

Hydrock  now

 Stantec

Parc Pelenna

Noise Impact Assessment

For Trivselhus UK Holdings Ltd.

Date 21 January 2025

Doc ref 16044-HYD-ZZ-XX-RP-Y-1001-P02

Document control sheet

Issued by	Hydrock Consultants Limited Wharton Place 13 Wharton Street Cardiff CF10 1GS United Kingdom	T +44 (0)2920 023 665 E cardiff@hydrock.com hydrock.com
Client	Trivselhus UK Holdings Ltd.	
Project name	Parc Pelenna	
Title	Noise Impact Assessment	
Doc ref	16044-HYD-ZZ-XX-RP-Y-1001-P02	
Project number	C-16044	
Status	S2	
Date	21/01/2025	

Document production record		
Issue number	P02	Name
Prepared by	Sophie Bryan AffiliatelOA	
Checked by	Rhodri Owen MIOA	
Approved by	Chris Borak MIOA	

Document revision record			
Issue number	Status	Date	Revision details
P01	S2	17/01/2025	For issue.
P02	S2	21/01/2025	Revision incorporating client comments and section on construction noise & vibration.

Hydrock Consultants Limited has prepared this report in accordance with the instructions of the above named client for their sole and specific use. Any third parties who may use the information contained herein do so at their own risk.

Contents

1.	Introduction	4
1.1	<i>Outline Description of Development.....</i>	4
1.2	<i>Policy and Guidance Documents</i>	5
2.	Environmental Noise Survey	6
2.1	<i>Survey Methodology.....</i>	6
2.2	<i>Meteorological Conditions</i>	7
2.3	<i>Noise Monitoring Equipment</i>	7
2.4	<i>Survey Results</i>	8
3.	Noise Impact Assessment	9
3.1	<i>Survey Results - Discussion.....</i>	9
3.2	<i>External Building Fabric Assessment</i>	10
3.3	<i>Preliminary Overheating Assessment</i>	10
4.	Noise & Vibration Limit Assessment	10
4.1	<i>Nearest Noise-Sensitive Receptors (NSRs)</i>	10
4.2	<i>External Services Plant Noise Limits.....</i>	10
4.3	<i>Construction Noise & Vibration Impact</i>	11
5.	Summary	15

Tables

Table 1: Noise Monitoring Location Details.....	6
Table 2: Survey Equipment.....	7
Table 3: Measured Daytime & Night Time Average Ambient Sound Levels.....	8
Table 4: Typical Night-time Maximum Noise Levels	9
Table 5: Minimum Consistent Background Sound Levels.....	9
Table 6: Proposed Plant Noise Limits.....	11
Table 7: Example Threshold of Potential Significant Effect at Dwellings (Table E.1 from BS5228)	12
Table 8: Proposed Noise Limit at Nearest Noise Sensitive Receivers.....	12
Table 10: Transient Vibration Guide Values (Table B.2 & Figure B.1 from BS 5228-2)	14

Figures

Figure 1: Aerial View of Proposed Site Boundary.....	4
Figure 2: Proposed Site Plan - Drawing 2304/ 001 rev G.....	5
Figure 3: Unattended Noise Monitoring Locations.....	6

Appendices

Appendix A Acoustic Terminology

Appendix B	Guidance Documents
Appendix C	Approximate Weather History
Appendix D	Environmental Noise Survey Graph
Appendix E	Background L_{A90} Distribution Graph

1. Introduction

Hydrock, now Stantec has been appointed to carry-out a noise impact assessment for the proposed new holiday park located to the north of Pelenna Forest, Neath.

A noise survey was conducted between Tuesday 10th December 2024 and Tuesday 17th December 2024 to assess the sound climate across the proposed development site. Measured noise levels are used as a basis to determine the extent of any mitigation necessary for residential units in order to meet best practice guidance and local policy requirements.

This report is technical in nature; therefore, a glossary is provided in Appendix A.

1.1 Outline Description of Development

The proposed holiday park is understood to have 120 holiday lodges with supported amenities. The site is an estimated 45.5 hectares overlooking the Vale of Neath and the B4434 road below. Additionally, a new access road from the B4434 is proposed.

An aerial view of the site boundary and existing site is shown in Figure 1. The proposed site plan is shown in Figure 2.



Figure 1: Aerial View of Proposed Site Boundary



Figure 2: Proposed Site Plan - Drawing 2304/ 001 rev G

1.2 Policy and Guidance Documents

The assessment methodology is based on the following policy and guidance documents:

- » Technical Advice Note 11 Wales (hereafter referred to as TAN11)
- » ProPG Supplementary Document 2 (hereafter referred to as ProPG)
- » World Health Organisation "Guidelines for Community Noise", Berglund et. al., 1999 (hereafter referred to as WHO Guidelines)
- » BS 8233:2014 – "Guidance on sound insulation and noise reduction for buildings" (hereafter referred to as BS8233)
- » BS 4142:2014 + A1 2019 – "Methods for rating and assessing commercial and industrial sound" (hereafter referred to as BS4142)
- » Approved Document O: Overheating 2022 Wales (hereafter referred to as ADO)
- » Acoustics, Ventilation and Overheating Guide: 2020 (hereafter referred to as AVO)

A review of the relevant planning policy and acoustics guidance is provided in Appendix B.

2. Environmental Noise Survey

2.1 Survey Methodology

An environmental noise survey was carried-out from Tuesday 10th December 2024 to Tuesday 17th December 2024 by unattended noise monitoring.

Measurements were carried-out in accordance with the guidance outlined in BS 4142:2014+A1 2019 and BS 7445-1:2003.

The noise monitoring locations are shown in Figure 3 and summarised in Table 1.

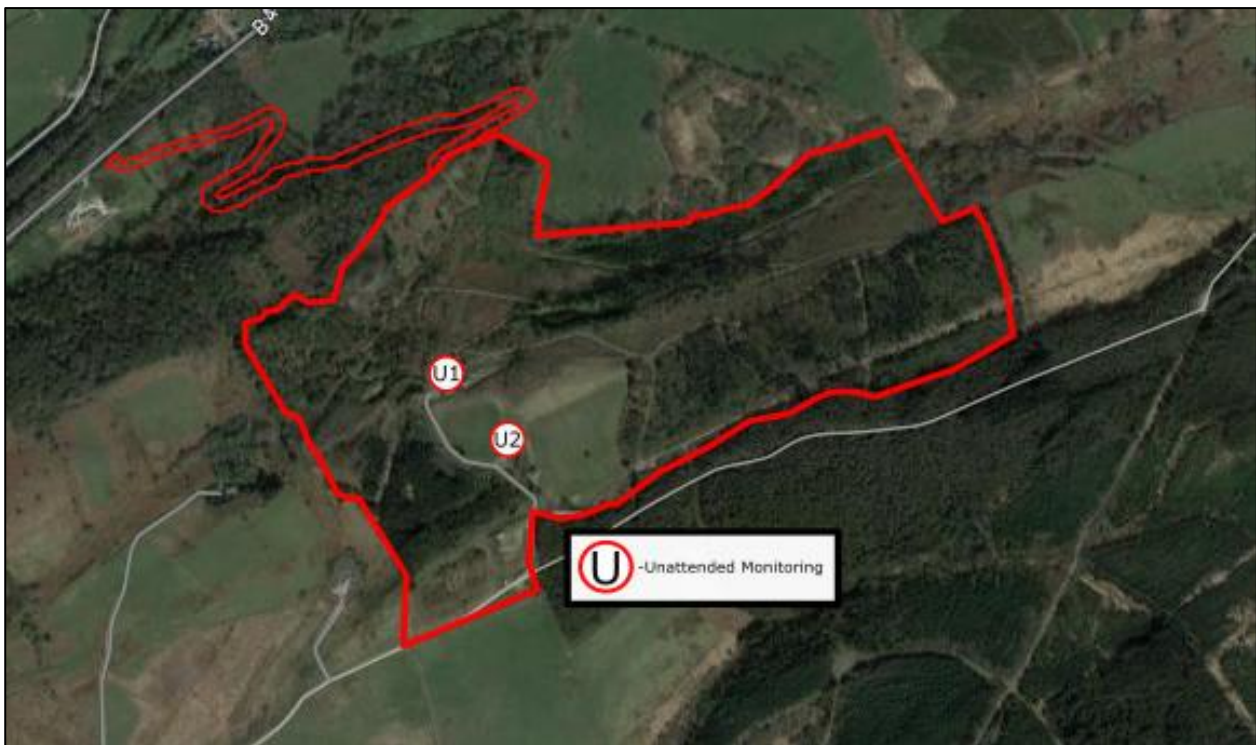


Figure 3: Unattended Noise Monitoring Locations

Table 1: Noise Monitoring Location Details

Monitoring Location ID	Description
U1	The noise monitoring position was located north of the existing residential dwelling near the western site boundary.
U2	The noise monitoring position was located south of the existing residential dwelling near the western site boundary.

Monitoring positions were "free-field", i.e. the microphone was more than 3.5m from reflective elements except the ground. Wind shields were fitted to the measurement microphones at all times.

2.2 Meteorological Conditions

Weather conditions were monitored throughout the noise survey period using a weather station. Results are shown in weather history graphs detailed in Appendix C. Weather conditions during the survey period are summarised as follows:

- » Tuesday 10th: Dry with a moderate breeze
- » Wednesday 11th: Dry with a gentle breeze
- » Thursday 12th: Dry with a light breeze
- » Friday 13th: Dry with a light breeze
- » Saturday 14th: Very light rainfall for a short duration with a gentle breeze
- » Sunday 15th: Dry with a gentle breeze
- » Monday 16th: Very light rainfall for a short duration with a gentle breeze
- » Tuesday 17th: Dry with a light breeze

Average recorded wind speeds during the environmental noise measurement process did not exceed 5 m/s. Weather conditions during the noise survey were suitable for the acquisition of noise data.

2.3 Noise Monitoring Equipment

Table 2: Survey Equipment

Monitoring Location ID	Equipment	Manufacturer	Instrument	Serial No.	Date of Last Laboratory Calibration
U1	Sound Level Meter	O1dB	FUSION	14526	26/04/2024
	Microphone	GRAS	40CD	470800	26/04/2024
	Calibrator	Cirrus	CR:515	96051	19/06/2024
U2	Sound Level Meter	O1dB	FUSION	14154	08/09/2023
	Microphone	GRAS	40CD	454513	08/09/2023
	Calibrator	Cirrus	CR:515	95406	16/10/2024
	Weather Station	VAISALA	WXT536	-	-

The sound level meters used for the noise survey have been verified as conforming to BS EN 61672-1. The acoustic calibrators used conform to BS EN IEC 60942. Equipment calibration certificates can be provided on request. The sound level meters were calibrated to a reference level of 94 dB at 1kHz both prior to, and on completion of, the noise survey period. No significant drift in calibration was noted during the survey (≤ 0.5 dB).

2.4 Survey Results

The following noise level indices are relevant to this assessment:

- » $L_{Aeq,T}$ dB ('A' weighted equivalent continuous sound pressure level) - defined as the level of a continuous noise with the same total energy as the actual fluctuating sound over the measurement time periods. It is sometimes referred to as the 'ambient noise level' and can be considered an average.
- » $L_{A90,T}$ dB - defined as the 'A' weighted sound pressure level exceeded for 90% of the measurement period 'T'. It is used to describe the prevailing background sound level within BS4142:2014 +A1 2019.
- » $L_{Amax,F,T}$ dB, defined as the 'A' weighted maximum sound pressure level that occurred during the time period 'T' acquired using a 'fast' time weighting (i.e. a sample every 125ms). It is commonly used to describe the highest noise level that occurred during an event such as a vehicle pass-by.

The noise level time history for the full survey period is presented in Appendix D.

Based on survey results and audio recordings obtained from the unattended continuous monitoring, the sound climate across the site was predominantly controlled by road traffic noise from the B4434. Rail movements from the train line at the bottom of the valley were not deemed to be significant.

A summary of the 16-hour daytime (07:00 to 23:00) and 8-hour night time (23:00 to 07:00) equivalent continuous average ambient sound levels ($L_{Aeq,T}$) is presented in Table 3.

Table 3: Measured Daytime & Night Time Average Ambient Sound Levels

Noise Monitoring Position	Period	Tues 10 th	Wed 11 th	Thurs 12 th	Fri 13 th	Sat 14 th	Sun 15 th	Mon 16 th	Overall
U1	Daytime $L_{Aeq,16hour}$ dB	45	42	38	43	46	45	46	44
	Night time $L_{Aeq,8hour}$ dB	40	32	36	39	38	43	34	39
U2	Daytime $L_{Aeq,16hour}$ dB	48	48	48	50	49	47	49	48
	Night time $L_{Aeq,8hour}$ dB	43	41	42	42	41	44	36	42

The typical night-time maximum noise level at each noise monitoring position is shown in Table 4. The typical night-time maximum noise level is determined by observing the highest $L_{AFmax,2mins}$ noise level exceeded more than 10 times during the worst-case night-time period (23:00-07:00).

Table 4: Typical Night-time Maximum Noise Levels

Noise Monitoring Position	Typical Night-time Maximum Noise Level $L_{AFmax,2mins}$ dB						
	Tues 10th	Wed 11th	Thurs 12th	Fri 13th	Sat 14th	Sun 15th	Mon 16th
U1	56	45	49	52	52	59	46
U2	56	53	54	53	57	56	47

The highest $L_{AFmax,2mins}$ noise level exceeded more than 10 times during the monitoring period for both positions are presented in bold within the table.

The typical background sound levels shown in Table 5 have been determined by observing the most-commonly occurring daytime (07:00-23:00) and night-time (23:00-07:00) background sound levels at each monitoring position. The most-commonly occurring background sound levels are shown in the L_{A90} background sound level distribution graphs presented in Appendix E.

Table 5: Minimum Consistent Background Sound Levels

Noise Monitoring Position	Period	Typical Background Sound Level
U1	Daytime (07:00-23:00)	43dB $L_{A90,1hour}$
U1	Night-time (23:00-07:00)	30dB $L_{A90,15mins}$
U2	Daytime (07:00-23:00)	47dB $L_{A90,1hour}$
U2	Night-time (23:00-07:00)	34dB $L_{A90,15mins}$

The typical background (L_{A90}) sound levels are used to set plant noise limits at the nearest noise-sensitive receptors to the proposed development site, as detailed in Section 4.1.

3. Noise Impact Assessment

3.1 Survey Results - Discussion

Survey results indicate the prevailing sound climate across the site falls within NEC Band A of TAN 11 [Wales] (See Appendix B). TAN11 describes NEC A sites with the following statement:

'Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.'

Daytime external noise levels of up to 48dB $L_{Aeq,16hr}$ across the site therefore fall below the 50dB $L_{Aeq,16hr}$ desirable outdoor amenity area limit level. Therefore, no noise mitigation measures to control external noise are deemed necessary.

3.2 External Building Fabric Assessment

To determine the necessity for noise mitigation measures to residential habitable rooms, an external building fabric assessment has been undertaken based on the following assessment scenario:

- » Bedroom with width of 4m, length of 3m, height of 2.5m
- » Façade area of 10m², with 4m² glazed area
- » Reverberation time of 0.5 seconds

The assessment has been undertaken based on standard external building fabric constructions, which are assumed to have the following minimum sound insulation performance values:

- » Timber cladding or masonry external wall, rated at min. 34dB R_w
- » Tiles on felt, pitched roof with 100mm mineral wool on plasterboard ceiling, rated at min. 43dB R_w (A minimum 34dB R_w rated roof construction is indicated sufficient).
- » Standard double-glazing 4mm/12as/4mm, rated at min. 31dB R_w
- » Trickle ventilator within window frame, rated at min. 31dB D_{ne,w}

Based on the assessment scenario outlined above, habitable rooms at the proposed site are predicted to achieve the internal noise criteria outlined in BS8233 and the WHO guidelines. Therefore, standard constructions are deemed sufficient to control external noise intrusion.

3.3 Preliminary Overheating Assessment

A level 1 site risk assessment has been undertaken in-line with the guidance presented in the AVO guide. Based on the measured external noise levels, survey results indicate that the prevailing sound climate across the site falls within the 'negligible' risk category. Therefore, it is deemed that the use of opening windows as a primary means of mitigating overheating is not likely to result in adverse effect from noise intrusion. This strategy is therefore deemed sufficient to meet the requirements of Building Regulations Part O (Wales).

4. Noise & Vibration Limit Assessment

4.1 Nearest Noise-Sensitive Receptors (NSRs)

The nearest third-party Noise-Sensitive Receptors (NSRs) to the development site are listed below:

- » Pen-Rhiw-Angharad Isaf - approx. 300m west.
- » Tan-y-Graig Bungalows - approx. 320m north-west.
- » Ynys-Nedd Farm - approx. 320m north-west.

Note: Pen-Rhiw-Angharad Uchaf house is located within the proposed development site and therefore limits for noise impact may not be applicable. It is however recommended that the vibration limits set out in Section 4.3.2 are adhered to for all existing residential dwellings.

4.2 External Services Plant Noise Limits

Rating level limits set equal to or below the measured background sound level should constitute a 'low impact depending on context' with reference to BS4142:2014+A1:2019. Limits have therefore been set in line with the most-commonly occurring measured background sound levels at monitoring position U1. The proposed rating plant noise limits are provided in Table 6.

Table 6: Proposed Plant Noise Limits

Receiver Locations	Period	Measured Minimum Consistent Background Sound Level dB L _{A90}	Proposed Rating Plant Noise Limit dB L _{Ar,Tr}
Surrounding Third-Party NSRs	Daytime (07:00 – 23:00)	43	≤ 43
	Night-time (23:00 – 07:00)	30	≤ 30

If required to comply with the design rating levels, the following mitigation could be employed:

- » Selection of energy efficient and therefore lower noise emission plant.
- » Locating external units (i.e. ASHPs, AC units) where there is no (or limited) direct line-of-sight to nearby receptors.
- » Enclose external units with proprietary acoustic enclosures or imperforate barriers. Any enclosure should be confirmed acceptable by a suitably qualified building services engineer.

By incorporating the possible mitigation strategies above (if required and identified during the appropriate design stage) into the detailed design of the proposed development, it is considered that the operational noise from fixed plant installations is predicted to result in no significant adverse impact on existing noise sensitive receptors.

4.3 Construction Noise & Vibration Impact

It is understood the proposed residential lodges are to have a modular construction and therefore their constituent parts are constructed off-site in a factory and then assembled on-site over a relatively short period of time. The highest noise levels from the construction phase are expected during groundwork activity and preparation of footings/foundations and the construction of the new road.

It is therefore expected that the noise & vibration impact to surrounding Noise-Sensitive Receptors (NSRs) during the construction phase is likely to be limited and brief in comparison to a typical (non-modular) scheme.

The nearest third-party receptor is shown to be at an approx. 300m distance. Predicted noise levels from a tracked excavator working throughout the day on the groundwork required for the lodges would likely result in an overall sound pressure level of 50dBA at the nearest NSR. This is not deemed to be significant and falls comfortably below BS 5228 limits.

The following section outlines proposed noise & vibration limits for the construction stage, to ensure noise impact to surrounding NSRs is reasonably controlled by best practicable means. These limits can be incorporated within a CEMP if deemed necessary.

4.3.1 Construction Noise Limit

BS 5228-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites' (hereafter referred to as BS 5228) provides the following method for setting noise limits at the nearest noise sensitive receivers from a proposed construction site:

Table E.1 shows an example of the threshold of potential significant effect at dwellings when the site noise level, rounded to the nearest decibel, exceeds the listed value. The table can be used as follows: for the appropriate period (night, evening/weekends or day), the ambient noise level is determined and rounded to the nearest 5 dB. This is then compared with the site noise level. If the site noise level exceeds the appropriate category value, then a potential significant effect is indicated. The assessor then needs to consider other project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect.

The table referenced in the quoted text above is presented within Table 7 below.

Table 7: Example Threshold of Potential Significant Effect at Dwellings (Table E.1 from BS5228)

Assessment category and threshold value period	Threshold value, in decibels (dB) ($L_{Aeq,T}$)		
	Category A ^{A)}	Category B ^{B)}	Category C ^{C)}
Night-time (23:00-07:00)	45	50	55
Evenings and weekends ^{D)}	55	60	65
Daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75

NOTE 1: A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

NOTE 2: If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.

NOTE 3: Applied to residential receptors only.

^{A)} Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.

^{B)} Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.

^{C)} Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.

^{D)} 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays

Based on the 'ABC' method outlined within BS 5228, and taking into account the measured average ambient noise levels at and around the site, the proposed noise limit at the nearest noise sensitive receivers is shown in Table 8.

Table 8: Proposed Noise Limit at Nearest Noise Sensitive Receivers

Location	Proposed Noise Limit
External façade of nearest noise sensitive receivers	$\leq 65 \text{ dB } L_{Aeq,T}$

The above noise limit is proposed on the assumption that all construction activity associated with the development site are limited to between 07:00 and 19:00 during the week (Monday through to Friday), and between 07:00 and 13:00 on Saturdays*. These operational hours are based on the guidance set within the ABC method of BS5228.

***Note:** it is deemed permissible to allow workers to arrive on site and get set-up before 7am in preparation to start construction activity at 7am.

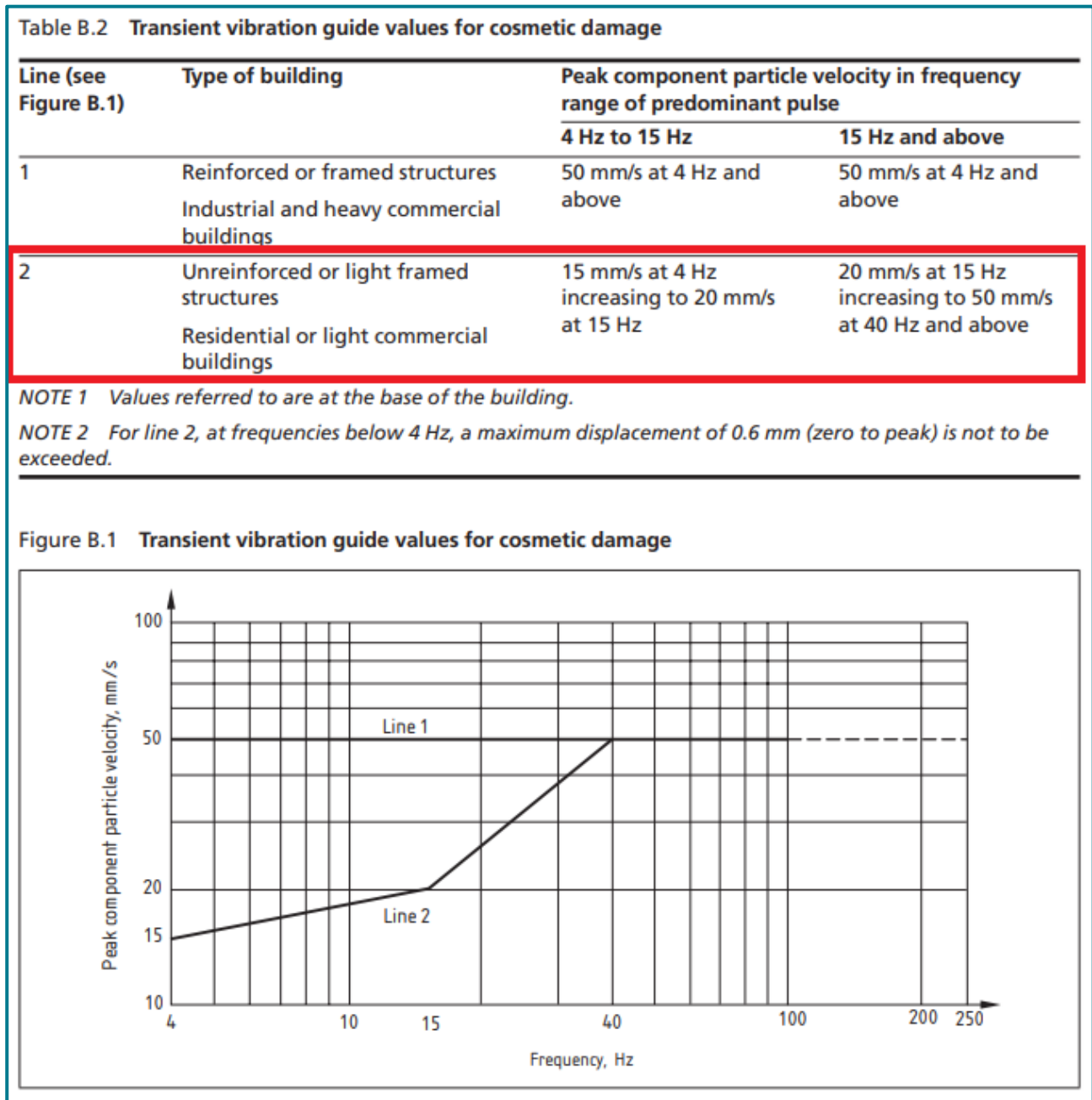
No construction activities should occur on Sundays and Bank Holidays, unless mutually agreed with nearby residents and the Local Authority.

4.3.2 Construction Vibration Limit

Construction vibration is deemed highly unlikely to affect third-party receptors at approx. 300m distance. Nonetheless, the following limits are prescribed for reference.

BS 5228 provides the following vibration level limits shown within Table 9 are peak component particle velocity (PPV) values, and would typically be measured at ground floor level of the affected building.

Table 9: Transient Vibration Guide Values (Table B.2 & Figure B.1 from BS 5228-2)



5. Summary

Hydrock now Stantec has been appointed to provide acoustic consultancy services in relation to the proposed new holiday park, located to the north of Pelenna Forest, Neath. An environmental noise survey was undertaken between the 10th and the 17th December 2024 to assess the existing noise climate at the proposed site.

Based on the survey measurement data, the site falls within the NEC Band A of TAN 11 (Wales) guidance. Standard external building fabric constructions are deemed sufficient to achieve internal acoustic design criteria, in line with BS 8233:2014 and ProPG guidance.

A passive open-window strategy for mitigating night-time overheating is deemed feasible and should therefore meet the requirements of Building Regulations Part O (Wales).

External plant noise limits and limits for construction-phase noise & vibration are proposed based on the typical measured ambient and background noise levels measured during the noise survey. Limits should be agreed acceptable with the Local Planning Authority's Environmental Health department.

Appendix A Acoustic Terminology

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2 \times 10^{-5} \text{Pa}$).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq,T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{AFmax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{AFmax} is sometimes used in assessing environmental noise where occasional loud noises occur, 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_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time, and the L_{90} is the level exceeded for 90% of the time.
R_w	R_w is the single-number quantity which characterizes the sound insulating properties of a given material over a range of frequencies. This is typically measured in a laboratory in accordance with BS EN ISO 717-1.
$D_{n,e,w}$	$D_{n,e,w}$ is the single number quantity which characterizes the airborne sound insulation performance across a given 'element' and is typically used to describe the acoustic performance of trickle ventilators etc.
C_{tr}	C_{tr} is a correction term applied to single-number sound insulation values (R_w , $D_{n,e,w}$ etc.) to afford additional weighting against low frequency performance.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and at least 3m from buildings.

Appendix B Guidance Documents

Planning Policy Wales

Welsh Government Planning Policy Wales (Edition 11) dated February 2021, states;

"6.7.20 Where sensitive developments need to be located close to existing transportation infrastructure for sustainable movement and access they should be designed, as far as practicable, to limit harmful substances and noise levels within and around those developments both now and in the future. This may include employing the principles of good acoustic design and the inclusion of active travel or travel management measures as part of development proposals. Such development, however, should preferably be located away from existing sources of significant noise, which may include aircraft noise or roads, particularly new roads or those with programmed route improvements."

The policy document goes on to refer to the 'Professional Planning Guidance (ProPG) Supplementary Document 2' produced by the Association of Noise Consultants, the Institute of Acoustics and the Chartered Institute of Environmental Health.

ProPG: Planning & Noise - Professional Guidance on Planning & Noise - New Residential Development

The Professional Practice Guidance on Planning and Noise (May 2017) provides guidance on transportation noise affecting new residential developments. The guidance was prepared by a working group formed from members of the Institute of Acoustics (IoA), the Association of Noise Consultants (ANC) and the Chartered Institute of Environmental Health (CIEH). It is specifically for assessing noise from predominantly transportation sources. The guidance promotes a two stage assessment approach:

- » Stage 1 – Initial Site Noise Risk Assessment; and,
- » Stage 2 – Full assessment and systematic appraisal of four key elements.

The Stage 1 initial risk assessment provides an indication of the likely risk of adverse effects from noise assuming in the first instance that no mitigation were included within the proposals. The risk assessment is based on measured or predicted noise levels during a "typical worst case" 24-hour period. Figure 1 of the document presents the Stage 1 assessment and indicates that higher noise levels result in increased noise risk without mitigation. This is summarised in Figure A1 below. Figure A1 (Figure 1 of ProPG) does not directly relate noise levels to specific risk categories although a negligible noise risk broadly correlates to noise levels not exceeding 50dB $L_{Aeq,16hr}$ (daytime) and 40 dB $L_{Aeq,8hr}$ (night).

Day L _{Aeq} , 16 Hr	50 dB	55 dB	60 dB	65 dB	70 dB
					
Night L _{Aeq} , 8 Hr	40 dB	45 dB	50 dB	55 dB	60 dB

Figure A 1: ProPG Stage 1 Noise Risk Assessment (adapted from ProPG Figure 1)

Where the initial noise assessment indicates a higher risk of adverse noise effects, a Stage 2 assessment is required. The Stage 2 assessment is more involved than the Stage 1 and requires systematic consideration of four elements:

Element 1 – Good Acoustic Design Process

The acoustic design of a building and any mitigation should be considered at an early stage of the design process. Following a good acoustic design process is considered a part of achieving a good design as required by the NPSE and NPPF. Guidance on the requirements for providing an Acoustic Design Statement (ADS) is given in Figure 3 of ProPG.

Element 2 – Internal Noise Level Guidelines

The guideline criteria for internal ambient noise levels are consistent with BS8233:2014:

- » 35 dB L_{Aeq,16hour} in living rooms during daytime;
- » 30 dB L_{Aeq,8hour} in bedrooms during night time; and
- » 45 dB L_{AFmax} should not normally be exceeded 10-15 times a night in bedrooms.

Element 3 – External Amenity Area Noise Assessment

The guidance of the ProPG reflects and extends on the advice of BS8233 and PPG Noise. The guidance in the ProPG presents five points for consideration, the first being "If the external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended".

Element 4 – Assessment of Other Relevant Issues

"Other relevant issues" within the context of the ProPG include relevant national and local policy which may have a bearing on the development.

Technical Advice Note (Wales) 11

Noise bands defining categories A-D of TAN 11 are set in terms of $L_{Aeq,16hr}$ daytime and $L_{Aeq,8hr}$ night time levels for road traffic noise and mixed sources, free field 1.2-1.5m above ground level as follows;

Recommended noise exposure categories for new dwellings near existing noise sources (ref Table 2 of TAN 11 (Wales) October 1997)					
Noise Source	Time	Noise Exposure Categories			
		A	B	C	D
Road Traffic	07:00-23:00	<55	55-63	63-72	>72
	23:00-07:00	<45	45-57	57-66	>66
Rail Traffic	07:00-23:00	<55	55-66	66-74	>74
	23:00-07:00	<45	45-59	59-66	>66
Air Traffic	07:00-23:00	<57	57-66	66-72	>72
	23:00-07:00	<48	48-57	57-66	>66
Mixed Sources ⁽⁴⁾	07:00-23:00	<55	55-63	63-72	>72
	23:00-07:00	<45	45-57	57-66	>66

Note: In addition, sites where individual noise events regularly exceed 82dB(A) $L_{max}(slow)$, several times in any night time hour should be treated as being in NEC C, unless the L_{eq} (8 hour) already puts the site in NEC D.

⁽⁴⁾Mixed sources: this refers to any combination of road, rail, air and industrial noise sources. The "mixed source" values are based on the lowest numerical values of the single source limits in the table. The "mixed source" NECs should only be used where no individual noise source is dominant.

British Standard 4142:2014+A1:2019

The standard method for assessing noise from commercial and industrial premises is British Standard BS 4142:2014+A1 2019 "Method for rating and assessing industrial and commercial sound". The standard is applicable for assessing noise affecting "dwellings or premises used for residential purposes".

A BS 4142 assessment is made by determining the difference between the specific noise under consideration and the background sound level, as represented by the L_{A90} parameter, determined in the absence of the commercial sound. The L_{A90} parameter is defined as the level exceeded for 90% of the measurement time. This parameter therefore excludes short duration noise events, such as individual vehicle movements, and represents the underlying continuous noise.

The commercial or industrial sound is assessed in terms of the equivalent continuous noise level, L_{Aeq} . The equivalent continuous noise level (L_{Aeq}) of the commercial or industrial sound, over the applicable assessment period, is known as the specific sound level.

A character correction penalty can be applied to the specific sound level where the commercial noise exhibits distinguishable tones, impulsiveness, intermittency or other characteristics which "are otherwise readily distinctive against the residual acoustic environment".

The specific noise level with the character correction (if necessary) is known as rating level (L_{Ar}) and the difference between the background noise and the rating level is determined to make the BS 4142 assessment. The following is then considered.

- "a) Typically, the greater this difference, the greater the magnitude of the impact.*
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- d) 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 highlights the importance of considering the context in which a sound occurs. Factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the existing acoustic character of the area should be considered when assessing the noise impact. The use of the proposed premises for short term holiday rentals is also pertinent to the consideration of context.

The standard notes the need to consider absolute sound levels where background sound levels are low:

"For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

Where the background sound levels and rating level are low, absolute levels might be as, or more, relevant than margin by which the rating level exceeds the background. This is especially true at night."

British Standard BS 8233:2014

Appropriate noise limits for internal noise levels within residential premises are recommended in BS 8233:2014. Limits are in terms of the equivalent continuous level (L_{Aeq}).

The table below provides the BS 8233:2014 guidance criteria for indoor ambient noise levels in habitable rooms when they are unoccupied.

Activity	Location	Daytime (07:00-23:00)	Night-time (23:00-07:00)
		$L_{Aeq16hour}$ dB	$L_{Aeq8hour}$ dB
Resting	Living room	35	-
Dining	Dining room / area	40	-
Sleeping (daytime resting)	Bedroom	35	30

The indoor ambient noise level guidance of BS 8233:2014 is qualified by various notes, of which applicable ones are given in the table below:

Qualifying Note	Description
Note 2	The levels shown in the table above are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the levels recommended in the table above.
Note 3	These levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.
Note 4	Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values.
Note 5	If relying on closed windows to meet the guide values, there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.
Note 7	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 conditions still achieved.

BS 8233:2014 also provides guidance on external noise levels for protection of private amenity spaces for residential demises. A level of 50 dB $L_{Aeq,T}$ is said to be desirable but 55 dB $L_{Aeq,T}$ should be regarded as the upper guideline value.

Building Regulations Part O 2022 (Wales)

Requirement O1 of Part O in Wales applies when a new residential building is erected and states,

*"(1) Reasonable provision must be made to –
limit unwanted solar gains in summer;
provide an adequate means to remove heat from the indoor environment.
(2) In meeting the obligations in sub-paragraph (1) –
account must be taken of the safety of any occupant, and their reasonable enjoyment of the building; and
mechanical cooling may only be used where insufficient heat is capable of being removed from the indoor environment without it. "*

Under the heading "Intention", it states that requirement O1(2)(a) is met if the building's overheating mitigation strategy takes account of all the following:

- » Noise at night
- » Pollution
- » Security
- » Protection from falling
- » Protection from entrapment

Noise at night is covered in paragraphs 2.2 to 2.4 as follows:

"2.2 High levels of external noise could limit the use of cross-ventilation to mitigate the risk of summer overheating. External noise is a material consideration considered when applying for Planning permission and mitigating measures may be required in the design in order to obtain Planning permission and controlled through a condition imposed on the consent. In exceptional cases, this could include non-openable windows. More commonly, windows will be openable in order to enable natural ventilation to occur at less sensitive times of day, when there is lower noise, when people are not present in the room, or when they are present but not engaged in noise-sensitive activities. But those windows may need to be kept closed at times to maintain acceptable indoor acoustic conditions, for example when people are using the rooms for sleep or office work. A noise issue may be identified at the Planning stage but rely on occupants to close windows at noise-sensitive times rather than prevent them from ever opening them, and in those cases overheating strategies should assume windows will be closed during noise-sensitive periods even if they are not fixed closed.

2.3 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:

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;

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.)

2.4 Where active measures (e.g. mechanical system) are used for removing excess heat within the overheating strategy, the noise generated by these measures, particularly within bedrooms and living rooms should be considered. Noise generated by ventilation/cooling systems (which may travel through ducts) and noise from the fan unit may disturb the occupants of the building and so discourage their use. Therefore, the designer should consider minimising noise by careful design and the specification of quieter products. Further guidance on mechanical ventilation systems can be found in Approved Document F."

There is no further criteria or guidance on internal noise levels within Building Regulations Part O in Wales and therefore guidance is sought from the Acoustics, Ventilation and Overheating Residential Design Guide (AVO Guide): 2020 prepared by the Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA).

Acoustics, Ventilation and Overheating – Residential Design Guide 2020

The Acoustics, Ventilation and Overheating – Residential Design Guide (AVO Guide) 2020 aims to assist designers to adopt an integrated approach to the acoustic design of residential dwellings within the context of ventilation and thermal comfort requirements.

The guidance outlines a two-level risk assessment procedure for estimating the potential adverse impact on occupants in overheating conditions.

The Level 1 site risk assessment is based on external free-field noise levels and the assumed scenario where a partially open window is used to mitigate overheating. The Level 1 assessment is sufficient for developments on 'Negligible' risk sites (as defined by the table shown on the page overleaf).

The Level 2 assessment is recommended for 'High' risk sites. For 'Low' and 'Medium' risk sites, a Level 2 assessment can optionally be carried-out to give more confidence regarding the suitability of internal noise conditions. This may be particularly appropriate for sites in the 'Medium' risk category.

Table 3-2 Guidance for Level 1 site risk assessment of noise from transport noise sources ^[Note 1] relating to overheating condition

Risk category for Level 1 assessment ^[Note 5]	Potential Effect without Mitigation	Recommendation for Level 2 assessment
$L_{Aeq, T}$ ^[Note 3] during 07:00 - 23:00 $L_{Aeq, 8hr}$ during 23:00 - 07:00 65 dB High 60 dB Medium 55 dB Low 50 dB Negligible	Increasing risk of adverse effect	Recommended Optional
	Use of opening windows as primary means of mitigating overheating is not likely to result in adverse effect	Not required

Note 1 The noise levels suggested assume a steady road traffic noise source but may be adapted for other types of transport. All levels are external free-field noise levels.

Note 2 The values presented in this table should not be regarded as fixed thresholds and reference can also be made to relevant dose-response relationships, [15, 17].

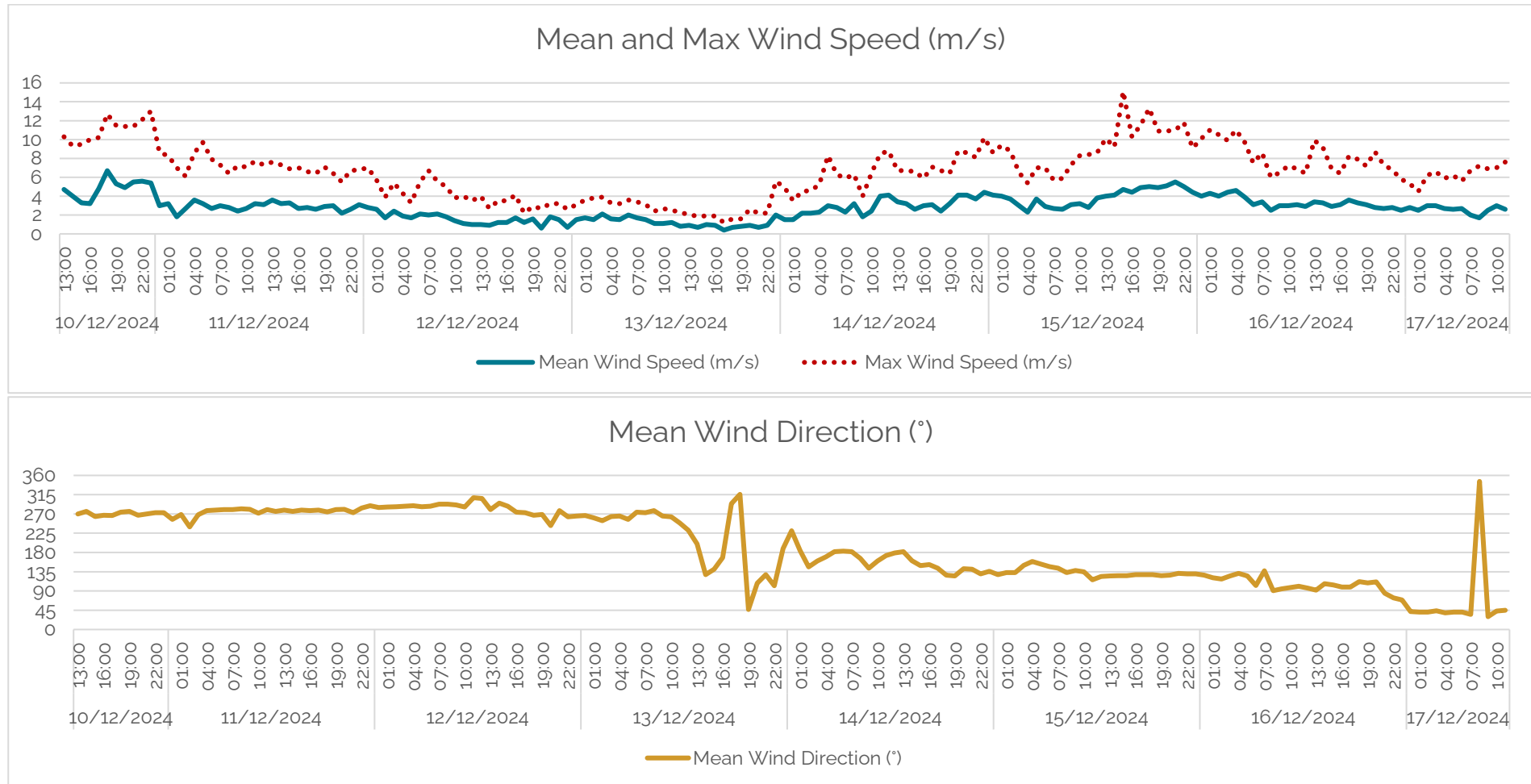
Note 3 A decision must be made regarding the appropriate averaging period to use. The averaging period should reflect the nature of the noise source, the occupancy profile and times at which overheating might be likely to occur. Further guidance can be found within the 2014 IEMA Guidelines ^[23].

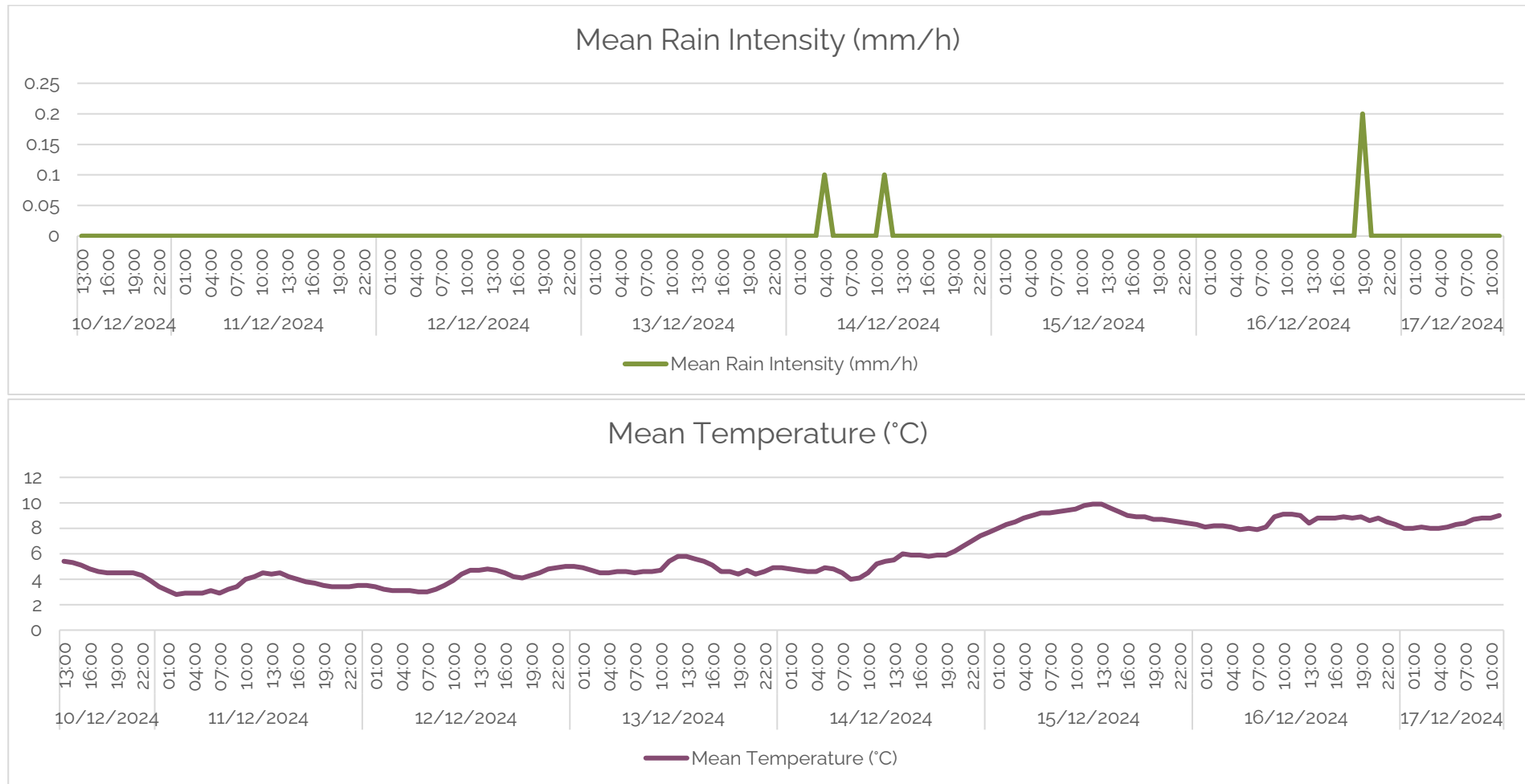
Note 4 Refer also to references ^[1, 17, 18, 22] for further guidance regarding individual noise events. Where 78dB LAFmax is normally exceeded during the night-time period (23:00–07:00), a Level 2 assessment is recommended.

Note 5 The risk of an adverse effect occurring will also depend on how frequently and for what duration the overheating condition occurs. Refer to Figure 3-2.

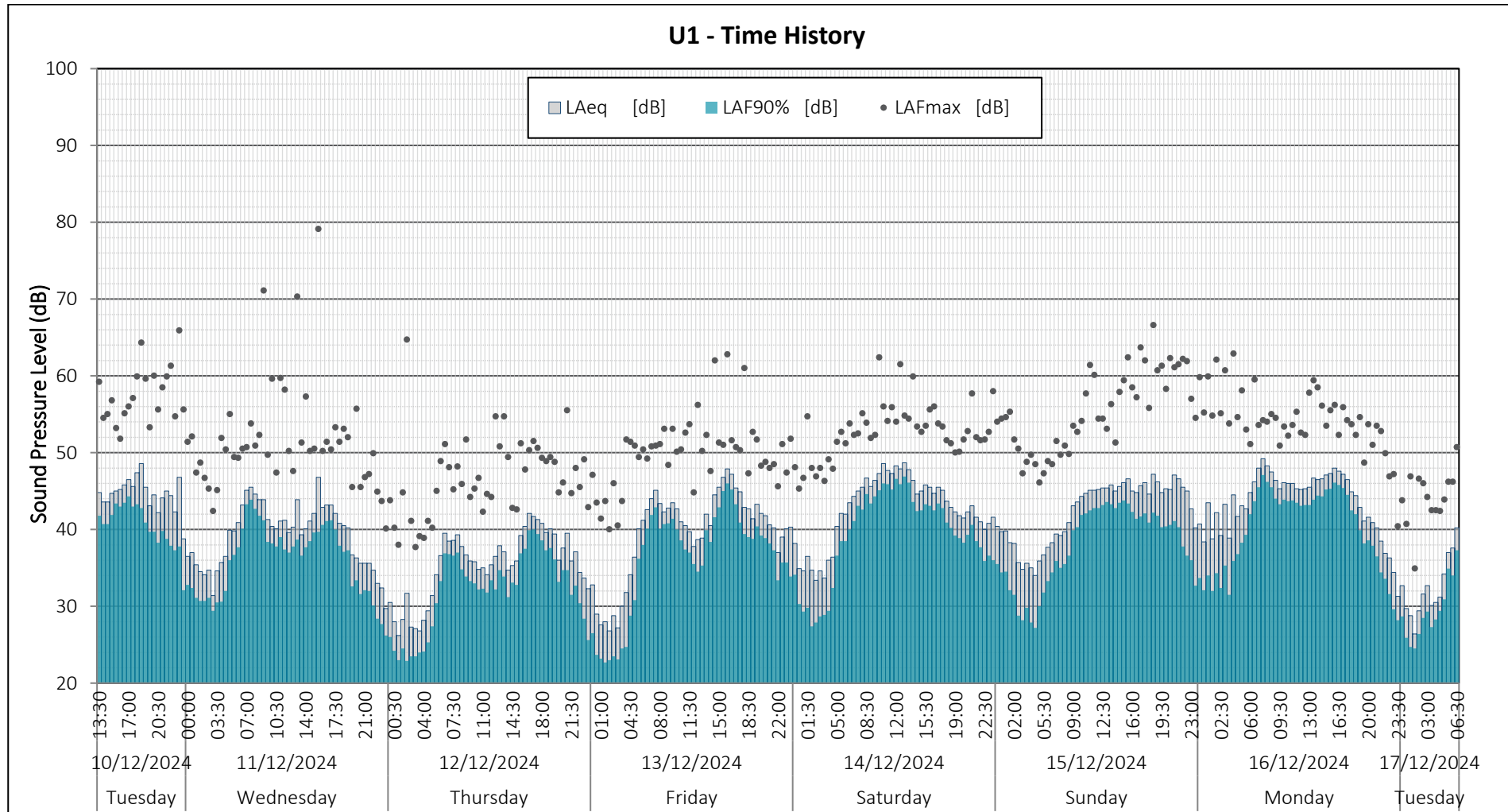
Note 6 To evaluate the risk category for a dwelling, all three aspects of external noise exposure (i.e. daytime, night-time and individual noise events) should be evaluated. The highest risk category for any of the three aspects applies.

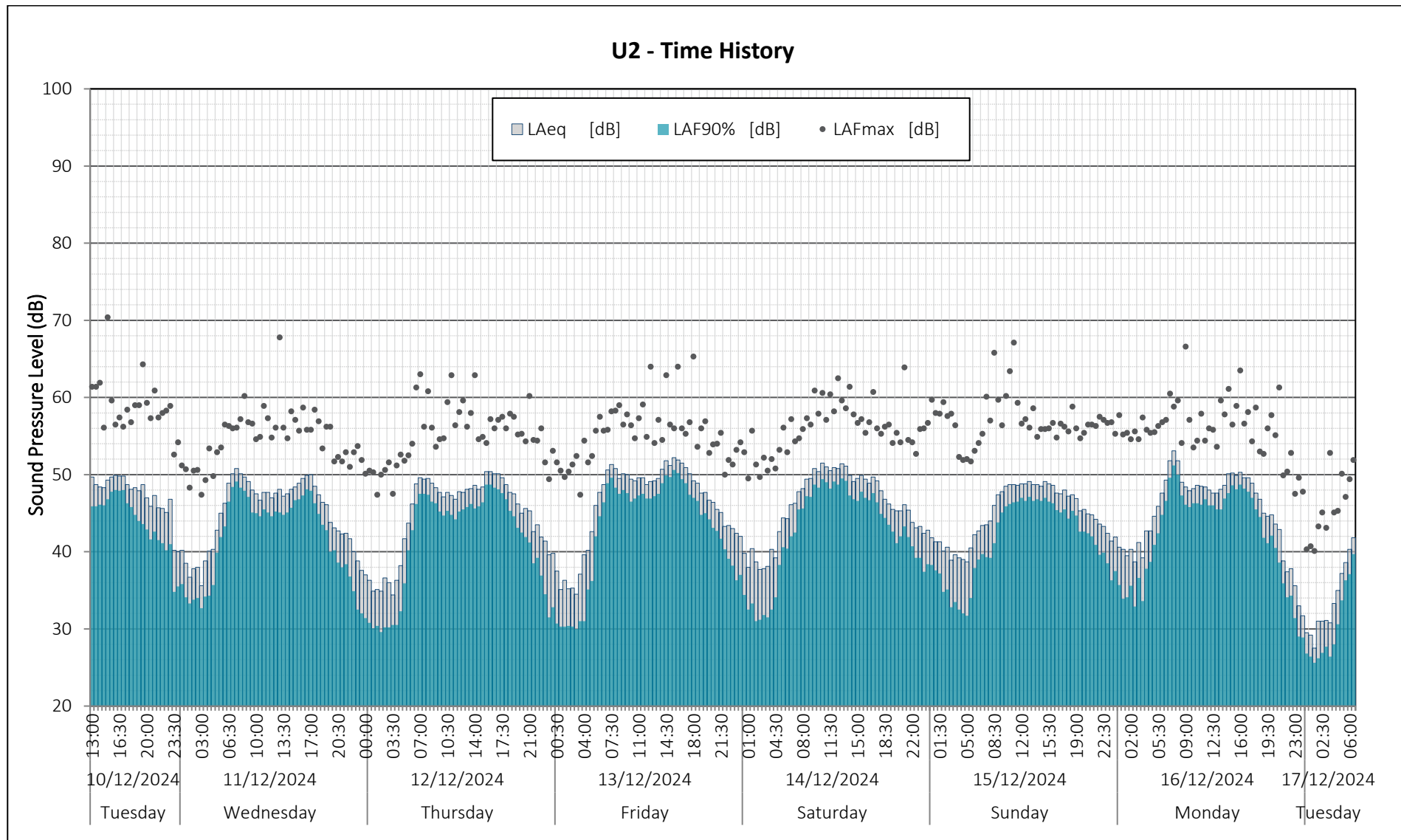
Appendix C Measured Weather History





Appendix D Environmental Noise Survey Graph





Appendix E Background L_{A90} Distribution Graph

