

Boronia Park Community and Sports Amenities Facility

DA Acoustic Assessment

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1 INTRODUCTION

Acoustic Logic has been engaged to conduct an assessment of potential noise impacts associated with the proposed Boronia Park Community and Sports Amenities Facility to be located on Park Road, Hunters Hill.

This report addresses noise emissions associated with the following:

- Noise from use of the Level 1 Community Space and Terrace.
- Noise from mechanical plant and equipment (in principle).

Acoustic Logic have utilised the following documents and regulations in this assessment:

- Hunters Hill Council *Consolidated Development Control Plan (DCP) 2013*.
- NSW Environmental Protection Authority (EPA) *Noise Policy for Industry (NPfI) 2017*.

This assessment has been conducted using the DJRD Architects architectural drawings for DA submission, dated April 2021.

2 SITE DESCRIPTION AND PROPOSAL

The project site is located on Parks Road, Hunters Hill – to be formally known as Boronia Park Community and Sports Amenities Facility. The proposed building will be located between the existing playing fields referred to as Oval 1 and Oval 2, set back approximately 85m from Park Road and 110m from Boronia Avenue as per Figure 1 below.



Figure 1 – Project Site Location Plan (As per DJRD Drawing DA-000)

As per the above, the site is bound as follows:

- Ryde Road along the south western boundary which carries a high volume of traffic. Beyond Ryde Road is existing residential dwellings.
- Park Road along the western boundary which carries a moderate volume of traffic. Beyond Park Road is existing residential dwellings.
- Boronia Avenue along the south boundary, and High Street along the northern boundary. Both roads carry low amounts of traffic, typically associated with residentially dwellings along the roadways.

The development will accommodate the following:

- Ground Floor
 - Equipment Storage
 - Canteen & BBQ Area
 - Changerooms and Amenities
- Level 1
 - Equipment Storage
 - Servery
 - Community Space
 - Outdoor Terrace

With regard to the existing carpark on Park Road, no expansion is proposed, and number of car spaces are expected to remain the same. On this basis, use of the car park will remain the same and no adverse acoustic impacts are expected.

Noise emissions from the proposed development will be greatest from the use of the Level 1 Community Space and Outdoor terrace. This office has been advised of the following hours of operation:

- Monday to Saturdays 6:00am – 10:00pm
- Sunday 6:00am – 5:00pm

In addition to the above, the facility is not to be used for hire by individuals for private celebrations such as weddings, birthdays etc. after 5:00pm on any day.

The most affected noise receivers surrounding the project site include:

- Receiver R1 – Residential dwellings situated west of the project site across Park Road.
- Receiver R2 – Residential dwellings situated south of the project site across Boronia Avenue.

An aerial site map indicating measurement locations and surrounding receivers is presented in Figure 2.



- Unattended Noise Monitor
- Attended Noise Measurements

Figure 2 – Site Survey and Monitoring Positions
Sourced from SixMaps NSW

- Residential Receiver
- Project Site

3 EXISTING ACOUSTIC ENVIRONMENT

Noise monitoring was conducted near the site to establish the background noise levels which will be used as a basis for this assessment.

3.1 ENVIRONMENTAL NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-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.

In analysing 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 by 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 15-minute period. L_{eq} is important in the assessment of environmental noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

3.1 BACKGROUND NOISE LEVELS

Background noise levels which will be used as a basis for this assessment are detailed in the following sections.

3.1.1 Measurement Equipment

Unattended noise monitoring was conducted using one Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of each measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

3.1.2 Measurement Location

An unattended noise monitor was installed adjacent to the entry of the existing car-park entry of Park Road. Refer to Figure 2 for more detail.

3.1.3 Measurement Period

Unattended noise monitoring was conducted from Thursday 15th April 2021 to Friday 23rd April 2021.

3.1.4 Attended Noise Measurement

Attended noise measurements were undertaken to supplement the unattended noise monitoring. A background noise measurement was conducted on Sunday 30th May 2021 between 11:00am to 11:30am at the residences along Boronia Avenue. The noise measurement is detailed in the table below.

Table 1 – Background Noise Level Measurement

Monitor Location	Measurement Period	Background Noise Level dB(A)L₉₀(period)
Boronia Avenue Residences Refer to Figure 2	Sunday 30 th May 2021	42

3.1.5 Measured Background Noise Levels

NSW EPA's RBL assessment procedure requires determination of background noise level for each day (the ABL) then the median of the individual days as set out for the entire monitoring period.

Appendix A provides detailed results of the unattended noise monitoring. The processed Rating Background Noise Levels (lowest 10th percentile noise levels during operation time period) are presented in the table below. Weather affected data has been excluded in the calculation to determine the Rating Background Noise Levels as per the NSW EPA *Noise Policy for Industry* recommendations

Background noise levels at the Boronia Avenue residences have been determined from the results of long-term unattended noise monitoring which has been corrected based on the attended noise measurement detailed above.

Table 2 – Rating Background Noise Levels

Receiver Location	Time of Day	Rating Background Noise Level (RBL) dB(A)_{L90(period)}
Park Road Residences	Early Morning (6:00am-7:00am)	48
	Day (7:00am-6:00pm)	46
	Evening (6:00pm-10:00pm)	43
	Night (10:00pm-7:00am)	31
Boronia Avenue Residences	Early Morning (6:00am-7:00am)	44
	Day (7:00am-6:00pm)	42
	Evening (6:00pm-10:00pm)	39
	Night (10:00pm-7:00am)	30 ⁽¹⁾

Table Notes:

1. As per Table 2.1 the NSW EPA *Noise Policy for Industry*, a minimum RBL of 30dB(A)_{Leq(Night)} is applicable when determining project intrusiveness noise goals.

4 NOISE EMISSION ASSESSMENT

Noise emissions from the site have been assessed for noise being emitted from the use of the Level 1 Community Space and Terrace.

4.1 NOISE EMISSION CRITERIA

4.1.1 Hornsby Council *Consolidated Development Consent Plan (DCP) 2013*

The Hornsby Council DCP does not provide specific noise emission goals for non-residential development outside of childcare centres.

In light of the above, a Background (BG) + 5dB(A) assessment criterion is to be adopted for the operation of the proposed facility. We note a BG+5dB(A) assessment criterion is consistent with the *Intrusiveness* criterion stipulated in the NSW EPA *Noise Policy for Industry* and the NSW EPA *Noise Guide for Local Government*.

4.1.2 NSW EPA *Noise Policy for Industry (NPfI) 2017'*

Notwithstanding the above, the *NPfI* applies to noise emissions from mechanical plant and equipment servicing the development.

The *NPfI* provides guidelines for assessing noise impacts from developments. The recommended assessment objectives vary depending on the potentially affected receivers, the time of day, and the type of noise source. The *NPfI* has two requirements which must both be complied with, namely an amenity criterion and an intrusiveness criterion.

4.1.2.1 Intrusiveness Criterion

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 not exceed the background noise level by more than 5 dB(A).

4.1.2.2 Amenity Criterion

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 Noise Policy for industry sets out acceptable noise levels for various land uses. Table 2.2 on page 11 of the policy has four categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface.

Acoustic Logic will assess noise emissions in accordance with the 'Suburban' category.

Table 3 – NPfl Project Amenity Criteria

Type of Receiver	Time of day	Recommended Project Acceptable Noise Level dB(A) $L_{eq}(15\text{-minutes})$
Residential (Suburban)	Day (7:00am-6:00pm)	53
	Evening (6:00pm-10:00pm)	43
	Night (10:00pm-7:00am)	38

4.1.2.3 Noise Policy for Industry Sleep Arousal Assessment

Potential sleep arousal impacts should be considered for noise generated after 10pm. Sleep arousal is a function of both the noise level and the duration of the noise.

As recommended in the NPfl, to assess potential sleep arousal impacts, a two-stage test is carried out:

- Step 1 – Section 2.5 *Maximum noise level event assessment* from the NPfl states the following:
Where the subject development/premises night-time noise levels at a residential location exceed:
 - $L_{Aeq,15min}$ 40dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
 - L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is greater,*a detailed maximum noise level event assessment should be undertaken.*

Based on the above the following noise objectives apply:

Table 4 – NPfl Sleep Arousal Criteria (Average/ L_{eq} Noise Levels)

Receiver Location	Rating Background Level dB(A) L_{90}	Rating Background Level + 5dB(A)	Governing Criteria dB(A) $L_{Aeq}(15mins)$
Residential Receiver R1	31	36	40
Residential Receiver R2	30	35	40

Table 5 – NPfl Sleep Arousal Criteria (Maximum/ L_{max} Events)

Location	Rating Background Level dB(A) L_{90}	Rating Background Level + 15dB(A)	Governing Criteria dB(A) $L_{(Max)}$
Residential Receiver R1	31	46	52
Residential Receiver R2	30	45	52

- Step 2 - If there are noise events that could exceed the average/maximum criteria detailed in the tables above, then an assessment of sleep arousal impact is required to be carried out taking into account the level and frequency of noise events during the night, existing noise sources, etc. This test takes into account the noise level and number of occurrences of each event with the potential to create a noise disturbance. As is recommended in the explanatory notes of the EPA Industrial Noise Policy, this more detailed sleep arousal test is conducted using the guidelines in the EPA Road Noise Policy. Most relevantly, the Road Noise Policy states:

For the research on sleep disturbance to date it can be concluded that:

- *Maximum internal noise levels below 50-55dB(A) are unlikely to awaken people from sleep.*
- *One to two noise events per night with maximum internal noise levels of 65-70dB(A) are not likely to affect health and wellbeing significantly.*

4.2 GENERAL ASSUMPTIONS

The following assumptions have been made in our assessment of noise emanating from the operation of the site:

- This office has been advised of three typical scenarios for the use of the facility, summarised by the following:
 - Scenario 1: Monday to Sunday use from 6am as a fitness class.
 - Music internally within the community space with a spatially average sound pressure level of 80dB(A) across the space.
 - Scenario 2: Monday to Sunday use from 7am up to 5pm for wedding, birthdays etc.
 - Patrons/occupants of the community space and outdoor terrace are assumed to have a sound power level of 75dB(A)_{Leq}.
 - Music internally within the community space with a spatially average sound pressure level of up to 90dB(A) across the space.
 - Two speakers are assumed to be located on the outdoor terrace, with a sound power level of 75dB(A)_{Leq}.
 - Scenario 3: Monday to Saturday use from 7am up to 10pm for functions with amplified speech and music.
 - Patrons/occupants of the community space and outdoor terrace are assumed to have a sound power level of 75dB(A)_{Leq}.
 - Music internally within the community space with a spatially average sound pressure level of up to 90dB(A) across the space.
 - Two speakers are assumed to be located on the outdoor terrace, with a sound power level of 75dB(A)_{Leq}.
- Number of patrons/occupants for the Level 1 Community Space and Terrace are assumed to be limited to the following:
 - Community Space: 150 patrons
 - Outdoor Terrace: 80 Patrons
- External glazing for the community space is constructed from minimum 4mm thick glass.
- Lightweight sheet metal roof/ceiling system will consist of the following:
 - External skin: 0.5mm thick steel sheet (similar to Colorbond)
 - Roof Cavity: Minimum 250mm thick cavity with 75mm thick 11kg/m³ glasswool insulation.
 - Internal skin: 10mm Standard Plasterboard

4.3 PREDICTED NOISE LEVELS

Based on the assumptions and information outlined above, the predicted cumulative noise levels at the surrounding receivers are presented in the tables below for each scenario.

Table 6 – Predicted Noise Levels for Scenario 1

Receiver	Predicted Noise Level dB(A) $L_{eq}(15\text{-minute})$	BG + 5 Criteria Noise Level dB(A) $L_{eq}(15\text{-minute})$	Compliance
Park Road Residences - R1	Doors Closed: < 20	Early Morning (6am-7am): 48 + 5 = 53dB(A)$L_{eq}(15\text{min})$ Day (7am-6pm): 46 + 5 = 51dB(A)$L_{eq}(15\text{min})$ Evening (6pm-10pm): 43 + 5 = 48dB(A)$L_{eq}(15\text{min})$	Yes
Boronia Avenue Residences – R2	Doors Closed: < 20	Early Morning (6am-7am): 44 + 5 = 49dB(A)$L_{eq}(15\text{min})$ Day (7am-6pm): 42 + 5 = 47dB(A)$L_{eq}(15\text{min})$ Evening (6pm-10pm): 39 + 5 = 44dB(A)$L_{eq}(15\text{min})$	Yes

In addition to the above, noise emissions from early morning use of the space (primarily fitness classes) will easily comply with sleep disturbance noise trigger levels outlined in Section 4.1.2.3

Table 7 – Predicted Noise Levels for Scenario 2

Receiver	Predicted Noise Level dB(A)$L_{eq}(15\text{-minute})$	BG + 5 Criteria Noise Level dB(A)$L_{eq}(15\text{-minute})$	Compliance
Park Road Residences - R1	Community Space Doors & Louvres Open: 44 ⁽¹⁾	Day (7am-6pm): 46 + 5 = 51dB(A)$L_{eq}(15\text{min})$	Yes, see recommendations
	Community Space Doors & Louvres Closed: 42 ⁽¹⁾	Evening (6pm-10pm): 43 + 5 = 48dB(A)$L_{eq}(15\text{min})$	
Boronia Avenue Residences – R2	Community Space Doors & Louvres Open: 47 ⁽²⁾	Day (7am-6pm): 42 + 5 = 47dB(A)$L_{eq}(15\text{min})$	Yes, see recommendations.
	Community Space Doors & Louvres Closed: 42 ⁽¹⁾	Evening (6pm-10pm): 39 + 5 = 44dB(A)$L_{eq}(15\text{min})$	

Table Notes:

1. Noise level predicted based on 90dB(A) music sound pressure level within the community space.
2. Noise level predicted based on 85dB(A) music sound pressure level within the community space.

As per the assumptions detailed in Section 4.2, noise levels for Scenario 3 will be equivalent to Scenario 2 given use of the spaces would be likely be similar with respect to potential patron numbers (based on floor area) and music noise levels.

In light of the predicted noise levels above, use of the site will be capable of achieving noise emission goals provided the recommendations in Section 5 are adopted.

4.4 NOISE FROM MECHANICAL PLANT AND EQUIPMENT

A detailed review of all external mechanical plant should be undertaken at construction certificate (CC) stage once plant selections and locations are finalised. Acoustic treatments should be determined in order to control plant noise emissions to the levels detailed in Section 4.1. Compliance with noise emission requirements will be achievable with appropriate acoustic treatment where required. We note primary external mechanical plant is likely to consist of air-conditioner condensers and exhaust fans for amenity areas. It is unlikely that additional treatment will be required to achieve *NPfl* noise emission goals based on

5 RECOMMENDATIONS

We make the following recommendations in order to comply with the noise emission goals identified above:

- All glazing for the Level 1 community terrace is to be minimum 4mm thick (minimum STC/Rw 27) with acoustic seals.
- Glass louvres on the northern/southern façade of the Level 1 community space (GLZ2 as per the architectural drawings) are to be replaced with the following:
 - Option 1: 300mm deep high performance acoustic louvre with the following minimum insertion loss:

Frequency	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Insertion Loss	4	7	10	12	15	15	15	14

- Option 2: Operable glass louvre (4mm thick with minimum acoustic performance of Rw 27). Louvre is to be shut before 7am and after 10pm.
- Speakers for the community space are to be vibration isolated from the building structure using Embelton NRD mounts or similar.
- The internal noise limit should be set as below:

Table 8 – Internal Music Noise Limit

Time	Sound Pressure Level dB(A)Leq
6am -7am	80*
7am-6pm	90 (doors closed) 85 (doors open)
6pm-10pm	90*

*Note: external door should remain closed except for patrons ingress/egress.

- Music at external areas is to be limited to background music with maximum 75 dB(A) sound power level for each speaker. Maximum 2 speakers are allowed and positioned towards the project building.
- When the community space is in use, doors to the terrace are to be closed after 6pm.
- Patron numbers are to be restricted as follows:
 - Community Space: 150 patrons
 - Terrace: 80 patrons
- External disposal of bottles/waste should be done prior to 10pm, but not before 7am.
- Signs are to be displayed at the entrance of the community space reminding visitors to minimise noise when departing, especially after 10pm.
- Lightweight sheet metal roof/ceiling system within the Level 1 community space to be consist of the following (any penetration in the external skin is to be acoustically sealed):
 - External skin: 0.5mm thick steel sheet (similar to Colorbond)
 - Roof Cavity: Minimum 250mm thick cavity with 75mm thick 11kg/m³ glasswool insulation.
 - Internal skin: 10mm Standard Plasterboard

6 CONCLUSION

The report presents Acoustic Logics findings in the assessment of potential noise impacts associated with the proposed Boronia Park Community and Sports Amenities Facility to be located on Park Road, Hunters Hill.

Noise emissions associated with the use of the development have been assessed in line with the following guidelines:

- Hunters Hill Council *Consolidated Development Control Plan (DCP) 2013*.
- NSW Environmental Protection Authority (EPA) *Noise Policy for Industry (NPfI) 2017*.

Provided the recommendations in Section 5 of this report are adopted, noise emissions from the use of the development will satisfy the relevant noise emission goals.

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

Yours faithfully,

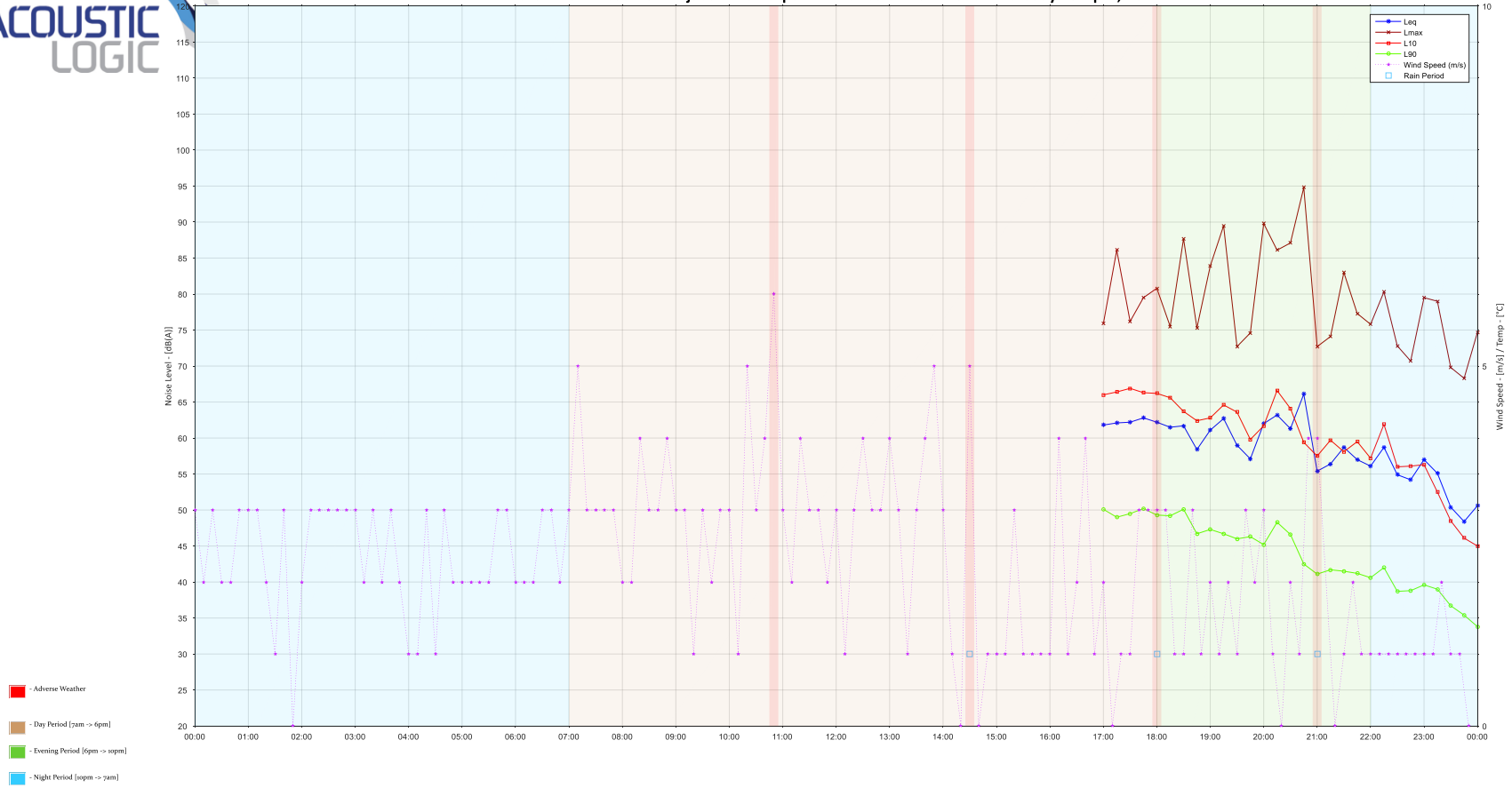
A handwritten signature in black ink, appearing to read 'Artie', written in a cursive style.

Acoustic Logic Pty Ltd
Artie Rattananikom

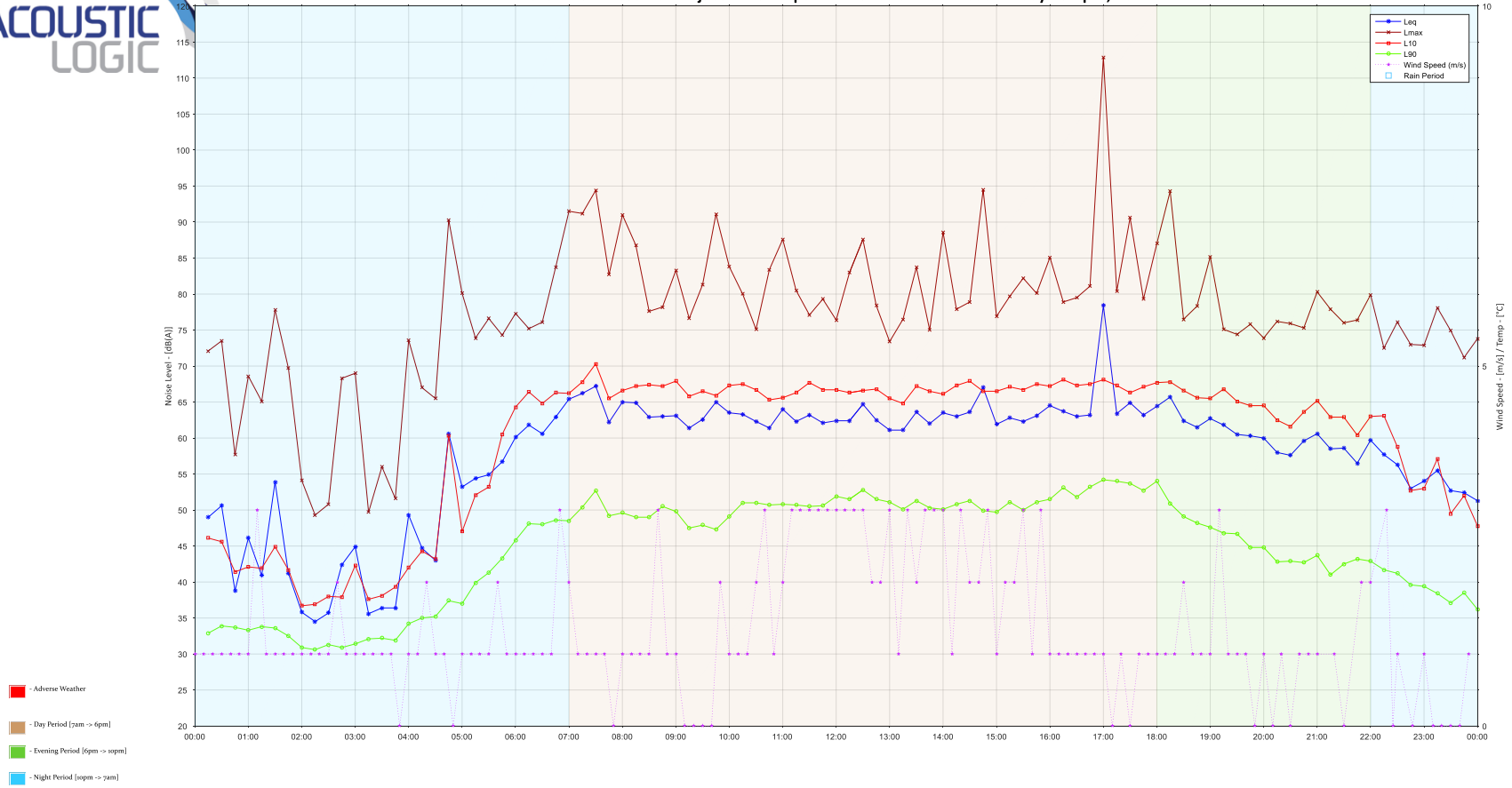
APPENDIX A – NOISE MONITORING RESULTS – BORONIA PARK RESERVE, ADJACENT TO PARK ROAD CARPARK ENTRANCE



Boroni Park Reserve - Adjacent to Carpark Entrance on Park Road: Thursday 15 April, 2021

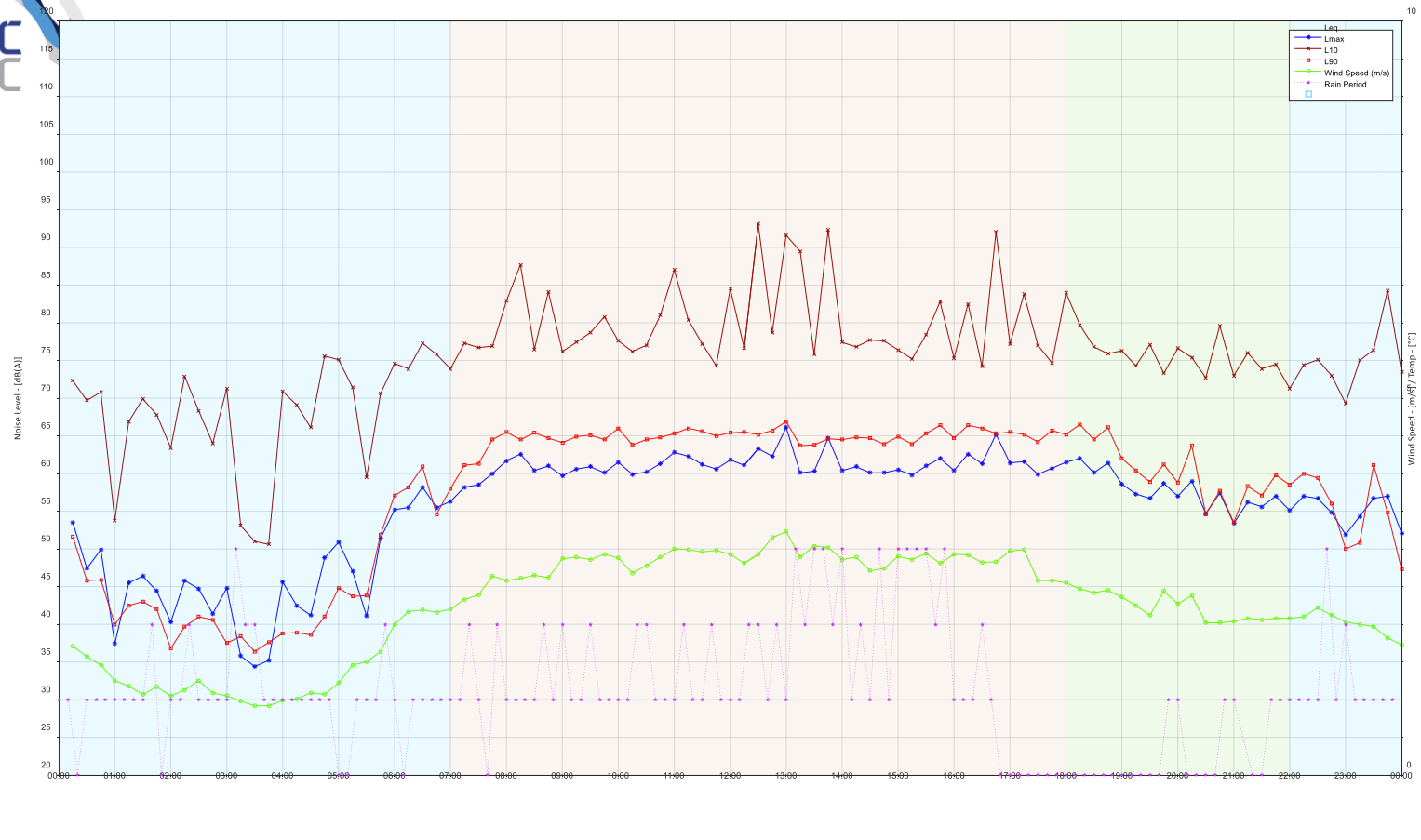


Boroni Park Reserve - Adjacent to Carpark Entrance on Park Road: Friday 16 April, 2021



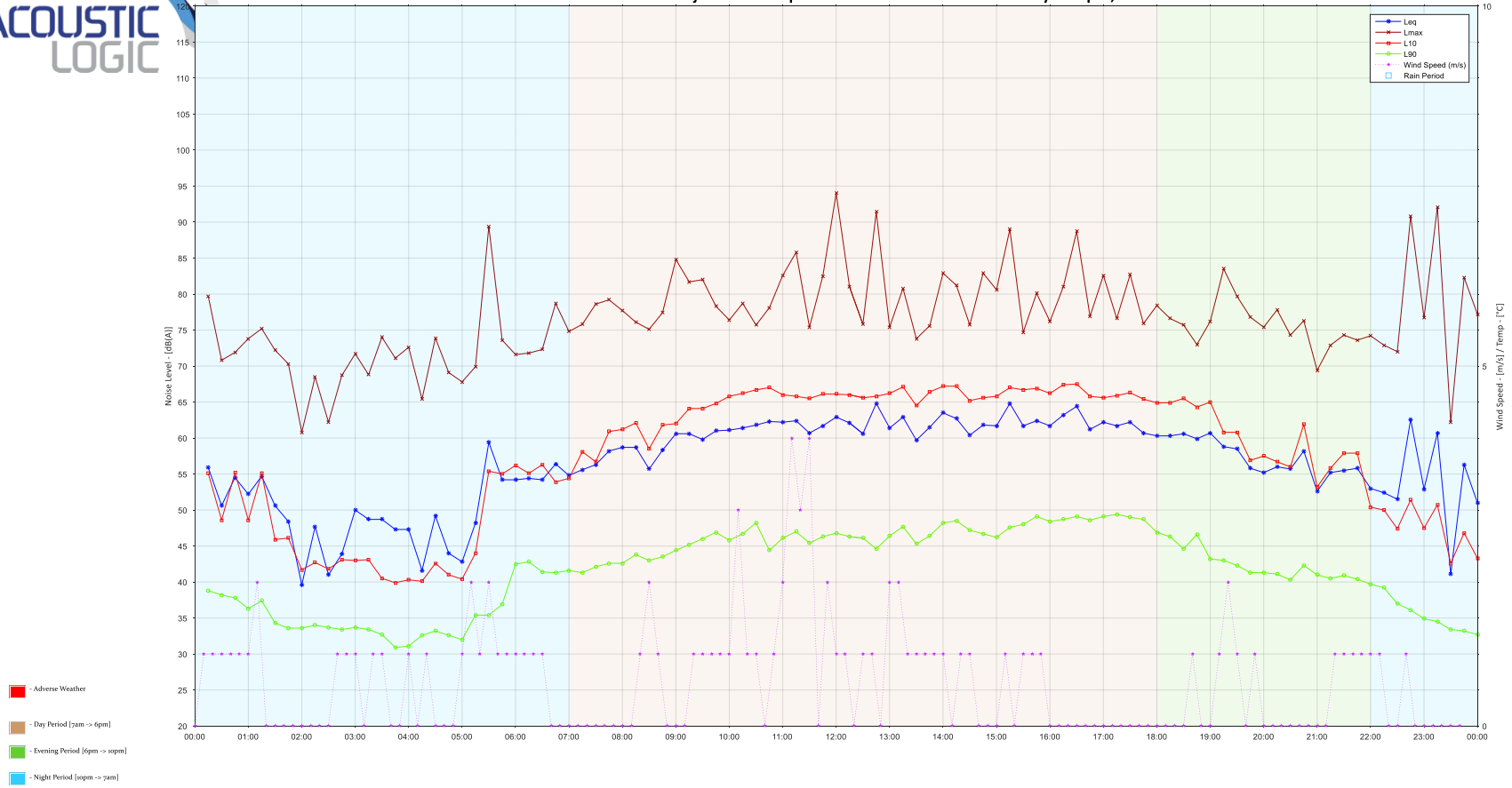


Boroni Park Reserve - Adjacent to Carpark Entrance on Park Road: Saturday 17 April, 2021



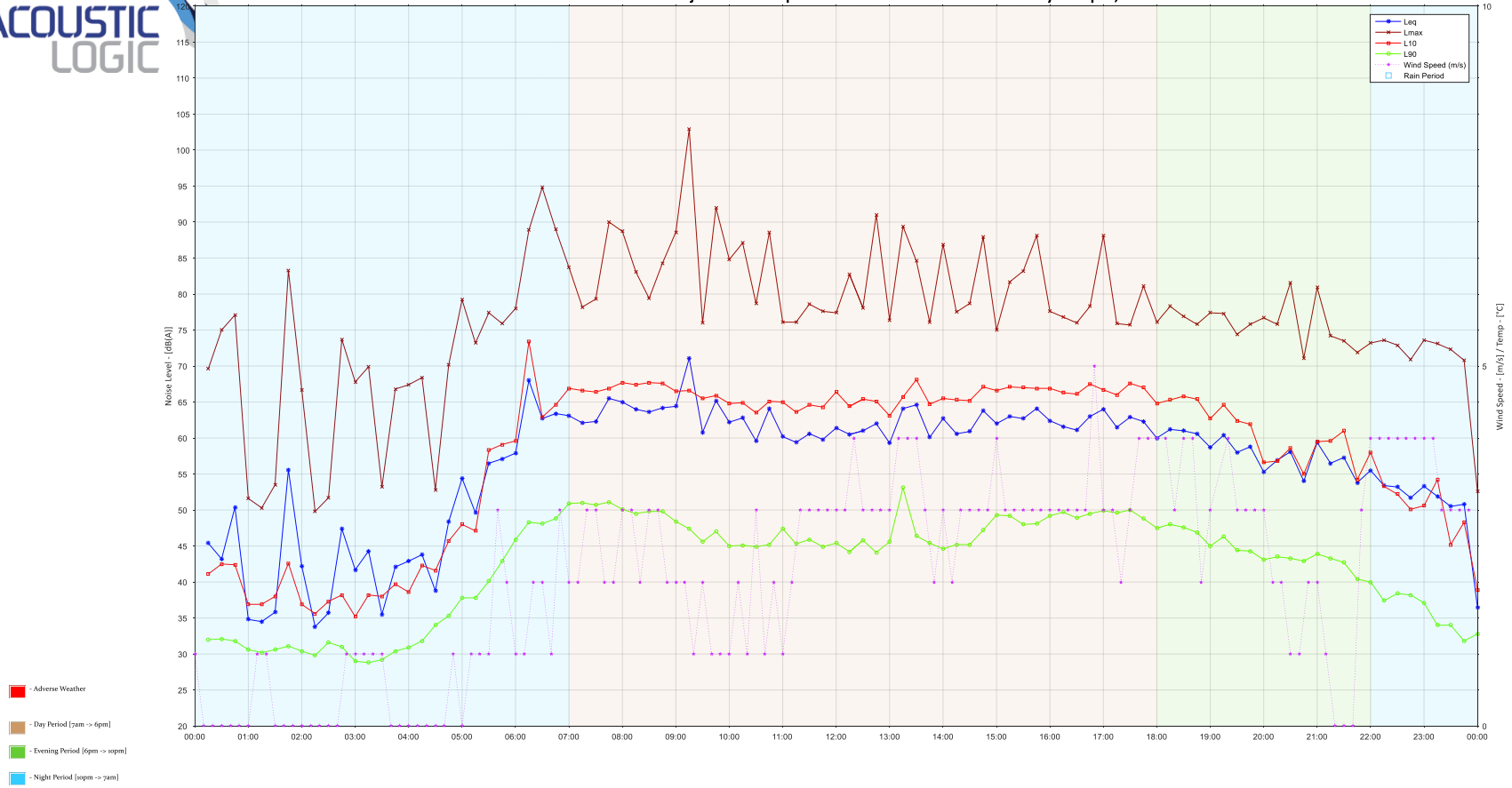


Boroni Park Reserve - Adjacent to Carpark Entrance on Park Road: Sunday 18 April, 2021



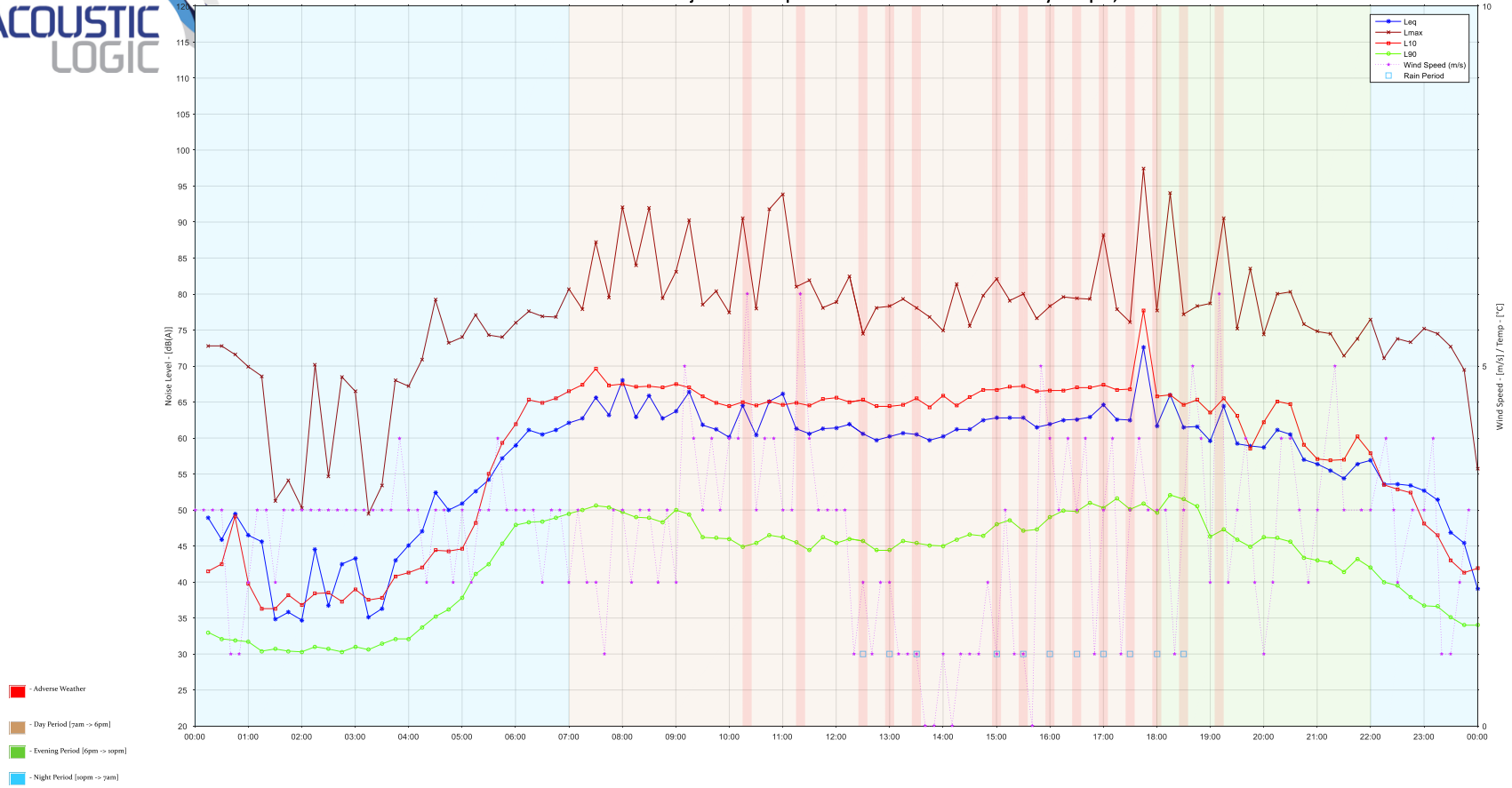


Boroni Park Reserve - Adjacent to Carpark Entrance on Park Road: Monday 19 April, 2021

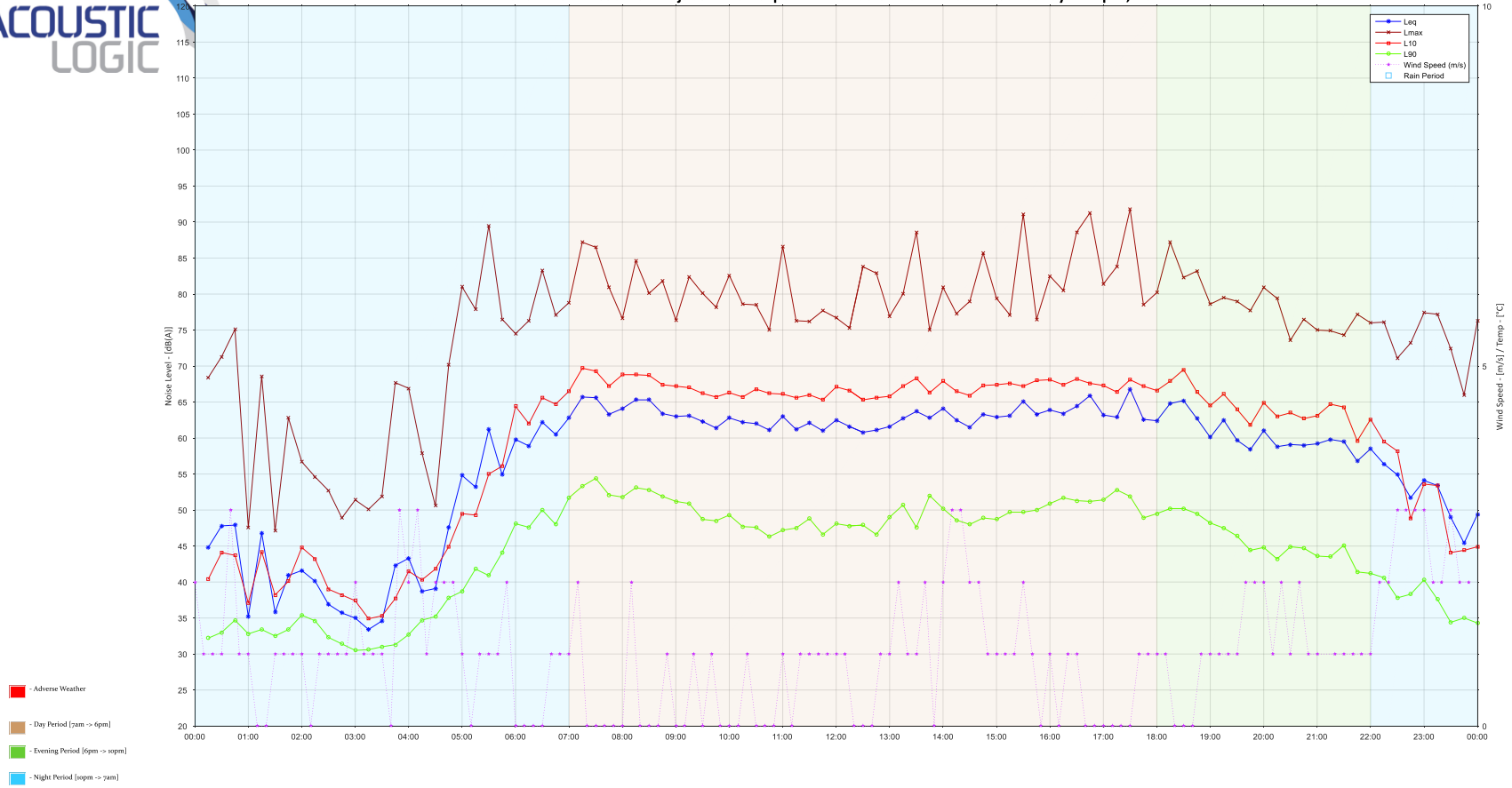




Boroni Park Reserve - Adjacent to Carpark Entrance on Park Road: Tuesday 20 April, 2021

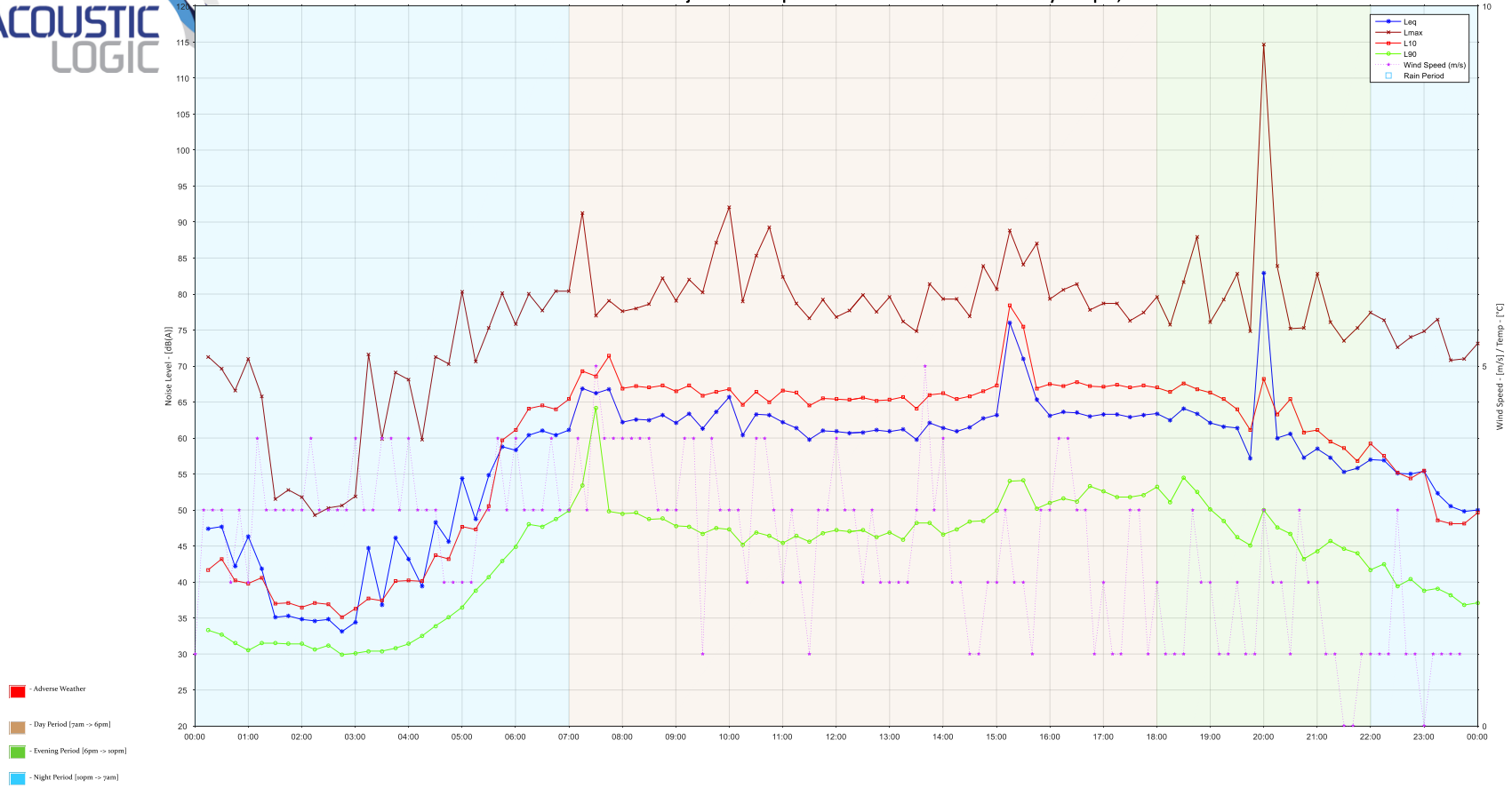


Boroni Park Reserve - Adjacent to Carpark Entrance on Park Road: Wednesday 21 April, 2021





Boroni Park Reserve - Adjacent to Carpark Entrance on Park Road: Thursday 22 April, 2021





Boroni Park Reserve - Adjacent to Carpark Entrance on Park Road: Friday 23 April, 2021

