MATTHEW PALAVIDIS
VICTOR FATTORETTO
MATTHEW SHIELDS

Redfern North Eveleigh Precinct Renewal Project

State Significant Development Application (SSDA)

Acoustic Assessment

SYDNEY
9 Sarah St
MASCOT NSW 2020
(02) 8339 8000

ABN 98 145 324 714
www.acousticlogic.com.au

Project ID	20220903.2
Document Title	State Significant Development Application (SSDA)
Attention To	Transport for NSW

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	11/08/2022	20220903.2/1108A/R0/PF	PF		AW
1	22/11/2022	20220903.2/2211A/R1/PF	AW		AW

TABLE OF CONTENTS

1 INTRODUCTION

This report supports State Significant Development (SSD) Development Application (DA) *No. SSD-39971796* for the heritage conservation and adaptive reuse of the former Chief Mechanical Engineer's Building (CME Building) in North Eveleigh, which is submitted to the Minister for Planning pursuant to Part 4 of the *Environmental Planning and Assessment Act* 1979 (EP&A Act).

Transport for NSW is the proponent for the SSDA.

2 BACKGROUND

2.1 SITE DESCRIPTION

The site comprises the former CME Building (Figure 1) and immediate surrounds (Figure 2). The site is identified as 505 Wilson Street, and forms part of Lot 5 in Deposited Plan 1175706.

Originally constructed in 1887 and subsequently extended to keep pace with the expansion of the NSW railways and demand for engineering services, the CME Building is of State heritage significance. The CME Building is listed on the NSW Heritage Register (SHR *No. 5014147*) and Transport for NSW's s170 Register. The statement of significance provided on the NSW Heritage Inventory outlines the significance of the site:

The building is a very fine late Victorian railways office on a scale above all other such structures in the State. The building reflects the importance of the railway engineers in the development of the State and its closeness to the Eveleigh workshops (mainly under the control of the Mechanical Branch) indicates the confidence in railway construction. The building is in a style not often seen in Sydney and is a rare survivor. More often this form of building is in evidence in the country where the pressure of development is less. It is an important element in the town and streetscape of Wilson St, Redfern, particularly to close proximity to the railway workshops.

The CME Building is located within the Redfern North Eveleigh Precinct (Figure 3). The Redfern North Eveleigh Precinct is located within the wider Redfern-Waterloo Authority Sites SSP. The Redfern North Eveleigh Precinct is 10 hectares of land owned by Transport Asset Holding Entity (TAHE) at the southern edge of Redfern Station, located between the rail corridor and Wilson Street.

The Redfern North Eveleigh Precinct, including the CME Building, is the subject of an approved Part 3A Concept Plan (MP08_0015) which continues to apply to the land pursuant to Schedule 2 of Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017. TfNSW is currently preparing a SSP Study for the Paint Shop Sub-Precinct within the wider Redfern North Eveleigh Precinct, which was exhibited between 26 July and 25 August 2022. It is noted that the SSP Study indicates that the Concept Approval would be surrendered should rezoning of the Paint Shop Precinct occur.

Figure 1 - Chief Mechanical Engineer's Building (existing), viewed from Wilson Street

Figure 2 – Aerial showing extent of works
Source: Nearmap/Ethos Urban

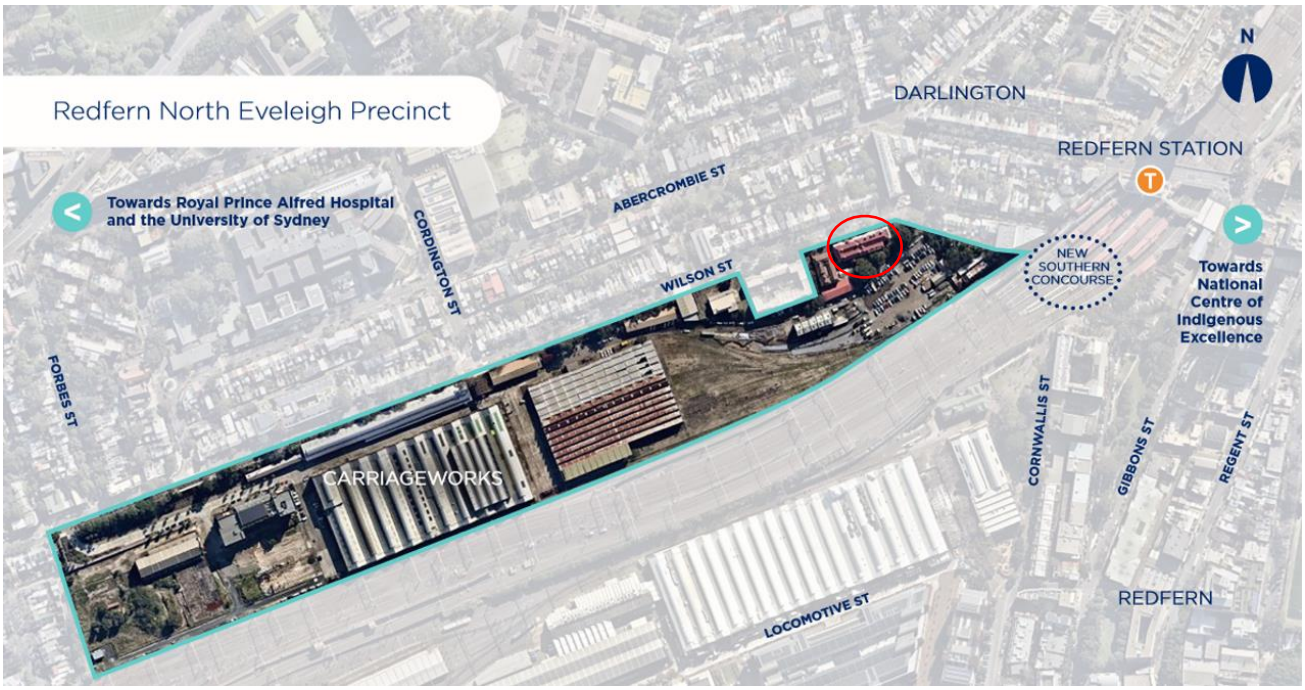


Figure 3 - Redfern North Eveleigh Precinct (CME Building outlined in red)
Source: Ethos

2.2 OVERVIEW OF PROPOSED DEVELOPMENT

The application seeks consent for the heritage conservation and adaptive reuse of the CME Building, which includes:

- Internal and external heritage conservation works to make the building suitable for adaptive reuse, including painting, repairs and refurbishment of the existing building (primarily internally) and installation of services to support future usage for offices or the like;
- Building upgrades to ensure compliance with the Building Code of Australia, including accessibility and fire safety requirements;
- Removal of any hazardous building materials; and
- Minor landscaping works.

No significant additions (except those necessary to facilitate suitable access and fire egress) or substantive demolition of external heritage fabric is envisaged as part of the project. Internal changes comprise the removal of some internal walls and alterations to building fabric to create suitable spaces and compliant paths of travel.

2.3 ASSESSMENT REQUIREMENTS

The Department of Planning and Environment have issued Secretary's Environmental Assessment Requirements (SEARs) to the applicant for the preparation of an Environmental Impact Statement for the proposed development. This report has been prepared having regard to the SEARs as follows:

> ***12. Noise and Vibration***
>
> *Provide a noise and vibration assessment prepared in accordance with the relevant NSW Environment Protection Authority (EPA) guidelines. The assessment must detail construction and operational noise and vibration impacts on nearby sensitive receivers and structures and outline the proposed management and mitigation measures that would be implemented.*

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

- NSW Department of Planning and Environment *Planning Secretary's Environmental Assessment Requirements*, dated 6 April 2022
- *State Environmental Planning Policy (SEPP)* (Transport and Infrastructure) 2021
- NSW Environmental Protection Authority (EPA) *Noise Policy for Industry* (NPfI) 2017
- NSW Environmental Protection Authority *Assessing Vibration – A Technical Guideline*
- British Standard BS 6472:1992 *Guide to Evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz)*
- German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures*
- NSW Environmental Protection Authority *Interim Construction Noise Guideline* (ICNG)

This assessment has been conducted using the CCG Architects architectural drawings (dated 4th November 2022).

2.4 SURROUNDING RECIEVERS

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 blocks to the north and east of the site
- Existing commercial receivers to the north of the site
- Existing industrial receivers bounding the site to the west

The nearest noise receivers around the site include:

- **R1**: Residential Receiver 1 – Multi storey residential dwellings to the north across Wilson Street at 470-512 Wilson Street, Eveleigh
- **R2**: Residential Receiver 2 – Multi storey residential buildings to the west at 501 Wilson Street, Eveleigh
- **R3**: Residential Receiver 3 – Multi storey residential dwellings further east at 125-157 Little Eveleigh street, Eveleigh
- **M1**: Mixed of Residential & Commercial Receiver 1 – Multi storey mixed used block with residents on upper floors and commercial units on lower floors to the northeast of the site at 181 Lawson Street, Eveleigh
- **I1**: Industrial Receiver 1 – Single storey industrial development to the west of the site

A site map, measurement description and surrounding receivers are presented in Figure 4 below.

Figure 4: Site Location and Measurement locations
Source: NSW Six Maps

Project Site

Residential Receivers

Industrial Receivers

Mixed Use Receivers

Unattended Noise Monitor

Attended Noise Measurements

Attended Vibration Measurements

3 NOISE DESCRIPTORS

Train noise constantly varies in level, due to fluctuations in frequency of train movement. Accordingly, it is not possible to accurately determine prevailing train noise conditions by measuring a single, instantaneous noise level. To accurately determine the effects of train 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. These parameters are used to measure how much annoyance would be caused by a particular noise source.

The principal measurement parameters obtained from the data are:

L_{eq} - represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of noise impact as it closely corresponds with how humans perceive the loudness of time-varying noise sources (such as traffic noise).

L_{90} – This is commonly used as a measure of the background noise level as it represents the noise level heard in the typical, quiet periods during the measurement interval. The L_{90} parameter is used to set noise emission criteria for potentially intrusive noise sources since the disturbance caused by a noise 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.

L_{10} is used in some guidelines to measure noise produced by an intrusive noise source since it represents the average of the loudest noise levels produced at the source. Typically, this is used to assess noise from licenced venues.

L_{max} is the highest noise level produced during a noise event, and is typically used to assess sleep arousal impacts from short term noise events during the night. It is also used to assess internal noise levels resulting from aircraft and railway ground vibration induced noise.

L_1 is sometimes used in place of L_{max} to represent a typical noise level from a number of high level, short term noise events.

4 EXISITING NOISE AND VIBRATION 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 POSITIONS

Two unattended noise monitors were located on site and around the potentially most noise affected residents, Refer to Figure 3 for detailed location:

- One unattended noise monitor was located directly in front of the **R1** receivers (470-512 Wilson Street, Eveleigh), capturing the background noise levels of residents located way from rail lines.
- One unattended noise monitor was located to the south boundary of the site facing rail corridor capturing the background noise levels of the residents affected by rail lines.

Attended short term measurements of rail noise were undertaken to supplement the unattended noise monitoring. Refer to Figure 3 for detailed location. Attended measurements were taken within the North Eveleigh Precinct and at the rear of the site at around 10m way from the first rail line. All attended measurements were taken 1.5m above the local ground height.

4.2 MEASUREMENT PERIOD

Unattended noise and vibration monitoring was conducted from Tuesday 26th of July 2022 to Thursday 4th of August 2022. Attended noise measurements were undertaken between the following hours:

- 11:00am and 12:00pm on Tuesday 26th of July 2022
- 10:00am and 3:00pm on Thursday 4th of August 2022

4.3 MEASUREMENT EQUIPMENT

4.3.1 NOISE MEASUREMENTS

Equipment used consisted of an Acoustic Research Laboratories Pty Ltd noise monitors. Monitors were set to A-weighted fast response and programmed to store 15-minute statistical noise levels throughout the monitoring periods. The monitors were calibrated at the start and end of the monitoring period using a Rion NC-74 calibrator. No significant drift was noted.

Attended 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.

4.3.2 VIBRATION MEASUREMENTS

Rail vibration measurements were conducted externally and internally within the project building. External measurements were taken at what appeared to be the closest external location of the site to the existing rail lines to assess the vibration experienced across the entire site.

Attended train vibration measurements were conducted on Thursday 4th of August 2022 between 10am and 11am. A Bruel & Kjaer (B&K) 4450 vibration monitoring terminal with a B&K 8380 Tri-axial Geophone was used for the attended vibration measurements. The geophone was fixed via beeswax to the steel plate, which was then fixed to the soil using metal spikes.

4.4 SUMMARISED NOISE LEVELS

Summarised rating background noise levels for residents surrounding the proposed development are presented below. 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 in accordance with Fact Sheets A & B of the NPI. Appendices of this report present a graphical representation of the raw monitoring data for each location.

Table 4-1 – Measured Rating Background Noise Levels

Monitor	Time of day	Rating Background Noise Level dB(A)$L_{90(Period)}$
North Boundary (Away from rail lines, representative for **R1**& **M1 (Residential Uses)**)	Day (7am – 6pm)	43
	Evening (6pm – 10pm)	41
	Night (10pm – 7am)	39
South Boundary (Facing rail lines, representative for **R2**&**R3**)	Day (7am – 6pm)	46
	Evening (6pm – 10pm)	44
	Night (10pm – 7am)	44

Table 4-2 – Measured Environmental Noise Levels

Monitor	Time of day	Environmental Noise Level dB(A)Leq(period)
North Boundary (Away from rail lines, representative for **R1**& **M1 (Residential Uses)**)	Day (7am – 6pm)	54 dB(A) $L_{eq(15hr)}$ 55 dB(A) $L_{eq(Worst\ 1hr)}$
	Night (10pm – 7am)	49 dB(A) $L_{eq(9hr)}$ 54 dB(A) $L_{eq(Worst\ 1hr)}$
South Boundary (Facing rail lines, representative for **R2**&**R3**)	Day (7am – 10pm)	58 dB(A) $L_{eq(15hr)}$ 61 dB(A) $L_{eq(Worst\ 1hr)}$
	Night (10pm – 7am)	57 dB(A) $L_{eq(9hr)}$ 63 dB(A) $L_{eq(Worst\ 1hr)}$

4.5 PREDICTED NOISE AT FAÇADE

Based on the unattended measurements detailed in the section above, noise from rail passbys and traffic from Wilson Street has been predicted and modelled at each façade of the CME building. The SoundPLAN modelling results are presented in Appendix C. Predicted cumulative noise levels from train passby from all rail lines and Wilson Street traffic are summarised below:

Table 4-3 – Predicated Noise levels at Façade

Facade	Max Noise Level $L_{Aeq(1hour)}$
Northern Facade	53
Southern Facade	58
Eastern Façade	57
Western Facade	52

4.6 SUMMARISED RAIL VIBRATION LEVELS

Summarised measured rail passby vibration levels are detailed below. Refer to Figure 4 for detailed location of each measurement. These values are based on attended passby measurements correct to a 15hr period (7am-10pm).

Table 4-4 – Calculated Rail Passby Vibration Levels

Time Period	Calculated internal VDV_{15Hr} $m/s^{1.75}$	Calculated external VDV_{15Hr} $m/s^{1.75}$
Day (7am – 10pm)	0.03	0.04

5 EXTERNAL NOISE & VIBRATION INTRUSION ASSESSMENT

Site investigation indicates that the major external noise and vibration sources around project site are from train movements within the North Eveleigh Precinct from train passbys on public lines.

5.1 NOISE INTRUSION CRITERIA

Noise intrusion criteria has been developed from the *State Environmental Planning Policy (SEPP)* (Transport and Infrastructure) 2021, detailed below.

5.1.1 State Environmental Planning Policy (SEPP) (Transport and Infrastructure) 2021

Clause 2.100 of the NSW SEPP states the following for non-rail development on or adjacent to a rail corridor.

> ***2.100 Impact of rail noise or vibration on non-rail development***
>
> *(1) This clause applies to development for any of the following purposes that is on land in or adjacent to a rail corridor and that the consent authority considers is likely to be adversely affected by rail noise or vibration—*
>
> *(a) residential accommodation,*
>
> *(b) a place of public worship,*
>
> *(c) a hospital,*
>
> *(d) an educational establishment or centre-based child care facility.*
>
> *(2) Before determining a development application for development to which this clause applies, the consent authority must take into consideration any guidelines that are issued by the Secretary for the purposes of this clause and published in the Gazette.*
>
> *(3) If the development is for the purposes of residential accommodation, 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 residential accommodation—35 dB(A) at any time between 10.00 pm and 7.00 am,*
>
> *(b) anywhere else in the residential accommodation (other than a garage, kitchen, bathroom or hallway)—40 dB(A) at any time.*

5.1.2 Discussion

The CME proposal has provisions for commercial uses, which does not require assessment under the SEPP (Transport and Infrastructure) 2021 requirements. On this basis, noise intrusion need not be considered any further for compliance with statutory or regulatory controls.

5.2 VIBRATION INTRUSION CRITERIA

A vibration intrusion assessment has been conducted based on the requirements of the NSW Environmental Protection Authority (EPA) document *Assessing Vibration – A Technical Guideline*.

5.2.1 NSW EPA Assessing Vibration Amenity

The NSW EPA document "*Assessing Vibration: A Technical Guideline*" provides procedures for assessing tactile vibration and regenerated noise within potentially affected buildings and is used in the assessment of vibration impact on amenity. This guideline draws on both the British Standard BS 6472:1992 Part 2 as well as Australian Standard AS2670.2-1990.

Relevant criteria is presented below.

Table 5-1 – EPA Recommended Vibration Criteria for Intermittent Vibration ($m/s^{1.75}$)

Location	Daytime[1]		Night-time[1]	
	Preferred Value	Maximum Value	Preferred Value	Maximum Value
Critical areas[2]	0.10	0.20	0.10	0.20
Residences	0.20	0.40	0.13	0.26
Offices, schools, educational institutional and places of worship	**0.40**	**0.80**	0.40	0.80
Workshops	0.80	1.60	0.80	1.60

[1] Daytime is 7.00 am to 10.00 pm and night-time is 10.00 pm to 7.00 am.

[2] Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. These criteria are only indicative, and there may be a need to assess intermittent values against the continuous or impulsive criteria for critical areas.
Source: BS 6472–1992

5.2.2 Discussion

As detailed in Table 4-5, measured vibration levels within the CME building from the existing operation of rail are below the 'preferred value' for human comfort, and as such acceptable for use as an office/commercial building within the guideline.

5.2.3 Recommendations

As per the attended site measurements of rail noise and vibration, the impacts of major external sources around project site comply with the criteria presented in the section above.

It is predicted that no new noise and/or vibration impacts are to be introduced on the CME building and its heritage façade from the surrounding rail precinct due to the development application. This office notes that both the CME building and the rail precinct are currently existing and operational.

6 NOISE EMISSIONS ASSESSMENT

Site investigation and proposal indicates that mechanical plant servicing the site is to be the primary operational noise emission sources associated with the proposed development.

6.1 NOISE EMISSION CRITERIA

Noise emission criteria for the project site will be set up based on NSW Department of Environment and Heritage, Environmental Protection Agency document *Noise Policy for Industry* (NPfI) 2017.

6.1.1 NSW EPA Noise Policy for Industry (2017)

The EPA NPI has two criteria which both are required to be satisfied, namely Intrusiveness and amenity. The NPfI 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 urban criteria.

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

6.1.1.1 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 4.4. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

Table 6-1 – EPA Intrusiveness Criteria

Location	Time of Day	Measured Rating Background Noise Levels dB(A)$L_{90(period)}$	Intrusiveness Noise Objective dB(A)$L_{eq(15min)}$ (Background + 5dB)
R1& **M1 (Residential Uses)** 470-512 Wilson Street, Eveleigh & 181 Lawson Street, Eveleigh	Day (7am - 6pm)	43	48
	Evening (6pm - 10pm)	41	46
	Night (10pm - 7am)	39	44
R2&**R3** 501 Wilson Street, Eveleigh & 125-157 Little Eveleigh street, Eveleigh	Day (7am - 6pm)	46	51
	Evening (6pm - 10pm)	44	49
	Night (10pm - 7am)	44	49

6.1.1.2 Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The EPA's NPfI 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 4.4, 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:

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

The amenity levels appropriate for the receivers surrounding the site are presented in Table 6-2.

Table 6-2 – NPfI Project 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 – urban	Day (7am - 6pm)	60	58
	Evening (6pm - 10pm)	50	48
	Night (10pm - 7am)	45	43
Commercial	When in use	65	63
Industrial	When in use	70	68

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

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

6.1.1.3 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 6-3 – Sleep Arousal Criteria for Residential Receivers

Receiver	Rating Background Noise Level (Night) dB(A)L_{90}	Emergence Level
R1&**M1 (Residential Uses)** 470-512 Wilson Street, Eveleigh & 181 Lawson Street, Eveleigh	39	44 dB(A)$L_{eq,\ 15min}$; 54 dB(A)L_{Fmax}
R2&**R3** 501 Wilson Street, Eveleigh & 125-157 Little Eveleigh street, Eveleigh	44	49 dB(A)$L_{eq,\ 15min}$; 59 dB(A)L_{Fmax}

6.2 SUMMARISED NOISE EMISSION CRITERIA

Table 6-4 – EPA NPI Noise Emission Criteria (Mechanical Noise Emissions)

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
R1&**M1 (Residential Uses)** 470-512 Wilson Street, Eveleigh & 181 Lawson Street, Eveleigh	Day (7am - 6pm)	43	58	**48**	-
	Evening (6pm - 10pm)	41	48	**46**	-
	Night (10pm - 7am)	39	**43**	44	44 dB(A)$L_{eq,\ 15min}$; 54 dB(A)L_{Fmax}
R2&**R3** 501 Wilson Street, Eveleigh & 125-157 Little Eveleigh Street, Eveleigh	Day (7am - 6pm)	46	58	**51**	-
	Evening (6pm - 10pm)	44	**48**	49	-
	Night (10pm - 7am)	44	**43**	49	49 dB(A)$L_{eq,\ 15min}$; 59 dB(A)L_{Fmax}
Commercial Premises	When in Use	-	**63**	-	-
Industrial Premises	When in Use	-	**68**	-	-

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

6.3 NOISE EMISSION FROM MECHANICAL PLANT

Detailed plant selection and location has not been completed at this stage, however a preliminary design/selection of major plant items has been provided with proposed placement on the ground floor/in roof space of the site.

An indicative assessment of initial design of primary plant items is presented below.

- Outdoor condenser units are proposed to be located at the back of CME building to the southern boundary. Preliminary analysis indicates that 5 off condenser units with a source sound power level of the condensers of approximately 70 dB(A) each are capable of complying with the noise emission requirements detailed in Section 6.2, due to distance attenuation between noise source and receiver, as well as barrier effects provided by the project building.

- 4 off supply fans proposed to be installed in first floor ceiling space with intake grille on roof top. Analysis indicates that a typical supply fan with a source sound power level of approximately 70dB will be able to comply with the noise emission requirements detailed in Section 6.2 due to distance attenuation between noise source and receiver

- Smaller fans and other ancillary items will be readily able to achieve the noise emission requirements for the site. Satisfactory levels will be achievable through appropriate plant selection, location and if necessary, standard acoustic treatments such as duct lining, acoustic silencers and enclosures.

Detailed acoustic review should be undertaken throughout the design to determine acoustic treatments to control noise emissions to satisfactory levels as detailed in Section 6.2 of this report.

7 CONSTRUCTION NOISE & VIBRATION IMPACTS

7.1 NOISE MANAGEMENT LEVELS

Noise associated of construction activities on the site will be assessed in accordance with the NSW EPA Interim Construction Noise Guideline.

7.1.1 EPA Interim Construction Noise Guidelines

The "quantitative" assessment procedure, as outlined in the Interim Construction Noise Guideline (ICNG) will be used. The quantitative assessment method requires: Determination of noise generation goals (based on ambient noise monitoring); Prediction of operational noise levels at nearby development; and if necessary, recommendation of noise controls strategies in the event that compliance with noise emission goals is not possible.

EPA guidelines adopt differing strategies for noise control depending on the predicted noise level at the nearest residences:

- *"Noise affected" level*. Where construction noise is predicted to exceed the "noise affected" level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the "noise affected level". For residential properties, the "noise affected" level occurs when construction noise exceeds ambient levels by more than 10dB(A)$L_{eq(15min)}$.
- "*Highly noise affected level*". Where noise emissions are such that nearby properties are "highly noise affected", noise controls such as respite periods should be considered. For residential properties, the "highly noise affected" level occurs when construction noise exceeds 75dB(A)$L_{eq(15min)}$ at nearby residences.

Table 7-1 – Residential Receiver Noise Emission Goals

Receiver	"Noise Affected" Level - dB(A)$L_{eq(15min)}$	"Highly Noise Affected" Level - dB(A)$L_{eq(15min)}$
R1&**M1 (Residential Uses)** 470-512 Wilson Street, Eveleigh & 181 Lawson Street, Eveleigh	53	75
R2&**R3** 501 Wilson Street, Eveleigh & 125-157 Little Eveleigh Street, Eveleigh	56	

Section 4.1.2 and 4.1.3 of this guideline also nominates management levels for other sensitive land uses (other than residences). Noise affected management levels relevant to this assessment is detailed below;

Table 7-2 – Noise Emission Goal – Non-Residential Properties

Land Use	Management Level
Commercial premises (offices, retail outlets)	External noise level 70 dB(A)$L_{eq(15mins)}$
Industrial premised	External noise level 75 dB(A)$L_{eq(15mins)}$

7.2 VIBRATION CRITERIA

Vibration associated with demolition and excavation activities on the site will be assessed in conjunction with the following guidelines:

For human exposure to vibration - Department of Environment and Conservation *NSW Assessing Vibration: A Technical Guideline* (Feb 2006) is based on the guidelines contained in BS 6472:1992 *Guide to Evaluate Human Exposure to Vibration in Buildings (1Hz to 80Hz)* for low probability of adverse comment.

For structural damage vibration - German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures.*

7.2.1 Assessing Amenity (Human Comfort Guidelines)

Vibration goals for the amenity of nearby land users are those recommended by the EPA document *Assessing Vibration: A technical guideline.* These levels are presented below:

Table 7-3 – Vibration Goals

		RMS acceleration (m/s^2)		RMS velocity (mm/s)		Peak velocity (mm/s)	
Place	**Time**	**Preferred**	**Maximum**	**Preferred**	**Maximum**	**Preferred**	**Maximum**
Continuous Vibration							
Residences	Daytime	0.01	0.02	0.2	0.4	0.28	0.56
Offices	Day or night-time	0.02	0.04	0.4	0.8	0.56	1.1
Workshops		0.04	0.08	0.8	1.6	1.1	2.2
Impulsive Vibration							
Residences	Daytime	0.3	0.6	6.0	12.0	8.6	17.0
Offices	Day or night-time	0.64	1.28	13	26	18	36
Workshops		0.64	1.23	13	26	18	36

Note 1: Continuous vibration relates to vibration that continues uninterrupted for a defined period (usually throughout the daytime or night-time), e.g. continuous construction or maintenance activity. (DECC, 2006).

Note 2: Impulsive vibration relate to vibration that builds up rapidly to a peak followed by a damped decay and that may or may not involve several cycles of vibration (depending on frequency and damping), with up to three occurrences in an assessment period, e.g. occasional loading and unloading, or dropping of heavy equipment. (DECC, 2006).

7.2.2 Structure Borne Vibration (Damage Criteria)

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) is shown in the below table.

It is noted that the peak velocity is the absolute value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 7-4 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration

TYPE OF STRUCTURE		PEAK PARTICLE VELOCITY (mms^{-1})			
		At Foundation at a Frequency of			Plane of Floor of Uppermost Storey
		< 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used in commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)	3	3 to 8	8 to 10	8

All surrounding commercial structures would be considered as 'Type 1', whereas all surrounding residential dwellings are to be assessed as 'Type 2'. Any heritage items such as the CME or surrounding heritage items are to be initially assessed per 'Type 3' in the above table.

Note that heritage buildings are not necessarily sensitive to vibration, and specific structural or heritage requirements should be developed as part of the construction methodology.

7.3 CONSTRUCTION NOISE EMISSION ASSESSMENT

The proposal is to refurbish and fit-out the CME Building for commercial occupancy. The current program of works indicates that construction and fit-out works would commence in June 2023 for six months until November 2023. An indicative construction scope is summarised in Table 7-5. it is envisaged that construction scope and staging would be further refined in subsequent stages of the development approval and documented (along with additional impacts or considerations) within a Construction Environment Management Plan.

Table 7-5 – CME Building Refurbish Work Staging[1]

Stage	Work Summary
1	Site establishment
2	Removal of contaminated material (including lead paints and asbestos)
3	Dismantle, package and transport offsite to storage all the loose heritage items
4	Internal strip-out works and removal of furniture, fixtures and equipment. Decommissioning of services
5	Internal refurbishment works

[1]Sourced from: SCT Consulting *Chief Mechanical Engineer's (CME) Building Traffic, Transport and Accessibility Study (SCT_00342,* dated 7 November 2022*)*

7.3.1 Source Noise Data

Typical equipment/processes anticipated to be used during the construction of the project site are outlined in the table below with A-weighted sound power levels. The equipment list is prepared based on our experience with similar projects.

Table 7-6 – Sound Power Levels of Equipment

Equipment / Process	Sound Power Level dB(A) (SWL)
Concrete saw cutter	117
Hand held Jackhammer	115
General Trucks	108
Cement mixing truck	105
Mobile crane	104
Powered hand tools	95

The noise levels presented in the above table are derived from the following sources, namely:

- On-site measurements.
- Table A1 of Australian Standard 2436-2010.
- Data held by this office from other similar studies.

7.3.2 Methodology

Noise from the loudest typical construction activities for all stages of works have been predicted to the nearest most affected sensitive receivers.

Predictions take into account:

- The distance between the noise source and the receiver.
- The screening effect provided by any building structure or building shell, if applicable. In particular, noise from works proposed during the fit-out stages when the building shell will screen these activities from the surrounding sensitive receivers.

7.3.3 Recommended Hours of Work

As recommended in section 2.2 of the NSW EPA Interim Construction Noise Guideline (ICNG), the following hours of operation will be enforced for all construction activities and delivery of materials to and from the site;

- Monday to Friday – 7am to 6pm.
- Saturdays – 8.00am to 1pm.
- Sundays and Public Holidays – No works.

7.3.4 Predicted Noise Levels

Maximum noise impacts from the construction equipment listed above have been predicted to the nearest noise receivers and presented below. Given the size of the site predicted noise levels will change significantly depending on where the noise source is located. As such, a noise level range has been presented, giving expected noise levels for activities 'farthest from' to 'nearest to' the receiver.

Table 7-7 – Predicted Construction Noise Levels

Activity	R1	R2	R3	M1 Residential Uses	M1 Commercial Uses	I1
Concrete saw cutter	63-73	59-66	57-67	60-70	60-70	62-82
Hand held Jackhammer	61-71	57-64	55-65	58-68	58-68	60-80
General Trucks	54-72	50-55	48-63	51-67	51-67	53-69
Cement mixing truck	53-71	49-54	47-62	50-66	50-66	52-71
Mobile crane	52-70	48-53	46-61	49-59	49-59	51-71
Powered hand tools	48-57	44-51	42-52	45-55	45-55	47-67
NML	**53**	**56**	**56**	**53**	**70**	**75**
HNML	**75**	**75**	**75**	**75**	**-**	**-**

7.4 GENERAL DISCUSSION

Noise

Understandably, noise impacts on nearby development will be dependent on the activity and where on the site the activity is undertaken. Demolition works (e.g., use of jackhammer) tend to be the loudest typical activity. Work close to the northern, eastern and western boundaries will have the greatest impact on nearby receivers. It is also noted that the existing building shell will be retained, which will provide considerable noise attenuation.

Initial analysis indicates:

- Demolition Stage – Primary noise emissions occur when using jackhammer and saw cutter, with equipment items typically having sound power levels of approximately 110-120 dB(A)$L_{eq(15min)}$. Predicted noise levels at residential receivers **R1**, **R2, R3** and **M1 (residential uses)** will not exceed the HNML but will generally exceed NML. Predicted noise levels at commercial receiver **M1 (Commercial uses)** will not exceed the NML of 70dB(A). Predicted noise levels at industrial receiver **I1** will exceed the NML of 75dB(A) when work is done at the western boundary.

- Construction stage – it is the use of hand tools (Powered hand tools etc), truck and crane which are the loudest typical activity (sound power levels of approximately 110 dB(A)$L_{eq(15min)}$). Noise levels at residential receivers **R1**, **R2, R3** and **M1 (residential uses)** will not exceed the HNML and will exceed NML only when work is done close to the receiver at the northern boundary of the project site. Noise levels at non-residential receivers will not exceed the NML.

Noise impacts can be minimised using the following:

- Selection of equipment and process.

- Location of static plant.

- Use of screens or enclosures and erection of hoarding (typically only feasible for static plant).

- Scheduling of noisy activities and provision of respite periods.

Detailed construction noise planning is typically undertaken after engagement of a builder and a construction program is prepared (i.e. – after DA stage) and therefore, detailed planning is not possible at this stage.

In light of the above, we recommend:

- During preparation of the construction program (CC stage), acoustic review of proposed construction activities and plant/methods should be undertaken to identify work items likely to exceed Noise Management Levels.

- For those activities likely to generate high noise levels, the analysis should identify where on the site are the areas likely to result in high noise levels. This will then assist in determining the likely time period for which high noise levels will occur.

- Identify feasible acoustic controls or management techniques (use of screens, scheduling of noisy works, notification of adjoining land users, respite periods) when excessive levels may occur.

- For activities where acoustic controls and management techniques still cannot guarantee compliant noise levels, implement a notification process whereby nearby development is made aware of the time and duration of noise intensive construction processes.

Through adoption of the above, noise impacts on nearby development can be suitably managed to prevent excessive impact.

Vibration

The highest levels of vibration are likely to be produced in the demolition stage with the use of jackhammers. This activity would only produce a moderate level of vibration close to the work site. Given the closest residential receiver is approximately 25m away from the site, the impact at the surrounding properties is moderate considering amenity and structure damage.

It is possible that demolition works or impact drilling works required as part of the fitout will need to be controlled to mitigate any potential damage to the heritage CME building. It is recommended that a vibration level of 2mm/s initially be adopted for the control of vibration, noting that specific levels should be reviewed in consultation with the structural engineer and heritage consultant.

Where required, vibration monitors may be installed at critical locations to determine any impact. Ongoing review and assessment of vibration impact will be conducted throughout the construction process to determine appropriate vibration levels. The specific location and quantity of vibration monitors to monitor heritage assets are to be determined in consultation with the builder, structural engineer and heritage consultants.

8 NOISE AND VIBRATION MANAGEMENT AND CONTROL

Notwithstanding that the assessment indicates noise and vibration emissions will generally comply with the noise and vibration management levels, emissions should be minimised as part of best practice endeavours, and contingency measures should be put into place to respond to complaints or if it is found the processes needed to complete the tasks vary from those envisaged in this assessment.

The recommended measures are provided below.

8.1 NOISE AND VIBRATION MONITORING, REPORTING AND RESPONSE PROCEDURES

Given the relatively low level of impact predicted, monitoring would only be required in response to complaints, if the processes needed to complete the tasks vary from those envisaged in this assessment, or if works outside of standard hours are proposed.

Noise and vibration monitoring may either consist of manned and/or unmanned measurements. Active monitoring may be undertaken during the construction work phase of the project if required in the event complaints are received from neighbours.

In the event that complaints are received from neighbours the following process should be considered:

1. Assessing impacts and determining the offending plant/equipment/process and.
2. Locating the plant/equipment/process further away from the affected receiver(s) if possible.
3. Implementing additional acoustic treatment in the form of localised barriers, silencers etc.
4. Selecting alternative equipment/processes

Where monitoring is required and indicates exceedances of the predicted noise impacts immediate action should be taken to identify any further controls as required to reduce noise emissions so that the noise limits are complied with. Monitoring of the activities following the implementation of these additional controls will be undertaken to confirm compliance.

8.1.1 Reporting Requirements

The following is an example of reporting which may be kept on site:

1. A register of complaints received/communication with the local community shall be maintained and kept on site with information as detailed below.
2. Where noise/vibration complaints require noise/vibration monitoring, results from monitoring shall be retained on site at all times.
3. Any noise exceedances occurring including, the actions taken and results of follow up monitoring.
4. A report detailing complaints received and actions taken shall be presented.
5. All monitoring and reporting shall be conducted in conjunction with the conditions of consent.

8.1.2 Response Procedures

Complaints associated with noise and vibration generated by site activities shall be recorded on a Noise Complaint Form. The person(s) responsible for complaint handling and contact details for receiving of complaints shall be established on site prior to construction works commencing. A sign shall be displayed at the site indicating the site manager and the general public and their contact telephone number

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form may list:

- The name and address of the complainant (if provided).
- The time and date the complaint was received.
- The nature of the complaint and the time and date the noise was heard.
- The name of the employee who received the complaint.
- Actions taken to investigate the complaint, and a summary of the results of the investigation.
- Indicate what operations were occurring on site at the time of the complaint.
- Required remedial action, if required
- Validation of the remedial action.
- Summary of feedback to the complainant.

The flow chart that follows illustrate the process followed to assess construction activities prior to the start of work on site and well as the ongoing investigation into noise during the construction period.

8.2 GENERAL NOISE CONTROL METHODS

The determination of appropriate additional noise control measures will be dependent on the particular activities and the construction equipment and plant identified as requiring future acoustic treatments to those already identified in this report. This section provides an outline of available methods which have previously been used on similar construction sites and may be possible on this site.

8.2.1 Selection of Alternate Appliance or Process

Where a particular activity or plant and equipment is found to generate noise levels that exceed the management levels, it may be possible to select an alternative approach or plant and equipment. For example; the use of excavator mounted hydraulic hammers of the site may potentially generate high levels of noise. By carrying this activity by using concrete saws or smaller plant here practical, construction noise levels and/or length of exposure to construction noise levels may be reduced.

8.2.2 Acoustic Barriers

The placement of barriers at the source is generally only effective for static plant. Placing barriers at the source cannot effectively attenuate equipment which is on the move or working in rough or undulating terrain.

The degree of noise reduction provided by barriers is dependent on the amount by which the line of sight can be blocked by the barrier. If the receiver is totally shielded from the noise source reductions of up to 15 dB(A) can be effected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8 dB(A) may be achieved. Where the barrier does not obstruct line of sight, generally no noise reduction will occur.

Barriers are used to provide shielding and do not act as an enclosure. The material they are constructed from should have a noise reduction performance which is approximately 10dB(A) greater than the maximum reduction provided by the barrier screening. In this case, the use of a material such as 15mm plywood (or equivalent material) would be acceptable for the barriers.

8.2.3 Silencing Devices

Where construction methodologies or plant and equipment permit, investigate the use of silencing devices. These may take the form of engine shrouding, or special industrial silencers fitted to exhausts, for example.

8.2.4 Treatment of Specific Equipment

In certain cases it may be possible to specially treat a piece of equipment to dramatically reduce the sound levels emitted.

8.2.5 Establishment of Site Practices

This involves the formulation of work practices to reduce noise generation. This includes investigating the possibility of locating fixed plant items as far as possible from residents as well as rotating plant and activities to provide respite to receivers.

8.2.6 Notification

Notification of affected receivers of the progress of works, particularly when short-term activities likely to create higher noise levels occur, can in many cases minimise community reaction.

9 CONTROL OF CONSTRUCTION NOISE AND VIBRATION – PROCEDURAL STEPS

The flow chart presented below illustrates the process that will be followed in assessing construction activities.

10 CONCLUSION

Potential noise and vibration impacts associated with the proposed internal alterations to the Chief Mechanical Engineers (CME) building located within the North Eveleigh Precinct have been assessed and outlined in this report. Based on this assessment, it can be concluded that relevant noise and vibration requirements are able to be met for commercial uses.

Noise impacts from existing environmental noise sources on future occupants of the development, have been assessed in accordance with the requirements of the *State Environmental Planning Policy (SEPP) (Transport and Infrastructure) 2021*

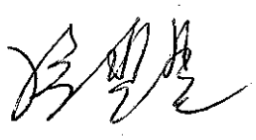
Noise and vibration impacts associated with the operation of proposed future uses of the development have been assessed in accordance with the requirements of the NSW Department of Environment and Heritage, Environmental Protection *Noise Policy for Industry* (NPfI) 2017

Construction noise and vibration impacts have been assessed using the following documents:

- NSW Environmental Protection Authority (EPA) *Assessing Vibration – A Technical Guideline.*
- British Standard BS 6472:1992 *Guide to Evaluation of human exposure to vibration in buildings (1 Hz to 80 Hz)*
- German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures*
- NSW Environmental Protection Authority (EPA) *Interim Construction Noise Guideline (ICNG)*

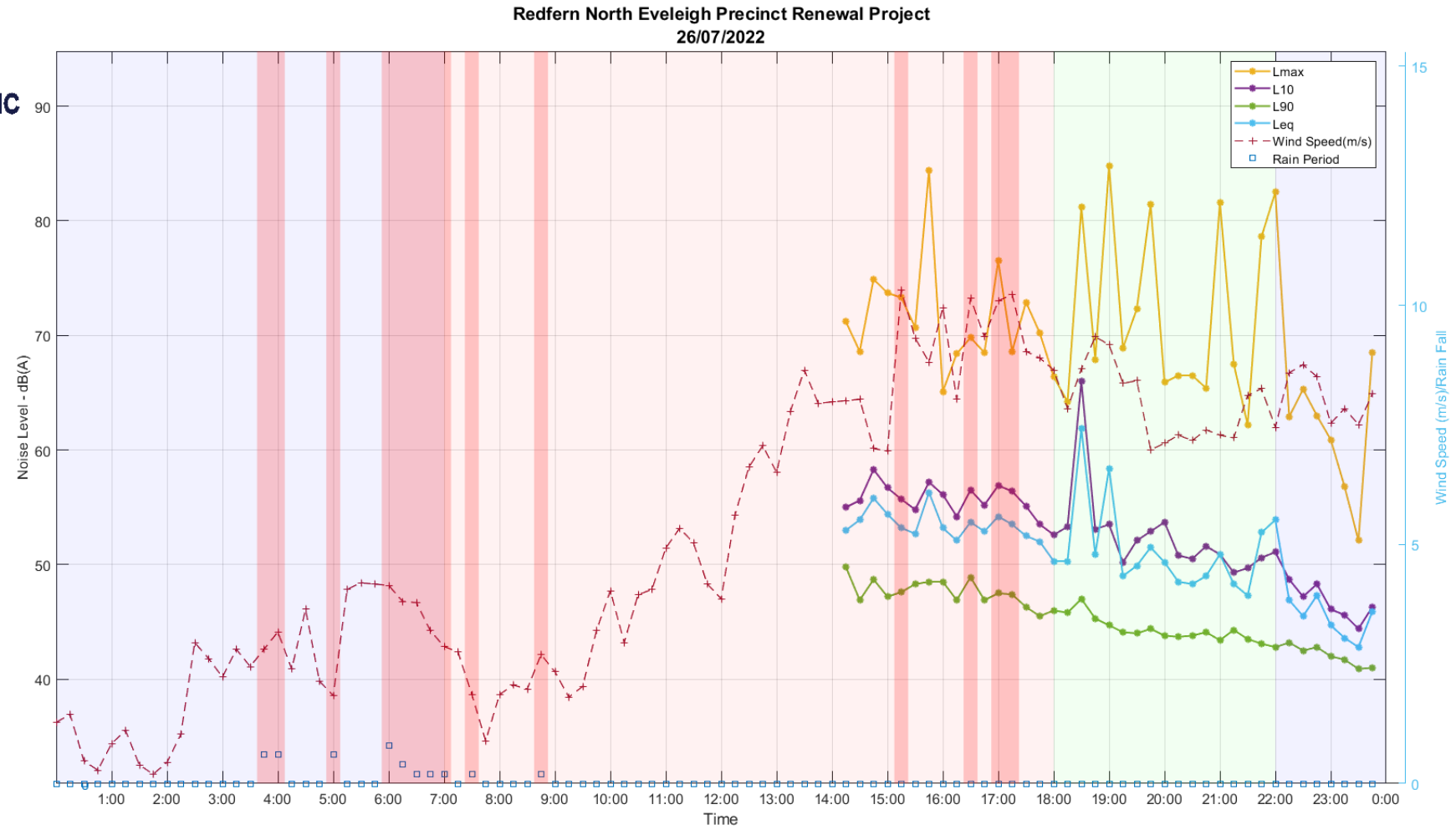
Please contact us should you have any further queries.

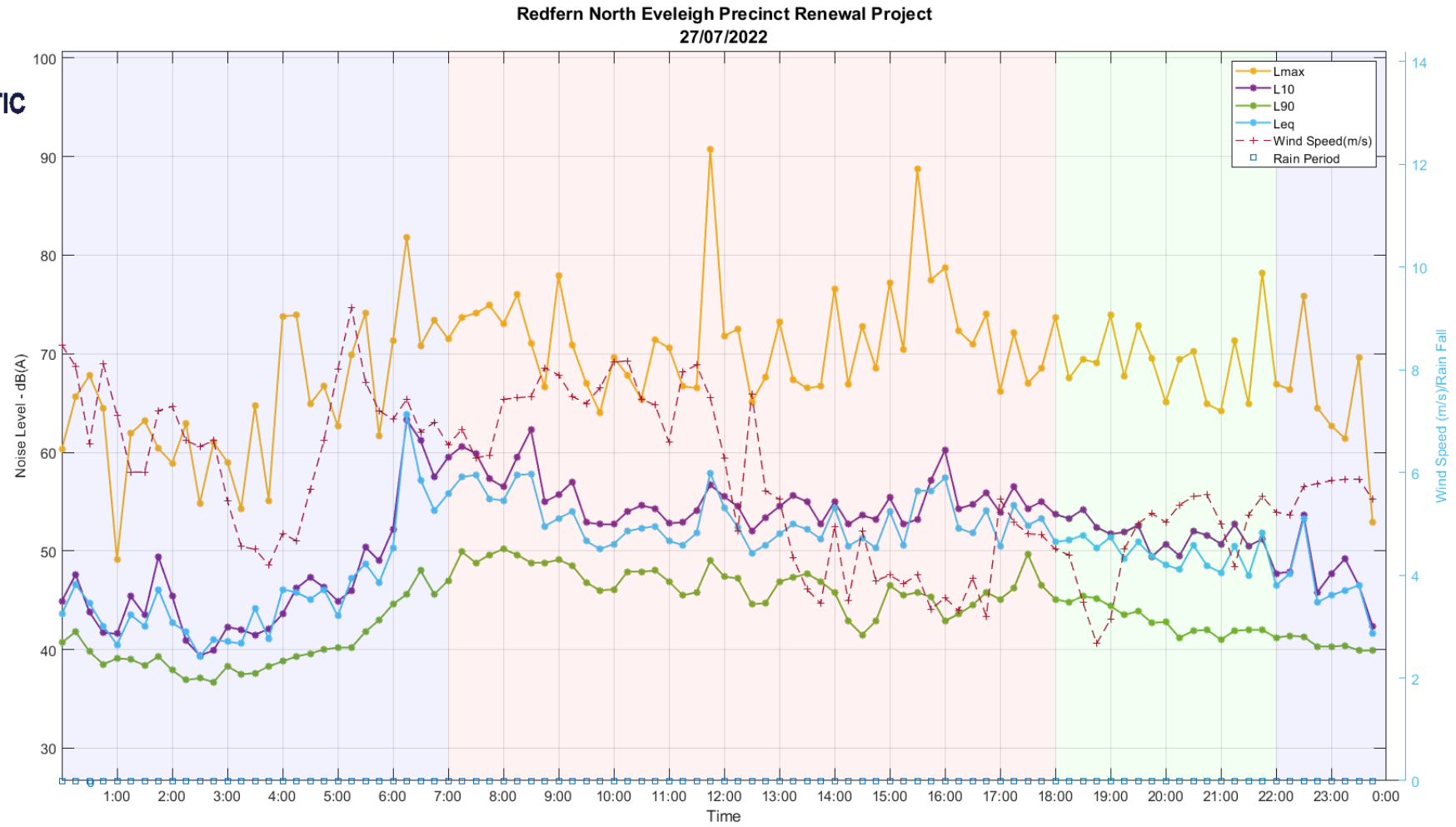
Yours faithfully,

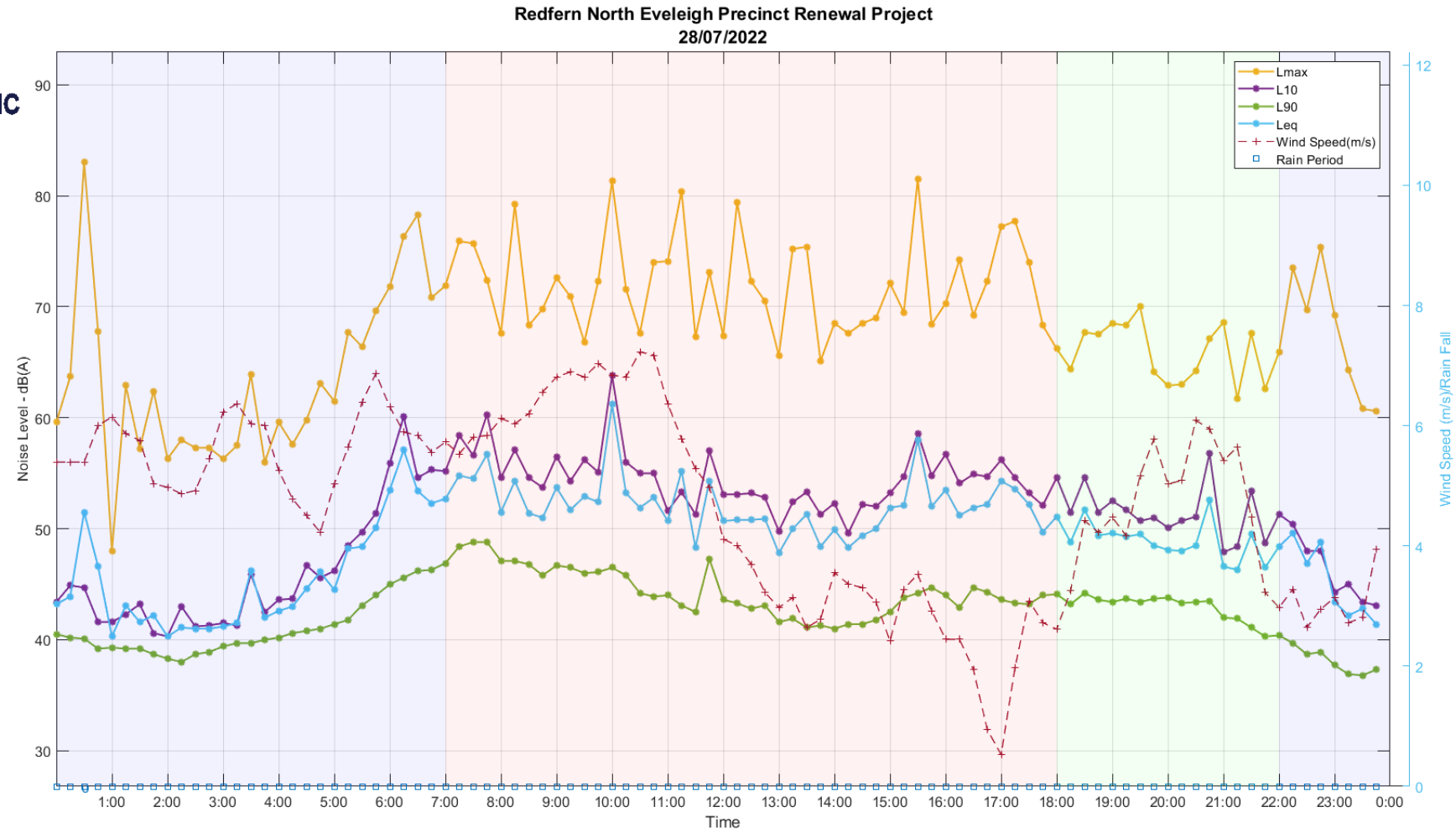


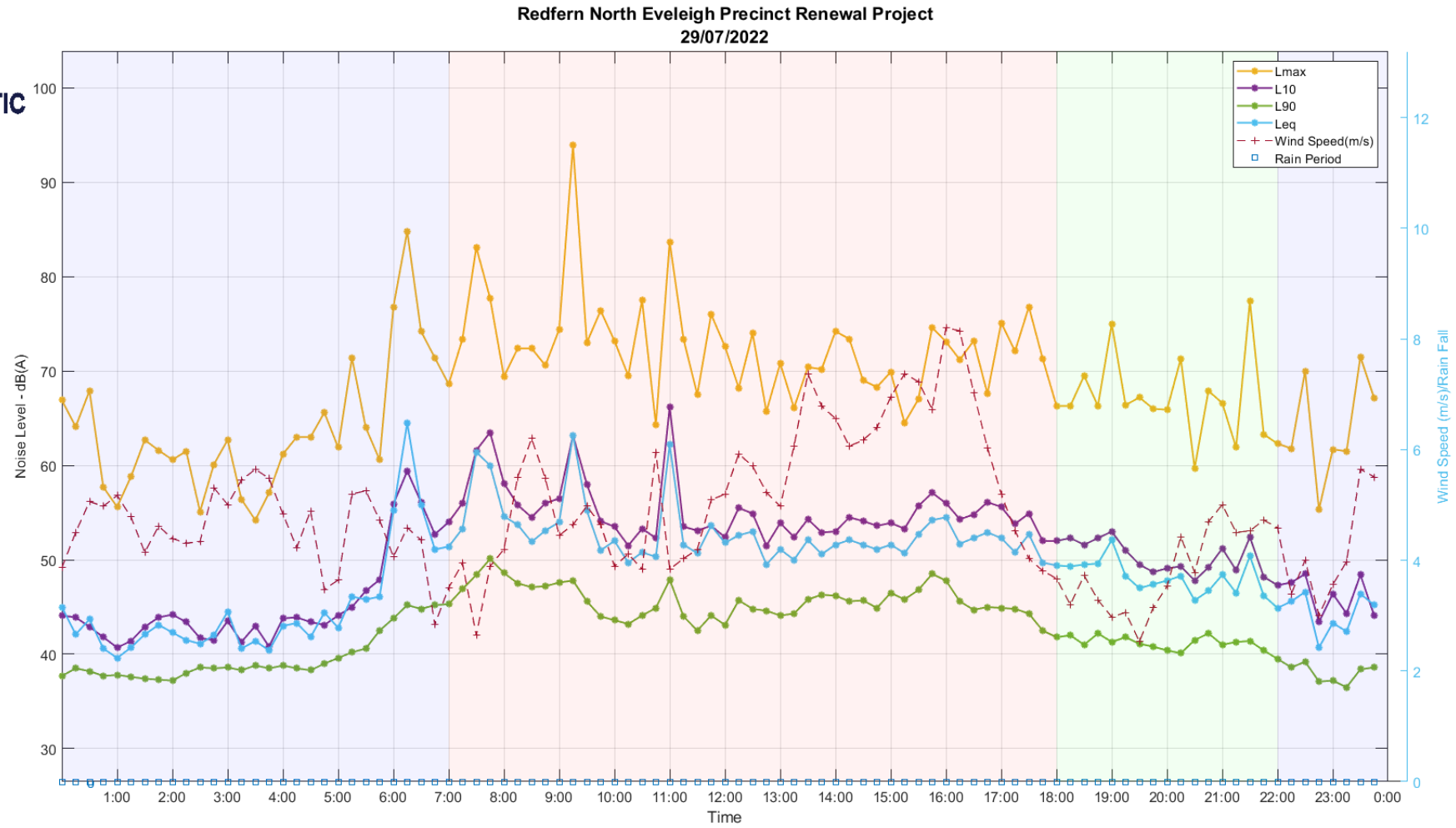
Acoustic Logic Pty Ltd
PeiPei Feng

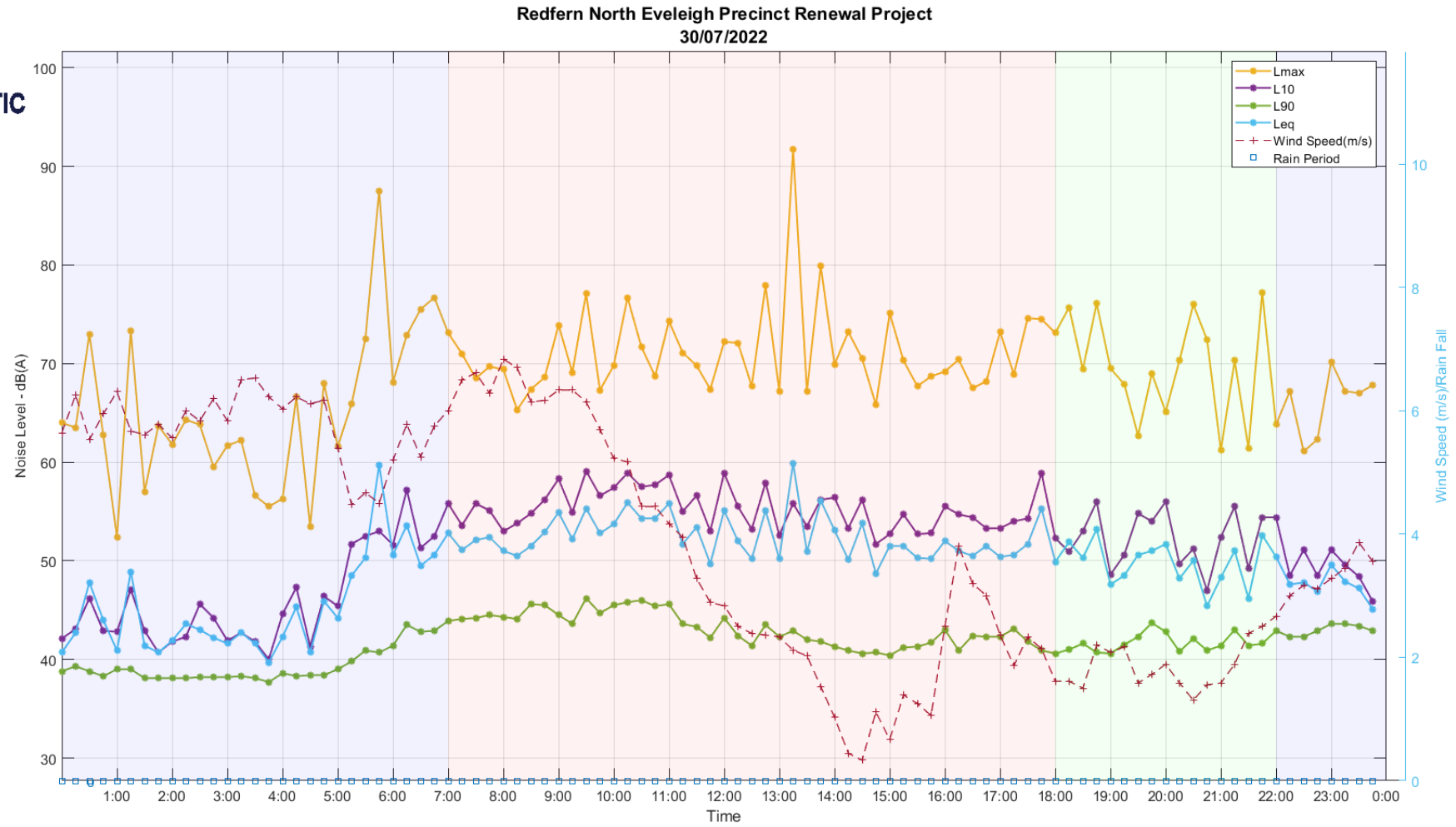
APPENDIX A – UNATTENDED NOISE MONITORING DATA (AWAY FROM RAIL LINES)

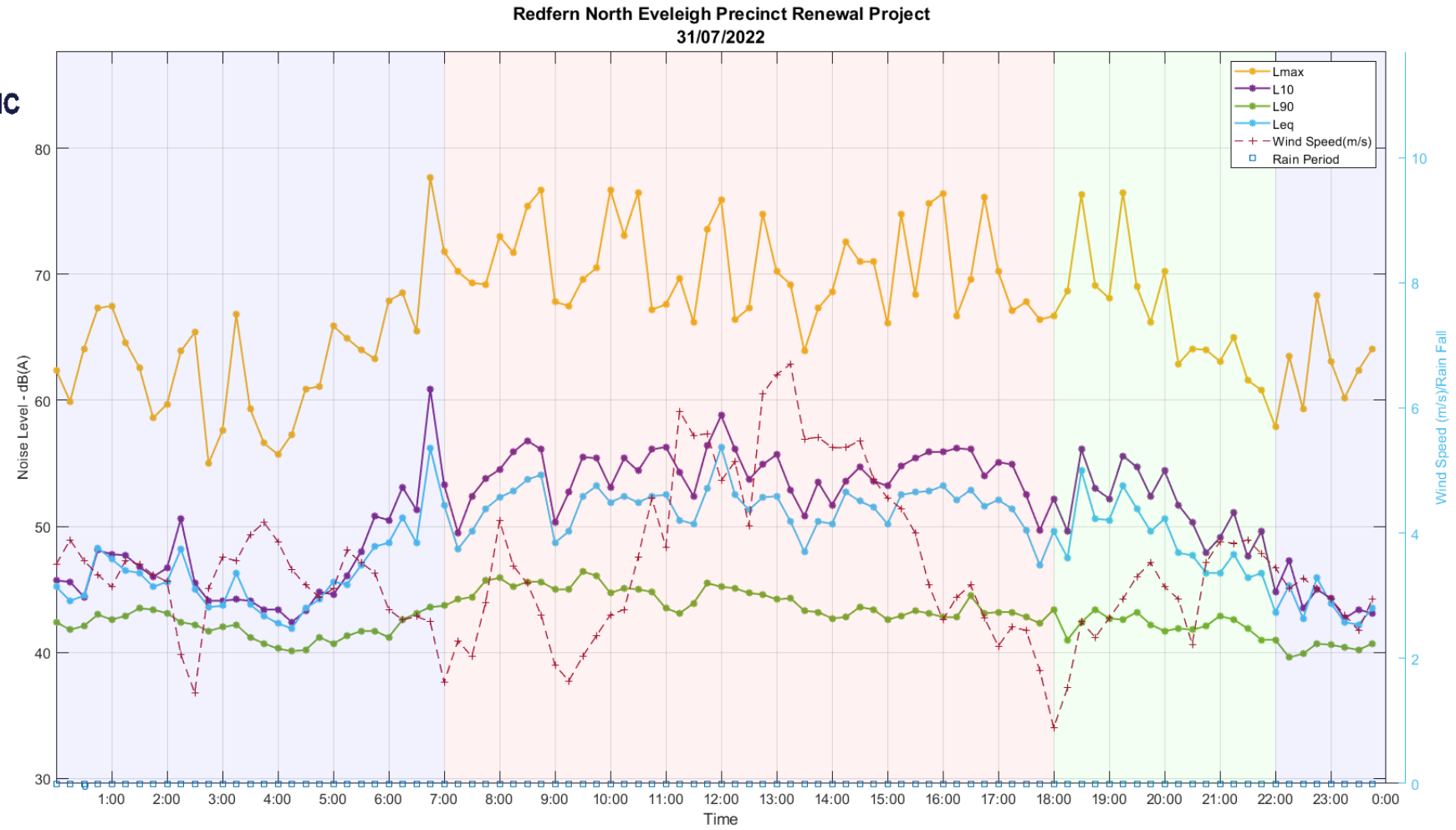

Redfern North Eveleigh Precinct Renewal Project
26/07/2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
15
10
5
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00

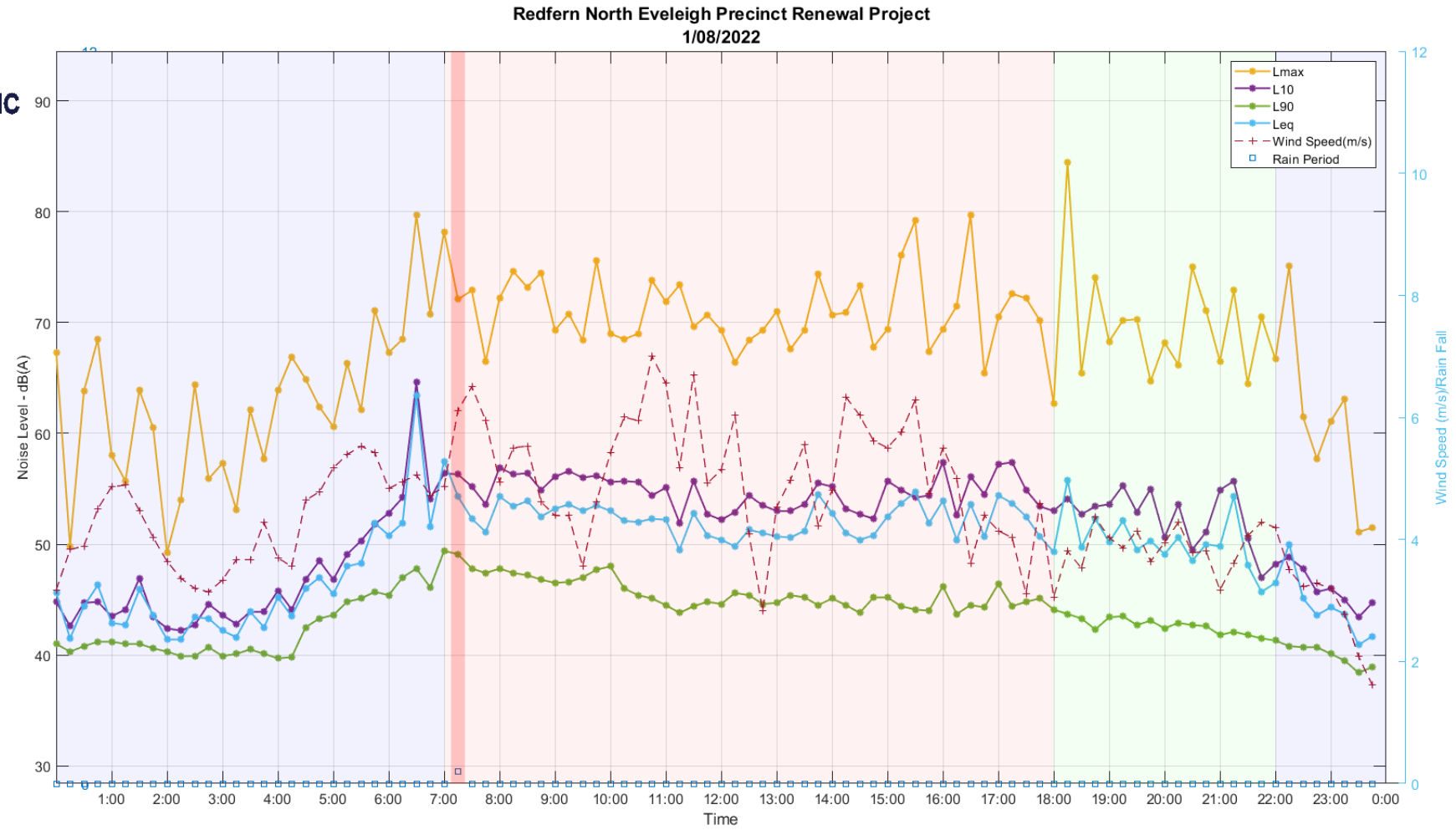

Redfern North Eveleigh Precinct Renewal Project
27/07/2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
100
90
80
70
60
50
40
30
14
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00

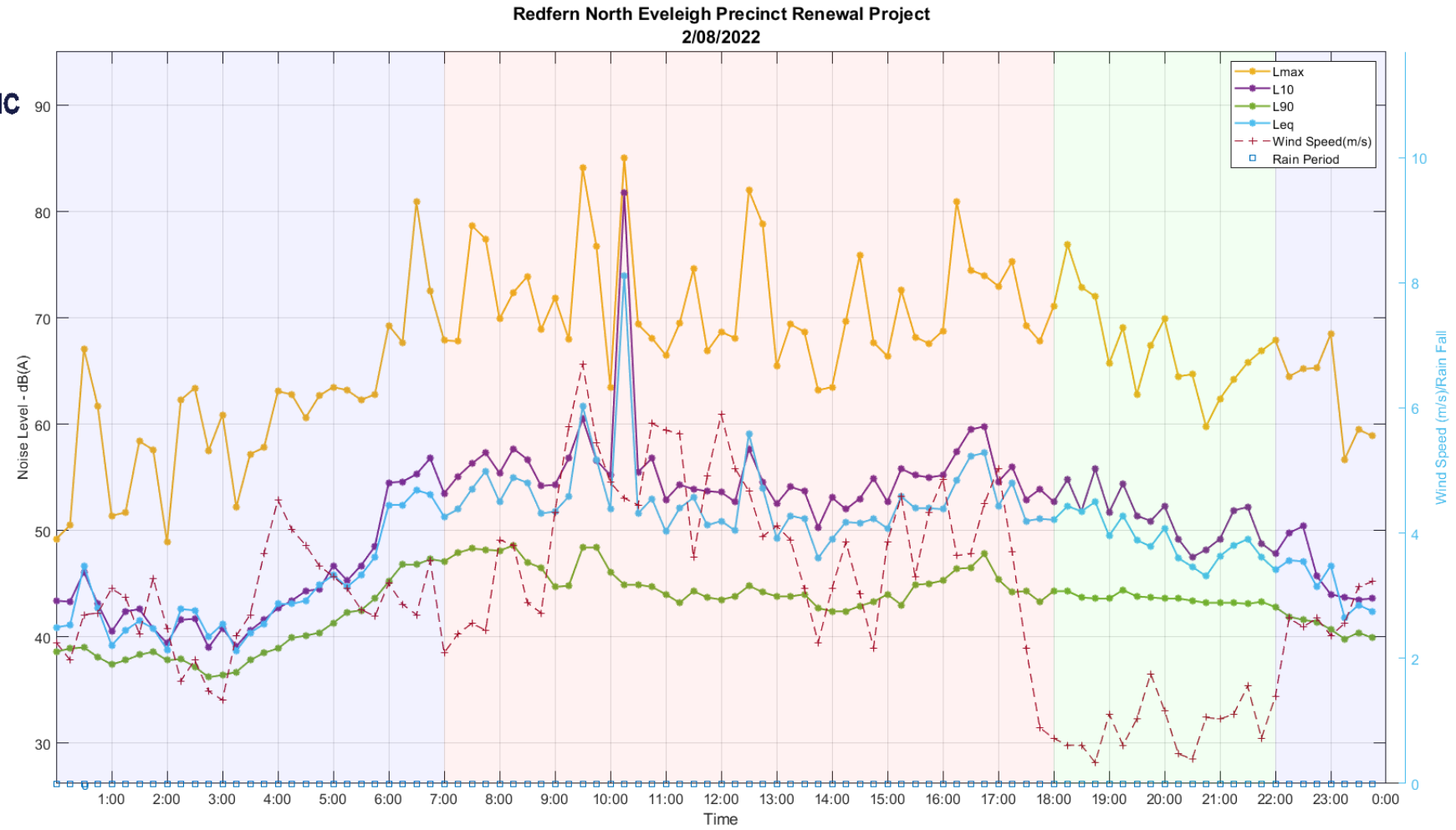

Redfern North Eveleigh Precinct Renewal Project
28/07/2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
30
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00

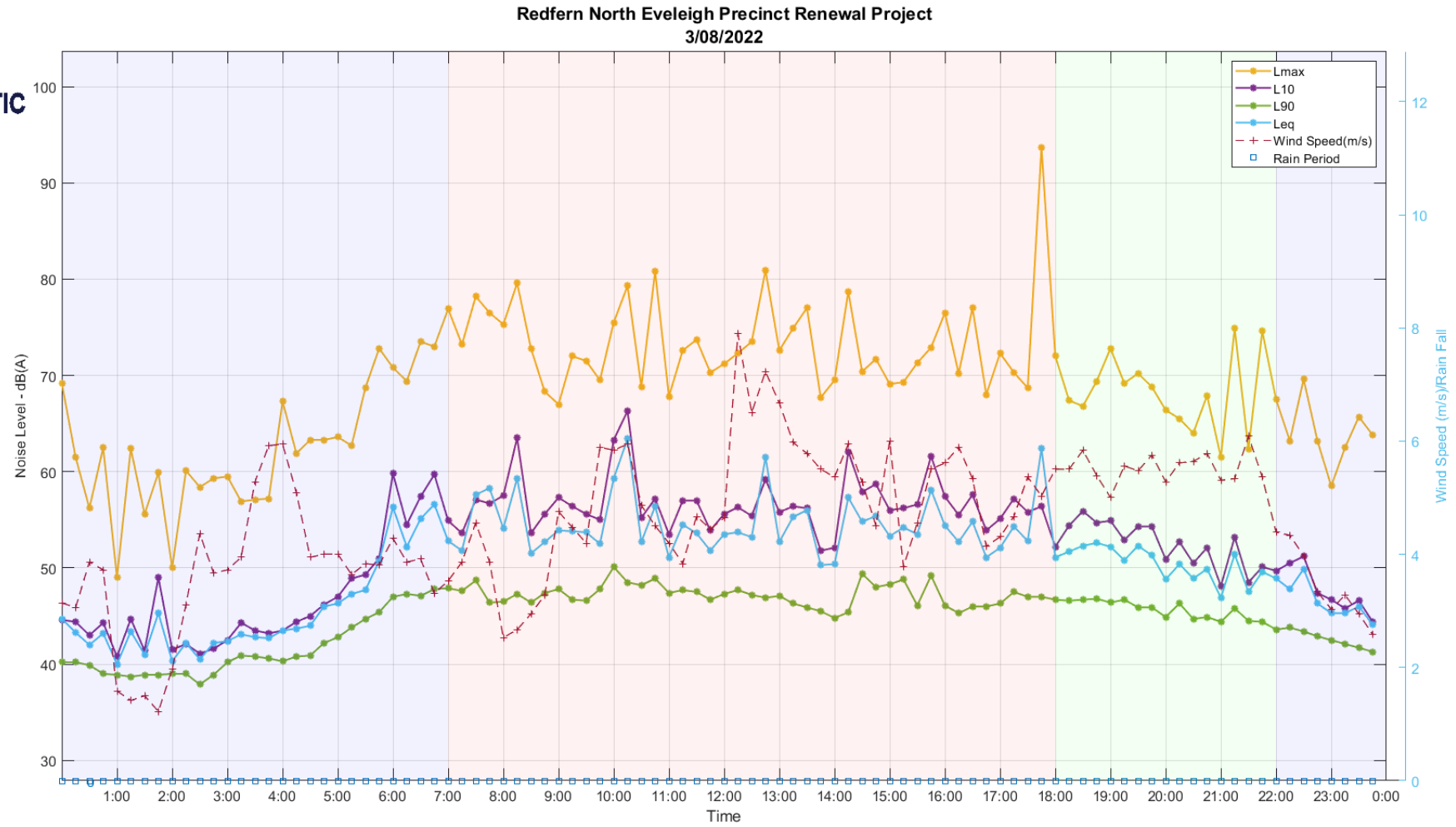

Redfern North Eveleigh Precinct Renewal Project
29/07/2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
100
90
80
70
60
50
40
30
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00


Redfern North Eveleigh Precinct Renewal Project
30/07/2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
100
90
80
70
60
50
40
30
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
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
0:00

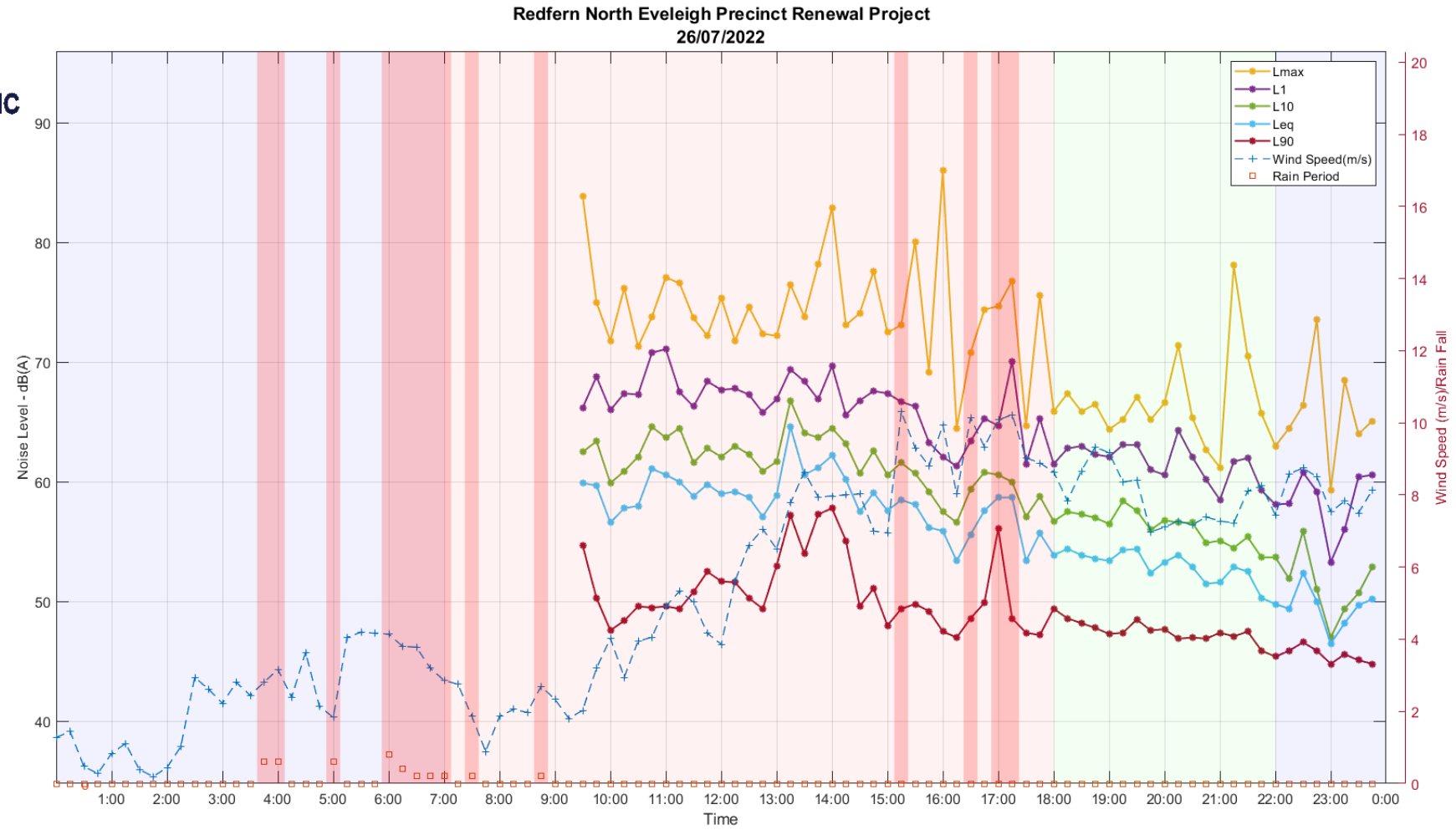

Redfern North Eveleigh Precinct Renewal Project
31/07/2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
80
70
60
50
40
30
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00

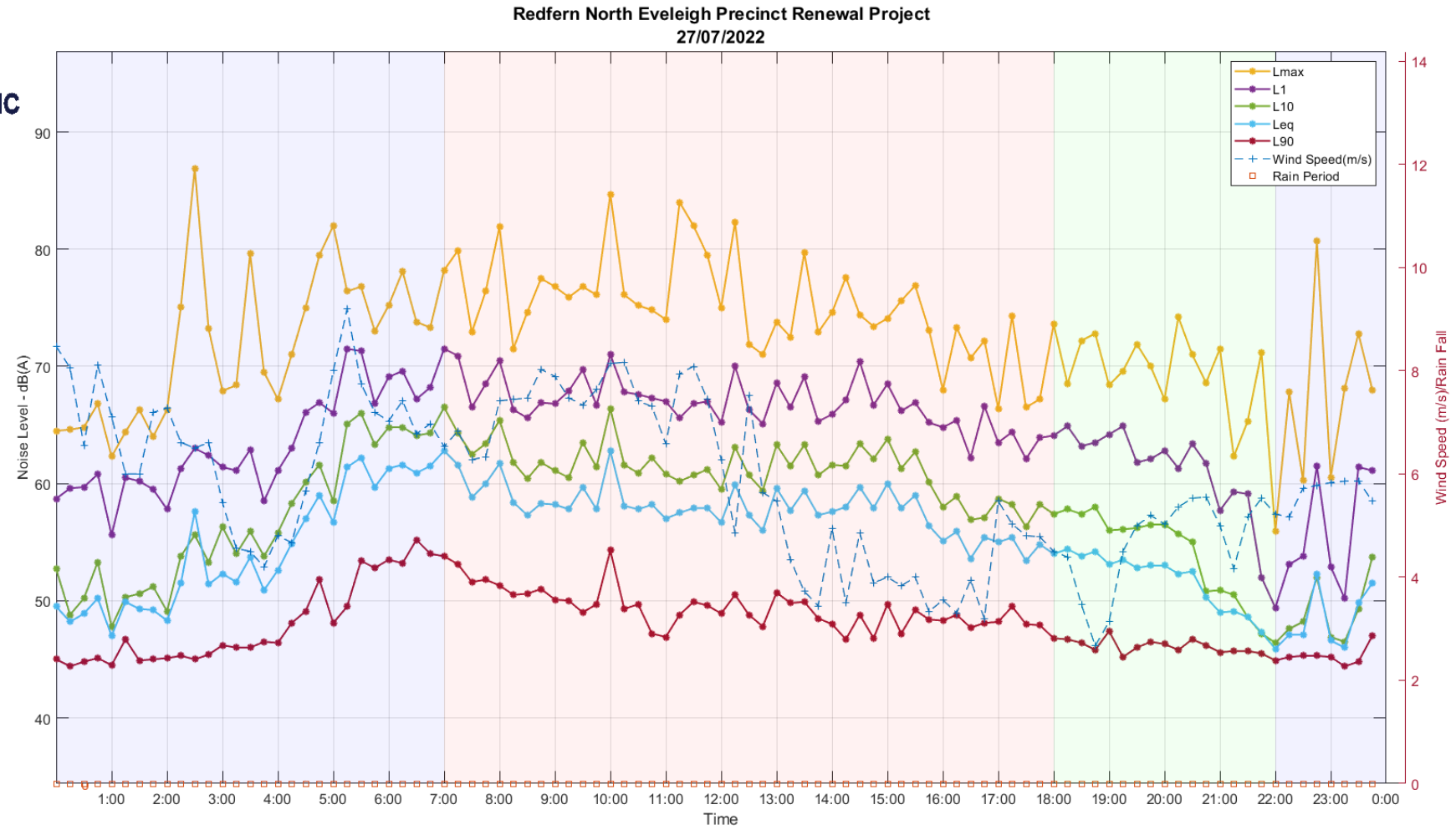

Redfern North Eveleigh Precinct Renewal Project
1/08/2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
30
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00

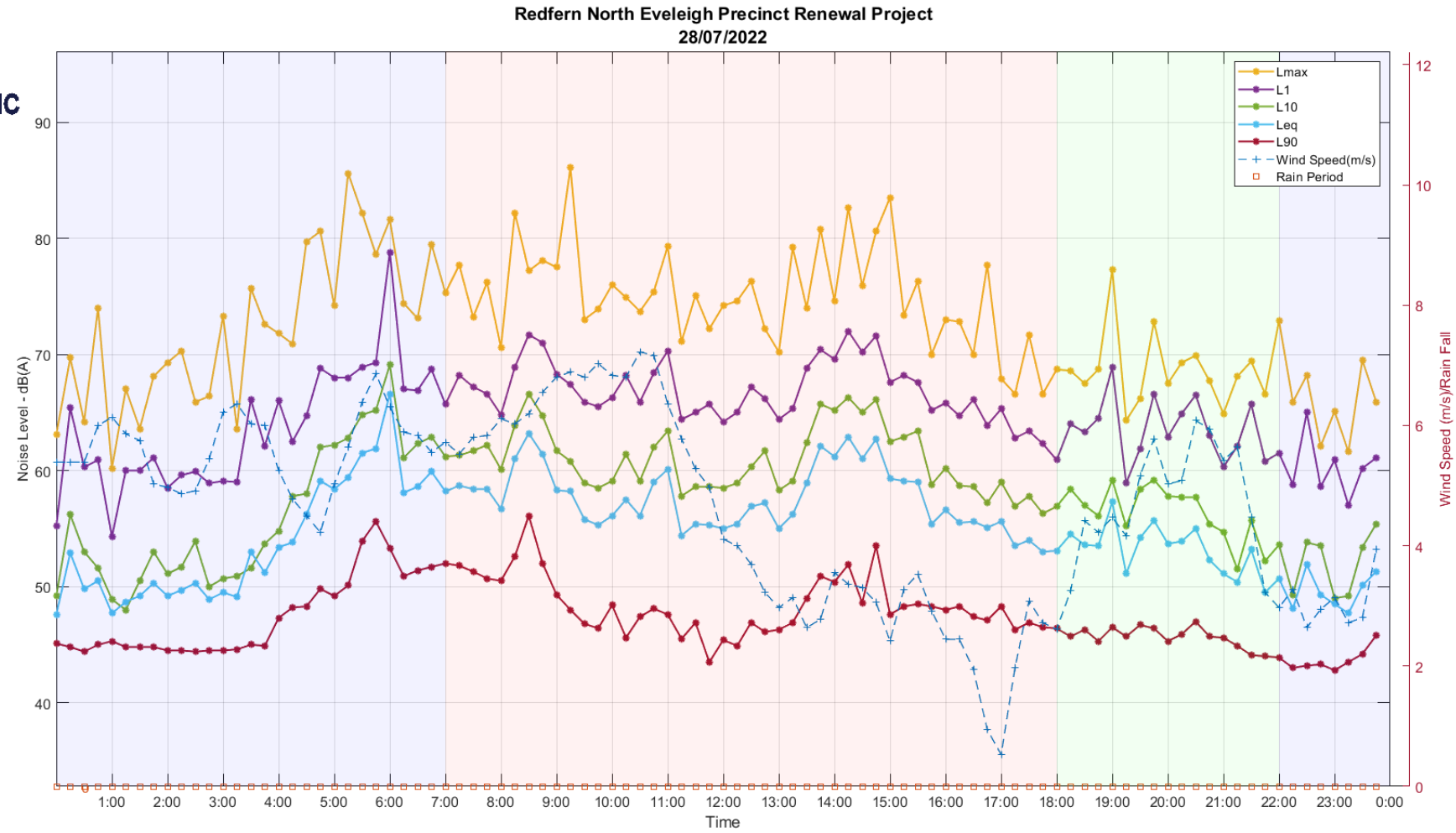

Redfern North Eveleigh Precinct Renewal Project
2/08/2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
30
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00

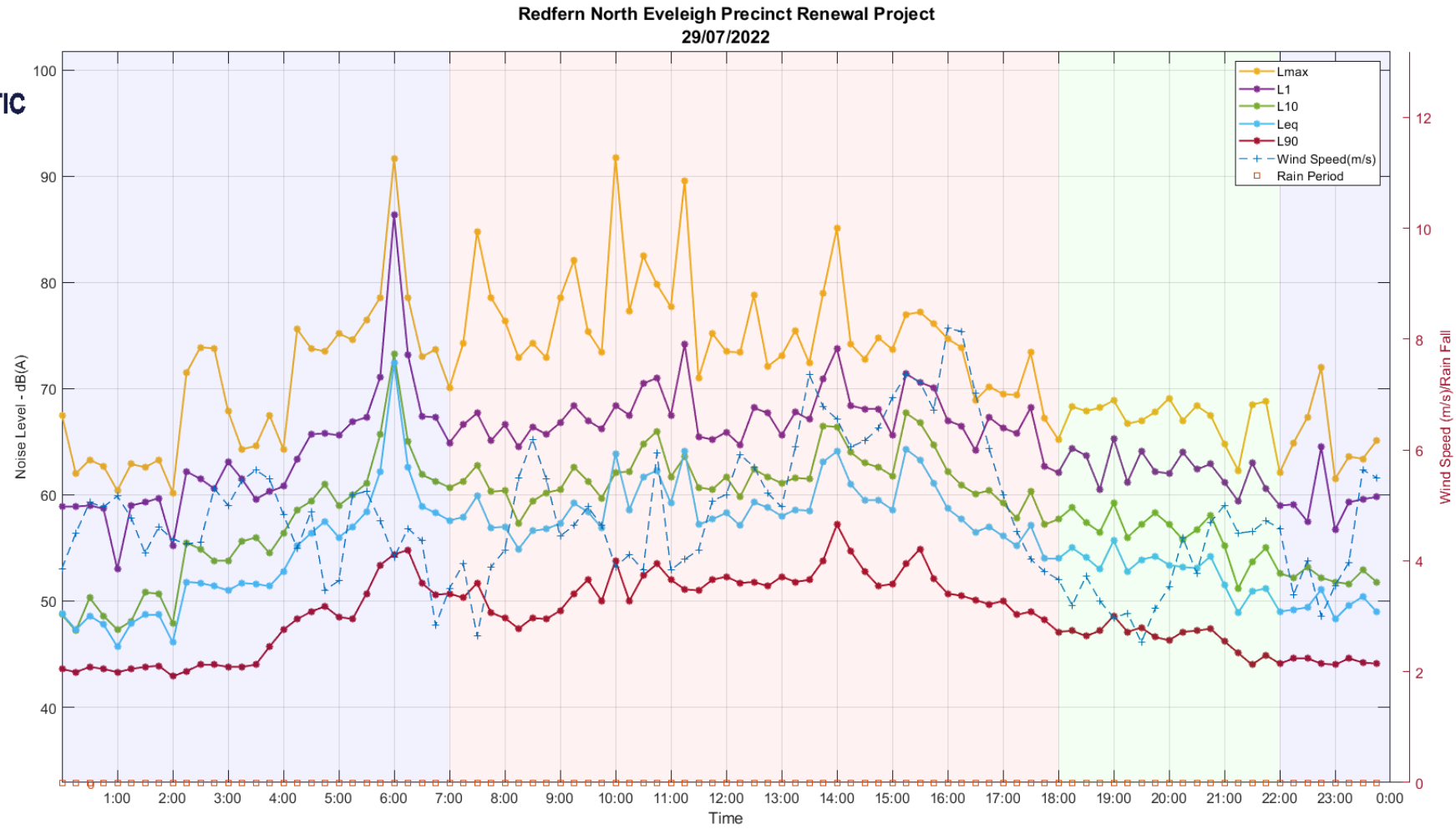

Redfern North Eveleigh Precinct Renewal Project
3/08/2022
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
100
90
80
70
60
50
40
30
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00

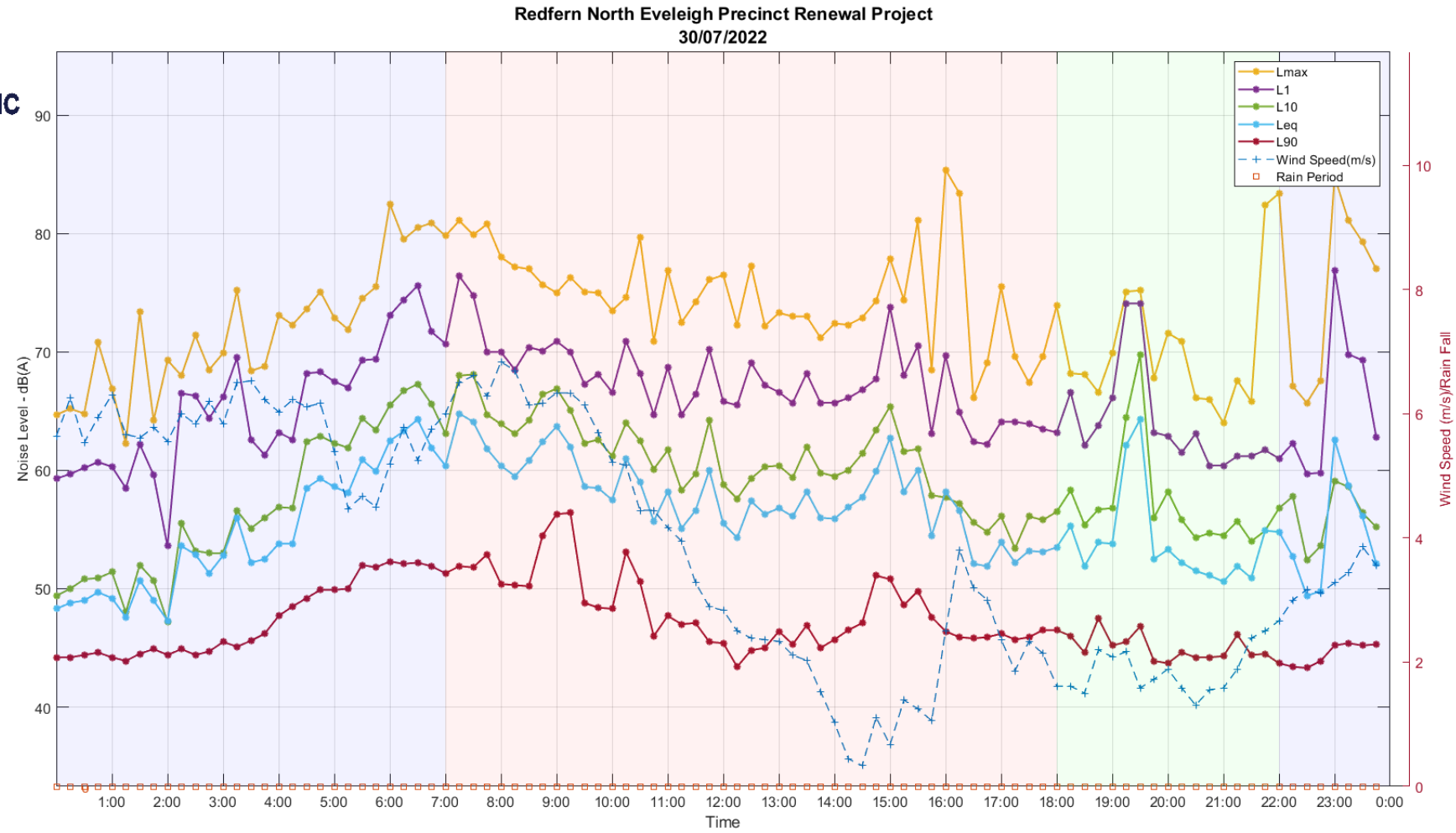
APPENDIX B – UNATTENDED NOISE MONITORING DATA (AFFECTED BY RAIL NOISE)

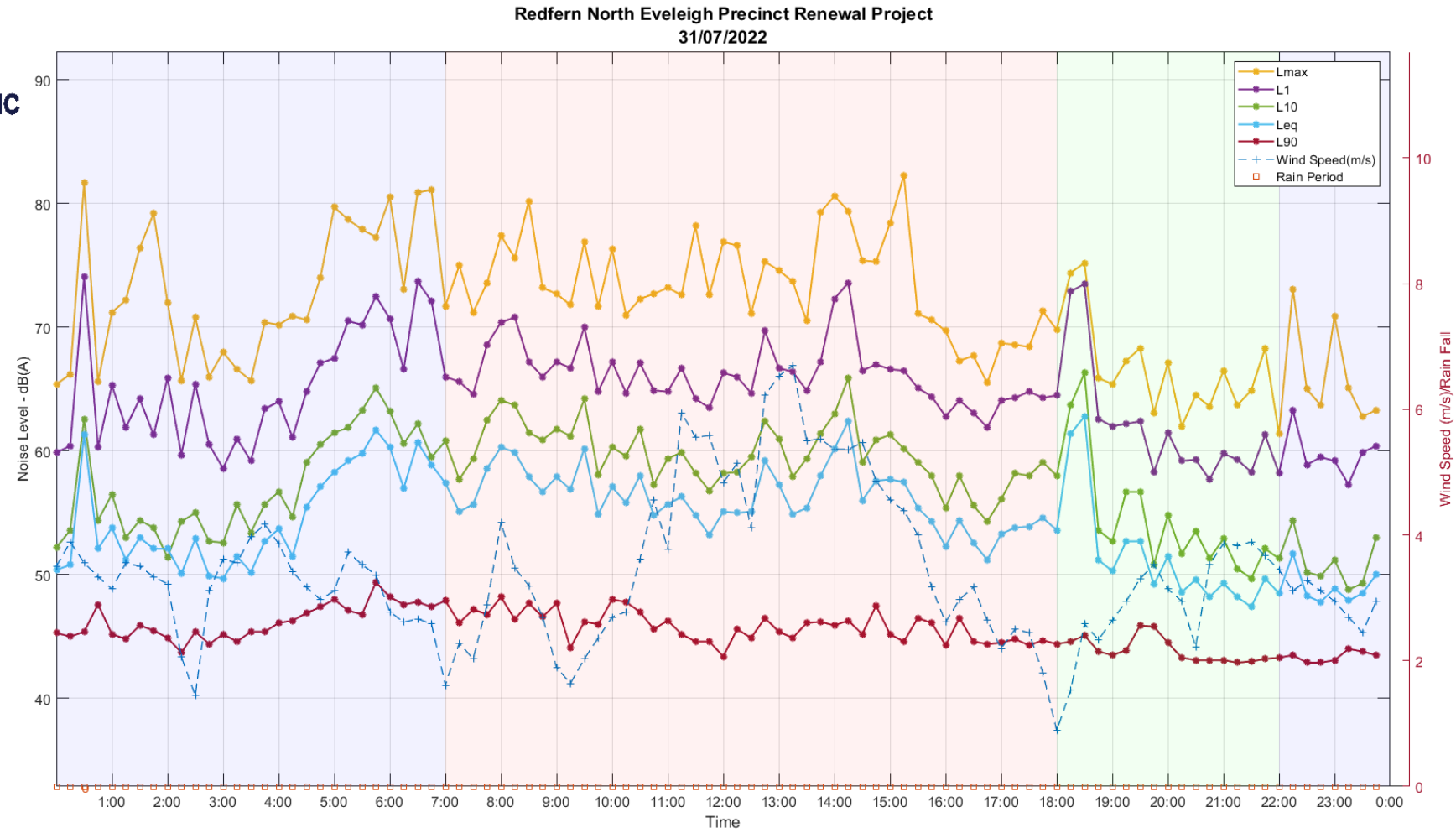

Redfern North Eveleigh Precinct Renewal Project
26/07/2022
Lmax
L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00

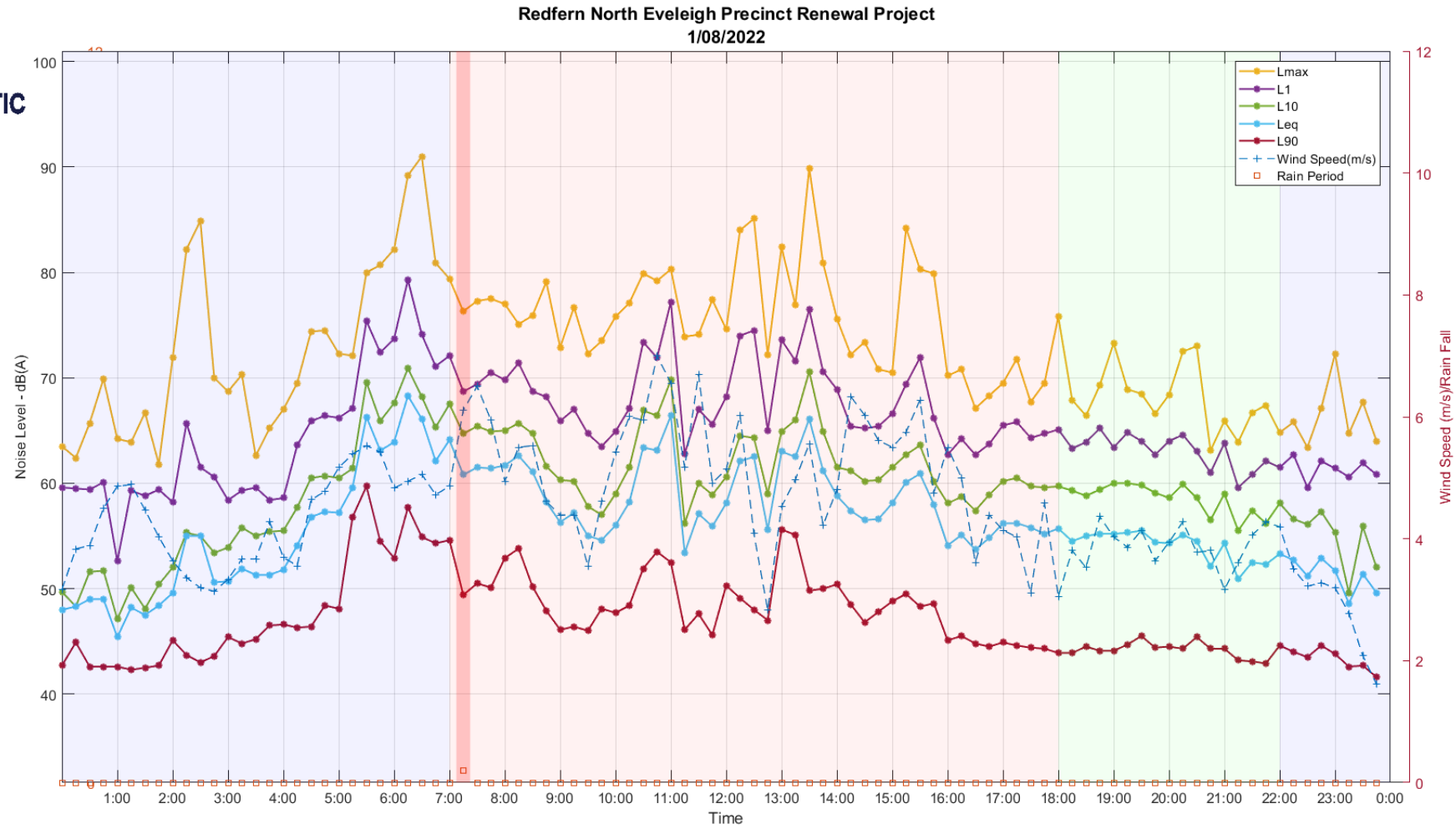

Redfern North Eveleigh Precinct Renewal Project
27/07/2022
Lmax
L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
14
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00

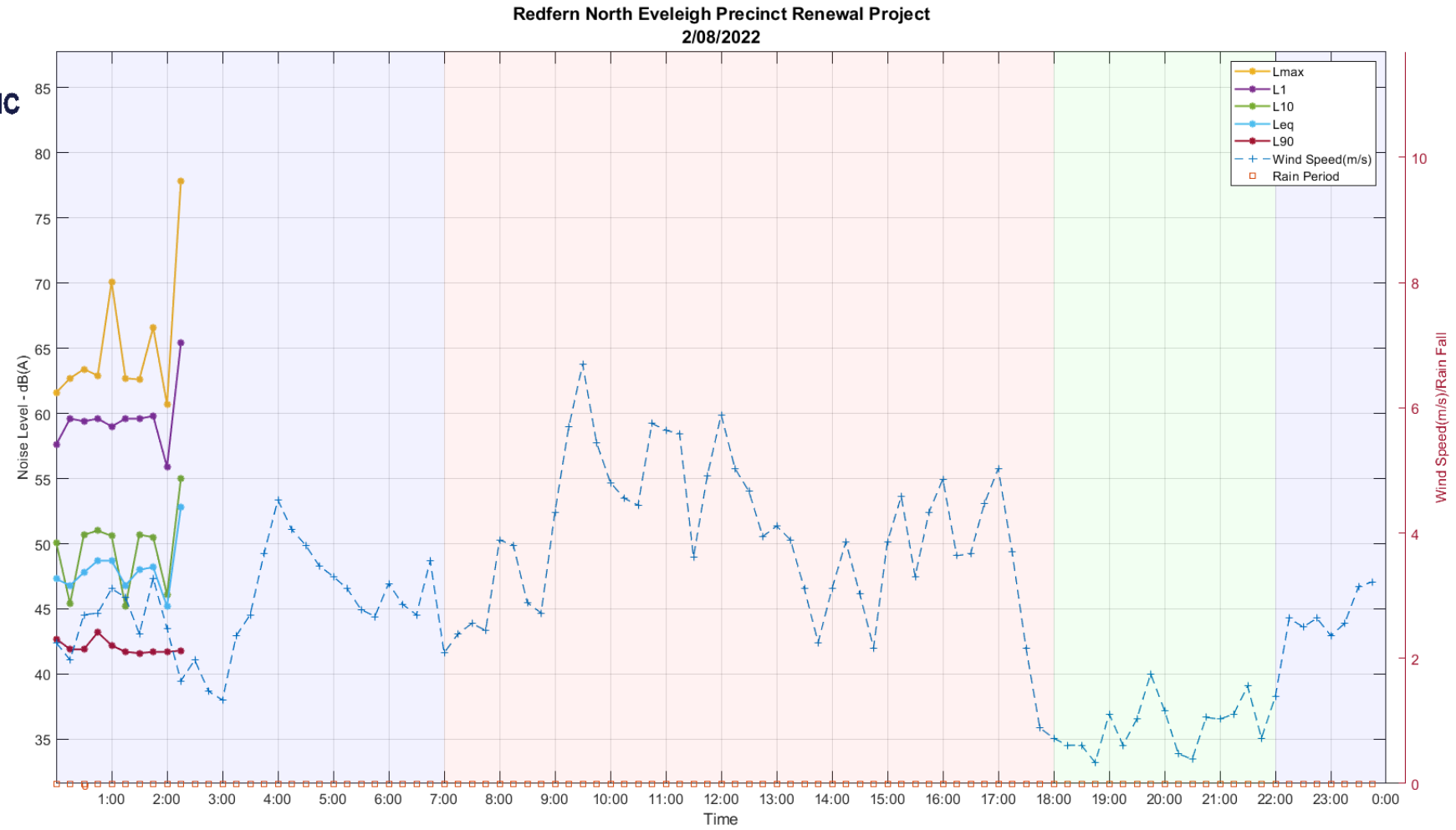

Redfern North Eveleigh Precinct Renewal Project
28/07/2022
Lmax
L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00


Redfern North Eveleigh Precinct Renewal Project
29/07/2022
Lmax
L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
100
90
80
70
60
50
40
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
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
0:00


Redfern North Eveleigh Precinct Renewal Project
30/07/2022
Lmax
L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
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
0:00


Redfern North Eveleigh Precinct Renewal Project
31/07/2022
Lmax
L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
90
80
70
60
50
40
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
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
0:00


Redfern North Eveleigh Precinct Renewal Project
1/08/2022
Lmax
L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
100
90
80
70
60
50
40
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
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
0:00


Redfern North Eveleigh Precinct Renewal Project
2/08/2022
Lmax
L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed(m/s)/Rain Fall
Time
85
80
75
70
65
60
55
50
45
40
35
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
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
0:00

APPENDIX C – SOUNDPLAN MODELING RESULTS

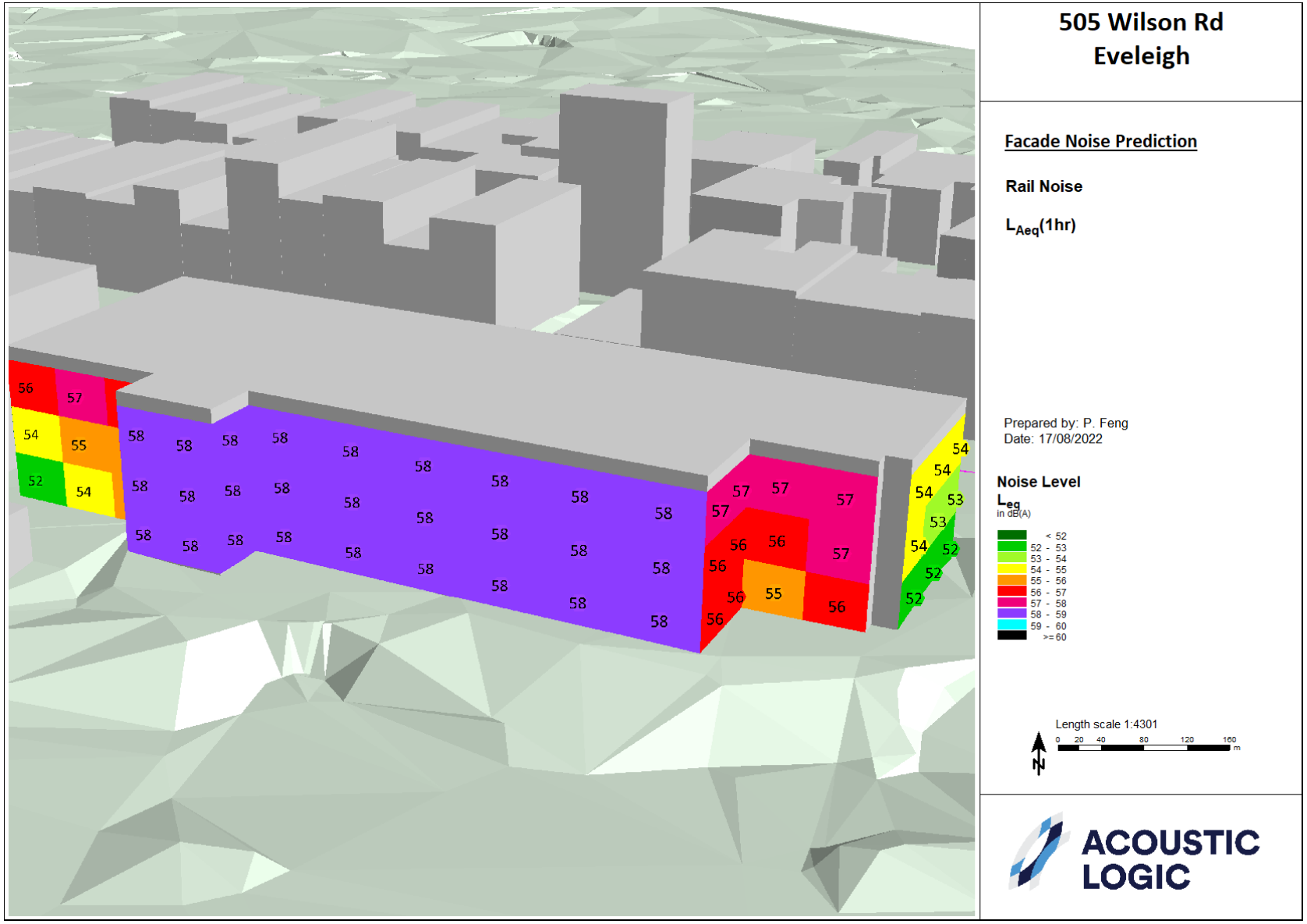


Figure 5: Southern and Eastern Facades Predicted Noise Levels – Cumulative Average Worst 1 hr

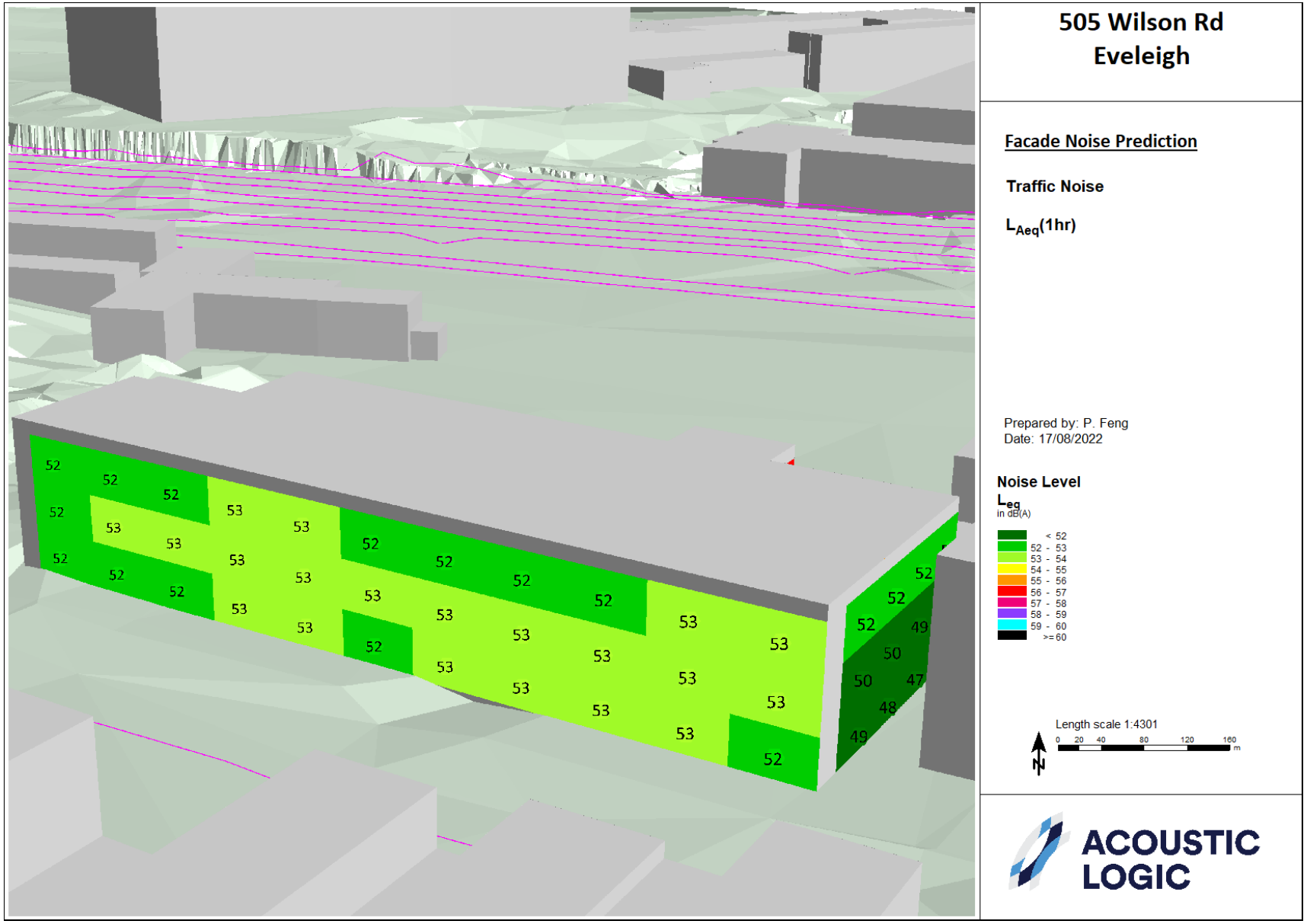


Figure 6: Northern and western Facades Predicted Noise Levels – Cumulative Average Worst 1 hr