

**LAND EAST OF MOLD ROAD, GWERSYLLT, WREXHAM
PROPOSED RESIDENTIAL DEVELOPMENT**

NOISE ASSESSMENT

On behalf of:

Castle Green Homes Ltd

LAND EAST OF MOLD ROAD, GWERSYLLT, WREXHAM PROPOSED RESIDENTIAL DEVELOPMENT

NOISE ASSESSMENT

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1. INTRODUCTION

- 1.1 Hepworth Acoustics Ltd was commissioned by Castle Green Homes to carry out a noise survey and assessment in connection with a proposed residential development on land to the east of Mold Road in Gwersyllt near Wrexham. The site location is shown in Figure 1.
- 1.2 We understand that the proposal is for the construction of 83 dwellings across the site, the dwellings will mostly be two storey detached and semi-detached houses with a small number of flats. Access to the site will be taken from Mold Road. The site layout is shown in Figure 2.
- 1.3 To the west, the site is bounded by the A541 (Mold Road), a dual carriageway that links the village of Gwersyllt with Wrexham. To the north of the site is Gwersyllt village and to the south is agricultural land.
- 1.4 To the east is a narrow piece of woodland and beyond is the Wrexham to Bidston Railway line, also known as the Borderlands Line. The railway line as it passes the site sits in a slight cutting, such that some of the passing train is obscured from view. Trains pass the site at a fairly low speed as most trains have either departed or are slowing to stop at the nearby Gwersyllt Station, the railway line is lightly trafficked with typically 3-4 trains per hour. The site plan shows the dwellings set back at least 125 metres from the railway line.
- 1.5 The noise assessment has included:
- An inspection of the development site and surrounding area;
 - Measurement of road noise levels on the development land;
 - Measurement of railway noise levels on the development land;
 - Assessment of the potential noise impact on the development land; and
 - Recommendations for noise mitigation measures.
- 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 recommendations for noise mitigation are described in Section 6.

3. RAILWAY NOISE SURVEY

- 3.1 A railway noise survey was carried out at the closest accessible location to the railway line, positioned at the field boundary of the site approximately 60 metres from the line. The measurement position is indicated on Figure 1 as Location 1.
- 3.2 The typical timetabled daily numbers of passing trains on a weekday are shown below in Table 2. This data has been obtained from the current passenger train timetables and realtimetrains.co.uk. Most passenger trains operate in the daytime with very few trains at night, although there is a small number of possible freight services at night.

Table 2: Daily Train Flows

Train type	Period	
	Daytime (07:00 – 23:00)	Night-time (23:00 – 07:00)
Passenger trains	37	2
Freight trains	10	4

- 3.3 Railway noise levels were measured on the site between approximately 11:30 and 21:30 hours on Monday 8th June 2026. However, due to operational issues on the line during this period, the majority of train services were cancelled and only a limited number of movements were recorded. The measured data was therefore not considered representative of normal operating conditions and has not been relied upon for this assessment. Instead, the railway noise calculations have been undertaken for the daytime and night-time periods using average L_{AE} values of 75 dB(A) for passenger trains and 78 dB(A) for freight trains. These values have been adopted from noise measurements carried out on the same line a short distance to the south, undertaken in connection with a separate planning application.
- 3.4 The noise monitoring was carried out using a Rion NA28 ‘Class 1’ sound level meter (SN: 0000960036), complying with BS EN 60804:2001 and independently calibrated within the preceding 24 months. The meter was mounted onto a tripod with a microphone height of approximately 1.5 metres above the ground.
- 3.5 A windshield was fitted to the microphone during all noise measurements. All measurements were carried out in ‘free-field’ conditions. Calibration checks were carried out before and after the noise survey with no variance in levels observed.
- 3.6 Noise levels were measured during the passage of each train in terms of the ‘sound exposure level’ (L_{AE}) and the maximum sound pressure level, L_{Amax} . The results of the railway noise survey, instrumentation used and weather conditions are detailed in Appendix B and is provided for reference.

Calculation of Railway Noise Exposure

- 3.7 Railway noise is evaluated in terms of the 'equivalent continuous noise level', L_{Aeq} . Period L_{Aeq} values for the site have been calculated from the results of the noise survey using the formula:

$$L_{Aeq(T)} = L_{AE \text{ Average}} + 10 \log N - 10 \log T$$

where: $L_{Aeq(T)} = L_{Aeq}$ over time period T

$L_{AE \text{ Average}}$ = Average 'Sound Exposure Level'

N = Number of train passes in time period T

T = Time period in seconds

- 3.8 Applying the formula above to the adopted L_{AE} values and the daily train flows set out in Table 2, the railway noise exposure has been calculated for the daytime and night-time periods. The resulting daytime and night time L_{Aeq} values for the site are shown in Table 3.

Table 3: Railway Noise Exposure Levels (dB)

Location	Daytime $L_{Aeq,16hr}$	Night-time $L_{Aeq,8hr}$
60 metres from Railway Line	45	40

- 3.9 Short-term peaks of noise from passing trains were within the range 66-69 dB $L_{Amax,fast}$ at 60 metres from the line.
- 3.10 The implications of the railway noise exposure values are set out in Section 6.

Comments on Railway Noise Exposure Levels

- 3.11 The results of the railway noise survey have been assessed in accordance with the guidance in 'Technical Advice Note (Wales) 11 – Noise', 1997 (TAN 11) and CL-01-15 updates.
- 3.12 TAN 11 sets out Noise Exposure Categories (NECs) for proposed residential development land that is exposed to different types of noise, and their suitability for residential use. The NECs for land exposed to railway noise (which are 'free field' values) are shown in Table 4.

Table 4: TAN 11 Railway Noise Exposure Categories

	Noise Exposure Category (NEC)			
	A	B	C	D
Daytime (07:00-23:00)	<55	55-66	66-74	>74
Night-time (23:00-07:00)	<45*	45-59*	59-66	>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.

3.13 Thus, the daytime railway noise exposure level at the eastern site boundary at this site (shown in Table 3) falls into NEC A of TAN 11. The night-time railway noise exposure level also falls into NEC A of TAN 11.

3.14 The railway noise exposure levels at the proposed location of the dwellings are therefore suitable for residential development levels and noise need not be considered as a determining factor and our recommendations for noise mitigation are set out in Section 6.

4. ROAD TRAFFIC NOISE SURVEY

- 4.1 The monitoring equipment used for the road traffic noise measurements was deployed at a location where it could be secured and left unattended, rather than at the proposed frontage of the dwellings closest to Mold Road.
- 4.2 The noise survey location is indicated in Figure 1 and is described below:
- Location 2: 5 metres from Mold Road
- 4.3 Noise measurements were taken at between approximately 11:50 on Monday 8th and 11:30 on Tuesday 9th June 2026 in consecutive two-minute sampling periods
- 4.4 The noise survey was carried out using a NTi Audio XL2 ‘Class 1’ integrating sound level meter (S/N: A2A-20361-E0), independently calibrated within the preceding 24 months. Acoustic calibration of the sound level meter was carried out before and after the noise measurements using an acoustic calibrator that had been independently calibrated within the preceding 12 months. No significant variation in the calibrated noise level was noted. Details of the instrumentation used, weather conditions, etc. are stated in Appendix B.
- 4.5 The noise measurements have been carried out in compliance with BS 7445: 2003. The noise measurements were taken in ‘free-field’ conditions and at a microphone height of approximately 1.5 metres above the ground.
- 4.6 The measured daytime and night-time L_{Aeq} values have been logarithmically averaged to obtain the respective $L_{Aeq,16hr}$ and $L_{Aeq,8hr}$ values.
- 4.7 The full results of the traffic noise survey are shown in Appendix B. A summary of the results is provided in Table 5 below.

Table 5: Road Traffic Noise Exposure Levels (dB)

Location	Daytime $L_{Aeq,16hr}$ (07:00-23:00)	Night-time $L_{Aeq,8hr}$ (23:00-07:00)
5m from Mold Road	65	59

- 4.8 Corresponding peaks of noise at Location 2 during the night were up to 80 dB L_{Amax} due to passing vehicles, with the 10th highest measured night-time value being 78 dB L_{Amax} .
- 4.9 The above levels were measured 5 metres from Mold Road. The nearest proposed dwellings are set back at least 20 metres from the carriageway, and allowing for distance attenuation over this separation, noise levels at the nearest dwellings reduce to approximately 59 dB $L_{Aeq,16hr}$ during the daytime and 53 dB $L_{Aeq,8hr}$ at night, with night-time peaks of around 72 dB $L_{Amax,10th\ Highest}$.

Comments on Road Traffic Noise Exposure Levels

4.10 The results of the traffic noise survey have been assessed in accordance with the guidance in 'Technical Advice Note (Wales) 11 – Noise', 1997 (TAN 11) and CL-01-15 updates. The NECs for land exposed to road traffic noise are shown in Table 6.

Table 6: 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.

4.11 The results of the traffic noise measurements demonstrate that, at the measurement position 5m from Mold Road, the site falls within Category C of TAN 11 during both the daytime and night-time periods. However, the nearest proposed dwellings are set back at least 20 metres from the road. Allowing for distance attenuation over this separation, noise levels at the nearest dwellings reduce to within Category B in both the daytime and at night.

4.12 We therefore conclude that the site is suitable for the proposed residential development, subject to an adequate scheme of noise mitigation measures to provide a commensurate level of noise protection for the plots nearest to Mold Road. Our recommendations for noise mitigation are set out in Section 6.

5. NOISE MODELLING

- 5.1 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.
- 5.2 The noise propagation model was calculated using the ISO 9613 'Acoustics - Attenuation of sound during propagation outdoors' procedure.
- 5.3 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%.
- 5.4 No topography was available to us, so we have adopted OS Terrain 5 data to determine ground heights.
- 5.5 Iterations of the noise propagation model incorporating the proposed layout have been generated to provide predicted $L_{Aeq,16hr}$ daytime and $L_{Aeq,8hr}$ night time noise levels at 1.5 and 4.5 metres respectively, above local ground height across the site. The noise contour plans are presented in Figure 3 and 4.
- 5.6 The results of the calculations described above have been used to assess and form the basis of the noise control recommendations for external amenity areas set out in Section 6.

6. NOISE MITIGATION SCHEME

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

Glazing & Ventilation

- 6.2 The noise modelling shows that for a number of the dwellings as shown in blue on Figure 2, to ensure the criteria for the control of noise are achieved, we recommend double glazed windows for bedrooms having a minimum sound insulation performance of $32 \text{ dB } R_w + C_{tr}$.
- 6.3 Typically, this would be achieved with a double-glazing specification of:
- 6.0mm glass - nominal (12-20mm) cavity – 6.4mm acoustic laminated glass (e.g. Saint Gobain ‘Stadip Silence’).
- 6.4 A small number of dwellings located further from the road shown in red on Figure 2, are less exposed and require a lesser glazing upgrade. For the bedrooms of these dwellings, we recommend double glazed windows with a minimum sound insulation performance of $30 \text{ dB } R_w + C_{tr}$.
- 6.5 Typically, this would be achieved with a double-glazing specification of:
- 4mm glass – nominal (12-16mm) cavity – 6.4mm acoustic laminated glass (e.g. Saint Gobain ‘Stadip Silence’).

Ventilation

- 6.6 For bedrooms that require upgraded glazing (i.e. those shown in blue in Figure 2) we recommend that, instead of standard window frame slot trickle vents, specialist acoustic vents are fitted having an acoustic rating of at least $42 \text{ dB } D_{n,e,w}$.
- 6.7 Examples of suitable products would be:
- Aereco EHA2 ‘3-part’ Acoustic Trickle Ventilators with internal acoustic humidity control, external acoustic canopy and acoustic sleeve. ($42 \text{ dB } D_{n,e,w}$): or,
 - Wall mounted Rytons AAC125HP Super Acoustic Controllable LookRyt AirCore Ventilators. ($43 \text{ dB } D_{n,e,w}$).
- 6.8 Standard window frame trickle vents would be adequate for all other houses on the development.

Gardens

- 6.9 The majority of rear gardens on the proposed development will be located away from the roads and will be screened adequately from traffic noise by the houses themselves.
- 6.10 However, as the daytime traffic noise exposure level was found to be above 55 dB L_{Aeq} in some locations, in order to achieve noise levels within the desirable criterion, we recommend that a 2.4m high proprietary acoustic fence is installed for the indicated in green on Figure 2.
- 6.11 The acoustic fencing must be imperforate (i.e. have no holes or gaps), have a surface mass no less than 10 kg/m² and be at least 20mm thick. Gates, where necessary, in the fencing would be acceptable as long as they are built to the same standard as the acoustic fencing.
- 6.12 Suppliers of proprietary acoustic fences include Jacksons Fencing (jacksons-fencing.co.uk), Guardian Fencing (guardianfencing.com) and Ransford's (ransfords.co.uk).

Other Dwellings

- 6.13 Standard double glazing and standard slot vents can be expected to be suitable for the majority of houses on the site that are less exposed to road and railway noise.

External Walls

- 6.14 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 .

Planning Condition

- 6.15 The need to ensure that an adequate scheme of noise mitigation is implemented can be formalised by an appropriately worded planning condition that requires a scheme of noise mitigation measures as described in this report to be implemented prior to occupation of relevant dwellings.

Conclusion

- 6.16 Subject to the recommendations for mitigation measures made above we conclude that potential noise impact from road traffic and the railway would not result in any unacceptable harm to residential amenity by reason of noise.

7. SUMMARY

- 7.1 The impact of noise has been assessed for a proposed residential development on land to the east of Mold Road in Gwersyllt.
- 7.2 The assessment has included the measurement of road traffic and railway noise at appropriate locations on the site and calculation of the daytime and night-time noise exposure levels.
- 7.3 Railway noise levels are low, and as such no specialist noise mitigation measures for the control of external and internal noise levels will be necessary.
- 7.4 Road traffic noise levels are such that some modest noise mitigation measures will be required to ensure appropriate control of external and internal noise levels.
- 7.5 An appropriate sound insulation scheme for the development has been described in this report. The requirement to implement an appropriate scheme of sound insulation measures can be ensured at this stage by a suitably worded planning condition.









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:

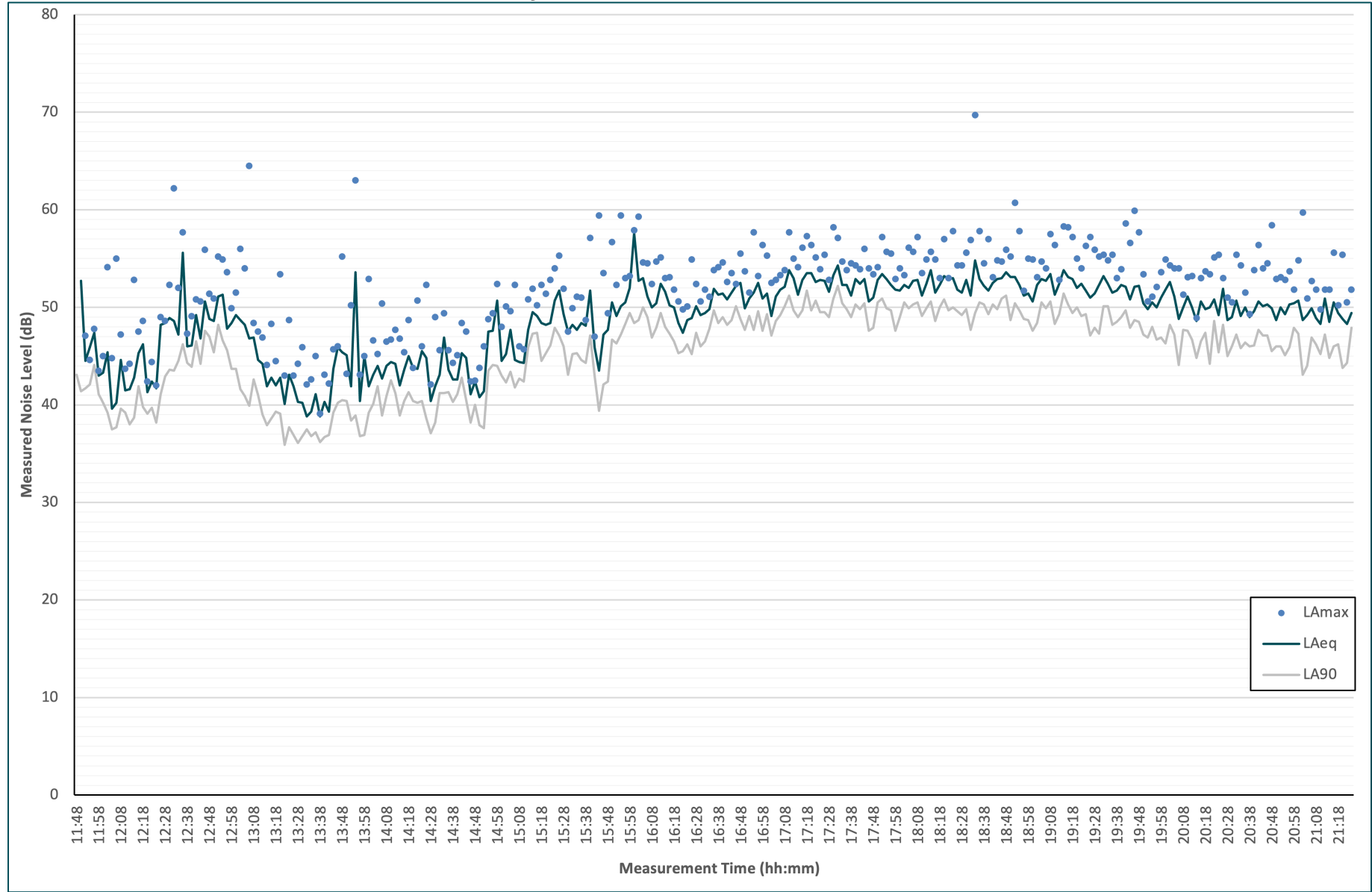
- $L_{Aeq,T}$** **A-weighted Equivalent Continuous Sound Level:** An average of the total sound pressure measured over a specified time period (T). In other words, $L_{Aeq,T}$ is the level of a steady sound which has the same total A-weighted sound pressure as the real fluctuating noise, measured over 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
- $D_{n,e,w}$** **Weighted Element Normalised Level Difference:** A frequency weighted single figure laboratory value quantifying the sound insulation performance of a building element, such as an air vent.

APPENDIX B: NOISE SURVEY RESULTS

Dates	Monday 08 – Tuesday 09 June 2026
Equipment	NTi Audio XL2-TA ‘Class 1’ sound analyser (s/n: A2A-20361-E0) Rion NA-28 ‘Class 1’ sound analyser (s/n: 0000960036) with associated calibrators and tripods/environmental outdoor monitoring kits
Weather	Daytime: 14 – 18°C, partially overcast, dry, NW wind 3-4 m/s Night-time: 9 – 12°C, overcast, dry, SW wind 4 m/s

Charts overleaf

Location 1: 60m from Wrexham to Bidston Railway Line



Location 2: 5m from Mold Road

