20-22 Melwood Avenue, Forestville

Noise Impact Assessment

Stages 1 & 2

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Attention To	Forestville RSL Club Ltd

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1. INTRODUCTION

This report has been prepared to assess noise impacts associated with the proposed Forestville RSL Club redevelopment and construction of seniors independent living units (**ILU**) at 20-22 Melwood Avenue, Forestville.

Impacts assessed include:

- Noise emissions from patrons and music.
- Plant noise emissions.
- Management of noise from waste collection and other site activities.

The subject site and local context are indicated in Figure 1.

The report has been prepared for the sole purpose of a development application assessment and should not be used or relied on for any other purpose.

2. REFERENCED DOCUMENTS

2.1. BACKGROUND INFORMATION USED

The assessment is based on the following drawings, reports and other information:

- Quatro Architecture Master plan set, Revision D, dated 30th August 2024
- Quatro Architecture Club and Seniors Living set, Revision D, dated 30th August 2024
- Traffix document, '*Traffic Impact Assessment*', dated 17th September 2024

2.2. GUIDELINES

The following legislation, planning instruments and guidelines have been used in the assessment:

- Forestville RSL Club Limited Liquor Licence (Licence no. *LIQC300227332)*
- Liquor Act 2007 (as amended)
- Liquor Amendment (Night Time Economy) Act 2020
- 24-Hour Economy Legislation Amendment (Vibrancy Reforms) Act 2023
- Liquor Regulation (2019) (as amended)
- Association of Australasian Acoustical Consultants "Licensed Premises Noise Assessment Technical Guideline" (Version 2.0) ("**AAAC Guideline"**)
- NSW EPA – 'Noise Policy for Industry' ("**NPfI**") October 2017
- NSW EPA – 'Noise Guide for Local Government' ("**NGLG**") 2023
- NSW EPA – 'Road Noise Policy" ("**RNP**") March 2011
- Northern Beaches Council (**DCP**)

3. ABBREVIATIONS AND DEFINITIONS

The following Abbreviations and definitions are used in this noise impact assessment.

dB	Decibels - unit for the measurement of sound
dB(A)	A-weighted decibels. Unit of measurement for broadband sound with the A-frequency weighting applied to approximate human loudness perception to sounds of different pitch.
L_{eq}	Energy, time averaged sound level
L_{max}	Maximum sound pressure level, fast response
L_{90}	Sound level exceeded for 90% of the measurement period
R_w	Frequency weighted sound reduction index.
NRC	Average absorption co-efficient for the octave bands with centre frequencies of 250Hz to 2 kHz inclusive.
Day*	The period from 7 am to 6 pm (Monday to Saturday) and 8 am to 6 pm(Sundays and public holidays).
Evening*	Refers to the period from 6 pm to 10 pm.
Night*	The period from 10 pm to 7 am (Monday to Saturday), and 10 pm to 8 am(Sundays and public holidays).
Project Trigger Level	Target noise levels for a particular noise-generating facility.
Assessment Background Level (ABL)	Background noise level representative of a single period.
Rating Background Level (RBL)	The overall, single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period. (Calculated in accordance with NPfI unless noted otherwise)

* Unless nominated otherwise.

4. SITE DESCRIPTION AND THE PROPOSAL

The project site is located at 20-22 Melwood Avenue, and consists of:

- An existing RSL development,
- Existing 2 lane road located east of the site, being Melwood Avenue,
- Public oval located south west of the site,
- Forestville Community Hall and dog park located west of the site and,
- Single and double storey residents located variously around the site, primarily north and east of the site.

4.1. DESCRIPTION OF THE PROPOSAL

The proposal includes a redevelopment of the existing Forestville RSL site to include the following:

- Basement level parking for RSL patrons, ILU residents and visitors. Garbage storage is also proposed within the RSL basement parking,
- Ground level RSL club, including indoor and alfresco gaming areas, outdoor dining, bar and lounge areas,
- Ground level ILU's consisting of 2- and 3-bedroom units and,
- A further 2 levels of ILU's. A portion of the ILU's is to be constructed over the club building.

4.2. HOURS OF OPERATION

The current liquor licence for the Forestville RSL club permits unrestricted hours for consumption on premise.

Take away sales are permitted as follows -

- Monday to Saturday - 5.00 AM to 11.00 PM
- Sunday- 10.00 AM to 10.00 PM
- Good Friday – Not permitted
- Christmas Day – Not permitted
- December 31st – Normal Trading

Gaming shut down hours required by the consent are 4am to 10am every day -

Gaming machine shutdown hours

Day	Start Time	End Time
Monday	04:00 AM	- 10:00 AM
Tuesday	04:00 AM	- 10:00 AM
Wednesday	04:00 AM	- 10:00 AM
Thursday	04:00 AM	- 10:00 AM
Friday	04:00 AM	- 10:00 AM
Saturday	04:00 AM	- 10:00 AM
Sunday	04:00 AM	- 10:00 AM
Public holiday	04:00 AM	- 10:00 AM

5. SENSITIVE RECEIVERS

The following table lists the nearest/potentially most impacted sensitive receivers surrounding the subject site. An aerial photo of the site indicating nearby noise sensitive receivers and measurement locations is presented in Figure 1.

Table 1 – Sensitive Receivers

Receiver (Refer Figure 1)	Receiver Type	Comment
R1	Residential	Single and double storey residential developments located north of the site along Forestville avenue and Melwood Avenue
R2	Residential	Single and double storey residential developments located east of the site along Melwood Avenue
R3	Residential	Single and double storey residential developments located west of the site along Forestville Avenue
C1	Commercial	Forestville Scout Hall, two storey development
C2	Commercial	Forestville Youth Centre
P1	Active Recreation	Forestville Dog Off Leash Area
P2	Active Recreation	Melwood Oval

Figure 1 – Site Plan Showing Local Context

-	Residential
-	Commercial
-	Recreation
-	Other (as noted)

6. ENVIRONMENTAL NOISE AND VIBRATION SOURCES

The following significant noise sources have been identified as requiring assessment:

- Noise emissions from patrons and music.
- Services plant noise emissions.
- Management of noise from waste collection and other site activities.
- Noise impacts from additional traffic on nearby public roads generated by the development.

6.1. NOISE ASSESSMENT GUIDELINES

The noise sources in Section 6 have different characteristics. Consequently, they require different impact assessment methodologies. These are summarised in the following table.

Table 2 – Noise Impact Assessment - Applicable Guidelines

Noise Source	Guideline Adopted	Comment
Patrons and music	No directly applicable guideline.	Refer discussion below
Services plant	NPfI	Cumulative noise from plant and site vehicle noise assessed.
Vehicle and patron movements external to the buildings	NPfI for vehicle movements	Patron noise impacts managed to minimise impacts.
Management of noise from waste collection and other site activities	NGLG	Activities managed to minimise impacts.
Noise impacts from additional traffic on nearby public roads generated by the development	RNP	

The local DCP also requires and assessment of noise emissions (refer below).

6.1.1. Patrons and Music/Entertainment

Liquor Act 2007

From mid-2024, the Vibrancy Reforms legislation designates Liquor and Gaming NSW as the regulator of entertainment sound-related complaints for all licensed premises.

To help Liquor and Gaming NSW effectively carry out this role, amendments have been made to relevant pieces of legislation. These amendments will ensure that entertainment sound emanating from licensed premises is solely managed through the *Liquor Act 2007*. This means that noise-related conditions of development consent and 'offensive noise pollution' laws will no longer apply when such matters are regulated by the *Liquor Act 2007*.

The Vibrancy Reforms will also increase the number of disturbance complainants needed for a complaints to be formally considered. The number will increase from 3 to 5 (and the complainants must be from different households). Complainants must also attempt to resolve disputes with the licensee before lodging a complaint.

How long a complainant has been living in the household (referred to as the "order of occupancy" in the legislation) will become a central consideration in disturbance complaints. This will help to prevent when newcomers to a neighbourhood work to shut down or wind back the entertainment offerings and/or operating hours of established venues.

The Vibrancy Reforms:

- Remove restrictions on live entertainment that generally seek to restrict the type of live music, whether it is amplified or not, the location on the site, etc.
- Conditions of development consent relating to entertainment noise emitted from licenced premises or trading hours cease to have effect.
- Formalise procedures related to complaints including who is able to make a complaint and the minimum number of complainants.
- Vary how noise is assessed depending on the "order of occupancy".

  When the licenced premises was operating prior to the complainant occupying their premises, a more relaxed test is applied, that is an *order of occupancy* test rather than *unduly disturbed*.

  In addition, a complainant cannot be considered to be *unreasonably and seriously disturbed* if the alleged disturbance was reasonably foreseeable by the complainant, or if the complainant could take reasonable steps to mitigate the impact of the disturbance on the complainant but did not.

Notwithstanding:

- Clause 79A of the Liquor Act states Licensed premises must not disturb quiet and good order of neighbourhood. A licence does not authorise business to be conducted on licensed premises in a way that unduly disturbs, or unreasonably and seriously disturbs, the quiet and good order of the neighbourhood in which the licensed premises are located.
- The licenced premises may already have noise limits in their licence (which will remain) or the Secretary may add noise abatement conditions on a licence when valid complaints are

received in a manner permitted by the acts, or the Secretary is satisfied the quiet and good order of the neighbourhood of the licensed premises are being unduly disturbed.

Objective tests to determine the levels of impact corresponding to *unreasonably and seriously disturbed* and *unduly disturbed* have not been established.

Historically, Liquor and Gaming typically applied the following licenced premises noise limits at residential receivers:

> *The L_{A10} noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz–8kHz inclusive) by more than 5dB between 7:00 am and 12:00 midnight at the boundary of any affected residence.*
>
> *The L_{A10} noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz–8kHz inclusive) between 12:00 midnight and 7:00 am at the boundary of any affected residence.*
>
> *Notwithstanding compliance with the above, the noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12:00 midnight and 7:00 am.*

The historically applied limits can be used to indicate if residential receivers are likely to be *unduly disturbed* where a new licenced premises is proposed and impacts existing receivers.

For existing licenced premises, different and, by definition, more relaxed criteria can be adopted depending on the situation, with the following proposed:

1. <u>Where the existing hours of operation are unchanged</u> - do not increase existing noise levels, or the following noise levels, whichever results in the higher noise level.

   The L_{A10} noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz–8kHz inclusive) by more than 10dB between 7:00 am and 12:00 midnight at the boundary of any affected residence.

   The L_{A10} noise level emitted from the licensed premises shall not exceed the background noise level in any Octave Band Centre Frequency (31.5Hz–8kHz inclusive) between 12:00 midnight and 7:00 am at the boundary of any affected residence.

At some frequencies, the application of the "background + 0" criterion may result in criteria that less than the threshold of hearing. In these cases the threshold of hearing has been adopted.

2. <u>For new residential development near an existing licenced premises - habitable rooms are to be provided with an alternative ventilation source complying with the BCA and an acoustically treated building envelope so that the noise level emitted by the licenced premises in any habitable room does not generally exceed the greater of:</u>

   - 23 $L_{A10,15min}$. with windows closed, between 10pm and 7am, and 28 L_{A10} at other times.
   - the background noise level in the room with the ventilation system operating.

Application to Subject Development

As indicated above, development consents can no longer contain conditions that limit noise levels at source or receiver, or regulate how live music is played.

Notwithstanding, an impact review has been undertaken to assess the likelihood of the proposed use causing the neighbourhood to be *unreasonably and seriously disturbed* or *unduly disturbed* (as applicable). Where significant adverse impacts are likely, noise mitigation and management that could be implemented to manage impacts is discussed.

In reviewing the potential impacts on residential properties, two situations have been identified:

- Noise from the licenced premises to existing dwellings. This will be (conservatively) assessed using the *unduly disturbed* test (i.e. the most stringent test) given the major changes to the club proposed.

- Noise from the licenced premises to the new dwellings proposed as part of the subject development. This will be (conservatively assessed using the *unreasonably and seriously disturbed* test according to Item 2 above.

The most relevant licenced premises assessment periods are 6pm to 10pm, 10pm to midnight and midnight to 7am. Project specific criteria have been determined for each most affected receiver location using these guidelines and the measured rating background noise level applicable to the operating time.

For the existing residences, where the external post-midnight criterion in any active band is less than the threshold of hearing plus 10 dB (indicating that the internal noise level with an open window would be inaudible), the threshold of hearing plus 10dB will be adopted as the external assessment criterion. The following table indicates the internal threshold of hearing levels adopted.

Table 3 - Threshold of Hearing (ISO226:2003),dB

Octave Band Centre Frequency								
31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
60	33	22	11	4	2	-1	5	13

Other Site Noise Emission Sources

Criteria to assess non liquor and gaming noise emissions from the operation of the proposed development have been developed using the NPfI. This policy was primarily developed to assess noise impacts from industrial development, but can also be adapted to assess other types of development such as commercial buildings and air conditioning plant.

For each receiver type:

- Receivers have been grouped into "catchments". These are receivers that have been assessed as having similar characteristics (receiver type and ambient noise level). These are shown in Figure 1

- For each catchment, representative noise assessment trigger levels have been determined based on NPfI guidelines. The trigger levels have been adopted in this assessment as criteria.

These will be used to indicate whether additional mitigation is needed to manage noise emissions.

- For each catchment, noise emissions have been assessed to the most impacted receiver. This means impacts at all other receivers within that catchment will be less. Compliance at the most impacted receiver will therefore also result in compliance at all other receivers within the catchment.

For residential receivers, three criteria are assessed:

- Intrusive assessment– that is, how audible loud is the emitted noise compared to ambient, background noise). Criteria are determined relative to the measured rating background noise level.

- Amenity assessment – that is, how loud is the absolute level of industrial noise, including cumulative noise from other industrial sources. The NPfI nominates appropriate amenity noise levels depending on the receiver type and prevailing noise environment/zoning.

- Maximum Noise assessment – will high level, short term noise events cause adversely impact sleep at night? Trigger levels are determined relative to the measured night rating background, and assessed outside sleeping areas.

For other receiver types, only an "amenity" assessment is required.

APPENDIX A and APPENDIX C summarise the derivation of trigger levels for each of the receivers, and these are summarised in the following table.

6.1.2. Summarised Noise Emission Criteria

Background Noise Levels

Table 4 -Summarised Background Noise Levels

Location/Receiver Type	Time	RBL dB(A) L_{90}
R1,R3 - Residential	Day	49
	Evening	44
	Shoulder Evening	41
	Night	36
R2 - Residential	Day	46
	Evening	42
	Shoulder Evening	39
	Night	34
C1,C2 - Commercial	All	n/a
P1,P2 – Active Recreation	All	n/a

Table 5 -Melwood Avenue Normalised Background Noise Spectrum

Hz	31.5	63	125	250	500	1000	2000	4000	8000
dB	16	10	4	-1	-4	-6	-8	-10	-16

Table 6 - Melwood Oval Normalised Background Noise Spectrum

Hz	31.5	63	125	250	500	1000	2000	4000	8000
dB	10	10	10	-1	-6	-10	-6	-10	-19

Non-Entertainment Noise Trigger Levels

Table 7 – Project Triger Levels – Non- Entertainment Noise

Location/Receiver Type	Time	RBL dB(A) L_{90}	Trigger Noise Level (dB(A) $L_{eq,15min}$)		
			Intrusiveness	Amenity	Max Event
R1,R3 - Residential	Day	49	**54**	58	n/a
	Evening	44	49	**43**	n/a
	Night	36	41	**38**	41 L_{eq} **52 L_{max}**
R2 - Residential	Day	46	**51**	58	n/a
	Evening	42	47	**43**	n/a
	Night	35	40	**38**	40 L_{eq} **52 L_{max}**
C1,C2 - Commercial	All	n/a	n/a	63	n/a
P1,P2 – Active Recreation	All	n/a	n/a	53	n/a

Entertainment Noise Assessment Goals – Existing Residences

For emissions between midnight and 7am, inaudibility criteria have been determined by taking the higher maximum of the following for each frequency band:

- The threshold of hearing plus 10 dB (to account for open window façade reduction).
- The measured background noise levels minus 10dB.

Table 8 -Residential Receiver 2 Inaudibility Criteria – Midnight to 7am

	31.5	63	125	250	500	1k	2k	4k	8k
Threshold of Hearing + 10dB	70	43	32	21	14	12	9	15	23
Night (BG + 0)	50	44	38	33	30	28	26	24	18
Night Inaudibility BG-10	40	34	28	23	20	18	16	14	8
Inaudibility Criterion (Max of BG-10 & Threshold +10)	70	43	32	23	20	18	16	15	23

Table 9 -Residential Receiver 1&3 Inaudibility Criteria – Midnight to 7am

	31.5	63	125	250	500	1k	2k	4k	8k
Threshold of Hearing + 10dB	70	43	32	21	14	12	9	15	23
Night (BG + 0)	46	46	46	35	30	26	30	26	17
Night Inaudibility BG-10	36	36	36	25	20	16	20	16	7
Inaudibility Criterion (Max of BG-10 & Threshold +10)	70	43	36	25	20	16	20	16	23

Table 10 - Liquor & Gaming External Boundary Noise Emission Goals dB L_{10} for Residential Receiver 2

Time	Background Noise level dB – Frequency (Hz)									
	31.5	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**A-wt**
Day (BG +5)	67	61	55	50	47	45	43	41	35	**51**
Evening (BG + 5)	63	57	51	46	43	41	39	37	31	**47**
Evening Shoulder Period (BG+5)	60	54	48	43	40	38	36	34	28	**44**
Night (BG + 0)	50	44	38	33	30	28	26	24	18	**34**
Night Inaudiblity	70	43	32	23	20	18	16	15	23	**27**

Table 11 - Liquor & Gaming External Boundary Noise Emission Goals dB(A) L_{10} for Residential Receivers 1&3

Time	Background Noise level dB – Frequency (Hz)									
	31.5	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	**A-wt**
Day (BG +5)	64	64	64	53	48	44	48	44	35	**54**
Evening (BG + 5)	59	59	59	48	43	39	43	39	30	**49**
Evening Shoulder Period (BG+5)	56	56	56	45	40	36	40	36	27	**46**
Night (BG + 0)	46	46	46	35	30	26	30	26	17	**36**
Night Inaudibility	70	43	36	25	20	16	20	16	23	**28**

Entertainment Noise Assessment Goals – Subject Site Residential

- Internal Noise Levels
  - 23 $L_{A10,15min}$. with windows closed, between 10pm and 7am, and 28 L_{A10} at other times.
  - the background noise level in the room with the ventilation system operating.
- External Noise Levels
  - The NPfI active recreation amenity level has been adopted for external noise level triggers
  - This corresponds to an amenity level of 55 dB(A) $L_{eq,15min}$

In general circumstances, it may be required that residential facades be treated to mitigate noise from transportation or industrial noise sources. Given that acoustically treating the façade of a building is suitable for mitigating existing noise levels, it stands to reason that it would be

acceptable for the residential facades to be treated to mitigate future patron noise from the RSL portion of the project.

6.2. LOCAL COUNCIL DCP

The DCP states the following:

5.1.15 Noise and Vibration

Requirements

1. For new development, a Noise Impact Assessment prepared by a suitably qualified acoustic consultant is required. Noise attenuation measures shall demonstrate that residential uses can withstand an external noise level of 55 decibels.

Consideration should be given to the impact of land uses which facilitate late night trading, entertainment and events in the public domain on residential amenity.

2. The location and design of noise generating activities, such as loading and unloading areas, garbage collection areas, driveways, parking areas, active recreation areas, air conditioning or mechanical plants, must be sited away from any adjacent sensitive land uses and/or screened by acoustic treatments.

3. In mixed use development that includes residential accommodation, non-residential components of the development must be designed to moderate the impact of noise generated by business operations.

The DCP does not provide any quantitative measures of performance/amenity. The EPA and Liquor Act guidelines adopted in this assessment adequately address the issues raised in the DCP.

7. NOISE EMISSIONS ASSESSMENT

7.1. LIQUOR AND GAMING

An assessment of patron and operational noise from the proposed RSL redevelopment has been conducted and the predicted noise levels shown below. Operational and patron noise associated with the ground floor outdoor dining, bars, lounges and gaming areas have been assessed.

Operational noise levels have been predicted at each of the identified most affected receivers by:

- Determining noise emission levels for each significant noise source.
- Correcting for any attenuation between the noise source including enclosures, distance, directivity and barrier effects, where present.
- Adding the contribution from multiple noise sources at each receiver to determine the noise level.

7.1.1. Adopted RSL Modelling Parameters

- The trading hours are in accordance with the current liquor licence.
- Sound level of music played in any external areas of 75 dB(A) L_{10} during the day, evening and late evening periods, with no music played in outdoor areas from 10pm onwards.
- Music to be played internally at a sound level of up to 85 L_{10} dB(A) at all times.
- All operable walls/glazing separating patron areas from outside are closed from 10pm onwards, with use of patron access doors only.
- Up to 60 patrons have been assumed to be located externally within the outdoor eating/family courtyard (located on north western boundary of the RSL) based on proposed number of seating.
- Up to 50 patrons have been assumed to be located externally within the outdoor eating and pickets/alfresco lawn areas (located on southern boundary of the RSL) based on proposed number of seating.
- A combined sound pressure level of gaming machines and patron noise within indoor gaming and alfresco gaming areas of 70 dB(A) L_{10} (based on previous measurements).
- For the external spaces, each patron generates a sound power level of 77 dB(A)L_{10} /75 dB(A)L_{eq}, representative of a "raised" voice, with one in two patrons speaking at any one time.
- Child play area assumed to not be in use at night.
- The recommendations in Section 9 have been incorporated.

7.1.2. Predicted Noise Levels

External Receivers

Table 12 Patron/Gaming Noise Emissions to Residential Receiver R1 (Day/Evening/Late Evening)

	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Predicted Late Evening Noise Level dB(A) L_{10}	51	43	35	36	37	36	34	29	22	**41**
Late Evening Criteria	56	56	56	45	40	36	40	36	27	**46**
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 13 Patron/Gaming Noise Emissions to Residential Receiver R1 (Night)

	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Predicted Night Noise Level dB(A)L_{10}	41	28	<20	<20	<20	<16	<20	<16	<17	**<20**
Night Inaudibility	70	43	36	25	20	16	20	16	23	**28**
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 14 Patron/Gaming Noise Emissions to Residential Receiver R2 (Day/Evening/Late Evening)

	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Predicted Late Evening Noise Level dB(A)L_{10}	20	23	26	31	33	34	29	20	9	**37**
Late Evening	60	54	48	43	40	38	36	34	28	**44**
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 15 Patron/Gaming Noise Emissions to Residential Receiver R2 (Night)

	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Predicted Night Noise Level dB(A)L_{10}	<20	<20	<20	<20	<20	<18	<16	<15	<18	**<20**
Night Inaudiblity	70	43	32	23	20	18	16	15	23	**27**
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 16 Patron/Gaming Noise Emissions to Residential Receiver R3 (Day/Evening/Late Evening)

	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Predicted Late Evening Noise Level dB(A)L_{10}	<20	25	30	33	37	36	33	24	11	**40**
Late Evening Criteria	56	56	56	45	40	36	40	36	27	**46**
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 17 Patron/Gaming Noise Emissions to Residential Receiver R3 (Night)

	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Predicted Night Noise Level dB(A)L_{10}	<20	<20	<20	<20	<20	<15	<20	<15	<15	**<20**
Night Inaudibility	70	43	36	25	20	16	20	16	23	**28**
Compliance	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

The analysis indicates that noise emissions would be compliant with typical Liquor and Gaming guidelines and therefore would not adversely impact the existing residences.

Noise Emissions to Subject Site Residential

Noise emissions to residential units constructed above the RSL have also been considered.

It will be possible to have small numbers of patrons outside and still comply with active recreational receiver amenity noise level at all surrounding unit balconies. When the outdoor dining areas are closed the amenity noise level is met at all surrounding unit balconies.

The physical controls in Section 9.1.2. will assist in managing noise from the Club to the residential units located on the subject site.

7.2. MECHANICAL PLANT

Plant areas are likely to be located within a number of basement and rooftop areas. At this stage of the development, mechanical plans and equipment selections have not been finalised and as such detailed assessment of noise impacts to residential areas cannot be completed. Notwithstanding, a preliminary assessment of typical plant items is presented below.

- Major fans (typically with a sound power over 80(A) – such as kitchen exhaust, major toilet exhaust and major relief air fans) will require acoustic treatment if located externally, and for intakes/discharges. Whenever possible for major fans, it is recommended that in-duct (as opposed to roof mounted fans) are to be used as this will enable acoustic treatment to be incorporated within ductwork running to atmosphere.
- Refrigeration equipment (servicing RSL, if located near to residential areas):
  - Refrigeration compressors are recommended to be located within enclosure plant rooms.
  - Locate refrigeration condensers as far as practicable from adjacent noise sensitive development. Noise screening (using either a dedicated noise screen or the building shell between the condensers and noise sensitive buildings) may be required.
  - To ensure compliance with NPI requirements during day, evening and night time, additional review is recommended following final plant selection and review of night time operational speeds.
- Condenser units on residential building rooftops. Given ILUs at a higher level may have line of sight to these plant items, appropriate selection of quiet units, barrier screening and location of condensers will allow for sufficient noise control.
- Kitchen exhaust fans to service the RSL will generally be located on the rooftop of the residential buildings. Acoustic treatment of duct lining (insulation, attenuators etc) as well as riser construction will minimise noise impacts to internal components of the residential building.
- Plant areas adjacent to residential communal areas may require barrier screening to control noise levels from the operation of plant items.

Cumulative assessment of both plant noise with other noise sources is recommended when conducting acoustic design of plant items, and this may be conditioned as a requirement for the detailed design/construction certificate phase of the project. This is particularly important for plant noise near any outdoor common areas or other residential façades.

Compliance with NSW *Noise Policy for Industry* (2017) criteria as set out in Section 6.1.2 will be achievable, provided that detailed acoustic review of plant items is undertaken once plant is selected, and standard acoustic treatments (such as in-duct attenuation, barriers, appropriate location of plant items etc) are adopted.

8. ROAD TRAFFIC NOISE GENERATED BY THE PROPOSED DEVELOPMENT

The impact of additional traffic generated by the proposed development has been assessed using the EPA RNP, which states the following:

- Section 2.3 of the RNP provides noise assessment criteria at residential (Table 3) and non-residential receivers (Table 4), and for different road classifications.
- Where existing traffic noise is already close to or exceeds the criteria in Tables 3 or 4, the RNP indicates the increase in noise should be assessed instead of the absolute level. For sensitive land uses affected by additional traffic on existing roads, any increase in the total traffic noise level should be limited to 2dB above that of the corresponding 'no build option'. The RNP indicates that an increase of up to 2dB(A) represents a minor impact that is considered barely perceptible to the average person.
- Where night time traffic movements are proposed, the impact on sleep from maximum noise events generated by these movements should also be considered for residential receivers.

Traffic noise data obtained from the Traffix traffic report indicates the proposed development will generate the following traffic movements:

- Site Peak – 0.4 Vehicle Trips per dwelling
- AM Peak – 0.09 vehicle trips per dwelling
- PM Peak – 0.2 Vehicle Trips per dwelling
- RSL – Assumed 0 increase from current trip generation due to reduced GFA from current RSL.

Based on the above the Traffic report predicts the following increase in traffic movements:

- AM Peak – 5 additional vehicle trips during AM peak period (+1 in, +4 out)
- PM Peak – 11 additional vehicle trips during PM peak period (+9 in, +2 out)

The traffic report indicates the current RSL club operations generate an evening peak of 89 vehicles per hour.

The increase in noise levels have been predicted based on the FHWA noise prediction model using the following:

- The no-build and predicted development vehicle movement numbers.
- Vehicle speed of 50 km/hr.
- Hard ground between the source and the measurement location.
- Neutral weather conditions.

Even making the conservative assumption that the Club and residential traffic peaks occur at the same time, the predicted increase in the L_{eq} noise level is ≤ 1dB(A).

As the increase in road traffic noise levels are predicted to be ≤2dB, it is concluded that any increase in road traffic noise as a result of the proposal would be inaudible and therefore would not adversely impact any residential receiver, and is compliant with the objectives of the RNP.

It is further noted that the proposal would enclose the existing carpark and therefore would reduce current noise impacts from vehicle noise and patron noise from the carpark.

9. MANAGEMENT AND PHYSICAL CONTROLS

The analysis undertaken indicates the proposed development can operate without causing "undue disturbance" to any of the nearby existing properties, or the causing the future occupants of the proposed residential units to be "unreasonably and seriously disturbed".

The following management and physical controls are to be considered to assist in managing noise emissions from Club activities.

9.1.1. Management Controls

- Operable walls within RSL club operations are to be closed after 10pm.
- Music sound limiters are to be installed for any amplified music systems (other than low level (<70 dB(A)) background music systems).
- No music is to be played in outdoor areas from 10pm onwards.
- All outdoor dining areas (excluding alfresco gaming areas) vacant after 10pm, except for minor patron numbers for smokers. Gaming machine noise levels are to be limited, particularly after 10pm.
- Management of patrons to minimise noise, particularly at night, including staff training in respect of patron control.
- Waste and deliveries to occur between 7am and 9pm Monday to Saturday and 8am to 9pm Sundays and public holidays.

9.1.2. Physical Controls

- Acoustic absorption with a minimum NRC 0.8 is to be installed to the ceiling, and to the walls (to the extent practical) for the following locations:
  - Northwestern outdoor family/sports bar area.
  - Alfesco gaming.
  - Outdoor café.
  - Kids play area and Alfresco lawn.
- Minimum 6mm float glazing to be installed for the ground level RSL club building external façade (Min. R_w 29).
- Subject to detailed design the residential units located in the building above the RSL to have glazing with a minimum R_w rating of 34. Examples include 10.38mm laminate glazing or 10.38/12mm gap/6mm float/toughened IGU glazing. (Refer APPENDIX B - Glazing and Ventilation markup)
- Subject to detailed design, the residential units in Buildings 1 and 3 facing towards outdoor dining and gaming areas (as indicated in APPENDIX B - Glazing and Ventilation markup) to have glazing with a minimum R_w rating of 34. Examples include 10.38mm laminate glazing or 10.38/12mm gap/6mm float/toughened IGU glazing.

- Subject to detailed design, the residential units in Building 1 and 3 with facades close to the RSL (as indicated in APPENDIX B - Glazing and Ventilation markup) to have glazing with a minimum R_w rating of 30. Examples include 6.38mm laminate glazing or 6.38/12mm gap/6mm float IGU glazing.

- Masonry external walls for the residential units will be acceptable and will not require further acoustic upgrading.

- The RSL patron and kitchen spaces should have a minimum 13mm thick solid plasterboard ceiling with min 75mm thick, 14 kg/m^3 density glasswool insulation in the cavity. Construction details to be finalised prior to CC, dependent on desired maximum noise level within the Club.

- Provide an alternative outside air supply to enable windows in the residential units to be closed and still achieve minimum BCA ventilation rates. Refer attached markups. This can either be either a intake duct incorporated into the air conditioning systems or separate fan units. (Refer APPENDIX B - Glazing and Ventilation markup)

- Install prominent signs at patron exit points and in the outdoor patron area requesting that patrons minimise noise, particularly at night.

- Undertake a detailed assessment of noise emissions from plant and equipment prior to CC approval and select/locate/treat plant to comply with the noise levels indicated in Table 7.

10. CONCLUSION

This report summarises the potential noise and vibration impact assessment undertaken for the proposed development. Construction and operational impacts have been assessed, as well as noise from traffic generated by the proposal.

- An assessment of plant operational noise emissions has been undertaken using Noise Policy for Industry guidelines. The preliminary assessment indicates that plant emissions should be assessed in detail prior to CC and treatment incorporated to comply with EPA guidelines for noise emissions.

- A review of entertainment and other Club noise emissions has been undertaken, and physical and management controls are provided in the report that will allow noise impacts to be managed in accordance with the Liquor Act.

- The proposal will enclose the existing open air carpark and would therefore have a beneficial impact on noise emissions to the exiting residences from this existing noise source. Additional road traffic noise generated by the proposed development has been assessed using the EPA "Road Noise Policy" guideline and found to be compliant.

Yours faithfully,

Acoustic Logic Pty Ltd
Scott Jacobs

APPENDIX A AMBIENT NOISE MONITORING

This appendix summarises the ambient noise data measured near the subject site, and the calculated noise level descriptors adopted to characterise the existing noise environment.

Monitoring has been undertaken to provide the following ambient data:

- Background noise levels at the surrounding residential properties and,
- Traffic noise levels.

A.1 NOISE DESCRIPTORS

Ambient noise constantly varies in level from moment to moment, so it is not possible to accurately determine prevailing noise conditions by measuring a single, instantaneous noise level.

To quantify ambient noise, a 15 minute measurement interval is typically utilised. Noise levels are monitored on a continuous basis over this period, and statistical and integrating techniques are used to characterise the noise being measured.

The principal measurement parameters 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 steady state and quasi-steady state 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 quieter 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 noise and ground vibration induced noise from railways.

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.

A.2 UNATTENDED LONG TERM NOISE MONITORING

A.2.1 Equipment Used

Unattended noise monitoring was conducted using two Acoustic Research Laboratories Pty Ltd Ngara (Type 1).

Monitoring was continuous, with statistical noise levels recorded at 15-minute intervals throughout the monitoring period. Measurements were taken on "A" frequency weighting and fast time response, unless noted otherwise.

All monitoring equipment used retains current calibration - either manufacturers' calibration or NATA certified calibration. The monitors were field calibrated at the beginning and the end of the measurement with no significant drift in calibration noted.

A.2.2 Locations Monitored

The locations monitored are indicated Figure A- 2. Photographs of the monitoring locations are provided below Figure A- 2.

A.2.3 Weather Affected and Extraneous/Outlying Data

Periods affected by adverse weather conditions (as defined by Fact Sheet B) are indicated on the following data graphs, and have been excluded from the assessment. Weather data was obtained from records provided by the Bureau of Meteorology for the following station:

As the Bureau of Meteorology wind data is typically obtained at an exposed location at 10m above ground level, and the monitoring locations were at approximately 1.5m above ground in more sheltered locations a wind multiplying factor of 0.5 has been applied to the BOM data to estimate the wind speed at the microphone location.

The Terrey Hills weather station has been utilised to determine periods of extraneous weather. The following additional periods have been identified as likely to contain significant periods of non-representative data and have been excluded from the assessment:

- 26/7/2024 Day
- 27/7/2024 Day
- 01/08/2024 Night

Figure A- 2 – Noise Monitoring Locations

Unattended Monitoring Location

Attended Monitoring Location

A.3 CALCULATION OF REPRESENTATIVE AMBIENT NOISE LEVELS

The ambient, assessment and rating background levels have been determined from the unattended, long-term noise monitoring data based on the methodology in the Noise Policy for Industry Fact Sheet B.

A.3.1 Rating Background Noise Levels

The following tables summarise the assessment background noise levels (ABL) for each location. Note that where no ABL is indicated, this is because that period was significantly affected by adverse weather or other extraneous noise.

The day, evening and night periods are as defined in the NPfI, as follows:

- Day - period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays
- Evening - the period from 6 pm to 10 pm
- Night - the remaining periods

In accordance with the NPfI:

- If the calculated evening rating background noise level is higher than the day level, the day rating background noise level has been adopted for the evening period.
- If the calculated night rating background noise level is higher than the evening level, the evening rating background noise level has been adopted for the evening period.
- If the calculated day rating background noise level was less than 35 dB(A), a "default" background of 35 dB(A) has been adopted.
- If the calculated evening or night rating background noise level was less than 30 dB(A), a "default" background of 30 dB(A) has been adopted.

- Where monitoring was conducted within 3m of a significant sound reflecting surface, 2.5 dB(A) has been subtracted from the calculated rating background to account for an increase in noise from reflections.

Table 18 –Assessment Background Noise Levels – Melwood Avenue

Location	Date	ABL			
		Day	Evening	Shoulder Evening	Night
Melwood Avenue Approx. 3m from Kerb East of Existing Forestville RSL	26/07/2024	-	44.9	39	34
	27/07/2024	-	43	40.5	35.1
	28/07/2024	45.7	41.7	38.6	37.8
	29/07/2024	47.4	40.8	37.8	36.6
	30/07/2024	46.6	41.9	38.8	34.3
	31/07/2024	47.5	42.3	38.8	35.4
	1/08/2024	45.5	43.5	-	-
	2/08/2024	43	44.5	38.6	33.8
	3/08/2024	41.7	41.3	39.5	33.5
	4/08/2024	43.2	41.4	36.2	32.1
	Calculated RBL	**46**	**42**	**39**	**34**
	Adopted RBL	**46**	**42**	**39**	**34**

Table 19 – Assessment Background Noise Levels – Forestville Avenue

Location	Date		ABL		
		Day	Evening	Shoulder Evening	Night
Forestville Avenue Approx. 15m from Kerb	26/07/2024	-	42.1	40.5	33.1
	27/07/2024	-	43.3	43.5	37.8
	28/07/2024	49.4	45.7	42.2	42.7
	29/07/2024	50.6	44.3	39.9	41
	30/07/2024	49.6	44.4	42.1	35.9
	31/07/2024	48.9	45.7	42.4	38.8
	1/08/2024	48.3	46.8	-	-
	2/08/2024	45.4	45.2	41.3	33.9
	3/08/2024	42.8	43.2	39.8	35.3
	4/08/2024	43	39.7	36.9	29.9
	RBL	**49**	**44**	**41**	**36**
	Adopted RBL	**49**	**44**	**41**	**36**

A.4 ATTENDED MONITORING

A.4.1 Equipment Used

Attended noise monitoring was conducted using a Norsonics SA 131 (Type 1) sound analyser.

The sound level meter equipment used retain current calibration - either manufacturers' calibration or NATA certified calibration and were field calibrated at the beginning and the end of the measurement with no significant drift in calibration noted.

A.4.2 Locations Monitored

The monitoring locations are indicated in Figure A- 2 and are described below:

- Melwood Road – Ambient noise measurements along Melwood Avenue to obtain noise spectrum
- Various attended measurements around site to determine existing noise emissions. Plant noise was noted on the northern boundary, background music was noted on the southern boundary.
- Melwood Oval – Ambient noise measurements at Melwood Oval to obtain background noise spectrum

A.4.3 RESULTS

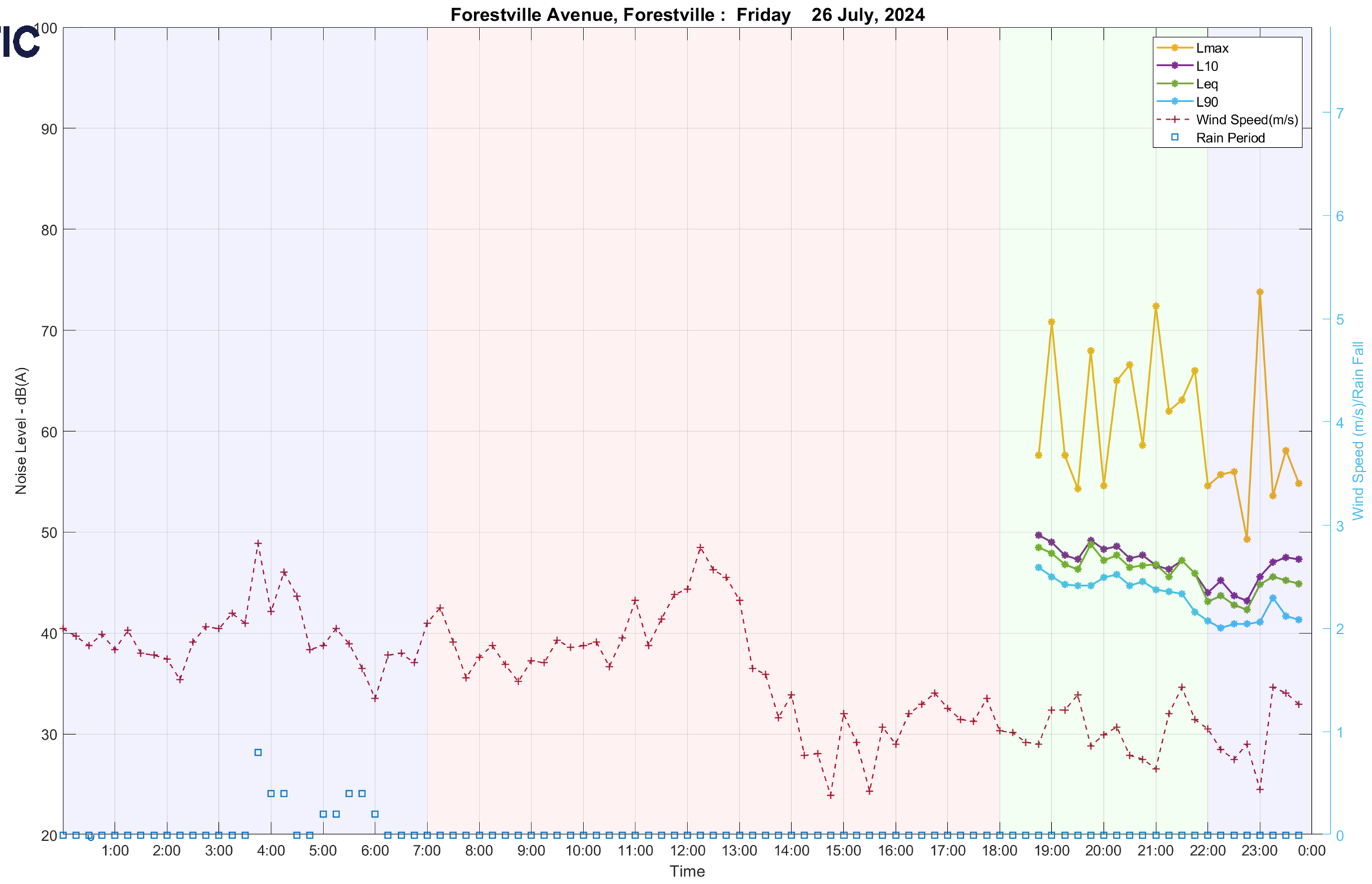
Table 20 -Melwood Avenue Normalised Background Noise Spectrum

Hz	31.5	63	125	250	500	1000	2000	4000	8000
	16	10	4	-1	-4	-6	-8	-10	-16

Table 21 - Melwood Oval Normalised Background Noise Spectrum

Hz	31.5	63	125	250	500	1000	2000	4000	8000
	10	10	10	-1	-6	-10	-6	-10	-19

A.5 UNATTENDED MONITORING DATA GRAPHS


Forestville Avenue, Forestville : Friday 26 July, 2024
Lmax
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
30
20
7
6
5
4
3
2
1
0
1:00
2:00
3:00
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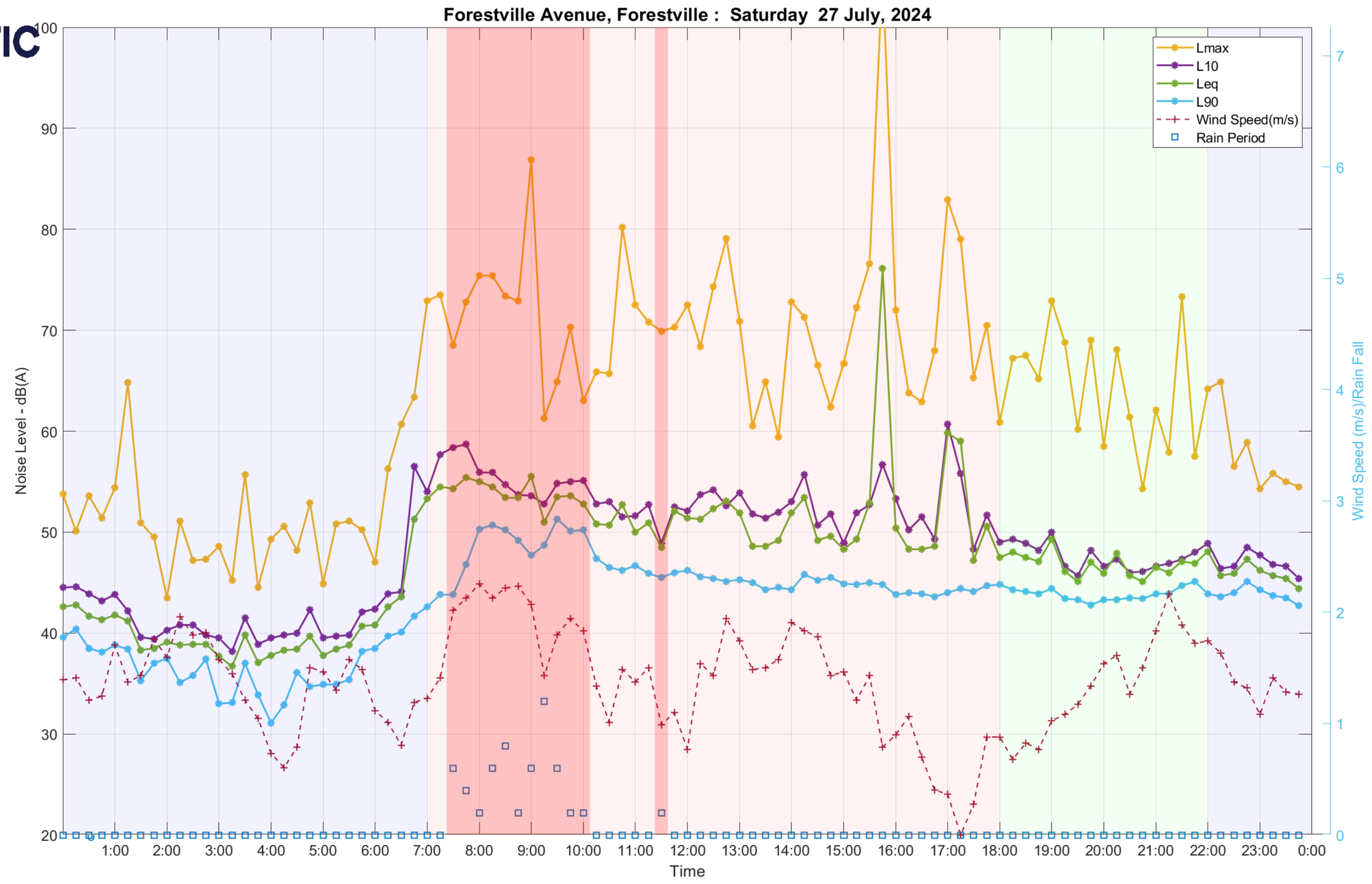

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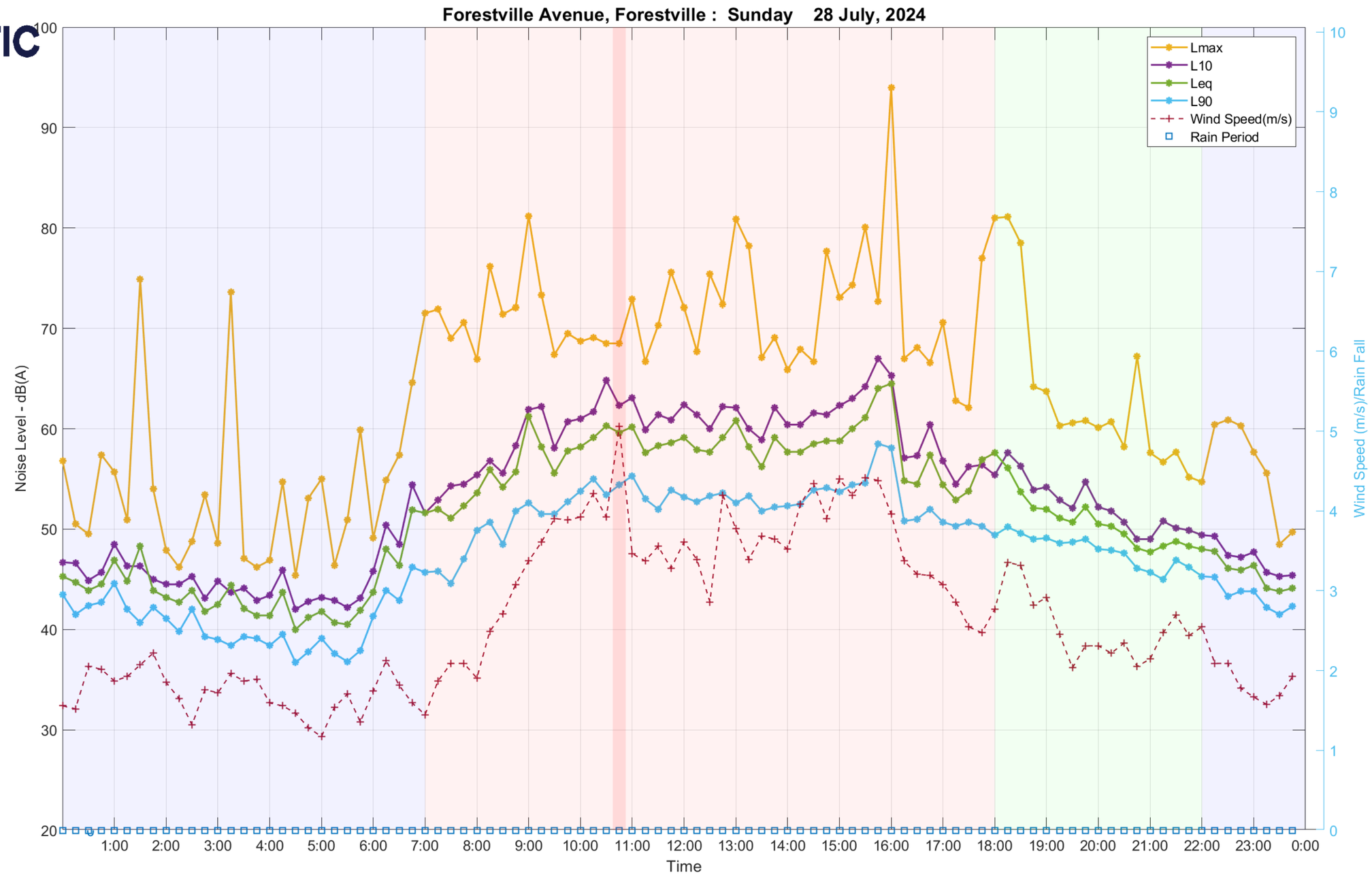

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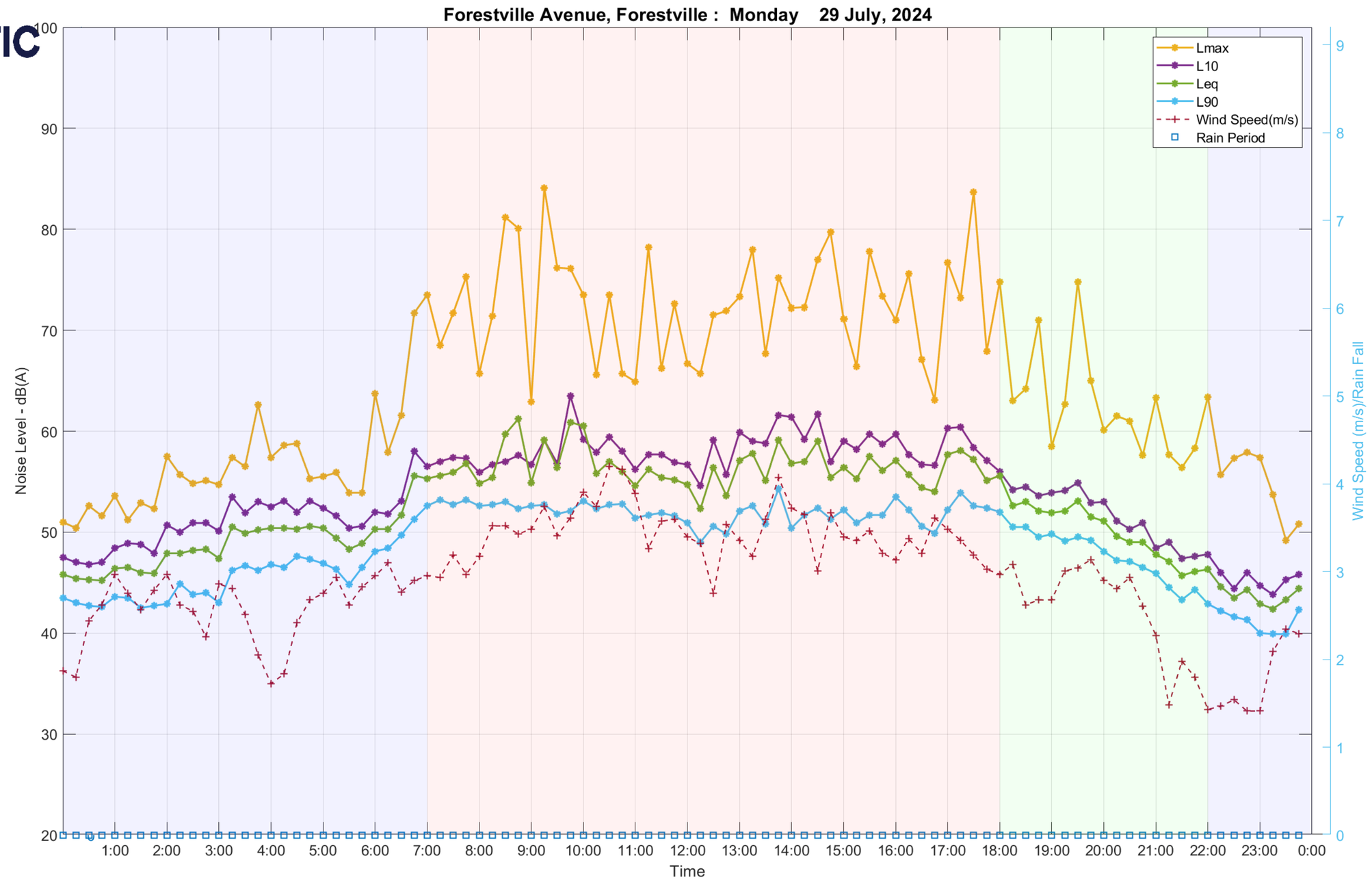

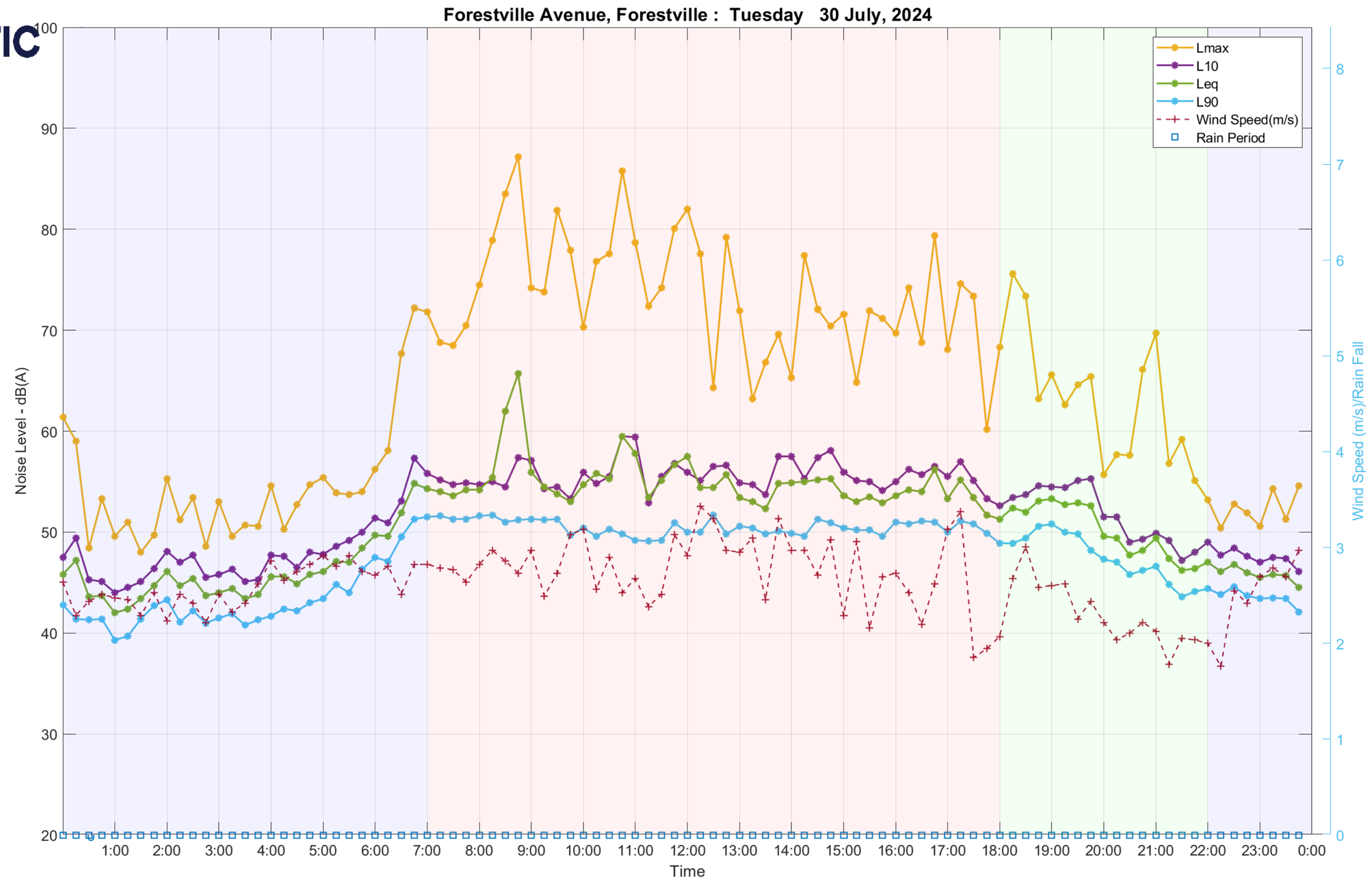
Forestville Avenue, Forestville : Tuesday 30 July, 2024
Lmax
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
100
90
80
70
60
50
40
30
20
8
7
6
5
4
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1:00
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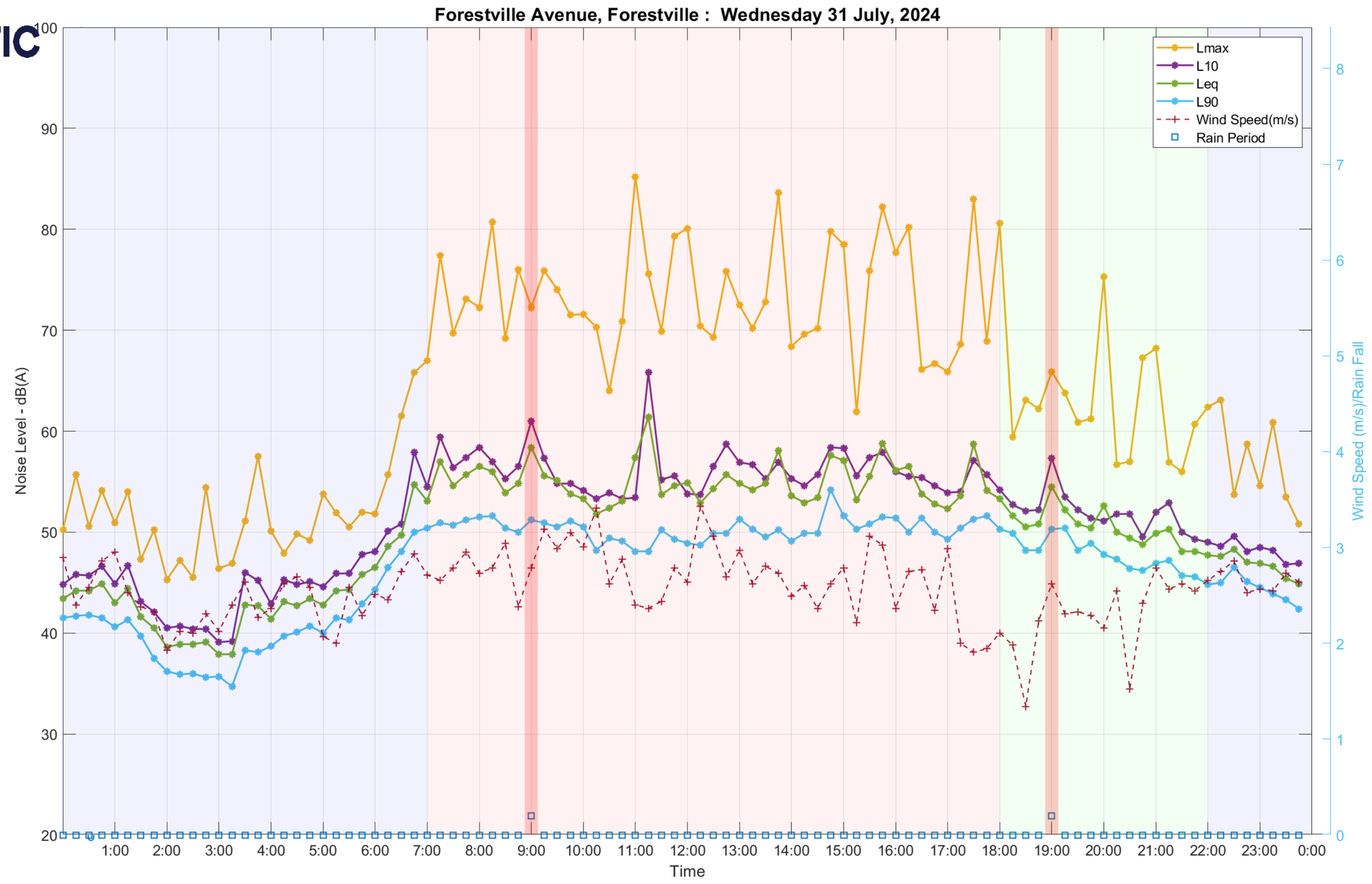
Forestville Avenue, Forestville : Wednesday 31 July, 2024
Lmax
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
100
90
80
70
60
50
40
30
20
8
7
6
5
4
3
2
1
0
1:00
2:00
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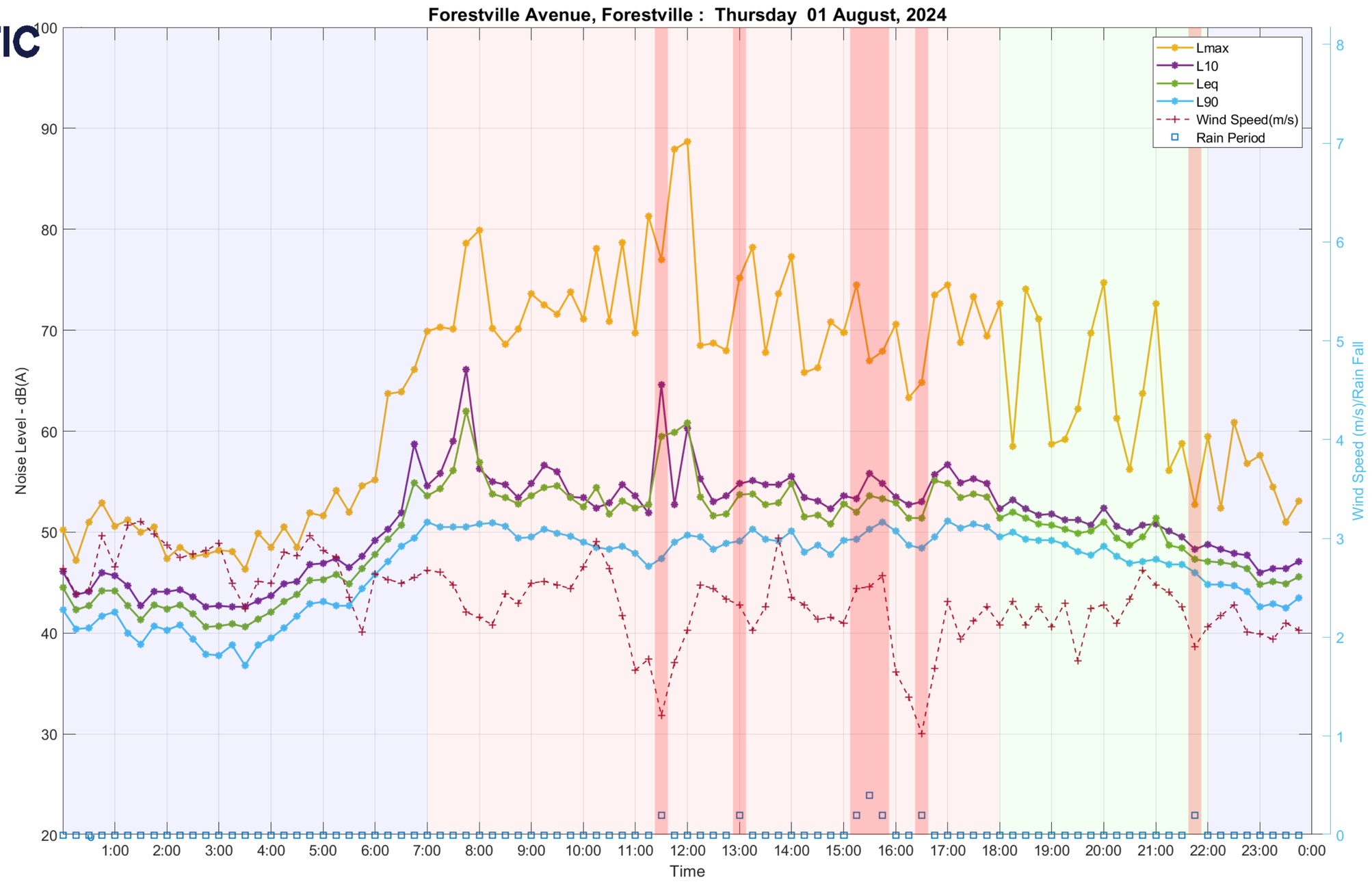

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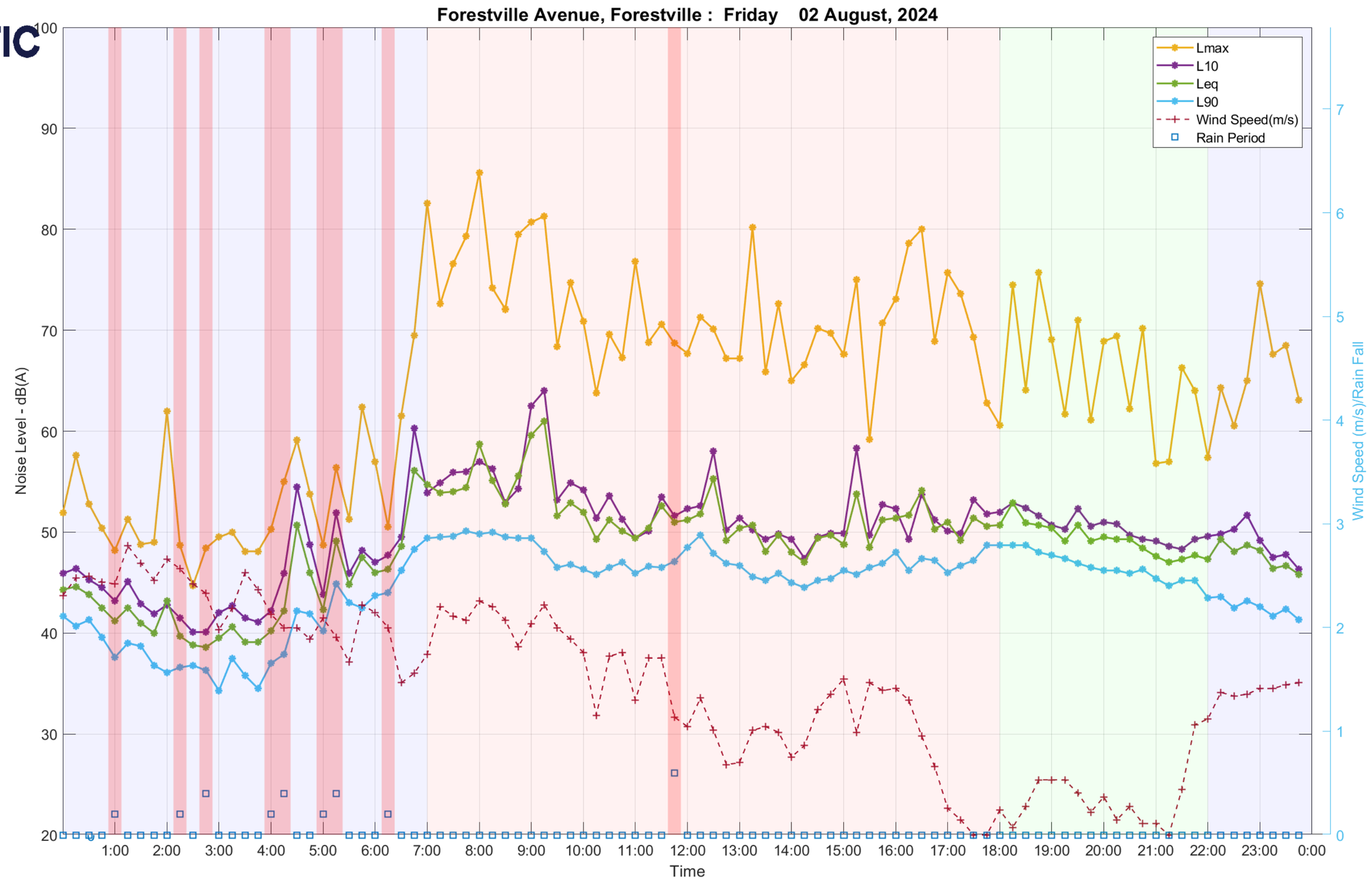

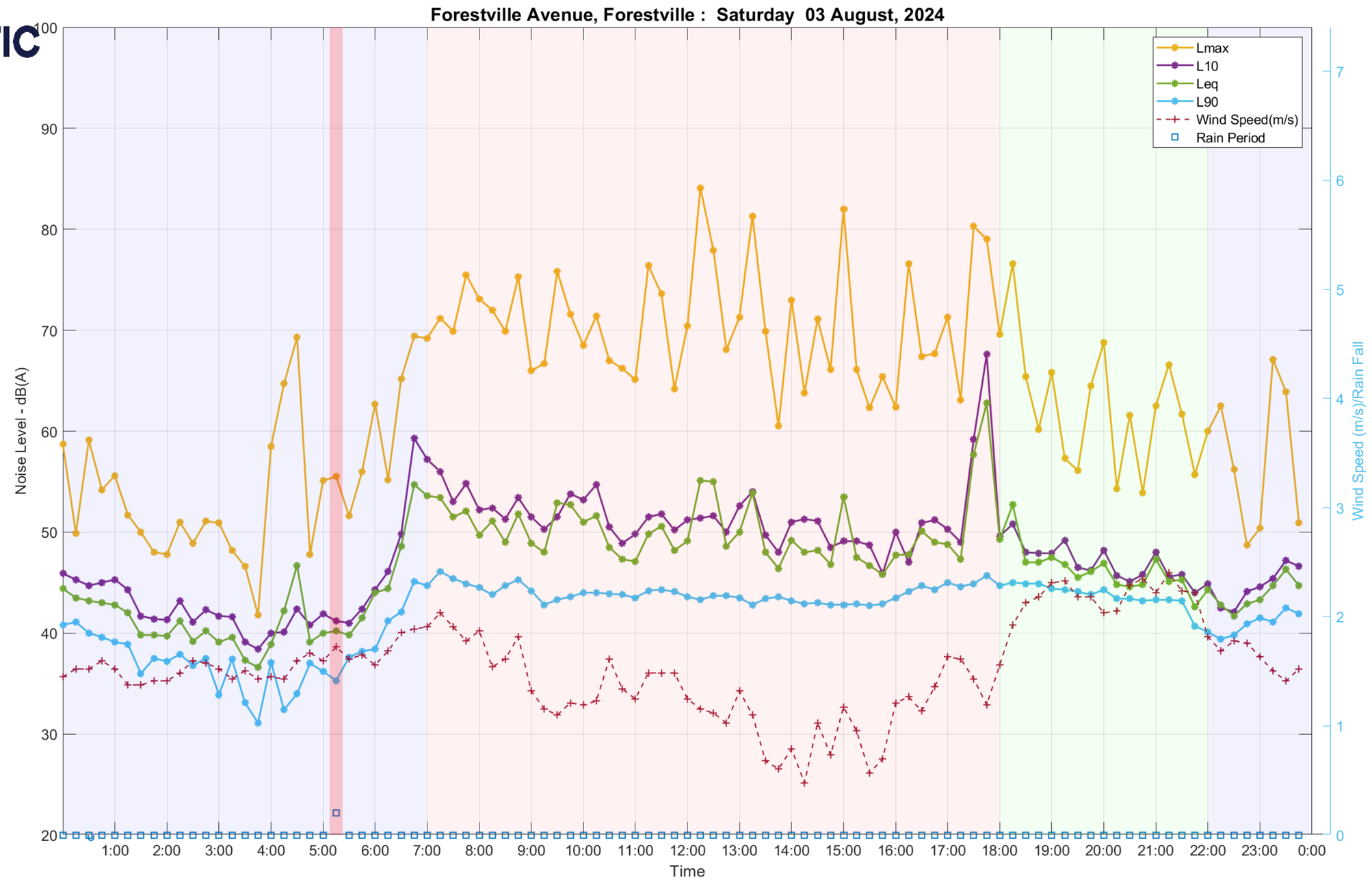
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Lmax
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
100
90
80
70
60
50
40
30
20
7
6
5
4
3
2
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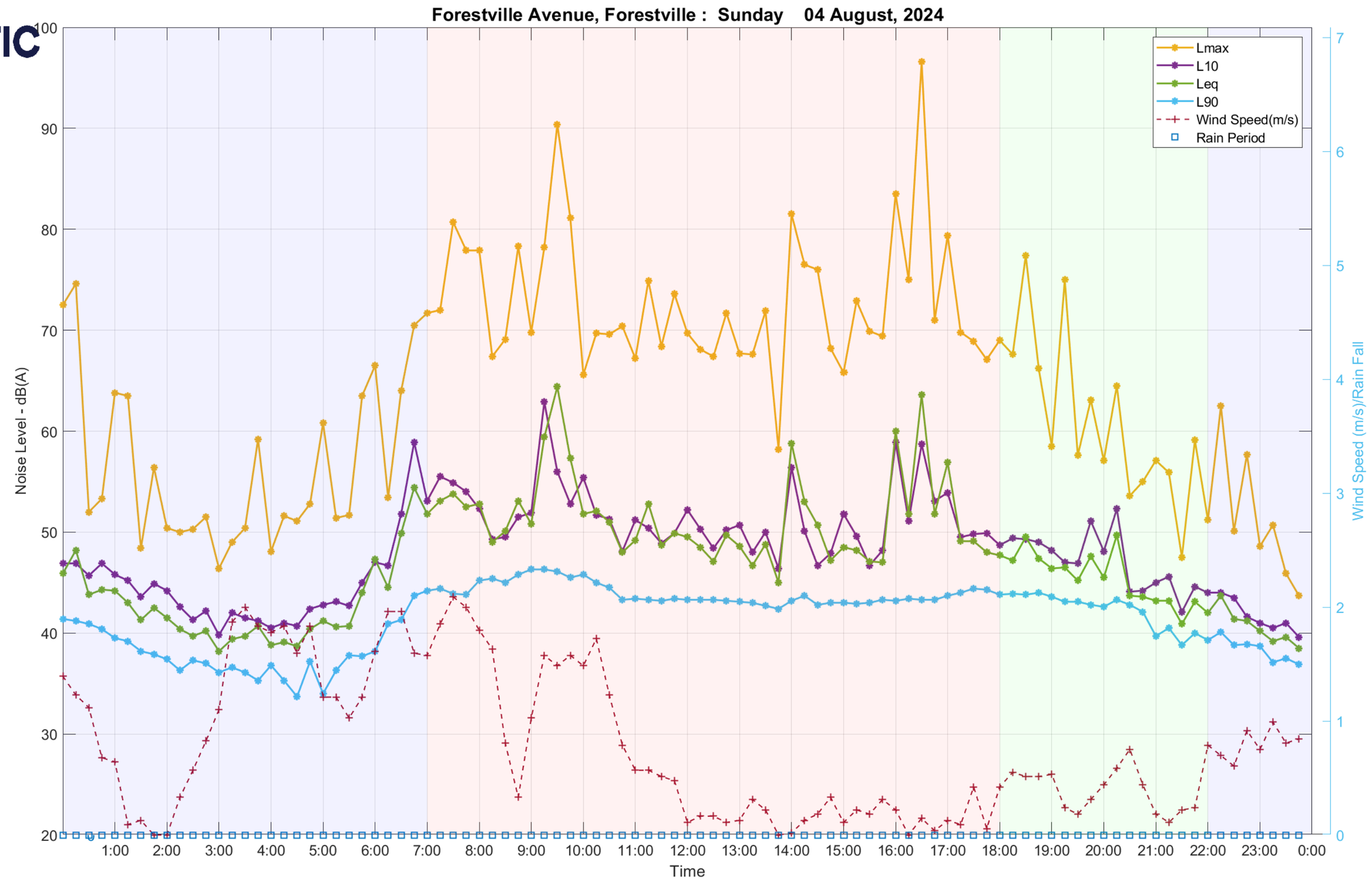
Forestville Avenue, Forestville : Sunday 04 August, 2024
Lmax
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
100
90
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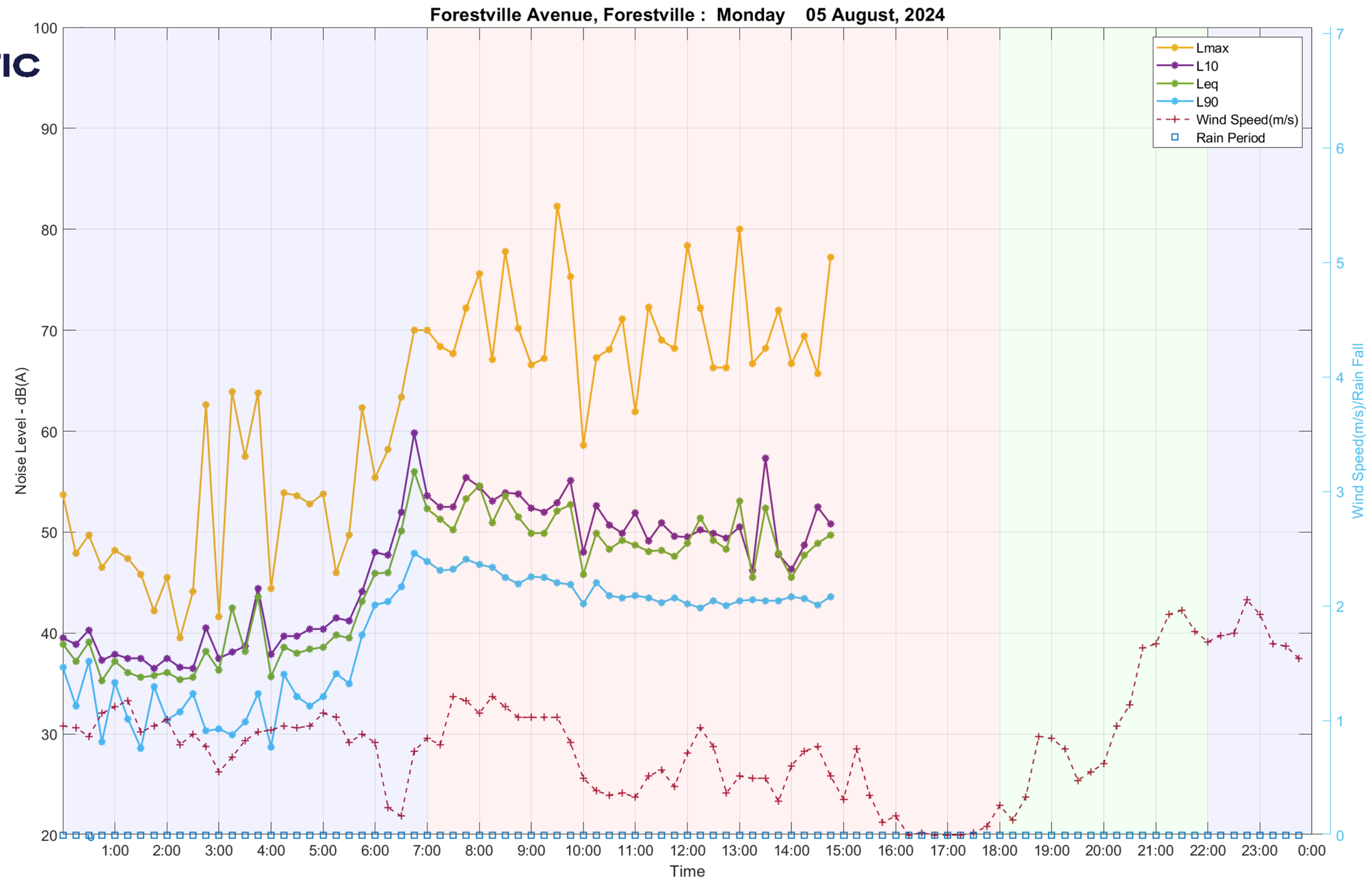
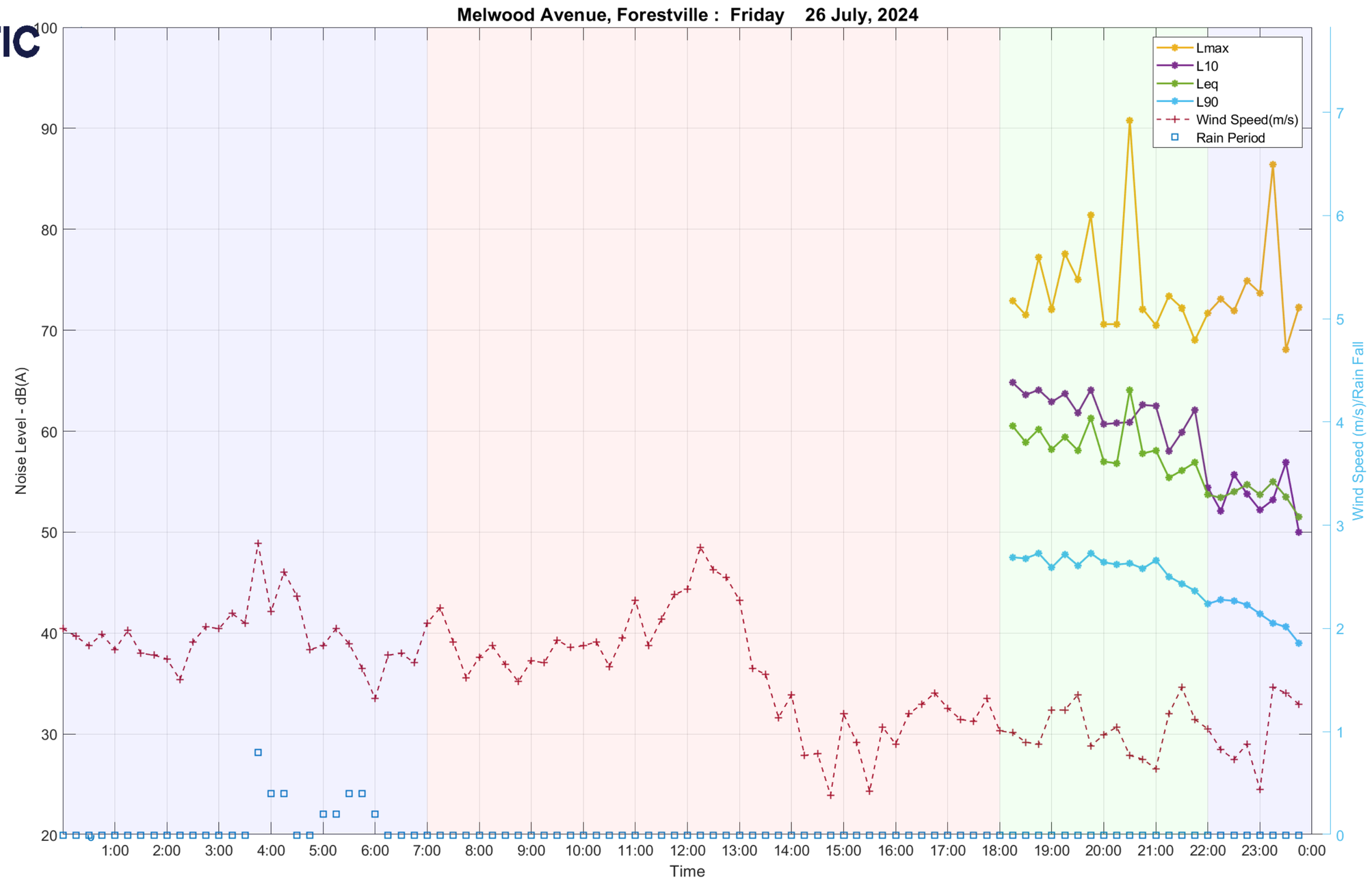


Wind Speed is corrected using factor 0.6600 based on logger location


Melwood Avenue, Forestville : Friday 26 July, 2024
Lmax
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Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
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70
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20
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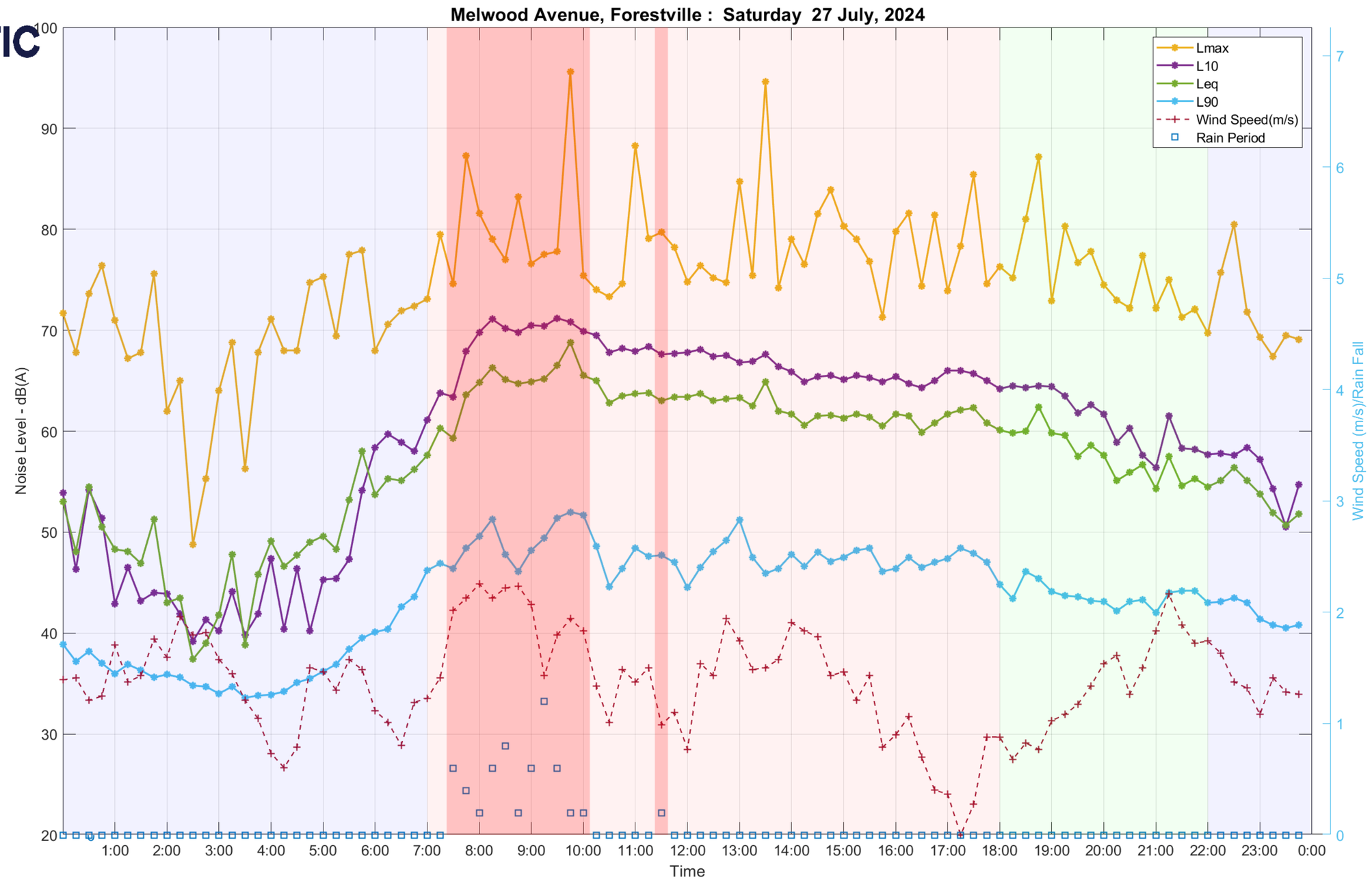

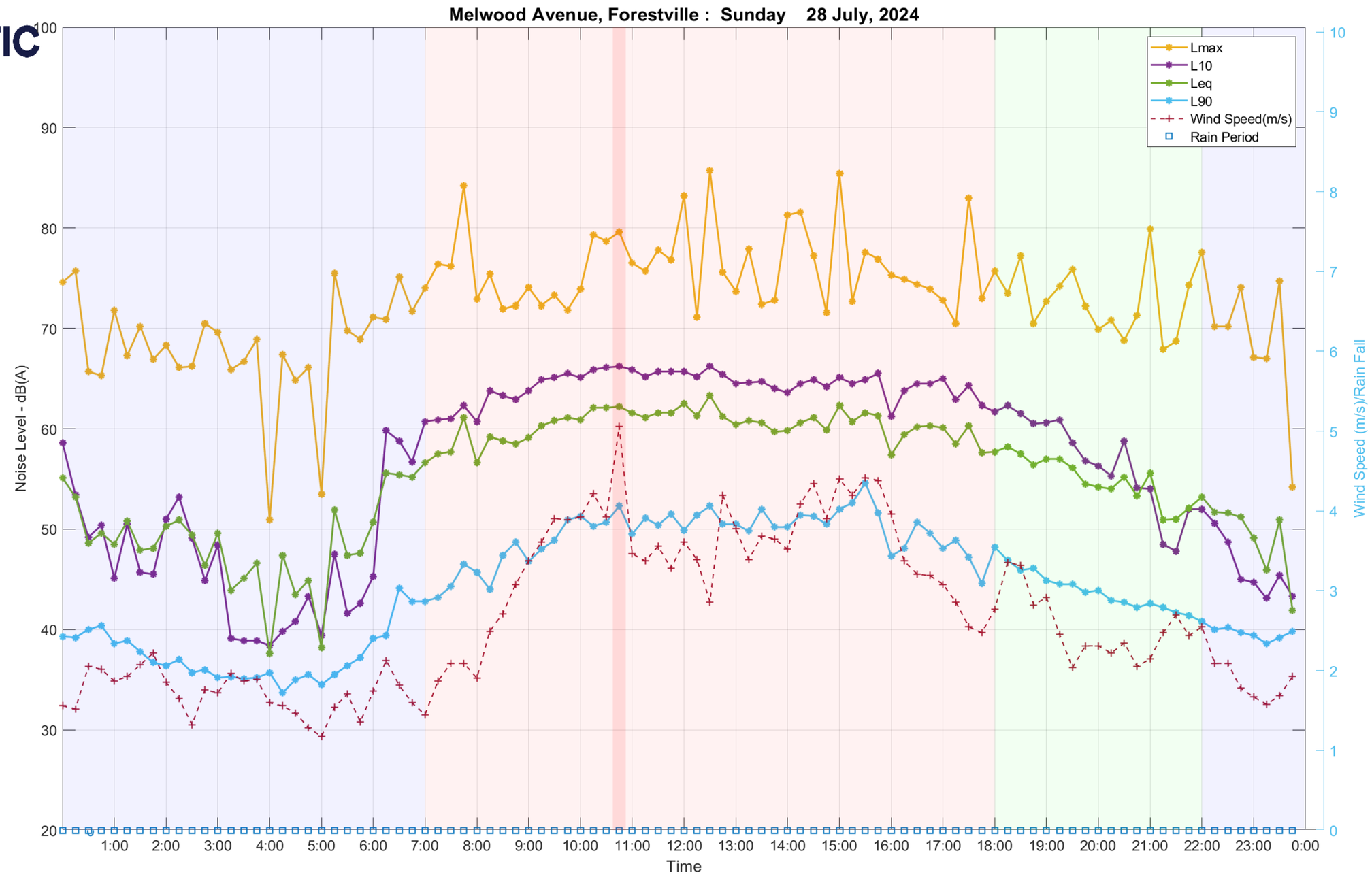
Melwood Avenue, Forestville : Sunday 28 July, 2024
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Leq
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Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
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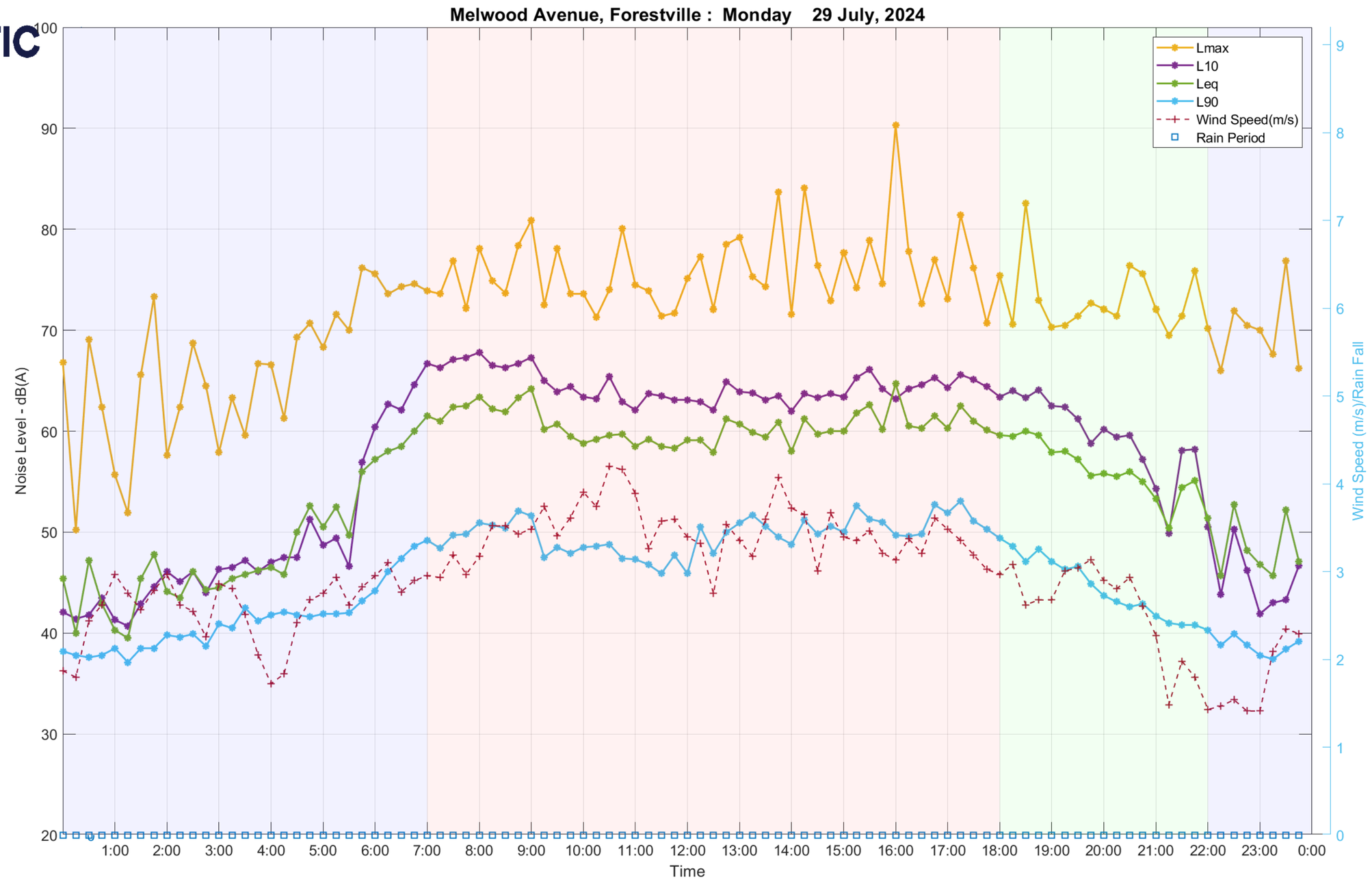
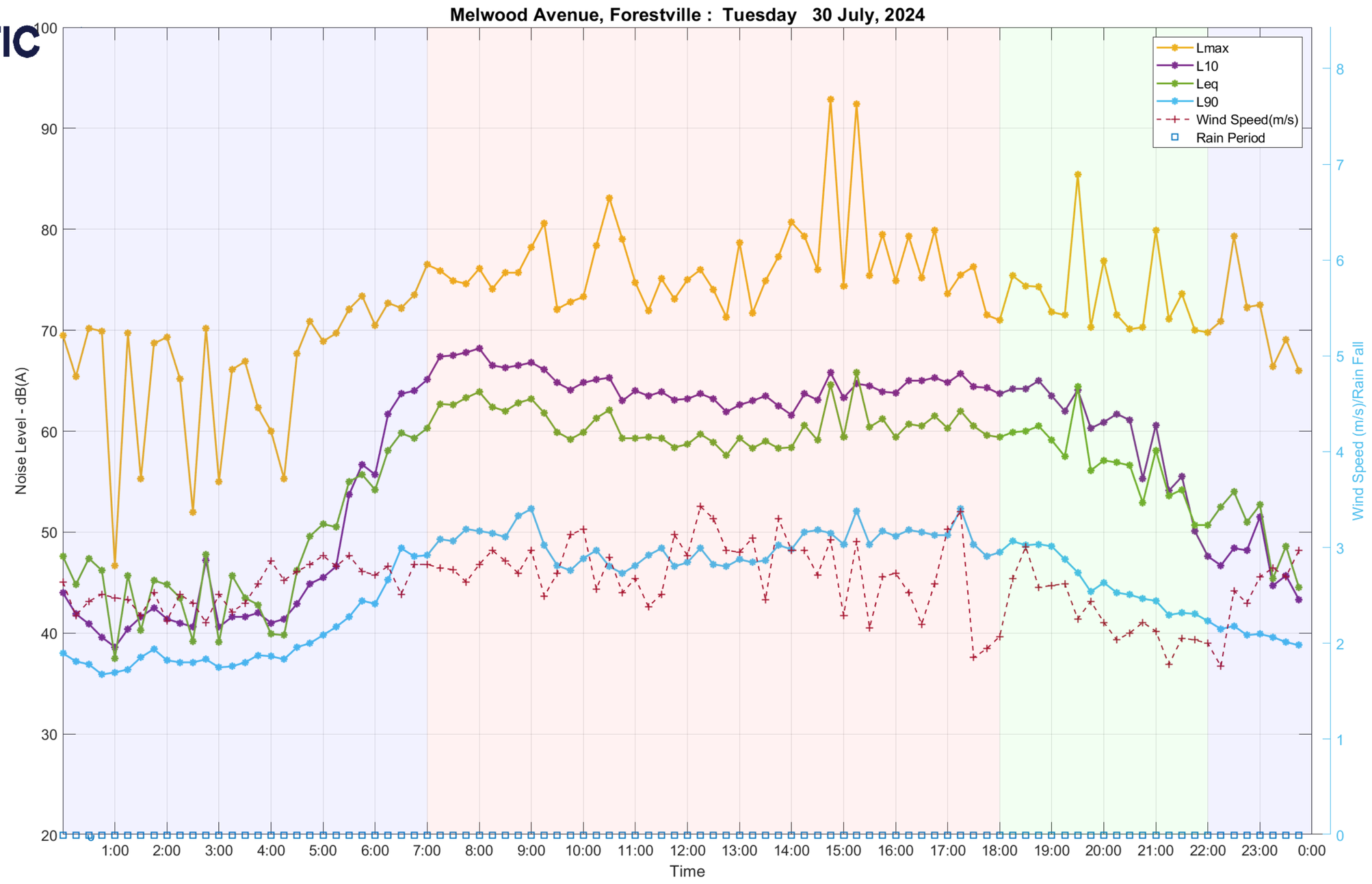
ACOUSTIC LOGIC




Melwood Avenue, Forestville : Tuesday 30 July, 2024
Lmax
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
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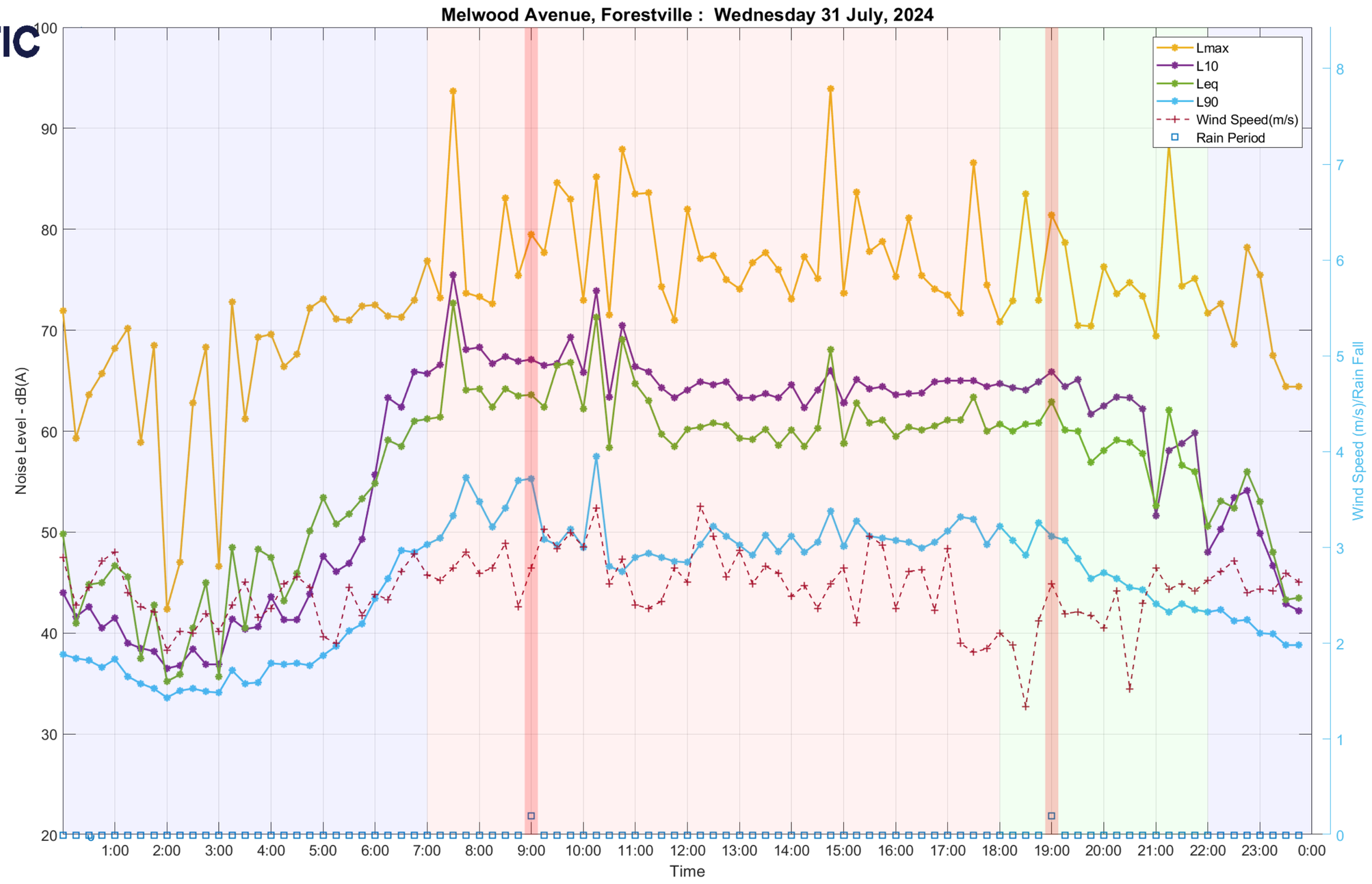
ACOUSTIC LOGIC



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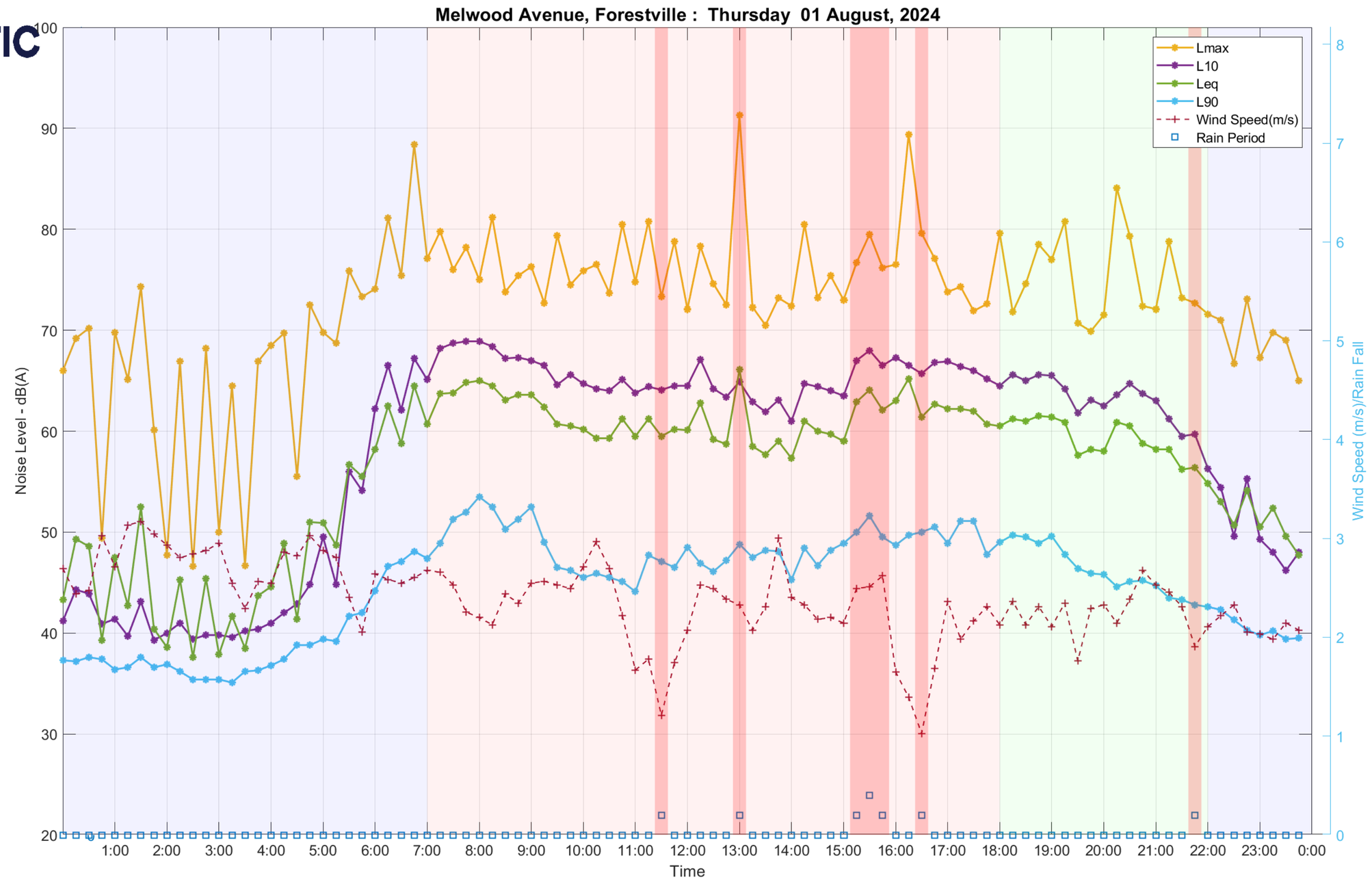

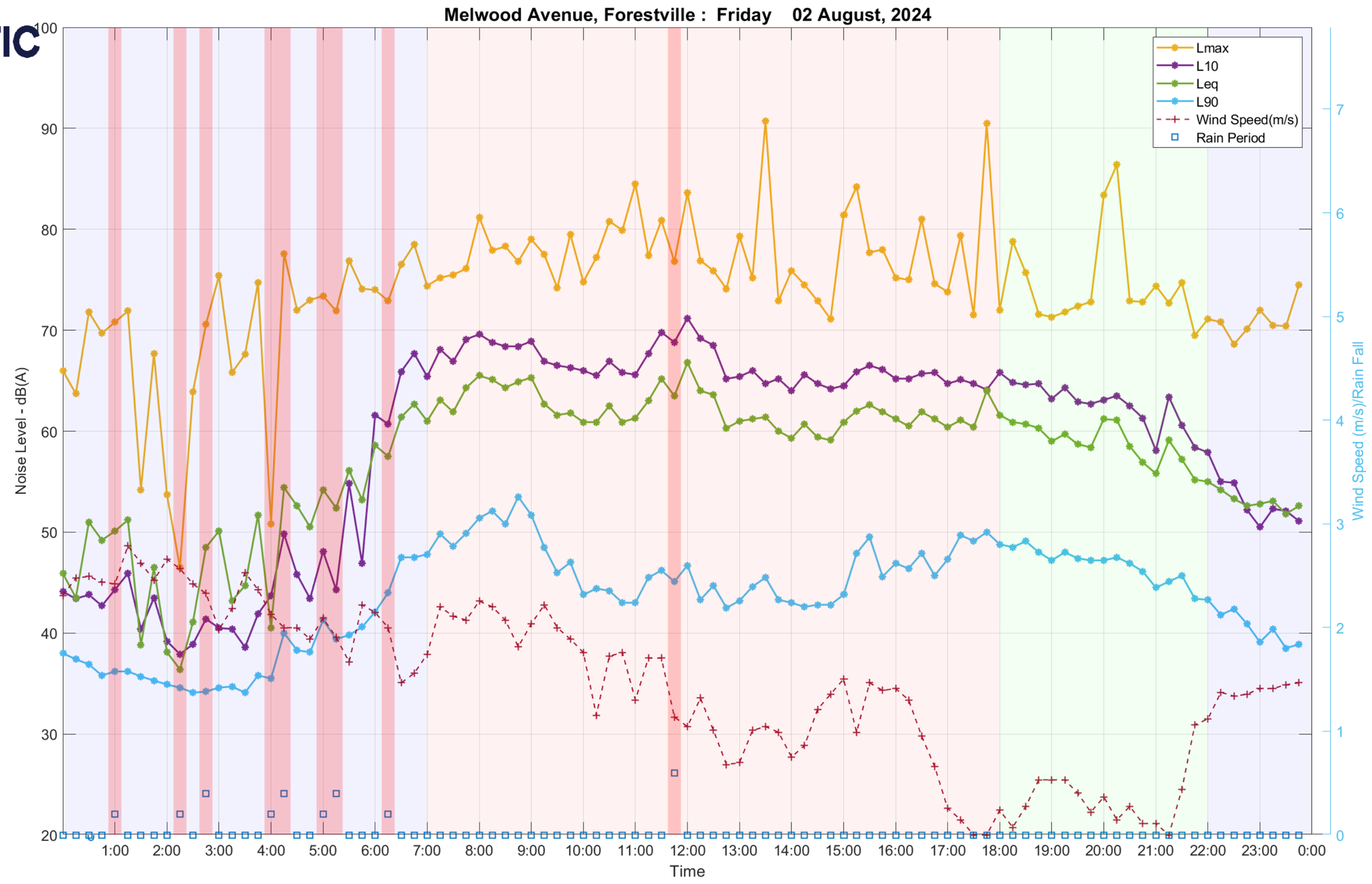
Melwood Avenue, Forestville : Friday 02 August, 2024
Lmax
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
100
90
80
70
60
50
40
30
20
7
6
5
4
3
2
1
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
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17:00
18:00
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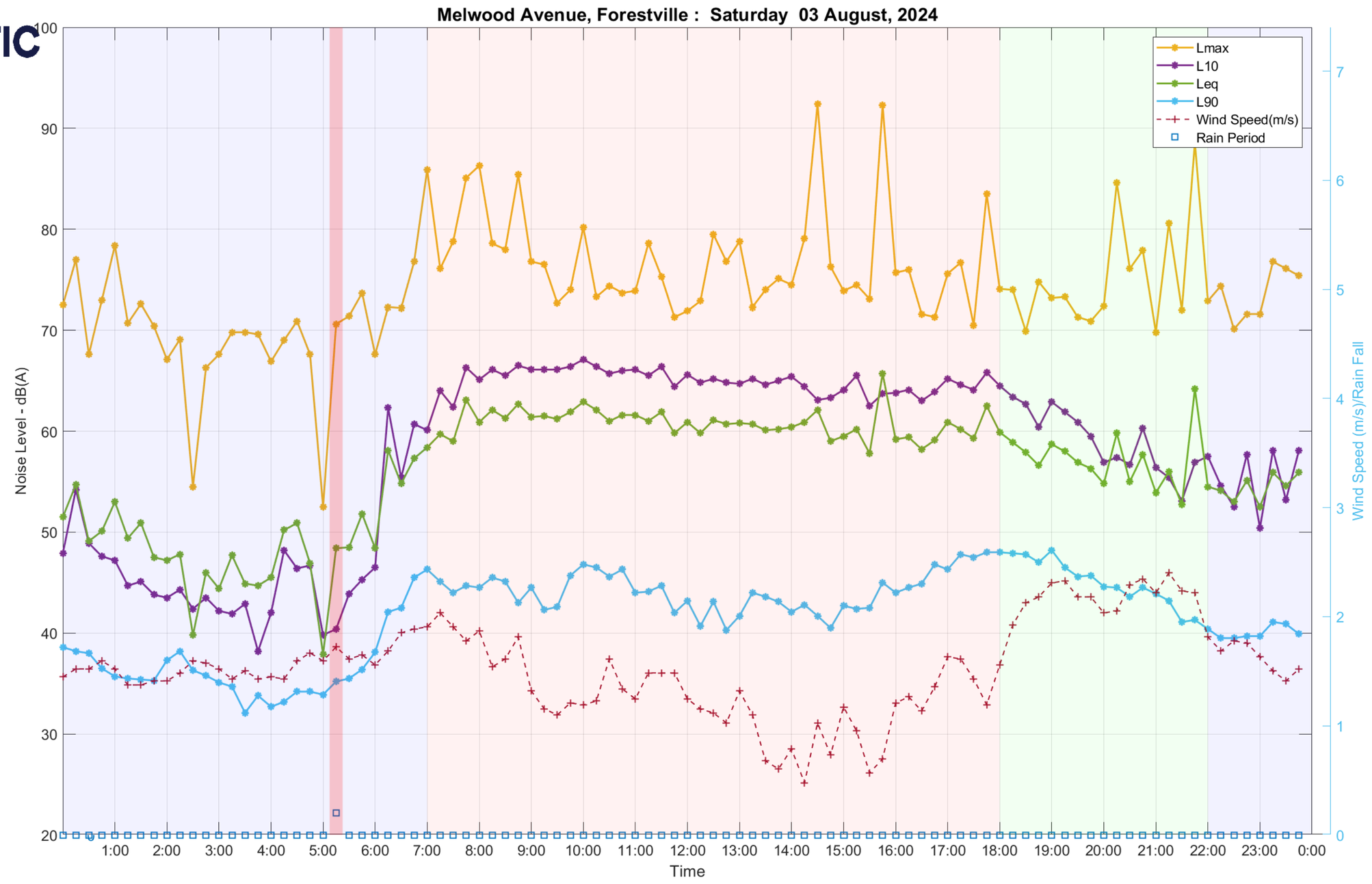
20:00
21:00
22:00
23:00
0:00


Melwood Avenue, Forestville : Saturday 03 August, 2024
Lmax
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
30
20
7
6
5
4
3
2
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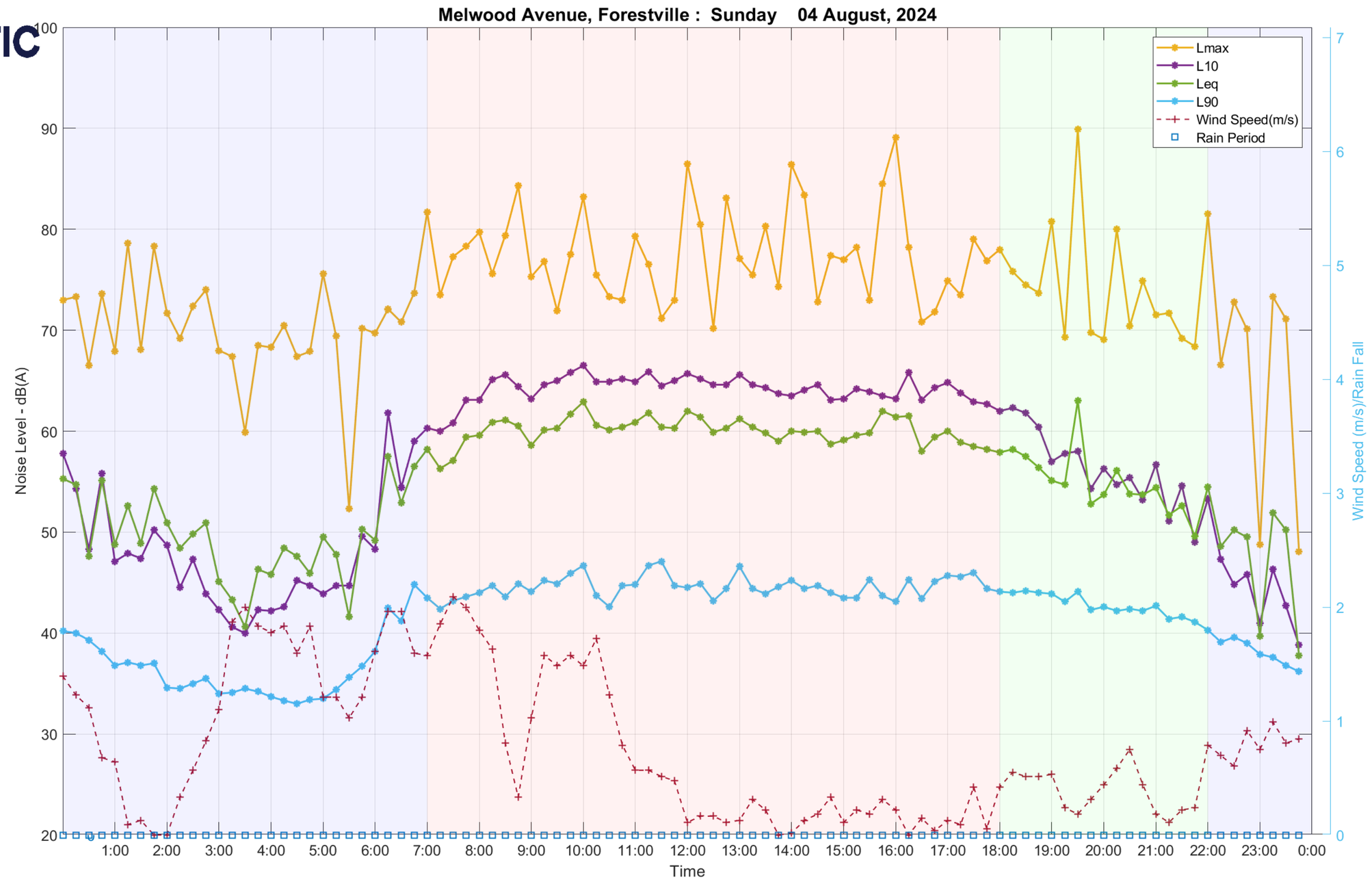
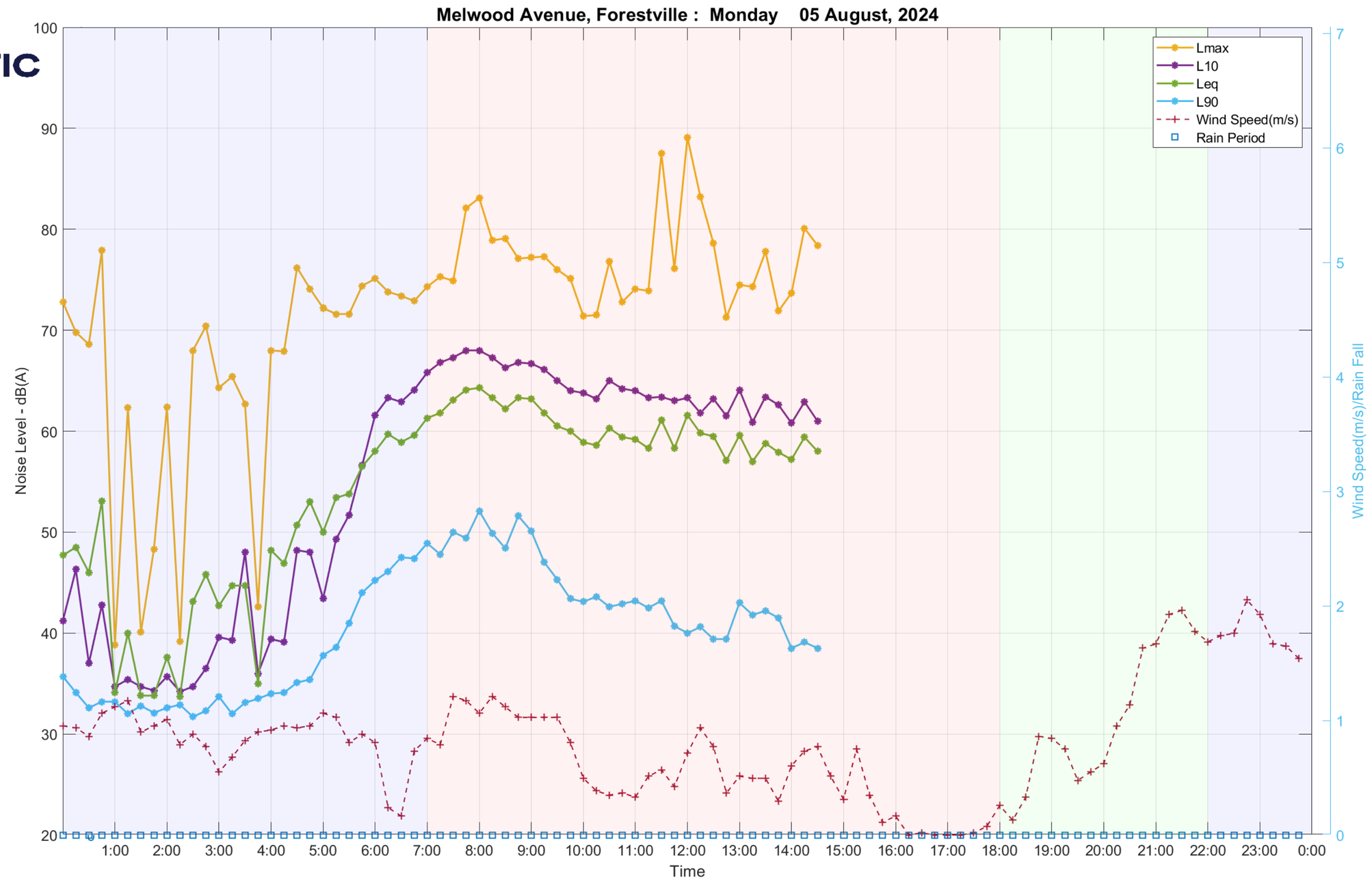
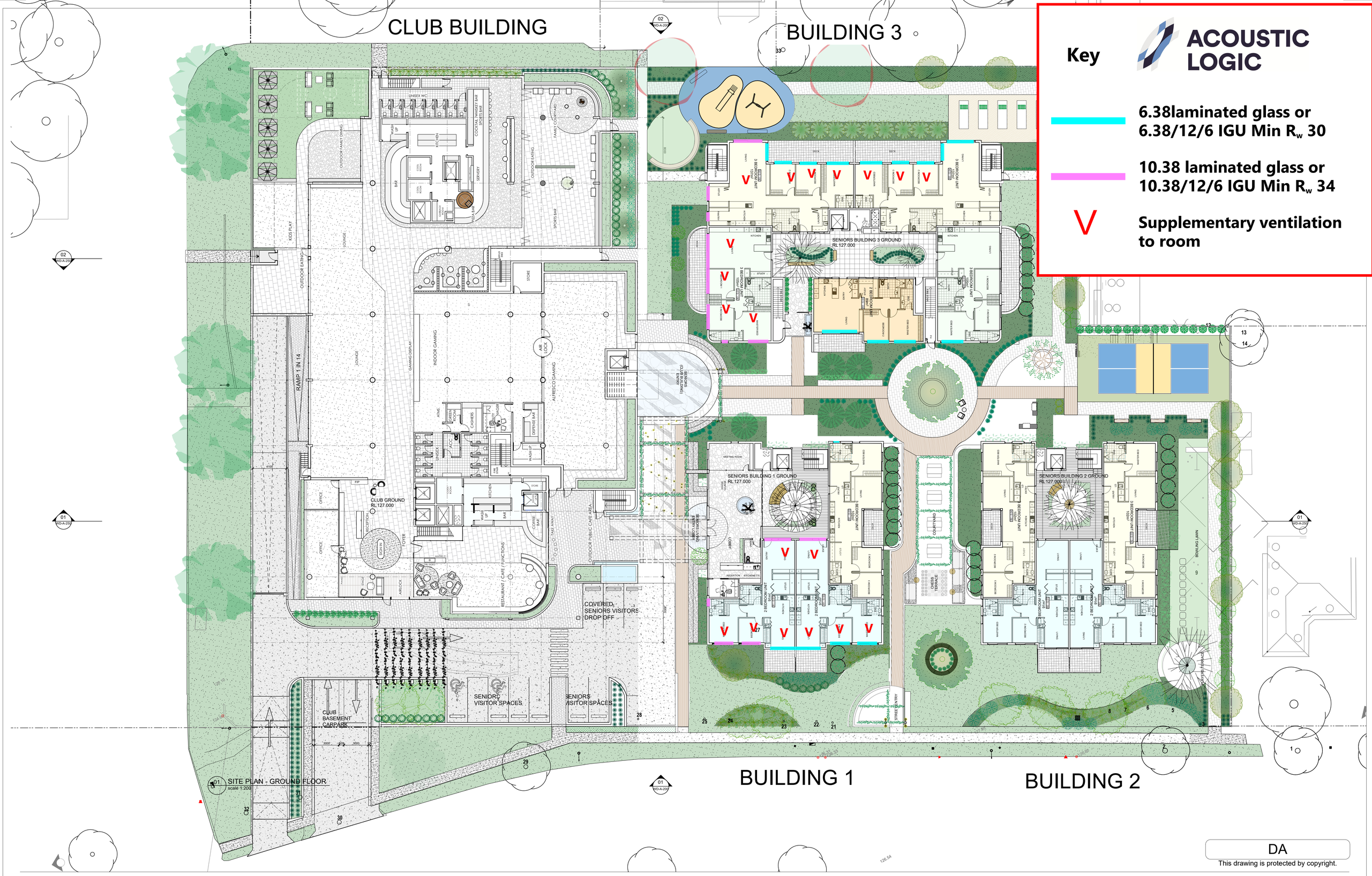
ACOUSTIC LOGIC





Wind Speed is corrected using factor 0.6600 based on logger location

APPENDIX B GLAZING AND VENTILATION MARKUP



DA

Sydney F: 61 2 9091 0190
Suite 129, 117 Old Pittwater Road
Brookvale NSW 2100
Peter Hosking (Director) Registered Architect - 6854

Canberra F: 61 2 6239 4044
Unit 5, 71 Leichhardt Street
Kingston ACT 2604
Tim Zuber Registered Architect - 2384

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Rev. No.	Date	Revision	By
A	16/11/2022	CLIENT MEETING	PJH
B	01/12/2023	CONCEPT UPDATE	PJH
C	12/04/2024	B5 ADDED	PJH
D	30/08/2024	DA	PH

CLIENT
FORESTVILLE RSL

PROJECT
CLUB REDEVELOPMENT
22 MELWOOD AVE
LOT 2589 & LOT 31
DP752038 & DP 366454

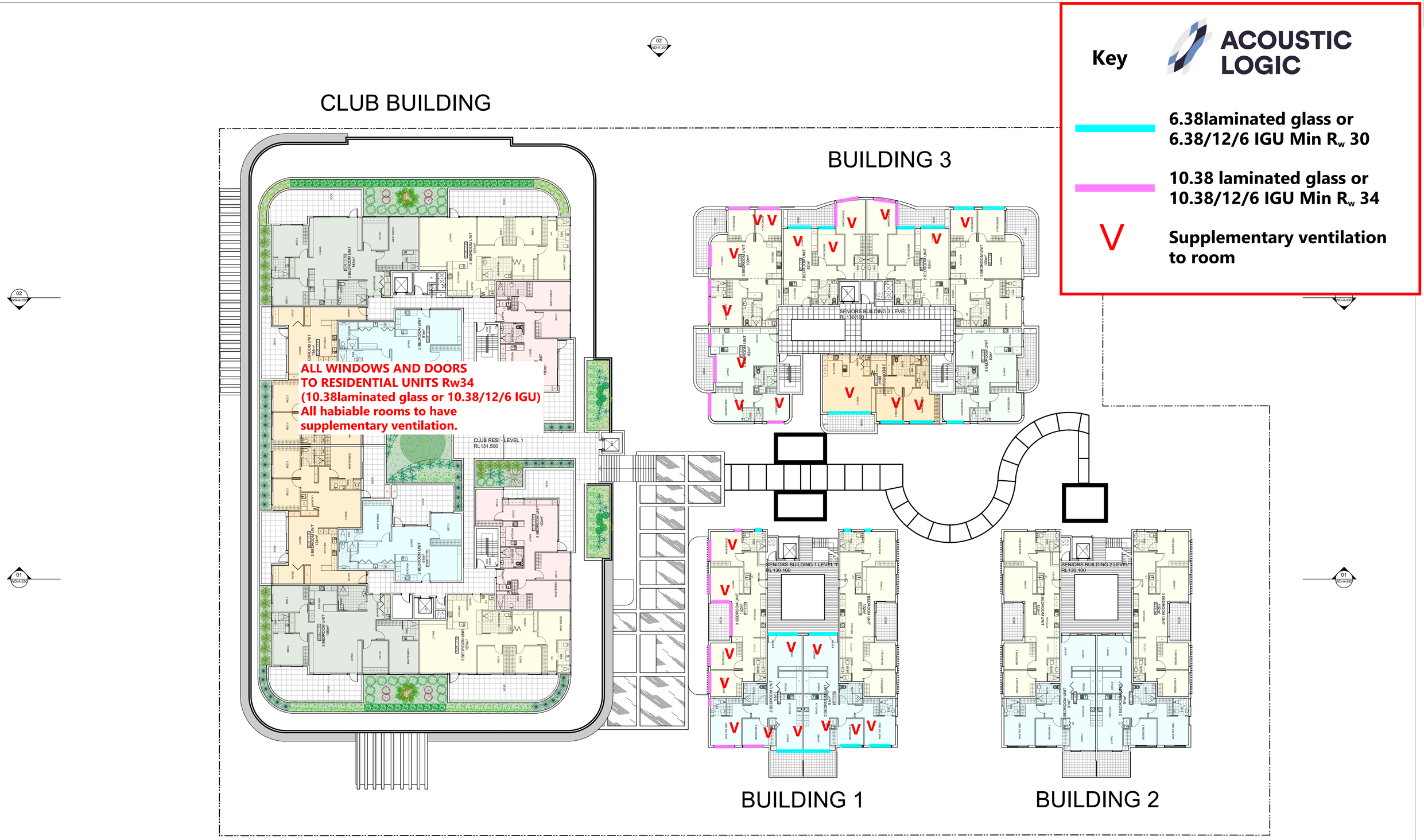
DRAWING
SITE PLAN - GROUND

MASTERPLAN SET

Scale at A1 1:200
Scale at A3 1:400
0m 2.5 5 10 15 16

Figured dimensions shall take precedence over scale. Contractors must verify all dimensions on job before commencing any work or making shop drawings.

DRAWN	DATE	CHKD
AL	20/04/2023	PH
PROJECT #	SHEET #	REVISION #
22-0716	DA_A_100	D



01 SITE PLAN - LEVEL 1
scale 1:200

DA

Sydney F: 61 2 9091 0190
Suite 129, 117 Old Pittwater Road
Brookvale NSW 2100
Peter Hosking (Director) Registered Architect - 6854

Canberra F: 61 2 6239 4044
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CLIENT
FORESTVILLE RSL

PROJECT
CLUB REDEVELOPMENT
22 MELWOOD AVE
LOT 2589 & LOT 31
DP752038 & DP 366454

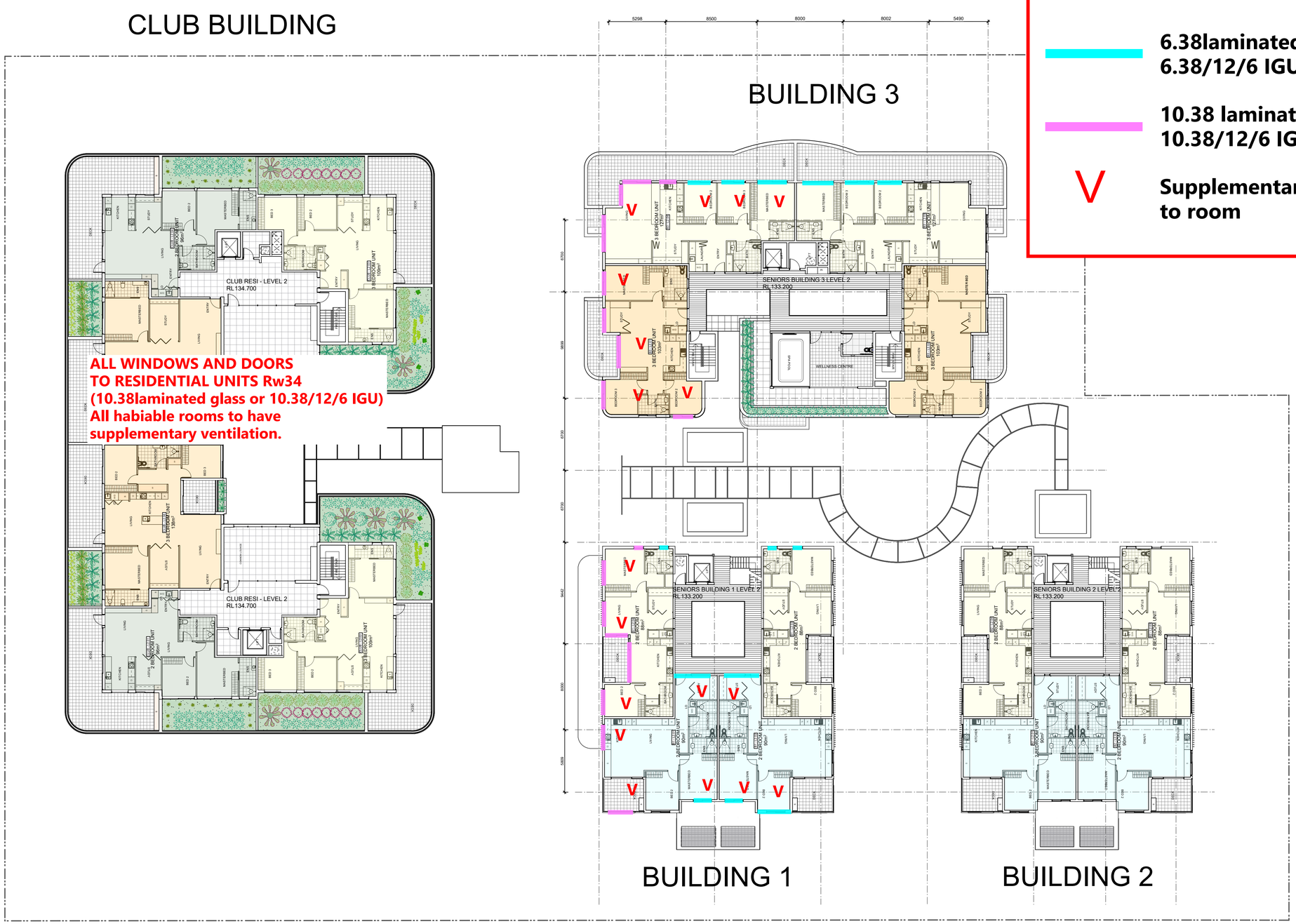
DRAWING
SITE PLAN - LEVEL 1

MASTERPLAN SET

Scale at A1 1:200
Scale at A3 1:400
0m 2.5 5 10 15 16

Figured dimensions shall take precedence over scale. Contractors must verify all dimensions on job before commencing any work or making shop drawings.

DRAWN	DATE	CHKD
AL	20/04/2023	PH
PROJECT #	SHEET #	REVISION #
22-0716	DA_A_101	D



Key

ACOUSTIC LOGIC

6.38laminated glass or 6.38/12/6 IGU Min R_w 30

10.38 laminated glass or 10.38/12/6 IGU Min R_w 34

V **Supplementary ventilation to room**

01 SITE PLAN - LEVEL 2
scale 1:200

DA

Sydney F: 61 2 9091 0190
Suite 129, 117 Old Pittwater Road
Brookvale NSW 2100
Peter Hosking (Director) Registered Architect - 6854

Canberra F: 61 2 6239 4044
Unit 5, 71 Leichhardt Street
Kingston ACT 2604
Tim Zuber Registered Architect - 2384

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CLIENT
FORESTVILLE RSL

PROJECT
CLUB REDEVELOPMENT
22 MELWOOD AVE
LOT 2589 & LOT 31
DP752038 & DP 366454

DRAWING
SITE PLAN - LEVEL 2

Scale at A1 1:200
Scale at A3 1:400
0m 2.5 5 10 15 16

Figured dimensions shall take precedence over scale. Contractors must verify all dimensions on job before commencing any work or making shop drawings.

MASTERPLAN SET

DRAWN	DATE	CHKD
AL	20/04/2023	PH
PROJECT #	SHEET #	REVISION #
22-0716	DA_A_102	D

APPENDIX C EPA NOISE POLICY FOR INDUSTRY TRIGGER LEVELS

Project specific assessment trigger levels have been determined for each noise source applying at the identified potentially most impacted receivers.

C.1 NPFI TRIGGER LEVELS

The NPfI requires noise impacts at residential receivers to be assessed in 3 ways:

- Whether the emitted noise is unreasonably loud relative to ambient background noise. (which the EPA calls the "intrusiveness" trigger level).
- Whether the noise emitted is unreasonably loud in an absolute sense, and consistent with surrounding land use and environment. ("amenity" trigger level)
- For night noise emissions, whether discrete noise events are likely to adversely impact sleep ("maximum noise level" trigger levels).

For other receiver types only the amenity trigger level is relevant.

C.1.1 Intrusiveness

The $L_{eq,15min}$ descriptor is used for the intrusiveness trigger level, and is set at a level that is 5dB(A) above the rating background noise level.

C.1.2 Amenity

Table 2.2 of the NPfI (repeated below) sets out acceptable noise levels for various receiver types.

There are 3 categories of residential receivers - rural, suburban, urban. The nearest residential receivers to the subject site are categorised as "suburban" receivers. Categories for non-residential uses are also indicated in the table.

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

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

Section 2.4 of the NPfI states:

Where cumulative industrial noise is not a necessary consideration because no other industries are present in the area, or likely to be introduced into the area in the future. In such cases the relevant amenity noise level is assigned as the project amenity noise level for the development.

Given there are no other nearby noise sources, and nor are any likely in the future, the applicable amenity level can be adopted as the L_{Aeq} trigger level.

The NfPI permits the project specific amenity level to be increased in areas where ambient noise levels already significantly exceed the levels in Table 2.2 of the NPfI.

NPfI *Table 2.2: Amenity* Noise Levels			
Receiver	***Noise Amenity Area***	***Time of* Day**	***Recommended* Amenity Noise Level L_{Aeq}**
Residential	*Rural*	*Day*	*50*
		Evening	*45*
		Night	*40*
	Suburban	*Day*	*55*
		Evening	*45*
		Night	*40*
	Urban	*Day*	*60*
		Evening	*50*
		Night	*45*
Area specifically reserved for passive recreation (e.g. national park)	*All*	*When in use*	*50*
Active recreation area (e.g. school playground golf course)	*All*	*When in use*	55
Commercial premises	*All*	*When in use*	*65*

Notes: The recommended amenity noise levels refer only to noise from industrial sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated.

Types of receivers are defined as follows:

• rural residential – see Table 2.3

• suburban residential – see Table 2.3

• urban residential – see Table 2.3

• industrial interface – an area that is in close proximity to existing industrial premises and that extends out to a point where the existing industrial noise from the source has fallen by 5 dB or an area defined in a planning instrument. Beyond this region the amenity noise level for the applicable category applies. This category may be used only for existing situations (further explanation on how this category applies is outlined in Section 2.7)

• commercial – commercial activities being undertaken in a planning zone that allows commercial land uses

• industrial – an area defined as an industrial zone on a local environment plan; for isolated residences within an industrial zone the industrial amenity level would usually apply.

Time of day is defined as follows:

• day – the period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays

• evening – the period from 6 pm to 10 pm

• night – the remaining periods.

(These periods may be varied where appropriate, for example, see A3 in Fact Sheet A.)

In the case where existing schools are affected by noise from existing industrial noise sources, the acceptable L_{Aeq} noise level may be increased to 40 dB $L_{Aeq(1hr)}$.

C.1.3 Noise Characteristic Modifying Factors

Where applicable, the emitted intrusive noise level should be modified (increased or decreased) to account for characteristics such as tonality, low frequency, duration, etc according to NPfI Fact Sheet C.

C.1.4 Maximum Noise Level Assessment

The purpose of this assessment is to identify whether discrete, night time noise events have the potential to produce adverse sleep impacts.

Section 2.5 of NPfI recommends the following procedure to assess the potential for adverse sleep 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 (L_{90}) plus 5 dB, whichever is the greater, and/or
- *L_{max} 52 dB(A) or the prevailing RBL (L_{90}) plus 15 dB, whichever is the greater,*

a detailed maximum noise level event assessment should be undertaken.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period. Some guidance on possible impact is contained in the review of research results in the NSW Road Noise Policy.

Other factors that may be important in assessing the extent of impacts on sleep include:

- *how often high noise events will occur*
- *the distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the subject development*
- *whether there are times of day when there is a clear change in the noise environment (such as during early-morning shoulder periods)*
- *current scientific literature available at the time of the assessment regarding the impact of maximum noise level events at night.*

Maximum noise level event assessments should be based on the L_{AFmax} descriptor on an event basis under 'fast' time response. The detailed assessment should consider all feasible and reasonable noise mitigation measures with a goal of achieving the above trigger levels.

C.1.5 project specific trigger levels

The following table summarises the trigger levels applying at each of the identified "most impacted" receivers. These have been determined based on the NPfI methodology described above and the measured rating background noise levels.

The trigger levels in bold indicate the most stringent trigger level at each location.

Table B1 –Project Specific Trigger Levels

Location/Receiver Type	Time	RBL dB(A) L_{90}	Trigger Noise Level (dB(A) $L_{eq,15min}$)		
			Intrusiveness	Amenity	Max Event
R1,R3 - Residential	Day	49	**54**	58	n/a
	Evening	44	49	**43**	n/a
	Night	36	41	**38**	41 L_{eq} **52 L_{max}**
R2 - Residential	Day	46	**51**	58	n/a
	Evening	42	47	**43**	n/a
	Night	35	40	**38**	40 L_{eq} **52 L_{max}**
C1,C2 - Commercial	All	n/a	n/a	63	n/a
P1,P2 – Active Recreation	All	n/a	n/a	53	n/a