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21 Whistler Street, Manly

Noise Impact Assessment

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1 INTRODUCTION

Acoustic Logic Consultancy (ALC) has been engaged to conduct an acoustic assessment of potential noise impacts associated with the proposed development of 21 Whistler Street, Manly.

This document addresses noise impacts associated with the following:

- Noise intrusion to project site from adjacent roadways.
- Noise emissions from mechanical plant to service the project site.

ALC have utilised the following documents and regulations in the noise assessment of the development;

- Northern Beaches Council – Manly Development Control Plan 2013;
- Australian Standard AS 2107:2016 *'Recommended design sound levels and reverberation times for building interiors'*
- NSW Department of Environment and Heritage, Environmental Protection Agency document – *Noise Policy for Industry* (NPI) 2017

This assessment has been conducted based on the architectural drawings provided by *Wolski Coppin Architecture* for this project (Project Number 21806, Revision CI01, dated 16th August 2018).

2 SITE DESCRIPTION

The proposed development comprises of one level of underground parking with ground floor retail tenancies and four levels of residential apartments above. In total, there is two retail tenancies and 8 residential apartments proposed to be constructed on the site.

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

- Existing residential development bounding the site to the north, south and west with addresses on Belgrave Street.
- Whistler Street to the east, further this is a residential flat building
- Belgrave Street to the west. The proposed development is screened from noise by existing development with frontage to Belgrave Street.
- Energy Australia Manly Zone Substation (No. 15009) located at 34 Whistler Street. Both noise logging data and site attendance indicate that any noise from the substation is not impacting on the development.

Whistler Street carries a light volume of predominantly passenger vehicles, Belgrave Street carries a moderate volume of passenger and heavy vehicle traffic. It is noted that both of these roads are not identified on SEPP maps for the purpose of noise assessment.

The nearest noise receivers around the site include:

- R1: Residential Receiver 1 – Residential development immediately bounding the site to the north, south and west, located at 33-40 Belgrave Street, Manly.
- R2: Residential Receiver 2 - Multi storey residential apartments to the east, located at 32 Whistler Street.

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

Project Site

Residential Receivers

Figure 1 - Project Site
Source: NSW Six Maps

Attended Measurements

Unattended Noise Monitor

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 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

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 1.

4.1.1 Measurement Position

One unattended noise monitor was located along the western boundary of 21 Whistler Street. Logger had a full view of traffic movements along Whistler Street and was located approximately 3m from the kerb. Refer to Figure 1 for detailed location.

4.1.2 Measurement Period

Unattended noise monitoring was conducted from Tuesday 28th of August to Wednesday 5th of September. Attended noise measurements were undertaken between the hours of 12:00pm and 1:00pm on 5th of August 2018.

4.1.3 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 1.

4.1.4 Summarised Rating Background Noise Levels

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

Table 1 – Measured Noise Levels

Time of day	Rating Background Noise Level $dB(A)_{L90(Period)}$
Day (7am – 6pm)	51
Evening (6pm – 10pm)	46
Night (10pm – 7am)	42

5 EXTERNAL NOISE INTRUSION ASSESSMENT

Site investigation indicates that the major external noise sources around project site are from traffic movements along Whistler Street and Belgrave Street.

5.1 NOISE INTRUSION CRITERIA

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

- Northern Beaches Council – Manly Development Control Plan 2013;
- Australian Standard AS 2107:2016 *'Recommended design sound levels and reverberation times for building interiors'*

5.2 NORTHERN BEACHES COUNCIL – MANLY DEVELOPMENT CONTROL PLAN 2013

Manly DCP 2013 has no specific controls in relation to noise intrusion from traffic at the project site. Internal noise level criteria will be determined from Australian Standard AS2107:2016.

5.2.1 Australian Standard AS2107:2016 – *Recommended Design Sound Levels and Reverberation Times for Building Interiors*

Australian Standard AS 2107-2016: Recommended design sound levels and reverberation times for building interiors specifies allowable internal noise levels for internal spaces within residential and commercial buildings. Table 2 presents the sound levels applicable to the proposed redevelopment.

Table 2 – Recommended Design Sound Levels of AS2107:2016

Space /Activity Type	Recommended Maximum Design Sound Level
Residential – Living Areas	40 dB(A)L_{eq}
Residential – Sleeping Areas (night time)	35 dB(A)L_{eq}
Small Retail Stores (General)	< 50 dB(A)L_{eq}

5.2.2 Summarised External Noise Intrusion Criteria

Summarised internal noise criteria adopted for each internal space is summarised below.

Table 3 – Adopted Internal Noise Levels

Space / Activity Type	Required Internal Noise Level
Residential Living Areas (7am – 10pm)	40 dB(A) $L_{eq\ (15hr)}$ ***AS2107:2016***
Residential Sleeping Areas (night time) (10pm – 7am)	35 dB(A) $L_{eq\ (9hr)}$ ***AS2107:2016***
Small Retail Stores (General)	< 50 dB(A) L_{eq} ***AS2107:2016***

5.3 EXTERNAL NOISE MEASUREMENTS

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

5.3.1 Measurement Equipment

Attended short term measurements of traffic noise were undertaken by this office to supplement the unattended noise monitoring. 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.

Unattended noise monitoring was conducting using one Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to continuously store statistical noise levels as well as audio files 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.

5.3.2 Measurement Location

One unattended noise monitor was located along the western boundary of 21 Whistler Street. Logger had a full view of traffic movements along Whistler Street and was located approximately 3m from the kerb. Refer to Figure 1 for detailed location.

Attended measurements were taken at the following locations;

- Whistler Street, Manly – Attended noise measurement conducted on Whistler Street near the boundary of project site. Sound level meter had an unobstructed view of traffic and was approximately 3m from the kerb. Refer to Figure 1 for detailed location.

- Belgrave Street, Manly - Attended noise measurement conducted on Belgrave Street near the boundary of project site. Sound level meter had an unobstructed view of traffic and was approximately 3m from the kerb. Refer to Figure 1 for detailed location.

5.3.3 Measurement Period

Unattended noise monitoring was conducted from Tuesday 28th of August to Wednesday 5th of September. Attended noise measurements were undertaken between the hours of 12:00pm and 1:00pm on 5th of August 2018.

5.3.4 Attended Noise Measurements

Attended noise measurements have been summarised below for each location.

Table 4 – Attended Noise Measurements

Location	Measure Noise Level dB(A) $L_{Aeq\ (15hour)}$
Whistler Street, Manly Measurement was conducted 3m from kerb of Whistler Street	59 dB(A)$L_{eq(15min)}$
Belgrave Street, Manly Measurement was conducted 3m from kerb of Belgrave Street	67 dB(A)$L_{eq(15min)}$

5.3.5 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 – Measured Traffic Noise Levels

Location	Time of Day	Noise Level – L_{eq}
Whistler Street (3m from kerb)	Daytime 7am – 10pm	59 dB(A) $L_{eq\ (15hr)}$
	Night Time 10pm – 7am	56 dB(A) $L_{eq\ (9hr)}$
Belgrave Street (3m from kerb)	Daytime 7am – 10pm	67 dB(A) $L_{eq\ (15hr)}$
	Night Time 10pm – 7am	64 dB(A) $L_{eq\ (9hr)}$

5.4 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.

5.4.1 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-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 6.

Table 6 - Recommended Glazing Construction

Façade	Area	Glazing Thickness	Acoustic Seals
Eastern Façade (Facing Whistler Street)	Bedrooms	10.38mm Laminated	Yes
	Living Spaces	6.38mm Laminated	Yes
Western Façade (Facing Belgrave Street)	Bedrooms	10.38mm Laminated	Yes
	Living Spaces	6.38mm Laminated	Yes
Retail Spaces Facing Whistler Street	All	6mm Float / Toughened	Yes

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 7 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 7 - Minimum R_w of Glazing Assembly (with Acoustic Seals)

Glazing Assembly	Minimum R_w of Installed Window
6mm Float / Toughened	29
6.38mm Laminated	31
10.38mm Laminated	35

5.4.2 Entry Doors

Entry doors will be via internal corridors and subject to BCA requirements.

5.4.3 External Wall Construction

External walls are of masonry construction and acoustically acceptable without any further treatment. In the event any penetrations are required through the external lining of any of the system for other building services, gaps should be filled with acoustic sealant to ensure compliance with acoustic criteria stipulated within this report.

5.4.4 External Roof & Ceiling Construction

Roof is of masonry construction and acoustically acceptable without any further treatment. In the event any penetrations are required through the external lining of any of the system for other building services, gaps should be filled with acoustic sealant to ensure compliance with acoustic criteria stipulated within this report.

5.4.5 Mechanical Ventilation

With respect to natural ventilation of a 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 (i.e. – allowable level in bedrooms becomes 45dB(A) $L_{eq(9hr)}$, and 50dB(A) $L_{eq(15hr)}$ in living rooms).

- Both the eastern and western façades of the development will be able to have windows or doors open to 5% of floor area and achieve required internal noise levels.

Mechanical consultant to confirm if any supplementary ventilation system is required. Any supplementary ventilation system proposed to be installed should be acoustically designed to ensure that the acoustic performance of the acoustic treatments outlined above is not reduced and does not exceed Council criteria for noise emission to nearby properties.

6 NOISE EMISSION CRITERIA

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

- Northern Beaches Council – Manly Development Control Plan 2013;
- NSW Department of Environment and Heritage, *Environmental Protection Agency document – Noise Policy for Industry (NPI) 2017*.

6.1 NORTHERN BEACHES COUNCIL – MANLY DCP 2013

3.4.2.3 Acoustical Privacy (Noise Nuisance)

See also Noise Guide for Local Government prepared by NSW Department of Environment, Climate Change and Water in 2010

a) Consideration must be given to the protection of acoustical privacy in the design and management of development;

b) Proposed development and activities likely to generate noise including certain outdoor living areas like communal areas in Boarding housed, outdoor open space, driveways, plant equipment including pool pumps and the like should be located in a manner which considers the acoustical privacy of neighbours including neighbouring bedrooms and living areas;

Although guidelines and general considerations for noise emissions are contained in the above document, there is no specific criteria for noise emissions from the development. On this basis, the NSW EPA Noise Policy for Industry will be referenced as a guide to limitations on future noise.

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 rural 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 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 1, 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;

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

The amenity levels appropriate for the receivers surrounding the project site are presented in Table 8

Table 8 – EPA Amenity Noise Levels

Type of Receiver	Time of day	Recommended Noise Level dB(A)$L_{eq(period)}$	Project Amenity Noise Level dB(A)$L_{eq(period)}$
Residential – Urban	Day	60	58
	Evening	50	48
	Night	45	43
Commercial premises	When in use	65	63
Industrial premises	When in use	70	68

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:*
>
> - *$L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
> - *L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,*
>
> *a detailed maximum noise level even assessment should be undertaken.*

Table 9 - Sleep Arousal Criteria for Residential Receivers

Receiver	Rating Background Noise Level (Night) dB(A)L_{90}	Emergence Level
Residences Surrounding Site Night (10pm – 7am)	42 dB(A) L_{90}	47 dB(A)$L_{eq,\ 15min}$; 57 dB(A)L_{Fmax}

6.3 SUMMARISED NOISE EMISSION CRITERIA

Table 10 – 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 $L_{eq(15min)}$	NPI Criteria for Sleep Disturbance
Day	51	58	56	N/A
Evening	46	48	51	N/A
Night	42	43	47	47 dB(A)$L_{eq,\ 15min}$; 57 dB(A)L_{Fmax}

Table 11 – EPA NPI Noise Emission Criteria (Non-Residential)

Receiver	Time of Day	Amenity Criteria dB(A) L_{eq}
Commercial	When in use	63
Industrial	When in use	68

7 NOISE EMISSION ASSESSMENT

7.1 NOISE FROM RETAIL TENANCIES

Use of retail tenancies is not yet known, and as such, detailed assessment cannot be completed. General retail spaces (retail shops, convenience stores, etc) will be acceptable without any additional acoustic treatments.

Should retail tenancy 1 or 2 be leased as a café or restaurant, an awning may be required between any outdoor dining area and the apartments above (although significant acoustic treatment is unlikely).

In the event that café / restaurant tenants propose late night use of outdoor dining areas, we assume this would be part of a separate development application where detailed review of operating times and patron numbers (and the associated noise generated) would be assessed with reference to Council and (if necessary) Liquor and Gaming NSW acoustic criteria.

7.2 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.

The carlift and turntable proposed for access to basement levels of the carpark additionally have the potential for intermittent peak noise events, particularly during the night time period. Acoustic assessment of the proposed car stacker is recommended to ensure that noise emissions to neighbouring residents are controlled to acceptable levels.

Noise emissions from all mechanical services to the closest residential receiver should comply with the requirements of Section 6.3.

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

8 CONCLUSION

This report presents an acoustic assessment of noise impacts associated with the development to be located at 21 Whistler Street, Manly.

Provided that the recommendations presented in Section 5.4 are adopted, internal noise levels for residential apartments & retail spaces of the proposed development will comply with the acoustic requirements of the following documents:

- Northern Beaches Council – Manly Development Control Plan 2013;
- Australian Standard AS 2107:2016 *'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;

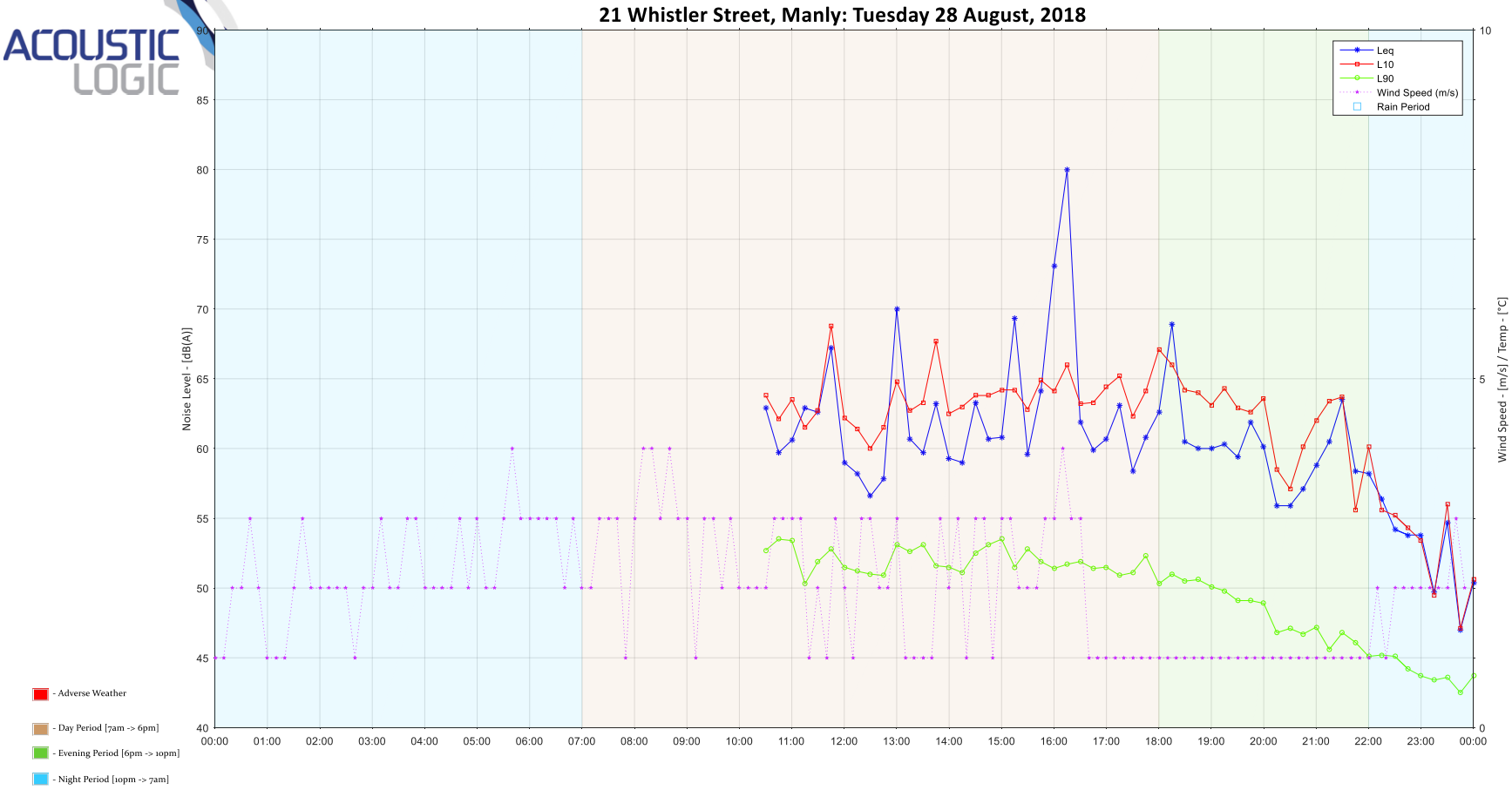
- Northern Beaches Council – Manly Development Control Plan 2013;
- NSW Department of Environment and Heritage, Environmental Protection Agency document – *Noise Policy for Industry* (NPI) 2017

Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Consultancy Pty Ltd
Alex Washer

APPENDIX ONE – UNATTENDED NOISE MONITORING DATA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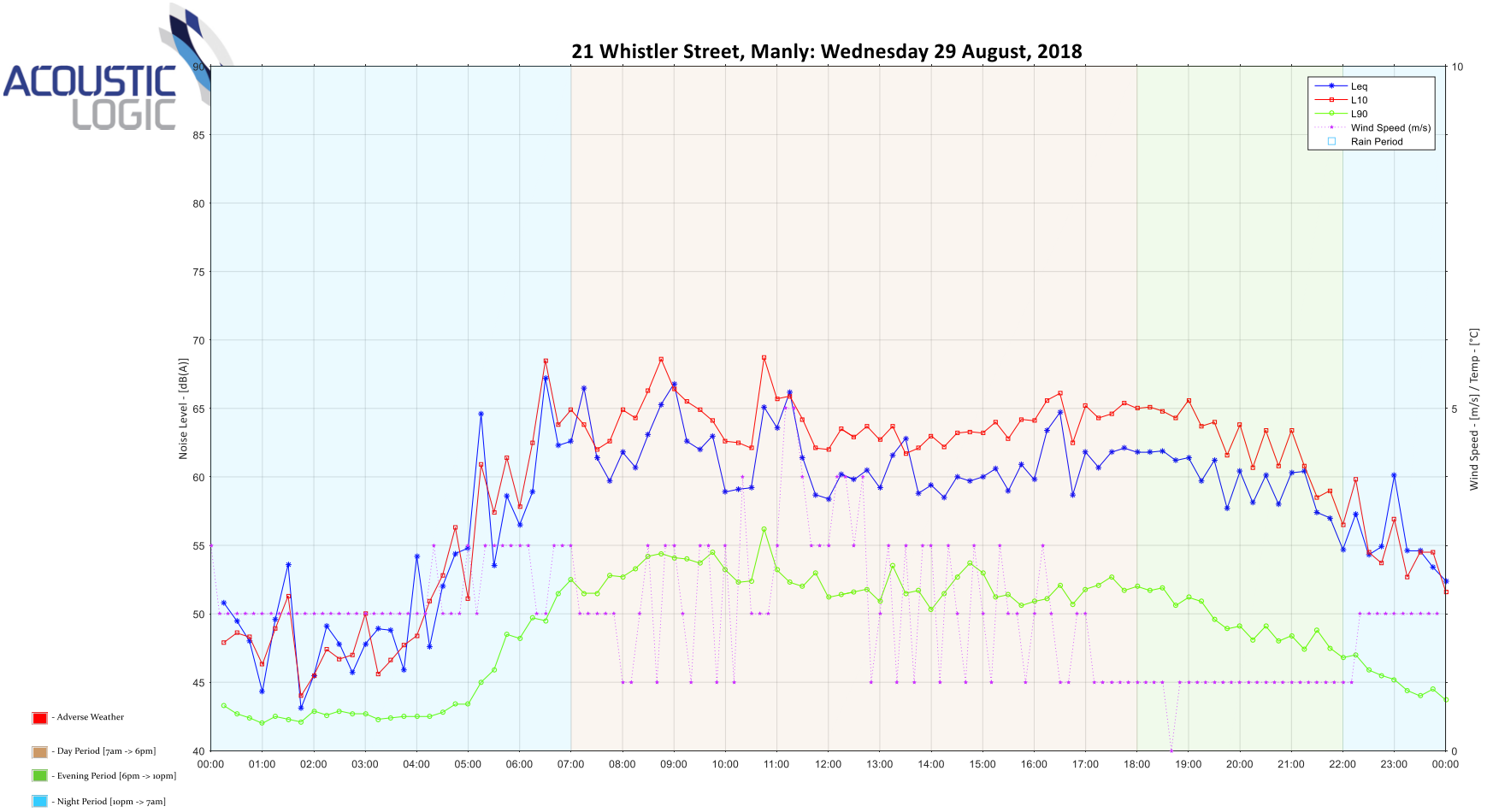
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]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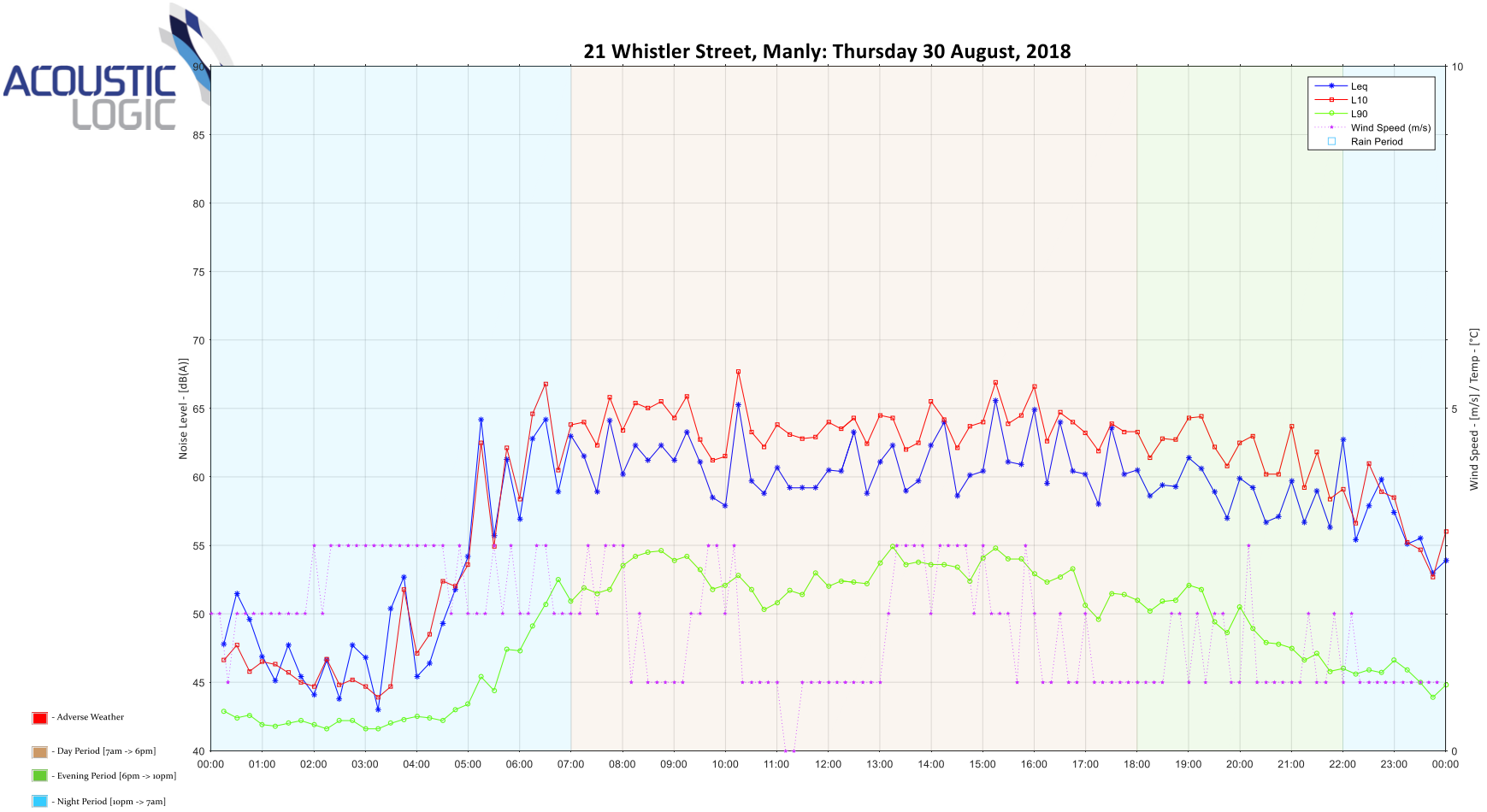
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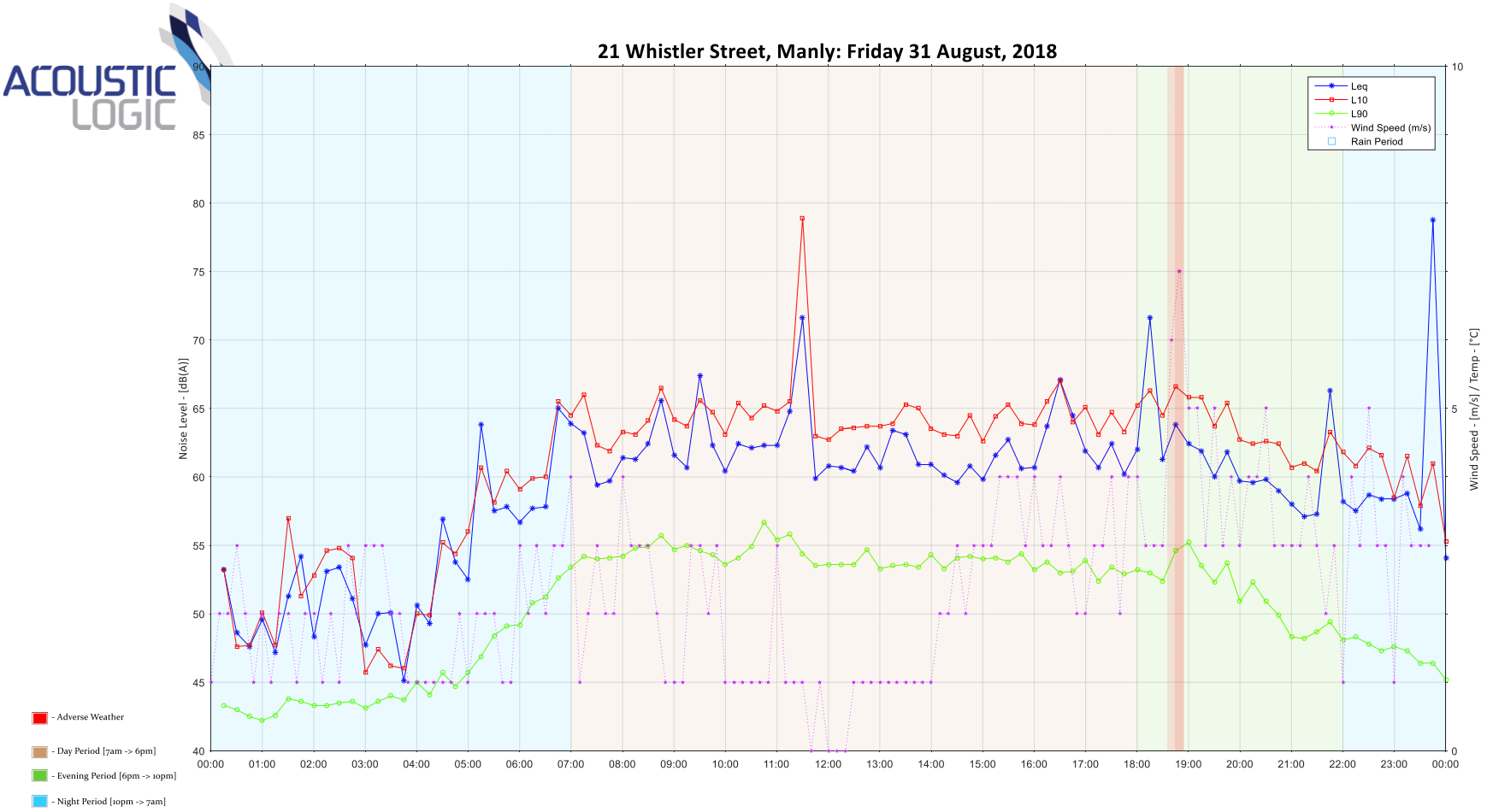
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]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Rain Period
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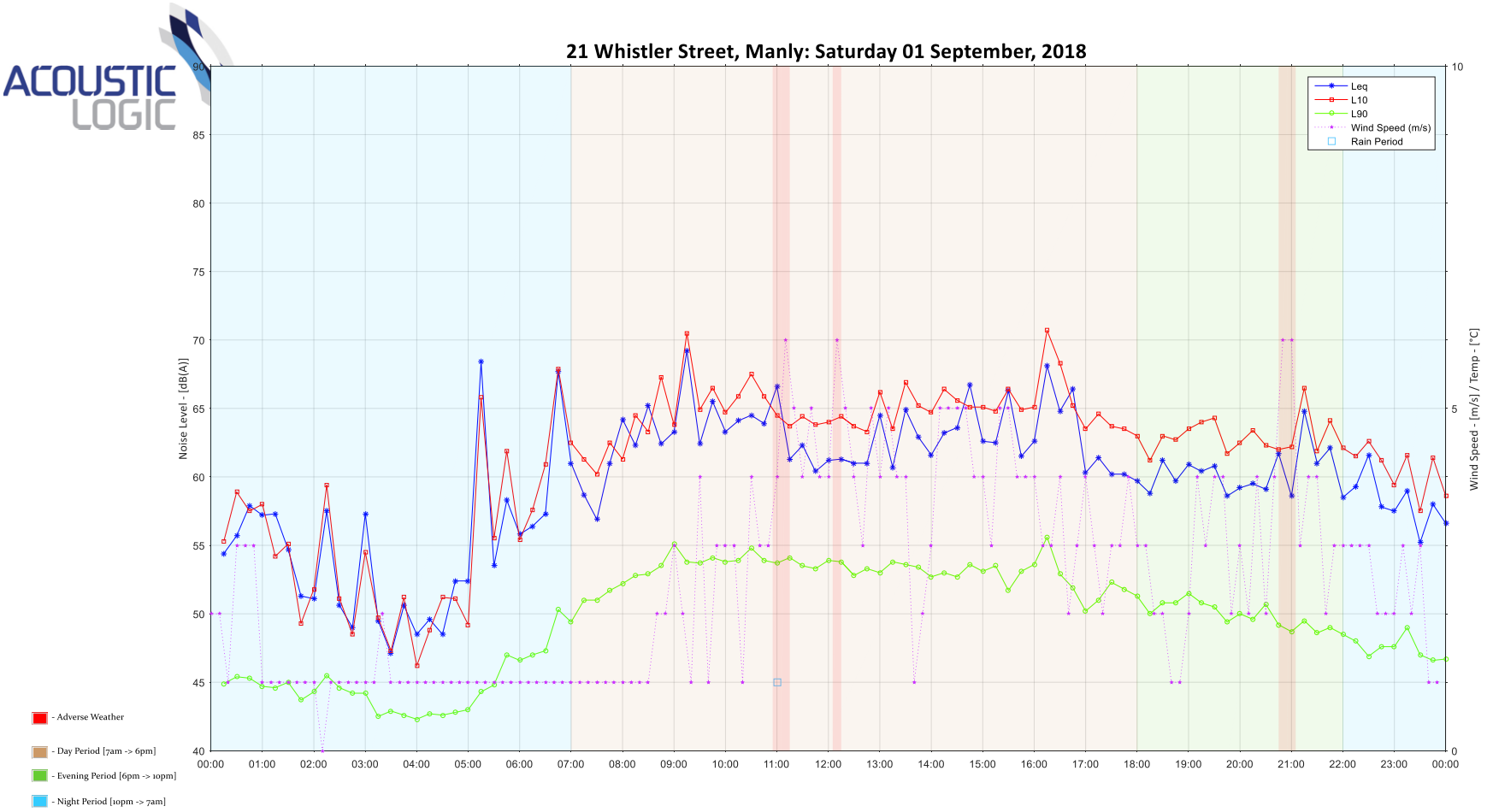
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]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L90
Wind Speed (m/s)
Rain Period
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- Evening Period [6pm -> 10pm]
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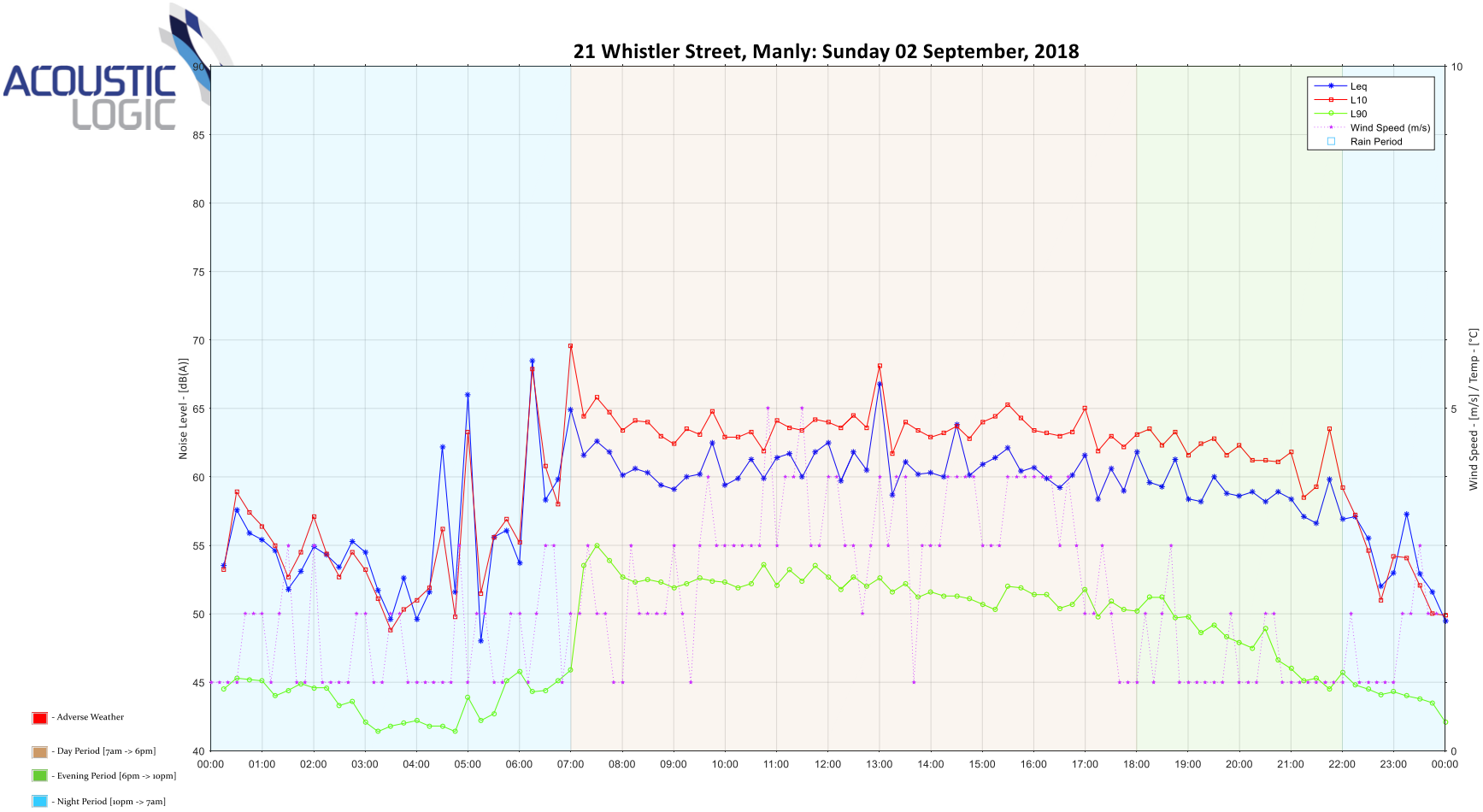
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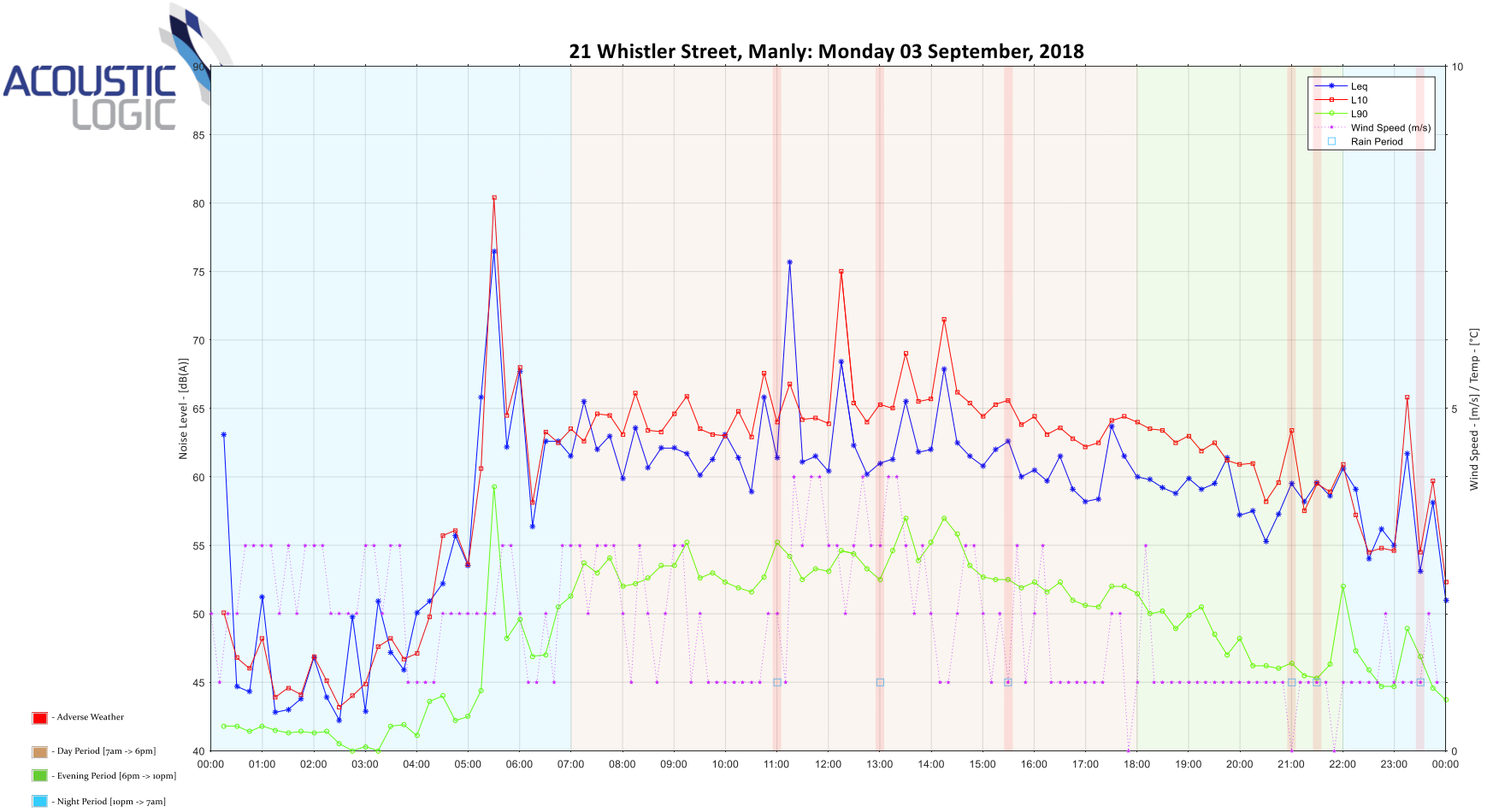
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Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
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Rain Period
- Adverse Weather
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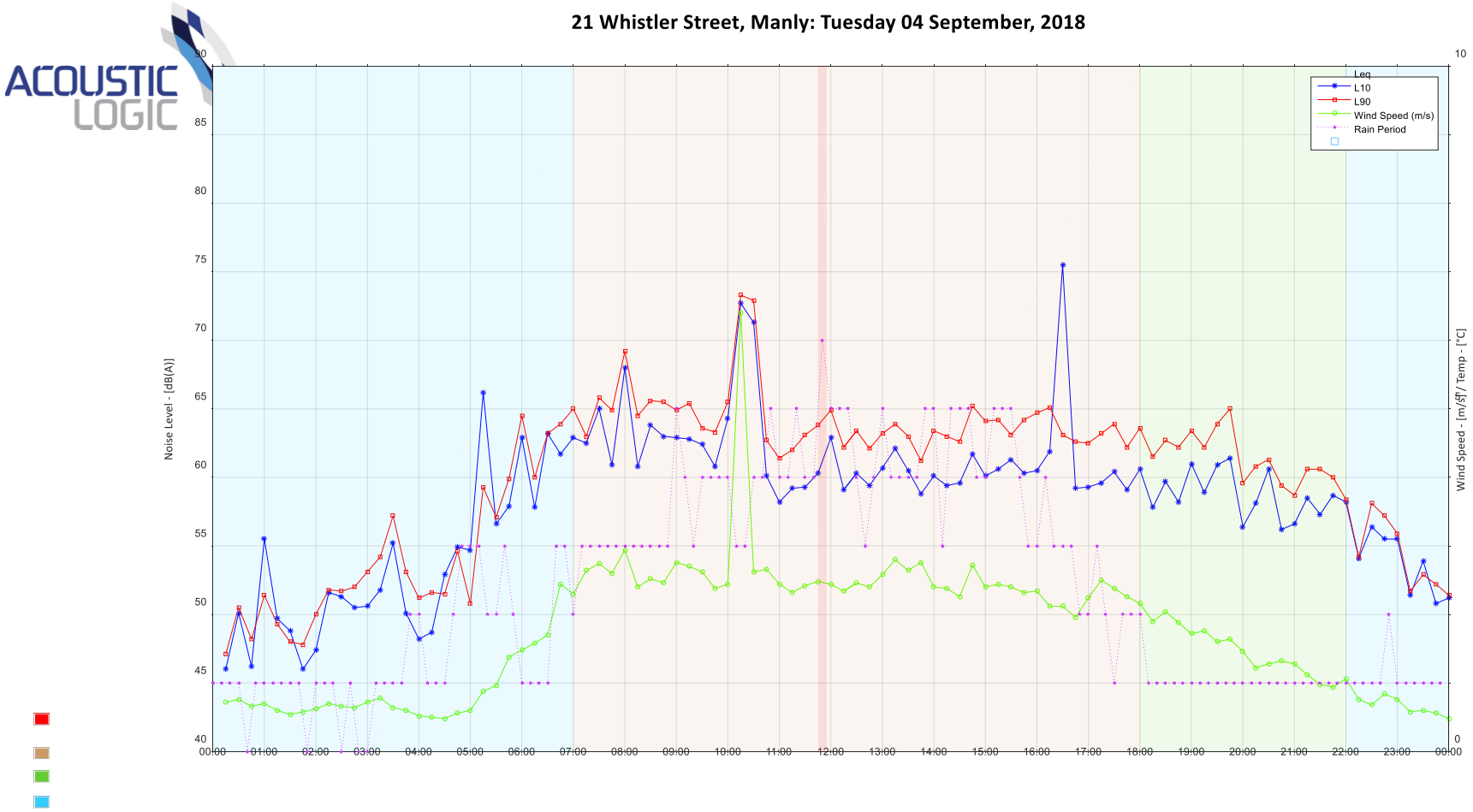
21 Whistler Street, Manly: Tuesday 04 September, 2018
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L10
L90
Wind Speed (m/s)
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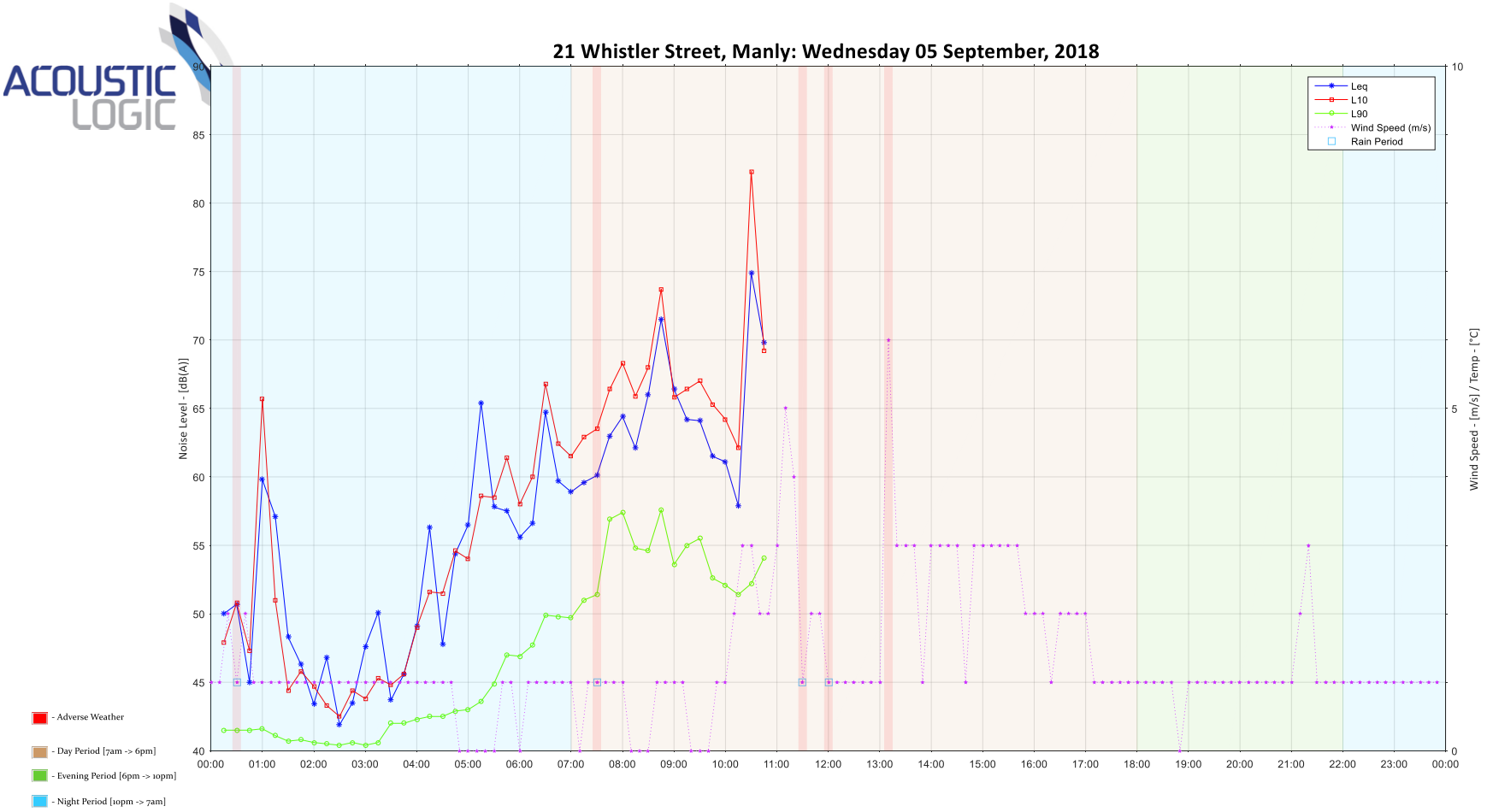
21 Whistler Street, Manly: Wednesday 05 September, 2018
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Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]