



Acoustic Survey and Assessment for Proposed residential dwelling at Twin Brook Barn, Upbrooks, Clitheroe, BB7 1PL.

Prepared for:

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1. Introduction

- 1.1. Martin Environmental Solutions has been commissioned to undertake an acoustic survey and assessment to support a planning application for a new residential property on land at Twin Brook Barn, Up brooks, Clitheroe, BB7 1PL.

Site Location and Context

- 1.2. The development site is situated to the north of Up brooks, sandwiched between Up brooks and Twin Brook Road. An 2m high solid barrier fence is located along the northern and western boundaries. The existing residential property is located to the south of the development site. To the east and west are existing industrial sites. The site to the east consists of a number of small modern industrial units, with rear blank facades along the boundary of the site. The site to the west is an open air vehicle storage site. To the north beyond the road a large historic distribution centre.
- 1.3. An aerial photograph is enclosed in Figure 1, together with a proposed layout drawing in Figure 2.
- 1.4. The report has been produced to clarify the potential impact on the proposed development and to identify mitigation measures if required to ensure the development is appropriate in terms of noise impact.



2. Policy and Guidance

- 2.1. The impact of noise can be a material consideration in the determination of planning applications. The planning system has the task of guiding development to the most appropriate locations. It is recognised that on occasions it will be difficult to reconcile some land uses, such as housing, hospitals, or schools, with other activities that generate high levels of noise. However, the planning system is tasked to ensure that, wherever practicable, noise-sensitive developments are separated from major sources of noise (such as road, rail and air transport and certain types of industrial development).
- 2.2. The Government's publication of the National Planning Policy Framework (NPPF), updated in August 2026, states that planning policies and decisions should prevent new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of noise pollution, paragraph National Decision Making Policies P3 – living conditions, para 2.
- 2.3. The document goes further by stating planning policies and decisions should ensure that new development is appropriate for its location ... in doing so they should *"mitigate and reduce to a minimum potential adverse impacts from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life"*. The NPPF makes direct reference to the Government published Noise Policy Statement for England (NPSE).
- 2.4. The NPSE sets out the long-term vision of the government's policy on noise, which 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."*
- 2.5. Its guiding principles include "Using Sound Science Responsibly – Ensuring policy is developed and implemented on the basis of strong scientific evidence, whilst taking into account scientific uncertainty (through the precautionary principle) as well as public attitudes and values."
- 2.6. The NPSE's long-term vision is supported by three aims:
 - Avoid significant adverse impacts on health and quality of life; and,
 - Mitigate and minimise adverse impacts on health and quality of life; and,



- Where possible, contribute to the improvements of health and quality of life.

2.7. The NPSE provides further guidance on “significant adverse effects” and “adverse effects” and introduces the following terms, which have been used within toxicological studies for years.

NOEL – No Observed Effect Level; this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

LOAEL – Lowest Observed Adverse Effect Level; this is the level of noise exposure above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level; this is the level of noise exposure above which significant adverse effects on health and quality of life occur.

2.8. The use of the word Observed is important, a change in behaviour, e.g. closing windows, turning up TVs or physical change, e.g. being woken up must be observed, and not simply being able to hear a sound.

2.9. The NPSE recognises that it is not possible to have single objective noise-based measures which define the SOAEL, LOAEL and NOEL that are applicable to all sources of noise in all situations. The levels are likely to be different for different noise sources, receptors and at different times of the day.

2.10. The Planning Practice Guidance on Noise, July 2019 (PPG – N) provides further guidance on the consideration of noise as part of the planning process and highlights that plan-making and decision-making need to take account of the acoustic environment and consider;

- Whether or not a significant adverse effect is occurring or likely to occur
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether a good standard of amenity can be achieved.

The guidance adopts the same concepts of adverse effect level, found within the NPSE.



2.11. The PPG -N document provides the following noise exposure hierarchy;

TABLE 2.1 NOISE EXPOSURE HIERARCHY

PERCEPTION	EXAMPLES OF OUTCOMES	INCREASING 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	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, or having to close windows for some of the time because of the noise where there is no alternative ventilation. 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, having to keep windows closed most of the time because of the noise where there is no alternative ventilation. 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 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 (auditory and non-auditory).	Unacceptable adverse effect	Prevent

2.12. One therefore needs to determine what level represents SOAEL in a given situation, so that it can be avoided and mitigated against. While the NPSE and PPG-N identify that no single level of sound can be provided which determines an adverse impact from noise. many local authorities have identified sound level criteria in accordance with the World Health Organisation's recommended levels, mirrored in BS8233:2014.



- 2.13. The World Health Organisation (WHO) “Guidelines for the prevention of Community Noise Annoyance” provides guidance on internal and external sound levels that are likely to result in community annoyance. These are mirrored within BS8233:2014. ‘Guidance on sound insulation and noise reduction for buildings – Code of Practice’
- 2.14. The WHO recommended noise levels are based on sound scientific research principles on when observed effects are reached as required by the NPPF.
- 2.15. The WHO guidance identifies that for outdoor amenity areas (gardens) sound levels should not exceed 55dB(A) $L_{Aeq,16hr}$ in order to avoid ‘Serious Community Annoyance’ or 50dB(A) $L_{Aeq,16hr}$ to avoid ‘Moderate Community Annoyance’ during the day. For internal levels the WHO set 35dB(A) $L_{Aeq,16hr}$ during the day to prevent Moderate Annoyance and 30 dB(A) $L_{Aeq,8hr}$ in bedrooms at night to prevent sleep disturbance.
- 2.16. The WHO guidance also recommends that maximum sound levels at night should not regularly exceed 45dB(A) within bedrooms to prevent sleep disturbance. Regularly is considered to be more than 10 times during any 8-hour night-time period.
- 2.17. The hours of 07:00 – 23:00 representing day-time and 23:00 -07:00 night-time periods.
- 2.18. BS 8233:2014 also specifies desirable noise levels to be achieved inside dwellings. The daytime period suggests internal noise levels of 35dB $L_{Aeq,16hr}$, for resting in living rooms and bedrooms while for night-time a level of 30dB $L_{Aeq,8hr}$ is recommended. Slightly higher levels are recommended for dining room areas at 40dB $L_{Aeq,16hr}$. The criteria for external areas mirrors that within the WHO guidance.
- 2.19. The WHO/BS8233 guidelines therefore suggest sound levels above 55dB(A) externally would result in a significant adverse impact (SOAEL), between 50-55dB(A) as a moderate annoyance or LOAEL and therefore below 50dB(A) as NOEL.
- 2.20. Internally the guidance recommended levels of 35dB(A) during the daytime to avoid moderate annoyance and 30dB(A) at night-time to prevent sleep disturbance (LOAEL). Thus, levels below these would equate to NOEL.



- 2.21. Based on the 15dB reduction for an open window cited within both the WHO and BS8233 guidance documents and the cited external and internal recommended sound levels, LOAEL would be observed between 35-40dB $L_{Aeq,16hr}$ day and 30-35dB $L_{Aeq,8hr}$ night. While SOAEL levels would be above these values.
- 2.22. Councils typically use the 35dB day/30dB night as internal criteria when assessing the impact on and from developments as part of the planning process, along with the night-time maximum 45dB L_{Amax} level within bedrooms.

BS4142:2014+A1:2019

- 2.23. Another commonly used standard is British Standard 4142:2014+A1:2019 'Method for rating industrial and commercial sound' compares the sound predicted by the source in question against the background, L_{A90} sound levels. This standard aims at addressing the impact from industrial and commercial activities, taking into account the subjective nature of sound and potential short term activities.
- 2.24. The methodology requires the "residual sound", the ambient sound level when the specific sound source is suppressed or absent, expressed as an $L_{Aeq,t}$ measurement, to be then subtracted from the "ambient sound level", the overall sound level present including the specific source sound, measured as L_{Aeq} measurement. This results in a value for the specific or "problem" sound.
- 2.25. If the "specific" sound is tonal, such as whine or hum, or if it is impulsive such as bangs or clatters or if it is intermittent or irregular enough to attract attention a correction is added to the "specific level" to produce a "rating level". The "rating level" is then compared to the measured "background" L_{A90} sound level.
- 2.26. If the "rating level" exceeds the "background" by around 10dB(A) or more this "indicates a significant adverse impact". A difference of around 5dB(A) 'indicates an adverse impact'. The lower the commercial noise level is, the lower the likely impact.

ProPG : Planning & Noise : 2017



- 2.27. The primary goal of this guidance is to assist the delivery of sustainable development by promoting good health and well-being through the effective management of noise.
- 2.28. 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. It is applicable to noise from existing transport sources (noting that good professional practice should have regard to any reasonably foreseeable changes in existing and/or new sources of noise).
- 2.29. The recommended approach is also considered suitable where some industrial or commercial noise contributes to the acoustic environment provided that is “not dominant”.
- 2.30. This ProPG advocates a systematic, proportionate, risk based, two-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. The two sequential stages of the overall approach are:
- Stage 1 – an initial noise risk assessment of the proposed development site; and
 - Stage 2 – a systematic consideration of four key elements.
- 2.31. The four key elements to be undertaken in parallel during Stage 2 of the recommended approach are:
- Element 1 – demonstrating a “Good Acoustic Design Process”;
 - Element 2 – observing internal “Noise Level Guidelines”;
 - Element 3 – undertaking an “External Amenity Area Noise Assessment”; and
 - Element 4 – consideration of “Other Relevant Issues”.
- The ProPG considers suitable guidance on internal noise levels found in “BS8233:2014: Guidance on sound insulation and noise reduction for buildings”.



2.32. Based on the above guidance and given the development being considered the following criterion have been identified:

Location	07:00 to 23:00	23:00 to 07:00
External Garden Amenity Areas	50dB $L_{Aeq,16hr}$	-
Living rooms (e.g. Lounges)	35dB $L_{Aeq,16hr}$	-
Bedrooms	35dB $L_{Aeq,16hr}$	30dB $L_{Aeq,8hr}$
Dining rooms	40dB $L_{Aeq,16hr}$	-
Night-time L_{AMax}	-	45dB L_{AMax}
BS4142:2014 Rating Level		
External Garden Amenity Areas	Rating level < background L_{A90}	
Living rooms	35dB $L_{Aeq,16hr}$	-
Bedrooms	35dB $L_{Aeq,16hr}$	30dB $L_{Aeq,8hr}$



3. The Assessment

The development

- 3.1 The proposed development consists of a new single storey residential property on land adjacent to the existing one. The applicant and current occupant of the existing dwelling is seeking a new smaller property to which the family can downsize approaching retirement.
- 3.2 Figure 2 below provides an overview of the proposed development.

Existing Situation.

- 3.3 In order to obtain representative background sound levels for the area on site monitoring was undertaken over the 10th-12th September 2025.
- 3.4 A Cirrus Optimus Green sound level meter was utilised for the monitoring. The meter was placed at a height of ~1.3m in the centre of the site and away from reflecting surfaces.
- 3.5 The meter was field-calibrated at the start and end of the monitoring period with no significant variation and full laboratory calibration certificates are available on request.
- 3.6 The weather during the monitoring was wet on set up and collection but warm and dry for the main full 24hour period of the 11th with little wind <5m/s.
- 3.7 The full results are shown in Appendix A, with a summary in the tables below.

Start Time	End Time	Duration	L _{Aeq}	L _{A90}	L _{AMax}
10/09/2026 18:00	10/09/2026 23:00	04:59:59	42.5	36.2	63.3
10/09/2026 23:00	11/09/2026 07:00	08:00:00	40.2	32.3	63.5
11/09/2026 07:00	11/09/2026 23:00	16:00:00	48.3	36.8	81.6
11/09/2026 23:00	12/09/2026 07:00	08:00:00	39.6	34.2	71.8
12/09/2026 07:00	12/09/2026 10:00	03:00:00	45.1	40.0	64.0

- 3.8 Background sound levels were dominated by passing traffic and bird song with night-time maximum sound levels not regularly exceeded identified at 67.8dB(A). No specific industrial sounds were identified from the recordings made.



Potential Impact

3.9 Given a 15dB attenuation¹ for an open window the sound levels to be experienced by the future occupants are below those identified within the guidance documents detailed in section 2 of the report. as such there will be No Observed Effect on the future occupants and no further mitigation measures are required and the use of standard openable windows will be adequate to protect the future occupants from the prevailing sound levels.

BS4142:2014+A1:2019

3.10 As mentioned above a review of the sound recordings made at the time has not identified any industrial noise on which to undertaken a BS4142 assessment. It is therefore not possible to identify any industrial or commercial sources of sound on which to base such an assessment, with identified sound levels below the guideline levels.

External Amenity Areas

3.11 For the external garden amenity areas to the rear and south of the building the identified sound levels are below the guidance criteria of 50dB(A) and as such no measures are required.

¹ BS8233: 2014; Guidance on sound insulation and noise reduction for buildings



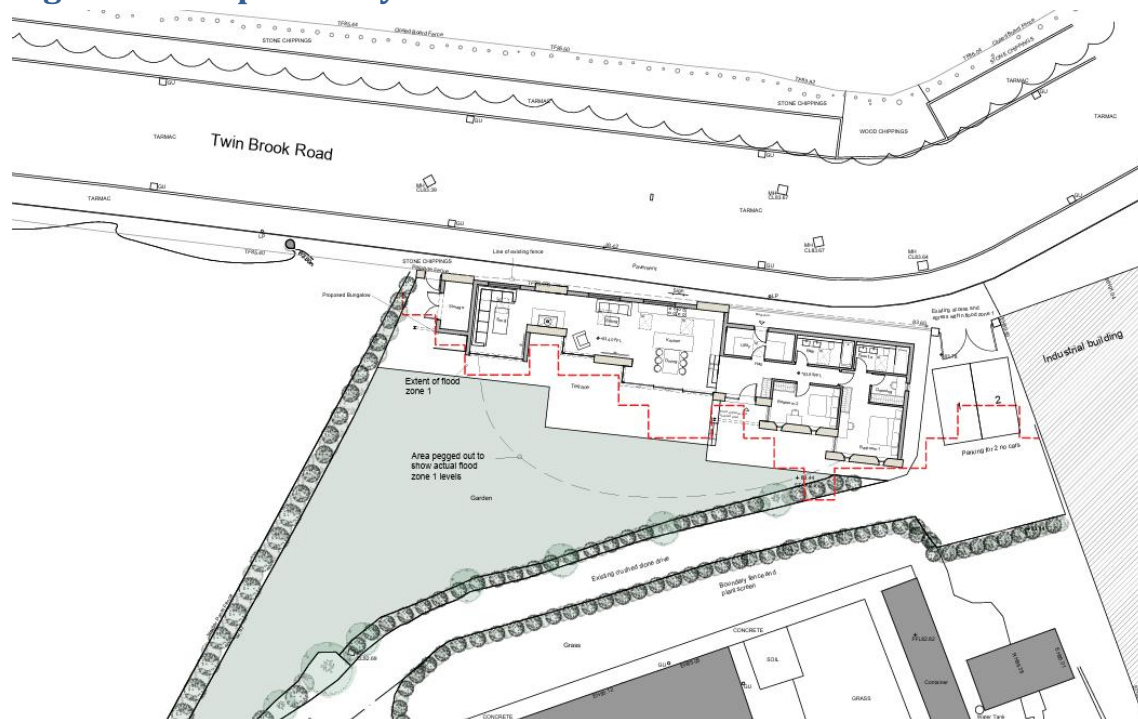
4. Conclusion

- 4.1. On-site monitoring has identified existing background sound levels, these are no excessive and are below the identified criteria to ensure no adverse impact is experienced by the future occupants.
- 4.2. The development ensure that the internal and external sound levels are acceptable and will result in a No Observed Effect Level (NOEL) on the future residents in line with the Noise Policy Statement for England. Thus, the development will achieve the aims of the NPSE by avoiding any significant adverse or adverse impacts on health or quality of life.
- 4.3. In terms of the PPG-N guidance the development achieves the aims of ensuring no significant adverse or adverse effect will occur at the development and a good standard of amenity is achieved.
- 4.4. As such the development will meet the objectives of the National Planning Policy Framework in ensuring that no significant adverse impact is experienced by the future residents. The development is therefore considered to be acceptable in terms of noise.

Figure 1 – Aerial Photograph



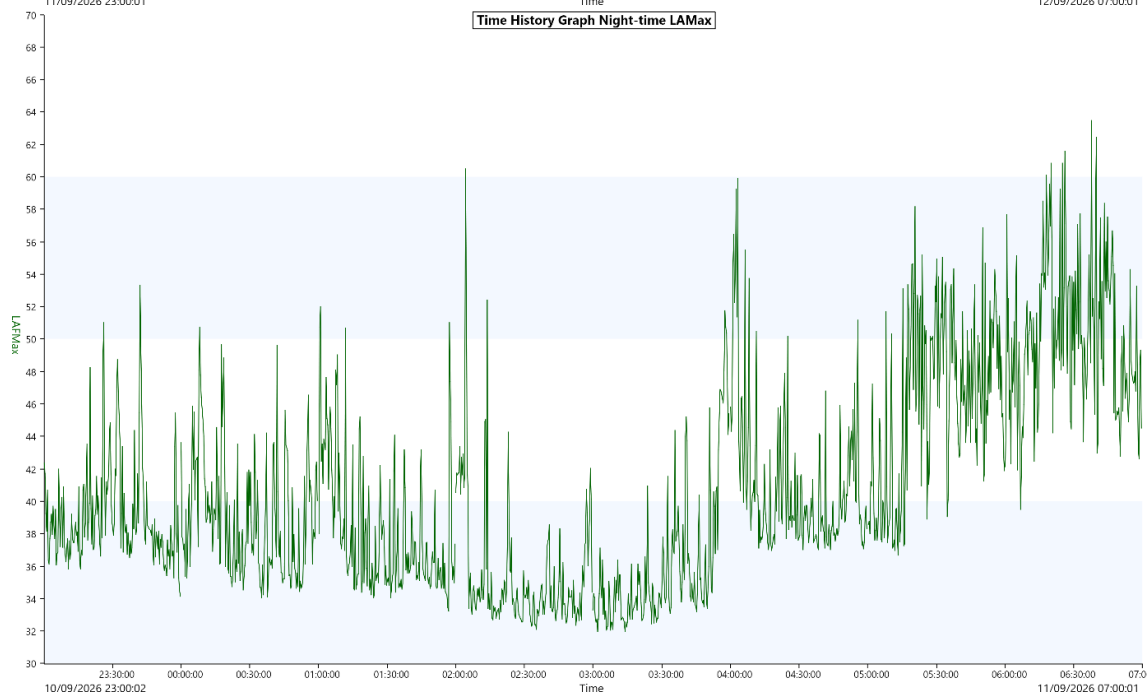
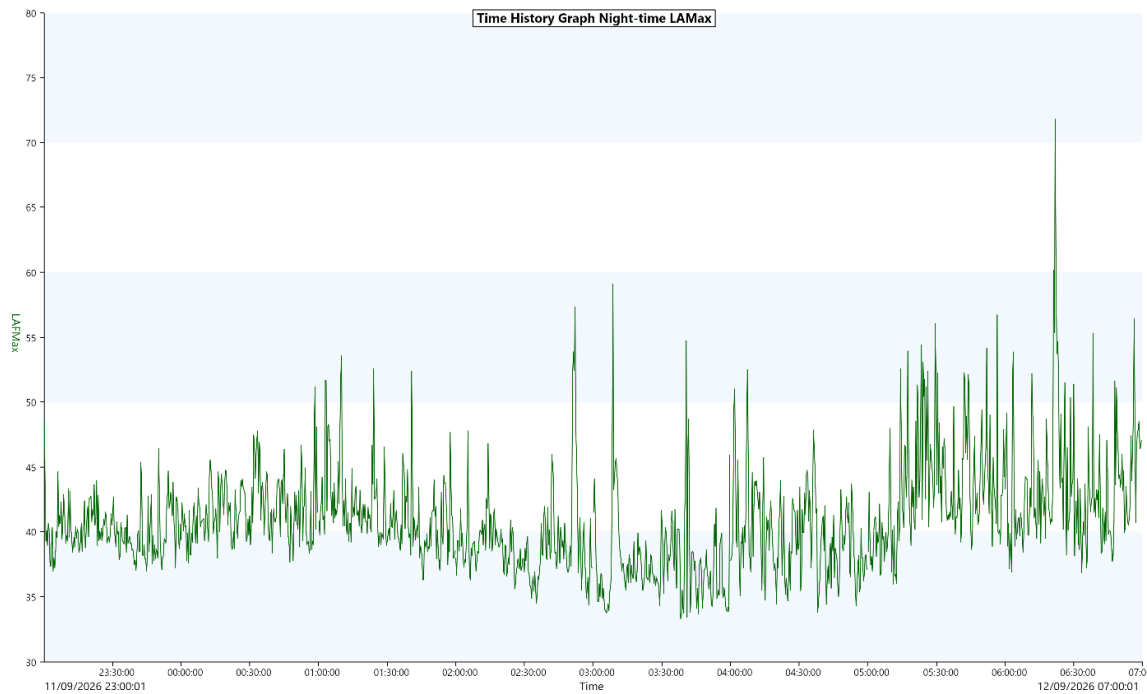
Figure 2 – Proposed Layout Plan





Appendix A – Full Monitoring Results

Time	L _{Aeq} (dB)	L _{AMax} (dB)	L _{A90} (dB)
12/09/2026 09:00	46.7	60.1	43.3
12/09/2026 08:00	44.6	64.0	40.9
12/09/2026 07:00	43.3	60.2	38.7
12/09/2026 06:00	43.6	71.8	35.7
12/09/2026 05:00	40.6	56.7	35.3
12/09/2026 04:00	37.2	52.5	33.1
12/09/2026 03:00	36.4	59.1	32.9
12/09/2026 02:00	37.8	57.3	34.3
12/09/2026 01:00	39.2	53.5	36.3
12/09/2026 00:00	39.3	51.2	36.7
11/09/2026 23:00	37.9	48.7	36.1
11/09/2026 22:00	37.8	50.8	35.8
11/09/2026 21:00	38.9	56.3	34.9
11/09/2026 20:00	39.8	62.4	36.8
11/09/2026 19:00	44.1	65.9	35.9
11/09/2026 18:00	43.2	59.1	35.7
11/09/2026 17:00	43.2	62.6	36.3
11/09/2026 16:00	47.6	63.2	39.6
11/09/2026 15:00	47.7	64.2	39.4
11/09/2026 14:00	51.8	70.2	44.3
11/09/2026 13:00	49.9	64.0	42.1
11/09/2026 12:00	46.7	61.3	40.7
11/09/2026 11:00	49.6	69.4	42.8
11/09/2026 10:00	45.6	63.3	39.3
11/09/2026 09:00	49.2	67.8	38.8
11/09/2026 08:00	54.5	81.6	40.1
11/09/2026 07:00	49.2	70.8	40.6
11/09/2026 06:00	44.9	63.5	39.7
11/09/2026 05:00	43.4	58.2	36.1
11/09/2026 04:00	40.7	59.9	35.7
11/09/2026 03:00	36.3	51.8	31.5
11/09/2026 02:00	34.9	60.5	31.7
11/09/2026 01:00	35.8	52.0	33.2
11/09/2026 00:00	36.0	50.7	33.4
10/09/2026 23:00	37.0	53.3	34.2
10/09/2026 22:00	38.5	56.9	34.7
10/09/2026 21:00	39.3	52.9	36.5
10/09/2026 20:00	42.5	63.3	37.6
10/09/2026 19:00	43.8	59.3	40.2
10/09/2026 18:00	45.1	58.4	42.1





Appendix B – Acoustic Terminology

Descriptor	Explanation
dB (decibel)	The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of 2×10^{-5} Pascals) and the threshold of pain is around 120 dB.
dB(A) – A-weighting	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
L_{Amax}	A noise level index defined as the maximum noise level. L_{Amax} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{A10} and L_{90}	A noise level index. The noise level exceeded for percentage of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
$R + R_w$	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. The higher the value, the greater the sound insulation, and the more onerous the requirement.
D_{nTw}	Weighted standardized level difference. Single-number quantity that characterizes the airborne sound insulation between rooms. Specified in Building Regulations and measured on site.
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. $R_w + C_{Tr}$
Reverberation Time	The time required for the steady sound pressure level in an enclosed space to decay by 60dB, measured from the moment the sound source is switched off.



Free-field	Far from the presence of sound reflecting objects (except the ground),
Fast/slow time weighting	An averaging time used in sound level meters. Defined in BS 5969.
$D_{n,e,w}$	A weighted normalised sound level difference as measured in laboratory conditions for small building components like ventilators. The higher the figure the greater the level of attenuation is achieved.
SEL	Single Event Level – A 1 second figure which contains the same energy as the whole event.
Frequency	the pitch of a sound in Hz or kHz.
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. 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. 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, L_p	a measure of the sound pressure at a point, in decibels.
Sound Power Level, w	sound power level. It is a measure of the total sound energy radiated by a sound source and is used to calculate sound levels at a distant location. The LWA is the A-weighted sound power level.



Appendix C - Report Author Details

This report has been produced by Neil Martin, BSc (Hons), PGDip, CEnvH MCIEH, MIOA.

Neil is the principal acoustic consultant at Martin Environmental Solutions Ltd, a consultancy company specialising in Environmental Health disciplines including environmental noise assessment and control. He holds a Bachelor's degree in Environmental Health and Diploma in Acoustics. He is a Chartered Member of the Chartered Institute of Environmental Health and a Full member of the Institute of Acoustics.

Neil has over 20 years' experience working within a Local Authority Environmental Health setting, principally in the Environmental Protection and Public Health areas and has been working as an acoustic consultant since 2011.

Since its formation, Martin Environmental Solutions has advised and assisted many groups including residents, developers and local authorities about the problems of noise and vibration in the environment and the possible solutions. Neil also acts as an expert witness in the area of acoustics.