27 East Esplanade, Manly

Noise Impact Assessment Report

Prepared for: I.M Advisory

Project No: SYD3761
Date: 27 August 2025
Revision: 00

Project:	27 East Esplanade, Manly
Location:	27 East Esplanade Manly, 2095
Prepared by:	ADP Consulting Pty Ltd Level 6, 33 Erskine Street Sydney NSW 2000
Project No:	SYD3761
Revision:	00
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Rev	Date	Comment	Author	Signature	Technical Review	Signature	Authorisation & QA	Signature
00	27/08/2025	DA	WC	WC	MJ	MJ	MJ	MJ

Project Team	
Client / Principal	I.M Advisory
Architect	MHNDUNION Architects

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1. Context

ADP Consulting Pty Ltd has been engaged to undertake acoustic engineering services and to prepare a noise impact assessment for the proposed construction of a residential apartment building at 27 East Esplanade, Manly, NSW.

This report addresses the following:

- Noise intrusion into the proposed development from external noise sources, such as road traffic.
- Noise emission criteria determined from unattended noise logging surveys conducted at the subject site.
- Assessment of inter-tenancy noise per the Building Code of Australia 2022 Volume 1.

The design criteria and acoustic treatment concepts in this report demonstrate the pathways by which these shall be addressed by ADP Consulting and the project team through further analysis, recommendations, and coordination as the design progresses.

1.1 Referenced Drawings, Codes, and Standards

The following drawings, conditions guidelines, standards, regulatory requirements, and other project-specific information have been referenced in preparing this report:

- Architectural drawings prepared by MHN Design Union Pty Ltd. with project number 25-042.
- The Manly Development Control Plan (DCP) 2013
- AS/NZS 2107:2016 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors (AS 2107).
- NSW EPA's Noise Policy for Industry dated October 2017 (NPfI).
- Protection of the Environment Operations Act 1997 – Offensive Noise Definition (POEO 1997).
- Protection of the Environment Operations Regulation 2017 (POEO 2017).
- NSW EPA Noise Guide for Local Government 2023 (NGfLG).
- National Construction Code 2022 – Volume One, Building Code of Australia

1.2 Project Summary

The proposed development at 27 East Esplanade, Manly, NSW, will comprise the following:

- 3 basement parking levels.
- Residential apartments across 8 above-ground floor levels.
- A private apartment pool located on Level 7.

1.3 Site Analysis

The project site is located at the R3 'Medium Density Residential' land zone at 27 East Esplanade, Manly, NSW. A site investigation has been carried out to identify noise sources that will potentially impact the project development and the nearest noise-sensitive receivers.

The subject site is bounded by the following noise sources:

> Road traffic noise from East Esplanade from the East.

> Local residential activity and mechanical plant systems from adjacent residential apartment buildings.

> Environmental noise from the surrounding coastal area.

Figure 1 below presents an aerial photo of the project site, the surrounding area and noise monitoring locations.

Figure 1 Subject site, surrounding area and noise monitoring location – Image Source: SixMaps

2. Noise Surveys

Unattended noise logging surveys were conducted at the site to determine the noise emission criteria and noise intrusion requirements for the proposed development. This Section presents a summary of the noise surveys conducted for this assessment.

2.1 Noise Measurement Equipment

The following instrumentation was used for noise measurement and analysis:

> Bruel and Kjaer Sound calibrator Type 4231

> Two Convergence Instruments Type 1 Noise Sentry Data Loggers NSRT MK3.

All instrument systems are laboratory calibrated using instrumentation traceable to Australian National Standards and certified within the last two years, thus conforming to Australian Standards. The measurement system was also field calibrated prior to and after noise surveys. Calibration drift was found to be less than 0.2dB during measurements. No adjustments for instrument drift during the measurement period were warranted.

2.2 Unattended Noise Measurements

Unattended background and traffic noise monitoring was conducted in the period between Tuesday, 22nd July, to Monday, 28th July 2025, at the locations as identified in Figure 1.

The microphones were placed approximately 1.5 m above the natural ground level.

The measured background noise levels have been corrected for meteorological conditions (excessive wind and/or rain), as required by section 3.4 of the EPA Noise Policy for Industry. Exceedances of the 5m/s average wind speed limit of the EPA were noted and corrected for in determining the background noise levels.

Unattended noise monitoring graphs are attached to this report as Appendix B.

Measured background and equivalent continuous sound levels at locations M1 and M2 are summarised below.

Table 1 Unattended Noise Logging Results

Location	Period	Ambient Noise Level (L_{Aeq})	Rating Background Noise Level – RBL (L_{A90})	Traffic Noise Level ($L_{Aeq, Period}$)
M1	Day	61	50	60
	Evening	57	47	
	Night	55	41	55
M2	Day	55	46	--
	Evening	51	45	
	Night	50	41	--

Notes: 1. Day periods are outlined below:
Daytime: 7 am – 6 pm (Monday-Saturday)

Location	Period	Ambient Noise Level (L_{Aeq})	Rating Background Noise Level – RBL (L_{A90})	Traffic Noise Level ($L_{Aeq, Period}$)
		Daytime: 8 am – 6 pm (Sundays and Public Holidays)		
		Evening: 6 pm – 10 pm		
		Nighttime: 10 pm – 7 am (Mondays-Saturdays)		
		Nighttime: 10 pm – 8 am (Sundays and Public Holidays)		
	2.	15-hour and 9-hour traffic levels outlined per NSW DoP guidelines.		

3. Criteria

3.1 Noise Intrusion Criteria

3.1.1 The Manly Development Control Plan (DCP) 2013

Section 3.4.2.3 *Acoustical Privacy (Noise Nuisance)* of the Manly Development Control Plan (DCP) 2013 outlines the objectives and controls for protecting the acoustic amenity of new development.

The DCP requires that developments be designed and constructed to minimise the impact of intrusive external noise and to ensure appropriate internal noise levels for future occupants.

As the DCP does not outline quantitative noise intrusion standards and guidelines, the following has been referred to:

- AS/NZS 2107:2016 Acoustics – Recommended Design Sound Levels and Reverberation Times for Building Interiors
- NSW Department of Planning: Development Near Rail Corridors and Busy Roads – Interim Guidelines

The more stringent internal noise level criteria from AS/NZS 2107:2016 or the NSW DoP Interim Guidelines have been adopted in this assessment.

3.1.2 AS/NZS 2107:2016

Indoor background noise levels in terms of Sound Pressure Level (SPL) deemed acceptable to most occupants are published in AS/NZS 2107. The table below summarises the recommended indoor noise levels for the proposed development as published by AS/NZS 2107:2016.

Table 2 As2107:2016 Recommended Internal Noise Levels

Type of occupancy	Design SPL, L_{Aeq}, dB(A)	Applicable Time Period
Residential buildings in inner city areas, entertainment districts, or near major roads		
Living Areas	35 to 45	Any time
Bedrooms (Nighttime)	35 to 40	Night [10 pm – 7 am]

3.1.3 NSW Department of Planning Interim Guidelines

The internal noise intrusion criteria, as published by the NSW DoP are outlined in the Table below:

Table 3 NSW DoP Internal Noise Criteria – [dB(A)]

Type of Occupancy	Noise Level	Applicable Time Period
Other habitable rooms	≤ 40	Any time
Sleeping area (bedroom)	≤ 35	Night [10 pm – 7 am]

Based on the noise levels as detailed above, the criteria outlined in the NSW DoP Interim Guidelines have been used as the noise intrusion criterion for this assessment.

3.2 Noise Emission Criteria

3.2.1 The Manly Development Control Plan (DCP) 2013

Section 3.4.2.3 Acoustical Privacy (Noise Nuisance) of the Manly Development Control Plan (DCP) 2013 outlines the objectives and controls for protecting the acoustic amenity of new development. The DCP outlines that the development must be compliant with the EPA Noise Policy for Industry 2017.

3.2.2 Noise Policy for Industry, EPA NSW (NPfI)

The NPfI requires compliance with specific *project noise trigger levels,* which provide a benchmark or objective for assessing a proposal or site. The project noise trigger level is not a mandatory requirement but rather indicates a potential noise impact on the community, and so 'triggers' a management response, for example, further investigation of mitigation measures.

The *project trigger levels* are determined from the lower (that is, the more stringent) value of the project *intrusiveness noise level* and *project amenity noise level*. The NPfI also includes the application of modifying factors for undesirable noise characteristics such as tonality or impulsiveness, up to a maximum of 10dB.

Noise intrusiveness

The NPfI states that the intrusiveness of an industrial noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (represented by the L_{Aeq} descriptor), measured over a 15-minute period, does not exceed the background noise level (L_{A90}) measured in the absence of the source by more than 5 dB.

Amenity noise levels

The NPfI describes a methodology to limit gradual increases in noise levels from the introduction of new noise sources in an area, sometimes referred to as 'background noise creep'.

The *recommended amenity noise levels* represent the objective for total noise at a receiver location, whereas the *project amenity noise level* represents the objective for noise from this project. The *project amenity noise level* for developments = *recommended amenity noise level* (Table 2.2) minus 5 dB(A). 3 dB is then added to convert from an L_{Aeq}, period to $L_{Aeq,\ 15min}$.

The *project amenity noise level* for developments in areas of high traffic (such as the subject site) = $L_{Aeq,\ period\ (traffic)}$ minus 15 dB(A). A site is a 'high traffic project' if traffic noise is identified as the dominant noise source, existing traffic noise levels are 10 dB or more above the recommended amenity noise levels and it is highly unlikely traffic noise levels will decrease in future.

NPfI Table 2.2 specifies amenity noise levels for different types of receivers.

Modifying Factors

Undesirable characteristics such as tonality, low frequency, impulsiveness and intermittency, adjustments (as per Fact Sheet C of the NPfI) shall be assessed. These modifying factors include a 5dB penalty for each undesirable characteristic. A maximum penalty of 10dB for 2 or more undesirable characteristics applies.

Considering the noise-sensitive receivers surrounding the site are subject to different noise environments, the relative difference between the simultaneous attended noise measurements and the 15-minute samples from the unattended noise monitoring during the same period has been used to extrapolate RBLs at monitoring Locations L1 and L2. This has been done to derive more accurate and reasonable noise emission criteria.

Summary of NPfI environmental noise criteria

A summary of noise emission criteria that apply at residential receivers from the use of the proposed development is presented in the following table.

The 'project trigger levels' are the most stringent noise criteria of the intrusive and amenity noise levels that apply in each instance.

Table 4 EPA NPfI Planning Levels – $L_{Aeq,\ 15\text{-}minutes}$ [dBA]

Period	Intrusive		Amenity					Project Noise Trigger Level
	RBL	RBL + 5 dB	Area Classification	Recommended Amenity Noise Level	High Traffic Area	Project Amenity Noise Level	+3 dB Correction	
Residences directly fronting East Esplanade [R1, R3 & R4]								
Day	50	55	Urban	60	No	55	58	**55**
Evening	47	52	Urban	50	No	45	48	**48**
Night	41	46	Urban	45	No	40	43	**43**
Residences to the northeast of the development site [R2 & R5]								
Day	46	51	Urban	60	No	55	58	**51**
Evening	45	50	Urban	50	No	45	48	**48**
Night	41	46	Urban	45	No	40	43	**43**
Notes:	1. Periods as defined by EPA are outlined below: Daytime: 7 am – 6 pm (Monday-Saturday) Daytime: 8 am – 6 pm (Sundays and Public Holidays) Evening: 6 pm – 10 pm Nighttime: 10 pm – 7 am (Mondays-Saturdays) Nighttime: 10 pm – 8 am (Sundays and Public Holidays)							

3.2.3 Protection of the Environment Operations (Noise Control) Regulation 2017

Clause 45 of the POEO 2017 Regulation states that all air-conditioning units installed on residential premises must not emit a noise that is audible inside a habitable room of an adjoining residential premise during the nighttime period. The following has been extracted and reproduced from the regulation

"*A person is guilty of an offence if:*

(a) the person causes or permits an air conditioner to be used on residential premises in such a manner that it emits noise that can be heard within any room in any other residential premises (that is not a garage, storage area, bathroom, laundry, toilet or pantry) whether or not any door or window to that room is open:

(i) before 8 am or after 10 pm on any Saturday, Sunday or public holiday, or

(ii) before 7 am or after 10 pm on any other day"

The inaudibility criteria have been taken as 5-8 dB below the existing nighttime background noise level, when assessed externally at neighbouring building facades. In this regard, the inaudibility criterion that applies to this development is:

- Residences directly fronting East Esplanade [R1, R3 & R4]: **$L_{Aeq,\ 15\ minutes}$ 33-36 dB**
- Residences to the northeast of the development site [R2 & R5]: **$L_{Aeq,\ 15\ minutes}$ 33-36 dB**

3.3 Inter-tenancy Noise Criteria – BCA/NCC

The Building Code of Australia (BCA) as part of the National Construction Code (NCC) outlines the minimum performance requirements of buildings to protect the occupants, the surrounding area and infrastructure in terms of safety, amenity, accessibility and sustainability. Sound insulation requirements for Class 2, 3 or 9c buildings are outlined in the BCA to protect occupants from loss of amenity due to excessive noise transfer.

The NCC requirements can be achieved through either a deemed-to-satisfy or performance solution. A performance solution is satisfied using either of the following:

- Evidence of suitability, using an accredited laboratory test, per BCA 2022 Schedule 1.
- Expert judgement.
- Compliance with an acceptable form of construction (Specification 28).

The deemed-to-satisfy requirements for this development are outlined in the Table below.

Table 5 BCA/NCC Acoustic Design Requirements

Element	Description	Airborne Sound	Impact Sound
Walls	Separating any two sole occupancy units	$R_w + C_{tr} \geq 50$	N/A
	Separating a habitable room in one SOU and a laundry, kitchen, bathroom or toilet in another SOU	$R_w + C_{tr} \geq 50$	Discontinuous construction
	Separating a sole occupancy unit and a stairway, public corridor, public lobby or the like, or parts of a different classification	$R_w \geq 50$	N/A
	Separating a sole occupancy unit and a plant room or lift shaft	$R_w \geq 50$	Discontinuous construction
Doors	Door that separates a sole occupancy unit from a stairway, public corridor, public lobby or the like	$R_w \geq 30$	N/A
Floors	Separating any two sole occupancy units, or separating a sole occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification	$R_w + C_{tr} \geq 50$	$L_{n,w} \leq 62$
Services	If the adjacent room is a habitable room	$R_w + C_{tr} \geq 40$	N/A
	If the adjacent room is a non-habitable (wet) room	$R_w + C_{tr} \geq 25$	N/A
	Access panel in acoustical walls and acoustical barrier ceilings	$R_w + C_{tr} \geq 25$	N/A
	If a stormwater pipe passes through a sole-occupancy unit, it must be separated as stated above.		
	A flexible coupling must be used at the point of connection between the service pipes in a building and any circulating or other pump.		
Notes	1. Discontinuous construction means a wall having a minimum 20mm cavity between 2 separate leaves and: a. For masonry walls where ties are required between leaves, they are to be of the resilient type, and b. For walls other than masonry, no mechanical linkage between the leaves, except at the perimeter.		

4. Noise Intrusion Assessment

The noise intrusion assessment is based on the following:

- The external noise level at the building.
- Sound insulation performance of the building envelope (external walls, glazing, etc.).
- Reverberation control inside the building.

The most dominant external noise source affecting the proposed development is East Esplanade Road. External noise measurements outlined in Section 2 have been used to determine the external façade noise level, and in turn, the external construction materials for the building.

4.1 External walls

The external walls will generally be comprised of masonry elements such as brick veneer, double brick, block work, concrete, etc. These wall types are not expected to require additional acoustic treatment, provided they achieve a minimum sound insulation of $R_w \geq 45$.

Similarly, if lightweight walls are proposed, they are required to achieve a minimum sound insulation of $R_w \geq 45$.

Table 6 External Wall Recommendations

Building Area	Recommended Construction	Minimum Required Sound Insulation
External Façade	**Masonry:** > Concrete external wall with stud framing and standard plasterboard internal lining, OR > 270 mm double-brick, OR > Bick veneer construction. **Lightweight:** > 16 mm James Hardie cladding > 92 mm steel stud > 75 mm insulation (minimum density ≥ 14 kg/m^3) > 13 mm standard plasterboard internal lining	≥ R_w 45

4.2 Roofing

Roofing constructions shall achieve a minimum sound insulation rating of $R_w \geq 40$. This can be achieved through a concrete roof slab as proposed. Similarly, if a lightweight roofing system is proposed, they are required to achieve a minimum sound insulation of $R_w \geq 40$.

Table 7 External Roof Recommendations

Building Area	Recommended Construction	Minimum Required Sound Insulation
External Roof	**Masonry:** > Concrete roofing system. **Lightweight:** > 0.6 mm BMT metal roof cladding > 9 mm fibre cement layer > 200 mm suspended light steel grid > 125 mm insulation (minimum density ≥ 8 kg/m^3) > 13 mm standard plasterboard ceiling	≥ R_w 40

4.3 Glazing

The minimum requirements that apply to external glazing systems are outlined in the Table below:

Table 8 Glazing Recommendations

Room	Glazing	Seals
All windows	6.38 mm laminated glass OR 8 mm glass/ 12 mm air gap/ 6 mm glass	Compressed neoprene seals

In addition to the minimum glazing thickness outlined above, the windows should also achieve the following minimum ratings:

> R_w 32 for 6.38 mm laminated glass.

> R_w 34 for 8 mm glass/ 12 mm air gap/ 6 mm glass

The following should also be noted:

> The glazing outlined above is the minimum required to comply with the relevant noise intrusion standards.

> Other window configurations may be considered provided they are reviewed before selection.

> Glazing should be built into a solid frame with compressed neoprene seals.

> All windows that can be opened should be air-tight when closed.

4.4 Ventilation

Based on the unattended noise surveys, all rooms may be naturally ventilated.

5. Noise Emission Assessment

Mechanical services drawings and equipment schedules have not been finalised at this stage, and therefore, the following advice is intended as a guide and will be reviewed and confirmed during the detailed design phase as the design progresses. The following table outlines general mechanical plant recommendations that shall be allowed for.

Table 9 Mechanical Plant and Equipment Recommendations

Equipment	Potential Noise Attenuation Measures
Car park supply / exhaust fans	> Plant should be selected considering the noise output. > Speed controllers may be required if used, should be of good quality and compatible with the motor model. Poor quality controllers can result in a significant increase in motor noise. > Attenuators between the fan and outdoor environment may be required. > Internal duct lining between the fan and outdoor environment may also be required. Duct lining (*where required*) should have a density of at least 24 kg/m^3. > Vibration isolators to reduce vibration to the building structure will be required. > Acoustic screens for external plant exhaust areas may be required. > Acoustic louvres may be required to control noise emissions.
Garbage exhaust fan	> Plant should be selected considering the noise output. > Attenuators between the fan and exhaust outlet may be required. > Internal duct lining between the fan and exhaust outlet may be required. Duct lining (*where required*) should have a density of at least 24 kg/m^3. > Vibration isolators to reduce vibration to the building structure will be required. > Acoustic screens for external plant exhaust areas may be required. > Sound absorptive treatments in plant room spaces may be required. > Acoustic louvres may be required to control noise emissions.
Basement supply / exhaust fans	> Plant should be selected considering the noise output. > Internal duct lining between the fan and outdoor environment may be required. Duct lining (*where required*) should have a density of at least 24 kg/m^3. > Vibration isolators to reduce vibration to the building structure will be required. > Acoustic louvres may be required to control noise emissions.
Air-conditioning condenser units	> Condenser units should be selected considering the noise output. > Selecting condenser units with night quiet mode availabilities to lower the noise level during nighttime hours. > Acoustic screens or enclosures may be required.
Kitchen exhaust fans	> No acoustic treatment is likely due to intermittent use and inherently low noise levels.

Equipment	Potential Noise Attenuation Measures
Bathroom exhaust fans	> No acoustic treatment is likely due to intermittent use and inherently low noise levels.

A detailed mechanical plant noise assessment shall be included as a condition within the development consent as part of the Construction Certificate requirements.

Services plant and equipment installed within the development must not emit noise levels that exceed the EPA's NPfI project noise trigger levels at nearby residential premises. An example of a development condition for services plant noise is included below:

"Services plant and equipment must be located, designed and/or acoustically attenuated so that noise emitted from the plant and equipment does not exceed the adopted Project Noise Trigger Levels as defined by the EPA's Noise Policy for Industry 2017 at surrounding residential premises"

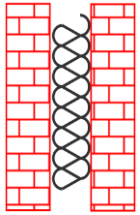
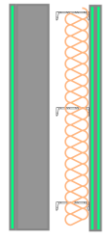
6. Inter-tenancy Noise

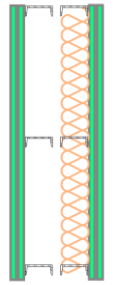
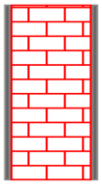
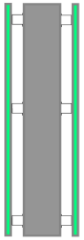
The development shall be designed and constructed to meet the design criteria outlined in Section 3.3 of this report and required by the BCA Volume One 2022. The proposed construction of all systems within the building shall be coordinated with the design teams during the detailed design phase as the project progresses.

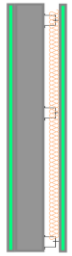
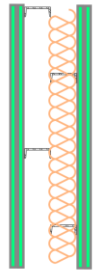
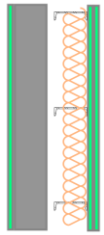
This Section presents potential constructions, based on either Deemed to Satisfy construction methods as outlined in the BCA or recommended systems predicted to achieve the required performance ratings for relevant areas.

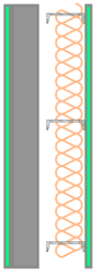
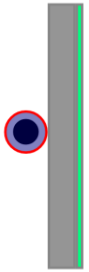
6.1 Walls

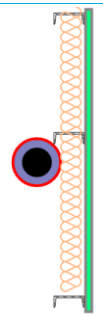
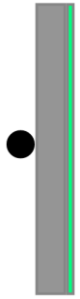
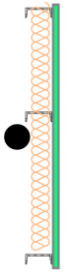
Table 10 Deemed-to-Satisfy Construction Details – BCA 2022, Volume One

Wall Type	BCA Sound Insulation Design Requirement	Construction Details [BCA 2022 Volume One Deemed-to-Satisfy] OR Recommended Wall Type	
Inter-tenancy wall	$R_w + C_{tr} \geq 50$	**Masonry** Two leaves of 110 mm clay brick with – - A cavity of not less than 50 mm between leaves; and - 50 mm thick glass wool insulation with a density of 11 kg/m^3 or 50 mm polyester insulation with a density of 20 kg/m^3 in the cavity. **Concrete** 150 mm thick concrete panel, OR A 100 mm thick concrete panel with (*Discontinuous*) – - A row of 64 mm steel studs (600 mm centres), 25 mm from the concrete panel, and - 80 mm thick polyester insulation or 50 mm thick glass wool insulation with a density of 11 kg/m^3, positioned between studs, and - Two layers of 13 mm plasterboard fixed to the outside face of studs and one layer of 13 mm plasterboard fixed to the outside face of the concrete panel. **Autoclaved Aerated Concrete** A 75 mm thick autoclaved aerated concrete panel with (*Discontinuous*) – - A row of 64 mm steel studs (600 mm centres), 20 mm from the concrete panel, and - 75 mm thick glass wool insulation with a density of 11 kg/m3 positioned between studs, and - One layer of 10 mm moisture-resistant plasterboard or 13 mm fire-protective grade plasterboard fixed to the outside face of studs and outside face of autoclaved aerated concrete wall panel.	 

Wall Type	BCA Sound Insulation Design Requirement	Construction Details [BCA 2022 Volume One Deemed-to-Satisfy] OR Recommended Wall Type	
		Lightweight Two rows of 70 x 35 mm timber studs (450 mm centres) with (*Discontinuous*) - An air gap of not less than 20 mm between rows of studs, and - 75 mm thick glass or mineral wool insulation with a density of 8 kg/m³ or 60 mm thick polyester insulation with a density of 11 kg/m³ positioned between one row of studs, and - Two layers of 13 mm fire-protective grade plasterboard or one layer of 6 mm fibre-cement sheet and one layer of 13 mm fire-protective grade plasterboard, fixed to the outside face of studs.	
Corridor and Stairwell Walls	$R_w \geq 50$	**Masonry** As per $R_w + C_{tr}$ 50 wall types, OR A single lead of 150 mm brick masonry with 13 mm cement render on each face.	
		Concrete As per $R_w + C_{tr}$ 50 wall types, OR A single 200 mm concrete slab, OR A 150 mm concrete panel with one layer of 10 mm plasterboard fixed to 28 mm metal furring channels on each face.	

Wall Type	BCA Sound Insulation Design Requirement	Construction Details [BCA 2022 Volume One Deemed-to-Satisfy] OR Recommended Wall Type	
		Autoclaved Aerated Concrete As per $R_W + C_{tr}$ 50 wall types, OR A 75 mm thick autoclaved aerated concrete panel with – - One layer of 10 mm moisture-resistant plasterboard on one face, and - 28 mm metal furring channels and resilient mounts, 75 mm polyester insulation with a density of 9 kg/m^3 and 13 mm fire-protective grade plasterboard fixed to the other face	
		Lightweight One row of 70 x 35 mm staggered timber studs, without noggings between adjacent studs (450 mm centres), fixed with 90 mm x 35 mm wall plates with - 75 mm thick glass or mineral wool insulation with a density of 8 kg/m^3 positioned between the studs, and - Two layers of 13 mm fire-protective grade plasterboard, fixed to the outside face of studs.	
Lift Shaft Walls Discontinuous	$R_w \geq 50$	**Concrete** A 100 mm thick concrete panel with (*Discontinuous*) – - A row of 64 mm steel studs (600 mm centres), 25 mm from the concrete panel, and - 80 mm thick polyester insulation or 50 mm thick glass wool insulation with a density of 11 kg/m^3, positioned between studs, and - Two layers of 13 mm plasterboard fixed to the outside face of studs and one layer of 13 mm plasterboard fixed to the outside face of the concrete panel.	

Wall Type	BCA Sound Insulation Design Requirement	Construction Details [BCA 2022 Volume One Deemed-to-Satisfy] OR Recommended Wall Type	
		Autoclaved Aerated Concrete A 75 mm thick autoclaved aerated concrete panel with (*Discontinuous*) – - A row of 64 mm steel studs (600 mm centres), 20 mm from the concrete panel, and - 75 mm thick glass wool insulation with a density of 11 kg/m3 positioned between studs, and - One layer of 10 mm moisture-resistant plasterboard or 13 mm fire-protective grade plasterboard fixed to the outside face of studs and outside face of autoclaved aerated concrete wall panel.	
Services Walls	$R_w + C_{tr} \geq 40$ (*Habitable*) $R_w + C_{tr} \geq 25$ (*Non-Habitable*)	**Habitable Rooms** Lagged pipes with: - 75 mm Hebel Powerpanel, OR - 110 mm brick, OR - 100 mm concrete, with - 13 mm plasterboard lining OR	

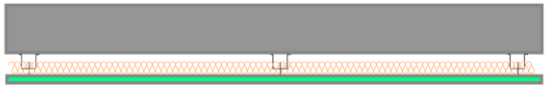
Wall Type	BCA Sound Insulation Design Requirement	Construction Details [BCA 2022 Volume One Deemed-to-Satisfy] OR Recommended Wall Type	
		Lagged pipes with: - 64 mm steel studs, - 24 kg/m^3 insulation batts, - 13 mm plasterboard lining	
		Non-Habitable Rooms Unlagged pipes with: - 75 mm Hebel Powerpanel, OR - 110 mm brick, OR - 100 mm concrete, with - 13 mm plasterboard lining OR	
		Unlagged pipes with: - 64 mm steel studs, - 13 mm plasterboard lining	

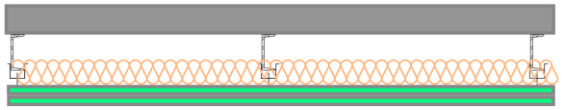
6.2 Floors

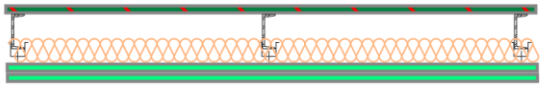
The following Table presents potential floor constructions, based on either Deemed to Satisfy construction methods as outlined in the BCA Volume One 2022 or recommended floor systems predicted to achieve the required performance ratings for ceiling/floor systems.

Table 11 Deemed-to-Satisfy Construction Details – BCA 2022, Volume One

Floor Type	BCA Sound Insulation Design Requirement	Construction Details [BCA 2022 Volume One Deemed-to-Satisfy] OR Recommended Floor Type
Inter-tenancy floor	$R_w + C_{tr} \geq 50$	**Concrete** 200 mm concrete slab with carpet-on-carpet underlay, OR A 100 mm thick concrete panel with – - 28 mm furring channels with isolation mounts at 600 mm centres, - 65 mm polyester insulation with a density of at least 8 kg/m^3 - One layer of 13 mm plasterboard **Autoclaved Aerated Concrete** 75 mm thick autoclaved concrete floor panel with – - Timber joists at 600 mm centres, - R1.5 glass wool insulation between the joists, - 28 mm furring channels with resilient mounts fixed to the underside of the joints, - Two layers of 13 mm plasterboard fixed to the furring channels





Floor Type	BCA Sound Insulation Design Requirement	Construction Details [BCA 2022 Volume One Deemed-to-Satisfy] OR Recommended Floor Type	
		Lightweight 19 mm thick particleboard sheeting with – - 190 mm x 45 mm timber joists at 450 mm centres, - R2.5 glass or mineral wool insulation positioned between the joists, - 28 mm furring channels with resilient mounts fixed to the underside of the joints (*resilient mounts to be natural rubber with a dynamic factor of ≤ 1.1 and static deflection of ≥ 3 mm at actual operating load*), - Two layers of 16 mm fire-protective grade plasterboard fixed to furring channels	

6.3 Doors

Entry doors that are incorporated into a common wall that separates an SOU from a common area (*e.g. lobby/foyer/stairwell, etc.*) are required to achieve ≥ R_w 30. Entry doors are recommended to be a minimum of 35 mm thick solid-core timber entry doors with appropriate acoustic drop and perimeter seals.

Table 12 Deemed-to-Satisfy Construction Details – BCA 2022, Volume One

Floor Type	BCA Sound Insulation Design Requirement	Recommended Door Type	
Entry Doors	R_w ≥ 30	- 35 mm thick solid core timber entry door - Acoustic drop seals (*Raven/Kilargo or similar*) - Acoustic perimeter seals (*Raven/Kilargo or similar*)	 *(Example door seal – Image Source: Raven)*

6.4 Private Access Lifts

The development is proposed to use private access lifts to the SOUs on each floor level. The building is required to comply with the following criteria using this construction method:

Table 13 BCA/NCC Acoustic Design Requirements

Element	Description	Airborne Sound
Doors	Door that separates a sole occupancy unit from a stairway, public corridor, public lobby or the like	$R_w \geq 30$
Floors	Separating any two sole occupancy units, or separating a sole occupancy unit from a plant room, lift shaft, stairway, public corridor, public lobby or the like, or parts of a different classification	$R_w + C_{tr} \geq 50$

In this case, the lift shaft is a common area, and the lobby of each apartment is part of the SOU. As a result, the lift door separating the lift cabin and the lobby of the SOU is required to achieve ≥ $R_{w\_}$ 30.

Additionally, the combination of the lift doors on each level and the lift shaft becomes the inter-tenancy wall/floor system, as it directly separates SOUs. As such, the system is required to achieve ≥ $R_{w\_}$+ C_{tr} 50.

The design of the system will be assessed as the design progresses to ensure compliance with these relevant BCA conditions.

7. Summary

This report presents a noise impact assessment for the proposed development at 27 East Esplanade, Manly, NSW.

The assessment was prepared in accordance with the architectural drawings and relevant noise control standards, policies and guidelines as outlined in Section 1.1 of this report.

This assessment has concluded:

- Internal noise levels in habitable areas of the development can comply with the relevant noise intrusion criteria through the selection of glazing and a sealed façade. Provided treatments as outlined in Section 4 are implemented correctly, required internal noise levels are expected to be achieved.
- Mechanical plant noise emissions can comply with the noise control guidelines; however, a detailed mechanical plant noise assessment shall be conducted at the detailed design stage.
- Deemed-to-satisfy construction methods are outlined in Section 6 to comply with relevant NCC/BCA requirements; a detailed review of the proposed internal partitions should be conducted as the design progresses.

The assessment concluded that the proposed development could satisfy the relevant noise standards, policies and guidelines.

Based on the assessment conducted in this report, there is sufficient scope within the building design to satisfy the noise control guidelines/requirements.

Appendix A
Glossary of Acoustic Terms

Air-borne sound

The sound emitted directly from a source into the surrounding air, such as speech, television or music.

Ambient sound

Of an environment: the all-encompassing sound associated with that environment, being a composite of sounds from many sources, near and far. This is normally taken to be the L_{Aeq} value.

Background noise level

The average of the lowest levels of the noise levels measured in an affected area in the absence of noise from occupants and from unwanted external ambient noise sources. Usually the L_{A90} value represents the background noise level.

dB(A)

Unit of acoustic measurement weighted to approximate the sensitivity of human hearing to sound frequency.

Decibel scale

The decibel scale is logarithmic in order to produce a better representation of the response of the human ear. Therefore, a 3 dB increase in the sound pressure level corresponds to a doubling in the sound energy. It is generally accepted that a 10 dB increase in the sound pressure level corresponds to a perceived doubling in loudness.

Examples of decibel levels of common sounds are as follows:

- 0 dB(A) Threshold of human hearing
- 30 dB(A) A quiet country park
- 40 dB(A) Whisper in a library
- 50 dB(A) Open office space
- 70 dB(A) Inside a car on a freeway
- 80 dB(A) Outboard motor
- 90 dB(A) Heavy truck pass-by
- 100 dB(A) Jackhammer / Subway train
- 110 dB(A) Rock Concert
- 115 dB(A) Limit of sound permitted in industry
- 120 dB(A) 747 take off at 250 metres

Frequency

The repetition rate of the cycle measured in Hertz (Hz). The frequency corresponds to the pitch of the sound. A high frequency corresponds to a high-pitched sound and a low frequency to a low-pitched sound.

L_{90}, L_{10}, etc

A statistical measurement giving the sound pressure level which is exceeded for the given percentile of a measurement period (i.e. L_{90} is the level which is exceeded for 90 percent of a measurement period). L_{90} is commonly referred to as a basis for measuring the background sound level.

$L_{Aeq,T}$

The equivalent continuous A-weighted sound pressure level. The value of the A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound.

L_{Amax}

The maximum sound pressure level measured over the measurement period.

L_{Amin}

The minimum sound pressure level measured over the measurement period.

Day

Referred to as the period between 7am and 6pm for Monday to Saturday and 8am to 6pm for Sundays and Public Holidays.

Evening

Referred to as the period between 6pm and 10pm for Monday to Sunday and Public Holidays.

Night

Referred to as the period between 10pm and 7am for Monday to Saturday and 10pm to 8am for Sundays and Public Holidays.

Assessment background level (ABL)

The overall background noise level on each day, evening and night periods for each day of the noise monitoring.

Rating background level (RBL)

The overall background level on each day, evening and night periods for the entire length of noise monitoring.

Reverberation

The persistence, after emission by the source has stopped, of a sound field in an enclosure.

Sound isolation

A reference to the degree of acoustical separation between two spaces. Sound isolation may refer to sound transmission loss of a partition or to noise reduction from any unwanted noise source. The term 'sound isolation' does not specify any grade or performance quality and requires the units to be specified for any contractual condition.

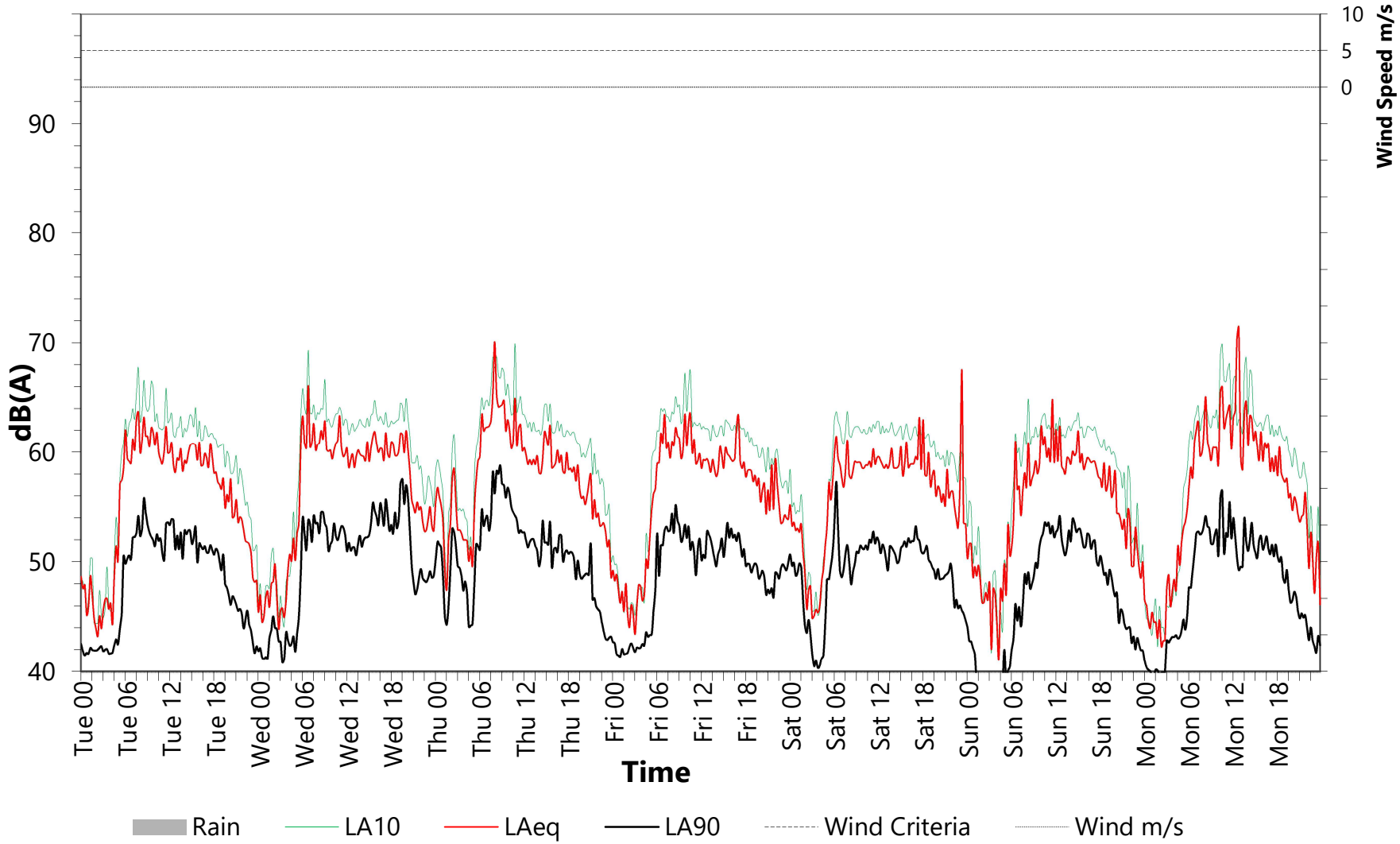
Sound pressure level, L_p, dB of a sound

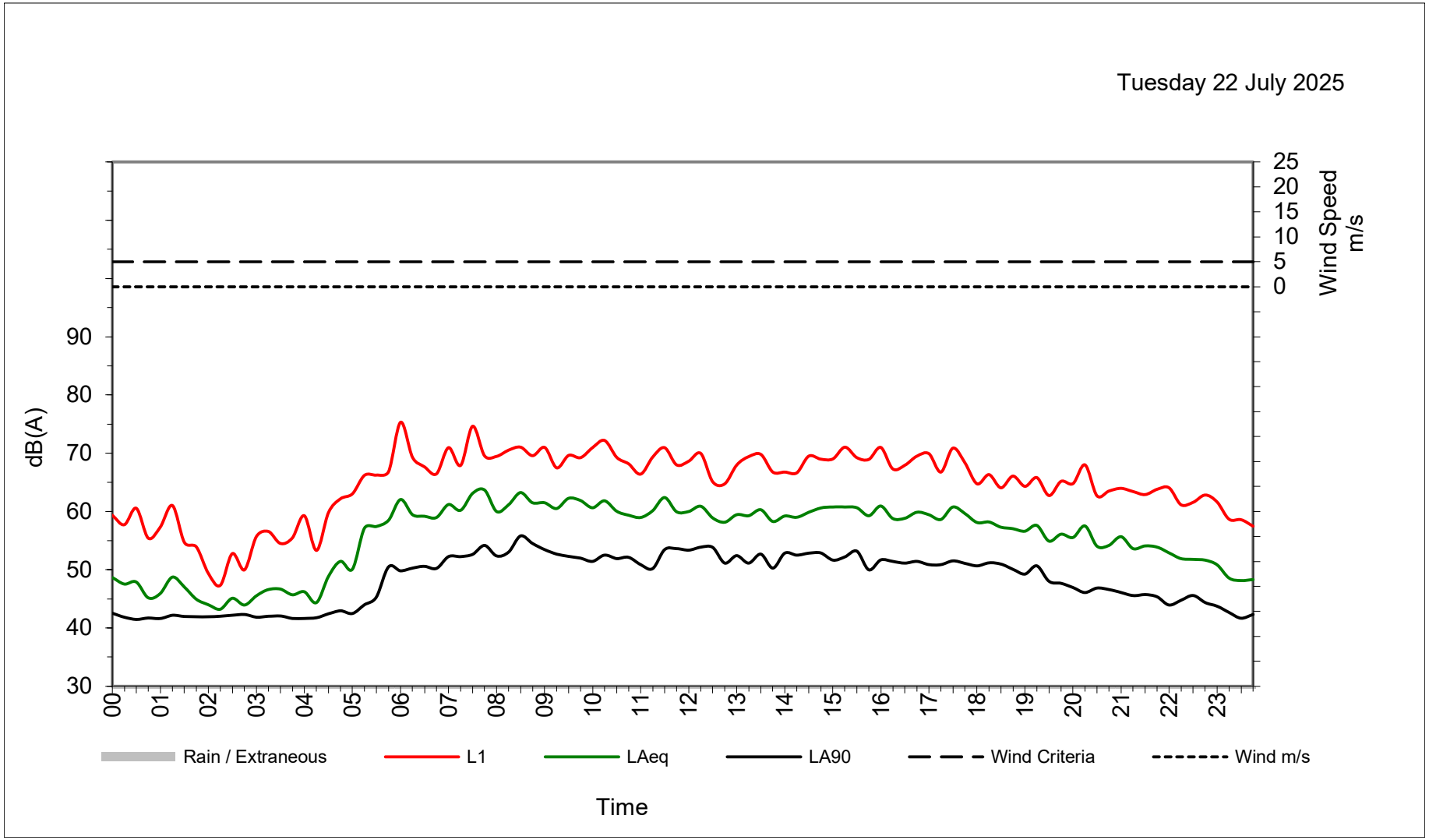
A measurement obtained directly obtained using a microphone and sound level meter. Sound pressure level varies with distance from a source and with changes to the measuring environment. Sound pressure level equals 20 times the logarithm to the base 10 of the ratio of the R.M.S. sound pressure to the reference sound pressure of 20 micro Pascals.

Appendix B
Unattended Noise Logger Graphs

M1 Logger Graph

Tuesday 22 July 2025
to
Monday 28 July 2025

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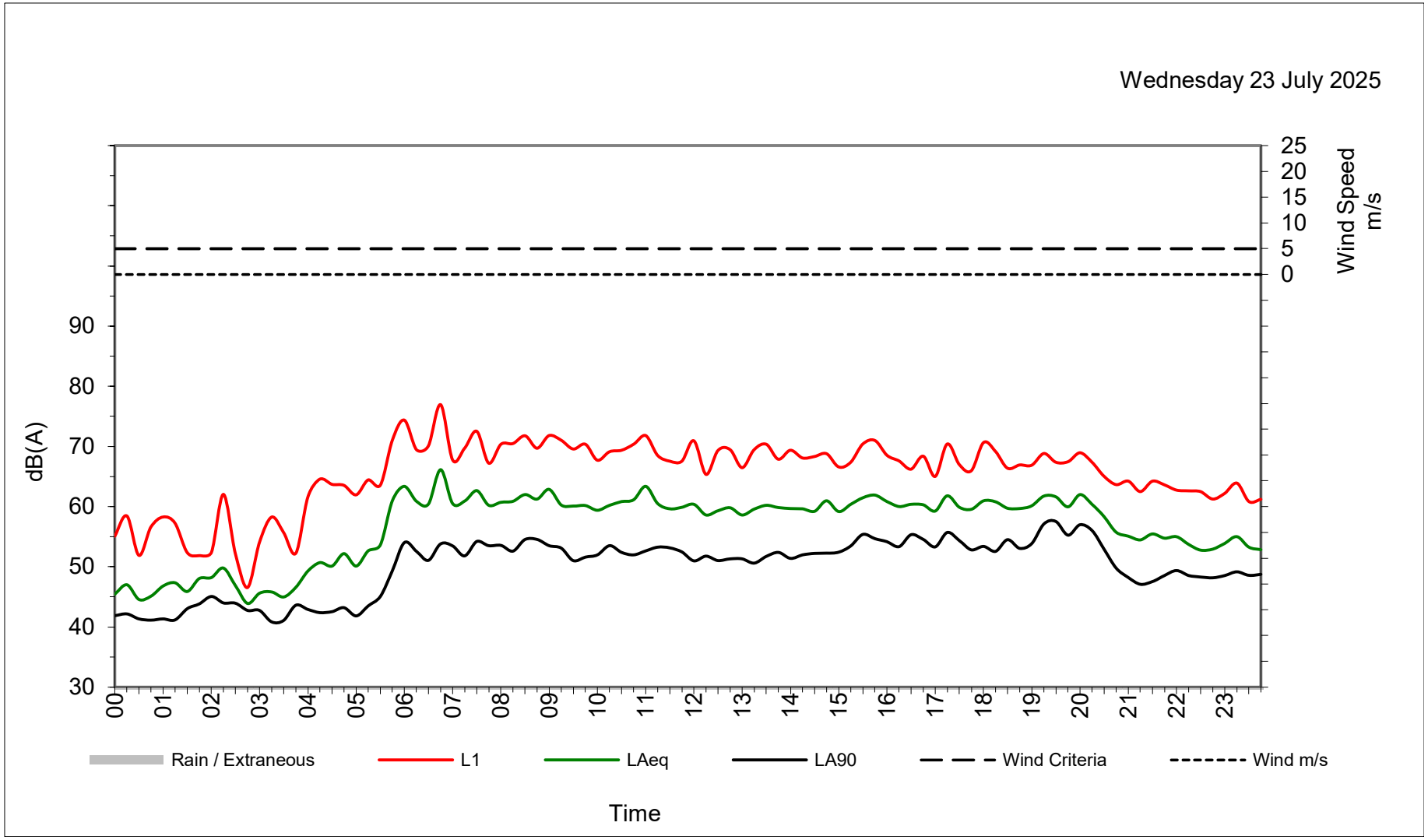
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dB(A)
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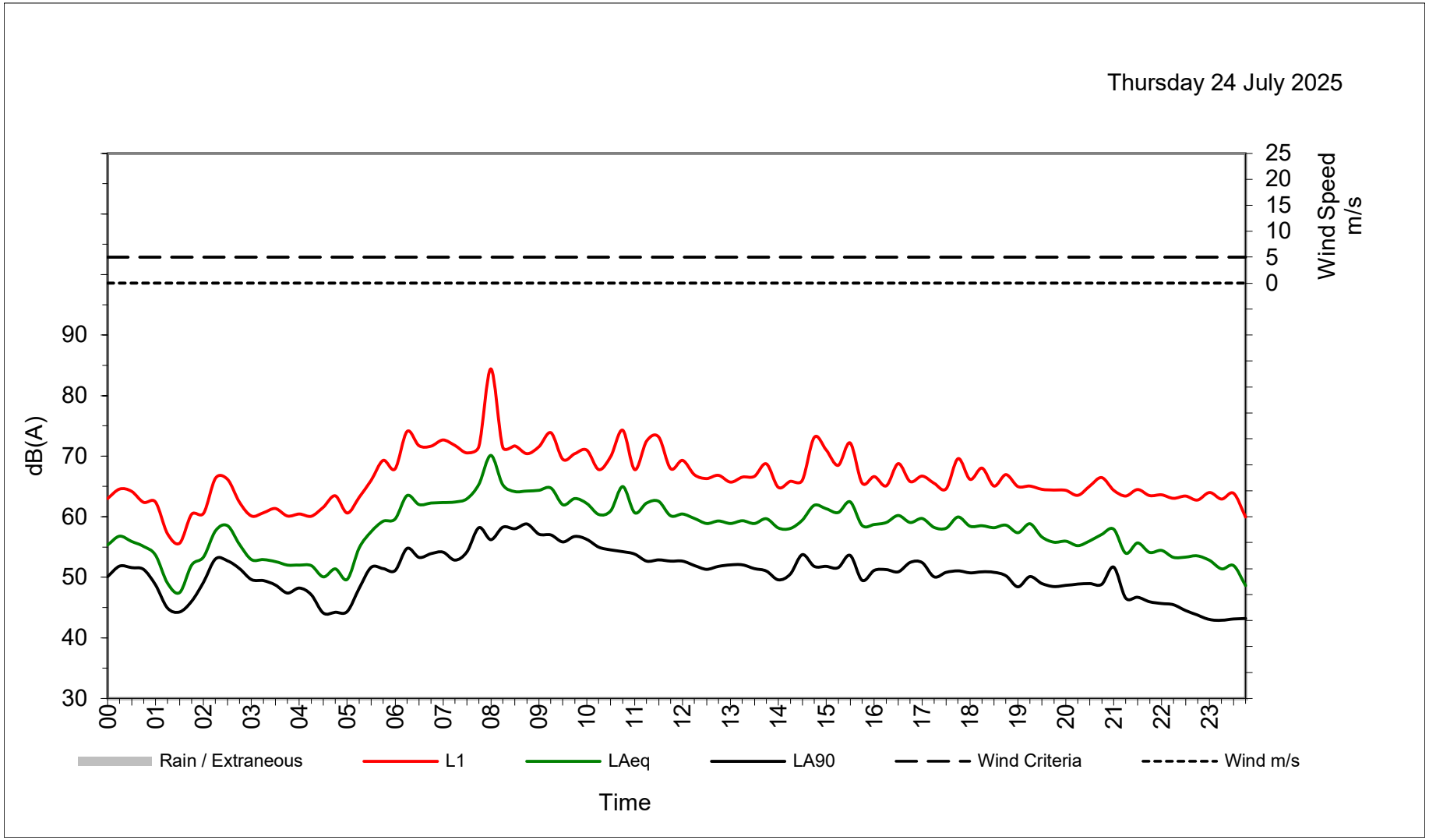
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Wind Criteria
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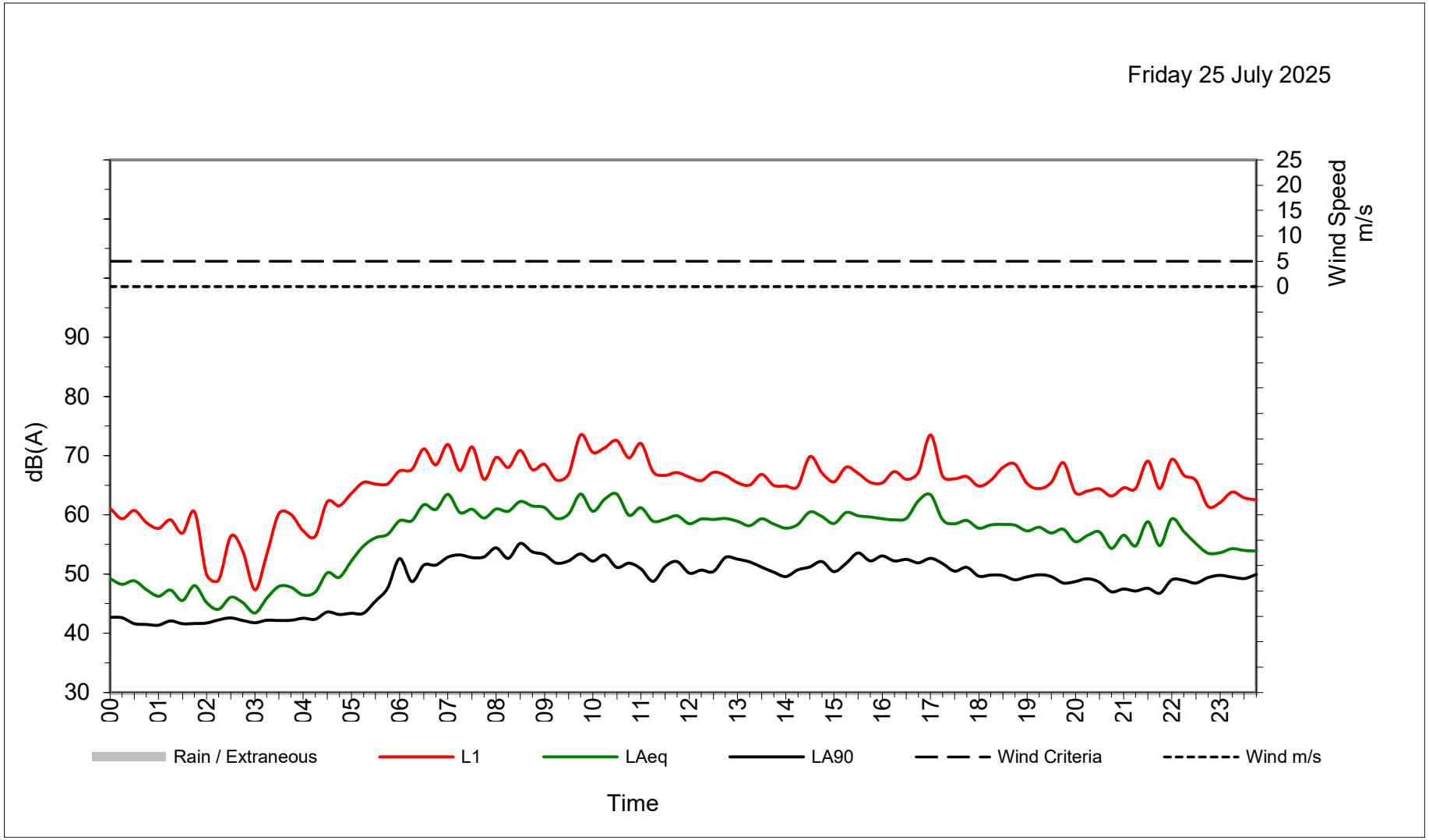
Time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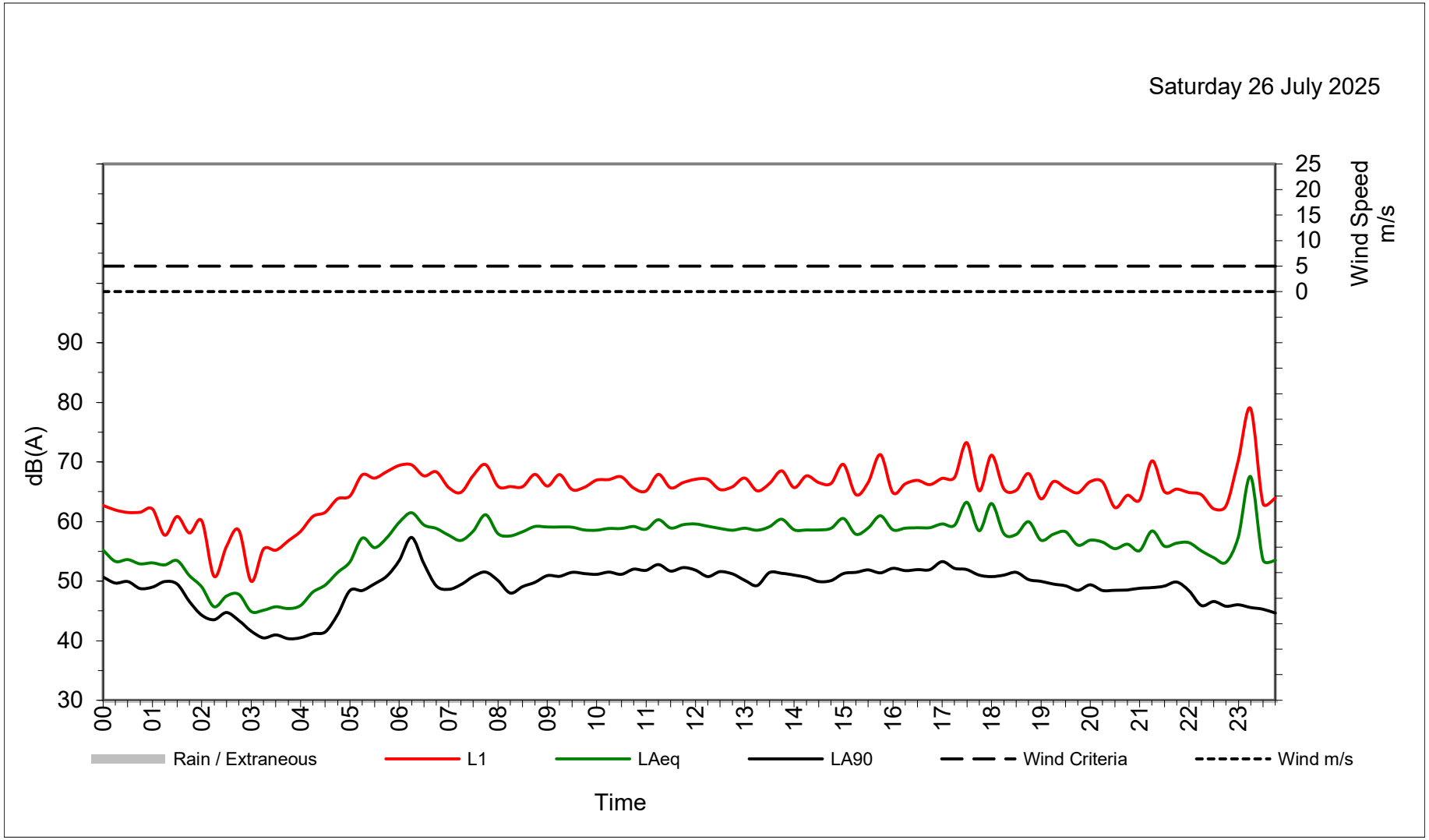
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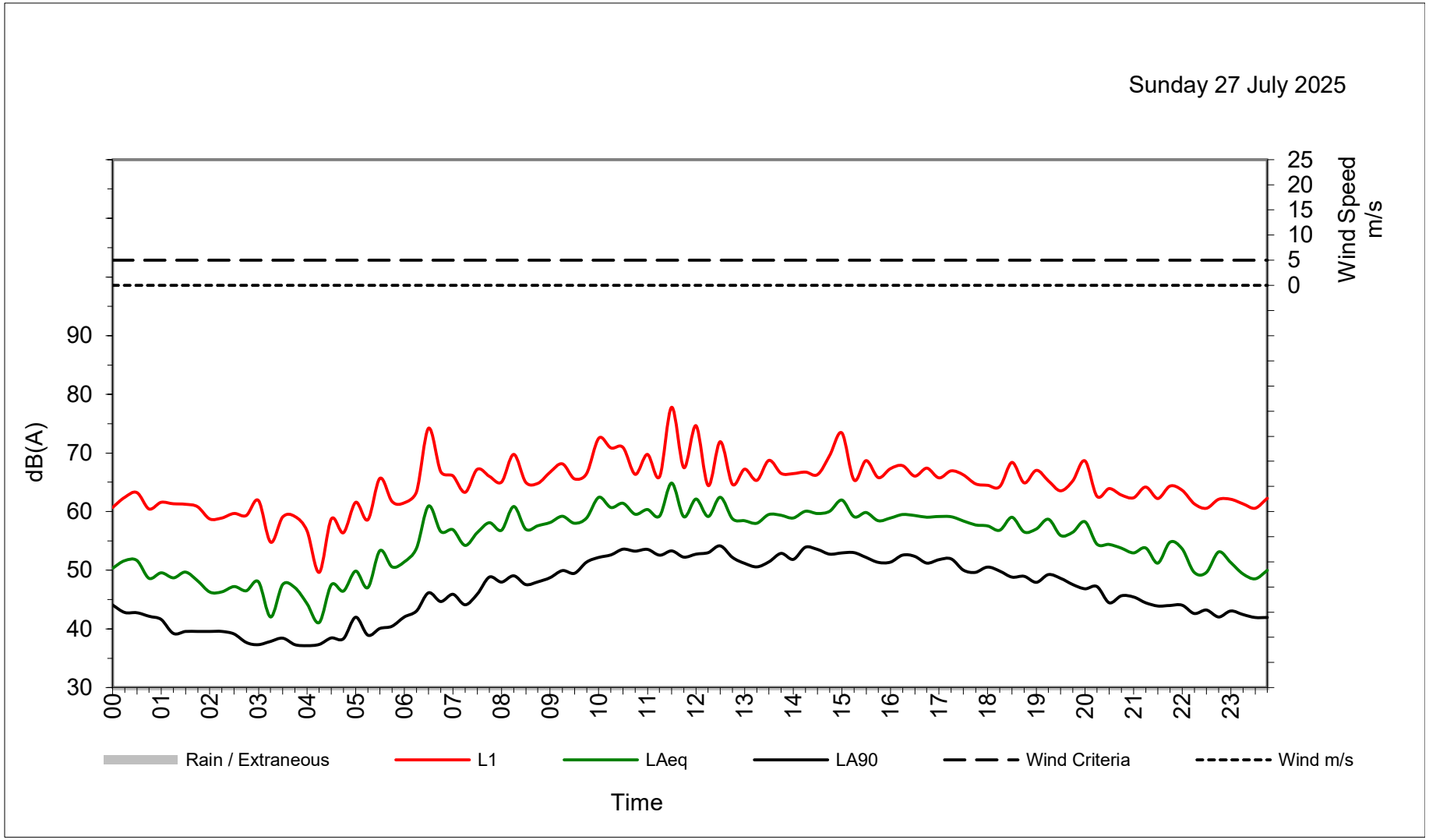
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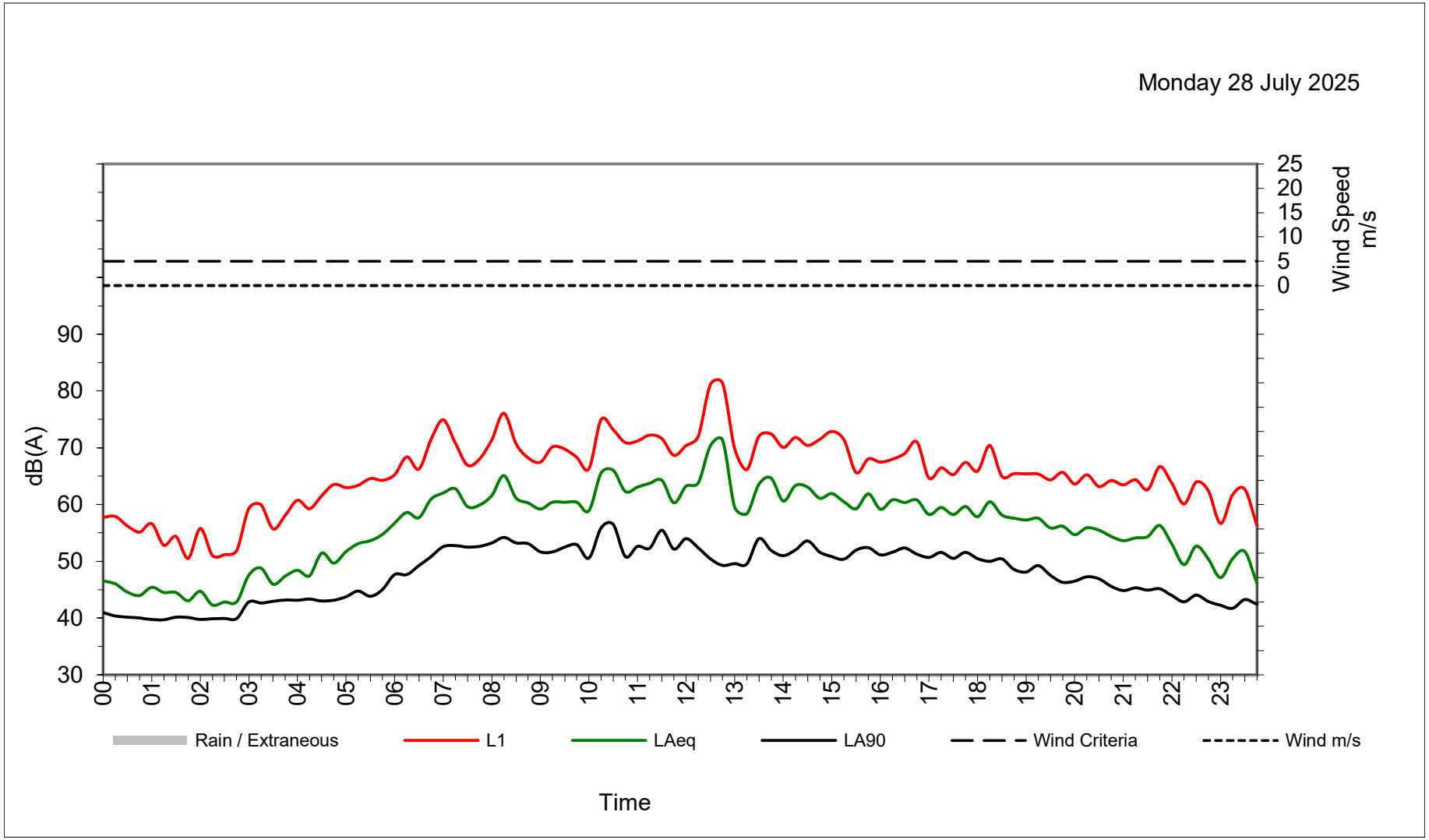
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Wind Criteria
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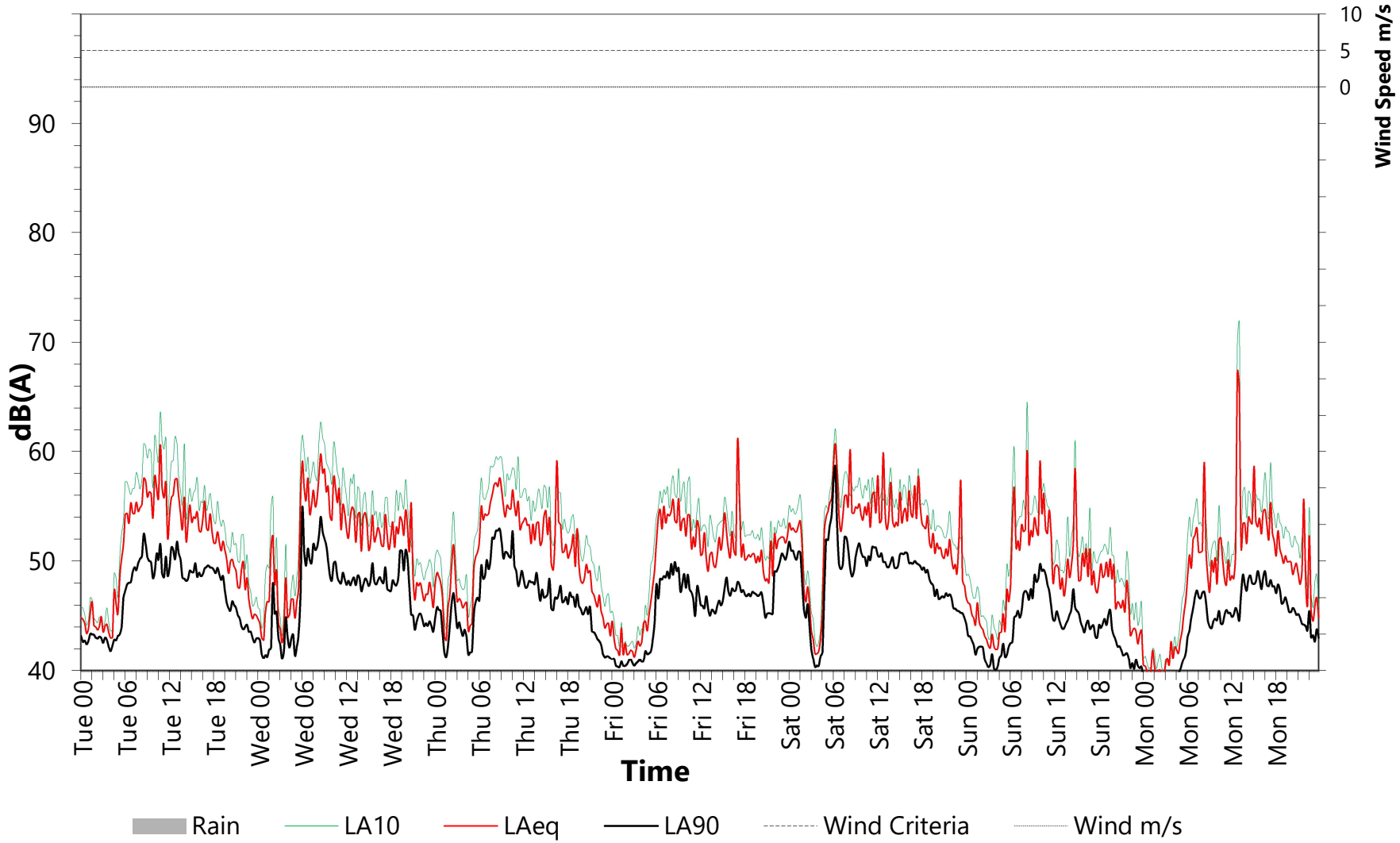
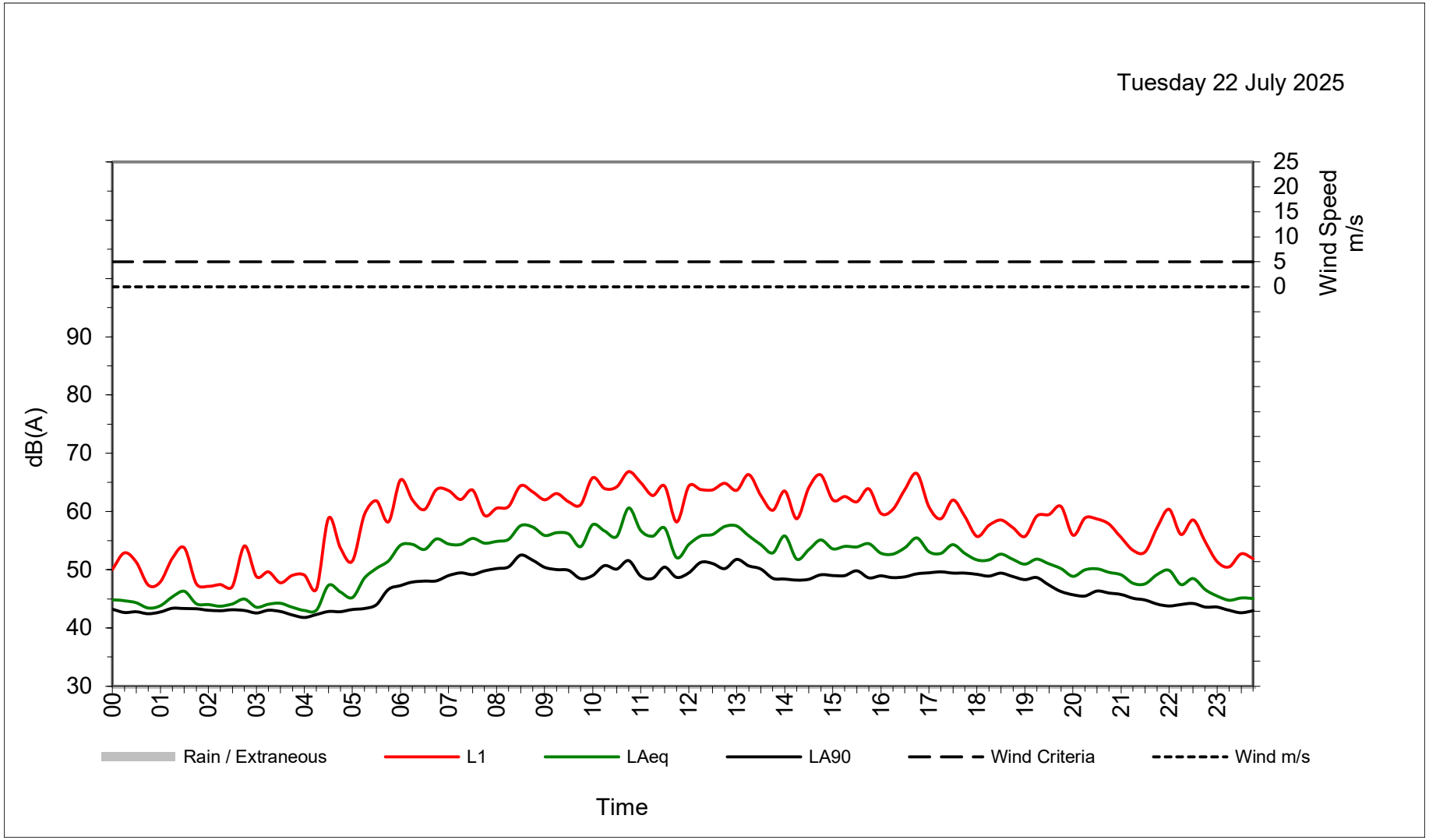
M2 Logger Graph

Tuesday 22 July 2025
to
Monday 28 July 2025

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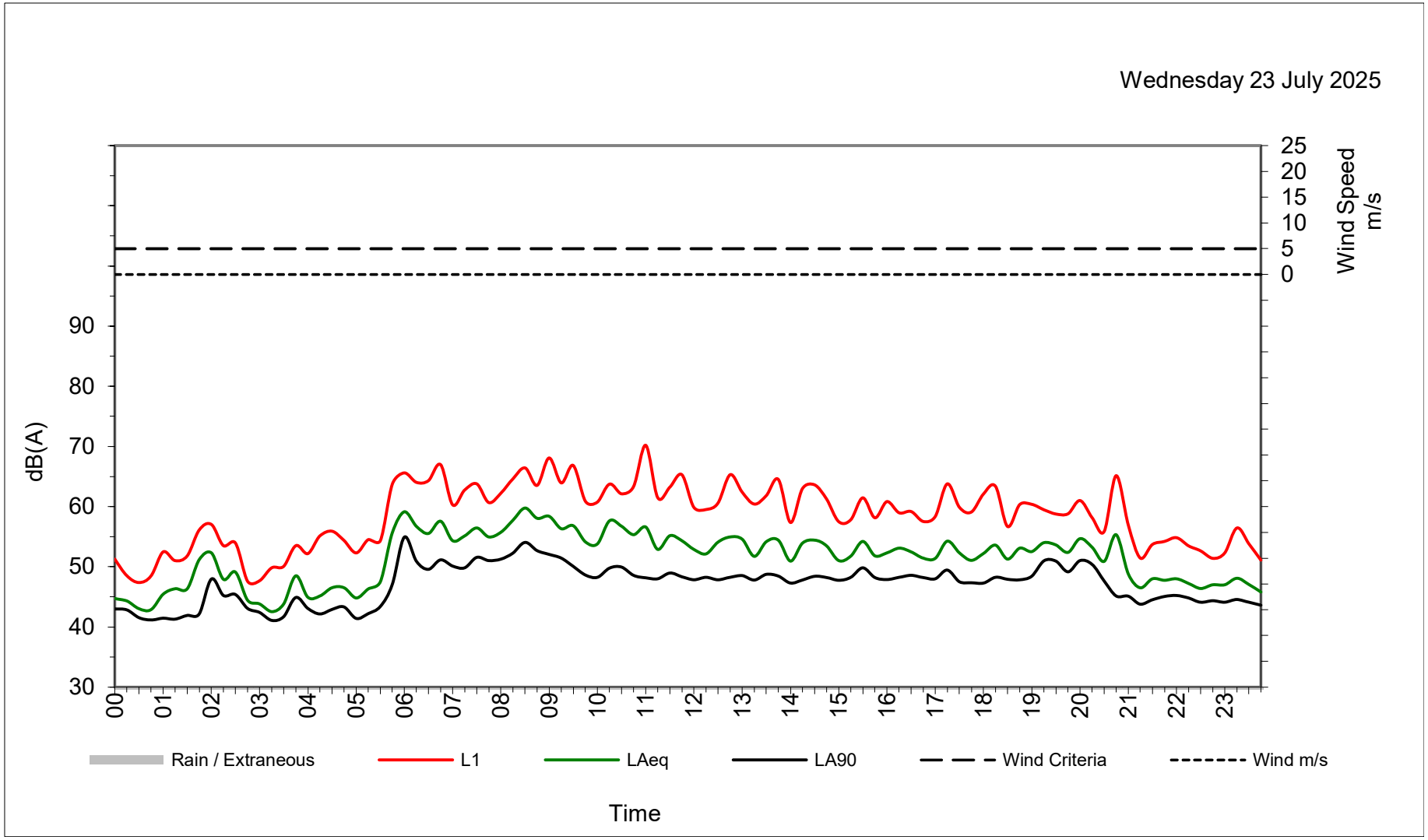
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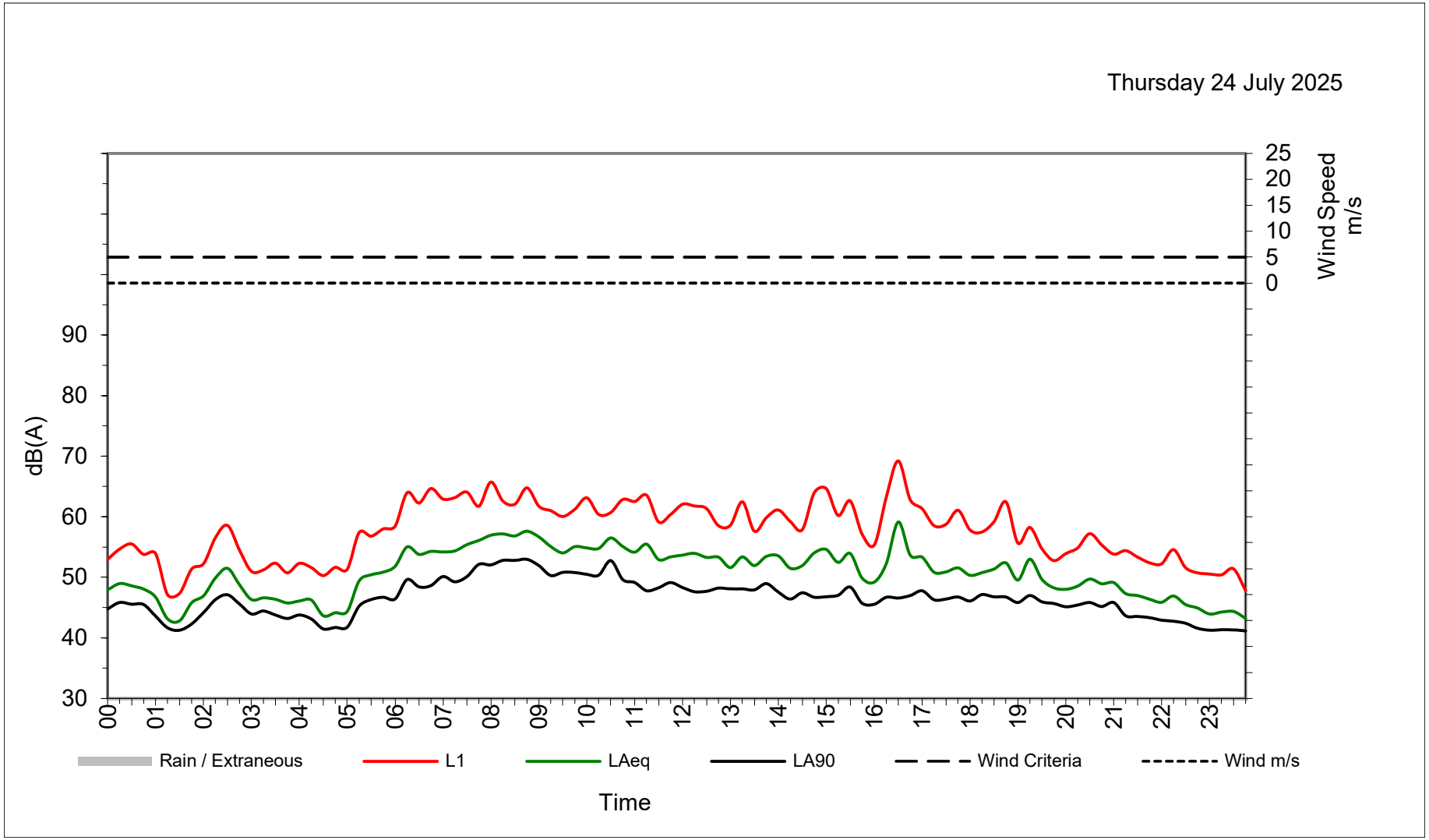
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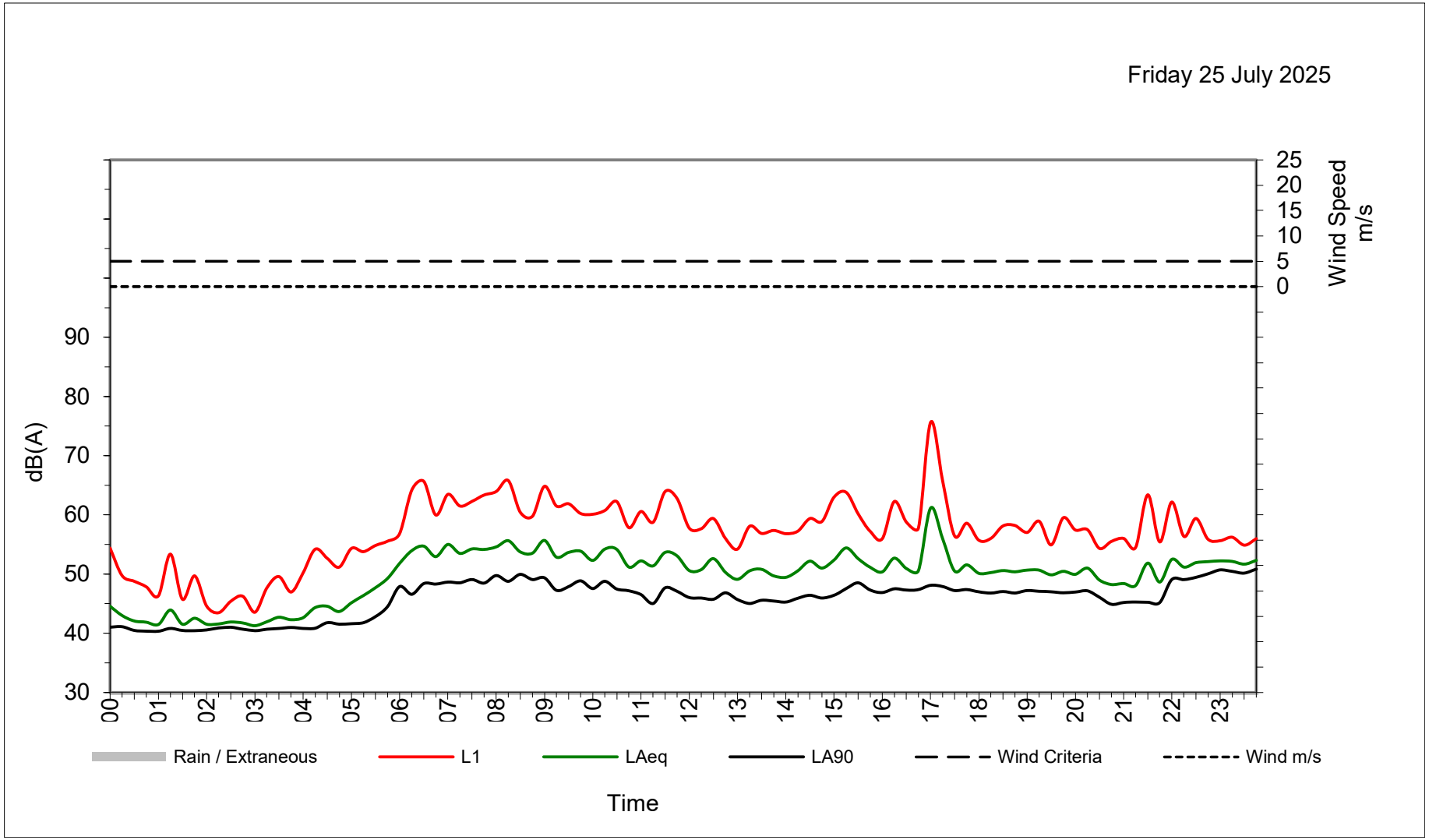
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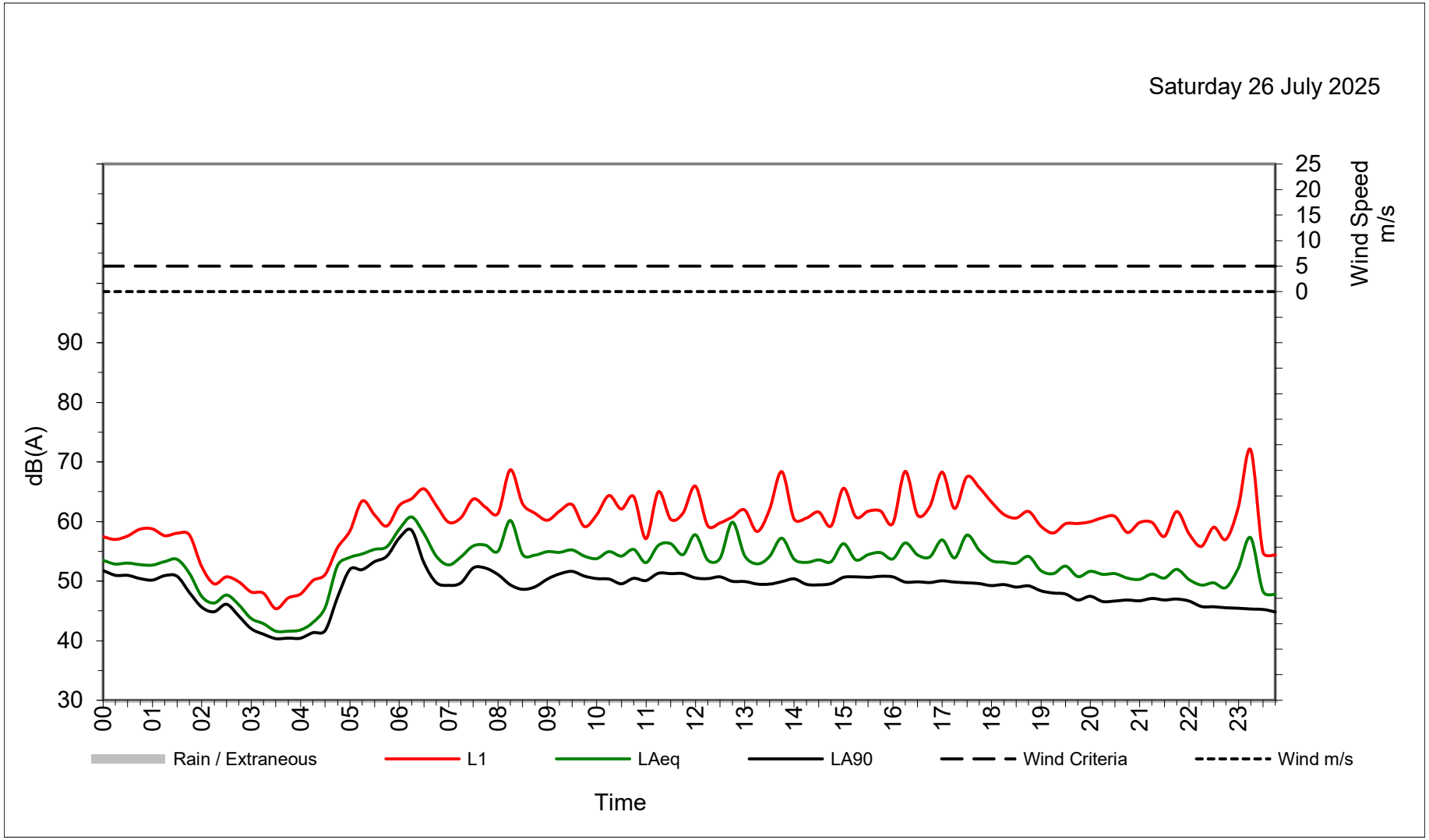
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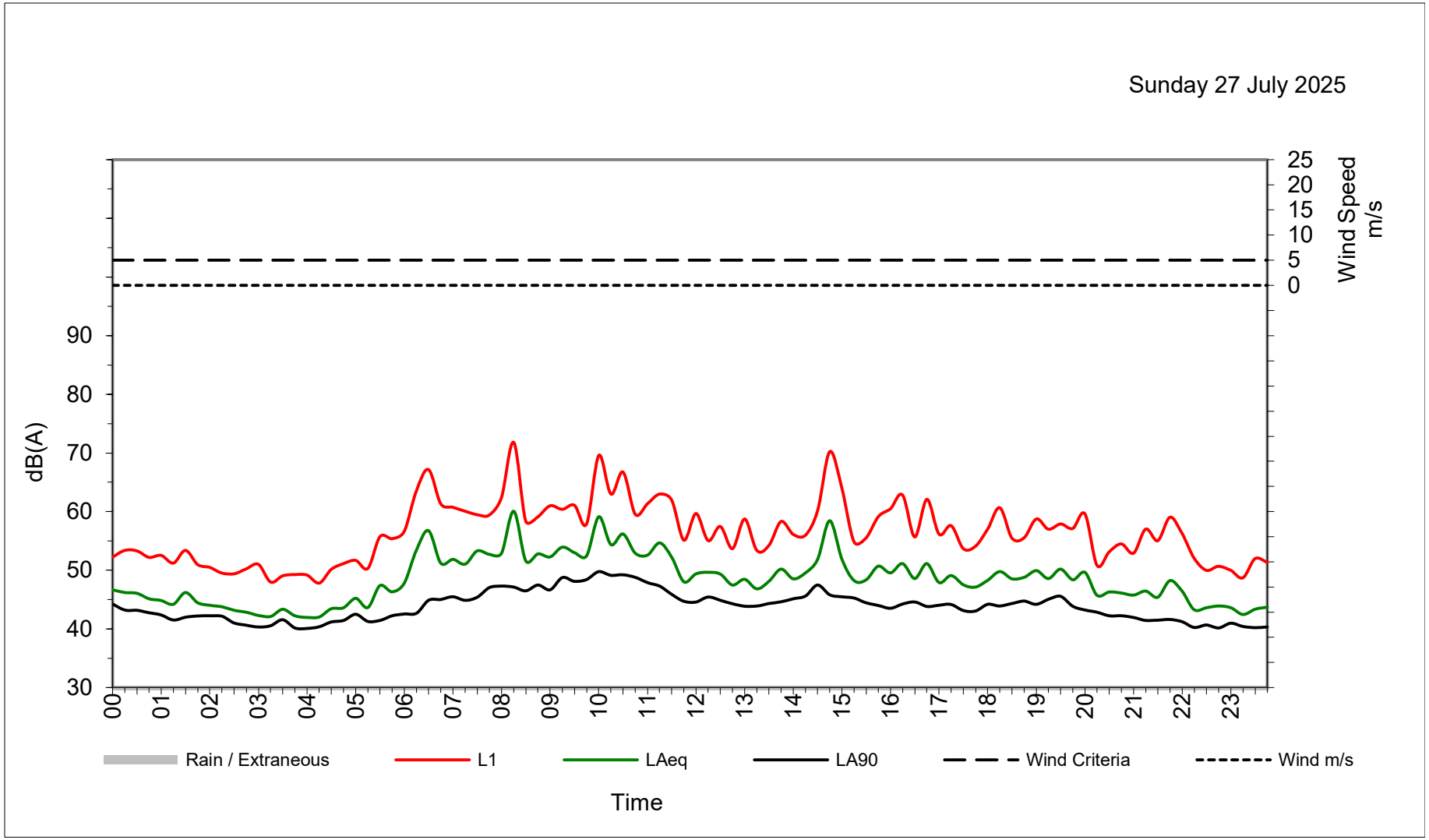
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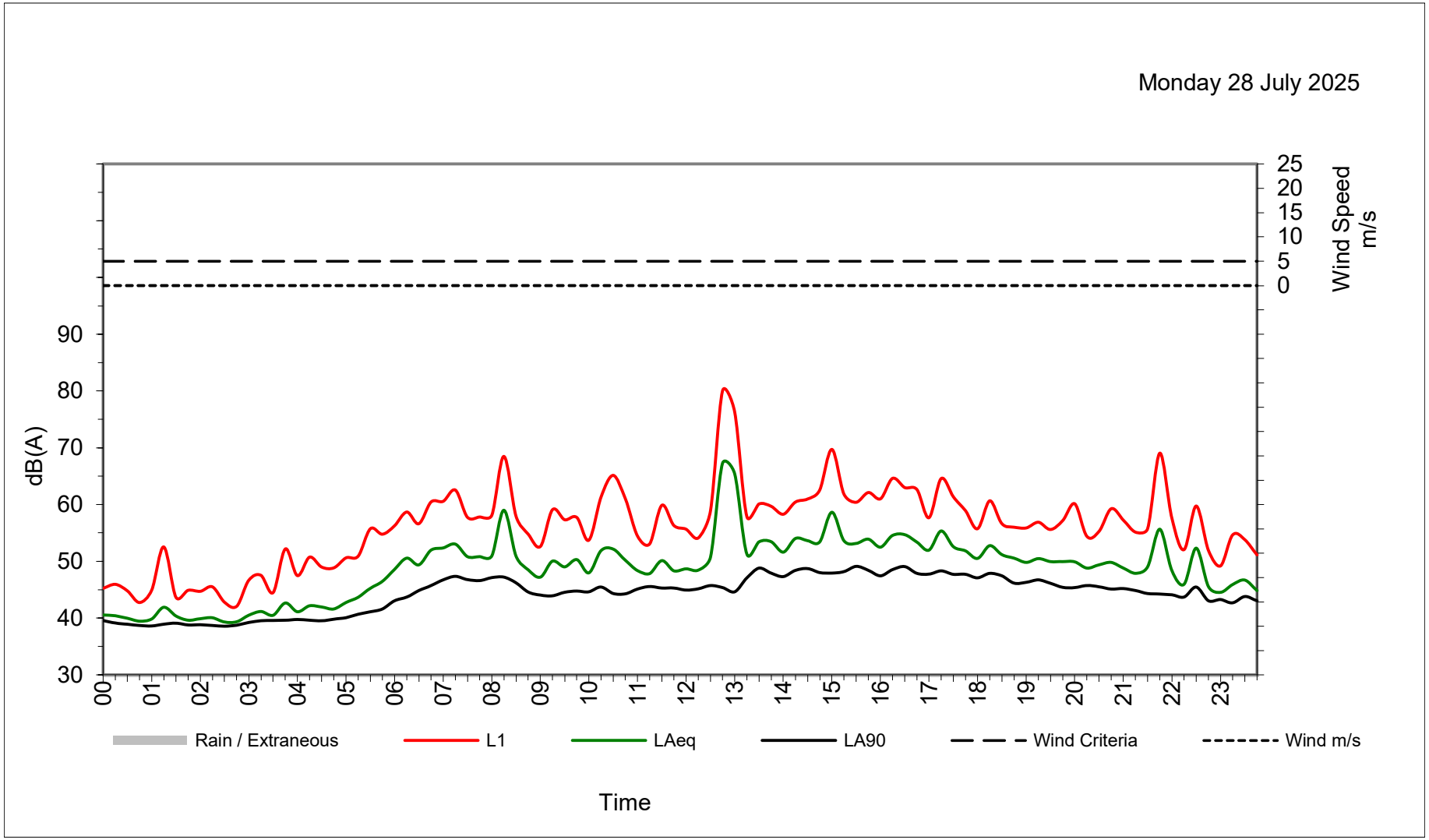
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Rain / Extraneous
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Wind Criteria
Wind m/s
Time

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