



**Independent Acoustic
Consultancy Practice**

Environmental Noise Assessment

**Land at Elba Crescent
Swansea**

1777/ENS6

Environmental Noise Assessment

Project: Land at Elba Crescent

Site Address: Jersey Marine
Swansea
SA1

HA Reference: 1777/ENS6

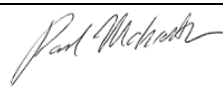
Date: 31/01/2022

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ISSUE / REVISION

Rev	Date			
0	31 January 2022	Filename	Document1	
		Description	First issue	
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1. INTRODUCTION

A housing development is proposed on Land at Elba Crescent, Jersey Marine, Swansea, SA1.

The site forms part of a larger site for which outline planning permission for a mixed-use development comprising business (B1, B2 and B8) and residential (C3) was granted on the 30th September 2011 (Ref: P2008/0514). The approved scheme shows the application site divided into two distinct sections; with the southern section (approximately 3.1 ha) proposed for residential development accessed off Elba Crescent and the northern section proposed for B1, B2 and B8 employment uses and served off the existing access in the north-western corner of the site. Subsequent to this, consent was granted in November 2014 (Ref: P2012/581) to vary condition 31 which related to the proposed landscaping buffer area. The noise assessments submitted in support of these applications were carried out by Hunter Acoustics

The new application relates to a part of the above site but seeks outline planning permission for just the residential element.

Hunter Acoustics has therefore been commissioned to undertake an up to date environmental noise survey and assessment.

Survey results have been used for comparison with typical Local Authority Planning conditions and current planning guidance.

2. CRITERIA

2.1 Planning Policy Wales

The Welsh Government's Planning Policy Wales (Edition 11) dated February 2021, states the following;

"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 document states "For more information on the principles of good acoustic design, readers are referred to 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 (<http://www.association-of-noise-consultants.co.uk/propg/>). ProPG has been written principally to assist with the planning process in England, but the design principles put forward in Supplementary Document 2 may also be adopted in Wales.

2.2 ProPG Supplementary Document 2

Professional Practice Guidance on Planning & Noise, New Residential Development 'Supplementary Document 2 – Good Acoustic Design' produced by the ANC, IOA and CIEH discusses the general principles of Good Acoustic Design, including the following hierarchy of noise management measures in descending order of preference;

- i) Maximising the spatial separation of noise source(s) and receptor(s).*
- ii) Investigating the necessity and feasibility of reducing existing noise levels and relocating existing noise sources.*
- iii) Using existing topography and existing structures (that are likely to last the expected life of the noise-sensitive scheme) to screen the proposed development site from significant sources of noise.*
- iv) Incorporating noise barriers as part of the scheme to screen the proposed development site from significant sources of noise.*
- v) Using the layout of the scheme to reduce noise propagation across the site.*
- vi) Using the orientation of the buildings to reduce the noise exposure of noise-sensitive rooms.*
- vii) Using the building envelope to mitigate noise to acceptable levels.*

“It should be remembered that good acoustic design is a process that begins as soon as land is under consideration for development. The timeline for good acoustic design stretches from the conceptual design stage, through quality control during construction, and beyond to post construction performance testing.

Both internal and external spaces should be considered in the acoustic design process. Care should be taken to ensure that acoustic mitigation measures do not result in an otherwise unsatisfactory development. Good acoustic design must be regarded as an integrated part of the overall design process”.

2.3 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;

Table 2.1 – TAN11 Noise Exposure Categories

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 $L_{eq}(8 \text{ hour})$ 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.

2.4 British Standard 8233:2014

British Standard 8233:2014 'Guidance on sound insulation and noise reduction for buildings' includes internal noise criteria of habitable rooms in residential dwellings, as shown below;

Table 2.2 – BS 8233:2014 Internal Ambient Noise Criteria for Habitable Rooms

Location	Desired		Reasonable *	
	07:00 to 23:00	23:00 to 07:00	07:00 to 23:00	23:00 to 07:00
Living room	35 dB $L_{Aeq,16hr}$	-	40 dB $L_{Aeq,16hr}$	-
Dining room/area	40 dB $L_{Aeq,16hr}$	-	45 dB $L_{Aeq,16hr}$	-
Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$	40 dB $L_{Aeq,16hr}$	35 dB $L_{Aeq,8hr}$

* NOTE 7 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 5dB and reasonable internal conditions still achieved.

In addition BS 8233:2014 states: “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.”

Reference is therefore made to World Health Organisation (WHO) ‘Guidelines for Community Noise, 1999’ which states “For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB L_{Amax} more than 10-15 times per night (Vallet & Vernet 1991)”.

Section 7.7.3.2 of BS 8233:2014 entitled ‘Design criteria for external noise’ states;

“For traditional external areas that are used for amenity space, such as gardens and patios, 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. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs to be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.”

The above criteria in BS 8233:2014 apply for sources without specific character, previously termed “anonymous noise”. BS 8233:2014 7.7.1 advises:

“NOTE: Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate.”

2.5 British Standard 4142:2014+A1:2019

British Standard 4142:2014+A1:2019 “Methods for rating and assessing industrial and commercial sound”, provides current guidance for the assessment of industrial noise affecting residential receivers.

This standard describes a rating method comparing L_{Aeq} noise levels from the industrial source with pre-existing background L_{A90} levels at the residential receiver. It advises at a difference (industrial noise - background) of:

- +10dB or higher, likely to be an indication of a significant adverse impact, depending on the context.
- A difference of + 5dB, likely to be an indication of an adverse impact, depending on the context.
- 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.

A sliding scale of penalties can be applied to industrial/commercial sound levels which have acoustically distinguishing characteristics, including tonality, impulsivity and intermittency.

Tonality – A penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible, and 6dB where it is highly perceptible.

Impulsivity – A penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it clearly perceptible, and 9dB where it is highly perceptible.

Other sound characteristics – Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied

Intermittency – If intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied.

BS 4142:2014 states under section 11;

"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.

- 1) *The absolute level of sound. 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 background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

- 2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

NOTE 3 Consideration should be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. A number of studies are listed in the "Effects on humans of industrial and commercial sound" portion of the "Further reading" list in the Bibliography.

- 3) *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:*
 - i) *facade insulation treatment;*
 - ii) *ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and*
 - iii) *acoustic screening."*

3. ENVIRONMENTAL NOISE SURVEY

3.1 Procedures

3.1.1 Continuous Monitoring

Continuous noise monitoring was carried out from 1200hrs on Wednesday, 19 January 2022 to 1200hrs on Thursday, 20 January 2022 at positions A and B.

Data including L_{Amax} , L_{Aeq} and background L_{A90} was logged at 1 minute intervals over the monitoring period, along with continuous audio and 100ms data to allow source identification and further detailed analysis of results if required.

Figure 3.1 – Site Plan Showing Monitoring Locations



Site plan in Figure 3.1 above shows the development site and continuous monitoring positions used, namely:

Table 3.1 – Continuous Monitoring Location Details

Position	Description
A	On fence post on the eastern site boundary approximately 40m east of GB Logistics & 7m east of the industrial site road
B	Located in tree line on the western site boundary approximately 18m away from the closest industrial unit to the west

Note: All microphone positions approximately 2m above local ground level.

3.1.2 Sample Measurements

Additional sample measurements were taken on Wednesday, 19 January 2022. Parameters recorded include $L_{\max}$ and L_{eq} levels including 1/3 octave band spectra.

Site plan in Figure 3.1 shows the sample measurement positions used, namely:

Table 3.2 – Sample Measurement Location Details

Position	Description
1	Located on the western boundary approximately 130m east of First GB Logistics & approximately 90m to the south of Trojan Electronics
2	Located 10m north of the southern site boundary with line of sight to Elba Crescent
3	Located on the northern site boundary on top of 2m bund

Note: All microphone positions approximately 1.5m above local ground level.

3.2 Meteorological Conditions

Approximate weather conditions are shown in time history graphs in Figure B.1 and Figure B.2 of Appendix B.

To summarise, the weather conditions during the monitoring period were dry with an occasional breeze.

3.3 Measurement Equipment

The following measurement equipment was used during the surveys:

Table 3.3 – Noise Monitoring Equipment List

Make	Description	Model	Serial Number	Last Calibrated	Certificate No.
NTi	Type 1 - Sound Level Meter	XL2-TA	A2A-10021-E0	17 August 2021	TCRT21/1568
	Preamplifier	MA220	5435	17 August 2021	TCRT21/1568
	Microphone Capsule	MC230	8547	17 August 2021	TCRT21/1568
NTi	Type 1 - Sound Level Meter	XL2-TA	A2A-13022-E0	18 August 2021	TCRT21/1571
	Preamplifier	MA220	6853	18 August 2021	TCRT21/1571
	Microphone Capsule	MC230	A14127	18 August 2021	TCRT21/1571
NTi	Type 1 - Sound Level Meter	XL2-TA	A2A-14577-E0	22 June 2020	TCRT20/1313
	Preamplifier	MA220	7485	22 June 2020	TCRT20/1313
	Microphone Capsule	MC230	A15594	22 June 2020	TCRT20/1313
Larson Davis	Calibrator (93.82dB / 113.83dB @ 1kHz)	CAL200	19047	19 August 2021	44427-19047-CAL200

Measurement systems were calibrated before and after the surveys and no variation occurred.

Note: Copies of traceable calibration certificates for all equipment are available upon request.

3.4 Results

3.4.1 Continuous Monitoring

Time history graphs in Figure B.3 and Figure B.4 of Appendix B show L_{Amax} , L_{Aeq} and L_{A90} sound pressure levels measured at positions A and B respectively.

The following $L_{Aeq,16hr}$ daytime (0700-2300hrs) and $L_{Aeq,8hr}$ night-time (2300-0700hrs) noise levels were measured;

Table 3.4 – Summary of Daytime $L_{Aeq,16hr}$ and Night-time $L_{Aeq,8hr}$ Results

Period	Date	Position	
		A	B
Daytime $L_{Aeq,16hr}$ (dB)	19-20/01/2022	58.7	49.7
Night-time $L_{Aeq,8hr}$ (dB)		46.6	42.6

There were no $L_{Amax,F}$ events over 82dB measured during the night-time period (2300-0700hrs) at any of the monitoring locations.

Levels at Position A show good agreement with those measured in our previous 2012 survey (at Location 4) of 59dB $L_{Aeq,16hr}$ daytime and 46dB $L_{Aeq,8hr}$ night-time.

Daytime levels at Position B are indicated lower than those measured previously by around 6dB however night-time levels are in line with those measured during the 2008 survey at 44dB $L_{Aeq,8hr}$.

These levels contain a mix of industrial and road traffic noise and could therefore be considered 'mixed source' under TAN 11. The site therefore falls mainly under NEC B of TAN11 daytime and night-time.

Graphs in Figure B.5 and Figure B.6 of Appendix B show statistical analysis of background sound levels measured at positions A and B respectively.

The following minimum consistent daytime and night-time background L_{A90} sound levels have been determined;

Table 3.5 – Minimum Consistent Daytime and Night-time Background L_{A90} Results

Period	Position	
	A	B
Daytime (0700-2300hrs) L_{A90} (dB)	49	42
Night-time (2300-0700hrs) L_{A90} (dB)	37	36

3.4.2 Sample Measurements

Results of sample measurements are shown in Table 3.6 below.

Table 3.6 – Sample Measurement Results

Pos	Time (hh:mm)	Description	Duration (mm:ss)	L_{Aeq} (dB)	$L_{Amax,F}$ (dB)	L_{A90} (dB)
1	11:01	Controlled by road traffic noise on Elba Crescent/Fabian Way	09:29	48	57.9	45.6
2	11:14	Lorry being loaded at First GB Logistics with forklift, general industrial noise from estate and road noise from Fabian Way	13:09	53.3	66.3	49.1
3	11:35	Approximately 30m from lorry being loaded in yard of Trojan Electronics	15:13	54.2	76.6	48.5

4. INDUSTRIAL NOISE CONTRIBUTIONS

Industrial noise contributions were picked up at both continuous monitoring positions with activities originating from Unit Superheater Engineering, Trojan Electronics and First GB Logistics.

Assessments of the industrial noise contributions have been carried out in line with British Standard 4142:2014 below, based on measured levels at Positions A, B and 3. These are discussed below.

Note: The following assessments include the proposed 10m landscape buffer and screening (10dB screening loss assumed for removal of line of sight, as per our previous assessments of the site) – see Section 5. Distances to nearest proposed dwellings are based on illustrative masterplan referenced in Appendix C.

4.1 Unit Superheater Engineering (USE)

Operational hours for the site appear to be 0900-1730hrs. Audio recordings confirmed no industrial activity was present during night time hours from this site.

Sources of noise from the site included impact from materials being dropped/hammered, reversing alarms including alarms from the warehouse as well, continuous plant and loading/unloading activities.

Industrial noise levels during a measured worst case 1hr daytime period at Position B are shown in Table 4.1 below;

Table 4.1 – BS 4142 Overview for USE

Period	Measured Industrial Activity at Pos B (dB)	Distance Loss to Proposed Dwellings	Screening Loss	Resultant Level at Proposed Dwellings (dB)	BS 4142:2014 Acoustic Feature Correction	Background from Pos B L_{A90} (dB)
Daytime $L_{Aeq,1hr}$ (worst case 1400-1500hrs)	53	-6	-5 *	42	+2 tonal +3 impulse	42

** Due to existing buildings providing some level of screening at Position B, it is assumed that the new barrier may only result in a further 5dB screening at this location, as opposed to the 10dB on other areas of the site.*

Result indicates a rating level around 5dB above background (42+2+3=47 minus 42dB background).

4.2 Trojan Electronics

Operational hours for the site are indicated between 0900-1700hrs.

Sources of noise from the site included handling of materials, reversing alarms from forklifts/trucks and loading/unloading activities.

Using the measurement undertaken at Position 3 (30m from a HGV being loaded at the Trojan site) and assuming a worst-case of the whole 1hr period being consumed with loading activity, the following has been carried out;

Industrial noise assessment overview is shown in Table 4.2 below;

Table 4.2 – BS 4142 Overview for Trojan Electronics

Period	Measured Industrial Activity at Pos 1 (dB)	Distance Loss to Proposed Dwellings	Screening Loss	Resultant Level at Proposed Dwellings (dB)	BS 4142:2014 Acoustic Feature Correction	Background from Pos B L_{A90} (dB)
Daytime $L_{Aeq,1hr}$ (worst case 1100-1200hrs)	54	-4	-10	40	+2 tonal +3 impulse	42

Result indicates a rating level around 3dB above background (40+2+3=45 minus 42dB background).

4.3 First GB Logistics / Position A

Operational hours for the site are between 0830-1700hrs. Audio recordings confirmed no industrial activity was present during night time hours from this site however there do appear to be vehicle movements on the access roads along the eastern site boundary starting around 0700hrs with a significant drop in numbers from 2030hrs.

Sources of noise from the site included impact from materials being dropped, reversing alarms on forklifts, loading/unloading activities, however vehicle movements on the access road were the dominant source during the worst case one hour period.

Industrial noise during a measured worst case 1hr daytime period at Position A are shown below;

Table 4.3 - BS4142 overview for First GB Logistics

Period	Measured Industrial Activity at Pos 1 (dB)	Distance Loss to Proposed Dwellings	Screening Loss	Resultant Level at Proposed Dwellings (dB)	BS 4142:2014 Acoustic Feature Correction	Background from Pos A L_{A90} (dB)
Daytime $L_{Aeq,1hr}$ (worst case 1100-1200hrs)	60	-2	-10	48	+3 other	49

Result indicates a rating level around 2dB above background (48+3=51 minus 49dB background).

4.4 Impact

With suitable screening place to remove line of sight from the first floor windows to service yard/access road sources, an excess of no more than 5dB is indicated based on the above assessments. BS 4142:2014+A1:2014 suggests this is may be an indication of adverse impact depending on context.

In this instance, we would advise the context consists of the following (referring to Section 11 of BS 4142 – see Section 2.5 of this report);

- Absolute noise levels from industrial activity in the range 40-48dB $L_{Aeq,1hr}$ outside proposed dwellings, below the guidance range of 50-55dB $L_{Aeq,16hr}$ in gardens from BS 8233:2014.
- Ambient noise climate on the majority of the site controlled by road traffic noise (53dB indicated at boundary with Elba Crescent, in line with levels measured during 2012 survey).
- New dwellings in proximity to a well-established industrial estate, that are to have suitable façade measures incorporated (acoustic glazing and ventilation) to control noise intrusion (see Section 6 below).
- Nearest industrial users appear to be operational during reasonable daytime hours only.

Overall therefore, we would advise that an adverse impact is unlikely.

5. BOUNDARY SCREENING

As per our previous assessment carried out for the site, it is advised to include a buffer zone with acoustic screening on the western, northern and eastern site boundaries to control industrial noise levels on the site.

A 3m high acoustic barrier along the site boundary with a 10m buffer (landscaping) zone is proposed.

This barrier should achieve a minimum mass per unit area of 10kg/m^2 and could consist of a timber/composite fence or an earth bund or a combination of the two to achieve the desired height.

The proposed landscaping / bunding / tree planting would also provide a visual benefit.

The proposed screening is required to remove line of sight from first floor windows to ground level service yards and access roads on the adjacent industrial sites to the north, east and west.

There should therefore be no room in roof or second floor habitable rooms on critical facades highlighted which may overlook this barrier.

Based on controlling industrial sources which are no more than 2m above ground level (typical HGV source height is 1.5m), the proposed barrier height of 3m is indicated to be sufficient.

6. PRELIMINARY EXTERNAL BUILDING FABRIC ASSESSMENT

Based on survey results and the illustration masterplan, we have carried out a preliminary external building fabric assessment with the aim of controlling noise intrusion to habitable rooms to meet 35dB $L_{Aeq,16hr}$ daytime and 30dB $L_{Aeq,8hr}$ night-time, in line with the desirable internal ambient noise values quoted in BS 8233:2014 (see section 2.4 of this report).

Typical HGV pass-by on the access roads along the eastern boundary with screening in place, are also indicated to achieve 45dB $L_{Amax,F}$ inside bedrooms for any occasional night-time movements, up to $L_{Amax,F}$ 79dB at 10m (to provide context, there were no $L_{Amax,F}$ events exceeding 70dB measured between 2300-0700hrs at Position A and only two exceeding 65dB).

Critical façades are shown on site plan in Figure 6.1 below, marked up with **MAGENTA** lines;

Figure 6.1 – Façades Requiring Additional Sound Insulation Measures



Note: Habitable rooms include bedrooms, lounges, dining rooms and kitchen/diners but not kitchens or bathrooms.

All habitable rooms (at all floor levels) on façades highlighted above require up-rated acoustic glazing and ventilation as specified below. Standard thermal double glazing and trickle ventilation should be sufficient on remaining façades (not highlighted).

This preliminary assessment is intended to provide an initial indication of the sound insulation measures required to control noise intrusion. Final design proposals should be confirmed acceptable with a suitably qualified acoustician at the detailed design stage.

This preliminary assessment has been carried out based on the following assumptions;

- Noise intrusion is calculated to a bedroom with dimensions of 4m (l) x 3m (w) x 2.5m (h)
- Façade area, exposed to road traffic of 7.5m² (w x h)
- Glazing area of 2m²

The analysis is based on the noise spectra for the worst case 1hr L_{Aeq} measured at Position A (highest out of all positions and therefore worst case) quoted in Figure B.7.

6.1 Glazing

The illustrative layout plan in Figure 6.1 shows critical façades. The following sound reduction index figures shall be met for glazing on these critical façades:

Table 6.1 - Glazing Sound Reduction Index Figures

Element	Description	Sound Reduction Index dB R (BS EN ISO 10140-2:2010) @ Octave Band Centre Frequency (Hz)				
		125	250	500	1k	2k
MAGENTA	For budgetary guidance: based on Pilkington 4mm / 6 – 16mm / 4mm	21	17	24	35	37

A typical glazing system that should be capable of achieving the quoted SRI figures (based on Pilkington test data) is included in the table for initial budgetary guidance, however;

The successful glazing suppliers shall provide independent laboratory test data to BS EN ISO 10140-5 – 2010, confirming their proposed systems (including frames/seals) meet the quoted octave band sound reduction performance figures above.

For all other façades standard thermal double-glazing and trickle ventilation is indicated to be sufficient.

6.2 Ventilation

All habitable rooms on critical façades highlighted **MAGENTA** require a ventilation strategy that does not rely on opening windows to achieve 'whole building' and 'extract' ventilation rates as required by Building Regulations Part F;

System 3: ***Continuous mechanical extract.** Guidance on minimum provisions for extract and whole building ventilation is set out in table 1.2c of Building Regulations Part F.*

System 4: ***Continuous mechanical supply and extract with heat recovery.** Guidance on minimum provisions for extract and whole building ventilation is set out in Table 1.2d of Building Regulations Part F.*

Note: Positive Input Ventilation systems (PIV) may also be considered, as depending on the air tightness of the dwelling, these may not require trickle ventilators.

The final proposed ventilation strategy should be confirmed acceptable with planners/ EHO and Building Control.

This strategy relies on windows being closed; however, occupiers may still open windows for purge ventilation rates, or under normal ventilation conditions if they so choose to, and so glazing would not be 'fixed pane'.

Facades highlighted in **MAGENTA** may utilise System 3 or System 4 ventilation.

6.2.1 Building Regulations Part F - System 3

If System 3 (MEV) is used to provide fresh air through (background) trickle ventilators, the trickle ventilators shall be acoustically treated to achieve the following ($D_{n,e}$) performance;

Table 6.2 – Acoustic Trickle Ventilator Specifications

Element	Description	Element-Normalised Level Difference dB $D_{n,e}$ (BS EN ISO 10140-2:2010)				
		125	250	500	1k	2k
Ventilator	For budgetary guidance: based on RW Simon FrameVent (open)	36	33	33	31	29

The calculation has allowed for a maximum of 2no acoustic trickle ventilators per room, meeting the minimum 2500mm² equivalent area requirement of Part F.

For budgetary guidance the above ventilator figures are based on RW Simon FrameVent ventilators. The successful tenderer shall provide independent laboratory test data showing their vent meets the above performance requirements.

The successful trickle ventilator suppliers shall provide independent laboratory test data to BS EN ISO 10140-5 – 2010, confirming their proposed ventilator meet the quoted octave band performance figures above.

Note: Building Regulations Part F advises for System 3: “The need for background ventilators will depend on the air permeability of the dwelling, and this is not normally known at the design stage. Therefore, as a precaution, it is recommended that controllable background ventilators having a minimum equivalent area of 2500mm² are fitted in each room, except wet rooms from which air is extracted. Where this approach causes difficulty (e.g. on a noisy site) seek expert advice.”

If the final ‘design’ air permeability is of the dwellings is to **>5m³/hr per m² (at 50Pa)** and the measured score is **>3m³/hr per m² (at 50Pa)** and therefore in accordance with Part F, background ventilators (or other ventilative openings in the façade) should not be required to the dwellings. (The final design and measured air permeability ratings shall be assessed by a suitably qualified professional in accordance with Building Regulations Approved Document L.)

6.2.2 Building Regulations Part F - System 4

Alternatively, a System 4 (mechanical ventilation with heat recovery, MVHR) could be utilised which does not require any trickle vents in the external façade.

6.2.3 Mechanical Ventilation Systems

All mechanical ventilation systems should be designed to meet the following internal noise levels (based on CIBSE guidance):

Table 6.3 - Internal Noise Criteria (Mechanical Ventilation)

Space	Noise Rating Criteria (NR)
Bedroom	25
Living Room	30
Kitchen	35
Bathroom	35
Hallway	35

6.2.4 General

Do not include standard trickle ventilation within window frames on critical facades.

Final proposals should be confirmed with Building Control and Environmental Health prior to orders being placed.

6.3 Overheating

Our assessment recommends mechanical ventilation on critical facades, to control noise intrusion. This is based on windows normally being closed (excluding purge ventilation).

If there is a risk of overheating on any of the facades, requiring windows to be opened more frequently, a more detailed assessment would be required – please advise.

7. EXTERNAL NOISE ASSESSMENT (GARDENS)

Unscreened daytime noise levels measured at Positions A and B were at 59dB and 50dB $L_{Aeq,16hr}$ respectively.

With the 10m landscape buffer and 3m high barrier/fence in place along the western, northern and eastern boundaries removing line of sight to industrial noise sources, garden levels across the site are indicated to achieve the 50dB desirable criterion from British Standard 8233:2014 (minimum 10dB screening loss assumed by removing line of sight to source).

8. CONCLUSION

A repeat environmental noise assessment has been carried out for the proposed residential development at Land at Elba Crescent, Jersey Marine, Swansea, SA1.

A noise assessment was previously carried out by Hunter Acoustics for a larger mixed-use development comprising business (B1, B2 and B8) and residential (C3). Consent was granted on the 30th September 2011 (Ref: P2008/0514) and renewed in 2014.

Results of our survey show good agreement with those undertaken previously at the site however there are now additional activities at units to the north and east.

Repeat noise surveys have been carried out across the site along with additional sample measurements of industrial activity.

The noise survey indicates that daytime remains the critical period (day/night difference > 5dB with little activity identified on recordings at night).

Assessments of industrial noise in Section 4 indicated that an adverse impact when taking the context into consideration is unlikely.

An external building fabric assessment has been carried out. Critical facades requiring additional sound insulation measures have been highlighted and specifications for external wall, roof, ventilation and glazing are included.

An assessment of external noise in gardens has been undertaken and shows that with boundary screening in place, gardens are indicated to meet the $L_{Aeq,16hr}$ 50dB desirable garden criterion from BS 8233:2014.

APPENDIX A - ACOUSTIC TERMINOLOGY

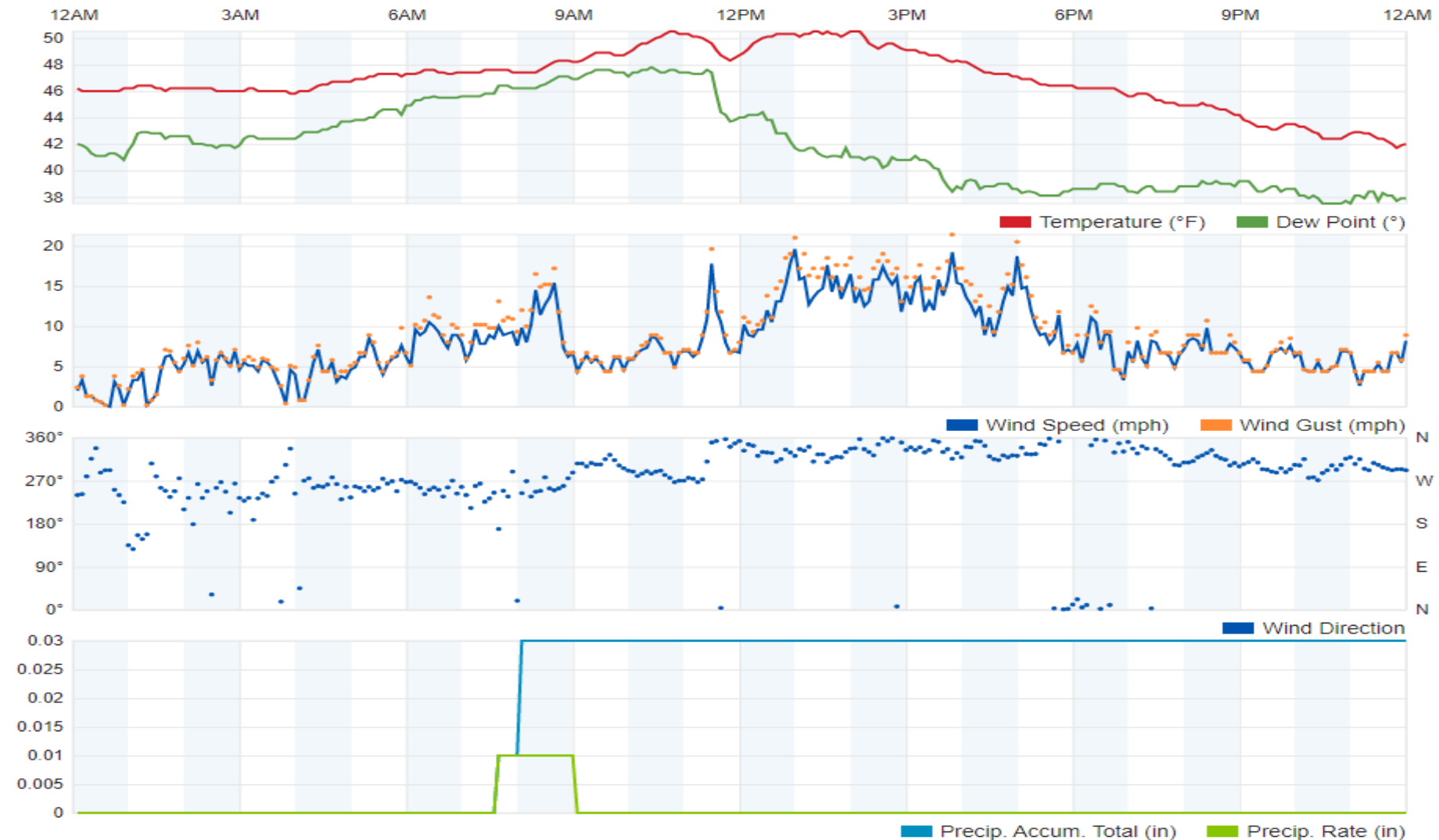
Human response to noise depends on a number of factors including loudness, frequency content and variations in level with time. Various frequency weightings and statistical indices have been developed in order to objectively quantify 'annoyance'.

The following units have been used in this report:

dB(A)	The sound pressure level A-weighted to correspond with the frequency response of the human ear and therefore a persons' subjective response to frequency content.
L_{eq}	The equivalent continuous sound level is a notional steady state level which over a quoted time period would have the same acoustic energy content as the actual fluctuating noise measured over that period.
L_{max}	The highest instantaneous sound level recorded during the measurement period.
L_{10}	The sound level which is exceeded for 10% of the measurement period. i.e. The level exceeded for 6 minutes of a 1 hour measurement - used as a measure of background noise.
L_{90}	The sound level which is exceeded for 90% of the measurement period. i.e. The level exceeded for 54 minutes of a 1 hour measurement - used as a measure of background noise.
$L_{Ar,Tr}$	The 'rating' level, as described in BS 4142:2014 – the specific noise plus any adjustment for the characteristic features of the noise.
SSR	Sound sensitive receiver

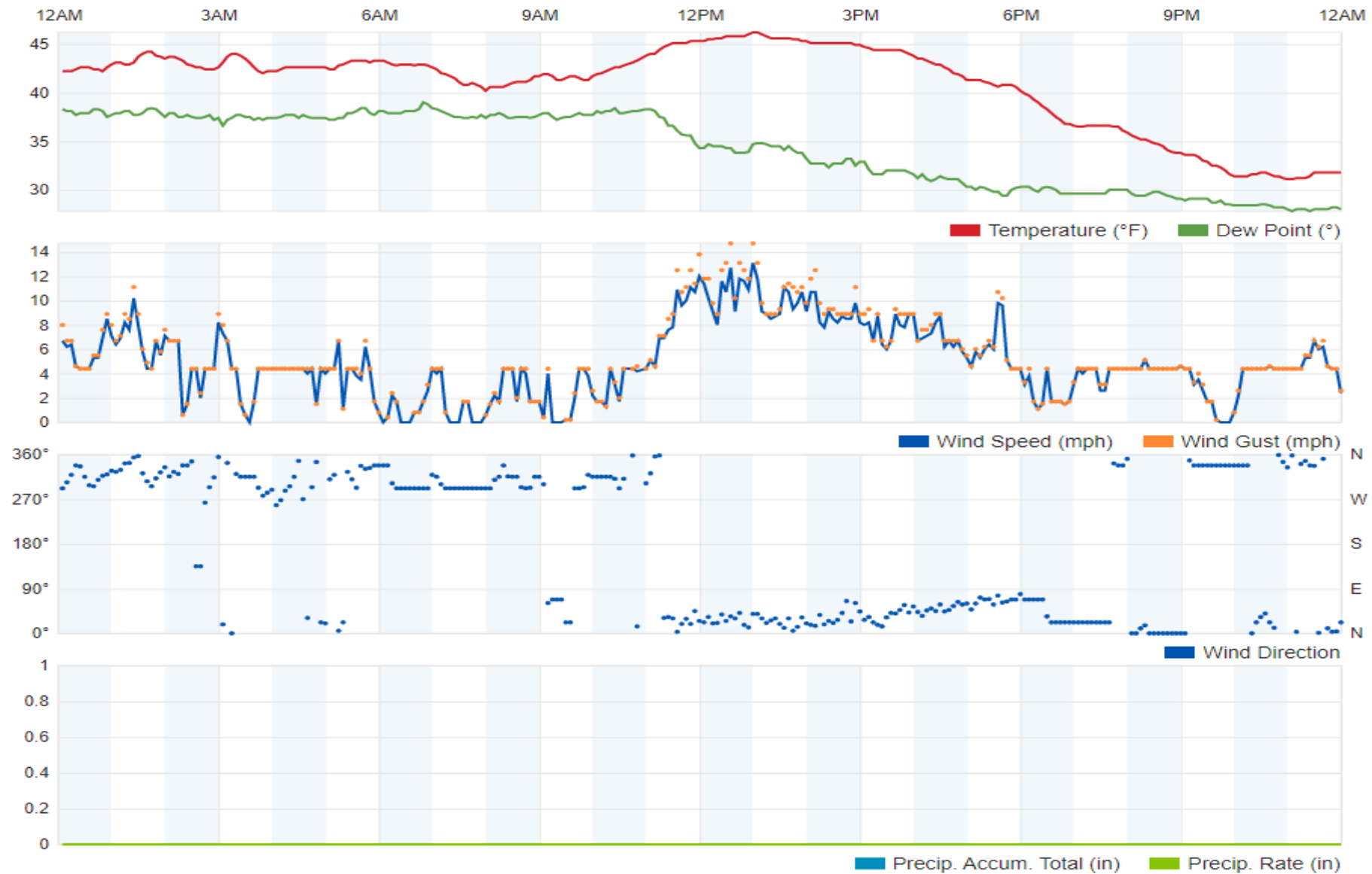
APPENDIX B - DIAGRAMS, GRAPHS AND TABLES

Figure B.1 – Approximate Weather History for Wednesday, 19 January 2022



Note: Taken from www.wunderground.com - weather station IPORTT3 located in Aberavon Sea Front [Elev 39 ft, 51.60 °N, 3.82 °W]

Figure B.2 – Approximate Weather History for Thursday, 20 January 2022



Note: Taken from www.wunderground.com - weather station IPORTT3 located in Aberavon Sea Front [Elev 39 ft, 51.60 °N, 3.82 °W]

Figure B.3 – Time History at Position A (Wednesday, 19 January 2022 to Thursday, 20 January 2022)

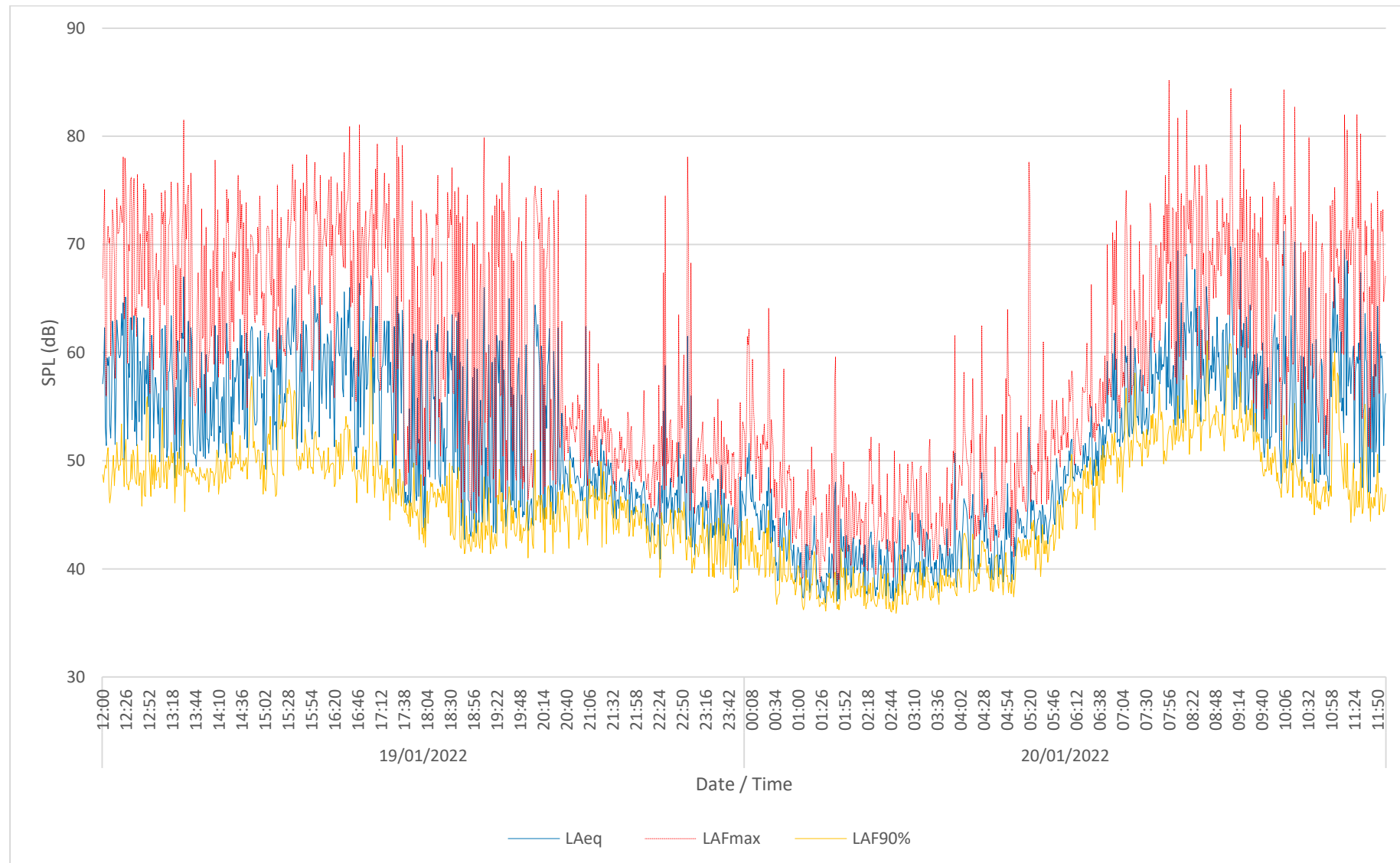


Figure B.4 – Time History at Position B (Wednesday, 19 January 2022 to Thursday, 20 January 2022)

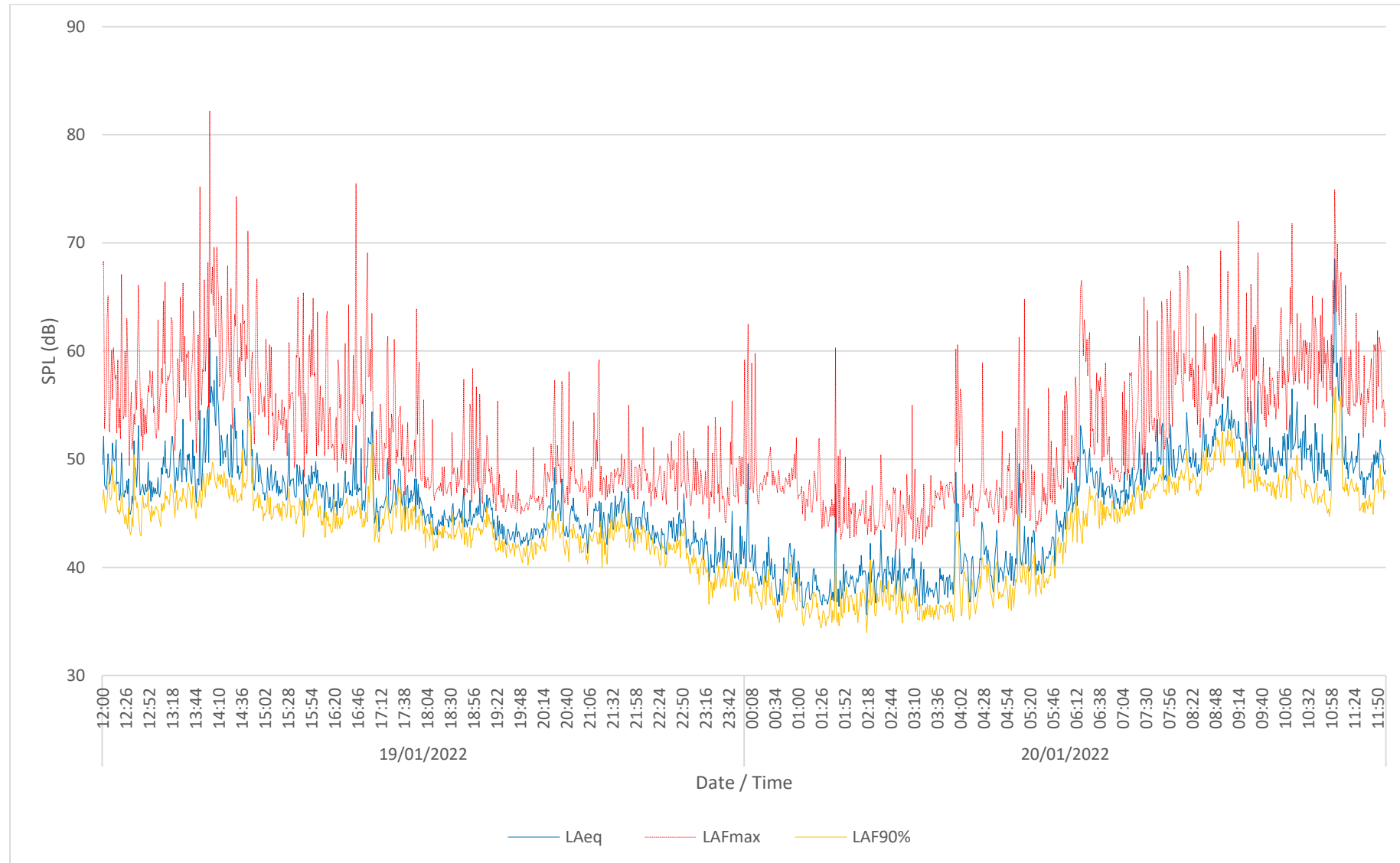


Figure B.5 – Statistical Analysis of Background Sound Levels Measured at Position A

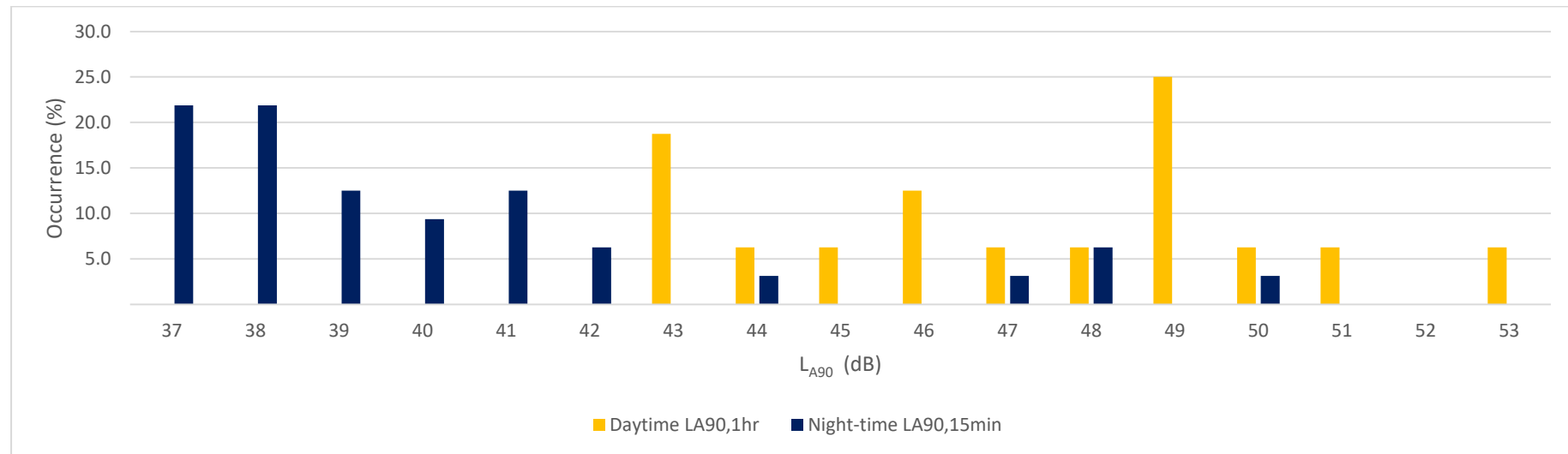


Figure B.6 – Statistical Analysis of Background Sound Levels Measured at Position B

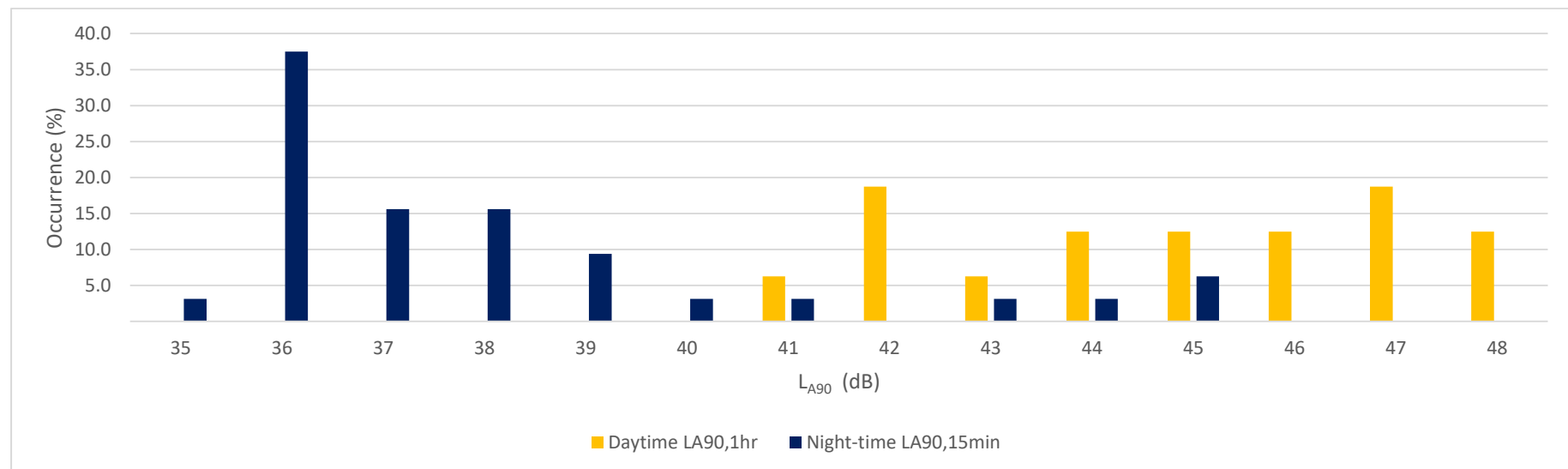
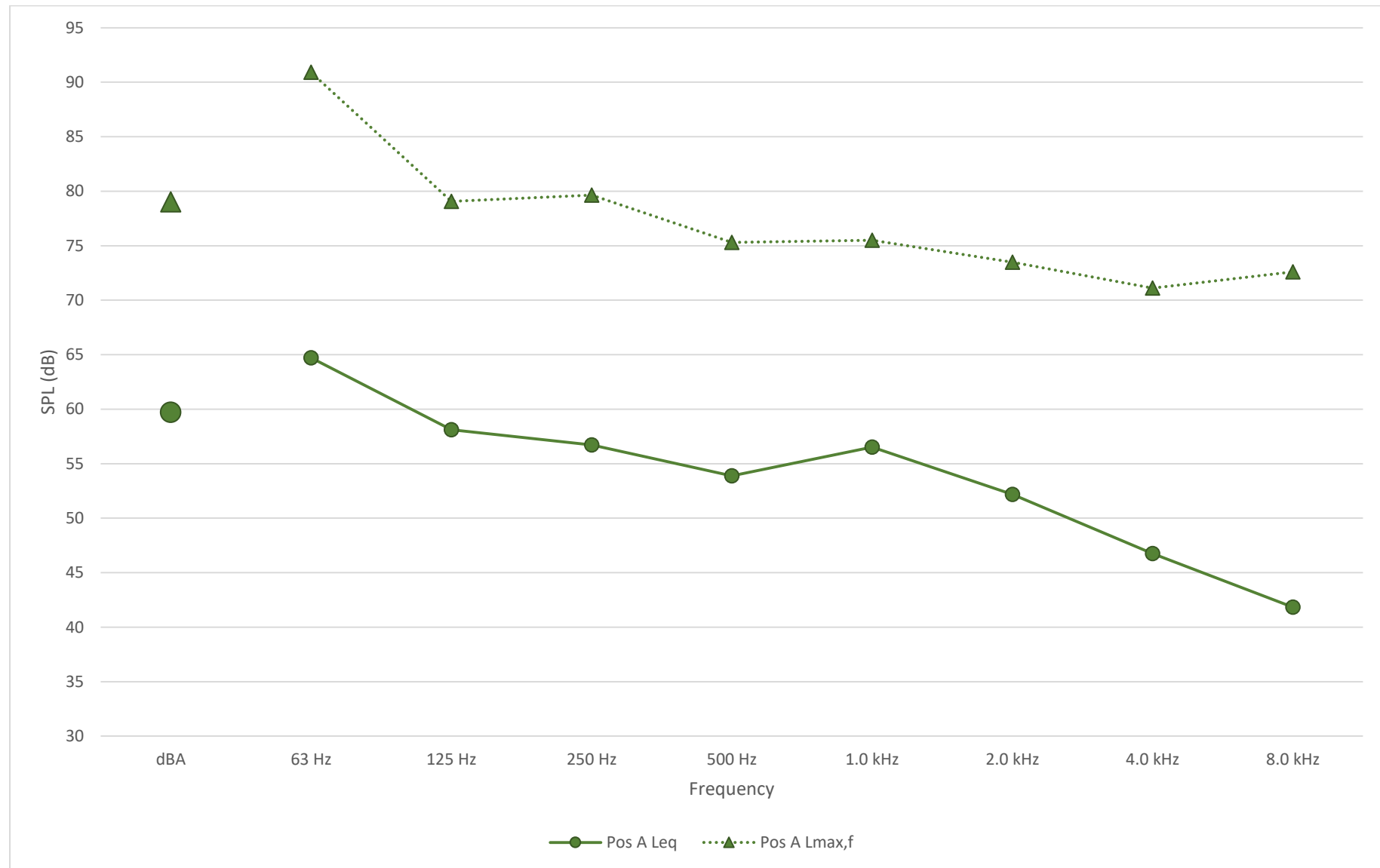


Figure B.7 – L_{eq} and $L_{max,F}$ Octave Band Spectra Measured at Position A (Worst Case Period, 1100-1200hrs on 19th January 2022)



APPENDIX C - DRAWING LISTS

The following drawings and documents have been used in our assessment;

Table C.1 – Drawing List

Drawing Title	Drawing Number	Rev	Date
DAS (Illustrative Masterplan)	-	-	-