Wrexham Student Residences

Noise Impact Assessment

Cityheart Ltd.

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1.0

Introduction

1.0 Introduction

Cundall has been commissioned by Cityheart Ltd. to undertake a noise impact assessment to inform the detailed application for the proposed new purpose-built student accommodation (PBSA) scheme adjacent to Crispin Lane, Wrexham (hereafter referred to as 'the Development').

The proposed scheme involves the redevelopment of the Wrexham University Plas Coch Campus carpark. The proposed scheme comprises the construction of new purpose-built student accommodation split over 3 blocks.

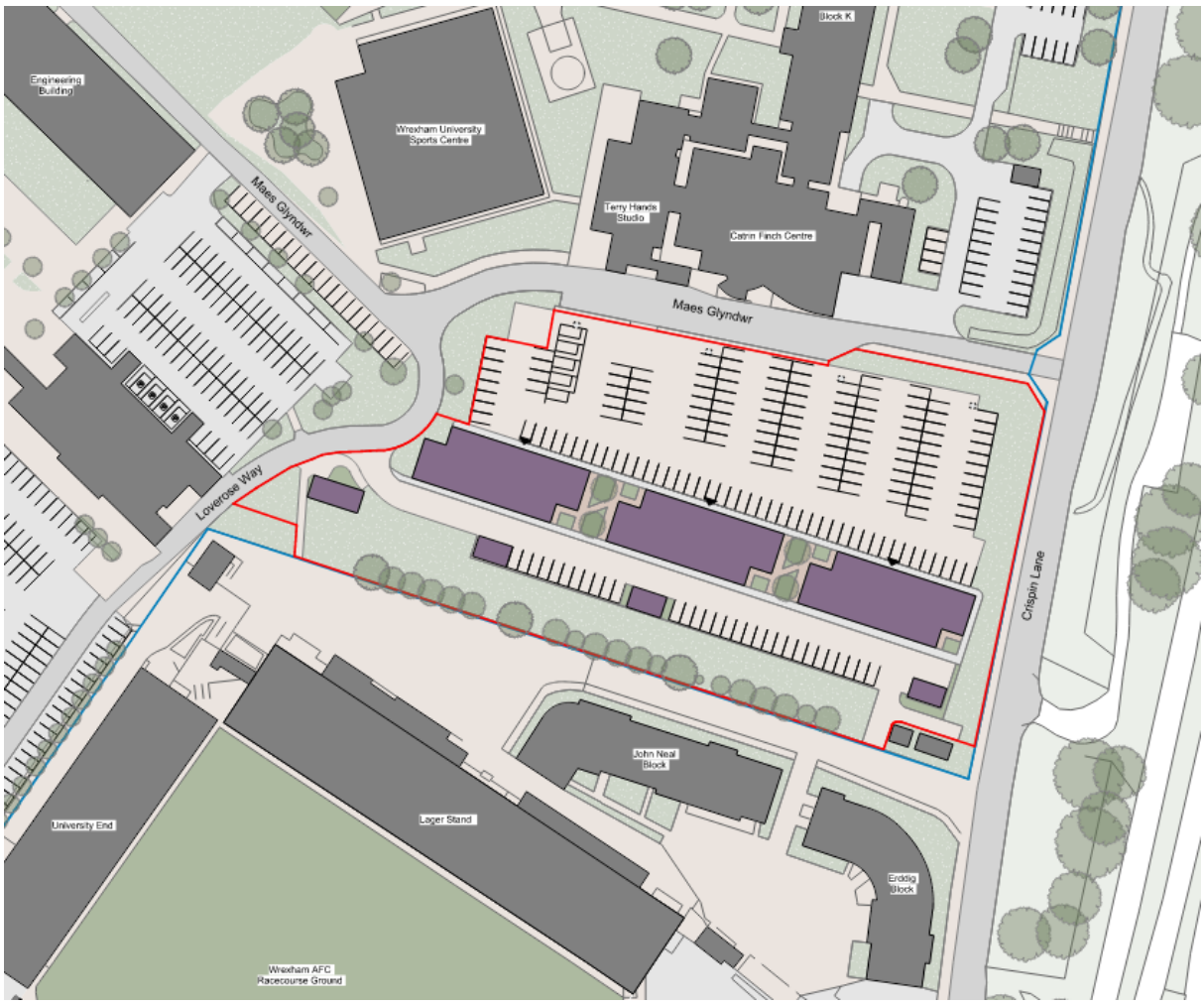


Figure 1-1: Proposed site plan (WREX-FBA-XX-XX-DR-A-0192)

The purpose of this report is to:

- Review appropriate national and local planning policy and relevant good acoustic design guidance;
- Determine appropriate internal noise levels;
- Evaluate the findings of the acoustic surveys in relation to the proposed scheme being brought forward;
- Carry out an acoustic assessment of the external building fabric requirements and where appropriate provide mitigation advice; and
- Set noise emission limits for externally mounted building service plant and equipment associated with the Development at nearby noise-sensitive receptors.

2.0

Design guidance and criteria

2.0 Acoustic design guidance and criteria

This section sets out the national and local policy, guidance and technical standards that inform the acoustic design criteria for the proposed residential development in Wrexham. It establishes the basis for the internal and external noise targets adopted in the assessment and demonstrates alignment with relevant Welsh and local planning policy.

These documents collectively provide the policy context for acceptable noise conditions in new dwellings and the technical basis for defining acoustic design criteria.

2.1 National policy and legislation

2.1.1 Future Wales: The National plan 2040

Future Wales: The National Plan 2040 is the national development framework plan for Wales to 2024. It sets out a long-term strategic vision for the sustainable growth of towns and cities, including Wrexham.

Of particular relevance to noise and soundscape:

- Future Wales seeks to deliver sustainable, liveable and healthy places, requiring that new development contributes positively to environmental quality and resident well-being.
- It expects development to avoid or minimise harmful environmental effects, including those arising from noise, and to protect and enhance the amenity of existing and future communities.
- Higher-density development in accessible locations is supported, but this is coupled with an expectation that design solutions are used to secure acceptable noise conditions.

The document does not contain specific acoustic design criteria for new developments, but refers to Planning Policy Wales (PPW), stating:

"Planning Policy Wales contains the planning policy framework for addressing air quality, soundscape and noise."

2.1.2 Planning Policy Wales (PPW), Edition 12

Planning Policy Wales (PPW), Edition 11 sets out the Welsh Government's national planning policy. It embeds soundscape within the concept of sustainable placemaking and recognises that the acoustic environment is a key component of quality of life

- PPW promotes the creation of "sustainable places" that support health, well-being and cohesive communities; sound environments are an explicit element of this.
- Noise and soundscape are to be considered alongside other planning issues (transport, air quality, green infrastructure, climate resilience) from the outset.
- The policy seeks to prevent new development from causing or being exposed to unacceptable noise impacts, with decisions informed by relevant technical guidance (including TAN 11 and the Noise and Soundscape Plan for Wales).

The design and assessment therefore aim not only to meet technical criteria but also to contribute to the PPW goal of securing appropriate soundscapes as a normal part of good placemaking.

2.1.3 Noise and Soundscape Plan for Wales (NSP) 2023–2028

The Noise and Soundscape Plan for Wales 2023–2028 (NSP) is the Welsh Government's national strategy for managing environmental noise and soundscapes. It shifts emphasis from simply reducing decibel levels to achieving appropriate soundscapes that support health, well-being and good placemaking.

For new developments, the NSP emphasises that;

- Good acoustic outcomes should be pursued from the earliest design stages

- The goal is to achieve “appropriate soundscapes”, i.e. “the right sound environment in the right time and place”, rather than a single generic target.

In practical terms, the NSP’s principles are reflected in this assessment as follows:

- Appropriate soundscapes rather than bare compliance
  - BS 8233/ TAN 11 internal and external noise targets are used as baseline benchmarks, but the design also considers the character of the sound environment (e.g. dominance of road / rail traffic vs. more benign background sounds).
- Baseline surveys consider both levels and character of existing noise.
- Ventilation, overheating mitigation and low carbon technologies (e.g. ASHPs) are to be considered together with acoustics so that carbon and comfort measures do not undermine soundscape quality.

The Noise Impact Assessment therefore demonstrates not only that numerical criteria are met, but also that the overall sound environment for future residents is consistent with the aims of the Noise and Soundscape Plan for Wales.

2.1.4 Technical Advice Note (TAN) 11: Noise

2.1.4.1 TAN 11 (1997) – Noise Exposure Categories (current)

The existing TAN 11: Noise (1997) remains the adopted technical guidance on noise in the Welsh planning system. Its core mechanism for assessing new housing near transport noise sources is the Noise Exposure Category (NEC) framework, which classifies sites into categories A–D based on external free-field L_{Aeq} noise levels during daytime (07:00–23:00) and night-time (23:00–07:00) periods.

The NEC bands, as set out in TAN 11 Annex A, can be summarised as follows:

Source / Period	NEC A – Noise unlikely to be determining factor	NEC B – Noise should be taken into account	NEC C – Planning permission should not normally be granted; strong mitigation needed where justified	NEC D – Planning permission should normally be refused
Road traffic (07:00–23:00)	< 55	55–63	63–72	> 72
Road traffic (23:00–07:00)	< 45	45–57	57–66	> 66
Rail traffic (07:00–23:00)	< 55	55–66	66–74	> 74
Rail traffic (23:00–07:00)	< 45	45–59	59–66	> 66
Air traffic (07:00–23:00)	< 57	57–66	66–72	> 72
Air traffic (23:00–07:00)	< 48	48–57	57–66	> 66
Mixed sources (07:00–23:00)	< 55	55–63	63–72	> 72
Mixed sources (23:00–07:00)	< 45	45–57	57–66	> 66

Table 2-1:TAN 11 Noise Exposure Categories for New Dwellings (external $L_{Aeq,T}$ dB)

Additional guidance in TAN 11 includes:

- Where night-time maximum noise levels (LAmax) regularly exceed around 82 dB several times in any hour, sites should generally be treated as at least NEC C, even where the LAeq value might suggest a lower category.

- Local planning authorities may, in specific circumstances, adjust NEC boundaries by approximately ±3 dB to reflect local priorities (e.g. regeneration needs or the desire to afford enhanced protection).
- The NEC system is intended primarily for new residential development affected by existing transport noise and is not generally recommended for assessing industrial/commercial sound, where BS 4142 is more appropriate.

In this Noise Impact Assessment:

- NECs are used as an initial screening tool to understand site suitability in relation to existing transport noise.
- Where parts of the site fall within NEC B or C, the assessment sets out mitigation and design measures (layout, screening, façade performance, ventilation) necessary to deliver acceptable internal and external noise conditions.

2.1.4.2 TAN 11: Air Quality, Noise and Soundscape (Draft)

The Welsh Government has consulted on a draft TAN 11: Air Quality, Noise and Soundscape, which, once adopted, will replace the 1997 TAN 11. While not yet in force, it is a material consideration and is therefore taken into account in this assessment.

Key ways in which the draft document differs from the current TAN 11 are summarised below:

- Integrated treatment of air quality, noise and soundscape in a single document, reflecting that these topics often share common sources, pathways and receptors.
- Move away from NEC tables to a risk- and design-based approach
- Greater focus on soundscape and placemaking
- Alignment with modern practice and standards (the document explicitly references BS 8233, BS 4142 and ProPG) as core tools for defining internal and external noise criteria, and for assessing plant and industrial sound.

To be robust under both the current and emerging frameworks, this Noise Impact Assessment:

- Uses current TAN 11 NECs to demonstrate that the site can be made suitable for residential use in principle.
- Derives internal and external design targets primarily from BS 8233 (see Section 2.4), consistent with the risk-based approach in the draft TAN.

2.1.5 Welsh Building Regulations – Approved Document O (Wales): Overheating

Approved Document O (ADO): Overheating (Wales) provides guidance on limiting overheating risk in new residential buildings. Although not a noise standard, it has important implications for acoustic design because many overheating mitigation strategies rely on ventilation via open windows, especially at night.

ADO does not define or impose specific absolute noise level criteria (e.g. maximum dB values) for internal or external environments.

Instead, it recognises that noise is a separate planning and design consideration, and states that overheating strategies should be compatible with any noise control measures agreed through planning or building design.

With regards to controlling internal noise levels at night, it states:

"When the removing excess heat as part of the overheating strategy, noise levels in bedrooms should be kept to a minimum during the sleeping hours of 23:00 –07:00. Building control bodies may accept as evidence that this requirement is satisfied:

a. documentation to demonstrate that the local planning authority did not consider external noise to be an issue at the site at the planning stage or;

b. if the local planning authority did consider external noise to be an issue that should be controlled through a condition at planning stage, then documentation to demonstrate that the proposals for heat removal (during the sleeping hours of 23.00 – 07.00) are accommodated within or do not conflict with documentation provided to the local planning authority to satisfy any related planning permission condition(s). (For example any expectation that windows on one or more façade, or in certain rooms, will need to be kept closed during noise-sensitive periods.)"

Where external noise levels are high, ADO expects designers to consider alternative means of ventilation and cooling, such as:

- Acoustically attenuated background ventilation; and/or
- Mechanical systems that allow for adequate night-time cooling without the need to open windows in bedrooms.

In this assessment, internal noise criteria are set such that they can be achieved under realistic ventilation conditions – i.e. those proposed to meet ADO requirements – ensuring that overheating mitigation and acoustic performance are addressed together, rather than in isolation.

2.2 Local authority policy

2.3 Wrexham Local Development Plan (LDP) 2013–2028

Following an Order of the High Court of Justice (May 2025) Wrexham's adoption of the 2013–2028 LDP has been quashed and is no longer part of the development plan for Wrexham.

The development plan for Wrexham now comprises the following:

2.3.1 Future Wales: The National plan 2040

See Section 2.1.1 above.

2.3.2 Wrexham Unitary Development Plan (UDP) 1996-2011

Policy GDP1 of the UDP states that, amongst other things;

"All new development should:

[…]

f) Ensure the safety and amenity of the public and safeguard the environment from the adverse effects of pollution of water, land or air, hazards from industry and quarrying, and associated noise, odour or vibration arising from development."

The acoustic design criteria adopted in this report are therefore set at a level intended to:

- Protect the amenity of existing residents in the vicinity of the site from noise associated with the development (e.g. fixed plant, vehicle movements).
- Ensure a good standard of amenity for future occupiers, consistent with Policy GDP1.

2.4 Technical and professional guidance

2.4.1 BS 8233: 2014 and World Health Organisation Guidelines for Community Noise

BS 8223:2014 'Guidance on sound insulation and noise reduction for buildings' (BS 8233) provides guidance on internal ambient noise levels in residential spaces.

Table 2-2below shows recommended internal noise levels for residential dwellings, as prescribed in BS 8233: 2014.

Area	Day level (07:00 – 23:00)	Night level (23:00 – 07:00)
Living rooms	≤ 35 dB $L_{Aeq,16hour}$	N/A
Dining rooms	≤ 40 dB $L_{Aeq,16hour}$	N/A
Bedrooms	≤ 35 dB $L_{Aeq,16hour}$	≤ 30 dB $L_{Aeq,8hour}$

Table 2-2: BS 8233: 2014 noise levels in dwellings

In relation to the noise guidelines in Table 1 above, BS 8233 states:

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

Noise levels generally apply to steady sources, such as those due to road traffic, mechanical services or continuously running plant, and should be the noise level in the space during normal hours of occupation but excluding any noise produced by the occupants and their activities.

To provide a comfortable environment within habitable rooms, specifically bedrooms, it is recommended that the external building fabric be generally designed to achieve an internal night-time noise level of 30 dBA and daytime level of 35 dBA.

BS 8233:2014 also notes that individual noise events at night can be disturbing to sleep patterns, and that a guideline level may be set in terms of SEL or $L_{AF,max}$.

BS 8233: 2014 does not give a definitive level for internal maximum levels or define an appropriate number of exceedances per night. However, the World Health Organisation's 'Guidelines for Community Noise' references a study by Vallet & Vernet, 1991, which concluded that *"…for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB $L_{AF,max}$ more that 10-15 times per night."*

2.4.2 BS 4142: 2014+2019 'Methods for rating and assessing industrial and commercial sound'

British Standard 4142 provides a methodology for assessing the impacts arising at sensitive receptors due to noise from industrial and commercial activities.

The BS 4142 method involves comparing the rating level of the sound source (the 'specific' noise level plus a range of potential feature corrections) to the measured background sound level in order to estimate its initial impact, as follows:

"Typically, the greater this difference, the greater the magnitude of the impact.

a) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

b) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

c) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. 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."

The standard suggests that the noise source of interest will have a 'low impact' when the 'rating level' of a noise source is less than the existing background noise. It is also important to note that the standard requires that any quantitative assessment results are assessed in light of the context in which the sound occurs.

Regarding background noise levels, BS 4142 states:

"In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods."

3.0

Site description and context

3.0 Site context

The site is largely bounded by the existing Wrexham University Campus, with Wrexham Student Village (existing student residential accommodation) to the south, Wrexham University Conference Venues to the north, and Wrexham Students Union and Wrexham University Sports Centre to the west. To the east, the site is bounded by Crispin Lane and rail lines. Further to the south lies Wrexham A,F,C STōK Cae Ras stadium.

The nearest residential noise-sensitive receptors (NSRs) to the Development have been identified as follows:

- NSR 1: existing student residential in Wrexham Student Village to the south; and
- NSR 2: residential dwellings in Spring Gardens on the other side of the railway

The NSRs (in yellow) along with the indicative red line boundary of the proposed Development and site context are shown in Figure 3-1.

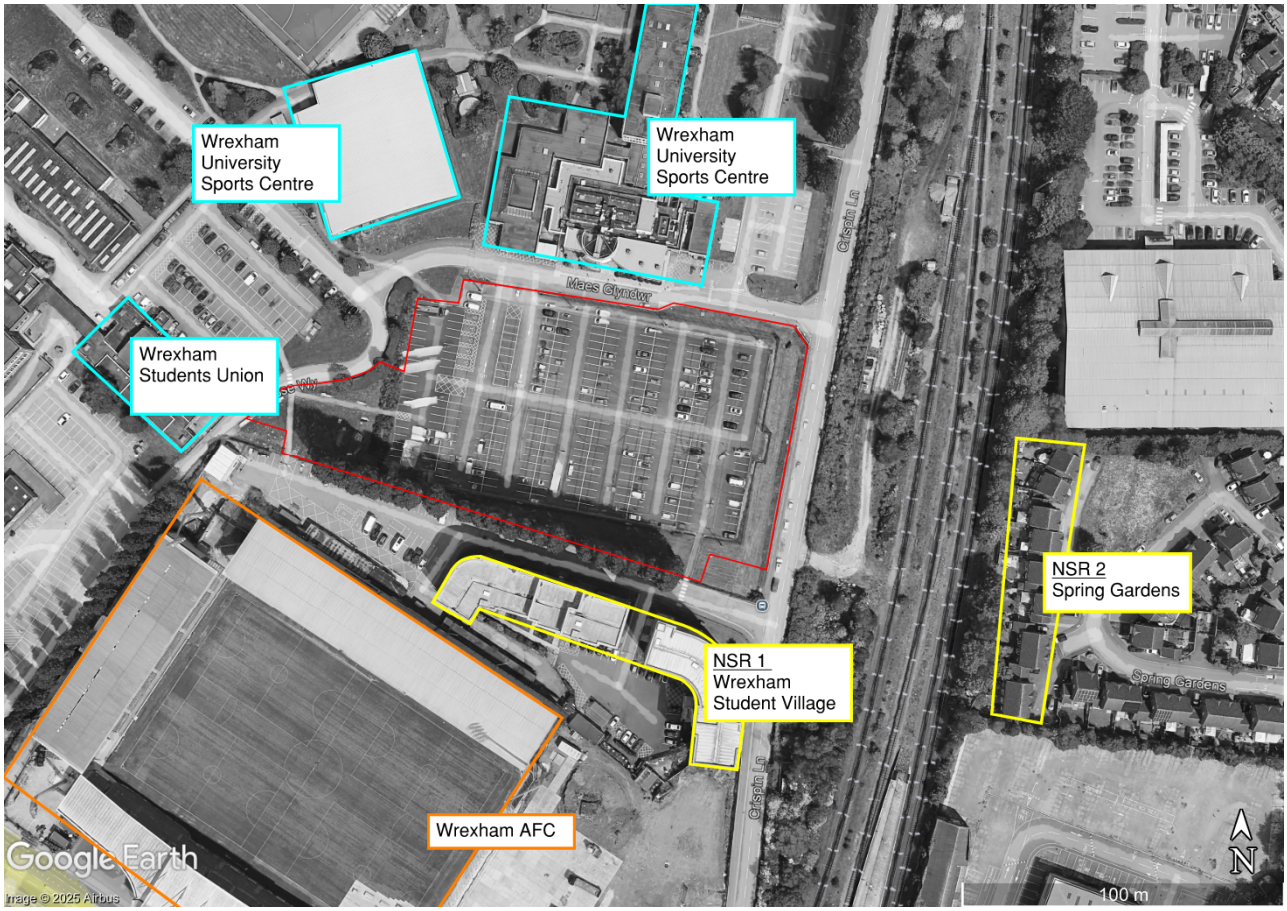


Figure 3-1: Site layout (site boundary in red)

3.1 Wrexham A.F.C Kop stand redevelopment

As of 4 December 2025, it is understood construction works are being undertaken for the redevelopment of the Kop Stand at the STōK Cae Ras stadium to increase the capacity to 7,750.

The Ramboll Noise Impact Assessment[1] submitted in support of the initial 5,500 seat expansion application (Application ref: P/2022/0725) states the following with respect to calculated noise impacts as a result of the stand expansion:

6.3 Wrexham Village Student Accommodation

At Wrexham Village Student Accommodation, noise levels are not expected to change as a result of the redevelopment.

There is therefore no expected change in noise levels at this receptor

Furthermore, the Operational noise breakout assessment[2] submitted in support of the Section 73 application for increased seating capacity to 7,750 (Application ref: P/2025/0090) states:

2. Operational noise breakout during a football match

2.1 Given the proposed new Kop Stand facades and roof, and their materiality, it is expected that operational noise levels during a football match at the nearby noise sensitive receivers will be similar to those predicted in Ramboll's Noise Impact Assessment dated October 2022. This shows that future noise levels with the new Kop Stand in use are likely to be the same or lower than the existing levels experienced by the nearby noise sensitive receivers during a match.

Given the above assessments and the proximity of the proposed PBSA Development to the Wrexham Student Village receptor, it is reasonable to conclude that any future noise impacts resulting from the Kop Stand expansion when assessed at the proposed PBSA Development are also likely to be comparable to, or lower than, those measured and reported within this assessment.

[1] Report ref: 1620012485 rev: F03 dated 10/10/2022
[2] Report ref: 6359-EXP-ACO-SKB-S73 Technical Note - Noise breakout-R02 dated 30/01/2025

4.0

Environmental noise survey

4.0 Environmental noise survey

4.1 Methodology

This section of the report gives details of the environmental noise survey undertaken at the site. The noise survey had the following key aims:

- Measure existing noise levels at the site which will be incident upon the proposed development; and,
- Measure existing background noise levels representative of those at the nearest NSR to the proposed development.

The survey comprised part attended / part unattended noise monitoring for approximately 24-hours, between 18:30 on Wednesday 26 November 2025 and 18:00 on 27 November 2025. Whilst on site, subjective assessments were made of the prevailing acoustic environment and soundscape.

The timing of the noise measurements was intentionally selected to coincide with a Wrexham A.F.C. home fixture against Bristol City (recorded attendance 10,540 spectators). The scheduled kick-off time of 19:45 provided an opportunity to capture stadium-related noise and associated spectator movements during a representative evening event, also enabling any potential impact on the soundscape during the night-time assessment period (i.e., after 11pm) to be quantified.

The noise logging position was continuously attended from 18:00 until approximately 22:45. This monitoring period encompassed pre-match spectator arrival, the duration of the match, and post-match dispersal. Attendance throughout the monitoring ensured that notable changes in the acoustic environment could be observed and correlated with stadium activity. Attended measurements were only concluded once it was evident that the soundscape had returned to ‘typical’ baseline conditions i.e., the absence of stadium noise and reduced levels of spectator transportation noise.

The following monitoring location was selected as summarised below and shown in Figure 4-1 overleaf.

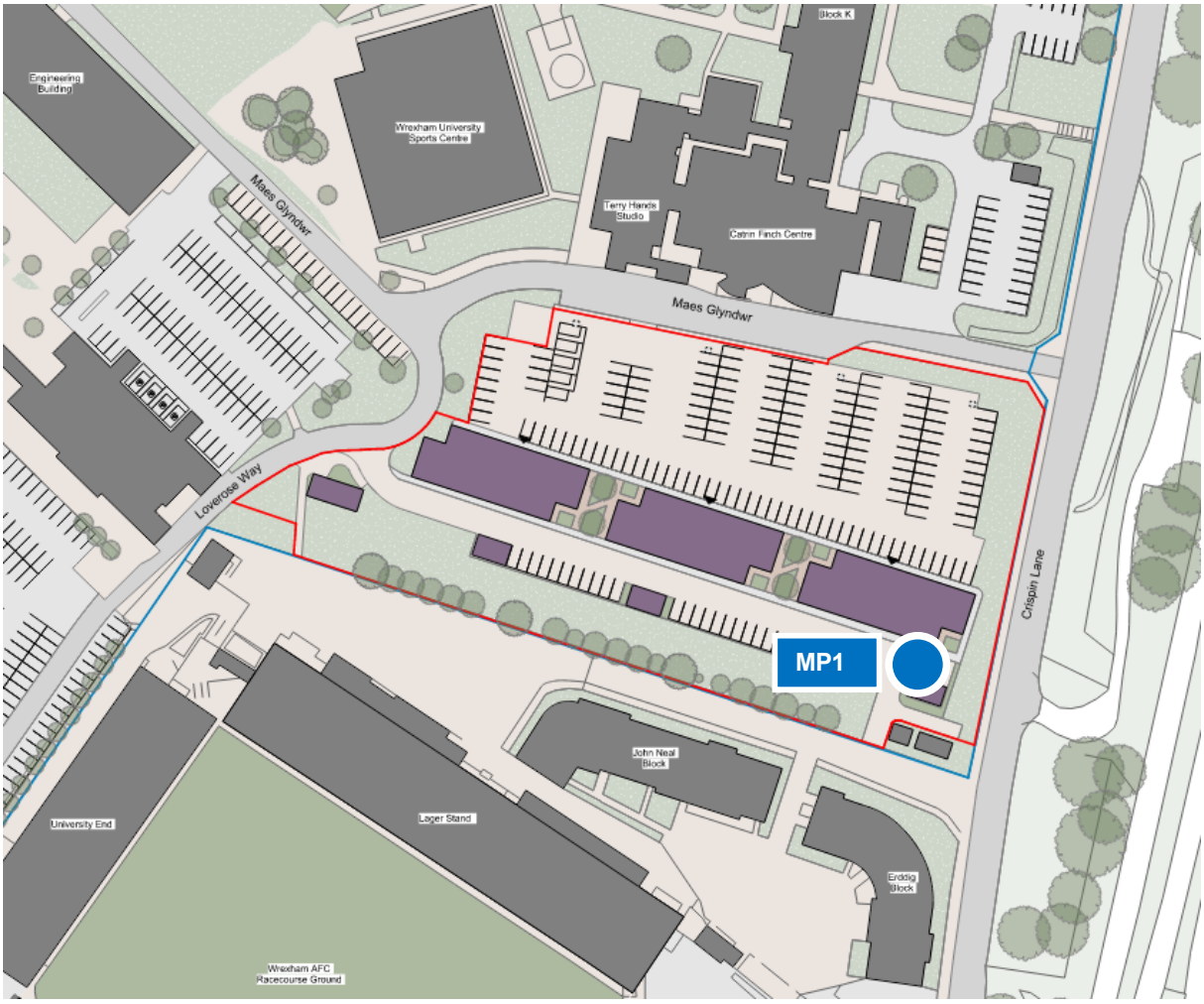


Figure 4-1: Approximate monitoring location

The sound level meter was installed in free field-conditions on a tripod at 1.7 m from the ground. The measurement position was selected as being representative of noise at the 'worst-case' façade of the proposed Development i.e., the façade positioned closest to road, rail and Wrexham A.F.C stadium noise sources.

The location is also considered representative of the background noise level at the nearest noise sensitive receptors to the Development.

It should be noted that measurement was carried out approximately 11 m from Crispin Road, whereas layouts show the proposed façade at approximately 8 m from the edge of Crispin Road. As such, a correction has been applied to account for this distance, full details of which are provided in Section 5.0.

Measurements were carried out following guidance from BS 4142 and BS 7445-1: 2003 'Description and measurement of environmental noise Part 1: Guide to quantities and procedures'.

Contiguous measurements were taken of the following sound level indicators:

- $L_{Aeq,T}$ (the continuous equivalent A-weighted sound level over a given time period)
- $L_{A90,T}$ (the A-weighted background sound level over a given time period)
- L_{AFMax} (the A-weighted maximum, sound level measured with a fast time-constant)

4.2 Instrumentation

Table 4-1 provides relevant details of the equipment used during the survey. The sound level meter used conforms to BS EN 61672-1:2013 Class 1 accuracy and was field calibrated before and after use with no significant drift in measurements observed between calibrations.

Equipment	Manufacturer & model	Serial number
Sound Level Meter	Casella 633	1211404
Sound Calibrator	Casella 120/1	3574169

Table 4-1:Survey equipment

Copies of external calibration certificates can be provided upon request.

The sound level meter was calibrated before and after measurements were undertaken with no significant drift noted.

4.3 Subjective impressions: Existing sound environment and soundscape

During the survey it was noted that the main noise sources which constitute the acoustic / sound environment at the site of the proposed Development are:

- Road and rail traffic from Crispin Lane and rail lines to the east, although neither were highly frequented, with only 2 trains (one passenger and one freight) noted over approximately four hours (~18:30-22:30).
- Distant road traffic noise from Mold Road (A541) to the south, was audible and continuous and was the predominant background noise source
- Noise from Wrexham AFC stadium prior to, during and after an evening match. Crowd noise during the match was clearly audible, though no significant amplified music or PA system announcements were noted. Noise was also noted from spectators arriving / leaving the match and associated road traffic. Noise levels subdued significantly post-match, returning to typical noise levels by 23:00.
- After the Wrexham AFC match, spectators were noted to vacate the area surrounding the stadium relatively quickly, with the soundscape surrounding the stadium returning to 'typical' noise levels within approximately 30-minutes.

4.4 Survey data summary

A summary of the noise levels recorded during the survey period is detailed in Table 4-2 below.

Location	Period	Ambient level dB $L_{Aeq,T}$	*Typical background level dB $L_{A90,15min}$	Maximum level dB $L_{AFMax,2min}$
MP1	Day	56 $L_{Aeq,16hour}$	49	-
	Night	49 $L_{Aeq,8hour}$	37	66
*Following statistical analysis of the measured background noise levels, the modal value has been determined to also be the most representative value during both daytime and night-time periods. Histograms showing the range of background noise levels and those determined to be typical are shown in Appendix D to this report				

Table 4-2: Environmental noise summary

Detailed time history graphs showing ambient ($L_{Aeq,T}$), background ($L_{A90,T}$) and night-time maximum noise events ($L_{AFMax,2min}$) are included in the Appendices of this report.

4.5 Uncertainty

There is some inherent uncertainty associated with the results of any noise survey. However, the measurement location chosen was representative of the conditions at the nearest receptors, Class 1 equipment was used, and calibrations checked before/after measurements, and weather conditions during the survey period were conducive with noise monitoring.

It is therefore considered that the potential risk associated with such uncertainties is minimal and that the measured noise levels are appropriate to inform the noise assessment detailed in this report.

5.0

Noise impact assessment

5.0 Noise impact assessment

The section presents an assessment of site suitability with respect to mitigation measures to achieve the proposed Internal Ambient Noise Level design criteria for the Development.

It is considered that suitable glazing and ventilation attenuation can be provided to habitable rooms, such that internal ambient noise levels would be compliant with the BS 8233 limits detailed in Table 2-2.

It can be seen from the results of the environmental noise survey that the highest noise levels at the south-east facade of the Development are as follows, which have been used for the basis of this assessment:

- Daytime $L_{Aeq,T}$: 56 dB
- Night-time $L_{Aeq,T}$: 49 dB
- Night-time $L_{AFmax,2min}$: 66 dB (10th highest exceedance)

It should be noted that the measurement was carried out approximately 11 m from Crispin Road, whereas layouts show the proposed façade at approximately 5 m from the edge of Crispin Road. As such, for the purpose of this noise impact assessment a correction has been applied to account for this distance .This is based on noise emission for the majority or the survey being dominated by local road traffic on Crispin lane, and is considered a reasonable / robust assumption.

The calculation of the applied correction is based on the ratio of distances between the measurement location and façade location in proximity to the road, as follows:

$$\Delta L = C * \log\left(\frac{d2}{d1}\right) = 3.4\ dB$$

Where C has a value of 10 for a line source (road)

5.1 Building envelope requirements

Within the vast majority of traditionally-built façades, the weakest elements of the external elevation are the glazing and any ventilation openings. Normally, the specification of these elements will be the primary factor in determining the internal ambient noise level within residential rooms due to noise ingress from outside.

The minimum sound reduction requirements identified for façades across the Development use the simplified calculation procedure for determining the glazing attenuation as follows:

$R_w + C_{tr}$ = External Façade Level dBA – Internal Design Target dBA

The following table presents summary of residential façade requirements. The required facade sound insulation for the residential development is no greater than 21 dB $R_w + C_{tr}$.

Monitoring location	External façade noise level	BS 8233 Internal noise criteria	Required sound insulation dB $R_w + C_{tr}$
MP	59 dB $L_{Aeq,daytime}$	35 dB $L_{Aeq,daytime}$	24
	52 dB $L_{Aeq,night\text{-}time}$	30 dB $L_{Aeq,night\text{-}time}$	22
	69 dB $L_{AF,max(night\text{-}time)}$ (10th highest exceedance)	45 dB $L_{AF,max(night\text{-}time)}$ fewer than 15 exceedances	24

Table 5-1: Summary of residential façade requirements

5.2 Glazing and ventilation requirements

Based on prevailing noise levels and building envelope calculations, target internal ambient noise levels should be achievable across all habitable rooms of the Development with the following glazing specification and trickle vent specification (if/where applicable).

Glazing specification	Trickle ventilation (if/where applicable)
Enhanced double-glazing e.g. ▪ 4 mm pane ▪ 6 to 20mm air gap ▪ 6 mm pane This construction is rated at $R_w + C_{tr}$ 25 dB by BS 12354-3:2000	Ventilation to habitable rooms to provide a sound reduction index of not less than 31 dB $D_{n,e,w} + C_{tr}$ (assuming maximum 2no. ventilators per room)

Table 5-2: Indicative minimum façade sound insulation criterion

The final ventilation solution for the project is yet to be finalised. However, if spaces are ventilated using a mechanical system (i.e. MVHR), no façade openings (e.g. trickle vents) would be required.

The following general recommendations are made for glazing and ventilation:

- Whole-dwellings ventilation (commonly known as 'background' ventilation) should be capable of providing the minimum ventilation rates given in Part F of the Building Regulations. Glazing calculations have been based upon the assumption that ventilation will be provided via MVHR systems i.e. no window-head trickle ventilators will be required. If windows head trickle ventilators are required, the Reserved Matters external noise intrusion calculations should be revised accordingly;
- Glazing and ventilation elements in the external facades are generally considered to be the weakest elements acoustically. To maintain the integrity of the external façade it will also be necessary for the project acoustician to review the external wall build-up once thermal upgrades have been proposed at detailed design stage.
- To meet the requirements for purge ventilation, it should be acceptable to open windows. Purge ventilation, as described in Part F of the Building Regulations (Wales) is intermittent *"and required only for pollutants produced by occasional activities (e.g. fumes from painting)."* During these short periods of time, increases in noise levels are considered acceptable;

Minimum glazing and façade sound insulation specifications will be further refined once internal room volumes for all habitable spaces have been confirmed and additional long-term unattended acoustic monitoring has been carried out at the site.

At the time of writing, an overheating strategy for the Development has not been finalised. The proposed overheating strategy will be considered in further detail at the next design stage as to not adversely affect internal noise levels. Further guidance with respect to Approved Document O (Wales) guidance is provided in Section 5.4.

5.3 Tan 11

When assessed against the Noise Exposure Categories (NEC) (detailed in Table 2-1) for new dwellings exposed to noise from either road traffic, rail traffic, or mixed sources under TAN 11 (1997), ambient noise levels at the site of the development fall under NEC B. Category B advises "*Noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection."*

Based on the subjective impressions of the existing sound environment made on site, road and rail traffic are expected to remain the primary noise sources post-development, with intermittent noise from matches at Wrexham AFC Stadium.

Rail and road traffic closest to the development were noted as moderate and unlikely to pose a significant risk. Stadium related noise, whilst perceptible is not considered a significant risk given the magnitude of the noise levels, character of sound (i.e. no amplified sound noted) the fact that it is intermittent (i.e. event-driven), and that noise levels subdue before the night-time assessment period, even during Wrexham A.F.C football matches with evening kick-off times.

Taking into consideration the magnitude of noise levels measured on site, the existing sound environment, and nearby existing student residential usage, it is deemed of low risk for residential use provided appropriate mitigation is applied.

5.4 Assessment of suitable overheating strategy (Noise)

As outlined in Section 2.1.5, Approved Document O (Wales) of the Building Regulations, sets out requirements for the control of overheating and the provision of suitable mitigation measures in new residential developments. ADO (Wales) does not define or impose specific absolute noise level criteria.

However, for reference, the supplementary guidance[3] published jointly by the Association of Noise Consultants (ANC) and the Institute of Acoustics (IoA) to accompany Approved Document O (England) defines external noise thresholds above which detailed dynamic thermal modelling is advised. While these thresholds are not formally adopted within the Welsh guidance, they provide a useful benchmark for identifying circumstances where open-window ventilation may not be appropriate without further acoustic assessment.

These ANC/IoA thresholds are reproduced in Table 5-3 below and compared against the external noise levels assessed at the most-exposed façade.

Parameter	Measured external noise levels	ANC/IoA guidance ADO (England) external noise thresholds for moderate risk locations	Assessment outcome
dBA $L_{eq,8h,}$ averaged over 8 hours (23:00-07:00)	52	≤ 50	2 dB exceedance
dBA L_{Fmax}, more than 10 times a night (23:00-07:00)	69	≤ 65	4 dB exceedance

Table 5-3: ADO thresholds for external noise levels

For worst-case affected facades of the Development with direct line-of-sight to Crispin Lane, predicted external façade noise levels exceed the ANC/IoA guidance threshold limits at which simple, non-modelled overheating assessments are advised. Therefore, while Approved Document O (Wales) does not define explicit numerical noise limits, it is recommended that TM59 dynamic thermal modelling is undertaken to establish the extent of any night-time overheating risk and to determine whether a cooling strategy reliant on open-window ventilation is necessary.

Should TM59 modelling confirm the need for openable windows as part of the current overheating mitigation strategy, further acoustic design assessment will be undertaken. This will quantify external noise intrusion based on the required equivalent free area of the ventilation openings and confirm whether acceptable internal noise levels can be achieved.

In the event that predicted internal noise levels are not acceptable with open-window ventilation, alternative means of providing sufficient cooling and ventilation (e.g., such as MVHR or MEV systems) will be further developed to negate or minimise the need for night-time open window ventilative cooling.

[3] The Guide to Demonstrating Compliance with the Noise Requirements of Approved Document O (v1.1, November 2024)

6.0

External noise emission limits

6.0 External noise emission limits

The proposed development may include noise-generating building services plant which have the potential to impact upon existing noise sensitive receptors (NSR) in the locality of the site.

Noise emission limits for new plant and equipment have been set at the façades of the nearest NSR based on local and national policy and guidance from BS 4142:2014 +2019 are summarised below.

Noise sensitive receptors	Period	Typical measured background noise level $L_{A90,15min}$ (dB)	Plant rating level at 1 m from NSR façade, $L_{Ar,Tr}$ (dB)
NSR 1 (Wrexham Student Village) & NSR 2 (Spring Gardens)	Daytime (07:00 – 23:00 hrs)	49	49
	Night-time (23:00 – 07:00 hrs)	37	37

Table 6-1: Proposed plant noise limits

The above limits are based on levels which BS 4142 deems as having a low risk of adverse on existing NSR and protecting the existing sound environment.

Plant noise emission limits apply to the cumulative noise levels from all new items of plant operating at their standard duty and are applicable at 1 metre from the window of the nearest noise sensitive receptors.

At this point in the design, no detailed specifications have been set out for buildings services installations associated with the proposed development. However, where necessary, suitable attenuation measures should be specified (e.g. acoustic screening or acoustic attenuators) where required in order to comply with these noise emission limits.

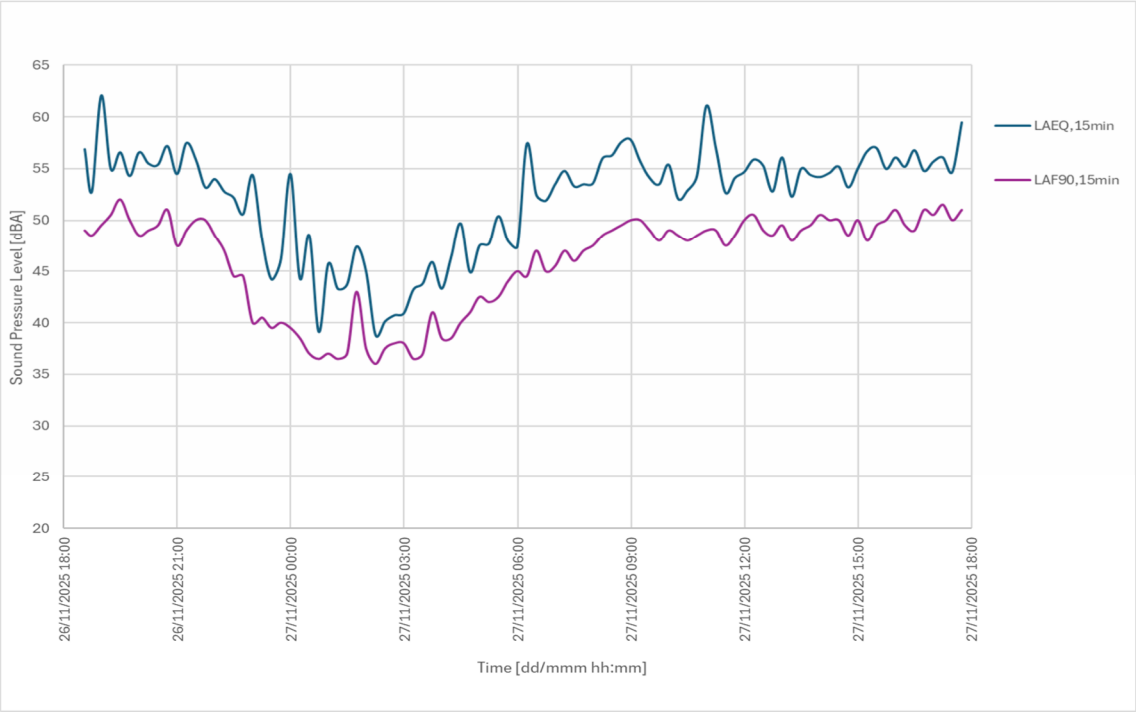
It is also important to note that the plant noise limits are in terms of the 'rating level' as defined in BS 4142: 2014. Therefore, if acoustic features such as tones, impulsivity or intermittence are present, a correction will need to be applied and the actual 'specific noise level' produced by any plant / equipment will need to be lower than the values above. The required level will depend on the type of sound in question.

When detailed information regarding new plant and equipment is available, a more detailed noise assessment should be undertaken based on the specific plant to be installed, its location, acoustic features and any noise control measures.

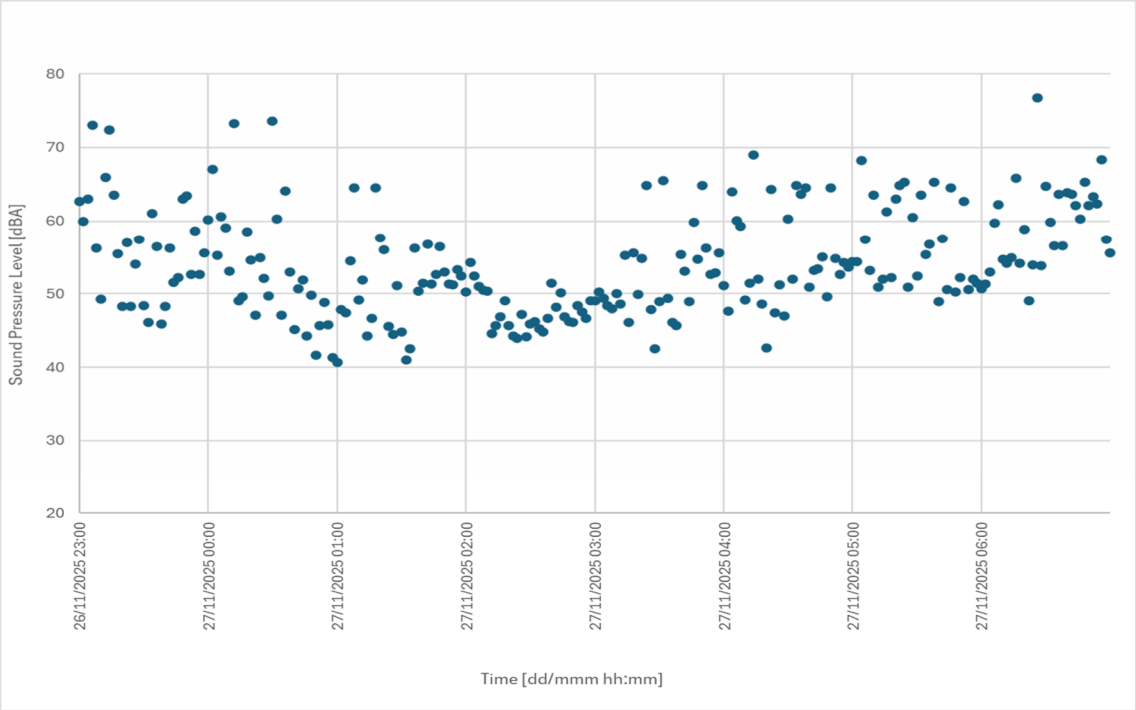
Appendices

Appendices

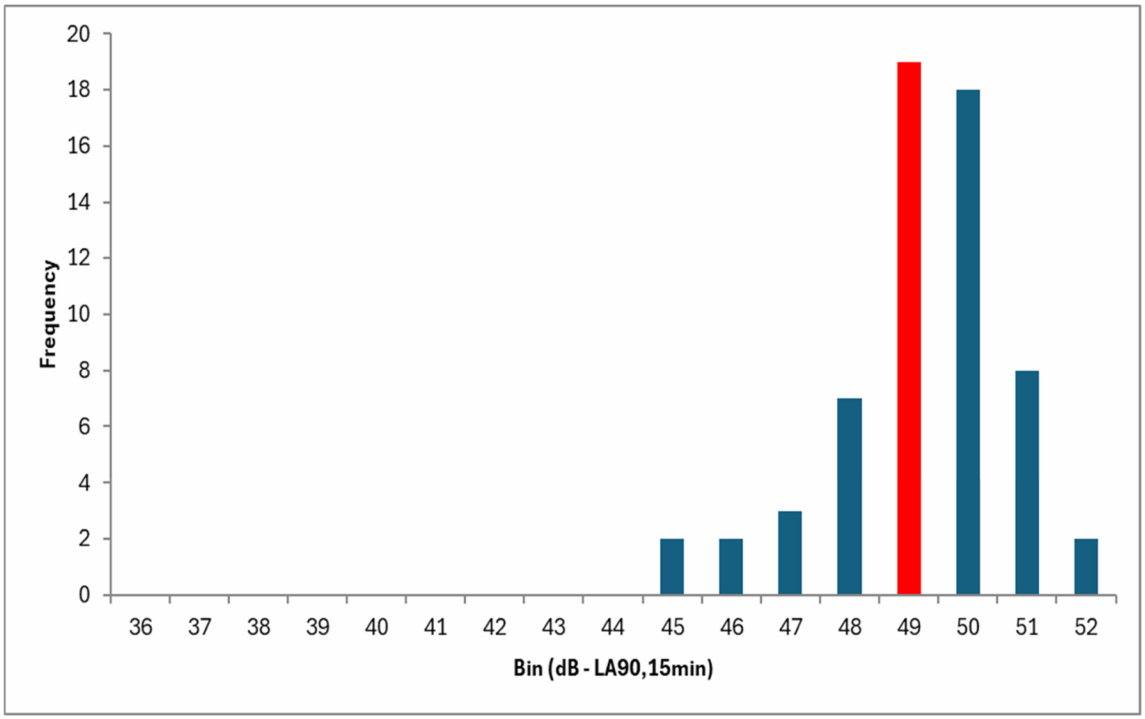
Appendix A Time history graph of measured ambient ($L_{Aeq,T}$) and background ($L_{A90,T}$) noise levels



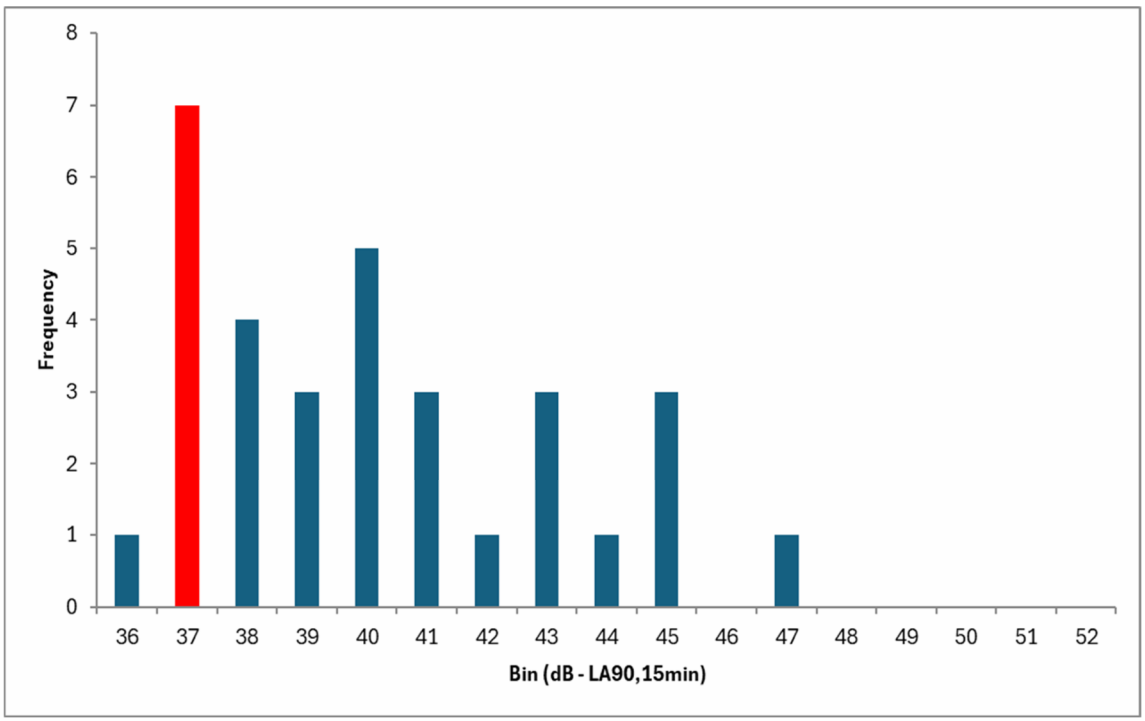
Appendix B Time history graph of measured maximum noise levels $L_{AFMax,2min}$



Appendix C Typical background noise level assessment (Daytime)



Appendix D Typical background noise level assessment (Night-time)



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