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**Lots 8, 10 & 11, 230 -232 Grange Avenue & 1032 -1036
Richmond Road, Marsden Park**

DA Acoustic Report

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DOCUMENT CONTROL REGISTER

Project Number	20191042.1
Project Name	Lots 8, 10 & 11, 230 -232 Grange Avenue & 1032 -1036 Richmond Road, Marsden Park
Document Title	DA Acoustic Report
Document Reference	20191042.1/0405A/R4/WY
Issue Type	Email
Attention To	The Bathla Group

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	22/01/2018	20171660.1/2201A/R0/MF	MF		GW
1	17/09/2019	20191042.1/1709A/R1/WY	WY		
2	17/09/2019	20191042.1/1709A/R2/WY	WY		GW
3	29/07/2020	20191042.1/2907A/R3/WY	WY		GW
4	4/05/2021	20191042.1/0405A/R4/WY	WY		GW

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1 INTRODUCTION

Acoustic Logic Consultancy (ALC) have been engaged to conduct an acoustic assessment of potential noise impacts associated with the proposed residential developments to be constructed at the Lots 8, 10 & 11, 230 -232 Grange Avenue & 1032 -1036 Richmond Road, Marsden Park.

This document addresses noise impacts associated with the following:

- Traffic noise impacts from Richmond Road; and
- Noise emissions criteria applicable to the development.

ALC have utilised the following documents and regulations in the assessment of noise emanating from the development:

- State Environmental Planning Policy (SEPP) (Sydney Region Growth Centres) 2006
- SEPP DCP for Blacktown City Council Growth Centre Precincts 2018
- NSW Department of Planning and Environment's document – *'Developments near Rail Corridors or Busy Roads – Interim Guideline'*
- NSW Department of Planning and Environment's document – *'State Environmental Planning Policy (SEPP) (INFRASTRUCTURE) 2007'*
- Australian and New Zealand AS/NZS 3671:1989 *'Acoustics—Road traffic noise intrusion—Building siting and construction'*
- Australian and New Zealand AS/NZS 2107:2016 *'Recommended design sound levels and reverberation times for building interiors'*
- NSW Environmental Protection Agency (EPA) document – *'Noise Policy for Industry (NPI),'* and
- Association of Australian Acoustical Consultants (AAAC) *'Guideline for Child Care Centre Acoustic Assessment,'* Version 3.0, 2020

I have read the Expert witness code of conduct, being schedule 7 of the Uniform Civil Produce Rules 2005 and this report has been prepared in accordance with that Code. I agree to be bound by the provision of the Expert Code.

This assessment has been conducted using the *The Bathla Group* architectural drawings for D.A Submission, see details below.

Table 1-1– Architectural Sheet Information

Site	Drawing No.	Drawing Title	Revision	Date
LOT 8	DA-008	BASEMENT 1	F	May 2021
	DA-009	BASEMENT 2	E	
	DA-010	GROUND FLOOR PLAN		
	DA-011	LEVEL 1	D	
	DA-012	LEVEL 2		
	DA-012A	LEVEL 3	C	August 2020
	DA-013	LEVEL 4 & 5		
	DA-014	ROOF PLAN		
	DA-015	ELEVATION	D	May 2021
	DA-016	SECTIONS		
LOT 10	DA007	BASEMENT 2	F	May 2021
	DA008	BASEMENT 1		
	DA009	GROUND FLOOR		
	DA010	LEVEL 1 AND TYPICAL LEVEL	E	April 2021
	DA011	LEVEL 5		
	DA012	ROOF	C	August 2020
	DA019	ELEVATIONS	B	July 2020
	DA020	SECTIONS	C	August 2020
LOT 11	DA 007	BASEMENT 2 PLAN	5	May 2021
	DA 008	BASEMENT 1 PLAN		
	DA 009	GROUND FLOOR	6	
	DA 009A	LEVEL 1 PLAN	4	
	DA 009B	LEVEL 2 & 3 PLAN	3	
	DA 010	LEVEL 4 PLAN		
	DA 0010A	LEVEL 5 PLAN		
	DA 011	ROOF PLAN	5	
	DA 012	ELEVATION 1	3	August 2020
	DA 013	ELEVATION 2		
	DA 014	SECTIONS	6	May 2021

2 SITE DESCRIPTION / PROPOSED REDEVELOPMENT

Onsite acoustic investigation has been carried out by this office in regard to the surrounding acoustic environment around the proposed development, which has been detailed below:

- North of the site is R3 zoned land for use of *Medium Density Residential* as per Blacktown Council LEP Maps. Existing use of the land is agriculture, medium density residential proposed.
- East of the site is Richmond Road which carries a high volume of daily traffic.
- South of the site is R3 zoned land for use of *Medium Density Residential* as per Blacktown Council LEP Maps. Existing use of the land is residential.
- West of the site is an area of land which is owned by NSW Government Waste Management Corporation.

Richmond Road carries a high volume of traffic, mostly light passenger traffic.

The nearest noise receivers around the project site include:

- **Receiver 1** – Residential development located at 1016 Richmond Road and 237-251 Grange Avenue, Marsden Park
- **Receiver 2** – Residential development located at 1029, 1059, 1069 Richmond Road and 5, 20 Excelsior Avenue, Marsden Park, and
- **Receiver 3** – Residential dwellings located at 1050 Richmond Road, Marsden Park.

A site map, measurement description and surrounding receivers are presented in Figure 1 below.

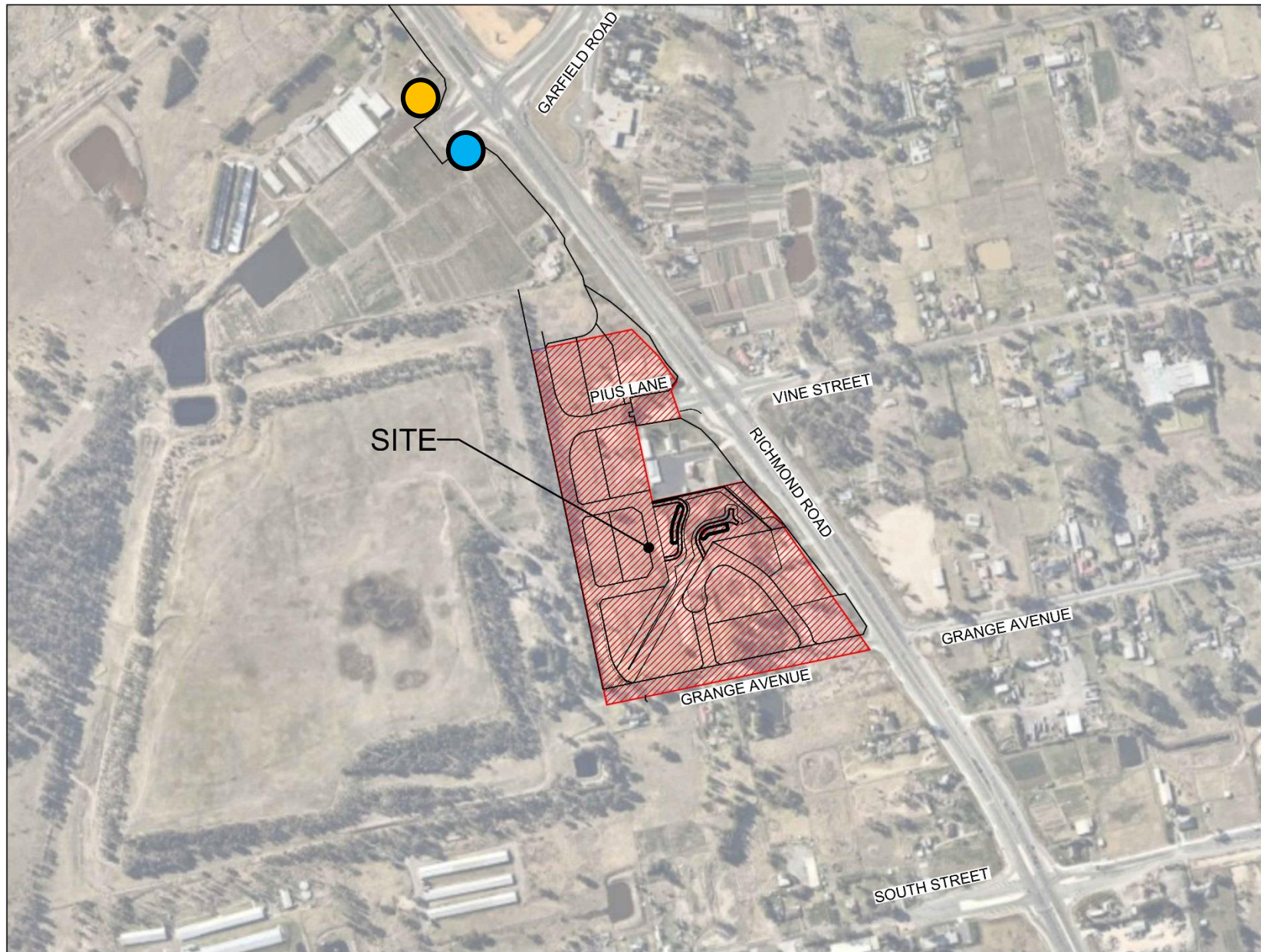


Figure 1 – Site Map

- Unattended Noise Monitor
- Attended Noise Measurement

3 EXISTING ACOUSTIC ENVIRONMENT

The acoustic environment is categorised by high, as background noise levels during the day and evening time is heavily affected by traffic movements along Richmond Road. A lower background noise level during the night period has been measured, as most of the volume of traffic have finished for the day.

Acoustic monitoring was conducted near the site to establish the background noise levels which will be used as 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.

3.2 BACKGROUND NOISE LEVELS

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

3.2.1 Measurement Equipment

Unattended noise monitoring was conducting 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.

3.2.2 Measurement Location

An unattended noise monitor was installed along the eastern boundary of 1086 Richmond Road, Marsden Park, as indicated by Figure 1 above.

3.2.3 Measurement Period

Unattended noise monitoring was conducted from Monday, 24th July 2017 to Monday, 31st July 2017.

3.2.4 Measured Background Noise Levels

The background noise levels established from the unattended noise monitoring are detailed in the Table below.

3.2.4.1 Unattended Noise Measurements

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.

Table below provides detailed results of the unattended noise monitoring. Weather affected data was excluded from the assessment. The processed Rating Background Noise Levels (lowest 10th percentile noise levels during operation time period) are presented in the table below.

Table 3-1 – Unattended Noise Monitor– Rating Background Noise Level

Date	dB(A)L₉₀		
	Day (7am-6pm)	Evening (6pm-10pm)	Night (10pm-7am Next Day)
Monday, 24 th July, 2017	-	44	34
Tuesday, 25 th July, 2017	51	48	36
Wednesday, 26 th July, 2017	48	42	38
Thursday, 27 th July, 2017	48	49	39
Friday, 28 th July, 2017	46	46	38
Saturday, 29 th July, 2017	48	48	33
Sunday, 30 th July, 2017	48	42	37
Monday, 31 st July, 2017	48	-	-
Median	48	46	37

3.2.4.2 Summarised Rating Background Noise Levels

Site investigation, attended, and unattended noise measurements indicate that the acoustic environment for the project site are consistent, this has been summarised below.

Table 3-2 – Summarised Rating Background Noise Level

Location	Time of day	Rating Background Noise Level dB(A)L₉₀
1032 Richmond Road, Marsden Park (See Figure 1)	Day	48
	Evening	46
	Night	37

4 EXTERNAL NOISE INTRUSION ASSESSMENT

Site investigation indicates that the major external noise sources around project site is traffic noise from surround roads such as Richmond Road. Noise intrusion from these sources will be assessed in accordance with criteria nominated Section 4.1 of this report.

4.1 NOISE INTRUSION CRITERIA

A traffic and operational noise intrusion assessment has been conducted based off the requirements of the following acoustic noise criteria/standards:

- State Environmental Planning Policy (SEPP) *Sydney Region Growth Centres* 2006
- NSW Department of Planning and Environment's document – '*Blacktown City Council Growth Centre Precincts Development Control Plan 2016*'
- NSW Department of Planning and Environment's document – '*Developments near Rail Corridors or Busy Roads – Interim Guideline*'
- NSW Department of Planning and Environment's document – '*State Environmental Planning Policy (SEPP) (INFRASTRUCTURE) 2007*'
- Australian and New Zealand AS/NZS 3671:1989 '*Acoustics—Road traffic noise intrusion—Building siting and construction*'
- Australian and New Zealand AS/NZS 2107:2016 '*Recommended design sound levels and reverberation times for building interiors,*' and
- NSW Environmental Protection Agency (EPA) document – '*Road Noise Policy 2011.*'

4.1.1 SEPP Sydney Region Growth Centres 2006

Blacktown City Council has released and rezoned Marsden Park under *State Environmental Planning Policy (Sydney Region Growth Centres)* 2006. Therefore, Council's LEP and DCP no longer apply to these lands. Instead, Blacktown City Council Growth Centre Precincts Development Control Plan will be used.

4.1.2 SEPP DCP for Blacktown City Council Growth Centre Precincts 2018

Section 4.2.9 of the SEPP DCP for Marsden Park states the following with regard to acoustic privacy, specifically in relation to external noise sources such as road traffic noise:

4.2.9 Visual and Acoustic Privacy

Controls

2. Development will require an acoustic report where it is:
 - Adjacent to railway line, arterial road or sub-arterial roads; or
 - Potentially impacted upon by a nearby industrial/employment area.
5. The design of dwellings must minimize the opportunity for sound transmission through the building structure, with particular attention given to protecting bedrooms and living areas.
8. Dwellings along main roads, or any other noise source, should be designed to minimize the impact of traffic noise.
11. Development effected by noise from rail or traffic noise is to comply with AS2107-2000 Acoustics: Recommended Design Sound Levels and Reverberation Times for Building Interiors.
12. Residential development shall aim to comply with the criteria in **Table 4-7**. **Figure 4-12** provides guidance on measures to manage internal noise levels.

Table 4-7: Noise criteria for residential premises impacted by traffic noise

	Sleeping areas	Living areas
Naturally ventilated/ windows open to 5% of the floor area (Mechanical ventilation or air conditioning systems not operating)	L _{Aeq} 15 hours (day): 40dBA L _{Aeq} 9 hour (night): 35dBA	L _{Aeq} 15 hours (day): 45dBA L _{Aeq} 9 hour (night): 40dBA
Doors and windows shut (Mechanical ventilation or air conditioning systems are operating)	L _{Aeq} 15 hours (day): 43dBA L _{Aeq} 9 hour (night): 38dBA	L _{Aeq} 15 hours (day): 46dBA L _{Aeq} 9 hour (night): 43dBA

Notes:

These levels correspond to the combined measured level of external sources and the ventilation system operating normally.

Where a naturally ventilated/windows open condition cannot be achieved, it is necessary to incorporate mechanical ventilation compliant with AS1668 and the Building Code of Australia.

L_{Aeq} 1 hour noise levels shall be determined by taking as the second highest L_{Aeq} 1 hour over the day and night period for each day and arithmetically averaging the results over a week for each period (5 or 7 day week, whichever is highest)

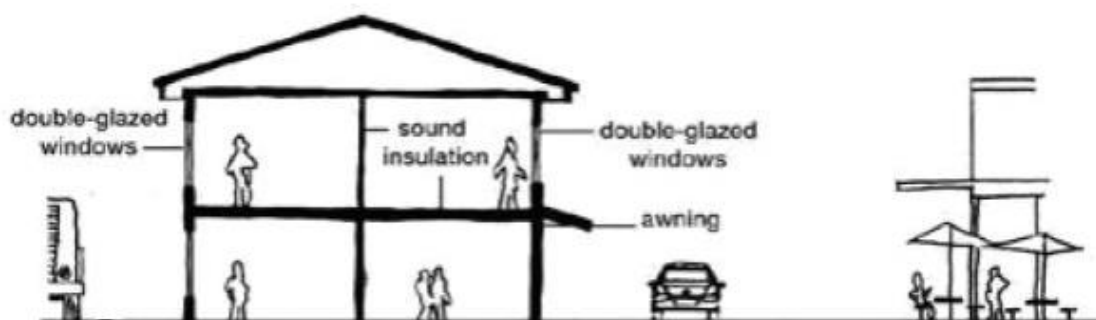


Figure 4-12: Strategies for minimising noise transmission

4.1.3 NSW Department of Planning and Environment document – ‘State Environmental Planning Policy (SEPP) (INFRASTRUCTURE) 2007’

RTA Map No. 10 of the traffic volume maps referenced by the SEPP (INFRASTRUCTURE) on the RTA website (see below), classifies the section of Richmond Road where the development is located adjacent to as a road where a noise intrusion assessment is mandatory under clause 102 of the SEPP Infrastructure 2007. See RTA average annual daily road traffic volume map number 10 and the approximate location of the site below.

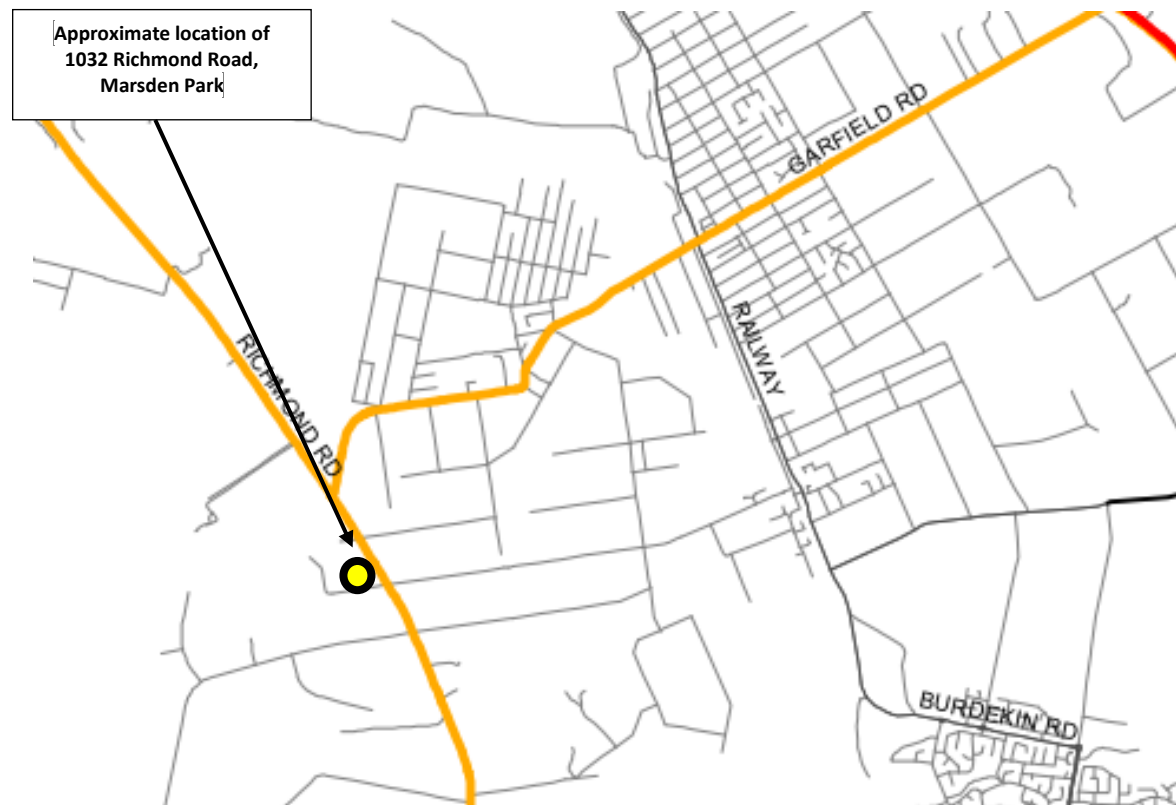


Figure 2 – RTA Map No. 10 and Approximate Location of Proposed Development

Clause 102: Impact of road noise or vibration on non-road development

- (3) *If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:*
- a) *in any bedroom in the building--35 dB(A) at any time between 10 pm and 7 am,*
 - b) *anywhere else in the building (other than a garage, kitchen, bathroom or hallway) -40 dB(A) at any time.*

4.1.4 NSW Department of Planning – Development near Rail Corridors or Busy Roads – Interim Guideline

Section 3.5 of the NSW Department of Planning's 'Development near Rail Corridors and Busy Roads (Interim Guideline)' states:

"The following provides an overall summary of the assessment procedure to meet the requirements of clauses 87 and 102 of the Infrastructure SEPP. The procedure covers noise at developments for both Road and Rail.

- *If the development is for the purpose of a building for residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:*
 - *in any bedroom in the building: 35dB(A) at any time 10pm-7am*
 - *anywhere else in the building (other than a garage, kitchen, bathroom or hallway): 40dB(A) at any time."*

Section 3.6.1 of the document dictates the following with respect to natural ventilation of a dwelling:

"If internal noise levels with windows or doors open exceed the criteria by more than 10dB(A), the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia."

With windows open, the allowable internal noise goal is permitted to be 10dB(A) higher than when the windows are closed (i.e. – allowable level in bedrooms becomes 45dB(A) $L_{eq(9hr)}$ and 50dB(A) $L_{eq(anytime)}$ for living rooms) with respect to the document's internal noise criteria.

4.1.5 Australian and New Zealand AS/NZS 3671:1989 'Acoustics—Road traffic noise intrusion—Building siting and construction'

Australian Standard AS 3671-1989 notes the following in relation to traffic noise:

- Internal noise levels should be determined in accordance with AS/NZS 2107:2016 'Acoustics – Recommended design sound levels and reverberation times for building interiors'.
- A suitable descriptor should be adopted relevant to the use of the development. As AS2107:2016 adopts the L_{eq} descriptor, ALC shall also use this descriptor.
- AS3671 does not specifically recommend a time interval. On this basis, ALC have adopted the interval used by the EPA Road Noise Policy for main/arterial roads, that being:
 - Day – 7am to 10pm (15 hour); and
 - Night – 10pm to 7am (9 hour).
- ALC have applied the daytime interval to the living areas of the apartment and the night time interval to the bedrooms of the apartment.

Internal noise levels have been selected in accordance with AS 2107:2016.

4.1.6 Australian and New Zealand AS/NZS 2107:2016 'Recommended design sound levels and reverberation times for building interiors'

AS2107-2016: Recommended design sound levels and reverberation times for building interiors specifies allowable internal noise levels for internal spaces within residential and commercial buildings. Table 1, in Section 5 of AS2107-2016, gives the following maximum internal noise levels for commercial buildings and residential buildings near major roads.

Table 4-1 – Recommended Design Sound Level

Space /Activity Type	Recommended Maximum Design Sound Level
Bedrooms	35-40dB(A) _{Leq(10pm-7am)}
Living Rooms	35-45dB(A) _{Leq(anytime)}
Commercial	45dB(A) _{Leq(When in Use)}

4.1.7 NSW EPA Road Noise Policy 2011

The NSW EPA Road Noise Policy provides noise assessment criteria for assessing impact and mitigation measures when there is a new road or road redevelopment, and when there is a land use development with the potential to generate additional traffic on local, sub-arterial or arterial roads. Table 4, in Section 2.3.2 gives the following road traffic assessment criteria for non-residential land uses affected by proposed road projects and traffic generating developments.

Table 4-2 – Assessment Criteria

Existing Sensitive Land Use	Recommended Maximum Design Sound Level
Open space (passive use)	55dB(A) _{Leq(15hr, when in use)} (externally)

4.1.8 Summarised Internal Noise Criteria

Summarised internal noise criteria for each space is summarised below.

Table 4-3 – Summarised Internal Noise Criteria

Space /Activity Type	Internal Noise Requirement
Bedrooms	35dB(A) _{Leq(10pm-7am)}
Living Rooms	40dB(A) _{Leq(anytime)}
Commercial	45dB(A) _{Leq(When in Use)}
Open space (passive use)	55dB(A) _{Leq(15hr, when in use)} (externally)

4.2 EXTERNAL NOISE MEASUREMENTS

This section of the report details noise measurements conducted at the site to establish traffic and surrounding environmental noise levels impacting the development.

4.2.1 Measurement Equipment

An unattended noise monitor was installed on the eastern boundary of project site, 1086 Richmond Road, Marsden Park. For detailed location refer to Figure 1. Noise monitor location was approximately 70m from the kerb of Richmond Road.

An attended traffic noise measurement was conducted along Richmond Road was located along the eastern boundary of 1086 Richmond Road, Marsden Park. See figure 1 for Measurement location. Noise measurement location had a 180° view of Richmond Road and was conducted at a distance of 5m from the kerb.

4.2.2 Measurement Period

Unattended noise monitoring was conducted from Monday, 24th July 2017 to Monday, 31st July 2017.

Attended noise measurements were undertaken between the hours of 4:30pm and 5:30pm on Tuesday, 25th July 2017.

4.2.3 Measured Traffic Noise Measurements

Attended and unattended noise measurements have been summarised below.

4.2.3.1 Unattended Noise Monitoring

Results from the unattended noise monitoring having been provided below.

Table 4-4 – Unattended Noise Monitor – Location 1 – Traffic Noise Measurements

Date	Measured Traffic Noise Level dB(A) _{Leq}	
	Day (7am-10pm)	Night (10pm-7am)
Monday, 24 th July, 2017	-	57
Tuesday, 25 th July, 2017	59	55
Wednesday, 26 th July, 2017	60	56
Thursday, 27 th July, 2017	58	56
Friday, 28 th July, 2017	59	55
Saturday, 29 th July, 2017	57	51
Sunday, 30 th July, 2017	58	55
Monday, 31 st July, 2017	-	-
Logarithmic Average	58	55

*Partially obstructed view.

4.2.3.2 Attended Traffic Noise Measurements

Attended noise measurements have been summarised below for each location.

Table 4-5 – Attended Traffic Noise Measurements

Location	Time of Measurement	Measured Noise Level
Richmond Road (See Figure 1) 5m from kerb 180° view of the road	4:30pm – 5:30pm Tuesday, 25 th July, 2017	69dB(A) _{Leq(15minutes)}

4.3 NOISE INTRUSION ANALYSIS

Traffic noise intrusion into the proposed development was assessed using the measured traffic noise levels presented in Section 4.2 above.

Calculations were undertaken taking into account the orientation of windows, barrier effects (*where applicable*), the total area of glazing, facade transmission loss and room sound absorption characteristics. In this way the likely interior noise levels can be predicted.

4.4 RECOMMENDED CONSTRUCTIONS

4.4.1 Glazed Windows and Doors

The following constructions are recommended to comply with the project noise objectives. Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria. All external windows and doors listed are required to be fitted with Q-Ion type acoustic seals. **(Mohair Seals are unacceptable)**.

Thicker glazing may be required for structural, safety or other purposes. Where it is required to use thicker glazing than scheduled, this will also be acoustically acceptable.

The recommended constructions are listed in Table 4-6 below.

Table 4-6 – Glazing Thickness Requirements

Site	Façade	Space	Glazing Construction	Acoustic Seals
Lot 8	Childcare	See Section 6.3		Yes
	Block A Northern Façade	Bedroom	10.38mm Laminate	
	Block A Eastern Façade (Richmond Road)	Bedroom	12.38mm Laminate	
		Living Space	10.38mm Laminate	
	Block A Southern Façade	Living Space	10mm Float	
	Block A Western Façade	Bedroom	6.38mm Laminate	
		Living Space	6mm Float	
	Block B Northern Façade	Bedroom	10.38mm Laminate	
		Living Space	10.38mm Laminate	
	Block B Eastern Façade (Richmond Road)	Bedroom	12.38mm Laminate	
		Living Space	10.38mm Laminate	
	Block B Southern Façade	Bedroom	10.38mm Laminate	
		Living Space	10mm Float	
	Block B Western Façade	Bedroom	6.38mm Laminate	
		Living Space	6mm Float	

***Note: Glazing recommendations apply to all levels.**

Table 4-5 – Glazing Thickness Requirements (Cont.)

Site	Façade	Space	Glazing Construction	Acoustic Seals
Lot 10	Northern Façade	Bedroom	10mm Float	Yes
		Living Space	10mm Float	
	Eastern Façade	Bedroom	10mm Float	
		Living Space	10mm Float	
	Southern Façade	Bedroom	6.38mm Laminate	
		Living Space	6mm Float	
	Western Façade	Bedroom	6.38mm Laminate	
		Living Space	6mm Float	
Lot 11	Block A Northern Façade	Bedroom	10.38mm Laminate	Yes
		Living Space	10mm Float	
	Block A Eastern Façade	Bedroom (Including Studio)	10.38mm Laminate	
		Living Space	10mm Float	
	Block A Southern Façade	Bedroom	6.38mm Laminate	
		Living Space	6mm Float	
	Block A Western Façade	Bedroom	6.38mm Laminate	
		Living Space	6mm Float	
	Block B Northern Façade	Bedroom	6.38mm Laminate	
		Living Space	6mm Float	
	Block B Eastern Façade	Bedroom (Including Studio)	6.38mm Laminate	
		Living Space	6mm Float	
	Block B Southern Façade	Bedroom	6.38mm Laminate	
		Living Space	6mm Float	
	Block B Western Façade	Bedroom	6.38mm Laminate	
		Living Space	6mm Float	

***Note: Glazing recommendations apply to all levels.**

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

In addition to complying with the minimum scheduled glazing thickness, the R_w rating of the glazing fitted into open-able frames and fixed into the building opening should not be lower than the values listed in Table 4-7 for all rooms. Where nominated, this will require the use of acoustic seals around the full perimeter of open-able frames and the frame will need to be sealed into the building opening using a flexible sealant.

Table 4-7 - Minimum R_w of Glazing (with Acoustic Seals)

Glazing Assembly	Minimum R_w of Installed Window
6mm Float	29
6.38mm Laminate	31
10mm Float	33
10.38mm Laminate	35
12.38mm Laminate	37

4.4.2 External Roof/Ceiling Construction

External roof construction will be constructed from concrete elements; this proposed structure will not require any further acoustic upgrading. In the event that any penetrations are required thru the external skin, an acoustic sealant should be used to minimise all gaps.

4.4.3 External Wall Construction

External wall construction will be constructed from concrete elements; this proposed structure will not require any further acoustic upgrading. In the event that any penetrations are required thru the external skin, an acoustic sealant should be used to minimise all gaps.

4.4.4 Entry Doors

Entry doors will be via internal corridors and as such, constructions will be formulated pursuant to the Building Code of Australia.

4.4.5 Mechanical Ventilation

With respect to natural ventilation of the dwelling, the NSW Department of Planning document “Development near Busy Roads and Rail Corridors - Interim Guideline” dictates that:

- *“If internal noise levels with windows or doors open exceed the criteria by more than 10dB(A), the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.”*

With windows open, the allowable internal noise goal is permitted to be 10dB(A) higher than when the windows are closed (ie – allowable level in bedrooms becomes 45dB(A), and 50dB(A) in living rooms).

- All western facing façades, Lot 10 & 11 southern façades and Lot 11B northern façade can have windows open to meet acoustic requirements.
- All other habitable spaces facing Richmond Road will require to have their windows closed in order to meet acoustic requirements.

A mechanical engineer is to confirm if supplementary ventilation (to meet Australian Standard AS1668.2 requirements) will be required to these rooms.

4.4.6 Traffic Noise Barrier to Communal Area

Section 6.5 details recommended barriers to meet the acoustic requirements of the communal area near Richmond Road in Lot 8.

5 NOISE EMISSION ASSESSMENT

A noise emission has been carried out to ensure noise emitting from the use of the site is in accordance with the requirements listed below in Section 5.1.

5.1 NOISE EMISSION CRITERIA

5.1.1 SEPP DCP for Blacktown City Council Growth Centre Precincts 2018

Section 4.2.9 of the SEPP DCP for Marsden Park states the following with regard to noise emissions;

4.2.9 Visual and Acoustic Privacy

Controls

7. *No electrical, mechanical or hydraulic equipment or plant shall generate a noise level greater than 5dBA above background noise level measured at the property boundary during the hours 7.00am to 10.00pm and noise is not to exceed background levels during the hours 10.00pm to 7.00am.*

5.1.2 NSW EPA Noise Policy for Industry (NPI) 2017

The EPA NPI has two criteria which both are required to be satisfied, namely Intrusiveness and amenity. The NPI sets out acceptable noise levels for various localities. The policy indicates four categories to assess the appropriate noise level at a site. They are rural, suburban, urban and urban/industrial interface. Under the policy the nearest residential receivers would be assessed against the suburban criteria.

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

5.1.2.1 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 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 0. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

5.1.2.2 Project 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 EPA's NPI sets out acceptable noise levels for various localities. The recommended noise amenity area is based upon the measured background noise levels at the sensitive receiver. Based on the measured background noise levels detailed in Section 0 **Error! Reference source not found.**, the Noise Policy for Industry suggests the adoption of the 'urban' categorisation.

The NPI requires project amenity noise levels to be calculated in the following manner;

$$L_{Aeq,15min} = \text{Recommended Amenity Noise Level} - 5 \text{ dB(A)} + 3 \text{ dB(A)}$$

The amenity levels appropriate for the receivers surrounding the site are presented in Table 5-1.

Table 5-1 – EPA Amenity Noise Levels

Type of Receiver	Time of day	Recommended Noise Level dB(A) $L_{eq}(\text{period})$	Project Amenity Noise Level dB(A) $L_{eq}(15 \text{ minute})$
Residential – Suburban	Day	60	58
	Evening	50	48
	Night	45	43
Commercial	When in Use	65	

The NSW EPA Noise Policy for Industry (2017) defines;

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

5.1.2.3 Sleep Arousal Criteria

The Noise Policy for Industry recommends the following noise limits to mitigate sleeping disturbance:

Where the subject development / premises night -time noise levels at a residential location exceed:

- $L_{eq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- L_{Fmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

a detailed maximum noise level even assessment should be undertaken.

Table 5-2 – Sleep Arousal Criteria for Residential Receivers

Receiver	Rating Background Noise Level (Night) dB(A) L_{90}	Emergence Level
Residences Surrounding Site Night (10pm – 7am)	37 dB(A) L_{90}	42 dB(A) $L_{eq, 15min}$; 52 dB(A) L_{Fmax}

5.1.3 Summarised Noise Emission Criteria

Table 5-3 – EPA NPI Noise Emission Criteria (Residents Surrounding Project Site)

Time Period	Assessment Background Noise Level dB(A) L_{90}	Project Amenity Criteria dB(A) L_{eq}	Intrusiveness Criteria $L_{eq}(15min)$	Blacktown City Council Growth Centre Precincts DCP	NPI Criteria for Sleep Disturbance
Day	48	58	53	53	N/A
Evening	46	48	51	51	N/A
Night	37	43	42	37	42 dB(A) $L_{eq,15min}$; 52 dB(A) L_{Fmax}

Table 5-4 – Summary of Noise Emission Criteria (Commercial Receivers)

Receiver	Time of day	Amenity Criteria dB(A) $L_{eq}(15min)$
Commercial	When in Use	63

5.2 MECHANICAL PLANT NOISE

Detailed plant selection has not been undertaken at this stage, as plant selections have not been determined. Detailed acoustic review should be undertaken at CC stage to determine acoustic treatments to control noise emissions to satisfactory levels. Satisfactory levels will be achievable through appropriate plant selection and location and, if necessary, standard acoustic treatments such as duct lining, acoustic silencers and enclosures.

Noise emissions from all mechanical services plant to the closest residential receiver should comply with the noise emission criteria in Section 5.1.3.

6 CHILD CARE CENTRE

Internal and external noise associated with the proposed child care centre are addressed below.

6.1 PROPOSED OPERATION

The childcare will be located on the ground floor of proposed apartment block on Lot 8 within the development.

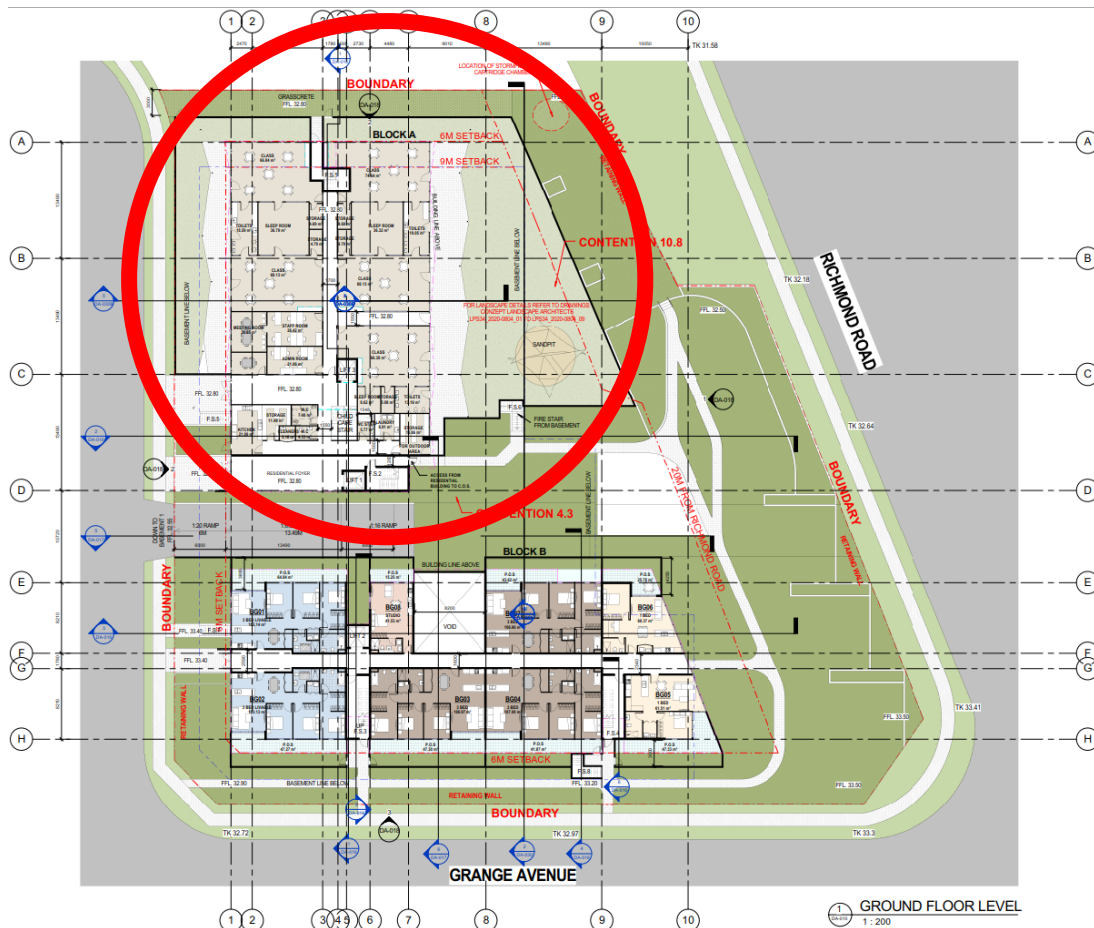


Figure 3 – Site Plan – Location of Lot 8 Block A Childcare Centre

The closest residential receivers have been identified as:

- Lot 9 Block A within the development to the North, directly across from the Childcare Centre
- Lot 11 Block A within the development to the West, directly across from the Childcare Centre, and
- Residential apartments directly above the Childcare Centre in Lot 8 Block A.

The childcare will operate between the hours of 7am to 6pm Monday to Friday. The total number of children is 100 broken up into the following age divisions:

- 0 to 2 years – 20 children
- 2 to 3 years – 20 children
- 3 to 6 years – 60 children

The following outdoor play times are indicatively proposed (with no outdoor play after 4pm to reflect the recommendations of the air quality assessment report prepared by Astute Environmental Consulting):

- 0 to 3 years – 8am to 9am and 1pm-2pm
- 3 to 6 years – 10am to 11am and 2:30pm-3:30pm

The proposed outdoor play times combine for a cumulated 2 hours of outdoor play in the morning and 2 hours of outdoor play in the afternoon, informing the selection of criteria in the section below.

6.2 ASSOCIATION OF AUSTRALIAN ACOUSTICAL CONSULTANTS (AAAC) 'GUIDELINE FOR CHILD CARE CENTRE ACOUSTIC ASSESSMENT,' VERSION 3.0, 2020

The guideline sets out of a recommended assessment method for noise impacts associated with childcare centres and provides typical recommendations for the control of noise also.

6.2.1 Noise Intrusion (From Surrounding Roads)

Section 5.1 of the guideline states the following regarding external noise impacts on childcare centres:

Road, Rail Traffic and Industry

The predictions of noise levels from road traffic on a child care centre can be calculated using basic formula as given, for example, in the Calculation of Road Traffic Noise from the UK Department of Transport, Welsh Office (1988).

The $L_{Aeq,1hr}$ noise level from road traffic, rail or industry at any location within the outdoor play or activity area during the hours when the Centre is operating should not exceed 55 dB(A).

The $L_{Aeq,1hr}$ noise level from road traffic, rail or industry at any location within the indoor activity or sleeping areas of the Centre during the hours when the centre is operating shall be capable (ie with doors and / or windows closed) of achieving 40 dB(A) within indoor activity areas and 35 dB(A) in sleeping areas.

6.2.2 Noise Emissions (Emitted by the Use)

Section 3.2 of the guideline states the following regarding noise criteria to residential receptors:

3.2.1 Outdoor Play Area

Base Criteria – *With the development of child care centres in residential areas, the background noise level within these areas can at certain times, be low. Thus, a base criterion of a contributed $L_{eq,15min}$ 45 dB(A) for the assessment of outdoor play is recommended in locations where the background noise level is less than 40 dB(A).*

Background Greater Than 40 dB(A) – *The contributed $L_{eq,15min}$ noise level emitted from an outdoor play and internal activity areas shall not exceed the background noise level by more than 5 or 10 dB at the assessment location, depending on the usage of the outdoor play area. AAAC members regard that a total time limit of approximately 2 hours outdoor play per morning and afternoon period should allow an emergence above the background of 10 dB (ie background +10 dB if outdoor play is limited to 2 hours in the morning and 2 hours in the afternoon).*

Up to 4 hours (total) per day – *If outdoor play is limited to no more than 2 hours in the morning and 2 hours in the afternoon, the contributed $L_{eq,15 minute}$ noise level emitted from the outdoor play shall not exceed the background noise level by more than 10 dB at the assessment location.*

More than 4 hours (total) per day – If outdoor play is not limited to no more than 2 hours in the morning and 2 hours in the afternoon, the contributed $L_{eq,15\text{ minute}}$ noise level emitted from the outdoor play area shall not exceed the background noise level by more than 5 dB at the assessment location.

3.2.2 Other Noise Emission

The cumulative $L_{eq,15\text{ minute}}$ noise emission level resulting from the use and operation of the child care centre, with the exception of noise emission from outdoor play discussed above, shall not exceed the background noise level by more than 5 dB at the assessment location as defined above. This includes the noise emission resulting from:

- Indoor play
- Mechanical plant
- Drop off and pick up
- Other activities/ operations (not including outdoor play).

3.2.3 Sleep Disturbance

The noise impact of staff arrivals, setup, cleaning or other on-site activities prior to 7am or during night-time hours should be assessed at nearby residential premises. The L_{Amax} noise level emitted from vehicles arriving and parking, depending on the requirements of the state or territory where the centre is located shall not exceed the background noise level by more than 15 dB outside the nearest habitable room window.

6.2.3 Criteria Summary

The following criteria will be used to assess the proposed childcare.

6.2.3.1 External Noise Intrusion

Table 6-1– Child Care Noise Intrusion Criteria

Source	Receiver	Criteria
Surrounding Roads	Internal Sleeping Areas	$L_{Aeq(1\text{ hour})}$ 35 dB(A)
	Internal Play Areas	$L_{Aeq(1\text{ hour})}$ 40 dB(A)
	Outdoor Play Areas	$L_{Aeq(1\text{ hour})}$ 55 dB(A)

6.2.3.2 Child Care Noise Emission Criteria

Table 6-2– Child Care Noise Emission Criteria

Source	Receiver	Criteria
Childcare Outdoor Play Areas	Residential Receivers	$L_{Aeq(15\text{ min})}$ 58 dB(A) (2 hours in the morning and 2 hours in the afternoon)
Indoor Play & Mechanical Plant & Pick up/drop off	Residential Receivers	$L_{Aeq(15\text{ min})}$ 53 dB(A)

6.3 NOISE INTRUSION ASSESSMENT

The childcare centre is located adjacent to Richmond Road, which is classified as an arterial road under SEPP. To achieve the required 55dB(A) outdoor noise criteria for play areas, acoustic barriers are to be installed around all play areas (See Section 6.5). Areas of glazing associated with the childcare rooms will require 6.38mm Laminate (Rw 31) glazing to comply with the indoor noise criteria. This has taken into account the 2.4m high acoustic fence surrounding the Childcare Centre.

6.4 NOISE EMISSION ASSESSMENT

6.4.1 Assumptions Adopted in Assessment

- Calculations are based on predictions that children are evenly distributed within in the outdoor play areas
- Play area for children aged 0 to 3 years old is located on the North West side of the building
- Play area for children aged 3 to 6 years old is located on the North East side of the building along Richmond Road, and
- Recommendations set out in Section 6.5 have been implemented.

6.4.1.1 Outdoor Play Sound Power Levels

Noise emissions from outdoor play activities were predicted using the mid-point level of Sound Power Level data recommended by AAAC Guideline for Child Care Centre Acoustic Assessment (2020) which has been detailed in table below.

Table 6-3 – AAAC Sound Power Levels

Number and Age of Children	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dB(A)	63	125	250	500	1k	2k	4k	8k
10 Children – 0 to 2 years	78	54	60	66	72	74	71	67	64
10 Children – 2 to 3 years	85	61	67	73	79	81	78	74	70
10 Children – 3 to 5 years	87	64	70	75	81	83	80	76	72

6.4.1.2 Indoor Play/ Teaching

- The sound pressure level generated inside the internal play areas is 75dB(A)Leq based on measurements taken by this office at similar sites.
- Up to 100 children using the indoor activity areas at any given time and approximately distributed as described in the architectural drawings.
- Predictions assuming that glazing is closed when indoor space is in use.

6.4.1.3 Outdoor Play

The outdoor play noise has been predicted based on the following information and assumptions:

- An acoustic barrier system as detailed in Section 6.5 of this report.
- The following number of children utilising the outdoor play areas concurrently:
 - All 40 children aged 0-3 to play in the outdoor play area to the north west, and
 - All 60 children aged 3-6 to play in the outdoor play area to the north east.
- Noise emission prediction have been calculated cumulatively from the outdoor play areas and were made at the following worst-case areas (5m from boundary being more conservative than 1m from boundary):
 - To Lot 9 Block A at the façade
 - To Lot 11 Block A at the façade
 - To the balcony of apartments above the 0–3-year play area, and
 - To the balcony of apartments above the 3–6-year play area.

6.4.2 Predicted Noise Levels

The noise level at the nearest residents were predicted using the above data and by taking into account any expected noise reduction provided by the building fabric, distance losses, directivity, barrier effects, number of children play etc.

The table below shows the predicted noise levels from the children in the outdoor play areas.

Table 6-4 – Predicted Noise Levels from Outdoor Play

Receiver	Source	Predicted Noise Level	Complies
Lot 9 Block A	0 to 3 years play area (40 children)	55	Yes
Lot 9 Block A	3 to 6 years play area (60 children)	56	Yes
Lot 11 Block A (across internal road)	0 to 3 years play area (40 children)	55	Yes
Apartments above	0 to 3 years play area (40 children)	55	Yes
Apartments above	3 to 6 years play area (60 children)	58	Yes

6.5 RECOMMENDATIONS

For compliance to the closest sensitive receivers to be achieved play areas are to be surrounded by 2.4m high acoustic barriers and outdoor play is to be restricted to a maximum of 2 hours per morning and 2 hours per afternoon cumulatively for each outdoor play area.

- Bounding both the 0-3 outdoor play area and 3-6 outdoor play area, a 1.8m high barrier must be constructed A mark up can be seen in Figure 4 below with barriers in red.
- Along Richmond Road, a 2.4m high barrier must be constructed. A mark up can be seen in Figure 4 below with barriers in orange.
- The fences along the perimeter of the outdoor areas, of height specified above, may be constructed of lapped and capped timber, plexiglass, 4mm Perspex, Colorbond, 9mm fibrous cement sheet or equivalent, installed with no gaps between the panels, and maximum of a 20mm gap at the bottom to allow water flow if required.

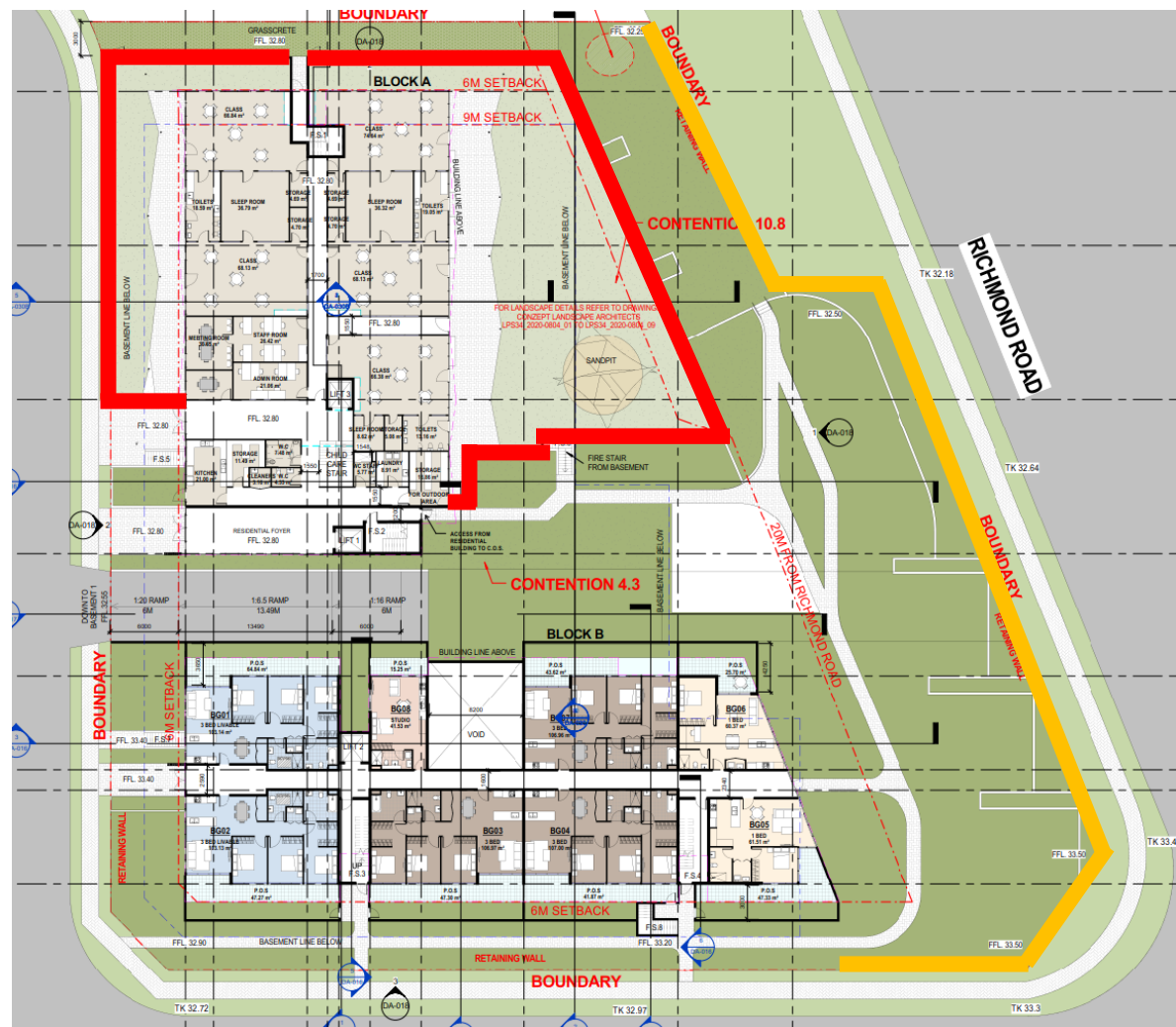


Figure 4 – Site Plan – Barrier Mark up

- All awnings over childcare outdoor play areas are to be as detailed per the architectural drawings, namely the minimum 2m deep awning on the western side, 3m deep awning on the eastern side and 1.5m deep awning on the northern side. See architectural drawing DA-011 for clarification.

6.5.1 General Management Controls

- Additional general management controls are as follow:
 - Signs reminding staff and visitors to minimise noise at all times shall be installed at ingress/egress points from the child care centre.
 - All staff are to be given appropriate training in relation to the acoustic impacts and requirements in terms of operation of the facility.
 - Management is to ensure children are supervised at all times to minimise noise generated by the children whenever practical and possible.
 - Install a contact phone number at the front of the centre so that any complaints regarding centre operation can be made.
 - No music systems are to be used outside at any time.
 - Mechanical Plant only to operate between 7:00am and 6:00pm.

7 NOISE EMISSIONS ASSESSMENT

7.1 CARPARK

Assessment of the carpark noise emissions has been undertaken based on the traffic trip generation information provided in the traffic report for the development prepared by Varga Traffic Planning (Ref: 19426, dated 2nd October 2019). The traffic report gives an estimated 14 vehicle movements during AM peak hour and 11 vehicle movements during PM peak hour for Lot 10. Night time traffic movements have been based on the PM peak hour trip. Calculations have been made to predict noise levels occurring at sensitive receivers during a one hour peak of traffic movements, with the worst affected residential receiver being the ground floor residents of the same development.

As there are no specific criteria for driveway usage noise to own residents, the Noise Policy for Industry project noise trigger levels shall be used for day and evening predictions to the most affected resident's balcony.

The following noise emission data for vehicle-related noise sources measured by this office have been used for the assessment.

Table 7-1 – Sound Power Levels of Typical Car Movements

Car Movement	Sound Power Level, dB(A)
Car Manoeuvring @ 10km/h	84 $L_{eq}(15 \text{ min})$

The following noise levels have been predicted:

Table 7-2 – Predicted Noise Levels to Closest Resident in Lot 10

Time Period	Predicted Noise	Criteria	Complies?
Day (7am to 6pm)	45 L_{eq}	53 dB(A) L_{eq}	Yes
Evening (6pm to 10pm)	44 L_{eq}	48 dB(A) L_{eq}	Yes

7.2 LOADING DOCK AND WASTE COLLECTION

The primary noise associated with the use of the loading dock will consist of trucks moving into or out of the loading dock.

Noise emission predictions at the nearby development have been made based on the following data/assumptions:

- A typical truck sound power level of 100dB(A)Leq;
- There are no more than two truck movements in any 15 minute period during day time and evening periods; and
- There are no truck movements in the night time period.

Average noise emissions from loading dock operation readily comply with the internal noise level requirements of AS2107 when assessed to the closest resident's living and bedrooms during the day and evening period with windows closed and the glazing recommendations of Section 4.4.1. If it is proposed to operate the loading dock during the night time period (10pm – 7am) such as for large deliveries or waste collection, it must be accompanied by a separate plan of managements demonstrating how acoustic controls for the site will be achieved.

8 CONCLUSION

This report presents an acoustic assessment of noise impacts associated with the proposed mixed-use development located at Lots 8, 10 & 11, 230 -232 Grange Avenue & 1032 -1036 Richmond Road, Marsden Park. Based on the information provided above we conclude the following;

Provided that the treatments set out in section 4 of this report are employed, internal noise levels shall comply with the requirements below:

- Blacktown City Council DCP and LEP 2015;
- SEPP DCP for Blacktown City Council Growth Centre Precincts 2018;
- NSW Department of Planning and Environment's document – '*Developments near Rail Corridors or Busy Roads – Interim Guideline*';
- NSW Department of Planning and Environment's document – '*State Environmental Planning Policy (SEPP) (INFRASTRUCTURE) 2007*';
- Australian and New Zealand AS/NZS 3671:1989 '*Acoustics—Road traffic noise intrusion—Building siting and construction*'; and
- Australian and New Zealand AS/NZS 2107:2016 '*Recommended design sound levels and reverberation times for building interiors*.'

External noise emissions criteria have been setup in this report to satisfy the requirements from the following documents;

- Blacktown City Council document – '*Development Control Plan (DCP) 2015*';
- NSW Environmental Protection Agency (EPA) document – '*Noise Policy for Industry (NPI)*'; and
- Association of Australian Acoustical Consultants (AAAC) document – '*Technical Guideline for Child Care Centre Acoustic Assessment – 2013*'.

Detailed acoustic control measures for the plant servicing the proposed development will be determined at CC stage.

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

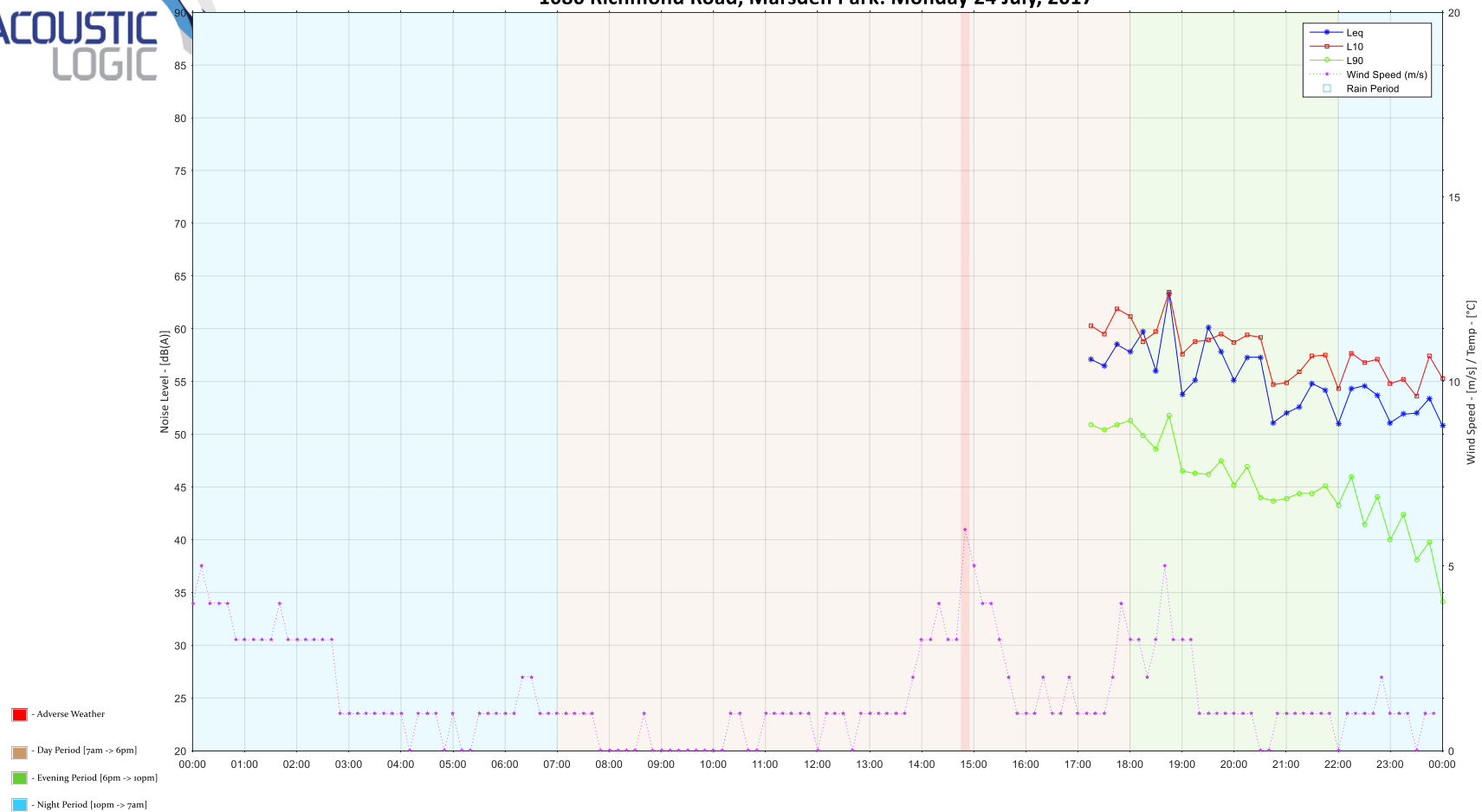
Yours faithfully,



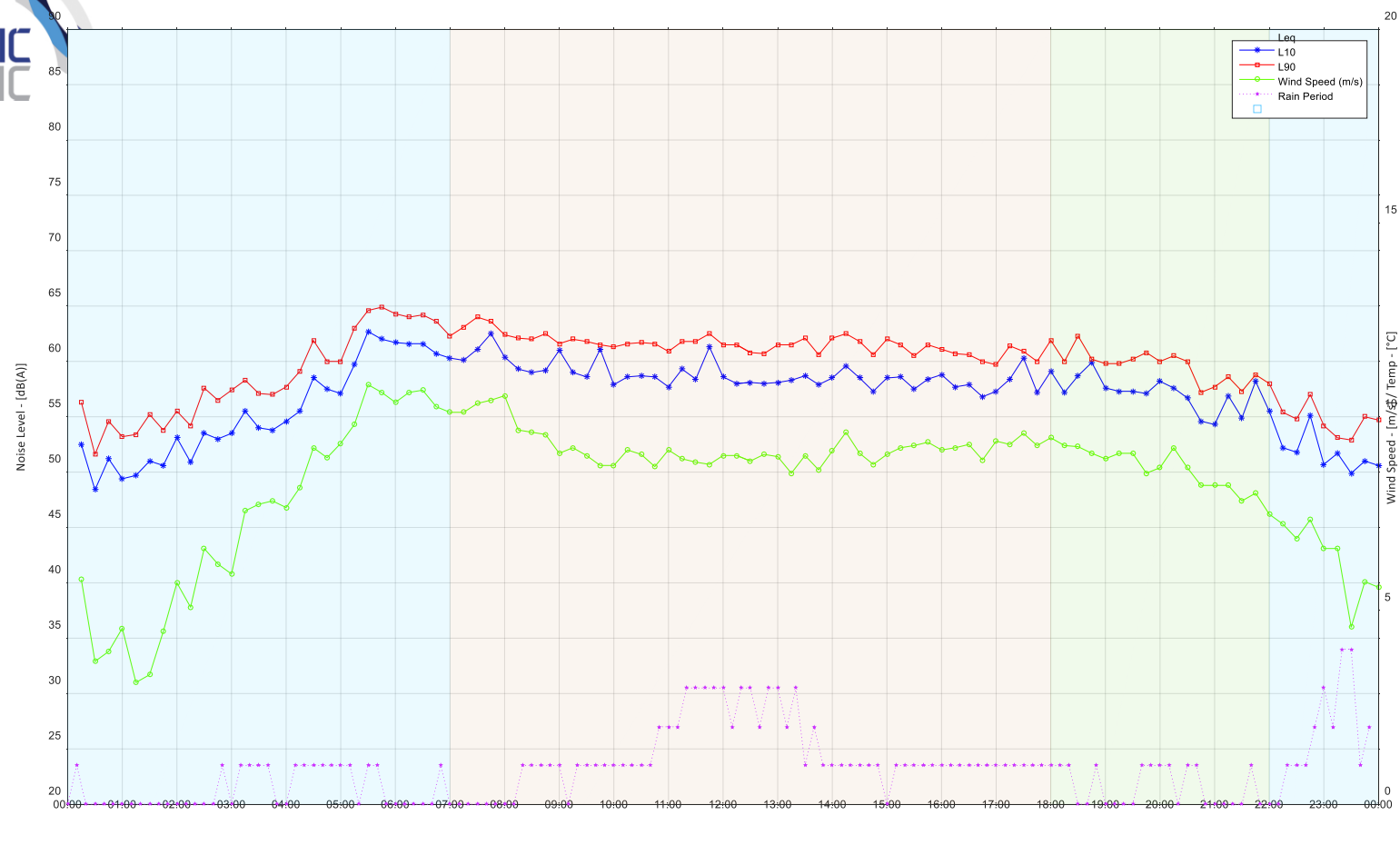
Acoustic Logic Consultancy Pty Ltd
Weber Yeh

APPENDIX A – UNATTENDED NOISE MONITORING DATA

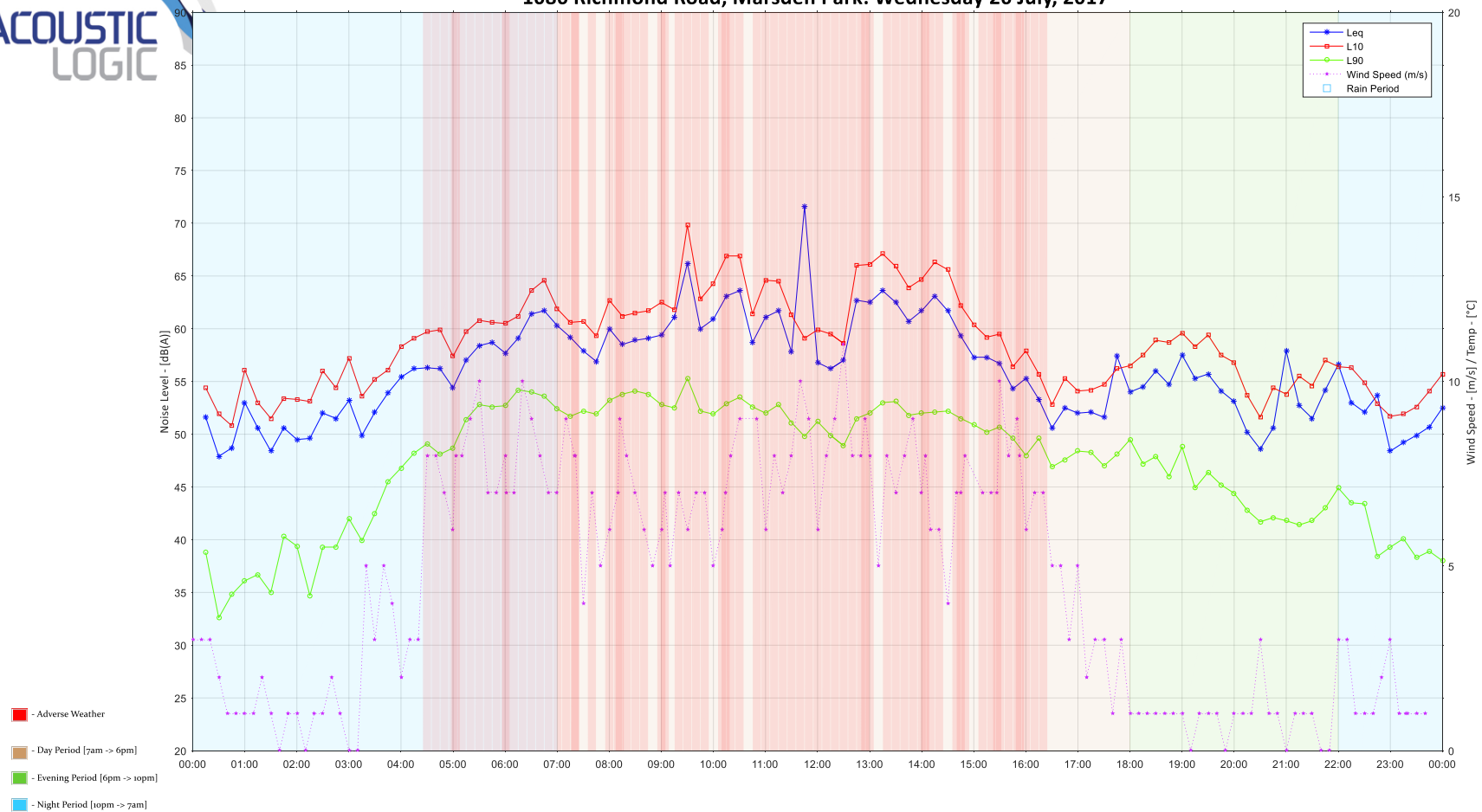
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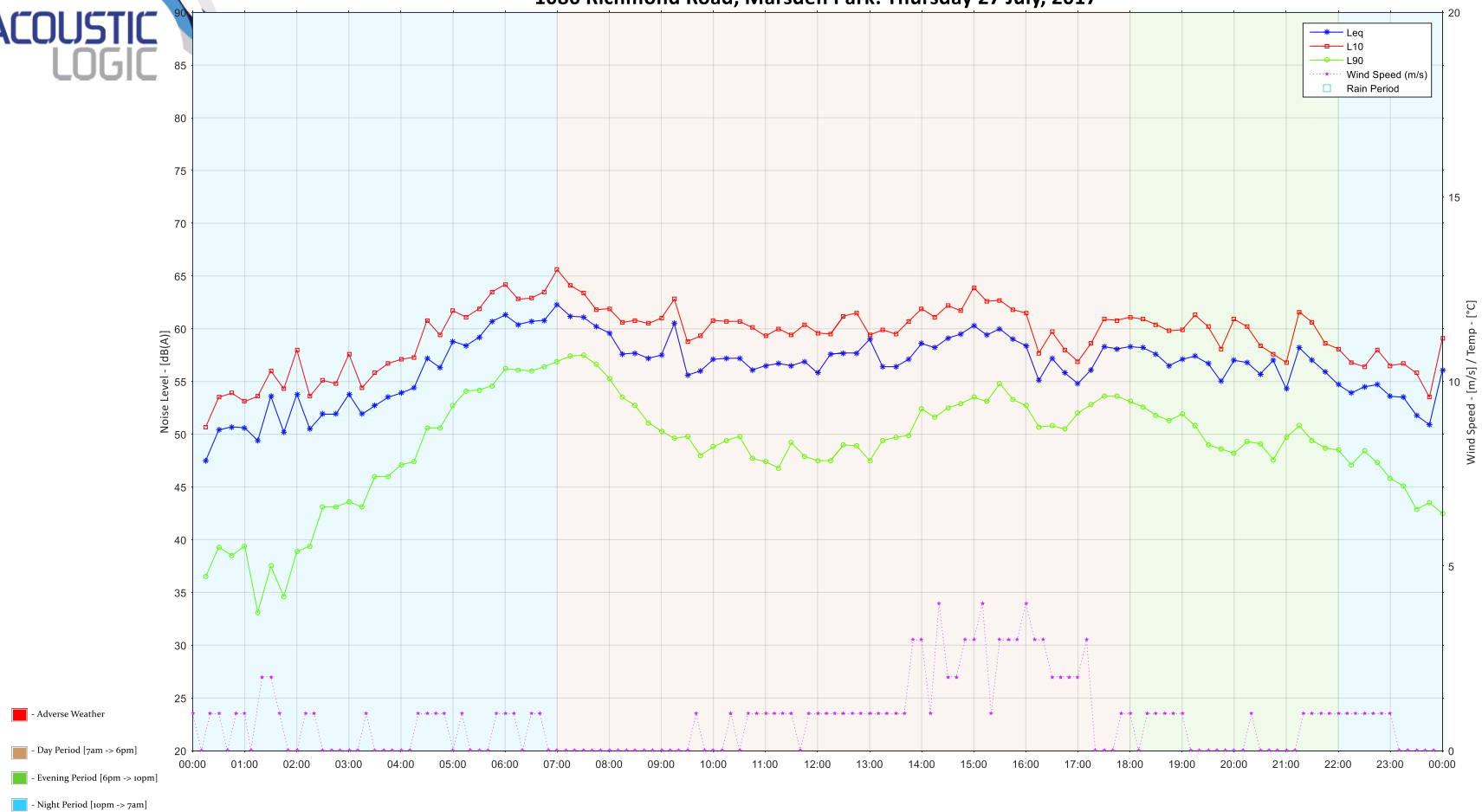
1086 Richmond Road, Marsden Park: Tuesday 25 July, 2017



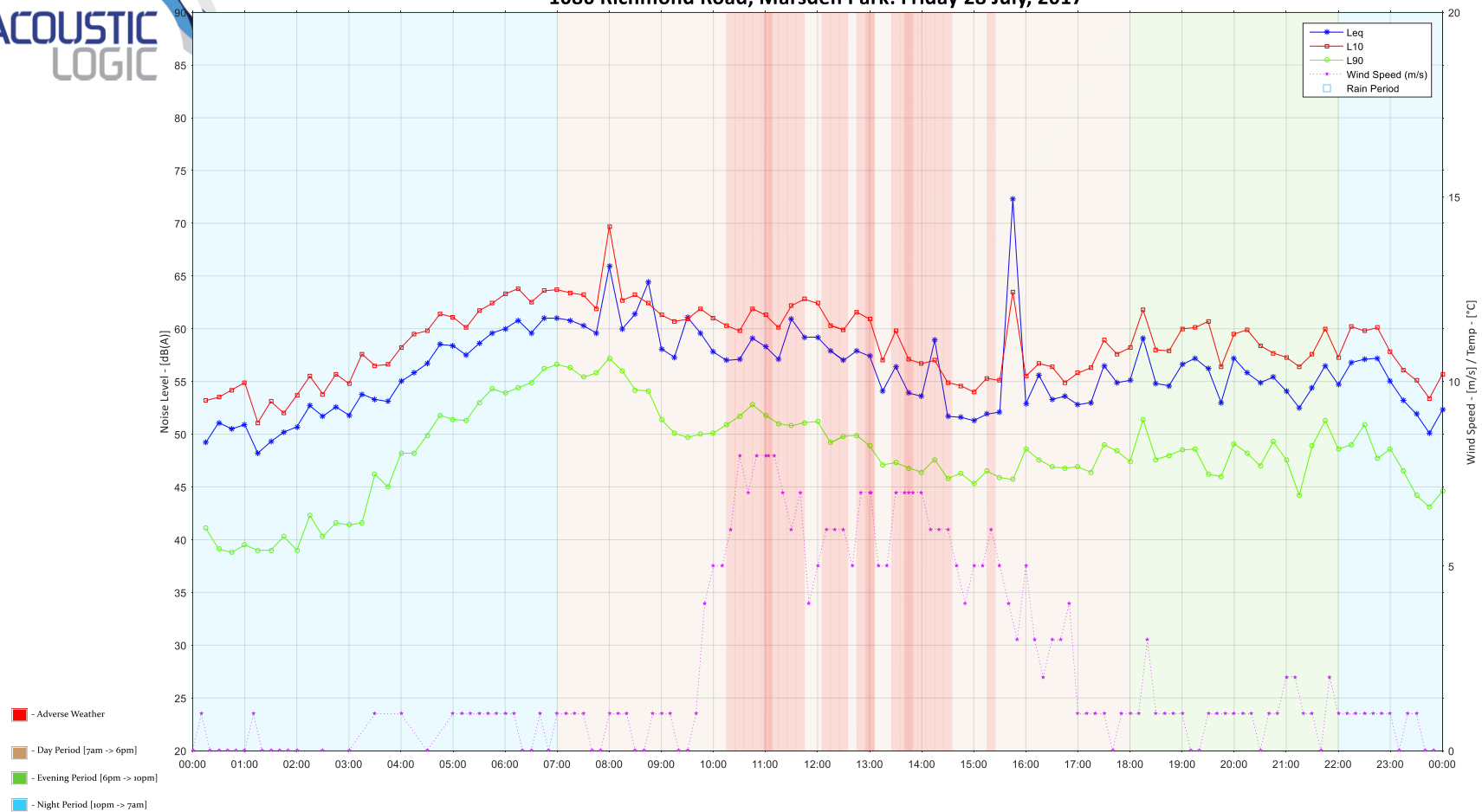
1086 Richmond Road, Marsden Park: Wednesday 26 July, 2017



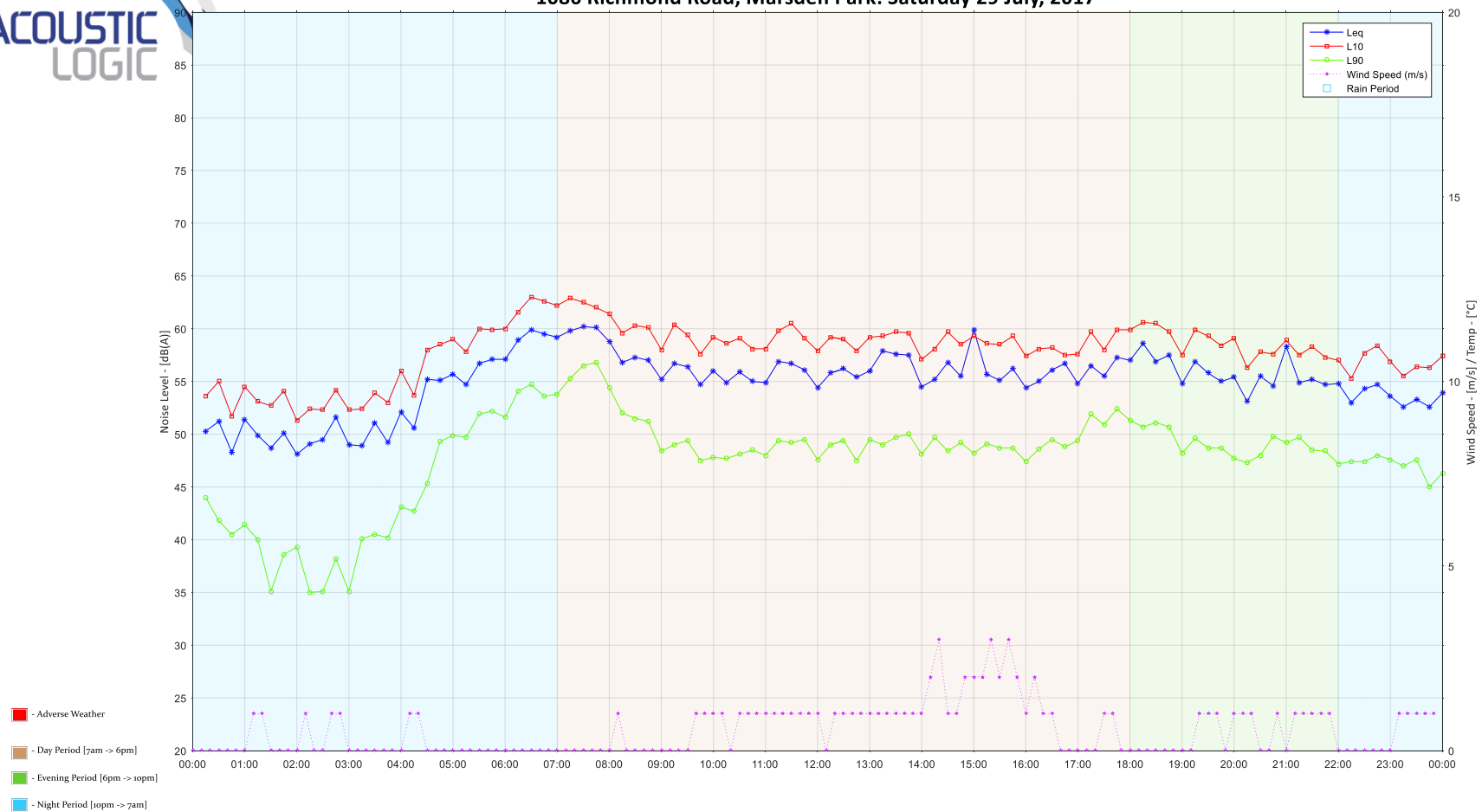
1086 Richmond Road, Marsden Park: Thursday 27 July, 2017



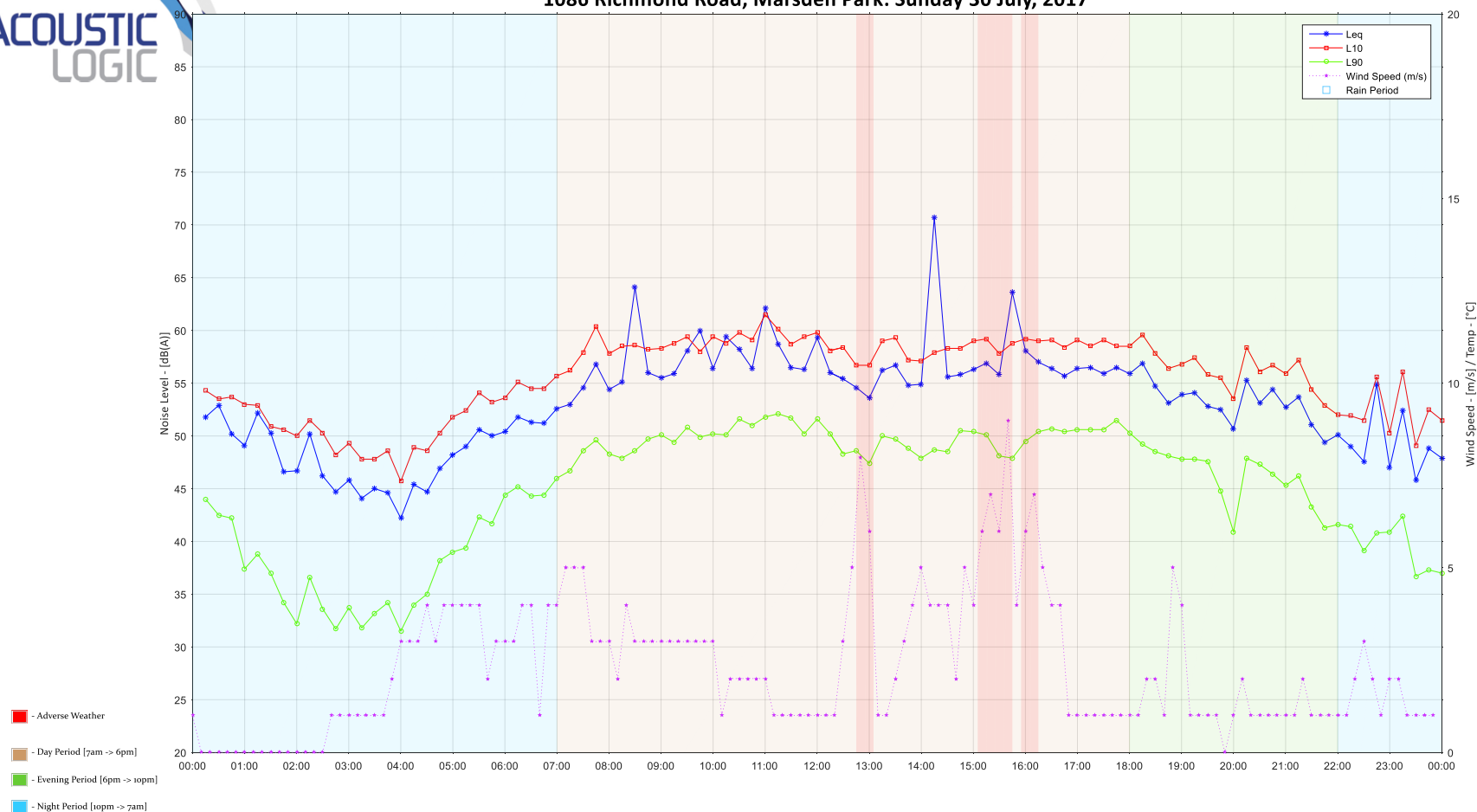
1086 Richmond Road, Marsden Park: Friday 28 July, 2017



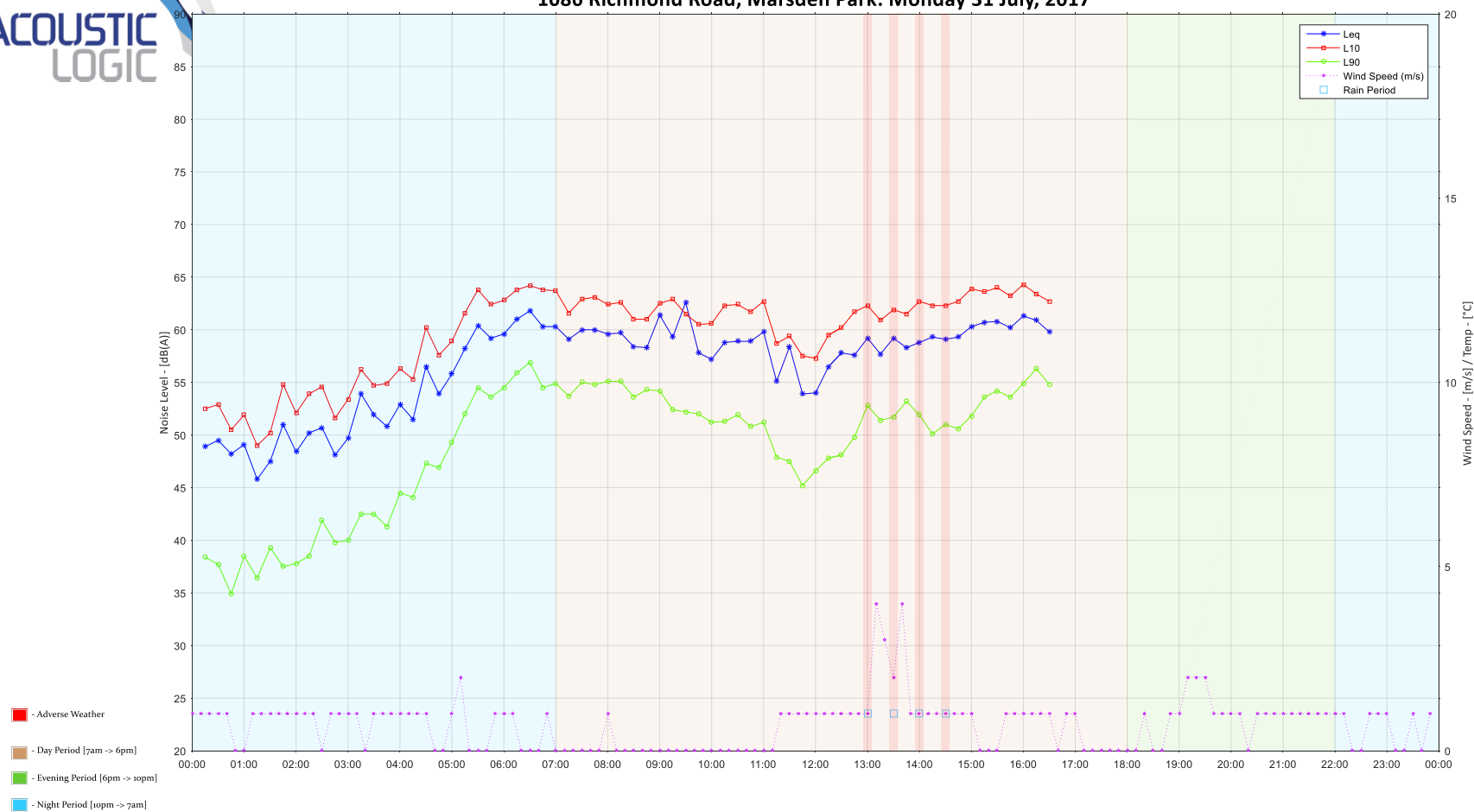
1086 Richmond Road, Marsden Park: Saturday 29 July, 2017



1086 Richmond Road, Marsden Park: Sunday 30 July, 2017



1086 Richmond Road, Marsden Park: Monday 31 July, 2017



APPENDIX B – CV

Weber Yeh
Project Engineer



Qualifications & Experience

2018 Bachelor of Engineering (Mech, Hons)/ Bachelor of Music (Sonic Arts, Dist)

2018-2021 Project Engineer, Acoustic Logic

Outline of Experience

Beginning at AL in 2018, Weber has developed experience in a variety of areas of noise and vibration measurement and assessment. Since working at AL, Weber has been involved in the investigation, design, construction, inspection and certification/compliance testing of acoustic impacts from environmental noise, building design, operational noise and mechanical noise. Weber has extensive experience in the usage and application of statutory codes and requirements of acoustic design in buildings and mechanical systems.

Project Experience

A sample of projects Weber has been or is currently involved with as a Project Engineer include:

Commercial Projects

- Circular Quay Tower, Sydney
- UNSW Village Green Redevelopment Project (VGR)
- Cricket NSW Centre of Excellence, Sydney Olympic Park
- Elara Neighbourhood Shopping Centre
- Winmalee Shopping Village, 14-28 White Cross Road, Winmalee
- CBUS, Level 25, 44 Market Street, Sydney
- 110-122 Walker Street, North Sydney
- Deluxe Media, Unit 7, 5 Talavera Road, Macquarie Park
- McCall Gardens, 19-32 Terry Road, Box Hill
- 97 Waterloo Road, Macquarie Park

Residential/ Hotel/ Mixed-Use Projects

- Waterfall, 20 O'Dea Avenue, Waterloo
- 180 George Street, Parramatta
- 112 Talavera Road, Macquarie Park
- Newmarket, Randwick
- The Bindery & Gild, Liverpool
- Shell Cove B2 Apartments, Shellharbour
- Dexus Phase 2 & 3, Rosebery
- 47-53 Wentworth Avenue, Surry Hills
- Lidcombe Rise, 2-36 Church Street, Lidcombe
- Beyond, 93 Forest Road, Hurstville

Healthcare, Educational and Aged-Care Facilities

- TAFE, Gunnedah
- Smalls Road Public School (SRPS), Ryde
- Barker College – Maths and Student Hub, Hornsby
- Cedars Christian College, Waples Road, Unanderra
- Pozieres RACF, Elkhorn Grove, Port Macquarie
- Holsworthy Health Centre, Holsworthy Barracks
- Sydney Ambulance Metropolitan Infrastructure Strategy (SAMIS), Randwick/ Mona Vale
- The Penrith Clinic, 34-36 Somerset Street, Kingswood
- Randwick Hospital Redevelopment
- Macquarie University Hospital, Clinical Education Building

SYDNEY

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MASCOT 2020

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SYDNEY MELBOURNE BRISBANE

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GREECE



CIRICULUM VITAE – GEORGE WEI (ASSOCIATE DIRECTOR)

Qualifications

*Master Degree of Mechanical Engineering (UNSW)
Bachelor Degree of Mechanical Engineer
Diploma of HVAC Engineering
Member of Australian Acoustical Society*

Outline of Experience

George Wei has been employed by Acoustic Logic Consultancy since January 2004 and has experienced projects in Middle East, Australia, New Zealand, Singapore and United Kingdom. George Wei has built variety experience in the areas of building acoustics, mechanical noise control, environmental noise, traffic noise control, train vibration isolation, hearing protection and real time noise/vibration monitoring.

Whilst employed with Acoustic Logic Consultancy, George has been responsible for projects of residential, retail, education, cinema, concert, aged care, sports facility, music function, gymnasium, childcare, etc.

Special Areas- Noise and Vibration

George has gained more than 16 years' experience of acoustic consultancy.

Employment History:

<i>Jan 2004 – March 2009</i>	<i>Project Engineer Acoustic Logic Consultancy.</i>
<i>March 2009-August 2017</i>	<i>Senior Acoustic Engineer Acoustic Logic Consultancy.</i>
<i>August 2017- Current</i>	<i>Associate Director Acoustic Logic Consultancy.</i>

SYDNEY MELBOURNE BRISBANE CANBERRA
LONDON DUBAI SINGAPORE GREECE
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Areas of Expertise and Relevant Experience:



- *Building acoustics*
- *MEP noise control*
- *Environmental noise modelling and assessment*
- *Train noise and vibration control*
- *Traffic noise prediction*
- *Concert / Cinema noise isolation.*
- *Helicopter & aircraft noise*
- *Construction noise and vibration*
- *Vibration Isolation*
- *Transmission Loss Testing*
- *Structural Dynamics*

Project Experience

Residential / Commercial / Mixed Use

- Loftus Lane
- 275 George St, Sydney
- Balvidia North Sydney
- South Bank, Woolli Creek
- 7D1-7D6, Breakfast Point
- 710 George St, Sydney.
- V- Crown Parramatta
- Meriton Group Projects (Victoria Park, Mascot Central, Gordon, Pymble, Epping, Arncliffe, Brisbane, Gold Coast, Parramatta, Pagewood, Olympic Park, etc)
- Regents Place, Town Hall
- Discovery Point, Woolli Creek
- Hyde Park Gardens
- Balmain Shores
- Bennelong Apartments
- Ikon
- BP513 & 5F Breakfast Point
- Newbury and York Apartments, Breakfast Point
- Pinnacle Rhodes
- Waterside Rhodes
- Kiewa Project, Rhodes
- Top Ryde City
- Belvedere, North Sydney
- Pinnacle Rhodes
- Portside Building, Brisbane

Hospital and Healthcare Projects

- Randwick Hospital Redevelopment
- Liverpool Hospital
- Westmead Hospital
- Manning Hospital
- St George's Hospital
- Royal North Shore
- Muswell brook Hospital

Hotel/Serviced Apartments

- Holiday Inn
- Star City
- Medina – Kent Street/King Street Wharf
- Mercure Hotels - Railway Sq.
- Grande Mecure - Darling Harbour
- Quest Apartments - Mascot, Cronulla, Rosehill

Commercial Projects

- Wynyard Place
- 275 George St
- 46-51 Waterloo Rd, Macquarie Park
- 60 Martin Place
- Penrith Panthers Club
- APRA 1 Martin Place
- UWS Projects (Bankstown, Penrith, etc)
- Manly Wharf
- Ibis Hotel
- Menzies Hotel
- Hydro Majestic Hotel
- T2 Piers, Sydney Airport
- Justice Precinct
- Liverpool Hospital
- Auburn Hospital
- Westmead Hospital
- Norwest precinct
- World Square, Sydney
- Stockland Merrylands
- Sydney Water, Parramatta
- Sydney Water, Potts Hill
- Atlas, Norwest

Aged Care Projects

- ARV Forestville
- Woollooware Shores ARV
- ARV Glenhaven
- ARV Lober Square, Castle Hill
- Malabar Aged Care Centre
- BUPA Princess Highway Sutherland
- St Josephs Coffs Harbour
- Pittwater ACF at 14-16 John St, Avalon
- Aged Care Centre at 75-77 Alexandria Parade, Wahroonga
- Mt Wilga Aged Care
- Acacia St Kirrawee Village

Child Care Projects

- CCC at 203 Darley Road, Randwick
- Kids Korner Greenway Supacenta
- 5 South Ave, Double Noy Childcare Nursery
- 1-5 Mullane Ave, Baulkham Hills.
- 88 Newcastle St, Rose Bay.
- Childcare centre at 77 King St, Sydney.
- 20 Gadigal Ave, Zetland, Childcare Centre.

GEORGE WEI
Associate Director

- 28 Ramsay Rd, Pennant Hills.
- 262 Hawthorne St, Haberfield
- 12-14 Pine St, Five Dock.
- 614 Polding St, Bossley Park.
- 7 Donnelly Rd, Narrebern
- 6-8 Waterloo St, Balmain.
- Montessori Academy

Heritage Buildings

- 110 Homebush Rd, Strathfield. Childcare Centre for Montessori Academy.
- 14 Garthowen Cre, Castle Hill. Childcare Centre for Revelop Projects.
- Cityview Baptist Church, Penrith
- St Basils Randwick.
- AIN Enabling Projects at Sydney Uni

Higher Education Projects

- AIN Enabling Projects at Sydney Uni
- Abercrombie Demolition, Sydney Uni.
- Function Centre, UTS.
- UWS College Teaching Facility, Kingswood campus.
- UWS Nirimba
- New Teaching Facility at UWS College Bankstown campus

Gym/ Fitness Projects

- George Wei has experienced more than 50 Gym projects in recent a few years.
- Fitness First Australia: Manly; Bondi Junction, Maroubra, Sydney, etc.
- Snap Fitness: Double Bay, Maroubra, Waterloo, Pyrmont, etc.

University Projects

- Regiment Redevelopment- Sydney University
- Lees Project – Sydney University
- Union Court redevelopment - ANU
- University of Sydney - Fo7 LEES 1 Building
- University of New South Wales – Gate 2 Student Accommodation
- University of Sydney - Creative Arts Rozelle – Mechanical Services
- Dover Heights High School – New Buildings
- Trinity Grammar – Internal acoustics and plant noise for auditorium
- Fort Street High School – New Music and Drama workshops and Admin building
- UTS Graduate School of Health
- University of Sydney – Conservatorium of Music (Refurb)
- UWS College Teaching Facility – Kingswood Campus

Acoustic Logic Consultancy

School Projects

- *Inner Sydney High School*
- *Knox Grammar*
- *Kent Road Public School*
- *Arthur Phillip High School*
- *Kellyville South Public School*
- *Marsden Park Public School*
- *Central Coast Schools*
- *St Ives North Public School*