RENZO TONIN & ASSOCIATES
inspired to achieve

Acoustics
Vibration
Structural Dynamics

2A GREGORY PLACE, HARRIS PARK (SSD-31179510)

Acoustic Assessment for SSDA

14 June 2022

2A Gregory Place P/L

TM724-01F01 Acoustic Assessment for SSDA SEAR 12 (r1)

35 1982-2017 ACOUSTIC ENGINEERING EXCELLENCE

Sydney Melbourne Brisbane Gold Coast Kuwait Singapore
Renzo Tonin & Associates ABN 29 117 462 861
Level 1/418A Elizabeth St SURRY HILLS NSW 2010 | PO Box 877 STRAWBERRY HILLS NSW 2012
P (02) 8218 0500 F (02) 8218 0501 sydney@renzotonin.com.au www.renzotonin.com.au

aaac Association of Australian Acoustical Consultants

Document details

Detail	Reference
Doc reference:	TM724-01F01 Acoustic Assessment for SSDA SEAR 12 (r1)
Prepared for:	2A Gregory Place P/L
Attention:	Raymond Raad

Document control

Date	Revision history	Non-issued revision	Issued revision	Prepared	Instructed	Reviewed / Authorised
30/5/2022	Prepare report		0	T. Taylor	T. Taylor	Y.Kalkunte
14/6/2022	Prepare report		1	T. Taylor	T. Taylor	Y.Kalkunte
File Path: \\SYD-SERVER.rtagroup.local\rtagroupsyd\AssocSydProjects\TM701-TM750\TM724 yk 2A Gregory Place, Harris Park\1 Docs\TM724-01F01 Acoustic Assessment for SSDA SEAR 12 (r1).docx						

Contents

List of tables

Executive Summary

Renzo Tonin & Associates was engaged to undertake an acoustic assessment of the proposed residential development at 2A Gregory Place, Harris Park to accompany the State Significant Development Application (SSDA).

The purpose of the study was to address SEAR 12, which states:

12. Noise and Vibration

- Provide certification from an acoustic engineer that the development could achieve compliance with the relevant NSW Environment Protection Authority (EPA) guidelines.

Relevant NSW EPA guidelines relating to noise and vibration are as follows:

- Operational noise emissions from the site to be regulated by EPA *Noise Policy for Industry* and *Road Noise Policy* and
- Construction noise to be regulated with reference to the *EPA Interim Construction Noise Guidelines* and *Assessing Vibration: A Technical Guideline*.

A detailed survey of ambient and background noise at the site was conducted using a combination of long term noise logging and attended noise measurements. The results of these measurements were used in conjunction with the EPA guidelines to set operational and construction noise limits.

Noise survey results and analysis at the site indicated that:

- The primary external noise sources at the site is road traffic from Hassall Street, which creates moderate noise levels (the apartments nearest Hassall Street are over 40m from the road).
- The Our Lady of Lebanon Church and associated car park did not cause significant levels of noise impact on the southern part of the site.

The primary operational noise associated with the site will be:

- Noise from plant and equipment. This is assessed with reference to the EPA *Noise Policy for Industry*. Primary plant and equipment items will consist of car park ventilation, air-conditioning plant and a sub-station. Compliance with noise emission goals will be achievable using standard acoustic treatment items (in-duct lining, acoustic louvres or similar) which would be determined at CC stage.
- Noise as a result of additional traffic created on Gregory Place. Gregory Place is a local road. Analysis of projected future traffic generation (and the noise associated with it) indicates that noise levels for residences located on Gregory Place will be compliant with the EPA *Road Noise Policy*.

With respect to construction noise:

- Given the proximity of the site to residential development to the east (Gregory Place) and south (Ruse Street), exceedance of EPA Noise Management Levels will potentially occur, particularly for noise intensive activities (bulk excavation) located close to the eastern or southern boundaries of the site. Exceedance of Noise Management Levels is common for construction projects in close proximity to residences.

- Given this, reasonable and feasible noise mitigation is likely to be required and would be identified in detail in a Construction Noise and Vibration Management Plan. This CNVMP would typically be prepared after development approval once a construction program is created.

We conclude that the proposed development is capable of complying with relevant EPA noise and vibration guidelines, as required by SEAR 12.

1 Introduction

Renzo Tonin & Associates was engaged to undertake an acoustic assessment of the proposed residential development at 2A Gregory Place, Harris Park to accompany the State Significant Development Application (SSDA).

This assessment addresses to requirements of Planning Secretary's Environmental Assessment Requirement 12, which states:

12. Noise and Vibration

- Provide certification from an acoustic engineer that the development could achieve compliance with the relevant NSW Environment Protection Authority (EPA) guidelines.

Relevant NSW EPA guidelines relating to noise are as follows:

- Operational noise emissions from the site to be regulated by EPA Noise Policy for Industry and Road Noise Policy and
- Construction noise to be regulated with reference to the EPA Interim Construction Noise Guidelines.

As part of this assessment, Renzo Tonin & Associates conducted a long-term unattended noise survey at the site to examine the existing ambient noise levels impacting the site and the background noise environment as is necessary for the study of potential noise emissions from the site.

Noise emission goals and operational noise mitigation recommendations to protect nearby noise sensitive receivers (as required by relevant EPA guidelines) are set out in Section 4 (for operational noise) and section 6 (for construction noise and vibration).

Appendix A contains a glossary of acoustic terms used in this report.

2 Project description

The SSDA seeks consent for a concept proposal for affordable housing and build-to-rent development comprising approximately 483 dwellings with three free standing four to eight storey buildings.

The site is bounded as follows:

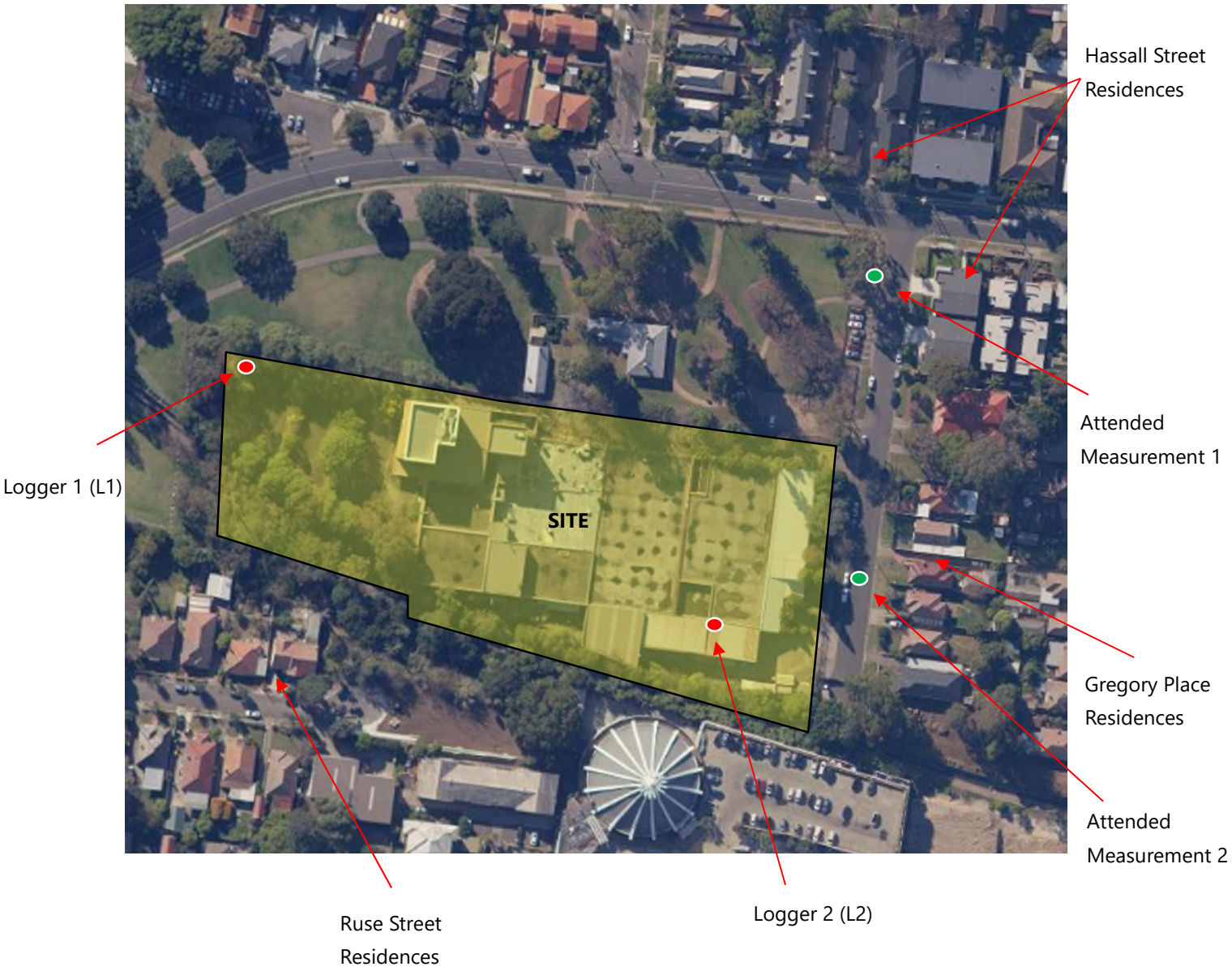
- To the north and West by parkland (Hambledon Cottage Reserve and Experiment Farm Reserve respectively). Further to the north and west lies Hassall St, a collector/semi-arterial road (which changes its name to Parkes Street).
- To the south by Clay Cliff Creek. Further to the south lies residential development (Ruse St residences at the western end of the southern boundary) and church/learning centre/car park (at the eastern end of the southern boundary).
- To the east by Gregory Place (a local road). Further to the east lies residential development (Gregory Place residences).

While the site is not highly impacted by external noise, the primary external noise source at the site is road traffic from Hassell Street.

The nearest noise sensitive development to the site is as follows:

- Ruse St Residences.
- Gregory Place residences.
- Our Lady of Lebanon Church/early learning centre.
- Hambledon Cottage Reserve.
- Experiment Farm Reserve.

Aerial photo below shows the site location showing noise/vibration measurement locations and the surrounding environment.



The proposed development consists of:

- Three residential buildings between 4 and 8 storeys high (each building consisting of multiple towers with a number of roof terrace areas).
- Two level basement car park inclusive of loading dock.
- Sub-station in Stage 1 (the eastern most building)

3 Existing Noise Environment

The noise environment of an area varies over time. The NSW Environmental Protection Authority's (EPA) Noise Policy for Industry (NPfI) outlines standard time periods over which the background and ambient noise levels are to be determined, which is as follows:

- Day: 07:00-18:00 Monday to Saturday and 08:00-18:00 Sundays & Public Holidays
- Evening: 18:00-22:00 Monday to Sunday & Public Holidays
- Night: 22:00-07:00 Monday to Saturday and 22:00-08:00 Sundays & Public Holidays

As such, the existing background and ambient noise levels on the site will be summarised in accordance with the NPfI.

An unattended noise survey was carried out to quantify the existing noise environment. Two unattended long-term noise monitors were installed within the site to measure the ambient and background noise levels. In addition, an attended measurement of road traffic noise was undertaken on 28 April 2022 (XL2 Type 1 sound level meter, A-weighted fast response mode) to supplement the noise logging data. The table below presents the description of the noise monitoring locations.

Table 1: Noise monitoring locations

Location ID	Description
Long-term noise monitoring	
L1	28 April to 10 May, installed in the north-western corner of the site, microphone 2.5m above ground in order to obtain unobstructed view to road traffic). Logging location selected to determine road traffic noise impacts on the site. It is also representative of ambient noise levels for residences facing Hassell Street.
L2	28 April to 3 May, installed on the roof near the south-east corner of the site (clear line of site to Our Lady of Lebanon Church/car park). Logging location selected to determine background noise levels at nearby residences (adjacent to the rear of the site on Ruse Street and on Gregory Place). In addition, it was installed at this location to determine of operational noise from the Our Lady of Lebanon Church/car park is a potential noise impact on the site.

The noise monitors record noise levels on a continuous basis and stores data every fifteen minutes. The noise logger was calibrated before and after measurements and no significant deviation in calibration was noted. The noise monitoring equipment used complies with Australian Standard 1259.2-1990 "Acoustics - Sound Level Meters" and is designated as Type 2 instruments suitable for field use. The long-term noise monitoring methodology is detailed in APPENDIX B, and noise level-vs-time graphs of the data are included in APPENDIX C.

3.1 Ambient noise levels

The results from the noise survey are summarised in Table 2 below.

Table 2: Measured background and ambient noise levels

Monitoring Duration	Noise Descriptor	Representative Noise Levels		
		Day[1]	Evening[2]	Night[3]
Monitoring location L1. Representative of: -Road noise impact from Hassell Street (L_{eq} noise levels). -Background Noise Levels at Hassell Street Residences (L_{90} noise levels)				
28/4/2022 to 10/5/2022	L_{90} Background Noise Levels	50	48	40
	L_{Aeq} Ambient Noise Levels	60	59	56
Monitoring location L2. Representative of: -Noise generation from Our Lady of Lebanon Church/Car Park. Industrial Development (L_{eq} noise levels). -Background Noise Levels at Ruse Street and Gregory Place Residences (L_{90} noise levels)				
28/4/2022 to 3/5/2022	L_{90} Background Noise Levels	46	47	40
	L_{Aeq} Ambient Noise Levels	54	55	49

Notes: The following time periods are in accordance with the NPfI:
1. Day: 07:00-18:00 Monday to Saturday and 08:00-18:00 Sundays & Public Holidays
2. Evening: 18:00-22:00 Monday to Sunday & Public Holidays
3. Night: 22:00-07:00 Monday to Saturday and 22:00-08:00 Sundays & Public Holidays

Ambient noise levels at the site are characterised by moderate traffic noise levels along the northern boundary (the site is over 40m from Hassell Street).

Review of noise logging recorded at location 2 indicated that there where no significant periods of high noise levels that could be attributed to noise from Our Lady of Lebanon Church or the associated car park.

3.2 Attended Noise Measurements

External noise levels from road traffic were determined and are presented below in order to supplement the long term noise logging data. They were made to supplement the noise logging data.

Ambient noise levels on Gregory Place are primarily defined by traffic noise from Hassell Street, with the noise level dropping off from the northern and to southern end of Gregory Place as the distance from Hassell Street increases.

Table 3: External noise levels (Hassall Street/Gregory Place)

Noise Monitoring Location	Measured Noise Level	
	Day[1]	Night[2]
Hassell Street (8m from Road) – 5.30pm	67dB(A)$L_{eq,15hr}$	63dB(A)$L_{eq,9hr}$*
Gregory Place (120m from Hassell St) – 5.45pm	51dB(A)$L_{eq,15hr}$	48dB(A)$L_{eq,9hr}$*

Notes: 1. Day: 07:00-22:00 Monday to Sunday
2. Night: 22:00-07:00 Monday to Sundays
*Estimated based on day/night difference from long term noise loggers.

4 Noise emission assessment

4.1 Criteria

4.1.1 Parramatta DCP

There are no numerical noise emission requirements in the Parramatta DCP 2011. In the absence of such, the EPA's Noise Policy for Industry (NPfI) is the most commonly adopted noise emission guideline for assessment of noise emissions, and is detailed below.

4.1.2 EPA Noise Policy for Industry

4.1.2.1 Project intrusive noise levels

The intrusiveness of a noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (represented by the $L_{Aeq,15min}$ descriptor) does not exceed the background noise level measured in the absence of the source by more than 5dB(A). The project intrusiveness noise level, which is only applicable to residential receivers, is determined as follows:

$L_{Aeq,15min}$ Intrusiveness noise level = Rating Background Level (RBL) plus 5 dB(A)

Based on the long-term background noise monitoring results obtained and presented in Table 2 above, the intrusiveness noise levels for residential receivers are determined and shown in Table 4 below.

Table 4: Project intrusiveness noise levels

Receivers	Intrusiveness noise level, LAeq,15min		
	Day[1]	Evening[2]	Night[3]
L1 (Hassell Street residences)	50 + 5 = 55	48 + 5 = 53	40 + 5 = 45
L2 (Ruse Street and Gregory Place Residences)	46 + 5 = 51	47 + 5 = 52	40 + 5 = 45

Notes: Day: 07:00-18:00 Monday to Saturday and 08:00-18:00 Sundays & Public Holidays
Evening: 18:00-22:00 Monday to Sunday & Public Holidays
Night: 22:00-07:00 Monday to Saturday and 22:00-08:00 Sundays & Public Holidays

4.1.2.2 Amenity noise levels

The project amenity noise levels for different time periods of the day are determined in accordance with Section 2.4 of the NPfI. The NPfI recommends amenity noise levels ($L_{Aeq,period}$) for various receivers including residential, commercial and industrial receivers and sensitive receivers such as schools, hotels, hospitals, churches and parks. These "recommended amenity noise levels" represent the objective for total industrial noise experienced at a receiver location. However, when assessing a single industrial development and its impact on an area, "project amenity noise levels" apply.

To ensure that the total industrial noise level (existing plus new) remain within the recommended amenity noise levels for an area, the project amenity noise level that applies for each new industrial noise source is determined as follows:

$L_{Aeq,period}$ Project amenity noise level = $L_{Aeq,period}$ Recommended amenity noise level – 5dB(A)

Furthermore, given that the intrusiveness noise level is based on a 15-minute assessment period and the project amenity noise level is based on day, evening and night assessment periods, the NPfI provides the following guidance on adjusting the $L_{Aeq,period}$ level to a representative $L_{Aeq,15minute}$ level in order to standardise the time periods.

$L_{Aeq,15minute}$ = $L_{Aeq,period}$ + 3dB(A)

Table 5: Project amenity noise levels for nearby receivers

Period	Recommended Amenity Noise Level	Project Amenity Noise Level	Project Amenity Noise level (adjusted for $L_{eq(15min)}$)
	$L_{Aeq,\ Period}$	$L_{Aeq,\ Period}$	$L_{Aeq,\ 15min}$
Residential receivers			
Day	55	55 - 5 = 50	50 + 3 = 53
Evening	45	45 - 5 = 40	40 + 3 = 43
Night	40	40 - 5 = 35	35 + 3 = 38
Church receiver			
When in use	40 (internal noise level)	40 - 5 = 35 (internal noise level)	35 + 3= 38 (internal noise level)
Hambledon Cottage			
When in use	50	45	48

Notes: Day: 07:00-18:00 Monday to Saturday and 08:00-18:00 Sundays & Public Holidays
Evening: 18:00-22:00 Monday to Sunday & Public Holidays
Night: 22:00-07:00 Monday to Saturday and 22:00-08:00 Sundays & Public Holidays

4.1.2.3 NPfI Project noise trigger levels

In accordance with the NPfI, the project noise trigger levels, which are the lower (ie. more stringent) value of the project intrusiveness noise level and project amenity noise level, have been determined and shown in the table below.

Table 6: Project noise trigger levels

Receiver type	Project noise trigger levels, dB(A)$L_{eq(15min)}$,		
	Day	Evening	Night
Nearby residences (Ruse Street, Gregory Place)	51	43	38
Nearby residences (Hassall Street)	53	43	38
Our Lady of Lebanon Church	38 (Internal noise level)	38 (Internal noise level)	38 (Internal noise level)
Hambledon Cottage Reserve	48	48	48

Notes: Day: 07:00-18:00 Monday to Saturday and 08:00-18:00 Sundays & Public Holidays
Evening: 18:00-22:00 Monday to Sunday & Public Holidays
Night: 22:00-07:00 Monday to Saturday and 22:00-08:00 Sundays & Public Holidays

4.1.3 Road traffic noise (additional road traffic created by the development).

Noise impacts from the potential increases in traffic on the surrounding road network due to construction and operational activities from the Proposal is assessed in accordance with the NSW *Road Noise Policy* (DECCW, 2011) (RNP). The RNP sets out criteria to be applied to particular types of road and land uses. These noise criteria are to be applied when assessing noise impact and determining mitigation measures for sensitive receivers that are potentially affected by road traffic noise associated with the construction and operation of the subject site, with the aim of preserving the amenity appropriate to the land use.

The Proposal will be using sub-arterial / arterial roads and not local roads. Therefore, for existing residences affected by additional traffic on existing sub-arterial / arterial roads generated by land use developments, the following RNP road traffic noise criteria would apply.

Table 7: RNP Road Traffic Noise Criteria, dB(A)

Road Category	Type of Project/Land Use	Assessment Criteria, dB(A)	
		Day 7am – 10pm	Night 10pm – 7am
Freeway/arterial/sub-arterial roads (Hassell Street)	3. Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq,(15\ hour)}$ 60 (external)	$L_{Aeq,(9\ hour)}$ 55 (external)
Local Road (Gregory Place)	3. Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq,(1\ hour)}$ 55 (external)	$L_{Aeq,(1\ hour)}$ 50 (external)

Further to the above, the RNP states the following for land use developments generating additional traffic:

> *"For existing residences and other sensitive land uses affected by* **additional traffic on existing roads generated by land use development***, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'."*

The RNP states that in assessing feasible and reasonable mitigation measures, an increase of up to 2 dB represents a minor impact that is considered barely perceptible to the average person.

4.2 Analysis and Recommendations – Plant and Equipment Noise

Noise from plant and equipment is assessed with reference to the EPA Noise Policy for Industry (criteria as outlined in Section 5.2).

The details of the mechanical plant and equipment servicing this development are yet to be finalised at this stage of the development. Therefore, the noise impacts from mechanical plant and equipment should be undertaken during the Detailed Design stage of the project.

However, we note:

- It is likely that primary plant and equipment items consist of car park/basement ventilation plant, stair pressure fans, lobby supply utilities spaces fans and air-conditioner condensers.
- Major fans located either in the basement or roof level such as car park ventilation (typically 75dB(A) at 3m), and utilities fans (typically 65dB(A) at 3m distance) are likely to require induct acoustic treatment between fan and external intake/discharge. This will consist of lined ducting or acoustic attenuators. The extent of treatment will depend on fan selection and position relative to the nearest apartment. Indicatively, at least a 3m zone should be allowed for in ductwork between the fan and any external grill to ensure sufficient space for acoustic treatment.
- Air conditioner Condensers (typically 51-55dB(A) at 1m distance):
    - Given the distance from the buildings to nearby development outside of the site, it is unlikely that condensers will exceed noise emission targets.
    - The key concern will be the acoustic impact on apartments within the development itself.
    - If located on balconies, condensers are unlikely to require acoustic treatment other than vibration isolation pads.
    - If located on roof tops – careful positioning and equipment selection will be required if located on roof areas that are overlooked by other apartments in the development. Maximising the distance between the plant are and apartment windows will potentially be

required. In addition, use of night quiet modes will potentially be required. This will be determined as condenser locations are finalised.

- Substation:
    - We note that there is a substation proposed to be located in Stage 1 (eastern most building).
    - Substations typically do not require acoustic treatment other than vibration isolation.
    - The need to incorporate acoustic treatment to any plant room ventilation/louvre will be determined on substation selection (detailed design phase).
    - Although unlikely to be required, it is recommended that a spatial allowance is made for a 200mm deep acoustic louvre for any substation plant room ventilation louvre. Alternatively, louvres can be omitted and acoustically treated plant room supply/exhaust fans can be provided.

Loading dock – there is no significant retail tenancy proposed at the site. The dock is for residential use. As such, it is unlikely that the loading dock would be used be vehicles large than removalist and waste vehicles, and would typically be during daytime or evening periods only. Provided the loading dock is not permitted to be used at night, noise disturbance from the use of the loading dock is unlikely.

4.3 Analysis – Traffic Generated on Public Roads as a Increased Traffic.

Access to the basement car park is via a driveway on Gregory Place. As such, the volume of traffic on Gregory Place is likely to increase as a result of additional road traffic created by the site. This is examined below.

- Noise as a result of additional road traffic is assessed based on the following assumptions:
- Typical passenger vehicle travel speed on Gregory place of 40km/h.
- Typical passenger vehicle noise level when driving on Gregory place of 90dB(A) sound power.
- Noise levels are to comply with the table in section 5.3 at the façade of the Gregory Place residences, taking into account a 2.5dB(A) façade reflection.

In order to comply with the noise targets identified in section 5.3 with respect to noise generation as a result of increased traffic on local roads, the site would be able to generate the following numbers of vehicles:

- Up to 350 per hour in the daytime period (7am-10pm) and
- Up to 100 per hour in the nigh time period (10pm to 7am).

We note that in the Traffic and Parking Assessment dated 10/5/2022 by Traffic Solutions P/L that peak traffic generation on Gregory Place were expected to be:

- 92 in the AM peak hour (8.15am-9.15am) and
- 72 in the PM peak hour (5pm to6pm).

Given the anticipated number of vehicle movements is less than 350 per hour (day) or 100 per hour (night), the anticipated noise generated by additional traffic created by the development will comply with EPA Road Noise Policy requirements.

5 Construction Noise and Vibration Assessment

5.1 Construction noise objectives

5.1.1 Noise management levels (NMLs)

The NSW Interim Construction Noise Guideline (ICNG, 2009) provides guidelines for assessing noise generated during the construction phase of developments.

The key components of the guideline that are incorporated into this assessment include:

- Use of L_{Aeq} as the descriptor for measuring and assessing construction noise.
- Application of reasonable and feasible noise mitigation measures.
- As stated in the ICNG, a noise mitigation measure is feasible if it is capable of being put into practice and is practical to build given the project constraints.
- Selecting reasonable mitigation measures from those that are feasible involves making a judgement to determine whether the overall noise benefit outweighs the overall social, economic and environmental effects.

The ICNG provides two methods described for the assessment of construction noise, being either a quantitative or a qualitative assessment. A quantitative assessment is recommended for major construction projects of significant duration and involves the measurement and prediction of noise levels and assessment against set criteria. A qualitative assessment is recommended for small projects with duration of less than three weeks and focuses on minimising noise disturbance through the implementation of reasonable and feasible work practices, and community notification. Given the scale and duration of the construction works proposed, a quantitative assessment is carried out herein, consistent with the ICNG requirements.

The table below reproduced from the ICNG, sets out the airborne noise management levels and how they are to be applied for residential receivers.

Table 8: Noise management levels at residential receivers

Time of day	Management level $L_{Aeq\ (15\ min)}$ *	How to apply
Recommended standard hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or public holidays	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise. • Where the predicted or measured LAeq (15 min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. • The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration, as well as contact details.
	Highly noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. • Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: - times identified by the community when they are less sensitive to noise (such as before/ after school for works near schools, or mid-morning or mid-afternoon for works near residences - if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours	Noise affected RBL + 5 dB	• A strong justification would typically be required for works outside the recommended standard hours. • The proponent should apply all feasible and reasonable work practices to meet the noise affected level. • Where all feasible and reasonable practices have been applied and noise is more than 5dB(A) above the noise affected level, the proponent should negotiate with the community. • For guidance on negotiating agreements see ICNG section 7.2.2.

* Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 metres above ground level. If the property boundary is more than 30 metres from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 metres of the residence. Noise levels may be higher at upper floors of the noise affected residence.

Table 9 sets out the ICNG noise management levels for other noise sensitive receiver locations.

Table 9: Noise management levels at other noise sensitive land uses

Land use	Time of day	Where objective applies	Management level $L_{Aeq\ (15\ min)}$
Industrial premises	When in use	Outdoor noise level	75

5.1.2 Summary of construction noise management levels

A summary of construction Noise Management Levels is presented below. In the event these Noise Management Levels are exceeded, reasonable and feasible construction noise mitigation is required.

Table 10: Construction noise management levels (Standard Hours)

Location description	Noise management level $L_{Aeq(15min)}$[1]
	Monday to Fridays (7:00am to 6:00pm) **Saturdays (8:00am to 1:00pm)**
Nearby residences (Hassall Street)	50 + 10 = 60
Nearby residences (Ruse Street, Gregory Place)	46 + 10 = 56
Our Lady of Lebanon Church	45 (internal noise level)
Hambledon Cottage Reserve	60

Notes:
1. Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5m above ground level. If the property boundary is more than 30m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30m of the residence. Noise levels may be higher at upper floors of the noise affected residence.
2. Noise management levels apply when receiver areas are in use only.
3. Day time background noise levels for residential receivers are presented in Table 2.

5.2 Construction vibration objectives

Construction vibration is associated with three main types of impact:

- disturbance to building occupants
- potential damage to buildings, and
- potential damage to sensitive equipment in a building.

Generally, if disturbance to building occupants is controlled, there is limited potential for structural damage to buildings.

Vibration amplitude may be measured as displacement, velocity, or acceleration.

- Displacement (x) measurement is the distance or amplitude displaced from a resting position. The International System of Units (SI unit) for distance is the metre (m), although common industrial standards include mm.
- Velocity ($v=\Delta x/\Delta t$) is the rate of change of displacement with respect to change in time. The SI unit for velocity is metres per second (m/s), although common industrial standards include mm/s. The Peak Particle Velocity (PPV) is the greatest instantaneous particle velocity during a given time interval. If measurements are made in 3-axis (x, y, and z) then the resultant PPV is the vector sum (i.e. the square root of the summed squares of the maximum velocities) regardless of when in the time history those occur.

- Acceleration (a=Δv/Δt) is the rate of change of velocity with respect to change in time. The SI unit for acceleration is metres per second squared (m/s2). Construction vibration goals are summarised below.

Construction vibration goals are summarised below.

5.2.1 Disturbance to buildings occupants

The acceptable vibration values to assess the potential for human annoyance from vibration are set out in the NSW 'Environmental Noise Management *Assessing Vibration: A Technical Guideline*' (AVTG).

To assess the potential for vibration impact on human comfort, an initial screening test will be done based on peak velocity units, as this metric is also used for the cosmetic damage vibration assessment. The screening test is based on the continuous vibration velocity (i.e. vibration that continues uninterrupted for a defined period). If the predicted vibration exceeds the initial screening test, the total estimated Vibration Dose Value (i.e. eVDV) will be determined based on the level and duration of the vibration event causing exceedance.

The initial screening test values and VDVs recommended in BS 6472-1992 for which various levels of adverse comment from occupants may be expected, are presented in Table 5 4. The 'Low probability of adverse comment eVDV' represent the preferred and maximum value presented in the AVTG.

Table 11: Vibration management levels for disturbance to building occupants

Place and Time	Initial screening test Velocity, PEAK, mm/s (>8Hz)	Low probability of adverse comment eVDV $m/s^{1.75}$	Adverse comment possible eVDV $m/s^{1.75}$	Adverse comment probable eVDV $m/s^{1.75}$
Residential buildings 16 hr day2	0.56	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8 hr night2	0.40	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8
Offices, schools, educational institutions and places of worship (day or night)	1.10	0.4 to 0.8	0.8 to 1.6	1.6 to 2.4

Notes: 1. Examples include hospital operating theatres and precision laboratories where sensitive operations are occurring. There may be cases where sensitive equipment or delicate tasks require more stringent criteria than the human comfort criteria specify above

2. Daytime is 7am to 10pm and night-time is 10pm to 7am

5.2.2 Building damage

Potential structural damage of buildings as a result of vibration is typically managed by ensuring vibration induced into the structure does not exceed certain limits and standards, such as British Standard 7385 Part 2 and German Standard DIN4150-3. Currently there is no existing Australian Standard for assessment of structural building damage caused by vibration energy.

It is noted that vibration levels required to cause minor cosmetic damage are typically 10 times higher than levels that will cause disturbance to building occupants. Many building occupants assume that building damage is occurring when they feel vibration or observe rattling of loose objects, however the

level of vibration at which people perceive vibration or at which loose objects may rattle is far lower than vibration levels that can cause damage to structures.

Within British Standard 7385 Part 1, different levels of structural damage are defined:

- *Cosmetic - The formation of hairline cracks on drywall surfaces, or the growth of existing cracks in plaster or drywall surfaces; in addition the formation of hairline cracks in mortar joints of brick/concrete block construction.*
- *Minor - The formation of large cracks or loosening of plaster or drywall surfaces, or cracks through bricks/concrete blocks.*
- *Major - Damage to structural elements of the building, cracks in supporting columns, loosening of joints, splaying of masonry cracks, etc.*

The vibration limits in Table 1 of British Standard 7385 Part 2 are for the protection against cosmetic damage, however guidance on limits for minor and major damage is provided in Section 7.4.2 of the Standard:

7.4.2 Guide values for transient vibration relating to cosmetic damage

Limits for transient vibration, above which cosmetic damage could occur are given numerically in Table 1 and graphically in Figure 1. In the lower frequency region where strains associated with a given vibration velocity magnitude are higher, the guide values for the building types corresponding to line 2 are reduced. Below a frequency of 4 Hz, where a high displacement is associated with a relatively low peak component particle velocity value a maximum displacement of 0.6 mm (zero to peak) should be used.

Minor damage is possible at vibration magnitudes which are greater than twice those given in Table 1, and major damage to a building structure may occur at values greater than four times the tabulated values.

Within DIN4150-3, damage is defined as "any permanent consequence of an action that reduces the serviceability of a structure or one of its components" (p.4). The Standard also outlines:

"For buildings as in lines 2 and 3 of Tables 1, 4 or B.1, the serviceability is considered to have been reduced if, for example

- *cracks form in plastered or rendered surfaces of walls;*
- *existing cracks in a structure are enlarged;*
- *partitions become detached from load-bearing walls or floor slabs.*

These effects are deemed 'minor damage. " (DIN4150.3:2016, p.6)

While the DIN Standard defines the above damage as 'minor', based on the definitions provided in BS7385, the DIN standard is considered to deal with cosmetic issues rather than major structural failures.

5.2.2.1 British Standard

British Standard 7385: Part 2 'Evaluation and measurement of vibration in buildings', can be used as a guide to assess the likelihood of building damage from ground vibration. BS7385 suggests levels at which 'cosmetic', 'minor' and 'major' categories of damage might occur.

The cosmetic damage levels set by BS 7385 are considered 'safe limits' up to which no damage due to vibration effects has been observed for certain particular building types. Damage comprises minor non-structural effects such as hairline cracks on drywall surfaces, hairline cracks in mortar joints and cement render, enlargement of existing cracks and separation of partitions or intermediate walls from load bearing walls. 'Minor' damage is considered possible at vibration magnitudes which are twice those given and 'major' damage to a building structure may occur at levels greater than four times those values.

BS7385 is based on peak particle velocity and specifies damage criteria for frequencies within the range 4Hz to 250Hz, being the range usually encountered in buildings. At frequencies below 4Hz, a maximum displacement value is recommended. The values set in the Standard relate to transient vibrations and to low-rise buildings. Continuous vibration can give rise to dynamic magnifications due to resonances and may need to be reduced by up to 50%. Table 12 sets out the BS7385 criteria for cosmetic, minor and major damage.

Regarding heritage buildings, British Standard 7385 Part 2 (1993) notes that "a building of historical value should not (unless it is structurally unsound) be assumed to be more sensitive" (p.5).

Table 12: BS 7385 structural damage criteria

Group	Type of structure	Damage level	Peak component particle velocity, mm/s		
			4Hz to 15Hz	15Hz to 40Hz	40Hz and above
1	Reinforced or framed structures Industrial and heavy commercial buildings	Cosmetic	50		
		Minor*	100		
		Major*	200		
2	Un-reinforced or light framed structures Residential or light commercial type buildings	Cosmetic	15 to 20	20 to 50	50
		Minor*	30 to 40	40 to 100	100
		Major*	60 to 80	80 to 200	200

Notes: Peak Component Particle Velocity is the maximum Peak particle velocity in any one direction (x, y, z) as measured by a tri-axial vibration transducer.

* Minor and major damage criteria established based on British Standard 7385 Part 2 (1993) Section 7.4.2

5.2.2.2 German Standard

German Standard DIN 4150 - Part 3 (2016) 'Vibration in buildings - Effects on Structures' (DIN 4150-3:2016), also provides recommended maximum levels of vibration that reduce the likelihood of building damage caused by vibration and are generally recognised to be conservative.

DIN 4150-3:2016 presents the recommended maximum limits over a range of frequencies (Hz), measured at the foundations, in the plane of the uppermost floor of a building or structure or vertically on floor slabs. The vibration limits at the foundations increase as the frequency content of the vibration increases. The criteria are presented in Table 13.

Table 13: DIN 4150-3:2016 structural damage criteria

Group	Type of structure	Vibration velocity, mm/s				
		At foundation in all directions at frequency of			Plane of floor uppermost storey in horizontal direction	Floor slabs, vertical direction
		1Hz to 10Hz	10Hz to 50Hz	50Hz to 100Hz	All frequencies	All frequencies
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 Groups 1 and 2 and are of great intrinsic value (eg listed buildings) – **Hambledon Cottage**	3	3 to 8	8 to 10	8	20

5.2.3 Damage to buried services

Section 5.3 of DIN 4150-3:2016 also sets out guideline values for vibration velocity to be used when evaluating the effects of vibration on buried pipework. These values, which apply at the wall of the pipe, are reproduced and presented in Table 5 7 below.

Table 14: DIN 4150-3:1999 Guideline values for vibration velocity to be used when evaluating the effects of short-term vibration on buried pipework

Line	Pipe Material	Guideline values for vibration velocity measured on the pipe, mm/s
1	Steel (including welded pipes)	100
2	Vitrified clay, concrete, reinforced concrete, prestressed concrete, metal (with or without flange)	80
3	Masonry, plastics	50

For long-term vibration the guideline levels presented in Table 14 should be halved.

Recommended vibration goals for electrical cables and telecommunication services such as fibre optic cables range from between 50 mm/s and 100 mm/s. It is noted however that although the cables may sustain these vibration levels, the services they are connected to, such as transformers and switch blocks, may not. It is recommended that should such equipment be encountered during the construction process an individual vibration assessment should be carried out. This may include a specific vibration impact statement addressing impact on the utility and consultation with the utility provider to confirm specific vibration requirements.

5.3 Construction noise and vibration assessment

5.3.1 Construction noise sources

A list of the loudest typical construction items is presented in the table below.

Table 15: Typical construction equipment & sound power levels, dB(A) re 1pW

Plant item	Plant description	Sound power levels LAeq(15min)
1	Excavator (with hydraulic hammer, stop/start use)	117 (inclusive of 5dB(A) penalty for irritating characteristics, and assuming 50% use in 15 minute period)
2	Excavator (no hydraulic hammer)	105
3	Tower crane (electric)	100
4	Concrete pump	105
5	Piling (augured)	105

The sound power levels for the majority of construction plant and equipment presented in the above table are based on maximum noise levels given in Table A1 of Australian Standard 2436 - 2010 'Guide to Noise Control on Construction, Demolition and Maintenance Sites', the Interim Construction Noise Guideline (ICNG), information from past projects and/or information held in our library files.

5.3.2 Predicted noise levels

The table below presents noise levels likely to be experienced at the nearby affected receivers based on the construction activities and plant and equipment associated with the proposed site. The noise level range presented represents the plant item operating at a location furthest from the receiver and a location closest to the receiver.

Table 16: Predicted noise levels for typical construction works

Plant Item	Plant description	Predicted dB(A)$L_{eq(15min)}$ construction noise levels			
		Location 1 (Gregory Place/Ruse Street residences)	Location 2 (Hassell Street residences)	Location 3 (Church - internal)	Location 4 (Hambledon Cottage Reserve)
Noise management level (external) – Standard construction hours					
1	Excavator (with hydraulic hammer)	60-80	60-72	40-60	60-85
2	Excavator (no hydraulic hammer)	55-75	55-65	35-55	55-80
3	Tower crane (electric)	50-60	50-60	30-40	50-60
4	Piling (augured)	50-73	50-60	35-55	50-75

The predicted noise levels presented above indicate that the noise levels during the excavation and construction stages are likely exceed the NML at nearby residential receivers when working near the eastern and southern property boundaries of the site.

When using hydraulic hammers near the southern or eastern boundaries of the site, there is a risk of residential receivers on Gregory Place or Ruse Street being highly noise affected (i.e., exposed to noise levels greater than 75 dB(A)$L_{eq(15min)}$) if working close to the property boundary.

It is likely that reasonable and feasible noise mitigation will be required. This would typically be addressed in a Construction Noise and Vibration Management Plan, prepared at CC stage. Indicative management measures are detailed below.

General noise management measures

The following general noise management measures are recommended for all receiver locations:

- Plant and equipment must be properly maintained.
- Use of electric cranes (as opposed to diesel) and bored piling (as opposed to vibrated) whenever feasible.
- Strategically position plant on site to reduce the emission of noise to the surrounding neighbourhood and to site personnel (locate crane centrally within site)
- Any equipment not in use for extended periods during construction work must be switched off.
- The offset distance between noisy plant and adjacent sensitive receivers is to be maximised where practicable.
- Plant used intermittently to be throttled down or shut down when not in use where practicable.
- The person selected to liaise with the community must be adequately trained and experienced in such matters.

In addition to the noise mitigation measures outlined above, a management procedure will need to be put in place to deal with noise complaints that may arise from construction activities. Each complaint will need to be investigated and appropriate noise amelioration measures put in place to mitigate future occurrences, where the noise in question is in excess of allowable limits.

5.3.3 Vibration assessment

5.3.3.1 Minimum working distances

The recommended minimum working distances for vibration intensive plant are presented below

Table 17: Recommended minimum working distances for vibration intensive equipment

Plant item	Minimum working distance, m					
	Cosmetic damage			Human disturbance		
	Commercial and industrial buildings1	Dwellings and similar structures1	Sensitive structures (e.g. heritage)1	Residences Day2	Offices	Workshops
5 Tonne Excavator w/Hydraulic Breaker, Vibratory Compactor	5	5	10	20	15	10

Notes: 1. Vibration limits referenced from DIN 4150 Structural Damage - Safe Limits for Short-term Building Vibration.
2. Daytime is 7 am to 10 pm;

Site specific buffer distances for vibration significant plant items must be measured on site where plant and equipment is likely to operate close to or within the minimum working distances for cosmetic damage.

With respect to vibration impact on the rail corridor - acceptable vibration impact on rail infrastructure would typically be indicated by Sydney Trains as approval stage. This is commonly approximately 15mm/s PPV, however must be confirmed. This is necessary to determine whether safe working distances or vibration monitoring would be required.

5.3.3.2 Vibration mitigation measures

Assuming that the basement excavation will require excavation in rock, the following vibration management measures are provided to minimise vibration impact from construction activities to the nearest affected receivers and to meet the relevant human comfort and building damage vibration limits:

- Dilapidation surveys should be conducted at Hambledon of the site. This will inform if any of the adjacent industrial development should be subject to vibration criteria different to those identified in Section 6.2.2.2
- At a minimum, vibration measurement during commencement of rock excavation should be made at Hambleton Cottage (heritage item) to determine if there needs to be an adjustment of safe working distances for this item (or use of different excavation methods when in close proximity to the Cottage).
- Notification by letterbox drop would be carried out for all occupied buildings within 100m of the construction site. These measures are to address potential community concerns that perceived vibration may cause damage to property.
- Where construction activity occurs in close proximity to sensitive receivers (Gunya Street Industrial development), vibration testing of actual equipment on site would be carried out prior to their

commencement of site operation to determine acceptable buffer distances to the nearest affected receiver locations.

- A management procedure should be implemented to deal with vibration complaints. Each complaint should be investigated and where vibration levels are established as exceeding the set limits, appropriate amelioration measures should be put in place to mitigate future occurrences.
- Where vibration is found to be excessive, management measures should be implemented to ensure vibration compliance is achieved. Management measures may include modification of construction methods such as using smaller equipment, establishment of safe buffer zones as mentioned above, and if necessary, time restrictions for the most excessive vibration activities. Time restrictions are to be negotiated with affected receivers.

5.3.4 Complaints management

The construction contractor will be responsible for ensuring that all reasonable measures are implemented such as the provision of a Noise and Vibration Complaints Program, to minimise the generation of excessive noise and/or vibration levels from the site to nearby sensitive areas.

Site management contact information to be clearly displayed on site.

Owners and occupants of nearby affected properties are to be informed of a direct telephone line and contact person where any noise and/or vibration complaints related to the operation of the construction activities are to be reported.

6 Conclusion

This report presents an examine of the ability of the site to comply with relevant EPA noise and vibration guidelines, as reuried by SEAR 12.

In order to address SEAR 12:

- Potential noise emissions from the site have been examined with reference to EPA *Noise Policy for Industry*. Noise from plant and equipment will be capable of complying with relevant EPA Noise Policy for Industry requirements. See section 5.2 for recommendations.

- Maximum number of vehicle movements in order to comply with EPA *Road Noise Policy* requirements with respect to additional noise as a result of additional traffic generated on the site is addressed in section 5.3. Examination of the Traffic and Parking Assessment prepared for the site indicates that the number of vehicle movements associated with the site will be such that compliance with the Road Noise Policy will be achieved.

- Demolition and Construction Noise and Vibration has been assessed with respect to EPA *Interim Construction Noise Guidelines*. While noise and vibration impacts from the development have the potential to warrant reasonable and feasible mitigation, noise/vibration impacts are not out of keeping with typical major development and can be suitably managed through the creation of a construction noise and vibration management plan and CC stage. This is addressed in section 6.

As such, the proposed development is suitable at the site from an acoustic viewpoint.

APPENDIX A Glossary of terminology

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
Ambient noise	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
Assessment period	The period in a day over which assessments are made.
Assessment point	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
Background noise	Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L90 noise level (see below).
Decibel [dB]	The units that sound is measured in. The following are examples of the decibel readings of everyday sounds: 0dB The faintest sound we can hear 30dB A quiet library or in a quiet location in the country 45dB Typical office space. Ambience in the city at night 60dB CBD mall at lunch time 70dB The sound of a car passing on the street 80dB Loud music played at home 90dB The sound of a truck passing on the street 100dB The sound of a rock band 115dB Limit of sound permitted in industry 120dB Deafening
dB(A)	A-weighted decibels. The A- weighting noise filter simulates the response of the human ear at relatively low levels, where the ear is not as effective in hearing low frequency sounds as it is in hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.
dB(C)	C-weighted decibels. The C-weighting noise filter simulates the response of the human ear at relatively high levels, where the human ear is nearly equally effective at hearing from mid-low frequency (63Hz) to mid-high frequency (4kHz) but is less effective outside these frequencies.
Frequency	Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch, and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.
Impulsive noise	Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.
Intermittent noise	The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.
L_{Max}	The maximum sound pressure level measured over a given period.
L_{Min}	The minimum sound pressure level measured over a given period.

L_1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L_{10}	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.
L_{90}	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound level meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance, and designed to measure sound pressure levels.
Sound pressure level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound power level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B Long-term noise monitoring methodology

B.1 Noise monitoring equipment

A long-term unattended noise monitor consists of a sound level meter housed inside a weather resistant enclosure. Noise levels are monitored continuously with statistical data stored in memory for every 15-minute period.

Long term noise monitoring was conducted using the following instrumentation:

Description	Type	Octave band data	Logger location
RTA06 (NTi Audio XL2, with low noise microphone)	Type 1	1/1	L1, L2

Note: All meters comply with AS IEC 61672.1 2004 "Electroacoustics - Sound Level Meters" and designated either Type 1 or Type 2 as per table and are suitable for field use.

The equipment was calibrated prior and subsequent to the measurement period using a Brüel & Kjær Type 4230 calibrator. No significant drift in calibration was observed.

B.2 Meteorology during monitoring

Measurements affected by extraneous noise, wind (greater than 5m/s) or rain were excluded from the recorded data in accordance with the NSW NPfI. Determination of extraneous meteorological conditions was based on data provided by the Bureau of Meteorology (BOM), for a location considered representative of the noise monitoring location(s). However, the data was adjusted to account for the height difference between the BOM weather station, where wind speed and direction is recorded at a height of 10m above ground level, and the microphone location, which is typically 1.5m above ground level (and less than 3m). The correction factor applied to the data is based on Table C.1 of ISO 4354:2009 '*Wind actions on structures*'.

B.3 Noise vs time graphs

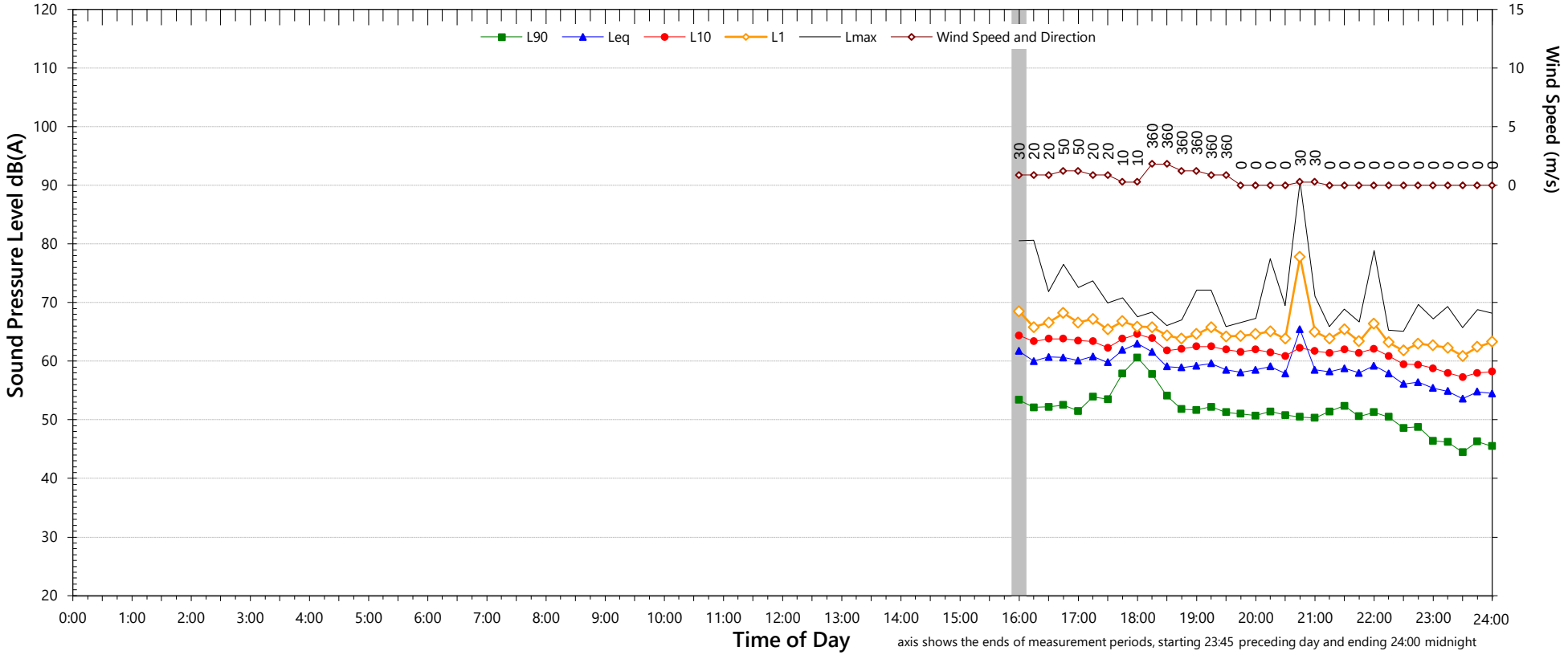
Noise almost always varies with time. Noise environments can be described using various descriptors to show how a noise ranges about a level. In this report, noise values measured or referred to include the L_{10}, L_{90}, and L_{eq} levels. The statistical descriptors L_{10} and L_{90} measure the noise level exceeded for 10% and 90% of the sample measurement time. The L_{eq} level is the equivalent continuous noise level, or the level averaged on an equal energy basis. Measurement sample periods are usually ten to fifteen minutes. The Noise -vs- Time graphs representing measured noise levels, as presented in this report, illustrate these concepts for the broadband dB(A) results.

APPENDIX C Long-term noise monitoring results

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Thursday, 28 April 2022



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	-	51	39
L_{Aeq}	-	60	56

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	68	to	83
L_{AFMax} - L_{Aeq} (Range)	15	to	27

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	-	58
$L_{Aeq\ 1hr}$ upper 10 percentile	-	61
$L_{Aeq\ 1hr}$ lower 10 percentile	-	55

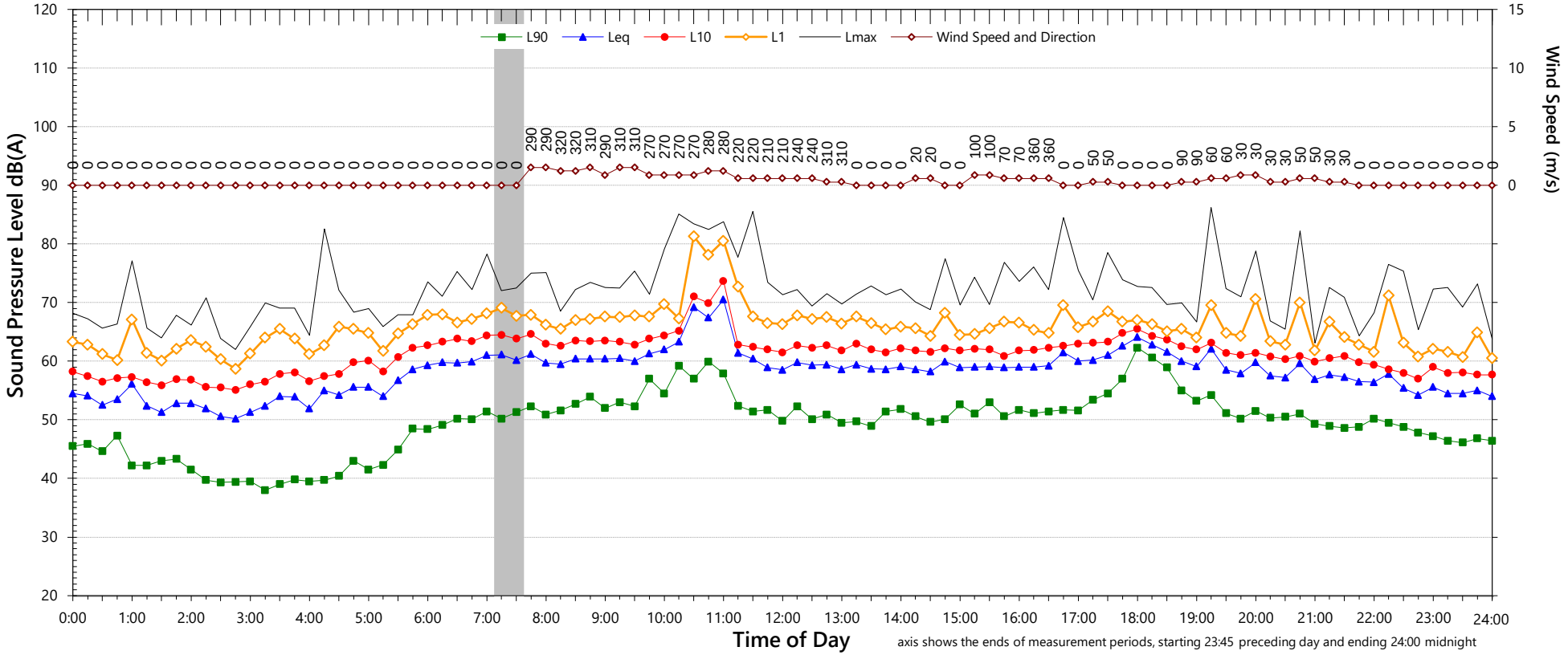
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax} - L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Friday, 29 April 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	50	49	41
L_{Aeq}	62	59	54

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	-	56
$L_{Aeq\ 1hr}$ upper 10 percentile	-	59
$L_{Aeq\ 1hr}$ lower 10 percentile	-	54

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	67	to	79
L_{AFMax} - L_{Aeq} (Range)	15	to	27

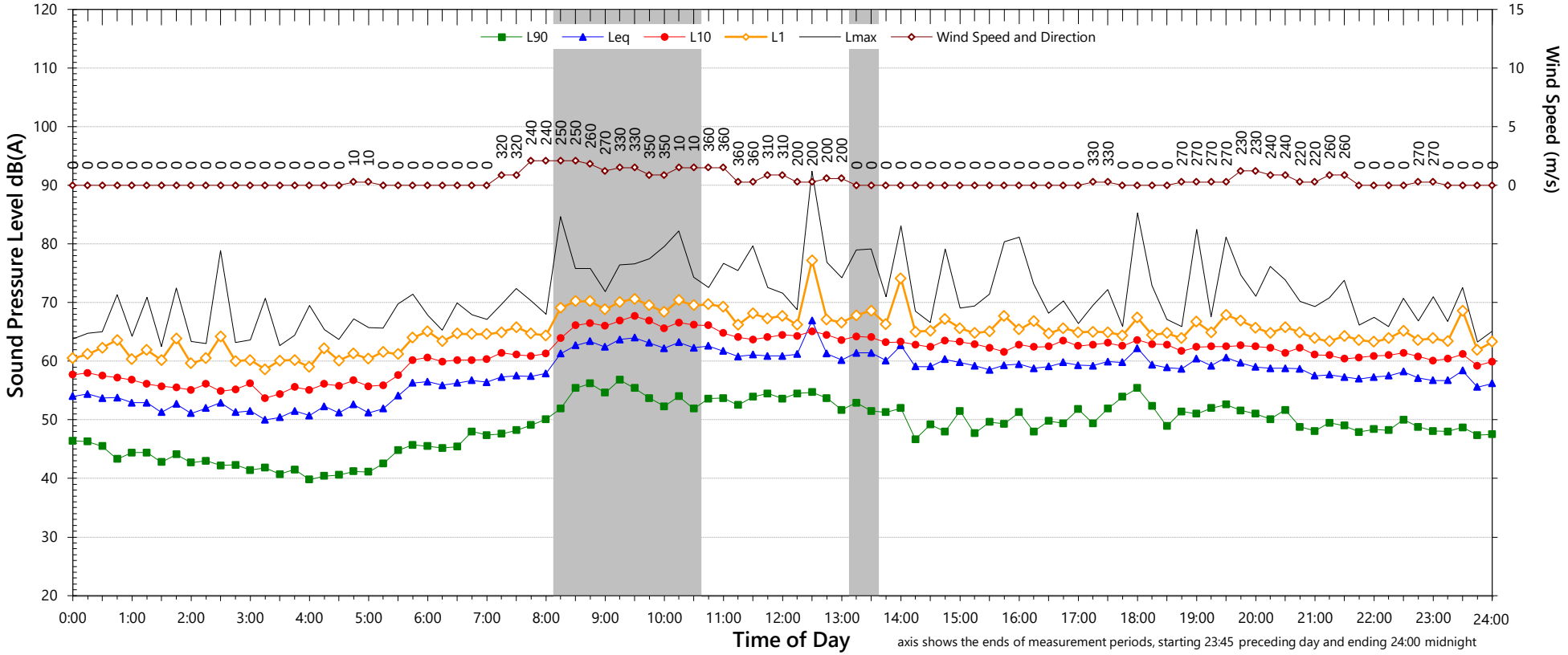
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Saturday, 30 April 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	-	48	41
L_{Aeq}	-	59	55

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	63	57
$L_{Aeq\ 1hr}$ upper 10 percentile	65	59
$L_{Aeq\ 1hr}$ lower 10 percentile	60	54

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	68	to	78
L_{AFMax} - L_{Aeq} (Range)	16	to	22

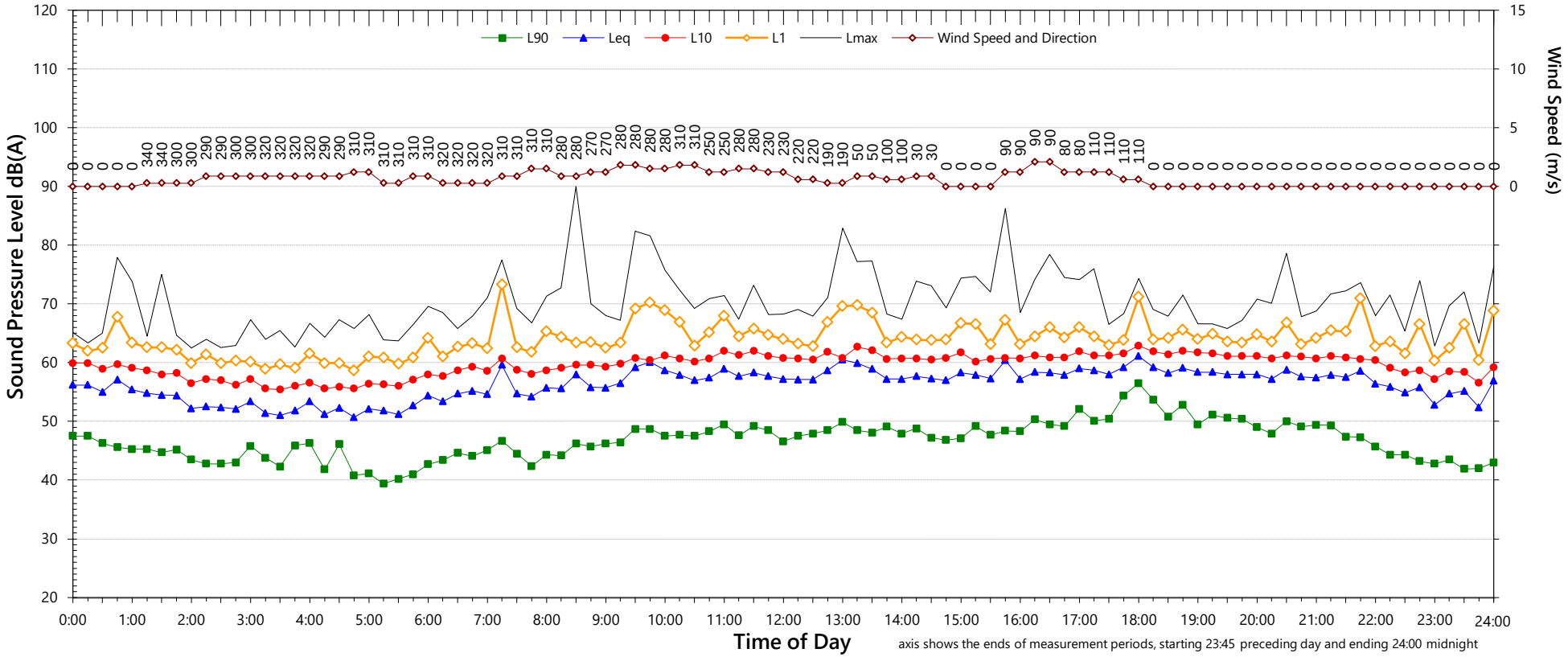
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Sunday, 1 May 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	46	47	38
L_{Aeq}	58	58	56

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	61	58
$L_{Aeq\ 1hr}$ upper 10 percentile	61	61
$L_{Aeq\ 1hr}$ lower 10 percentile	60	54

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	69	to	84
L_{AFMax} - L_{Aeq} (Range)	17	to	23

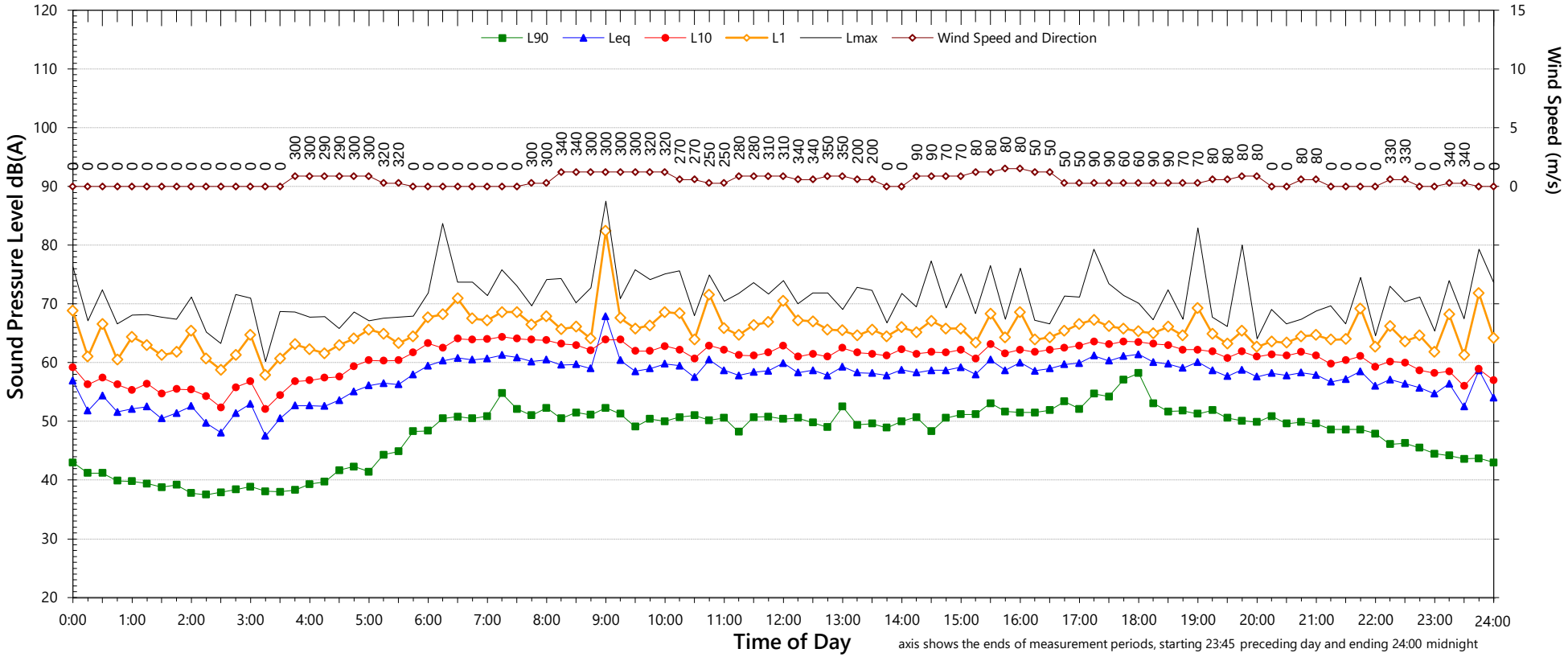
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Monday, 2 May 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	49	49	40
L_{Aeq}	60	58	56

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	68	to	79
L_{AFMax} - L_{Aeq} (Range)	16	to	23

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	62	59
$L_{Aeq\ 1hr}$ upper 10 percentile	63	61
$L_{Aeq\ 1hr}$ lower 10 percentile	61	55

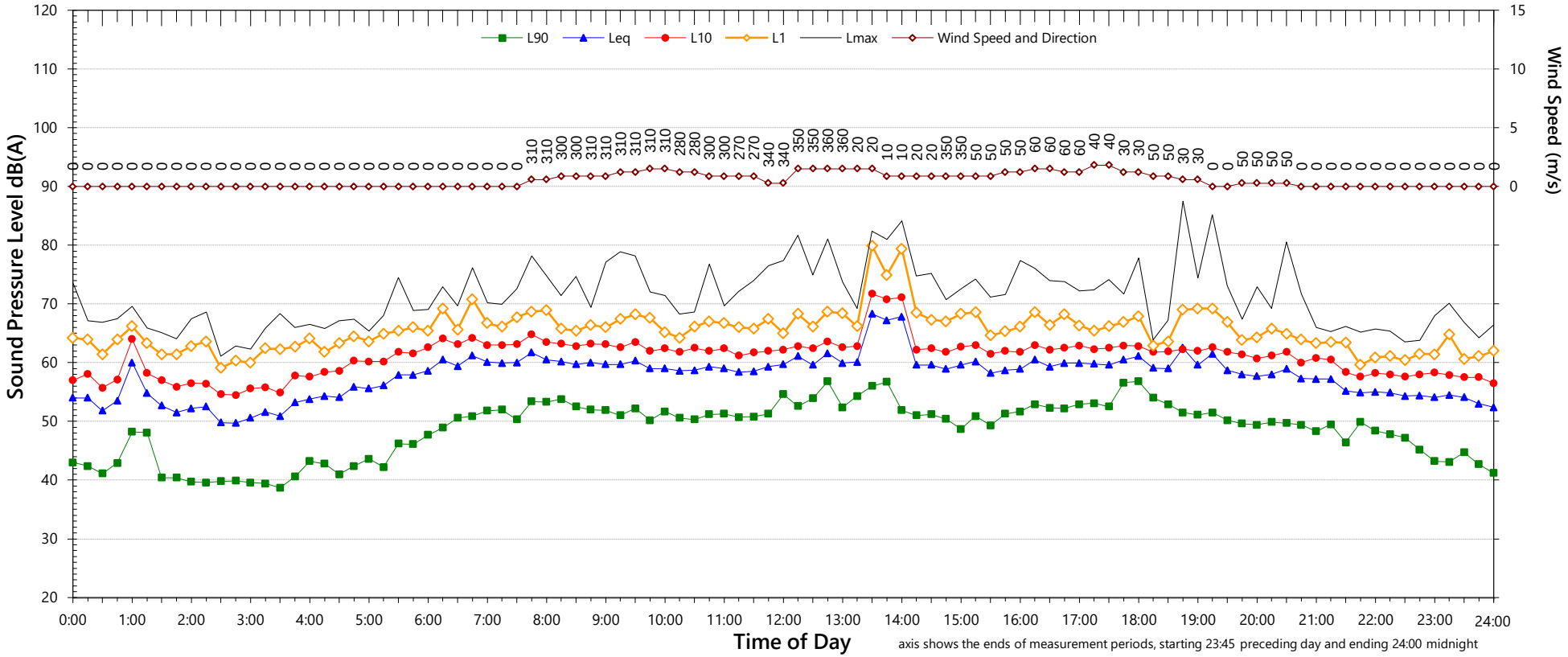
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Tuesday, 3 May 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	50	48	39
L_{Aeq}	61	59	55

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	63	58
$L_{Aeq\ 1hr}$ upper 10 percentile	63	61
$L_{Aeq\ 1hr}$ lower 10 percentile	61	54

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	68	to	78
L_{AFMax} - L_{Aeq} (Range)	16	to	21

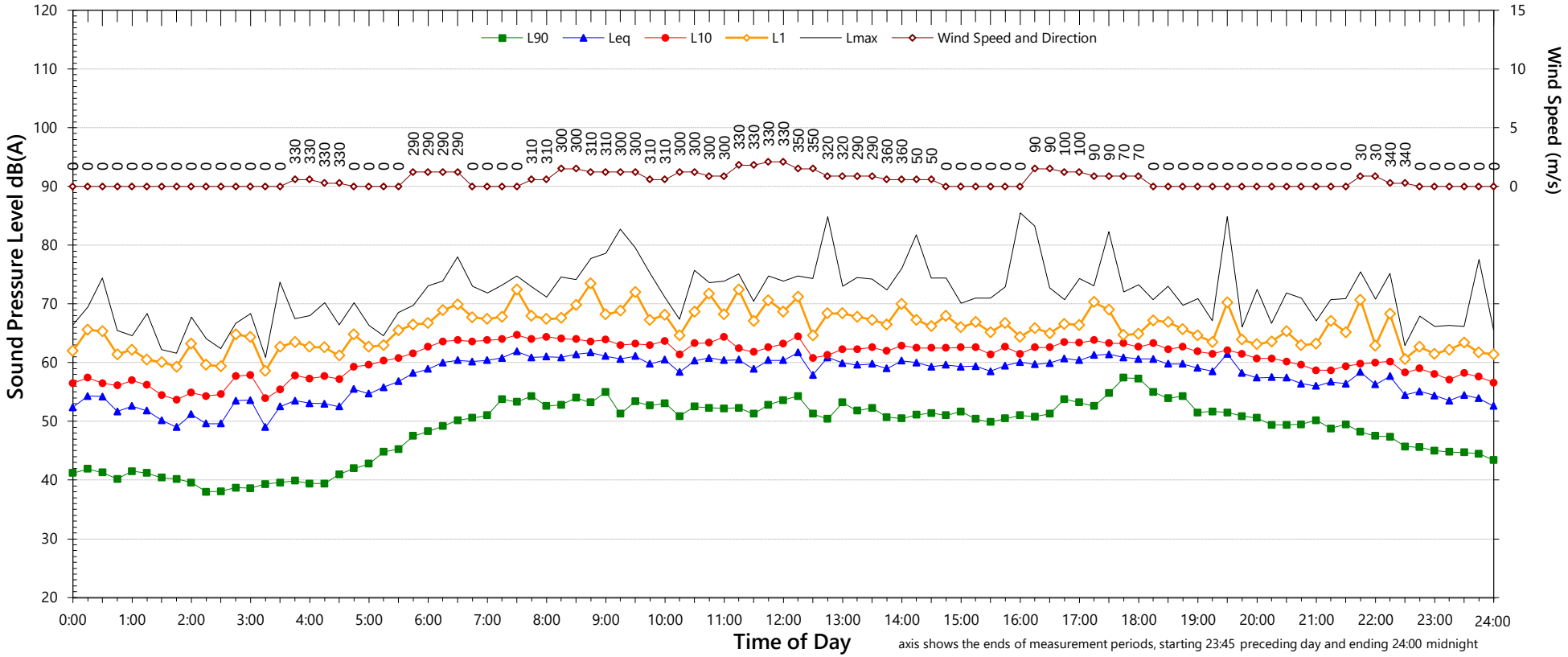
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Wednesday, 4 May 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	51	49	38
L_{Aeq}	60	58	56

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	68	to	88
L_{AFMax} - L_{Aeq} (Range)	15	to	30

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	62	59
$L_{Aeq\ 1hr}$ upper 10 percentile	64	61
$L_{Aeq\ 1hr}$ lower 10 percentile	60	54

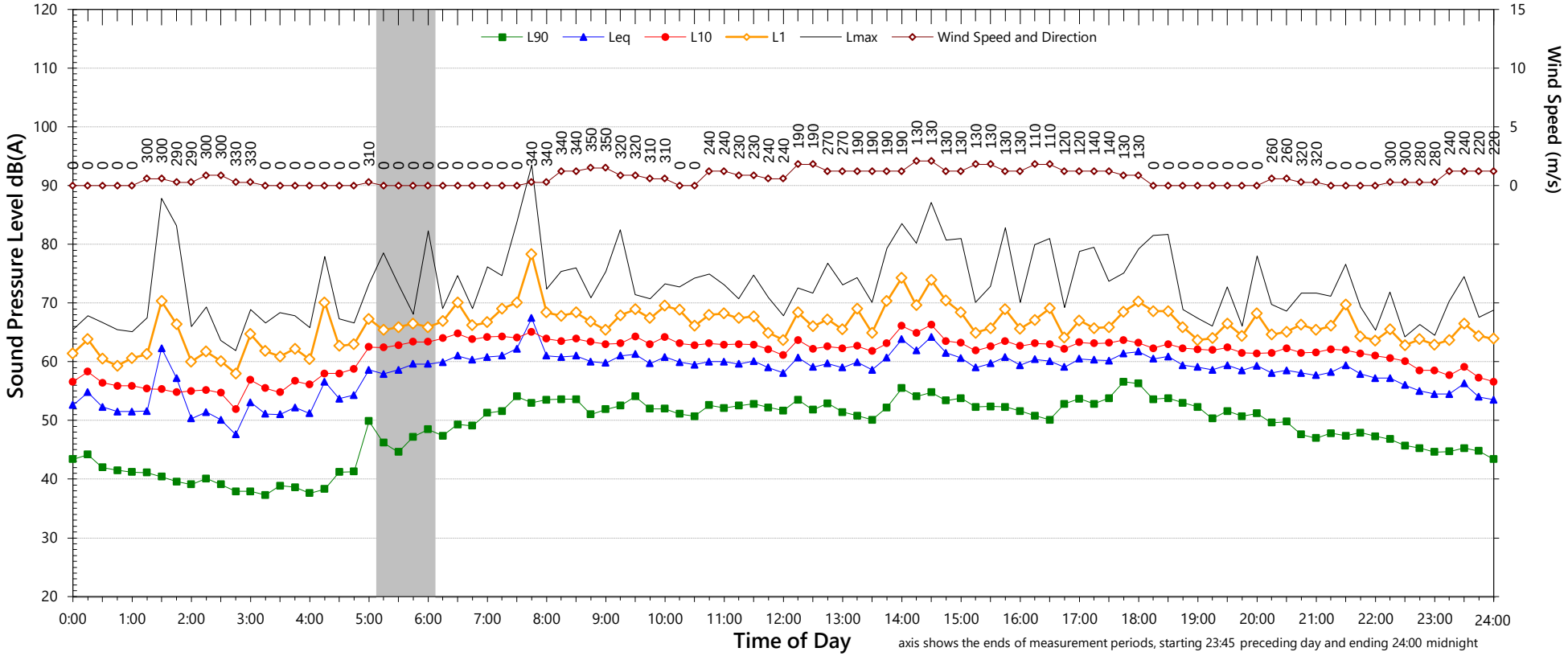
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Thursday, 5 May 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	51	47	41
L_{Aeq}	61	59	56

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	63	59
$L_{Aeq\ 1hr}$ upper 10 percentile	64	61
$L_{Aeq\ 1hr}$ lower 10 percentile	61	54

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	68	to	81
L_{AFMax} - L_{Aeq} (Range)	15	to	24

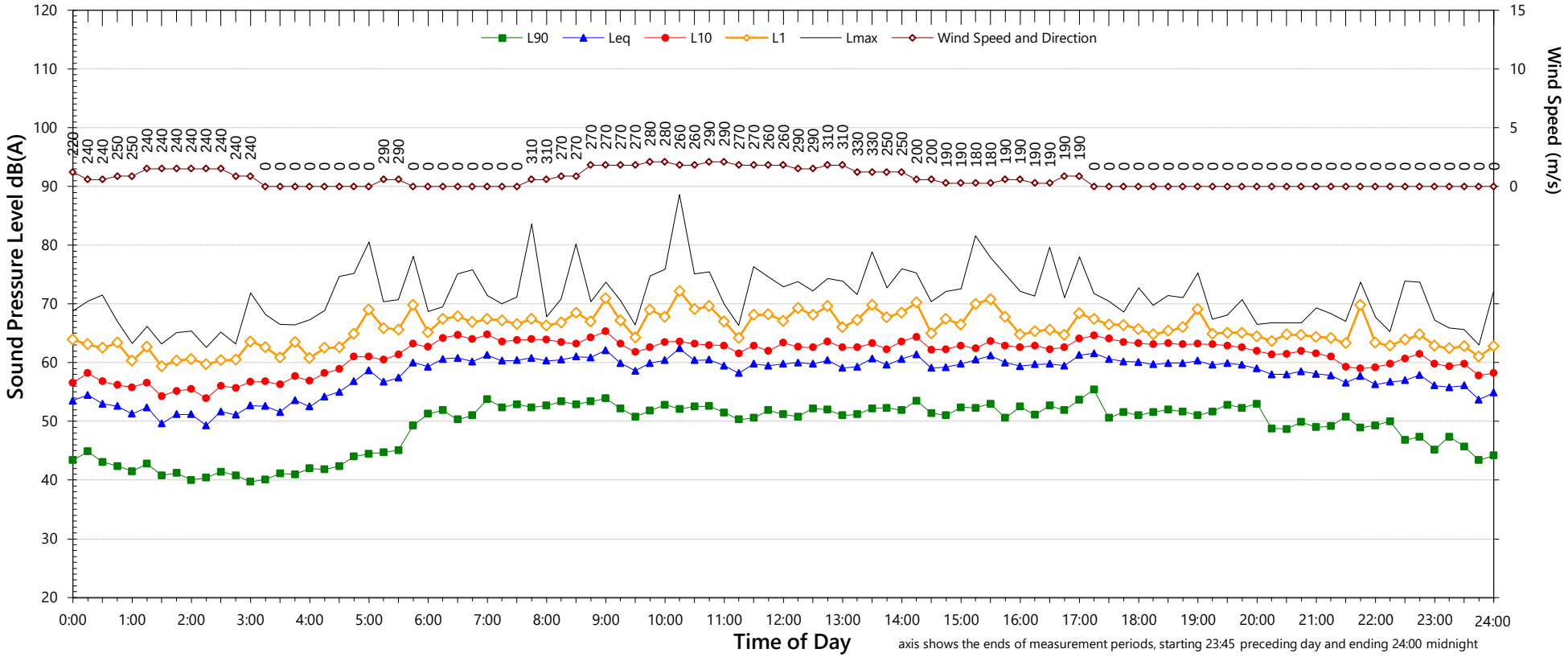
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Friday, 6 May 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	51	49	40
L_{Aeq}	60	59	56

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	62	58
$L_{Aeq\ 1hr}$ upper 10 percentile	63	60
$L_{Aeq\ 1hr}$ lower 10 percentile	61	55

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	72	to	90
L_{AFMax} - L_{Aeq} (Range)	17	to	34

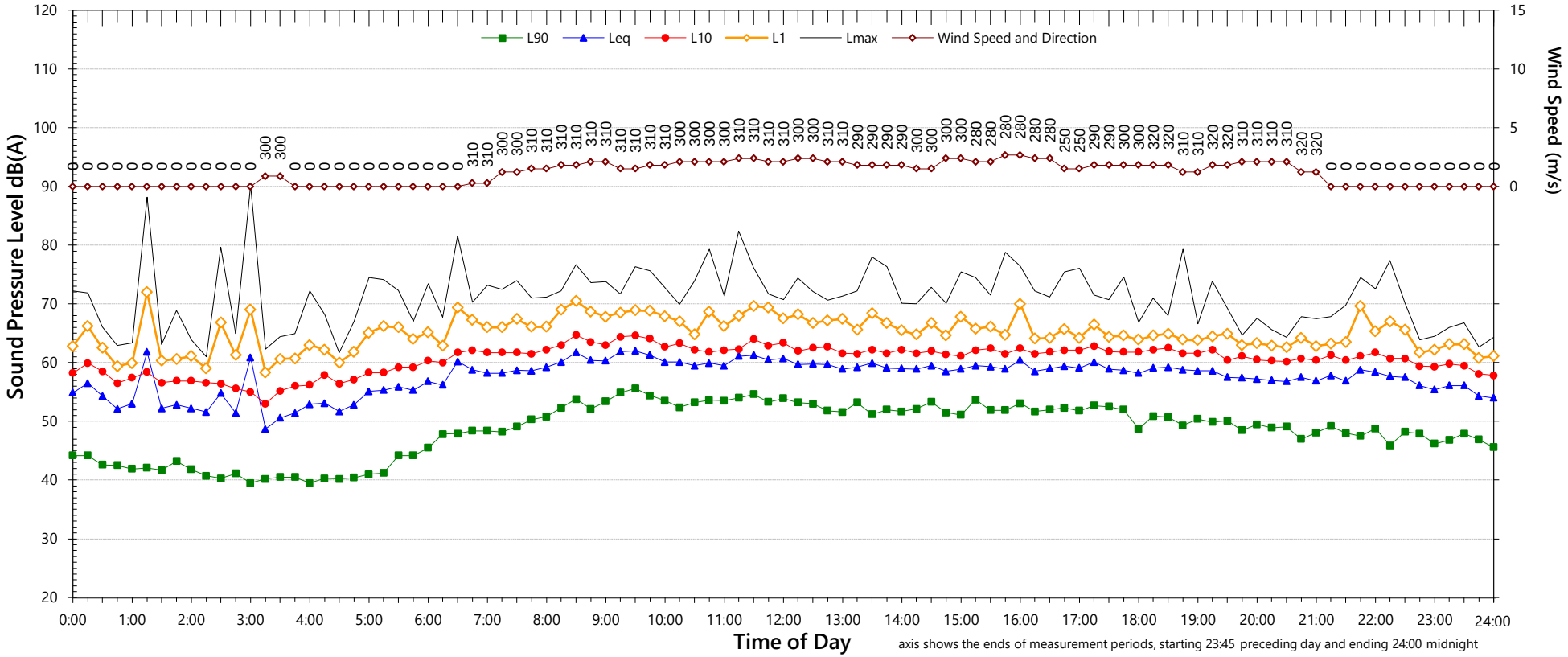
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Saturday, 7 May 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	51	48	41
L_{Aeq}	60	58	54

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	62	56
$L_{Aeq\ 1hr}$ upper 10 percentile	63	58
$L_{Aeq\ 1hr}$ lower 10 percentile	60	54

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	69	to	77
L_{AFMax} - L_{Aeq} (Range)	17	to	26

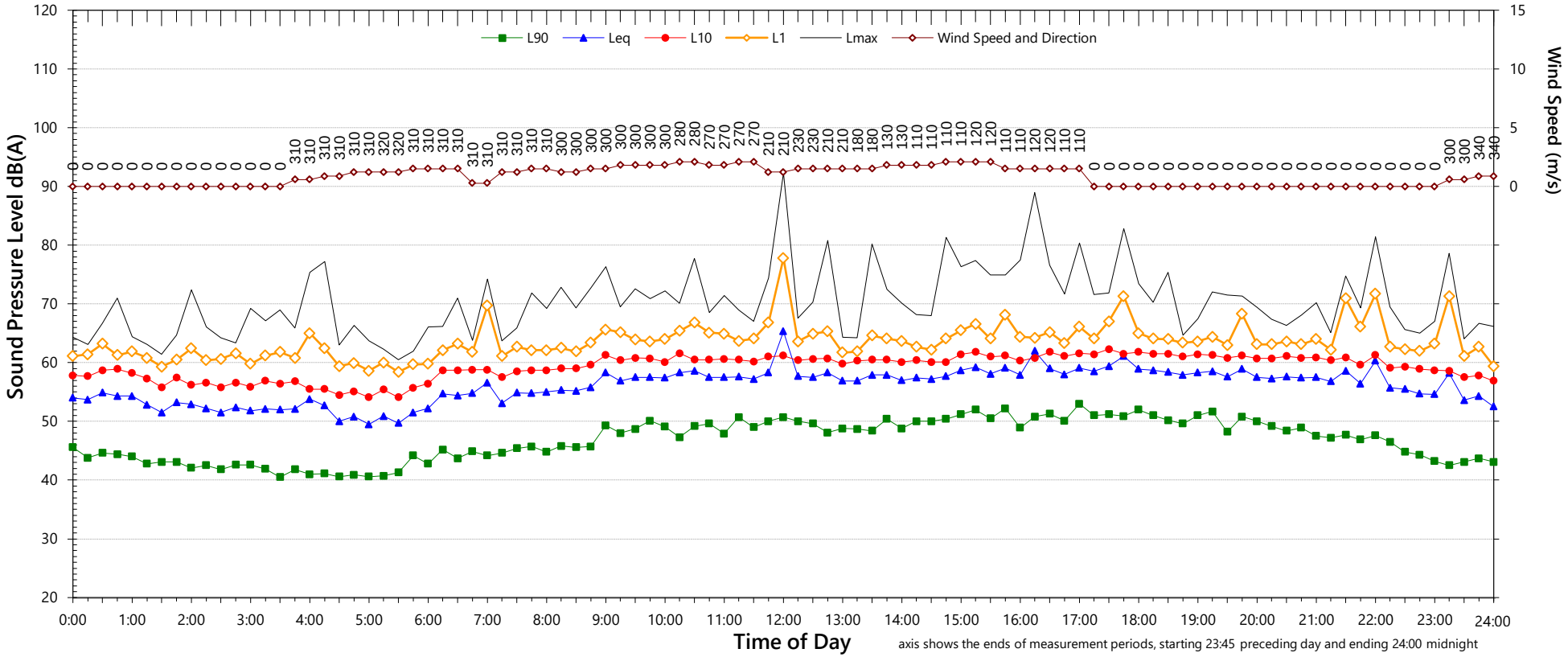
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Sunday, 8 May 2022



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	48	47	38
L_{Aeq}	59	58	55

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	61	58
$L_{Aeq\ 1hr}$ upper 10 percentile	62	61
$L_{Aeq\ 1hr}$ lower 10 percentile	59	53

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	66	to	84
L_{AFMax} - L_{Aeq} (Range)	15	to	26

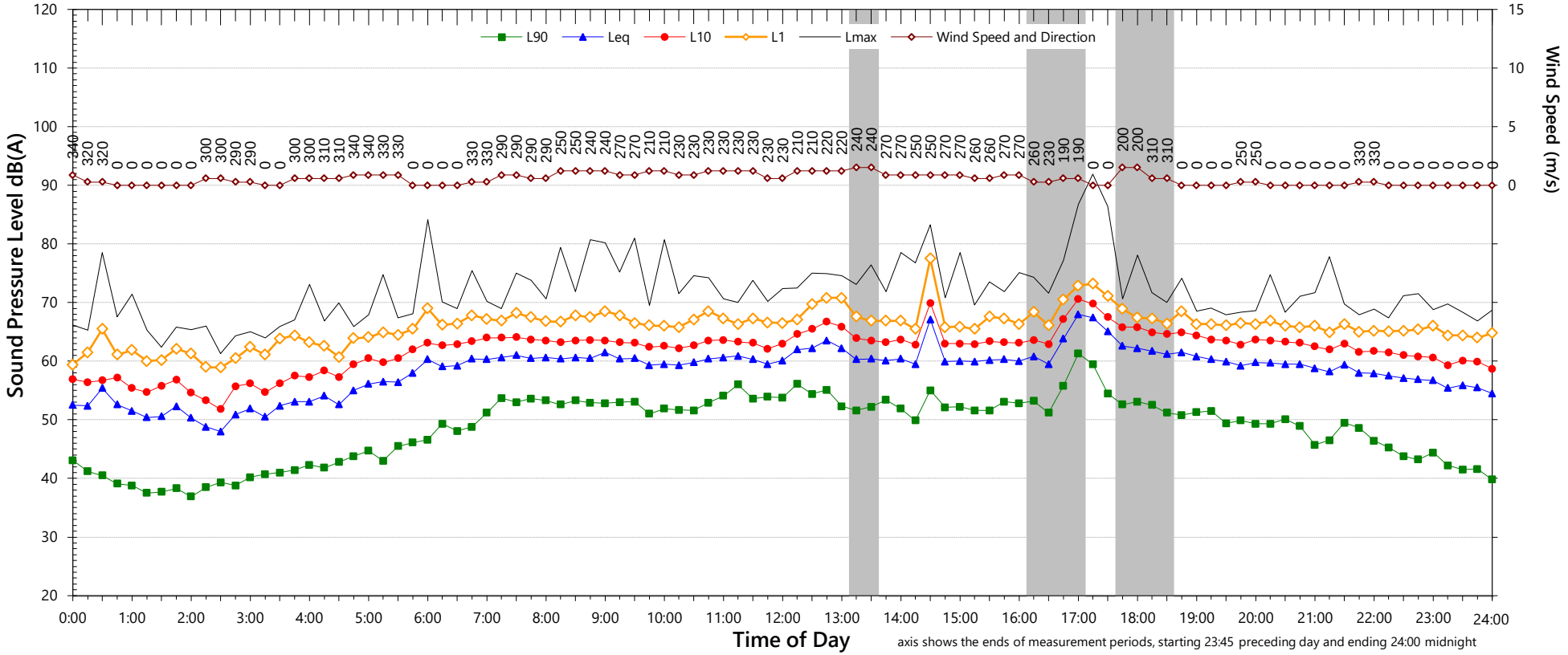
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Monday, 9 May 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	52	46	37
L_{Aeq}	62	60	57

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	64	60
$L_{Aeq\ 1hr}$ upper 10 percentile	65	63
$L_{Aeq\ 1hr}$ lower 10 percentile	62	56

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	70	to	82
L_{AFMax} - L_{Aeq} (Range)	16	to	28

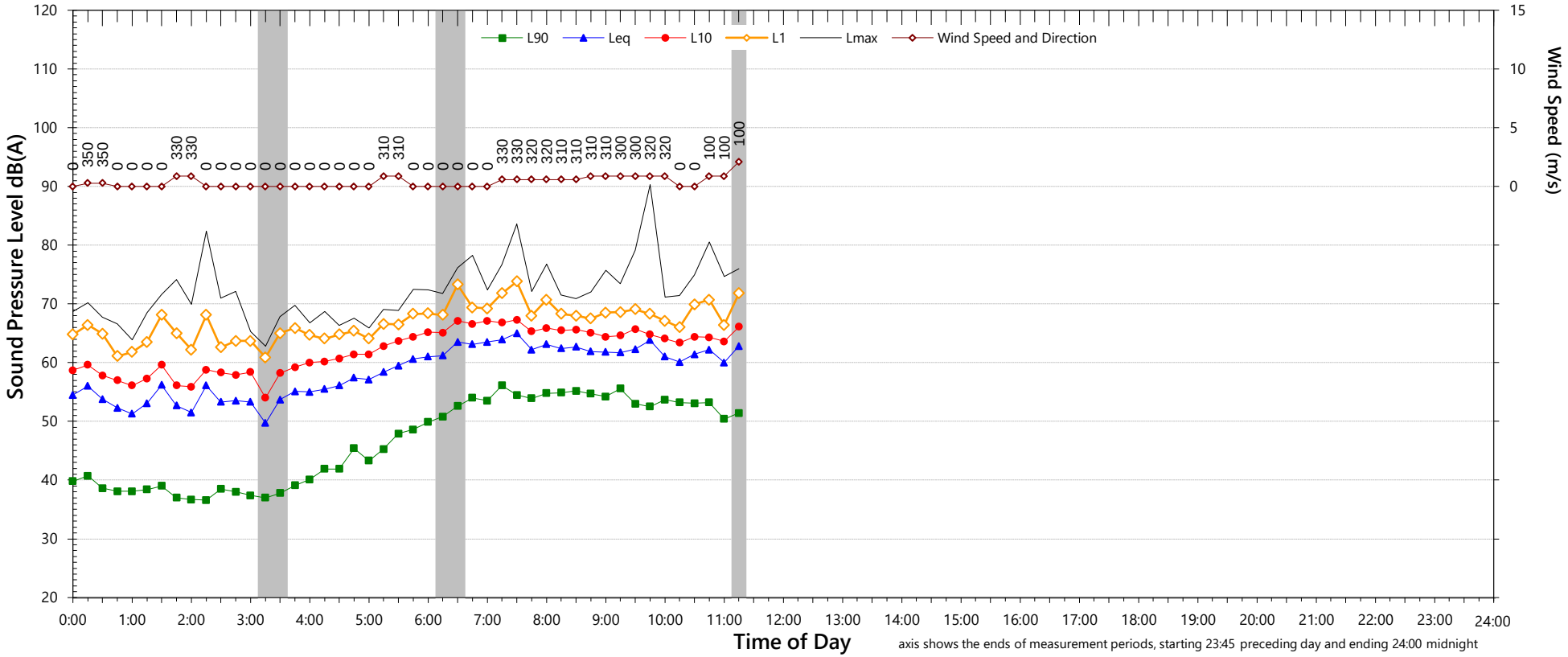
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L01 - 2A Gregory Place, Harris Park

Tuesday, 10 May 2022



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	-	-	-
L_{Aeq}	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	-	to	-
L_{AFMax} - L_{Aeq} (Range)	-	to	-

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	-	-
$L_{Aeq\ 1hr}$ upper 10 percentile	-	-
$L_{Aeq\ 1hr}$ lower 10 percentile	-	-

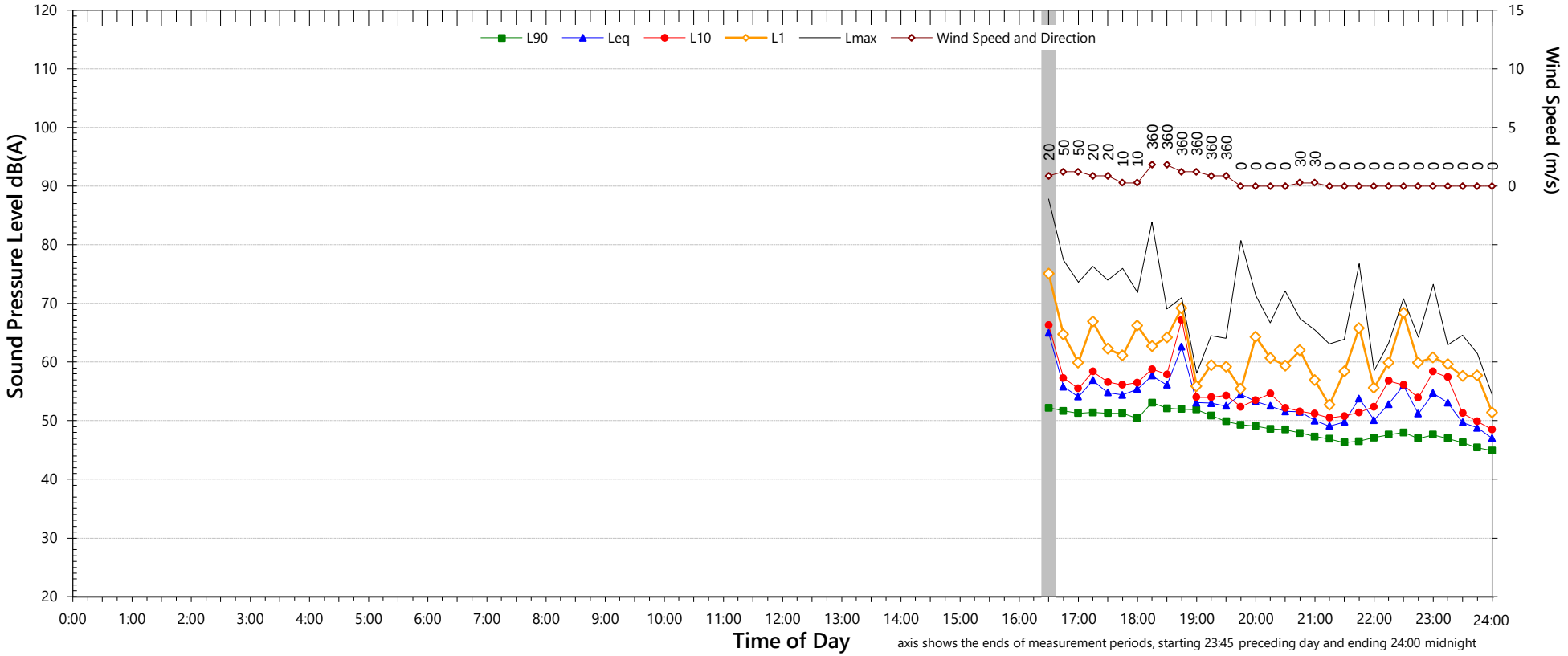
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L02 - 2A Gregory Place, Harris Park

Thursday, 28 April 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	Day[2]	Evening[3]	Night[4 5]
L_{A90} ABL	-	47	39
L_{Aeq}	-	55	48

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	65	to	73
L_{AFMax} - L_{Aeq} (Range)	15	to	20

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	Day	Night[5]
	7am-10pm	10pm-7am
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	-	51
$L_{Aeq\ 1hr}$ upper 10 percentile	-	54
$L_{Aeq\ 1hr}$ lower 10 percentile	-	46

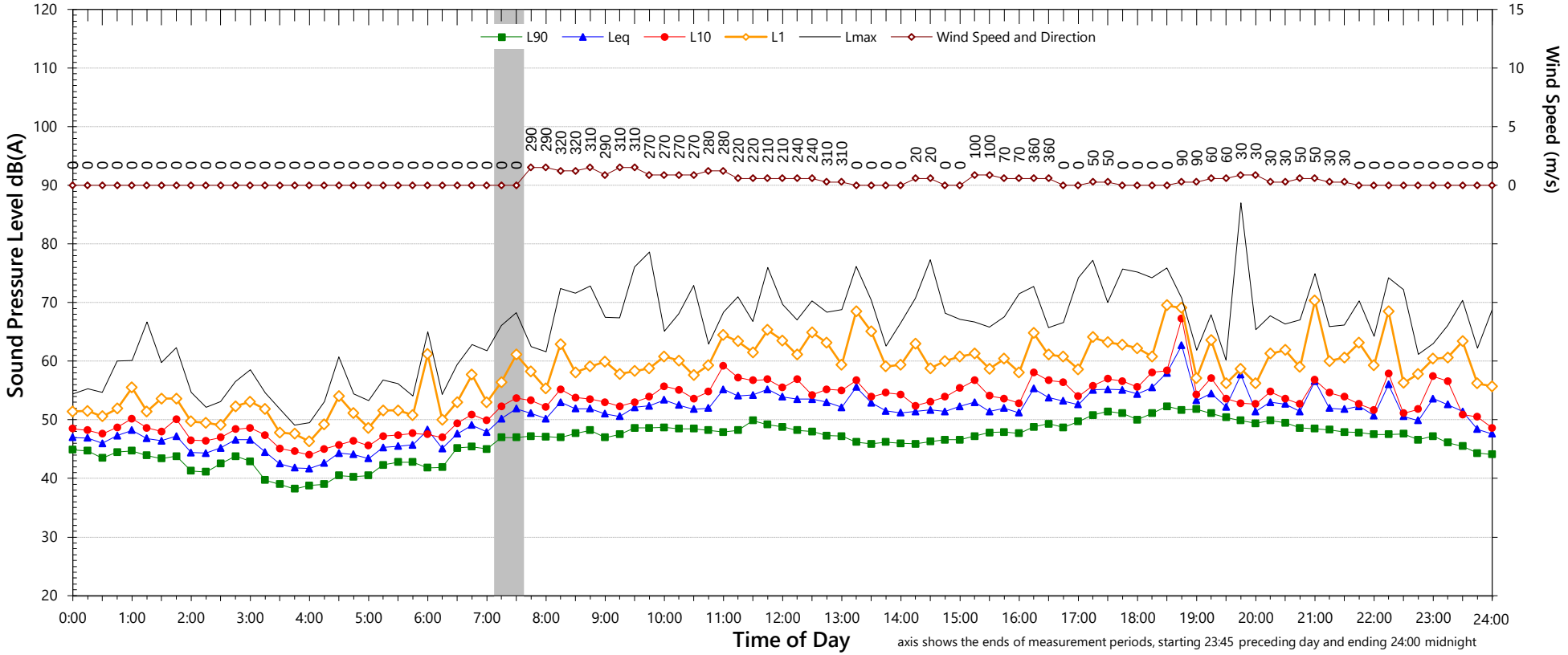
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L02 - 2A Gregory Place, Harris Park

Friday, 29 April 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	46	48	42
L_{Aeq}	53	56	49

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	-	51
$L_{Aeq\ 1hr}$ upper 10 percentile	-	54
$L_{Aeq\ 1hr}$ lower 10 percentile	-	48

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	70	to	79
L_{AFMax} - L_{Aeq} (Range)	16	to	31

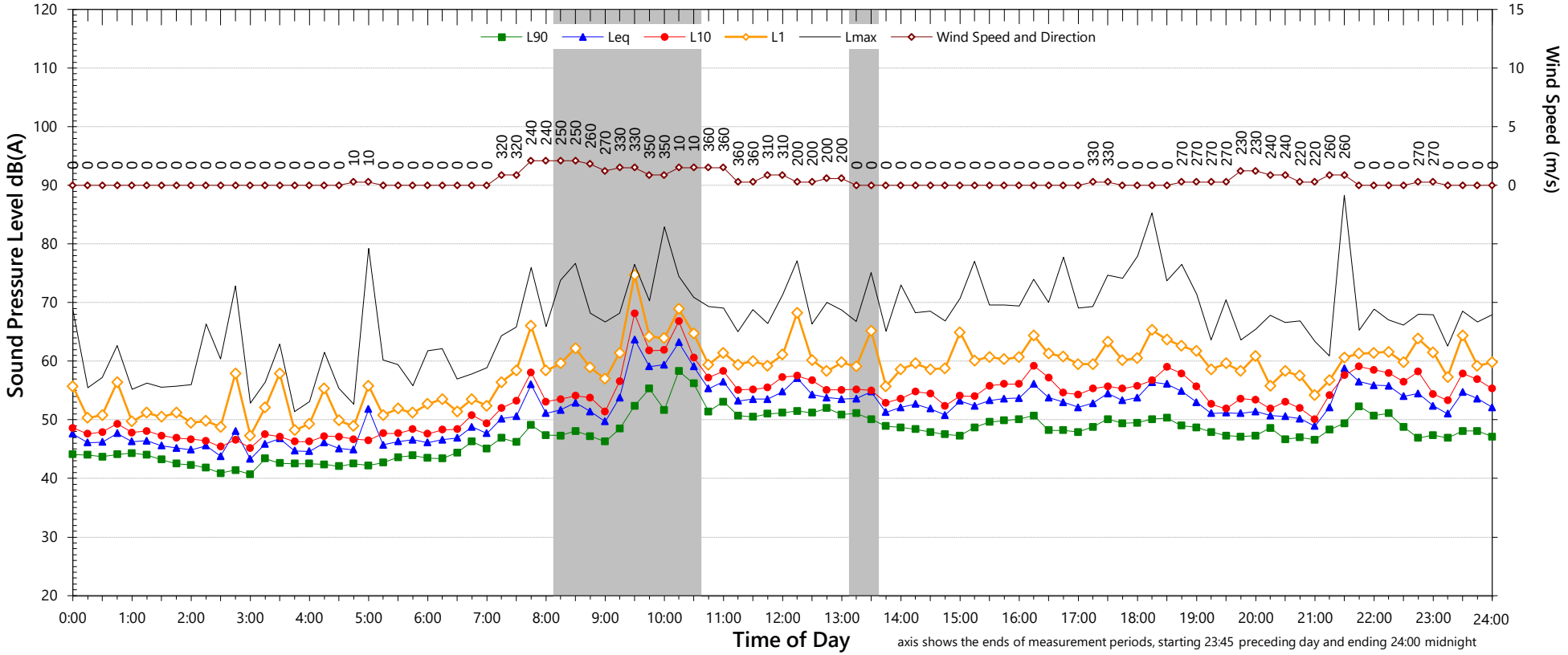
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L02 - 2A Gregory Place, Harris Park

Saturday, 30 April 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	-	47	41
L_{Aeq}	-	54	50

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	56	52
$L_{Aeq\ 1hr}$ upper 10 percentile	58	56
$L_{Aeq\ 1hr}$ lower 10 percentile	54	47

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	65	to	71
L_{AFMax} - L_{Aeq} (Range)	15	to	23

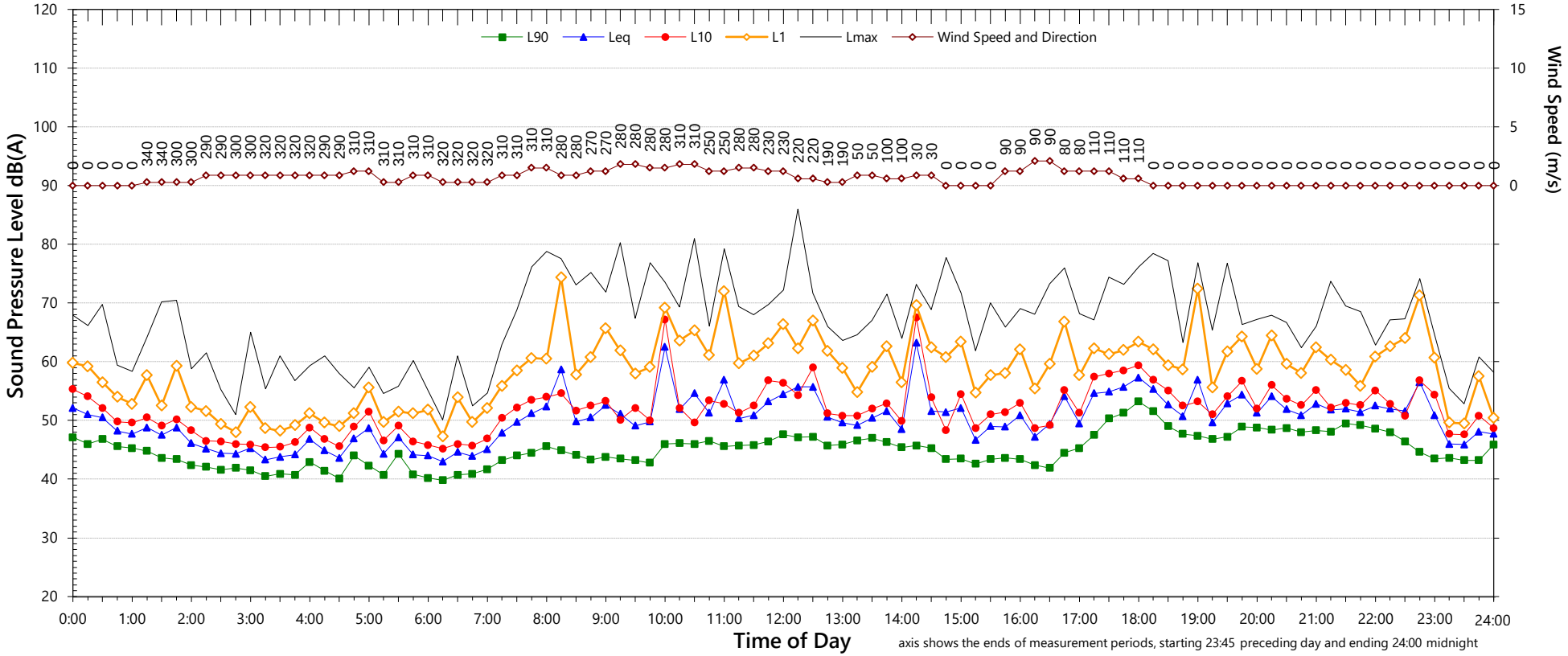
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L02 - 2A Gregory Place, Harris Park

Sunday, 1 May 2022



axis shows the ends of measurement periods, starting 23:45 preceding day and ending 24:00 midnight

NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	43	47	40
L_{Aeq}	54	53	48

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	56	51
$L_{Aeq\ 1hr}$ upper 10 percentile	59	54
$L_{Aeq\ 1hr}$ lower 10 percentile	53	46

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	66	to	83
L_{AFMax} - L_{Aeq} (Range)	16	to	32

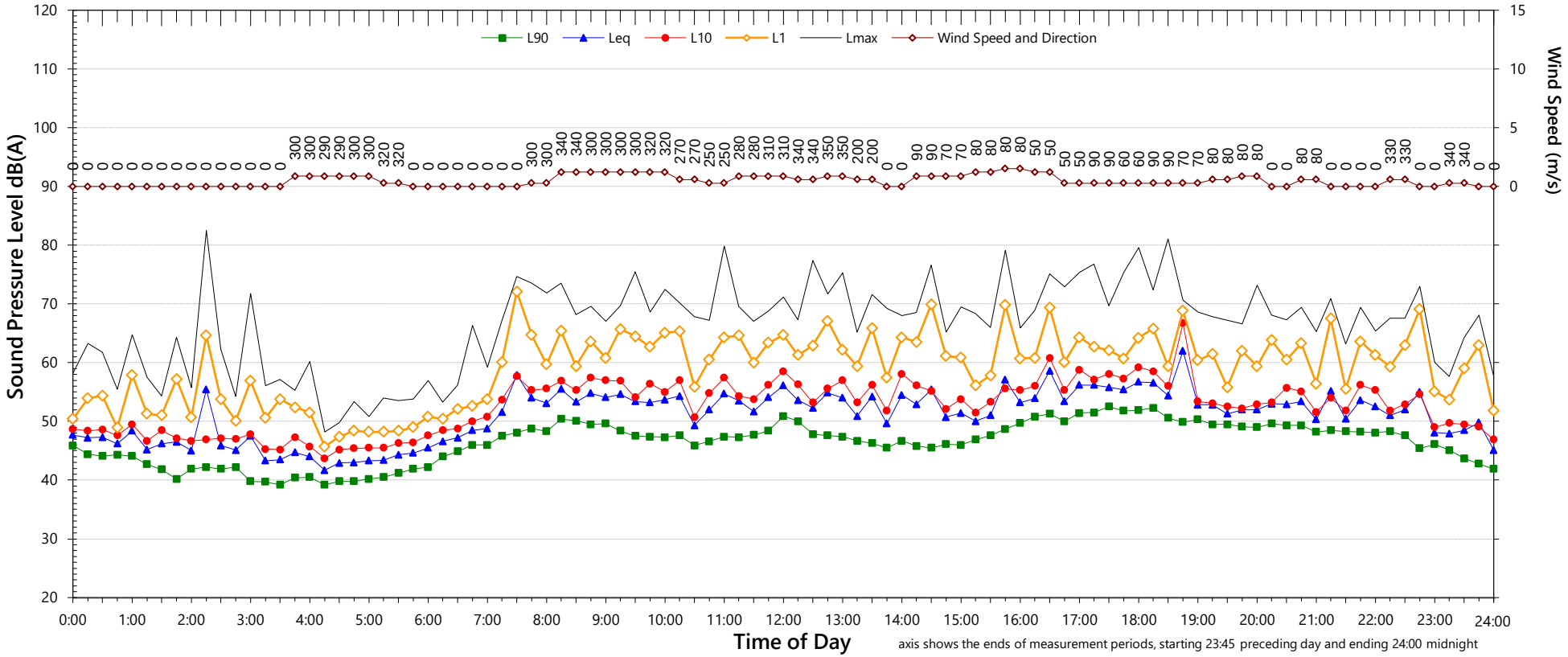
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L02 - 2A Gregory Place, Harris Park

Monday, 2 May 2022



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	46	48	-
L_{Aeq}	54	55	-

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	68	to	73
L_{AFMax} - L_{Aeq} (Range)	19	to	21

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	57	-
$L_{Aeq\ 1hr}$ upper 10 percentile	59	-
$L_{Aeq\ 1hr}$ lower 10 percentile	55	-

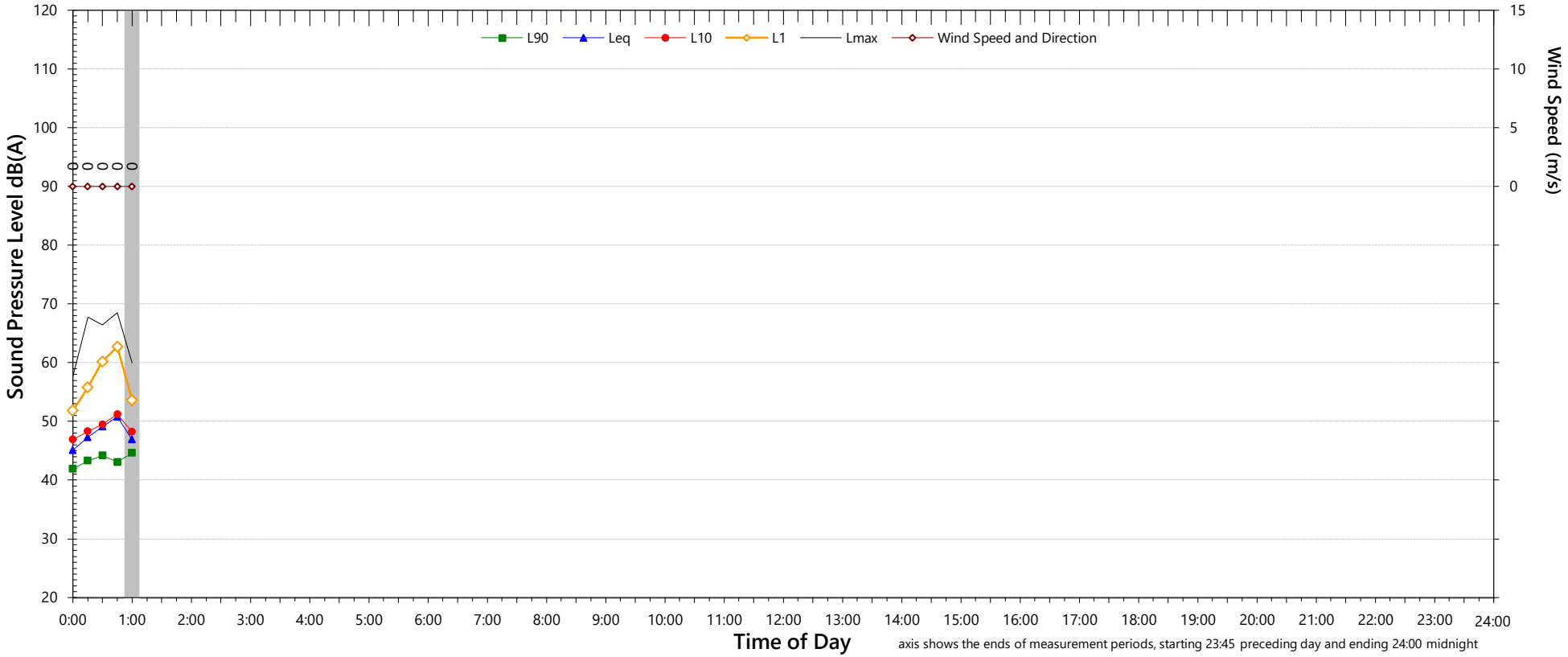
Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax}- L_{Aeq} ≥15dB(A)

Unattended Noise Monitoring Results

L02 - 2A Gregory Place, Harris Park

Tuesday, 3 May 2022



NSW Noise Policy for Industry (Free Field)			
Descriptor	**Day[2]**	**Evening[3]**	**Night[4 5]**
L_{A90} ABL	-	-	-
L_{Aeq}	-	-	-

Night Time Maximum Noise Levels			(see note 7)
L_{AFMax} (Range)	-	to	-
L_{AFMax} - L_{Aeq} (Range)	-	to	-

NSW Road Noise Policy (1m from facade)		(see note 6)
Descriptor	**Day**	**Night[5]**
	7am-10pm	**10pm-7am**
$L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9\ hr}$	-	-
$L_{Aeq\ 1hr}$ upper 10 percentile	-	-
$L_{Aeq\ 1hr}$ lower 10 percentile	-	-

Notes:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Day" is the period from 8am till 6pm on Sundays and 7am till 6pm on other days
3. "Evening" is the period from 6pm till 10pm
4. "Night" relates to the remaining periods
5. "Night" relates to period from 10pm on this graph to morning on the following graph.
6. Graphed data measured in free-field; tabulated results facade corrected
7. 1-hour values for L_{AFMax} are shown only where L_{AFMax} >65dB(A) and where L_{AFMax} - L_{Aeq} ≥15dB(A)