NOISE IMPACT ASSESSMENT

2-4 VIMY STREET
BANKSTOWN NSW 2200

PREPARED FOR

Ghayath Al Shelh c/- ABCON

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CONTRACT NO C23 9147
REPORT NO EMS23 1154-R1

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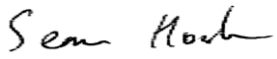
First Report Issue Date

AUTHOR: 	Sean Hook MArchSci (Audio and Acoustics) Acoustic Consultant MAAS	Date: 16.01.2024
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DOCUMENT CONTROL

COPY No: 1

REVISION HISTORY

Revision No	Date Issued	Reason/ Comments
0	17.01.2024	First version
1	09.04.2024	Traffic report details added

DISTRIBUTION

Copy No	Revision No	Destination
1	1	Ghayath Al Shelh
2	1	Environmental Monitoring Services Pty Ltd

1 INTRODUCTION

1.1 Project Description

Environmental Monitoring Services Pty Ltd (EMS) was engaged by Ghayath Al Shelh c/- ABCON to provide a Noise Impact Assessment for the DA submission for the proposed residential flat building, as part of the affordable housing project, to be built at 2-4 Vimy Street, Bankstown NSW (the site).

The proposed development consists of a 3-storey residential building with 12 units over a common one level of basement parking with ground floor Waste Room and Communal BBQ area at the western boundary.

The proposal comprises of:

Ground Floor

Unit 1 to Unit 4: all units having 1 x Bedroom, Kitchen/Living room, Laundry, Bathroom and Alfresco area apart from Unit 4 which has 2 x Bedrooms and an Ensuite.

First Floor

Unit 5 to Unit 8: all units having 2 x Bedrooms, Kitchen/Living room, Laundry, an Ensuite to the Master bedroom, separate Bathroom and Balcony apart from Unit 7 which has no ensuite.

Second Floor

Unit 9 to Unit 12: all units having 2 x Bedrooms, Kitchen/Living room, Laundry, an Ensuite to the Master bedroom, separate Bathroom and Balcony.

The purpose of this Noise Impact Assessment is to investigate the predicted noise levels generated from the proposed development at the surrounding noise receivers and compare these levels against an established Noise Criteria. The noise intrusion to the development from the adjacent sports ovals and park playground will also be assessed.

Plans provided by the proponent for this assessment were drawn by ABCON (Project No.: 23155, Issue: C) dated December 19th 2023.

1.2 Site Location and Description

The site is made up of Lot 49 & 50 from DP 13055 with the addresses 4 and 2 Vimy Street Bankstown respectively. The site is bounded by the residential property 6 Vimy Street to the south and Vimy Street to the east with residential dwellings on the other side of Vimy Street.

To the west of the site is Bankstown Oval and the John Macky Indoor Sport Centre and to the south west is the Grahame Thomas Oval

The immediate building to the north of the site is a substation and further north are the recreational receivers Variety Livvi's Place playground and Bankstown City Gardens. Immediately north of the playground at a distance of approximately 135 metres is Bankstown Public School and immediately north of the Bankstown Oval at a distance of approximately 170 metres is Bankstown Girls High School.

1.3 Noise Receivers

Table 1.1 below displays the surrounding noise receivers.

Table 1.1 – Surrounding Noise Receiver Locations

Receiver	Address	Location in Relation to the Development	Description
R1	6 Vimy Street	South	One storey residential dwelling
R2	8 Vimy Street	South	One storey residential dwelling
R3	7 Vimy Street	Southeast	One storey residential dwelling
R4	5 Vimy Street	Southeast	Two storey residential dwelling
R5	3 Vimy Street	East	One storey residential dwelling
R6	1 Vimy Street	East	2 x One storey residential dwellings
Rec1	Bankstown City Gardens	Northeast	Picnic shelters and lawn
Rec2	Variety Livvi's Place	North	Playground
Rec3	Bankstown Oval	West	Cricket oval
Rec4	John Macky Indoor Sport Centre	West	Sports/recreational use
Ed1	Bankstown Public School	North	Primary

Figure 1.1 on the following page displays the development's location and surrounding noise receivers.

Figure 1.1

Map provided by Six MAPS

Legends

The Site

Unattended Noise Monitor Location

Attended Noise Monitor Location

R1, R2 .... Residential Noise Receiver

Rec1, Rec2 .... Recreational Noise Receiver

Ed1 .... Educational Noise Receiver

Site: 2-4 Vimy Street, Bankstown NSW 2142

Report No.: EMS23 1154-R1

Contract No.: C23 9147

2 NOISE MONITORING

2.1 Unattended Background Noise Measurement

Unattended noise monitoring was conducted from the 1st to 12th of December 2023, using the Svan 955 Sound Level Meter (SLM). The calibration of the unit was checked prior to and after monitoring, and no significant drift was found. The SLM was placed in the northwestern boundary corner of the vacant site (houses demolished) with the microphone above the paling fence approximately 2.1 metres above ground level.

The noise logger was set to record 'A' weighted statistical sound pressure levels (SPL) with 15-minute intervals using a 'fast response'.

The L_{A90} will be used to determine the Rating Background Level (RBL) for the Urban area immediately surrounding the proposed development for the establishment of a relevant noise criterion. The L_{A90} statistical measurement is the Sound Pressure Level measurement that is exceeded for 90% of the measurement period.

The noise logger also collected the L_{Aeq}; this represents the level of noise equivalent to the energy average of varying noise occurring over a measurement period. The L_{A10} was also obtained; this is the sound pressure level that is exceeded from 10% of the measurement period.

2.2 Rating Background Level

As all periods of the day have different background noise levels, the NSW Environment Protection Authority's (EPA) publication *Noise Policy for Industry* (NPfI) - 2017 defines each period for assessment.

Below is the time category for the noise assessment extracted from the NPfI:

- **Day:** the period from 07:00 am to 06:00 pm Monday to Saturday; or 08:00 am to 06:00 pm on Sundays and public holidays.
- **Evening:** the period from 06:00 pm to 10:00 pm.
- **Night:** the remaining periods 10:00 pm to 07:00 am Monday to Saturday; or 10:00 pm to 08:00 am Sundays and public holidays.

The Rating Background Level (RBL) is described in the NPfI as an 'overall single figure background level representing each assessment period (day/evening/night) and is used for assessment purposes'.

Table 2.1 displays the Rating Background Levels and Existing Noise Levels from the unattended noise monitoring (1st – 12th December 2023) conducted at the monitoring location shown in Figure 1.1.

Table 2.1 – Summary of the Existing Noise Level (L_{Aeq}) and RBL (L_{A90}) in dB at 2 Vimy, Bankstown

Time of Day	Monitoring Location	Rating Background Level (RBL) L_{A90}	Existing Noise Level L_{Aeq}
Day Time (07:00 – 18:00)	2 Vimy Street, Bankstown	44	55
Evening Time (18:00 – 22:00)		47	55
Night-Time (22:00 – 07:00)		43	51

Weather data from the Bureau of Meteorology (BOM) – Bankstown Airport Automatic Weather Station (AWS), located approximately 3.5km from the proposal, was used to filter out periods affected by rainfall and high windspeeds from the RBL assessment, in accordance with the NPfI.

The site inspection revealed oval maintenance equipment such as lawn mowers being heard during the weekday monitor installation. Cricket player vocal noise was heard during the weekend noise survey as well as noise from the playground and mechanical plant noise coming from the direction of Bankstown Girls High School.

3 NOISE CRITERIA (EXTERNAL RECEIVERS)

3.1 City of Canterbury Bankstown

The proposed development is located with the City of Canterbury Bankstown council. Chapter 5 – Residential Accommodation from the Canterbury Bankstown Development Control Plan (DCP) 2023 has two parts:

- Chapter 5.1 – Former Bankstown LGA

Chapter 5.1 – Former Bankstown LGA isn't specific regarding acoustic design or criteria but gives the instruction in clause 8.28 (d)

> *whether noise generation from fixed sources or motor vehicles associated with the proposed development will be effectively insulated or otherwise minimised*

3.2 The NSW EPA Noise Policy for Industry 2017 (NPfI)

The NSW EPA publication *Noise Policy for Industry* (NPfI) - 2017 provides guidelines for noise assessment and noise mitigation strategies for levels that exceed noise thresholds. The main aims for this policy are:

- To establish noise criteria that will protect the community from excessive intrusive noise and preserve amenity for specific land uses.
- To outline a range of mitigation measures that could be used to minimise noise impacts.

The Noise Policy for Industry implements an Intrusive Noise Criteria and an Amenity Noise Criteria for residential receivers, the more stringent of the two is utilised.

When defining Intrusive noise, the NPfI states 'The intrusiveness of an industrial source may generally be considered acceptable if the 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 by more than 5 dB when beyond a minimum threshold.'

The Amenity Criteria is used to limit continuing increases in noise by industrial developments.

3.2.1 *Residential Noise Receivers*

The evaluated Intrusive and Amenity Noise Criteria for the residential noise receivers surrounding the proposed development are displayed below in Table 3.1.

Table 3.1 – NPfI Noise Emission Criteria – Residential (External) dB(A)

Location	Time of Day	Recommended Amenity Noise level (Urban)	Rating Background Level (RBL) L_{A90}	Existing Noise Level L_{Aeq}	NPfI Criteria	
					Intrusive $L_{Aeq,15minute}$ Noise Criterion	Project Amenity $L_{Aeq,period}$ Noise Criterion
Surrounding Residential Receivers	Day	60	44	55	**49**	58[1]
	Evening	50	47	55	52	**48**[1]
	Night	45	43	51	48	**44**[1]

Notes

1. The resultant project amenity noise level [recommended amenity noise level – 5 dB] was not 10 dB(A) or more below the existing noise level therefore the project amenity noise level remained [recommended amenity noise level – 5 dB]. 3 dB(A) was added to convert from a period level to a 15-minute level as per the NPfI.
2. The resultant project amenity nose level [recommended amenity noise level – 5 dB] was 10 dB(A) or more below the existing noise level therefore the project amenity noise level became [existing noise level - 10 dB(A)]. 3 dB(A) was added to convert from a period level to a 15-minute level as per the NPfI.

3.2.2 Active Recreation Noise Receiver

The recommended amenity noise level, reproduced from Table 2.2 in the NPfI, is relevant to active recreational receivers near the site and is displayed below in Table 3.2.

Table 3.2 – Noise Emission Criteria – Active Recreational (External) dB(A)

Type of Receiver	Noise amenity area	Time of Day	Recommended Amenity Noise Level $L_{Aeq,\ period}$ (external)	Project Amenity $L_{Aeq,period}$ Noise Criterion (external)
Active Recreation	All	When in use	55	**53**[1]

1. The resultant project amenity noise level [recommended amenity noise level – 5 dB] was not 10 dB(A) or more below the existing noise level therefore the project amenity noise level remained [recommended amenity noise level – 5 dB]. 3 dB(A) was added to convert from a period level to a 15-minute level as per the NPfI.

3.2.3 Educational Noise Receivers

The recommended amenity noise level, reproduced from Table 2.2 in the EPA NPfI, is relevant to educational receivers near the proposed development and is displayed below in Table 3.3.

Table 3.3 – Noise Emission Criteria Educational

Type of Receiver	Noise amenity area	Time of Day	Recommended Amenity Noise Level $L_{Aeq,\ period}$ (external)	Project Amenity $L_{Aeq,period}$ Noise Criterion (external)
School classroom – internal	All	Noisiest 1-hour period when in use	35 internal **45 external**[1]	**48**[2] **external**

1. To obtain an external noise level at the receiver, 10 dB(A) was added to the internal noise level to account for a typical façade loss with windows opened sufficiently to provide adequate ventilation.

2. The external recommended amenity noise level [recommended amenity noise level – 5 dB] was 10 dB(A) or more below the existing noise level therefore the project amenity noise level became [existing noise level - 10 dB(A)]. 3 dB(A) was added to convert from a period level to a 15-minute level as per the NPfI.

4 NOISE ASSESSMENT (EXTERNAL RECEIVERS)

The noise predictions were carried out in SoundPLAN (version 9.0). The noise predictions were based on the assumptions mentioned below. Assessment locations were in the yards (back, side, front etc.) closest to the proposal and at the centre of the affected windows (where known) or 1.5 metres above the floor level at the façade of buildings. A 1.8 boundary fence was modelled at the southern boundary of the property dividing the proposal from 6 Vimy Street.

The main noise sources from the proposed development that may potentially affect the nearby noise receivers are as follows:

- Mechanical Plant
    - Air conditioning units
    - Basement ventilation system (extraction fan)
- Basement Parking Noise Emissions
    - Vehicles arriving and leaving the basement parking
- Communal BBQ Area

The most affected noise levels for each of the receivers is displayed in the predicted noise results.

4.1 Mechanical Plant Noise Emissions

Details of mechanical plant for the development are not available at this stage. Judicial selection and further assessment of all items of plant proposed for the development will be required during the detailed design stage to ensure compliance with the noise criteria previously determined in Section 3.2 of this report. Items of plant typical for this type of development are available to meet the criteria.

4.1.1 Air Conditioner Units

EMS assumes each of the 8 Units will have their own split system air conditioners with the outdoor unit located on the Alfresco area for the ground floor Units and on the balcony for the upper level Units. For the acoustic model a Sound Power Level (SLW) of 65 dB(A) was assigned for each outdoor unit.

4.1.2 Basement Ventilation System

The enclosed basement parking will require mechanical ventilation, the exhaust from the basement parking is assumed to exit to the roof via the services shaft adjacent to the lift shaft, located towards the centre of the building. A Sound Power Level of 69 dB(A) at the exhaust vent has been applied within the model.

4.2 Vehicle Noise Emissions

Parking for the proposed development is to be within the basement under the development, with vehicular access to the basement provided by the ramp off Vimy Street located at the east of the site. The ABCON Plan (Project No.: 23155, Issue: C, 19/12/2023) show 13 car spaces including 1 disabled spot which equates to approximately 1 car space per Unit.

A Traffic and Parking Impacts Report was prepared by TEF Consulting (Job No. 23104 Rep 01a) on the 1st April 2024 which gave the morning and afternoon peak hour traffic generated by the proposed development (in/out movements) of 5 movements.

As a conservative measure EMS modelled the traffic generation from the basement parking as 6 in/out movements during peak hour based on the Roads and Traffic Authority (RTA) document "*Guide to Traffic Generating Developments*" Version 2.2, dated October 2002. This guide gives the trip generation rates for medium density residential flat buildings as shown below.

> **3.3.2 Medium density residential flat building.**
>
> **Rates.**
>
> Smaller units and flats (up to two bedrooms):
>
> Daily vehicle trips = 4-5 per dwelling
> Weekday peak hour vehicle trips = 0.4-0.5 per dwelling.
>
> Larger units and town houses (three or more bedrooms):
>
> Daily vehicle trips = 5.0-6.5 per dwelling
> Weekday peak hour vehicle trips = 0.5-0.65 per dwelling.

The basement car park will adequately contain the noises associated with the closing of car doors, starting of engines and vehicle movements within the basement, however, the vehicles entering/exiting the carpark may impact adjacent residences. For the purpose of this assessment, a conservative trip generation rate for the morning and evening peak hours equates to 6 trips per peak hour (12 Units at 0.5 trips per hour gives 6 trips per hour).

As a conservative worst-case scenario, vehicles entering/leaving the development have been modelled as 6 trips per hour for all assessment periods (day, evening and night). Vehicles entering/egressing the proposals basement carpark via Vimy Street were modelled using a line source with a SWL emission of 47.8 dB(A)/m as per RLS-90. One car movement was modelled every 10-minute period (6 per hour), either entering or egressing the basement.

The proposed multi dwelling housing development is not expected to result in an increase of the existing road traffic noise levels on the road network by more than 2 dB thus satisfying the NSW ECCW *Road Noise Policy* 2011.

4.3 Communal BBQ Area

A communal area with BBQ is proposed on the ground floor adjacent to the residential flat building's western façade. For the acoustic model it was assumed the communal area is occupied by 18 attendees with 1 in 3 males talking continually for a 15-minute period having a raised voice. This represents a worst-case scenario as the male voice has a higher SWL than the female voice.

Using the Sound Pressure Level (SPL) measured at one metre from different types of speech (raised, shout, ect.) found in *Prediction of Noise from Small to Medium Sized Crowds* (Hayne, Taylor, Rumble and Mee, 2011) the SWL was calculated for a raised male voice. The SWL is displayed below in Table 4.1 for a raised voice.

Table 4.1 – SWL Patron Noise Emissions for a Raised Male Voice

Noise Source	Octave Band Frequency L_w dB(A)						Broadband SWL dB(A)
	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Raised Male Voice ($L_{Aeq,\ 15minute}$)	65	74	69	69	64	53	77

5 PREDICTED NOISE LEVELS

5.1 Predicted Noise Levels at Adjacent Residential Receivers

Table 5.1 below shows the predicted noise levels at the adjacent residential receivers and represents a worst-case scenario. The predicted noise levels comply with the Noise Criteria from the daytime, evening and night periods at all residential receivers.

Table 5.1 – Predicted Noise Emissions at Adjacent Residential Receivers (NPfI criteria)

Assessment Period	NPfI $L_{Aeq,15\ minute}$ Noise Criteria (dBA)	Residential Receiver Location (external)	Noise Source	Predicted Noise Level (dBA)	Complies
Any	**49 / 48 / 44 (Day/Evening/Night)**	R1 6 Vimy Street	Mechanical Pant	38	✓
			Vehicles	23	
			Communal BBQ[1]	30	
			Cumulative Noise Level	**39**	
		R2 8 Vimy Street	Mechanical Pant	33	✓
			Vehicles	13	
			Communal BBQ[1]	28	
			Cumulative Noise Level	**34**	
		R3 7 Vimy Street	Mechanical Pant	28	✓
			Vehicles	27	
			Communal BBQ[1]	18	
			Cumulative Noise Level	**31**	
		R4 5 Vimy Street	Mechanical Pant	29	✓
			Vehicles	29	
			Communal BBQ[1]	19	
			Cumulative Noise Level	**32**	
		R5 3 Vimy Street	Mechanical Pant	29	✓
			Vehicles	30	
			Communal BBQ[1]	23	
			Cumulative Noise Level	**33**	
		R6 1 Vimy Street	Mechanical Pant	30	✓
			Vehicles	29	
			Communal BBQ[1]	23	
			Cumulative Noise Level	**33**	

1. EMS notes the communal area should not be used during the night-time period.

5.2 Predicted Noise Levels at Adjacent Recreational and Educational Receivers

Table 5.2 below shows the predicted noise levels at the adjacent Recreational and Educational receivers and represents a worst-case scenario. The predicted noise levels comply with the Noise Criteria at all receivers.

Table 5.2 – Predicted Noise Emissions at Adjacent Recreational and Educational Receivers (NPfI criteria)

Assessment Period	NPfI $L_{Aeq,15\ minute}$ Noise Criteria (dBA)	Residential Receiver Location (external)	Noise Source	Predicted Noise Level (dBA)	Complies
When in use	**53**	Rec1 Bankstown City Gardens	Mechanical Pant	21	✓
			Vehicles	13	
			Communal BBQ[1]	25	
			Cumulative Noise Level	**27**	
		Rec2 Variety Livvi's Place	Mechanical Pant	27	✓
			Vehicles	16	
			Communal BBQ[1]	30	
			Cumulative Noise Level	**32**	
		Rec3 Bankstown Oval	Mechanical Pant	26	✓
			Vehicles	8	
			Communal BBQ[1]	31	
			Cumulative Noise Level	**32**	
		Rec4 John Macky Indoor Sport Centre	Mechanical Pant	32	✓
			Vehicles	10	
			Communal BBQ[1]	42	
			Cumulative Noise Level	**42**	
	48	Ed1 Bankstown Public School	Mechanical Pant	20	✓
			Vehicles	8	
			Communal BBQ[1]	22	
			Cumulative Noise Level	**24**	

1. EMS notes the communal area should not be used during the night-time period.

6 NOISE INTRUSION ASSESSMENT

The proposed development is adjacent to the Bankstown Oval, Grahame Thomas Oval, Variety Livvi's Place (playground) and Bankstown City Gardens (field and picnic shelter) and the noise intrusion to the proposal from these recreational areas will be assessed.

6.1 Noise Intrusion Criteria

6.1.1 AS 2107:2016 Acoustics – Recommended design sound levels and reverberation times for building interiors

The Australian Standard 2107:2016 Acoustics – *Recommended design sound levels and reverberation times for building interiors* gives a recommended design sound level and reverberation time ranges for various types of occupancies within buildings. The relevant occupancy for the site as per AS 2107:2016 is listed below in Table 6.1.

This Standard recommends design criteria for conditions affecting the acoustic environment within building interiors to ensure a healthy, comfortable and productive environment for the occupants and the users. The background sound levels recommended take into account the function of the area(s) and apply to the sound level measured within the space unoccupied but ready for occupancy. The Standard is applicable to steady-state or quasi-steady-state sounds. The reverberation times recommended are for the occupied state of the space. Quasi-steady-state sounds is sound whose average characteristics substantially represent a steady-state sound.

This Standard also specifies methods of measuring the background sound level in unoccupied spaces in unoccupied spaces in buildings. The sound level during occupancy will usually be increased owing to the activities of the occupants.

Table 6.1 – AS2107:2016 Noise Criteria dB(A)

Type of Occupancy/Activity	Design sound level ($L_{Aeq,t}$) range dB(A)
RESIDENTIAL BUILDINGS	
Houses and apartments in suburban areas or near minor roads	
Apartment common areas (e.g. foyer, lift lobby)	45 to 50
Living areas	30 to 40
Sleeping areas (night-time)	30 to 35
Work areas	35 to 45

6.2 Attended Noise Monitoring

A short term attended noise survey was conducted near the centre of the site using the Brüel & Kjær 2250 Sound Level Meter (SLM) whilst cricket matches were being played at both adjacent ovals between 10:25am to 11:00am on the 9th of December concurrently with the unattended noise logging. A field calibration was performed on the SLM prior to and after the measurement and no significant drift occurred.

Table 6.2 – Attended noise monitoring Saturday 9th December 2023

Location	Time Period	1/1 Octave-Band Filters (Hz), dB(A)									A-Weight dB(A)
		31.5	63	125	250	500	1K	2K	4K	8K	
2-4 Vimy St, Bankstown	10:25 – 11:00	21	31	33	32	37	42	39	37	31	46

During the attended measurement the following noise sources were heard:

- Cricketers (appealing, clapping, encouraging)
- Distant mechanical plant
- Birds and insects
- Bell (possibly from the oval or nearby schools)
- Playground (hand water pump, swings, children playing)

EMS notes due to a high temperature on the day of the attended noise monitoring (maximum 42.5°) the oval's stands had little spectators and the playground had less than 5 children using it.

6.3 Noise Intrusion Assessment

As the attended noise measurement does not represent worst-case noise emissions from the adjacent recreational areas noise predictions were carried out in SoundPLAN (version 9.0). The noise predictions were based on the assumptions mentioned below. Assessment locations were at the proposal's four façades (north, south, east, west).

The noise sources from the surrounding recreational noise emitters that were assessed were:

- Sport's ovals (Bankstown Oval and Grahame Thomas Oval)
    - Players
    - Stands (spectators)
- Playground (Variety Livvi's Place)
    - Children playing
- Picnic shelter (Bankstown City Garden)
    - Portable loudspeaker

6.3.1 Sport's Ovals

The sport's ovals had player noise emissions at each oval (Bankstown Oval and Grahame Thomas Oval) modelled with 1 male voice speaking continuously with an over a 15-minute period with a loud voice.

The Bankstown Oval stands have a capacity of approximately 1,500 spectators. The acoustic model had capacity seating with 1 in 3 spectators speaking for a third of a 15-minute period (5 minutes) with a loud voice. This represents a worst-case scenario as the male voice has a higher SWL than the female voice.

Using the Sound Pressure Level (SPL) measured at one metre from different types of speech (raised, shout, ect.) found in *Prediction of Noise from Small to Medium Sized Crowds* (Hayne, Taylor, Rumble and Mee, 2011) the SWL was calculated for a loud male voice. The SWL is displayed below in Table 4.1 for raised and load voices respectively.

Table 6.3 – SWL Patron Noise Emissions for a Raised & Loud Male Voice

Noise Source	Octave Band Frequency L_w dB(A)						Broadband SWL dB(A)
	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
Loud Male Voice ($L_{Aeq, 15minute}$)	73	82	79	78	72	62	85

6.3.2 Playground

EMS assumes 30 children occupying the Variety Livvi's Place playground with the following breakup:

- 10 children – 0 to 2 years old
- 10 children – 2 to 3 years old
- 10 children – 3 to 5 years old

The children were modelled as area sources covering the play area, at a source height of 1 metre above the ground.

The AAAC's *Guideline for Child Care Centre Acoustics Assessment* (Version 3.0) gives the Sound Power Level (SWL) for groups of 10 children playing over different age ranges and is reproduced below in Table 6.4.

Table 6.4 – Effective Sound Power Levels ($L_{Aeq, 15min}$) for Groups of 10 Children Playing Actively taken (AAAC's *GfCCAA*)

Number and Age of Children	Sound Power Levels dB(A) at Octave Band Centre Frequencies								
	dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
10 Children – 0 to 2 years	78	54	60	66	72	74	71	67	64
10 Children – 2 to 3 years	85	61	67	73	79	81	78	74	70
10 Children – 3 to 5 years	87	64	70	75	81	83	80	76	72

Notes: If applicable, an adjustment to the above Sound Power Levels of -6 dB could be applied in each age group for children involved in passive play.

To calculate the sound power level for a specific number of children, the following formula has been used.

Effective Sound Power Level for 'n' children = Effective Sound Power Level for 10 children + 10log (n/10)

6.4 Picnic Shelter

Picnic gatherings are often accompanied with music reproduced via a portable loudspeaker.

For a previous assessment EMS measured the Klipsch AW-650 Outdoor Speaker and the spectrum was normalised to give a Sound Power Level of 90 dB(A) as seen in Table 6.5. For this report EMS assumes the portable outdoor loudspeaker will have a similar indoor 1/1 octave band relative spectrum as the Klipsch AW-650 Outdoor Speaker.

The portable loudspeaker was located towards the southern boundary of the Bankstown City Gardens.

Table 6.5 – SWL Sound System Noise Emissions Klipsch AW-650 Outdoor Speaker

Octave Band Frequency dB(A)									Broadband Level A-weighted
31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	
43	64	81	78	82	83	81	83	81	90

7 RECOMMENDATIONS

EMS recommends the following engineering controls and noise management plan to ensure the noise levels are within NSW EPA *Noise Policy for Industry* (2017) Noise Criteria:

7.1 Mechanical Plant

Detailed mechanical plant specifications are yet to be determined; however, EMS advises that all mechanical plant has been modelled using typical plant sound power levels and spectrums. EMS recommends that mechanical plant associated with the operation of the residential flat development incorporates the following:

- The basement car park exhaust outlet should not exceed a Sound Power Level (SWL) of 69 dB(A) and is to be located no closer than 3 metres from any roof edge. Further assessment is required by a qualified acoustic consultant should a supply air system be required for ventilation to the carpark to determine the appropriate location and Sound Power Level.
- Outdoor air conditioning units for each of the Units of the development are to have a Sound Power Level (SWL) not exceeding 65 dB(A) and are to be located on the Alfresco slab for the ground floor Units and on the Balconies for the upper levels.
- All mechanical equipment within the proposed development should be well maintained and regularly inspected in order that no loose or faulty components cause an increase in Sound Pressure Levels.
- The assessment has been conducted using typical sound power levels for representative items of plant likely to be selected if the development is approved. Further detailed assessment should be conducted for all items of plant prior to the approval of a construction certificate to ensure that compliance with the criteria will be maintained.

7.2 Boundary Fencing

Acoustic fencing of 1.8 metre height shall be located along the entire southern boundary of the site. The fencing is to be gap free and may be constructed of lapped & capped timber, colorbond steel or masonry construction.

7.3 Sound Insulation Recommendations

The predicted noise levels from Section 6.3 Noise Intrusion Assessment were found to be at their highest 50 dB(A) at the northern and western facades of the proposal. Based on these levels 4mm float glass meets the glazing requirements for all windows and doors for all types of rooms (bedrooms and habitable rooms). EMS notes that the sports fields and adjacent recreational areas are not expected to have significant usage and noise emissions throughout the night period.

EMS notes that the glazing recommendations are based solely on the acoustic performance and the client should consider the other desired or required design, such as safety, thermal or energy efficiency in order that they meet the other relevant standards.

The proposed masonry walls will provide sufficient sound insulation for the development as will sheet metal roofing with minimum 10 kg/m^3 fibreglass insulation and 10mm plasterboard.

8 CONCLUSION

A Noise Impact Assessment was carried out for the proposed residential flat development to be located at 2-4 Vimy Street, Bankstown.

Noise criteria for the development is determined in Section 3 of this report.

In Section 5 of this report the Noise Impact Assessment predicted the noise emissions generated from the proposed development at the adjacent residential noise receivers using typical Sound Power Levels of items of plant, vehicles and communal area occupants. A noise intrusion assessment from the neighbouring recreational areas is included in Section 6.

Detailed specifics of proposed item of plant and their locations have not yet been determined for the proposal. Provided that judicial care is taken for the careful selection and location of items of plant, compliance with the criteria will be achieved.

Recommended engineering controls and noise management are found in Section 7 to ensure the external noise levels at the surrounding residential noise receivers are within the NSW EPA *Noise Policy for Industry* Noise Criteria requirements, which on the proviso the proponent would implement would see compliance.

9 REFERENCES

Architectural plans prepared by ABCON (Project No.: 23155, Issue: C) dated December 19th 2023

NSW EPA Publication *Noise Policy for Industry* 2017

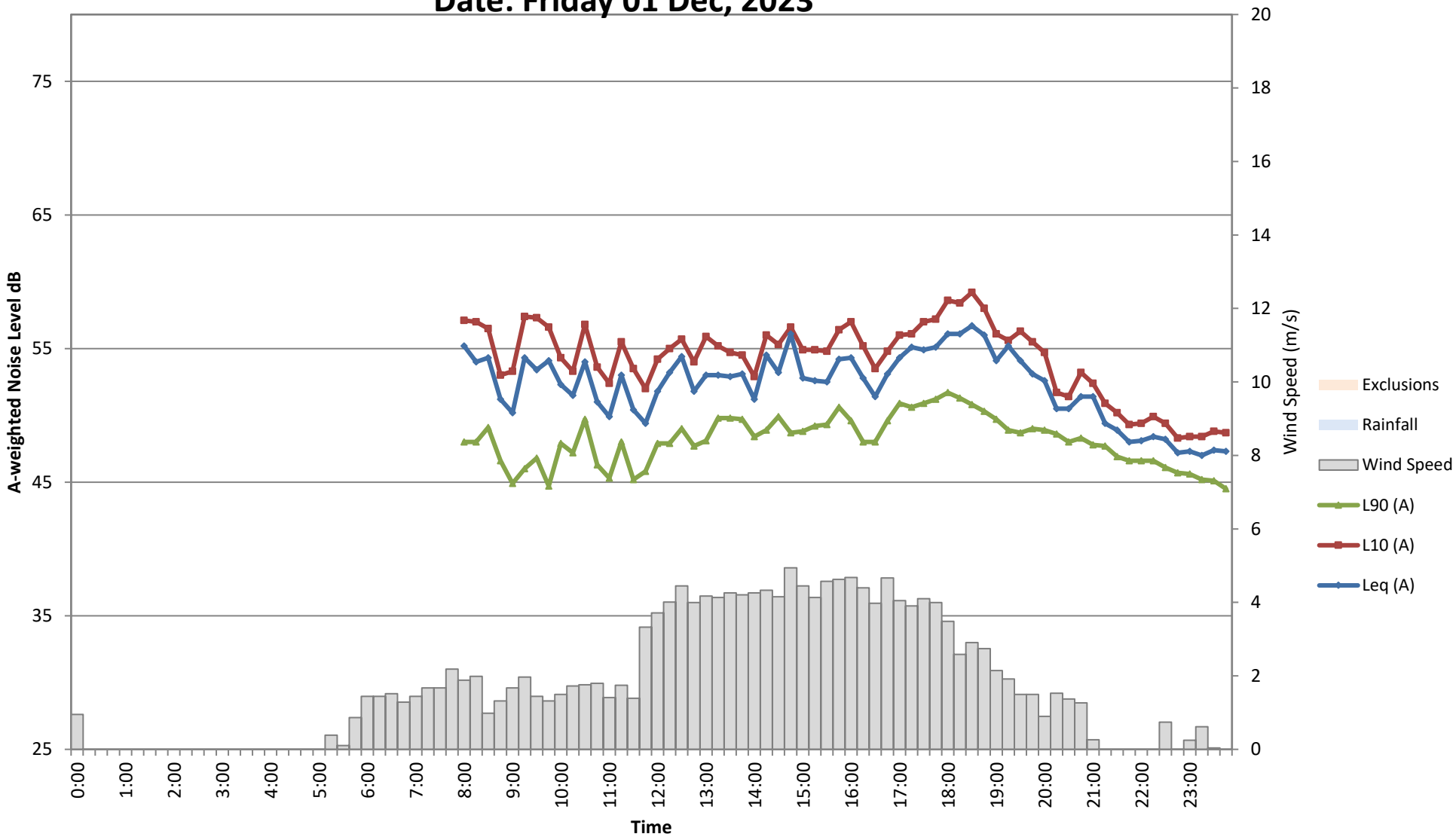
City of Canterbury Bankstown Development Control Plan 2015

Guide to Traffic Generating Developments, Roads and Traffic Authority, Version 2.2, dated October 2002

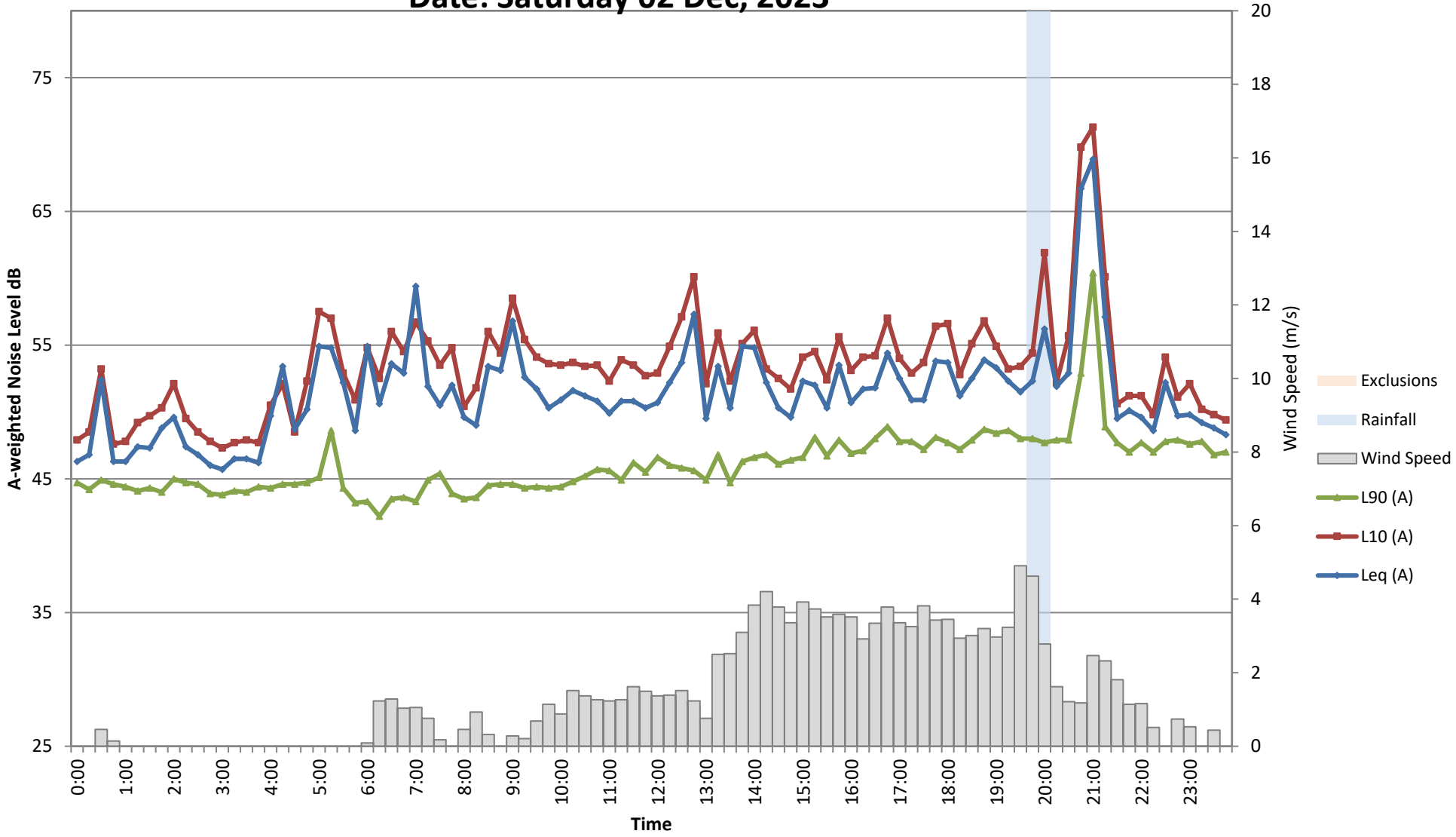
Traffic and Parking Impacts Report was prepared by TEF Consulting (Job No. 23104 Rep 01a) on the 1st April 2024

APPENDIX A – BACKGROUND NOISE MEASUREMENT

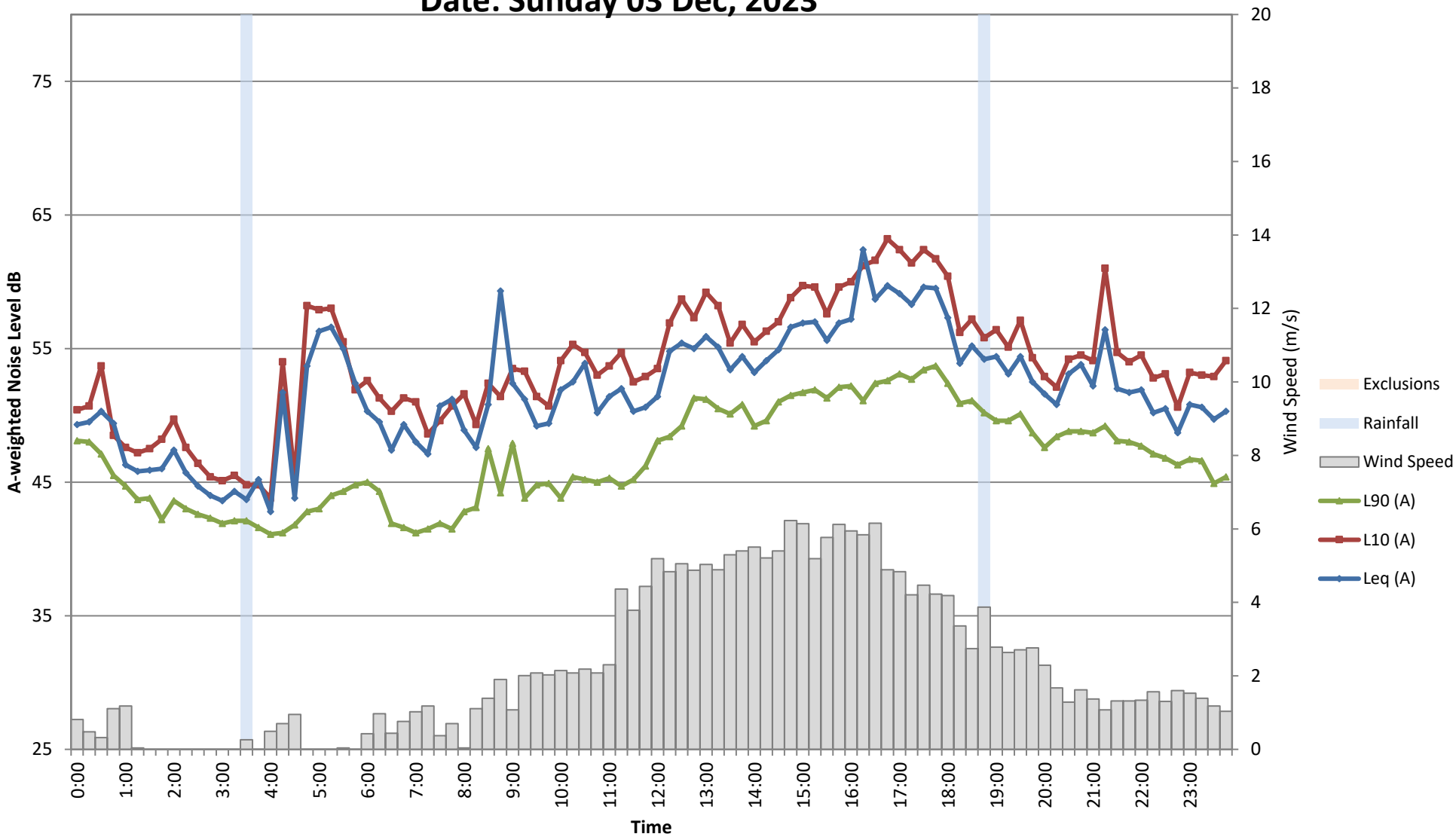
Noise Level Measurements
Monitor Location: 2-4 Vimy St Bankstown - Northwest corner
Date: Friday 01 Dec, 2023



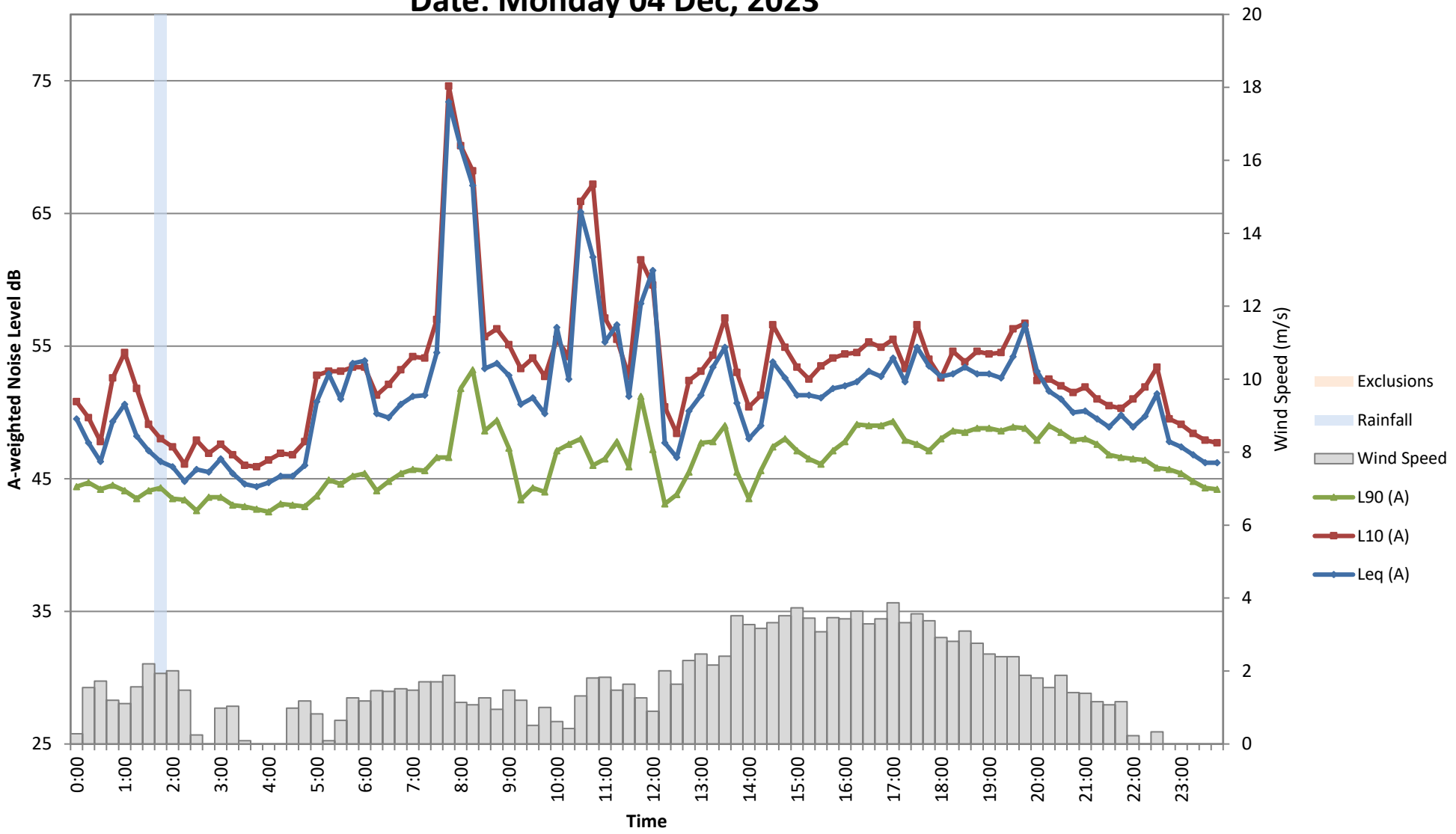
Noise Level Measurements
Monitor Location: 2-4 Vimy St Bankstown - Northwest corner
Date: Saturday 02 Dec, 2023



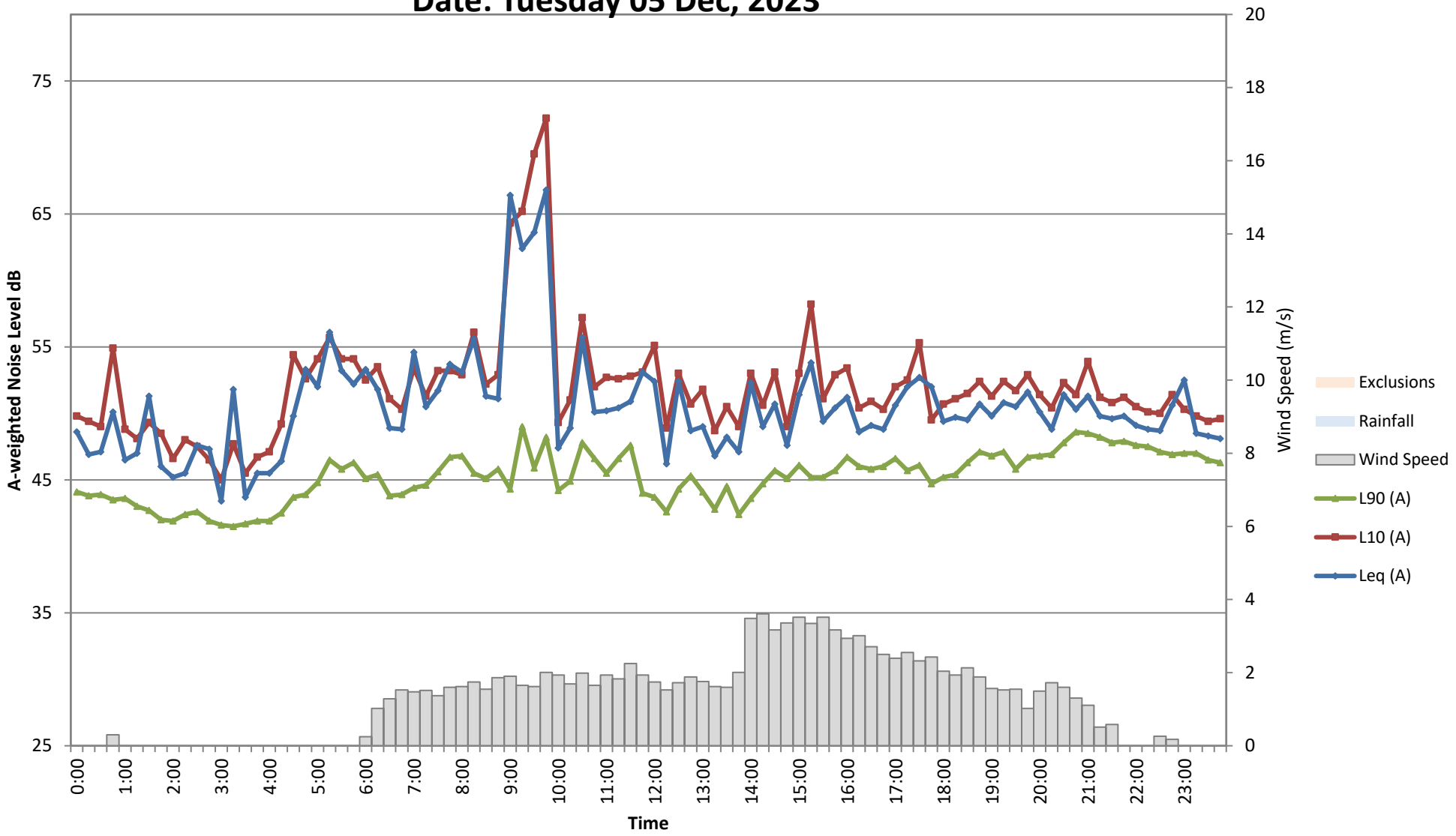
Noise Level Measurements
Monitor Location: 2-4 Vimy St Bankstown - Northwest corner
Date: Sunday 03 Dec, 2023



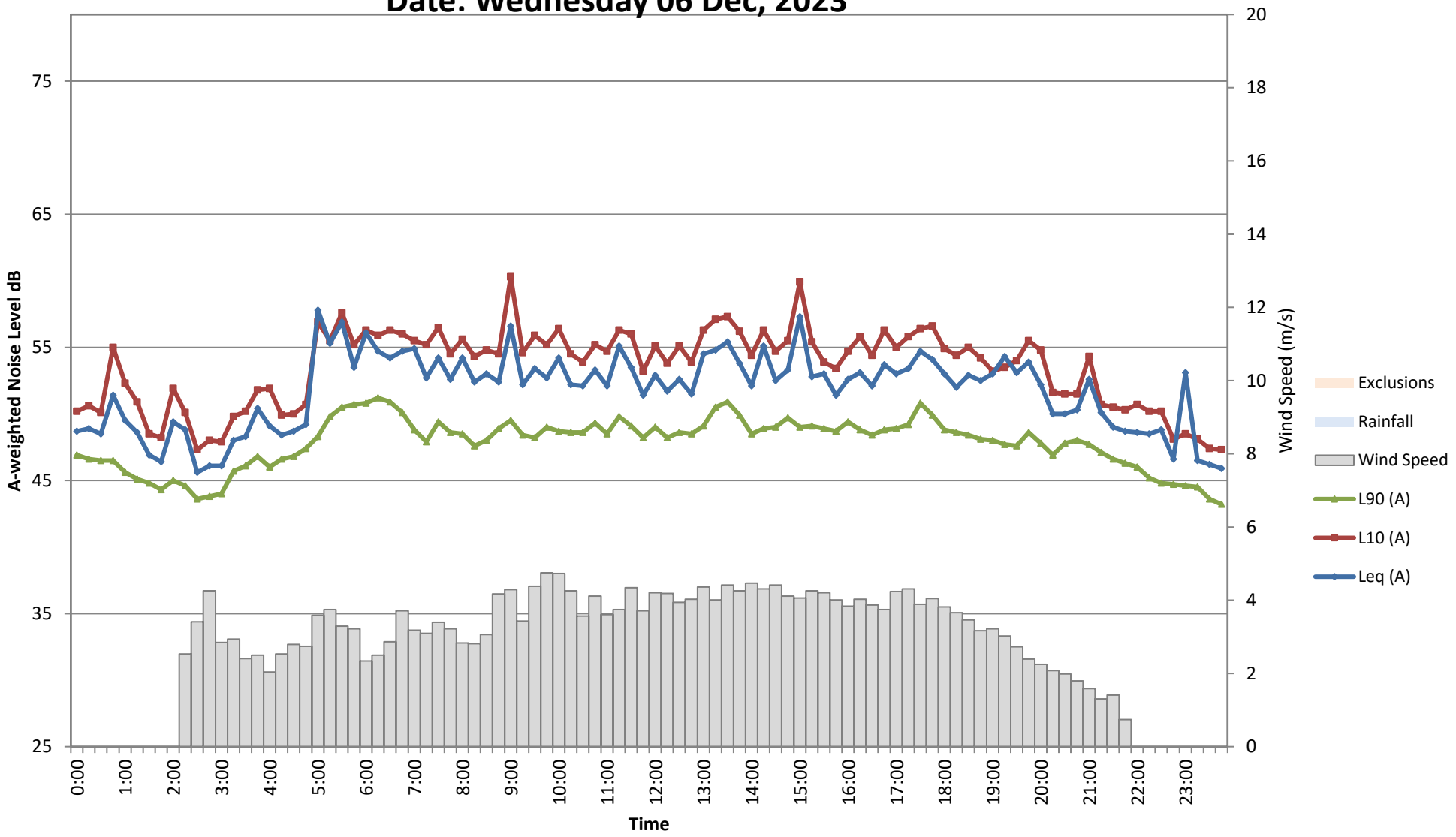
Noise Level Measurements
Monitor Location: 2-4 Vimy St Bankstown - Northwest corner
Date: Monday 04 Dec, 2023



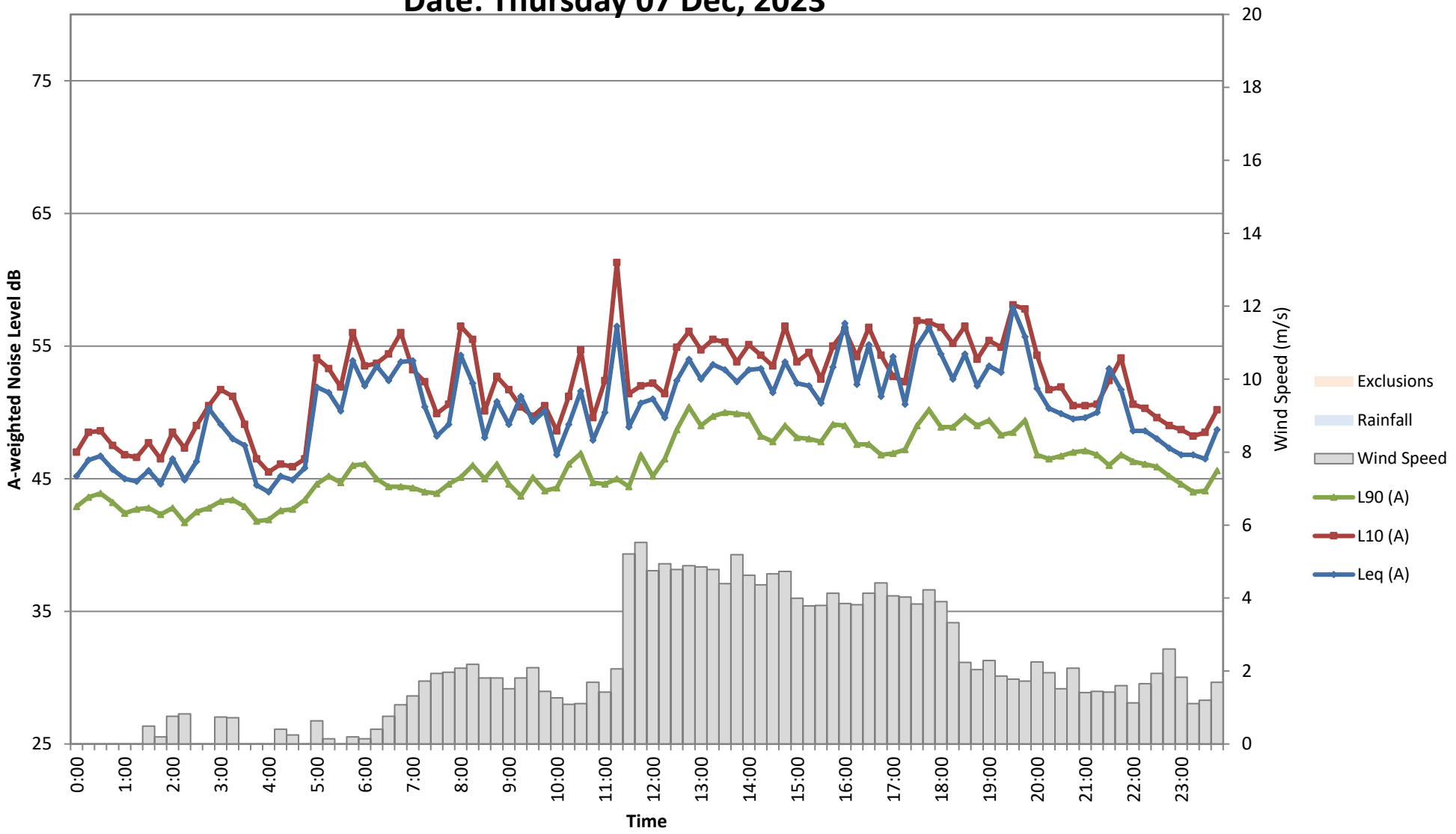
Noise Level Measurements
Monitor Location: 2-4 Vimy St Bankstown - Northwest corner
Date: Tuesday 05 Dec, 2023



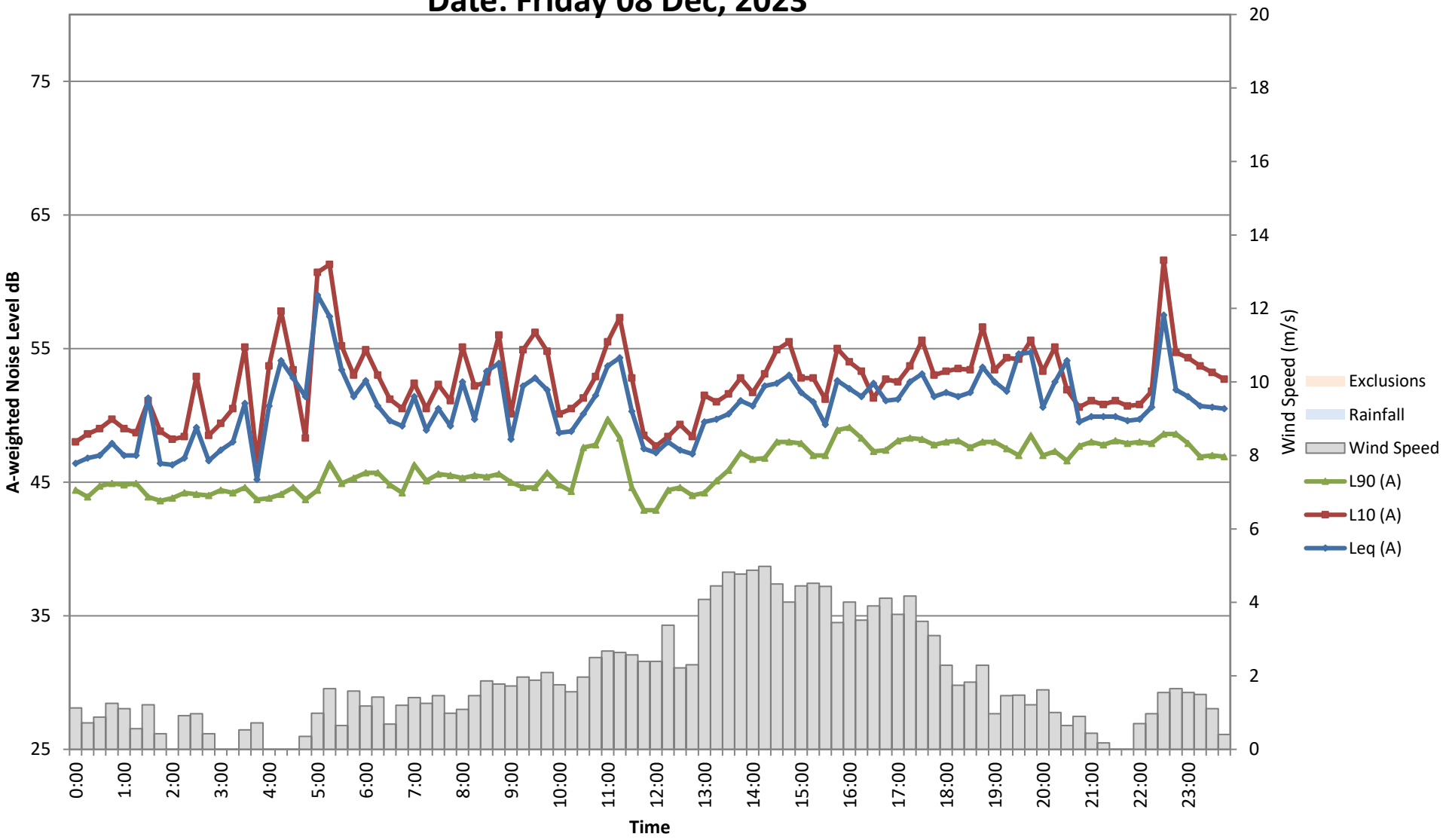
Noise Level Measurements
Monitor Location: 2-4 Vimy St Bankstown - Northwest corner
Date: Wednesday 06 Dec, 2023



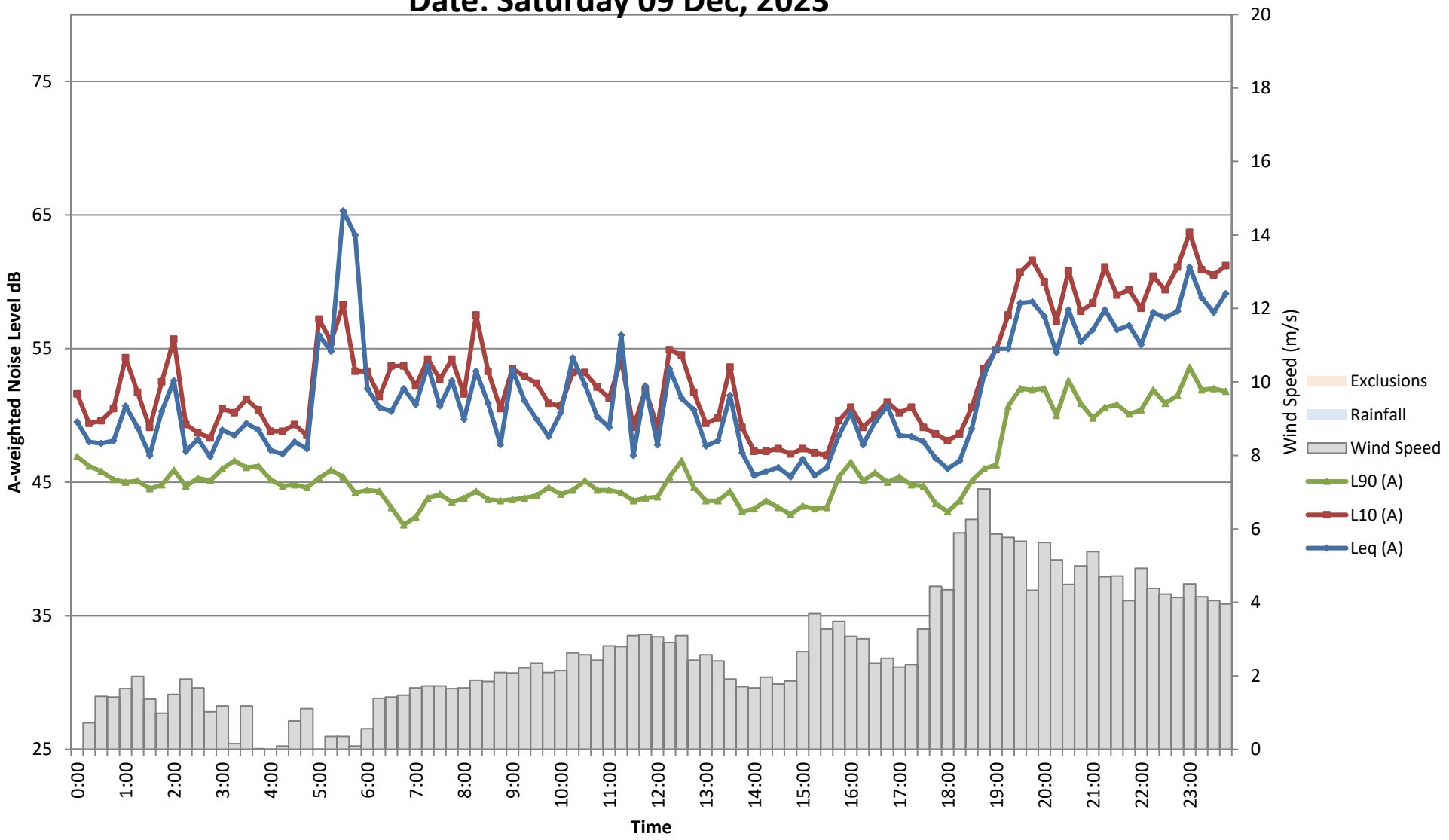
Noise Level Measurements
Monitor Location: 2-4 Vimy St Bankstown - Northwest corner
Date: Thursday 07 Dec, 2023



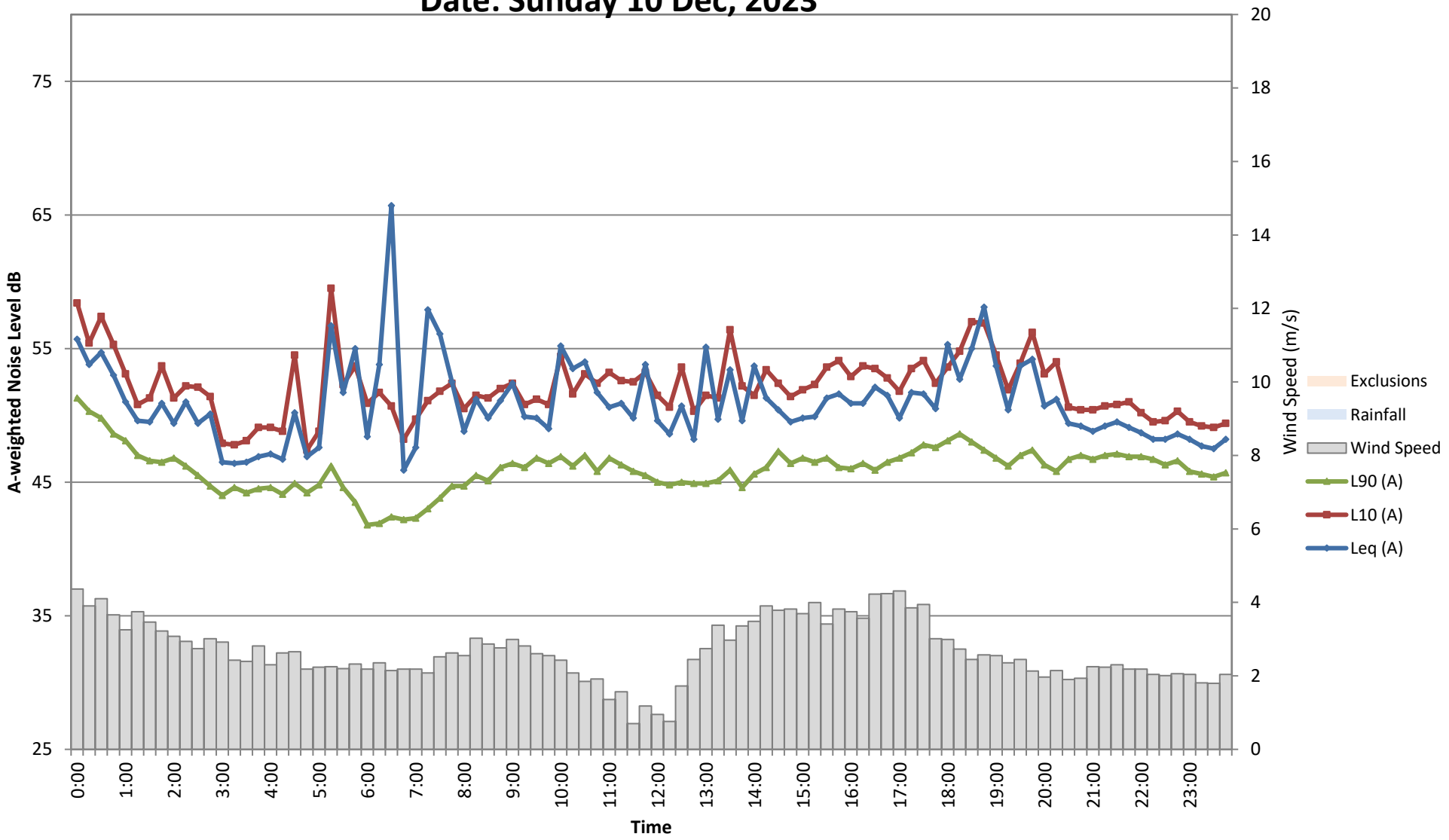
Noise Level Measurements
Monitor Location: 2-4 Vimy St Bankstown - Northwest corner
Date: Friday 08 Dec, 2023



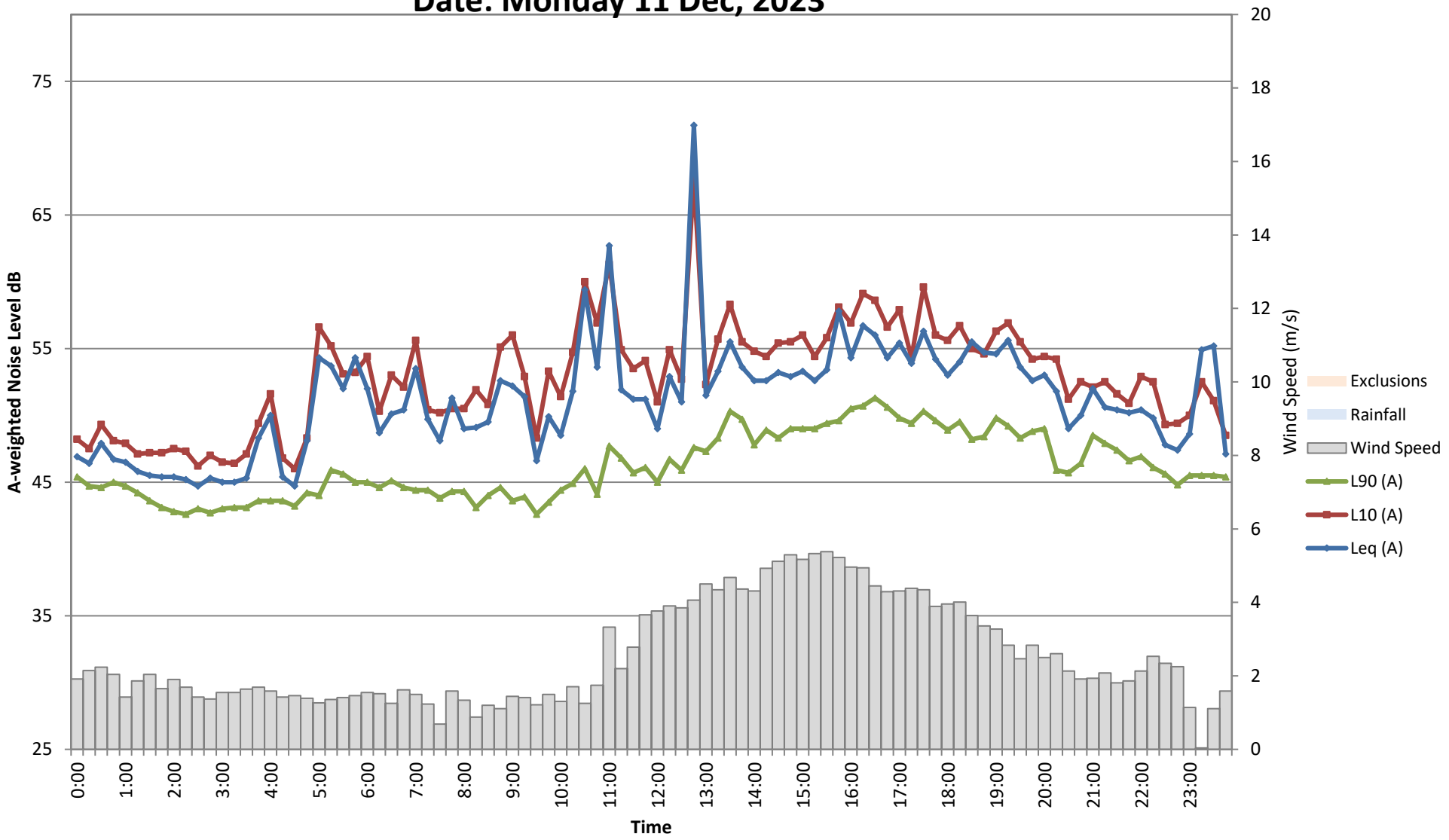
Noise Level Measurements
Monitor Location: 2-4 Vimy St Bankstown - Northwest corner
Date: Saturday 09 Dec, 2023



Noise Level Measurements
Monitor Location: 2-4 Vimy St Bankstown - Northwest corner
Date: Sunday 10 Dec, 2023



Noise Level Measurements
Monitor Location: 2-4 Vimy St Bankstown - Northwest corner
Date: Monday 11 Dec, 2023



Noise Level Measurements
Monitor Location: 2-4 Vimy St Bankstown - Northwest corner
Date: Saturday 00 Jan, 1900