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DA Acoustic Assessment

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1 INTRODUCTION

Acoustic Logic (AL) has been engaged to conduct an acoustic assessment of potential noise impacts associated with the proposed redevelopment of the Salvation Army mixed-use building located at 23 Dalcassia Street, Hurstville.

This document addresses noise impacts associated with the following:

- Noise intrusion to project site from adjacent roadways;
- Noise emissions from usage of the ground floor worship space, salvos café and the rooftop communal areas; and
- Noise emissions from mechanical plant to service the project site (in principle).

AL have utilised the following documents and regulations in the noise assessment of the development:

- Georges River Council Development Control Plan (DCP) 2018;
- NSW Department of Planning and Environment document – 'Developments near Rail Corridors or Busy Roads – Interim Guideline';
- Australian Standard AS/NZS 3671:1989 'Acoustics—Road traffic noise intrusion—Building siting and Construction';
- Australian Standard AS2107:2016 – '*Recommended Design Sound Levels and Reverberation Times for Building Interiors,*' and
- NSW Department of Environment and Heritage, Environmental Protection Authority document – '*Noise Policy for Industry*' (NPI) 2017.

This assessment has been conducted using the Integrated Design Group architectural drawings for D.A Submission, see details below.

Table 1-1 – Architectural Sheet Information

Drawing Owner	Drawing No.	Drawing Title	Revision	Date
Integrated Design Group	CC0100	Site Plan	B	29/9/20
	1001	Upper Basement	C	28/9/20
	1002	Lower Basement	B	28/9/20
	1003	Basement 3	A	28/9/20
	1004	Basement 4	A	28/9/20
	1100	Ground Floor Plan	C	28/9/20
	1101	Level 1 Floor Plan	B	28/9/20
	1102	Typical residential floor plan	D	29/9/20
	1103	Level 6 Floor Plan	C	29/9/20
	1104	Roof Terrace	C	29/9/20
	2000	West Elevation	C	28/9/20
	2001	South Elevation	B	28/9/20
	2002	East Elevation	B	28/9/20
	2003	North Elevation	B	28/9/20
	3000	Sections 01	C	29/9/20
	3001	Sections 02	B	28/9/20

2 SITE DESCRIPTION

The proposed seven (7) storey mixed use development consists of a worship space, café and offices on the ground floor, a community room, activity room, offices and amenities on the first floor with a total of 33 apartments spanning across five (5) levels of the development. The four (4) levels of basement provide a total of 48 parking spaces for the development.

Investigation has been carried out by this office in regard to the existing properties and noise impacts surrounding the proposed development, which is detailed below:

The nearest noise sensitive receivers around the project site include:

- **Receiver 1:** Residential receiver located at 20 Bond Street to the south-east. Residential receiver is multi-storey.
- **Receiver 2:** Residential receiver located at 19 Dalcassia Street to the north-east. Residential receiver is multi-storey.
- **Receiver 3:** Residential receiver located at 20-24 Dalcassia Street to the north-west. Residential receiver is multi-storey.
- **Receiver 4:** Residential receivers located at 51, 53, 57 and 59 Dora Street to the south-west. Residential receivers are single and double storey.
- **Receiver 5:** Residential receiver located at 12-22 Dora Street to the south. Residential receiver is multi-storey.
- **Receiver 6:** Commercial receivers located at 33, 35, 37, 39, 41, 43, 45 and 47 Dora Street to the south. Commercial receivers are single storey.

An aerial site map, measurement locations and surrounding nearest receivers are presented in Figure 1 below.

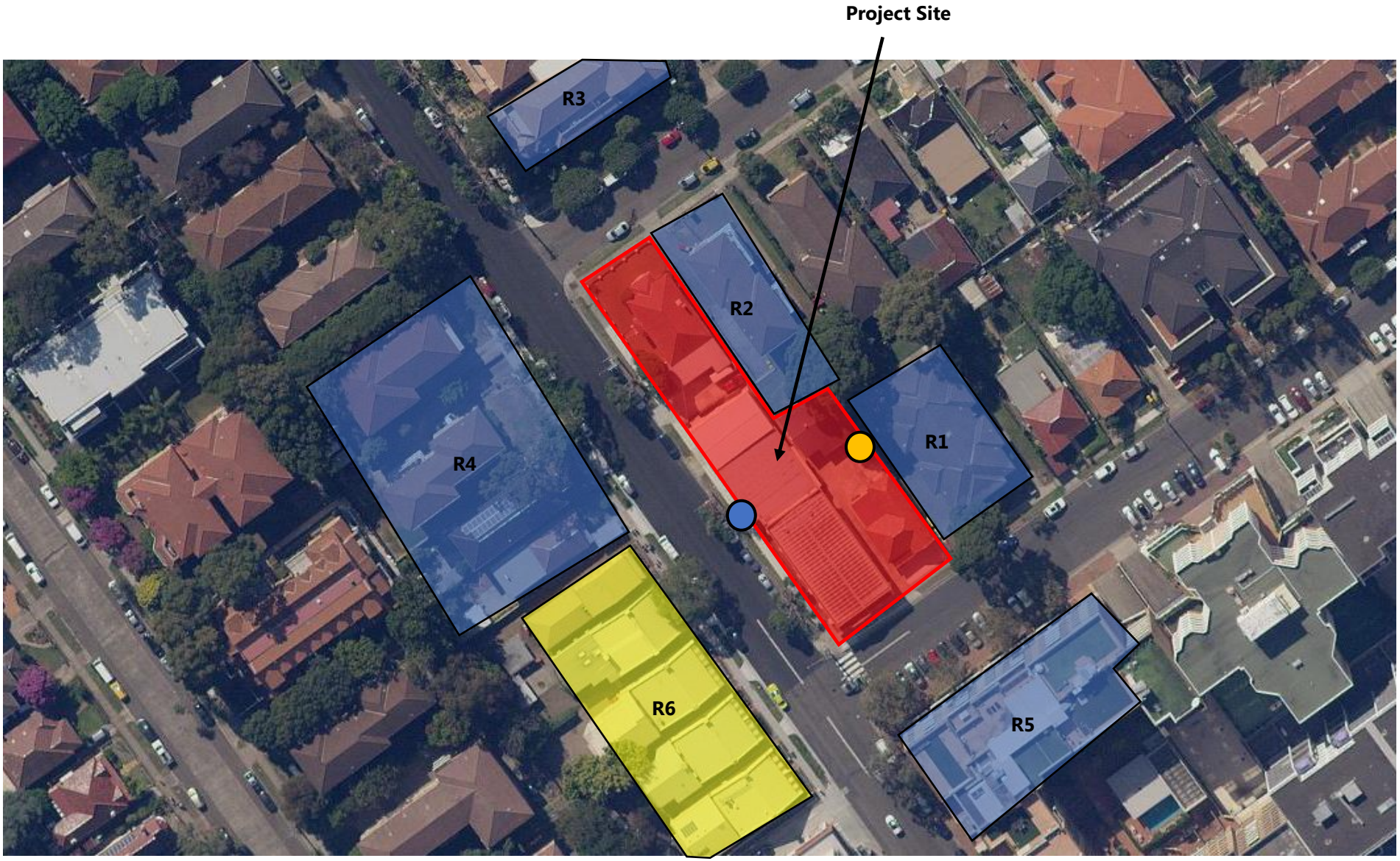


Figure 1 - Project Site
Source: NSW Six Maps

3 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.

4 AMBIENT NOISE SURVEY

NSW EPA's Rating Background Noise Level (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.

Appendices in this report present results of unattended noise monitoring conducted at the project site. Weather affected data was excluded from the assessment. The processed RBL (lowest 10th percentile noise levels during operation time period) are presented in Table 4-1.

4.1 MEASUREMENT POSITION

One unattended noise monitor was located along the south-eastern boundary of the project site.

4.2 MEASUREMENT PERIOD

Unattended noise monitoring was conducted from Friday, 25th September 2020 to Friday, 2nd of October 2020. Attended noise measurements were undertaken between the hours of 3:00pm to 4:00pm on Friday, 2nd of October 2020.

4.3 MEASUREMENT EQUIPMENT

Equipment used consisted of an Acoustic Research Laboratories Pty Ltd noise logger. The logger was set to A-weighted fast response and was programmed to store 15-minute statistical noise levels throughout the monitoring period. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted. Noise logger data is provided in Appendix A of this report.

4.4 SUMMARISED RATING BACKGROUND NOISE LEVELS

Summarised rating background noise levels for the project site and immediate surroundings are presented below.

Table 4-1 – Measured Noise Levels

Noise Monitor Location	Time of day	Rating Background Noise Level dB(A)$_{L90(Period)}$
23 Dalcassia Street, Hurstville (South-eastern boundary)	Day (7am – 6pm)	42
	Evening (6pm – 10pm)	39
	Night (10pm – 7am)	37

On review of the monitoring data, the measured L_{90} noise levels during high wind speed days do not increase background noise levels significantly as periods with little to no wind. This demonstrates that even though wind speeds measured at Sydney Airport exceed EPA guidelines, either:

- The wind speed on site at this time was significantly lower than at Sydney Airport (which is likely given that Sydney Airport is located in a very exposed area) and/or
- The wind on site was not sufficiently consistent to increase background noise levels compared to calm periods.

Therefore, only periods of adverse weather that were determined to have affected the noise data have been eliminated when determining the rating background noise level at the site, which is presented above.

5 EXTERNAL NOISE INTRUSION ASSESSMENT

Site investigation indicates that the major external noise source around the project site is from traffic movements along Dora Street, south-west of the project site.

5.1 NOISE INTRUSION CRITERIA

A noise intrusion assessment has been conducted based on the requirements of the following acoustic noise criteria and standards:

- Georges River Council Development Control Plan (DCP) 2018;
- NSW Department of Planning and Environment document – 'Developments near Rail Corridors or Busy Roads – Interim Guideline';
- Australian Standard AS/NZS 3671:1989 'Acoustics—Road traffic noise intrusion—Building siting and Construction'; and
- Australian Standard AS2107:2016 – '*Recommended Design Sound Levels and Reverberation Times for Building Interiors.*'

5.1.1 Georges River Council Development Control Plan (DCP) 2018

Section 4.1: Residential Flat Buildings

Noise	
PC10. *Development is sited, designed and constructed to:* *a. minimise the intrusion of noise from external sources into habitable rooms, in particular bedrooms* *b. minimise noise transmission between dwellings within the development and from the development to adjoining dwelling houses*	***DS10.1.*** *Windows of adjacent dwellings are separated by a distance of at least 3m Note: this can be achieved by an offset.*
	DS10.2. *Site layout separates active recreation areas, parking areas, vehicle access-ways and service equipment areas from bedroom areas.*
	DS10.3. *Dwellings are designed so that the internal noise level from outside sources does not exceed the parameters established by the NSW Environment Protection Authority (EPA).*
	DS10.4. *Habitable rooms located within 60m of a railway or facing a classified major road satisfy the acoustic criteria contained within the NSW Government's Development Near Rail Corridors and Busy Roads – Interim Guideline (2008), or the most recent version*
	DS10.5. *Where development is likely to be subject to noise from a railway line, arterial or state road or Sydney airport flight path, council may require the submission of a report prepared by a qualified acoustic engineer to demonstrate that internal noise levels will be acceptable.*

5.1.2 NSW Department of Planning and Environment document – *'Developments near Rail Corridors or Busy Roads – Interim Guideline (2008)'*

Section 3.5

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 L_{Aeq} 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."*

5.1.3 Australian Standard 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, AL shall also use this descriptor.
- AS3671 does not specifically recommend a time interval. On this basis, AL 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).
- AL 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.

5.1.4 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 5-1 – Recommended Design Sound Levels

Space /Activity Type	Recommended Design Sound Levels
Sleeping Areas	35-40 dB(A)$L_{eq(10pm-7am)}$
Living Areas	35-45 dB(A)$L_{eq(anytime)}$
Place of Worship	30-40 dB(A)$L_{eq(anytime)}$
Lobby	45-50 dB(A)$L_{eq(anytime)}$
General Office Areas	40-45 dB(A)$L_{eq(anytime)}$
Café	40-50 dB(A)$L_{eq(anytime)}$

5.1.5 Summarised External Noise Intrusion Criteria

The internal noise criteria adopted for each internal space is therefore summarised below based on the relevant State, Council and Australian Standard requirements.

Table 5-2 – Adopted Internal Noise Levels

Space / Activity Type	Required Internal Noise Level
Sleeping Areas	35 dB(A)$L_{eq(10pm-7am)}$
Living Areas	40 dB(A)$L_{eq(worst\ 1hr)}$
Place of Worship	30-40 dB(A)$L_{eq(anytime)}$
Lobby	45-50 dB(A)$L_{eq(anytime)}$
General Office Areas	40-45 dB(A)$L_{eq(anytime)}$
Café	40-50 dB(A)$L_{eq(anytime)}$

5.2 EXTERNAL NOISE MEASUREMENTS

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

5.2.1 Measurement Equipment

Attended short term noise measurements of traffic noise were undertaken by this office. Measurements were conducted using a Norsonic 140 Sound Analyser. The analyser was set to fast response and calibrated before and after the measurements using a Norsonic Sound Calibrator type 1251. No significant drift was noted.

5.2.2 Measurement Location

Attended noise measurements were undertaken along the western boundary of the 23 Dalcassia Street project site. The sound level meter had an unobstructed view of traffic and was approximately 3m from the kerb. Refer to Figure 1 for a detailed location.

5.2.3 Measurement Period

Attended noise measurements were undertaken between the hours of 3:00pm to 4:00pm on Friday, 2nd of October 2020.

5.2.4 Attended Noise Measurements

Attended noise measurements have been summarised below for each location.

Table 5-3 – Attended Noise Measurements

Noise Measurement Location	Measured Noise Level dB(A) $L_{eq\ (15\ minute)}$
Dora Street, Hurstville Approximately 3m from the kerb (Adjacent to 23 Dalcassia Street)	62 dB(A)$L_{eq(15min)}$

5.2.5 Summarised External Noise Levels

The following noise levels for the site have been established based on short term attended measurements and long-term noise monitoring.

Table 5-4 – Measured Traffic Noise Levels

Noise Measurement Location	Time of Day	Noise Level – L_{eq}
Dora Street, Hurstville Approximately 3m from the kerb (Adjacent to 23 Dalcassia Street)	Daytime 7am – 10pm	62 dB(A) $L_{eq\ (15hr)}$
	Night-time 10pm – 7am	59 dB(A) $L_{eq\ (9hr)}$

5.3 RECOMMENDED CONSTRUCTIONS

Assessment of façade requirements to achieve required indoor noise levels has been undertaken. Dimensions of rooms, setbacks from roadways, window openings and floor areas have been used.

5.3.1 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-lon 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 detailed in Table 5-5.

Table 5-5 – Recommended Glazing Construction

Façade	Room	Glazing Thickness	Acoustic Seals
South-west & south-east	Activity Room	6mm Float	Yes
North-west & west	Office and Community Support Services	6mm Float	
South & west	Salvos Café	6mm Float	
North	Community Room	6mm Float	
	Worship Space	6.38mm Laminated	
West (Dora Street)	Bedroom	6mm Float	
	Living Room	6mm Float	
	Studio	6mm Float	
North (Dalcassia Street)	Bedroom	6mm Float	
	Living Room	6mm Float	
	Studio	6mm Float	
South (Bond Street)	Bedroom	6mm Float	
	Living Room	6mm Float	
	Studio	6mm Float	
East	Bedroom	4mm Float	
	Living Room	4mm Float	
	Studio	4mm Float	

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 5-6 for all areas. 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 5-6 – Minimum R_w of Glazing Assembly (with Acoustic Seals)

Glazing Assembly	Minimum R_w of Installed Window
4mm Float	27
6mm Float	29
6.38mm Laminated	31

5.3.2 External Roof/Ceiling Construction

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

5.3.3 External Wall Construction

External wall construction from concrete or masonry elements will not require acoustic upgrading. There should not be vents on the internal skin of external walls. In the event that any penetrations are required through the external skin, an acoustic sealant should be used to minimise all gaps.

6 NOISE EMISSION CRITERIA

The noise emission from the project site shall comply with the requirements of the following documents:

- Georges River Council Development Control Plan (DCP) 2018; and
- NSW Department of Environment and Heritage, Environmental Protection Authority document – '*Noise Policy for Industry*' (NPI) 2017.

6.1 GEORGES RIVER COUNCIL DEVELOPMENT CONTROL PLAN (DCP) 2018

The Georges River Council Development Control Plan has no specific controls in relation to noise emissions criteria, therefore the EPA Noise Policy for Industry shall be adopted.

6.2 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.

6.2.1 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 Table 4-1. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

6.2.2 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 Table 4-1, the Noise Policy for Industry suggests the adoption of the 'suburban' categorisation.

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

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

The amenity levels appropriate for the receivers surrounding the site are presented in Table 6-1.

Table 6-1 – EPA Amenity Noise Levels

Type of Receiver	Time of day	Recommended Noise Level dB(A)$L_{eq(period)}$	Project Amenity Noise Level dB(A)$L_{eq(15\ minute)}$
Residential – Suburban	Day (7am – 6pm)	55	53
	Evening (6pm – 10pm)	45	43
	Night (10pm – 7am)	40	38
Commercial	When in use	65	63

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.

6.2.3 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 6-2 – 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}

6.3 SUMMARISED NOISE EMISSION CRITERIA

Table 6-3 – EPA NPfI Noise Emission Criteria

Receiver	Time Period	Assessment Background Noise Level dB(A)L_{90}	Project Amenity Criteria dB(A) L_{eq}	Intrusiveness Criteria $L_{eq(15min)}$	NPI Criteria for Sleep Disturbance
Residential	Day (7am – 6pm)	42	53	**47**	N/A
	Evening (6pm – 10pm)	39	**43**	44	N/A
	Night (10pm – 7am)	37	**38**	42	**42 dB(A)$L_{eq, 15min}$; 52 dB(A)L_{Fmax}**
Commercial	When in use	N/A	**63**	N/A	N/A

The project noise trigger levels are indicated by the bolded values in the table above.

7 NOISE EMISSION ASSESSMENT

7.1 NOISE FROM MECHANICAL PLANT WITHIN PROPOSED SITE GENERALLY

Detailed plant selection and location has not been undertaken at this stage. Satisfactory levels will be achievable through appropriate plant selection, location and if necessary, standard acoustic treatments such as duct lining, acoustic silencers and enclosures.

Noise emissions from all mechanical services to the closest residential receiver should comply with the requirements of Section 6.

Detailed acoustic review should be undertaken at CC stage to determine acoustic treatments to control noise emissions to satisfactory levels.

7.2 GROUND FLOOR WORSHIP SPACE

Noise generated by usage of the ground floor worship space is assessed in this section.

7.2.1 Combined Patron and Music Noise

The main noise source within the worship space are predominately background music and patrons talking. It is assumed that the operation of the ground floor worship space would only operate during daytime hours of 7am-6pm.

The combined internal noise from background music and patrons talking has been predicted to the nearest receivers. The noise level predicted at each receiver is based on an internal Sound Pressure Level of up to 85dB(A)$_{10}$ and is detailed in table 7-1 below.

Table 7-1 – L_{10} Sound Power Level of Background Music & Speech

Music Type	Sound Pressure Level dB(A) L_{10}
Music and Speech	Up to 85 dB(A)

7.3 GROUND FLOOR SALVOS CAFE

Noise generated by usage of the ground floor salvos café is assessed in this section.

7.3.1 Patron Noise

The main noise source from the use of the salvos cafe would be patron speech, with a sound power level of 77 dB(A) L_{10} per patron based on AL measurements.

Noise from patrons within the salvos café and the outdoor seating area has been predicted to the nearest receivers. The noise level predicted at each receiver is based on a total of 36 patrons inside the café with 8 patrons seated within the outdoor area with up to 1 in 2 people talking at any one time.

It is assumed that the salvos café would only operate during the daytime period of 7am to 6pm.

Table 7-2 – L_{10} Sound Power Level Spectrum of Single Patron, dB

	Octave Band Centre Frequency (Hz)									
	31.5Hz	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**	**A-wt dB(A)L_{10}**
Patron Noise (dB(A))	62	62	70	70	76	73	68	59	47	**77**

7.4 LEVEL 1 ACTIVITY ROOM

Noise generated by usage of the level 1 activity room is assessed in this section.

7.4.1 Combined Patron and Music Noise

The main noise source within the level 1 activity room are predominately background music and patrons talking. It is assumed that the operation of the activity room would only operate during daytime hours of 7am-6pm.

The combined internal noise from background music and patrons talking has been predicted to the nearest receivers. The noise level predicted at each receiver is based on an internal Sound Pressure Level of up to 70dB(A)$_{10}$ and is detailed in table 7-1 below.

Table 7-3 – L_{10} Sound Power Level of Background Music & Speech

Music Type	**Sound Pressure Level dB(A) L_{10}**
Music and Speech	Up to 70 dB(A)

7.5 LEVEL 6 OUTDOOR TERRACE

Noise generated by usage of the level 6 outdoor terrace is assessed in this section.

7.5.1 Patron Noise

The main noise source from the use of the level 6 outdoor terrace would be patron speech, with a sound power level of 77 dB(A) L_{10} per patron based on AL measurements.

Noise from patrons utilising the level 6 outdoor terrace has been predicted to the nearest receivers. The noise level predicted at each receiver is based on a total of 12 patrons with up to 1 in 2 people talking at any one time.

Table 7-4 – L_{10} Sound Power Level Spectrum of Single Patron, dB

	Octave Band Centre Frequency (Hz)									
	31.5Hz	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**	**A-wt dB(A)L_{10}**
Patron Noise (dB(A))	62	62	70	70	76	73	68	59	47	**77**

7.6 COMMUNAL ROOF TERRACE

Noise generated by usage of the communal roof terrace is assessed in this section.

7.6.1 Patron Noise

The main noise source from the use of the communal roof terrace would be patron speech, with a sound power level of 77 dB(A) L_{10} per patron based on AL measurements.

Noise from patrons utilising the communal roof terrace has been predicted to the nearest receivers. The noise level predicted at each receiver is based on a total of 18 patrons with up to 1 in 2 people talking at any one time.

Table 7-5 – L_{10} Sound Power Level Spectrum of Single Patron, dB

	Octave Band Centre Frequency (Hz)									
	31.5Hz	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**	**A-wt dB(A)L_{10}**
Patron Noise (dB(A))	62	62	70	70	76	73	68	59	47	**77**

7.7 RECOMMENDATIONS

Noise emissions from operation of project site has been analysed and the following acoustic treatments are recommended to ensure that the external noise emissions comply with the criteria in Section 6. Noise emission from plant service project site shall be carried out at CC stage to ensure that the overall noise emission satisfy the requirements in Section 6.

Ground Floor Worship Space

- Combined internal noise levels from patrons and music is to be limited to 85 dB(A) L_{10} sound pressure level.
- Speakers are to be vibration isolated by NRD mounts or equal.
- Worship space should only operate during daytime hours of 7am-6pm and evening time 6pm-10pm.
- Management controls shall be implemented to minimise noise levels from usage of the worship space.
- All windows are to be constructed from minimum 6.38mm laminated glazing (R_w31) with acoustic seals and are to be closed during the use of the worship space.
- The entry/exit door should be closed during the use of the space except for patron ingress/egress.

Ground Floor Salvos Cafe

- No more than 36 patrons inside and 8 patrons outside at any given time.
- The cafe should only operate during daytime hours of 7am-6pm. (Staff food preparation can be conducted outside of these hours).
- Management controls shall be implemented to minimise noise levels from the operation of the café.
- Entry door or bi-fold sliding doors should be closed except for patron ingress/egress.

Level 1 Activity Room

- Combined internal noise levels from patrons and music is to be limited to 70 dB(A) L_{10} sound pressure level.
- Speakers are to be vibration isolated by NRD mounts or equal.
- The activity room should only operate during daytime hours of 7am-6pm and evening time 6pm-10pm.
- Management controls shall be implemented to minimise noise levels from usage of the activity room.
- Music is not to be played on the balcony of the activity room.
- A maximum of 8 patrons are allowed on the balcony at any given time. The balcony is not to be used between 6pm-7am.

Level 6 Outdoor Terrace

- Daytime Period (7am-6pm):
    - Up to 10 residents can use the outdoor terrace.
- Evening Period (6pm-10pm):
    - Up to 4 residents can use the outdoor terrace.
- Outdoor terrace shall not be used after 10pm.
- Management controls shall be implemented to minimise noise levels from usage of the outdoor terrace.

Communal Roof Terrace

- Daytime Period (7am-6pm):
    - Up to 18 residents can use the outdoor terrace.
- Evening Period (6pm-10pm):
    - Up to 8 residents can use the outdoor terrace.
- Outdoor terrace shall not be used after 10pm.
- Management controls shall be implemented to minimise noise levels from usage of the outdoor terrace.

8 CONCLUSION

This report presents an acoustic assessment of noise impacts associated with the proposed redevelopment of the Salvation Army mixed-use building located at 23 Dalcassia Street, Hurstville.

Provided that the recommendations presented in this report are adopted, internal noise levels for the development will comply with the acoustic requirements of the following documents:

- Georges River Council Development Control Plan (DCP) 2018;
- NSW Department of Planning and Environment document – 'Developments near Rail Corridors or Busy Roads – Interim Guideline';
- Australian Standard AS/NZS 3671:1989 'Acoustics—Road traffic noise intrusion—Building siting and Construction'; and
- Australian Standard AS2107:2016 – '*Recommended Design Sound Levels and Reverberation Times for Building Interiors.*'

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

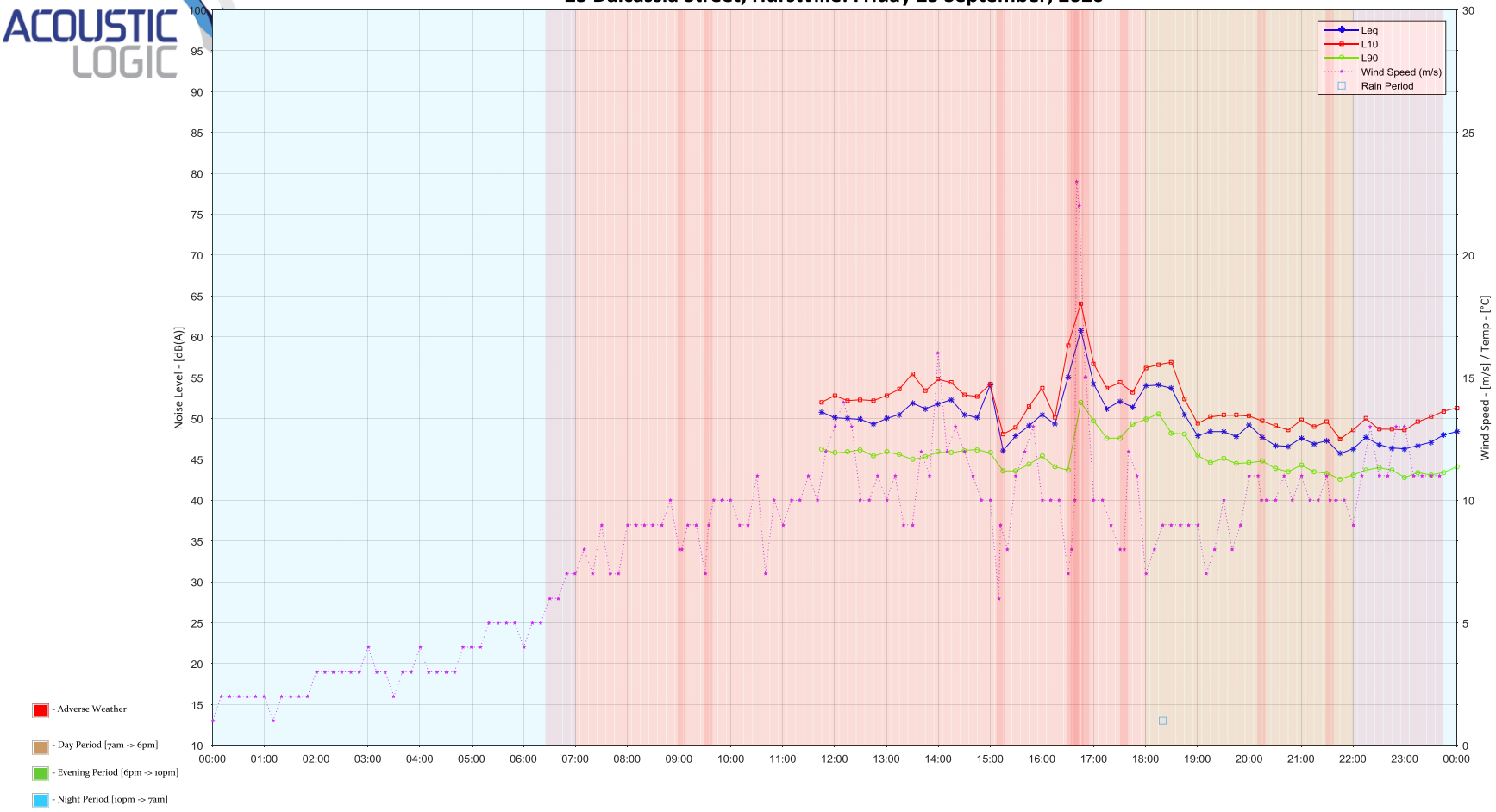
- Georges River Council Development Control Plan (DCP) 2018; and
- NSW Department of Environment and Heritage, Environmental Protection Authority document – '*Noise Policy for Industry*' (NPI) 2017.

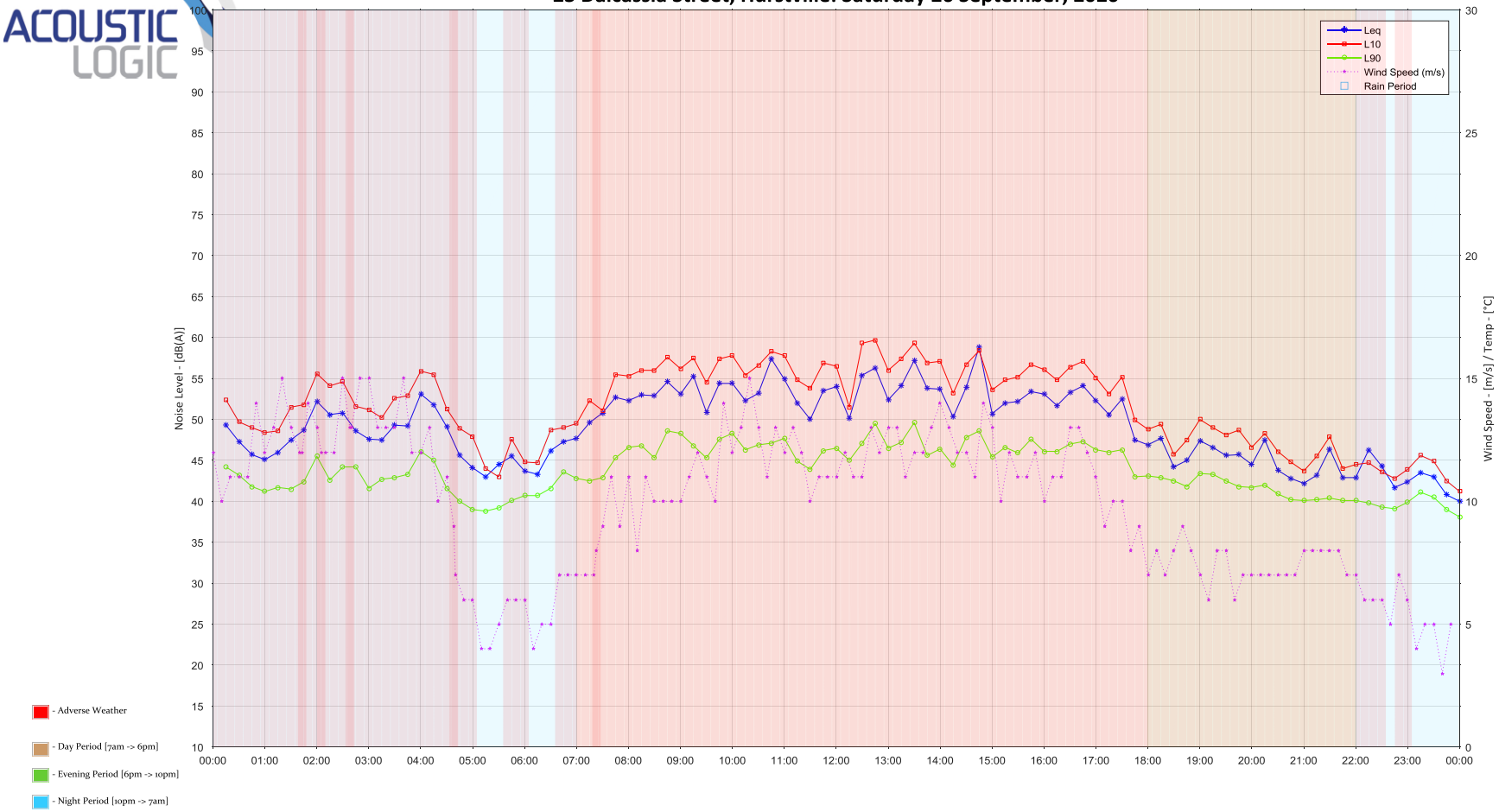
We trust this information is satisfactory. Please contact us should you have any further queries.

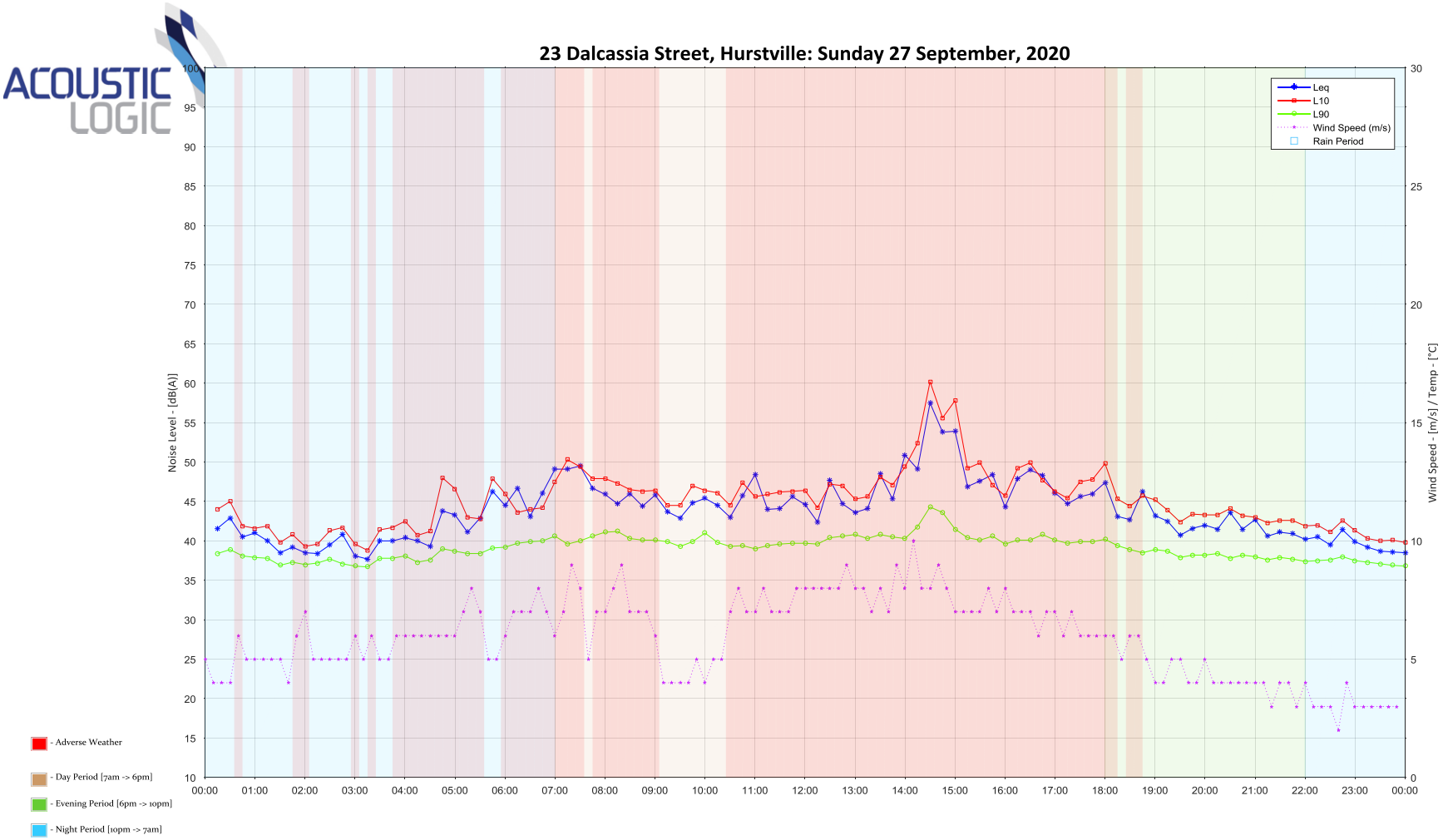
Yours faithfully,

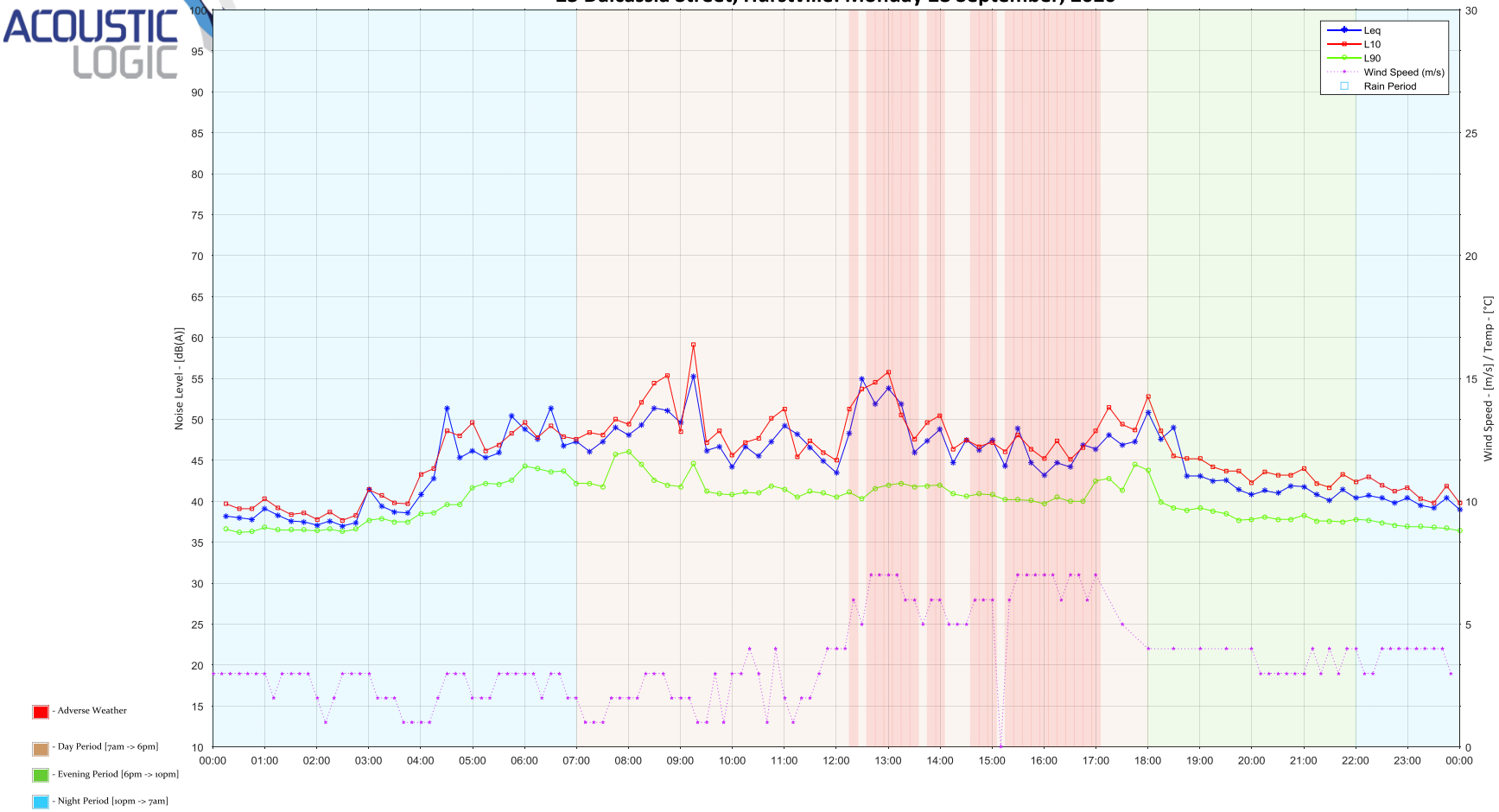
Acoustic Logic Pty Ltd
Shane Nichols

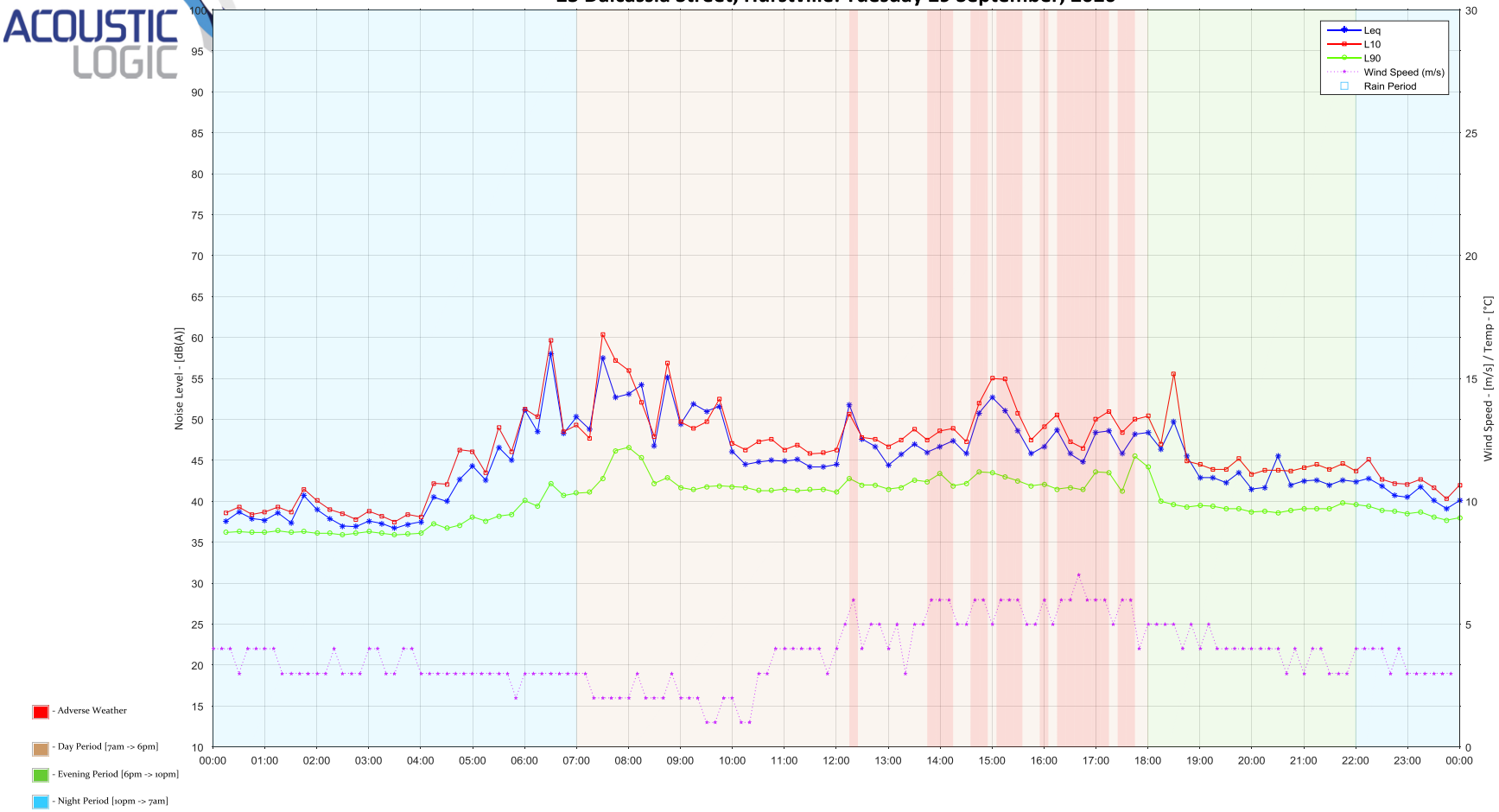
APPENDIX A – UNATTENDED NOISE MONITORING DATA

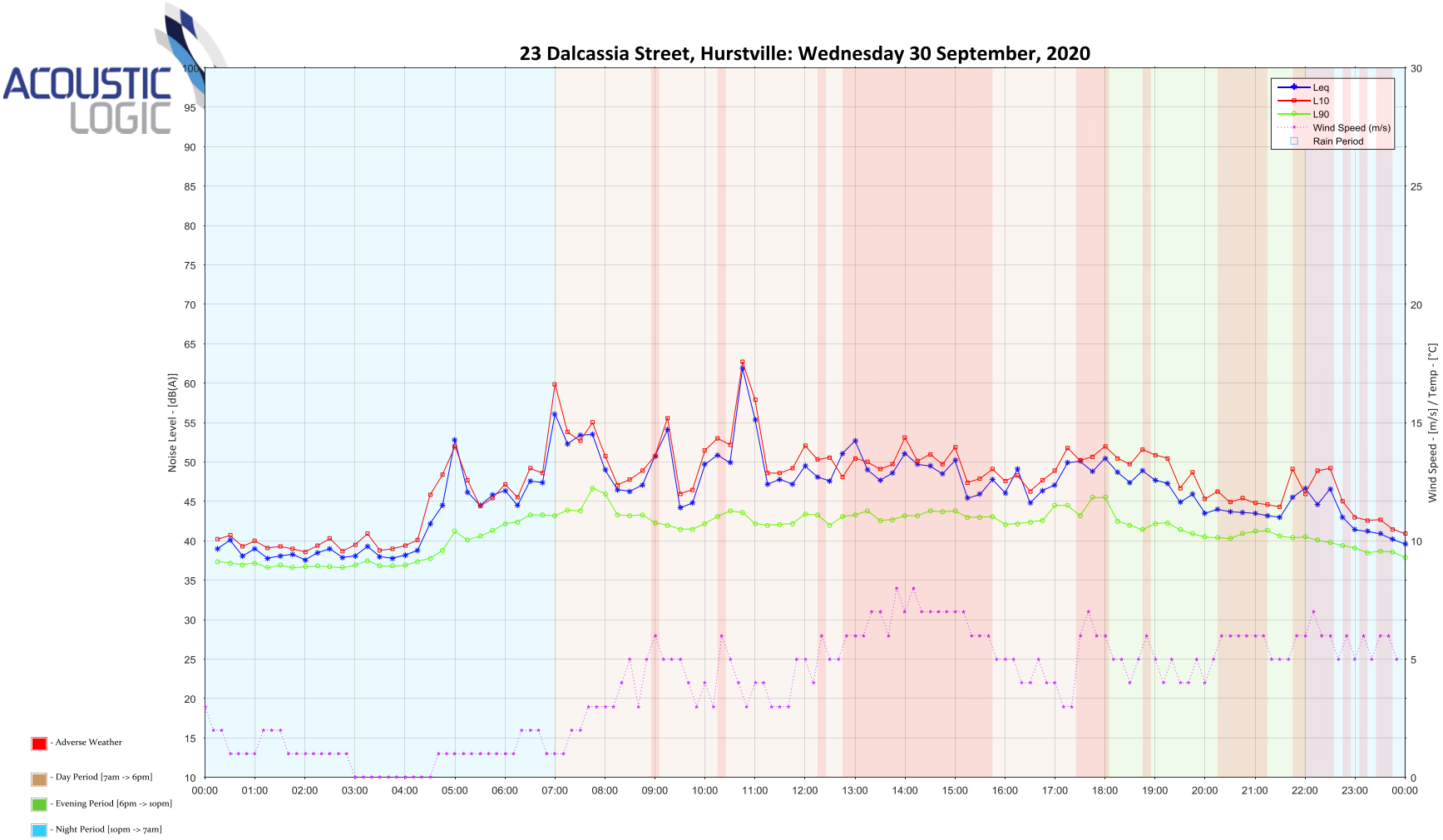

23 Dalcassia Street, Hurstville: Friday 25 September, 2020
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

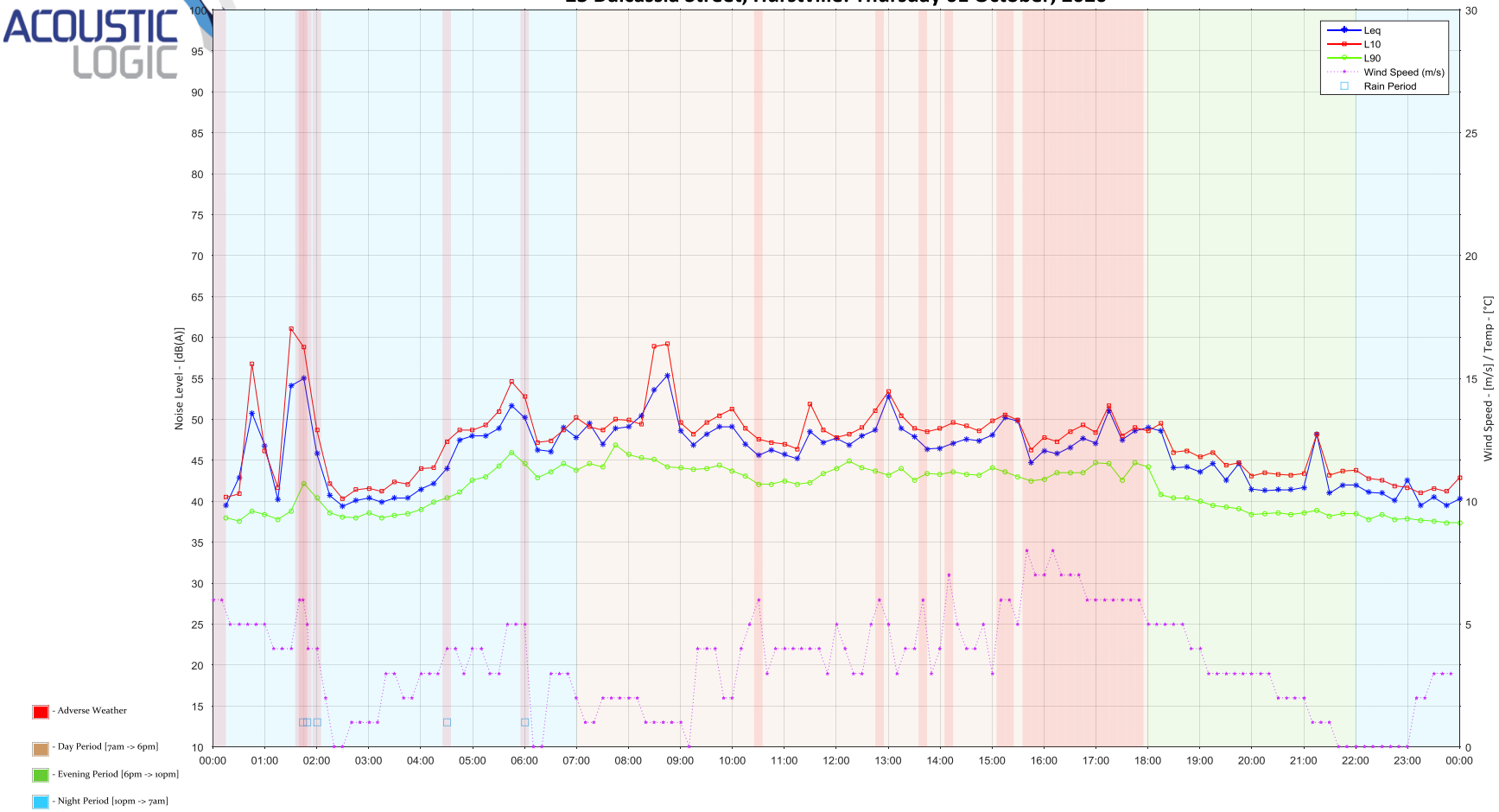

23 Dalcassia Street, Hurstville: Saturday 26 September, 2020
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
00:00
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

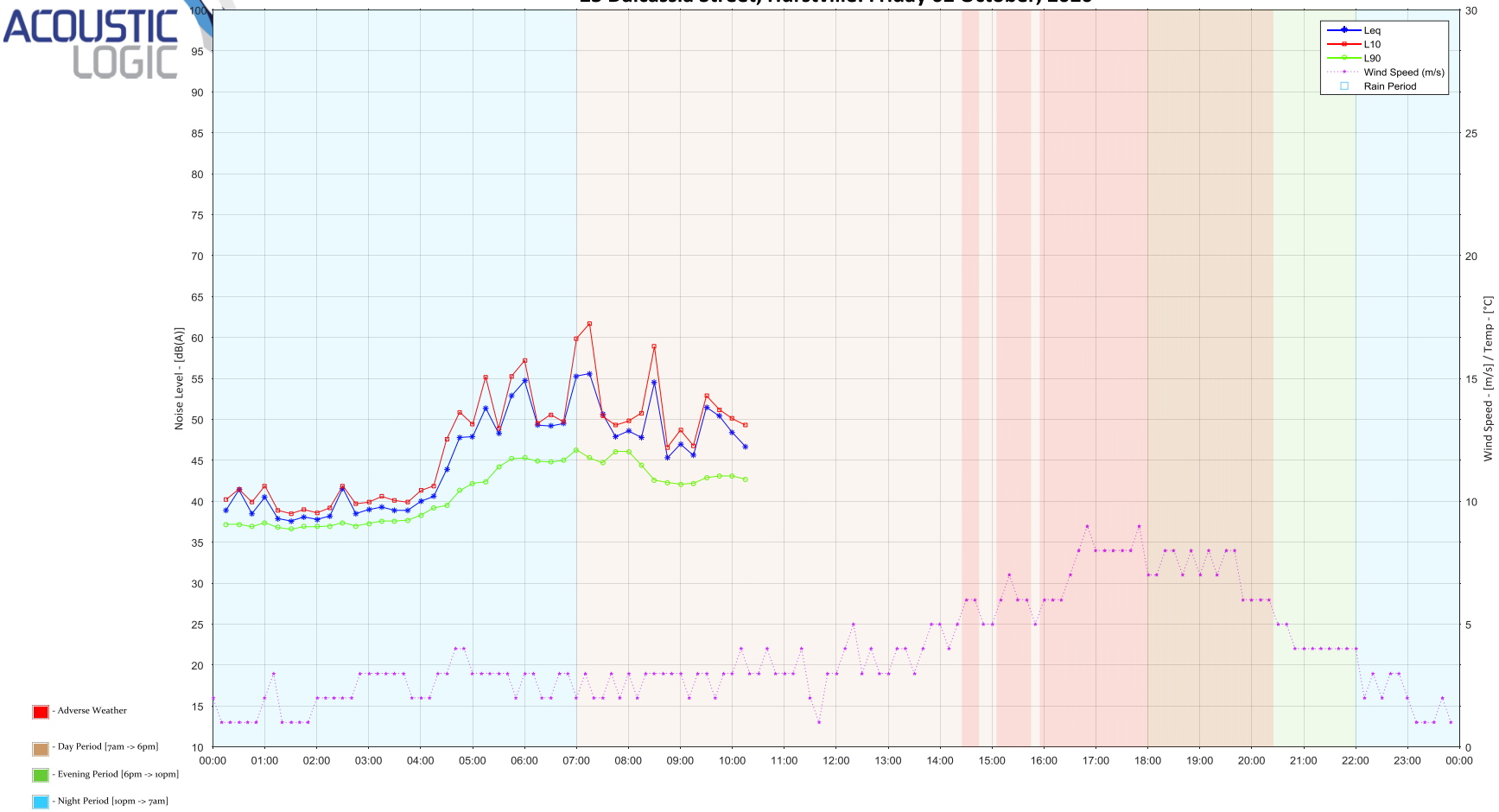

23 Dalcassia Street, Hurstville: Sunday 27 September, 2020
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


23 Dalcassia Street, Hurstville: Monday 28 September, 2020
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


23 Dalcassia Street, Hurstville: Tuesday 29 September, 2020
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


23 Dalcassia Street, Hurstville: Wednesday 30 September, 2020
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


23 Dalcassia Street, Hurstville: Thursday 01 October, 2020
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


23 Dalcassia Street, Hurstville: Friday 02 October, 2020
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]