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ST GEORGES ROAD, ABERGELE
PROPOSED RESIDENTIAL DEVELOPMENT

NOISE ASSESSMENT

On behalf of:
Castle Green Homes Ltd

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PROPOSED RESIDENTIAL DEVELOPMENT

NOISE ASSESSMENT

Report number	Prepared by	Prepared for
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1. INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Castle Green Homes Ltd to carry out a noise survey and assessment in connection with a proposed residential development on land off St Georges Road in Abergele. The site location is shown in Figure 1.

1.2 We understand that the proposal is for the construction of 123 dwellings across the site. The dwellings will mostly be two-storey detached, semi-detached and terraced houses with a small number of flats. Access to the site will be taken from St Georges Road. The site layout is shown in Figure 2.

1.3 The site is currently farmland used for grazing. It is bounded by St Georges Road to the south and west, the Kinmel Hotel to the east and open land to the north. Beyond the open land to the north-east is the A55 North Wales Expressway around 180 metres from the site.

1.4 The site layout shows public open space along the northern part of the site, with the nearest proposed dwellings set back approximately 200 metres from the A55.

1.5 The noise assessment has included:

- An inspection of the development site and surrounding area;
- Measurement of road traffic noise levels in the vicinity of the site;
- Computer noise modelling of road traffic noise across the site;
- Assessment of the potential noise impact on the development land; and
- Recommendations for noise mitigation measures where appropriate.

1.6 The various noise units and indices referred to in this report are described in Appendix A. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2. ACOUSTIC DESIGN CRITERIA

2.1 The most relevant national guidance on appropriate acoustic design goals for residential development is set out in BS 8233: 2014, Guidance on sound insulation and noise reduction for buildings, (referred to hereafter as BS 8233) which carries the full weight of an adopted British Standard. The design criteria recommended in BS 8233 for daytime periods (07:00-23:00) and night-time periods (23:00-07:00) are summarised in Table 1:

Table 1: BS 8233 Recommended Acoustic Design Criteria

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

2.2 BS 8233 states that if there is a reliance on closed windows to meet the guide values, "*there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level*".

2.3 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{Amax} values and these can be highly variable and unpredictable such that for design purposes it is usual to take into account the findings of research described in WHO *Community Noise Guidelines* that states, "*for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times per night*".

2.4 Therefore, for this development we recommend the following noise criteria be adopted with windows closed and trickle ventilation provided:

- Daytime noise below 35 dB L_{Aeq} inside living rooms and bedrooms; and
- Night-time noise levels not exceeding 30 dB L_{Aeq} and generally not exceeding 45 dB L_{Amax} in bedrooms i.e. not more than 10-15 times per night.

2.5 Meeting the above adopted noise criteria will provide a good standard of protection of residential amenity for future residents of the proposed development.

2.6 For outdoor amenity spaces such as private gardens and patios, BS 8233 states that "*it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments*".

2.7 However, the standard also recognises that these guideline values are not achievable in all circumstances where development might be desirable, particularly for development sites adjoining the 'strategic transport network'. In such cases (i.e. where noise levels would be above 55 dB L_{Aeq}),

BS 8233 states that the development should be designed to minimise noise levels as far as is practicable 'but should not be prohibited'.

2.8 On this basis, our assessment of noise levels across the site is described in Section 5.

3. ROAD TRAFFIC NOISE SURVEY

3.1 Noise measurements were carried out at two locations, shown in Figure 1 and described below:

- Location 1: 20 metres from the A55 North Wales Expressway
- Location 2: Northern site boundary

3.2 Location 1 was selected on the basis of the original site layout, which extended closer to the A55 and included dwellings near the road. The location also allowed the equipment to be secured and left unattended for the duration of the survey. The site layout has since been altered, and the proposed dwellings are now set considerably further from the A55 than this position.

3.3 Unattended noise measurements were taken at Location 1 between approximately 12:30 on Tuesday 25th and 12:30 on Wednesday 26th November 2025 in consecutive 2-minute periods. The noise survey was carried out using an NTi Audio XL2 'Class 1' integrating sound level meter (s/n: A2A-20228-E0), independently calibrated within the preceding 24 months.

3.4 To account for the revised layout, and to assist with calibration of the noise model, attended noise measurements were taken at Location 2 between approximately 10:00 and 13:00 on Thursday 22nd October 2026, in consecutive 15-minute periods.

3.5 These measurements were taken on the revised site boundary nearest the A55. The noise survey was carried out using a Brüel & Kjær 2260 'Type 1' integrating sound level meter (s/n: 2467016), independently calibrated within the preceding 24 months.

3.6 Acoustic calibration of both sound level meters was carried out before and after the noise measurements using acoustic calibrators that have been independently calibrated within the preceding 12 months. Full details of the instrumentation used, weather conditions, etc. are stated in Appendix B.

3.7 The noise measurements have been carried out in compliance with BS 7445:2003.

3.8 The noise measurements were taken in *'free-field'* conditions and at a microphone height of approximately 1.5 metres above the ground.

3.9 The measured daytime and night-time L_{Aeq} values at Location 1 have been logarithmically averaged to obtain the respective $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ values.

3.10 The full results of the traffic noise survey are shown in Appendix B. A summary of the results is provided in Table 2 below.

Table 2: Road Traffic Noise Exposure Levels (dB)

Location	Daytime $L_{Aeq,16hr}$ (07:00-23:00)	Night-time $L_{Aeq,8hr}$ (23:00-07:00)
20m from A55	69	63

3.11 Corresponding peaks of noise at Location 1 during the night were due to passing vehicles, with the 10th highest measured night-time value being 76 dB L_{Amax}.

3.12 The above levels were measured at Location 1, 20 metres from the A55. The nearest proposed dwellings are set back approximately 200 metres from the carriageway, and noise levels at the dwellings will therefore be substantially lower than those measured. Noise levels across the site have been predicted using a computer noise model, calibrated against the attended measurements at Location 2, as described in Section 4.

3.13 The results of the attended measurements at Location 2 are summarised in Table 3.

Table 3: Attended Noise Measurements at Location 2 (dB)

Location	$L_{Aeq,T}$ (Range)
200m from A55	54-57

3.14 The noise climate at Location 2 was dominated by distant road traffic on the A55. Measured noise levels ranged from 54 to 57 dB $L_{Aeq,15min}$, approximately 12 to 15 dB lower than at Location 1.

3.15 Our assessment of noise levels at the proposed dwellings is set out in Section 5.

4. NOISE MODELLING

4.1 Noise calculations have been carried out using the CadnaA noise prediction software for daytime (07:00-23:00) and night-time (23:00-07:00) periods. The technique uses a 3-dimensional computer model of the topography of the site and the surrounding area as a basis for undertaking automated noise calculations.

4.2 The noise propagation model was calculated using the ISO 9613 *'Acoustics - Attenuation of sound during propagation outdoors'* procedure.

4.3 The following relevant CadnaA settings and standards were used in the noise model:

- Software Version: 2025 MR 1 (build: 211.5558).
- Standards: CRTN and ISO 9613-2:2024.
- Source of topographical data: OS Terrain 5.
- Orders of reflection: 2.
- Search radius: 2 km.
- Ground absorption: 1. The majority of the surrounding land is absorptive.
- Temperature: 10°C.
- Humidity: 70%.

4.4 No on-site or off-site topographical data were available to us, so we have adopted OS Terrain 5 data to determine ground heights.

4.5 The noise model has been calibrated against the noise levels measured at Location 1 and the attended measurements at Location 2, with predicted levels at Location 2 correlating well with the measured levels.

4.6 Iterations of the noise propagation model incorporating the proposed layout have been generated to provide predicted daytime $L_{Aeq,16hr}$ noise levels at 1.5 metres (ground floor) and night-time $L_{Aeq,8hr}$ noise levels at 4.5 metres (first floor) above local ground height across the site. The noise contour plans are presented in Figures 3 and 4.

4.7 The results of the noise modelling described above have been used to determine requirements for noise mitigation set out in Section 5.

5. NOISE ASSESSMENT AND MITIGATION SCHEME

Noise Exposure Categories

5.1 Noise levels at the proposed dwellings have been assessed in accordance with the guidance in '*Technical Advice Note (Wales) 11 – Noise'*, 1997 (TAN 11) and *CL-01-15 updates*.

5.2 The NECs for land exposed to road traffic noise are shown in Table 4.

Table 4: TAN 11 Road Traffic Noise Exposure Categories

	Noise Exposure Category			
	A	**B**	**C**	**D**
Daytime (07:00-23:00)	<55	55-63	63-72	>72
Night-time (23:00-07:00)	<45*	45-57*	57-66	>66

* Sites where noise events regularly exceed 82 dB L_{Amax} several times in any hour at night should be treated as being in Category C

Category A - Noise need not be considered as a determining factor in granting planning permission.

Category B - Noise should be taken into account and steps taken to ensure an adequate level of protection against noise.

Category C - Planning permission should not normally be granted. Where development is permitted, steps should be taken to ensure a commensurate level of protection against noise.

Category D - Planning permission should normally be refused.

5.3 The noise modelling shows that predicted noise levels at the façades of the proposed dwellings are no higher than 55 dB $L_{Aeq,16hr}$ during the daytime (Figure 3) and no higher than 50 dB $L_{Aeq,8hr}$ during the night-time (Figure 4).

5.4 These levels fall within Category A of TAN 11 during the daytime and Category B during the night-time.

5.5 The 10th highest night-time maximum level measured at Location 1, 20 metres from the A55, was 76 dB L_{Amax}. Noise events at the proposed dwellings will therefore not regularly exceed 82 dB L_{Amax}, and the night-time Category C provision does not apply.

5.6 We therefore conclude that the site is suitable for the proposed residential development.

Glazing & Ventilation

5.7 Windows of standard thermal double glazing (4mm glass – 4mm glass) have a typical sound reduction performance of 25 dB $R_w + C_{tr}$. Therefore, where external noise levels (including façade reflection effects) exceed 60 dB $L_{Aeq,16hr}$ during the daytime and/or 55 dB $L_{Aeq,8hr}$ and/or 70 dB L_{Amax} at night, higher specification glazing will be necessary.

5.8 The noise modelling shows that predicted daytime noise levels at the ground floor façades (Figure 3) and night-time noise levels at the first floor façades (Figure 4) of all proposed dwellings are below 60 dB $L_{Aeq,16hr}$ and 55 dB $L_{Aeq,8hr}$ respectively.

5.9 The 10th highest night-time maximum level measured at Location 1, 20 metres from the A55, was 76 dB L_{Amax}. Maximum noise levels from individual vehicle passes reduce by approximately 6 dB per doubling of distance.

5.10 Allowing for the distance of approximately 200 metres to the nearest proposed dwellings, night-time maximum levels at the dwellings will therefore be well below 70 dB L_{Amax}. This is supported by the attended daytime measurements at Location 2, during which none of the noise peaks measured were higher than 70 dB L_{Amax}. The higher peaks that were measured were generally due to birdsong or other extraneous noise rather than road traffic on the A55.

5.11 On this basis, standard thermal double glazing and standard window frame trickle vents will be suitable for all dwellings on the development, and no specialist sound insulation measures are necessary.

Gardens

5.12 The noise modelling shows that daytime noise levels in all proposed private gardens are below 55 dB $L_{Aeq,16hr}$. The majority of rear gardens will also be screened from the A55 by the houses themselves, and noise levels in these gardens will be lower still.

5.13 Therefore, no specific noise mitigation measures, such as acoustic fencing, are required for gardens on this development.

External Walls

5.14 The exact construction of the external walls is not known at this stage; however, it is assumed that the sound insulation performance of the external wall construction will not be less than 50 dB R_w.

Conclusion

5.15 On the basis of the above, we conclude that road traffic noise from the A55 would not result in any unacceptable harm to residential amenity by reason of noise, and the adopted acoustic design criteria are expected to be achieved in all dwellings without the need for any special noise mitigation measures.

6. SUMMARY

6.1 The impact of noise has been assessed for a proposed residential development on land off St Georges Road in Abergele.

6.2 The assessment has included the measurement of road traffic noise from the A55 North Wales Expressway and computer noise modelling of road traffic noise on the site.

6.3 Road traffic noise levels at the proposed dwellings are low, as the dwellings are set back approximately 200 metres from the A55, and fall within Category A of TAN 11 during the day and Category B during the night-time.

6.4 Predicted noise levels at the façades of all dwellings are below the levels at which enhanced glazing would be required, and noise levels in all private gardens are below 55 dB L_{Aeq}.

6.5 On this basis, the adopted acoustic design criteria are expected to be achieved in all dwellings with standard thermal double glazing and standard trickle ventilation, and no specialist noise mitigation measures are necessary.



Do not scale from this figure

Key:

x - Noise Measurement Position

N

Project: P25-473

Ref: **Figure 1**

Title: Site Location & Noise Measurement Positions

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Do not scale from this figure

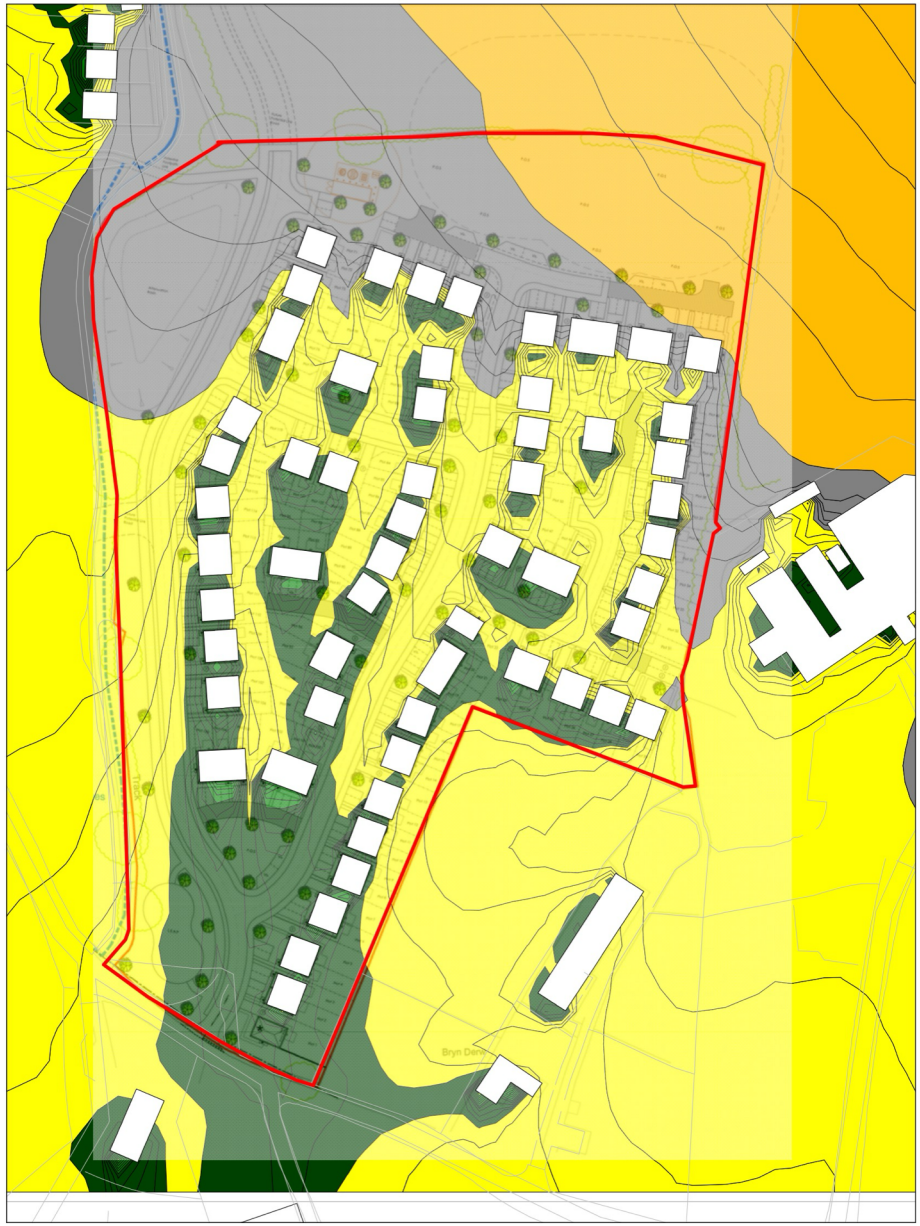
Key:

Project: P25-473

Ref: **Figure 2**

Title: Proposed Site Layout

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Do not scale from this figure

Key:

Noise contours

$L_{Aeq,16hour}$ at 1.5m above ground

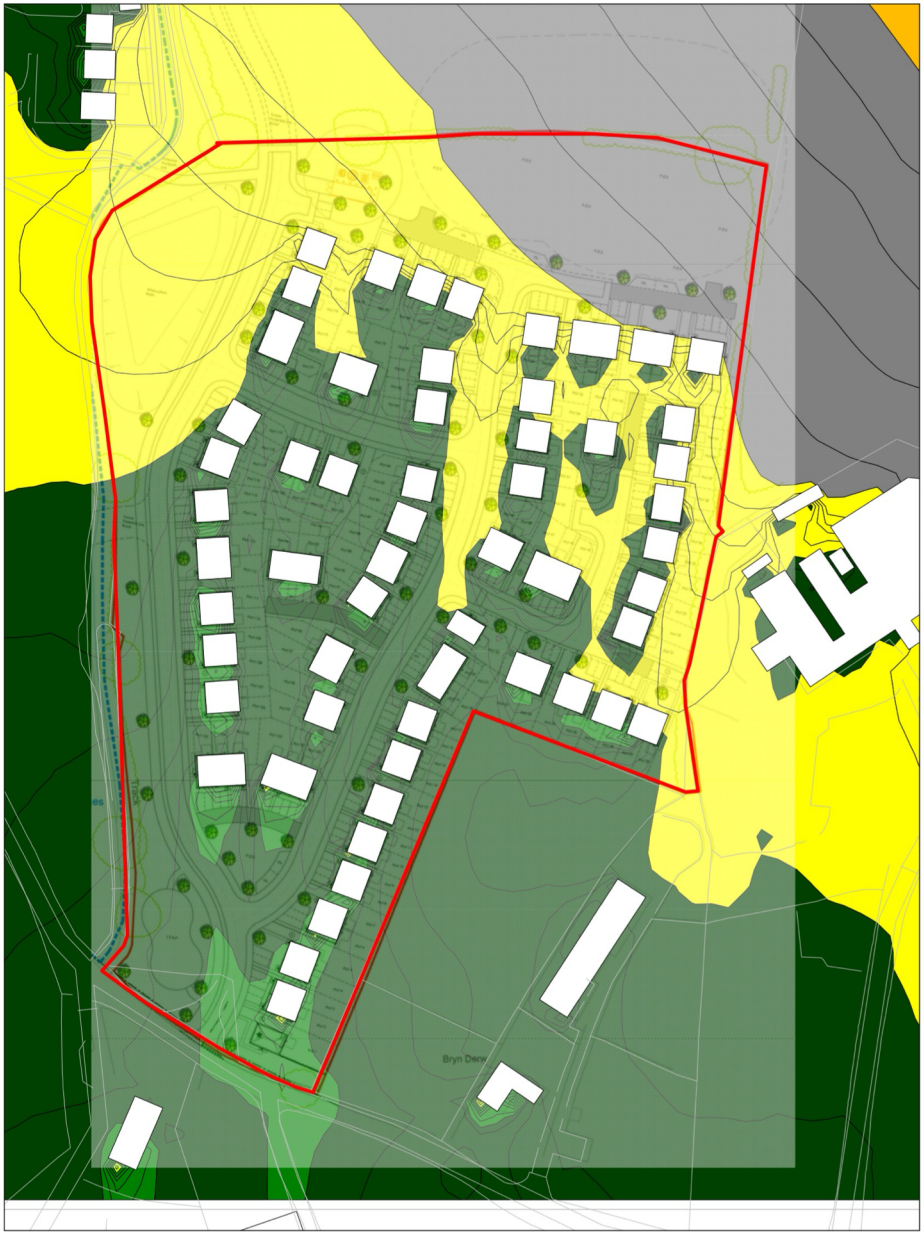
- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB

Project: P25-473

Ref: **Figure 3**

Title: Daytime Noise Contour Plot at 1.5m $L_{Aeq,16hr}$

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Do not scale from this figure

Key:

Noise contours

$L_{Aeq,8hour}$ at 4.5m above ground

- > 35.0 dB
- > 40.0 dB
- > 45.0 dB
- > 50.0 dB
- > 55.0 dB
- > 60.0 dB
- > 65.0 dB
- > 70.0 dB
- > 75.0 dB
- > 80.0 dB
- > 85.0 dB

Project: P25-473

Ref: **Figure 4**

Title: Night Time Noise Contour Plot at 4.5m $L_{Aeq,8hr}$

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APPENDIX A: ACOUSTICS UNITS & INDICES

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with

a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. There are also a number of ways to describe sound insulation performance.

The indices used in this report are described below:

$L_{Aeq,T}$ **A-weighted Equivalent Continuous Sound Level:** An average of the total sound pressure measured over a specified time period (T). In other words, $L_{Aeq,T}$ is the level of a steady sound which has the same total A-weighted sound pressure as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for most forms of environmental noise.

L_{Amax} **Maximum A-weighted Sound Level with Fast Time-weighting:** The maximum A-weighted sound pressure level during the measurement period, using the Fast time-weighting of 125 ms. L_{Amax} used in this report refers throughout to L_{AFmax} with the Fast time weighting, denoted L_{AFmax} or $L_{Amax,f}$ in other documents but L_{Amax} in BS 8233:2014 standard notation.

$L_{A90,T}$ **A-weighted 90 Percentile Level:** The A-weighted sound level exceeded for 90% of a measurement time period (T). $L_{A90,T}$ is generally used as a measure of Background Sound Level.

C_{tr} **Transport Noise Spectral Adaptation Term:** A term used with single figure broadband sound insulation metrics (e.g. $R_{w,}$ $D_{n,e,w}$ or $D_{nT,w}$) to account for the spectral composition of typical transport noise sources.

R_w **Weighted Sound Reduction Index:** A single figure frequency weighted laboratory sound insulation performance metric of a building element or construction arrangement (e.g. a window, wall or floor).

APPENDIX B: NOISE SURVEY RESULTS

Dates	Tuesday 25 – Wednesday 26 November 2025 (Location 1) Thursday 22 October 2026 (Location 2)
Equipment	NTi Audio XL2-TA 'Class 1' sound analyser (s/n: A2A-20228-E0) – Location 1 Brüel & Kjær 2260 'Type 1' sound level meter (s/n: 2467016) – Location 2 with associated calibrators and tripods or environmental outdoor monitoring kits
Weather	**Tuesday 25 – Wednesday 26 November 2025** Daytime: -1 – 8 °C, clear to partly cloudy, dry, north-westerly to south-easterly wind 4 m/s Night-time: -3 – -1 °C, clear, dry, southerly wind <3 m/s **Thursday 22 October 2026** 8 – 10 °C, clear to cloudy, dry, westerly to south-easterly wind 2-3 m/s

Chart overleaf

Location 1: Southern boundary of the site

Time		Measured noise levels (dB)			Notes
Start	Stop	L_{AFmax}	L_{Aeq}	L_{A90}	
10:02	10:17				
10:17	10:32				
10:32	10:47				
10:47	11:02				
11:02	11:17				
11:17	11:32				
11:32	11:47				
11:47	12:02				
12:02	12:17				
12:17	12:32				
12:32	12:47				
12:47	13:02				

Location 1: 20m from A55 North Wales Expressway

