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DA Noise Impact Assessment

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1 INTRODUCTION

This report presents our DA acoustic assessment for the proposed boarding facility at 7 Albion Street, Harris Park.

In this report we have:

- Conducted an external noise intrusion assessment (primarily traffic noise) and recommended acoustic treatments to ensure that a reasonable level of amenity is achieved for future occupants. Traffic noise at the site have been measured and assessed in accordance with the requirements of Parramatta City Council DCP and the Australian Standard AS2107:2016.
- Carried out background noise measurement to determine noise emission goals for future use of the development to meet Parramatta City Council and NSW Environment Protection Authority (EPA) acoustic requirements.

The assessment is based on the architectural drawings provided by Cracknell & Lonergan Architects dated Revision DA-A.

2 SITE DESCRIPTION

The proposed development is made up of a single storey boarding house. The site is bounded by Albion Street to the east which carries low to medium volume of traffic primarily used for local residential/commercial access. The west of the site is bounded by Gordon McKinnon Lane which carries low volume of traffic primarily used for local residential/commercial access. To the north and south are existing residential houses.

Traffic noise along Albion Street is the primary noise source affecting the proposed development. Figure 1 shows the site, noise monitor and measurement locations.

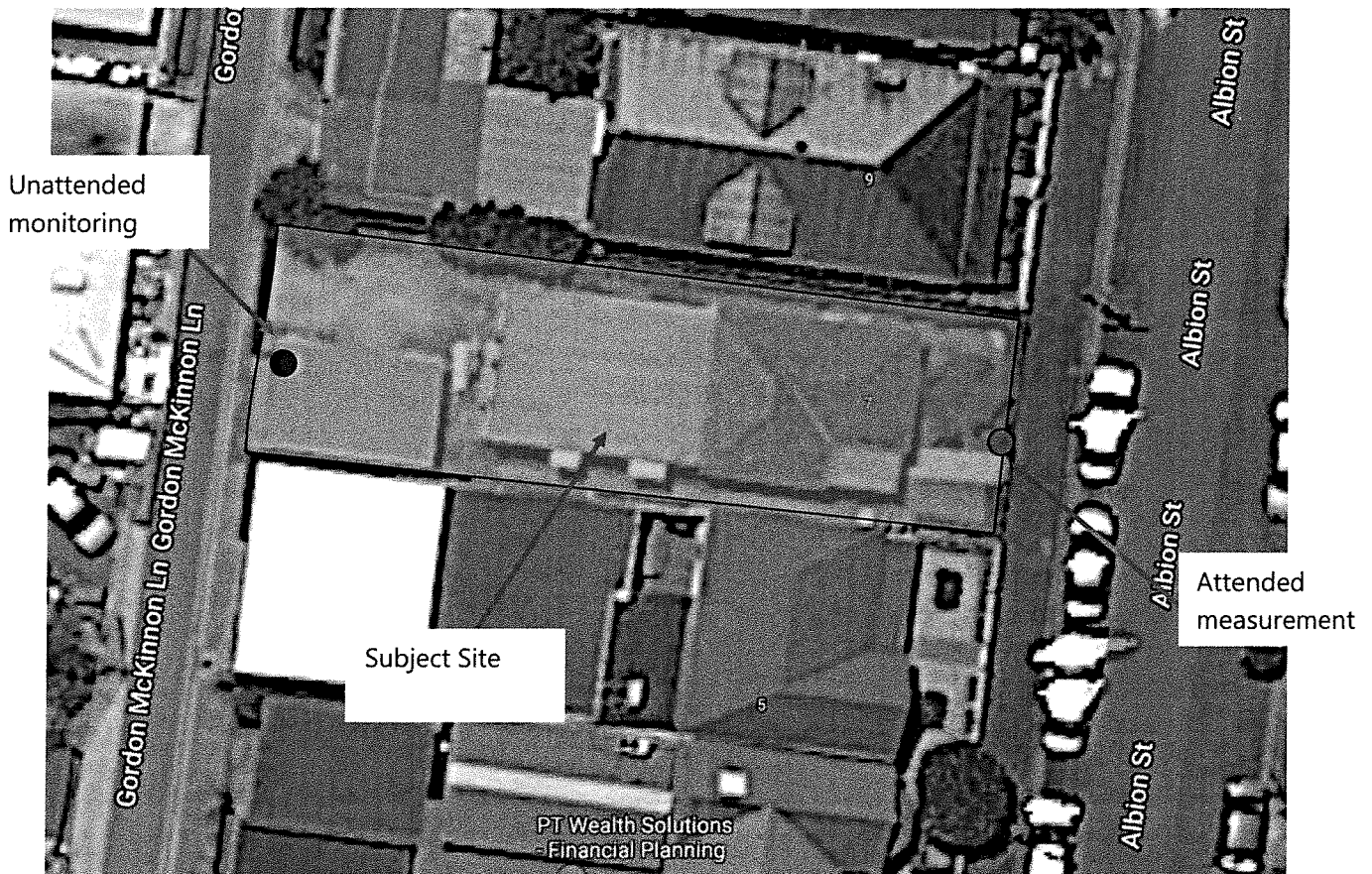


Figure 1: Site Map and Measurement Locations

3 NOISE DESCRIPTORS

Traffic noise constantly varies in level, due to fluctuations in traffic speed, vehicle types, road conditions and traffic densities. Accordingly, it is not possible to accurately determine prevailing traffic noise conditions by measuring a single, instantaneous noise level. To accurately determine the effects of traffic noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters. These parameters are used to measure how much annoyance would be caused by a particular noise source.

In the case of environmental noise three principle measurement parameters are used, namely L_{10} , L_{90} and L_{eq} .

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced at the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of traffic noise.

Current practice favours the L_{eq} parameter as a means of measuring traffic noise, whereas the L_{10} parameter has been used in the past and is still incorporated in some codes. For the reasons outlined above, the L_{90} parameter is not used to assess traffic noise intrusion.

LA_{max} refers to the maximum noise level occurring during a measurement period, and is used when assessing sleep disturbance impacts.

4 NOISE INTRUSION ASSESSMENT

Traffic noise is the significant noise sources that can potentially affect the acoustic amenity of the proposed site, and a noise intrusion assessment has been conducted below.

4.1 TRAFFIC NOISE CRITERIA

The assessment of traffic noise is conducted in accordance with the following documents:

- Parramatta City Council Development Control Plan
- Australian Standard AS2107 – 2016 Acoustics – Recommended design sound level and reverberation times for building interiors.

Parramatta City Council DCP does not have any specific control over traffic noise intrusion for this type of location and property, the assessment criteria will be based on the Australian Standard AS 3671-1989 and AS2107-2016.

4.1.1 Australian Standards Criteria

The Australian Standards recommend maximum design sound levels for different areas of occupancy in the residential development while AS 3671 -1989 "Road Traffic Noise Intrusion - Building Siting and Construction" recommends that an appropriate L_{eq} for traffic noise descriptor be used for the occupancy being assessed.

Based on AS2107-2016 and AS 3671-1989 the following assessment criteria would apply to the proposed development based on developments near minor roads.

Table 1- AS2107:2016 Internal Traffic Noise Criteria

Space Activity Type	Noise Level dB(A) $L_{eq}(1 \text{ hour})$	
	Satisfactory	Maximum*
Bedroom	30	35
Living Area	30	40
Washrooms and Toilets	45	55

***Recommendations nominated will comply with the maximum design criterion above.**

4.2 EXTERNAL NOISE MEASUREMENT

As part of this investigation, traffic noise from Albion Street has been measured. The results of this measurement will be used to determine the treatments required to reduce noise levels to within the project acoustic objectives.

Measurements include attended noise levels measurements conducted along the proposed eastern boundary as detailed in Figure 1 above.

4.2.1 Measurement Location

Traffic noise measurement locations are detailed above in Figure 1.

4.2.2 Attended Measurements

Measurements were taken using a Norsonic-118 precision sound level analyser, set to A-weighted fast response. The sound level meter was calibrated before and after the measurements using a RION NC73 precision sound calibrator and no significant drift was recorded. Measurements were taken on 12th January 2021 between 4:00pm and 6:00pm (afternoon peak hour) and 19th January 2021 between 8:00am and 9:00am (morning peak hour). There were no periods of adverse weather during the measurement.

4.2.3 Resultant Noise Levels

The following table presents the resultant noise levels at the proposed eastern boundary of the development. The noise levels are based on the attended noise measurement results conducted by this office.

Table 2 – Measured Existing Environmental Noise Levels

Locations	Date/Time	Traffic Noise Levels
Eastern Boundary (Facing Albion St)	12/1/2021 – 4:00pm to 6:00pm	54
	19/1/2021 – 8:00am to 9:00am	53

4.3 EVALUATION OF NOISE INTRUSION AND RECOMMENDATIONS

Internal noise levels will primarily be as a result of noise transfer through the windows and doors and roof, as these are relatively light building elements that offer less resistance to the transmission of sound. **Any external walls that are proposed to be of heavy masonry elements will not require upgrading.**

The construction recommendations to attenuate external noise impacts through windows and doors for the proposed residential development are discussed below. The recommendations have been based on the measured level and spectral characteristics of the external noise, the area of building elements exposed to traffic noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements to ensure compliance with the internal noise level criteria.

Calculations were performed taking into account the orientation of windows, barrier effects (where applicable), the total area of glazing, facade transmission loss and the likely room sound absorption characteristics.

4.3.1 Glazing Constructions

The recommended glazing assemblies are indicated in Table 3 below. The glazing thicknesses recommended are those needed to satisfy acoustic requirements and do not take into account other requirements such as structural, safety or other considerations. These additional considerations may require the glazing thickness to be increased beyond the acoustic requirement.

Table 3 – Glazing Requirements

Façade	Room	Element	Glazing Thickness	Acoustic seals
Eastern	Living Room	Glazing	6mm Toughened	Yes
	Bedroom	Glazing	6mm Toughened	Yes
Northern	Living Room	Glazing	6mm Toughened	Yes
Southern	Bedroom (Skylight)	Glazing	6mm Toughened	Yes
	Living Room	Glazing	6mm Toughened	Yes
	Bathroom	Glazing	4mm Toughened	Yes

In addition to complying with the minimum scheduled glazing thickness, the STC/R_w rating of the glazing fitted into operable frames and fixed into the building opening should not be lower than the values listed in the Table 8 below.

Where nominated, this will require the use of acoustic seals equal to Schlegel Q-Ion series (*acoustic bulb seal*) around the full perimeter of operable frames. The frame will need to be sealed into the building opening using a flexible 100% polyurethane sealant equal to Selley's Pro Series Fireblock. Note that mohair seals and/or mohair/plastic fin combination seals in windows and doors are **not** acceptable where acoustic seals are required.

It is recommended that only window systems have test results indicating compliance with the required ratings obtained in a certified laboratory be used where windows with acoustic seals have been recommended.

Table 4 – Minimum STC/R_w of Glazing Requirements

Glazing Assembly	Acoustic Seals	Minimum STC/R_w of Installed Window
4mm toughened	Yes	27
6mm Toughened	Yes	29

4.3.2 External Walls

External walls composed of concrete or masonry elements will not require upgrading. There should not be vents on the internal skin of external walls. All penetrations in the internal skin of external walls should be acoustically sealed.

4.3.3 External Doors

Any timber external doors shall be a minimum 40mm solid core timber with Lorient IS7025 to the top and sides and IS8011si to the underside of the door.

Any external glass door should be constructed using glazing thickness as specified in Table 3. Full perimeter acoustic seals around the doors are required.

4.3.4 Roof / Ceiling Construction

Any external roof construction to be constructed from concrete will not require any further acoustic upgrading. In the event that any penetrations are required through the external skin, an acoustic sealant should be used to minimise all gaps.

Any roof/ceiling proposed to be constructed of light weight materials. Penetrations in all ceilings must be acoustically treated and sealed gap free with a flexible sealant.

The recommended roof/ceiling construction is shown in Figure 2.

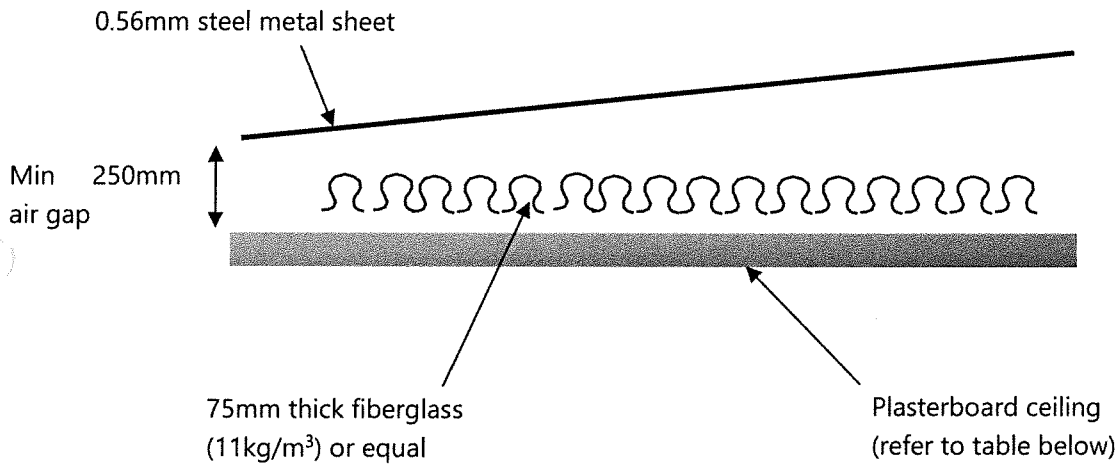


Figure 2 – Roof / Ceiling Construction

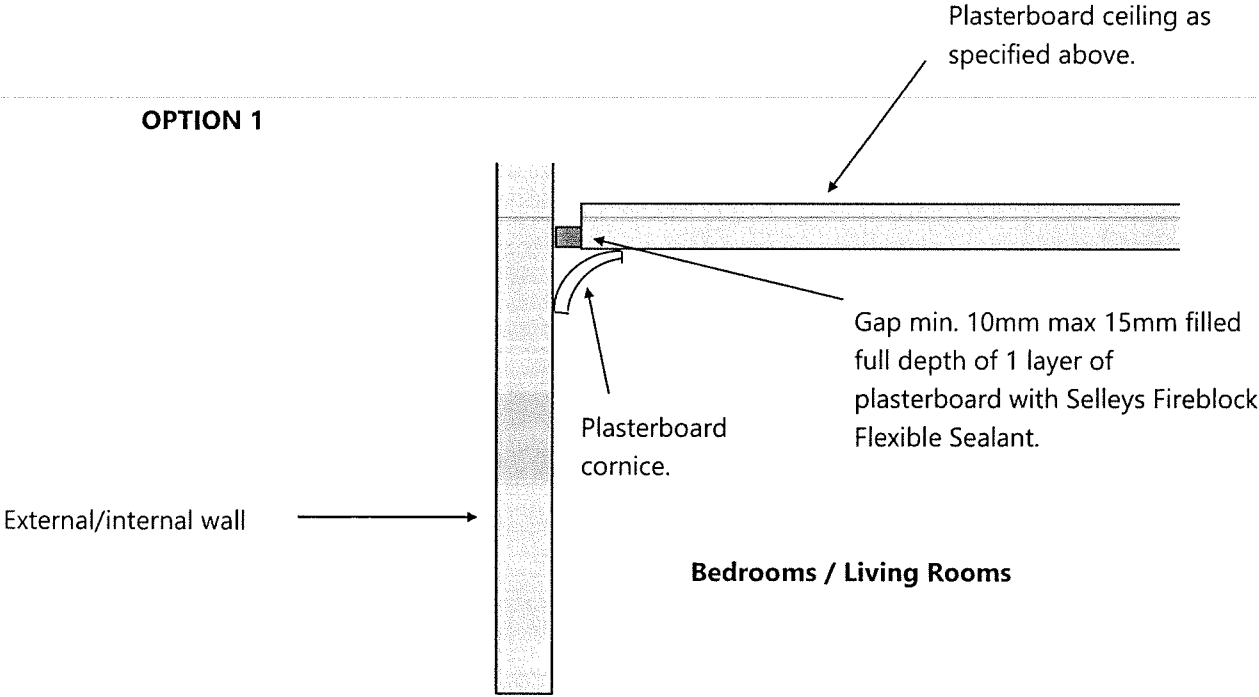
Table 5 – Roof/ Ceiling Construction

Units	Room	Roof Construction	Cavity	Ceiling Construction
Facing Albion St	Living Room	0.56mm steel metal sheet	Min 250mm, with 75mm thick fiberglass (11kg/m ³) insulation	1x13mm plasterboard
All	Bedroom	0.56mm steel metal sheet	Min 250mm, with 75mm thick fiberglass (11kg/m ³) insulation	1x13mm plasterboard

4.3.5 Plasterboard Corner Details

The recommended plasterboard ceiling/wall corner construction options over the rooms are shown in the figure 3.

OPTION 1



OPTION 2

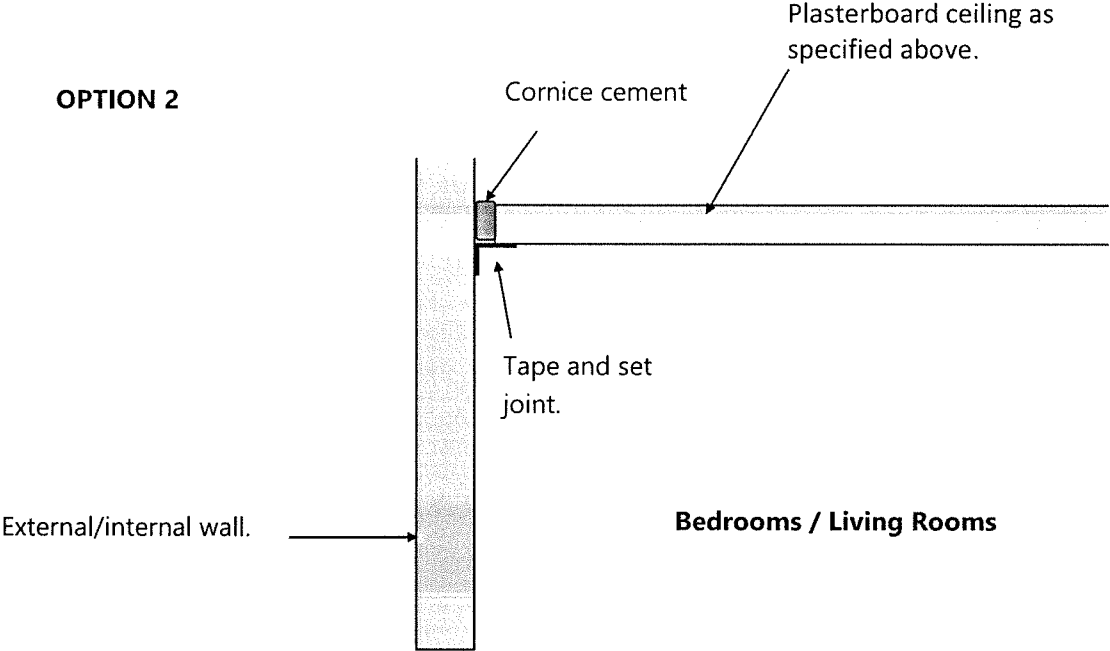


Figure 3 – Plasterboard Corner Options

5 NOISE EMISSION ASSESSMENT

Detailed mechanical equipment selection and layouts are not available at this stage. The external noise emission criteria are set up in this section of the report to ensure that the amenities of nearby land users are not adversely affected.

The nearest potentially affected residential receivers are the residential properties located along the northern and southern boundaries from the subject development.

5.1 BACKGROUND NOISE MONITORING

A long-term unattended monitor was used for background noise measurements. Detailed noise monitoring results can be found in Appendix 1.

The long-term noise monitoring was conducted from the 12th January 2021 to 19th January 2021

The long term monitoring was conducted using Acoustic Research Laboratories Pty Ltd noise loggers. The loggers were set to A-weighted fast response and were programmed to store 15-minute statistical noise levels throughout the monitoring period. The monitors were calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted. See Figure 1 for monitor location.

Table 6 – Measured Background Noise Levels

Location	Period/Time	Background Noise Level dB(A) L₉₀(period)
7 Albion Street (See figure 1)	Day (7am-6pm)	52
	Evening(6pm-10pm)	47
	Night(10pm-7am)	42

5.2 NOISE EMISSION OBJECTIVES

Parramatta City Council DCP does not contain any specific control for noise emissions, the following documents were used to determine the project criteria for noise emissions:

- NSW EPA Noise Policy for Industry 2017
- Protection of Environmental Operation Act Regulation

5.2.1 NSW EPA Noise Policy for Industry 2017

The NSW EPA Noise Policy for Industry 2017, has two criteria which need to be satisfied; namely the Intrusiveness noise level criteria and the Project amenity noise level criteria. The project noise trigger level is then established based on the lower of the intrusiveness and project amenity levels.

Noise levels are to be assessed at the property boundary or nearby dwelling, or at the balcony or façade of an apartment.

5.2.1.1 Intrusiveness Noise Level Criteria

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor do not exceed the background noise level by more than 5dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

Background noise levels adopted are presented in Section 5.1. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

Table 7– Allowable Intrusive Noise Levels

Location	Intrusiveness Noise Goals dB(A) $L_{eq}(15 \text{ minutes})$		
	Daytime (7am – 6pm)	Evening (6pm – 10pm)	Night-time (10pm – 7am)
All Boundaries (Residential Receiver)	57	52	47

5.2.1.2 Project Amenity Noise Level Criteria

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The NSW EPA Noise Policy for Industry sets out acceptable noise levels for various localities. Table 2.2 on page 11 of the policy indicates 3 categories to distinguish different residential areas. They are rural, suburban, urban. This site is categorised by urban receivers.

For the purposes of this condition:

- Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
- Evening is defined as the period from 6pm to 10pm.
- Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sunday and public holidays.

The project amenity noise level is calculated by taking the recommended amenity noise level (as presented in table 2.2 of the policy), subtracting 5dB(A) and then adding 3dB(A) to convert from $L_{Aeq, period}$ to a $L_{Aeq, 15 \text{ minute}}$ descriptor. The project amenity noise level criteria are presented in the table below.

Table 8 – Project Amenity Noise Level Criteria

Location	Period/Time	Project Amenity Noise Level Criteria dB(A) $L_{eq(15min)}$
Nearby Residences – Suburban Receiver	Day (7am-6pm)	53
	Evening(6pm-10pm)	43
	Night(10pm-7am)	38
Commercial	When in use	63

5.2.1.3 Project Noise Emission Limit

The project noise emission limit (as outlined in section 2.1 of the policy) is the lower of the intrusiveness and project amenity noise levels. The project noise emission limits are presented in the table below.

Table 9 – Project Noise Emission Limit Criteria

Location	Period/Time	Project Noise Trigger Level Criteria dB(A) $L_{eq(15min)}$
All Boundaries (Residential Receiver)	Day (7am-6pm)	53
	Evening(6pm-10pm)	43
	Night(10pm-7am)	38
Commercial	When in use	63

5.2.2 Sleep Arousal Criteria

Potential sleep arousal impacts should be considered for noise generated before 7am or after 10pm.

Short duration, intermittent noise events (such as cars driving by) are typically assessed for potential sleep disturbance.

Potential impacts are assessed using the recommended procedure in the NSW EPA Noise Policy for Industry.

- An assessment should be conducted to determine if noise levels at a residential location during the night time period (10pm-7am) exceed:
 - $L_{Aeq, 15min}$ 40dB(A) or the prevailing RBL (rating background noise level) plus 5 dB, whichever is greater, and/or
 - L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is greater.

The policy does not explicitly state where noise impacts should be assessed within the residential location. For the purposes of this assessment, noise impacts will be assessed at the location immediately outside a resident's bedroom window. If the noise events are compliant with this criteria, then sleep arousal impacts are unlikely and no further analysis is needed. This is consistent with the Noise Guide for Local Government. The criteria is set out below.

Table 10– Sleep Arousal Criteria

Location	Background Noise Level (10pm-7am)	Sleep Arousal Criteria dB(A)
All Boundaries (Residential Receiver)	42dB(A) L_{90}	47 dB(A) $L_{eq(15min)}$ 57dB(A) $L_{Max, F}$

5.2.3 Protection of the Environmental Operation Act Regulation

Protection of the Environmental Operations regulation limits the noise levels associated within the operation of domestic air conditioning criteria during night time periods which is presented below:

Protection of the Environmental Operations (Noise Control) Regulation 2000-Sect 52

52 Air Conditioners

(1) A person must not cause or permit an air conditioner to be used on residential premises in such a manner that it emits noise that can be heard within a habitable room in any other residential premises (regardless of whether any door or window to that room is open):

(a) before 8 am or after 10 pm on any Saturday, Sunday or public holiday, or

(b) before 7 am or after 10 pm on any other day.

5.2.4 Summary of Noise Emission Objectives

Based on the requirements stated in the sections above, the Table 11 below provides a summary of the assessment criteria applicable to the future residential development at the project site. The assessment criteria are also based on the ambient noise monitoring conducted at the site.

Table 11 – Environmental Noise Emission Criteria

Time of day	Measured Background Noise Level dB(A) L₉₀(15minutes)	Amenity Criteria dB(A) L_{eq}(period)	Intrusiveness Criteria Background + 5 dB(A) L_{eq}(15minutes)	EPA Criteria for Residential Condensers	EPA Criteria for Sleep Arousal – dB (A)
Day	52	53	57	N/A	N/A
Evening	47	43	52	N/A	N/A
Night	42	38	47	Inaudible within neighbouring premises	47dB(A) _{L_{eq}(15min)} 57dB(A) _{L_{Max}, F}

5.3 ASSESSMENT OF NOISE EMISSION

As mechanical plant has not yet been selected at this stage, a complete assessment of mechanical noise emissions can not be conducted at this time. Generally, this is undertaken at CC stage, once the plant selections have been undertaken. Notwithstanding, compliance with the mechanical noise emission criteria presented in section 5.2.4 is both practical and reasonable with the use of one or more of (but not limited to) the following:

- Acoustic Barriers/Screens;
- Internally lined ductwork;
- External Lagging;
- Silencers etc.

5.3.1 Noise – Air-conditioners

As air conditioning plant has not yet been selected, a complete assessment of air-conditioning noise emissions can not be conducted at this time. Generally, this is undertaken at CC stage, once the plant selections have been undertaken. Notwithstanding, compliance with the air conditioning noise emission criteria presented in section 5.2.4 is both practical and reasonable with the use of one or more of (but not limited to) the following acoustic treatments:

- Acoustic Barriers/Screens;
- Internally lined ductwork;
- External Lagging;
- Silencers etc.

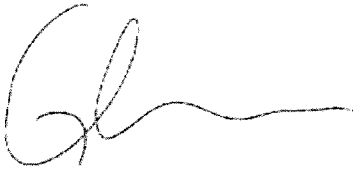
6 CONCLUSION

This report presents our acoustic assessment for the proposed boarding facility at 7 Albion Street, Harris Park.

- Noise intrusion impact from traffic noise onto the future occupants of the development has been assessed in accordance with Australian Standard AS2107:2016. The acoustic treatments in principle necessary to achieve these guidelines have been set out in Section 4.
- Noise emission criteria for the development site have been determined based on the site noise logging, NSW EPA Noise Policy for Industry and Protection of the Environmental Operation Act Regulation. These requirements have been presented in Section 5.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

A handwritten signature in black ink, appearing to be 'Glen Campbell', with a long horizontal flourish extending to the right.

Acoustic Logic Pty Ltd
Glen Campbell

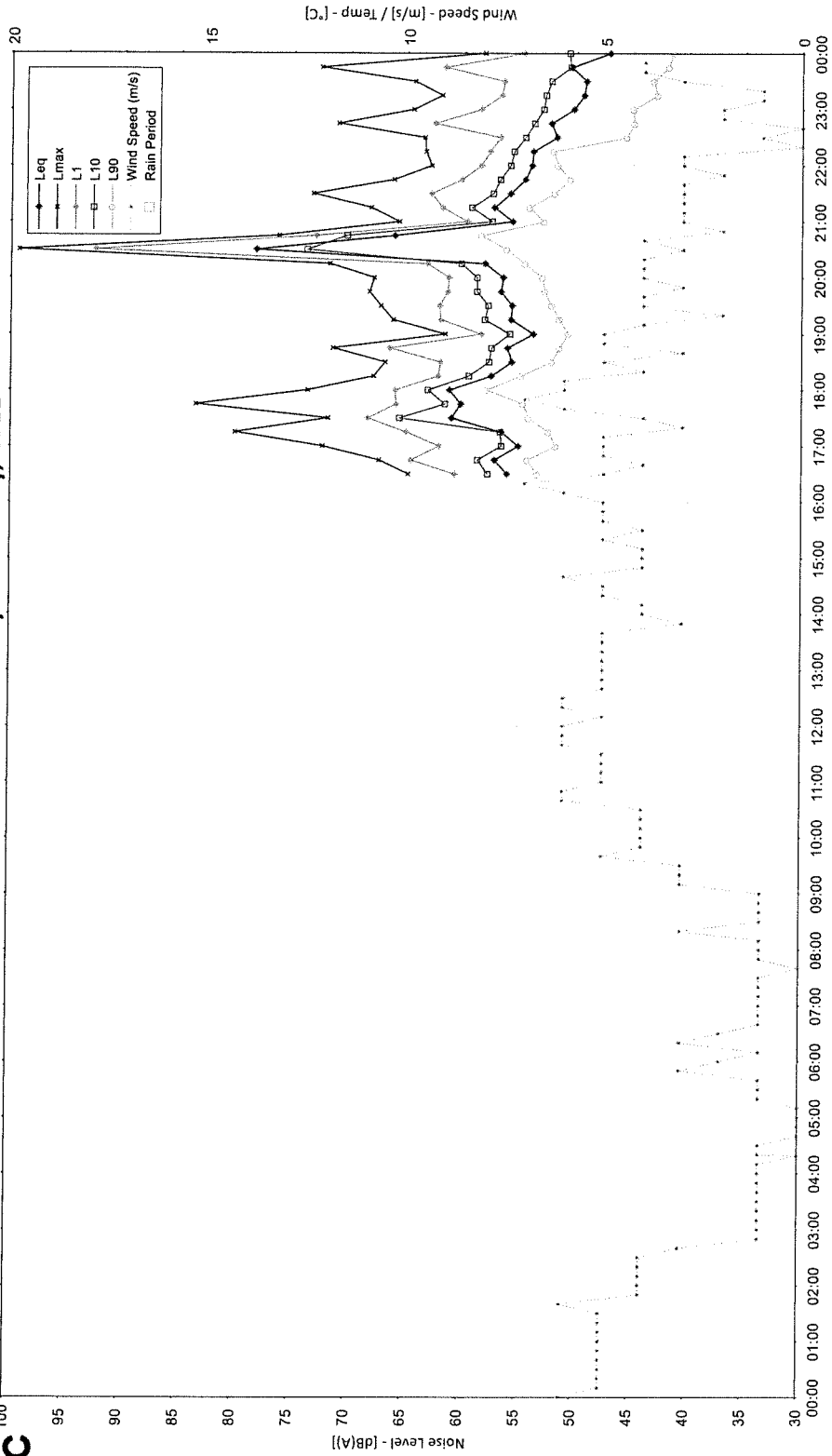
APPENDIX 1

Unattended Noise Monitoring Data

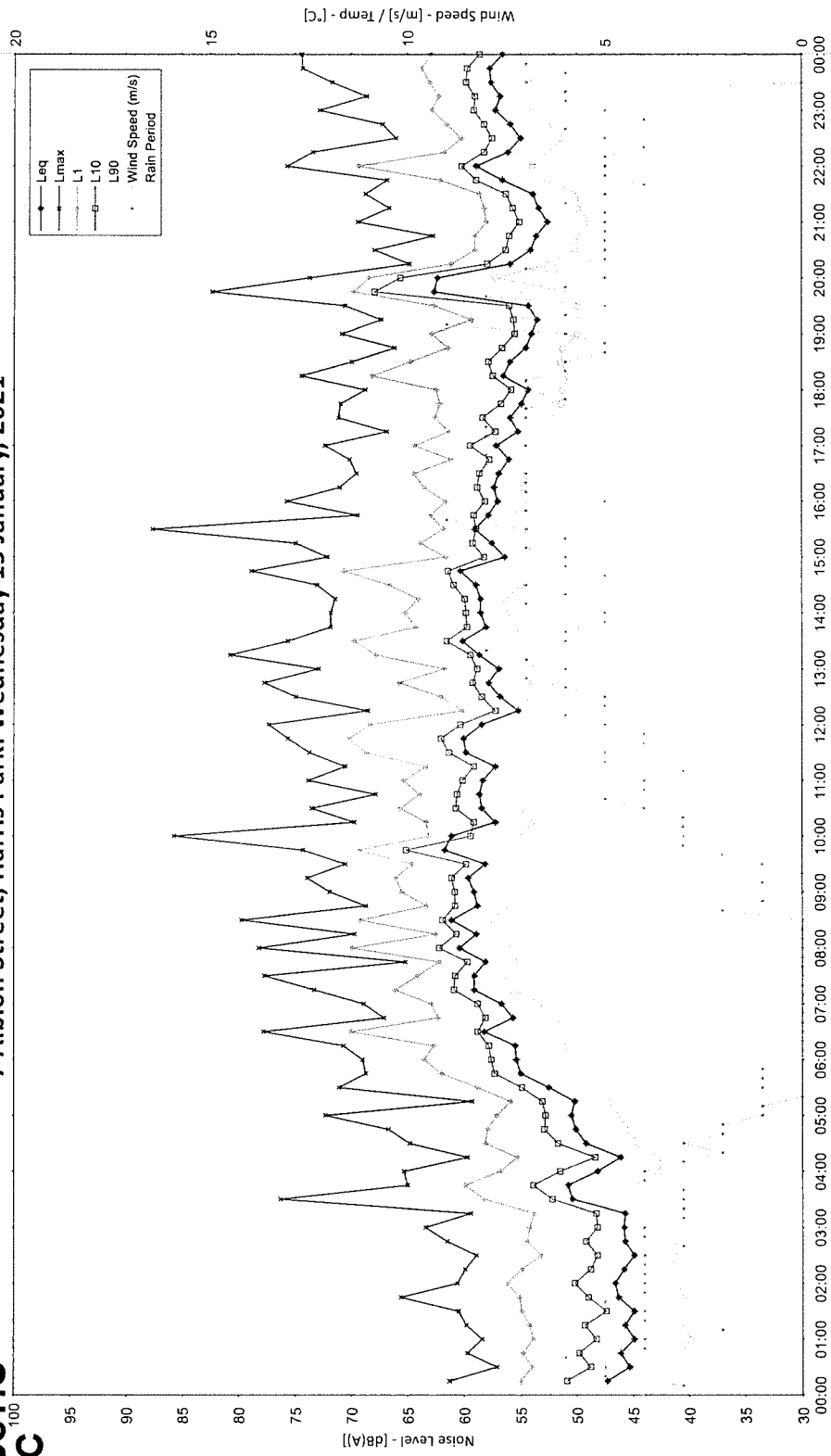


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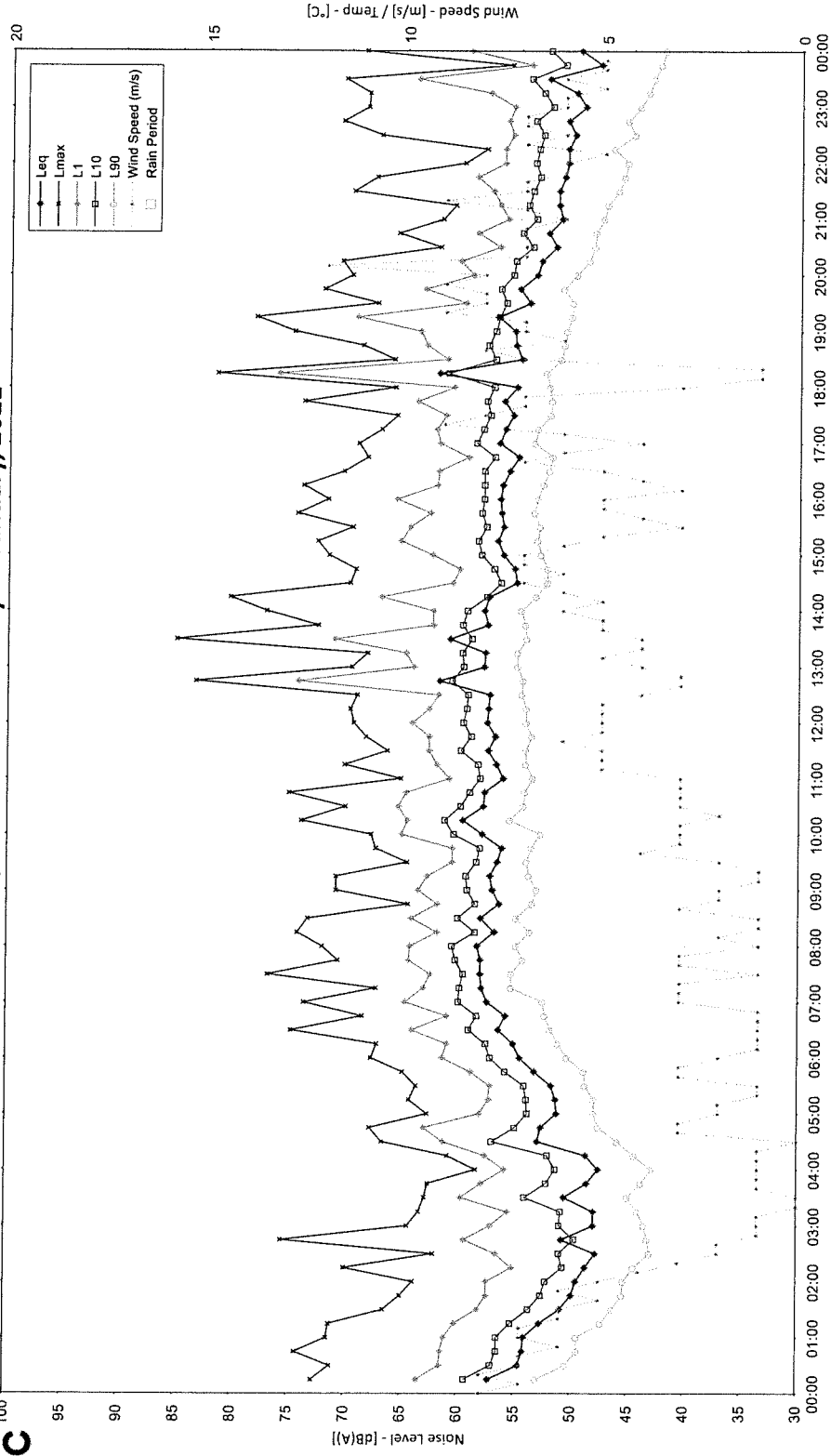
7 Albion Street, Harris Park: Tuesday 12 January, 2021



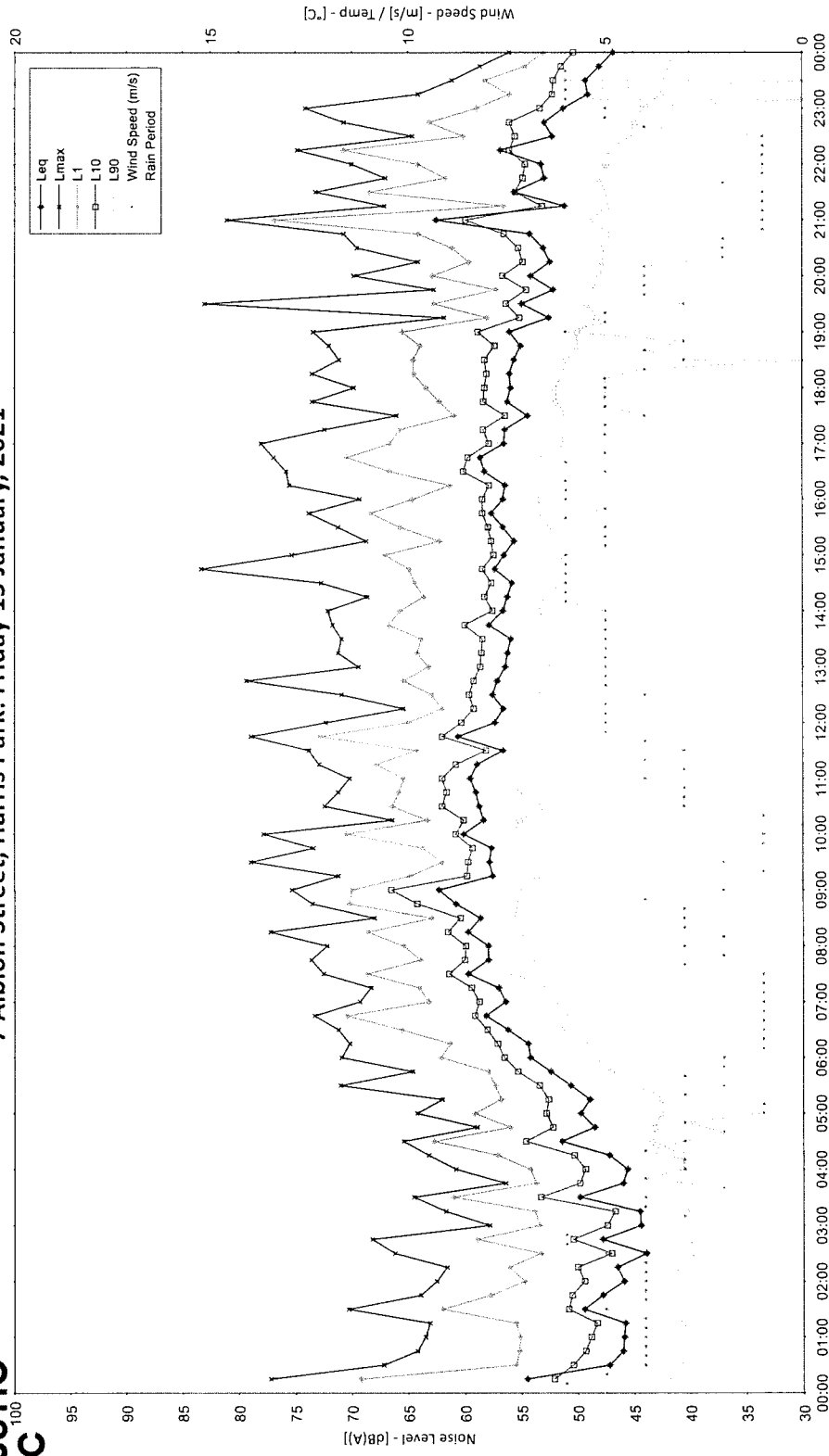
7 Albion Street, Harris Park: Wednesday 13 January, 2021



7 Albion Street, Harris Park: Thursday 14 January, 2021



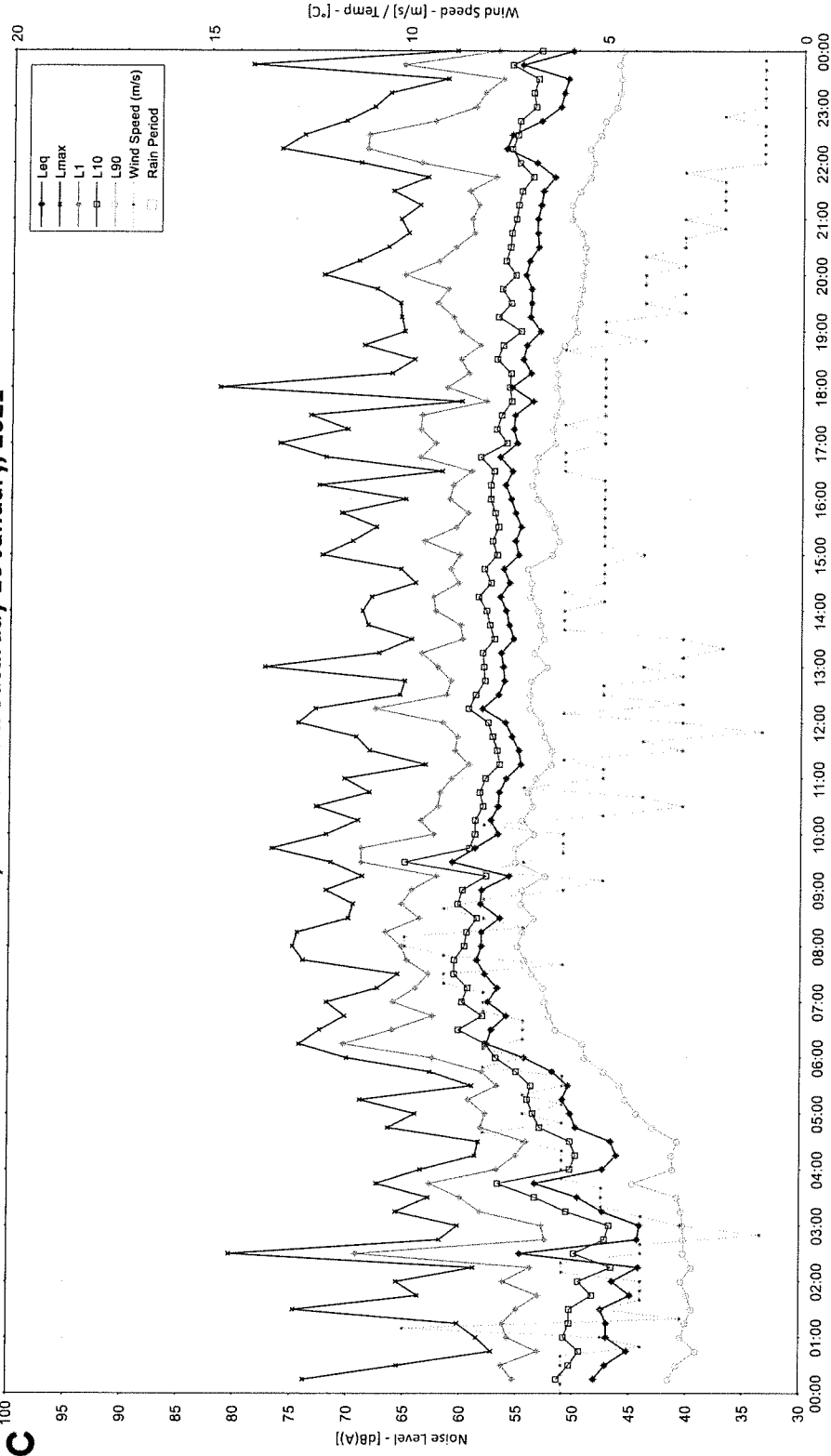
7 Albion Street, Harris Park: Friday 15 January, 2021





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7 Albion Street, Harris Park: Saturday 16 January, 2021

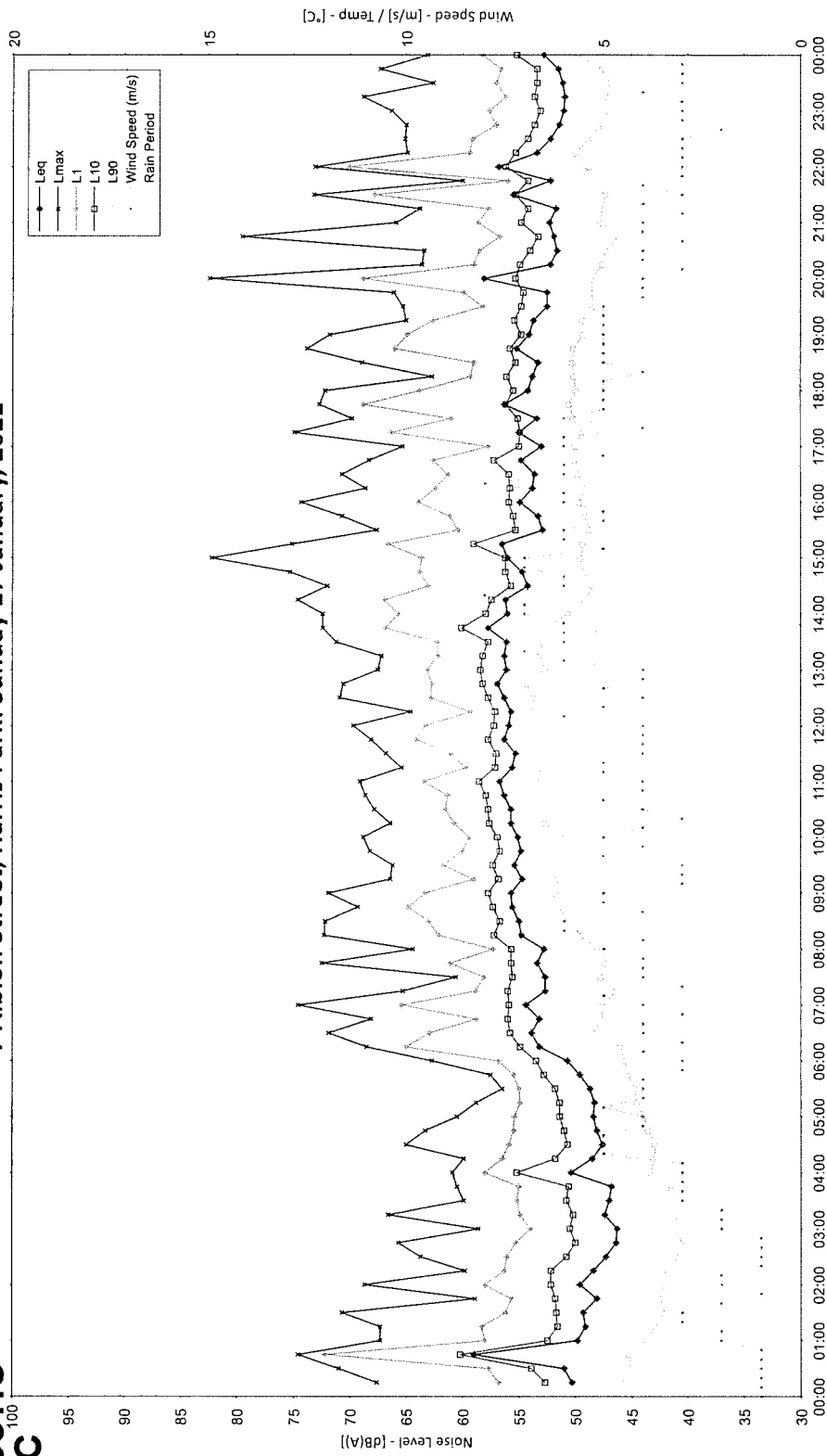


■ - Rain Period



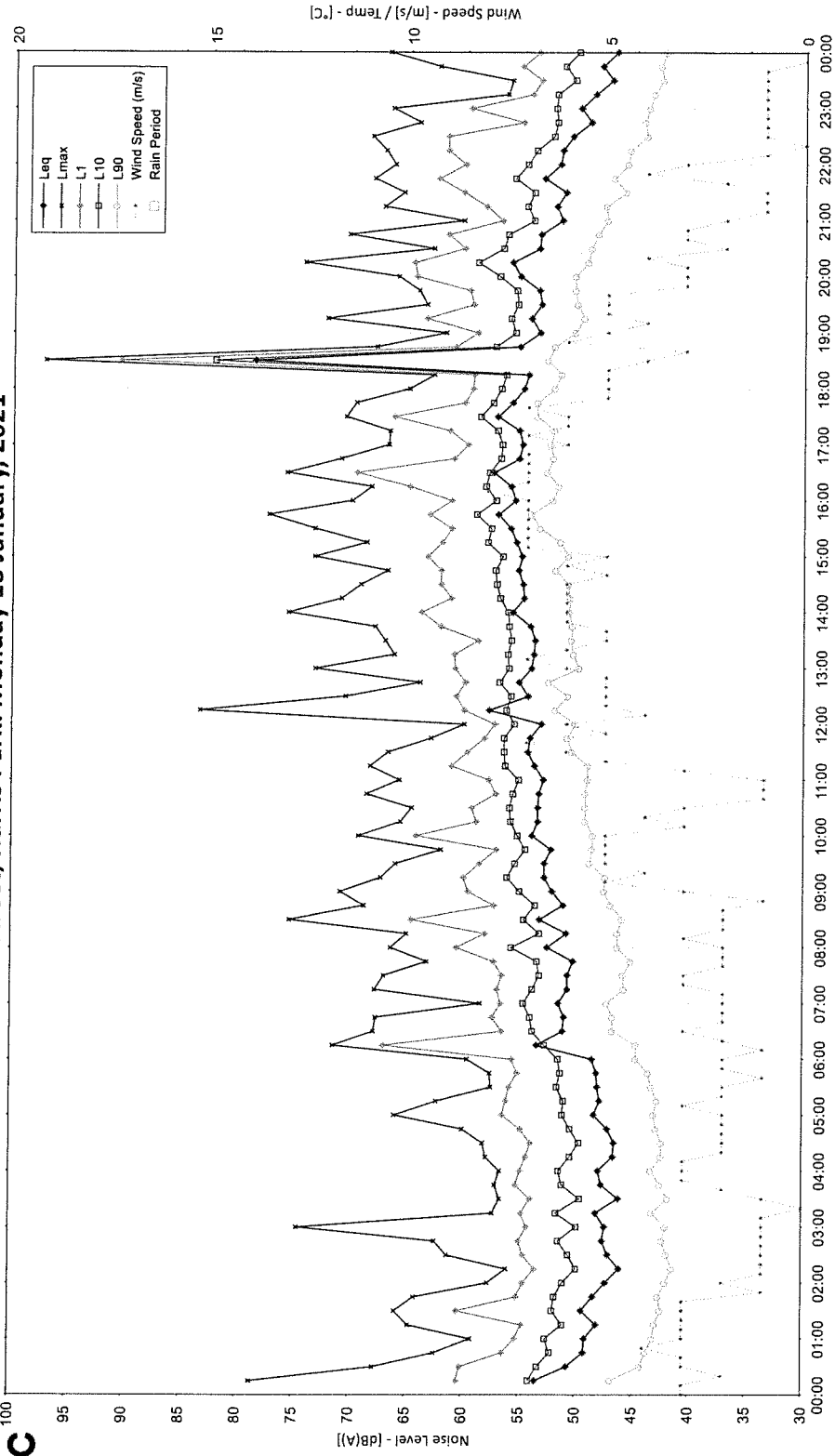
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7 Albion Street, Harris Park: Sunday 17 January, 2021



■ - Rain Period

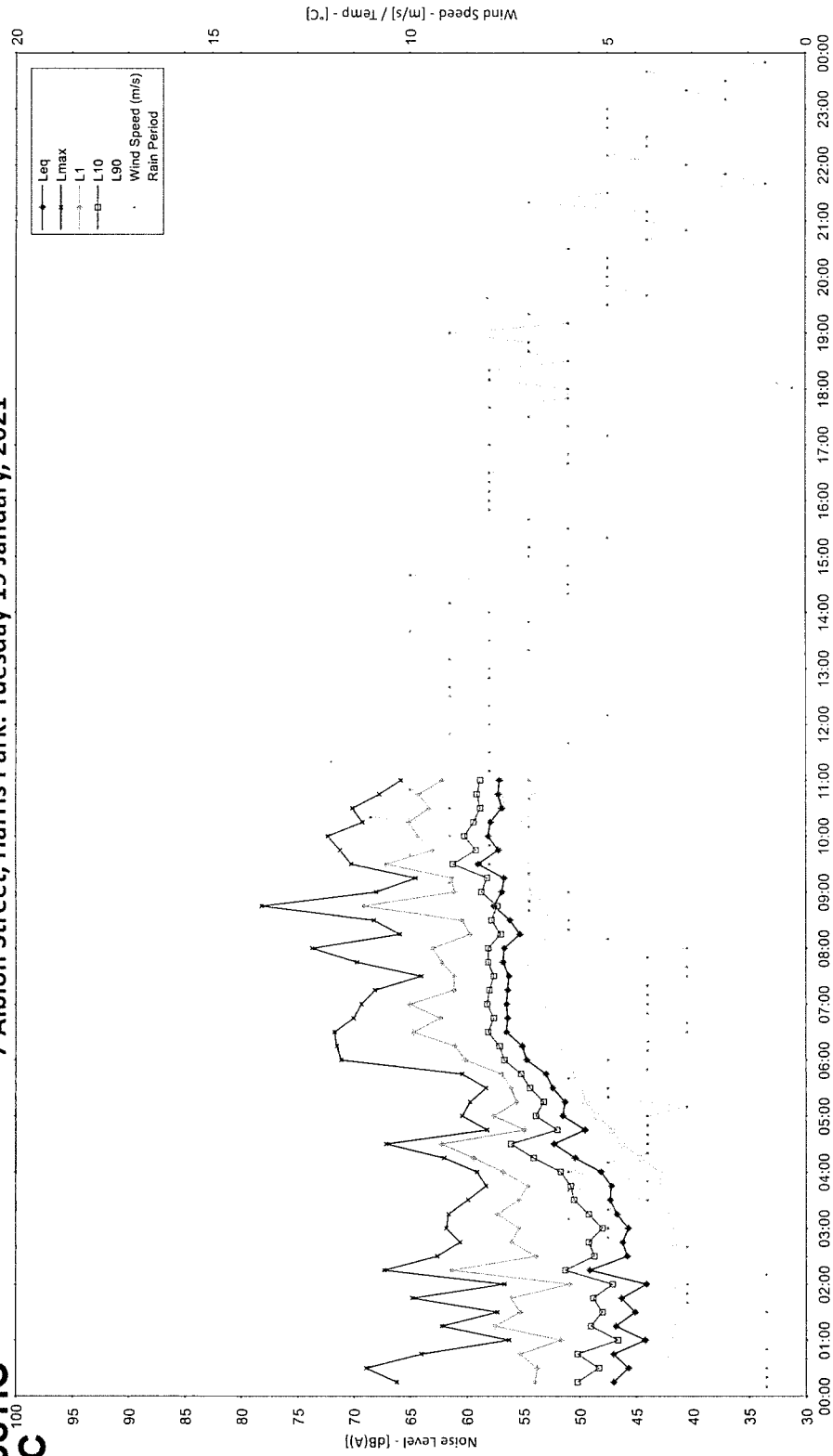
7 Albion Street, Harris Park: Monday 18 January, 2021





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7 Albion Street, Harris Park: Tuesday 19 January, 2021



■ - Rain Period