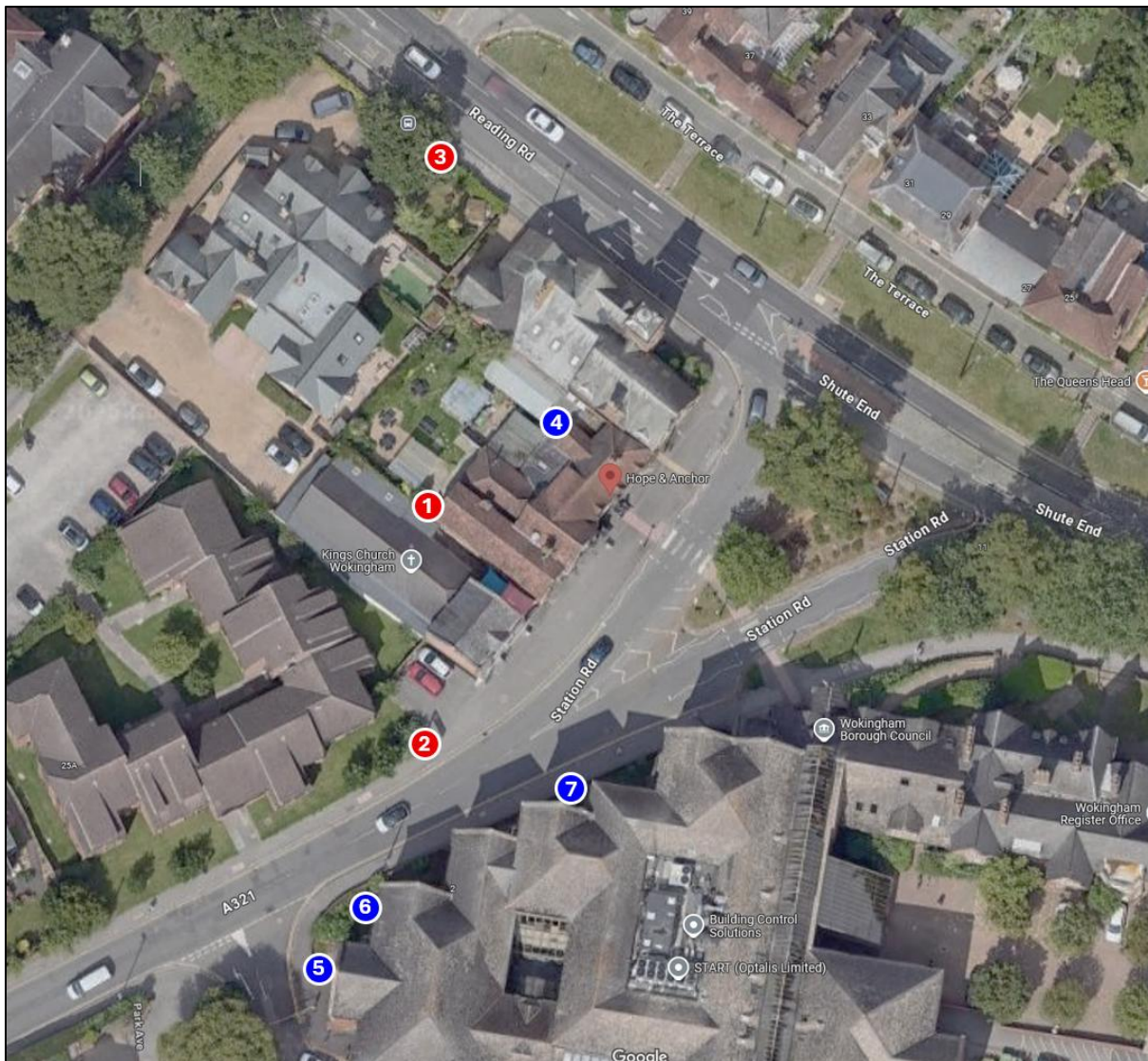


Figure 4 - Noise monitoring locations on site. **Red** receiver positions indicate unattended monitoring and **Blue** positions indicate attended monitoring

- 8.1.2. An additional monitor was also placed above the bar of the Hope and Anchor overlooking the performance area to determine internal levels for the live music event planned on the 7th June 2025. A photograph of the internal monitoring location is given in the appendix. Note this monitoring position is for reference only and the sound pressure level values have not been used in this assessment.
- 8.1.3. The measurement instrumentation used during the survey is detailed in the appendix. The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003⁵ before and after the surveys. The calibration details are also detailed in the appendix.

⁵ BS7445-1:2003 "Description and measurement of environmental noise – Part 1: Guide to quantities and procedures"

8.2. Noise Climate

- 8.2.1. At the rear of the proposed development in the current beer garden, the noise climate on the proposed site was dominated by continuous road traffic noise from Reading Road/Shute end. To the front of the building, the noise climate was also dominated by continuous road traffic noise, but with noticeable contribution from fixed plant associated with the Wokingham Borough Council building.

8.3. Meteorology

- 8.3.1. During the survey the weather information was noted. This is summarised in Table 6.

	5 th June 2025	9 th June 2025
Roads(Wet/Dry)	Wet	Dry
Wind Speed (ms ⁻¹)/Direction	5 / SW	4 / SW

Table 6 - Meteorological data noted during the survey

8.4. Measurement and Timescale

- 8.4.1. Unattended monitoring was carried out between the 5th June 2025 and the 9th June 2025. The measurements that have been made are summarised in Table 7.

Monitoring position	Date	Type	Quantity
1	5 th – 8 th June 2025	Unattended	L _{A90,15min} / L _{Aeq,15min}
2	5 th – 8 th June 2025	Unattended	L _{Aeq,5min}
3	5 th – 8 th June 2025	Unattended	L _{Aeq,5min}
4	9 th June 2025	Attended	L _{Aeq,25ms}
5	9 th June 2025	Attended	L _{Aeq,25ms}
6	9 th June 2025	Attended	L _{Aeq,25ms}
7	9 th June 2025	Attended	L _{Aeq,25ms}

Table 7 – Measurements made at the site of the Proposed Development

- 8.4.2. Sound pressure measurements were subsequently averaged into hourly, daytime and night-time periods. The acoustic measurements and their interpretation have been in accordance with BS 7445: Parts 1, and 2⁶. All sound pressure levels are in dB (re 20μPa).
- 8.4.3. Note that Position 1 includes noise from patrons and general pub operation, but the live music event noise has been removed. The start and end times for live music have been referenced from the internal monitor in the bar. Subsequently, data was removed from 20:45 to 23:30 on 7th June 2025. Graphical representations are given in the appendix.

⁶ BS7445-2:1991 "Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use"

8.5. Results Summary

Average Sound Pressure Levels

8.5.1. The fixed position external measurement results are summarised in Table 8.

Measurement location	Daytime dB, $L_{Aeq,16hr}$	Night-time dB, $L_{Aeq,8hr}$
1	55.5 ¹	51.2 ¹
2	70.0	63.0
3	73.7	66.9
¹ -3dB façade correction applied		

Table 8 - Summary of the external sound pressure levels measured

Background Sound Levels

8.5.2. Figure 5 shows the results of the data analysis in terms of the frequency of occurrence of each data value during the daytime and the night-time respectively.

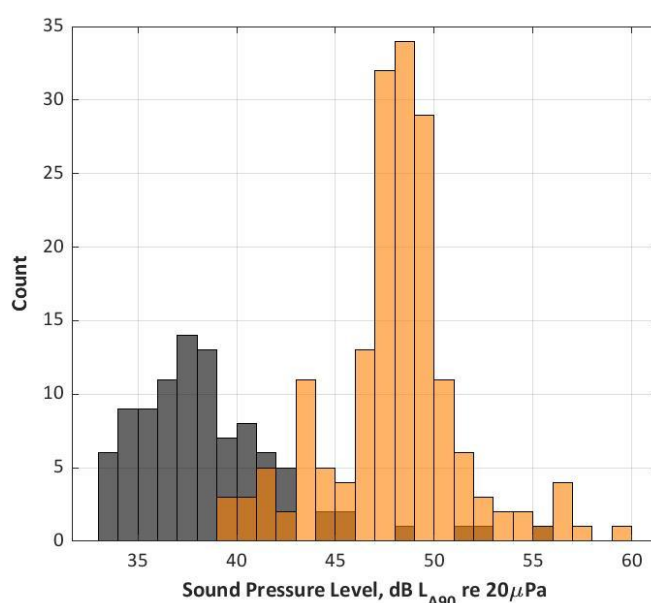


Figure 5 – Distribution of background sound levels during the daytime (07:00-23:00) and during the night-time (23:00-07:00)

8.5.3. As can be seen in Figure 5 the background sound levels ranged between 39dB $L_{A90,15min}$ and 60dB $L_{A90,15min}$ during the daytime period, and between 33dB $L_{A90,15min}$ and 56dB $L_{A90,15min}$ during the night-time period.

8.5.4. The typical background sound level has been taken to be 49dB $L_{A90,15min}$ during the daytime and 38dB $L_{A90,15min}$ for the night-time.

Specific Sound Levels

8.5.5. Short term L_{Aeq} measurements (25ms) were made during the attended surveys for the duration of the reference time interval. The specific events associated with surrounding commercial/industrial businesses were noted, including:

- time of event;
- duration of event;
- description of event; and,
- time-series for subsequent acoustic feature analysis.

- 8.5.6. The measurements of specific sources operating during the survey have been summarised in Table 9. Measurements were taken in the nearfield, during periods of minimal contribution from other sources, and are therefore taken to be the Specific Source Level.

Source	Specific Source Level, dB(A)
Hope & Anchor	
Refrigeration Fixed Plant	61.7
Wokingham Borough Council	
Flue Vent	67.1
Plant Room Vent	59.2
Single AIRBLADE unit	64.7

Table 9 – Summary of the specific sound level measurements

9. 3D Noise Model

- 9.1.1. A 3D noise model has been constructed using SoundPLAN™ in order to predict the propagation of sound across the site of the Proposed Development. The calculation procedure has been used from ISO9613-2:1996⁷ to predict the propagation of sound from source to receiver, taking into account distance, screening, and atmospheric and ground conditions.
- 9.1.2. Data from Google Maps has been used to create the existing roads and buildings. Terrain data has been taken from the Department for Environment Food and Rural Affairs (DEFRA) data services platform.
- 9.1.3. Fences and walls have been included in the model as indicated on plans.

Noise from Transportation Sources

- 9.1.4. Reading Road/Shute End and Station Road have been modelled as line sources and calibrated to the survey data from position 3 and position 2 respectively. Note that the survey data includes noise from all sources.
- 9.1.5. The results of the model have been illustrated in noise contour maps in Figure 6 and Figure 7.



Figure 6 – Noise contour plot showing the propagations of road traffic noise across the site during the daytime

⁷ ISO9613-2:1996 "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation"



Worst Case Location	Daytime dB, $L_{Aeq,16hr}$	Night-time dB, $L_{Aeq,8hr}$
Overlooking Station Road	67.8	60.8

Table 10 - Summary of predicted external sound pressure levels for the development (Transportation Sources)

Noise from Industrial and Commercial Sources

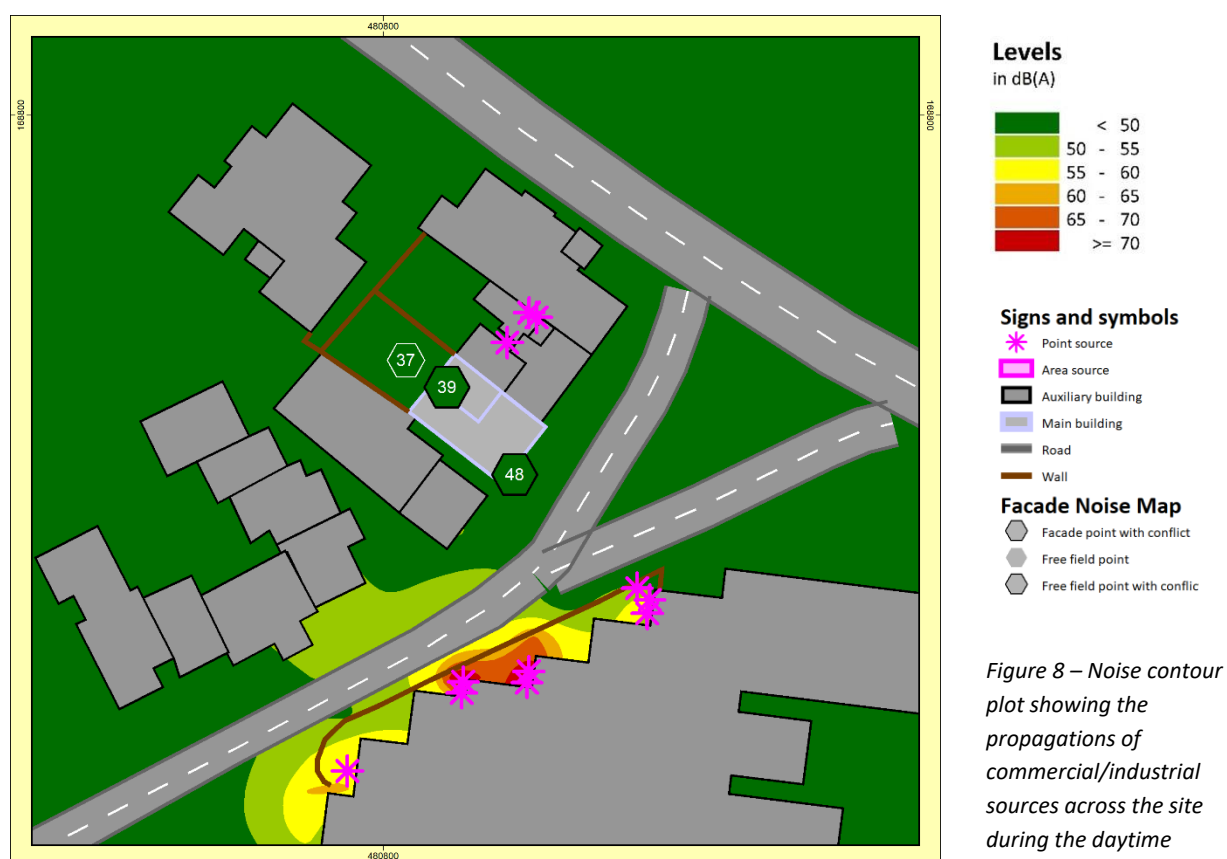
- 9.1.6. Sources have been calibrated to the information given in Table 3.
- 9.1.7. Due to the unconfirmed operating hours to the specific sources, and to account for a worst case scenario, it has been assumed that all sources are running simultaneously during the daytime and night-time periods for the purpose of this assessment.
- 9.1.8. The sources included in the model are summarised in Table 11.

Source	Qty modelled	Type
Hope & Anchor Refrigeration Fixed Plant	1	Point Source
Fujitsu Airstage AJY072LELDH	2	Point Source
AIRBLADE (model unknown)	4	Point Source
Toshiba RAV-SP404AT-E	3	Point Source
Daikin REYQ8U7Y	1	Point Source
Plant Room Extract	4	Individual Area Sources covering louvres
Flue Vent Extract	1	Area source covering louvres

Table 11 – Sources included in the model

- 9.1.9. The acoustic character of the sources is not considered in the model and is discussed in Section 10.

9.1.10. The results of the model showing the propagation of the commercial/industrial sources are illustrated in the noise contour map in Figure 8.



Location	Specific Sound Level
1F bedroom window overlooking Station Road	48
1F bedroom window overlooking rear of Hope & Anchor	39
Private garden area	37

Table 12 - Summary of predicted Specific Sound Levels

Noise from All Sources

9.1.11. A situation has been created to illustrate the total contribution from all sources at the receiver locations.

9.1.12. The results of the model are illustrated in noise contour maps in Figure 9 and Figure 10.



Figure 9 – Noise contour plot showing the propagations of sound across the site during the daytime



Figure 10 – Noise contour plot showing the propagation of sound across the site during the night-time

Worst Case Location	Daytime dB, $L_{Aeq,16hr}$	Night-time dB, $L_{Aeq,8hr}$
Overlooking Station Road	67.8	60.8

Table 13 - Summary of predicted external sound pressure levels (All Sources)

- 9.1.13. The results of the 3D model illustrate that the road traffic noise is the dominant source, and the industrial/commercial sources do not have significant impact on the overall sound pressure levels at the proposed development.

10. BS4142 Assessments

10.1. Rating Level

- 10.1.1. Not all of the commercial sound sources assessed were operating at the time of the attended survey, therefore it is not possible to make an objective or subjective judgment of the specific sound based on the character of the cumulative sound at the receptor. Subjective character corrections have been made based on a combination of site observations and experience of similar items of plant. The adjustments to the specific sound levels for acoustic features have been discussed in the following sections.
- 10.1.2. It has been assumed that all plant could be operational simultaneously during both the daytime and the night-time periods, therefore a single assessment has been carried out which considers a cumulative Specific Source level for all commercial/industrial sources discussed.

Tonality

- 10.1.3. A just perceptible continuous hum was noted outside the proposed development on Station Road in the short gaps in traffic flow. This was attributed to the flue vent on the Wokingham Borough Council building.
- 10.1.4. All other plant which was operational at the time of the survey was considered to be broadband in nature. The items of fixed plant which were not operating are used for heating and cooling which is generally broadband in nature under normal operating conditions. These items are not expected to attract a penalty for tonality.
- 10.1.5. A +2dB penalty for tonality has been applied.

Impulsivity

- 10.1.6. It is not expected that any of the proposed specific sources will generate any impulsive sound under normal operation. No correction for impulsivity has been applied.

Intermittency

- 10.1.7. Although the operating hours of the sources are unspecified, it is generally expected that the type of operation typical of the associated fixed plant would be continuous and is not typically expected to switch on/off multiple times during the reference time period⁸. Most items of heating and cooling plant operating on temperature demand have a ramp up and ramp down process under typical operating conditions, opposed to instant on/off condition, leading to a slower rate of change in sound as equipment approaches its intended operating speed. This type of operation draws less attention than a short, sudden change in sound level.
- 10.1.8. No correction for intermittency has been applied.

⁸ Reference time interval T_r defined in BS4142:2014, 1h 07:00 to 23:00 / 15min 23:00 to 07:00

10.2. Initial Assessments

- 10.2.1. The BS4142 assessment detailed in Table 14 is based on the worst-affected receiver as a 1F bedroom window overlooking Station Road.

	Level, dB	
	Daytime (07:00-23:00)	Night-time (23:00-07:00)
Background sound level , dB $L_{A90,15min}$	49	38
Specific sound level , dB(A)	48	48
Acoustic feature corrections		
Tonality	+2	+2
Impulsivity	0	0
Intermittency	0	0
Rating level		
Specific sound level + corrections	50	50
Initial Estimate		
Rating level – Background sound level	+1	+11
<i>"A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context"</i>		

Table 14 - The assessment procedure from BS4142

- 10.2.2. BS4142 states "Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact".
- 10.2.3. The initial estimate considers the impact on existing background sound levels in the absence of the existing specific source and is not always representative of the impact on the receiver directly. Where the initial estimate of the impact needs to be modified due to context, other factors should be considered, including: absolute sound levels, any barriers or acoustic screening, the character and level of the residual sound and the sensitivity of the receiver, which includes the effect of building façade sound insulation.
- 10.2.4. A BS4142 assessment for the private amenity area is detailed in Table 15.

	Level, dB
	Daytime (07:00-23:00)
Background sound level , dB $L_{A90,15min}$	49
Specific sound level , dB(A)	37
Acoustic feature corrections	
Tonality	+2
Impulsivity	0
Intermittency	0
Rating level	
Specific sound level + corrections	39
Initial Estimate	
Rating level – Background sound level	-10
<i>"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"</i>	

Table 15 - The assessment procedure from BS4142

10.3. Context

- 10.3.1. In this situation, the new residential receivers are being introduced close to existing commercial/industrial sources. The impact of the industrial/commercial sound is likely to be significantly reduced compared to the situation where new sound sources are being introduced close to existing residential receivers.
- 10.3.2. The results of the 3D noise model show that the road traffic noise remains the dominant source. Despite a significant adverse impact during the night-time, the actual contribution of the commercial sources can be considered insignificant compared to the road traffic noise.
- 10.3.3. Whilst the numerical outcome predicts a significant adverse impact during the night-time, it is expected that receivers are located indoors at this time and will be afforded some level of mitigation from façade sound insulation, even when windows are partially open. The amount of sound reduction is outside the scope of this assessment, but in general terms this should be considered as a downward modification of the initial rating level estimate to address the outside to inside level difference.
- 10.3.4. Mitigation treatment for the new receivers is within the scope of the developer to allow reasonable internal ambient sound pressure level criteria to be achieved in habitable rooms, i.e. bedrooms and living rooms.

11. Mitigation

11.1. Methodology

- 11.1.1. Based on the measured and predicted free-field sound pressure levels at the worst affected facades, the simple calculation method from BS8233:2014 has been used to determine the necessary sound reduction to meet the guideline values. Standard forms of construction are assumed such that the glazing is likely to be the lowest performing facade element.
- 11.1.2. In this case, since road traffic noise is dominant, the mitigation specification is sufficient for all sources considered in this assessment.

11.2. Required Mitigation

- 11.2.1. The single figure glazing and ventilator performance requirements in order to achieve the internal design criteria are summarised in Table 16. The glazing performance has been specified in terms of the road traffic corrected weighted sound reduction index, $R_w + C_{tr}$, and the ventilator performance has been specified in terms of the road traffic corrected element normalised level difference $D_{ne,w} + C_{tr}$.
- 11.2.2. In this case the bedroom specification during the night-time is dictated by the night-time $L_{Aeq,T}$ measured at monitor position 1, rather than the predicted night-time level.

	Living rooms	Bedrooms
	Specification 1	
Glazing Performance	27dB $R_w + C_{tr}$	27dB $R_w + C_{tr}$
Ventilator Performance	33dB $D_{ne,w} + C_{tr}$	33dB $D_{ne,w} + C_{tr}$
	Specification 2	
Glazing Performance	33dB $R_w + C_{tr}$	33dB $R_w + C_{tr}$
Ventilator Performance	39dB $D_{ne,w} + C_{tr}$	39dB $D_{ne,w} + C_{tr}$

Table 16 – Required facade sound insulation (Glazing & Ventilator)

- 11.2.3. It is generally expected that standard thermal double glazing can achieve performance of 26-27dB $R_w + C_{tr}$.
- 11.2.4. A glazing markup plan showing where these specifications apply has been provided in the appendix.

11.3. Recommended Glazing Specifications

- 11.3.1. The glazing performance has been specified based on the performance data provided by Saint-Gobain. These are suggested configurations and any other glazing and vent combination can be used provided it achieves the minimum performance levels given in Table 16. The recommended glazing specification is given in Table 17.

Living rooms	Bedrooms
Specification 1	
Saint Gobain 4(12)4	Saint Gobain 4(12)4
Specification 2	
Saint Gobain 4(6)10	Saint Gobain 4(6)10

Table 17 - Our recommended glazing configurations

- 11.3.2. Should penetrations be required for ventilation purposes the ventilator performance ($D_{ne,w} + C_{tr}$) is calculated to work in conjunction with the above glazing specifications. It should be checked by a suitably

qualified person the ventilator specification meets the requirements of Approved Document F. It should be noted that any vent or total combination of vents should be specified to achieve the ventilator performances given in Table 16.

- 11.3.3. Given the assumptions in this method the information in this section should be treated as general guidance only. The acoustic performance of third party products cannot be guaranteed by noise.co.uk.
- 11.3.4. It should be noted that, in order to meet the internal ambient noise criteria in these areas, the windows may need to remain closed. This does not mean that windows should be fixed shut, and they should be openable at the discretion of the occupant.

11.4. External Amenity Area Noise Assessment

- 11.4.1. BS8223 states that it is desirable that the external noise level for amenity spaces, such as gardens and patios, does not exceed 50dB $L_{Aeq,T}$ with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments.
- 11.4.2. However, the standard acknowledges that there may be areas where development is desirable where these guideline values are not achievable. This will be true for higher noise areas such as city centres or urban areas adjoining the strategic transport network. In these situations, a compromise between elevated noise levels and other factors might be warranted, such as:
- the convenience of living in these locations; and/or,
 - making efficient use of land resources to ensure development needs can be met.
- 11.4.3. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.
- 11.4.4. Figure 9, Section 9 considers noise from all sources and illustrates that the private garden areas is predicted to achieve the guideline criteria, falling into the 50-55dB $L_{Aeq,T}$ range.
- 11.4.5. Fences have been included in the model, assuming that any fences that border residential private gardens are close boarded with no gaps between the panels and the ground or panels and the posts and have a minimum wooden panel mass of 10Kg/m² to optimise their barrier performance. In practice, this can generally be achieved with a basic, wooden, standard close boarded fence constructed of 19mm thick treated pine.⁹

11.5. Internal Sound Insulation

- 11.5.1. In addition to controlling exterior noise, sound from adjacent spaces can affect the intended use of a space, depending on the noise activity, noise sensitivity and privacy requirement.
- 11.5.2. Plans indicate a section of new party wall between the Hope & Anchor bar, and the WC/Entrance Hall/Stairs of the proposed dwelling. The receive room can considered part of a circulation space within the dwelling with a low sensitivity and low privacy requirement.
- 11.5.3. The matrix in Table 3 in BS8233:2014 has been used to determine an example specification for on-site sound insulation between these spaces of 47dB $D_{nT,w}$.
- 11.5.4. It should be ensured that any existing separating walls meet the appropriate sound insulation specification set out in building regulations Approved Document E.

⁹ Based on the density of treated pine at 550Kg/m³

12. Conclusions

- 12.1.1. An environmental noise assessment has been carried out at the site of a proposed residential development at Hope and Anchor, Station Road, Wokingham to determine typical ambient sound levels. The sound levels have been used to calculate the required facade sound insulation to meet the guideline internal levels from BS8233:2014.
- 12.1.2. A numerical BS4142 assessment shows that the specific sound is likely to have a low impact on the proposed new residential receivers during the daytime; and that the specific sound is likely to have a significant adverse impact on proposed new residential receivers during the night-time.
- 12.1.3. It is important to consider the context of the assessment as there are several contextual factors which support a downward modification of the estimated numerical assessment, particularly during the night-time. The contribution of the commercial/industrial noise is not significant compared to the dominant source which is road traffic noise.
- 12.1.4. In this context the new residential receivers are being introduced close to existing commercial/industrial sources. This is likely to result in reduced impact when compared to the situation where new sources are being introduced close to existing residential receivers. In this situation, facade sound insulation is within the development.
- 12.1.5. Table 16 in section 11 gives the required facade sound reduction by any glazing and ventilator combination to be compliant with internal guideline values.
- 12.1.6. It should be ensured that existing walls which are proposed to form separating walls meet the appropriate sound insulation specification set out in building regulation Approved Document E.
- 12.1.7. There is a proposed new separating wall on the ground floor between the bar and the entrance hall of the proposed dwelling. The matrix in Table 3 in BS8233:2014 has been used to determine a specification for on-site sound insulation of 47dB $D_{nT,w}$.
- 12.1.8. We strongly recommend that this report be passed to the local planning authority for approval prior to any works being carried out.

13. Appendix

APPENDIX A: Summary Information

Required ISO Test Report Information (cross referenced where required)			
		Measurements carried out to:	Analysed to:
A	Standards	BS 7445-1: 2003 BS 7445-2: 1991 BS4142:2014	BS 8233:2014 BS4142:2014
B	Organisation performed the measurements	noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name of Client	W H Brakspear & Sons Ltd	
D	Full site address	Hope & Anchor Station Road Wokingham	
E	Date of surveys	Survey Dates: 5 th June 2025 – 9 th June 2025	
F	Description & identification of Proposed Development	It is proposed to develop the site for residential use.	
G	Brief Description of details of Procedure & equipment	See Section 5 of this report.	

APPENDIX B: Technical Appendix

13.1.1. Measurements were made using the following equipment:

Monitoring Position	Sound Level Meter (Serial Number)	Calibrator (Serial Number)
1	SoftdB Piccolo 2 (PO219092301)	BSWA CA114 (590010)
2	SoftdB Piccolo 2 (PO221070108)	BSWA CA114 (590010)
3	SoftdB Piccolo 2 (PO221070106)	BSWA CA114 (590010)
4/5/6/7	Norsoinc 140 (1407446)	Norsonic 1251 (33767)

13.1.2. The equipment has traceable calibration. The sound level meter was calibrated immediately prior to and immediately after the measurements were carried out.

Sound Level Meter	Before	After
SoftdB Piccolo 2 (PO219092301)	94.0 dB	93.9 dB
SoftdB Piccolo 2 (PO221070108)	94.0 dB	94.3 dB
SoftdB Piccolo 2 (PO221070106)	94.0 dB	94.3 dB
Norsoinc 140 (1407446)	114.0 dB	114.0 dB

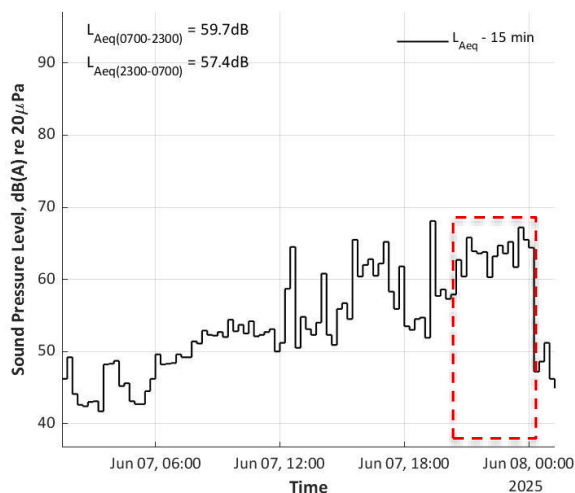
13.1.3. There was no adverse deviation.

APPENDIX C: Raw Data

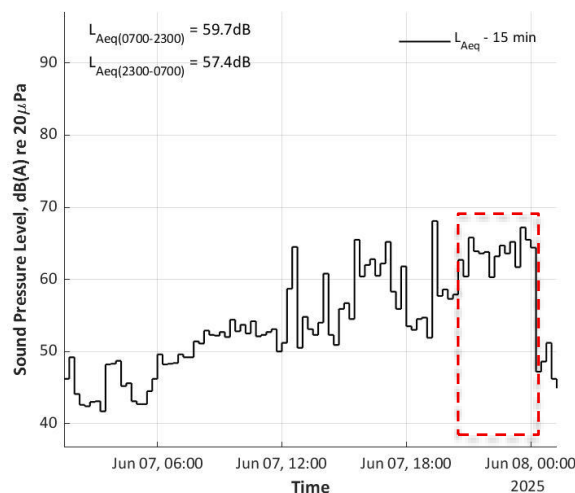
Position 1

Data removed from live music event. Times 20:45 to 23:30 correlated with internal monitoring position

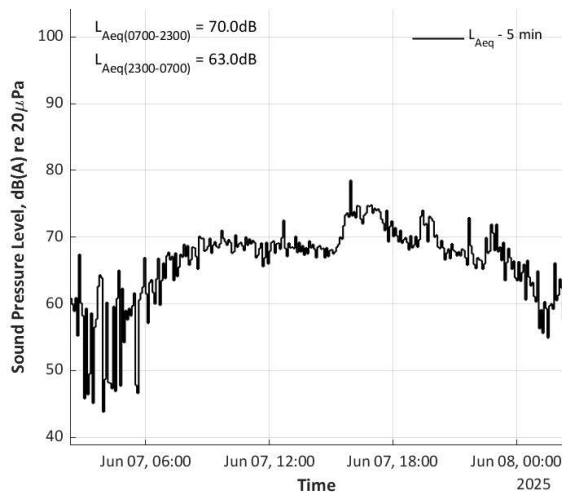
Daytime



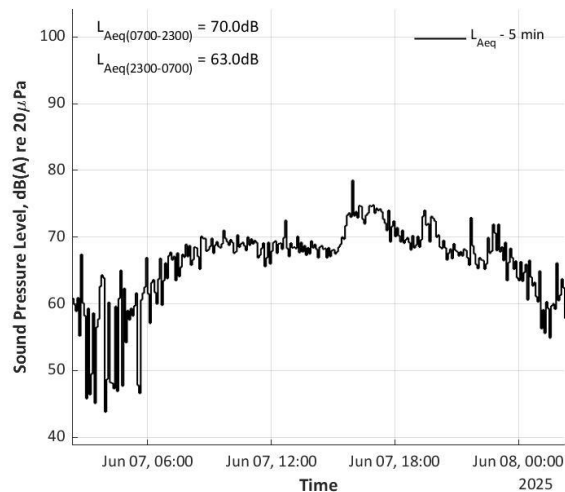
Night-time

Position 2

Daytime



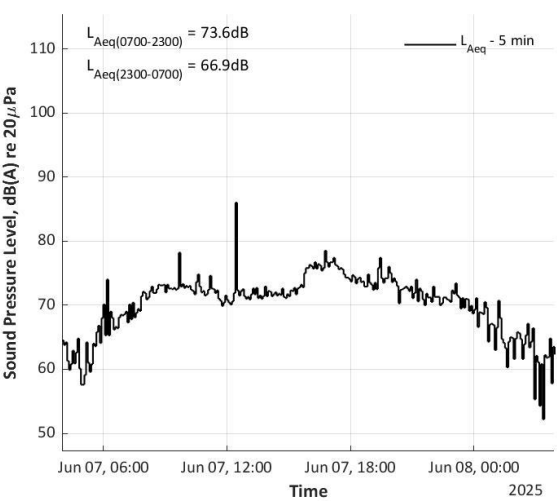
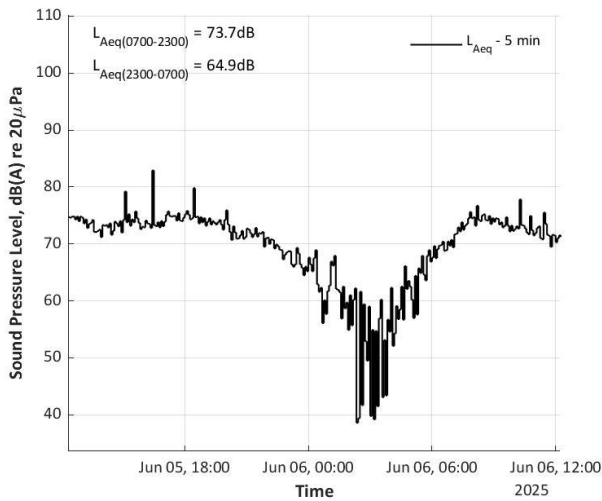
Night-time



Position 3

Daytime

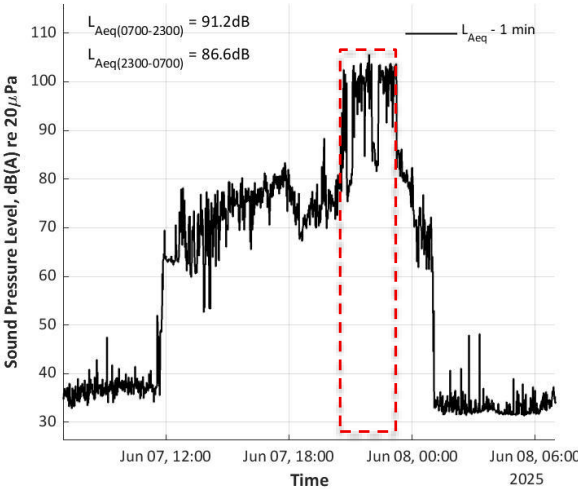
Night-time



Internal Monitor Position

Data removed from live music event. Times 20:45 to 23:30 correlated with internal monitoring position

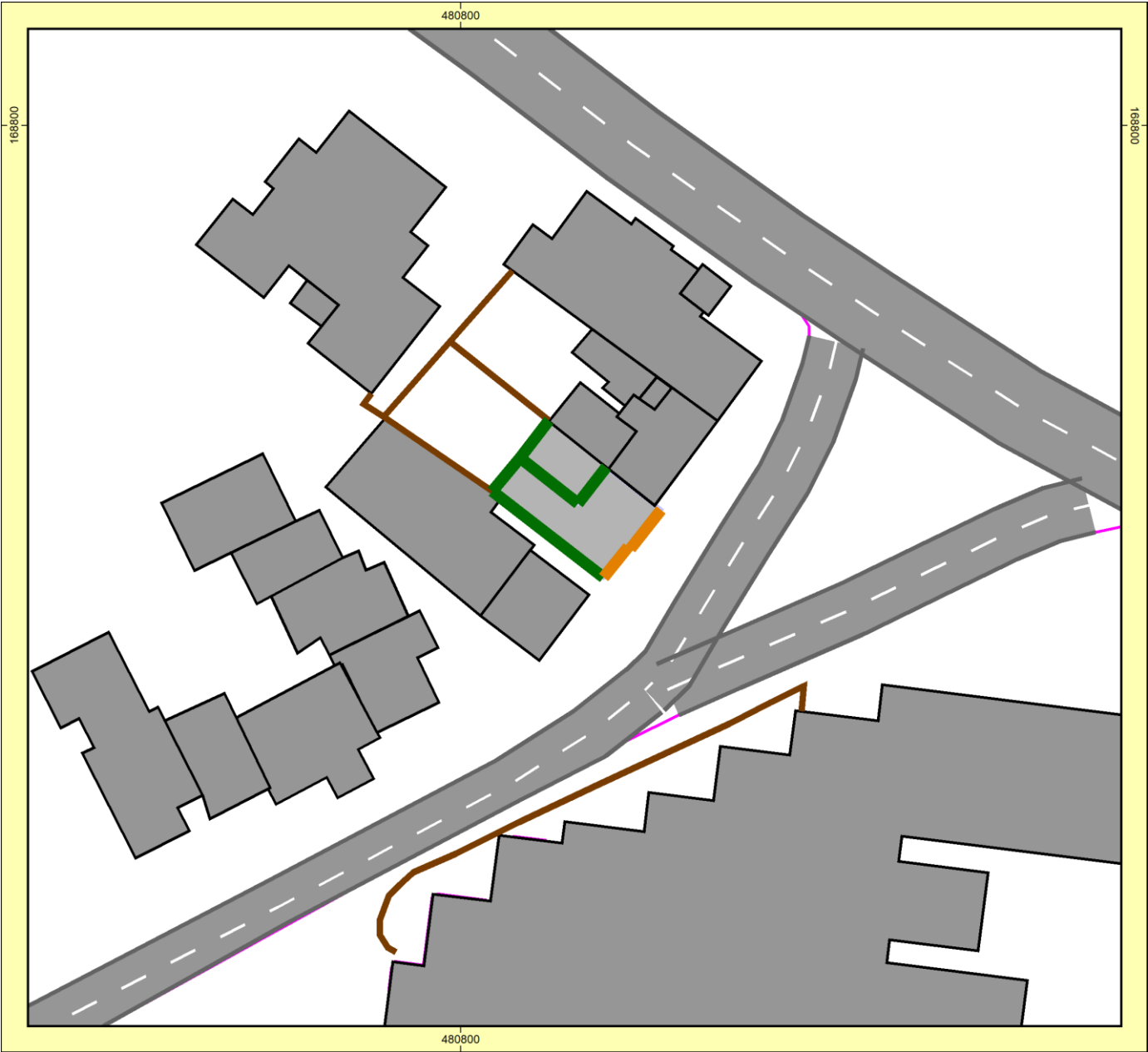
24hr 7th June 2025 to 8th June 2025 07:00-07:00



APENDIX D: Internal Monitor Location



APPENDIX E: Glazing Markup Plan



	Living rooms	Bedrooms
	Specification 1	
Glazing Performance	27dB $R_w + C_{tr}$	27dB $R_w + C_{tr}$
Ventilator Performance	33dB $D_{ne,w} + C_{tr}$	33dB $D_{ne,w} + C_{tr}$
	Specification 2	
Glazing Performance	33dB $R_w + C_{tr}$	33dB $R_w + C_{tr}$
Ventilator Performance	39dB $D_{ne,w} + C_{tr}$	39dB $D_{ne,w} + C_{tr}$