

# REF ACOUSTIC REPORT

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Ryde Secondary College, Ryde

**ID: 12300-3 R01vB DRAFT**

9 September 2022

**Prepared For:**

Lipman

Level 6, 66 Berry St  
North Sydney NSW 2060

Email: [REDACTED]

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*The work reported herein has been carried out in accordance with the terms of membership. We stress that the advice given herein is for acoustic purposes only, and that the relevant authorities should be consulted with regard to compliance with regulations governing areas other than acoustics.*

## 1.0 INTRODUCTION

PKA Acoustic Consulting have been commissioned by Lipman to prepare a Review of Environmental Factors (REF) acoustic report regarding the two (2) storey pavilion classrooms proposed for Ryde Secondary College, located at 5 Malvina Street, Ryde.

The pavilion classrooms will be constructed using modular prefabricated principals such as Modern Methods of Construction (MMC) and Design for Manufacture and Assembly (DfMA) based on Schools Infrastructure NSW (SINSW) Kit-of-Parts catalogue.

This acoustic report addresses the potential noise impacts from the proposed outdoor mechanical plant servicing the pavilion classrooms, along with the student noise within the classrooms, to the residential receivers. The proposed acoustic treatments to be incorporated in the design achieve compliance with the *NSW EPA Noise Policy for Industry, 2017 (NPfI)* suitable for an REF submission.

### Purpose of the Report

This report forms part of an environmental assessment under Part 5 of the *Environmental Planning and Assessment Act, 1979* for proposed upgrades to Ryde Secondary College. The proposed works are deemed permitted without consent by Section 3.37 of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* which provides that:

1. *Development for any of the following purposes may be carried out by or on behalf of a public authority without development consent on land within the boundaries of an existing school –*
  - a. *Construction, operation or maintenance, more than 5 metres from any property boundary with land in a residential zone and more than 1 metre from any property boundary with land in any other zone, of –*
    - (ii) *a portable classroom (including a modular or prefabricated classroom that is not more than 2 storeys high*
  - b. *Minor alterations and additions...*
  - c. *demolition of structures or buildings*

### Reference Documentation

This report has been prepared with references to the following documentation:

- Architectural drawings prepared by Bennet and Trimble [Ref: 211021, Issue P01 Schematic Design dated 2022-08-18]
- Mechanical drawings and specifications prepared by SEiD [Ref: 220302, Issue P02 Preliminary Design dated 2022-08-11]

## 2.0 SUMMARY

PKA Acoustic Consulting performed an acoustic assessment in accordance with the *NSW EPA Noise Policy for Industry*. The noise impact from mechanical plant associated with the proposed pavilion classrooms at Ryde Secondary College will comply with the NPfI providing our acoustic recommendations in Section 8.0 are implemented.

### 3.0 SITE DESCRIPTION

#### 3.1 Site Location

Ryde Secondary College is located at 5 Malvina Street, Ryde (Lot 284 and 285 in DP752035) within the City of Ryde Local Government Area. Ryde Secondary College has approximately 1,600 students currently enrolled. An aerial photograph of the site is provided in Figure 3-1 below, along with the location of the noise logger position.

Existing development includes single and double storey classrooms buildings, a multipurpose hall, covered outdoor learning areas, sports courts, demountable classrooms, landscaping, pathways and hardstand areas, vehicle circulation and carparking.

The site has frontage to Malvina Street (north-western boundary) and Forrest Road (north-eastern boundary) with low density residential development along the opposite road frontages. The site adjoins low density residential on the south-western boundary, Buffalo Creek along the southern boundary and Barton Reserve along the south-eastern boundary.

Figure 3-1 Site Location

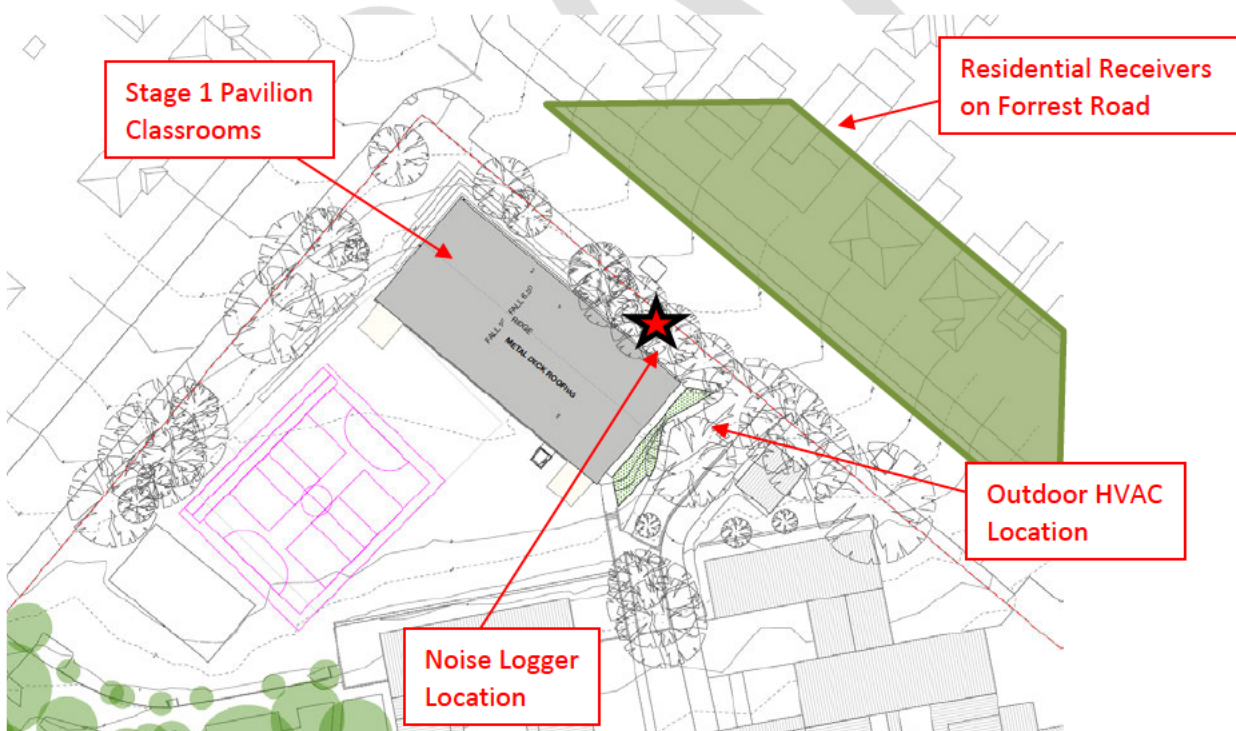


### 3.2 Proposed Upgrades

The scope of works subject to this environmental assessment are known as Stage 1 works in the master-planned redevelopment of Ryde Secondary College. Stage 1 works include:

- Demolition in the vicinity of the proposed pavilion
- Two (2) storey pavilion building comprising:
  - Thirteen (13) GLS
  - Learning commons
  - Fitness lab
  - Seminar spaces
  - Staff room
  - Store
  - Change rooms
- Lift, stair and ramp access
- Associated adjustments to the existing sports court
- Removable of demountable classrooms.

Figure 3-2 Site Plan



## 4.0 ACOUSTIC CRITERIA

### 4.1 Noise Policy for Industry (NPfI)

Noise generated from mechanical noise is generally assessed against the requirements of the *NSW EPA Noise Policy for Industry 2017* (NPfI). The policy sets out two separate criteria to ensure environmental noise objectives are met. The first criterion considers intrusive noise to residential properties and the second is set to ensure the amenity of the land use is protected. The lower value of both criteria is considered to be the Project noise trigger level, which is the limit of the  $L_{Aeq, 15min}$  noise level that must not be exceeded for the corresponding period of the day.

#### Intrusiveness Criterion

The intrusiveness of a stationary noise source may be considered acceptable if the average of the maximum A-weighted levels of noise,  $L_{Aeq, 15 \text{ minute}}$  from the source do not exceed by more than 5dB the Rating Background Level (RBL) measured in the absence of the source. This applies during all times of the day and night. There also exists an adjustment factor to be applied as per the character of the noise source. This includes factors such as tonal, fluctuating, low frequency, impulsive, intermittent etc. qualities of noise. The RBL is determined in accordance with Section 2.3 of the NPfI. The intrusiveness criterion is  $L_{Aeq, 15 \text{ minute}} < RBL + 5$ .

#### Amenity Criterion

To limit continuing increases in noise levels, the maximum ambient noise level within an area from industrial noise sources should not normally exceed the levels as specified in Table 2.2 of the policy for the specified time period.

To ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels for an area, a project amenity noise level applies for each new source of industrial noise to be 5dB below the recommended amenity. To standardise the time periods for the intrusiveness and amenity noise levels, this policy assumes that the Amenity  $L_{Aeq, 15min}$  will be taken to be equal to the project  $L_{Aeq, period} + 3dB$ . PKA have summarised the NPfI Project Amenity Noise Levels for daytime suburban receiver premises.

Type of receiver	Time of day	Period	Recommended Amenity Noise Level $L_{Aeq, (period)}$	Project Amenity Noise Level $L_{Aeq, (15-minute)}$
Residential (Suburban)	Day	07:00 to 18:00	55	53

## 5.0 NOISE SURVEY AND PROJECT NOISE GOALS

### 5.1 Methodology

To assess the background  $L_{A90}$ , a noise monitor was installed on site to measure existing background noise which is conducted for 7 days. The monitor was installed from 17<sup>th</sup> August 2022 to 24<sup>th</sup> August 2022. The noise monitor was programmed to store the  $L_n$  percentile noise levels for each 15-minute sampling period. Measurements were made of  $L_{min}$ ,  $L_{max}$ ,  $L_{90}$ , and  $L_{eq}$  and were later retrieved for analysis. The position of the noise monitor is shown in Figure 3-1. The results and summary of the noise monitoring are listed in graphical form in Appendix A of this report.

### 5.2 Instrumentation

Noise measurements were conducted using the following equipment:

- NTI XL2 Precision Sound Analyser Type Approved, Serial No. A2A-20149-E0.
- Sound calibrator Larson & Davis CAL200, Serial number 11419.

The instruments were calibrated before and after the noise measurements and there were no adverse deviations between the two. The analysers are type 1 and comply with AS IEC 61672.2-2004. The instruments carry traceable calibration certificates.

### 5.3 Measured Ambient Levels & Project Noise Criteria

Data from the noise monitor was processed to obtain the background noise levels as follows:

**Table 5-1 Noise Logger Results**

		Background Noise Levels $L_{A90}$ dB					
		Daytime 07:00 - 18:00		Evening 18:00 - 22:00		Nighttime 22:00 - 07:00	
		Measured	Corrected	Measured	Corrected	Measured	Corrected
Wednesday	17/08/2022			40.0	40.0	35.4	35.4
Thursday	18/08/2022	40.8	40.8	42.0	42.0	35.4	35.4
Friday	19/08/2022	43.4	43.3	42.7	42.7	36.5	36.5
Saturday	20/08/2022	40.7	40.7	42.8	42.8	34.6	34.6
Sunday	21/08/2022	37.1	37.1	39.9	39.9	35.7	35.7
Monday	22/08/2022	44.1	44.1	41.6	41.6	35.5	35.5
Tuesday	23/08/2022	46.9	46.9	49.1	49.1	41.4	41.4
Wednesday	24/08/2022						
<b>Rating Background Level (RBL)</b>		<b>43</b>	<b>43</b>	<b>42</b>	<b>42</b>	<b>36</b>	<b>36</b>

**Table 5-2 NPfI Project Noise Trigger Levels for Residential Receivers**

Receiver Type	Period	Measured RBL $L_{A90}$ dB	Acceptable Noise Levels $L_{Aeq}$ (period) dB	NPfI Noise Criteria		Project Noise Trigger Levels $L_{Aeq}$ 15min dB
				Amenity $L_{Aeq}$ 15min dB	Intrusiveness $L_{Aeq}$ 15min dB	
Residential	Day	43	55	53	48	48



## 6.0 ACOUSTIC ASSESSMENT – MECHANICAL PLANT NOISE

### 6.1 Noise Data

PKA has been advised by the mechanical consultants (SEiD) that the following outdoor chiller units will be used. The table below also presents the manufacturer published noise data which is the maximum allowable noise levels for the corresponding equipment to ensure acoustic compliance is achieved.

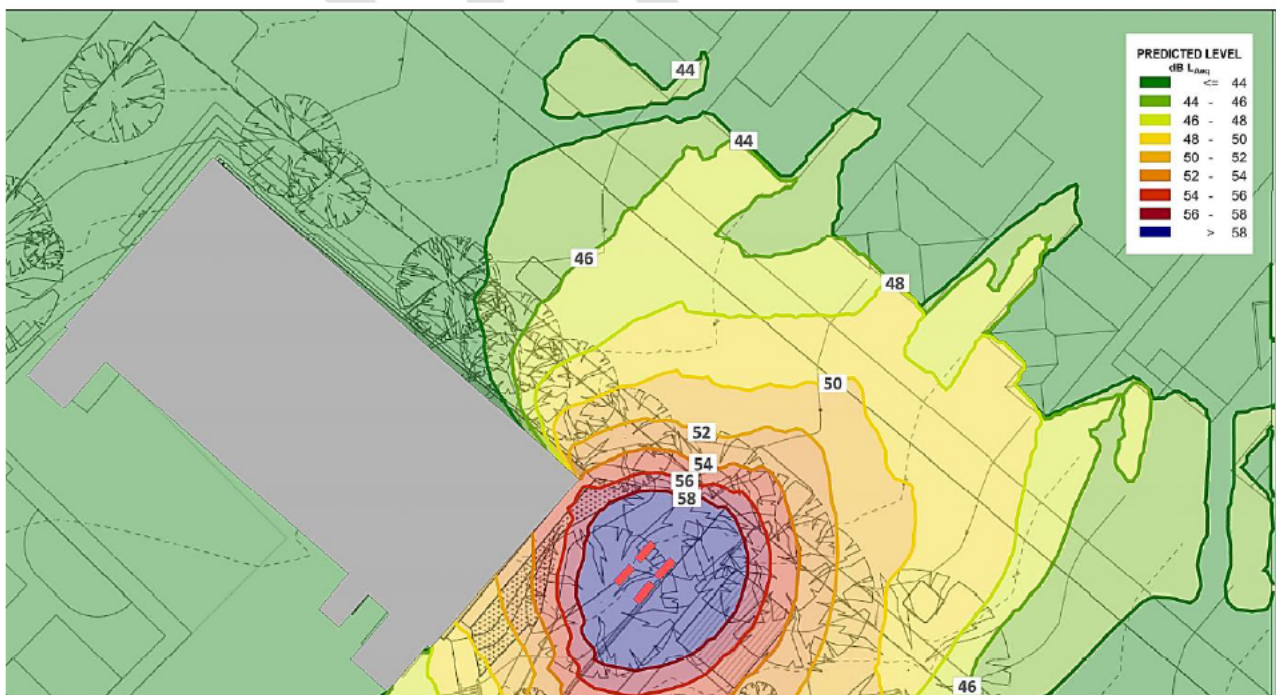
**Table 6-1 Manufacturer Sound Data**

HVAC Equipment	SWL dBA	SPL @1m dBA	Sound Pressure Level at 1m from Unit Octave Band Centre Frequency (Hz) dBZ							
			63	125	250	500	1000	2000	4000	8000
4-off Daikin Air Cooled Chiller EWYT/EWAT050CXZ-A2	81	64	77	72	63	59	56	55	53	48

### 6.2 Modelling Results

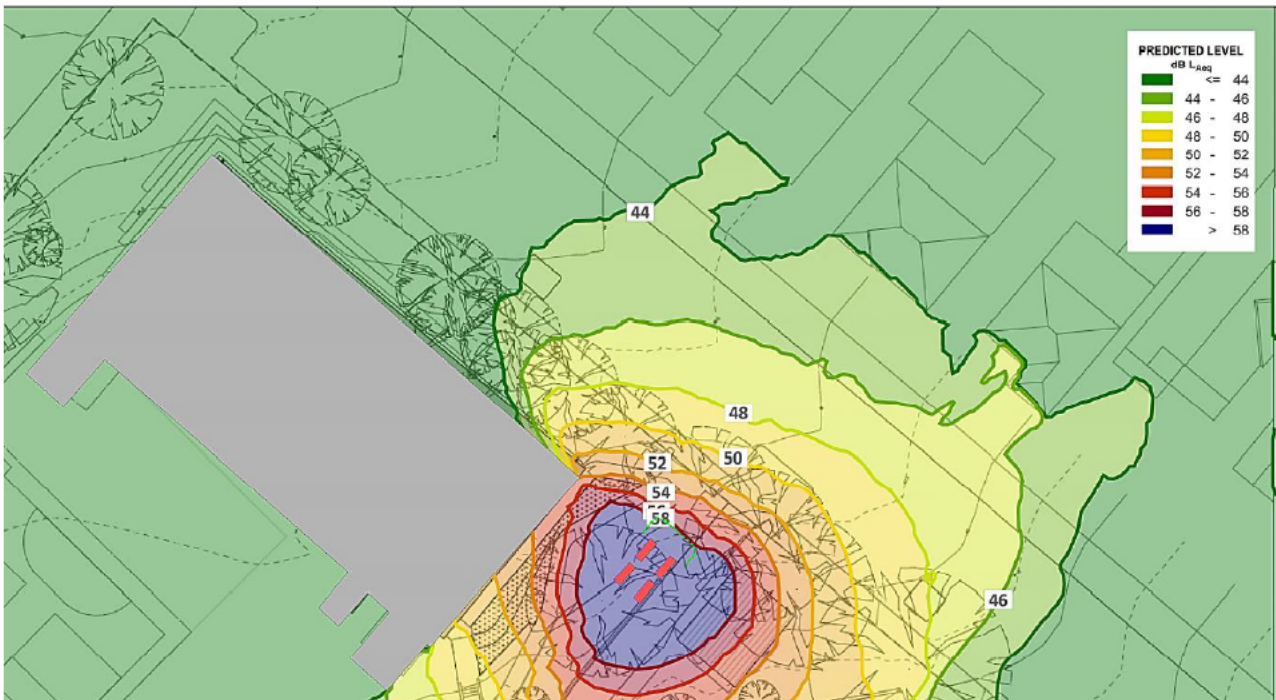
The proposed mechanical plant noise impact to residential receivers was acoustically modelling using SoundPlan 8.2. The noise contour maps without and with acoustic treatment are presented below.

**Figure 6-1 No Acoustic Treatment to HVAC**



From the above noise modelling results, the outdoor chillers exceed the 48dBA project noise trigger level without any acoustic treatment.

Figure 6-2 Acoustic Screening to Northern Plant Boundary



From the above noise modelling results, acoustic screening to the plant area reduces the noise impact below the 48dBA limit and therefore achieves compliance with the NPfl.

### 6.3 Summary Results

Table 6-2 HVAC Noise Impact to Residential Receivers

Receivers	Scenario	Calculated Noise Impact L <sub>Aeq</sub> 15min dB	NPfl Project Noise Trigger Level L <sub>Aeq</sub> 15min dB	Compliance Achieved?
Residents along Forrest Road	No Acoustic Treatment	49	≤ 48	No
	Acoustic Screening to Northern Plant Boundary	45		Yes

## 7.0 ACOUSTIC ASSESSMENT – CLASSROOM STUDENT NOISE

### 7.1 Noise Data and Assumptions

Noise breakout from classroom student activity to the residential receivers has been assessed. The following details and assumptions have been considered and adopted:

- Proposed pavilion classrooms will be utilising existing student capacity within the school
- 13 General Learning Spaces (GLS) to occupy 25 students each totalling 325 students, which will operate simultaneously
- Classroom facade glazing is operable to allow natural ventilation. PKA have assumed glazed elements to be open to allow a worst-case scenario regarding noise breakout
- Student noise levels derived from extensive measurements previously conducted by PKA, resulting in a sound pressure level of  $L_{Aeq\ 15min}$  62 dB within each GLS.

### 7.2 Summary Results

**Table 7-1 Classroom Student Noise Impact to Residential Receivers**

Receivers	Scenario	Calculated Noise Impact $L_{Aeq\ 15min}$ dB	NPfl Project Noise Trigger Level $L_{Aeq\ 15min}$ dB	Compliance Achieved?
Residents along Forrest Road	Pavilion glazing open. No noise mitigation	43	≤ 48	Yes

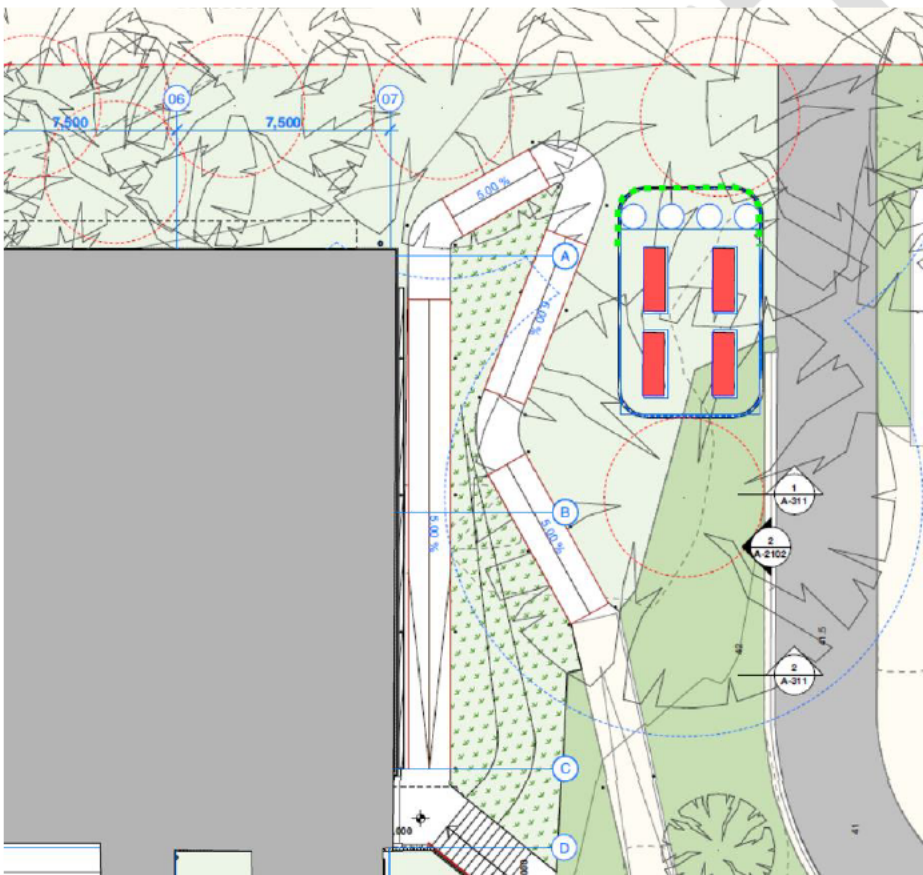
Noise breakout from classroom student activity complies with NPfl noise criteria with no acoustic treatment or noise mitigation required.

## 8.0 ACOUSTIC RECOMMENDATIONS

Based on the mechanical plant calculations in Section 6.0, the following acoustic treatment is necessary to achieve the NPfl noise criteria:

- Acoustic barrier to be located around the northern boundary of the plant area as shown in **Figure 8-1** below
- Acoustic barrier to be approx. 2.2m high, providing a min. 300mm above the top of the Daikin Chillers
- Acoustic barrier to have a surface density of min. 9kg/m<sup>2</sup> such as 7mm fibre cement sheeting.
- Acoustic barrier to be of solid construction with no air gaps at the threshold or at any vertical junction.

**Figure 8-1 Acoustic Screening Location**



## 9.0 CONCLUSION

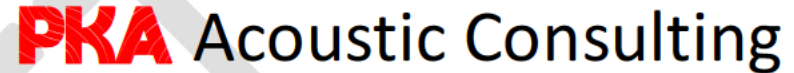
PKA Acoustic Consulting performed an acoustic assessment in accordance with the *NSW EPA Noise Policy for Industry*. The mechanical plant associated with the proposed pavilion classrooms at Ryde Secondary College will comply with the NPfl providing our acoustic recommendations in Section 8.0 are implemented.

APPENDIX A NOISE LOGGER MEASUREMENTS

12300-3 Ryde Secondary College

Project Address: 5 Malvina St, Ryde NSW 2112

Logger Location: North east end of the property (adjacent Forrest Road)



		Background Noise Levels $L_{A90}$ dB					
		Daytime		Evening		Nighttime	
		07:00 - 18:00		18:00 - 22:00		22:00 - 07:00	
		Measured	Corrected	Measured	Corrected	Measured	Corrected
Wednesday	17/08/2022			40.0	40.0	35.4	35.4
Thursday	18/08/2022	40.8	40.8	42.0	42.0	35.4	35.4
Friday	19/08/2022	43.4	43.3	42.7	42.7	36.5	36.5
Saturday	20/08/2022	40.7	40.7	42.8	42.8	34.6	34.6
Sunday	21/08/2022	37.1	37.1	39.9	39.9	35.7	35.7
Monday	22/08/2022	44.1	44.1	41.6	41.6	35.5	35.5
Tuesday	23/08/2022	46.9	46.9	49.1	49.1	41.4	41.4
Wednesday	24/08/2022						
Rating Background Level (RBL)		43	43	42	42	36	36

		Existing Noise Levels $L_{Aeq}$ dB						Sunday or Public Holiday?
		Daytime		Evening		Nighttime		
		07:00 - 18:00		18:00 - 22:00		22:00 - 07:00		
		Measured	Corrected	Measured	Corrected	Measured	Corrected	
Wednesday	17/08/2022			46.9	46.9	48.5	48.5	
Thursday	18/08/2022	55.2	55.2	47.2	47.2	48.1	48.1	
Friday	19/08/2022	55.9	55.7	48.0	48.0	48.4	48.4	
Saturday	20/08/2022	52.1	52.1	47.6	47.6	47.1	47.1	
Sunday	21/08/2022	48.4	48.4	45.3	45.3	50.8	50.8	Y
Monday	22/08/2022	56.1	56.1	47.2	47.2	49.5	49.5	
Tuesday	23/08/2022	59.1	59.1	54.6	54.6	50.0	50.0	
Wednesday	24/08/2022							
Average Noise Level ( $L_{Aeq}$ )		56	56	49	49	49	49	

12300-3 Ryde Secondary College

Project Address: 5 Malvina St, Ryde NSW 2112

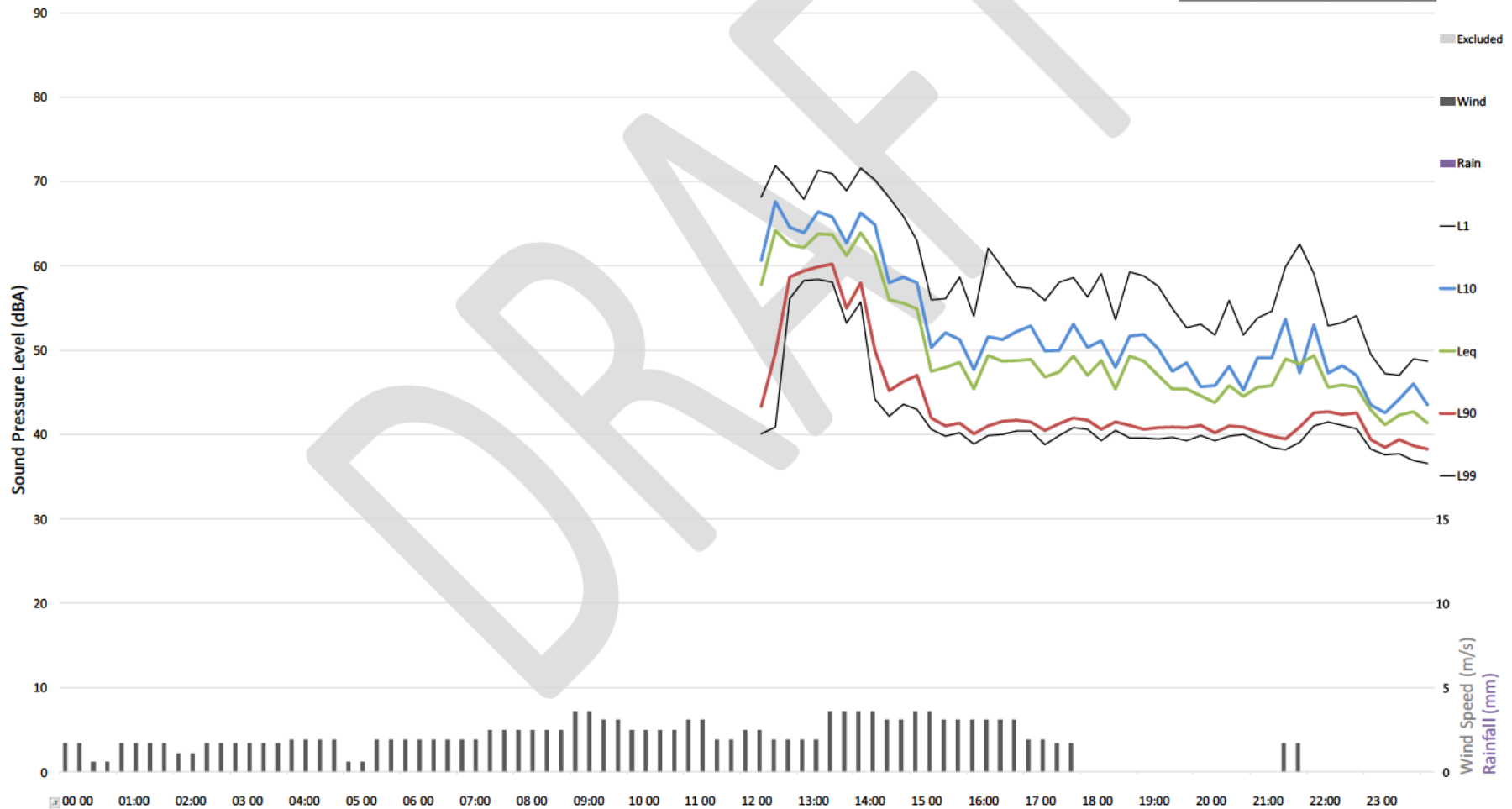
Logger Location: North east end of the property (adjacent Forrest Road)

BOM weather data: Sydney Olympic Park IDN60901

**PKA Acoustic Consulting**

17/08/2022 Wednesday  
Existing Ambient Noise Levels (dBA)

	Daytime 07 00 - 18 00		Evening 18 00 - 22 00		Nighttime 22 00 - 07 00	
	Measured	Corrected	Measured	Corrected	Measured	Corrected
L <sub>Aeq</sub> dB			46.9	46.9	48.5	48.5
L <sub>A90</sub> dB			40.0	40.0	35.4	35.4



12300-3 Ryde Secondary College

Project Address: 5 Malvina St, Ryde NSW 2112

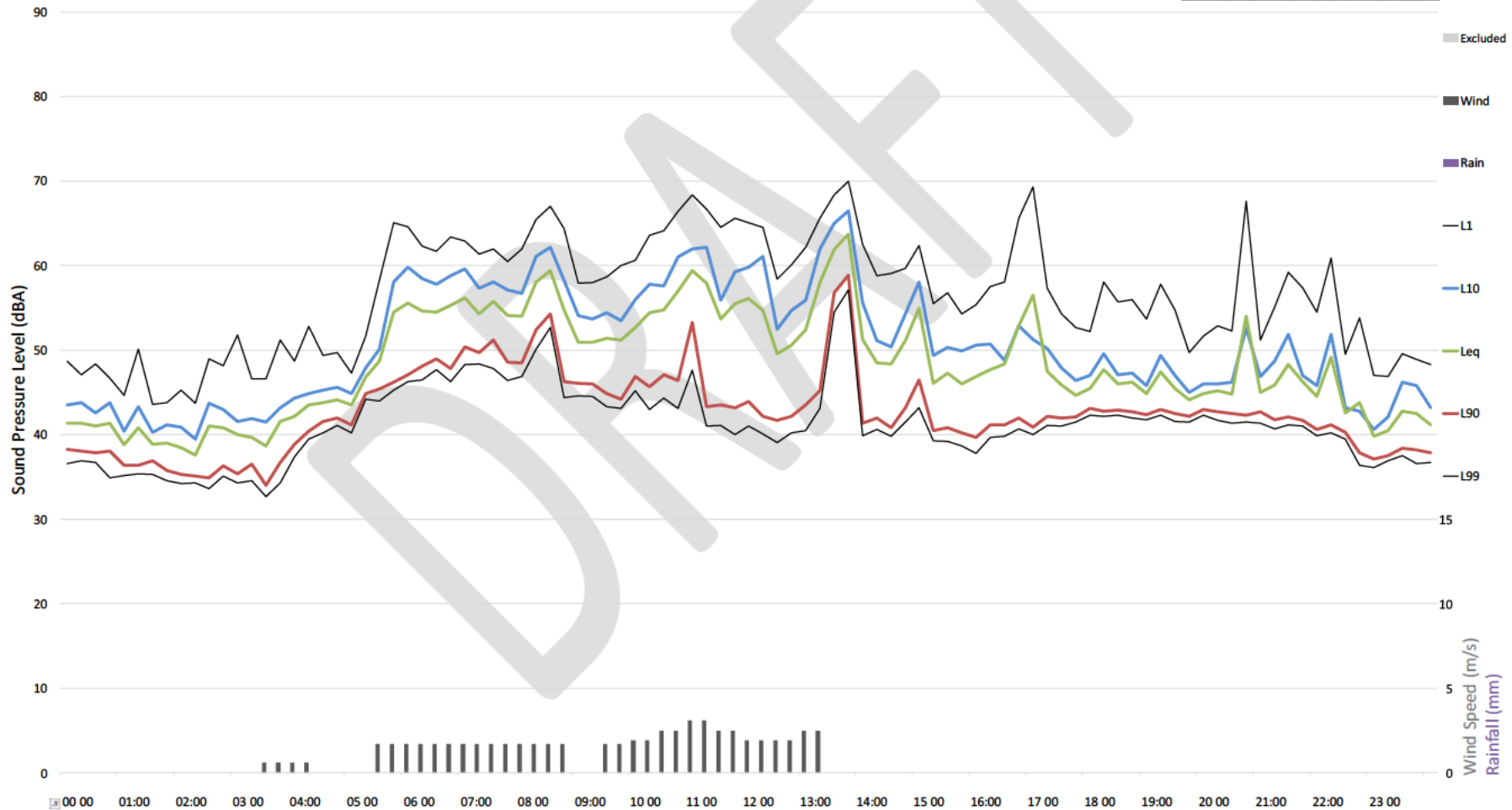
Logger Location: North east end of the property (adjacent Forrest Road)

BOM weather data: Sydney Olympic Park IDN60901

**PKA** Acoustic Consulting

18/08/2022 Thursday  
Existing Ambient Noise Levels (dBA)

	Daytime		Evening		Nighttime	
	07 00 - 18 00	18 00 - 22 00	22 00 - 07 00	07 00 - 18 00	18 00 - 22 00	22 00 - 07 00
L <sub>Aeq</sub> dB	55.2	55.2	47.2	47.2	48.1	48.1
L <sub>A90</sub> dB	40.8	40.8	42.0	42.0	35.4	35.4



12300-3 Ryde Secondary College

Project Address: 5 Malvina St, Ryde NSW 2112

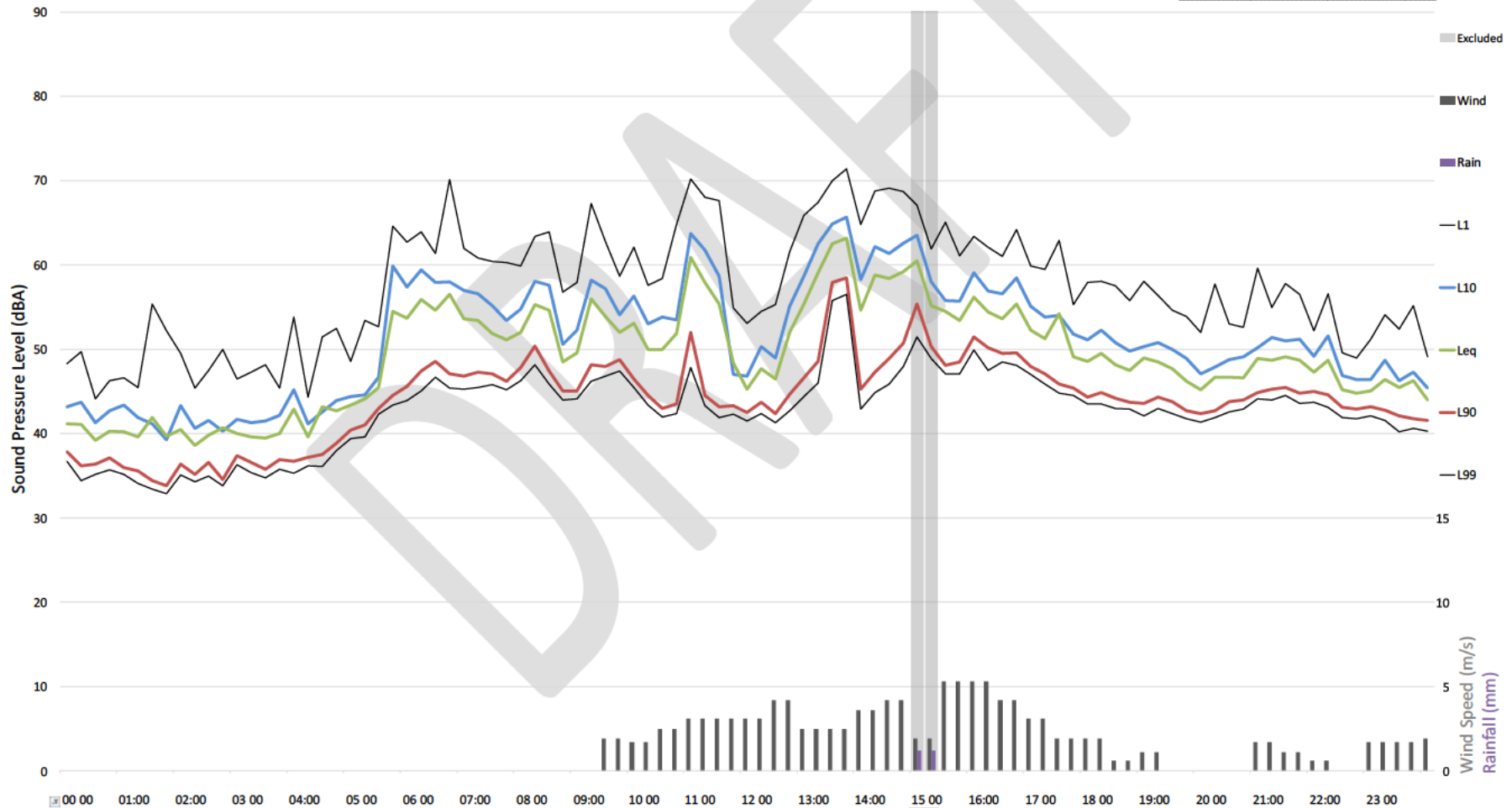
Logger Location: North east end of the property (adjacent Forrest Road)

BOM weather data: Sydney Olympic Park IDN60901

**PKA** Acoustic Consulting

19/08/2022 Friday  
Existing Ambient Noise Levels (dBA)

	Daytime 07 00 - 18 00		Evening 18 00 - 22 00		Nighttime 22 00 - 07 00	
	Measured	Corrected	Measured	Corrected	Measured	Corrected
L <sub>Aeq</sub> dB	55.9	55.7	48.0	48.0	48.4	48.4
L <sub>A90</sub> dB	43.4	43.3	42.7	42.7	36.5	36.5





12300-3 Ryde Secondary College

Project Address: 5 Malvina St, Ryde NSW 2112

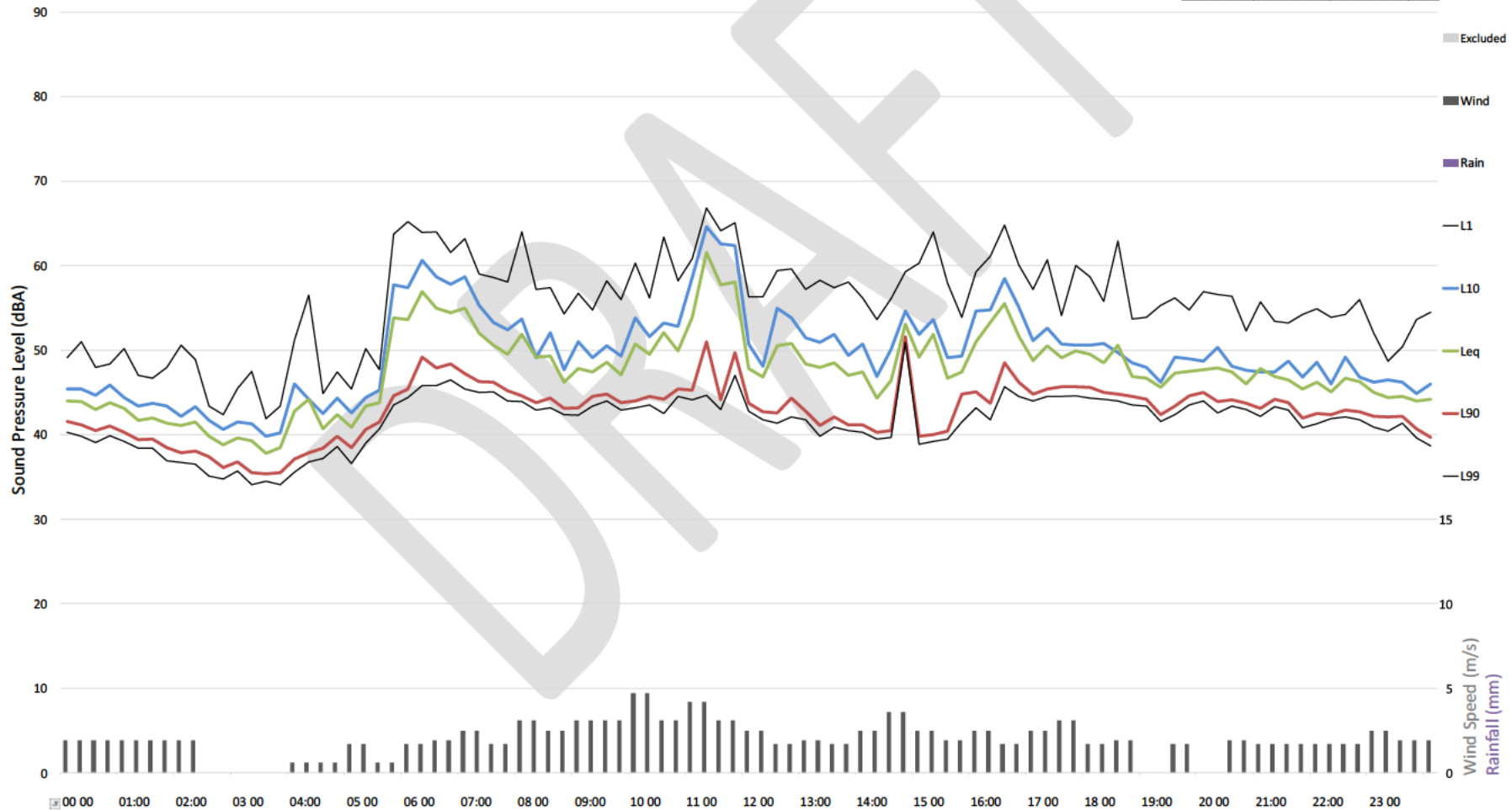
Logger Location: North east end of the property (adjacent Forrest Road)

BOM weather data: Sydney Olympic Park IDN60901

**PKA** Acoustic Consulting

20/08/2022   
Existing Ambient Noise Levels (dBA)

	Daytime		Evening		Nighttime	
	07 00 - 18 00	18 00 - 22 00	22 00 - 07 00	07 00 - 18 00	18 00 - 22 00	22 00 - 07 00
L <sub>Aeq</sub> dB	52.1	52.1	47.6	47.6	47.1	47.1
L <sub>A90</sub> dB	40.7	40.7	42.8	42.8	34.6	34.6



12300-3 Ryde Secondary College

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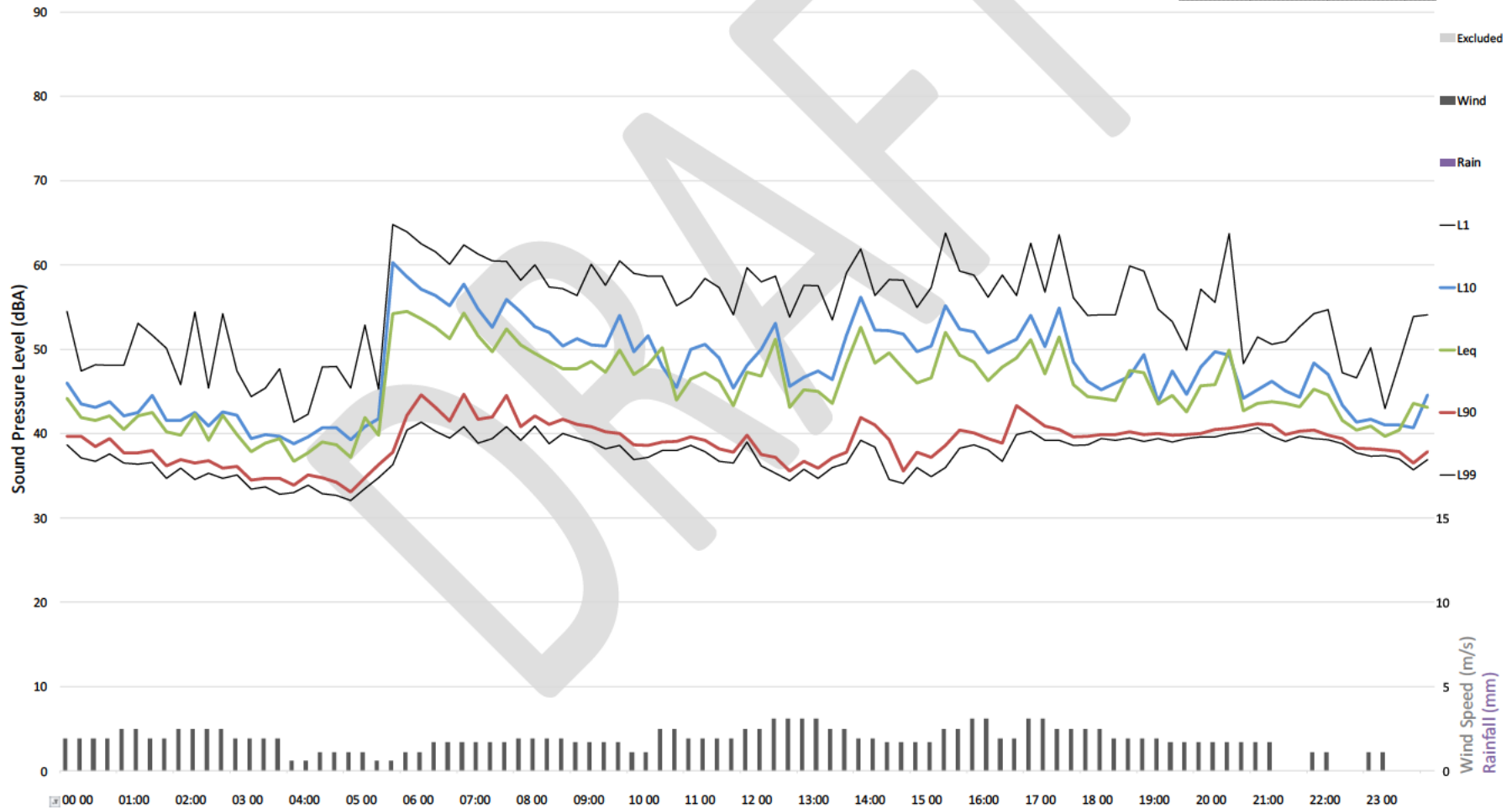
Logger Location: North east end of the property (adjacent Forrest Road)

BOM weather data: Sydney Olympic Park IDN60901

**PKA** Acoustic Consulting

21/08/2022 Sunday  
Existing Ambient Noise Levels (dBA)

	Daytime		Evening		Nighttime		
	08 00 - 18 00	18 00 - 22 00	22 00 - 08 00	Measured	Corrected	Measured	Corrected
L <sub>Aeq</sub> dB	48.4	48.4	45.3	45.3	50.8	50.8	
L <sub>A90</sub> dB	37.1	37.1	39.9	39.9	35.7	35.7	



12300-3 Ryde Secondary College

Project Address: 5 Malvina St, Ryde NSW 2112

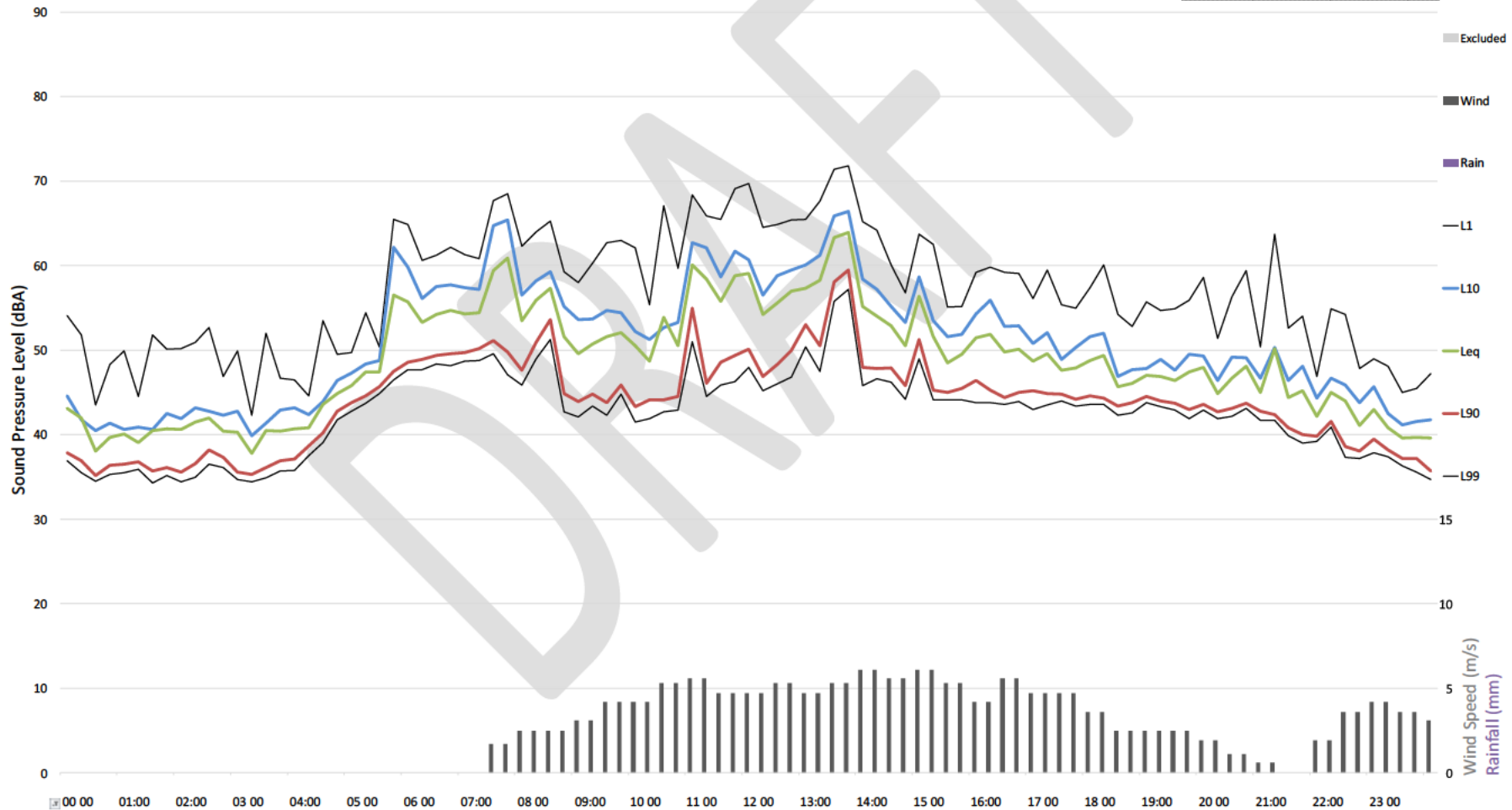
Logger Location: North east end of the property (adjacent Forrest Road)

BOM weather data: Sydney Olympic Park IDN60901

**PKA** Acoustic Consulting

22/08/2022  Monday  
Existing Ambient Noise Levels (dBA)

	Daytime		Evening		Nighttime	
	07 00 - 18 00	18 00 - 22 00	22 00 - 07 00	07 00 - 18 00	18 00 - 22 00	22 00 - 07 00
L <sub>Aeq</sub> dB	56.1	56.1	47.2	47.2	49.5	49.5
L <sub>A90</sub> dB	44.1	44.1	41.6	41.6	35.5	35.5



12300-3 Ryde Secondary College

Project Address: 5 Malvina St, Ryde NSW 2112

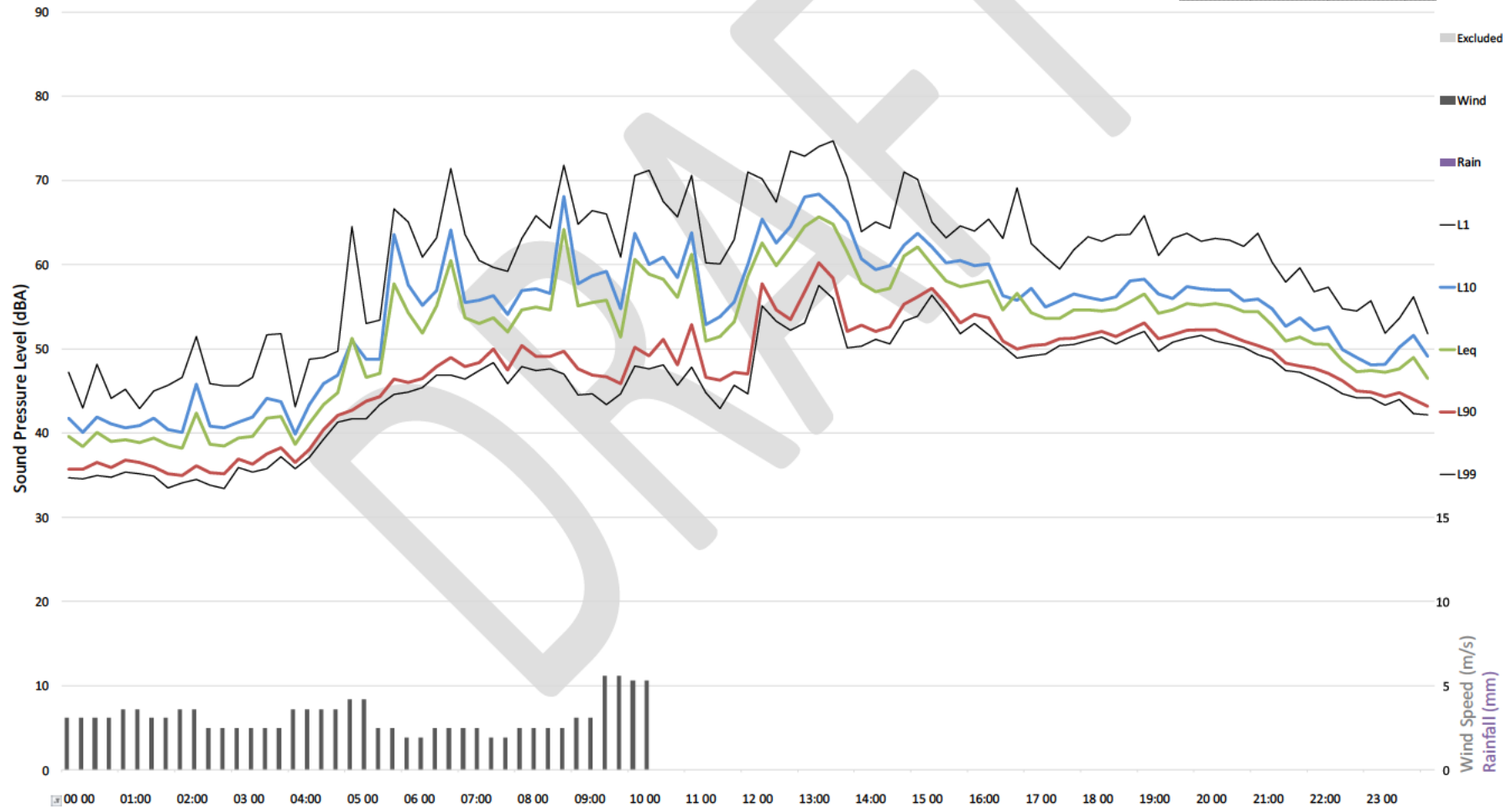
Logger Location: North east end of the property (adjacent Forrest Road)

BOM weather data: Sydney Olympic Park IDN60901

**PKA** Acoustic Consulting

23/08/2022 Tuesday  
Existing Ambient Noise Levels (dBA)

	Daytime 07 00 - 18 00		Evening 18 00 - 22 00		Nighttime 22 00 - 07 00	
	Measured	Corrected	Measured	Corrected	Measured	Corrected
L <sub>Aeq</sub> dB	59.1	59.1	54.6	54.6	50.0	50.0
L <sub>A90</sub> dB	46.9	46.9	49.1	49.1	41.4	41.4



12300-3 Ryde Secondary College

Project Address: 5 Malvina St, Ryde NSW 2112

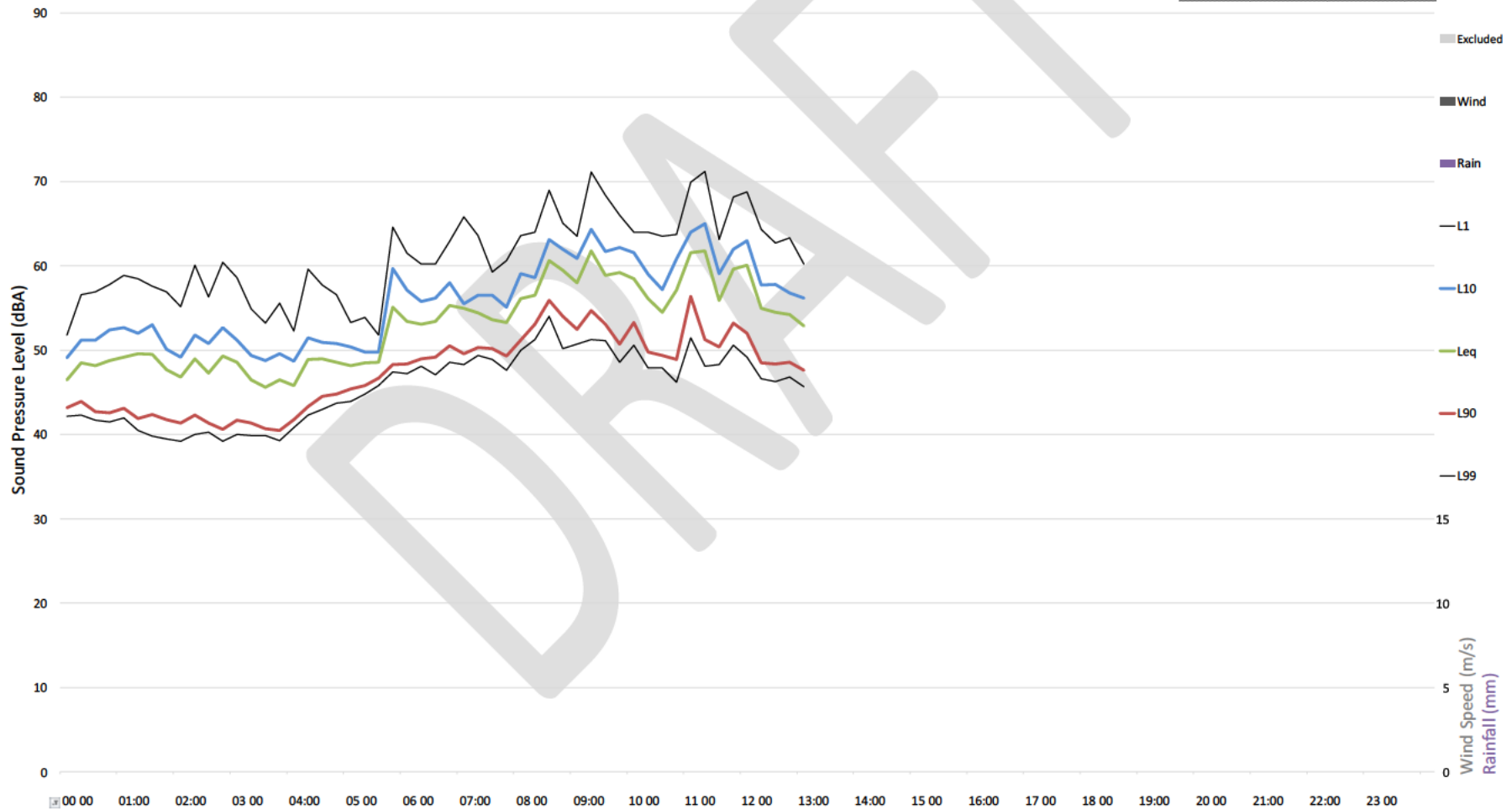
Logger Location: North east end of the property (adjacent Forrest Road)

BOM weather data: Sydney Olympic Park IDN60901

**PKA** Acoustic Consulting

24/08/2022 Wednesday  
Existing Ambient Noise Levels (dBA)

Daytime 07 00 - 18 00		Evening 18 00 - 22 00		Nighttime 22 00 - 07 00	
Measured	Corrected	Measured	Corrected	Measured	Corrected
L <sub>Aeq</sub> dB					
L <sub>A90</sub> dB					



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