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13/03/2026

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Attn: Shannon Roberts

84 Tallawong Road, Rouse Hill - Review of Requests for Information

This letter has been prepared in response to comments received for the Stage Significant Development Application submitted for the proposed residential development with infill affordable housing at 84 Tallawong Road, Rouse Hill (SSD-80287510).

Comments relating to acoustics have been reproduced within this letter and our responses provided accordingly.

The letter should be read in conjunction with the revised Noise Impact Assessment prepared by this office (ref: 20250481.2/0502A/R2/HD, dated 05/02/2026) and any other relevant updated supporting documentation issued for this submission.

For context, the revised design is summarised as follows:

- 1. Building RL's consolidated and reduced*
- 2. Basements consolidated to one basement resulting in additional 15 spaces.*
- 3. Building F updated to be allocated to affordable housing*
- 4. Additional level added to all buildings. Relying on Affordable Housing bonus.*
- 5. Rooftop communal open space is redesigned*
- 6. Apartment layout updated to accommodate core change*
- 7. Level 4 apartments adjusted to accommodate 18m internal separation*

Department Comments

11. Provide an updated Noise Report that includes the following:

a. a noise impact assessment considering only the elements of the proposed development included in the scope of the SSD application, rather than the development in its entirety.

Acoustic Logic Response

A review of the design documentation indicates that the modified design does not affect the overall acoustic impacts from the development when compared to the original design.

The Noise Impact Assessment (NIA) prepared by this office has been developed to supersede the previously submitted acoustic report prepared by NG Child & Associates (project ref: CA17/126/1002, dated 31/08/2017) for a number of reasons, including:

- The previously acoustic report was prepared in 2017 and many of the relevant guidelines presented in the report are now outdated. For example, the SEPP 2007 have since been superseded by the SEPP (Transport and Infrastructure) 2021 and the NSW Industrial Noise Policy 1999 has been superseded by the Noise Policy for Industry 2017.
- The report does not consider impacts to all surrounding noise-sensitive receivers, specifically Tallawong Public School to the north of the site.
- The report does not include an assessment of construction noise impacts on surrounding development.

On the above basis, it is our recommendation that the NIA prepared for this SSD be adopted for the whole site.

Department Comment

11. Provide an updated Noise Report that includes the following:

b. the noise impact from outdoor communal open space areas on internal and external receivers.

Acoustic Logic Response

Communal open spaces are proposed at rooftop areas of the development and provide the opportunity for residents to participate in a range of outside activities. For these spaces, it is typical that for a significant proportion of the time they are either not used, or used for passive purposes that do not generate significant noise, particularly at night.

We note that there are no specific noise emission criteria for residential private open spaces, and guidelines such as the commonly adopted NSW EPA Noise Policy for Industry (NPfI) are not appropriate for assessment of this noise type.

The NSW Planning and Environment Apartment Design Guide (ADG) - Objective 4H-1 provides the following objectives regarding communal open spaces:

"Noise sources such as garage doors, driveways, service areas, plant rooms, building services, mechanical equipment, active communal open spaces and circulation areas should be located at least 3m away from bedrooms"

Based on a review of the architectural design, the proposed communal spaces are at least 3m from any bedrooms which satisfies Objective 4H-1 of the ADG.

As with noise from private open space in detached dwellings, a level of noise generated on residential lots is accepted as part of community living. For example, noise from lawn mowing is accepted as “normal”, notwithstanding the relatively high levels of noise generated. These noisier activities are typical of urban living, as other noise generating activities carried out in private open space from time to time.

There are legislated time restrictions contained within the Protection of the Environment Operations (Noise Control) Regulation 2017 to manage activities carried out on residential properties and prevent them from adversely impacting other properties, particularly at night.

Given that the nearest receivers around communal open spaces are the occupiers of the same development, the most appropriate noise mitigation strategy would be for the owners corporation or building management to include by-laws to manage the use of these spaces such as time limits (e.g. no use during the night time), restriction on the number of users, etc.

Department Comment

11. Provide an updated Noise Report that includes the following:

c. the proposed layout and location of mechanical plant.

Acoustic Logic Response

A preliminary review of mechanical services has been undertaken based on mechanical services spatial drawings prepared by Bestec, noting that detailed layouts of plant and equipment selections have not been made yet at this stage. The assessment is presented in Section 6.4 of the revised report.

Summarily, the findings of this assessment provide indicative maximum permissible sound power levels applicable to each rooftop plant compound, noting that treatments to specific plant items are to be reviewed in more detail prior to obtaining CC and is to be assessed cumulatively from all external plant in this area.

Blacktown City Council Comments

Noise and Vibration

Noise and vibration assessments are to assess construction noise impacts and consider the school as a sensitive receiver.

If noise and vibration exceedances at the school are identified, mitigation measures should be developed consistent with NSW EPA construction noise guidelines. The mitigation measures should seek to maintain internal noise levels for classrooms required by the department’s Educational Facilities Standards and Guidelines (EFSG).

If necessary, a mitigation measure should also be included to provide periods of respite during the school day to limit impacts to student learning.

Acoustic Logic Response

An assessment of construction noise impacts has been provided in Section 8 of the revised Noise Impact Assessment. Impacts to the New Tallawong Public School have been considered, and noise management levels have been adopted based on the guidelines outlined by the EPA Interim Construction Noise Guideline (ICNG) – specifically 45 dB(A) within internal classrooms.

We note the EFSG is a document prepared by NSW Education and provides guidance with respect to the detailed design and construction of school projects across NSW. The document should not be applied for the assessment of construction noise and vibration impacts from external parties.

Recommendations have been provided within the discussion of the NIA and include a range of feasible and practical mitigation strategies which could be implemented during construction, including community liaison, notification, acoustic screening, scheduling of works and respite periods where necessary– these are captured in Section 8.5 of the updated report.

Please contact us should you have any further queries.

Yours faithfully,

A handwritten signature in black ink, consisting of a stylized, cursive 'D' followed by a long horizontal line extending to the right.

Acoustic Logic Pty Ltd
Hyde Deng
MAAS



MATTHEW PALAVIDIS
VICTOR FATTORETTO
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84 Tallawong Road, Rouse Hill

Noise and Vibration Impact Assessment

SSD-80287510

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Document Title	Noise and Vibration Impact Assessment
Attention To	84 Tallawong Road Rouse Hill Development Pty

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1 EXECUTIVE SUMMARY

This Noise and Vibration Impact Assessment has been prepared by Acoustic Logic to accompany a Significant Development Application (**SSDA**) for residential development with in-fill affordable housing at 84 Tallawong Road, Rouse Hill (the site).

The legal description of the site is Lot 63 in Deposited Plan 30186.

This report has been prepared to address the Secretary's Environmental Assessment Requirements (**SEARs**) issued for the project (**SSD-80287510**).

This SSDA seeks consent to amend three existing consents (SPP-17-00031, SPP-17-00032, and SPP-17-00033) for residential development comprising 1 shop-top housing building and 5 residential flat buildings with a combined total of 411 units (including 70 affordable housing units).

Notwithstanding that an acoustic report was previously prepared for the approved development consents, given that report is dated 2017 and that additional housing units are included within this proposal, the Noise and Vibration Impact Assessment has been undertaken to assess the entire development.

This updated assessment concludes that the proposed development is suitable and warrants approval subject to the implementation of mitigation measures summarised under the below headings. Following the implementation of these mitigation measures, the remaining impacts are appropriate.

Noise Intrusion to the Development

The main source of noise surrounding the development is traffic noise from Tallawong Road to the west of the site and requires assessment in accordance with the guidance outlined within the Development Near Rail Corridors and Busy Roads (DNRCBR) and Blacktown City Council Growth Centre Precincts Development Control Plan (DCP) 2018.

A series of attended and unattended (long term) noise measurements were undertaken at the site to determine the environmental noise levels and noise exposure of the future development. Detailed three-dimensional noise modelling was undertaken to predict noise levels to the future façades of the building and allow assessment of potential noise impact to future residents within the development.

Based on the modelling and assessment, it was determined that upgraded façade constructions are required to achieve the relevant internal noise level requirements. Minimum complying mitigations to the building shell have been presented accordingly within the report to satisfy all internal noise level requirements. A further review is recommended to be undertaken prior to CC once the façade design has been finalised.

Noise and Vibration Emissions to Surrounding Receivers

The primary source of noise and vibration emissions from the site will be from mechanical plant, and in particular anything which is located externally. Long term unattended noise measurements were undertaken to determine existing background noise levels representative of surrounding residential receivers.

Based on these measurements, project noise trigger levels for the site were developed in line with the requirements of the NSW EPA Noise Policy for Industry – this guideline considers both the audibility of a noise source (i.e. its increase over the background noise level) as well as cumulative noise impacts to external receivers (the 'amenity' level).

As the detailed mechanical design has not yet progressed, it has been recommended that a detailed acoustic review be undertaken as part of the design development prior to CC to ensure the relevant project noise trigger levels are achieved. Notwithstanding, compliance is achievable with the implementation of standard acoustic treatments (internal duct lining, attenuators etc.) and further verification testing is recommended to be undertaken prior to OC.

Construction Noise and Vibration Impacts

Noise and vibration from construction activities have the potential to impact surrounding development throughout the course of construction for the overall development. The NSW EPA Interim Construction Noise Guideline provides a framework to assess these impacts and provides recommendations for the control of noise and vibration levels from construction activities.

Noise and vibration management levels have been developed within this report based on the EPA guidelines using long term unattended monitoring data, as well as Australian Standards relating to vibration. These levels provide a threshold by which potential impacts can be predicted, and mitigation methods developed to reduce the effects.

Notwithstanding that detailed construction methodologies have not yet been established, a preliminary assessment of construction noise and vibration has been undertaken within the report. Based on the assessment, reasonable and feasible mitigation measures will need to be implemented throughout the course of construction to ensure any impacts are minimised to surrounding receivers. A separate Construction Noise and Vibration Management Plan is recommended be prepared prior to CC to assess specific plant, equipment and construction methodologies once these have been established in further detail.

2 INTRODUCTION

This Noise and Vibration Impact Assessment has been prepared to support a State Significant Development Application (**SSDA**) at 84 Tallawong Road, Rouse Hill (the site) for residential development with in-fill affordable housing.

This SSDA seeks modification of existing consents related to the site (SPP-17-00031, SPP-17-00032, and SPP-17-00033) in accordance with the consent authority's powers under s4.17(1)(b) and (5) of the *Environmental Planning and Assessment Act 1979*. Those powers enable a consent authority to amend conditions in existing consents as part of the approval of a fresh development application including allowing substitution of plan references in conditions.

More particularly this SSDA seeks consent for an additional 78 dwellings (including 70 affordable housing units) and 15 car spaces to deliver a total of 411 apartments and 526 car spaces within the development of 1 shop-top housing and 5 residential flat buildings consistent with the infill affordable housing provisions of Chapter 2, Part 2, Div. 1 of *State Environmental Planning Policy (Housing) 2021*.

A comparison of the approved developments and the scope of the modifications are as follows:

Approved Under Existing Consents	Sought For Consent Under This SSDA	Total
<u>Apartment Yield</u>		
Lot 1 – 112	+ 25 apartments	135
Lot 2 – 112	+ 28 apartments	138
Lot 3 - 109	+ 26 apartments	138
Total		
333	+ 78 apartments (including 70 affordable housing units)	411
<u>Retail Floor Space (Lot 1 Only)</u>		
120 sqm	-1.81 sqm	118.19 sqm
<u>Parking</u>		
Lot 1 - 175	- 9 car spaces	166
Lot 2 - 168	+ 22 car spaces	190
Lot 3 - 168	+ 2 car spaces	170
Total		
511	+ 15 car spaces	526

2.1 PURPOSE OF THIS REPORT

This report has been prepared in response to the requirements contained within the Secretary's Environmental Assessment Requirements (**SEARs**) dated 26 March 2025 and issued for the SSDA (SSD-80287510). Specifically, this report has been prepared to respond to the SEARs requirements issued below.

Table 1 – SEARs Requirements SSD-80287510

Item	Description of Requirement	Section Reference (this Report)
10. Noise and Vibration	Provide a noise and vibration assessment prepared in accordance with the relevant NSW Environment Protection Authority (EPA) Guidelines.	This report has been prepared to address the SEARs requirement.
	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.	6, 7 & 8

Key modifications to the existing design as part of this revision are summarised below:

1. *Building RL's consolidated and reduced*
2. *Basements consolidated to one basement resulting in additional 15 spaces.*
3. *Building F updated to be allocated to affordable housing*
4. *Additional level added to all buildings. Relying on Affordable Housing bonus.*
5. *Rooftop communal open space is redesigned*
6. *Apartment layout updated to accommodate core change*
7. *Level 4 apartments adjusted to accommodate 18m internal separation*

A review of the design documentation indicates that the modified design does not affect the overall acoustic impacts from the development when compared to the original design.

This Noise Impact Assessment (NIA) has been developed to supersede the previously submitted acoustic report prepared by NG Child & Associates (project ref: CA17/126/1002, dated 31/08/2017) for the following reasons:

- The previously acoustic report was prepared in 2017 and many of the relevant guidelines presented in the report are now outdated. For example, the SEPP 2007 have since been superseded by the SEPP (Transport and Infrastructure) 2021 and the NSW Industrial Noise Policy 1999 has been superseded by the Noise Policy for Industry 2017.
- The previous report did not consider impacts to all surrounding noise-sensitive receivers, specifically Tallawong Public School to the north of the site.
- The report did not include an assessment of construction noise impacts on surrounding development.

On the above basis and given the age of the previous report and that additional housing units are included within this proposal, this report has been prepared with the intention to supersede the 2017 report by addressing the development in its entirety.

2.2 REFERENCED DOCUMENTS

This assessment was conducted using drawings provided by Place Studio, project number 2025018 and preliminary mechanical services spatial drawings issued by Bestec (project no. 30800).

Internal noise intrusion criteria have been determined to satisfy the requirements below:

- Blacktown City Council Growth Centre Precincts Development Control Plan ("**DCP**") 2018
- NSW Department of Planning, Industry, and Environment – '*Development near Rail Corridors or Busy Roads – Interim Guideline*' ("**DNRCBR**")

External noise and vibration emission noise trigger levels have been determined to satisfy the requirements below:

- Blacktown City Council Growth Centre Precincts Development Control Plan ("**DCP**") 2018
- NSW Environment Protection Authority (EPA) Document – '*Noise Policy for Industry*' ("**NPI**") 2017
- Australian Standard 2436-1981 & Australian Standard 2436-2010.
- Department of Environment and Climate Change NSW – '*Interim Construction Noise Guideline (ICNG)*', dated July 2009.
- Department of Environment and Conservation NSW – '*Assessing Vibration: A Technical Guideline*', dated February 2006.
- German Standard DIN 4150-3 (2016) – '*Vibration in Buildings - Part 3: Effects on Structures*'.
- British Standard BS 6472:1992 '*Guide to Evaluate Human Exposure to Vibration in Buildings (1Hz to 80Hz)*'.

3 SITE DESCRIPTION AND SURROUNDING ENVIRONMENT

The site is located at 84 Tallawong Road, Rouse Hill within the Blacktown City Council Local Government Area (LGA), The legal description of the site is Lot 63 in Deposited Plan 30186. A site plan is provided below in Figure 1.



Figure 1 – Proposed Site Plan (Source: Place Studio, August 2025)

The following significant environmental noise sources have been identified:

- Traffic noise from Tallawong Road to the west of the site.
- Operational/Mechanical noise emissions from the use of the premises

3.1 NEAREST SENSITIVE RECEIVERS

The following table lists the nearest sensitive receivers surrounding the site. An aerial photo of the site indicating nearby noise sensitive receivers and measurement locations is presented in Figure 2.

Table 2 - Sensitive Receivers

Receiver (Figure 2)	Land Use	Comment
R1	Residential	Townhouse dwellings to the south along 74A Tallawong Road (currently under construction)
R2	Residential	Residential dwellings to the west along Tallawong Road
R3	Residential	Residential dwelling to the north-west of the site at 100 Tallawong Road
R4	Residential	Residential dwellings to the east along Cudgegong Road and Macquarie Road
E1	School	Approved Tallawong Public School to the north at Lot 2 and Part Lot 1, Macquarie Road



Figure 2 - Site Map with Surrounding Receivers and Monitoring Locations (Source: NSW SIX Maps)

4 AMBIENT NOISE SURVEY SUMMARY

Attended short-term measurements and long-term unattended noise monitoring was conducted to quantify the existing acoustic environment at the site and surrounding receivers. Noise monitoring and measurements were undertaken in August 2025.

Unattended measurements have been undertaken as per the procedures outlines in Fact Sheet A & B of the NSW EPA Noise Policy for Industry. Detailed graphs of the measured noise levels from unattended noise monitoring are presented in the appendices of this report.

Rating background noise levels and traffic noise levels have been summarised in the tables below. Appendix A provides detailed information on the selected monitoring locations, duration and calculation procedures required for the assessment, as well as detailed graphs of the measured noise levels from each monitor.

Table 3 – Measured Rating Background Noise Levels

Monitor Location	Rating Background Noise Level - Time of Day dB(A) $L_{90(\text{period})}$		
	Daytime (7am-6pm)	Evening (6pm-10pm)	Night (10pm-7am)
M1 Tallowong Road	49	43	35
M2 East of site	43	41	35

Table Notes: The Rating Background Noise Levels (RBLs) at M1 will be adopted for receivers facing Tallowong Road, and RBLs at M2 will be adopted for receivers adjacent to the east of the site.

Table 4 – Measured Traffic Noise Levels

Monitor Location	Traffic Noise Level dB(A) L_{eq}	
	Daytime (7am-10pm)	Night (10pm-7am)
M1 Tallowong Road	64 dB(A) $L_{eq(15\text{-hr})}$	58 dB(A) $L_{eq(9\text{-hr})}$
A1 25/08/2025, 8:30am – 9:00am Tallowong Road @3m from kerb, 1.5m above ground	66 dB(A) $L_{eq(15\text{-min})}$	-

5 EXTERNAL NOISE INTRUSION ASSESSMENT

5.1 EXTERNAL NOISE INTRUSION STANDARDS AND GUIDELINES

External noise impacts will be assessed within the context of the site against relevant noise project noise criteria. The primary external noise source impacting the site is traffic along Tallawong Road to the west of the site.

The following guidelines have been referenced to as part of the assessment:

- Blacktown City Council Growth Centre Precincts Development Control Plan (“**DCP**”) 2018
- NSW Department of Planning, Industry, and Environment – ‘*Development near Rail Corridors or Busy Roads – Interim Guideline*’ (“**DNRCBR**”)
- NSW Apartment Design Guide (“**ADG**”)

An outline of relevant acoustic criteria is presented below.

5.1.1 Blacktown City Council Growth Centre Precincts DCP

The DCP provides the following guidance with relation to external noise impacts on residential development as summarised in the following table:

Table 5 - Noise Criteria For Residential Premises Impacted By Traffic Noise

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

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

In conjunction with the *TISEPP 2021*, the development will need to ensure compliance with the *DNRCBR* guideline which states the following:

“The following provides an overall summary of the assessment procedure to meet the requirements of clauses 87 and 102 of the Infrastructure SEPP [Sections 2.100 and 2.120 of the TI SEPP 2021]. The procedure covers noise at developments for both road and rail.

If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following L_{Aeq} levels are not exceeded:

- In any bedroom in the building – 35 dB(A) at any time between 10pm and 7am,*
- Anywhere else in the building (other than a garage, kitchen, bathroom, or hallway) – 40 dB(A) at any time.”*

Section 3.6 of the NSW Department of Planning's 'Development near Rail Corridors and Busy Roads (Interim Guideline) specifies the following noise descriptors for the assessment of traffic noise:

- Day - L_{eq} (15 hour)
- Night - L_{eq} (9 hour)

The DNRCBR also provides guidance on the assessment of natural ventilation. The allowable internal noise goal is permitted to be 10 dB(A) higher than when the windows are closed (i.e. – allowable level in bedrooms becomes 45 dB(A), and 50 dB(A) in living rooms). Where noise levels would exceed this, the NSW Planning guideline recommends that an alternative ventilation system be provided to achieve the ventilation requirements of the BCA with windows closed. We note that where the 'open window/door' scenario cannot be achieved, this does not necessarily mean that there cannot be operable elements on these façades, only that internal noise level requirements will only be met when they are closed.

5.2 SUMMARISED EXTERNAL NOISE INTRUSION REQUIREMENTS

A comparison of the two sets of internal noise level objectives between the DNRCBR and Blacktown DCP is provided below:

- For a 'windows closed' scenario,
 - Both the DNRCBR and DCP provide assessment criteria for living areas during the daytime, and for sleeping areas during the night.
 - the DCP provides additional assessment levels for sleeping areas during the day time, and living areas during the night
 - The DNRCBR does not clarify whether mechanical ventilation or air condition systems are active during the 'windows closed' scenario. The DCP appears to accommodate for noise contributions from mechanical systems during each period which results in a higher assessment noise level (for scenarios where 'windows open' noise levels are exceeded).
 - the DNRCBR criteria is more onerous for both sleeping and living areas with respect to the relevant assessment periods.
- For a 'windows open' scenario,
 - The DNRCBR provides a screening test where a 10dB dispensation (increase) is applied to the internal noise level.
 - AL's interpretation of the DCP indicates that two 'windows closed' scenarios are presented where mechanical/alternative ventilation systems are either operational or not operational, i.e., the 'windows open' noise levels for a 'naturally ventilated' space becomes the equivalent of the DNRCBR 'windows closed' level with additional consideration for additional time periods and the 'windows closed' level then means that the screening test threshold is exceeded, and so mechanical ventilation is used.
 - On the above basis, the requirements of the DNRCBR would be equal to or more stringent than the requirements of the DCP during the relevant assessment periods outlined within the DNRCBR.

Internal noise objectives adopted for areas within the development are summarised below based on the above.

Table 6 – Adopted Project Internal Noise Level Objectives

Scenario	Façade Arrangement	Space	Time of Day	Required Internal Noise Level
Windows Open Screening Test	Windows Open to 5% of floor area	Sleeping Areas	Night(10pm-7am)	45 dB(A) _{Leq(9-hour)} - DNRCBR
		Living Areas	Day (7am-10pm)	50 dB(A) _{Leq(15-hour)} - DNRCBR
Where Screening Test Exceeded (Alternative Ventilation Option)	Windows closed and mechanical ventilation system running	Sleeping Areas	Day (7am-10pm)	43 dB(A) _{Leq(15-hour)} – DCP
			Night (10pm-7am)	38 dB(A) _{Leq(9 hour)} – DCP
		Living Areas	Day (7am-10pm)	46 dB(A) _{Leq(15-hour)} – DCP
			Night (10pm-7am)	43 dB(A) _{Leq(9 hour)} – DCP
Where Screening Test Achieved (No Additional Ventilation Required)	Windows closed with no additional ventilation system running	Sleeping Areas	Day (7am-10pm)	40 dB(A) _{Leq(15-hour)} – DCP
			Night (10pm-7am)	35 dB(A) _{Leq(9 hour)} – DCP/DNRCBR
		Living Areas	Day (7am-10pm)	40 dB(A) _{Leq(15-hour)} – DNRCBR
			Night (10pm-7am)	40 dB(A) _{Leq(9 hour)} - DCP

Noise intrusion impacts from external traffic movements are assessed against the requirements above with minimum complying constructions to be applied to the building shell (external walls, windows and roof). Refer to Section 6 for minimum complying mitigations based on a 'windows closed' noise level.

5.3 COMPLYING CONSTRUCTIONS

5.3.1 Glazed Windows and Doors

Indicative treatments to satisfy both the DNRCBR and Blacktown DCP internal noise criteria detailed above have been determined based on the architectural drawings provided for a 'windows closed' scenario. Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria. All external windows and doors listed are required to be fitted with Q-Lon type acoustic seals. (**Note: Mohair Seals are not considered acoustic seals**).

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

A full assessment of all treatments recommended within this report is to be conducted during detailed design to ensure that the criteria determined within this report is met.

Table 7– Minimum Complying Glazing Thickness

Building	Façade	Space	Minimum Glazing Construction	Acoustic Seals
A and B	West	Living Areas	6.38mm Laminate / 8mm float or toughened	Yes
		Bedrooms		
	All other façades	Living Areas	6mm float or toughened	
		Bedrooms		
	All other spaces	Standard Glazing	-	
C, D, E, F	All	Living Rooms	6mm float or toughened	Yes
		Bedrooms	6mm float or toughened	
		All other areas	Standard Glazing	-

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

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

In addition to complying with the minimum complying glazing construction, the R_w rating of the glazing fitted into open-able frames and fixed into the building opening should not be lower than the values listed in the following table. This will require the use of acoustic seals around the full perimeter of open-able frames and the frame will need to be sealed into the building opening using a flexible sealant.

Table 8 – Minimum R_w of Single Glazing (with Acoustic Seals)

Single Glazing Assembly	Minimum R_w of Installed Window
6mm float or toughened	29
6.38mm laminated / 8mm float or toughened	31

5.3.2 Use of Insulated Glass Units (Double Glazing)

Where single glazing has been recommended in Table 7 above, the following IGU's can be used in place of the tabled single glazing.

Table 9 – Equivalent IGU $R_w / R_w + C_{tr}$ Requirements

Single Glazing Assembly	Equivalent IGU	Minimum $R_w/R_w + C_{tr}$ of Installed Window
6mm float or toughened	6/12AG/6	33/30
8mm float or toughened and 6.38mm laminated	8/16AG/8 OR 6/12/6.38	35/31

5.3.3 External Wall Construction

Masonry or concrete wall structures will be acceptable without any further acoustic treatment required. In the event that light weight constructions are proposed as part of the detailed design of the project, these are to be reviewed by the project acoustic consultant to ensure that the internal noise criteria is achieved.

Any penetrations through the walls are to be acoustically sealed to maintain the required acoustic rating of the façade structure.

5.3.4 External Roof/Ceiling Construction

Masonry or concrete roof structures will be acceptable without any further acoustic treatment required. In the event that light weight constructions are proposed as part of the detailed design of the project, these are to be reviewed by the project acoustic consultant to ensure that the internal noise criteria is achieved.

Any penetrations through the ceiling are to be acoustically sealed to maintain the required acoustic rating of the façade structure.

5.4 VENTILATION AND AIR CONDITIONING

Both the DNRCBR and DCP noise levels provide a threshold for internal noise levels from traffic where windows or doors are open. The DCP provides a quantum of what the arrangement of openings should be, - being 5% of the floor area, which is consistent with the minimum natural ventilation openings detailed in both the Building Code of Australia and the Apartment Design Guide.

The NSW Department of Planning's 'Development near Rail Corridors and Busy Roads (Interim Guideline)' specifies the following controls regarding natural ventilation:

With respect to natural ventilation of a dwelling the allowable internal noise goal is permitted to be 10 dB(A) higher than when the windows are closed (i.e. – allowable level in bedrooms becomes 45 dB(A), and 50 dB(A) in living rooms). Where noise levels would exceed this, the NSW Planning guideline recommends that a ventilation system be provided to achieve the ventilation requirements of the BCA with windows closed.

With respect to natural ventilation of a dwelling, NSW Planning requirements allow internal noise levels to be up to 10 dB(A) higher than the specified criterion with windows and doors to a dwelling open to allow for ventilation.

Based on the current layouts we note:

- Façades of Buildings A and B facing directly onto Tallawong Road will require windows/doors to be closed in order to achieve the required internal noise levels. Indicative façades requiring an alternative ventilation system are summarised in Appendix B of this report.
- For all remaining façades, noise levels are below the screening test noise levels.
- Should internal layout alterations be undertaken during the detailed design phase of the project, alternative ventilation strategies, such as borrowed ventilation, could also be considered.

The above assessment is based on the windows directly servicing the rooms in question being open to allow for ventilation. As ventilation is less constrained to living rooms (particularly during the night time period), alternative opening arrangements could also be considered whilst still complying with both the ADG and Building Code of Australia, for example borrowed ventilation. This would allow for lower internal noise levels to be attained in bedrooms whilst maintaining natural ventilation.

We note that future occupants would also have the ability to vary window openings within the apartment to suit their preferences. Windows could be open further (including above the minimum 5%) where additional ventilation was desired, and further closed (or closed fully) where lower noise levels were desired.

In the event supplementary ventilation system or façade openings are proposed to be installed to provide alternative ventilation options to apartments, they should be acoustically designed to ensure that the internal noise levels are achieved in accordance with the requirements of the NSW Department of Planning's 'Development near Rail Corridors and Busy Roads (Interim Guideline).

In the event mechanically assisted ventilation is utilised (such as centralised or individual apartment outside air fans), it should be acoustically designed so that internal noise levels within apartments are appropriate, and any external noise emissions to surrounding noise sensitive receivers is within the requirements detailed in Section 6.2 of this report.

6 NOISE EMISSIONS ASSESSMENT

6.1 NOISE EMISSION STANDARDS AND GUIDELINES

Potential noise emissions from the site will be assessed within the context of the site against relevant noise project noise criteria. The primary potential noise sources from the use of the site will be from mechanical plant and equipment servicing the development.

The following policies and guidelines have been referenced to as part of the assessment:

- Blacktown City Council Growth Centre Precincts Development Control Plan (“**DCP**”) 2018
- NSW Environment Protection Authority (EPA) Document – ‘Noise Policy for Industry’ (“**NPI**”) 2017

An outline of relevant acoustic criteria is presented below.

6.1.1 Blacktown City Council Growth Centre Precincts DCP

The Blacktown DCP provides the following guidance with respect to noise emissions from the development:

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

6.1.2 NSW EPA Noise Policy for Industry (NPI) 2017

The Noise Policy for Industry outlines two trigger levels which need to be satisfied: namely the intrusiveness noise level and the project amenity noise level. The project noise trigger level is then established based on the lower of the intrusiveness and project amenity levels.

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

6.1.2.1 Project Intrusiveness Noise Levels

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 do 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 are conservatively adopted from the noise monitors installed at location M1 and M2. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary. Note RBLs are higher at receivers with a view of Tallawong Road.

Table 10 – NPI Intrusiveness Noise Levels

Receiver	Time of Day	Rating Background Noise Level dB(A)L_{90(15min)}	Intrusiveness Noise Level dB(A)L_{eq(15min)}
R1, R2 & R3 Residential Receivers along Tallawong Road	Day (7am – 6pm)	49	54
	Evening (6pm-10pm)	43	48
	Night (10pm – 7am)	35	40
R4 Residential Receivers to the East / rear of site	Day (7am – 6pm)	43	48
	Evening (6pm-10pm)	41	46
	Night (10pm – 7am)	35	40

6.1.2.2 Project Amenity Noise Levels

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

The EPA’s NPI sets out acceptable noise levels for various localities. The recommended noise amenity area is based upon the measured background noise levels at the sensitive receiver. Based on the measured background noise levels detailed in Table 3, the Noise Policy for Industry suggests the adoption of the ‘Urban’ categorisation for receivers along R1-R3 facing Tallawong Road, and the ‘Suburban’ categorisation for receivers along R4.

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

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

Table 11 – NPI Amenity Noise Levels

Type of Receiver	Time of Day*	Recommended Noise Level dB(A)L_{eq(period)}	Amenity Noise Level dB(A)L_{eq(period)}
R1, R2 & R3 Residential Receivers along Tallawong Road	Day	60	58
	Evening	50	48
	Night	45	43
R4 Residential Receivers to the East / rear of site	Day	55	53
	Evening	45	43
	Night	40	38
School Classrooms	When in use	N/A	35 (internal)

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

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

6.2 SUMMARISED EXTERNAL NOISE EMISSION CRITERIA

Summarised noise emission criteria applicable to the development site are bolded in the tables below.

Table 12 – Project Noise Emission Trigger Levels

Receiver	Period	Rating Background Noise Level dB(A)L₉₀	NPI Project Trigger Level dB(A) L_{eq(15min)}	Blacktown Growth Centre Precincts DCP
R1, R2 & R3 Residential Receivers along Tallawong Road	Day	49	54	54 (BG + 5)
	Evening	43	48	48 (BG + 5)
	Night	35	40	35 (BG + 0)
R4 Residential Receivers to the East / rear of site	Day	43	48	48 (BG + 5)
	Evening	41	46	46 (BG + 5)
	Night	35	38	35 (BG + 0)
School Classrooms	When in use	-	35 (internal)	-

A discussion of the potential noise impacts associated with the development have been presented for the following:

- Ground level retail tenancy
- Preliminary assessment of mechanical plant noise emissions (commercial and residential)
- Use of rooftop communal open space

6.3 COMMERCIAL USE OF THE SITE

The specific use of the ground floor tenancy space is unknown at this stage. It is assumed that the tenancy space will be used within a retail or café capacity.

The primary source of noise generated by the retail tenancy is likely to be associated with indoor background music (as well as plant noise associated with the use). In this regard, we note the following:

- It is expected that compliance with the relevant noise emission objectives is to be reviewed for any tenancies capable of generating higher noise levels, based on a separate planning approval as part of a fit out development application subject to the specific operations of the tenancy once operators have been determined. The tenancy is be capable of achieving noise emission objectives provided the appropriate acoustic treatments and management controls are implemented for its specific application.
- *If* the tenancy were to become licensed for the service of alcohol, this use would be subject to a separate planning application which would be accompanied by a noise impact assessment of the proposed use typical for Liquor and Gaming NSW. Acoustic treatments and management controls could be applied to these tenancies use to achieve the relevant noise emission requirements from internal activities (such as upgraded glazing); however, the use of external areas (if any) would be likely management of patron numbers/hours of use to achieve compliance at all times.

6.4 NOISE FROM MECHANICAL PLANT

Mechanical plant servicing the development have not been selected at this stage, though it is assumed that common plant is to be installed within the basement and roof levels of the development.

Typically, this is comprised of large axial and centrifugal supply/exhaust fans, AHUs, A/C and refrigeration condensers and the like.

A preliminary review of noise generation from mechanical plant servicing the development has been undertaken based on mechanical services spatial drawings prepared by Bestec below.

6.4.1 Plant Generally

Experience with similar projects dictates that the following acoustic treatment methods may be implemented:

Major Supply / Exhaust Plant

Supply and exhaust fans are typically located within the basement plant rooms or in rooftop plant areas. These units typically emit high noise levels and require acoustic treatment such as silencers/attenuators and internally lined ductwork, and barriers, external lagging or enclosures for external plant. Silencer requirements would be determined once fan selections have been completed.

Minor Plant

Other minor plant items, such as bathroom or kitchen exhaust fans, may also be required. These items typically emit relatively low noise levels and may require minimal acoustic treatment of a standard nature, such as internally lining of ductwork.

A detailed acoustic review should be undertaken prior to CC to determine acoustic treatments to control noise emissions to satisfactory levels.

Acoustic treatments to all plant are to be reviewed by the acoustic consultant prior to construction once final plant selections have been made to ensure relevant noise emission requirements are satisfied. Noise levels are to be satisfied cumulatively from all plant servicing the development.

6.4.2 Rooftop Plant Compounds

Rooftop plant compounds are indicated within the referenced Bestec mechanical services spatial drawings for the development. Pumps, carpark supply and exhaust fans and condenser units (CUs) are located in these areas and are likely to require additional treatment to comply with external noise emission goals, typically in the form of silencers, perimeter barriers, attenuators and/or enclosures. Given the detailed number, location and noise levels of rooftop plant is unknown, maximum permissible sound power levels from rooftop plant compounds have been determined based on the following assumptions:

- There is one rooftop plant compound per building.
- Each individual rooftop contains one carpark supply and exhaust fan servicing the basement of the development. Each fan is assumed to be supplied with a VSD and is provided with 2 diameter long circular attenuators to the inlet and outlet of the fan.
- The nearest rooftop plant is approximately 30m from the nearest residential receiver to the south, and 50m from the nearest school receiver building. For the school receivers all windows are assumed to be open with a 10dB(A) reduction in noise level between the external and internal noise levels.
- Residential Condenser units will operate at up to 100% capacity between 7am-10pm, and will operate at a reduced capacity after 10pm. This will be facilitated by the installation of night-time

quiet mode settings within the unit for off peak use, as well as provisions of solid screening along the plant platforms.

Based on assumptions above, to comply with Council and NSW EPA guidelines at the nearest sensitive receiver; the maximum permissible cumulative sound power level for each rooftop bank based on distance corrections only is indicatively:

- 87 dB(A) during the day
- 81 dB(A) during the evening
- 68 dB(A) during the night.

Note: these levels are indicative only and are to be reviewed in more detail prior to obtaining CC and is to be assessed cumulatively from all external plant in this area.

If the final plant selection exceeds the above cumulative noise levels, additional treatment will be required to either individual plant items or to each roof plant compound as a whole. This may be achieved with solid barriers/screens, acoustic louvres, alternative plant selections, attenuators and/or absorptive linings to wall surfaces.

6.4.3 Recommendations

Acoustic treatments to all plant are to be reviewed by a qualified acoustic consultant prior to construction once final plant selections have been made to ensure relevant noise emission requirements are satisfied. Noise levels are to be satisfied cumulatively from all plant servicing the development.

If the final plant selection exceeds the above cumulative noise levels, additional treatment will be required to either individual plant items or to each plant compound as a whole. This may be achieved with solid barriers/screens, acoustic louvres, alternative plant selections, attenuators and/or absorptive linings to wall surfaces and internal ductwork.

The development is capable of achieving complying noise and vibration emission levels; a detailed acoustic review should be undertaken prior to CC to determine acoustic treatments to control noise and vibration emissions to satisfactory levels.

6.5 ROOFTOP COMMUNAL OPEN SPACE

Communal open spaces are proposed at rooftop areas of the development and provide the opportunity for residents to participate in a range of outside activities. For these spaces, it is typical that for a significant proportion of the time they are either not used, or used for passive purposes that do not generate significant noise, particularly at night.

We note that there are no specific noise emission criteria for residential private open spaces, and guidelines such as the commonly adopted NSW EPA Noise Policy for Industry (NPfI) are not appropriate for assessment of this noise type.

The NSW Planning and Environment Apartment Design Guide (ADG) - Objective 4H-1 provides the following objectives regarding communal open spaces:

"Noise sources such as garage doors, driveways, service areas, plant rooms, building services, mechanical equipment, active communal open spaces and circulation areas should be located at least 3m away from bedrooms"

Regarding the objectives of the ADG, the proposed communal spaces are at least 3m from any bedrooms.

As with noise from private open space in detached dwellings, a level of noise generated on residential lots is accepted as part of community living. For example, noise from lawn mowing is accepted as “normal”, notwithstanding the relatively high levels of noise generated. These noisier activities are typical of urban living, as other noise generating activities carried out in private open space from time to time.

There are legislated time restrictions contained within the Protection of the Environment Operations (Noise Control) Regulation 2017 to manage activities carried out on residential properties and prevent them from adversely impacting other properties, particularly at night.

Given that the nearest receivers around communal open spaces are the occupiers of the same development, the most appropriate noise mitigation strategy would be for the owners corporation or building management to include by-laws to manage the use of these spaces such as time limits (e.g. no use during the night time), restriction on the number of users, etc.

7 CONSTRUCTION NOISE AND VIBRATION ASSESSMENT

A preliminary assessment of construction noise and vibration impacts during the main building works of the development has been undertaken. The assessment includes:

- Identification of the noise and vibration guidelines which will be applicable to this project.
- Identification of potentially affected nearby sensitive receivers.
- Identification of likely noise sources and vibration generating activities.
- Formulation of a strategy to address the guidelines identified including mitigation treatments.

7.1 DESCRIPTION OF ACTIVITIES

Typical works anticipated are as follow:

- Demolition and Excavation using hammering attachments, excavators, and saw cutters.
- Piling (assumed auger) during basement and structural works
- Use of electric tower crane, powered by mains/generator.
- Erection of building structure (powered hand tools for formwork, concrete pump, vibrators).
- Façade Installation (powered hand tools)
- Landscaping (front end loaders etc).
- Internal fit out of apartments.

A summary of the standard construction working hours from the ICNG is presented below in Table 13 below.

Table 13 – ICNG Standard Construction Hours

Day	Building Construction Works
Monday – Friday	7am – 6pm
Saturday	8am – 1pm
Sunday & Public Holidays	No Work

7.2 NOISE MANAGEMENT LEVELS

7.2.1 EPA Interim Construction Noise Guideline

The EPA Interim Construction Noise Guideline (ICNG) assessment requires:

- Determination of noise management levels (based on ambient noise monitoring).
- Review of operational noise levels at nearby development.
- If necessary, recommendation of noise controls strategies in the event that compliance with noise emission management levels 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)_{Leq(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)_{Leq(15min)} at nearby residences.
- Section 4.1.2 and 4.1.3 of the EPA Interim Construction Noise Guideline also nominates management levels for other sensitive land uses (other than residences). Noise management levels relevant to this assessment are detailed below.
 - **Classrooms (internal):** 45 dB(A)_{Leq(15min)}.

A summary of the recommended noise levels from the ICNG is presented below in Table 14.

Table 14 – Noise Management Levels

Location	Noise Affected Management Level (NAML) - dB(A)_{Leq(15min)}	Highly Noise Affected Management Level - dB(A)_{Leq(15min)}
All Residents Surrounding 84 Tallawong Road, Rouse Hill	53	75
Classrooms New Tallawong Public School	45 (internal)	N/A

If noise levels exceed the management levels identified in the tables above, reasonable and feasible noise management techniques will be reviewed.

7.3 VIBRATION OBJECTIVES

Vibration caused by construction at any residence or structure outside the subject site must be limited to:

- For structural damage vibration, German Standard *‘DIN 4150-3 (2016) – Vibration in Buildings - Part 3: Effects on Structures’*; and
- 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.

7.3.1 Structure Borne Vibrations

German Standard DIN 4150-3 (2016) provides a guideline for acceptable levels of vibration velocity in building foundations, to assess the effects of vibration on structures. The table give guidance on the maximum accepted values of velocity at the foundation and in the plane of the highest floor of various types of buildings, to prevent any structural damage.

The table below lists the peak particle velocity, which is the maximum absolute value of the velocity signals for the three orthogonal components. This is measured as a maximum value of any of the three orthogonal component particle velocities when 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.

It is noted that if measured vibration levels are below the guidelines listed below, damage that will reduce the serviceability of the building will not occur and if damage to the building does occur, it is assumed that the damage is related to other activities or sources. Furthermore, the DIN4150-3 guideline states the following regarding the limits presented in Table 1:

“Exceeding the guideline values does not necessarily lead to damage. Should they be exceeded, however, further investigations may be necessary, such as determining and evaluating the stresses as detailed in 4.3 and 4.4.”

Table 15 - (Table 1 – DIN 4150-3 (2016) – Guideline values for vibration velocity, $v_{i,max}$, for evaluating the effects of short-term vibration on structures)

-	TYPE OF STRUCTURE	Guideline values for $v_{i,max}$ in mm/s				
		Foundation, all directions, $i = x, y, z,$ at a frequency of			Topmost floor, horizontal direction, $i = x, y$	Floor slabs, vertical direction, $i = z$
		1Hz to 10Hz	10Hz to 50Hz	50Hz to 100Hz ^a	All Frequencies	All frequencies
L/C	1	2	3	4	5	6
1	Buildings used for commercial purposes, industrial buildings, and buildings of similar design	20	20 to 40	40 to 50	40	20
2	Residential buildings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20	15	20
3	Structures that, because of their particular sensitivity to vibration, cannot be classified under lines 1 and 2 and are of great intrinsic value (e.g. listed buildings) buildings that are under a preservation order)	3	3 to 8	8 to 10	8	20 ^b

NOTE Even if guideline values as in line 1, columns 2 to 5, are complied with, minor damage cannot be excluded.

a At frequencies above 100 Hz, the guideline values for 100 Hz can be applied as minimum values.

b Paragraph 2 of 5.1.2 shall be observed.

7.3.2 Assessing Amenity

Department of Environment and Conservation NSW 'Assessing Vibration: A Technical Guideline' (Feb 2006) is based on the guidelines contained in BS 6472:1992. This guideline provides procedures for assessing tactile vibration and regenerated noise within potentially affected buildings.

The recommendations of this guideline should be adopted to assess and manage vibration from the site. Where vibration exceeds, or is likely to exceed, the recommended levels then an assessment of reasonable and feasible methods for the management of vibration should be undertaken.

Table 16 – Preferred and Maximum Weighted RMS Values for Vibration Acceleration (m/s²) 1-80 Hz

Location	Assessment Period	Preferred Values Z-axis	Preferred Values X & Y-axis	Maximum Values Z-axis	Maximum Values X & Y-axis
Continuous Vibration					
Critical Areas	Day time	0.005	0.0036	0.010	0.0072
Residences	Day time	0.010	0.0071	0.020	0.014
Office	Day time	0.020	0.014	0.040	0.028
Impulsive Vibration					
Critical Areas	Day time	0.005	0.0036	0.010	0.0072
Residence	Day time	0.3	0.21	0.6	0.42
Office	Day time	0.64	0.46	1.28	0.92

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).

7.4 CONSTRUCTION NOISE ASSESSMENT

7.4.1 Activities to be Conducted and the Associated Noise Levels

We have been advised of the typical equipment/processes anticipated to be used for the construction of the subject development. Noise impacts from these activities on the amenity of the surrounding identified sensitive receivers, will be predicted in this section.

The A-weighted sound power levels for the anticipated equipment/processes are outlined in Table 17 below.

Table 17 – Sound Power Levels (SWL)

EQUIPMENT /PROCESS	SOUND POWER LEVEL dB(A)
Demolition / Excavation/ Piling	
Excavator with Hydraulic Hammer (up to 40 tonnes)	122*
Excavator with Bucket (up to 40 tonnes)	115
Concrete Saw	115*
Angle Grinder	114*
Jackhammer	113
CFA/Auger Pile	111
Concrete Pump	107
Trucks (up to 12 tonnes)	100
Construction	
Power Saw	115*
Angle Grinder	114*
Impact drill	110*
Concrete/Shotcrete Pump	107
Cement Mixing Truck	105
Electric Tower Crane	104
Trucks (up to 12 tonnes)	100
Drilling	94*

***Includes 5 dB(A) addition for characteristics of noise source.**

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

1. On-site measurements;
2. Table D2 of Australian Standard 2436-1981 & Table A1 of Australian Standard 2436-2010; and
3. Data held by this office from other similar studies.

7.4.2 Predicted Noise Levels

Noise generated by plant and equipment will be managed to generally comply with the nominated acoustic noise management levels, and where this noise goal may be exceeded, noise will be managed based on principles consistent with Australian Standard 2436.

Predictions of noise levels at the sensitive receivers identified have been made of the construction processes with the potential to produce significant noise. It is noted that:

- Many of the noise sources are present over a small period of the day or may be present for a few days with a significant intervening period before the activity occurs again.
- The distance between the noise source and the receiver.
- The screening effect provided by any remaining building structure or building shell. In particular, noise from works done on higher level will be substantially screened by the remaining building structure to receivers located on lower levels.
- A façade reduction of 20dB(A) for school receivers with windows closed has been applied.

Please see following tables for predicted noise levels for each receiver.

Table 18 – Predicted Noise Impacts During Demolition/Excavation/Piling

Location/Receiver	Predicted Levels dB(A) $L_{eq}(15min)$	Noise Management Level dB(A) $L_{eq}(15min)$	Comment
R1	49-87	NAML 53 (external) HNAML 75 (external)	Generally exceeds the NAML and the HNAML, particularly when working close to site boundaries.
R2	39-79		
R3	45-77		
R4	37-77		
E1	27-63	NAML 45 (internal)	

Table 19 – Predicted Noise Impacts During Construction

Location/Receiver	Predicted Levels dB(A) $L_{eq}(15min)$	Noise Management Level dB(A) $L_{eq}(15min)$	Comment
R1	43-80	NAML 53 (external) HNAML 75 (external)	Generally exceeds the NAML and below the HNAML, particularly when working close to site boundaries.
R2	33-72		
R3	39-70		
R4	31-70		
E1	27-56	NAML 45 (internal)	

7.5 DISCUSSION

Noise

The demolition and excavation stages utilise the loudest equipment across the range of stages of construction.

Primarily, the use of the excavator with hydraulic hammer and/or jackhammers are predicted to be the highest noise generating equipment. It is also noted that both equipment are only expected to be used in during specific portions of the demolition and excavation stages and will not be continuous throughout these stages.

During demolition, excavation and piling phases, the analysis indicates that:

- Predicted noise levels indicate that there is potential for noise emissions from the construction activity which are above the NML/HANML at surrounding noise sensitive receivers.
- Once the excavation of the site progresses below ground level, additional screening is expected to occur.
- Ground level receivers will also receive lower noise levels than predicted due to hoarding around the perimeter of the site.

During the construction phase, the analysis indicates that:

- Surrounding receivers are predicted to be subject to noise exceeding the NML only when unscreened highly noise generating works are undertaken nearest to the boundary of the site nearest to the receiver as a result of the use of concrete trucks and pumps and powered hand tools. All other noise sources are predicted to be generate noise levels below the NML.
- Further noise reduction would be expected once works progress to internal areas within the site and again once the façade is installed.

To assess whether mitigation of these exceedances is feasible or reasonable, the ICNG indicates the following should be considered:

- The levels of impact including noise levels and the number of people affected.
- The benefits of noise mitigation and the number of people protected.
- Cost effectiveness of mitigation.
- Community views.

For all receivers closer to the project site, this assessment indicates that feasible and reasonable noise mitigation would need to be investigated to by the contractor to minimise noise impacts, based on the procedures and methods outlined in the ICNG. Detailed mitigation measures are to be explored within a Detailed Construction Noise and Vibration Management Plan.

The most effective mitigation investigation strategy is likely to be:

- Select the quietest plant/activity available (or retrofit acoustic treatment to the plant such as residential class mufflers) to minimise any NML exceedances.
- If any residual exceedances, investigate the use of additional barriers to screen the affected receivers. It is noted that solid hoardings are proposed along the whole perimeter of the site.
- If any remaining residual significant exceedances, investigate time restrictions (e.g. avoiding loud early morning works at the residences) and notification of affected receivers when works likely to exceed the NAML's is likely to occur.

- Stage demolition works in a way to retain as much of the external façade as practicable to act as an acoustic barrier with internal demolition to be conducted prior to external works.

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 preliminary assessment of vibration impacts is undertaken based on the referenced Desktop Study undertaken by WSP.

Anticipated Geotechnical Conditions

The referenced geotechnical investigation indicates that excavation of basement levels for the development may necessitate cuts of up to approximately 9m, with a wide variety of existing subsurface material grades, ranging from readily excavatable soils to zones of high strength rock.

The report indicates the demolition and excavation of the high strength rock would likely require rock breakers, grinders, ripping methods and the like. The report recognises that further geotechnical drilling is required to characterise the site in more detail.

Vibration Sources

The following preliminary sources have been identified as potentially producing significant ground vibration:

- Vibratory rollers
- Bore Piling (in rock)
- Ripping (excavator with claw)
- Hydraulic hammer (rock)

The remaining activities are not expected to produce significant ground vibration and/or are sufficiently separated from sensitive receivers.

Assessment of Vibration

A precise assessment of vibration emissions from the proposed works is not possible due to the large number of unknowns including the actual equipment employed, how it is operated, site conditions, etc.

In the absence of any specific equipment details, site vibration levels from machinery and processes should be verified on site as soil conditions may be different from the basis sources.

The assessment of building and soil settlement or the liquefaction of soils under induced vibration is outside the scope of typical vibration standards such as DIN 4150-3 and expert advice is to be sought from a Geotechnical Engineer.

8 SUMMARY OF RECOMMENDATIONS

The assessment indicates that compliance with the relevant noise criteria can be achieved at all times.

A summary of the applicable recommendations presented in this report can be seen below:

Building Controls

To control external sources of traffic noise, the building shell shall be constructed in accordance with the minimum complying constructions or higher as outlined within **Section 5.3** of this report to ensure that internal noise requirements are achieved at all times.

The design of the building shell for the entirety of the project site (including glazing selections, lightweight walls, roof, etc.) shall be reviewed by a qualified acoustic consultant and finalised prior to CC stage once detailed material selections have been made.

Noise Emissions From Mechanical Plant

Detailed acoustic review of mechanical plant items (in particular any which are located externally) is to be undertaken as part of the detailed design of the building. Relevant noise emission noise level requirements are summarised in **Section 6.2**.

Construction Noise and Vibration

It is recommended that a project specific Construction Noise and Vibration Management Plan be developed for the construction phase to assess potential impacts from the construction methodologies proposed, and to recommend appropriate management of construction activities once detailed construction methodologies have been finalised.

The management plan should reference the relevant noise and vibration management levels outlined in **Sections 7.2** and **7.3** for surrounding development and provide specific recommendations to limit potential noise and vibration impacts where feasible and practical.

9 CONCLUSION

Acoustic Logic has conducted an acoustic assessment of the noise impacts associated with the proposed residential development to be located at 84 Tallawong Road, Rouse Hill.

Noise intrusion impacts have been assessed and indicative complying constructions to meet the noise intrusion requirements outlined within this report have been detailed in Section 5.3. A review of these treatments is to be undertaken during detailed design of the development. In principle the development will be capable of achieving compliant internal noise levels with the appropriate selection of external building shell elements (glazing, external walls, roof and the like).

As natural ventilation cannot be achieved for select façades (Refer Section 5.4 and Appendix B), supplementary ventilation requirements should be investigated and any supplementary systems (whether it be mechanical or otherwise) should be reviewed by a qualified acoustic consultant prior to CC to ensure acceptable internal and external noise levels are achieved.

As detailed mechanical plant selections have not been made at this stage, noise emissions from mechanical plant are recommended to be assessed prior to CC and should demonstrate compliance with the requirements of the NSW EPA Noise Policy for Industry and Blacktown Growth Centre Precincts DCP with reference to the project noise emission trigger levels summarised in Section 6.2.

A preliminary assessment of likely construction noise and vibration generated by the development indicates that specific mitigation may be required for some highly noise generating activities that have a potential to exceed noise and vibration management levels established using EPA guidelines. It is recommended that a project specific Construction Noise And Vibration Management Plan be required prior to CC to assess potential impacts from the construction methodologies proposed, and to recommend appropriate management of construction activities once detailed construction methodologies have been established.

Please contact us should you have any further queries.

Yours faithfully,

A handwritten signature in black ink, appearing to be 'Hyde Deng', with a long horizontal line extending to the right.

Acoustic Logic Pty Ltd
Hyde Deng
MAAS

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 surrounding nearest-affected residential receivers.
- Traffic noise levels from along Tallawong Road.

A.1 AMBIENT 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).

L₉₀ – 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 **L₉₀** 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 **L₉₀** level.

L₁₀ 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.

L₁ 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 LONG TERM UNATTENDED NOISE MONITORING

A.2.1 Monitoring Locations

Monitoring locations are as outlined in Section 2 and detailed as follows:

- M1 – Monitor located at the property boundary at 84 Tallawong Road, Rouse Hill and is representative of residential receivers along Tallawong Road. Traffic noise levels from this location will be adopted for the external noise intrusion assessment.
- M2 – Monitor located to the east of the project site and is representative of residents located further to the east of Tallawong Road. Rating background noise levels from this location will be conservatively adopted for the assessment of noise emissions to surrounding receivers.

A.2.2 Measurement Period and Equipment Used

Long term unattended noise monitoring was conducted between the 11th to 25th of August 2025.

Unattended noise monitoring was conducted using the following equipment:

- 2 x Rion NL-42 (Type 2) noise monitors
- Rion Sound Level calibrator Type NC 74

The 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.2.3 Weather Affected and Extraneous/Outlying Data

Periods affected by adverse weather conditions are indicated on the following data graphs. Weather data was obtained from records provided by the Bureau of Meteorology for the following station:

- Olympic Park AWS

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.

A.3 CALCULATION OF REPRESENTATIVE AMBIENT NOISE LEVELS

The noise data for the day, evening and night periods have been processed to determine the period ambient noise levels at the monitoring locations. Noise levels that are in bold type indicate that these periods were determined to have been significantly affected by non-representative noise sources and these periods were excluded from subsequent calculations.

The following tables summarise the daily measurements and the representative rating background noise levels and traffic noise levels at each location.

Table 20 – NPI Assessment Background Noise Levels – Location M1

Location	Date	ABL		
		Day	Evening	Night
Location M1 Tallowong Road	11/08/2025	-	-	35
	12/08/2025	51	42	33
	13/08/2025	51	43	-
	14/08/2025	0	43	36
	15/08/2025	50	44	37
	16/08/2025	45	42	35
	17/08/2025	41	39	33
	18/08/2025	-	-	-
	19/08/2025	49	-	-
	20/08/2025	0	-	-
	21/08/2025	49	43	38
	22/08/2025	49	45	37
	23/08/2025	46	44	35
	24/08/2025	42	41	35
		RBL	49	43

Table 21 – NPI Assessment Background Noise Levels – Location M2

Location	Date	ABL		
		Day	Evening	Night
Location M2 East of site	11/08/2025	-	-	35
	12/08/2025	43	40	34
	13/08/2025	44	42	-
	14/08/2025	-	43	35
	15/08/2025	43	41	37
	16/08/2025	42	41	34
	17/08/2025	39	39	33
	18/08/2025	-	-	-
	19/08/2025	45	-	-
	20/08/2025	0	-	-
	21/08/2025	45	39	35
	22/08/2025	44	44	36
	23/08/2025	43	43	35
	24/08/2025	40	40	35
		RBL	43	41

Table 22 – Measured Traffic Noise Levels – Location M1

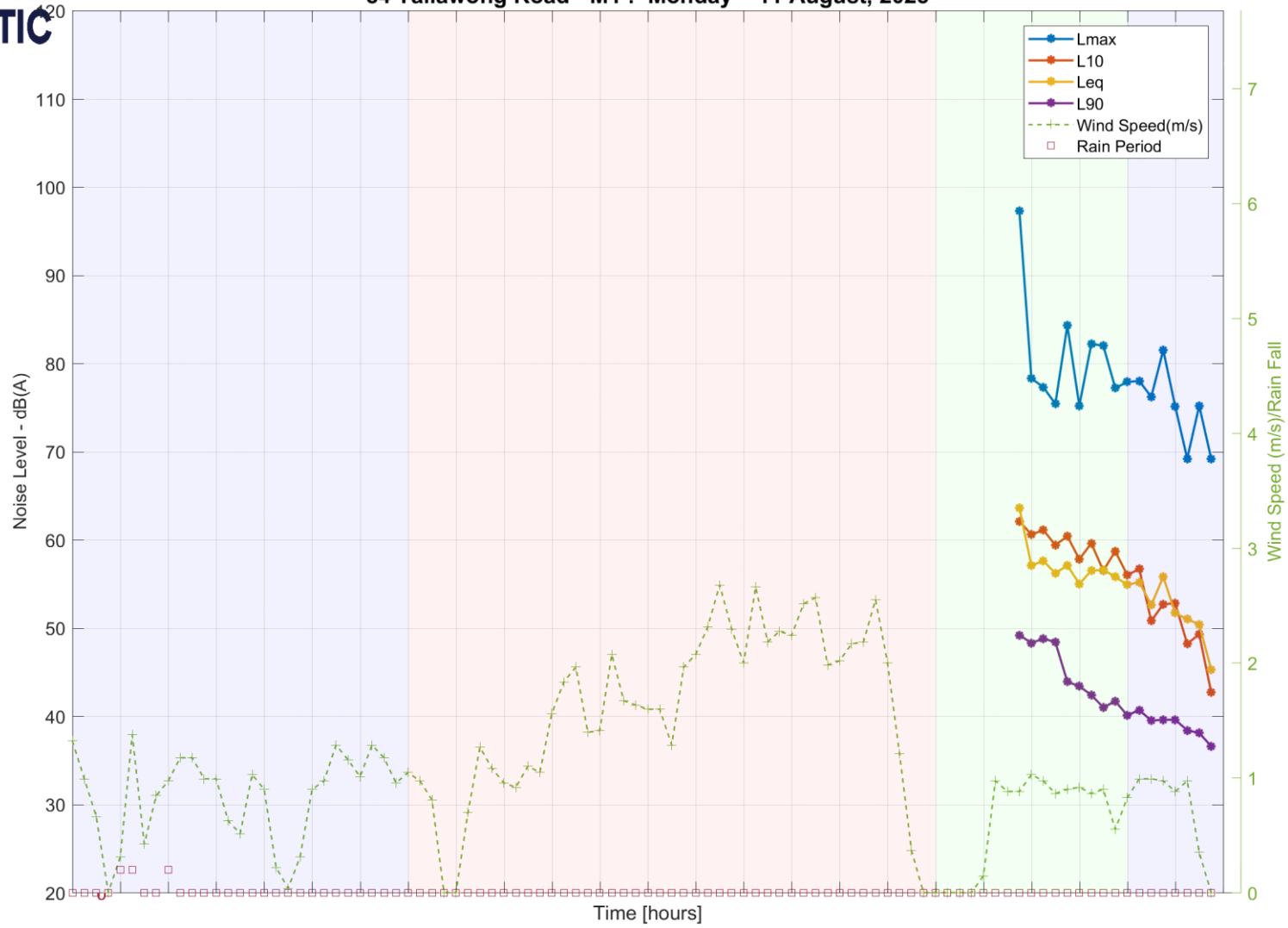
Location	Date	Traffic Noise Level dB(A) L_{eq}	
		Day (15-hr)	Night (9-hr)
Location M1 Tallowong Road	11/08/2025	-	57
	12/08/2025	65	57
	13/08/2025	70	58
	14/08/2025	63	59
	15/08/2025	63	55
	16/08/2025	64	54
	17/08/2025	61	58
	18/08/2025	63	59
	19/08/2025	63	57
	20/08/2025	62	59
	21/08/2025	66	60
	22/08/2025	65	56
	23/08/2025	62	53
	24/08/2025	60	58

A.4 UNATTENDED MONITORING DATA GRAPHS

Unattended noise monitoring locations are outlined in Section 2. Photographs of the monitoring locations are presented below, with their respective monitoring graphs provided on the following pages.

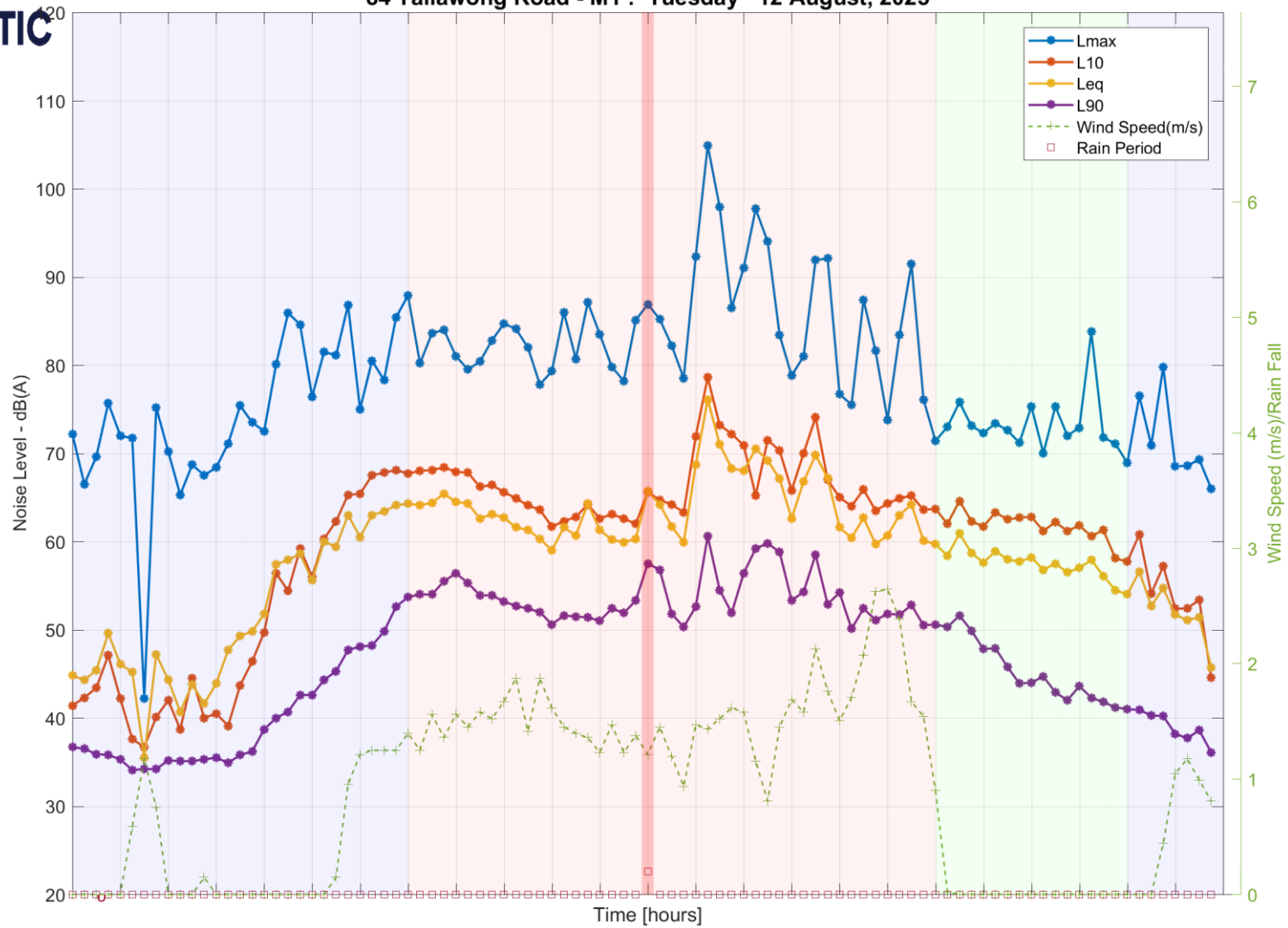


84 Tallawong Road - M1 : Monday 11 August, 2025



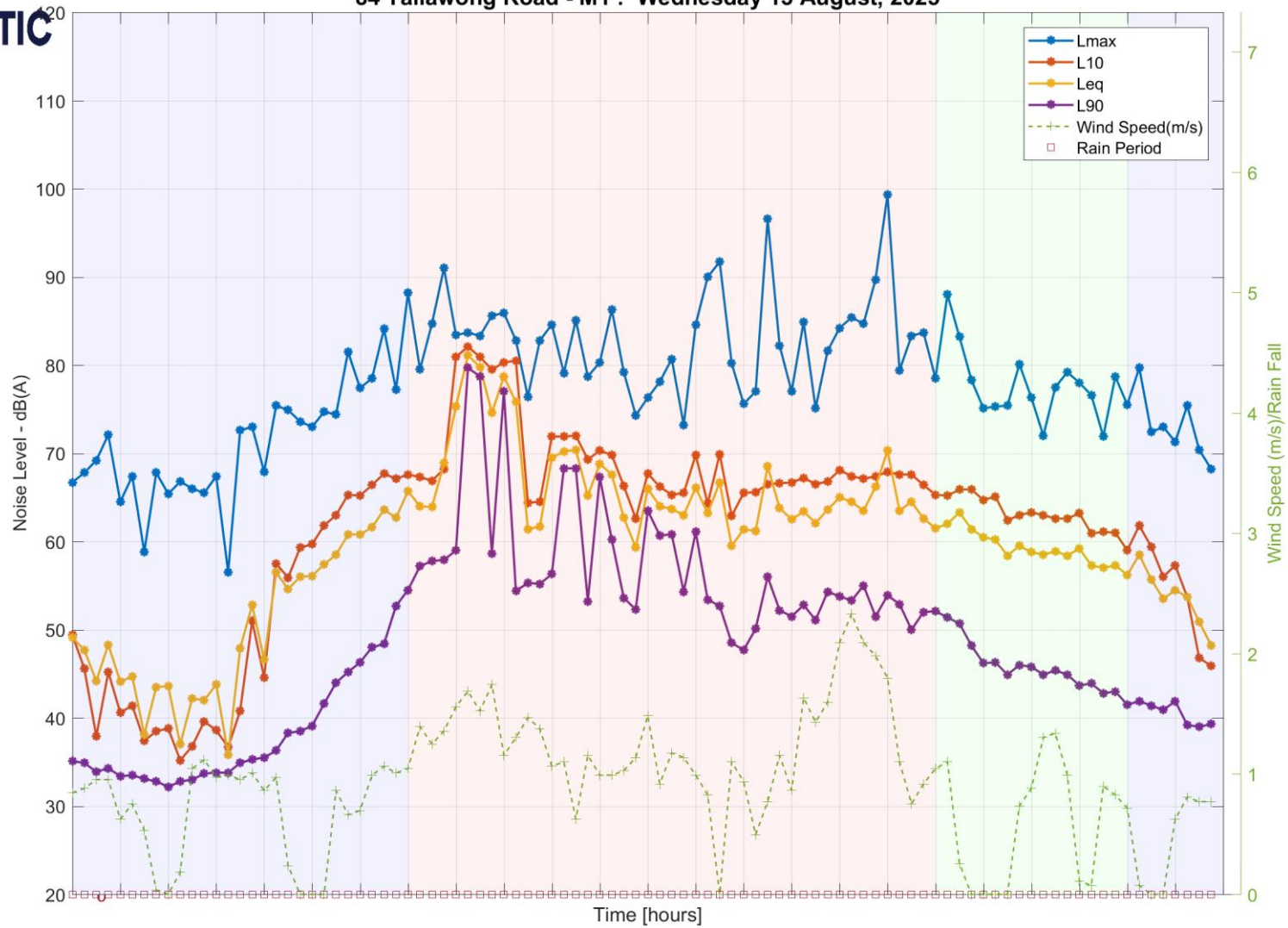


84 Tallawong Road - M1 : Tuesday 12 August, 2025

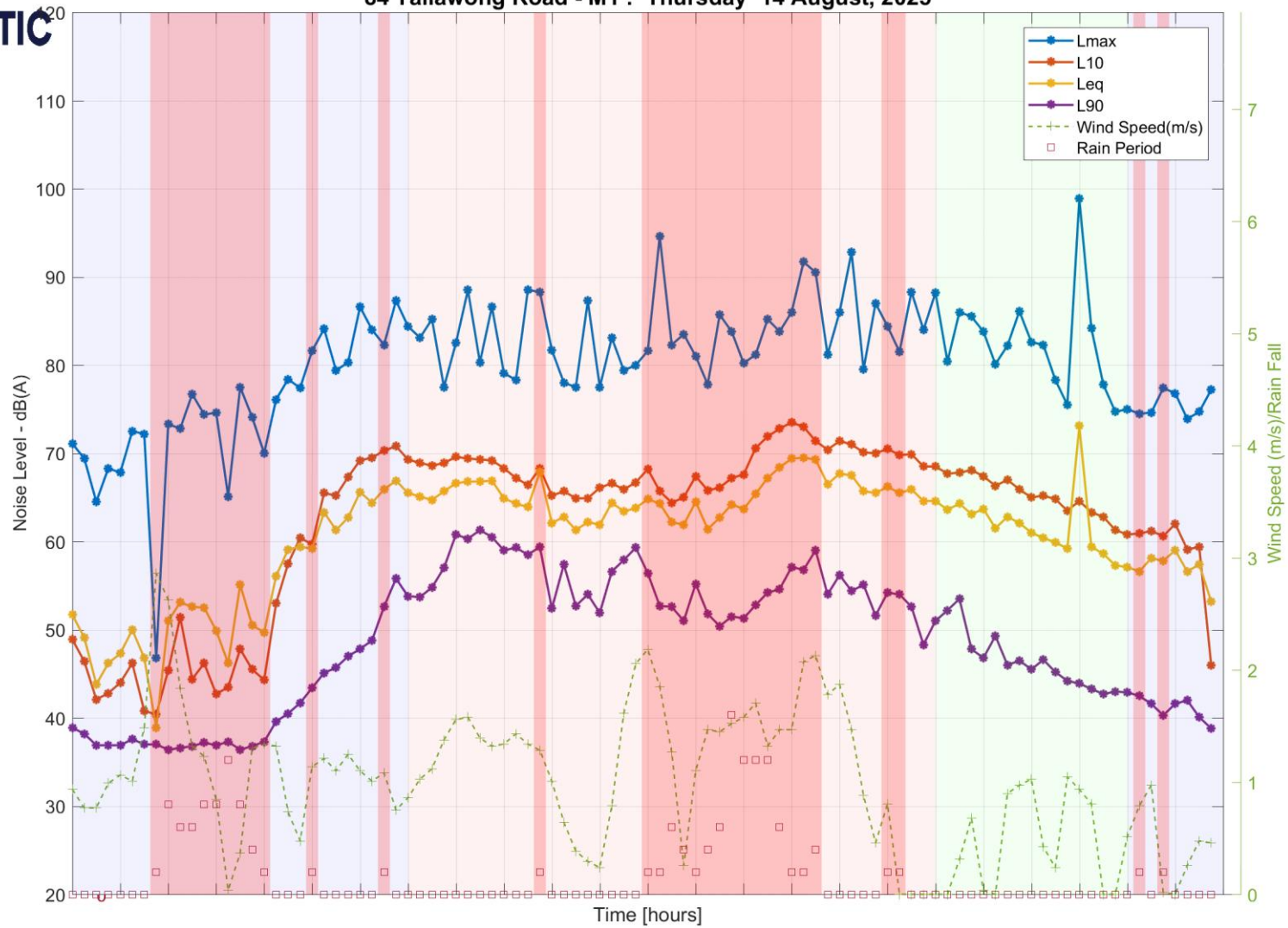




84 Tallawong Road - M1 : Wednesday 13 August, 2025

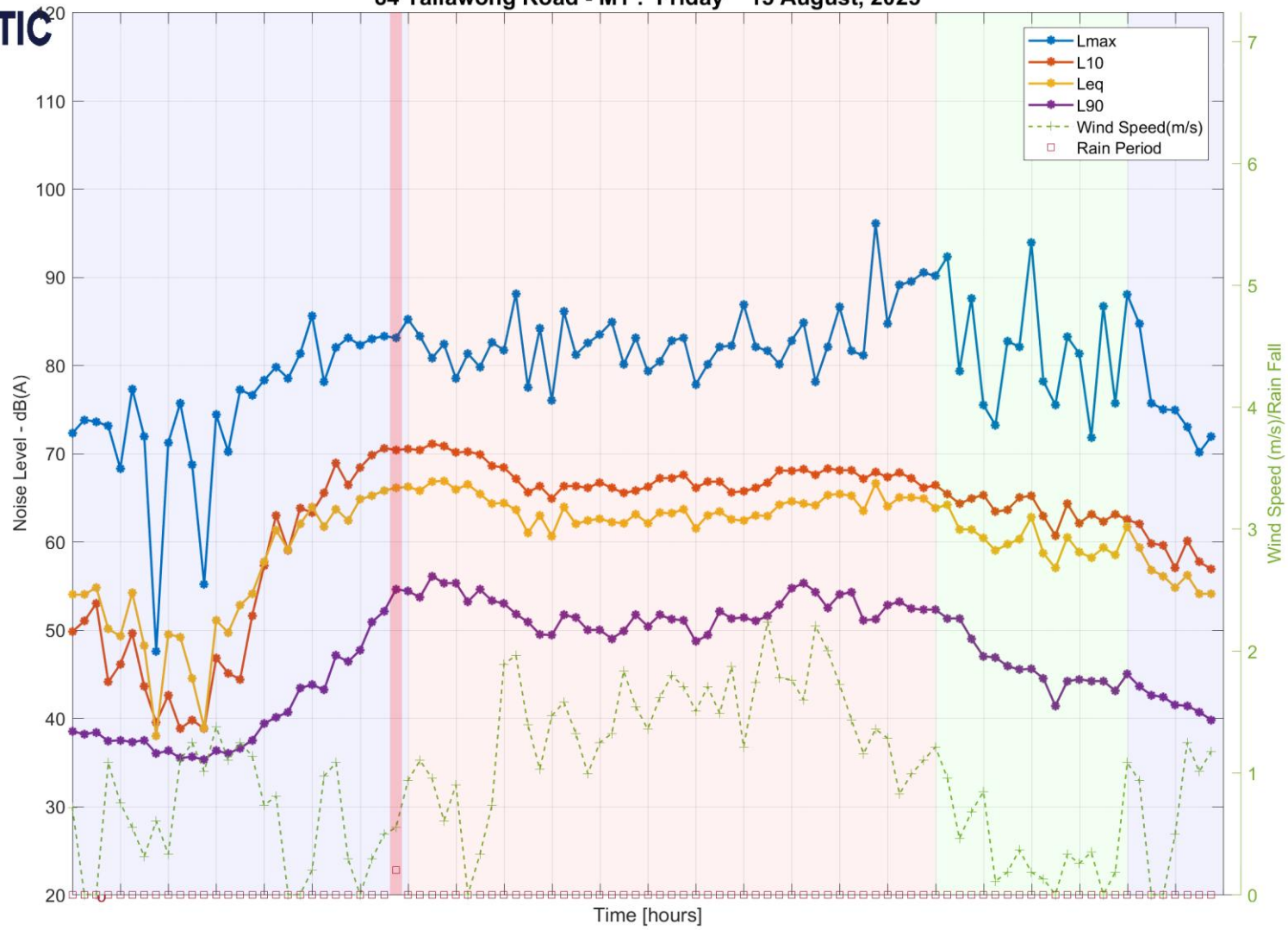


84 Tallawong Road - M1 : Thursday 14 August, 2025



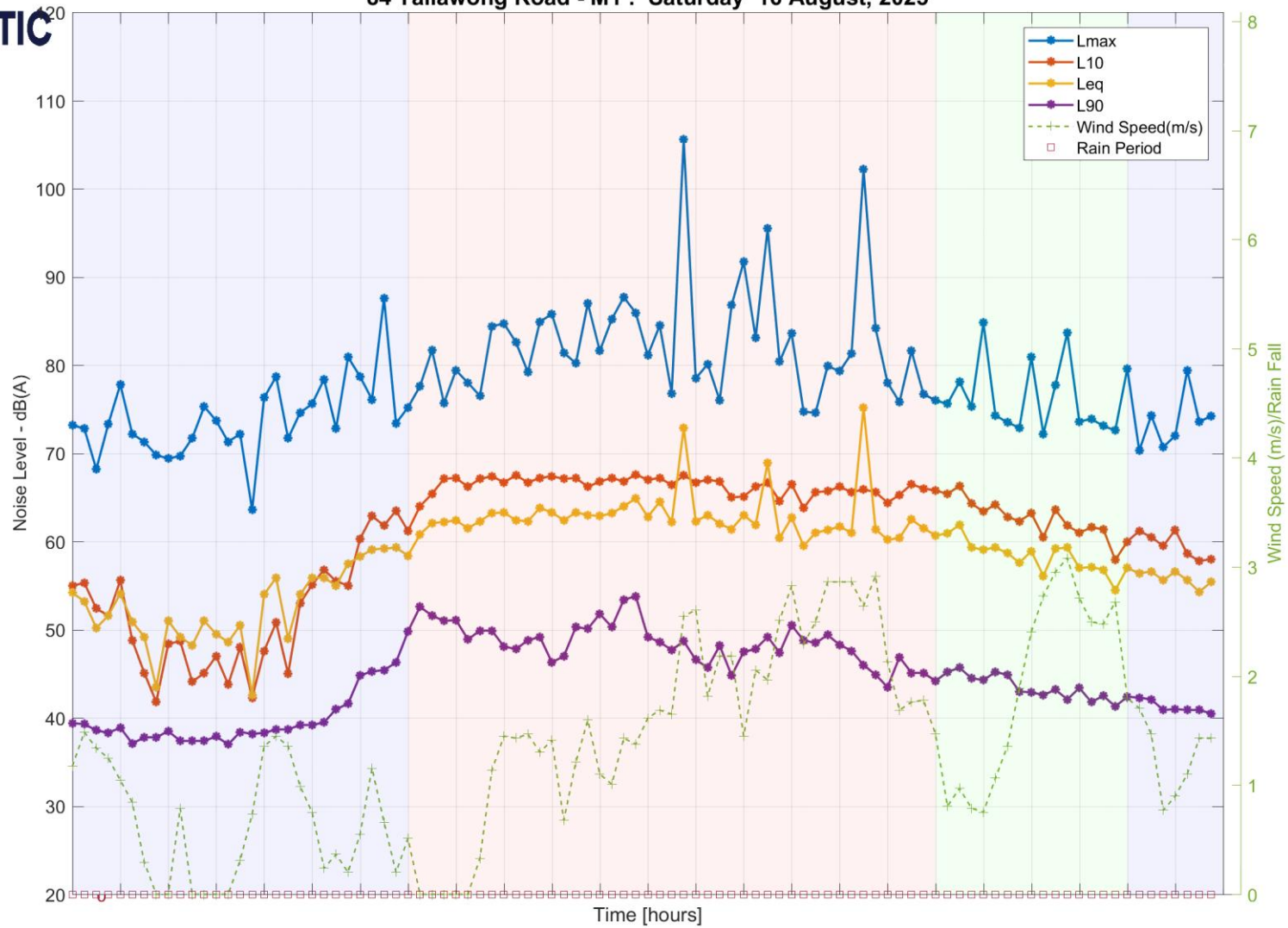


84 Tallawong Road - M1 : Friday 15 August, 2025



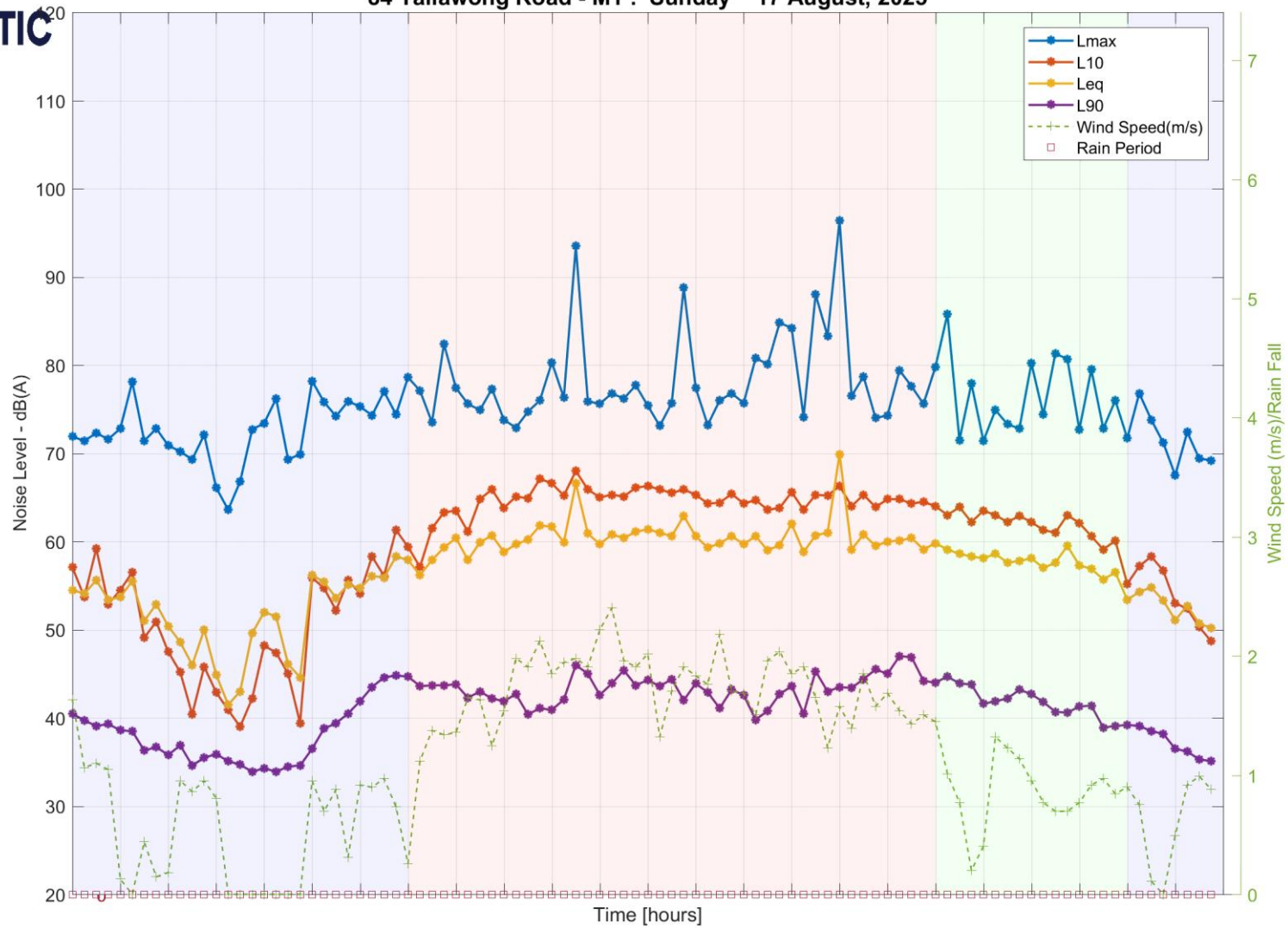


84 Tallawong Road - M1 : Saturday 16 August, 2025



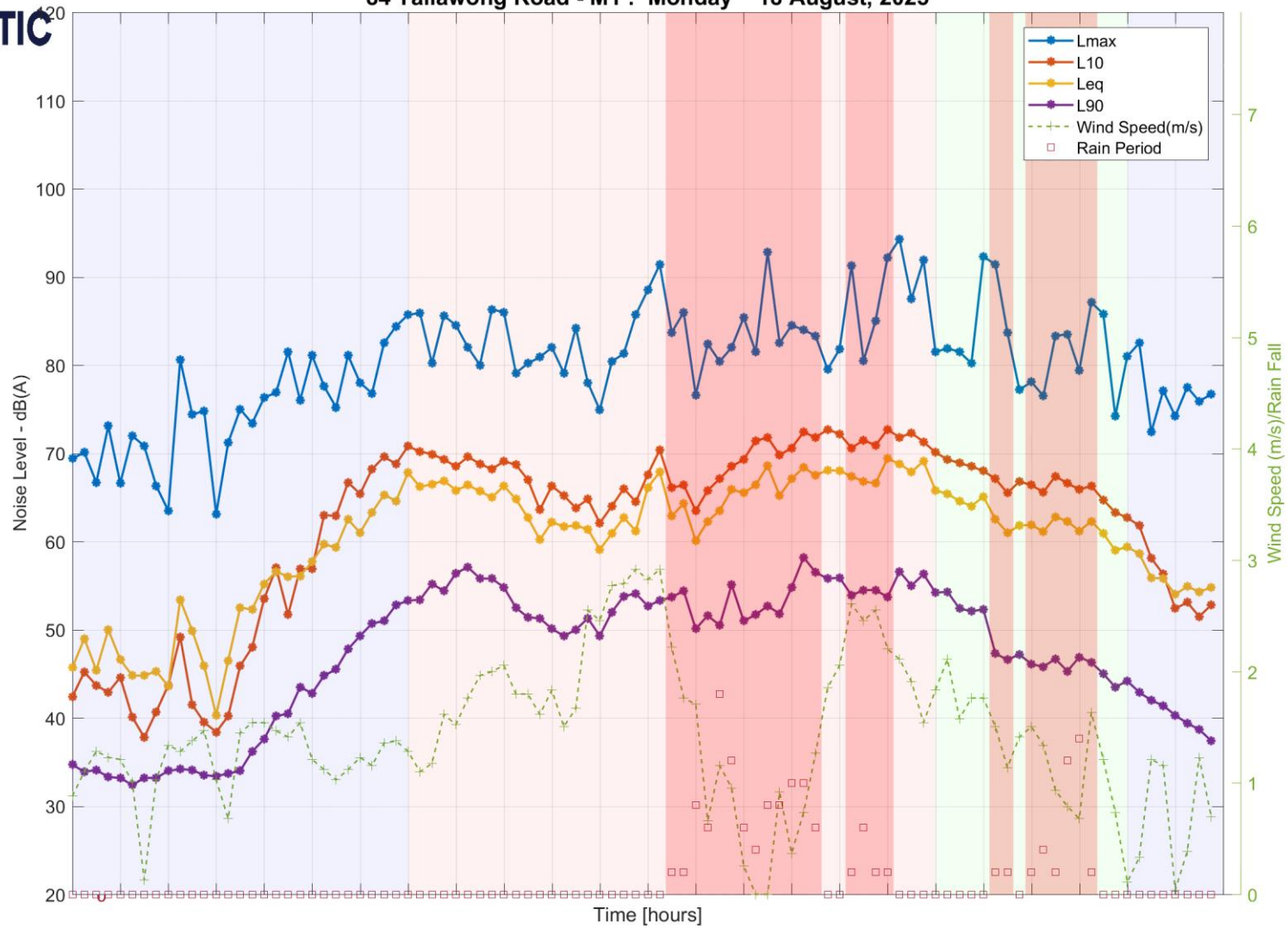


84 Tallawong Road - M1 : Sunday 17 August, 2025



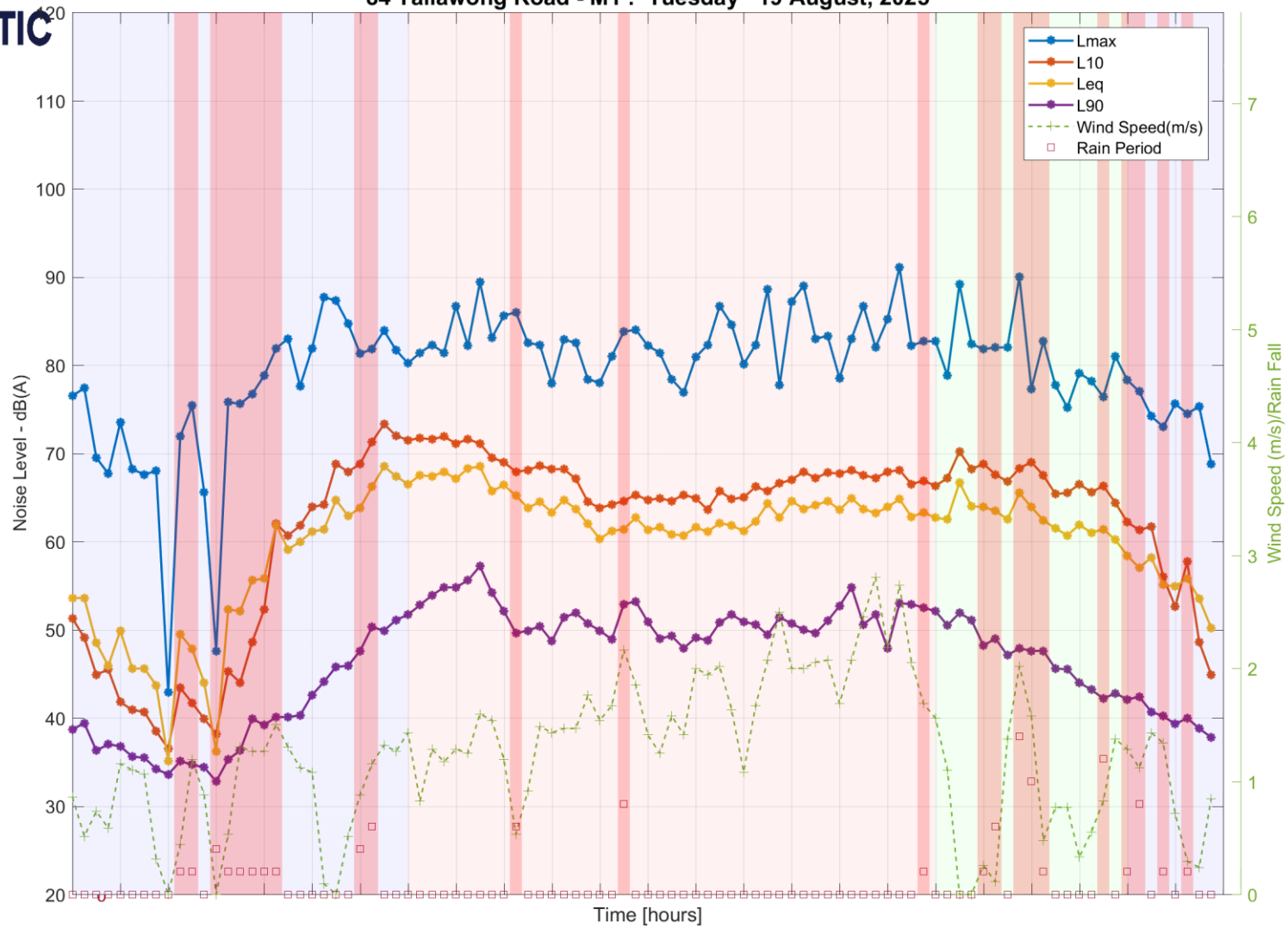


84 Tallawong Road - M1 : Monday 18 August, 2025



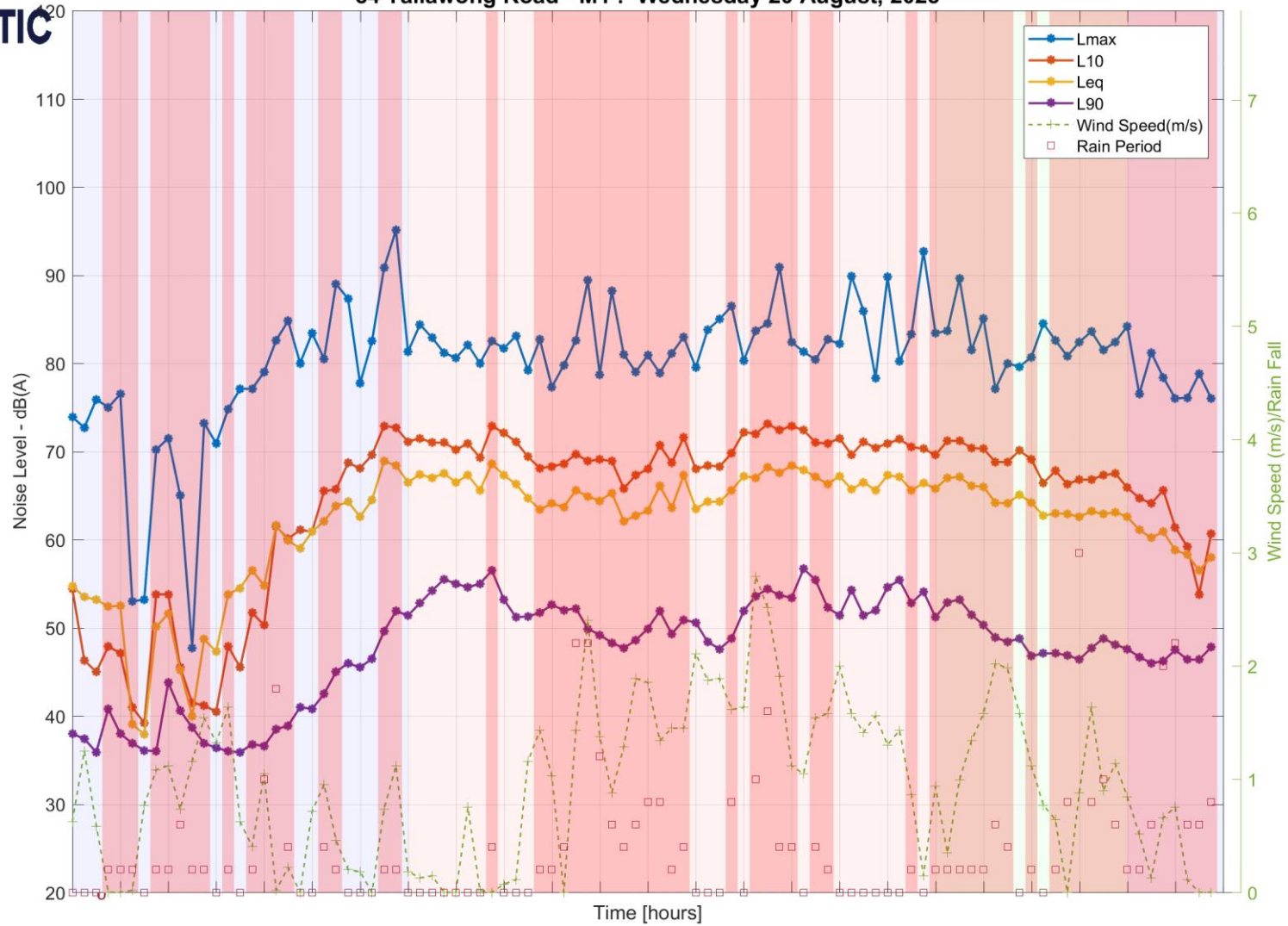


84 Tallawong Road - M1 : Tuesday 19 August, 2025



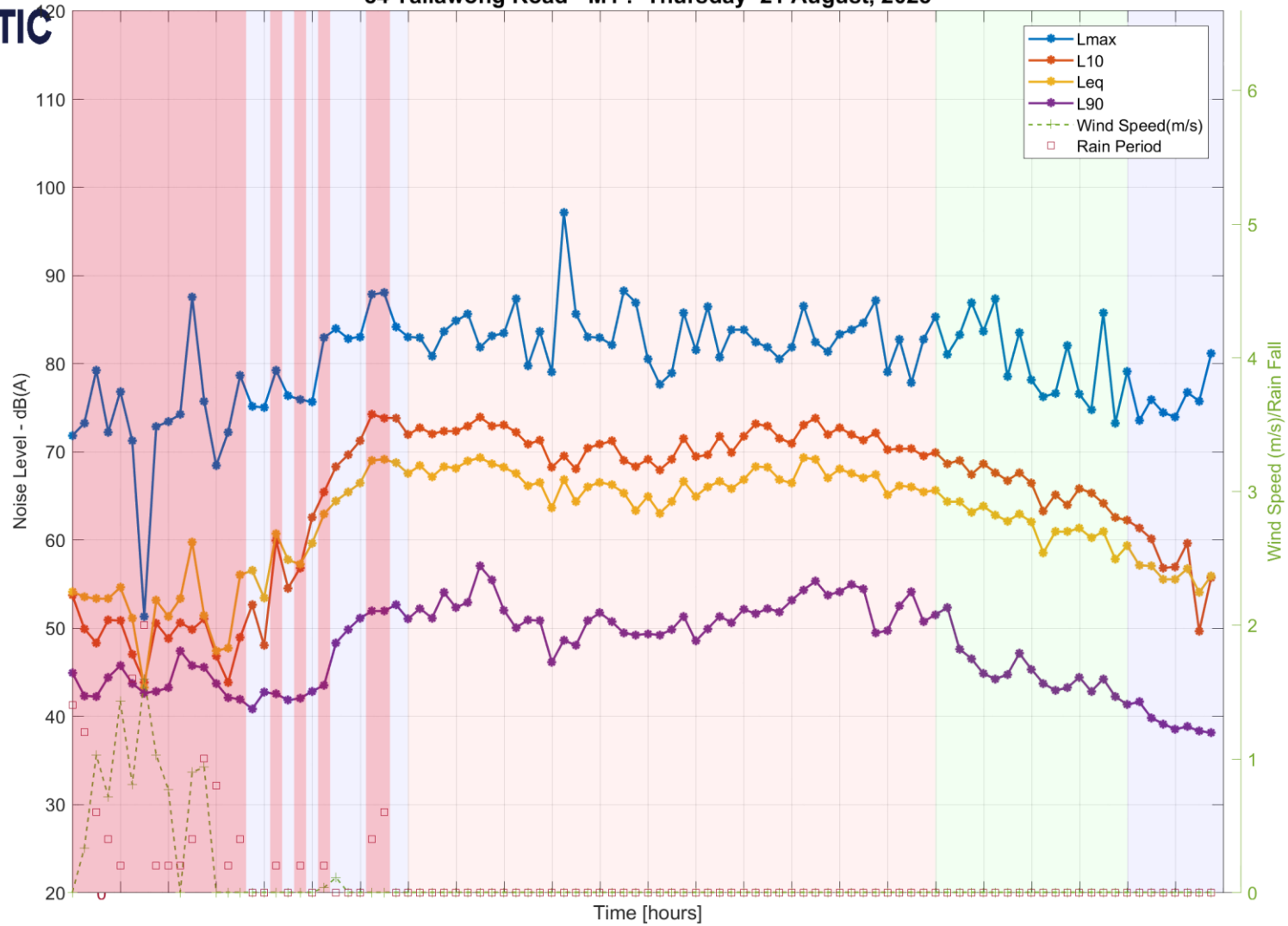


84 Tallawong Road - M1 : Wednesday 20 August, 2025



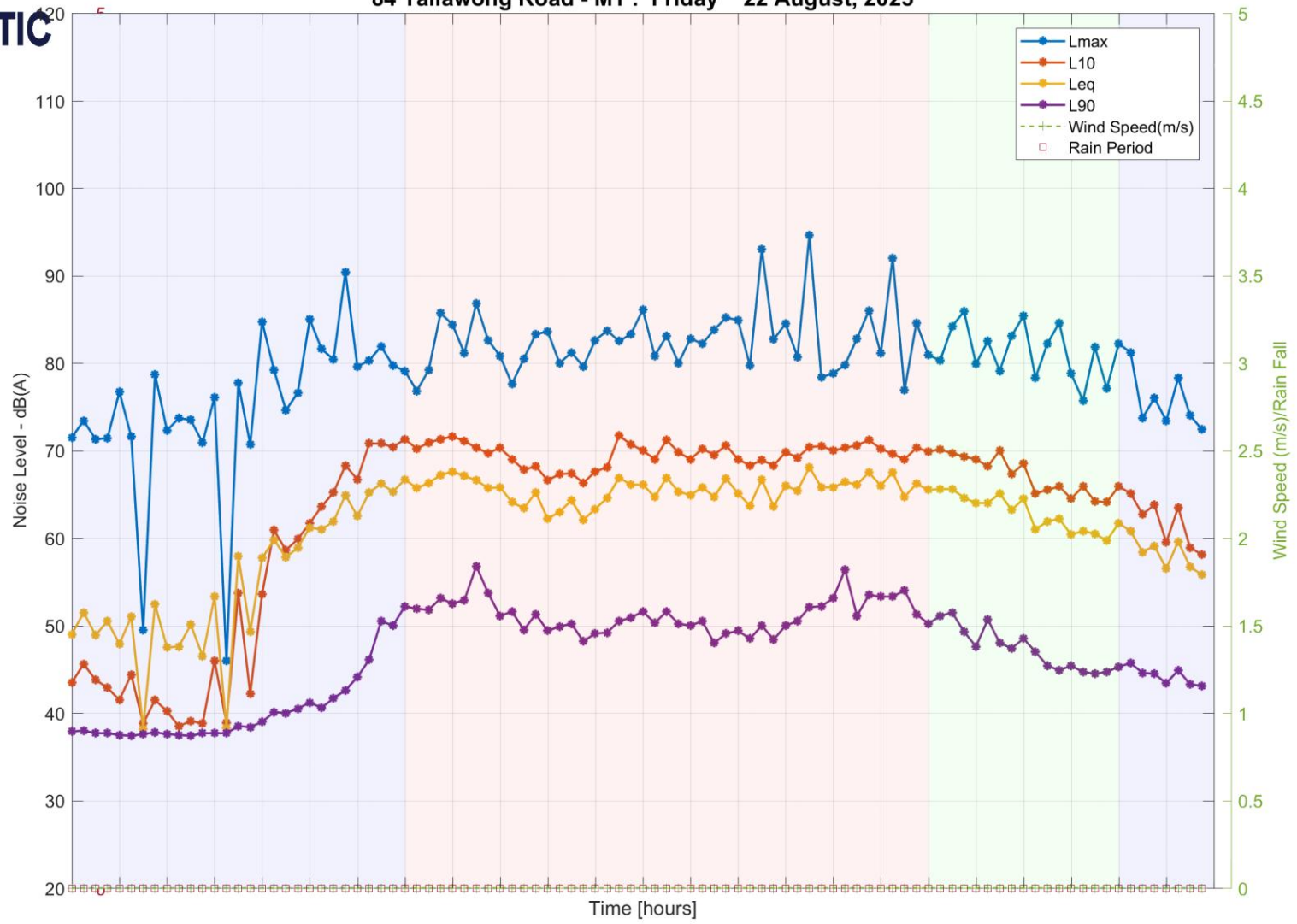


84 Tallawong Road - M1 : Thursday 21 August, 2025



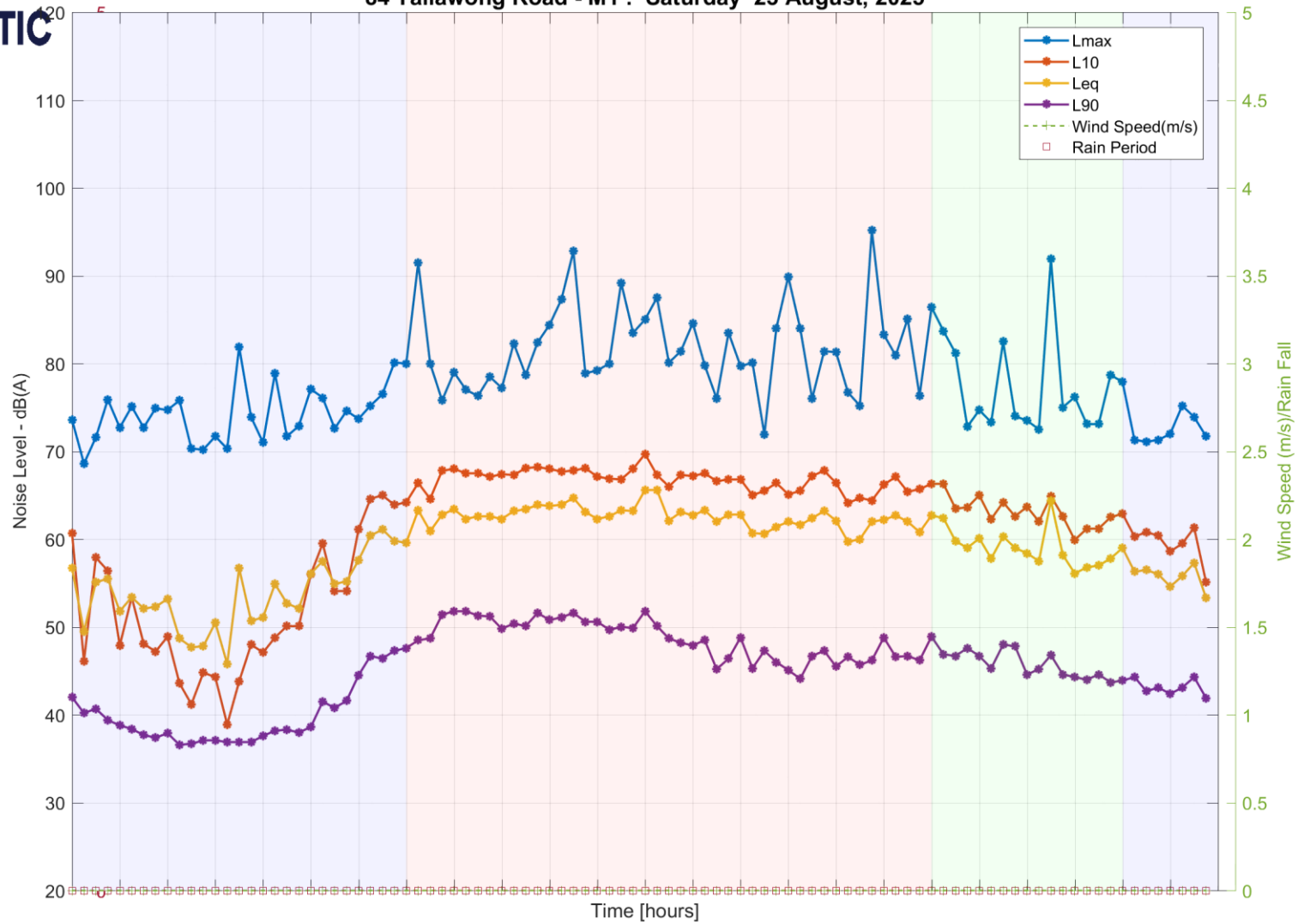


84 Tallawong Road - M1 : Friday 22 August, 2025



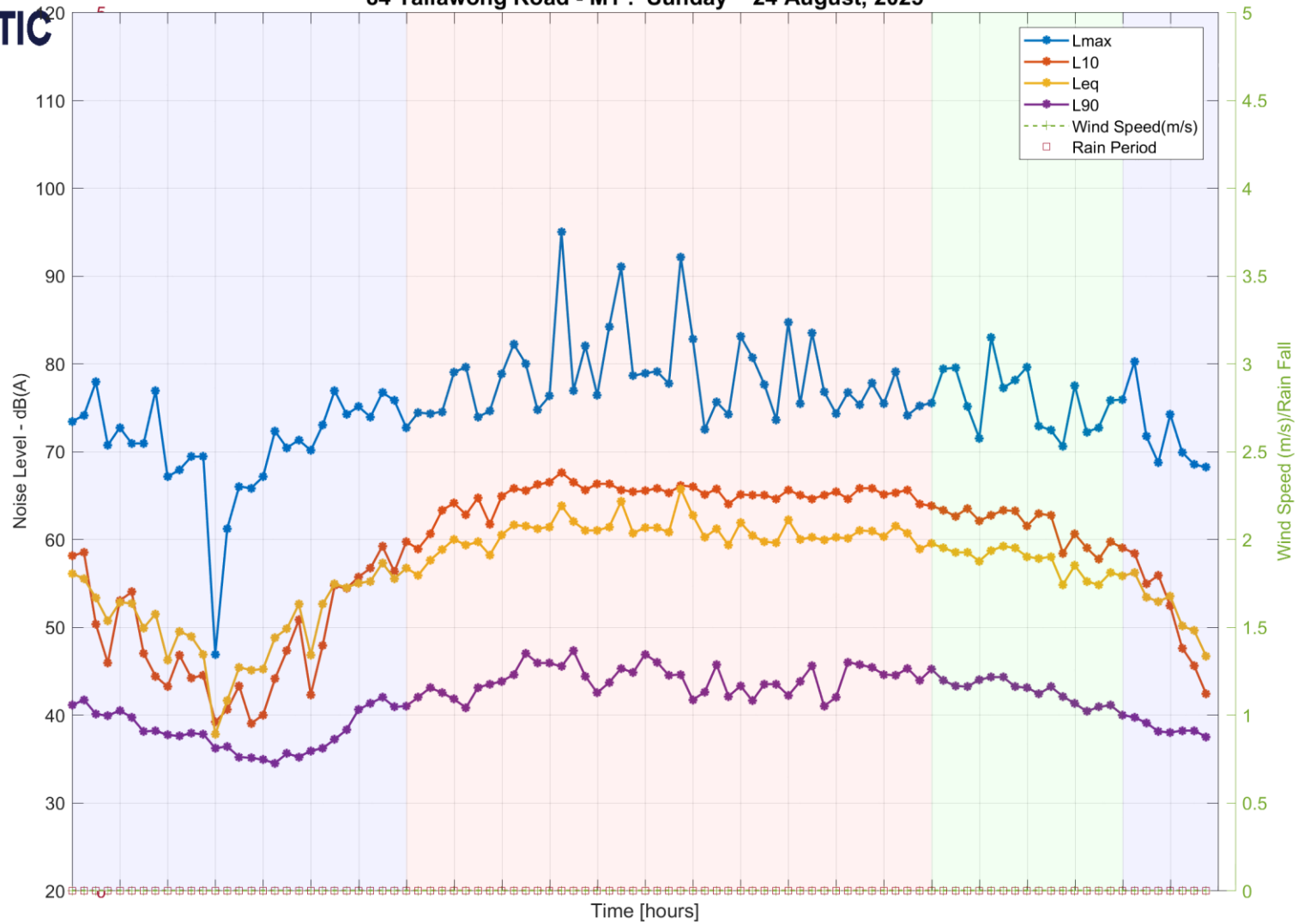


84 Tallawong Road - M1 : Saturday 23 August, 2025



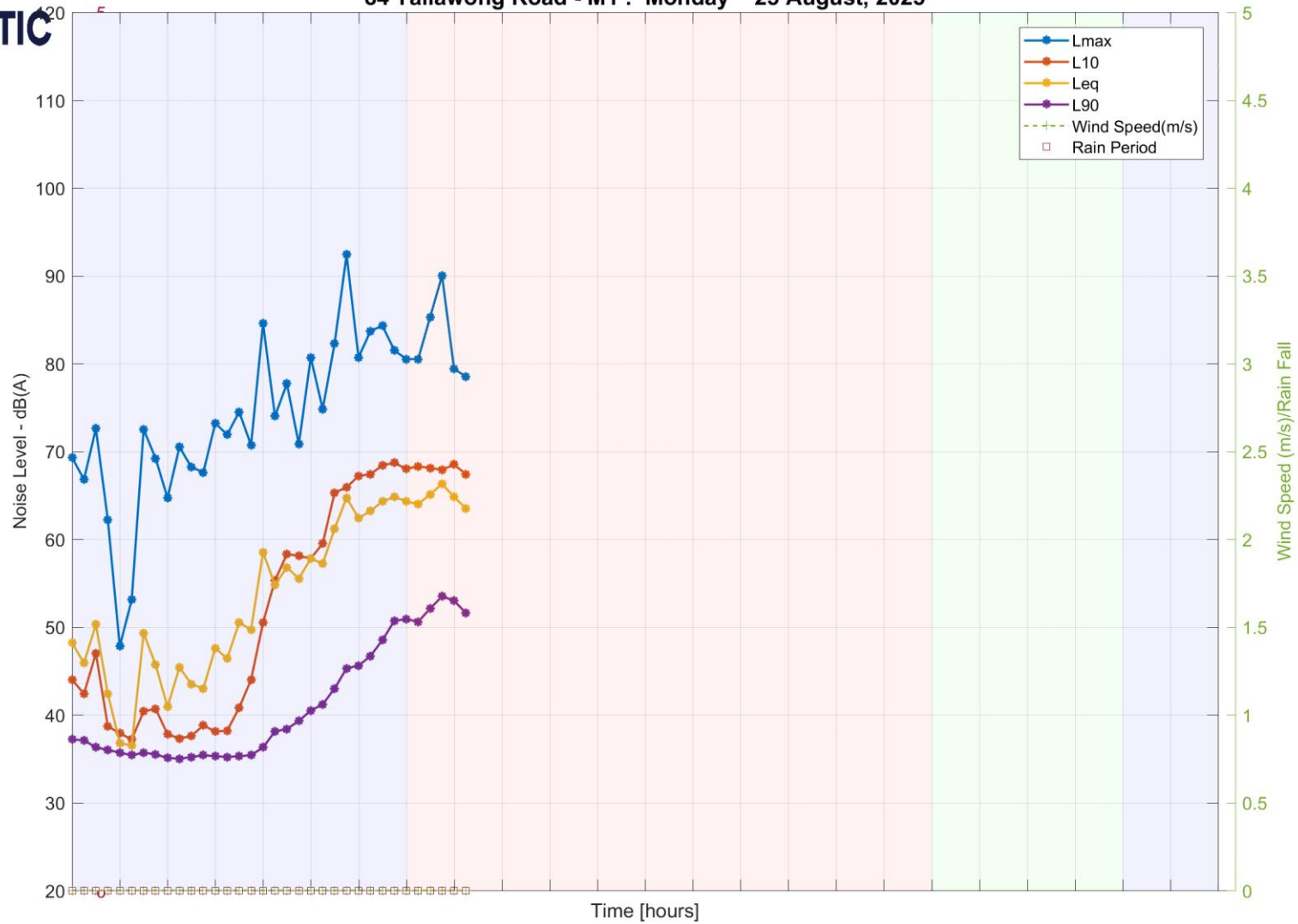


84 Tallawong Road - M1 : Sunday 24 August, 2025





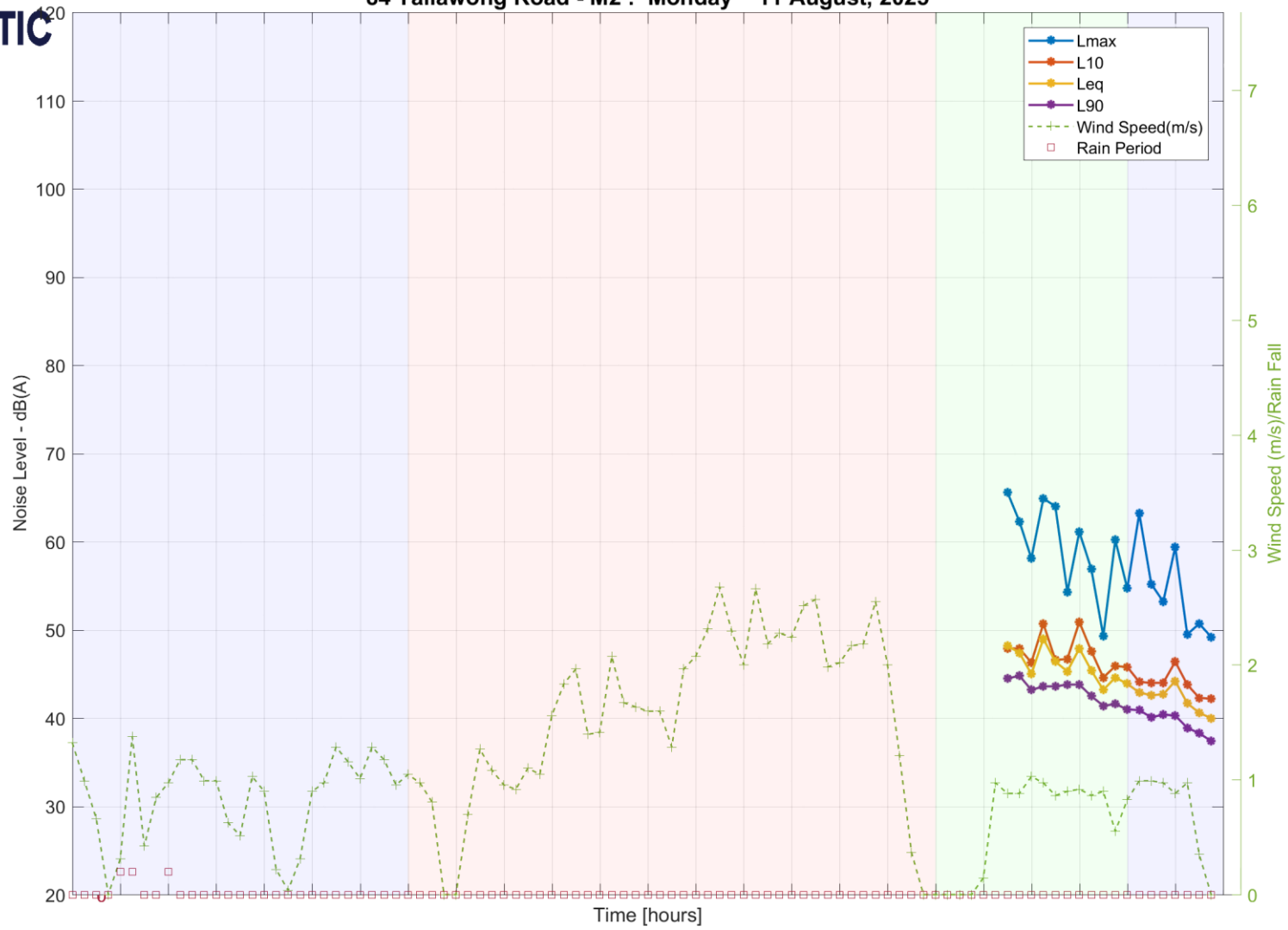
84 Tallawong Road - M1 : Monday 25 August, 2025



Wind Speed is corrected using factor 0.66 based on logger location

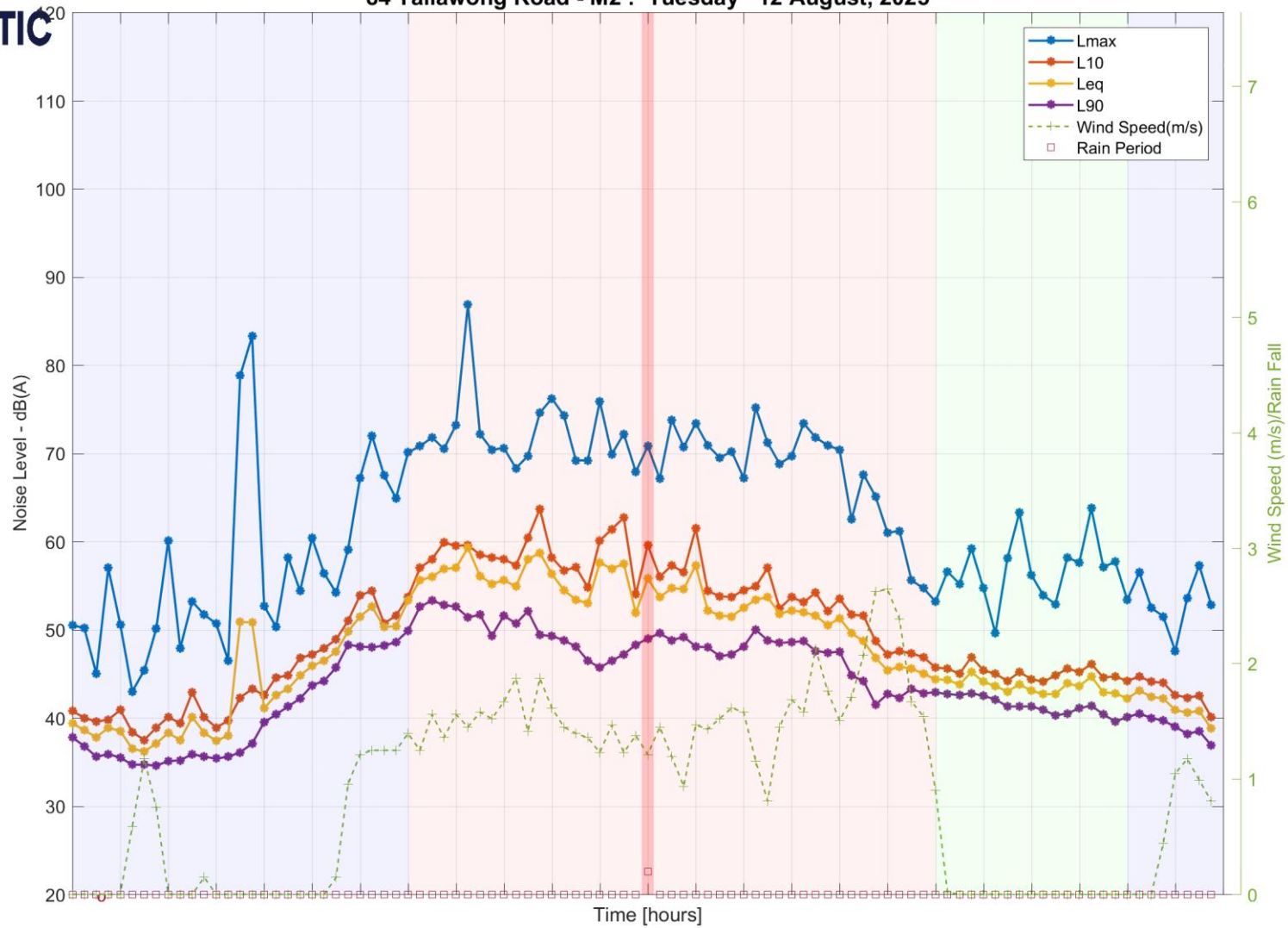


84 Tallawong Road - M2 : Monday 11 August, 2025



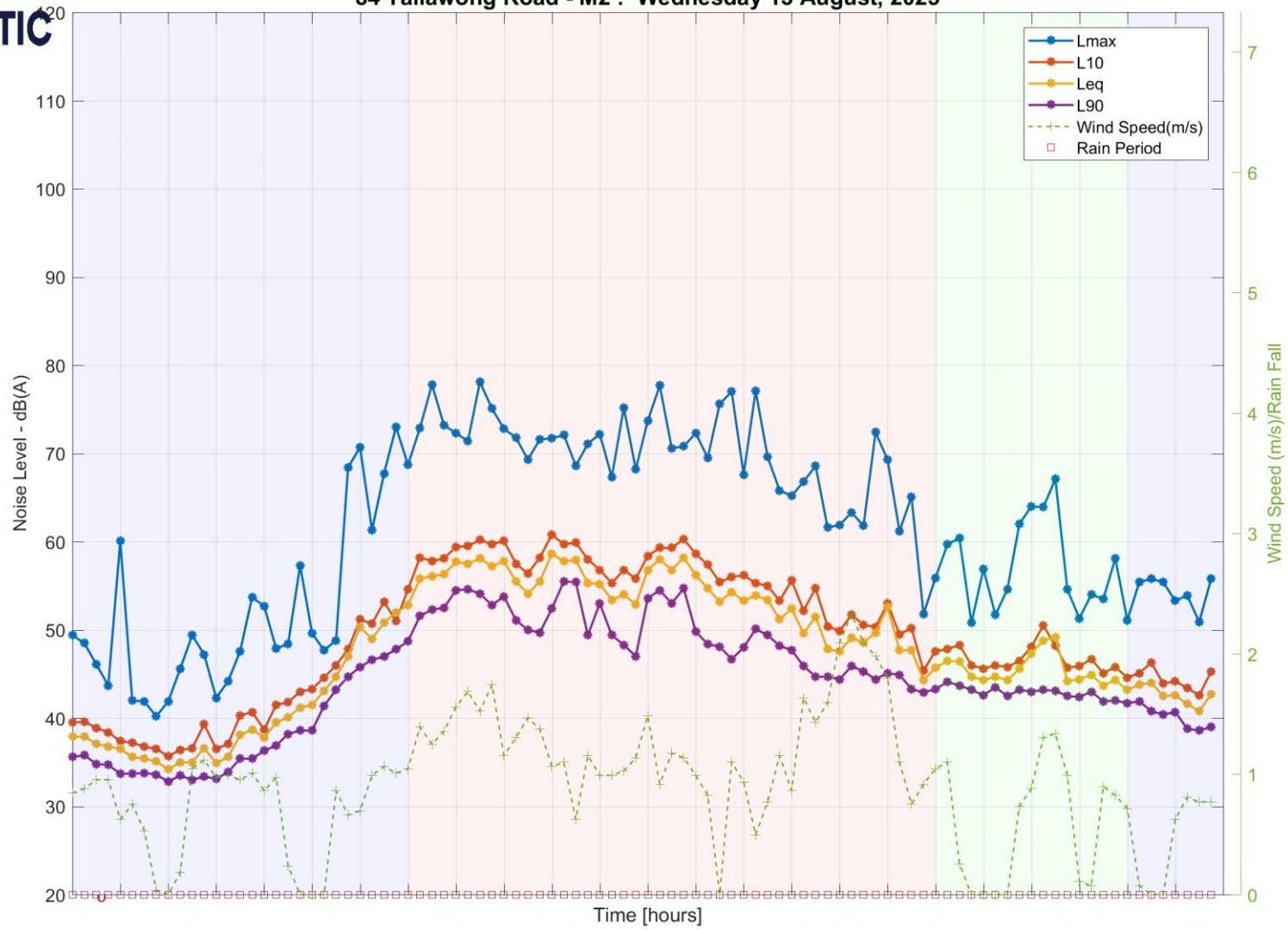


84 Tallawong Road - M2 : Tuesday 12 August, 2025



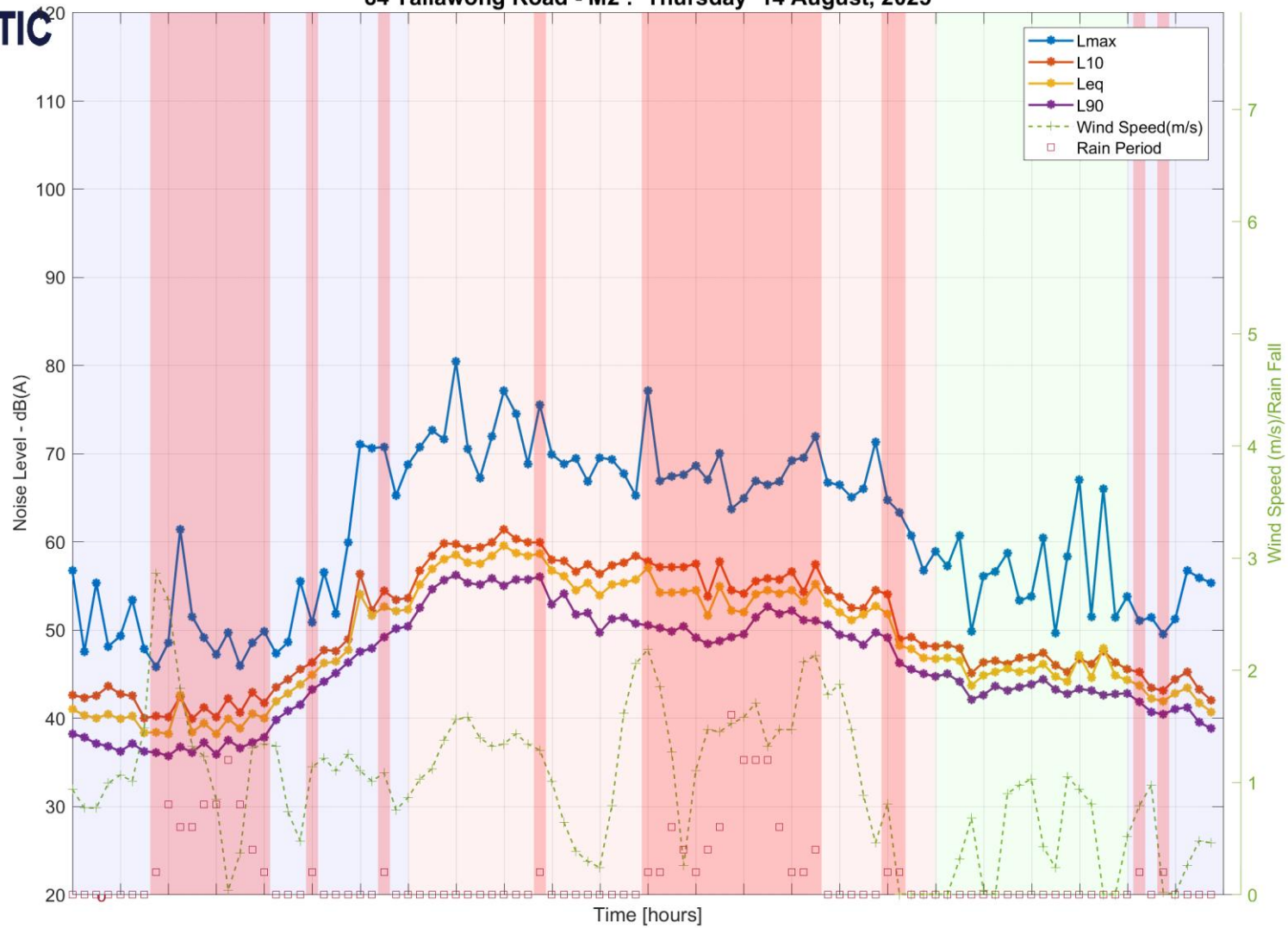


84 Tallawong Road - M2 : Wednesday 13 August, 2025



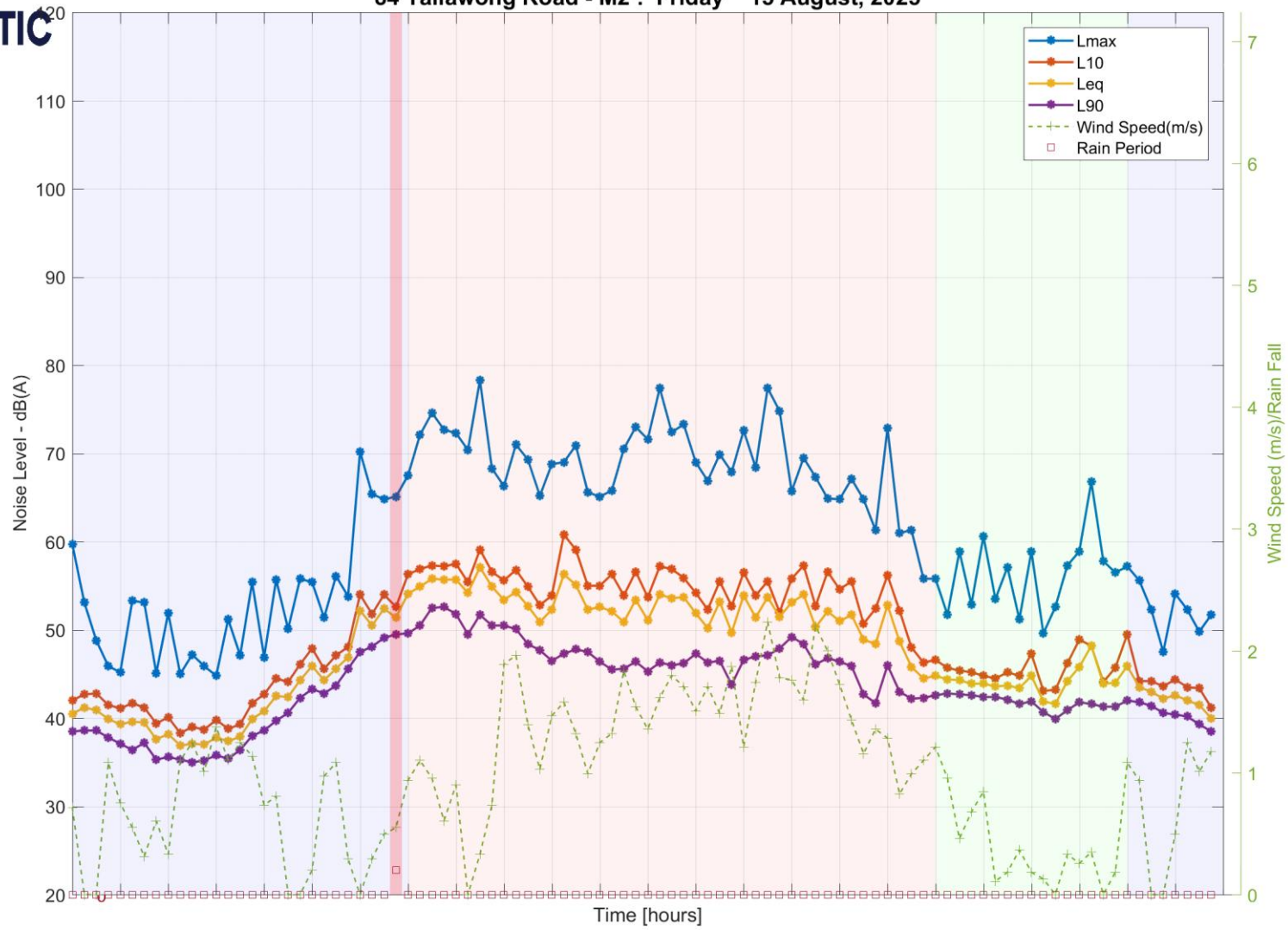


84 Tallawong Road - M2 : Thursday 14 August, 2025



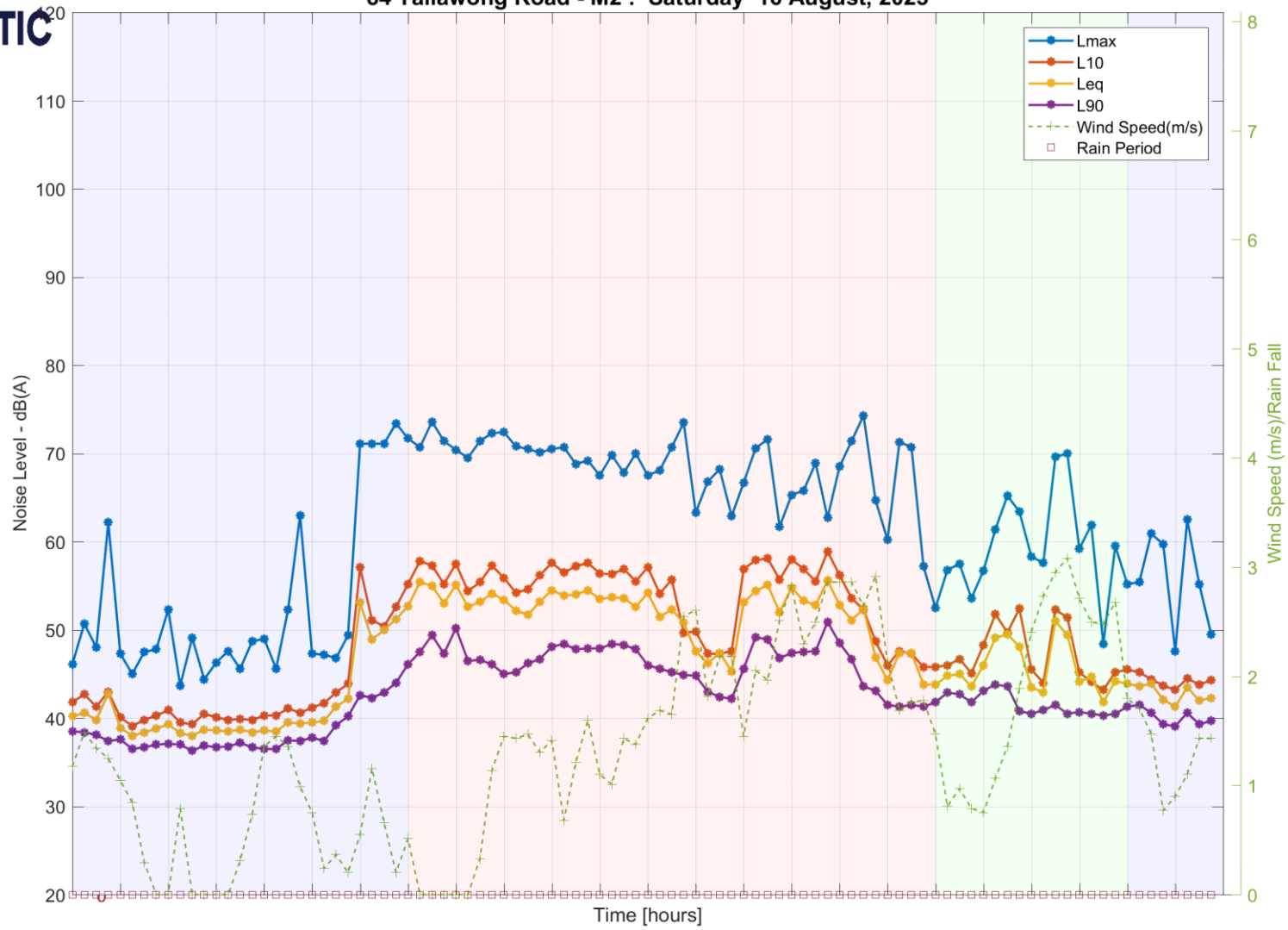


84 Tallawong Road - M2 : Friday 15 August, 2025



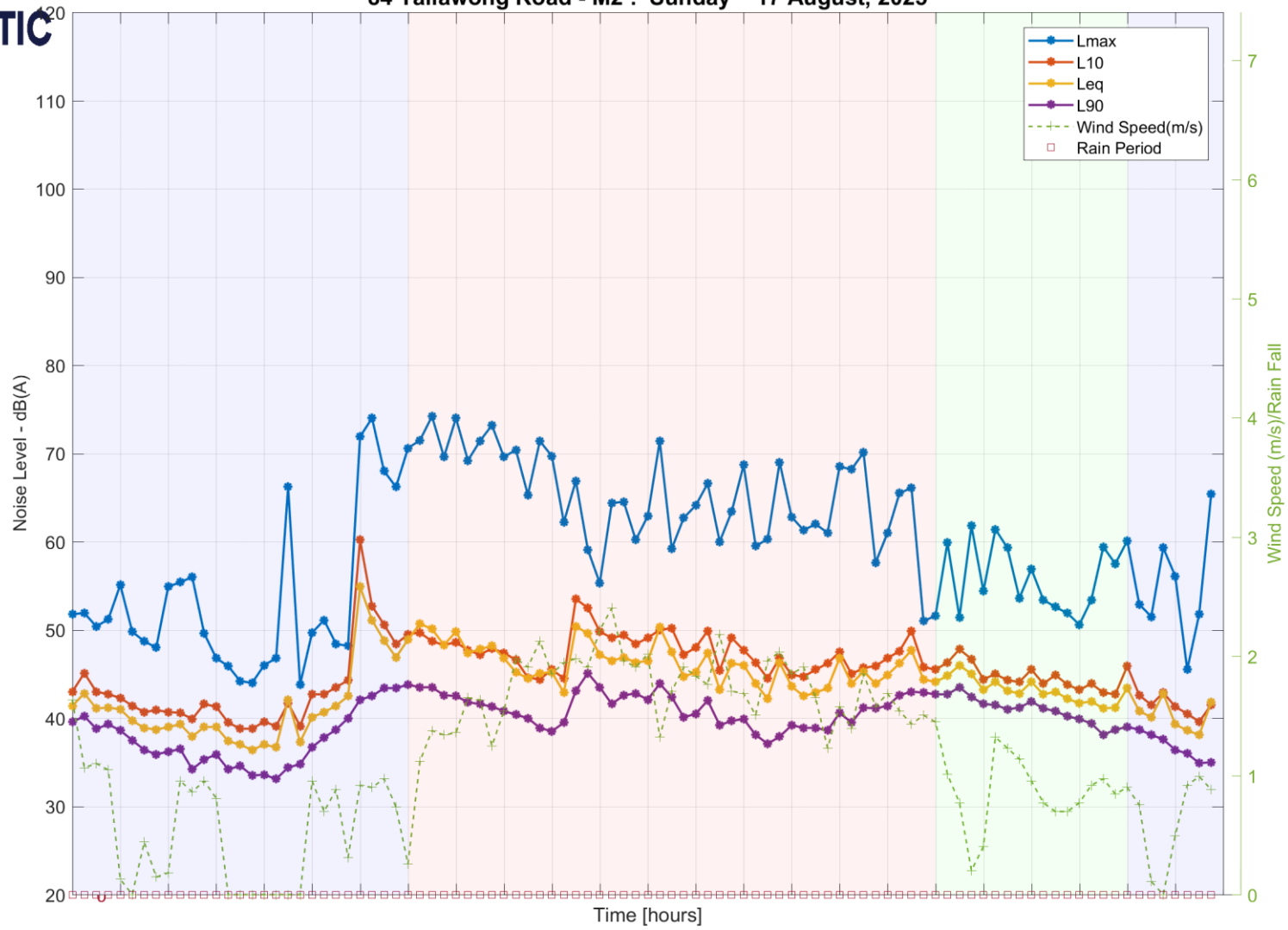


84 Tallawong Road - M2 : Saturday 16 August, 2025



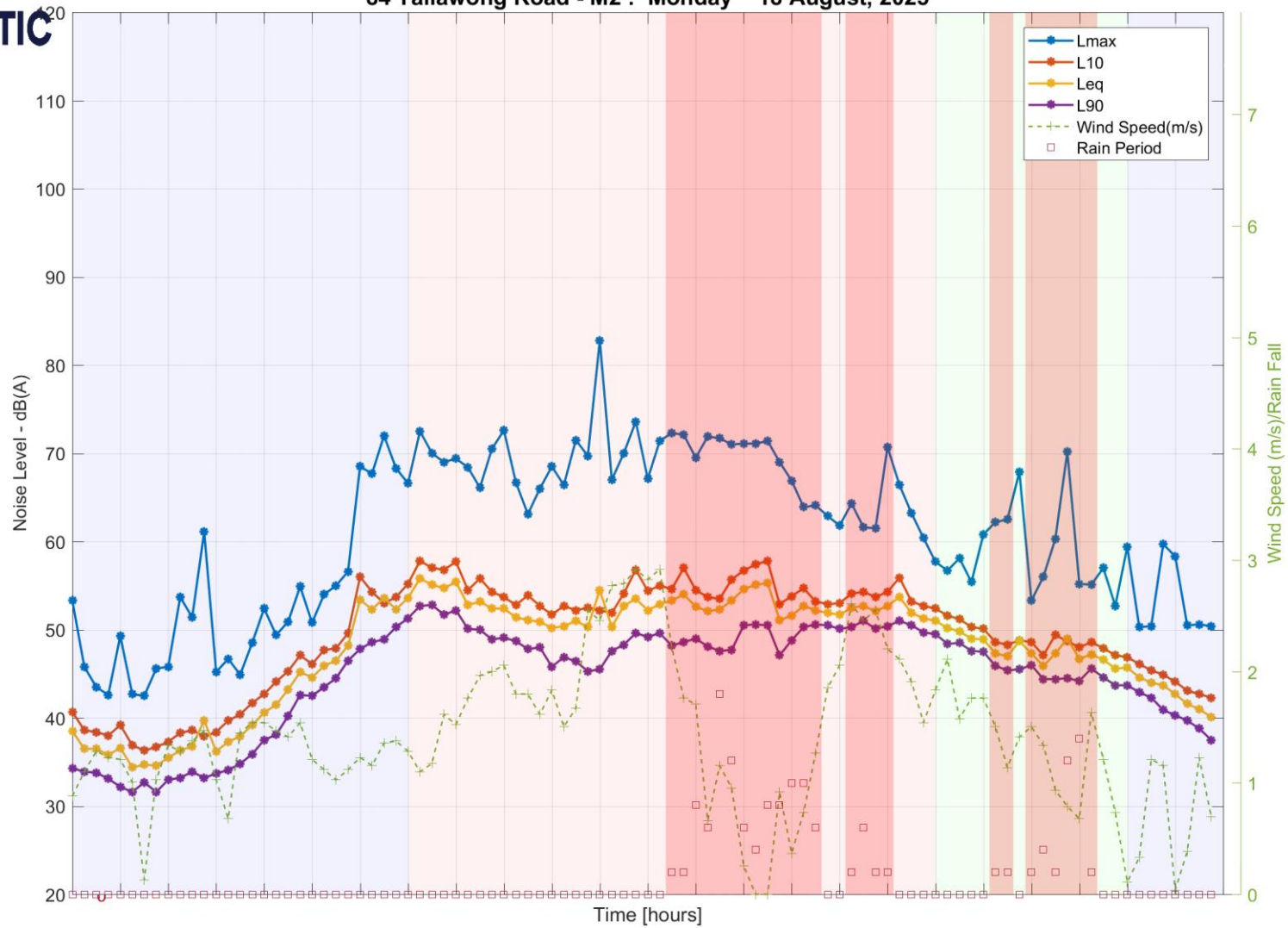


84 Tallawong Road - M2 : Sunday 17 August, 2025



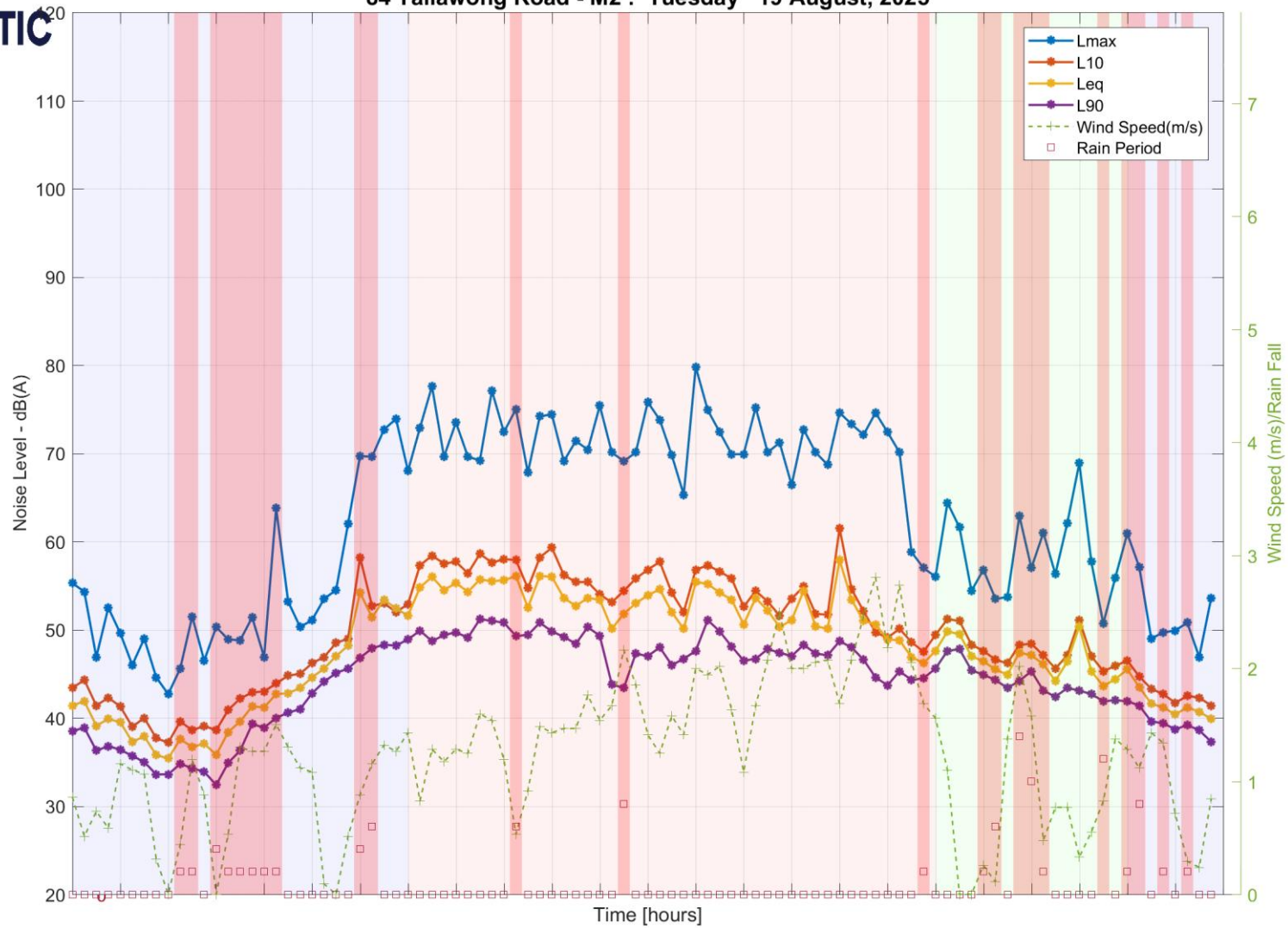


84 Tallawong Road - M2 : Monday 18 August, 2025



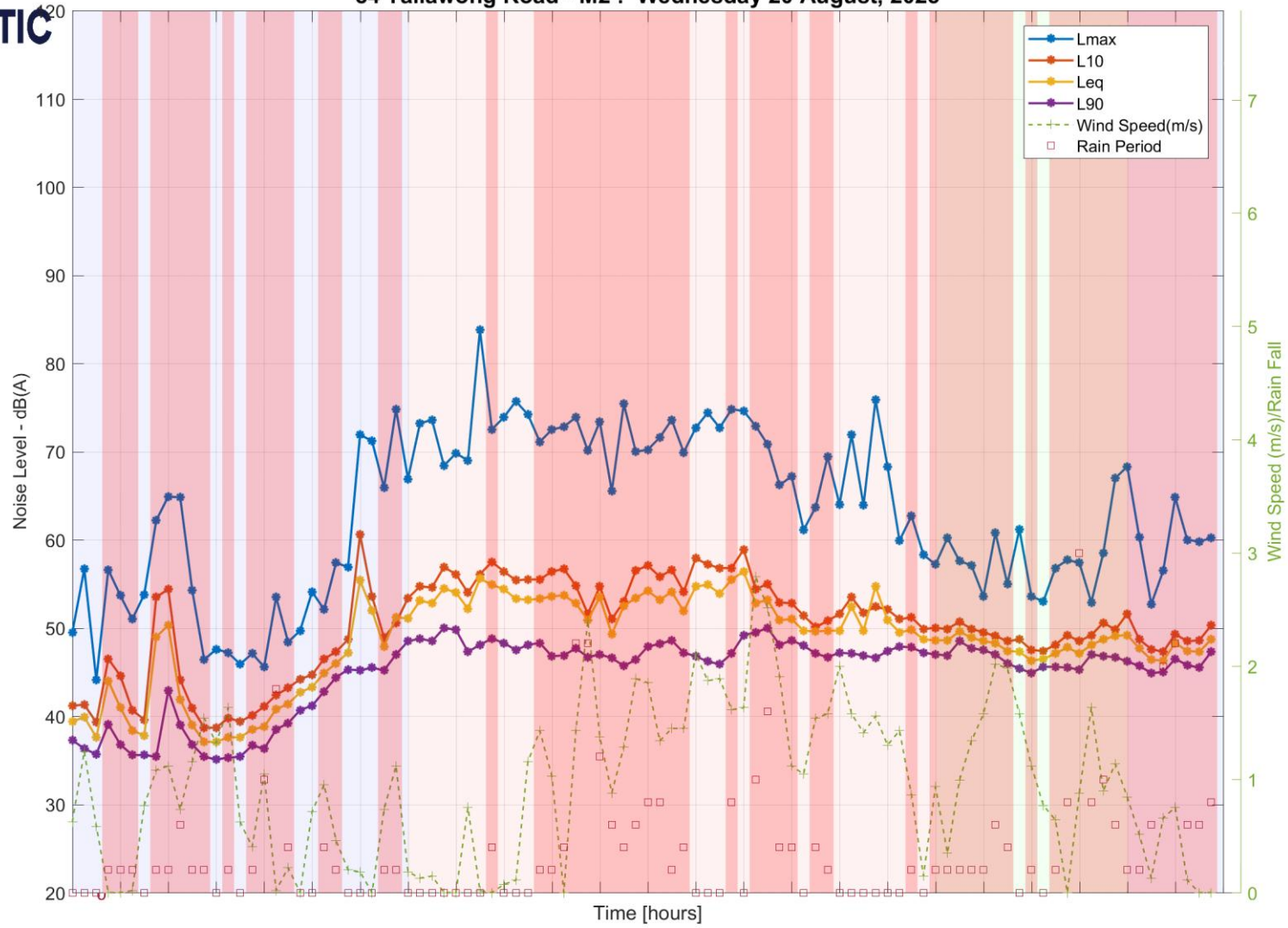


84 Tallawong Road - M2 : Tuesday 19 August, 2025



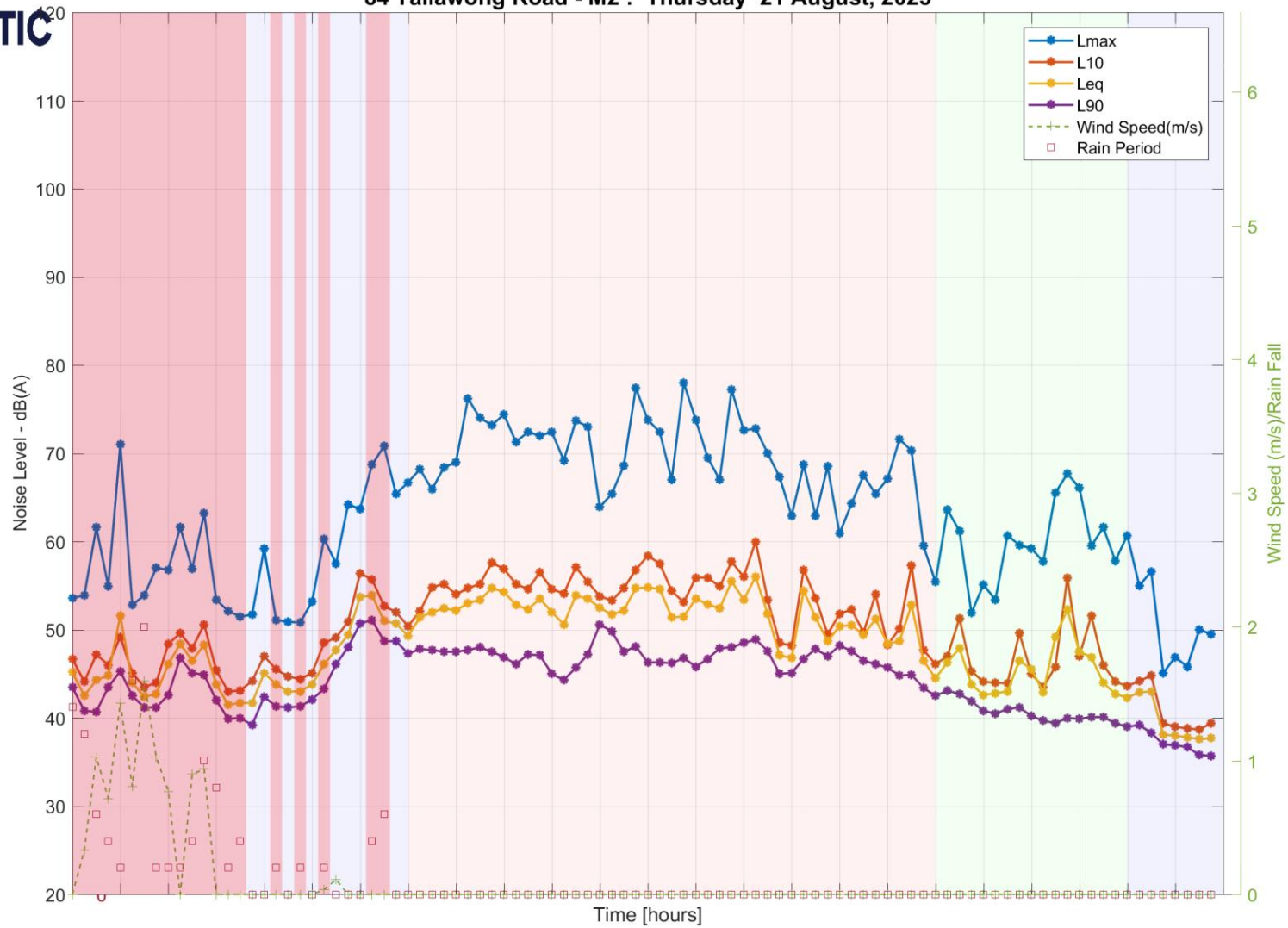


84 Tallawong Road - M2 : Wednesday 20 August, 2025



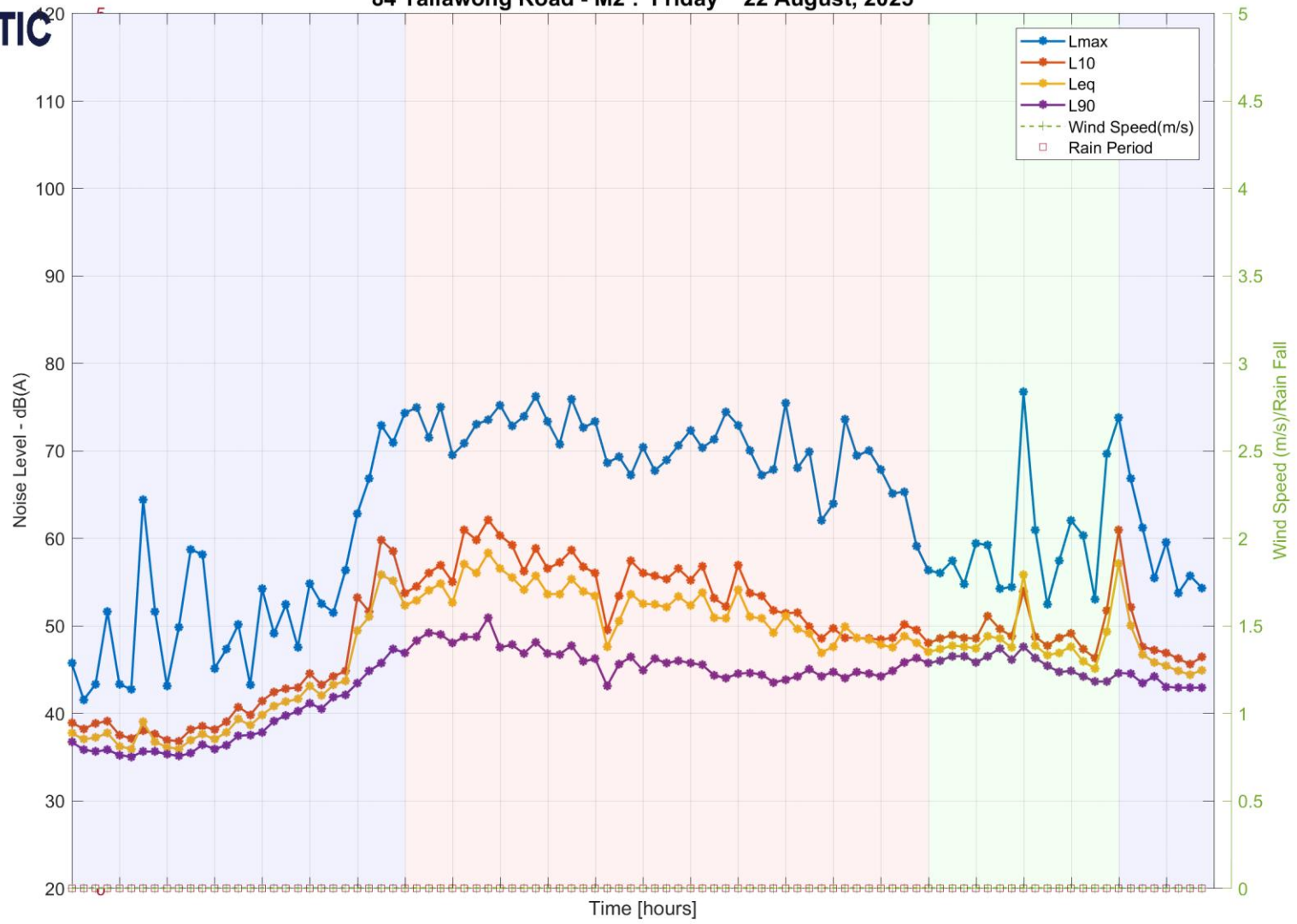


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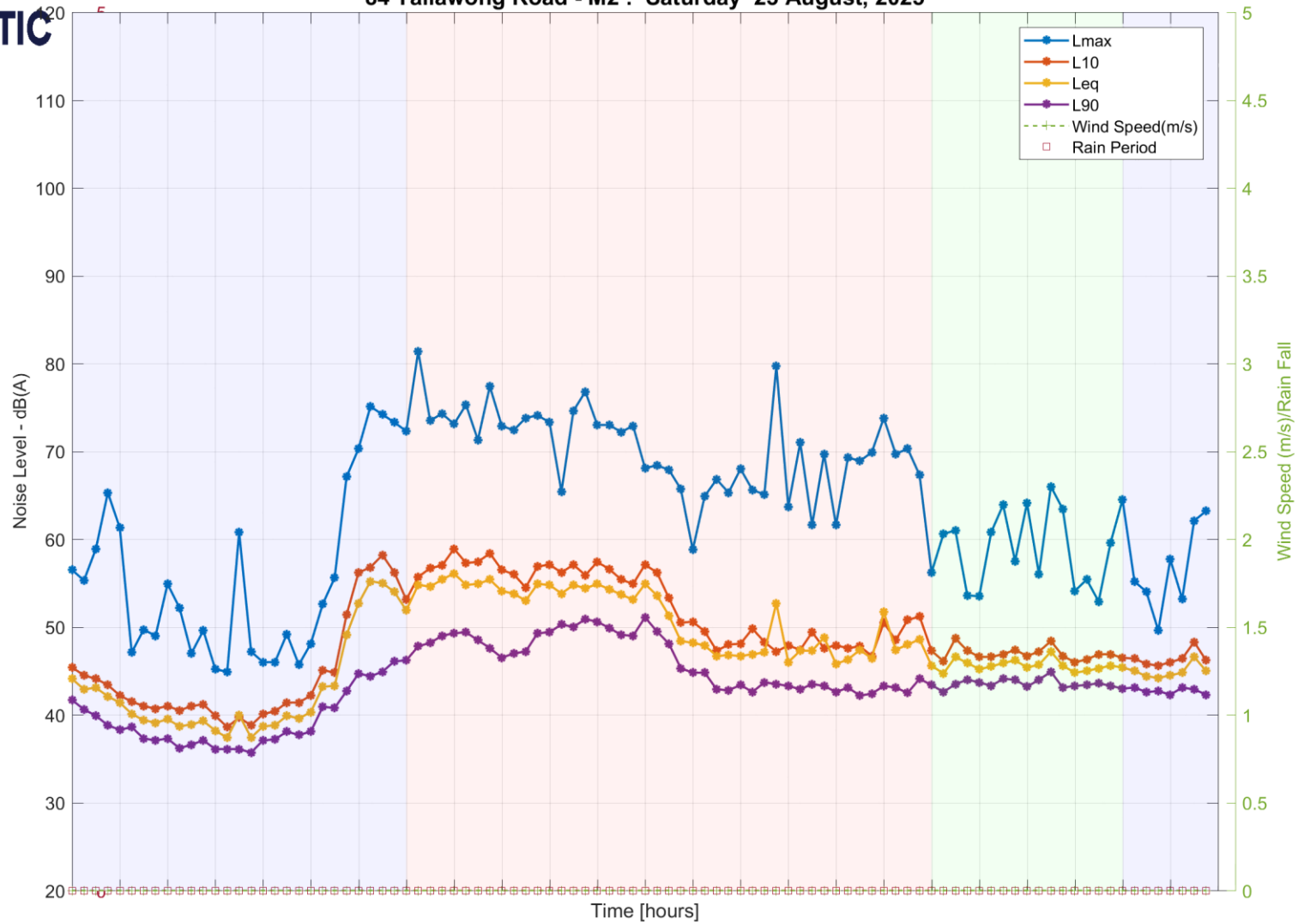


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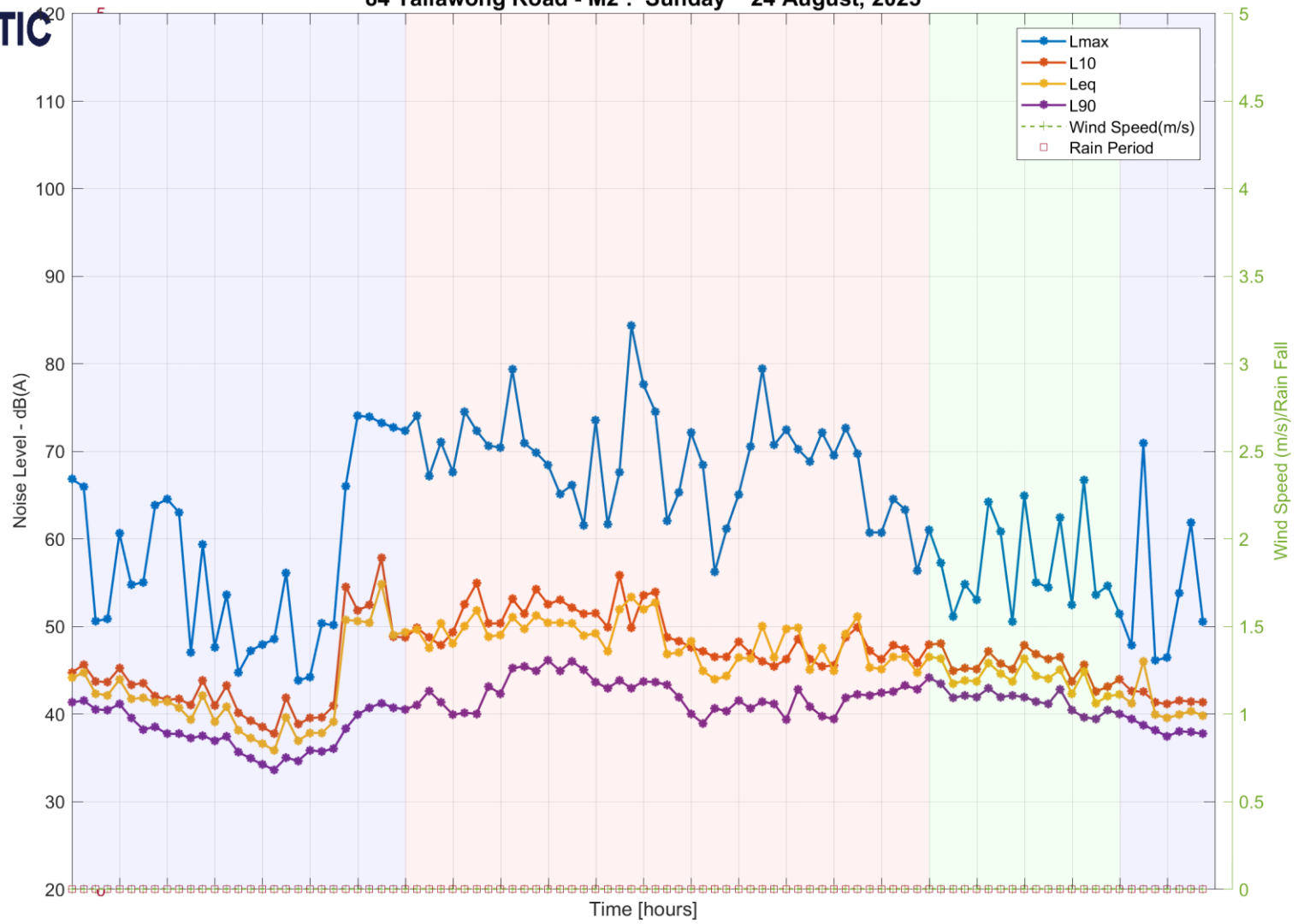


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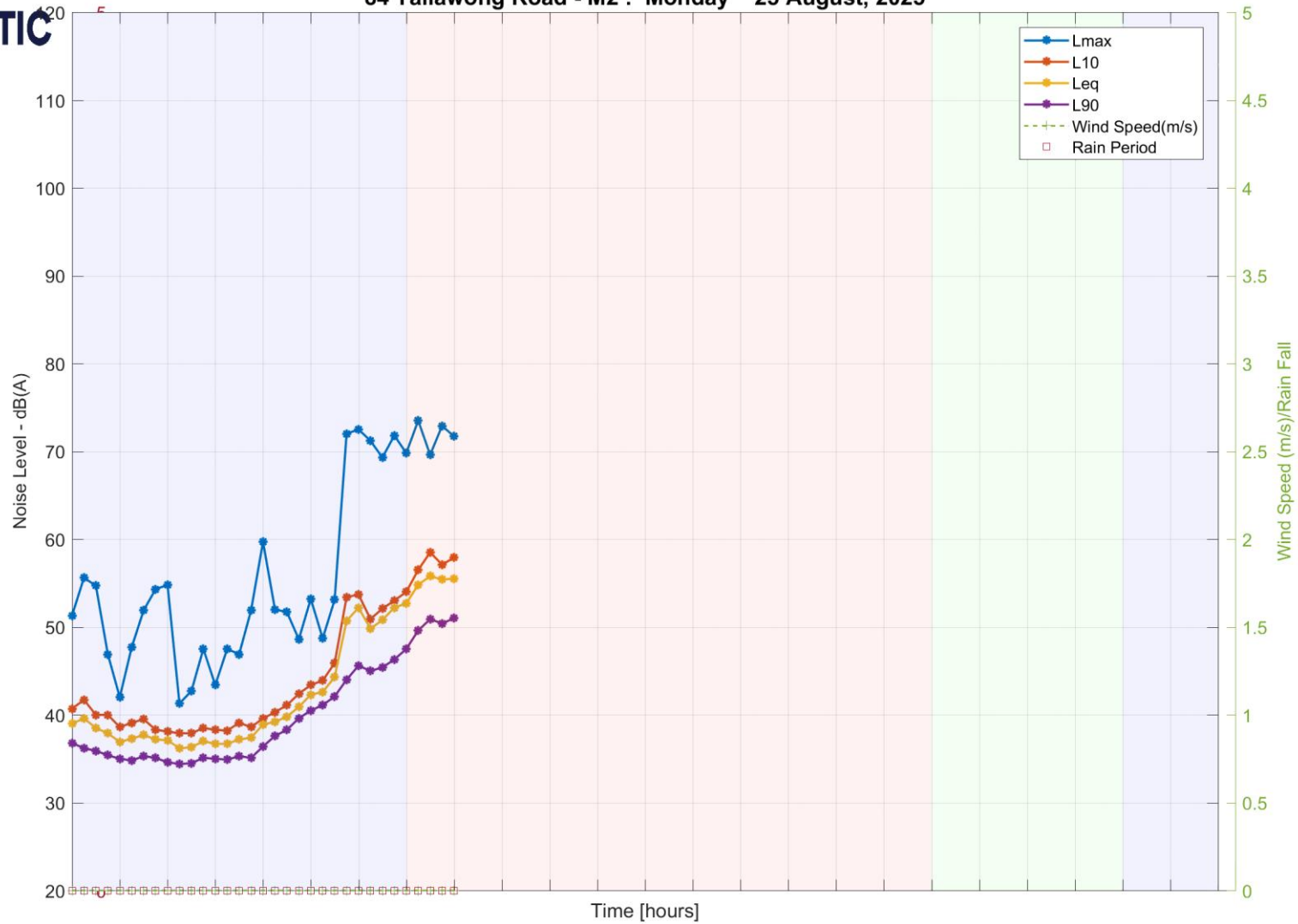


84 Tallawong Road - M2 : Sunday 24 August, 2025





84 Tallawong Road - M2 : Monday 25 August, 2025

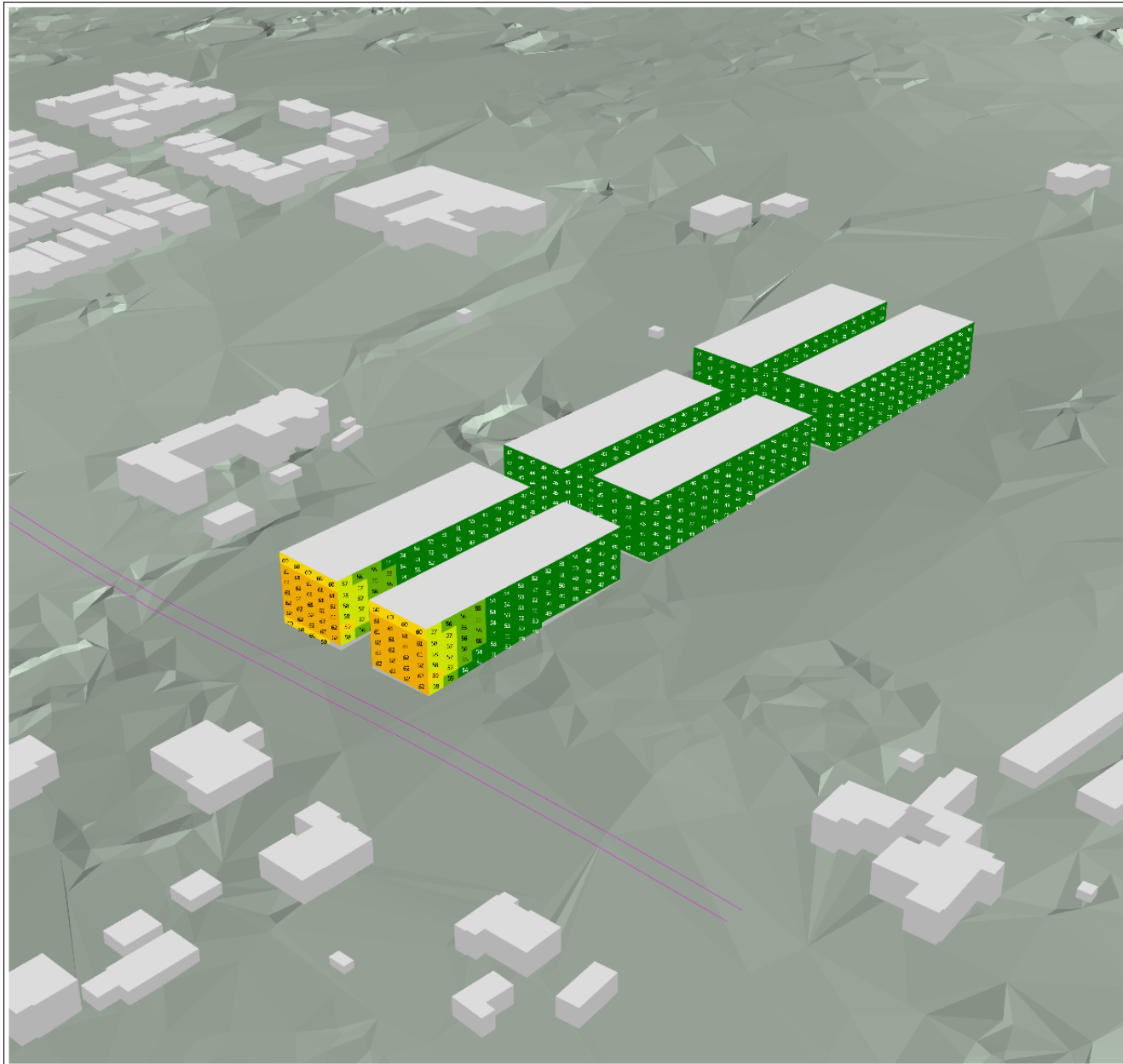


Wind Speed is corrected using factor 0.66 based on logger location

APPENDIX B – SOUNDPLAN NOISE MODELLING RESULTS

Results are presented for the following:

- External noise levels incident upon the building envelope.
- Façades where an alternative ventilation system should be considered



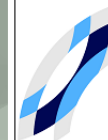
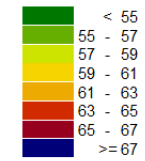
84 Tallawong Road Rouse Hill

Day Traffic Noise Prediction

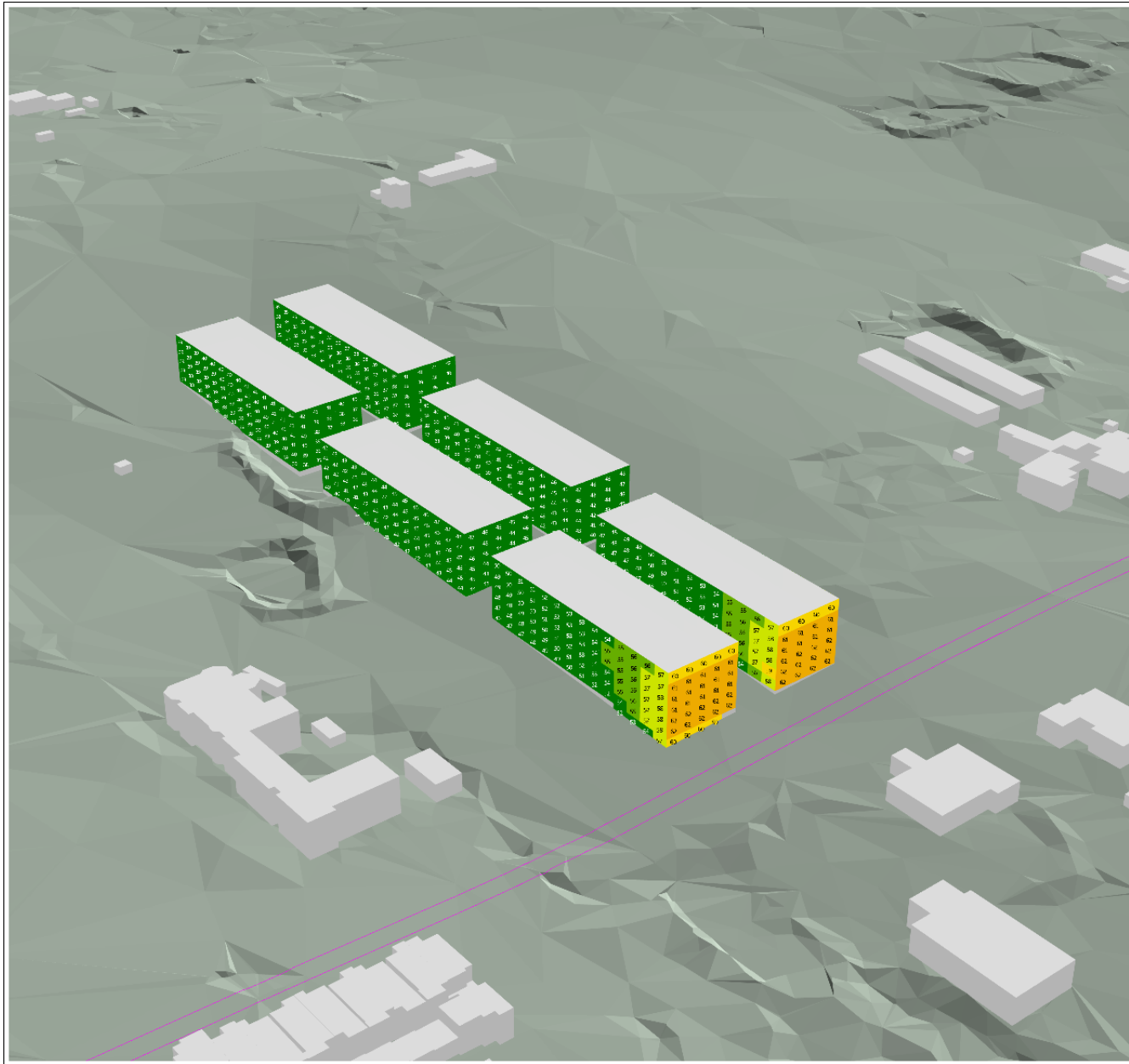
Prepared by: HD
Date: 29/08/2025
Project ID: 20250481

Noise Level

Leq
in dB(A)



**ACOUSTIC
LOGIC**



84 Tallawong Road Rouse Hill

Day Traffic Noise Prediction

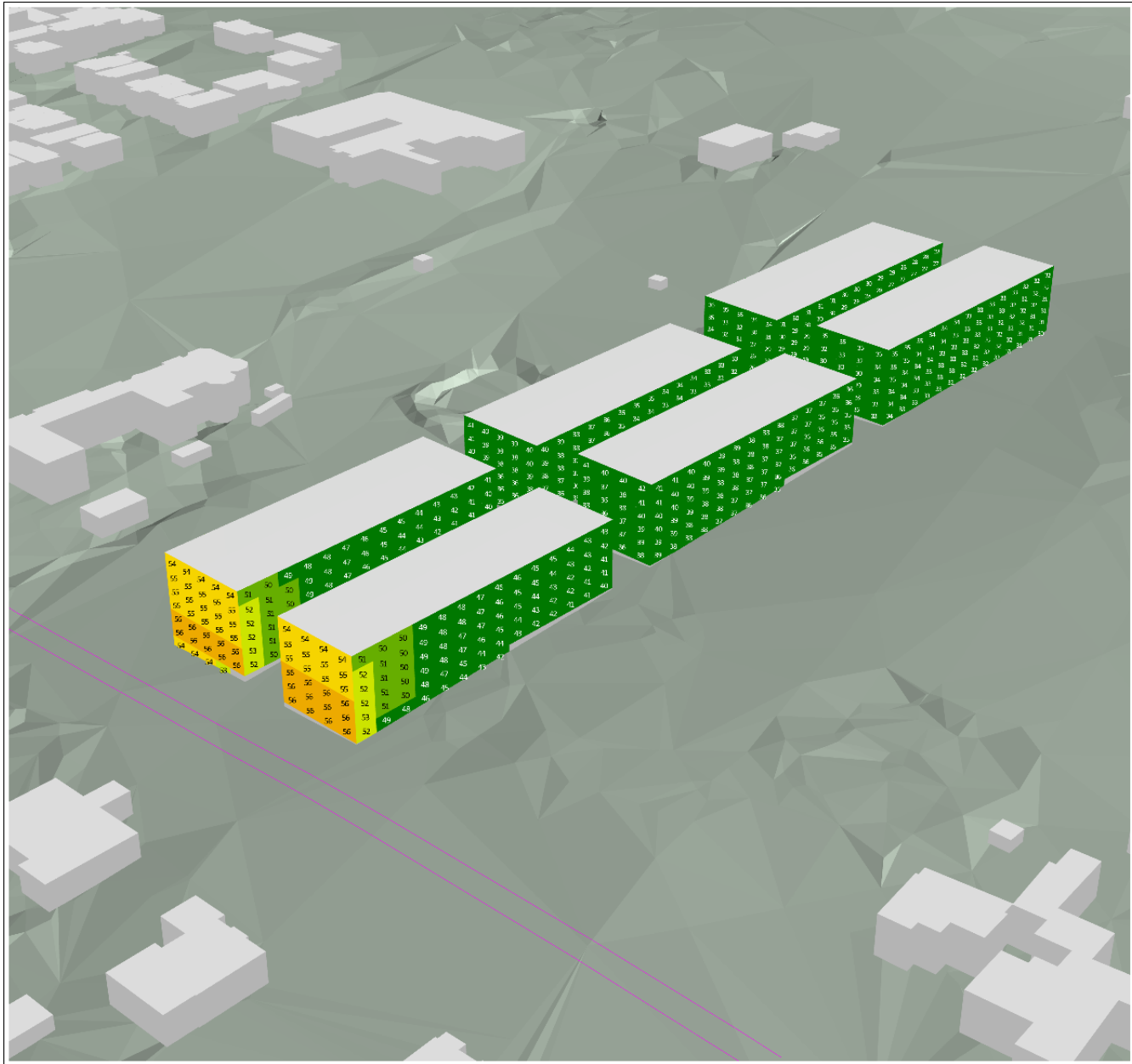
Prepared by: HD
Date: 29/08/2025
Project ID: 20250481

Noise Level

Leq
in dB(A)

	< 55
	55 - 57
	57 - 59
	59 - 61
	61 - 63
	63 - 65
	65 - 67
	>=67





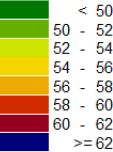
84 Tallawong Road Rouse Hill

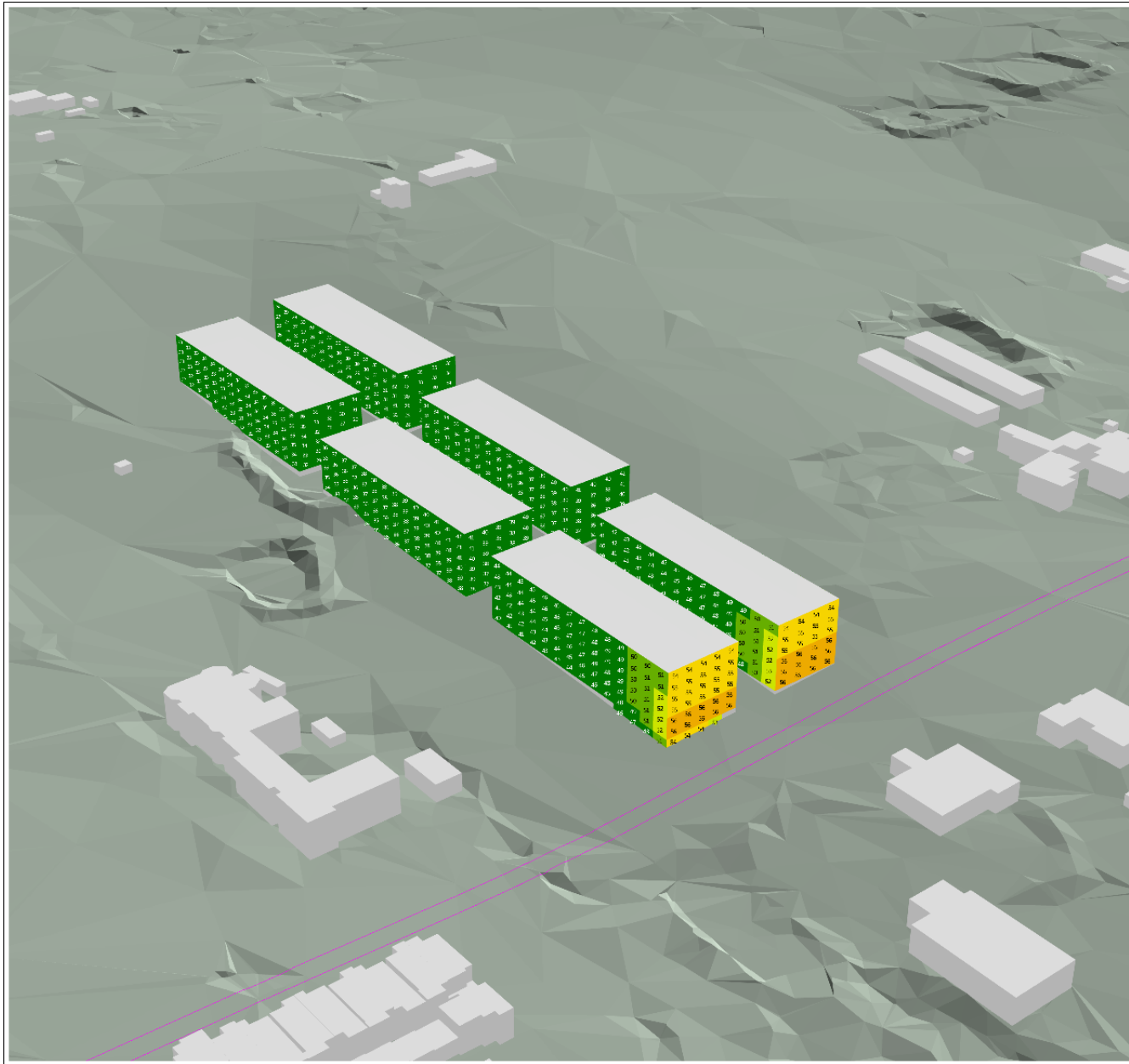
Night Traffic Noise Prediction

Prepared by: HD
Date: 29/08/2025
Project ID: 20250481

Noise Level

Leq
in dB(A)





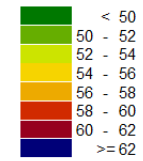
84 Tallawong Road Rouse Hill

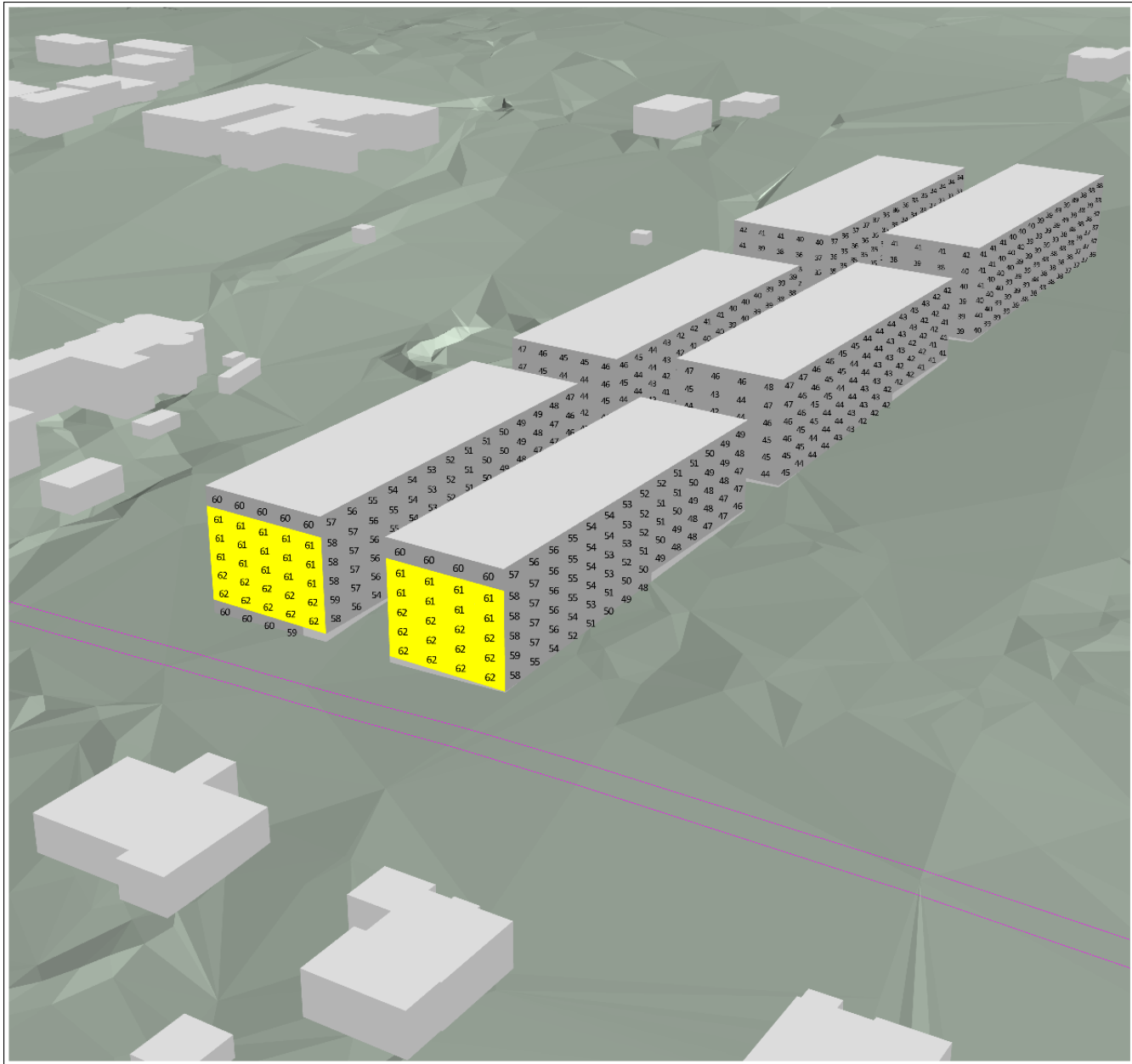
Night Traffic Noise Prediction

Prepared by: HD
Date: 29/08/2025
Project ID: 20250481

Noise Level

Leq
in dB(A)





84 Tallawong Road Rouse Hill

Traffic Noise Prediction

**Ventilation Requirements
Living Areas
7am-10pm**

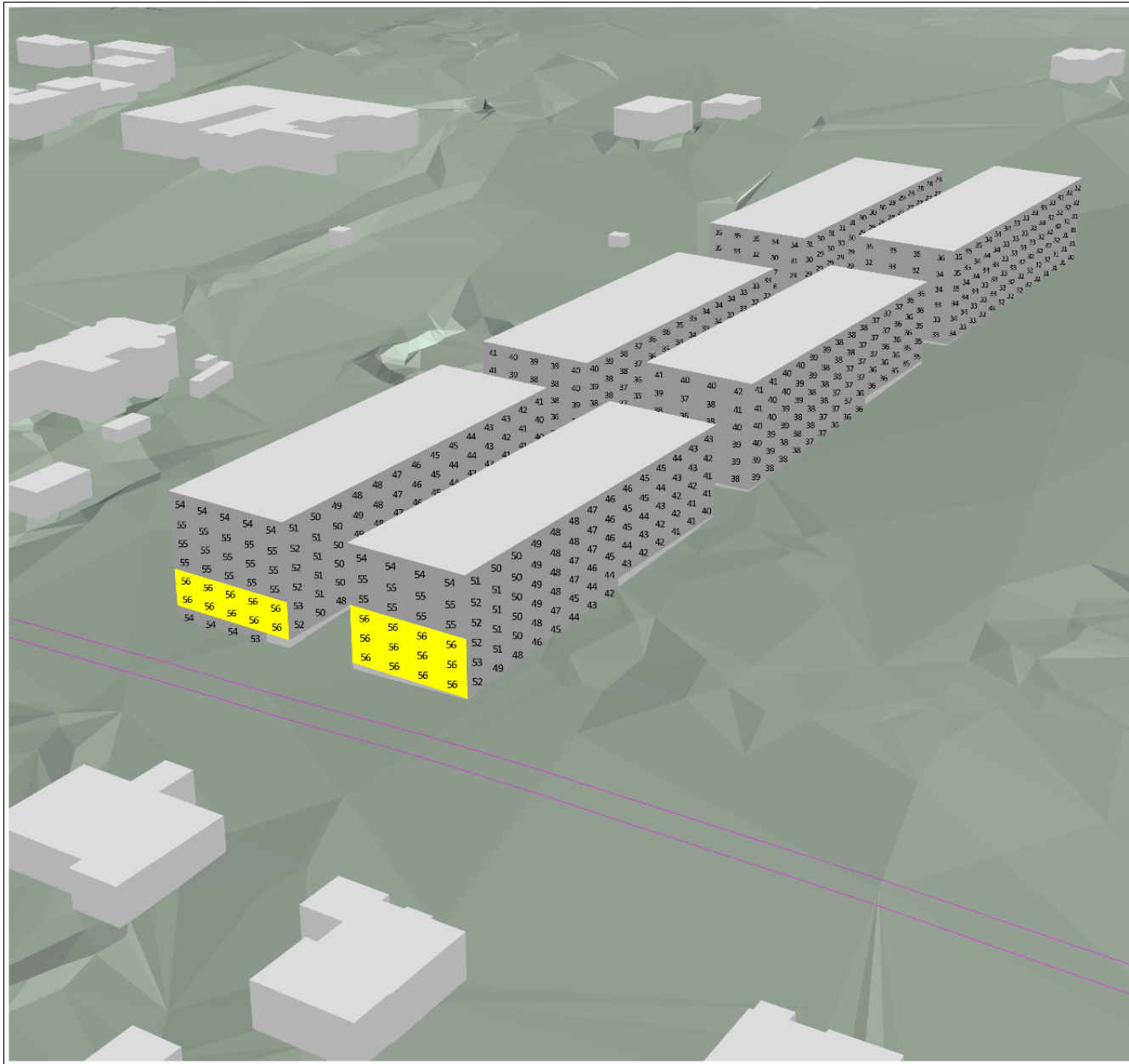
Prepared by: HD
Date: 29/08/2025
Project ID: 20250481

Noise Level

Leq
in dB(A)

- <= 60
- > 60





84 Tallawong Road Rouse Hill

Traffic Noise Prediction

**Ventilation Requirements
Bedrooms
10pm-7am**

Prepared by: HD
Date: 29/08/2025
Project ID: 20250481

Noise Level

Leq
in dB(A)

- ≤ 55
- > 55

