Appendix I

Noise and vibration assessment

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Acoustics
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MEMORIAL AVENUE UPGRADE

Noise and Vibration Assessment

14 October 2014

Hyder Consulting Pty Ltd

TG582-01F02 (r5) Noise and Vibration Assessment

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1 Introduction

1.1 Proposal overview

Roads and Maritime Services (Roads and Maritime) propose to upgrade 2.2 kilometres of Memorial Avenue (MR642) between Windsor Road and Old Windsor Road, Kellyville (the proposal). The Proposal would include widening Memorial Avenue with a central median strip along the length to accommodate a possible future upgrade to a six-lane configuration (three lanes in each direction). The road is located in the Hills Shire Council LGA, about 35 kilometres north-west of the Sydney Central Business District.

1.2 Key features

The key features of the proposal include:

- Widening Memorial Avenue from a two-lane road to a four-lane divided road
- Providing a wide central median to allow the road to be widened to six lanes, when required
- Upgrading the intersections of Memorial Avenue with Windsor Road, Arnold Avenue (west), and Old Windsor Road / Sunnyholt Road
- Closing the intersections of Memorial Avenue with Hector Court, Rutherford Avenue, and Arnold Avenue (east)
- Providing traffic signals at the intersections of Memorial Avenue with Arnold Avenue and Severn Vale Drive
- Providing left-in and left-out access for Burns Road and Stone Mason Drive
- Widening the alignment of Windsor Road generally to the west of the existing road between President Road and Wrights Road
- Slightly widening the alignment of Old Windsor Road for about 250 metres either side of the intersection
- Building a bridge to carry Memorial Avenue over Strangers Creek
- Providing a posted vehicle speed limit of 70 kilometres per hour along Memorial Avenue

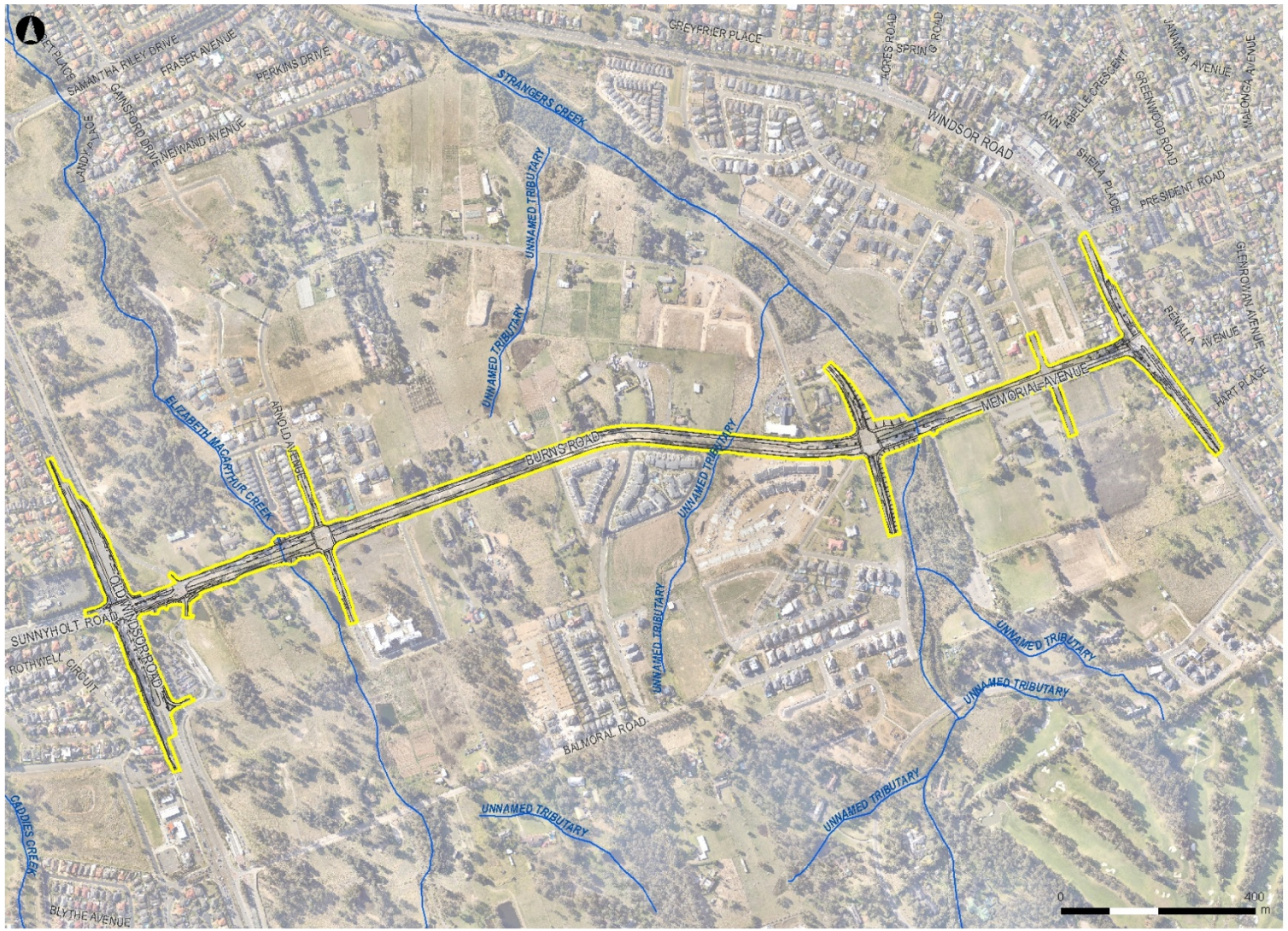
1.3 Purpose of this report

This noise and vibration assessment forms part of the Review of Environmental Factors (REF) and its purpose is to:

- Assess potential operational traffic noise impacts,
- Identify where traffic noise mitigation measures should be considered,
- Assess potential construction noise and vibration impacts.

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001. Appendix A contains a glossary of acoustic terms used in this report.

Figure 1 The proposal



2 Existing Noise Environment

2.1 Noise Catchment Areas

To facilitate the assessment of noise impacts from the proposed Memorial Avenue Upgrade, noise sensitive receiver areas along the route have been divided into Noise Catchment Areas (NCAs).

The NCAs identified for this project are described in Table 1 and shown on Figure 2.

Table 1 Noise catchment areas

NCA	Location	Description
NCA 1	Old Windsor Rd to Thomas Boulton Cct Northern side of Memorial Ave	• Single commercial receiver towards Old Windsor Rd • Low to medium density suburban land • Recent subdivision development with current continuation of subdivision construction to the east • Gracelands Early Education Centre
NCA 2	Old Windsor Road to 30 Memorial Ave Southern side of Memorial Ave	• Mixture of low density rural land & high density residential with commercial ground floor at The Gracewood Community • Recent demolition of residential dwellings
NCA 3	Thomas Boulton Cct to Arnold Ave Northern side of Memorial Ave	• Low density rural land with residential & commercial receivers • The Hills Clinic (Hospital)
NCA 4	Rocks St to Hector Ct Southern side of Memorial Ave	• Medium density suburban land • Recent subdivision development with current continuation of subdivision construction to the west and throughout Grace Cres and surrounding roads
NCA 5	Arnold Ave to Windsor Rd Northern side of Memorial Ave	• Mixture of medium density new subdivision and existing residential receivers along Memorial Ave • Current subdivision construction at the intersection of Memorial Ave & Arnold Ave • Mixture of residential & commercial receivers along Windsor Rd
NCA 6	Hector Ct to Windsor Rd Southern side of Memorial Ave	• Low density residential receiver at west near Hector Ct • Kellyville Cricket Club near middle of NCA • Commercial receivers along Windsor Rd
NCA 7	Windsor Road Eastern side of Windsor Rd from President Rd to Wrights Rd	• Medium density residential receivers • Commercial receivers including Caltex & Repco towards northern end on eastern side of Windsor Road • Kellyville Preschool Kindergarten at northern end on President Avenue
NCA 8	Old Windsor Road Western side of Old Windsor Rd from Kentwell Cr to Rothwell Cct	• Medium density residential receivers • Fit Kidz Day Care Centre • Outback Steakhouse (commercial receiver at southern end Old Windsor Road

2.2 Existing ambient noise conditions

The ambient noise environment in the study area is controlled by traffic noise from Memorial Avenue, Old Windsor Road to the west and Windsor Road to the east. Long-term noise monitoring was conducted to quantify ambient noise levels. The purpose of the noise monitoring is to establish:

- existing traffic noise levels for benchmarking and validation of the operational noise model, and
- background noise levels for the setting of construction noise goals for the project.

2.2.1 Noise monitoring locations

Long-term noise monitoring was conducted in the study area along Memorial Avenue from Tuesday 11th to Tuesday 25th February 2014 at monitoring locations M1-M4 (identified in Table 4 below). It was not possible conduct noise monitoring at all NCAs along Memorial Avenue due to the limited number of residential dwellings within this semi-rural area, significant setback distances of some dwellings from Memorial Avenue, residential subdivision construction works potentially affecting the measured noise levels, and obstruction from boundary fences along the road corridor.

During the assessment process the scope of the project was increased to include design changes at the Windsor Road and Old Windsor Road intersections. To address the expanded scope of the project, additional noise monitoring was conducted at two locations (M5 & M6) from Tuesday 15th to Wednesday 23rd July 2014.

The monitoring locations are listed in Table 2 and shown in Figure 2.

Table 2 Noise monitoring locations

Location	NCA	Address	Description
M1	2	32 Memorial Avenue	Front of the property in the free field approximately 35m from the existing road corridor
M2	3	25 Memorial Avenue	Front yard at the property boundary in the free field approximately 8m from the road corridor
M3	3	19 Memorial Avenue	Front yard of the property in the free field approximately 14m from the road corridor
M4	5	16 Gorman Avenue	Front yard of the property in the free field approximately 50m from the road corridor
M5	7	8 Windsor Road	Front yard of the property in the free field approximately 18m from the road corridor
M6	8	10 Rothwell Circuit	Rear yard of the property in the free field approximately 20m from the road corridor with 1.8m boundary fence between noise monitor and Old Windsor Rd

2.2.2 Measured noise levels

The noise monitoring methodology is described in Appendix B. A summary of the long-term noise monitoring results are presented in Table 3, and the graphical outputs from the noise monitors are presented in Appendix F.

Table 3 Measured noise levels

Location	Address	L_{Aeq} Traffic Noise Levels		L_{A90} Background Noise Level (RBL)		
		Day, $L_{Aeq,15hr}$	Night, $L_{Aeq,9hr}$	Day	Evening	Night
M1	32 Memorial Avenue	62	58	49	46	37
M2	25 Memorial Avenue	72	66	54	48	42
M3	19 Memorial Avenue	71	65	53	50	41
M4	16 Gorman Avenue	59	56	49	50	44
M5	8 Windsor Road	68	63	55	50	34
M6	10 Rothwell Circuit	61	58	49	48	38

Figure 2 Noise catchment areas and monitoring locations

3 Noise Criteria

3.1 Operational traffic noise criteria

The assessment of road traffic noise impact is guided by the *NSW Road Noise Policy*, 2011 (RNP) and *RTA Environmental Noise Management Manual* (ENMM, 2001).

Memorial Avenue provides connection between Old Windsor Road and Windsor Road arterials, and is therefore defined as a sub-arterial in the RNP. According to the ENMM, the upgrade of Memorial Avenue does not constitute a 'new road traffic noise source' because the road is not new and does not produce noise to receptors from a different direction. The project is within the existing road corridor and therefore the project is classed as a 'road redevelopment'.

3.1.1 Residential land uses

The RNP is used to assess the potential traffic noise impact from a redevelopment of road infrastructure. The 'redevelopment' criteria for residential type receivers, as set out in the RNP apply, and are presented in Table 4. These criteria are for noise levels assessed in front of a building facade, or facade corrected noise levels when assessing in the free-field.

Table 4 Road traffic noise assessment criteria for residential land uses

Road Category	Type of project/land use	Assessment Criteria, dB(A)	
		Day 7:00am-10:00pm	Night 10:00pm-7:00am
Freeway/ arterial/ sub-arterial roads	Existing residences affected by noise from redevelopment of existing freeway / arterial / sub-arterial roads	$L_{Aeq,(15\ hour)}$ 60 (external)	$L_{Aeq,(9\ hour)}$ 55 (external)

Note: Land use developers must meet internal noise goals in the Infrastructure SEPP (Department of Planning NSW 2007) for residences near busy roads (see RNP Appendix C10).

Where existing traffic noise levels are above the noise assessment criteria, the primary objective is to reduce these through feasible and reasonable measures to meet the assessment criteria. A secondary objective is to protect against excessive decreases in amenity as the result of a project by applying the relative increase criteria.

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

3.1.2 Sensitive land use developments

The RNP also sets guidelines for the assessment of traffic noise on sensitive land uses such as schools, hospitals, places of worship and recreation areas. The noise assessment criteria for these land uses are presented in Table 5.

Table 5 Road traffic noise assessment criteria for non-residential land uses

Existing sensitive land use		Assessment criteria, dB(A)		Additional considerations
		Day (7am-10pm)	Night (10pm-7am)	
1.	School classrooms	$L_{Aeq,1hour}$ 40 (internal) when in use	–	In the case of buildings used for education or health care, noise level criteria for spaces other than classrooms and wards may be obtained by interpolation from the 'maximum' levels shown in Australian Standard 2107:2000 (Standards Australia 2000).
2.	Hospital wards	$L_{Aeq,1hour}$ 35 (internal)	$L_{Aeq,1\ hour}$ 35 (internal)	
3.	Places of worship	$L_{Aeq,1hour}$ 40 (internal)	$L_{Aeq,1\ hour}$ 40 (internal)	The criteria are internal, i.e. the inside of a church. Areas outside the place of worship, such as a churchyard or cemetery, may also be a place of worship. Therefore, in determining appropriate criteria for such external areas, it should be established what in these areas may be affected by road traffic noise. For example, if there is a church car park between a church and the road, compliance with the internal criteria inside the church may be sufficient. If, however, there are areas between the church and the road where outdoor services may take place such as weddings and funerals, external criteria for these areas are appropriate. As issues such as speech intelligibility may be a consideration in these cases, the passive recreation criteria (see point 5) may be applied.
4.	Open space (active use)	$L_{Aeq,15hour}$ 60 (external) when in use		Active recreation is characterised by sporting activities and activities which generate their own noise or focus for participants, making them less sensitive to external noise intrusion. Passive recreation is characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, e.g. playing chess, reading. In determining whether areas are used for active or passive recreation, the type of activity that occurs in that area and its sensitivity to noise intrusion should be established. For areas where there may be a mix of passive and active recreation, e.g. school playgrounds, the more stringent criteria apply. Open space may also be used as a buffer zone for more sensitive land uses.
5.	Open space (passive use)	$L_{Aeq,15hour}$ 55 (external) when in use		
6.	Childcare facilities	Sleeping rooms $L_{Aeq,1hour}$ 35 (internal) Indoor play areas $L_{Aeq,1hour}$ 40 (internal) Outdoor play areas $L_{Aeq,1hour}$ 55 (external)	–	Multi-purpose spaces, e.g. shared indoor play/sleeping rooms should meet the lower of the respective criteria. Measurements for sleeping rooms should be taken during designated sleeping times for the facility, or if these are not known, during the highest hourly traffic noise level during the opening hours of the facility.
7.	Aged care facilities	–	–	Residential land use noise assessment criteria should be applied to these facilities

Notes: Land use developers must meet internal noise goals in the Infrastructure SEPP (Department of Planning NSW 2007) for sensitive developments near busy roads.

It is generally accepted that most buildings provide a noise reduction of at least 10dB(A) when windows are left 20% open, without providing additional treatment. Therefore where the noise goals are internal, a 10dB(A) reduction from external noise levels to internal noise levels has been adopted to allow an external assessment.

3.2 Relative increase criteria

The traffic noise impact from the proposed road 'redevelopment' would need to also comply with the 'Relative Increase Criteria' as discussed in Section 2.4 of the RNP. The relative increase criteria are to be applied to the external areas of existing residential and sensitive land uses impacted upon by the redeveloped road.

The relative increase criteria as set out in the RNP applicable to this project are reproduced below and apply for all NCAs.

Table 6 Relative increase criteria

Type of development	Total traffic noise level increase, dB(A)
Redevelopment of existing road	Existing traffic $L_{Aeq(period)}$ + 12 dB (external)

Note: 'Existing traffic' refers to the traffic noise levels for the relevant 'no build' option

Receivers alongside Memorial Avenue are already exposed to high levels of traffic noise. Since this project is an upgrade of an existing road and only minor changes to the road width and alignment are being proposed, noise modelling presented in Appendix C shows that the noise level change at any receiver between the build and no build scenarios is small, well below 12dB(A). There are no locations where the project will cause an increase of more than 12dB over the existing noise levels. The project therefore complies with the relative increase criteria.

3.3 Recent residential developments

RMS advised The Hills Shire Council of the plan to upgrade Memorial Avenue in 2008 so that any land developers who approached Council with a development application could be notified of the upgrade. The RNP noise goals apply only to existing receivers. Any recent developments in the project area that were approved after 2008 are not considered for additional noise mitigation as noise mitigation is the responsibility of the developer. Land developers must meet the internal noise goals set out in the Infrastructure SEPP (Department of Planning NSW 2007).

4 Operational Noise Assessment

4.1 Traffic flow and composition summary

4.1.1 Existing traffic volumes

Traffic counts of Memorial Avenue within the project area were conducted concurrently with the long term noise monitoring of Memorial Avenue in February 2014 to allow validation of the computer noise model. Additional traffic data for Old Windsor Road and Windsor Road was provided by Hyder Consulting. The results of the traffic survey and additional traffic data are summarised in Table 7.

Table 7 Existing 2014 Traffic volume & compositions

Road	ADT	Direction	Volume	Day time (7:00 – 22:00)		Night time (22:00 – 7:00)		Speed km/h
				Volume	HV%	Volume	HV%	
Memorial Ave at Stranglers Ck	22953	EB	11989	10679	4.9	1309	15.9	63
		WB	10964	9744	6.2	1220	16.9	65
Memorial Ave at Elizabeth Macarthur Ck	22471	EB	12059	10653	4.7	1407	15.0	60
		WB	10412	9267	4.3	1145	12.5	60
Old Windsor Rd - North of Memorial Ave	34900	Combined	34900	30400	5.9	4,500	6.4	80
Old Windsor Rd - South of Memorial Ave	43200	Combined	43200	37,600	6.1	5,600	5.2	80
Windsor Rd - North of Memorial Ave	33300	Combined	33300	29,000	5.9	4,300	7.0	60
Windsor Rd - South of Memorial Ave	45500	Combined	45500	39,600	6.1	5,900	5.6	60

4.1.2 Opening and design year traffic volumes

Traffic data for Memorial Avenue, Old Windsor Road & Windsor Road has been provided by Hyder Consulting for future years 2019 (Year of Opening) and 2029 (Design Year) as shown in Table 8 below. This data was utilised for the purpose of noise modelling predictions.

Table 8 Forecasted traffic volumes

Road	AADT	Day time (7:00 – 22:00)			Night time (22:00 – 7:00)		
		Volume	HV%	Speed km/h	Volume	HV%	Speed km/h
2019 Forecast							
Memorial Avenue at Stranglers Creek	32,200	28,000	6.8	70	4,200	7.6	70
Memorial Avenue at Elizabeth Macarthur Creek	33,500	29,100	6.9	70	4,400	7.0	70
Old Windsor Rd - North of Memorial Ave	40800	35500	5.9	80	5300	6.6	80
Old Windsor Rd - South of Memorial Ave	51200	44500	6.1	80	6700	5.5	80
Windsor Rd - North of Memorial Ave	41400	36000	6.1	60	5400	5.2	60

Road	AADT	Day time (7:00 – 22:00)			Night time (22:00 – 7:00)		
		Volume	HV%	Speed km/h	Volume	HV%	Speed km/h
Windsor Rd - South of Memorial Ave	56600	49200	6.1	60	7400	5.4	60
2029 Forecast							
Memorial Avenue at Stranglers Creek	38000	33200	6.7	70	4800	8.3	70
Memorial Avenue at Elizabeth Macarthur Creek	41600	36200	5.4	70	5400	5.9	70
Old Windsor Rd - North of Memorial Ave	44000	38300	6.0	80	5700	6.0	80
Old Windsor Rd - South of Memorial Ave	55000	47900	6.1	80	7100	5.6	80
Windsor Rd - North of Memorial Ave	44500	38700	5.9	60	5800	6.4	60
Windsor Rd - South of Memorial Ave	62800	54600	6.0	60	8200	5.7	60

It is assumed that the growth in traffic on Memorial Avenue would occur regardless of the road upgrade, therefore the noise models for both the 'build' and 'no build' options utilise the same traffic data.

4.2 Road traffic noise predictions

Noise predictions are based on a method developed by the United Kingdom Department of Environment entitled "Calculation of Road Traffic Noise (1988)" known as the CoRTN (1988) method. This method has been adapted to Australian conditions and extensively tested by the Australian Road Research Board and as a result it is recognised and accepted by the NSW Environment Protection Authority. The model predicts noise levels for steady flowing traffic and noise from high truck exhausts is also taken into account.

The CoRTN algorithms are contained within the 'CadnaA' noise modelling software which has been used to calculate traffic noise levels at receivers. The noise prediction model takes into account the following inputs.

Table 9 Summary of modelling inputs

Input parameters	Data acquired from
Traffic volumes and mix	Based on traffic counts and forecast data from Hyder
Vehicle speed	Memorial Avenue: 'No Build' Model: Sections of 60km/h and 70km/h as per posted speeds 'Build' Model: Upgraded posted speed of 70km/h Old Windsor Road: 80km/h as per posted speed Windsor Road: 60km/h as per posted speed
Gradient of roadway	Topographic data provided by Hyder
Source height	0.5 metre for car exhaust, 1.5 metres for car and truck engines and 3.6 metres for truck exhaust and detailed within CORTN88
Ground topography at receiver and road	Ground contours obtained from Hyder Consulting & NSW Land & Property Information (LPI)
Angles of view from receiver	Contained within model

Input parameters	Data acquired from
Reflections from existing barriers, structures and cuttings on opposite side of road	Calculated in CadnaA through CoRTN algorithm
Ground absorption	1.0 [can vary between 0 (hard surface) to 1 (soft ground)]
Receiver Heights	1.5 metre above ground level for ground floor and 4.5 metre above ground level for 1st floor
Facade correction	+2.5dB(A)
Correction for Australian conditions	LAeq,15h: -1.7 dB for 'at facade' & -0.7dB for 'free field' conditions from Australian Road Research Board (ARRB) Transport Research (Saunders et al 1983) LAeq,9h: No Australian Conditions correction applied
Acoustic properties of road surfaces	Dense graded asphalt – no corrections applied
Noise mitigation measures	Existing significant fences included in noise model

4.3 Model validation

The noise model was validated using the long-term noise monitoring results. Table 10 below summarises the results of the validation, providing a comparison of the modelled traffic noise levels for existing conditions compared to the measured traffic noise levels.

Table 10 Noise model validation

Location	$L_{Aeq,15hr}$ Daytime noise level			$L_{Aeq,9hr}$ Night time noise level		
	Measured	Modelled	Variation	Measured	Modelled	Variation
32 Memorial Avenue	62.3	62.6	-0.3	57.8	58.9	-1.1
25 Memorial Avenue	72.1	71.5	0.6	66.2	67.8	-1.6
19 Memorial Avenue	70.9	69.2	1.7	65.4	65.4	0.0
16 Gormon Avenue	59.2	61.7	-2.5	55.5	57.9	-2.4
8 Windsor Road	67.6	68.0	-0.4	62.8	62.9	-0.1
10 Rothwell Circuit	64.1	65.1	-1.0	58.3	59.6	-1.3
Mean variation			**-0.4**			**-1.1**

The noise model validation results show that the noise model outputs are typically in good agreement with the noise monitoring results and there is a high level of confidence that can be placed on the noise model for predicting future traffic noise levels.

At 16 Gorman Avenue the model is predicting approximately 2.5dB higher than the measured noise levels during both the day and night periods. The model may be under predicting the acoustic shielding from the terrain and boundary fencing along Burns Road (perpendicular to memorial Avenue), combined with the effect of traffic travelling slower than the posted speed in this area as it approaches the Windsor Road intersection, particularly during peak periods when vehicles are queuing on Memorial Avenue.

The mean variation between the measured and modelled traffic noise levels is an acceptable tolerance and therefore no model calibration corrections were applied to the noise model when generating the operational noise predictions for future traffic noise scenarios.

4.4 Noise model prediction results

Operational noise modelling has been conducted based on the traffic volumes presented in Section 4.1.2. The scenarios predicted are:

- **'Opening Year' 2019**, 'no-build' and 'build' options, day and night periods.
- **'Design Year' 2029,** 'no-build' and 'build' options, day and night periods.

The outcomes of noise modelling are:

- The increase in noise levels between the design year 'no-build' and 'build' options is more than 2dB(A) in NCAs 2, 4 and 5.
- Design year 2029 noise levels are predicted to be acute at 117 properties.
- There are several residential subdivisions that were approved after the road upgrade was proposed, and noise mitigation for these recent developments lies with the developer. These properties are not considered for noise treatment as part of this project.
- 52 properties have been identified for further consideration of noise mitigation, which includes the Gracelands Early Education Centre at 24 Arnold Avenue.

Further noise mitigation is considered at receivers where design year noise levels are acute, that is greater than or equal to $L_{Aeq,15hr}$ 65dB(A) or $L_{Aeq,9hr}$ 60dB(A), or where noise levels exceed the RNP noise assessment criteria and have increased by more than 2dB(A).

The predicted noise levels produced by the noise model are shown in detail in Appendix C. A summary of the results is shown in Table 11. Properties where further noise mitigation is to be considered are identified in Appendix E and a discussion of possible noise mitigation options is presented in Section 4.6.

Table 11 Summary of operational noise model results

NCA	Does the project increase noise levels by more than 2dB(A) for predicted levels above the RNP noise assessment criteria?	Number of 'acute' properties in Design Year 2029	Number of properties where further noise mitigation would be considered*
1	No	8	2
2	Yes	1	1
3	No	6	5
4	Yes	42	0
5	Yes	26	11
6	No	3	2
7	No	14	13
8	No	20	18
	Total	**120**	**52**

Note * noise affected properties that were approved for development after the road upgrade was proposed and made known to Council are not considered for further treatment. Rather it is the responsibility of the developer to achieve the noise goals outlined in the NSW State Environmental Planning Policy (Infrastructure) 2007.

4.5 Noise contours

The $L_{Aeq,15hr}$ Daytime and $L_{Aeq,9hr}$ Night time noise contours for the Design Year 2029 'No Build' and 'Build' scenarios are presented in Appendix D. The noise contours are produced by interpolation from a series of calculations to specific points within a regularly spaced grid, 1.5 metres above ground level. Noise contours are estimates of the predicted noise levels, and contour values may differ slightly from equivalent spot calculations.

4.6 Road traffic noise mitigation options

As some residences within the project area are exposed to a noise level increase of more than 2dB(A), and/or exposed to acute noise levels, an assessment of feasible and reasonable noise mitigation options is required.

This project is still at concept design phase and final noise mitigation treatments will not be decided until the detailed design phase to allow for all design changes to be considered in the noise assessment. Nonetheless, the following recommendations provide in-principle noise control solutions to reduce noise impacts to residential receivers. The advice provided here is in respect of acoustics only. Supplementary professional advice may need to be sought in respect of fire ratings, structural design, buildability, fitness for purpose and the like.

Section 3.4.1 of the RNP indicates the following priority order for noise mitigation:

> *"…identify feasible and reasonable mitigation measures in the following order of priority:*
>
> *i. Road design and traffic management*
>
> *ii. Quieter pavement surfaces*

iii. In-corridor noise barriers/mounds

iv. At-property treatments or localised barriers/mounds"

After road design and traffic management opportunities have been included in the road design and non-compliances still remain, the other additional mitigation measure should be applied where reasonable and feasible. The following discussion comments on the feasibility and reasonableness of the remaining mitigation options in accordance with the order of priority stated above.

4.6.1 Quieter pavements

At speeds of approximately 50km/h, road/tyre noise begins to be the dominate component of road traffic noise. At speeds of 70km/h or more, low noise pavements such as Stone Mastic Asphalt (SMA) or Open Graded Asphaltic Concrete (OGAC) can typically provide 3 - 4dB(A) noise reduction compared to dense graded asphalt, although this benefit is reduced over time due to degradation of the pavement surface.

There are 9 residences along the Memorial Avenue corridor that are identified for further consideration of noise mitigation and if a low noise pavement was applied to Memorial Avenue only, this would be reduced to 3 residences.

All of the other residences within the study area that are identified for further consideration of noise mitigation are adjacent to Windsor Road and Old Windsor Road near the intersections with Memorial Avenue. At intersections, where traffic slows down and then accelerates, is not ideal for quiet pavements and can cause increased wear and maintenance.

While a low noise pavement would provide some reduction in traffic noise, it is probably not feasible near intersections, and may not be cost effective along the length of Memorial Avenue due to the relatively small number of residences that require treatment. Implementation of low noise pavement should be further considered by pavement engineers at the detailed design phase of the project to confirm these assertions.

4.6.2 Noise barriers

At the time of announcement of Memorial Avenue Upgrade the residences along the road corridor were largely semi-rural in nature, isolated on large lots or in small groups. The RTA's ENMM notes that noise barriers are not cost effective where residences are isolated or in small groups, rather architectural treatments to dwellings are a more cost effective solution. Subsequently roadside noise barriers are not recommended for this project. Even though in recent years there have been low density residential developments constructed along the corridor, noise mitigation for these new residences is the responsibility of the developer.

4.6.3 At-property treatment

At-property treatment would only be considered for dwellings where other noise mitigation measures are either exhausted or are not feasible or cost effective.

The RNP's noise criteria are external noise goals, and building treatment only reduces noise levels inside a dwelling. Therefore, any applied building treatment would be designed to achieve the internal noise levels that would have been achieved had the project complied with the RNP criteria externally.

It is generally accepted that most buildings provide a noise reduction of at least 10dB(A) when windows are left 20% open, without providing additional treatment. This equates to an RNP internal criteria of $L_{Aeq,15hr}$ 50dB(A) and $L_{Aeq,9hr}$ 45dB(A) for residences along the road upgrade.

According to the ENMM, building treatments (in no particular order) may comprise:

- Fresh air ventilation systems that allow existing windows and doors to be kept shut;
- Upgraded windows and glazing and solid core doors on the exposed facades of masonry structures only (these techniques are unlikely to produce any noticeable benefit for light frame structures with no acoustic insulation in the walls);
- Upgrading window and door seals;
- Sealing wall vents; and
- External screen walls or property boundary fencing.

The following table provides guidance on the level of treatment required in relation to the exceedance above the RNP external assessment criteria.

Table 12 Residential at-property treatment options

Treatment 1	**Mechanical ventilation only**
<5dB(A) reduction	Where external noise levels are less than 5dB(A) above the RNP external assessment criteria, the internal noise goals may be achieved with windows closed. A light framed building with single glazed windows will provide a minimum noise reduction of up to 15dB(A) from outside to inside when windows are closed. If the RNP internal noise goals can only be achieved with windows closed, then mechanical ventilation should be considered to ensure fresh airflow inside the dwelling so to meet the requirements of the Building Code of Australia. It is important to ensure that mechanical ventilation does not provide a new noise leakage path into the dwelling and does not create a noise nuisance to neighbouring residential premises.
Treatment 2	**Mechanical ventilation and sealing of wall vents**
5-10 dB(A) reduction	Where external noise levels are less than 10dB(A) above the RNP external assessment criteria, the internal noise goals may be achieved with windows closed. A light framed building with single glazed windows will provide a minimum noise reduction of up to 20dB(A) from outside to inside (ENMM p20) when windows are closed and wall vents are sealed. If the internal noise goals can only be achieved with windows closed, then mechanical ventilation should be considered to ensure fresh airflow inside the dwelling so to meet the requirements of the Building Code of Australia.

Treatment 3	**Upgraded seals for windows and doors**
10-12dB(A) reduction	Where external noise levels are only slightly greater than 10dB(A) above the RNP external assessment criteria, then in addition to installing mechanical ventilation (Treatment 1) and sealing of wall vents (Treatment 2), special acoustic grade seals should be installed on windows and perimeter doors exposed to road traffic noise to enable the internal noise criteria to be achieved with windows and doors shut.
Option 4	**Upgraded windows, glazing and doors**
>12 dB(A) reduction	Where the predicted external noise level exceeds the RNP external assessment criteria by significantly more than 10dB(A), then upgraded windows and glazing and the provision of solid core doors would be required on the facades exposed to the proposed upgrade, in addition to the mechanical ventilation, sealing of wall vents and acoustic seals for windows and doors described in Treatments 1, 2 and 3, respectively. Note that these upgrades are only suitable for masonry type buildings. It is unlikely that this degree of upgrade would provide significant benefits to light framed structures should there be no acoustic insulation in the walls.

There are a number of physical factors that can influence the level of noise reduction actually achieved from outside-to-inside a dwelling, which include:

- existence of balconies on a facade causing reflections and amplification of sound
- orientation of each facade exposed to road noise for each room
- number of facades exposed to road noise for each room
- area size of all facades exposed to road noise for each room
- surface areas of windows / doors per room
- surface areas of walls / roofs / floors per room
- possible entry of noise via roof / sub-floor
- type of construction, thickness and condition of windows / doors / walls / roofs / floors per room
- size, volume and layout of each room
- type of floor covering, curtains and other soft furnishings in each room

Given that the above details are unique for each dwelling, it is recommended that field inspections of each affected property be undertaken during the detailed design stage of the project in order to conduct detailed noise modelling for the affected habitable rooms of each dwelling.

4.7 New signalised intersections

4.7.1 Interrupted traffic flow

The proposal includes new signalised intersections at Arnold Avenue and Severn Vale Drive. This will potentially create interrupted (or stop-and-go) traffic flow conditions compared to the largely uninterrupted flows that are currently found on Memorial Avenue. Stop-and-go conditions resulting from changing traffic signals result in deceleration and acceleration noises as vehicles approach and depart road intersections. These deceleration and acceleration noises not only differ from each other, but also differ from the cruising traffic noise that occurs in the middle of a green light period. Different characteristics which are apparent throughout the noise measurement period of interrupted traffic flow conditions in urban areas make formulating a theoretical traffic noise model difficult and complex for this kind of condition.

Notwithstanding the above, the RLS-90 noise prediction method defines a correction for signalised intersections which is dependent on distance from the road. Assuming a reduced traffic speed as vehicles approach an intersection to stop, and adding the RLS-90 correction, we have conducted noise calculations with and without signalised intersections, and we expect the Leq noise levels to change by less than 1dB(A) at the nearest residence due to the introduction of the signalised intersection compared to free-flowing traffic. This is consistent with our past experience where noise levels from vehicles were measured at an intersection for both free-flowing and stop-and-go conditions, and the measured levels were within 1dB(A) for each scenario.

In terms of Lmax, noise levels can be higher near intersections than along equivalent sections of road with continuous traffic flow. This is due to the acceleration of vehicles away from an intersection; however this only occurs for vehicles traveling with instantaneous speeds of less than 60km/h. At instantaneous speeds of approx. 60km/h or greater, a vehicle's passby noise level will tend to be the same whether the vehicle is travelling at a constant speed or accelerating at that instant in time. This is likely due to tyre-to-road noise dominating over engine noise at higher speeds. Also the passby noise level of a vehicle at 60km/h is greater than the noise of a vehicle accelerating at instantaneous speeds of less than 60km/h. This applies to light vehicles and could vary for heavy vehicles depending on gearing. [Reference: 'Prediction of noise changes due to traffic speed control', p2074-2081, JASA 122(4), October 2007].

In summary, while the introduction of intersections may alter the character of noise that the surrounding receivers experience, the new intersections themselves will not significantly alter the level of noise at those receivers.

4.7.2 Audio-tactile push buttons

RMS installs audio-tactile push buttons to pedestrian crossing traffic control signals to provide improved accessibility for hearing and visually impaired people. RMS has produced a management framework for noise from audio-tactile push buttons titled 'Management of noise from traffic signal audio-tactile push buttons'. The management framework states the following:

"As the audio-tactile push buttons produce short duration high noise levels, an EIA maximum noise goal of 15dB(A) over the assumed internal sleeping accommodation noise level of 35dB(A) should be applied.

As most houses, regardless of the construction type, will achieve 10dB(A) noise level reduction through the building façade with windows open, the appropriate external noise performance standard for evaluating environmental impacts associated with new traffic signal installations is 35 + 15 + 10 = 60dB(A) Lmax."

The above noise goal is primarily used to protect bedrooms of a residential dwelling and thus would be applicable for the night period only. Therefore, based on the above requirements, the applicable noise goal for the assessment of tactile noise from the pedestrian push buttons is 60dB(A), outside an affected bedroom window of a dwelling during the night period.

The loudest producible noise level from a push button is 85dB(A) at a walk phase signal frequency of 500Hz and at a distance of 1m from the push button device. Allowing for a 5dB(A) correction for the tonal nature of the source, the level used for assessment purposes is 90dB(A) at 1m.

Noise modelling of push button noise was conducted for at both intersections. The nearest residence to the Severn Vale Drive intersection push button will be approximately 80m (after property acquisitions). The noise level at this residence is predicted to be 52dB(A), which complies with the 60dB(A) goal.

The nearest residence to the Arnold Avenue intersection is approximately 25m, although this residence is recent and was DA approved after the announcement of the road upgrade proposal. The predicted level at the nearest residence to Arnold Avenue is 62dB(A), which is a minor exceedance of the goal.

If in the event noise from push buttons was generating complaints, there are several mitigation measures available. A three setting volume switch (ie. high, medium and low) is available inside the push button housing. The source noise level used in this assessment is based on the highest volume setting. It is understood that the volume switch provides a 3dB(A) reduction per switch setting, therefore on the low setting up to 6dB(A) reduction is achievable. This volume setting alone would mitigate the minor predicted exceedance at the Arnold Avenue intersection.

Furthermore, the push button unit also incorporates an automatic gain control (AGC), which actively reduces the noise source level based on the instantaneous ambient noise level immediately prior to the walk phase signal being activated. Therefore during periods of low background noise in the absence of vehicle passbys, AGC will reducing the source level, thereby minimising noise disturbance, particularly at night.

5 Maximum Noise Level Assessment

The RNP does not specify a night-time L_{max} noise limit or noise goal. This is primarily because research conducted to date in this field has not been definitive and the relationship between maximum noise levels, sleep disturbance and subsequent health effects is not currently well defined.

According to the policy however, the likely maximum or peak noise levels are to be broadly assessed and reported for the night-time period, which is considered by the EPA as being 10pm to 7am. The assessment of maximum noise levels are only applicable at residential receivers.

The RNP does not specify a night-time Lmax noise limit or noise goal. This is primarily because research conducted to date in this field has not been definitive and the relationship between maximum noise levels, sleep disturbance and subsequent health effects is not currently well defined.

According to the policy however, the likely maximum or peak noise levels are to be broadly assessed and reported for the night-time period, which is considered by the NSW Environment Protection Authority (EPA) as being 10pm to 7am.

For the purpose of this assessment, a maximum noise event is defined as any vehicle passby for which L_{Amax} > 65dB(A) and L_{Amax} - $L_{Aeq(1hr)}$ ≥ 15dB(A). Taking guidance from Practice Note iii of the ENMM, we have used the following methodology for assessing maximum noise levels;

- Collate external L_{Amax} and L_{Aeq} noise levels from the monitored existing noise levels between 10 pm and 7 am based on 1 second stored data at all available monitoring locations (4 in total).
- Calculate the L_{Amax} – L_{Aeq} range from the monitored existing noise levels at each location.
- Analyse the L_{Amax} noise levels based on the 1 second stored data to determine the number of maximum noise events per hour during the night period.
- Predict the future L_{Amax} noise levels based on the proposed road design and distance corrections.
- Predict the future L_{Amax} events by factoring the measured events to the increase in traffic between existing (2014) and future (2029) traffic volumes data provided by RMS.
- Discuss the predicted results at noise monitoring locations with respect to residential receivers within each NCA.
- Evaluate whether maximum noise impacts will reduce or increase for the design year.

Table 13 shows the range of L_{Amax} levels and the number of maximum noise events as measured by the noise monitors deployed for this study. The distance of each monitor from the road varied, however since much of the study area is to be redeveloped for residential use in the future, and since new developments will tend to have a road setback of around 15 - 20m, the results from M3 are most relevant and have been used as the basis of future maximum noise event predictions.

Allowing for changes in the road to receiver distance as a result of the project widening, the maximum noise levels in 2029 are predicted to be 69 - 89dB(A) externally. This represents a 4 - 5dB(A) increase for receivers in NCA 2, 4, and 5 as these are the areas where the road widens significantly towards the residences. Residences in other NCAs will experience L_{Amax} levels similar to current levels.

Based on future traffic growth and specifically the increase in night time heavy vehicles, receivers along Memorial Avenue can expect an increase in the number of maximum noise events from approximately 48 per night to 88 per night, which is an increase of more than 80%.

While L_{Amax} noise levels at a property do not determine whether noise mitigation should be applied, they can assist in the prioritisation and selection of mitigation. Where a dwelling in NCA 2, 4, or 5 has been identified for noise mitigation, building treatments that allow bedroom windows to remain closed and improve the noise reduction of L_{Amax} levels across the facade should be considered a priority.

Table 13 Measured maximum noise levels at night

Receiver			Measured 2014								
ID	Address	Approx. distance to existing road (m)	L_{Amax} Range		L_{Amax} - L_{Aeq} Range		L_{Amax} events Per hour		L_{Amax} Events per Night		Average No. of L_{Amax} Events per night
			Min	Max	Min	Max	Min	Max	Min	Max	
M1	32 Memorial Avenue	36	65	86	15	24	0	6	7	22	12
M2	25 Memorial Avenue	8	73	91	15	31	0	22	33	79	54
M3	19 Memorial Avenue	15	71	91	15	28	0	23	19	88	48
M4	16 Gorman Avenue	52	65	78	15	24	0	6	1	12	5
M5	8 Windsor Road	18	68	91	15	31	0	13	22	48	35
M6	10 Rothwell Circuit	25	67	83	15	28	0	8	8	28	18

Notes:

1. Night-time L_{Amax} values are shown only where L_{Amax} > 65dB(A) and where $L_{Amax} - L_{Aeq} \geq$ 15dB(A)

6 Construction Noise Assessment

The NSW *Interim Construction Noise Guideline* (ICNG, 2009) provides guidelines for assessing noise generated during the construction phase of developments. The ICNG provides two methods for 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 of the construction works for the proposal, a quantitative assessment method has been used for this assessment.

6.1 Construction noise objectives

6.1.1 Construction noise management levels at residences

Construction noise management levels are determined by the NSW 'Interim Construction Noise Guideline'. Table 14 below (reproduced from Table 2 of the ICNG) sets out the noise management levels (NMLs) for residences and how they are to be applied.

The guideline intends to provide respite for residents exposed to excessive construction noise outside the recommended standard hours whilst allowing construction during the recommended standard hours without undue constraints.

The rating background level (RBL) is used when determining the NML. The RBL is the overall single-figure background noise level measured in each relevant assessment period (during or outside the recommended standard hours).

Table 14 Noise management levels at residential receivers

Time of day	Management level $L_{Aeq\ (15\ min)}$	How to apply
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected RBL + 10dB(A)	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.

Time of day	Management level $L_{Aeq\ (15\ min)}$	How to apply
	Highly noise affected 75dB(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: 1. times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences 2. 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 + 5dB(A)	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 section 7.2.2 of the ICNG.

The NML represents the point above which there may be some community reaction to noise. Residential receivers are considered 'noise affected' where construction noise levels are greater than the NML. Where predicted and/or measured construction noise levels exceed the NML, all feasible and reasonable work practices will be applied to meet the management levels.

During standard construction hours a highly affected noise objective of $L_{Aeq(15min)}$ 75 dB(A) applies at all receivers.

Table 15 identifies the adopted NMLs for receivers within the various NCA's along the route. The NMLs for each NCA are derived from the RBL results of the nearest long term noise monitoring location.

Table 15 Construction noise management levels at residential receivers

NCA	L_{A90} Rating Background Level (RBL)			Noise Management Level $L_{Aeq(15min)}$ [1]		
	Day	Evening	Night	Day	Evening	Night
1	49	46	37	59	51	42
2	49	46	37	59	51	42
3	53	50	41	63	55	46
4	53	50	41	63	55	46
5	49	50	44	59	55	49
6	49	50	44	59	55	49
7	55	50	34	65	55	39
8	49	48	38	59	53	43

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.

6.1.2 Construction noise management levels at other sensitive land uses

Table 16 sets out the ICNG noise management levels for other noise sensitive receiver locations. Other sensitive receivers that have been identified along the project construction route are summarised in Table 17.

Table 16 Noise management levels at other noise sensitive land uses

Land use	Where Objective Applies	Management level $L_{Aeq,15min}$
Classrooms at schools and other educational institutions	Internal noise level	45 dB(A)
Hospital wards and operating theatres	Internal noise level	45 dB(A)
Places of worship	Internal noise level	45 dB(A)
Active recreation areas	External noise level	65 dB(A)
Passive recreation areas	External noise level	60 dB(A)
Community centres	Depends on the intended use of the centre.	Refer to the 'maximum' internal levels in AS2107 for specific uses.
Commercial premises	External noise level	70 dB(A)
Industrial premises	External noise level	75 dB(A)

Notes:

1. Noise management levels apply when receiver areas are in use only.

Table 17 Other sensitive receivers

ID	NCA	Address	Receiver	Receiver Type
S1	1	43 Memorial Avenue	Industrial Building	Industrial
S2	1	24 Arnold Avenue	Gracelands Early Education Centre	Classroom
S3	2	8 Free Settlers Dr	The Gracewood Community Retirement Village	Commercial (ground floor)
S4	3	15-17 Memorial Avenue	The Hills Clinic	Hospital ward
S5	6	Memorial Avenue	Kellyville Cricket Club	Active recreation
S6	7	3-5 President Road	Kellyville Preschool Kindergarten	Classroom
S7	7	3 Windsor Road	Repco	Commercial
S8	7	5 Windsor Road	Caltex	Commercial
S9	8	6 Rothwell Circuit	Fit Kidz Day Care Centre	Classroom
S10	8	Lot 4 1190 Old Windsor Road	Outback Steakhouse	Commercial

For schools, hospitals and places of worship where an internal management level of 45dB(A) is specified, the equivalent external management level is 55dB(A) assuming 10dB(A) noise reduction through an open window.

As identified for residential receivers, at all other noise sensitive receivers a highly affected noise objective of $L_{Aeq(15min)}$ 75dB(A) shall apply. Construction activity noise above this level would be managed as described in Table 14.

6.1.3 Sleep disturbance

The ICNG recommends that where construction works are planned to extend over two or more consecutive nights, the assessment should consider maximum noise levels and the extent and frequency of maximum noise level events exceeding the RBL. The ICNG (p15) refers to the discussion on sleep disturbance provided in the NSW Environmental Criteria for Road Traffic Noise (ECRTN, Environment Protection Authority 1999, pp 25-30). The ECRTN presents a summary of the findings from all the research conducted world-wide on sleep disturbance, and after consideration of all the information presented it concludes the following:

- Maximum internal noise levels below 50-55dB(A) are unlikely to cause awakening reactions.
- One or two events per night with maximum internal noise levels of 65-70dB(A) are not likely to affect health and wellbeing. (ECRTN p29)

Based on the above, an upper external noise limit of L_{Amax} 65dB(A) is set as a NML for the purpose of this construction noise assessment.

6.2 Construction activities

Whilst construction work would be carried out during daytime hours whenever practicable, due to high traffic volumes on Memorial Avenue during the day, it is likely that much of the construction work will need to be carried out during the evening and night.

The following table lists the general construction activities and the associated major plant and equipment likely to be used by the contractor to carry out the necessary construction work for this project.

Table 18 Construction activity & equipment list

Activity	Plant/ Equipment
Site clearance	Chain Saw Tracked Excavator Dump Truck Bull Dozer
Utility, property, service adjustment	Tracked Excavator Dump Truck Mobile Crane
Pavement and kerb demolition	Milling Machine Tracked Excavator Tracked Excavator (with Rock Breaker) Front end loader Backhoe Dump Truck

Activity	Plant/ Equipment
Installation of drainage pits & lines	Tracked Excavator Drilling Rig Dump Truck Front end loader Backhoe
Supply, lay and compact road fill, sub base and surface Supply, lay and compact footpath, kerb and gutter	Mobile Crane Concrete Truck Concrete pump Grader Pavement Laying Machine Roller Generator
Traffic signals, signposting and line marking	Mobile Crane Truck

6.3 Construction noise sources

The following table lists the sound power levels of the plant and equipment likely to be used by the contractor to carry out the necessary construction work for this project.

Table 19 Typical construction equipment & sound power levels

Plant Description	Sound Power Levels, dB(A)	
	L_{Aeq}	L_{Amax}
Rock Breaker	117	125
Concrete Saw	115	118
Mobile Crane	110	116
Compactor	110	116
Front End Loader	110	112
Pavement Laying Machine	109	118
Bulldozer	109	115
Tracked Excavator	107	115
Grader	107	115
Road Milling Machine	108	111
Concrete Truck	106	110
Dump Trucks	105	110
Rollers	104	110
Truck (>20tonne)	103	106
Concrete Pump	102	104
Backhoe	101	108
Power Generator	100	106

The sound power levels for the majority of activities presented in the above table are based on maximum levels given in Table A1 of Australian Standard 2436 - 2010 "Guide to Noise Control on Construction, Demolition and Maintenance Sites", ICNG, information from past projects and information held in the Renzo Tonin & Associates library files.

6.4 Predicted noise levels

Noise emissions were determined by modelling the noise sources, receiver locations, and operating activities as outlined above. Predicted noise levels assume all listed equipment for individual tasks are operating concurrently. This approach is conservative and has been adopted to ensure the full extent of possible noise impacts are assessed (what might occur in the worst-case). Therefore, the noise generated during construction works will generally be below the predictions presented below.

All construction activities are assessed against all time periods to give an indication of the potential noise impacts should construction occur out of hours.

Table 20 presents a summary of the predicted L_{Aeq} noise levels for each activity associated with the construction phase. The assessment point is at the boundary for residential receivers and at the most affected occupied point of the premises (typically at the front facade) for other sensitive receivers.

Table 21 presents a summary of the predicted L_{Amax} noise levels during potential night time works for residential receivers. The assessment point is at the building facade assuming a bedroom window.

Table 20 Predicted L_{Aeq} construction noise levels

Activity		NCA 1	NCA 2	NCA 3	NCA 4	NCA 5	NCA 6	NCA 7	NCA 8	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
	NML Day	*59*	*59*	*63*	*63*	*59*	*59*	*65*	*59*	*75*	*55*	*70*	*55*	*65*	*55*	*70*	*70*	*55*	*70*
	Evening	*51*	*51*	*55*	*55*	*55*	*55*	*55*	*53*	*75*	*55*	*70*	*55*	*65*	*55*	*70*	*70*	*55*	*70*
	Night	*42*	*42*	*46*	*46*	*49*	*49*	*39*	*43*	*75*	*55*	*70*	*55*	*65*	*55*	*70*	*70*	*55*	*70*
	Site clearance	**75**	**83**	**85**	72	**74**	**79**	74	**76**	56	**82**	59	**71**	59	56	**75**	73	75	75
	Site Clearance (without chainsaw)	**70**	**78**	**80**	67	69	**74**	69	**71**	51	**77**	54	**66**	54	51	70	68	**70**	70
	Utility & service adjustment	**70**	**79**	**80**	67	**70**	**75**	70	**72**	52	**77**	54	**66**	55	52	70	69	**71**	70
Earthworks Phase	Pavement & kerb demolition	**77**	**86**	**87**	**74**	**77**	**82**	**77**	**79**	59	**84**	61	**73**	62	59	**77**	**76**	**78**	**77**
Earthworks Phase	Pavement & kerb demolition (without rock breaker)	**73**	**82**	**83**	70	**73**	**78**	73	**75**	55	**80**	57	**69**	58	55	73	72	**74**	73
Earthworks Phase	Drainage pits & lines	**73**	**81**	**83**	70	**73**	**78**	73	**74**	55	**80**	57	**69**	58	54	73	71	73	73
Earthworks Phase	Supply, lay & compact road & footpath	**73**	**81**	**83**	70	**72**	**77**	72	**74**	54	**80**	57	**69**	58	54	73	71	73	73
	Traffic signals, signposting & line marking	68	**77**	**79**	65	68	**73**	68	**70**	50	**75**	53	64	53	50	68	67	69	68

Notes:

Bold font represents exceedance of greater than 10dB(A) above the daytime NML (20dB(A) above daytime RBL).

Red font represents exceedance of the 75dB(A) **highly affected** noise objective.

Table 21 Predicted L_{Amax} Construction Noise Levels for Night Works (Residential)

Activity		NCA 1	NCA 2	NCA 3	NCA 4	NCA 5	NCA 6	NCA 7	NCA 8
	Sleep Disturbance Upper Limit Night	65	65	65	65	65	65	65	65
	Site clearance	**74**	**71**	**77**	**72**	**73**	**75**	**75**	**77**
	Site Clearance (without chainsaw)	**74**	**71**	**77**	**72**	**73**	**75**	**75**	**77**
	Utility & service adjustment	**71**	**68**	**75**	**69**	**70**	**73**	**73**	**75**
Earthworks Phase	Pavement & kerb demolition	**86**	**83**	**90**	**84**	**85**	**88**	**88**	**90**
	Pavement & kerb demolition (without rock breaker)	**74**	**71**	**78**	**72**	**73**	**76**	**76**	**78**
	Drainage pits & lines	**80**	**77**	**84**	**78**	**79**	**81**	**82**	**83**
	Supply, lay & compact road & footpath	**71**	**68**	**74**	**69**	**70**	**72**	**72**	**74**
	Traffic signals	**72**	**69**	**75**	**69**	**70**	**73**	**73**	**75**
	Line Marking	**71**	**68**	**75**	**69**	**70**	**73**	**73**	**75**

Notes:

1. **Bold** font represents exceedance of night time sleep disturbance upper limit.
2. Noise level predictions for L_{Amax} sleep disturbance have been made at the building facade

Construction phase noise levels at residences are expected to exceed the NMLs in most NCAs, and with the exception of NCA 4, residences may also be "highly noise affected". Other sensitive receivers are expected to be slightly less affected than residences as they generally only operate during the day and are often set back further from the road. Nonetheless Gracelands Early Education Centre (S2) and Fit Kidz Day Care Centre (S9) may be "highly noise affected".

The predictions for L_{Amax} noise levels at night are above the goals for residences which highlights the potential for sleep disturbance during night works. Noise mitigation measures are discussed in Section 6.5.

6.5 Construction noise mitigation options

The mitigation of construction noise would occur through the preparation and implementation of a Construction Noise and Vibration Management Plan (CNVMP). The following recommendations provide in-principle noise control solutions available for use in the CNVMP. Where actual construction activities differ from those assessed in this report, more detailed design of noise control measures may be required once specific items of plant and construction methods have been chosen and assessed on site.

6.5.1 Standard noise and vibration management measures

Table 22 sets out standard noise and vibration mitigation, as outlined in the ENMM (Section 5), to be implemented in the CNVMP as required.

Table 22 Standard mitigation measures to reduce construction noise and vibration

Action Required	Applies to	Details
Management Measures		
Implement community consultation measures – inform community of construction activity and potential impacts	Airborne noise Ground-borne vibration	Incorporate into Community Liaison Plan
Site inductions	Airborne noise Ground-borne vibration	All employees, contractors and subcontractors are to receive a Project induction. The environmental component may be covered in toolboxes and should include: • all relevant project specific and standard noise and vibration mitigation measures; • relevant licence and approval conditions; • permissible hours of work; • any limitations on high noise generating activities; • location of nearest sensitive receivers; • construction employee parking areas; • designated loading/unloading areas and procedures; • site opening/closing times (including deliveries); and • environmental incident procedures.
Behavioural practices	Airborne noise	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height where practicable, throwing of metal items and slamming of doors.
Monitoring	Airborne noise Ground-borne vibration	Monitoring procedures and requirements to be specified in CNVMP
Site specific attended vibration measurements	Ground-borne Vibration	Monitoring procedures and requirements to be specified in CNVMP
Source Controls		
Construction hours and scheduling	Airborne noise Ground-borne vibration	Where feasible and reasonable, construction would be carried out during the standard daytime working hours. Work generating high noise and/or vibration levels would be scheduled during less sensitive time periods if practicable.
Construction respite period	Airborne noise Ground-borne vibration	Noise and vibration generating activities with impulsive, tonal or low frequency characteristics (such as jack hammering, rock breaking, rock hammering, vibratory rolling) would only be carried out: • in continuous blocks, up to but not exceeding 3 hours each; and • with a minimum respite period of one hour between each block.
Equipment selection	Airborne noise Ground-borne vibration	Use quieter and less noise/ vibration emitting construction methods where feasible and reasonable. Where vibration intensive equipment is used within the minimum working distances identified, determine whether alternative construction methodology or less vibration intensive equipment can be used, e.g. when piling is required, use bored piles rather than impact-driven piles.
Maximum noise levels	Airborne noise	All plant and equipment to be appropriately maintained to ensure optimum running conditions, with periodic monitoring.

Action Required	Applies to	Details
Use and siting of plant	Airborne noise Ground-borne vibration	Simultaneous operation of noisy plant within discernible range of a sensitive receiver is to be limited/ avoided where possible. 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. Noise-emitting plant to be directed away from sensitive receivers where possible.
Plan worksites and activities to minimise noise and vibration	Airborne noise Ground-borne vibration	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.
Non-tonal reversing alarms	Airborne noise	Non-tonal reversing beepers (or an equivalent mechanism) should be fitted and used on all construction vehicles and mobile plant regularly used on site for periods of over two months where practicable.
Minimise disturbance arising from delivery of goods to construction sites	Airborne noise	Ensure all deliveries occur during standard construction hours.
Path Controls		
Shield sensitive receivers from noisy activities	Airborne noise	Where reasonable and feasible, use structures to shield residential receivers from noise such as: • site shed placement; • earth bunds; • temporary noise screens (where practicable) • enclosures to shield fixed noise sources such as pumps, compressors, fans etc screens (where practicable); and • consideration of site topography when situating plant.

6.5.2 Additional airborne noise mitigation measures

Additional mitigation measures to be considered when preparing the CNVMP include:

- **Phone calls:** phone calls detailing relevant information would be made to identified/ affected stakeholders;
- **Letter box drops:** used to disseminate project information to interested stakeholders and/or to provide advanced warning of high noise impact activities during the day or potentially audible OOHW activities (can also be emailed);
- **Individual briefings:** used to inform stakeholders about the impacts of high noise activities and mitigation measures that will be implemented;
- **Project specific respite offer:** residents subjected to lengthy periods of noise or vibration may be eligible for a Project specific respite offer (e.g. pre-purchased movie tickets);
- **Specific notifications:** letterbox dropped, emailed or hand delivered to advise stakeholders that construction activities are likely to exceed the noise objectives;
- **Monitoring:** noise or vibration monitoring offered to stakeholders likely to incur noise and/ or vibration levels above the applicable levels; and

- **Alternative accommodation:** offered to residents living in close proximity to Project construction works that are likely to incur noise levels at night that are significantly above the applicable levels in Section 6.1.1.

Table 23 below can be used to advise the appropriate application of additional noise mitigation. Procedures for noise monitoring and complaints handling would be defined in the CNVMP.

Table 23 Additional airborne noise mitigation measures

Time Period		Mitigation measures/predicted L_{Aeq}(15min) noise level above RBL			
		0 to 10 dB(A) Noticeable	**10 to 20 dB(A) Clearly audible**	**20 to 30 dB(A) Moderately intrusive**	**>30 dB(A) Highly intrusive**
Standard	Mon-Fri (7am-6pm) Sat (8am-1pm) Sun/ Public Hol (Nil)	-	-	Letterbox drop, Monitoring	Letterbox drop, Monitoring
OOHW Period 1	Mon-Fri (6pm-10pm) Sat (7am to 8am & 1pm-10pm) Sun/ Public Hol (8am - 6pm)	-	Letterbox Drop	Monitoring, Letterbox Drop	Monitoring, Individual Briefing, Letterbox Drop Project Specific Respite Offer, Phone Calls, Specific Notification
OOHW Period 2	Mon-Fri (10pm-7am) Sat (10pm-7am) Sun/ Public Hol (6pm-8am)	Letterbox Drop	Monitoring, Letterbox Drop	Monitoring, Individual Briefing, Letterbox drop, Phone Calls, Specific Notification	Alternate Accommodation, Monitoring, Individual Briefing, Letterbox Drop, Phone Calls, Specific Notification

Source: TCA Construction Noise Strategy, October 2010

7 Construction Vibration Assessment

7.1 Construction vibration objectives

7.1.1 Disturbance to buildings occupants

Assessment of potential disturbance from vibration on human occupants of buildings is made in accordance with the DECC '*Assessing Vibration; a technical guideline*' (DECC, 2006). The guideline provides criteria which are based on the British Standard BS 6472-1992 '*Evaluation of human exposure to vibration in buildings (1-80Hz)*'. Sources of vibration are defined as either 'Continuous', 'Impulsive' or 'Intermittent'. Table 24 provides definitions and examples of each type of vibration.

Vibration sources are defined as Continuous, Impulsive or Intermittent. Table 24 provides a definition and examples of each type of vibration.

Table 24 Types of vibration

Type of vibration	Definition	Examples
Continuous vibration	Continues uninterrupted for a defined period (usually throughout the day-time and/or night-time)	Machinery, steady road traffic, continuous construction activity (such as tunnel boring machinery).
Impulsive vibration	A rapid build-up to a peak followed by a damped decay that may or may not involve several cycles of vibration (depending on frequency and damping). It can also consist of a sudden application of several cycles at approximately the same amplitude, providing that the duration is short, typically less than 2 seconds	Infrequent: Activities that create up to 3 distinct vibration events in an assessment period, e.g. occasional dropping of heavy equipment, occasional loading and unloading.
Intermittent vibration	Can be defined as interrupted periods of continuous or repeated periods of impulsive vibration that varies significantly in magnitude	Trains, nearby intermittent construction activity, passing heavy vehicles, forging machines, impact pile driving, jack hammers. Where the number of vibration events in an assessment period is three or fewer, this would be assessed against impulsive vibration criteria.

Source: Assessing Vibration; a technical guideline, Department of Environment & Climate Change, 2006

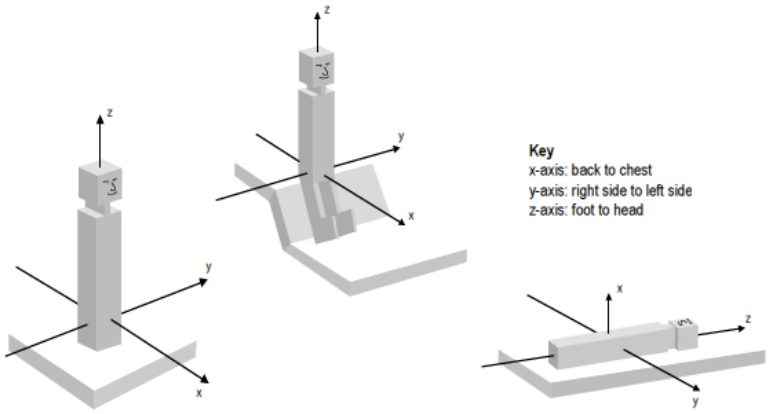
The vibration criteria are defined as a single weighted root mean square (rms) acceleration source level in each orthogonal axis. Section 2.3 of the guideline states:

> *'Evidence from research suggests that there are summation effects for vibrations at different frequencies. Therefore, for evaluation of vibration in relation to annoyance and comfort, overall weighted rms acceleration values of the vibration in each orthogonal axis are preferred (BS 6472).'*

When applying the criteria, it is important to note that the three directional axes are referenced to the human body, i.e. x-axis (back to chest), y-axis (right side to left side) or z-axis (foot to head). Vibration may enter the body along different orthogonal axes and affect it in different ways. Therefore, application of the criteria requires consideration of the position of the people being assessed, as illustrated in Figure

3. For example, vibration measured in the horizontal plane is compared with x- and y-axis criteria if the concern is for people in an upright position, or with the y- and z- axis criteria if the concern is for people in the lateral position.

Figure 3 Orthogonal axes for human exposure to vibration



The preferred and maximum values for continuous and impulsive vibration are defined in Table 2.2 of the guideline and are reproduced in Table 25.

Table 25 Preferred and maximum levels for human comfort

Location	Assessment period[1]	Preferred values		Maximum values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Continuous vibration (weighted RMS acceleration, m/s^2, 1-80Hz)					
Critical areas[2]	Day- or night-time	0.005	0.0036	0.010	0.0072
Residences	Daytime	0.010	0.0071	0.020	0.014
	Night-time	0.007	0.005	0.014	0.010
Offices, schools, educational institutions and places of worship	Day- or night-time	0.020	0.014	0.040	0.028
Workshops	Day- or night-time	0.04	0.029	0.080	0.058
Impulsive vibration (weighted RMS acceleration, m/s^2, 1-80Hz)					
Critical areas[2]	Day- or night-time	0.005	0.0036	0.010	0.0072
Residences	Daytime	0.30	0.21	0.60	0.42
	Night-time	0.10	0.071	0.20	0.14
Offices, schools, educational institutions and places of worship	Day- or night-time	0.64	0.46	1.28	0.92
Workshops	Day- or night-time	0.64	0.46	1.28	0.92
Intermittent vibration (Vibration Dose Values, VDV, $m/s^{1.75}$, 1-80Hz)					
Critical areas[2]	Day- or night-time	0.10		0.20	
Residences	Daytime	0.20		0.40	
	Night-time	0.13		0.26	

Location	Assessment period[1]	Preferred values		Maximum values	
		z-axis	x- and y-axis	z-axis	x- and y-axis
Offices, schools, educational institutions and places of worship	Day- or night-time	0.40		0.80	
Workshops	Day- or night-time	0.80		1.60	

Notes:
2. Daytime is 7:00am to 10:00pm and night-time is 10:00pm to 7:00am
3. 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. Stipulation of such criteria is outside the scope of their policy and other guidance documents (e.g. relevant standards) should be referred to. Source: BS 6472-1992

7.1.2 Structural damage to buildings

Safe limits for construction generated vibration have been determined using the vibration limits set out in the German Standard *DIN 4150 Part 3-1999 Structural Vibration in Buildings – Effects on Structures*.

The minimum 'safe limit' of vibration at low frequencies for commercial and industrial buildings is 20mm/s. For dwellings it is 5mm/s and for particularly sensitive structures (eg historical with preservation orders etc), it is 3mm/s. These limits increase as the frequency content of the vibration increases. These values are presented in Table 26 below and are generally recognised to be conservative.

Table 26 DIN 4150-3 Structural damage criteria

Group	Type of Structure	Vibration Velocity, mm/s			
		At Foundation at Frequency of			Plane of Floor Uppermost Storey
		1Hz to 10Hz	10Hz to 50Hz	50Hz to 100Hz	All Frequencies
1	Buildings used for commercial purposes, industrial buildings and buildings of similar design	20	20 to 40	40 to 50	40
2	Dwellings and buildings of similar design and/or use	5	5 to 15	15 to 20	15
3	Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Group 1 or 2 and have intrinsic value (eg buildings under a preservation order)	3	3 to 8	8 to 10	8

7.2 Vibration sources

The vibration generated from construction works will vary depending on the level and type of activity carried out at each site during each activity.

Table 27 below identifies the dominant vibration generating plant and their typical vibration levels based on library data and measurements from past projects. Potential vibration generated to receivers for this project will be dependent on separation distances, the intervening soil and rock strata, dominant frequencies of vibration and the receiver structure.

Table 27 Typical ranges of construction plant vibration levels

Plant vibration source	PPV Vibration (mm/s) at distance from plant							
	5m	10m	15m	20m	30m	40m	50m	100m
Bobcat (Mustang 2054)	<1	-	-	-	-	-	-	-
Compactor (852G)	5.3	2.0	2.2	1.4	<1	-		
Dozer (D810) (with ripper)	<2	-	-	-	-	-		
Drilling machine – Pneumatic (Atlas Copco (ROC 812HC 20T)	3.2	1	-	-	<0.1	-	<0.1	-
Drilling Rig – Air Trac Rotary (Ingersoll/Rand CM350)	4.4	1.4	-	-	0.6	-	<0.1	-
Drilling Rig – Tracked (Samsung SE 240 LC3 18T)	<2	-	-	-	-	-	-	-
Excavator ≤30T (travelling)	8.0	3.4	1.6	-	-	-		
Excavator ≤30T (digging)	5.8	4.0	0.0	-	-	-		
Excavator & Rock Hammer (20T)	4.5	1.3	-	0.4	0.2	0.15		
Excavator & Rock Hammer (27T)	10.5	2.5	-	-	-	-		
Excavator & Heavy Rock Hammer (eg 1500 kg)	4.5	1.3	-	0.4	0.2	0.15	0.02	-
Grader (20 tonne)	2.0	-	0.2	-	-	-		
Jack hammers	2.0	1.0	0.2	0.1	0.0	0.1		
Piling Rig – Bored (Soilmec 60T) *	2.4	0.2	0.2	-	-	-		
Piling Rig – Vibratory (Mertz M26)	29-36	16-40	7-17	19-22	2-13	1-15	1-7	1-3.5
Ripper (D10 D375A-2)	1-2	-	-	-	-	-	-	-
Rocksaw (Komatsu AVANCE PC300)	1.5	-	-	-	-	-	-	-
Timber Pole Drill	3.2	1	-	-	-	<0.2		
Truck & Trailer (45T net)	14.5	10.3	3.4	-	-	-		
Vibratory Roller ≤ 3T (Smooth Drum)#	8.7	5.4	-	-	-	-	-	-
Vibratory Roller ≤ 8T (Pad Footed)#	9-12	3.1						
Vibratory Roller ≤ 17T (Smooth Drum)	24.5	8.9	4.2	-	-	-		
Vibratory Roller ≤ 17T (Pad Footed)	15.1	10.3	3.2	-	-	-		

Notes: Source – Renzo Tonin & Associates database
* data based on sand/clay soil conditions
# Monitor mounted on plate in sands

Site specific buffer distances for vibration significant plant items (e.g. vibratory rollers, compactors, pile boring, pole drilling) must be measured on site. Unlike noise, vibration can't be 'predicted'. There are many variables from site to site, for example soil type and conditions; sub surface rock; building types and foundations; and actual plant on site. The data relied upon in this assessment (tabulated above) is taken from a database of vibration levels measured at various sites or obtained from other sources (e.g. BS5228-2:2009). They are not specific to this project.

7.3 Potential vibration impacts to residential and commercial uses

Based on the vibration data presented in Section 7.2 above, vibration generated by construction plant was estimated and potential vibration impacts to residences are summarised in Table 28 below.

Table 28 Potential vibration for residential properties

NCA	Approximate distance from works	Assessment of potential vibration impacts	
		Structural Damage	Human Disturbance
1	15 - 20m	**Low** probability of structural damage from vibratory rolling. **Very Low** probability of structural damage from other activities.	**Medium** probability of adverse comment as a result of vibratory rolling.
2	30 - 35m	**Very Low** probability of structural damage from vibratory rolling. **Very Low** probability of structural damage from other activities.	**Low** probability of adverse comment as a result of vibratory rolling.
3	15 - 20m	**Low** probability of structural damage from vibratory rolling. **Very Low** probability of structural damage from other activities.	**Medium** probability of adverse comment as a result of vibratory rolling.
4	20 - 25 m	**Low** probability of structural damage from vibratory rolling. **Very Low** probability of structural damage from other activities.	**Medium** probability of adverse comment as a result of vibratory rolling.
5	15 – 20m	**Low** probability of structural damage from vibratory rolling. **Very Low** probability of structural damage from other activities.	**Medium** probability of adverse comment as a result of vibratory rolling.
6	5-10m	**High** probability of structural damage from vibratory rolling. **Medium** probability of structural damage from other activities.	**High** probability of adverse comment as a result of vibratory rolling.
7	5-10m	**High** probability of structural damage from vibratory rolling. **Medium** probability of structural damage from other activities.	**High** probability of adverse comment as a result of vibratory rolling.
8	10-15m	**Medium** probability of structural damage from vibratory rolling. **Low** probability of structural damage from other activities.	**High** probability of adverse comment as a result of vibratory rolling.

Recommendations for reducing potential vibration impacts, including minimum working distances for construction plant are provided in Section 7.4 below.

Bridge Piling

It is unknown at this stage whether piling will be required for construction of the bridge over Strangers Creek, or what type if piling might be employed. However the nearest residences are more than 50m from where piling would occur and therefore it is very unlikely that vibration from piling would be an issue. Use of bored piling over impact or vibratory piling would minimise any impacts.

7.4 Vibration mitigation

Prior to construction commencement, the management of potential vibration impacts can be as follows:

- A CNVMP shall be prepared containing a management procedure to deal with vibration complaints. Each complaint would be investigated and where vibration levels are established as exceeding the set limits, appropriate amelioration measures would be put in place to mitigate future occurrences.
- Implement time restrictions for the most excessive vibration activities. Time restrictions can be negotiated with affected receivers.
- Carry out vibration testing of actual equipment on site prior to their commencement of operation to determine acceptable buffer distances to the nearest affected receiver locations.
- Notification by letterbox to the community advising of times and duration of high vibration activities such as rock hammering, vibratory rolling or piling.
- Conduct dilapidation surveys of any building within 50m of where rock hammering, vibratory rolling or piling is to occur.

During construction, where a reduction in vibration levels is required, the following mitigation measures are generally available:

- Increase the distance between the vibration source and receiver.
- Substitute the vibration source with a smaller capacity, less vibration intensive machine.
- Use an alternative construction method.

Based on vibration measurements from past projects and library information, Table 29 presents generic recommended minimum working distances for high vibration generating plant. However only site specific buffer distances should be relied upon, and these can be determined once vibration emission levels are measured from each plant item prior to the commencement of their regular use on site.

Table 29 Recommended minimum working distances for vibration intensive plant

Plant item	Rating / description	Minimum working distance	
		Cosmetic damage	Human response
Vibratory Roller[1]	< 50 kN (Typically 1-2 tonnes)	5 m	15m – 20 m
	< 100 kN (Typically 2-4 tonnes)	6 m	20 m
	< 200 kN (Typically 4-6 tonnes)	12 m	40 m
	< 300 kN (Typically 7-13 tonnes)	15 m	100 m
	> 300 kN (Typically 13-18 tonnes)	20 m	100 m
	> 300 kN (Typically > 18 tonnes)	25 m	100 m
Compactors[2]	-	15 m	100 m
Dozer[1]	(D810) with ripper	2 m (nominal)	10 m

Plant item	Rating / description	Minimum working distance	
		Cosmetic damage	Human response
Excavators[2]	< 30 Tonne (travelling/ digging)	10 m	15 m
Grader[1]	<= 20 tonne	2 m (nominal)	10 m
Loaders[2]	-	-	5 m
Small Hydraulic Hammer[2]	300kg (5-12 tonne excavator)	2 m	7 m
Medium Hydraulic Hammer[2]	900kg (12-18 tonne excavator)	7 m	23 m
Large Hydraulic Hammer[2]	1600kg (18-34 tonne excavator)	22 m	73 m
Jackhammer[2]	Hand held	1 m (nominal)	Avoid contact with structure
Truck Movements[2]	-	-	10 m

Notes: 1. TCA Construction Noise Strategy (Rail Projects) November 2011
2. Renzo Tonin & Associates project files, databases & library

8 Conclusion

Renzo Tonin & Associates have completed a noise and vibration assessment of the proposed upgrade of Memorial Avenue, between Old Windsor Road and Windsor Road, Kellyville. Noise from the operation of the upgraded road has been assessed, along with noise and vibration associated with the project construction activities.

The findings of this study are:

Traffic noise assessment

- The increase in noise levels as a result of the road widening is more than 2dB(A) in some areas along the road corridor.
- Design year noise levels are predicted to be acute at 120 properties.
- There are several residential subdivisions that were approved after the road upgrade was proposed, and noise mitigation for these recent developments lies with the developer. These properties are not considered for noise treatment as part of this project.
- 52 properties have been identified for further consideration of noise mitigation.

Construction noise and vibration assessment

- Construction noise is likely to exceed the construction noise management levels. Impacts will be greatest during any night time work. All reasonable and feasible noise mitigation would be applied during the construction phase. Possible noise mitigation measures and their effectiveness have been discussed.
- The probability of structural damage during construction is generally assessed as being low, although there is medium to high probability for residences within 10m of the construction zone. There is also a medium to high probability of adverse comment from the nearest receivers for felt vibration. Vibration mitigation and management measures have been provided.

9 References

1. *NSW Road Noise Policy* (NSW DECCW, March 2011)

2. *RTA Environmental Noise Management Manual* (RTA, December 2001)

3. *NSW Interim Construction Noise Guideline* (DECC, 2009)

4. *Assessing Vibration: A Technical Guideline* (DECC, 2006)

5. British Standard 6472-1992, *Evaluation of human exposure to vibration in buildings (1-80Hz)*

6. German Standard DIN 4150 – Part 3, *Structural vibration in buildings - Effects on Structures*

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 every day 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 ear is not as effective in hearing low frequency sounds as it is 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.
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 Noise Monitoring Methodology

B.1 Noise Monitoring Equipment

A 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
RTA05 (NTi Audio XL2)	Type 1	1/1 octaves
RTA06 (NTi Audio XL2, with low noise microphone)	Type 1	1/1 octaves

Notes: 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 Bruel & Kjaer Type 4230 or 4231 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 INP. The Bureau of Meteorology (BOM) provided meteorological data, which is considered representative of the site, for the duration of the noise monitoring period. The data was modified to allow 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 was taken from *Australian Standard AS1170.2 1989 Section 4.2.5.1*.

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 $\mathbf{L_{10}}$, $\mathbf{L_{90}}$, and $\mathbf{L_{eq}}$ levels. The statistical descriptors $\mathbf{L_{10}}$ and $\mathbf{L_{90}}$ measure the noise level exceeded for 10% and 90% of the sample measurement time. The $\mathbf{L_{eq}}$ level is the equivalent continuous noise level or the level averaged on an equal energy basis. The measurement sample periods are were fifteen minutes. The Noise -vs- Time graphs representing measured noise levels, as presented in this report, illustrate these concepts for the broadband results.

APPENDIX C Operation Noise Predictions (Without Mitigation)

The following table presents the detailed noise prediction results from the noise model. The results are colour coded consistent with RMS standard procedures where:

Black = Below the Road Noise Policy (RNP) base criteria

Blue = Above the RNP base criteria but not Acute

Red = Acute: $L_{Aeq,15hr}$ of 65dB(A) or greater OR $L_{Aeq,9hr}$ of 60dB(A) or greater (applies to buildings only)

Memorial Avenue - Operational Noise Assessment

Operational Noise Predictions

Date: 14/10/2014

NCA	NCA ID	Receiver Address	Receiver Description	Facade		Opening Year 2019				Design Year 2029				Increase (Build - No Build)				RNP External Noise Criteria		Exposed to Acute Noise Levels		Consider further treatment?
						No Build		Build		No Build		Build		2019		2029						
				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
1	1_001	43 Memorial Avenue	Industrial Building	G	S	60	56	60	56	61	56	61	56	0.1	0.1	0.1	0.1	-	-	-	-	NO
1	1_001	43 Memorial Avenue	Industrial Building	1	S	62	58	62	58	63	59	63	59	-0.1	-0.2	-0.2	-0.1	-	-	-	-	NO
1	1_002	41 Memorial Avenue		G	S	66	61	65	61	66	62	66	62	-0.3	-0.3	-0.3	-0.3	60	55	YES	YES	YES
1	1_003	2 Colonial Street	Post 2008 Development (Residence)	G	W	53	48	53	49	53	49	54	49	0.5	0.5	0.4	0.4	60	55	NO	NO	NO
1	1_003	2 Colonial Street	Post 2008 Development (Residence)	1	S	57	53	57	53	57	53	58	53	0.2	0.2	0.3	0.3	60	55	NO	NO	NO
1	1_004	4 Colonial Street	Post 2008 Development (Residence)	G	S	54	50	54	50	54	50	54	50	0.2	0.1	0.2	0.2	60	55	NO	NO	NO
1	1_004	4 Colonial Street	Post 2008 Development (Residence)	1	S	57	53	57	53	58	53	58	54	0.4	0.4	0.4	0.4	60	55	NO	NO	NO
1	1_005	10 Colonial Street	Post 2008 Development (Residence)	G	S	56	51	56	51	56	52	56	52	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
1	1_005	10 Colonial Street	Post 2008 Development (Residence)	1	S	57	53	57	53	57	53	58	53	0.3	0.3	0.3	0.4	60	55	NO	NO	NO
1	1_006	1 Brunner Count	Post 2008 Development (Residence)	G	W	53	49	54	49	54	49	54	50	0.5	0.5	0.5	0.5	60	55	NO	NO	NO
1	1_006	1 Brunner Count	Post 2008 Development (Residence)	1	W	57	53	57	53	57	53	58	53	0.2	0.2	0.3	0.2	60	55	NO	NO	NO
1	1_007	2 Brunner Count	Post 2008 Development (Residence)	G	W	54	50	54	50	54	50	55	50	0.2	0.1	0.2	0.2	60	55	NO	NO	NO
1	1_007	2 Brunner Count	Post 2008 Development (Residence)	1	S	57	53	57	53	58	53	58	54	0.3	0.3	0.3	0.3	60	55	NO	NO	NO
1	1_008	3 Brunner Count	Post 2008 Development (Residence)	G	W	55	50	55	51	55	51	55	51	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
1	1_008	3 Brunner Count	Post 2008 Development (Residence)	1	W	57	53	57	53	58	53	58	53	0.2	0.2	0.1	0.1	60	55	NO	NO	NO
1	1_009	4 Brunner Count	Post 2008 Development (Residence)	G	W	55	51	56	51	56	52	56	52	0.3	0.3	0.3	0.3	60	55	NO	NO	NO
1	1_010	5 Brunner Count	Post 2008 Development (Residence)	G	W	55	51	55	51	56	52	56	52	0.1	0.2	0.1	0.1	60	55	NO	NO	NO
1	1_010	5 Brunner Count	Post 2008 Development (Residence)	1	W	57	53	57	53	58	53	58	53	0.2	0.1	0.1	0.1	60	55	NO	NO	NO
1	1_011	6 Brunner Count	Post 2008 Development (Residence)	G	W	55	51	56	51	56	52	56	52	0.3	0.3	0.4	0.3	60	55	NO	NO	NO
1	1_012	7 Brunner Count	Post 2008 Development (Residence)	G	W	56	52	57	52	57	52	57	53	0.3	0.2	0.2	0.2	60	55	NO	NO	NO
1	1_012	7 Brunner Count	Post 2008 Development (Residence)	1	W	58	53	58	54	58	54	58	54	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
1	1_013	8 Brunner Count	Post 2008 Development (Residence)	G	W	56	52	56	52	56	52	57	53	0.4	0.4	0.4	0.5	60	55	NO	NO	NO
1	1_014	9 Brunner Count	Post 2008 Development (Residence)	G	W	57	53	57	53	57	53	58	53	0.2	0.2	0.3	0.3	60	55	NO	NO	NO
1	1_014	9 Brunner Count	Post 2008 Development (Residence)	1	W	58	54	58	54	58	54	59	54	0.2	0.2	0.3	0.3	60	55	NO	NO	NO
1	1_015	10 Brunner Count	Post 2008 Development (Residence)	G	W	57	53	58	53	58	53	58	54	0.5	0.5	0.5	0.4	60	55	NO	NO	NO
1	1_016	11 Brunner Count	Post 2008 Development (Residence)	G	W	57	53	57	53	57	53	58	53	0.3	0.3	0.4	0.3	60	55	NO	NO	NO
1	1_016	11 Brunner Count	Post 2008 Development (Residence)	1	W	58	54	58	54	59	54	59	55	0.3	0.2	0.3	0.3	60	55	NO	NO	NO
1	1_017	12 Brunner Count	Post 2008 Development (Residence)	G	W	58	54	58	54	59	54	59	55	0.2	0.2	0.3	0.3	60	55	NO	NO	NO
1	1_018	13 Brunner Count	Post 2008 Development (Residence)	G	W	57	53	57	53	58	53	58	54	0.3	0.3	0.3	0.4	60	55	NO	NO	NO
1	1_018	13 Brunner Count	Post 2008 Development (Residence)	1	W	58	54	59	54	59	55	59	55	0.3	0.2	0.3	0.3	60	55	NO	NO	NO
1	1_019	14 Brunner Count	Post 2008 Development (Residence)	G	W	59	54	59	55	59	55	59	55	0.1	0.2	0.2	0.2	60	55	NO	NO	NO
1	1_019	14 Brunner Count	Post 2008 Development (Residence)	1	W	60	56	60	56	61	56	61	56	0	0	0.1	0	60	55	NO	NO	NO
1	1_020	15 Brunner Count	Post 2008 Development (Residence)	G	W	57	53	58	54	58	54	58	54	0.4	0.3	0.4	0.4	60	55	NO	NO	NO
1	1_020	15 Brunner Count	Post 2008 Development (Residence)	1	W	59	55	59	55	59	55	60	55	0.3	0.3	0.3	0.3	60	55	NO	NO	NO
1	1_021	16 Brunner Count	Post 2008 Development (Residence)	G	W	59	55	59	55	60	55	60	56	0	0	0	0.1	60	55	NO	NO	NO
1	1_021	16 Brunner Count	Post 2008 Development (Residence)	1	W	61	57	61	56	61	57	61	57	-0.1	-0.2	-0.1	-0.1	60	55	NO	NO	NO
1	1_022	17 Brunner Count	Post 2008 Development (Residence)	G	S	58	54	59	55	59	55	59	55	0.5	0.5	0.6	0.5	60	55	NO	NO	NO
1	1_022	17 Brunner Count	Post 2008 Development (Residence)	1	S	60	56	60	56	60	56	61	57	0.4	0.4	0.4	0.4	60	55	NO	NO	NO
1	1_023	18 Brunner Count	Post 2008 Development (Residence)	G	W	61	56	61	56	61	57	61	57	0.2	0.1	0.2	0.2	60	55	NO	NO	NO

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						No Build		Build		No Build		Build		2019		2029						
				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
1	1_023	18 Brunner Count	Post 2008 Development (Residence)	1	W	62	58	62	58	63	59	63	58	-0.3	-0.2	-0.2	-0.2	60	55	NO	NO	NO
1	1_024	20 Brunner Count	Post 2008 Development (Residence)	G	SW	62	57	62	57	62	58	62	58	0	0	0.1	0	60	55	NO	NO	NO
1	1_024	20 Brunner Count	Post 2008 Development (Residence)	1	SW	64	59	63	59	64	60	64	59	-0.6	-0.5	-0.5	-0.5	60	55	NO	NO	NO
1	1_025	22 Brunner Count	Post 2008 Development (Residence)	G	W	64	59	63	59	64	60	64	60	-0.5	-0.4	-0.4	-0.4	60	55	NO	YES	NO
1	1_025	22 Brunner Count	Post 2008 Development (Residence)	1	W	66	61	65	60	66	62	65	61	-1	-1	-1	-1	60	55	YES	YES	NO
1	1_026	24 Brunner Count	Post 2008 Development (Residence)	G	S	68	64	68	63	69	65	68	64	-0.5	-0.5	-0.5	-0.5	60	55	YES	YES	NO
1	1_026	24 Brunner Count	Post 2008 Development (Residence)	1	S	71	67	70	65	72	68	70	66	-1.5	-1.6	-1.5	-1.5	60	55	YES	YES	NO
1	1_027	Arnold Avenue	Post 2008 Development (Residence)	G	S	65	60	66	61	65	61	66	62	1.1	1	1	1	60	55	YES	YES	NO
1	1_027	Arnold Avenue	Post 2008 Development (Residence)	1	S	69	65	68	64	70	65	69	64	-1	-1.1	-1	-1.1	60	55	YES	YES	NO
1	1_028	Arnold Avenue	Post 2008 Development (Residence)	G	E	61	56	61	56	61	57	61	57	-0.1	-0.2	-0.2	-0.1	60	55	NO	NO	NO
1	1_029	Arnold Avenue	Post 2008 Development (Residence)	G	E	59	54	59	54	59	55	59	55	-0.1	-0.1	-0.1	-0.1	60	55	NO	NO	NO
1	1_030	Arnold Avenue	Post 2008 Development (Residence)	G	E	57	53	57	53	58	54	58	54	0	0	0	0	60	55	NO	NO	NO
1	1_031	Arnold Avenue	Post 2008 Development (Residence)	G	E	56	52	56	52	56	52	57	52	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
1	1_032	Arnold Avenue	Post 2008 Development (Residence)	G	W	56	52	56	52	57	53	57	53	0.1	0.1	0.2	0.1	60	55	NO	NO	NO
1	1_033	Arnold Avenue	Post 2008 Development (Residence)	G	W	57	53	57	53	57	53	57	53	0.2	0.1	0.2	0.3	60	55	NO	NO	NO
1	1_034	Arnold Avenue	Post 2008 Development (Residence)	G	W	57	52	57	53	57	53	58	53	0.4	0.4	0.4	0.4	60	55	NO	NO	NO
1	1_035	Arnold Avenue	Post 2008 Development (Residence)	G	W	56	52	57	52	57	53	57	53	0.4	0.4	0.4	0.4	60	55	NO	NO	NO
1	1_036	Arnold Avenue	Post 2008 Development (Residence)	G	W	56	52	56	52	56	52	57	53	0.6	0.6	0.6	0.5	60	55	NO	NO	NO
1	1_037	Arnold Avenue	Post 2008 Development (Residence)	G	W	55	51	56	52	56	52	56	52	0.4	0.5	0.4	0.4	60	55	NO	NO	NO
1	1_038	Arnold Avenue	Post 2008 Development (Residence)	G	S	58	54	59	54	59	55	59	55	0.3	0.3	0.2	0.3	60	55	NO	NO	NO
1	1_038	Arnold Avenue	Post 2008 Development (Residence)	1	S	61	56	61	56	61	57	61	57	0	0.1	0.1	0.1	60	55	NO	NO	NO
1	1_038	Arnold Avenue	Post 2008 Development (Residence)	G	S	58	54	59	54	59	55	59	55	0.3	0.3	0.2	0.3	60	55	NO	NO	NO
1	1_038	Arnold Avenue	Post 2008 Development (Residence)	1	S	61	56	61	56	61	57	61	57	0	0.1	0.1	0.1	60	55	NO	NO	NO
1	1_039	Arnold Avenue	Post 2008 Development (Residence)	G	W	56	52	57	52	57	53	57	53	0.2	0.2	0.3	0.2	60	55	NO	NO	NO
1	1_039	Arnold Avenue	Post 2008 Development (Residence)	1	W	58	54	58	54	59	54	59	55	0.3	0.2	0.3	0.2	60	55	NO	NO	NO
1	1_040	Arnold Avenue	Post 2008 Development (Residence)	G	W	56	51	56	52	56	52	56	52	0.2	0.2	0.1	0.1	60	55	NO	NO	NO
1	1_040	Arnold Avenue	Post 2008 Development (Residence)	1	W	57	53	57	53	58	53	58	54	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
1	1_041	Arnold Avenue	Post 2008 Development (Residence)	G	W	56	51	56	52	56	52	56	52	0.2	0.2	0.3	0.3	60	55	NO	NO	NO
1	1_041	Arnold Avenue	Post 2008 Development (Residence)	1	W	57	53	57	53	57	53	58	53	0.2	0.2	0.3	0.2	60	55	NO	NO	NO
1	1_042	3 Half Penny Avenue	Post 2008 Development (Residence)	G	W	54	50	54	50	55	51	55	50	-0.1	-0.1	0	-0.1	60	55	NO	NO	NO
1	1_042	3 Half Penny Avenue	Post 2008 Development (Residence)	1	W	56	52	56	52	56	52	56	52	0	0	0.1	0.1	60	55	NO	NO	NO
1	1_043	5 Half Penny Avenue	Post 2008 Development (Residence)	G	S	51	47	51	47	52	47	52	47	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
1	1_043	5 Half Penny Avenue	Post 2008 Development (Residence)	1	S	55	51	55	51	56	51	56	52	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
1	1_044	7 Half Penny Avenue	Post 2008 Development (Residence)	G	W	54	49	54	50	54	50	54	50	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
1	1_044	7 Half Penny Avenue	Post 2008 Development (Residence)	1	W	56	52	56	52	56	52	57	52	0.1	0.2	0.1	0.1	60	55	NO	NO	NO
1	1_045	9 Half Penny Avenue	Post 2008 Development (Residence)	G	S	54	50	54	50	55	50	55	50	0.1	0	0	0.1	60	55	NO	NO	NO
1	1_045	9 Half Penny Avenue	Post 2008 Development (Residence)	1	S	57	53	57	53	57	53	57	53	0.1	0.1	0.1	0.2	60	55	NO	NO	NO
1	1_046	11 Half Penny Avenue	Post 2008 Development (Residence)	G	S	56	52	56	52	57	53	57	52	-0.1	-0.1	-0.1	-0.2	60	55	NO	NO	NO
1	1_047	Thomas Boulton Circuit	Post 2008 Development (Residence)	G	S	68	64	67	63	69	64	67	63	-1.1	-1.2	-1.1	-1.1	60	55	YES	YES	NO
1	1_048	Thomas Boulton Circuit	Post 2008 Development (Residence)	G	S	68	63	67	62	68	64	67	63	-1	-1	-1.1	-1	60	55	YES	YES	NO
1	1_049	Thomas Boulton Circuit	Post 2008 Development (Residence)	G	S	58	54	58	54	58	54	59	54	0	0	0.1	0	60	55	NO	NO	NO
1	1_049	Thomas Boulton Circuit	Post 2008 Development (Residence)	1	S	60	56	60	56	60	56	61	56	0.2	0.1	0.2	0.2	60	55	NO	NO	NO
1	1_050	Thomas Boulton Circuit	Post 2008 Development (Residence)	G	W	54	49	54	50	54	50	54	50	0.4	0.4	0.4	0.5	60	55	NO	NO	NO
1	1_050	Thomas Boulton Circuit	Post 2008 Development (Residence)	1	W	57	53	57	53	58	53	58	54	0.2	0.3	0.3	0.3	60	55	NO	NO	NO
1	1_051	Thomas Boulton Circuit	Post 2008 Development (Residence)	G	W	53	49	53	49	53	49	53	49	0.1	0	0	0.1	60	55	NO	NO	NO
1	1_051	Thomas Boulton Circuit	Post 2008 Development (Residence)	1	W	56	52	57	52	57	53	57	53	0.2	0.2	0.2	0.2	60	55	NO	NO	NO

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						No Build		Build		No Build		Build		2019		2029						
				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
1	1_052	Thomas Boulton Circuit	Post 2008 Development (Residence)	G	W	50	46	50	46	51	46	51	46	0.1	0.1	0.1	0.2	60	55	NO	NO	NO
1	1_052	Thomas Boulton Circuit	Post 2008 Development (Residence)	1	W	55	51	55	51	55	51	56	51	0.1	0.1	0.2	0.2	60	55	NO	NO	NO
1	1_053	Thomas Boulton Circuit	Post 2008 Development (Residence)	G	S	63	59	63	59	64	60	64	59	-0.4	-0.4	-0.4	-0.4	60	55	NO	NO	NO
1	1_053	Thomas Boulton Circuit	Post 2008 Development (Residence)	1	S	66	62	65	61	66	62	66	62	-0.6	-0.6	-0.6	-0.5	60	55	YES	YES	NO
1	1_054	Thomas Boulton Circuit	Post 2008 Development (Residence)	G	W	58	54	58	54	59	54	59	54	0	0	0	0.1	60	55	NO	NO	NO
1	1_054	Thomas Boulton Circuit	Post 2008 Development (Residence)	1	W	60	56	60	56	61	56	61	57	0.2	0.1	0.1	0.2	60	55	NO	NO	NO
1	1_055	Thomas Boulton Circuit	Post 2008 Development (Residence)	G	S	55	51	55	51	55	51	56	51	0.3	0.3	0.3	0.4	60	55	NO	NO	NO
1	1_055	Thomas Boulton Circuit	Post 2008 Development (Residence)	1	S	57	53	58	53	58	54	58	54	0.4	0.4	0.4	0.5	60	55	NO	NO	NO
1	1_056	Thomas Boulton Circuit	Post 2008 Development (Residence)	G	W	53	49	54	49	54	49	54	50	0.3	0.3	0.3	0.3	60	55	NO	NO	NO
1	1_056	Thomas Boulton Circuit	Post 2008 Development (Residence)	1	W	56	52	57	52	57	53	57	53	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
1	1_057	Thomas Boulton Circuit	Post 2008 Development (Residence)	G	W	53	49	53	49	54	49	54	50	0.2	0.2	0.3	0.3	60	55	NO	NO	NO
1	1_057	Thomas Boulton Circuit	Post 2008 Development (Residence)	1	W	56	52	56	52	57	52	57	52	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
1	1_058	3 John Hillas Avenue	Post 2008 Development (Residence)	G	S	59	54	58	54	59	55	59	55	-0.4	-0.3	-0.3	-0.3	60	55	NO	NO	NO
1	1_058	3 John Hillas Avenue	Post 2008 Development (Residence)	1	S	62	58	62	58	63	58	62	58	-0.4	-0.3	-0.3	-0.3	60	55	NO	NO	NO
1	1_059	5 John Hillas Avenue	Post 2008 Development (Residence)	G	S	60	55	59	55	60	56	60	56	-0.5	-0.5	-0.5	-0.5	60	55	NO	NO	NO
1	1_059	5 John Hillas Avenue	Post 2008 Development (Residence)	1	S	63	58	62	58	63	59	63	59	-0.3	-0.4	-0.3	-0.4	60	55	NO	NO	NO
1	1_060	6 John Hillas Avenue	Post 2008 Development (Residence)	G	S	58	53	57	53	58	54	58	54	-0.3	-0.3	-0.3	-0.4	60	55	NO	NO	NO
1	1_060	6 John Hillas Avenue	Post 2008 Development (Residence)	1	S	59	55	59	55	60	56	59	55	-0.3	-0.3	-0.3	-0.3	60	55	NO	NO	NO
1	1_061a	24 Arnold Avenue	Gracelands Early Education Centre			68	63	66	61	69	63	67	61	-1.9	-1.9	-1.9	-1.9	55	-	-	-	NO
1	1_061b	24 Arnold Avenue	Gracelands Early Education Centre	G	S	67	63	66	62	67	63	66	62	-0.8	-0.9	-0.9	-0.9	45	-	YES	-	YES
2	2_001	40 Memorial Avenue		G	N	60	56	61	56	61	56	61	57	0.5	0.4	0.5	0.5	60	55	NO	NO	NO
2	2_002	8 Free Settlers Dr	The Gracewood Community	G	NW	56	51	56	51	56	52	56	52	0	0	0	0	60	55	NO	NO	NO
2	2_002	8 Free Settlers Dr	The Gracewood Community	1	NW	57	52	56	52	57	53	57	53	-0.1	-0.1	-0.1	0	60	55	NO	NO	NO
2	2_003	8 Free Settlers Dr	The Gracewood Community	G	N	57	53	57	53	58	53	58	53	0	0	-0.1	-0.1	60	55	NO	NO	NO
2	2_003	8 Free Settlers Dr	The Gracewood Community	1	N	58	54	58	53	58	54	58	54	-0.1	-0.2	-0.1	-0.1	60	55	NO	NO	NO
2	2_004	30 Memorial Avenue		G	N	64	60	66	61	65	60	66	62	1.4	1.4	1.5	1.5	60	55	YES	YES	YES
2	2_005	32 Memorial Avenue		G	NW	54	50	54	50	55	51	55	51	-0.1	-0.1	-0.1	0	60	55	NO	NO	NO
3	3_001	15-17 Memorial Avenue (Front)	Post 2008 Development (Hills Clinic)	G	S	68	63	67	62	68	64	67	63	-1.1	-1.1	-1.1	-1.1	45	45	YES	YES	NO
3	3_001	15-17 Memorial Avenue (Front)	Post 2008 Development (Hills Clinic)	1	S	71	66	70	65	71	67	70	66	-1.2	-1.2	-1.1	-1.1	45	45	YES	YES	NO
3	3_002	15-17 Memorial Avenue (Rear)	Post 2008 Development (Hills Clinic)	G	E	57	53	58	54	58	54	59	55	0.8	0.8	0.8	0.9	45	45	NO	NO	NO
3	3_002	15-17 Memorial Avenue (Rear)	Post 2008 Development (Hills Clinic)	1	E	59	55	60	56	60	55	60	56	0.8	0.7	0.8	0.8	45	45	NO	NO	NO
3	3_003	19 Memorial Avenue		G	S	70	66	68	64	70	66	68	64	-2	-2	-2	-2	60	55	YES	YES	YES
3	3_003	19 Memorial Avenue		1	S	72	68	70	66	72	68	71	66	-1.8	-1.8	-1.8	-1.7	60	55	YES	YES	YES
3	3_004	21 Memorial Avenue		G	S	60	56	59	55	61	57	60	56	-1.1	-1.1	-1	-1	60	55	NO	NO	NO
3	3_006	23 Memorial Avenue		G	SE	62	58	61	56	63	58	61	57	-1.6	-1.5	-1.6	-1.6	60	55	NO	NO	NO
3	3_007	25 Memorial Avenue		G	S	67	63	66	61	68	64	66	62	-1.6	-1.7	-1.7	-1.7	60	55	YES	YES	YES
3	3_007	25 Memorial Avenue		1	S	69	65	68	64	70	66	68	64	-1.6	-1.6	-1.5	-1.5	60	55	YES	YES	YES
3	3_008	27 Memorial Avenue		G	S	66	62	64	60	67	62	64	60	-2.3	-2.3	-2.3	-2.3	60	55	NO	YES	YES
3	3_009	29 Memorial Avenue		G	S	68	64	66	62	69	65	67	62	-2.2	-2.3	-2.3	-2.3	60	55	YES	YES	YES
3	3_010	31 Memorial Avenue		G	S	66	62	64	60	67	63	65	61	-2	-2	-2	-2	60	55	YES	YES	YES
4	4_001	2 Rocks Street	Post 2008 Development (Residence)	G	N	62	58	63	59	63	59	64	60	1.1	1.1	1.1	1	60	55	NO	YES	NO
4	4_001	2 Rocks Street	Post 2008 Development (Residence)	1	N	64	59	65	60	64	60	65	61	1	0.9	1	1	60	55	YES	YES	NO
4	4_002	4 Rocks Street	Post 2008 Development (Residence)	G	W	60	56	61	57	61	57	62	58	0.9	1	0.9	1	60	55	NO	NO	NO
4	4_002	4 Rocks Street	Post 2008 Development (Residence)	1	W	62	57	62	58	62	58	63	59	0.8	0.9	0.8	0.8	60	55	NO	NO	NO

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						No Build		Build		No Build		Build		2019		2029						
				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
4	4_003	6 Rocks Street	Post 2008 Development (Residence)	G	W	59	55	60	56	60	56	61	57	0.8	0.8	0.8	0.9	60	55	NO	NO	NO
4	4_003	6 Rocks Street	Post 2008 Development (Residence)	1	W	61	56	61	57	61	57	62	58	0.7	0.7	0.6	0.7	60	55	NO	NO	NO
4	4_004	8 Rocks Street	Post 2008 Development (Residence)	G	W	58	54	59	55	59	55	60	56	0.8	0.7	0.8	0.7	60	55	NO	NO	NO
4	4_004	8 Rocks Street	Post 2008 Development (Residence)	1	W	60	56	61	56	61	56	61	57	0.6	0.6	0.6	0.5	60	55	NO	NO	NO
4	4_005	10 Rocks Street	Post 2008 Development (Residence)	G	W	58	54	59	54	58	54	59	55	0.7	0.6	0.7	0.6	60	55	NO	NO	NO
4	4_005	10 Rocks Street	Post 2008 Development (Residence)	1	W	59	55	60	56	60	56	60	56	0.5	0.5	0.5	0.5	60	55	NO	NO	NO
4	4_006	12 Rocks Street	Post 2008 Development (Residence)	G	W	57	53	58	54	58	54	59	54	0.6	0.6	0.6	0.6	60	55	NO	NO	NO
4	4_006	12 Rocks Street	Post 2008 Development (Residence)	1	W	59	55	59	55	59	55	60	56	0.4	0.4	0.4	0.4	60	55	NO	NO	NO
4	4_007	14 Rocks Street	Post 2008 Development (Residence)	G	W	57	53	57	53	57	53	58	54	0.5	0.6	0.5	0.6	60	55	NO	NO	NO
4	4_007	14 Rocks Street	Post 2008 Development (Residence)	1	W	58	54	59	54	59	55	59	55	0.3	0.3	0.4	0.3	60	55	NO	NO	NO
4	4_008	2 Rutherford Avenue	Post 2008 Development (Residence)	G	SE	51	47	52	48	51	47	53	49	1.5	1.5	1.5	1.6	60	55	NO	NO	NO
4	4_008	2 Rutherford Avenue	Post 2008 Development (Residence)	1	NW	54	50	55	51	55	51	56	51	0.7	0.7	0.7	0.7	60	55	NO	NO	NO
4	4_009	4 Rutherford Avenue	Post 2008 Development (Residence)	G	SE	51	46	52	48	51	47	53	49	1.7	1.7	1.7	1.7	60	55	NO	NO	NO
4	4_009	4 Rutherford Avenue	Post 2008 Development (Residence)	1	N	54	50	55	50	55	50	55	51	0.8	0.8	0.8	0.9	60	55	NO	NO	NO
4	4_010	6 Rutherford Avenue	Post 2008 Development (Residence)	G	S	51	47	52	48	51	47	53	49	1.4	1.3	1.4	1.4	60	55	NO	NO	NO
4	4_010	6 Rutherford Avenue	Post 2008 Development (Residence)	1	S	53	49	54	50	54	49	55	50	1.1	1.2	1.1	1.1	60	55	NO	NO	NO
4	4_011	8 Rutherford Avenue	Post 2008 Development (Residence)	G	S	51	47	52	48	51	47	53	49	1.3	1.4	1.4	1.4	60	55	NO	NO	NO
4	4_011	8 Rutherford Avenue	Post 2008 Development (Residence)	1	S	53	49	54	50	54	49	55	51	1.2	1.1	1.2	1.2	60	55	NO	NO	NO
4	4_012	10 Rutherford Avenue	Post 2008 Development (Residence)	G	SE	51	47	52	48	52	48	53	49	1.1	1.2	1.2	1.2	60	55	NO	NO	NO
4	4_012	10 Rutherford Avenue	Post 2008 Development (Residence)	1	SE	54	49	55	50	54	50	55	51	1	1	1	1	60	55	NO	NO	NO
4	4_013	12 Rutherford Avenue	Post 2008 Development (Residence)	G	SE	51	47	53	49	52	48	53	49	1.6	1.6	1.7	1.6	60	55	NO	NO	NO
4	4_013	12 Rutherford Avenue	Post 2008 Development (Residence)	1	SE	54	49	55	51	54	50	56	51	1.2	1.3	1.3	1.3	60	55	NO	NO	NO
4	4_014	14 Rutherford Avenue	Post 2008 Development (Residence)	G	NW	50	45	50	45	50	46	50	46	0	0	0	-0.1	60	55	NO	NO	NO
4	4_014	14 Rutherford Avenue	Post 2008 Development (Residence)	1	SE	54	49	55	51	54	50	56	51	1.2	1.2	1.3	1.3	60	55	NO	NO	NO
4	4_015	16 Rutherford Avenue	Post 2008 Development (Residence)	G	NW	50	45	50	45	50	46	50	46	0	-0.1	0	0	60	55	NO	NO	NO
4	4_015	16 Rutherford Avenue	Post 2008 Development (Residence)	1	SE	54	49	55	51	54	50	55	51	1.2	1.2	1.2	1.2	60	55	NO	NO	NO
4	4_016	18 Rutherford Avenue	Post 2008 Development (Residence)	G	NW	49	45	49	45	50	46	50	46	-0.1	0	0	0	60	55	NO	NO	NO
4	4_016	18 Rutherford Avenue	Post 2008 Development (Residence)	1	SE	53	49	54	50	54	50	55	51	1.1	1.2	1.1	1.1	60	55	NO	NO	NO
4	4_017	20 Rutherford Avenue	Post 2008 Development (Residence)	G	NW	49	44	49	44	49	45	49	45	0	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_017	20 Rutherford Avenue	Post 2008 Development (Residence)	1	NE	53	49	53	49	54	50	54	50	0.1	0.1	0.1	0	60	55	NO	NO	NO
4	4_018	22 Rutherford Avenue	Post 2008 Development (Residence)	G	NE	53	49	53	49	53	49	54	49	0.2	0.2	0.1	0.1	60	55	NO	NO	NO
4	4_018	22 Rutherford Avenue	Post 2008 Development (Residence)	1	NE	56	52	57	53	57	52	57	53	0.7	0.7	0.7	0.8	60	55	NO	NO	NO
4	4_019	24 Rutherford Avenue	Post 2008 Development (Residence)	G	NE	53	48	53	49	53	49	53	49	0.3	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_019	24 Rutherford Avenue	Post 2008 Development (Residence)	1	NE	56	52	57	53	57	52	58	53	0.9	1	1	1	60	55	NO	NO	NO
4	4_020	26 Rutherford Avenue	Post 2008 Development (Residence)	G	NE	52	47	52	47	52	48	52	48	0.1	0.1	0	0	60	55	NO	NO	NO
4	4_020	26 Rutherford Avenue	Post 2008 Development (Residence)	1	NE	56	51	56	52	56	52	57	53	0.7	0.7	0.7	0.6	60	55	NO	NO	NO
4	4_021	28 Rutherford Avenue	Post 2008 Development (Residence)	G	NE	51	47	51	47	52	48	52	48	0	0	0	0	60	55	NO	NO	NO
4	4_021	28 Rutherford Avenue	Post 2008 Development (Residence)	1	NE	55	51	56	52	56	52	57	52	0.8	0.7	0.8	0.7	60	55	NO	NO	NO
4	4_022	30 Rutherford Avenue	Post 2008 Development (Residence)	G	NE	51	47	51	47	51	47	51	47	-0.1	0	-0.1	0	60	55	NO	NO	NO
4	4_022	30 Rutherford Avenue	Post 2008 Development (Residence)	1	NE	55	51	55	51	56	51	56	52	0.5	0.5	0.5	0.5	60	55	NO	NO	NO
4	4_023	32 Rutherford Avenue	Post 2008 Development (Residence)	G	SE	51	47	52	48	52	48	53	49	0.7	0.8	0.7	0.7	60	55	NO	NO	NO
4	4_023	32 Rutherford Avenue	Post 2008 Development (Residence)	1	SE	54	50	55	51	55	51	56	52	1	1.1	1.1	1	60	55	NO	NO	NO
4	4_024	34 Rutherford Avenue	Post 2008 Development (Residence)	G	E	56	51	57	52	56	52	57	53	1	1	1	1	60	55	NO	NO	NO
4	4_024	34 Rutherford Avenue	Post 2008 Development (Residence)	1	E	57	53	58	54	58	54	59	55	1	1.1	1	1	60	55	NO	NO	NO

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				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
4	4_025	36 Rutherford Avenue	Post 2008 Development (Residence)	G	E	55	51	57	52	56	52	57	53	1.2	1.1	1.2	1.2	60	55	NO	NO	NO
4	4_025	36 Rutherford Avenue	Post 2008 Development (Residence)	1	E	57	53	58	54	58	54	59	55	1	1	1	1	60	55	NO	NO	NO
4	4_026	38 Rutherford Avenue	Post 2008 Development (Residence)	G	NE	50	45	50	46	50	46	50	46	0.2	0.2	0.2	0.1	60	55	NO	NO	NO
4	4_026	38 Rutherford Avenue	Post 2008 Development (Residence)	1	NE	54	50	54	50	55	51	55	51	0.1	0.1	0.2	0.1	60	55	NO	NO	NO
4	4_027	40 Rutherford Avenue	Post 2008 Development (Residence)	G	NE	50	45	50	46	50	46	50	46	0.3	0.3	0.3	0.3	60	55	NO	NO	NO
4	4_027	40 Rutherford Avenue	Post 2008 Development (Residence)	1	NE	55	50	55	51	55	51	56	51	0.3	0.3	0.2	0.2	60	55	NO	NO	NO
4	4_028	42 Rutherford Avenue	Post 2008 Development (Residence)	G	E	52	48	52	48	52	48	53	49	0.2	0.2	0.3	0.3	60	55	NO	NO	NO
4	4_028	42 Rutherford Avenue	Post 2008 Development (Residence)	1	E	56	52	57	52	57	53	57	53	0.4	0.4	0.4	0.4	60	55	NO	NO	NO
4	4_029	44 Rutherford Avenue	Post 2008 Development (Residence)	G	N	55	51	57	52	56	52	57	53	1.4	1.3	1.4	1.4	60	55	NO	NO	NO
4	4_029	44 Rutherford Avenue	Post 2008 Development (Residence)	1	N	58	53	59	54	58	54	59	55	0.9	1	0.9	0.9	60	55	NO	NO	NO
4	4_030	46 Rutherford Avenue	Post 2008 Development (Residence)	G	SE	55	51	57	52	56	52	57	53	1.4	1.4	1.4	1.4	60	55	NO	NO	NO
4	4_030	46 Rutherford Avenue	Post 2008 Development (Residence)	1	SE	57	53	58	54	57	53	59	54	1.2	1.3	1.2	1.2	60	55	NO	NO	NO
4	4_031	48 Rutherford Avenue	Post 2008 Development (Residence)	G	SE	55	50	56	52	55	51	57	53	1.7	1.6	1.7	1.7	60	55	NO	NO	NO
4	4_031	48 Rutherford Avenue	Post 2008 Development (Residence)	1	SE	57	52	58	54	57	53	59	54	1.5	1.5	1.5	1.5	60	55	NO	NO	NO
4	4_032	50 Rutherford Avenue	Post 2008 Development (Residence)	G	SE	55	51	57	52	56	51	57	53	1.5	1.6	1.6	1.6	60	55	NO	NO	NO
4	4_032	50 Rutherford Avenue	Post 2008 Development (Residence)	1	SE	57	53	58	54	58	53	59	55	1.4	1.5	1.4	1.4	60	55	NO	NO	NO
4	4_033	52 Rutherford Avenue	Post 2008 Development (Residence)	G	NE	59	54	60	56	59	55	61	56	1.2	1.2	1.2	1.2	60	55	NO	NO	NO
4	4_033	52 Rutherford Avenue	Post 2008 Development (Residence)	1	NE	60	56	61	57	61	57	62	58	1.1	1.1	1.1	1	60	55	NO	NO	NO
4	4_034	54 Rutherford Avenue	Post 2008 Development (Residence)	G	N	65	61	67	63	66	61	68	63	2.2	2.2	2.2	2.2	60	55	YES	YES	NO
4	4_034	54 Rutherford Avenue	Post 2008 Development (Residence)	1	N	67	62	69	65	67	63	69	65	2.1	2.2	2.1	2.1	60	55	YES	YES	NO
4	4_035	56 Rutherford Avenue	Post 2008 Development (Residence)	G	N	65	61	67	63	65	61	68	63	2.2	2.2	2.1	2.1	60	55	YES	YES	NO
4	4_035	56 Rutherford Avenue	Post 2008 Development (Residence)	1	N	67	62	69	64	67	63	69	65	2.1	2.1	2.1	2.1	60	55	YES	YES	NO
4	4_036	58 Rutherford Avenue	Post 2008 Development (Residence)	G	N	65	61	67	63	65	61	67	63	2.1	2.1	2.1	2.1	60	55	YES	YES	NO
4	4_036	58 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	69	64	67	63	69	65	2.1	2.1	2.1	2	60	55	YES	YES	NO
4	4_037	60 Rutherford Avenue	Post 2008 Development (Residence)	G	N	65	60	67	62	65	61	67	63	2.1	2	2.1	2.1	60	55	YES	YES	NO
4	4_037	60 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	68	64	67	63	69	65	2	2	2	2	60	55	YES	YES	NO
4	4_038	62 Rutherford Avenue	Post 2008 Development (Residence)	G	N	65	60	66	62	65	61	67	63	1.9	2	2	2	60	55	YES	YES	NO
4	4_038	62 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	68	64	67	63	69	64	2	1.9	2	1.9	60	55	YES	YES	NO
4	4_039	64 Rutherford Avenue	Post 2008 Development (Residence)	G	N	64	60	66	62	65	61	67	63	2	1.9	1.9	1.9	60	55	YES	YES	NO
4	4_039	64 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	68	64	67	62	69	64	1.9	1.9	1.9	1.9	60	55	YES	YES	NO
4	4_040	66 Rutherford Avenue	Post 2008 Development (Residence)	G	N	64	60	66	62	65	61	67	62	1.9	1.9	1.8	1.9	60	55	YES	YES	NO
4	4_040	66 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	68	64	67	62	68	64	1.9	1.8	1.9	1.8	60	55	YES	YES	NO
4	4_041	68 Rutherford Avenue	Post 2008 Development (Residence)	G	N	64	60	66	62	65	61	67	62	1.9	1.8	1.8	1.8	60	55	YES	YES	NO
4	4_041	68 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	68	63	67	62	68	64	1.8	1.8	1.8	1.7	60	55	YES	YES	NO
4	4_042	70 Rutherford Avenue	Post 2008 Development (Residence)	G	N	64	60	66	62	65	60	66	62	1.8	1.7	1.8	1.7	60	55	YES	YES	NO
4	4_042	70 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	68	63	66	62	68	64	1.8	1.7	1.7	1.8	60	55	YES	YES	NO
4	4_043	72 Rutherford Avenue	Post 2008 Development (Residence)	G	N	64	60	66	62	65	60	66	62	1.7	1.8	1.7	1.7	60	55	YES	YES	NO
4	4_043	72 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	67	63	66	62	68	64	1.7	1.7	1.7	1.7	60	55	YES	YES	NO
4	4_044	74 Rutherford Avenue	Post 2008 Development (Residence)	G	N	64	60	66	61	64	60	66	62	1.7	1.7	1.7	1.7	60	55	YES	YES	NO
4	4_044	74 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	61	67	63	66	62	68	64	1.7	1.7	1.7	1.7	60	55	YES	YES	NO
4	4_045	76 Rutherford Avenue	Post 2008 Development (Residence)	G	N	65	60	66	62	65	61	67	63	1.9	1.9	1.8	1.9	60	55	YES	YES	NO
4	4_045	76 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	68	64	67	63	69	65	1.9	1.9	1.9	1.9	60	55	YES	YES	NO
4	4_046	78 Rutherford Avenue	Post 2008 Development (Residence)	G	N	65	60	67	62	65	61	67	63	1.9	1.9	1.9	1.9	60	55	YES	YES	NO
4	4_046	78 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	68	64	67	63	69	65	2	2	1.9	1.9	60	55	YES	YES	NO

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				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
4	4_047	80 Rutherford Avenue	Post 2008 Development (Residence)	G	N	64	59	65	61	64	60	66	62	1.4	1.5	1.5	1.5	60	55	YES	YES	NO
4	4_047	80 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	61	67	63	66	62	68	64	1.8	1.8	1.8	1.8	60	55	YES	YES	NO
4	4_048	82 Rutherford Avenue	Post 2008 Development (Residence)	G	E	57	53	58	54	58	54	59	55	1.1	1	1.1	1	60	55	NO	NO	NO
4	4_048	82 Rutherford Avenue	Post 2008 Development (Residence)	1	E	60	56	61	57	61	56	62	57	1	1	0.9	0.9	60	55	NO	NO	NO
4	4_049	84 Rutherford Avenue	Post 2008 Development (Residence)	G	W	58	54	59	54	59	55	59	55	0.3	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_049	84 Rutherford Avenue	Post 2008 Development (Residence)	1	W	61	57	62	57	62	57	62	58	0.5	0.5	0.5	0.4	60	55	NO	NO	NO
4	4_050	86 Rutherford Avenue	Post 2008 Development (Residence)	G	NW	57	53	57	53	58	53	58	54	0.2	0.2	0.1	0.1	60	55	NO	NO	NO
4	4_050	86 Rutherford Avenue	Post 2008 Development (Residence)	1	NW	60	55	60	56	60	56	60	56	0.2	0.3	0.2	0.2	60	55	NO	NO	NO
4	4_051	88 Rutherford Avenue	Post 2008 Development (Residence)	G	NW	56	52	56	52	57	52	57	52	0	0	0.1	0	60	55	NO	NO	NO
4	4_051	88 Rutherford Avenue	Post 2008 Development (Residence)	1	NW	59	54	59	55	59	55	60	55	0.2	0.3	0.2	0.2	60	55	NO	NO	NO
4	4_052	90 Rutherford Avenue	Post 2008 Development (Residence)	G	NW	55	51	55	51	55	51	55	51	0.1	0	0	0	60	55	NO	NO	NO
4	4_052	90 Rutherford Avenue	Post 2008 Development (Residence)	1	NW	58	53	58	53	58	54	58	54	0	0	0	0	60	55	NO	NO	NO
4	4_053	92 Rutherford Avenue	Post 2008 Development (Residence)	G	SE	54	49	54	50	54	50	55	50	0.5	0.5	0.4	0.4	60	55	NO	NO	NO
4	4_053	92 Rutherford Avenue	Post 2008 Development (Residence)	1	SE	57	52	57	53	57	53	58	53	0.5	0.5	0.6	0.5	60	55	NO	NO	NO
4	4_054	94 Rutherford Avenue	Post 2008 Development (Residence)	G	SE	53	49	54	49	54	50	54	50	0.4	0.4	0.4	0.4	60	55	NO	NO	NO
4	4_054	94 Rutherford Avenue	Post 2008 Development (Residence)	1	SE	56	52	57	53	57	53	57	53	0.6	0.6	0.5	0.5	60	55	NO	NO	NO
4	4_055	96 Rutherford Avenue	Post 2008 Development (Residence)	G	SE	53	49	54	49	54	49	54	50	0.4	0.4	0.4	0.4	60	55	NO	NO	NO
4	4_055	96 Rutherford Avenue	Post 2008 Development (Residence)	1	SE	56	52	57	52	57	52	57	53	0.7	0.6	0.7	0.7	60	55	NO	NO	NO
4	4_056	98 Rutherford Avenue	Post 2008 Development (Residence)	G	E	53	49	54	49	54	49	54	50	0.5	0.6	0.6	0.6	60	55	NO	NO	NO
4	4_056	98 Rutherford Avenue	Post 2008 Development (Residence)	1	E	56	52	57	52	57	52	57	53	0.8	0.7	0.8	0.8	60	55	NO	NO	NO
4	4_057	100 Rutherford Avenue	Post 2008 Development (Residence)	G	E	53	49	54	50	54	49	54	50	0.8	0.9	0.8	0.9	60	55	NO	NO	NO
4	4_057	100 Rutherford Avenue	Post 2008 Development (Residence)	1	E	56	52	57	52	56	52	57	53	0.8	0.9	0.8	0.8	60	55	NO	NO	NO
4	4_058	102 Rutherford Avenue	Post 2008 Development (Residence)	G	E	53	48	54	49	53	49	54	50	1	1.1	1	1	60	55	NO	NO	NO
4	4_058	102 Rutherford Avenue	Post 2008 Development (Residence)	1	E	56	51	57	52	56	52	57	53	1	1	1	1.1	60	55	NO	NO	NO
4	4_059	104 Rutherford Avenue	Post 2008 Development (Residence)	G	E	52	48	53	49	53	49	54	49	0.8	0.8	0.8	0.8	60	55	NO	NO	NO
4	4_059	104 Rutherford Avenue	Post 2008 Development (Residence)	1	E	55	51	56	52	56	52	57	53	1	1.1	1	1.1	60	55	NO	NO	NO
4	4_060	106 Rutherford Avenue	Post 2008 Development (Residence)	G	W	53	49	53	49	54	49	53	49	0	-0.1	-0.1	0	60	55	NO	NO	NO
4	4_060	106 Rutherford Avenue	Post 2008 Development (Residence)	1	E	55	51	56	52	56	52	57	53	1	1	1	1	60	55	NO	NO	NO
4	4_061	108 Rutherford Avenue	Post 2008 Development (Residence)	G	W	54	50	54	50	55	51	55	51	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_061	108 Rutherford Avenue	Post 2008 Development (Residence)	1	W	56	52	56	52	57	53	57	53	0	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_062	110 Rutherford Avenue	Post 2008 Development (Residence)	G	W	54	50	54	50	54	50	55	51	0.4	0.4	0.4	0.4	60	55	NO	NO	NO
4	4_062	110 Rutherford Avenue	Post 2008 Development (Residence)	1	W	56	52	56	52	57	52	57	53	0.1	0.2	0.1	0.2	60	55	NO	NO	NO
4	4_063	112 Rutherford Avenue	Post 2008 Development (Residence)	G	W	55	51	55	51	56	51	56	52	0.4	0.3	0.3	0.3	60	55	NO	NO	NO
4	4_063	112 Rutherford Avenue	Post 2008 Development (Residence)	1	W	57	52	57	53	57	53	57	53	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_064	114 Rutherford Avenue	Post 2008 Development (Residence)	G	N	64	59	65	61	64	60	66	62	1.5	1.5	1.4	1.4	60	55	YES	YES	NO
4	4_064	114 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	68	64	67	63	69	64	1.8	1.8	1.8	1.8	60	55	YES	YES	NO
4	4_065	116 Rutherford Avenue	Post 2008 Development (Residence)	G	N	65	60	66	61	65	61	66	62	1	0.9	0.9	0.9	60	55	YES	YES	NO
4	4_065	116 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	68	64	67	63	68	64	1.5	1.5	1.5	1.5	60	55	YES	YES	NO
4	4_066	118 Rutherford Avenue	Post 2008 Development (Residence)	G	S	48	-89	-90	-89	-90	-89	-90	-89	-138.4	0	0	0	60	55	NO	NO	NO
4	4_066	118 Rutherford Avenue	Post 2008 Development (Residence)	1	S	54	-89	-90	-89	-90	-89	-90	-89	-143.9	0	0	0	60	55	NO	NO	NO
4	4_067	120 Rutherford Avenue	Post 2008 Development (Residence)	G	S	48	-89	-90	-89	-90	-89	-90	-89	-138.6	0	0	0	60	55	NO	NO	NO
4	4_067	120 Rutherford Avenue	Post 2008 Development (Residence)	1	S	54	-89	-90	-89	-90	-89	-90	-89	-144	0	0	0	60	55	NO	NO	NO
4	4_068	122 Rutherford Avenue	Post 2008 Development (Residence)	G	N	65	60	66	62	65	61	67	62	1.3	1.3	1.3	1.3	60	55	YES	YES	NO
4	4_068	122 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	68	64	67	63	68	64	1.6	1.5	1.5	1.5	60	55	YES	YES	NO

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						No Build		Build		No Build		Build		2019		2029						
				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
4	4_069	124 Rutherford Avenue	Post 2008 Development (Residence)	G	N	65	60	66	62	65	61	67	62	1.4	1.4	1.5	1.4	60	55	YES	YES	NO
4	4_069	124 Rutherford Avenue	Post 2008 Development (Residence)	1	N	66	62	68	64	67	63	68	64	1.5	1.6	1.5	1.5	60	55	YES	YES	NO
4	4_070	126 Rutherford Avenue	Post 2008 Development (Residence)	G	N	65	61	66	62	65	61	67	63	1.5	1.6	1.6	1.6	60	55	YES	YES	NO
4	4_070	126 Rutherford Avenue	Post 2008 Development (Residence)	1	N	67	62	68	64	67	63	69	65	1.6	1.6	1.6	1.7	60	55	YES	YES	NO
4	4_071	23 Pellizzer Boulevard	Post 2008 Development (Residence)	G	NW	52	48	52	48	52	48	52	48	0	0.1	0	0.1	60	55	NO	NO	NO
4	4_071	23 Pellizzer Boulevard	Post 2008 Development (Residence)	1	SE	54	50	55	51	54	50	56	51	1.2	1.2	1.2	1.2	60	55	NO	NO	NO
4	4_072	25 Pellizzer Boulevard	Post 2008 Development (Residence)	G	NW	52	48	52	48	53	48	53	48	0.1	0.1	0	0	60	55	NO	NO	NO
4	4_072	25 Pellizzer Boulevard	Post 2008 Development (Residence)	1	SE	54	50	55	51	55	50	56	52	1.3	1.3	1.3	1.3	60	55	NO	NO	NO
4	4_073	27 Pellizzer Boulevard	Post 2008 Development (Residence)	G	NW	52	48	52	48	53	49	53	49	0.1	0.1	0.2	0.1	60	55	NO	NO	NO
4	4_073	27 Pellizzer Boulevard	Post 2008 Development (Residence)	1	SE	54	50	55	51	55	50	56	51	1	1	1	1.1	60	55	NO	NO	NO
4	4_074	29 Pellizzer Boulevard	Post 2008 Development (Residence)	G	NW	53	48	53	48	53	49	53	49	0.1	0.1	0.2	0.1	60	55	NO	NO	NO
4	4_074	29 Pellizzer Boulevard	Post 2008 Development (Residence)	1	NW	55	51	55	51	55	51	55	51	0	0	0	0.1	60	55	NO	NO	NO
4	4_075	31 Pellizzer Boulevard	Post 2008 Development (Residence)	G	W	53	49	53	49	53	49	54	49	0.2	0.3	0.2	0.2	60	55	NO	NO	NO
4	4_075	31 Pellizzer Boulevard	Post 2008 Development (Residence)	1	W	55	51	55	51	56	52	56	52	0.1	0	0.1	0.1	60	55	NO	NO	NO
4	4_076	33 Pellizzer Boulevard	Post 2008 Development (Residence)	G	W	53	49	54	49	54	50	54	50	0.3	0.3	0.3	0.3	60	55	NO	NO	NO
4	4_076	33 Pellizzer Boulevard	Post 2008 Development (Residence)	1	W	56	51	56	52	56	52	56	52	0.2	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_077	35 Pellizzer Boulevard	Post 2008 Development (Residence)	G	W	54	49	54	50	54	50	55	50	0.4	0.3	0.3	0.3	60	55	NO	NO	NO
4	4_077	35 Pellizzer Boulevard	Post 2008 Development (Residence)	1	W	56	52	56	52	57	53	57	53	0.3	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_078	37 Pellizzer Boulevard	Post 2008 Development (Residence)	G	W	54	50	55	50	55	51	55	51	0.4	0.4	0.5	0.5	60	55	NO	NO	NO
4	4_078	37 Pellizzer Boulevard	Post 2008 Development (Residence)	1	W	57	53	57	53	57	53	58	53	0.3	0.2	0.3	0.3	60	55	NO	NO	NO
4	4_079	39 Pellizzer Boulevard	Post 2008 Development (Residence)	G	W	55	50	55	51	55	51	56	52	0.6	0.6	0.5	0.5	60	55	NO	NO	NO
4	4_079	39 Pellizzer Boulevard	Post 2008 Development (Residence)	1	W	57	53	58	54	58	54	58	54	0.4	0.4	0.4	0.4	60	55	NO	NO	NO
4	4_080	41 Pellizzer Boulevard	Post 2008 Development (Residence)	G	W	55	51	56	52	56	52	57	52	0.6	0.6	0.6	0.6	60	55	NO	NO	NO
4	4_080	41 Pellizzer Boulevard	Post 2008 Development (Residence)	1	W	58	54	59	54	59	54	59	55	0.5	0.5	0.4	0.4	60	55	NO	NO	NO
4	4_081	43 Pellizzer Boulevard	Post 2008 Development (Residence)	G	W	56	52	56	52	56	52	57	53	0.7	0.7	0.7	0.7	60	55	NO	NO	NO
4	4_081	43 Pellizzer Boulevard	Post 2008 Development (Residence)	1	W	58	54	59	55	59	55	60	55	0.6	0.5	0.5	0.5	60	55	NO	NO	NO
4	4_082	45 Pellizzer Boulevard	Post 2008 Development (Residence)	G	W	58	53	59	54	58	54	59	55	0.9	0.8	0.8	0.8	60	55	NO	NO	NO
4	4_082	45 Pellizzer Boulevard	Post 2008 Development (Residence)	1	W	60	56	61	57	61	57	62	57	0.8	0.7	0.7	0.7	60	55	NO	NO	NO
4	4_083	47 Pellizzer Boulevard	Post 2008 Development (Residence)	G	N	61	57	62	58	62	58	63	58	1	0.9	1	0.9	60	55	NO	NO	NO
4	4_083	47 Pellizzer Boulevard	Post 2008 Development (Residence)	1	N	63	59	65	60	64	60	65	61	1.2	1.2	1.1	1.1	60	55	YES	YES	NO
4	4_084	Grace Crescent	Post 2008 Development (Residence)	G	SE	54	50	55	51	55	51	56	52	1.1	1.1	1.1	1.1	60	55	NO	NO	NO
4	4_084	Grace Crescent	Post 2008 Development (Residence)	1	SE	57	53	58	53	58	54	58	54	0.6	0.6	0.5	0.5	60	55	NO	NO	NO
4	4_085	Grace Crescent	Post 2008 Development (Residence)	G	SE	54	50	55	51	55	51	56	52	1.1	1.1	1.2	1.1	60	55	NO	NO	NO
4	4_085	Grace Crescent	Post 2008 Development (Residence)	1	SE	57	53	58	54	58	54	59	54	0.5	0.5	0.6	0.5	60	55	NO	NO	NO
4	4_086	Grace Crescent	Post 2008 Development (Residence)	G	SE	55	51	56	52	55	51	56	52	1	1	1	1	60	55	NO	NO	NO
4	4_086	Grace Crescent	Post 2008 Development (Residence)	1	SE	58	54	58	54	58	54	59	55	0.4	0.4	0.5	0.4	60	55	NO	NO	NO
4	4_087	Grace Crescent	Post 2008 Development (Residence)	G	SE	55	51	56	52	55	51	57	52	1.1	1.1	1.1	1.1	60	55	NO	NO	NO
4	4_087	Grace Crescent	Post 2008 Development (Residence)	1	SE	58	54	59	54	59	55	59	55	0.3	0.3	0.4	0.3	60	55	NO	NO	NO
4	4_088	Grace Crescent	Post 2008 Development (Residence)	G	SE	55	50	56	51	55	51	56	52	1	1	1	1	60	55	NO	NO	NO
4	4_088	Grace Crescent	Post 2008 Development (Residence)	1	SE	59	54	59	55	59	55	60	55	0.3	0.3	0.3	0.3	60	55	NO	NO	NO
4	4_089	Grace Crescent	Post 2008 Development (Residence)	G	SE	55	51	56	52	56	52	57	53	1	1	1	0.9	60	55	NO	NO	NO
4	4_089	Grace Crescent	Post 2008 Development (Residence)	1	SE	59	55	59	55	60	56	60	56	0.2	0.2	0.1	0.2	60	55	NO	NO	NO
4	4_090	Grace Crescent	Post 2008 Development (Residence)	G	SE	56	51	57	52	56	52	57	53	1	0.9	1	1	60	55	NO	NO	NO
4	4_090	Grace Crescent	Post 2008 Development (Residence)	1	SE	60	56	60	56	61	56	61	56	0	0	0.1	0	60	55	NO	NO	NO

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				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
4	4_091	Grace Crescent	Post 2008 Development (Residence)	G	SE	56	52	57	53	57	52	58	53	1	1	1	0.9	60	55	NO	NO	NO
4	4_091	Grace Crescent	Post 2008 Development (Residence)	1	SE	60	56	60	56	61	57	61	57	0	0	0.1	0	60	55	NO	NO	NO
4	4_092	Grace Crescent	Post 2008 Development (Residence)	G	SE	57	53	58	54	57	53	58	54	1.1	1	1.1	1.1	60	55	NO	NO	NO
4	4_092	Grace Crescent	Post 2008 Development (Residence)	1	SE	61	57	61	57	62	58	62	58	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_093	Grace Crescent	Post 2008 Development (Residence)	G	E	61	56	61	57	61	57	62	58	0.8	0.7	0.8	0.8	60	55	NO	NO	NO
4	4_093	Grace Crescent	Post 2008 Development (Residence)	1	E	64	60	64	60	64	60	65	61	0.3	0.3	0.3	0.2	60	55	YES	YES	NO
4	4_094	Grace Crescent	Post 2008 Development (Residence)	G	E	61	57	62	58	62	58	63	58	0.8	0.8	0.8	0.8	60	55	NO	NO	NO
4	4_094	Grace Crescent	Post 2008 Development (Residence)	1	E	65	60	65	61	65	61	66	62	0.5	0.5	0.6	0.5	60	55	YES	YES	NO
4	4_095	Grace Crescent	Post 2008 Development (Residence)	G	N	65	61	67	62	66	61	67	63	1.6	1.7	1.6	1.6	60	55	YES	YES	NO
4	4_095	Grace Crescent	Post 2008 Development (Residence)	1	N	68	64	70	66	69	65	71	67	2	1.9	2	2	60	55	YES	YES	NO
4	4_096	Grace Crescent	Post 2008 Development (Residence)	G	N	65	61	67	63	66	61	67	63	1.8	1.9	1.8	1.8	60	55	YES	YES	NO
4	4_096	Grace Crescent	Post 2008 Development (Residence)	1	N	68	64	70	66	68	64	71	67	2.5	2.5	2.5	2.5	60	55	YES	YES	NO
4	4_097	Grace Crescent	Post 2008 Development (Residence)	G	N	65	61	67	62	65	61	67	63	1.9	1.9	1.9	1.9	60	55	YES	YES	NO
4	4_097	Grace Crescent	Post 2008 Development (Residence)	1	N	68	63	70	66	68	64	71	67	2.7	2.6	2.7	2.6	60	55	YES	YES	NO
4	4_098	Grace Crescent	Post 2008 Development (Residence)	G	N	65	61	67	62	65	61	67	63	1.9	1.8	1.9	1.9	60	55	YES	YES	NO
4	4_098	Grace Crescent	Post 2008 Development (Residence)	1	N	68	63	70	66	68	64	71	67	2.7	2.6	2.6	2.7	60	55	YES	YES	NO
4	4_099	Grace Crescent	Post 2008 Development (Residence)	G	N	65	61	67	63	66	61	67	63	1.8	1.9	1.9	1.8	60	55	YES	YES	NO
4	4_099	Grace Crescent	Post 2008 Development (Residence)	1	N	68	63	70	66	68	64	71	67	2.7	2.7	2.7	2.7	60	55	YES	YES	NO
4	4_100	Grace Crescent	Post 2008 Development (Residence)	G	N	65	61	67	63	66	61	67	63	1.8	1.9	1.8	1.8	60	55	YES	YES	NO
4	4_100	Grace Crescent	Post 2008 Development (Residence)	1	N	68	63	70	66	68	64	71	67	2.7	2.7	2.7	2.7	60	55	YES	YES	NO
4	4_101	Grace Crescent	Post 2008 Development (Residence)	G	N	65	61	67	63	66	62	67	63	1.8	1.8	1.7	1.7	60	55	YES	YES	NO
4	4_101	Grace Crescent	Post 2008 Development (Residence)	1	N	67	63	70	66	68	64	71	67	2.8	2.7	2.7	2.7	60	55	YES	YES	NO
4	4_102	Grace Crescent	Post 2008 Development (Residence)	G	N	65	61	67	62	66	61	67	63	1.6	1.5	1.6	1.6	60	55	YES	YES	NO
4	4_102	Grace Crescent	Post 2008 Development (Residence)	1	N	67	63	70	66	68	64	71	66	2.7	2.6	2.6	2.6	60	55	YES	YES	NO
4	4_103	Grace Crescent	Post 2008 Development (Residence)	G	N	65	61	66	62	66	61	67	63	1.4	1.3	1.3	1.3	60	55	YES	YES	NO
4	4_103	Grace Crescent	Post 2008 Development (Residence)	1	N	67	63	70	66	68	64	70	66	2.6	2.5	2.5	2.5	60	55	YES	YES	NO
4	4_104	Grace Crescent	Post 2008 Development (Residence)	G	N	65	61	66	62	66	61	67	63	1.2	1.2	1.2	1.2	60	55	YES	YES	NO
4	4_104	Grace Crescent	Post 2008 Development (Residence)	1	N	67	63	70	65	68	64	70	66	2.4	2.4	2.4	2.4	60	55	YES	YES	NO
4	4_105	Grace Crescent	Post 2008 Development (Residence)	G	N	66	61	67	63	66	62	68	63	1.3	1.2	1.2	1.2	60	55	YES	YES	NO
4	4_105	Grace Crescent	Post 2008 Development (Residence)	1	N	67	63	70	65	68	64	70	66	2.3	2.2	2.3	2.3	60	55	YES	YES	NO
4	4_106	Grace Crescent	Post 2008 Development (Residence)	G	N	64	60	65	60	65	60	65	61	0.8	0.8	0.8	0.8	60	55	YES	YES	NO
4	4_106	Grace Crescent	Post 2008 Development (Residence)	1	N	66	62	68	64	67	62	69	64	1.9	1.9	1.9	1.9	60	55	YES	YES	NO
4	4_107	Grace Crescent	Post 2008 Development (Residence)	G	N	64	60	65	61	65	61	66	62	1	1.1	1	1	60	55	YES	YES	NO
4	4_107	Grace Crescent	Post 2008 Development (Residence)	1	N	66	62	68	64	67	63	69	64	1.9	1.9	1.9	1.9	60	55	YES	YES	NO
4	4_108	Grace Crescent	Post 2008 Development (Residence)	G	N	65	61	66	62	66	61	67	63	1.2	1.2	1.2	1.2	60	55	YES	YES	NO
4	4_108	Grace Crescent	Post 2008 Development (Residence)	1	N	66	62	68	64	67	63	69	65	1.9	1.8	1.8	1.9	60	55	YES	YES	NO
4	4_109	Grace Crescent	Post 2008 Development (Residence)	G	N	64	60	66	61	65	61	66	62	1.3	1.2	1.2	1.2	60	55	YES	YES	NO
4	4_109	Grace Crescent	Post 2008 Development (Residence)	1	N	66	62	68	63	67	62	68	64	1.6	1.7	1.7	1.6	60	55	YES	YES	NO
4	4_110	Grace Crescent	Post 2008 Development (Residence)	G	N	63	58	63	59	63	59	64	60	0.7	0.6	0.7	0.6	60	55	NO	YES	NO
4	4_110	Grace Crescent	Post 2008 Development (Residence)	1	N	64	60	65	61	65	61	66	62	1	1	1	1	60	55	YES	YES	NO
4	4_111	Grace Crescent	Post 2008 Development (Residence)	G	N	63	58	63	59	63	59	64	60	0.6	0.6	0.6	0.6	60	55	NO	YES	NO
4	4_111	Grace Crescent	Post 2008 Development (Residence)	1	N	64	60	65	61	65	61	66	62	1	1.1	1	1	60	55	YES	YES	NO
4	4_112	Grace Crescent	Post 2008 Development (Residence)	G	N	63	59	64	60	64	59	64	60	0.9	0.9	0.8	0.8	60	55	NO	YES	NO
4	4_112	Grace Crescent	Post 2008 Development (Residence)	1	N	64	60	65	61	65	61	66	62	1	1.1	1	1	60	55	YES	YES	NO

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						No Build		Build		No Build		Build		2019		2029						
				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
4	4_113	Grace Crescent	Post 2008 Development (Residence)	G	NW	62	58	62	58	62	58	63	59	0.7	0.6	0.7	0.7	60	55	NO	NO	NO
4	4_113	Grace Crescent	Post 2008 Development (Residence)	1	NW	63	59	64	60	64	60	64	60	0.7	0.7	0.7	0.7	60	55	NO	YES	NO
4	4_114	Grace Crescent	Post 2008 Development (Residence)	G	NW	60	56	61	57	61	57	62	57	0.6	0.6	0.6	0.7	60	55	NO	NO	NO
4	4_114	Grace Crescent	Post 2008 Development (Residence)	1	NW	62	57	62	58	62	58	63	59	0.6	0.6	0.6	0.6	60	55	NO	NO	NO
4	4_115	Grace Crescent	Post 2008 Development (Residence)	G	NW	61	57	61	57	62	57	62	58	0.5	0.6	0.5	0.5	60	55	NO	NO	NO
4	4_115	Grace Crescent	Post 2008 Development (Residence)	1	NW	62	58	63	59	63	59	63	59	0.6	0.5	0.6	0.6	60	55	NO	NO	NO
4	4_116	Grace Crescent	Post 2008 Development (Residence)	G	NW	60	56	61	56	61	57	61	57	0.5	0.5	0.5	0.5	60	55	NO	NO	NO
4	4_116	Grace Crescent	Post 2008 Development (Residence)	1	NW	62	57	62	58	62	58	63	58	0.4	0.5	0.4	0.4	60	55	NO	NO	NO
4	4_117	Grace Crescent	Post 2008 Development (Residence)	G	NW	59	54	59	55	59	55	60	56	0.5	0.5	0.5	0.6	60	55	NO	NO	NO
4	4_117	Grace Crescent	Post 2008 Development (Residence)	1	NW	60	56	61	56	61	56	61	57	0.5	0.4	0.5	0.4	60	55	NO	NO	NO
4	4_118	Grace Crescent	Post 2008 Development (Residence)	G	NW	59	55	59	55	59	55	60	56	0.5	0.4	0.5	0.5	60	55	NO	NO	NO
4	4_118	Grace Crescent	Post 2008 Development (Residence)	1	NW	60	56	61	56	61	57	61	57	0.4	0.4	0.3	0.4	60	55	NO	NO	NO
4	4_119	Grace Crescent	Post 2008 Development (Residence)	G	NW	58	54	59	54	59	54	59	55	0.5	0.5	0.4	0.4	60	55	NO	NO	NO
4	4_119	Grace Crescent	Post 2008 Development (Residence)	1	NW	59	55	60	56	60	56	60	56	0.4	0.4	0.4	0.3	60	55	NO	NO	NO
4	4_120	Grace Crescent	Post 2008 Development (Residence)	G	NW	56	52	57	52	57	53	57	53	0.4	0.5	0.4	0.4	60	55	NO	NO	NO
4	4_120	Grace Crescent	Post 2008 Development (Residence)	1	NW	58	53	58	54	58	54	59	54	0.3	0.3	0.3	0.3	60	55	NO	NO	NO
4	4_121	Grace Crescent	Post 2008 Development (Residence)	G	NW	57	53	57	53	58	53	58	54	0.4	0.3	0.4	0.4	60	55	NO	NO	NO
4	4_121	Grace Crescent	Post 2008 Development (Residence)	1	NW	58	54	59	54	59	55	59	55	0.3	0.2	0.3	0.3	60	55	NO	NO	NO
4	4_122	Grace Crescent	Post 2008 Development (Residence)	G	NW	56	52	57	52	57	53	57	53	0.3	0.3	0.3	0.3	60	55	NO	NO	NO
4	4_122	Grace Crescent	Post 2008 Development (Residence)	1	NW	58	53	58	54	58	54	58	54	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_123	Grace Crescent	Post 2008 Development (Residence)	G	NW	54	49	54	50	54	50	55	50	0.3	0.3	0.3	0.3	60	55	NO	NO	NO
4	4_123	Grace Crescent	Post 2008 Development (Residence)	1	NW	55	51	56	51	56	52	56	52	0.2	0.1	0.2	0.2	60	55	NO	NO	NO
4	4_124	Grace Crescent	Post 2008 Development (Residence)	G	NW	55	51	56	51	56	52	56	52	0.2	0.3	0.2	0.2	60	55	NO	NO	NO
4	4_124	Grace Crescent	Post 2008 Development (Residence)	1	NW	57	53	57	53	57	53	57	53	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_125	Grace Crescent	Post 2008 Development (Residence)	G	W	54	50	54	50	54	50	55	50	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_125	Grace Crescent	Post 2008 Development (Residence)	1	W	55	51	56	51	56	52	56	52	0.1	0.1	0	0.1	60	55	NO	NO	NO
4	4_126	Grace Crescent	Post 2008 Development (Residence)	G	NW	53	49	53	49	54	49	54	50	0.2	0.2	0.3	0.2	60	55	NO	NO	NO
4	4_126	Grace Crescent	Post 2008 Development (Residence)	1	NW	55	50	55	51	55	51	55	51	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_127	Grace Crescent	Post 2008 Development (Residence)	G	W	53	49	54	49	54	50	54	50	0.2	0.2	0.1	0.1	60	55	NO	NO	NO
4	4_127	Grace Crescent	Post 2008 Development (Residence)	1	W	55	51	55	51	56	51	56	51	0	0.1	0	0	60	55	NO	NO	NO
4	4_128	Grace Crescent	Post 2008 Development (Residence)	G	W	52	47	52	48	52	48	52	48	0.1	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_128	Grace Crescent	Post 2008 Development (Residence)	1	W	53	49	53	49	54	50	54	50	0.1	0.1	0	0	60	55	NO	NO	NO
4	4_129	Grace Crescent	Post 2008 Development (Residence)	G	W	52	47	52	47	52	48	52	48	0.2	0.2	0.1	0.2	60	55	NO	NO	NO
4	4_129	Grace Crescent	Post 2008 Development (Residence)	1	W	53	49	53	49	54	50	54	50	0.1	0	0.1	0.1	60	55	NO	NO	NO
4	4_130	Grace Crescent	Post 2008 Development (Residence)	G	W	51	47	51	47	52	48	52	48	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_130	Grace Crescent	Post 2008 Development (Residence)	1	W	53	49	53	49	54	49	54	49	0.1	0.1	0	0	60	55	NO	NO	NO
4	4_131	Grace Crescent	Post 2008 Development (Residence)	G	W	51	47	51	47	52	47	52	48	0.2	0.1	0.2	0.2	60	55	NO	NO	NO
4	4_131	Grace Crescent	Post 2008 Development (Residence)	1	W	53	48	53	48	53	49	53	49	0.1	0.1	0	0	60	55	NO	NO	NO
4	4_132	Grace Crescent	Post 2008 Development (Residence)	G	W	51	47	51	47	51	47	52	47	0.2	0.1	0.2	0.1	60	55	NO	NO	NO
4	4_132	Grace Crescent	Post 2008 Development (Residence)	1	W	52	48	52	48	53	49	53	49	0	0	0	0.1	60	55	NO	NO	NO
4	4_133	Grace Crescent	Post 2008 Development (Residence)	G	W	51	46	51	47	51	47	51	47	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_133	Grace Crescent	Post 2008 Development (Residence)	1	W	52	48	52	48	53	49	53	49	0	0	0	0	60	55	NO	NO	NO
4	4_134	Grace Crescent	Post 2008 Development (Residence)	G	N	51	46	51	47	51	47	51	47	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_134	Grace Crescent	Post 2008 Development (Residence)	1	N	53	48	53	48	53	49	53	49	0	0	0.1	0	60	55	NO	NO	NO

NCA	NCA ID	Receiver Address	Receiver Description	Facade		Opening Year 2019				Design Year 2029				Increase (Build - No Build)				RNP External Noise Criteria		Exposed to Acute Noise Levels		Consider further treatment?
						No Build		Build		No Build		Build		2019		2029						
				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
4	4_135	Grace Crescent	Post 2008 Development (Residence)	G	N	51	47	51	47	52	48	52	48	0.1	0	0.1	0	60	55	NO	NO	NO
4	4_135	Grace Crescent	Post 2008 Development (Residence)	1	N	53	49	53	49	53	49	53	49	0	0	0	0	60	55	NO	NO	NO
4	4_136	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	47	52	47	52	48	52	48	0.1	0.1	0	0	60	55	NO	NO	NO
4	4_136	Grace Crescent	Post 2008 Development (Residence)	1	NW	53	49	53	49	54	49	54	49	0	0	0	0.1	60	55	NO	NO	NO
4	4_137	Grace Crescent	Post 2008 Development (Residence)	G	N	54	49	54	50	54	50	55	50	0.5	0.4	0.5	0.5	60	55	NO	NO	NO
4	4_137	Grace Crescent	Post 2008 Development (Residence)	1	N	58	54	58	54	58	54	59	55	0.3	0.3	0.3	0.3	60	55	NO	NO	NO
4	4_138	Grace Crescent	Post 2008 Development (Residence)	G	N	53	48	53	49	53	49	53	49	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_138	Grace Crescent	Post 2008 Development (Residence)	1	N	56	52	56	52	57	52	57	52	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_139	Grace Crescent	Post 2008 Development (Residence)	G	N	52	48	52	48	52	48	53	49	0.5	0.4	0.5	0.5	60	55	NO	NO	NO
4	4_139	Grace Crescent	Post 2008 Development (Residence)	1	N	55	51	56	52	56	51	56	52	0.8	0.8	0.7	0.7	60	55	NO	NO	NO
4	4_140	Grace Crescent	Post 2008 Development (Residence)	G	N	53	49	53	49	54	50	54	50	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_140	Grace Crescent	Post 2008 Development (Residence)	1	N	58	54	58	53	59	54	58	54	-0.2	-0.3	-0.2	-0.2	60	55	NO	NO	NO
4	4_141	Grace Crescent	Post 2008 Development (Residence)	G	N	53	49	53	49	54	50	54	50	0	0.1	0	0.1	60	55	NO	NO	NO
4	4_141	Grace Crescent	Post 2008 Development (Residence)	1	N	58	54	58	54	58	54	58	54	-0.1	0	-0.1	-0.1	60	55	NO	NO	NO
4	4_142	Grace Crescent	Post 2008 Development (Residence)	G	N	52	47	52	47	52	48	52	48	0.1	0.1	0.1	0	60	55	NO	NO	NO
4	4_142	Grace Crescent	Post 2008 Development (Residence)	1	N	55	51	55	51	56	52	56	52	-0.1	-0.2	-0.1	-0.1	60	55	NO	NO	NO
4	4_143	Grace Crescent	Post 2008 Development (Residence)	G	N	53	49	53	49	54	49	54	50	0.2	0.1	0.2	0.2	60	55	NO	NO	NO
4	4_143	Grace Crescent	Post 2008 Development (Residence)	1	N	58	54	58	53	59	54	58	54	-0.3	-0.3	-0.3	-0.3	60	55	NO	NO	NO
4	4_144	Grace Crescent	Post 2008 Development (Residence)	G	NW	53	49	53	49	54	50	54	50	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_144	Grace Crescent	Post 2008 Development (Residence)	1	NW	58	54	58	54	59	55	58	54	-0.2	-0.3	-0.3	-0.3	60	55	NO	NO	NO
4	4_145	Grace Crescent	Post 2008 Development (Residence)	G	N	51	47	51	47	52	48	52	48	-0.1	0	-0.1	-0.1	60	55	NO	NO	NO
4	4_145	Grace Crescent	Post 2008 Development (Residence)	1	N	55	51	55	51	56	52	56	52	-0.1	-0.1	-0.1	-0.1	60	55	NO	NO	NO
4	4_146	Grace Crescent	Post 2008 Development (Residence)	G	N	53	49	53	49	54	49	54	50	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_146	Grace Crescent	Post 2008 Development (Residence)	1	N	56	52	56	52	57	53	57	53	0	0	0	0	60	55	NO	NO	NO
4	4_147	Grace Crescent	Post 2008 Development (Residence)	G	NW	55	51	55	51	56	52	56	52	0.2	0.2	0.2	0.1	60	55	NO	NO	NO
4	4_147	Grace Crescent	Post 2008 Development (Residence)	1	NW	59	55	59	55	59	55	59	55	0	0	0	0	60	55	NO	NO	NO
4	4_148	Grace Crescent	Post 2008 Development (Residence)	G	NW	54	50	55	50	55	51	55	51	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_148	Grace Crescent	Post 2008 Development (Residence)	1	NW	58	53	58	53	58	54	58	54	0	0	0	0	60	55	NO	NO	NO
4	4_149	Grace Crescent	Post 2008 Development (Residence)	G	NW	52	48	52	48	52	48	52	48	0	-0.1	0	0	60	55	NO	NO	NO
4	4_149	Grace Crescent	Post 2008 Development (Residence)	1	NW	56	52	56	51	57	52	56	52	-0.2	-0.2	-0.2	-0.2	60	55	NO	NO	NO
4	4_150	Grace Crescent	Post 2008 Development (Residence)	G	NW	52	48	52	48	53	48	53	48	0.1	0	0	0	60	55	NO	NO	NO
4	4_150	Grace Crescent	Post 2008 Development (Residence)	1	NW	56	52	56	52	57	53	57	52	-0.2	-0.2	-0.2	-0.3	60	55	NO	NO	NO
4	4_151	Grace Crescent	Post 2008 Development (Residence)	G	NW	52	48	52	48	53	48	53	48	0	0	-0.1	0	60	55	NO	NO	NO
4	4_151	Grace Crescent	Post 2008 Development (Residence)	1	NW	56	52	56	52	57	52	56	52	-0.3	-0.2	-0.3	-0.3	60	55	NO	NO	NO
4	4_152	Grace Crescent	Post 2008 Development (Residence)	G	NW	50	46	50	46	51	47	51	46	-0.1	-0.1	-0.1	-0.1	60	55	NO	NO	NO
4	4_152	Grace Crescent	Post 2008 Development (Residence)	1	NW	55	50	54	50	55	51	55	51	-0.3	-0.3	-0.4	-0.3	60	55	NO	NO	NO
4	4_153	Grace Crescent	Post 2008 Development (Residence)	G	NW	52	47	52	47	52	48	52	48	0	0	0	0	60	55	NO	NO	NO
4	4_153	Grace Crescent	Post 2008 Development (Residence)	1	NW	55	51	55	51	56	52	56	52	-0.2	-0.3	-0.2	-0.2	60	55	NO	NO	NO
4	4_154	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	47	51	47	52	48	52	48	0	-0.1	-0.1	-0.1	60	55	NO	NO	NO
4	4_154	Grace Crescent	Post 2008 Development (Residence)	1	NW	55	51	55	50	55	51	55	51	-0.2	-0.2	-0.2	-0.3	60	55	NO	NO	NO
4	4_155	Grace Crescent	Post 2008 Development (Residence)	G	NW	49	45	49	45	50	46	50	45	-0.1	-0.1	0	-0.1	60	55	NO	NO	NO
4	4_155	Grace Crescent	Post 2008 Development (Residence)	1	NW	53	49	53	49	54	50	54	50	-0.1	-0.2	-0.2	-0.2	60	55	NO	NO	NO
4	4_156	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	47	51	47	52	47	51	47	-0.1	-0.1	-0.1	0	60	55	NO	NO	NO
4	4_156	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	50	55	51	55	51	-0.1	-0.1	-0.2	-0.2	60	55	NO	NO	NO

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						No Build		Build		No Build		Build		2019		2029						
				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
4	4_157	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	46	51	46	51	47	51	47	0	-0.1	-0.1	-0.1	60	55	NO	NO	NO
4	4_157	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	49	54	50	54	50	-0.2	-0.2	-0.1	-0.2	60	55	NO	NO	NO
4	4_158	Grace Crescent	Post 2008 Development (Residence)	G	NW	49	44	49	44	49	45	49	45	-0.1	-0.1	0	-0.1	60	55	NO	NO	NO
4	4_158	Grace Crescent	Post 2008 Development (Residence)	1	NW	53	48	53	48	53	49	53	49	-0.2	-0.2	-0.2	-0.2	60	55	NO	NO	NO
4	4_159	Grace Crescent	Post 2008 Development (Residence)	G	NW	50	46	50	46	51	47	51	47	0	-0.1	-0.1	-0.1	60	55	NO	NO	NO
4	4_159	Grace Crescent	Post 2008 Development (Residence)	1	NW	53	49	53	49	54	50	54	50	-0.1	-0.2	-0.2	-0.2	60	55	NO	NO	NO
4	4_160	Grace Crescent	Post 2008 Development (Residence)	G	W	50	45	50	45	50	46	50	46	-0.1	0	-0.1	-0.1	60	55	NO	NO	NO
4	4_160	Grace Crescent	Post 2008 Development (Residence)	1	W	53	48	53	48	53	49	53	49	-0.1	-0.1	-0.2	-0.1	60	55	NO	NO	NO
4	4_161	Grace Crescent	Post 2008 Development (Residence)	G	W	47	43	47	43	48	44	48	43	-0.2	-0.2	-0.2	-0.2	60	55	NO	NO	NO
4	4_161	Grace Crescent	Post 2008 Development (Residence)	1	W	51	46	50	46	51	47	51	47	-0.3	-0.3	-0.3	-0.3	60	55	NO	NO	NO
4	4_162	Grace Crescent	Post 2008 Development (Residence)	G	W	50	45	49	45	50	46	50	46	-0.2	-0.1	-0.2	-0.1	60	55	NO	NO	NO
4	4_162	Grace Crescent	Post 2008 Development (Residence)	1	W	52	48	52	48	53	49	53	48	-0.2	-0.2	-0.1	-0.2	60	55	NO	NO	NO
4	4_163	Grace Crescent	Post 2008 Development (Residence)	G	N	51	46	51	47	51	47	51	47	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_163	Grace Crescent	Post 2008 Development (Residence)	1	N	54	50	54	50	54	50	54	50	0	0	0	0.1	60	55	NO	NO	NO
4	4_164	Grace Crescent	Post 2008 Development (Residence)	G	N	51	47	51	47	51	47	51	47	0.1	0.1	0	0.1	60	55	NO	NO	NO
4	4_164	Grace Crescent	Post 2008 Development (Residence)	1	N	54	49	54	49	54	50	54	50	0	0	-0.1	-0.1	60	55	NO	NO	NO
4	4_165	Grace Crescent	Post 2008 Development (Residence)	G	N	50	46	50	46	51	47	51	46	-0.1	-0.2	-0.1	-0.2	60	55	NO	NO	NO
4	4_165	Grace Crescent	Post 2008 Development (Residence)	1	N	53	49	53	49	54	50	53	49	-0.3	-0.3	-0.3	-0.3	60	55	NO	NO	NO
4	4_166	Grace Crescent	Post 2008 Development (Residence)	G	N	52	47	52	47	52	48	52	48	0	0	0	0	60	55	NO	NO	NO
4	4_166	Grace Crescent	Post 2008 Development (Residence)	1	N	54	50	54	50	55	51	55	50	0	-0.1	-0.1	-0.1	60	55	NO	NO	NO
4	4_167	Grace Crescent	Post 2008 Development (Residence)	G	NW	52	47	52	47	52	48	52	48	0	0	-0.1	0	60	55	NO	NO	NO
4	4_167	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	50	55	51	55	50	-0.1	-0.1	-0.2	-0.1	60	55	NO	NO	NO
4	4_168	Grace Crescent	Post 2008 Development (Residence)	G	NW	52	47	51	47	52	48	52	48	-0.2	-0.2	-0.1	-0.2	60	55	NO	NO	NO
4	4_168	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	50	55	50	54	50	-0.2	-0.2	-0.2	-0.2	60	55	NO	NO	NO
4	4_169	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	47	51	47	52	48	52	48	-0.1	-0.1	-0.1	-0.1	60	55	NO	NO	NO
4	4_169	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	49	55	50	54	50	-0.3	-0.3	-0.4	-0.3	60	55	NO	NO	NO
4	4_170	Grace Crescent	Post 2008 Development (Residence)	G	NW	52	48	52	48	53	48	53	48	0	0	0	0	60	55	NO	NO	NO
4	4_170	Grace Crescent	Post 2008 Development (Residence)	1	NW	55	50	54	50	55	51	55	51	-0.2	-0.2	-0.1	-0.1	60	55	NO	NO	NO
4	4_171	Grace Crescent	Post 2008 Development (Residence)	G	NW	52	47	52	47	52	48	52	48	0	0	-0.1	0	60	55	NO	NO	NO
4	4_171	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	50	55	51	55	50	-0.2	-0.2	-0.2	-0.2	60	55	NO	NO	NO
4	4_172	Grace Crescent	Post 2008 Development (Residence)	G	NW	52	47	52	47	52	48	52	48	0.1	0.1	0	0.1	60	55	NO	NO	NO
4	4_172	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	50	55	51	55	51	-0.1	-0.2	-0.1	-0.2	60	55	NO	NO	NO
4	4_173	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	47	51	47	52	47	51	47	-0.1	-0.1	-0.2	-0.1	60	55	NO	NO	NO
4	4_173	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	49	55	50	54	50	-0.3	-0.3	-0.2	-0.2	60	55	NO	NO	NO
4	4_174	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	47	51	47	52	48	52	48	0	0	0	0	60	55	NO	NO	NO
4	4_174	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	50	55	51	55	51	0	-0.1	-0.1	-0.1	60	55	NO	NO	NO
4	4_175	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	47	51	47	52	47	52	47	0.1	0.1	0	0	60	55	NO	NO	NO
4	4_175	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	50	55	51	55	50	-0.1	-0.1	-0.1	-0.1	60	55	NO	NO	NO
4	4_176	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	47	51	47	51	47	51	47	0.1	0.1	0	0.1	60	55	NO	NO	NO
4	4_176	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	50	55	51	55	50	0	-0.1	0	-0.1	60	55	NO	NO	NO
4	4_177	Grace Crescent	Post 2008 Development (Residence)	G	NW	50	46	50	46	51	47	51	47	0.1	0.1	0	0	60	55	NO	NO	NO
4	4_177	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	50	55	50	55	50	-0.1	0	-0.1	0	60	55	NO	NO	NO
4	4_178	Grace Crescent	Post 2008 Development (Residence)	G	NE	51	47	52	47	52	48	52	48	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_178	Grace Crescent	Post 2008 Development (Residence)	1	NE	55	51	56	51	56	52	56	52	0.2	0.3	0.2	0.2	60	55	NO	NO	NO

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						No Build		Build		No Build		Build		2019		2029						
				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
4	4_179	Grace Crescent	Post 2008 Development (Residence)	G	N	51	46	50	46	51	47	51	47	-0.1	-0.1	-0.1	-0.1	60	55	NO	NO	NO
4	4_179	Grace Crescent	Post 2008 Development (Residence)	1	N	53	49	53	49	53	49	53	49	0	0	0	-0.1	60	55	NO	NO	NO
4	4_180	Grace Crescent	Post 2008 Development (Residence)	G	N	51	46	51	46	51	47	51	47	0	0	0	0	60	55	NO	NO	NO
4	4_180	Grace Crescent	Post 2008 Development (Residence)	1	N	53	49	53	49	54	49	54	49	0	0	0	0	60	55	NO	NO	NO
4	4_181	Grace Crescent	Post 2008 Development (Residence)	G	N	51	46	51	46	51	47	51	47	0	-0.1	0	0	60	55	NO	NO	NO
4	4_181	Grace Crescent	Post 2008 Development (Residence)	1	N	53	49	53	49	54	49	54	49	0	0	0	0	60	55	NO	NO	NO
4	4_182	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	46	51	46	51	47	51	47	0	0	0	0.1	60	55	NO	NO	NO
4	4_182	Grace Crescent	Post 2008 Development (Residence)	1	NW	53	49	53	49	53	49	54	49	0.1	0.1	0.1	0	60	55	NO	NO	NO
4	4_183	Grace Crescent	Post 2008 Development (Residence)	G	N	51	46	51	46	51	47	51	47	0	0	0	0	60	55	NO	NO	NO
4	4_183	Grace Crescent	Post 2008 Development (Residence)	1	N	53	49	53	49	53	49	53	49	0.1	0.1	0	0.1	60	55	NO	NO	NO
4	4_184	Grace Crescent	Post 2008 Development (Residence)	G	N	51	46	51	46	51	47	51	47	0	0	0	0	60	55	NO	NO	NO
4	4_184	Grace Crescent	Post 2008 Development (Residence)	1	N	53	48	53	49	53	49	53	49	0.1	0.1	0.1	0.2	60	55	NO	NO	NO
4	4_185	Grace Crescent	Post 2008 Development (Residence)	G	N	51	46	51	46	51	47	51	47	0	0	0	0	60	55	NO	NO	NO
4	4_185	Grace Crescent	Post 2008 Development (Residence)	1	N	53	48	53	49	53	49	53	49	0.2	0.2	0.1	0.2	60	55	NO	NO	NO
4	4_186	Grace Crescent	Post 2008 Development (Residence)	G	NW	50	46	50	46	51	47	51	47	0	0	0	0	60	55	NO	NO	NO
4	4_186	Grace Crescent	Post 2008 Development (Residence)	1	NW	52	48	53	48	53	49	53	49	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_187	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	46	51	46	51	47	51	47	0	0	-0.1	0	60	55	NO	NO	NO
4	4_187	Grace Crescent	Post 2008 Development (Residence)	1	NW	53	48	53	48	53	49	53	49	0.1	0.1	0.2	0.1	60	55	NO	NO	NO
4	4_188	Grace Crescent	Post 2008 Development (Residence)	G	N	51	46	50	46	51	47	51	47	-0.1	-0.1	-0.1	-0.1	60	55	NO	NO	NO
4	4_188	Grace Crescent	Post 2008 Development (Residence)	1	N	53	48	53	48	53	49	53	49	-0.1	-0.1	0	-0.1	60	55	NO	NO	NO
4	4_189	Grace Crescent	Post 2008 Development (Residence)	G	N	50	46	50	46	51	47	51	47	-0.2	-0.2	-0.2	-0.2	60	55	NO	NO	NO
4	4_189	Grace Crescent	Post 2008 Development (Residence)	1	N	53	49	53	48	53	49	53	49	-0.2	-0.2	-0.2	-0.2	60	55	NO	NO	NO
4	4_190	Grace Crescent	Post 2008 Development (Residence)	G	N	52	47	52	47	52	48	52	48	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_190	Grace Crescent	Post 2008 Development (Residence)	1	N	54	50	55	50	55	51	55	51	0.1	0.1	0.2	0.2	60	55	NO	NO	NO
4	4_191	Grace Crescent	Post 2008 Development (Residence)	G	N	50	46	50	46	51	47	51	47	0	0	0	0.1	60	55	NO	NO	NO
4	4_191	Grace Crescent	Post 2008 Development (Residence)	1	N	53	49	53	49	54	49	54	50	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
4	4_192	Grace Crescent	Post 2008 Development (Residence)	G	N	50	46	50	45	51	46	50	46	-0.3	-0.3	-0.3	-0.3	60	55	NO	NO	NO
4	4_192	Grace Crescent	Post 2008 Development (Residence)	1	N	53	48	53	48	53	49	53	49	-0.2	-0.2	-0.3	-0.3	60	55	NO	NO	NO
4	4_193	Grace Crescent	Post 2008 Development (Residence)	G	N	51	47	51	47	52	47	52	48	0.1	0.1	0.2	0.1	60	55	NO	NO	NO
4	4_193	Grace Crescent	Post 2008 Development (Residence)	1	N	54	50	54	50	55	50	55	51	0.3	0.3	0.2	0.3	60	55	NO	NO	NO
4	4_194	Grace Crescent	Post 2008 Development (Residence)	G	N	51	47	51	47	51	47	52	47	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_194	Grace Crescent	Post 2008 Development (Residence)	1	N	54	50	54	50	55	50	55	51	0.3	0.3	0.2	0.3	60	55	NO	NO	NO
4	4_195	Grace Crescent	Post 2008 Development (Residence)	G	N	49	45	49	44	50	45	49	45	-0.2	-0.2	-0.2	-0.2	60	55	NO	NO	NO
4	4_195	Grace Crescent	Post 2008 Development (Residence)	1	N	53	48	52	48	53	49	53	49	-0.3	-0.3	-0.4	-0.3	60	55	NO	NO	NO
4	4_196	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	47	51	47	51	47	52	47	0.3	0.3	0.2	0.2	60	55	NO	NO	NO
4	4_196	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	50	55	50	55	51	0.1	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_197	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	47	51	47	52	47	52	48	0.2	0.2	0.2	0.2	60	55	NO	NO	NO
4	4_197	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	50	55	51	55	51	0.1	0.1	0.1	0	60	55	NO	NO	NO
4	4_198	Grace Crescent	Post 2008 Development (Residence)	G	NW	51	46	51	46	51	47	51	47	0.2	0.1	0.1	0.2	60	55	NO	NO	NO
4	4_198	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	49	54	49	54	50	54	50	-0.1	-0.1	-0.1	-0.2	60	55	NO	NO	NO
4	4_199	Grace Crescent	Post 2008 Development (Residence)	G	NW	49	45	49	45	50	46	50	46	-0.1	-0.2	-0.1	-0.2	60	55	NO	NO	NO
4	4_199	Grace Crescent	Post 2008 Development (Residence)	1	NW	53	49	53	49	54	50	53	49	-0.4	-0.4	-0.4	-0.5	60	55	NO	NO	NO
4	4_200	Grace Crescent	Post 2008 Development (Residence)	G	SE	52	47	52	48	52	48	53	49	0.4	0.5	0.4	0.4	60	55	NO	NO	NO
4	4_200	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	54	50	55	51	55	51	0.1	0.1	0.1	0	60	55	NO	NO	NO

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				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
4	4_201	Grace Crescent	Post 2008 Development (Residence)	G	SE	52	48	53	48	53	49	53	49	0.5	0.5	0.6	0.5	60	55	NO	NO	NO
4	4_201	Grace Crescent	Post 2008 Development (Residence)	1	NW	54	50	55	50	55	51	55	51	0.1	0.1	0	0	60	55	NO	NO	NO
4	4_202	Grace Crescent	Post 2008 Development (Residence)	G	NW	49	45	49	45	50	46	50	45	-0.1	-0.1	-0.1	-0.2	60	55	NO	NO	NO
4	4_202	Grace Crescent	Post 2008 Development (Residence)	1	NW	53	49	53	49	54	50	54	49	-0.3	-0.3	-0.2	-0.3	60	55	NO	NO	NO
4	4_203	Grace Crescent	Post 2008 Development (Residence)	G	SE	53	48	53	49	53	49	54	50	0.7	0.7	0.7	0.7	60	55	NO	NO	NO
4	4_203	Grace Crescent	Post 2008 Development (Residence)	1	SE	54	50	55	50	55	51	55	51	0.6	0.5	0.6	0.5	60	55	NO	NO	NO
4	4_204	Grace Crescent	Post 2008 Development (Residence)	G	SE	53	48	53	49	53	49	54	50	0.8	0.8	0.8	0.8	60	55	NO	NO	NO
4	4_204	Grace Crescent	Post 2008 Development (Residence)	1	SE	54	50	55	51	55	51	55	51	0.6	0.5	0.6	0.5	60	55	NO	NO	NO
4	4_205	Grace Crescent	Post 2008 Development (Residence)	G	SE	52	48	53	49	53	49	54	49	0.5	0.5	0.6	0.5	60	55	NO	NO	NO
4	4_205	Grace Crescent	Post 2008 Development (Residence)	1	SE	54	50	54	50	55	50	55	51	0.4	0.4	0.4	0.5	60	55	NO	NO	NO
4	4_206	Grace Crescent	Post 2008 Development (Residence)	G	NW	48	43	48	43	48	44	48	44	0	-0.1	0	-0.1	60	55	NO	NO	NO
4	4_206	Grace Crescent	Post 2008 Development (Residence)	1	NW	52	48	52	48	52	48	52	48	0	0	0	0	60	55	NO	NO	NO
4	4_207	Grace Crescent	Post 2008 Development (Residence)	G	SE	54	49	54	50	54	50	55	51	0.9	0.9	0.9	0.9	60	55	NO	NO	NO
4	4_207	Grace Crescent	Post 2008 Development (Residence)	1	SE	55	51	56	52	56	52	56	52	0.6	0.7	0.6	0.7	60	55	NO	NO	NO
4	4_208	Grace Crescent	Post 2008 Development (Residence)	G	SE	54	49	54	50	54	50	55	51	0.8	0.8	0.9	0.8	60	55	NO	NO	NO
4	4_208	Grace Crescent	Post 2008 Development (Residence)	1	SE	55	51	56	52	56	52	56	52	0.6	0.5	0.6	0.5	60	55	NO	NO	NO
4	4_209	Grace Crescent	Post 2008 Development (Residence)	G	NW	49	44	49	44	49	45	49	45	0	0	0	0	60	55	NO	NO	NO
4	4_209	Grace Crescent	Post 2008 Development (Residence)	1	NW	53	48	53	48	53	49	53	49	0	0	0	0.1	60	55	NO	NO	NO
4	4_210	Grace Crescent	Post 2008 Development (Residence)	G	SE	54	50	55	51	55	51	56	52	1	1	0.9	1	60	55	NO	NO	NO
4	4_210	Grace Crescent	Post 2008 Development (Residence)	1	SE	56	52	57	52	57	53	57	53	0.7	0.6	0.7	0.6	60	55	NO	NO	NO
5	5_001	75 Hartigan Avenue	Post 2008 Development (Residence)	G	W	51	47	52	48	52	48	53	49	0.8	0.9	0.8	0.8	60	55	NO	NO	NO
5	5_001	75 Hartigan Avenue	Post 2008 Development (Residence)	1	E	53	49	54	50	54	50	55	50	0.6	0.6	0.6	0.6	60	55	NO	NO	NO
5	5_002	77 Hartigan Avenue	Post 2008 Development (Residence)	G	S	52	48	53	49	53	49	54	50	0.9	0.9	0.9	0.9	60	55	NO	NO	NO
5	5_002	77 Hartigan Avenue	Post 2008 Development (Residence)	1	S	54	50	55	51	55	51	56	52	0.8	0.8	0.9	0.8	60	55	NO	NO	NO
5	5_003	79 Hartigan Avenue	Post 2008 Development (Residence)	G	S	54	50	55	51	55	50	56	52	1.3	1.4	1.4	1.4	60	55	NO	NO	NO
5	5_003	79 Hartigan Avenue	Post 2008 Development (Residence)	1	S	56	51	57	52	56	52	57	53	1.1	1.1	1.2	1.1	60	55	NO	NO	NO
5	5_004	81 Hartigan Avenue	Post 2008 Development (Residence)	G	SW	54	50	56	52	55	50	56	52	1.8	1.8	1.7	1.8	60	55	NO	NO	NO
5	5_004	81 Hartigan Avenue	Post 2008 Development (Residence)	1	SW	56	51	57	53	56	52	58	54	1.5	1.5	1.4	1.5	60	55	NO	NO	NO
5	5_005	83 Hartigan Avenue	Post 2008 Development (Residence)	G	W	55	51	57	53	56	52	58	54	2	2	2	2.1	60	55	NO	NO	NO
5	5_005	83 Hartigan Avenue	Post 2008 Development (Residence)	1	S	57	53	59	55	58	54	60	55	1.6	1.6	1.7	1.7	60	55	NO	NO	NO
5	5_006	85 Hartigan Avenue	Post 2008 Development (Residence)	G	W	56	52	58	54	57	53	59	55	2	2	2	2	60	55	NO	NO	NO
5	5_007	87 Hartigan Avenue	Post 2008 Development (Residence)	G	S	58	54	60	56	59	55	61	57	2.5	2.4	2.5	2.4	60	55	NO	NO	NO
5	5_007	87 Hartigan Avenue	Post 2008 Development (Residence)	1	S	60	56	62	58	61	56	63	59	2.1	2.2	2.1	2.1	60	55	NO	NO	NO
5	5_008	89 Hartigan Avenue	Post 2008 Development (Residence)	G	S	63	59	67	63	64	60	67	63	3.3	3.2	3.3	3.3	60	55	YES	YES	NO
5	5_008	89 Hartigan Avenue	Post 2008 Development (Residence)	1	S	65	61	68	64	66	62	69	65	3.2	3.3	3.2	3.2	60	55	YES	YES	NO
5	5_009	Hartigan Avenue	Post 2008 Development (Residence)	G	NE	51	47	51	47	52	47	52	48	0.1	0.1	0.2	0.2	60	55	NO	NO	NO
5	5_009	Hartigan Avenue	Post 2008 Development (Residence)	1	SE	53	49	54	50	54	50	55	50	0.7	0.7	0.7	0.7	60	55	NO	NO	NO
5	5_010	Hartigan Avenue	Post 2008 Development (Residence)	G	W	50	46	51	46	50	46	51	47	0.9	0.9	1	0.9	60	55	NO	NO	NO
5	5_010	Hartigan Avenue	Post 2008 Development (Residence)	1	W	53	49	54	50	54	50	55	51	0.8	0.8	0.8	0.9	60	55	NO	NO	NO
5	5_011	Hartigan Avenue	Post 2008 Development (Residence)	G	W	51	47	52	48	52	47	52	48	0.7	0.8	0.8	0.8	60	55	NO	NO	NO
5	5_011	Hartigan Avenue	Post 2008 Development (Residence)	1	W	53	49	54	50	54	50	55	51	1	0.9	0.9	0.9	60	55	NO	NO	NO
5	5_012	Hartigan Avenue	Post 2008 Development (Residence)	G	SW	50	46	52	47	51	47	52	48	1.3	1.3	1.4	1.3	60	55	NO	NO	NO
5	5_012	Hartigan Avenue	Post 2008 Development (Residence)	1	S	54	50	55	51	55	50	56	52	1	1.1	1.1	1.1	60	55	NO	NO	NO
5	5_013	Hartigan Avenue	Post 2008 Development (Residence)	G	W	52	48	53	49	53	49	54	50	0.9	1	0.9	0.9	60	55	NO	NO	NO

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				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
5	5_014	Hartigan Avenue	Post 2008 Development (Residence)	G	SW	51	47	52	48	52	48	53	49	1.3	1.3	1.4	1.3	60	55	NO	NO	NO
5	5_014	Hartigan Avenue	Post 2008 Development (Residence)	1	S	56	51	57	53	56	52	57	53	1.2	1.2	1.2	1.2	60	55	NO	NO	NO
5	5_015	Hartigan Avenue	Post 2008 Development (Residence)	G	W	54	50	55	51	54	50	56	52	1.5	1.5	1.6	1.5	60	55	NO	NO	NO
5	5_016	Hartigan Avenue	Post 2008 Development (Residence)	G	S	53	49	55	50	54	50	55	51	1.3	1.3	1.4	1.3	60	55	NO	NO	NO
5	5_016	Hartigan Avenue	Post 2008 Development (Residence)	1	S	58	54	60	55	59	55	60	56	1.5	1.4	1.5	1.5	60	55	NO	NO	NO
5	5_017	Hartigan Avenue	Post 2008 Development (Residence)	G	SW	56	51	57	53	56	52	58	54	1.9	1.8	1.9	1.8	60	55	NO	NO	NO
5	5_018	3 Gorman Avenue	Post 2008 Development (Residence)	G	E	52	48	53	48	53	48	53	49	0.5	0.6	0.5	0.6	60	55	NO	NO	NO
5	5_018	3 Gorman Avenue	Post 2008 Development (Residence)	1	E	54	50	55	50	54	50	55	51	0.6	0.6	0.7	0.6	60	55	NO	NO	NO
5	5_019	5 Gorman Avenue	Post 2008 Development (Residence)	G	E	52	48	53	49	53	49	53	49	0.6	0.7	0.7	0.6	60	55	NO	NO	NO
5	5_019	5 Gorman Avenue	Post 2008 Development (Residence)	1	S	54	50	55	51	55	51	56	52	1.1	1	1.1	1.1	60	55	NO	NO	NO
5	5_020	7 Gorman Avenue	Post 2008 Development (Residence)	G	E	53	48	53	49	53	49	54	50	0.7	0.8	0.8	0.8	60	55	NO	NO	NO
5	5_021	9 Gorman Avenue	Post 2008 Development (Residence)	G	E	53	49	54	50	54	50	55	51	1.2	1.2	1.1	1.2	60	55	NO	NO	NO
5	5_021	9 Gorman Avenue	Post 2008 Development (Residence)	1	E	56	51	57	53	56	52	57	53	1.1	1.2	1.1	1.2	60	55	NO	NO	NO
5	5_022	10 Gorman Avenue	Post 2008 Development (Residence)	G	W	52	48	53	49	52	48	53	49	0.9	1	1	1	60	55	NO	NO	NO
5	5_022	10 Gorman Avenue	Post 2008 Development (Residence)	1	W	54	50	55	51	55	51	56	52	1.1	1.1	1.2	1.1	60	55	NO	NO	NO
5	5_023	11 Gorman Avenue	Post 2008 Development (Residence)	G	E	54	50	56	51	55	51	56	52	1.4	1.5	1.5	1.5	60	55	NO	NO	NO
5	5_023	11 Gorman Avenue	Post 2008 Development (Residence)	1	E	56	52	58	54	57	53	58	54	1.4	1.4	1.4	1.4	60	55	NO	NO	NO
5	5_024	12 Gorman Avenue	Post 2008 Development (Residence)	G	W	52	48	53	49	53	49	54	50	1.2	1.1	1.2	1.1	60	55	NO	NO	NO
5	5_024	12 Gorman Avenue	Post 2008 Development (Residence)	1	W	55	51	56	52	55	51	57	53	1.3	1.2	1.3	1.2	60	55	NO	NO	NO
5	5_025	13 Gorman Avenue	Post 2008 Development (Residence)	G	E	56	51	57	53	56	52	58	54	1.7	1.8	1.8	1.8	60	55	NO	NO	NO
5	5_025	13 Gorman Avenue	Post 2008 Development (Residence)	1	S	59	55	61	56	59	55	61	57	1.8	1.7	1.8	1.7	60	55	NO	NO	NO
5	5_026	14 Gorman Avenue	Post 2008 Development (Residence)	G	S	55	51	56	52	55	51	57	53	1.5	1.5	1.4	1.4	60	55	NO	NO	NO
5	5_026	14 Gorman Avenue	Post 2008 Development (Residence)	1	S	58	54	59	55	58	54	60	56	1.4	1.5	1.5	1.5	60	55	NO	NO	NO
5	5_027	15 Gorman Avenue	Post 2008 Development (Residence)	G	E	57	53	59	55	58	54	60	56	2.1	2.1	2.2	2.1	60	55	NO	NO	NO
5	5_028	16 Gorman Avenue	Post 2008 Development (Residence)	G	S	60	56	63	58	61	57	63	59	2.3	2.4	2.3	2.3	60	55	NO	NO	NO
5	5_029	17 Gorman Avenue	Post 2008 Development (Residence)	G	S	64	59	67	63	64	60	68	64	3.6	3.6	3.7	3.6	60	55	YES	YES	NO
5	5_029	17 Gorman Avenue	Post 2008 Development (Residence)	1	S	65	61	69	65	66	62	70	66	3.6	3.6	3.6	3.6	60	55	YES	YES	NO
5	5_030	19 Gorman Avenue	Post 2008 Development (Residence)	G	S	64	59	67	63	64	60	68	64	3.4	3.5	3.4	3.4	60	55	YES	YES	NO
5	5_031	21 Gorman Avenue	Post 2008 Development (Residence)	G	S	64	59	67	63	64	60	68	64	3.4	3.5	3.4	3.4	60	55	YES	YES	NO
5	5_031	21 Gorman Avenue	Post 2008 Development (Residence)	1	S	65	61	69	65	66	62	69	65	3.4	3.4	3.5	3.5	60	55	YES	YES	NO
5	5_032	10 Burns Rd	Post 2008 Development (Residence)	G	S	55	51	56	52	56	51	57	53	1.5	1.5	1.6	1.5	60	55	NO	NO	NO
5	5_033	12 Burns Rd	Post 2008 Development (Residence)	G	E	53	49	54	49	53	49	54	50	0.6	0.6	0.7	0.6	60	55	NO	NO	NO
5	5_033	12 Burns Rd	Post 2008 Development (Residence)	1	S	56	52	58	54	57	53	58	54	1.3	1.4	1.4	1.3	60	55	NO	NO	NO
5	5_034	Burns Road	Post 2008 Development (Residence)	G	S	64	59	67	63	64	60	67	63	3	3.1	3.1	3.1	60	55	YES	YES	NO
5	5_034	Burns Road	Post 2008 Development (Residence)	1	S	67	63	71	67	68	64	72	68	4	4.1	4.1	4	60	55	YES	YES	NO
5	5_035	Burns Road	Post 2008 Development (Residence)	G	S	63	59	66	62	64	60	67	63	3	3	3	3	60	55	YES	YES	NO
5	5_035	Burns Road	Post 2008 Development (Residence)	1	S	67	63	71	67	68	64	71	67	3.8	3.8	3.8	3.8	60	55	YES	YES	NO
5	5_036	Burns Road	Post 2008 Development (Residence)	G	S	63	59	66	62	64	60	67	63	3	3	3	3	60	55	YES	YES	NO
5	5_036	Burns Road	Post 2008 Development (Residence)	1	S	67	63	71	66	68	63	71	67	3.7	3.7	3.7	3.7	60	55	YES	YES	NO
5	5_037	Burns Road	Post 2008 Development (Residence)	G	S	63	59	66	62	64	60	67	63	2.9	2.9	2.9	3	60	55	YES	YES	NO
5	5_037	Burns Road	Post 2008 Development (Residence)	1	S	67	63	71	67	68	64	72	68	3.9	3.9	3.9	3.9	60	55	YES	YES	NO
5	5_038	Burns Road	Post 2008 Development (Residence)	G	S	64	59	66	62	64	60	67	63	2.9	2.8	2.9	2.8	60	55	YES	YES	NO
5	5_038	Burns Road	Post 2008 Development (Residence)	1	S	67	63	71	67	68	64	72	68	3.9	3.9	4	3.9	60	55	YES	YES	NO
5	5_039	Burns Road	Post 2008 Development (Residence)	G	S	63	59	66	62	64	60	67	63	2.8	2.9	2.9	2.9	60	55	YES	YES	NO

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				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
5	5_039	Burns Road	Post 2008 Development (Residence)	1	S	67	63	71	67	68	64	72	68	3.9	3.9	3.9	3.9	60	55	YES	YES	NO
5	5_040	Burns Road	Post 2008 Development (Residence)	G	W	59	55	61	57	60	56	62	58	2.1	2.1	2.2	2.2	60	55	NO	NO	NO
5	5_040	Burns Road	Post 2008 Development (Residence)	1	W	61	57	63	59	62	57	64	60	2.3	2.3	2.3	2.3	60	55	NO	YES	NO
5	5_041	Burns Road	Post 2008 Development (Residence)	G	W	57	53	59	55	58	54	60	56	1.9	2	1.9	1.9	60	55	NO	NO	NO
5	5_041	Burns Road	Post 2008 Development (Residence)	1	W	59	55	62	57	60	56	62	58	2.1	2.1	2.1	2.1	60	55	NO	NO	NO
5	5_042	Burns Road	Post 2008 Development (Residence)	G	W	57	53	59	54	57	53	59	55	1.9	1.9	1.9	1.9	60	55	NO	NO	NO
5	5_042	Burns Road	Post 2008 Development (Residence)	1	W	59	54	61	56	59	55	61	57	1.9	1.9	1.8	1.8	60	55	NO	NO	NO
5	5_043	Burns Road	Post 2008 Development (Residence)	G	W	56	51	57	53	56	52	58	54	1.8	1.8	1.8	1.9	60	55	NO	NO	NO
5	5_043	Burns Road	Post 2008 Development (Residence)	1	W	58	54	59	55	58	54	60	56	1.7	1.7	1.7	1.7	60	55	NO	NO	NO
5	5_044	Burns Road	Post 2008 Development (Residence)	G	W	55	51	56	52	55	51	57	53	1.7	1.7	1.6	1.6	60	55	NO	NO	NO
5	5_044	Burns Road	Post 2008 Development (Residence)	1	W	57	53	59	54	58	54	59	55	1.4	1.4	1.5	1.4	60	55	NO	NO	NO
5	5_045	Burns Road	Post 2008 Development (Residence)	G	W	53	49	55	51	54	50	56	51	1.5	1.5	1.6	1.6	60	55	NO	NO	NO
5	5_045	Burns Road	Post 2008 Development (Residence)	1	W	56	52	58	54	57	53	58	54	1.3	1.3	1.3	1.3	60	55	NO	NO	NO
5	5_046	Burns Road	Post 2008 Development (Residence)	G	SE	56	52	58	53	56	52	58	54	1.7	1.8	1.7	1.7	60	55	NO	NO	NO
5	5_046	Burns Road	Post 2008 Development (Residence)	1	S	59	54	60	56	59	55	61	57	1.6	1.7	1.7	1.7	60	55	NO	NO	NO
5	5_047	Burns Road	Post 2008 Development (Residence)	G	NE	55	50	56	52	55	51	57	53	1.7	1.9	1.8	1.8	60	55	NO	NO	NO
5	5_047	Burns Road	Post 2008 Development (Residence)	1	NE	57	52	59	54	57	53	59	55	1.9	2.1	2	2	60	55	NO	NO	NO
5	5_048	Burns Road	Post 2008 Development (Residence)	G	E	55	50	56	52	55	51	57	53	1.7	1.8	1.8	1.8	60	55	NO	NO	NO
5	5_048	Burns Road	Post 2008 Development (Residence)	1	E	57	52	59	54	57	53	59	55	1.8	1.9	1.9	1.9	60	55	NO	NO	NO
5	5_049	Burns Road	Post 2008 Development (Residence)	G	E	55	50	56	52	55	51	57	53	1.5	1.5	1.6	1.6	60	55	NO	NO	NO
5	5_049	Burns Road	Post 2008 Development (Residence)	1	E	57	53	59	54	57	53	59	55	1.7	1.7	1.7	1.7	60	55	NO	NO	NO
5	5_050	Burns Road	Post 2008 Development (Residence)	G	E	55	50	56	52	55	51	56	52	1.3	1.4	1.4	1.4	60	55	NO	NO	NO
5	5_050	Burns Road	Post 2008 Development (Residence)	1	E	57	52	58	54	57	53	59	55	1.4	1.4	1.5	1.5	60	55	NO	NO	NO
5	5_051	Burns Road	Post 2008 Development (Residence)	G	E	54	50	56	51	55	51	56	52	1.2	1.2	1.3	1.3	60	55	NO	NO	NO
5	5_051	Burns Road	Post 2008 Development (Residence)	1	E	57	52	58	54	57	53	58	54	1.2	1.3	1.3	1.3	60	55	NO	NO	NO
5	5_052	Burns Road	Post 2008 Development (Residence)	G	W	53	49	54	50	54	50	55	50	0.9	0.9	1	0.9	60	55	NO	NO	NO
5	5_052	Burns Road	Post 2008 Development (Residence)	1	W	55	51	56	52	56	52	57	53	0.9	0.9	1	0.9	60	55	NO	NO	NO
5	5_053	Burns Road	Post 2008 Development (Residence)	G	SW	53	49	54	50	53	49	55	50	1.1	1.2	1.2	1.2	60	55	NO	NO	NO
5	5_053	Burns Road	Post 2008 Development (Residence)	1	SW	55	51	56	52	56	52	57	53	1.1	1.1	1.1	1.1	60	55	NO	NO	NO
5	5_054	Burns Road	Post 2008 Development (Residence)	G	N	54	49	54	49	54	50	54	50	0	0.1	0.1	0	60	55	NO	NO	NO
5	5_054	Burns Road	Post 2008 Development (Residence)	1	N	56	51	56	51	56	52	56	52	0.1	0.1	0.2	0.2	60	55	NO	NO	NO
5	5_055	Burns Road	Post 2008 Development (Residence)	G	S	53	49	54	50	53	49	55	51	1.4	1.5	1.4	1.4	60	55	NO	NO	NO
5	5_055	Burns Road	Post 2008 Development (Residence)	1	S	56	51	57	53	56	52	57	53	1.4	1.5	1.5	1.4	60	55	NO	NO	NO
5	5_056	Burns Road	Post 2008 Development (Residence)	G	NE	56	51	57	52	56	52	57	53	0.6	0.6	0.5	0.5	60	55	NO	NO	NO
5	5_056	Burns Road	Post 2008 Development (Residence)	1	NE	58	53	58	54	58	54	59	55	0.7	0.7	0.7	0.7	60	55	NO	NO	NO
5	5_057	6 Windsor Road		G	E	65	61	67	63	66	62	68	63	1.9	2	1.9	1.9	60	55	YES	YES	YES
5	5_058	8 Windsor Road		G	E	67	62	68	63	67	63	68	64	1	1.1	1.1	1.1	60	55	YES	YES	YES
5	5_058	8 Windsor Road		1	E	69	65	70	66	70	65	70	66	0.8	0.8	0.8	0.8	60	55	YES	YES	YES
5	5_059	10 Windsor Road		G	E	67	62	68	63	67	63	68	64	0.8	0.9	0.8	0.8	60	55	YES	YES	YES
5	5_060	12 Windsor Road		G	E	67	63	68	64	68	64	68	64	0.7	0.7	0.6	0.6	60	55	YES	YES	YES
5	5_061	14-16 Windsor Road		G	E	68	63	69	64	68	64	69	65	0.8	0.8	0.8	0.8	60	55	YES	YES	YES
5	5_062	18-20 Windsor Road		G	E	67	63	68	63	67	63	68	64	0.8	0.8	0.8	0.8	60	55	YES	YES	YES
5	5_062	18-20 Windsor Road		1	E	69	65	70	65	70	65	70	66	0.7	0.7	0.8	0.7	60	55	YES	YES	YES
5	5_063	1 Arnold Avenue		G	S	64	60	65	61	65	61	66	62	1	1	1	1	60	55	YES	YES	YES

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				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
5	5_064	22 Windsor Road		G	E	66	62	67	62	66	62	67	63	0.5	0.4	0.4	0.4	60	55	YES	YES	YES
5	5_065	24 Windsor Road		G	E	69	64	69	65	69	65	69	65	0.3	0.3	0.3	0.3	60	55	YES	YES	YES
5	5_066	26 Windsor Road		G	E	67	62	67	63	67	63	67	63	0.1	0.1	0.1	0.1	60	55	YES	YES	YES
5	5_066	26 Windsor Road		1	E	70	65	70	65	70	66	70	66	0.2	0.1	0.1	0.1	60	55	YES	YES	YES
5	5_067	28 Windsor Road		G	E	67	63	67	63	67	63	67	63	0.1	0.1	0.1	0	60	55	YES	YES	YES
6	6_001	2 Hector Court		G	NE	59	55	60	56	60	56	61	57	0.7	0.7	0.8	0.7	60	55	NO	NO	NO
6	6_002	2A Hector Court		G	N	56	52	57	53	57	53	58	53	0.8	0.7	0.8	0.8	60	55	NO	NO	NO
6	6_003	2B Hector Court		G	N	55	51	56	51	56	51	56	52	0.7	0.7	0.7	0.7	60	55	NO	NO	NO
6	6_004a	Memorial Avenue	Kellyville Cricket Club (Outdoor)			61	56	61	56	61	56	61	56	0	0	0.1	0	60	-	-	-	NO
6	6_004b	Memorial Avenue	Kellyville Cricket Club (Building)	G	N	63	59	63	59	63	59	63	59	-0.1	0	-0.1	-0.1	-	-	-	-	NO
6	6_005	Memorial Avenue	Kellyville Cricket Club (Residence?)	G	N	69	65	68	64	70	66	69	65	-1	-1	-1	-1	60	55	YES	YES	YES
6	6_006	Lot 59B Windsor Road		G	E	69	64	70	65	69	65	70	66	0.8	0.8	0.8	0.8	60	55	YES	YES	YES
6	6_007	Windsor Road	Residence (Dilapidated)	G	E	65	61	66	61	66	61	66	62	0.2	0.2	0.2	0.2	60	55	YES	YES	NO
7	7_008	1 President Road		G	N	56	52	56	52	57	52	57	52	0	0	0	0	60	55	NO	NO	NO
7	7_009	1B President Road		G	W	61	56	61	56	61	57	61	57	0.1	0.1	0	0.1	60	55	NO	NO	NO
7	7_011	Lot 9 Windsor Road	Residence (Dilapidated)	G	W	67	62	67	62	67	63	67	63	0	-0.1	-0.1	-0.1	60	55	YES	YES	NO
7	7_012	3 Windsor Road	Repco	G	SW	68	63	68	63	68	64	68	64	-0.2	-0.2	-0.3	-0.3	-	-	-	-	NO
7	7_013	5 Windsor Road	Caltex	G	SW	71	66	70	66	71	67	71	67	-0.2	-0.2	-0.2	-0.2	-	-	-	-	NO
7	7_014	12 Benalla Ave		G	S	59	54	59	54	59	55	59	55	0	0	0	0	60	55	NO	NO	NO
7	7_015	14 Benalla Ave		G	W	60	55	60	55	60	56	60	56	0	0.1	0.1	0.1	60	55	NO	NO	NO
7	7_016	16 Benalla Ave		G	SW	59	55	59	55	59	55	60	55	0.1	0.1	0.1	0	60	55	NO	NO	NO
7	7_017	18 Benalla Ave		G	W	65	60	65	60	65	61	65	61	0	0	0	0.1	60	55	YES	YES	YES
7	7_018	20 Benalla Ave		G	SW	65	60	65	60	65	61	65	61	0.1	0.1	0.1	0	60	55	YES	YES	YES
7	7_019	22 Benalla Ave		G	SW	65	60	65	60	65	61	65	61	0.2	0.1	0.2	0.1	60	55	YES	YES	YES
7	7_020	24 Benalla Ave		G	SW	66	61	66	61	66	62	66	62	0.1	0.2	0.1	0.2	60	55	YES	YES	YES
7	7_021	26 Benalla Ave		G	SW	57	53	57	53	58	53	58	54	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
7	7_021	26 Benalla Ave		1	SW	62	57	62	57	62	58	62	58	0.2	0.2	0.2	0.3	60	55	NO	NO	NO
7	7_022	28 Benalla Ave		G	SW	58	54	58	54	59	54	59	54	0	0	0	0	60	55	NO	NO	NO
7	7_023	30 Benalla Ave		G	SW	59	55	59	55	60	55	60	56	0.2	0.2	0.2	0.3	60	55	NO	NO	NO
7	7_024	32 Benalla Ave		G	SW	59	55	60	55	60	55	60	56	0.2	0.1	0.1	0.2	60	55	NO	NO	NO
7	7_025	34 Benalla Ave		G	SW	59	54	59	54	59	55	59	55	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
7	7_026	36 Benalla Ave		G	W	65	61	65	61	65	61	66	62	0.3	0.2	0.3	0.2	60	55	YES	YES	YES
7	7_027	38 Benalla Ave		G	SW	65	60	65	60	65	61	65	61	0.2	0.2	0.2	0.2	60	55	YES	YES	YES
7	7_028	40 Benalla Ave		G	SW	65	60	65	60	65	61	65	61	0	0	0	0	60	55	YES	YES	YES
7	7_029	42 Benalla Ave		G	SW	65	60	65	60	65	61	65	61	0	0	0	0	60	55	YES	YES	YES
7	7_030	44 Benalla Ave		G	W	58	53	58	54	58	54	58	54	0.2	0.1	0.1	0.2	60	55	NO	NO	NO
7	7_031	46 Benalla Ave		G	W	57	52	57	52	57	53	57	53	0	-0.1	0	0	60	55	NO	NO	NO
7	7_031	46 Benalla Ave		1	S	60	56	60	56	60	56	61	56	0.1	0.2	0.2	0.2	60	55	NO	NO	NO
7	7_032	48 Benalla Ave		G	SW	56	51	55	51	56	52	56	52	-0.1	0	-0.1	-0.1	60	55	NO	NO	NO
7	7_033	50 Benalla Ave		G	N	55	50	54	50	55	51	55	51	-0.1	-0.1	-0.1	-0.1	60	55	NO	NO	NO
7	7_033	50 Benalla Ave		1	W	58	53	58	54	58	54	58	54	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
7	7_034	Lot 1 Old Windsor Road		G	W	67	62	67	62	67	63	67	63	0	-0.1	-0.1	-0.1	60	55	YES	YES	YES
7	7_034	Lot 1 Old Windsor Road		1	W	70	65	69	65	70	66	70	65	-0.1	-0.1	-0.1	-0.2	60	55	YES	YES	YES
7	7_035	10 Hart Place		G	W	57	53	57	52	57	53	57	53	-0.1	-0.1	0	0	60	55	NO	NO	NO

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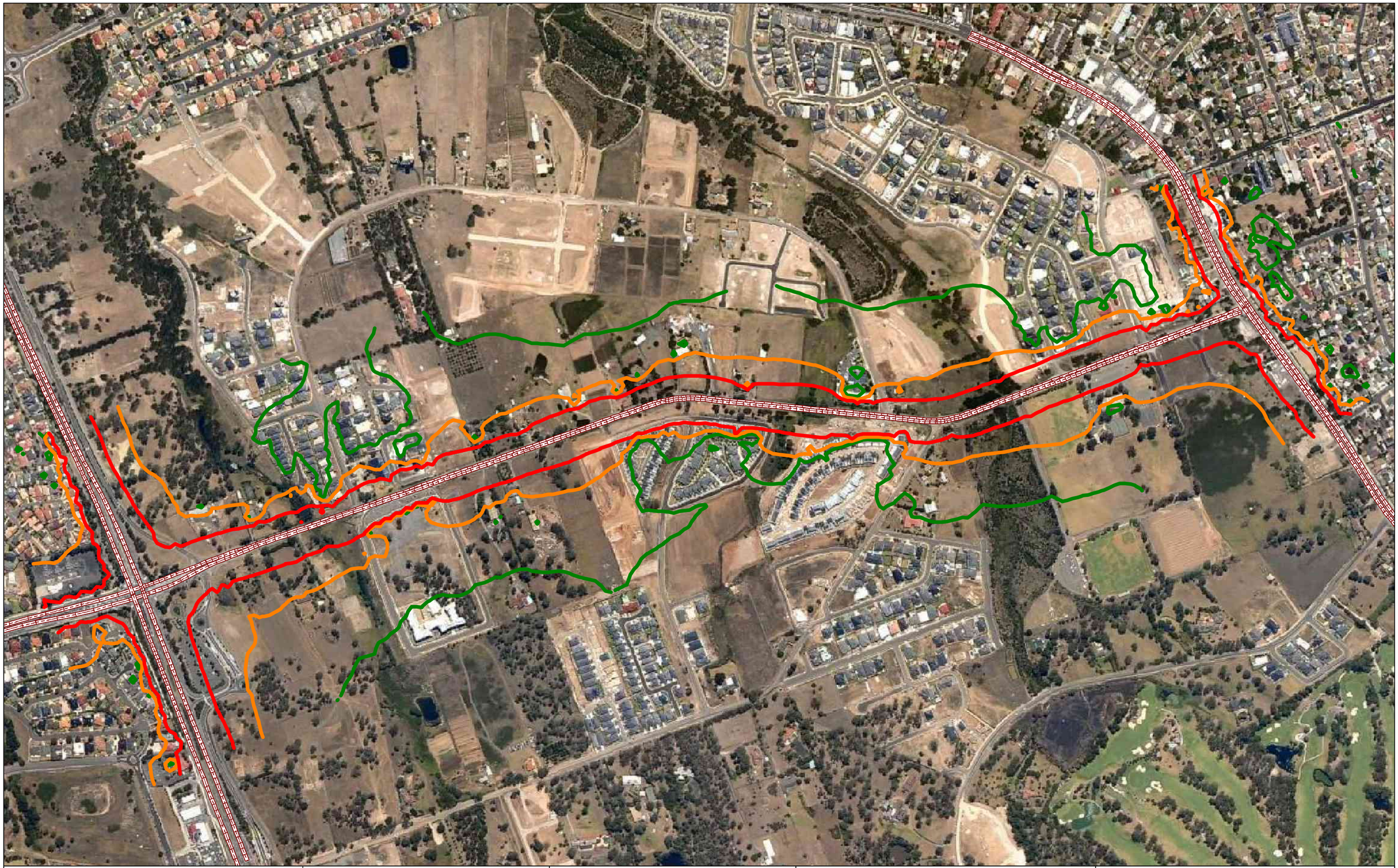
						No Build		Build		No Build		Build		2019		2029						
				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
7	7_036	12 Hart Place		G	W	59	55	59	55	59	55	59	55	0	0	0	-0.1	60	55	NO	NO	NO
7	7_037	16 Hart Place		G	W	65	61	65	60	66	61	65	61	-0.2	-0.1	-0.1	-0.1	60	55	YES	YES	YES
7	7_038	17 Hart Place		G	W	61	57	61	57	62	58	62	57	-0.1	-0.1	-0.1	-0.1	60	55	NO	NO	NO
7	7_039	18 Hart Place		G	SW	65	61	65	61	66	61	66	61	-0.1	-0.1	-0.2	-0.1	60	55	YES	YES	YES
7	7_040	20 Hart Place		G	SW	67	62	67	62	67	63	67	63	-0.1	-0.1	-0.1	-0.1	60	55	YES	YES	YES
7	7_041	22 Hart Place		G	SW	61	57	61	57	62	57	62	57	0	0	0	-0.1	60	55	NO	NO	NO
7	7_042	2 Wrights Road		G	SW	64	59	64	59	64	60	64	60	-0.1	-0.1	-0.1	-0.1	60	55	NO	YES	YES
7	7_042	2 Wrights Road		1	SW	69	65	69	65	70	65	69	65	-0.1	-0.1	-0.1	-0.1	60	55	YES	YES	YES
7	7_043	4 Wrights Road		G	SE	60	55	60	55	60	56	60	56	0	0	0	0	60	55	NO	NO	NO
7	7_044	6 Wrights Road		G	SW	59	54	59	54	59	55	59	55	0	-0.1	0	0	60	55	NO	NO	NO
7	7_045a	3-5 President Road	Kellyville Preschool Kindergarten			55	50	55	50	56	50	56	50	0	0	0	0	55	-	-	-	NO
7	7_045b	3-5 President Road	Kellyville Preschool Kindergarten	G	W	57	52	56	52	57	53	57	53	-0.1	0	0	-0.1	45	-	NO	-	NO
8	8_010	36 Kentwell Crescent		G	NE	58	53	58	53	58	54	58	54	0	0	0	0	60	55	NO	NO	NO
8	8_014	43 Kentwell Crescent		G	E	63	59	63	59	64	59	64	59	0	0	0	0	60	55	NO	NO	NO
8	8_015	49 Kentwell Crescent		G	NE	63	59	63	59	63	59	63	59	0	0	0	0.1	60	55	NO	NO	NO
8	8_016	45 Kentwell Crescent		G	E	63	59	63	59	64	59	64	59	0	0	0	0	60	55	NO	NO	NO
8	8_016	45 Kentwell Crescent		1	E	70	66	70	66	70	66	70	66	0	0	0	0	60	55	YES	YES	YES
8	8_017	47 Kentwell Crescent		G	E	63	59	63	59	63	59	63	59	0	0	0	0	60	55	NO	NO	NO
8	8_017	47 Kentwell Crescent		1	E	71	66	71	66	71	67	71	67	0	0	0.1	0	60	55	YES	YES	YES
8	8_018	51 Kentwell Crescent		G	S	59	55	59	55	60	55	60	55	0	0	0	0.1	60	55	NO	NO	NO
8	8_019	53 Kentwell Crescent		G	N	57	53	57	53	57	53	57	53	0	0	0	0	60	55	NO	NO	NO
8	8_020	55 Kentwell Crescent		G	N	56	51	56	51	56	52	56	52	0	0	0	0	60	55	NO	NO	NO
8	8_020	55 Kentwell Crescent		1	E	61	57	61	57	61	57	61	57	0	0	0	0	60	55	NO	NO	NO
8	8_022	6 Meldon Place		G	SE	57	53	57	53	57	53	57	53	0	-0.1	0	0	60	55	NO	NO	NO
8	8_023	8 Meldon Place		G	E	57	52	57	52	57	53	57	53	0	0	0	0	60	55	NO	NO	NO
8	8_024	9 Meldon Place		G	S	57	53	57	53	57	53	57	53	0	0	0	0	60	55	NO	NO	NO
8	8_025	10 Meldon Place		G	E	57	53	57	53	58	53	58	53	0	0	0	0	60	55	NO	NO	NO
8	8_026	11 Meldon Place		G	S	57	53	57	53	57	53	57	53	0	0	0	0	60	55	NO	NO	NO
8	8_026	11 Meldon Place		1	S	61	57	61	57	61	57	61	57	0.1	0	0	0.1	60	55	NO	NO	NO
8	8_027	12 Meldon Place		G	SW	57	53	57	53	58	53	58	53	0	0	0	0	60	55	NO	NO	NO
8	8_028	13 Meldon Place		G	S	57	53	57	53	58	53	58	53	0	0	0	0	60	55	NO	NO	NO
8	8_028	13 Meldon Place		1	S	62	58	62	58	62	58	62	58	0	0	0	0	60	55	NO	NO	NO
8	8_029	14 Meldon Place		G	S	58	54	58	54	59	55	59	55	0	-0.1	0.1	0	60	55	NO	NO	NO
8	8_029	14 Meldon Place		1	S	60	56	60	56	61	57	61	57	0	0	0	0	60	55	NO	NO	NO
8	8_030	15 Meldon Place		G	E	62	58	62	58	62	58	62	58	0	0.1	0.1	0.1	60	55	NO	NO	NO
8	8_030	15 Meldon Place		1	E	68	63	68	64	68	64	68	64	0.2	0.2	0.1	0.2	60	55	YES	YES	YES
8	8_031	16 Meldon Place		G	S	59	54	59	54	59	55	59	55	0	-0.1	0	-0.1	60	55	NO	NO	NO
8	8_031	16 Meldon Place		1	S	61	57	61	57	61	57	61	57	0	-0.1	0	0	60	55	NO	NO	NO
8	8_032	17 Meldon Place		G	E	62	58	62	58	62	58	62	58	0	0	0.1	0.1	60	55	NO	NO	NO
8	8_033	19 Meldon Place		G	N	61	57	62	57	62	58	62	58	0.1	0	0.1	0	60	55	NO	NO	NO
8	8_034	21 Meldon Place		G	E	60	56	60	56	61	56	61	57	0	0	0	0.1	60	55	NO	NO	NO
8	8_035	23 Meldon Place		G	E	61	57	61	57	62	57	62	57	0	0	0	0.1	60	55	NO	NO	NO
8	8_036	25 Meldon Place		G	E	61	57	62	57	62	58	62	58	0.1	0	0.1	0	60	55	NO	NO	NO
8	8_037	27 Meldon Place		G	NE	62	57	62	57	62	58	62	58	0	0	0.1	0	60	55	NO	NO	NO

NCA	NCA ID	Receiver Address	Receiver Description	Facade		Opening Year 2019				Design Year 2029				Increase (Build - No Build)				RNP External Noise Criteria		Exposed to Acute Noise Levels		Consider further treatment?
						No Build		Build		No Build		Build		2019		2029						
				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
8	8_037	27 Meldon Place		1	NE	67	63	67	63	67	63	67	63	0.1	0.1	0.1	0.1	60	55	YES	YES	YES
8	8_038	29 Meldon Place		G	SE	60	56	60	56	60	56	60	56	0	0	0	0	60	55	NO	NO	NO
8	8_038	29 Meldon Place		1	NE	65	60	65	60	65	61	65	61	0	0	0	0.1	60	55	YES	YES	YES
8	8_039	1 Carolyn Court	Post 2008 Development (Residence)	G	N	63	58	63	58	63	59	63	59	-0.1	-0.1	0	0.1	60	55	NO	NO	NO
8	8_039	1 Carolyn Court	Post 2008 Development (Residence)	1	N	67	63	67	63	68	63	68	63	0	0	0.1	0	60	55	YES	YES	NO
8	8_040	3 Carolyn Court	Post 2008 Development (Residence)	G	N	62	58	62	58	63	58	63	58	-0.1	-0.1	0.1	0	60	55	NO	NO	NO
8	8_040	3 Carolyn Court	Post 2008 Development (Residence)	1	N	66	62	66	62	67	63	67	63	0	0	0.1	0.1	60	55	YES	YES	NO
8	8_041	15 Carolyn Court		G	N	62	58	62	58	63	59	63	59	0	0	0.1	0	60	55	NO	NO	NO
8	8_041	15 Carolyn Court		1	NE	70	66	70	66	71	66	71	66	0.1	0.1	0.1	0.1	60	55	YES	YES	YES
8	8_042	2 Jakob Way		G	NW	60	55	60	55	60	56	60	56	-0.1	-0.1	0.1	0.1	60	55	NO	NO	NO
8	8_042	2 Jakob Way		1	NW	63	58	62	58	63	59	63	59	-0.1	-0.1	0	0	60	55	NO	NO	NO
8	8_043	3 Jakob Way		G	E	63	58	63	58	63	59	63	59	0	0.1	0	0.1	60	55	NO	NO	NO
8	8_043	3 Jakob Way		1	E	68	64	68	64	69	64	69	64	0.1	0	0.1	0	60	55	YES	YES	YES
8	8_044	4 Jakob Way		G	NE	58	54	58	54	59	54	59	54	-0.1	-0.1	0	0.1	60	55	NO	NO	NO
8	8_044	4 Jakob Way		1	NE	61	57	61	57	62	57	62	57	0	0	0	0	60	55	NO	NO	NO
8	8_045	5 Jakob Way		G	NE	62	58	62	58	63	58	63	58	0	0.1	0.1	0	60	55	NO	NO	NO
8	8_045	5 Jakob Way		1	NE	68	64	69	64	69	64	69	64	0.1	0.1	0.1	0	60	55	YES	YES	YES
8	8_046	7 Jakob Way		G	E	62	58	62	58	63	58	63	58	0	0.1	0.1	0.1	60	55	NO	NO	NO
8	8_046	7 Jakob Way		1	E	68	64	68	64	69	64	69	64	0.1	0.1	0	0.1	60	55	YES	YES	YES
8	8_047	3 Rory Court		G	NE	58	54	58	54	58	54	58	54	0	0	0	0	60	55	NO	NO	NO
8	8_047	3 Rory Court		1	NE	61	57	61	57	61	57	61	57	0	0	0	0	60	55	NO	NO	NO
8	8_047	3 Rory Court		G	NE	58	54	58	54	58	54	58	54	0	0	0	0	60	55	NO	NO	NO
8	8_047	3 Rory Court		1	NE	61	57	61	57	61	57	61	57	0	-0.1	0	0	60	55	NO	NO	NO
8	8_048	4 Rory Court		G	NW	57	53	57	53	57	53	57	53	-0.1	-0.1	0.1	0	60	55	NO	NO	NO
8	8_048	4 Rory Court		1	NW	60	55	60	55	60	56	60	56	0	0	0.1	0	60	55	NO	NO	NO
8	8_049	6 Rory Court		G	SE	58	53	58	53	58	54	58	54	0	0	0	0	60	55	NO	NO	NO
8	8_049	6 Rory Court		1	NE	61	57	61	57	62	57	62	57	0	0	0	0.1	60	55	NO	NO	NO
8	8_050	8 Rory Court		G	E	64	59	64	59	64	59	64	59	0	0.1	0.1	0.1	60	55	NO	NO	NO
8	8_050	8 Rory Court		1	E	69	64	69	64	69	65	69	65	0.1	0.1	0.1	0.2	60	55	YES	YES	YES
8	8_051	10 Rory Court		G	E	62	58	62	58	62	58	62	58	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
8	8_051	10 Rory Court		1	E	70	66	70	66	71	66	71	66	0.2	0.1	0.2	0.2	60	55	YES	YES	YES
8	8_052	12 Rory Court		G	NE	62	58	62	58	62	58	62	58	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
8	8_052	12 Rory Court		1	NE	70	65	70	66	70	66	70	66	0.2	0.2	0.1	0.1	60	55	YES	YES	YES
8	8_053a	6 Rothwell Circuit	Fit Kidz Day Care Centre			63	57	63	58	63	58	63	58	0.1	0.2	0.1	0.2	55	-	-	-	NO
8	8_053b	6 Rothwell Circuit	Fit Kidz Day Care Centre	G	E	62	58	62	58	63	58	63	58	0.1	0.1	0.1	0.1	45	-	NO	-	NO
8	8_054	8 Rothwell Circuit		G	E	62	58	62	58	62	58	62	58	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
8	8_055	10 Rothwell Circuit		G	E	63	59	63	59	63	59	63	59	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
8	8_055	10 Rothwell Circuit		1	E	68	64	68	64	69	64	69	64	0.1	0.1	0.1	0.1	60	55	YES	YES	YES
8	8_056	12 Rothwell Circuit		G	S	62	58	62	58	62	58	63	58	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
8	8_056	12 Rothwell Circuit		1	E	72	67	72	67	72	67	72	68	0.2	0.2	0.2	0.2	60	55	YES	YES	YES
8	8_057	14 Rothwell Circuit		G	SE	59	54	59	54	59	55	59	55	0.1	0	0	0	60	55	NO	NO	NO
8	8_057	14 Rothwell Circuit		1	SE	63	58	63	58	63	59	63	59	0	0	0.1	0	60	55	NO	NO	NO
8	8_058	16 Rothwell Circuit		G	NE	56	52	56	52	57	52	57	52	0	0	0	0.1	60	55	NO	NO	NO
8	8_058	16 Rothwell Circuit		1	NE	60	56	60	56	61	56	61	56	0	0	0	0	60	55	NO	NO	NO
8	8_059	16A Rothwell Circuit		G	NE	64	60	64	60	65	60	65	60	0.1	0.1	0.1	0.1	60	55	YES	YES	YES
8	8_059	16A Rothwell Circuit		1	NE	71	66	71	67	71	67	71	67	0.1	0.2	0.1	0.2	60	55	YES	YES	YES

NCA	NCA ID	Receiver Address	Receiver Description	Facade		Opening Year 2019				Design Year 2029				Increase (Build - No Build)				RNP External Noise Criteria		Exposed to Acute Noise Levels		Consider further treatment?
						No Build		Build		No Build		Build		2019		2029						
				Floor	Orientation	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	DAY	NIGHT	
						dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB	dB	dB	dB	dB(A)	dB(A)	≥ 65dB LAeq,15h	≥ 60dB LAeq,9h	
8	8_060	18 Rothwell Circuit		G	NE	56	51	56	51	56	51	56	51	0	0	0	0	60	55	NO	NO	NO
8	8_060	18 Rothwell Circuit		1	NE	59	55	59	55	60	55	60	55	0	0	0	0.1	60	55	NO	NO	NO
8	8_061	18A Rothwell Circuit		G	NE	63	59	63	59	63	59	63	59	0.1	0.1	0	0.1	60	55	NO	NO	NO
8	8_061	18A Rothwell Circuit		1	NE	70	65	70	66	70	66	70	66	0.1	0.2	0.1	0.2	60	55	YES	YES	YES
8	8_062	20 Rothwell Circuit		G	NE	58	53	58	53	58	53	58	54	0.1	0	0	0.1	60	55	NO	NO	NO
8	8_062	20 Rothwell Circuit		1	NE	61	57	61	57	61	57	61	57	0.1	0	0	0	60	55	NO	NO	NO
8	8_063	22 Rothwell Circuit		G	NE	64	60	64	60	64	60	64	60	0.1	0	0.1	0.1	60	55	NO	YES	YES
8	8_063	22 Rothwell Circuit		1	NE	71	66	71	66	71	66	71	67	0.2	0.2	0.1	0.1	60	55	YES	YES	YES
8	8_064	24 Rothwell Circuit		G	NE	63	59	64	59	64	59	64	59	0.1	0.1	0.1	0.1	60	55	NO	NO	NO
8	8_064	24 Rothwell Circuit		1	NE	70	65	70	65	70	65	70	66	0.2	0.1	0.1	0.1	60	55	YES	YES	YES
8	8_065	26 Rothwell Circuit		G	NE	57	53	57	53	57	53	57	53	0	0	0	0	60	55	NO	NO	NO
8	8_065	26 Rothwell Circuit		1	NE	60	56	60	56	61	56	61	56	-0.1	0	0	-0.1	60	55	NO	NO	NO
8	8_066	Lot 4 1190 Old Windsor Road	Outback Steakhouse	G	E	69	65	69	65	70	65	70	65	0	0.1	0	0	-	-	-	-	NO

APPENDIX D Noise Contours



Legend:

Road

Noise level dB(A)

= 55
= 60
= 65

Consultant:

RENZO TONIN & ASSOCIATES
inspired to achieve
Acoustics, Vibration & Structural Dynamics
Sydney Melbourne Brisbane Gold Coast Kuwait
1/418A Elizabeth Street, SURRY HILLS NSW 2010
P: 02 8218 0500 F: 02 8218 0501

Client:

Hyder

Project:

MEMORIAL AVENUE UPGRADE
OLD WINDSOR ROAD TO WINDSOR ROAD

Description:

DESIGN YEAR (2029)
'NO BUILD' SCENARIO
LAeq,15h DAY TIME
1.5M NOISE CONTOUR

Noise levels are approximate due to interpolation of contours and should b used for reference only.
For information only and not for construction.

Project No.:	TG582-01	Created by:	RP
Fig Ref:	TG582-01.5.2.4.3.P02 (r2)	Grid:	13_C1
Date:	2014.10.14	Scale:	1: 6800 A3

Legend:

Road

Noise level dB(A)

= 50
= 55
= 60

Consultant:

RENZO TONIN & ASSOCIATES
inspired to achieve
Acoustics, Vibration & Structural Dynamics
Sydney Melbourne Brisbane Gold Coast Kuwait
1/418A Elizabeth Street, SURRY HILLS NSW 2010
P: 02 8218 0500 F: 02 8218 0501

Client:

Hyder

Project:

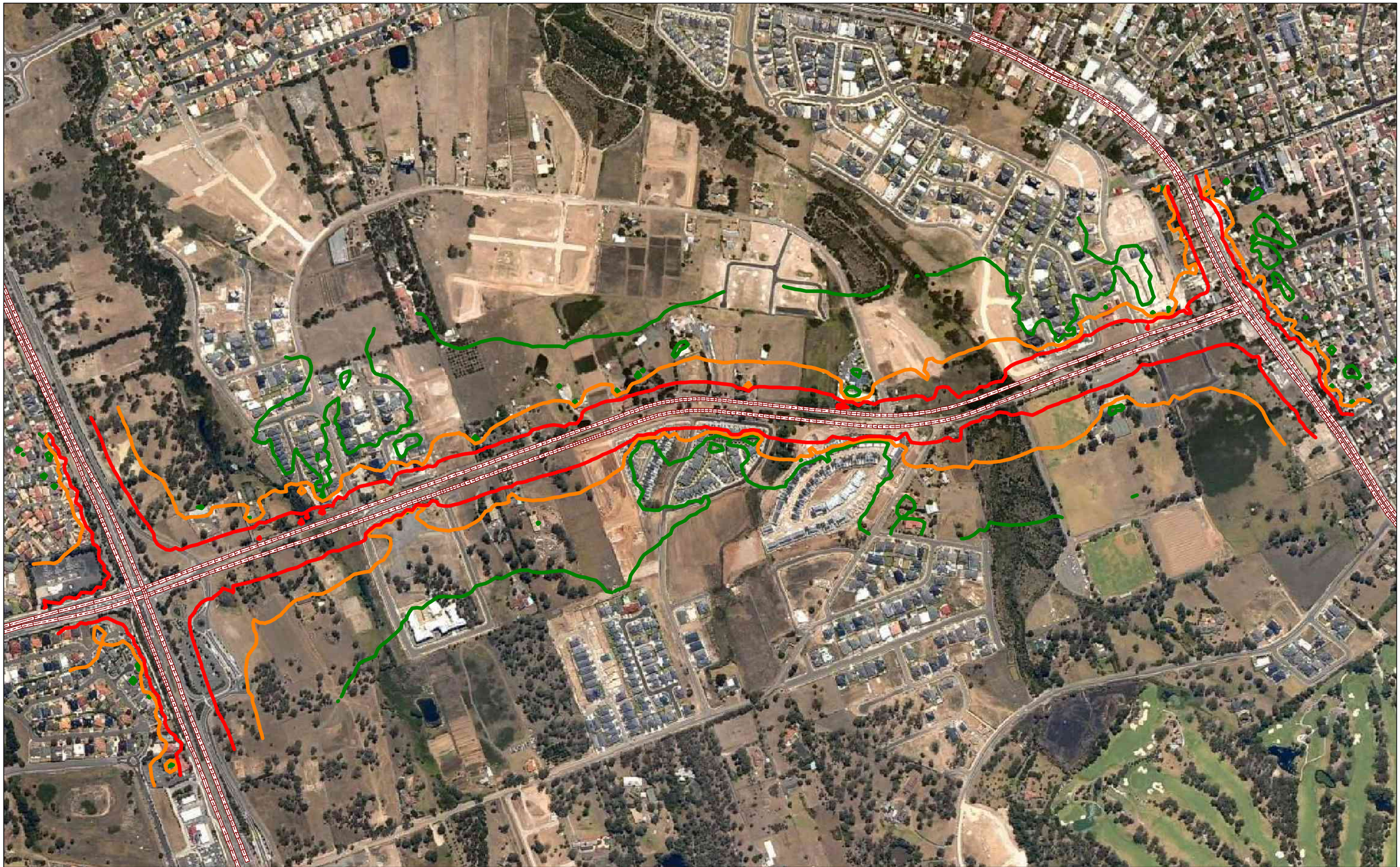
MEMORIAL AVENUE UPGRADE
OLD WINDSOR ROAD TO WINDSOR ROAD

Description:

DESIGN YEAR (2029)
'NO BUILD' SCENARIO
LAeq,9h NIGHT TIME
1.5M NOISE CONTOUR

Noise levels are approximate due to interpolation of contours and should b used for reference only.
For information only and not for construction.

Project No.:	TG582-01	Created by:	RP
Fig Ref:	TG582-01.5.2.4.3.P03 (r2)	Grid:	14_C1
Date:	2014.10.14	Scale:	1: 6800 A3



Legend:

Road

Noise level dB(A)

= 55
= 60
= 65

Consultant:

RENZO TONIN & ASSOCIATES
inspired to achieve
Acoustics, Vibration & Structural Dynamics
Sydney Melbourne Brisbane Gold Coast Kuwait
1/418A Elizabeth Street, SURRY HILLS NSW 2010
P: 02 8218 0500 F: 02 8218 0501

Client:

Hyder

Project:

MEMORIAL AVENUE UPGRADE
OLD WINDSOR ROAD TO WINDSOR ROAD

Description:

DESIGN YEAR (2029)
'BUILD' SCENARIO
LAeq,15h DAY TIME
1.5M NOISE CONTOUR

Noise levels are approximate due to interpolation of contours and should t used for reference only.
For information only and not for construction.

Project No.:	TG582-01	Created by:	RP
Fig Ref:	TG582-01.5.2.4.3.P04 (r2)	Grid:	15_C1
Date:	2014.10.14	Scale:	1: 6800 A3

Legend:

Road

Noise level dB(A)

= 50
= 55
= 60

Consultant:

RENZO TONIN & ASSOCIATES
inspired to achieve
Acoustics, Vibration & Structural Dynamics
Sydney Melbourne Brisbane Gold Coast Kuwait
1/418A Elizabeth Street, SURRY HILLS NSW 2010
P: 02 8218 0500 F: 02 8218 0501

Client:

Hyder

Project:

MEMORIAL AVENUE UPGRADE
OLD WINDSOR ROAD TO WINDSOR ROAD

Description:

DESIGN YEAR (2029)
'BUILD' SCENARIO
LAeq,9h NIGHT TIME
1.5M NOISE CONTOUR

Noise levels are approximate due to interpolation of contours and should b used for reference only.
For information only and not for construction.

Project No.:	TG582-01	Created by:	RP
Fig Ref:	TG582-01.5.2.4.3.P05 (r2)	Grid:	16_C1
Date:	2014.10.14	Scale:	1: 6800 A3

APPENDIX E Receivers Considered for Further Treatment

Legend:

Building
Receiver

Consider Further Treatment

YES

Consultant:

RENZO TONIN & ASSOCIATES
inspired to achieve
Acoustics, Vibration & Structural Dynamics
Sydney Melbourne Brisbane Gold Coast Kuwait
1/418A Elizabeth Street, SURRY HILLS NSW 2010
P: 02 8218 0500 F: 02 8218 0501

Client:

Hyder

Project:

MEMORIAL AVENUE UPGRADE
OLD WINDSOR ROAD TO WINDSOR ROAD

Description:

RECEIVERS TO BE CONSIDERED
FOR FURTHER TREATMENT

Noise levels are approximate due to interpolation of contours and should be used for reference only.
For information only and not for construction.

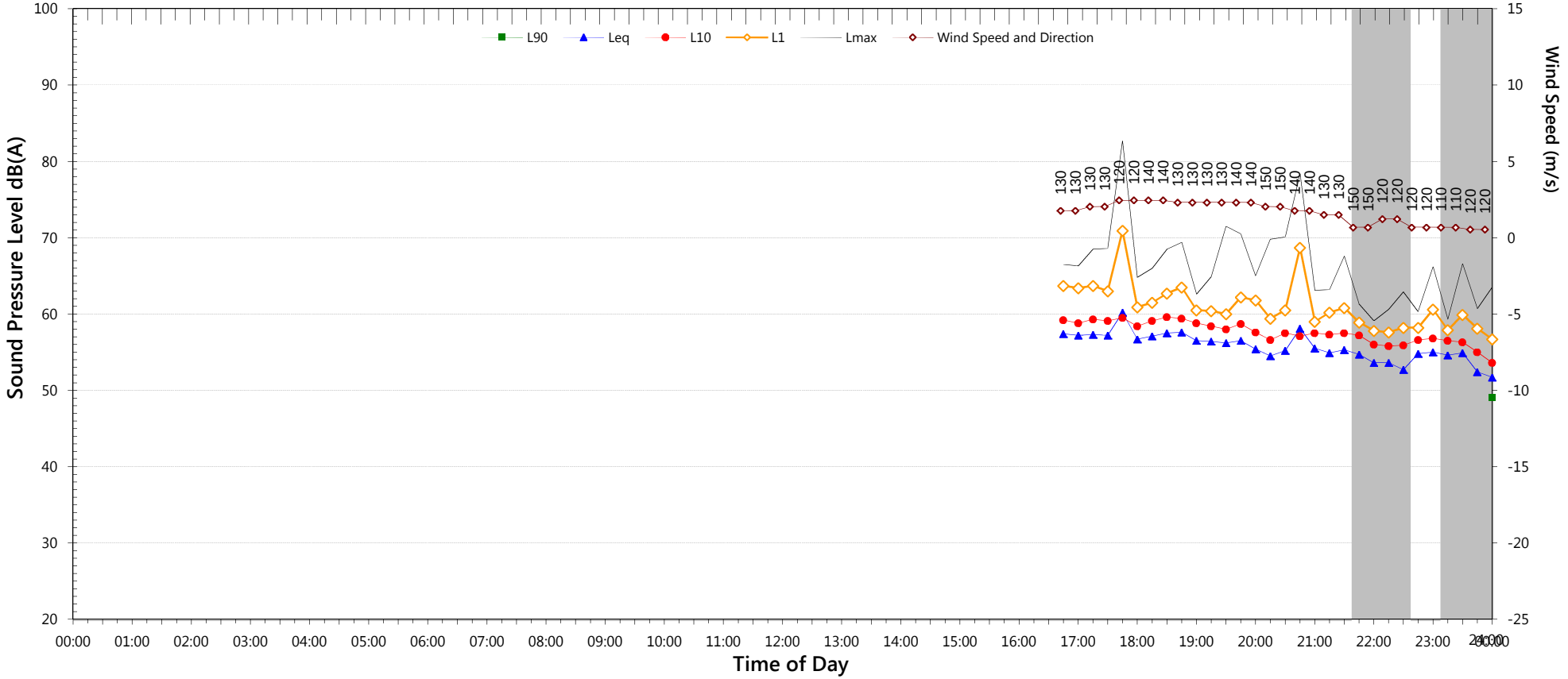
Project No.:	TG582-01	Created by:	RP
Fig Ref:	TG582-01.5.2.4.3.P01 (r3)	Grid:	-
Date:	2014.10.14	Scale:	1: 6800 A3

APPENDIX F Measured Noise Data

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Tuesday, 11 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	51.2	-
Leq	-	56.3	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

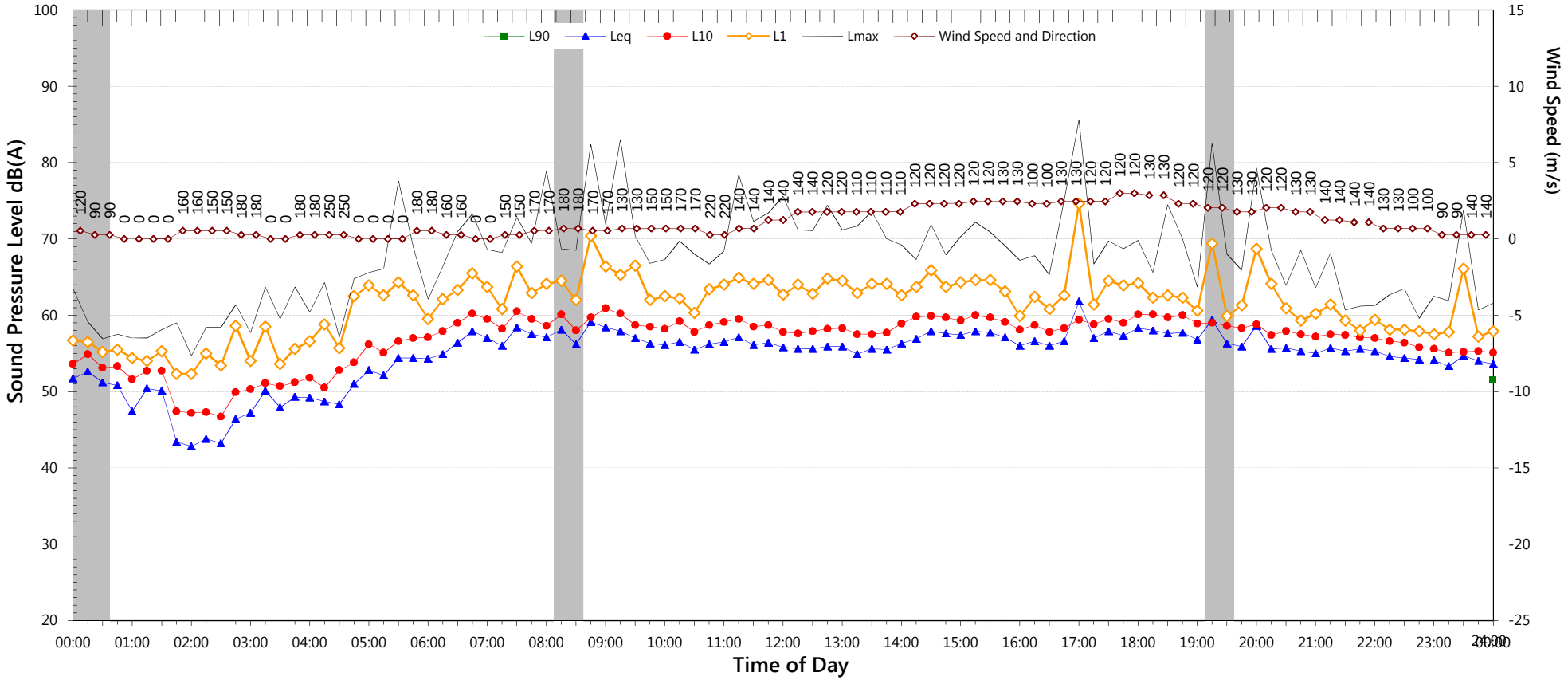
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.3	54.9
$L_{eq\ 1hr}$ upper 10 percentile	60.6	59.2
$L_{eq\ 1hr}$ lower 10 percentile	57.6	48.0

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	65.6	to	77.6
Lmax - Leq (Range)	15.0	to	23.7

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Wednesday, 12 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	50.2	50.9	39.4
Leq	57.1	56.5	53.0

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

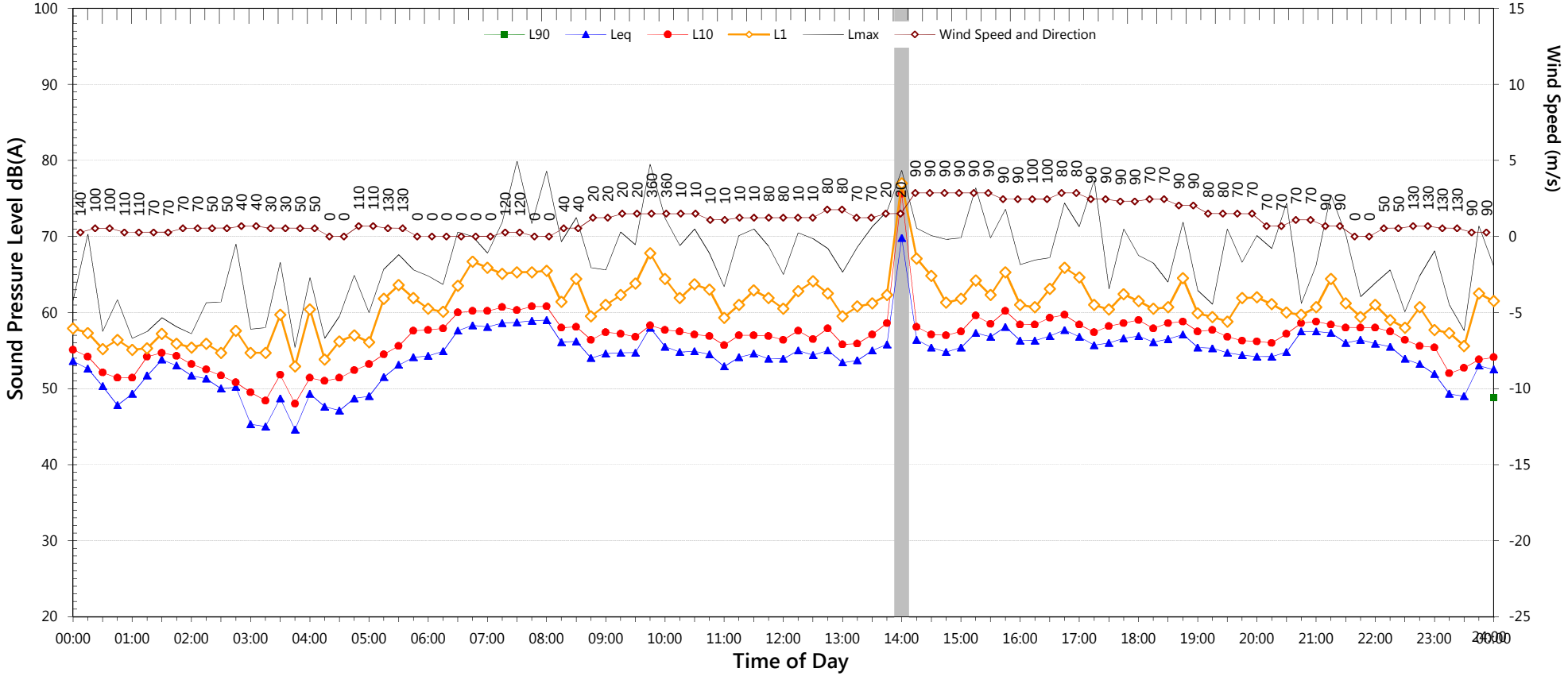
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.4	55.5
$L_{eq\ 1hr}$ upper 10 percentile	61.1	59.9
$L_{eq\ 1hr}$ lower 10 percentile	57.9	49.9

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	66.6	to	73.8
Lmax - Leq (Range)	16.7	to	19.9

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Thursday, 13 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	48.8	48.3	-
Leq	56.1	56.0	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

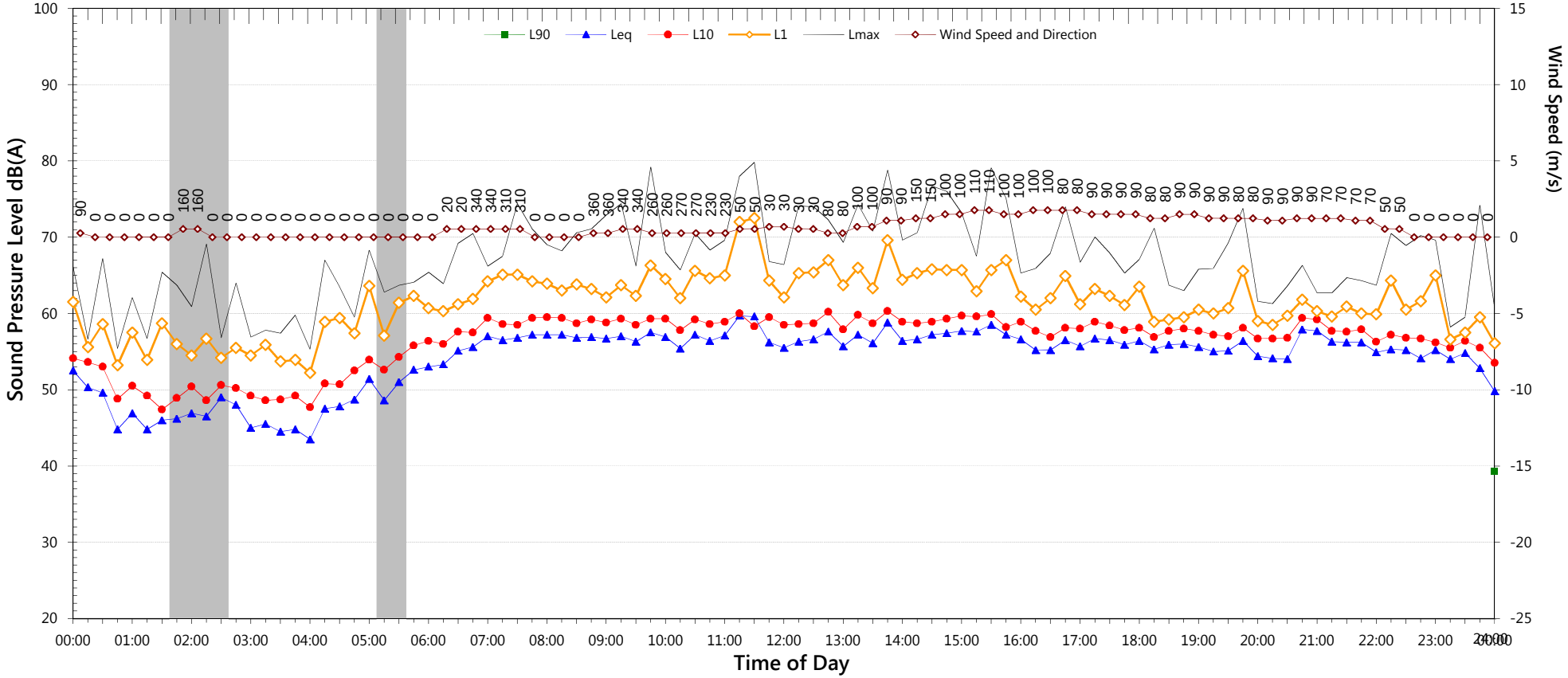
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	58.5	53.9
$L_{eq\ 1hr}$ upper 10 percentile	60.6	57.9
$L_{eq\ 1hr}$ lower 10 percentile	56.7	47.1

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	65.4	to	71.4
Lmax - Leq (Range)	15.1	to	20.1

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Friday, 14 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	50.8	49.0	-
Leq	57.0	55.8	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

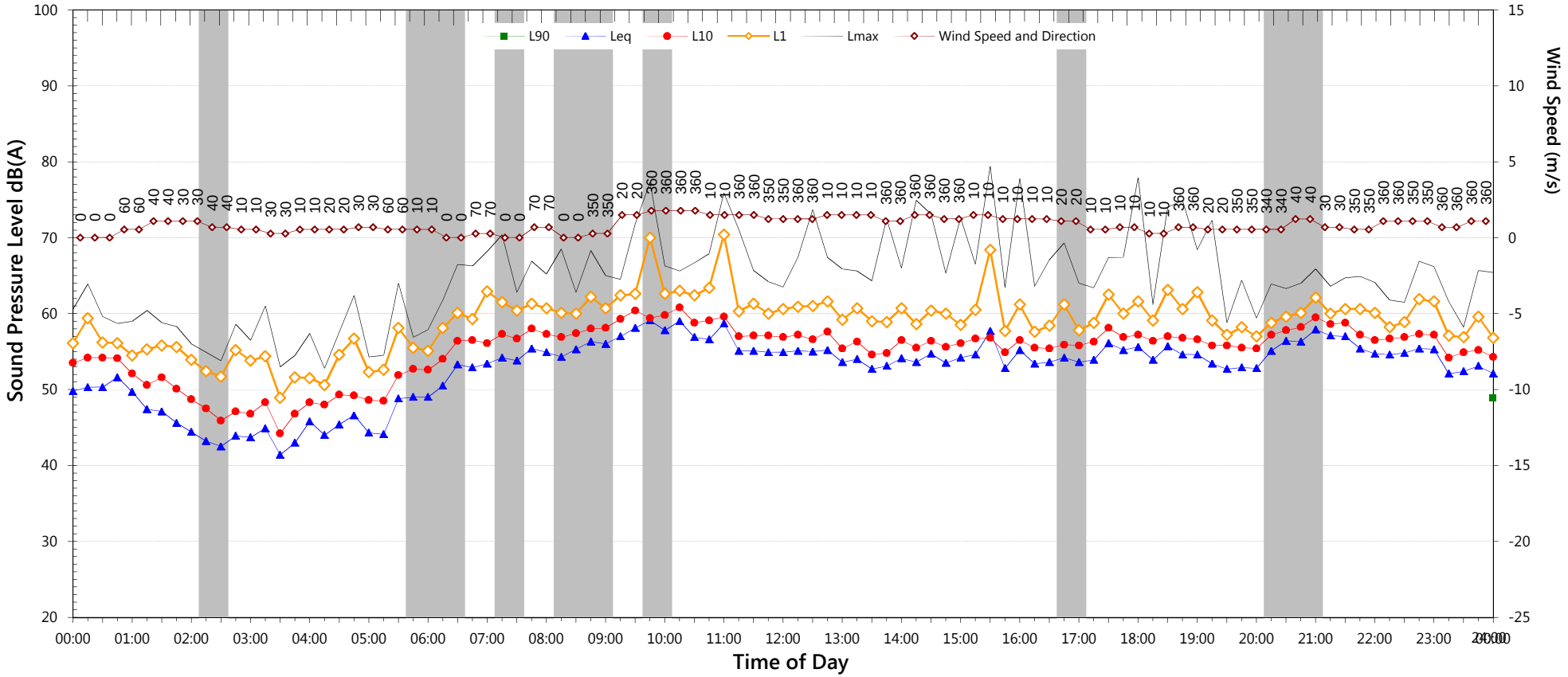
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.2	53.2
$L_{eq\ 1hr}$ upper 10 percentile	60.4	57.5
$L_{eq\ 1hr}$ lower 10 percentile	58.0	46.3

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	68.2	to	74.2
Lmax - Leq (Range)	15.0	to	21.0

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Saturday, 15 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

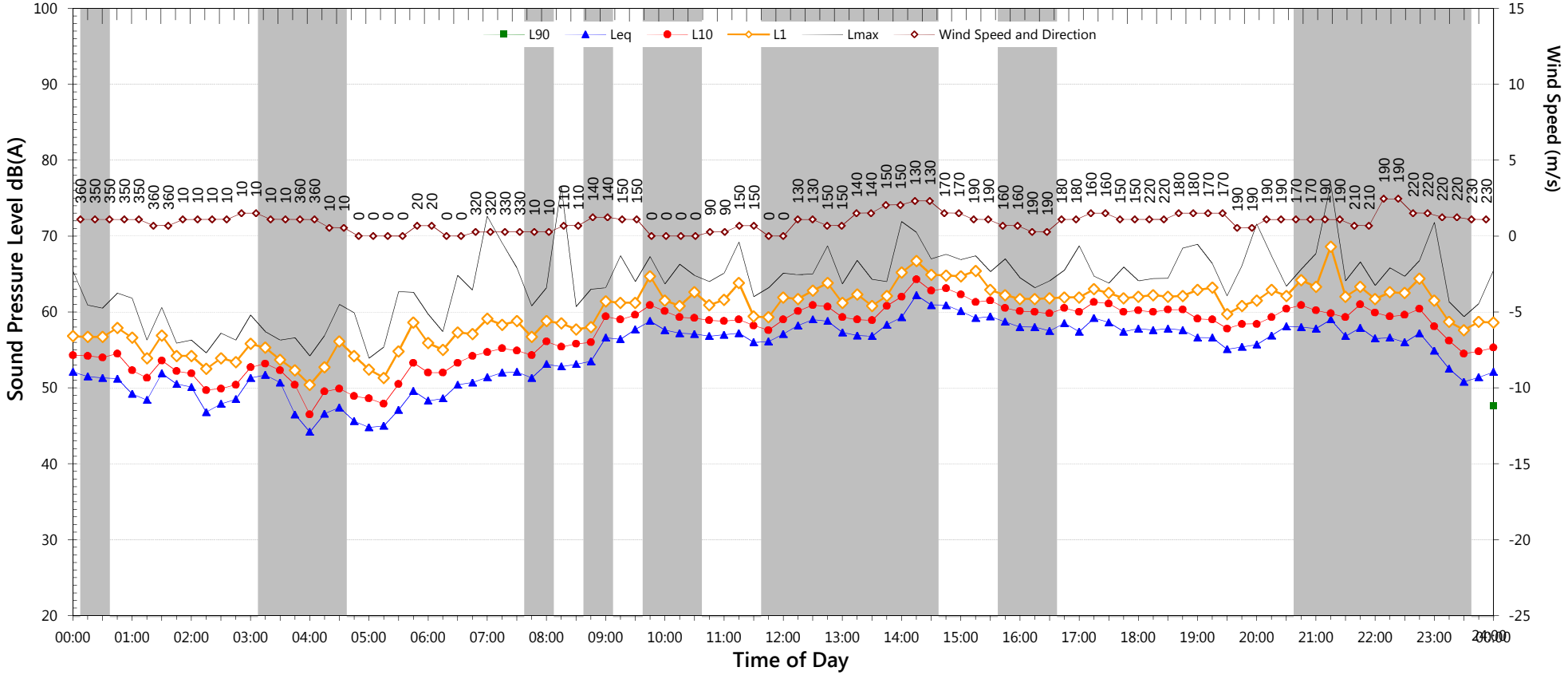
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	57.8	53.8
$L_{eq\ 1hr}$ upper 10 percentile	60.3	57.5
$L_{eq\ 1hr}$ lower 10 percentile	55.6	47.7

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	72.6	to	72.6
Lmax - Leq (Range)	22.2	to	22.2

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Sunday, 16 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

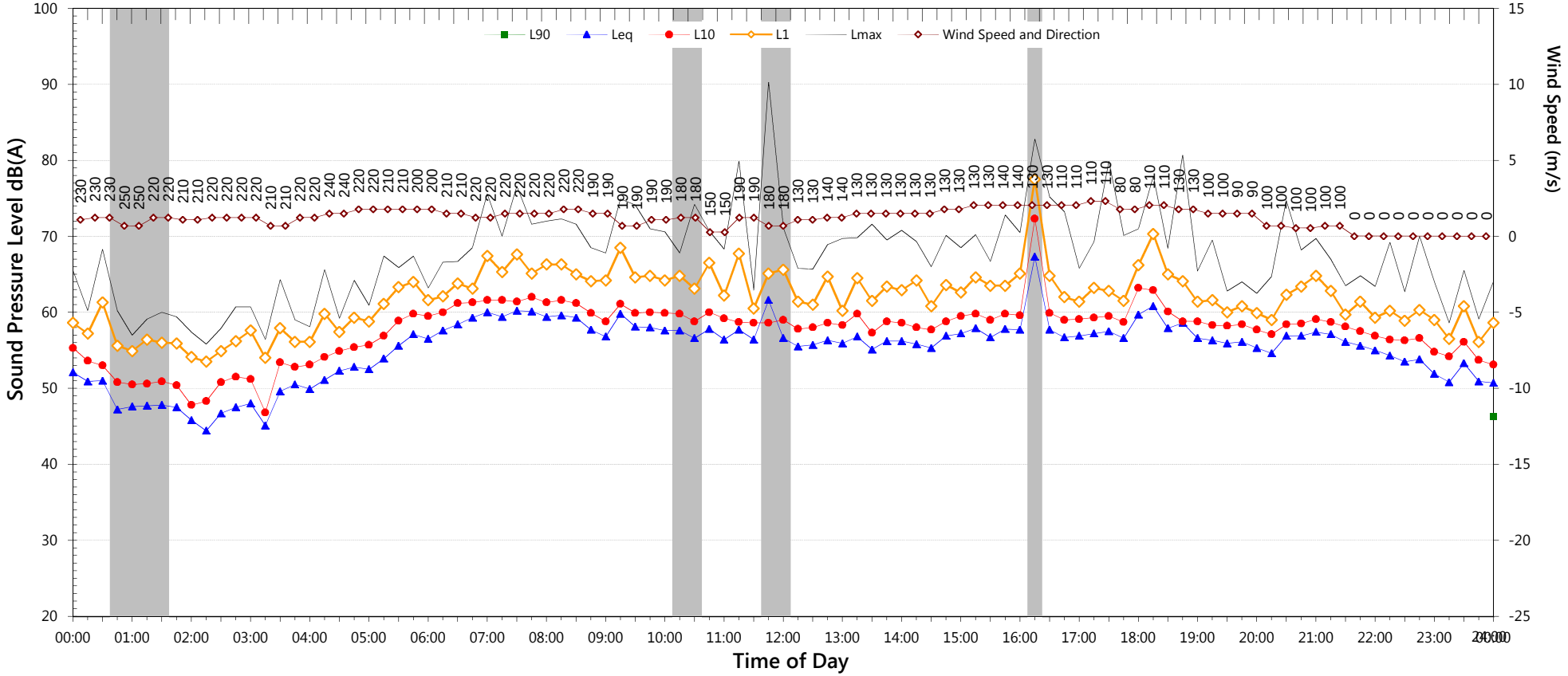
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.9	56.5
$L_{eq\ 1hr}$ upper 10 percentile	62.8	61.4
$L_{eq\ 1hr}$ lower 10 percentile	54.7	49.2

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	68.3	to	75.6
Lmax - Leq (Range)	15.1	to	17.3

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Monday, 17 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	49.8	50.2	40.0
Leq	57.7	57.0	52.5

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

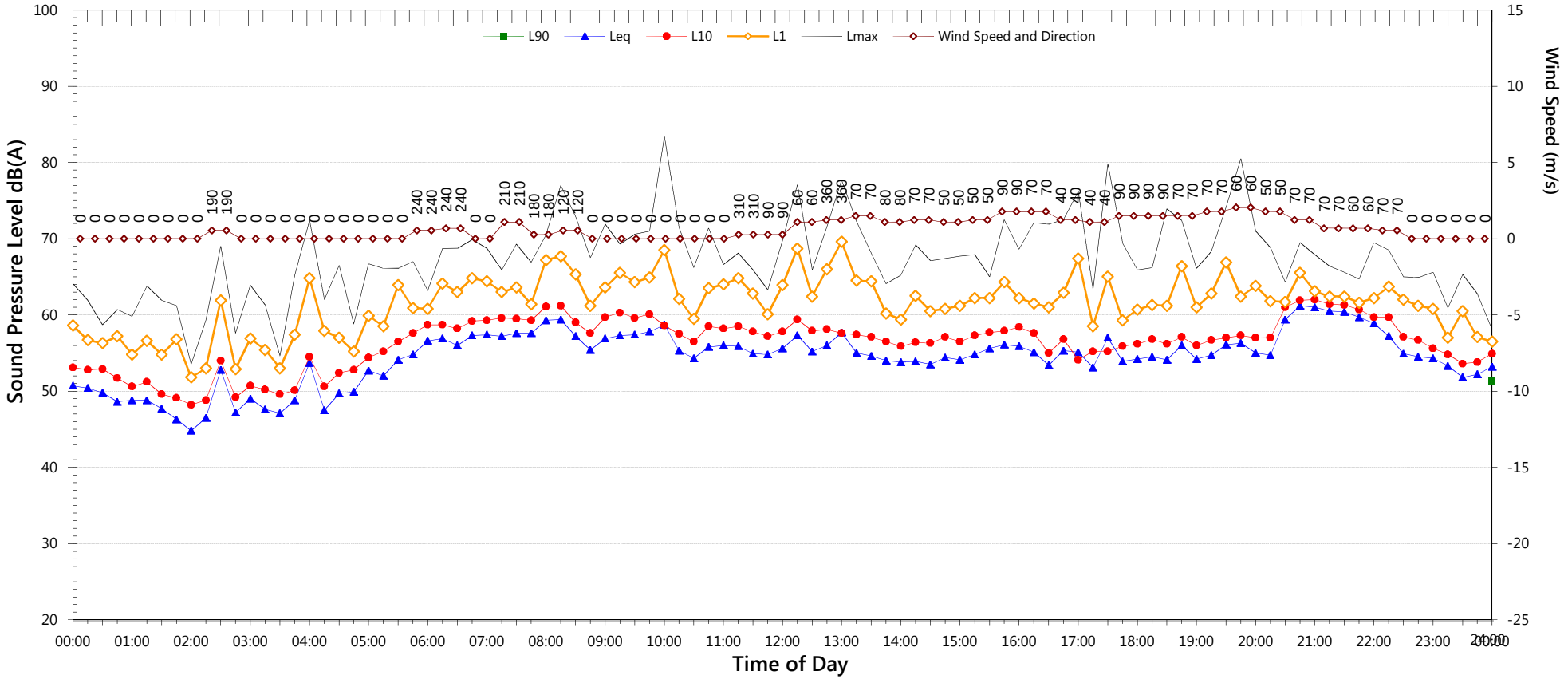
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	60.0	55.0
$L_{eq\ 1hr}$ upper 10 percentile	61.8	59.4
$L_{eq\ 1hr}$ lower 10 percentile	58.4	49.7

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	66.7	to	72.4
Lmax - Leq (Range)	16.4	to	22.2

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Tuesday, 18 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	47.7	49.0	47.9
Leq	56.1	58.1	54.5

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

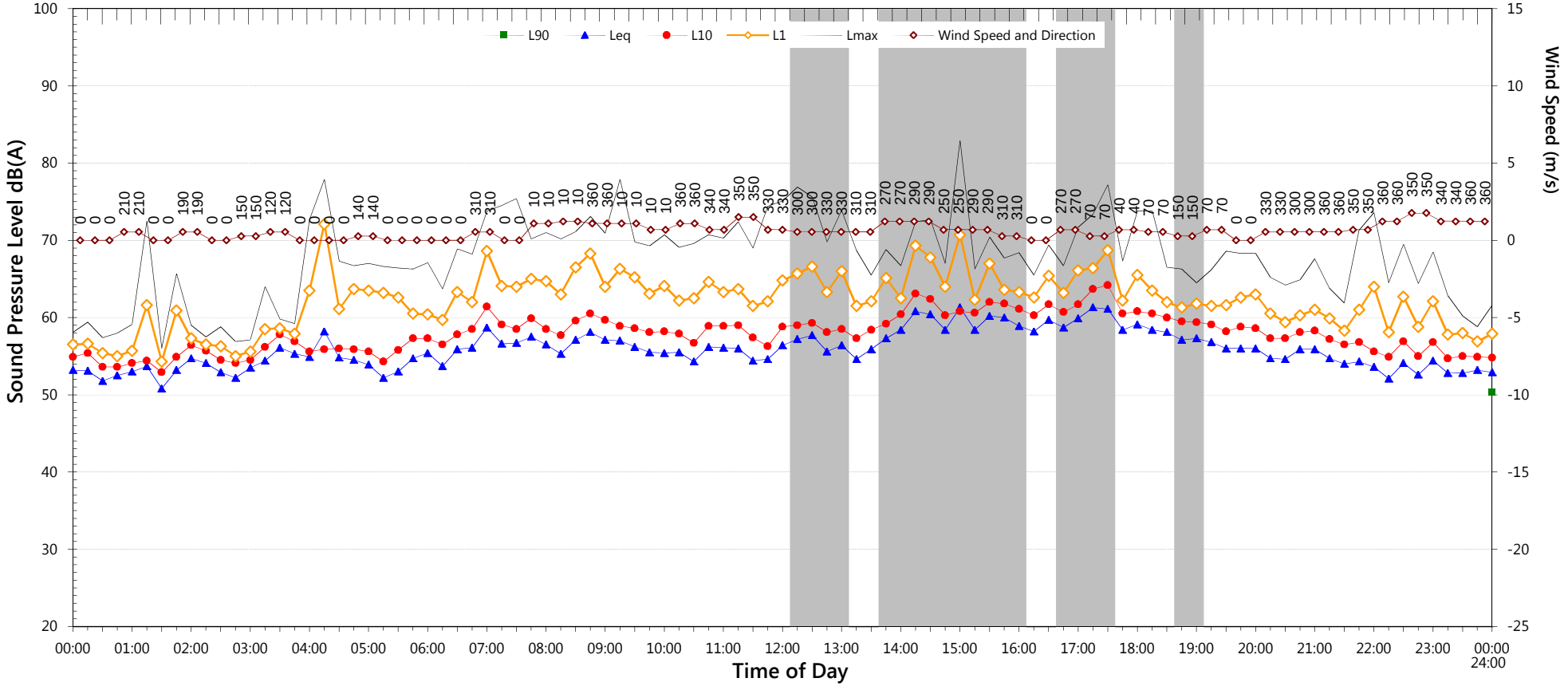
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.2	57.0
$L_{eq\ 1hr}$ upper 10 percentile	62.3	59.0
$L_{eq\ 1hr}$ lower 10 percentile	56.7	55.1

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	72.5	to	77.9
Lmax - Leq (Range)	17.3	to	22.2

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Wednesday, 19 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	47.6	43.3
Leq	-	55.9	53.8

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

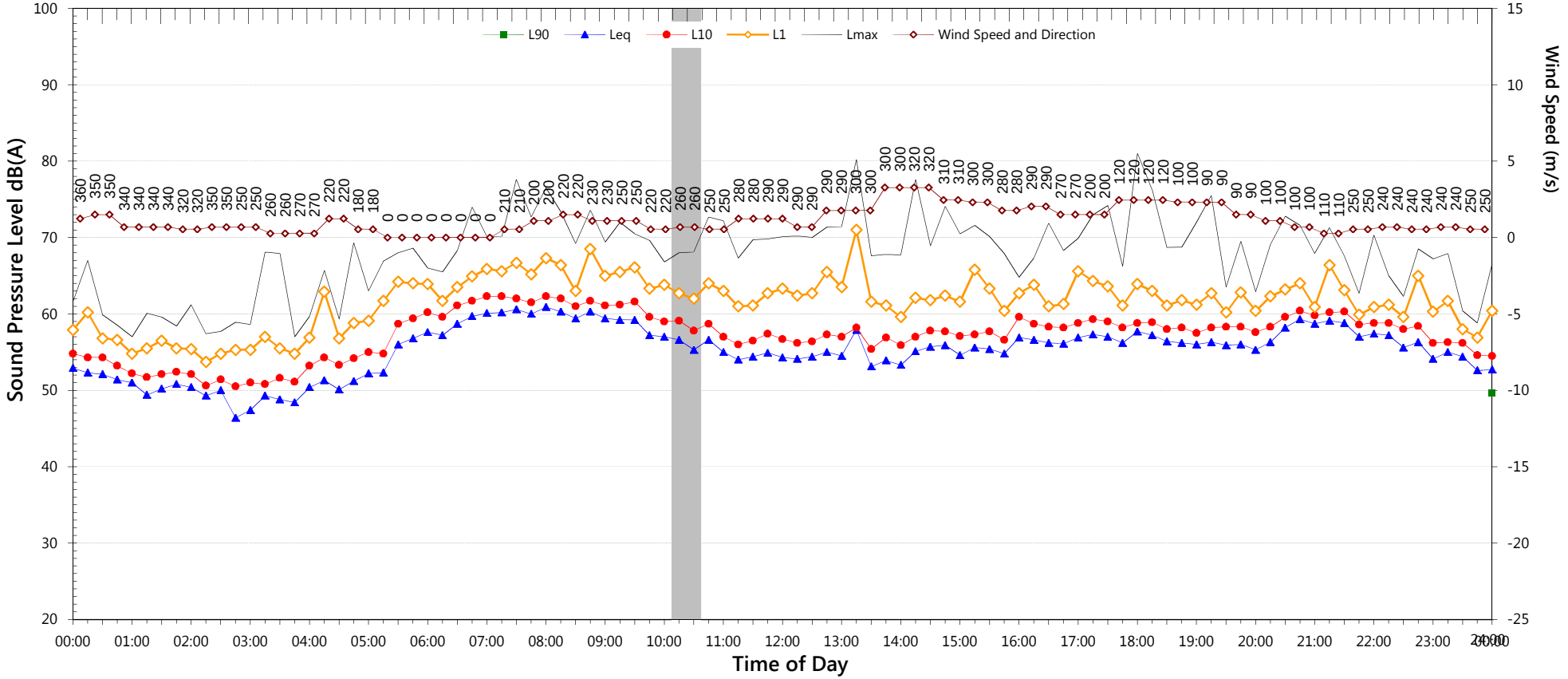
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	58.9	56.3
$L_{eq\ 1hr}$ upper 10 percentile	61.5	61.6
$L_{eq\ 1hr}$ lower 10 percentile	56.9	51.0

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	67.0	to	69.5
Lmax - Leq (Range)	15.3	to	18.8

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Thursday, 20 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	48.5	51.1	44.4
Leq	57.2	57.3	55.3

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

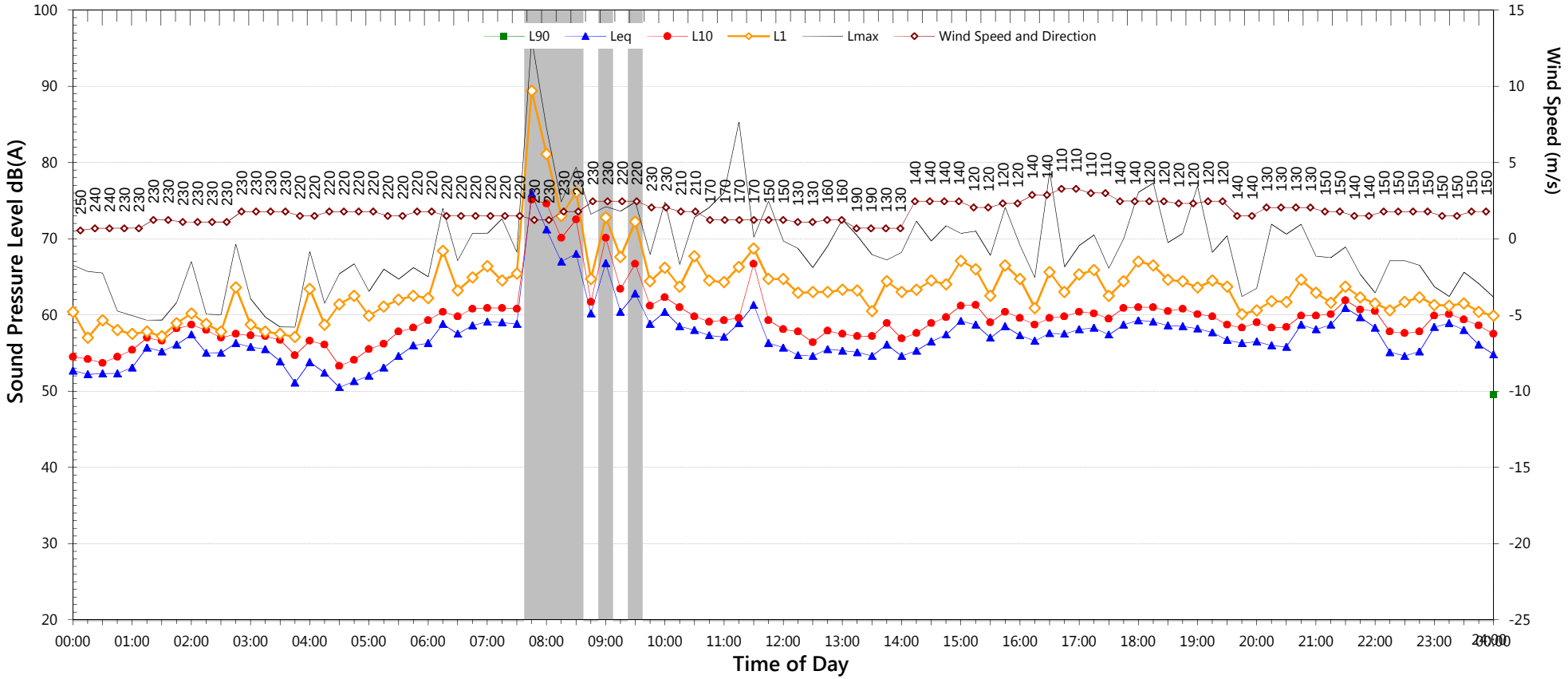
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.7	57.8
$L_{eq\ 1hr}$ upper 10 percentile	62.7	61.0
$L_{eq\ 1hr}$ lower 10 percentile	57.0	54.1

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	66.7	to	74.0
Lmax - Leq (Range)	15.1	to	15.5

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Friday, 21 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	48.8	51.1	43.7
Leq	57.8	58.2	54.6

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

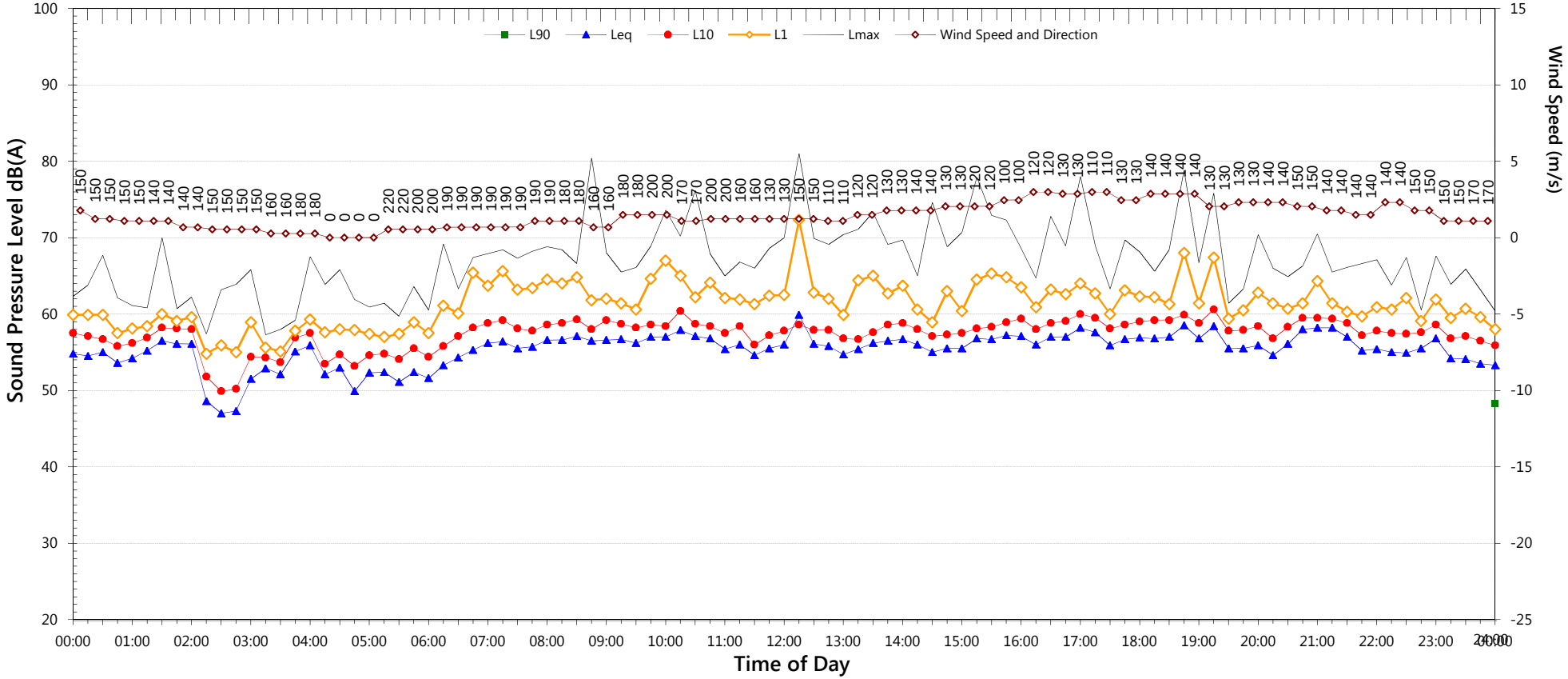
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	60.5	57.1
$L_{eq\ 1hr}$ upper 10 percentile	62.6	59.7
$L_{eq\ 1hr}$ lower 10 percentile	57.6	51.5

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	65.8	to	65.8
Lmax - Leq (Range)	16.8	to	16.8

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Saturday, 22 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	50.6	49.6	41.0
Leq	56.6	56.9	52.9

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

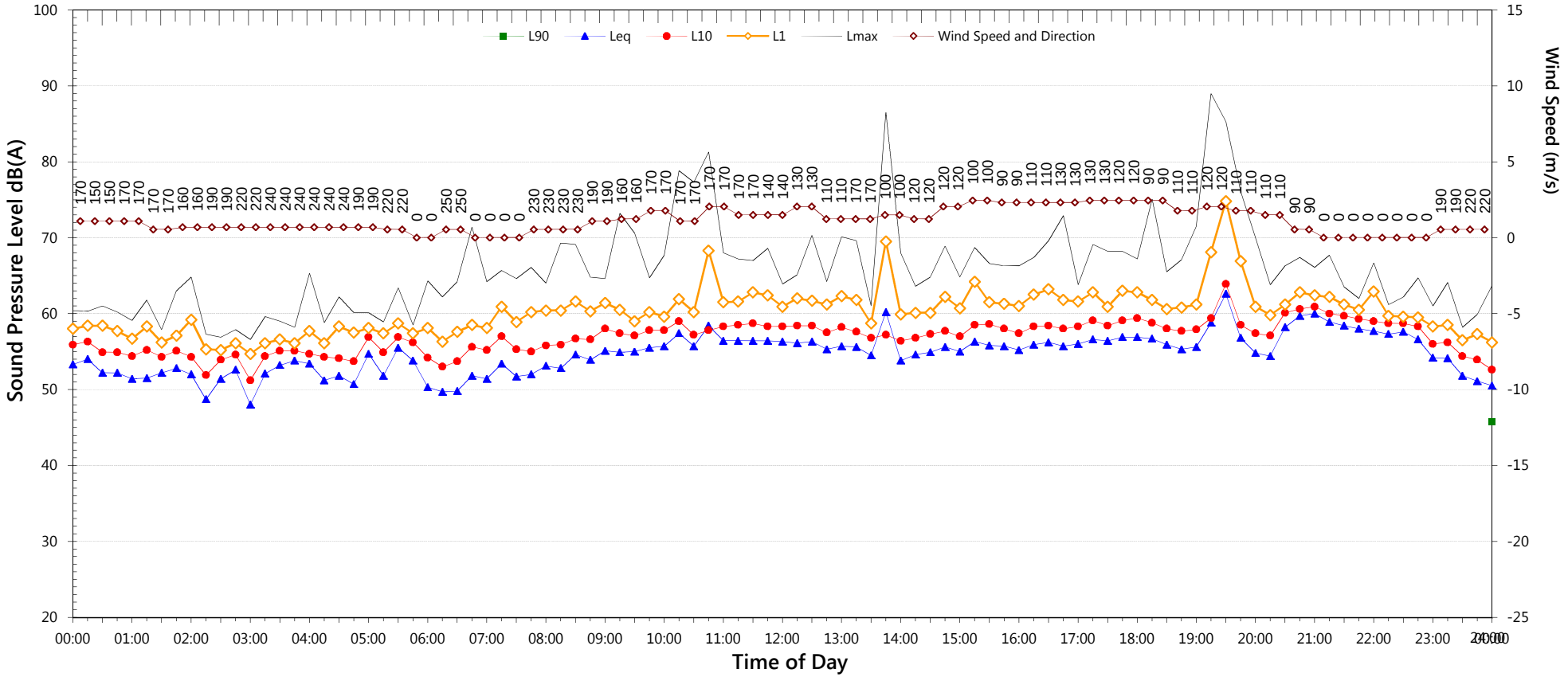
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.1	55.4
$L_{eq\ 1hr}$ upper 10 percentile	59.7	58.1
$L_{eq\ 1hr}$ lower 10 percentile	58.0	53.1

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	71.4	to	71.4
Lmax - Leq (Range)	20.6	to	20.6

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Sunday, 23 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	47.5	48.3	46.0
Leq	56.0	58.2	54.7

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

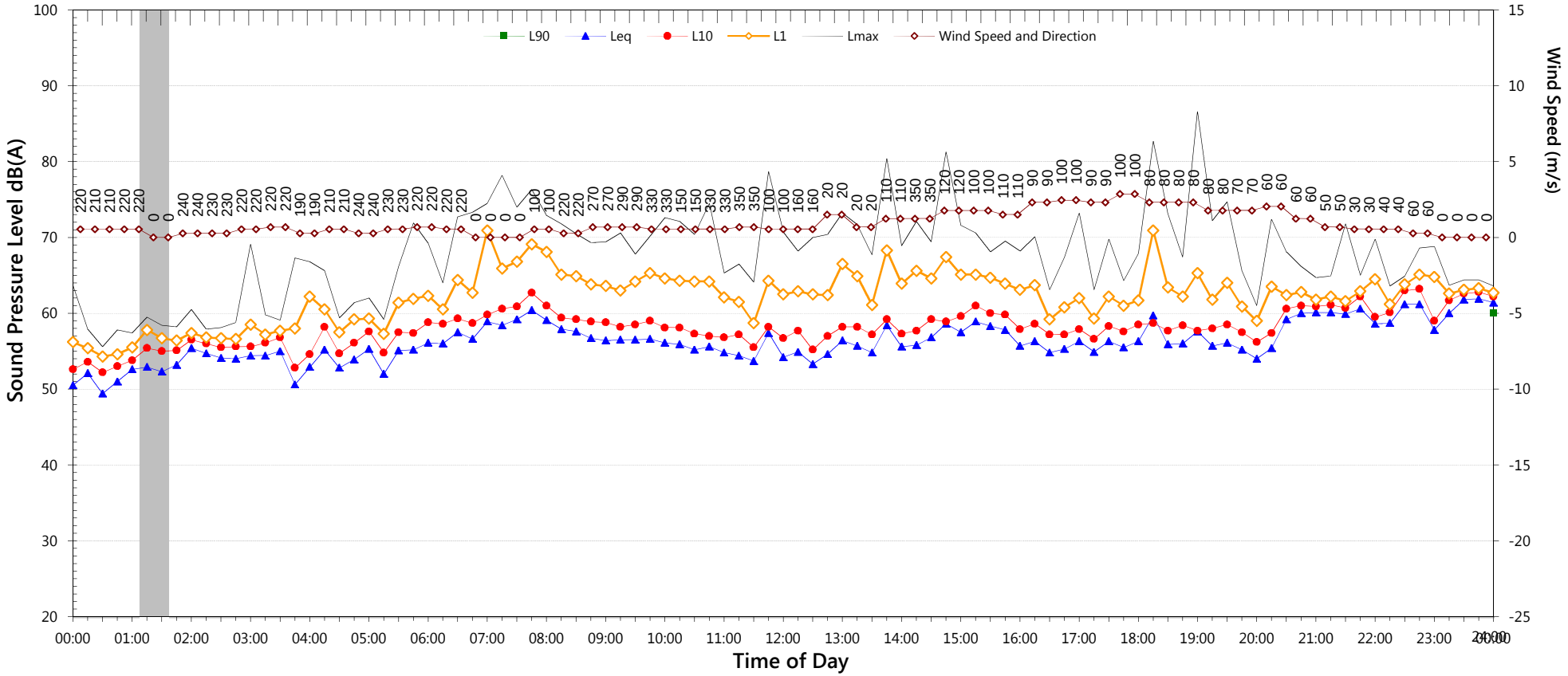
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.0	57.2
$L_{eq\ 1hr}$ upper 10 percentile	61.4	59.9
$L_{eq\ 1hr}$ lower 10 percentile	56.0	53.9

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	71.9	to	74.5
Lmax - Leq (Range)	17.1	to	17.1

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Monday, 24 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	49.5	49.5	44.6
Leq	56.7	58.3	57.5

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

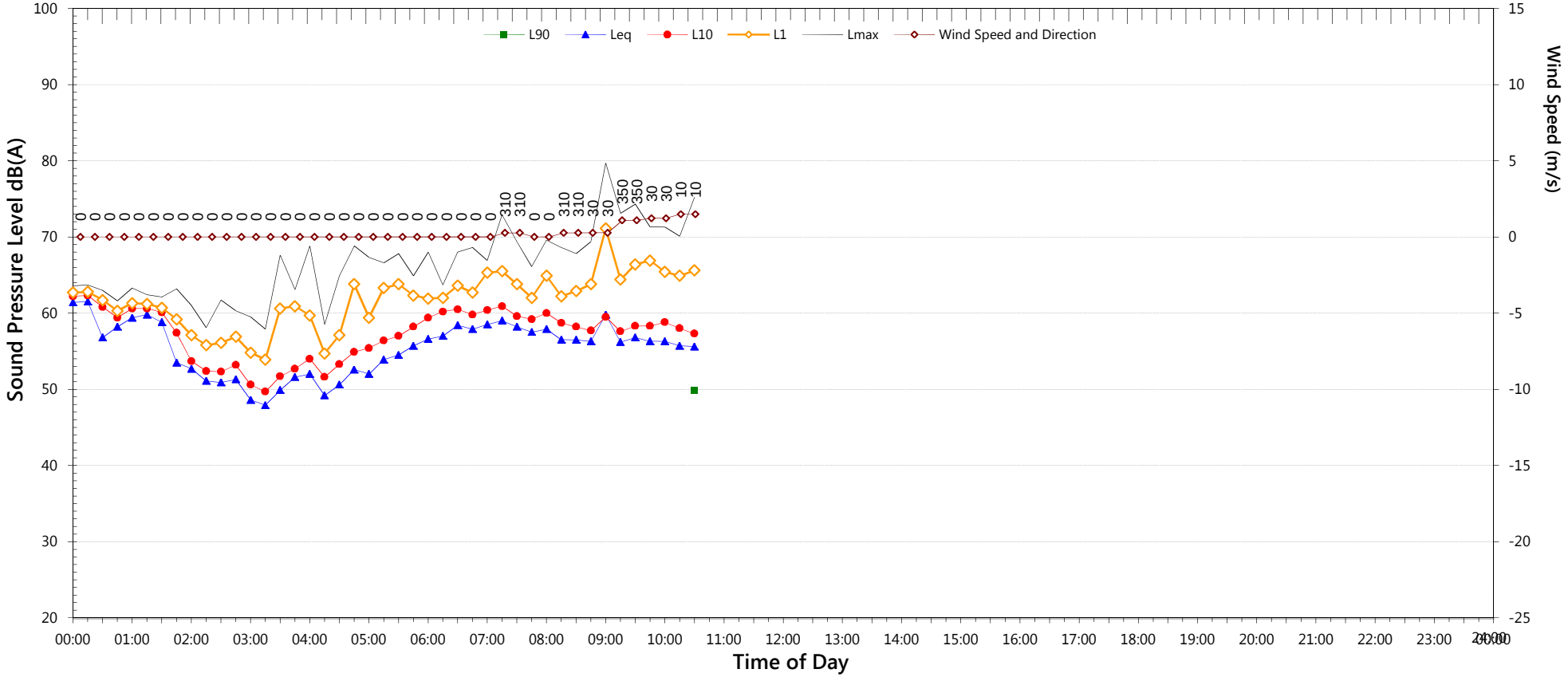
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.7	60.0
$L_{eq\ 1hr}$ upper 10 percentile	62.1	63.8
$L_{eq\ 1hr}$ lower 10 percentile	57.6	53.1

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	68.8	to	68.8
Lmax - Leq (Range)	17.5	to	18.2

Unattended Noise Monitoring Results

16 Gorman Ave - Front Yard

Tuesday, 25 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

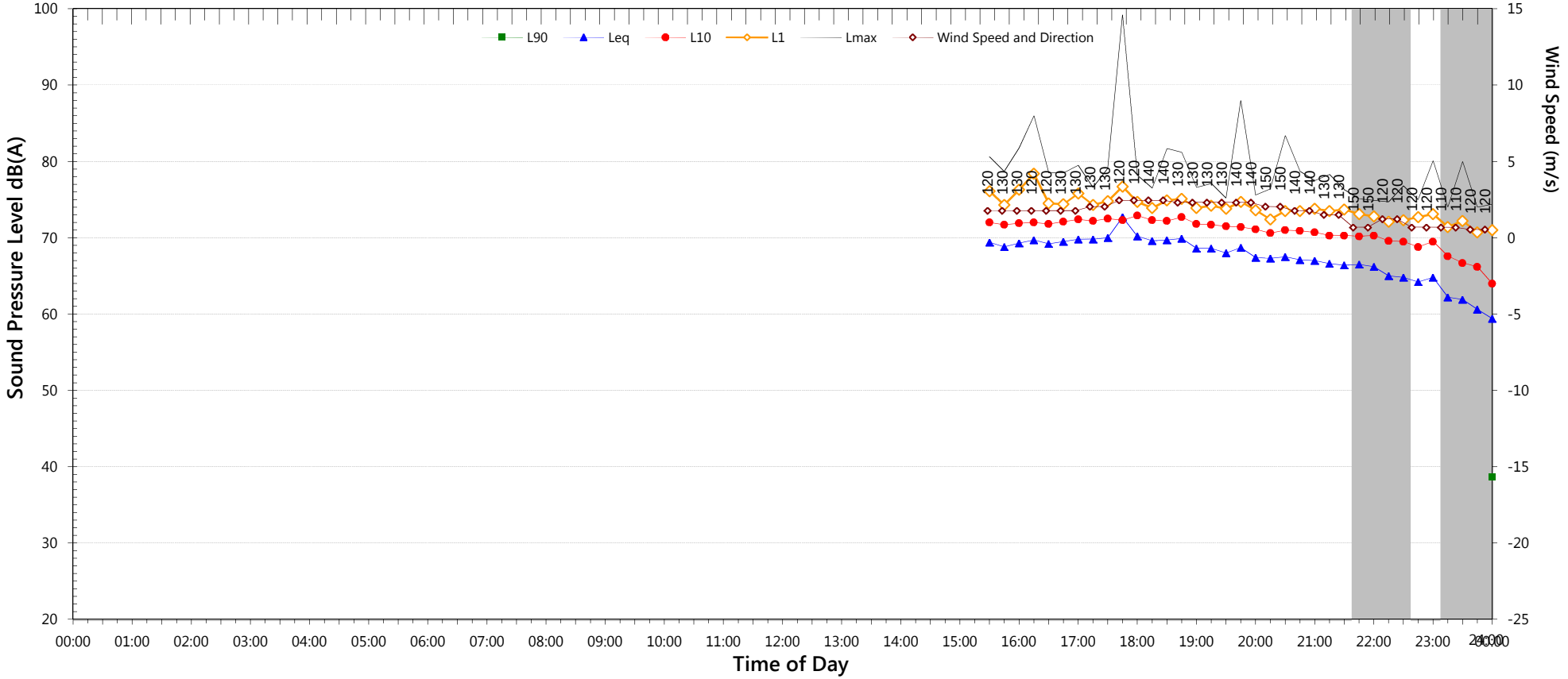
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	59.7	-
$L_{eq\ 1hr}$ upper 10 percentile	60.7	-
$L_{eq\ 1hr}$ lower 10 percentile	58.2	-

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Tuesday, 11 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	52.1	-
Leq	-	68.2	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

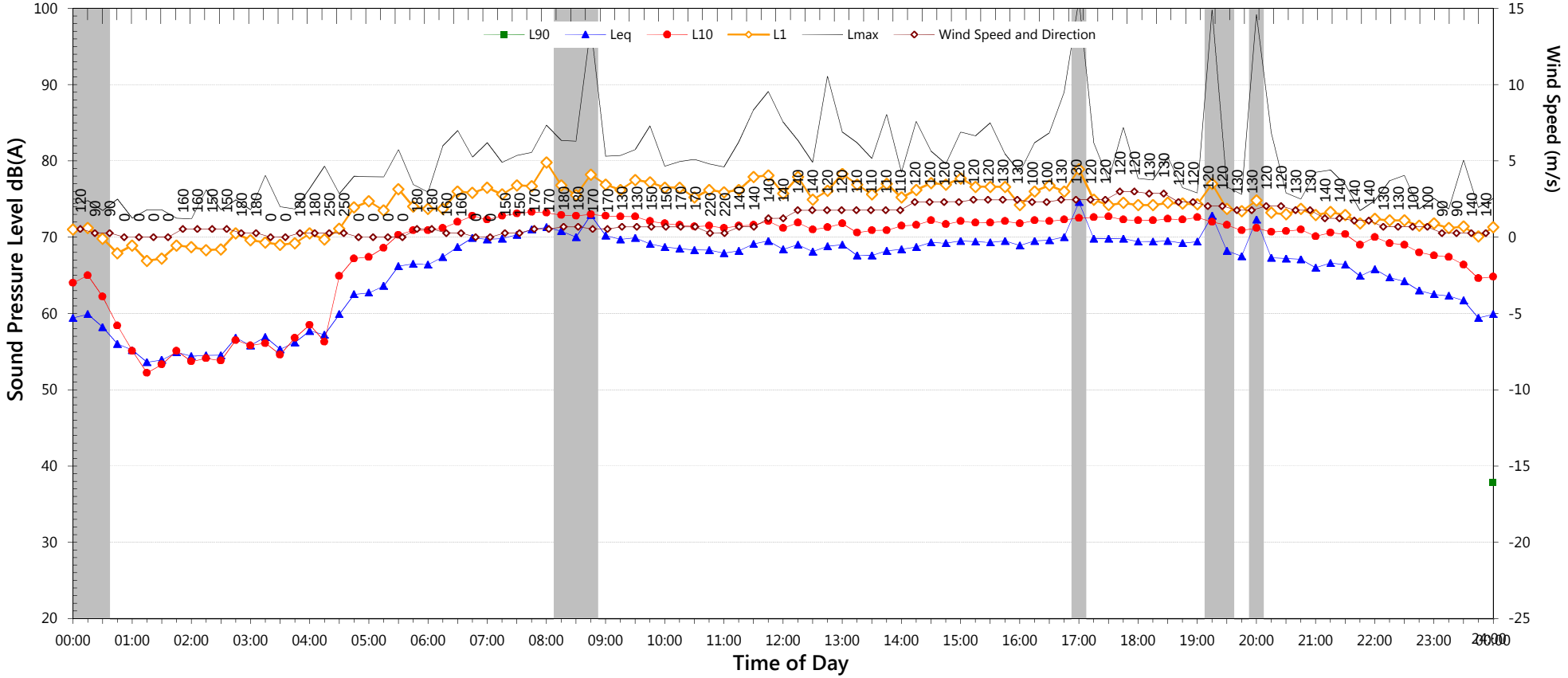
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.6	66.0
$L_{eq\ 1hr}$ upper 10 percentile	73.3	71.5
$L_{eq\ 1hr}$ lower 10 percentile	69.0	56.7

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	73.6	to	81.5
Lmax - Leq (Range)	15.6	to	21.5

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Wednesday, 12 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	55.6	-	37.8
Leq	69.2	-	63.2

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

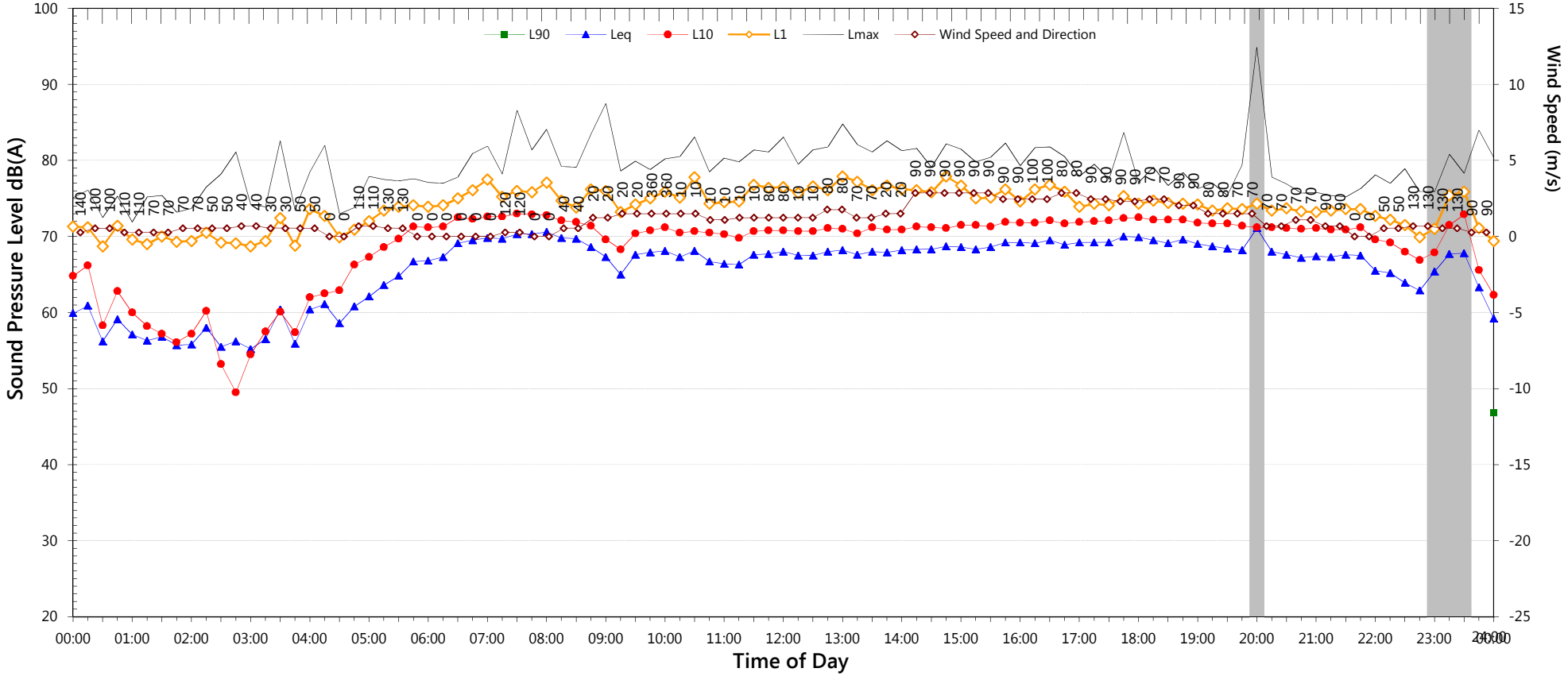
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.4	65.7
$L_{eq\ 1hr}$ upper 10 percentile	72.9	71.5
$L_{eq\ 1hr}$ lower 10 percentile	69.0	58.7

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	75.4	to	82.6
Lmax - Leq (Range)	17.4	to	24.7

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Thursday, 13 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	51.8	51.5	-
Leq	68.6	68.2	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

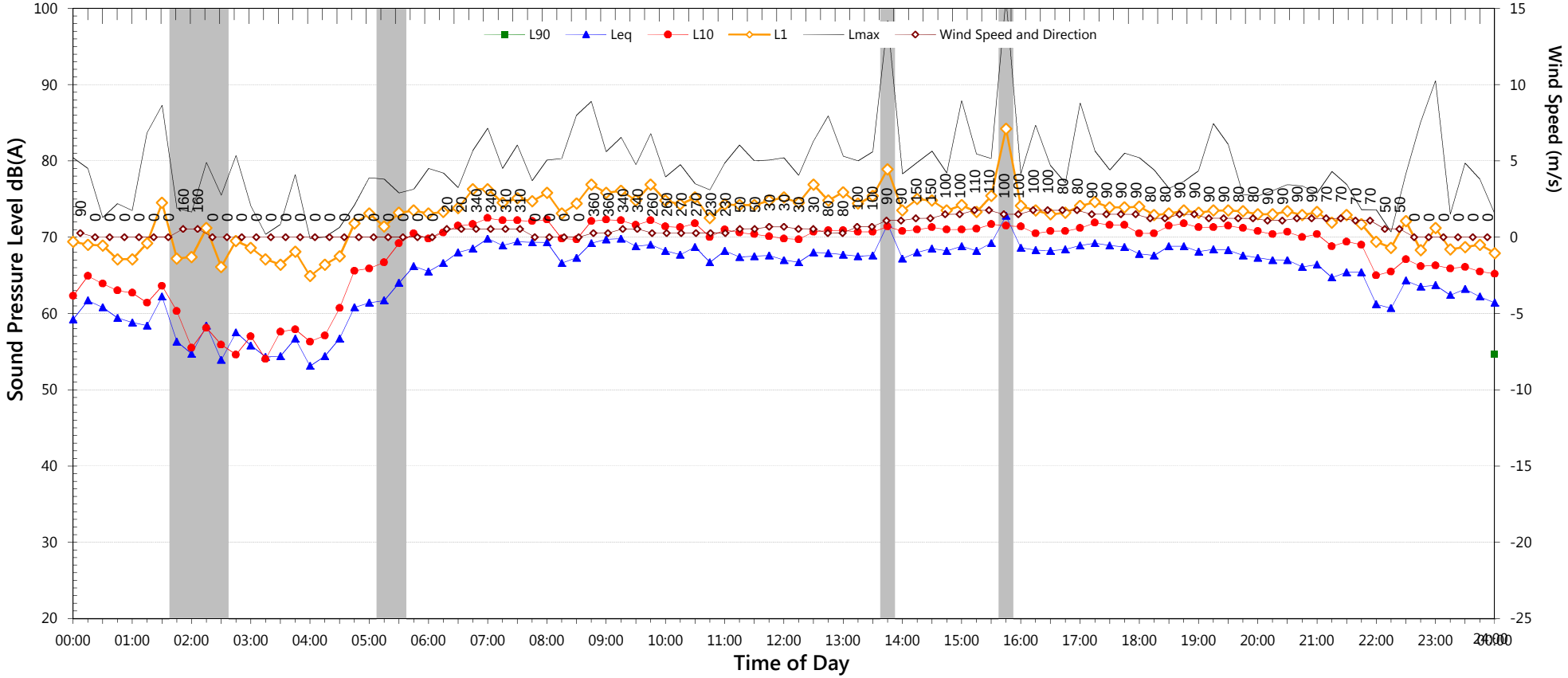
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.0	65.8
$L_{eq\ 1hr}$ upper 10 percentile	72.4	70.9
$L_{eq\ 1hr}$ lower 10 percentile	69.6	57.3

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	77.8	to	87.3
Lmax - Leq (Range)	15.9	to	26.6

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Friday, 14 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	54.0	50.5	-
Leq	68.3	67.1	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

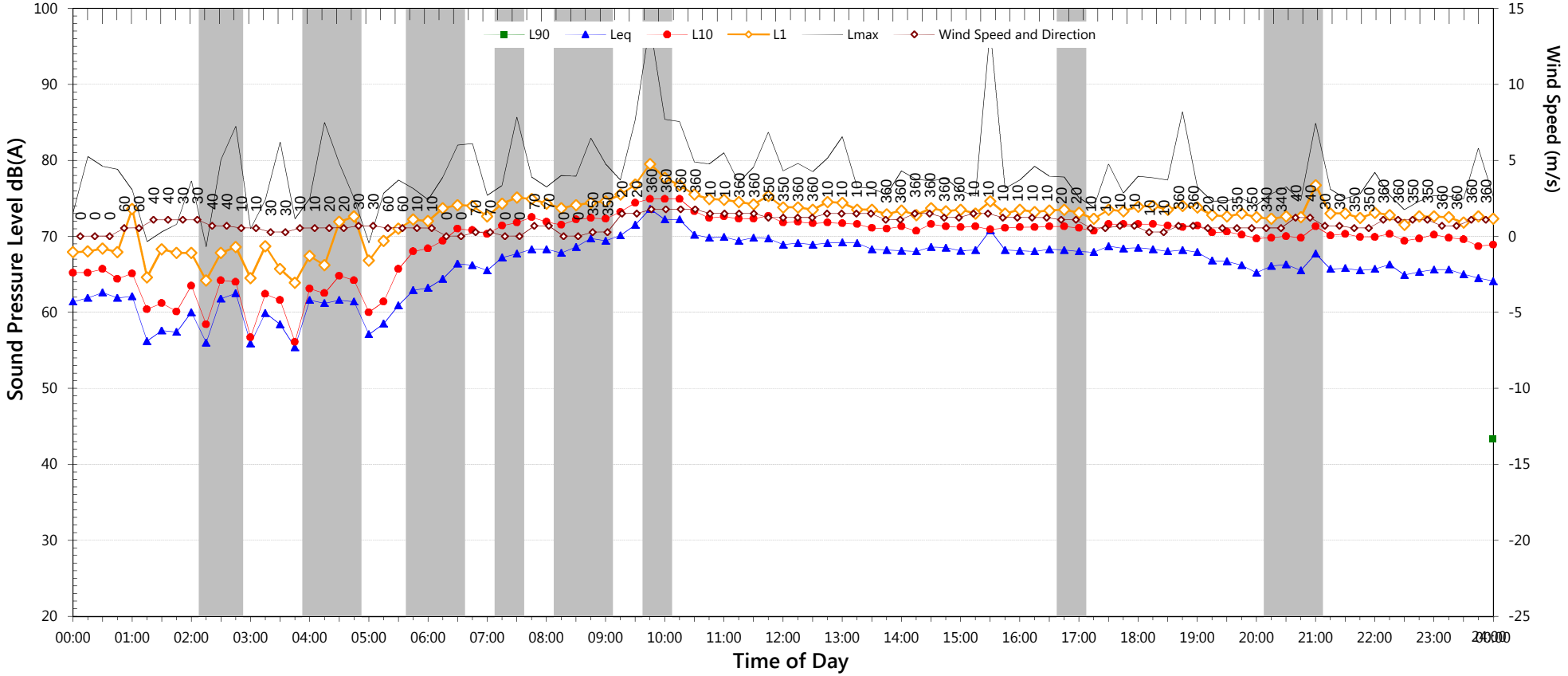
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	70.5	64.2
$L_{eq\ 1hr}$ upper 10 percentile	71.6	68.4
$L_{eq\ 1hr}$ lower 10 percentile	68.2	58.4

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	71.0	to	90.5
Lmax - Leq (Range)	15.1	to	27.3

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Saturday, 15 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

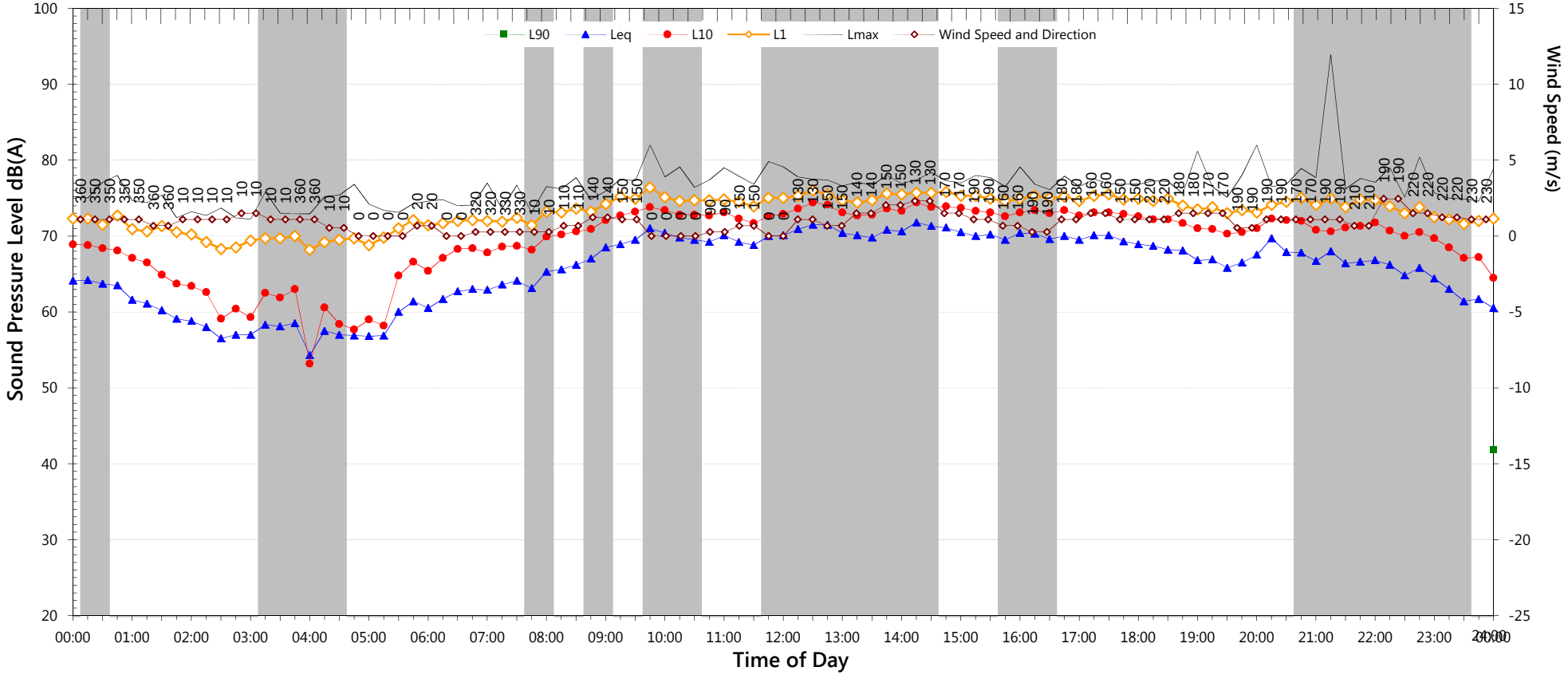
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.1	65.0
$L_{eq\ 1hr}$ upper 10 percentile	73.3	68.1
$L_{eq\ 1hr}$ lower 10 percentile	68.4	59.4

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	73.7	to	81.6
Lmax - Leq (Range)	15.3	to	19.9

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Sunday, 16 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

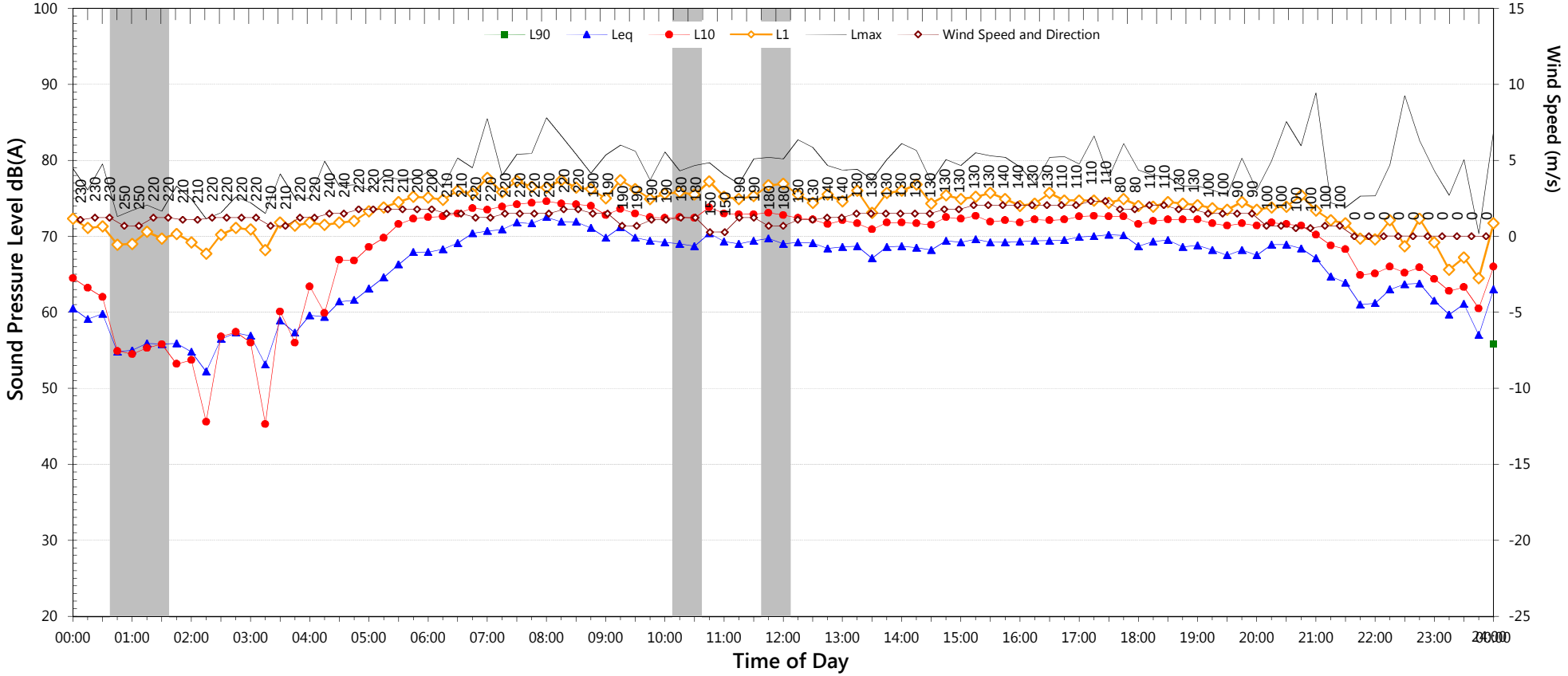
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.2	66.9
$L_{eq\ 1hr}$ upper 10 percentile	73.2	72.2
$L_{eq\ 1hr}$ lower 10 percentile	66.9	57.9

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	75.2	to	85.5
Lmax - Leq (Range)	15.8	to	21.2

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Monday, 17 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	53.7	49.7	-
Leq	69.8	67.6	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

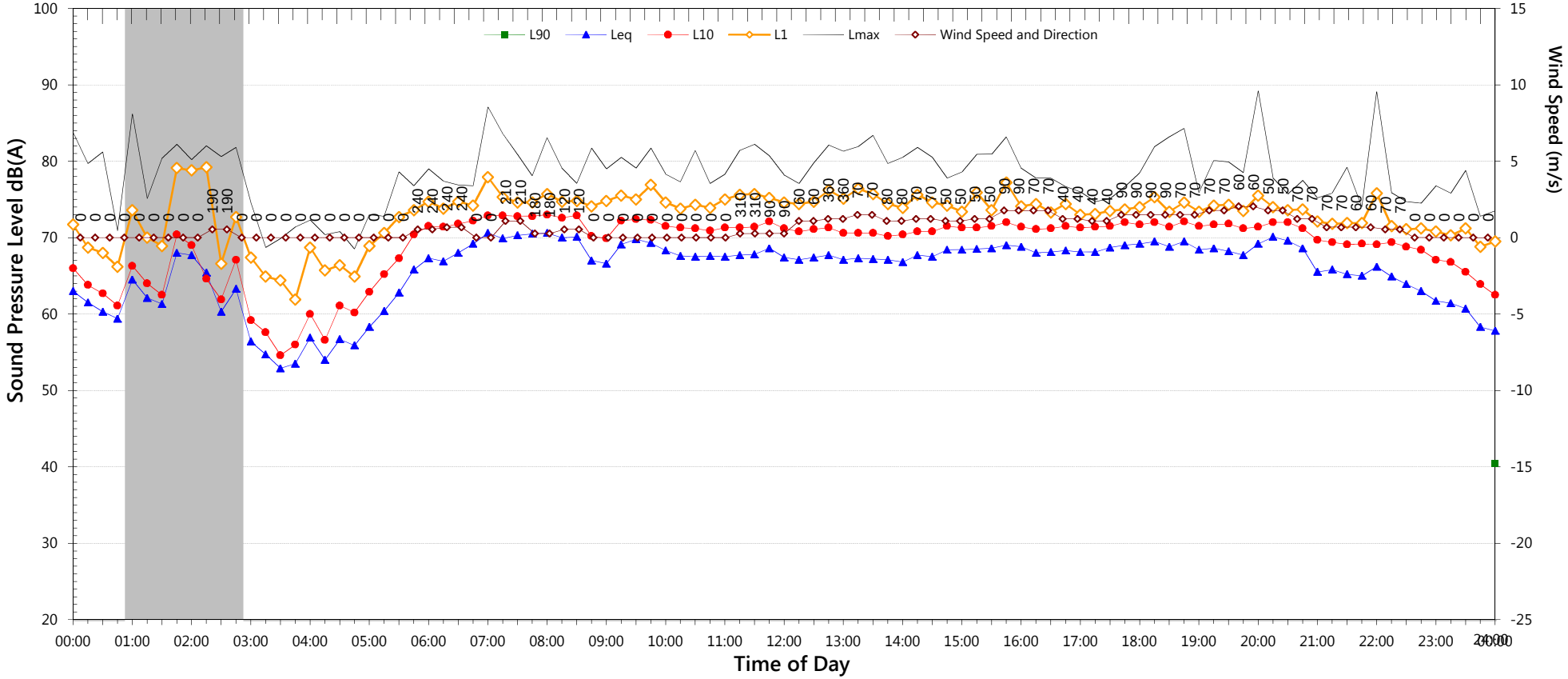
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.8	66.0
$L_{eq\ 1hr}$ upper 10 percentile	74.0	71.4
$L_{eq\ 1hr}$ lower 10 percentile	68.6	57.3

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	72.3	to	88.5
Lmax - Leq (Range)	16.5	to	25.4

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Tuesday, 18 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	51.5	44.6	40.5
Leq	68.4	68.2	62.8

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

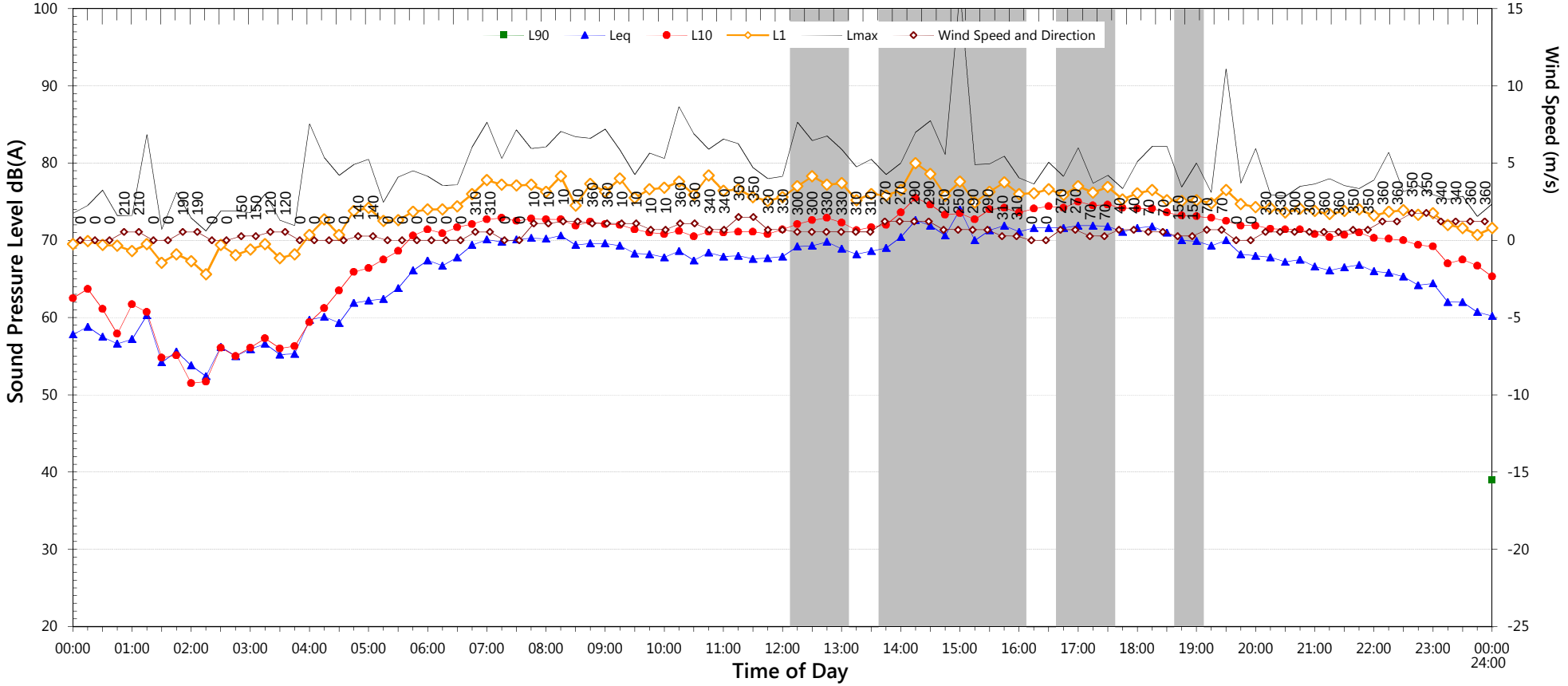
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	70.9	65.3
$L_{eq\ 1hr}$ upper 10 percentile	72.3	71.2
$L_{eq\ 1hr}$ lower 10 percentile	68.9	57.6

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	73.8	to	85.3
Lmax - Leq (Range)	16.6	to	28.0

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Wednesday, 19 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	48.9	37.6
Leq	-	68.4	64.4

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

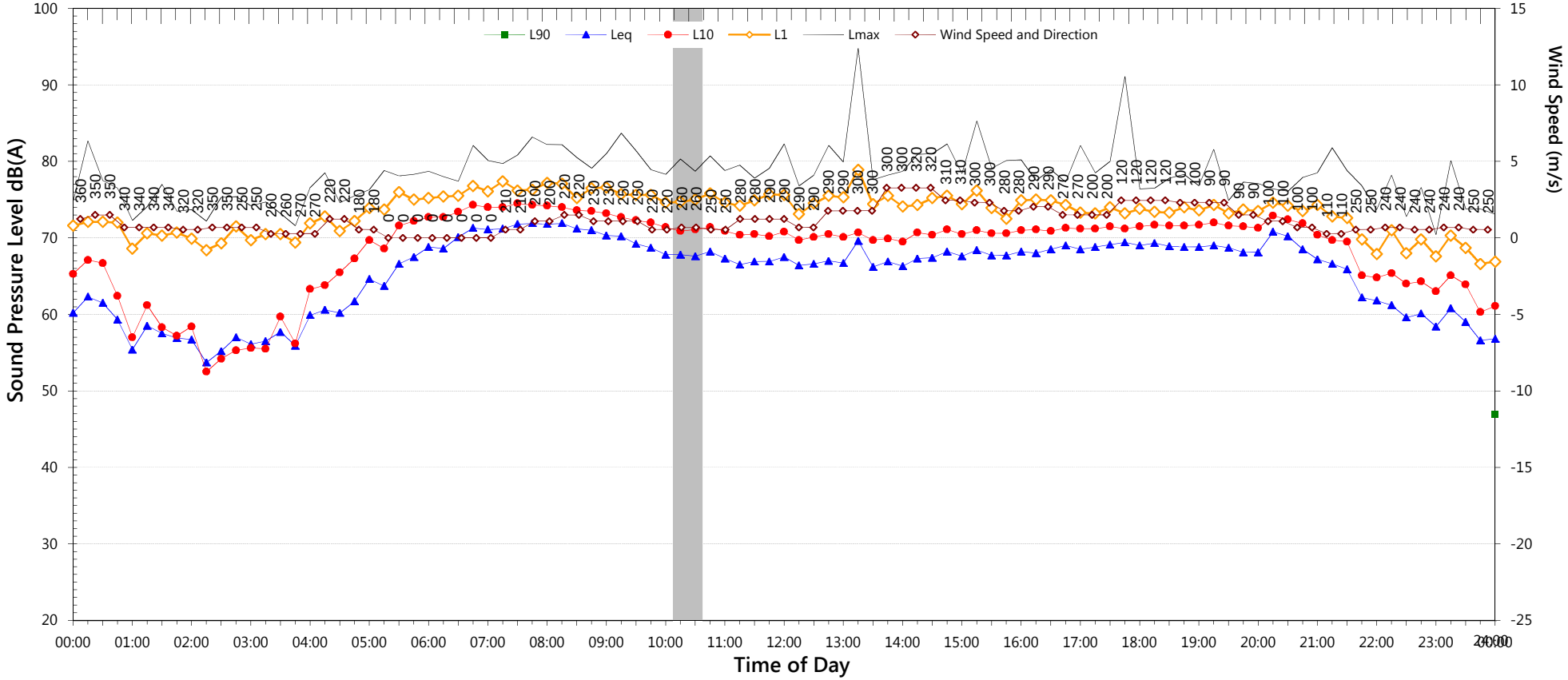
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.6	66.9
$L_{eq\ 1hr}$ upper 10 percentile	74.1	72.9
$L_{eq\ 1hr}$ lower 10 percentile	69.1	58.2

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	75.4	to	82.7
Lmax - Leq (Range)	16.4	to	22.4

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Thursday, 20 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	49.9	53.6	43.1
Leq	68.9	68.2	62.8

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

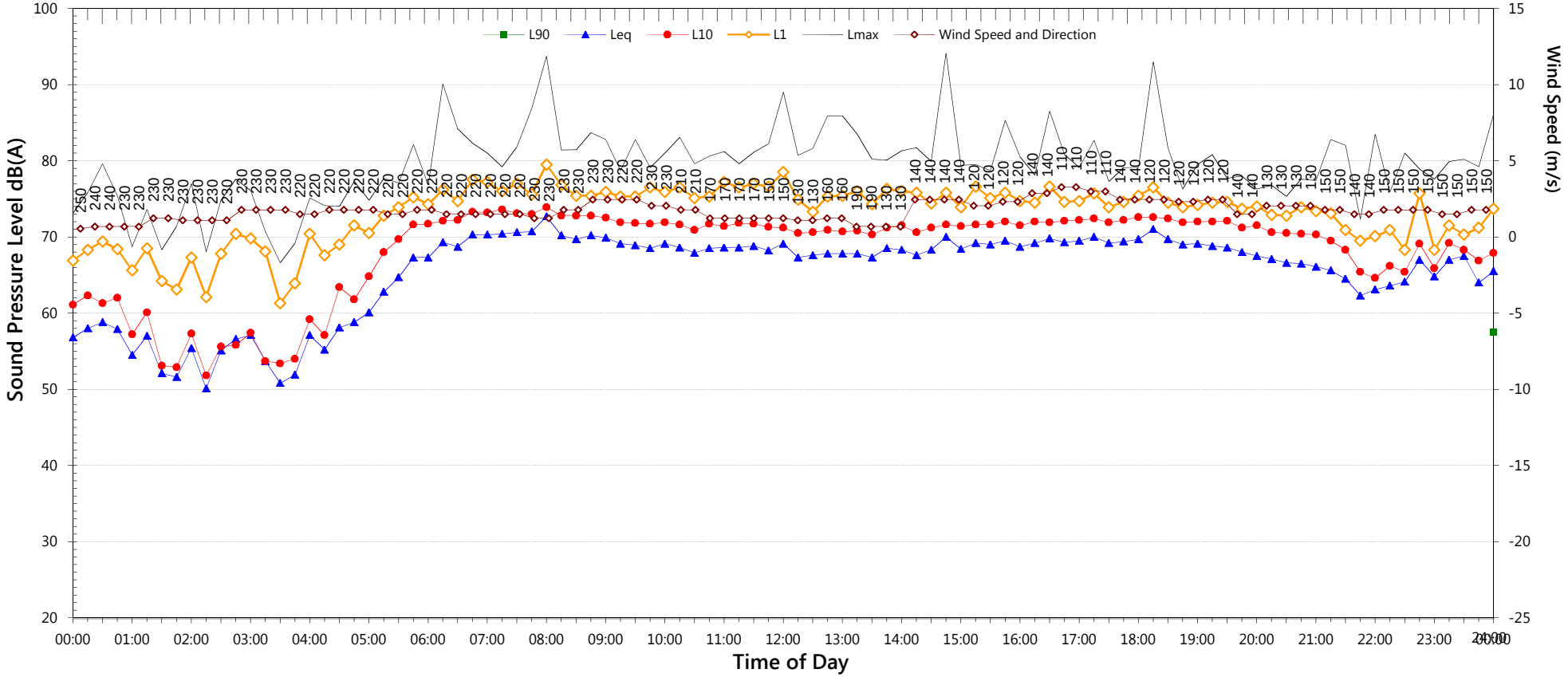
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.2	65.3
$L_{eq\ 1hr}$ upper 10 percentile	73.9	72.2
$L_{eq\ 1hr}$ lower 10 percentile	68.3	56.6

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	75.1	to	90.1
Lmax - Leq (Range)	16.2	to	22.4

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Friday, 21 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	54.5	50.1	-
Leq	69.2	67.7	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

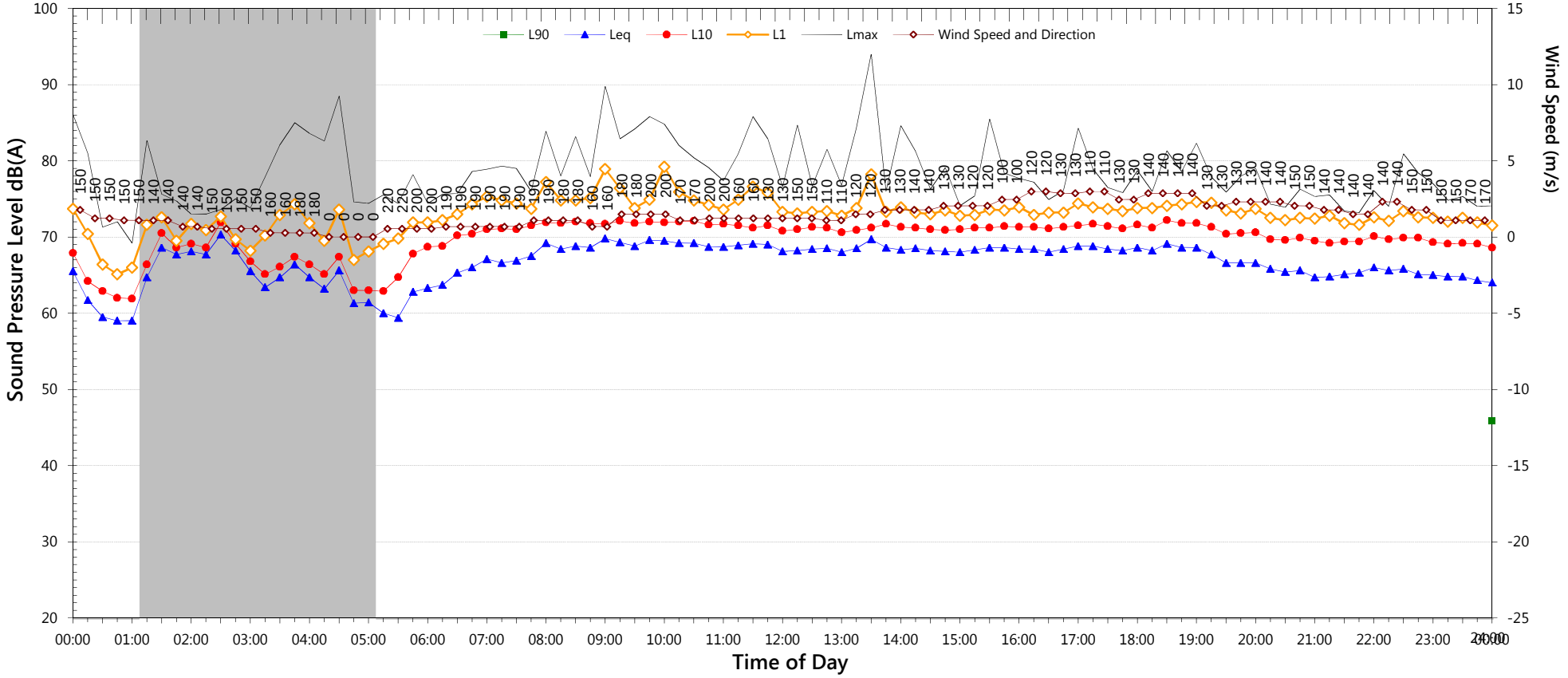
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.3	66.8
$L_{eq\ 1hr}$ upper 10 percentile	73.1	68.7
$L_{eq\ 1hr}$ lower 10 percentile	68.0	62.5

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	78.2	to	86.1
Lmax - Leq (Range)	15.9	to	21.0

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Saturday, 22 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	54.5	49.3	40.5
Leq	68.6	66.8	62.1

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

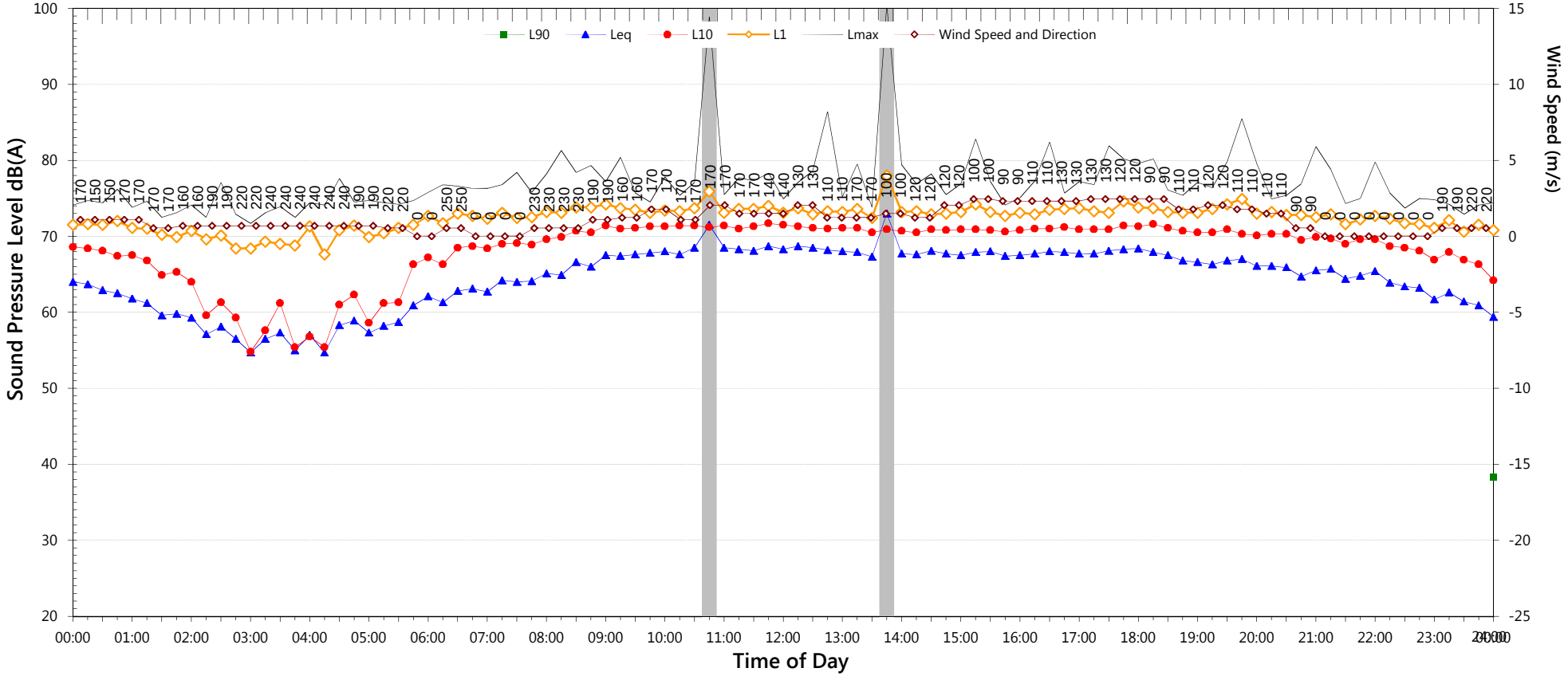
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	70.7	64.6
$L_{eq\ 1hr}$ upper 10 percentile	71.6	67.9
$L_{eq\ 1hr}$ lower 10 percentile	67.9	59.0

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	74.4	to	80.9
Lmax - Leq (Range)	15.5	to	20.3

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Sunday, 23 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	49.2	45.4	38.3
Leq	67.8	66.2	63.1

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

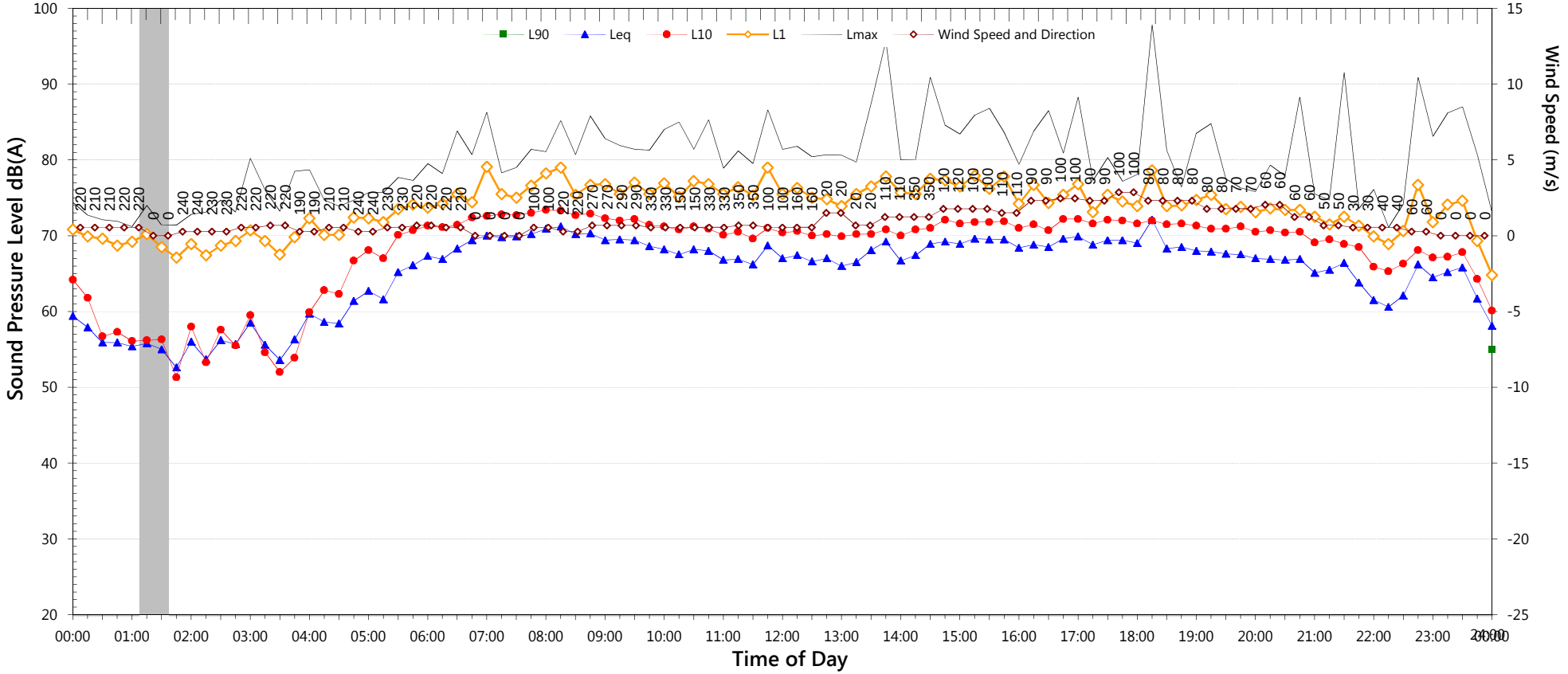
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	69.8	65.6
$L_{eq\ 1hr}$ upper 10 percentile	70.9	71.3
$L_{eq\ 1hr}$ lower 10 percentile	67.3	57.1

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	72.7	to	86.3
Lmax - Leq (Range)	15.0	to	23.8

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Monday, 24 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	50.6	48.9	40.7
Leq	68.8	67.4	63.4

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

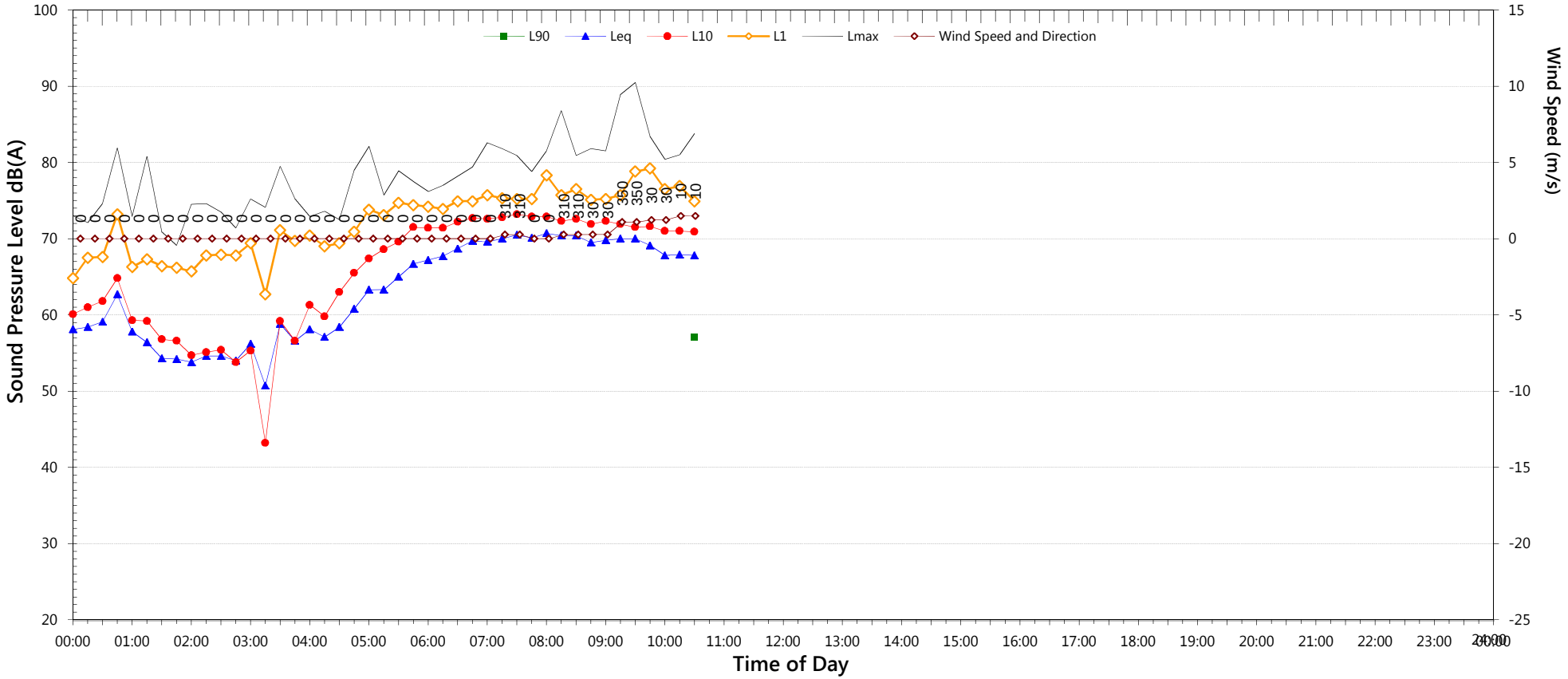
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.0	65.9
$L_{eq\ 1hr}$ upper 10 percentile	72.8	71.5
$L_{eq\ 1hr}$ lower 10 percentile	68.2	57.3

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	75.2	to	90.9
Lmax - Leq (Range)	20.3	to	27.0

Unattended Noise Monitoring Results

19 Memorial Ave - Front Yard

Tuesday, 25 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

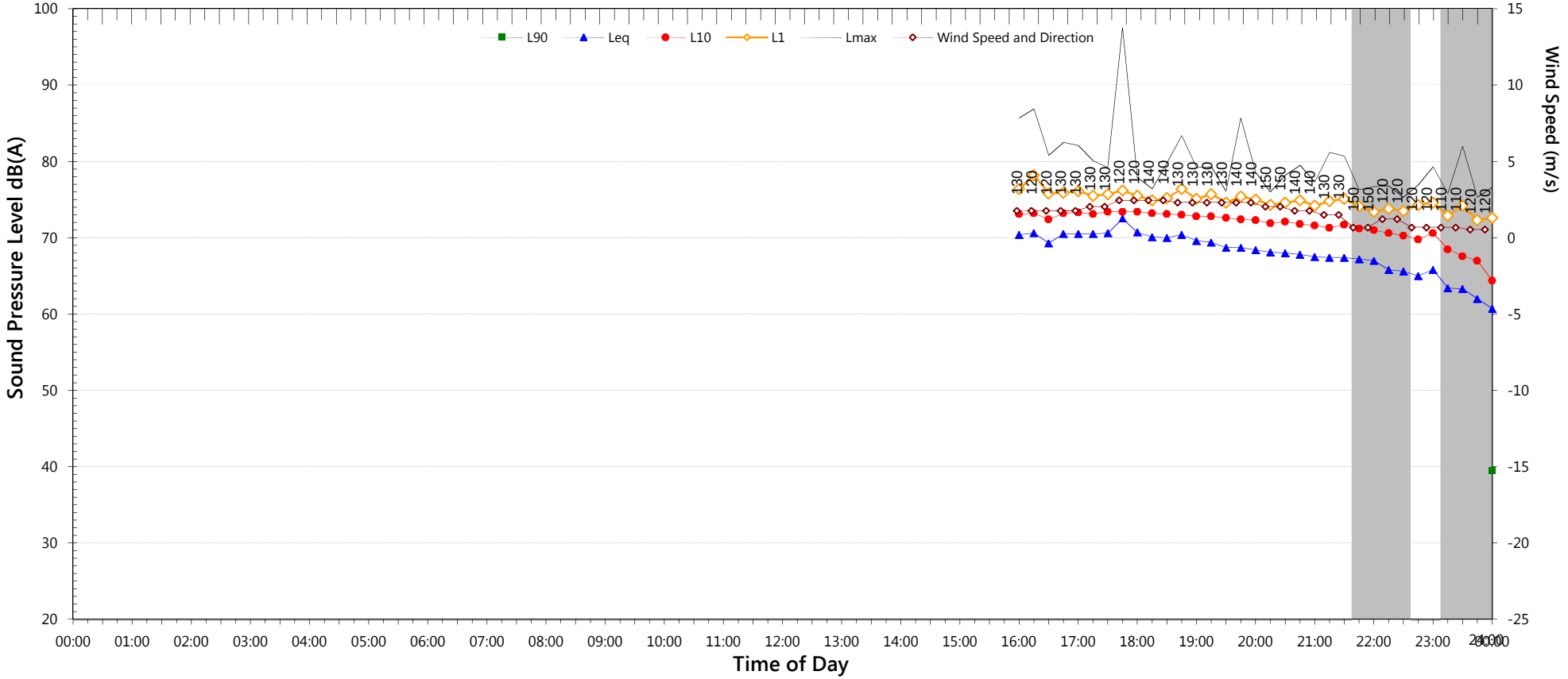
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72.2	-
$L_{eq\ 1hr}$ upper 10 percentile	72.8	-
$L_{eq\ 1hr}$ lower 10 percentile	70.4	-

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Tuesday, 11 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	52.1	-
Leq	-	68.8	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

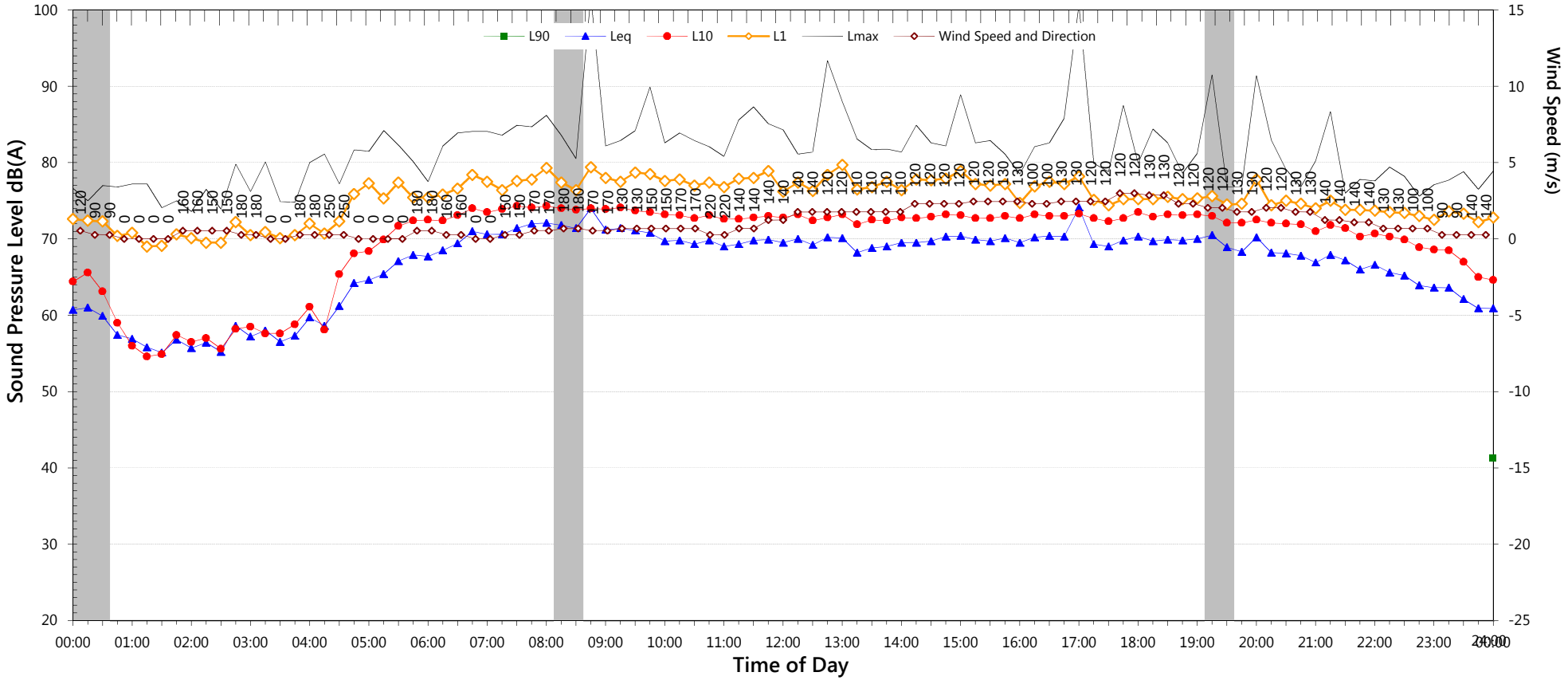
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72.1	67.2
$L_{eq\ 1hr}$ upper 10 percentile	73.7	72.5
$L_{eq\ 1hr}$ lower 10 percentile	69.9	58.4

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	77.2	to	84.2
Lmax - Leq (Range)	17.1	to	22.8

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Wednesday, 12 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	56.3	49.8	40.4
Leq	70.4	68.5	64.2

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

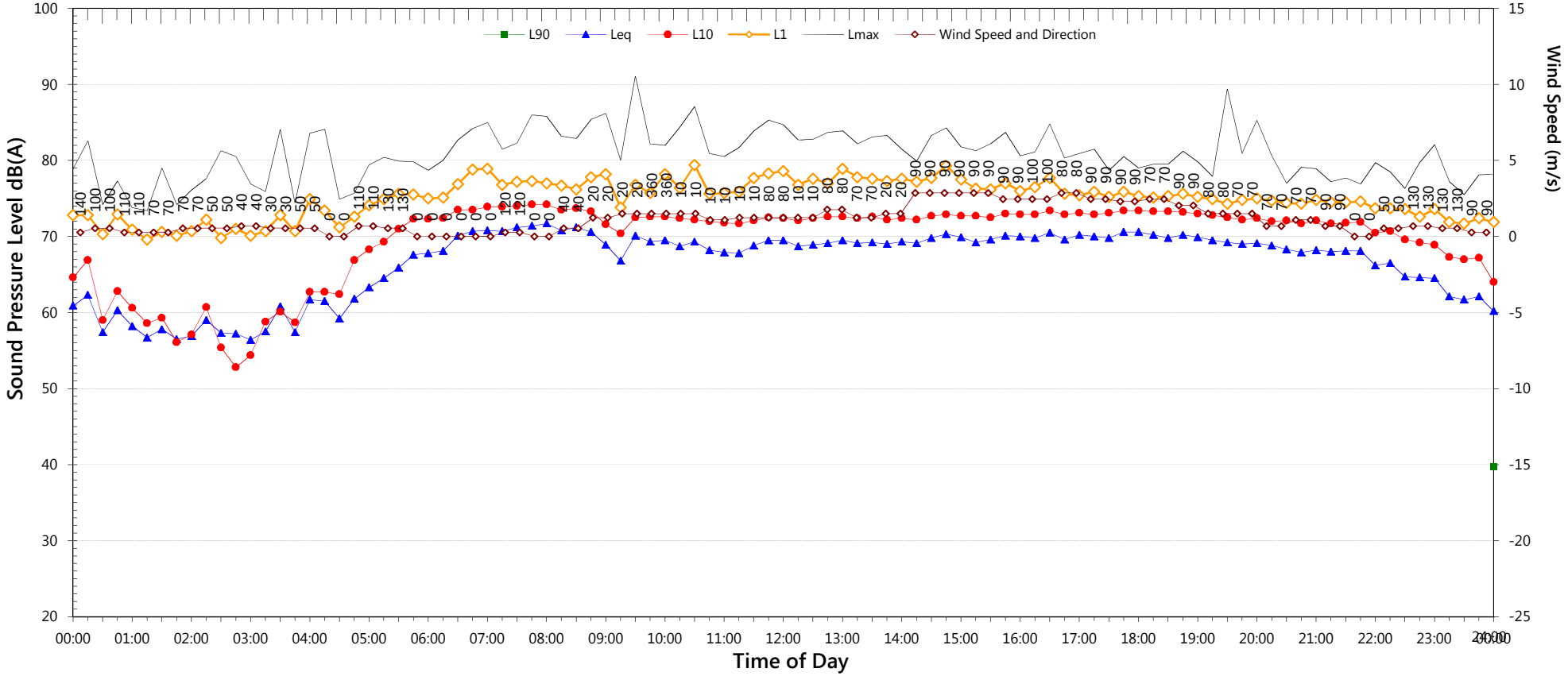
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72.5	66.7
$L_{eq\ 1hr}$ upper 10 percentile	74.8	72.5
$L_{eq\ 1hr}$ lower 10 percentile	69.9	59.5

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	78.9	to	84.1
Lmax - Leq (Range)	16.9	to	24.3

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Thursday, 13 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	54.4	53.3	-
Leq	69.7	68.9	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

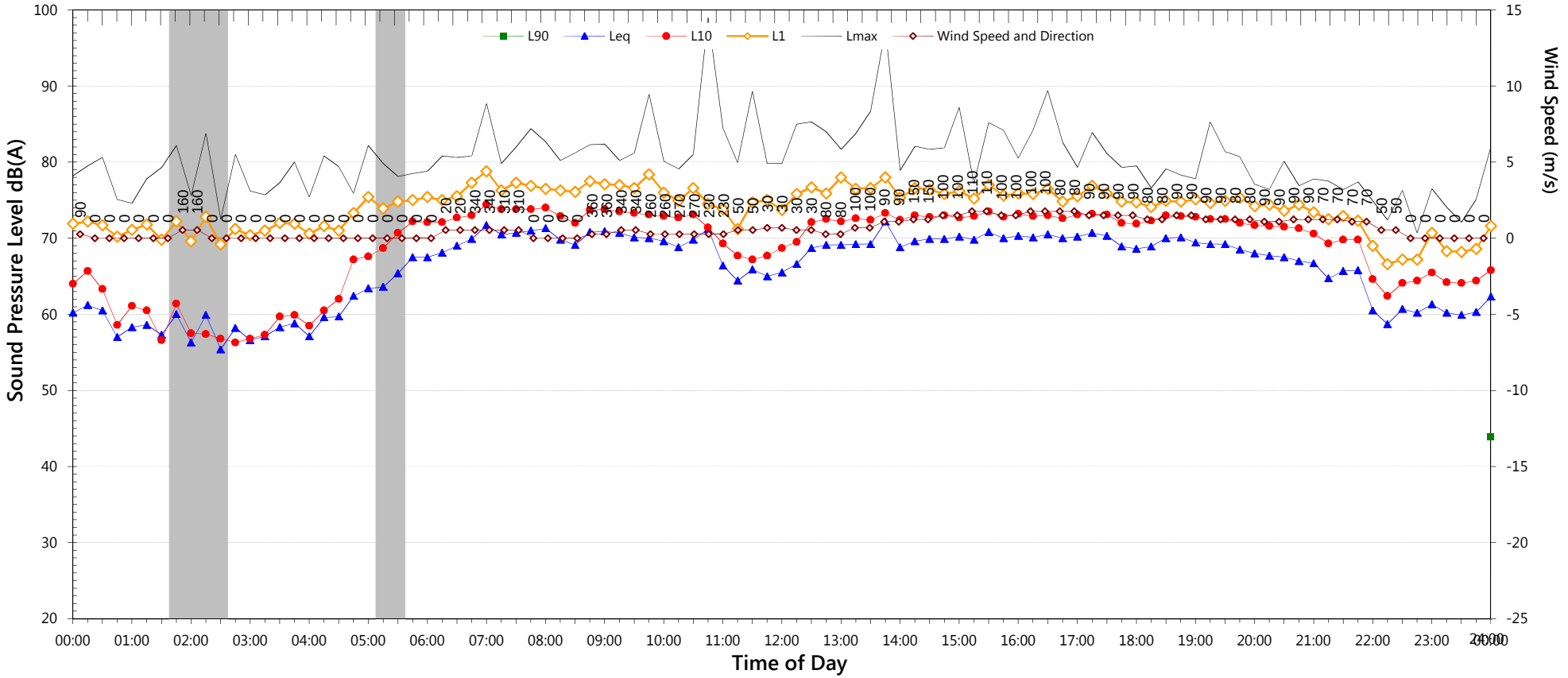
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72.0	66.9
$L_{eq\ 1hr}$ upper 10 percentile	73.4	72.4
$L_{eq\ 1hr}$ lower 10 percentile	70.5	60.0

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	78.2	to	87.7
Lmax - Leq (Range)	16.6	to	23.5

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Friday, 14 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	53.8	49.0	-
Leq	69.7	67.9	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

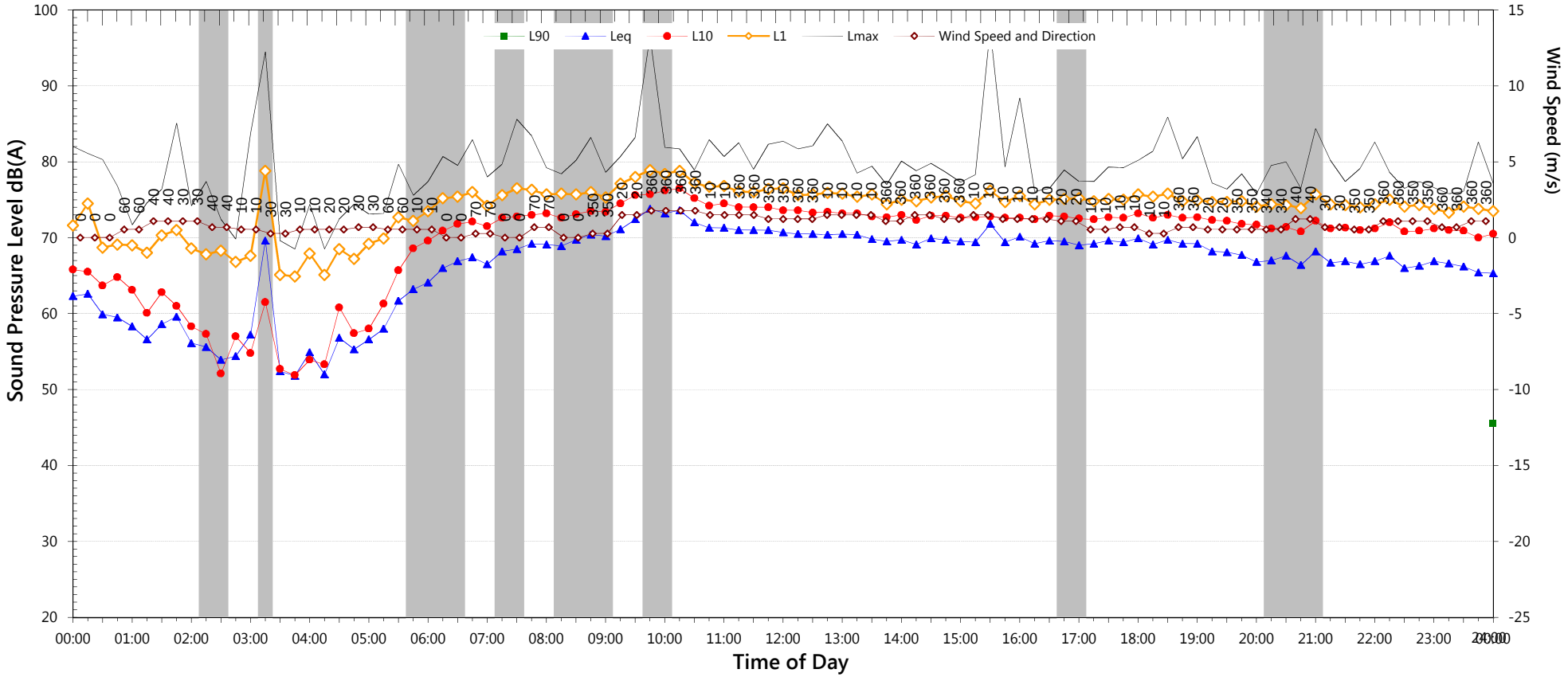
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.8	62.8
$L_{eq\ 1hr}$ upper 10 percentile	73.1	69.5
$L_{eq\ 1hr}$ lower 10 percentile	67.4	55.8

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	74.4	to	85.1
Lmax - Leq (Range)	15.9	to	27.7

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Saturday, 15 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

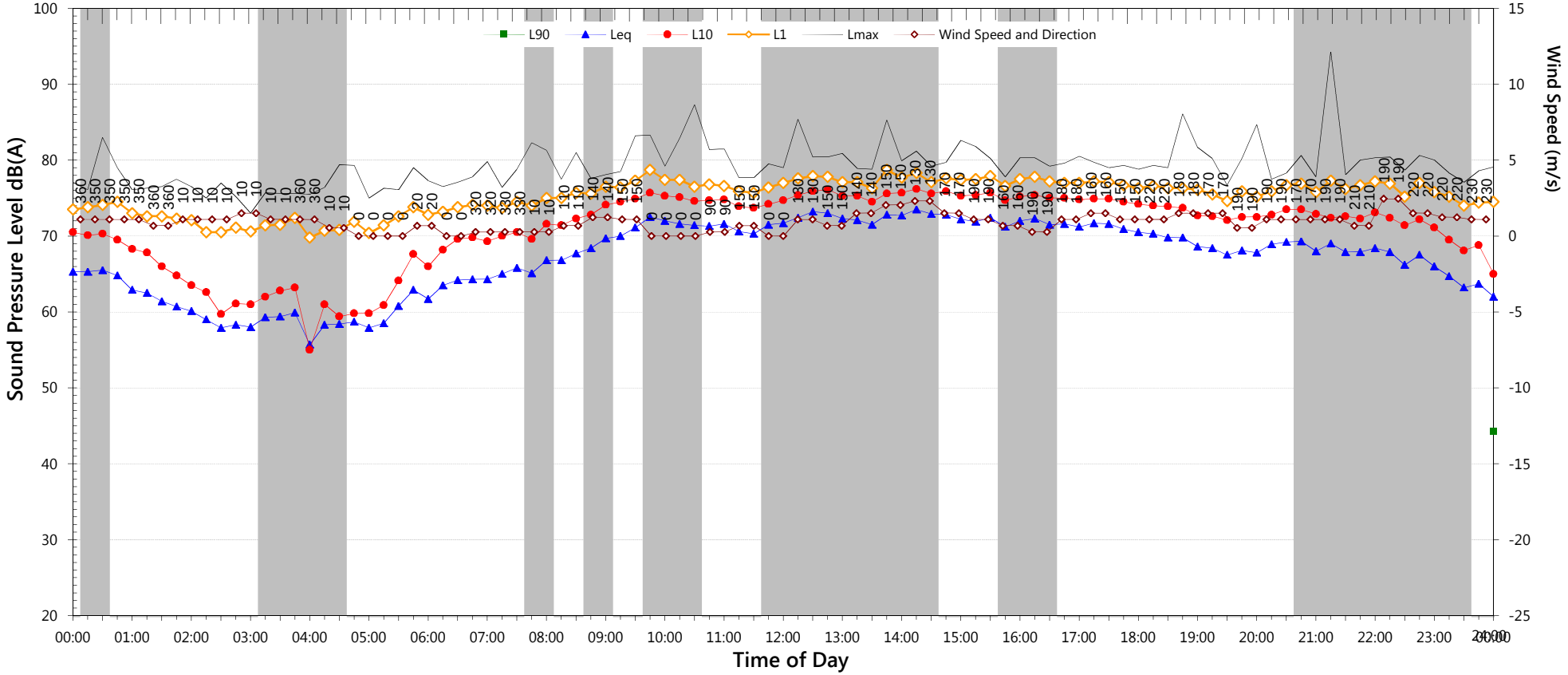
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72.4	66.3
$L_{eq\ 1hr}$ upper 10 percentile	74.6	69.2
$L_{eq\ 1hr}$ lower 10 percentile	69.6	60.8

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	77.0	to	82.6
Lmax - Leq (Range)	15.0	to	21.0

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Sunday, 16 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

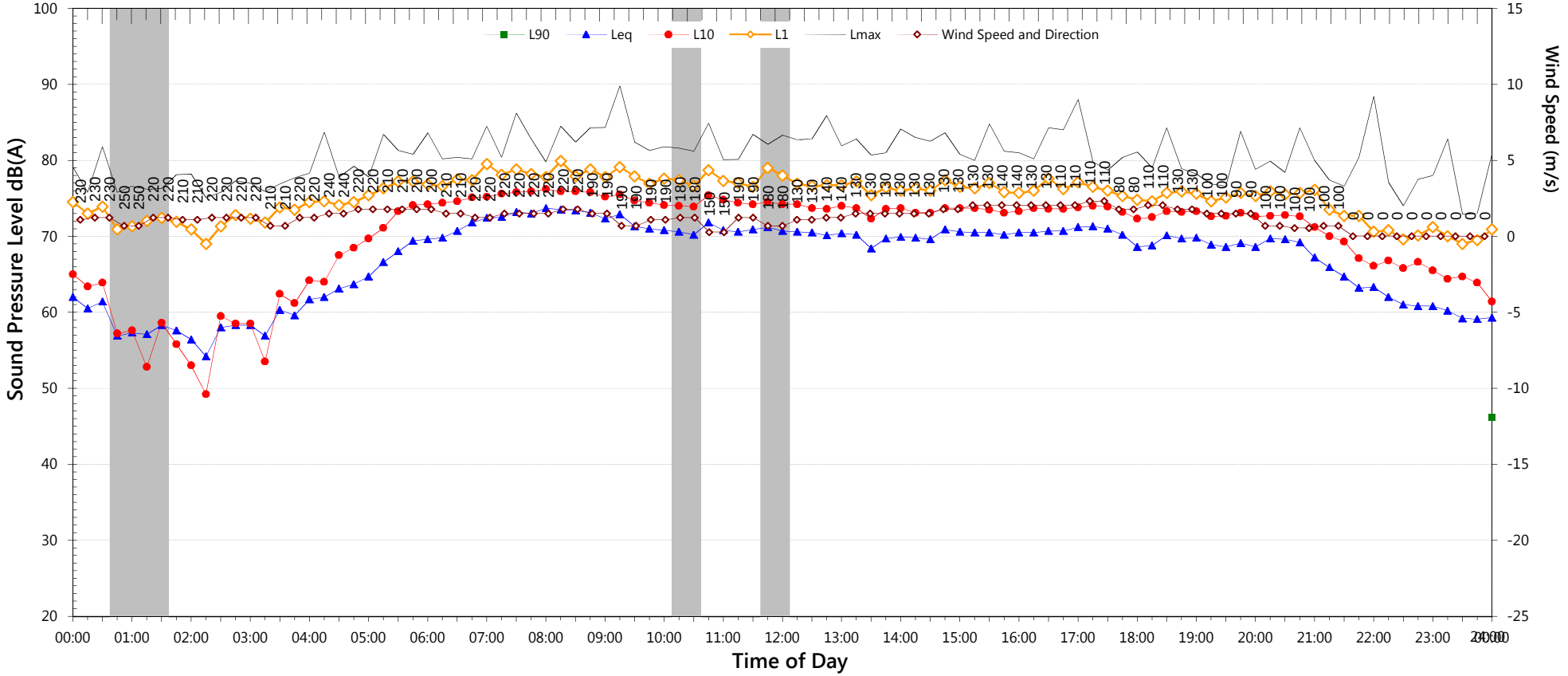
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72.7	68.6
$L_{eq\ 1hr}$ upper 10 percentile	74.9	73.8
$L_{eq\ 1hr}$ lower 10 percentile	68.4	59.5

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	77.3	to	83.7
Lmax - Leq (Range)	15.0	to	21.2

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Monday, 17 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	54.7	46.0	42.6
Leq	71.2	68.4	63.3

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

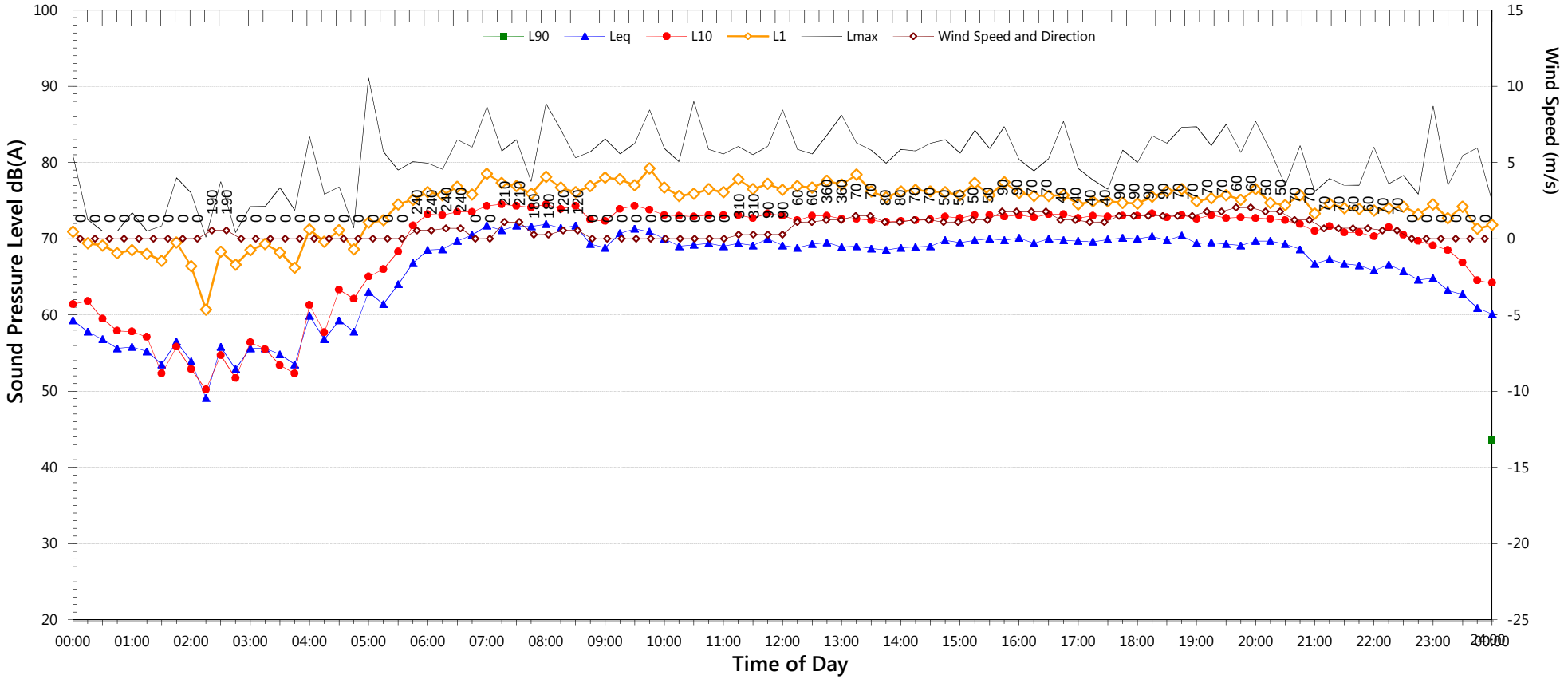
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	73.1	65.8
$L_{eq\ 1hr}$ upper 10 percentile	75.6	72.8
$L_{eq\ 1hr}$ lower 10 percentile	69.6	56.6

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	73.4	to	91.1
Lmax - Leq (Range)	15.4	to	31.2

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Tuesday, 18 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	52.8	48.0	41.7
Leq	69.9	68.9	64.5

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

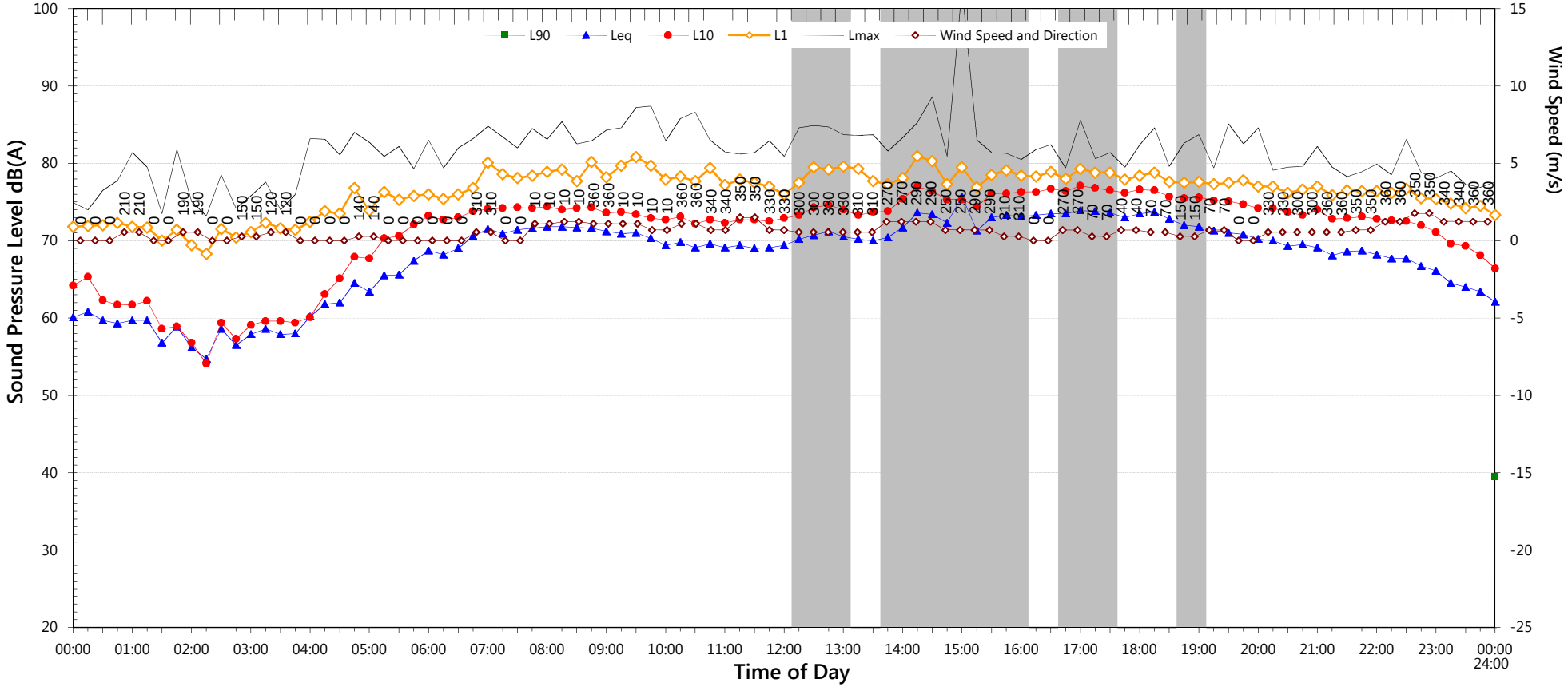
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72.2	67.0
$L_{eq\ 1hr}$ upper 10 percentile	73.7	72.5
$L_{eq\ 1hr}$ lower 10 percentile	70.3	59.7

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	78.5	to	87.4
Lmax - Leq (Range)	16.0	to	24.4

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Wednesday, 19 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	47.2	35.5
Leq	-	70.4	66.6

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

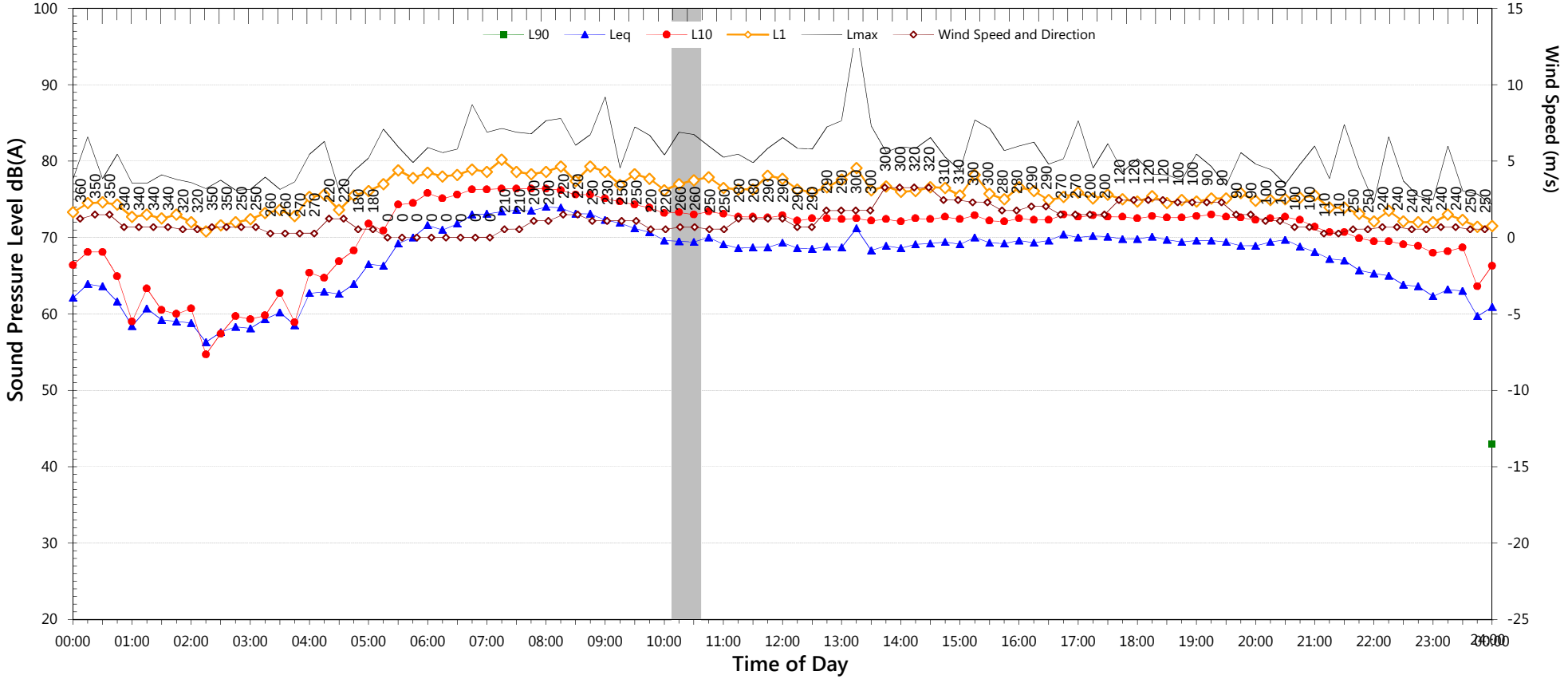
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	73.4	69.1
$L_{eq\ 1hr}$ upper 10 percentile	75.9	74.8
$L_{eq\ 1hr}$ lower 10 percentile	71.1	60.1

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	77.5	to	87.4
Lmax - Leq (Range)	15.1	to	20.8

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Thursday, 20 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	52.8	45.6	42.5
Leq	70.6	68.8	64.3

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

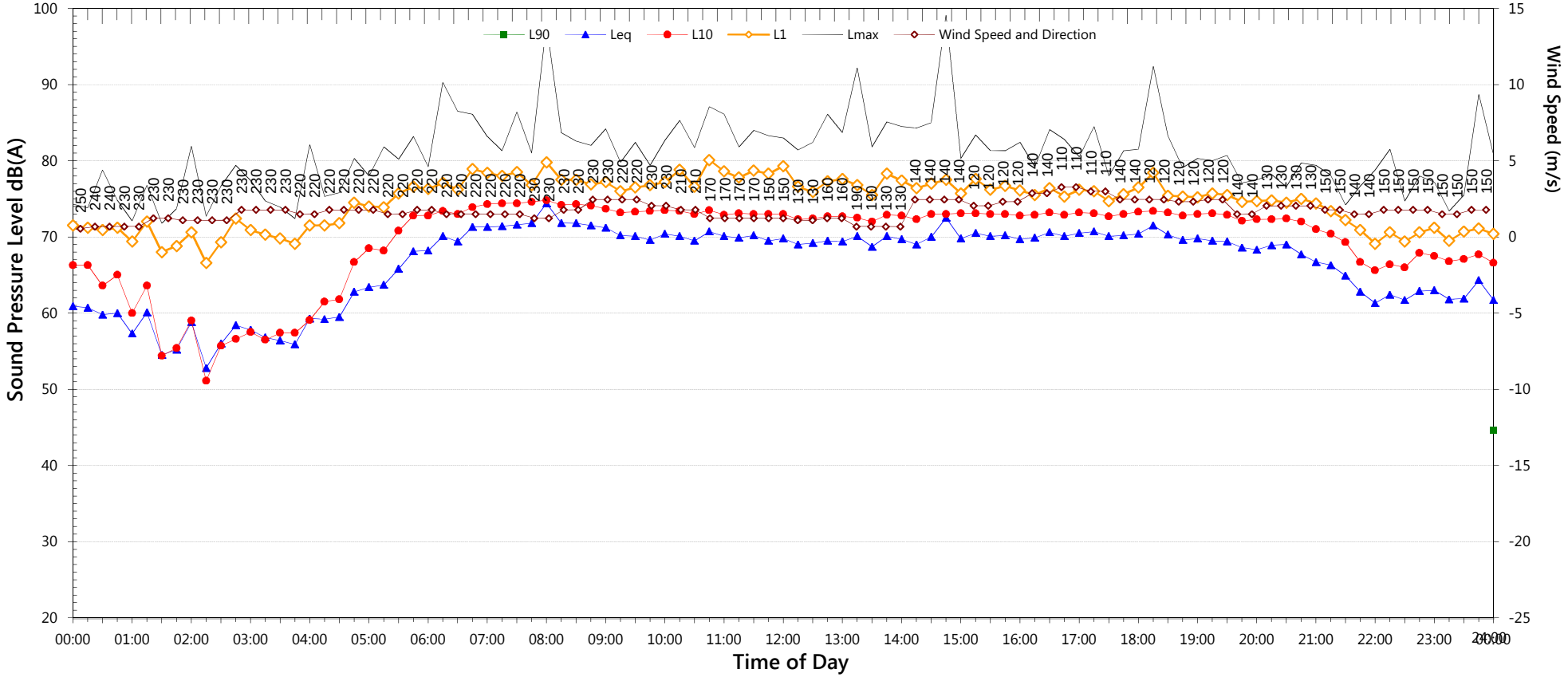
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72.7	66.8
$L_{eq\ 1hr}$ upper 10 percentile	75.9	73.1
$L_{eq\ 1hr}$ lower 10 percentile	70.2	59.2

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	78.8	to	90.3
Lmax - Leq (Range)	16.4	to	24.8

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Friday, 21 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	55.9	48.6	41.9
Leq	70.5	68.5	62.0

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

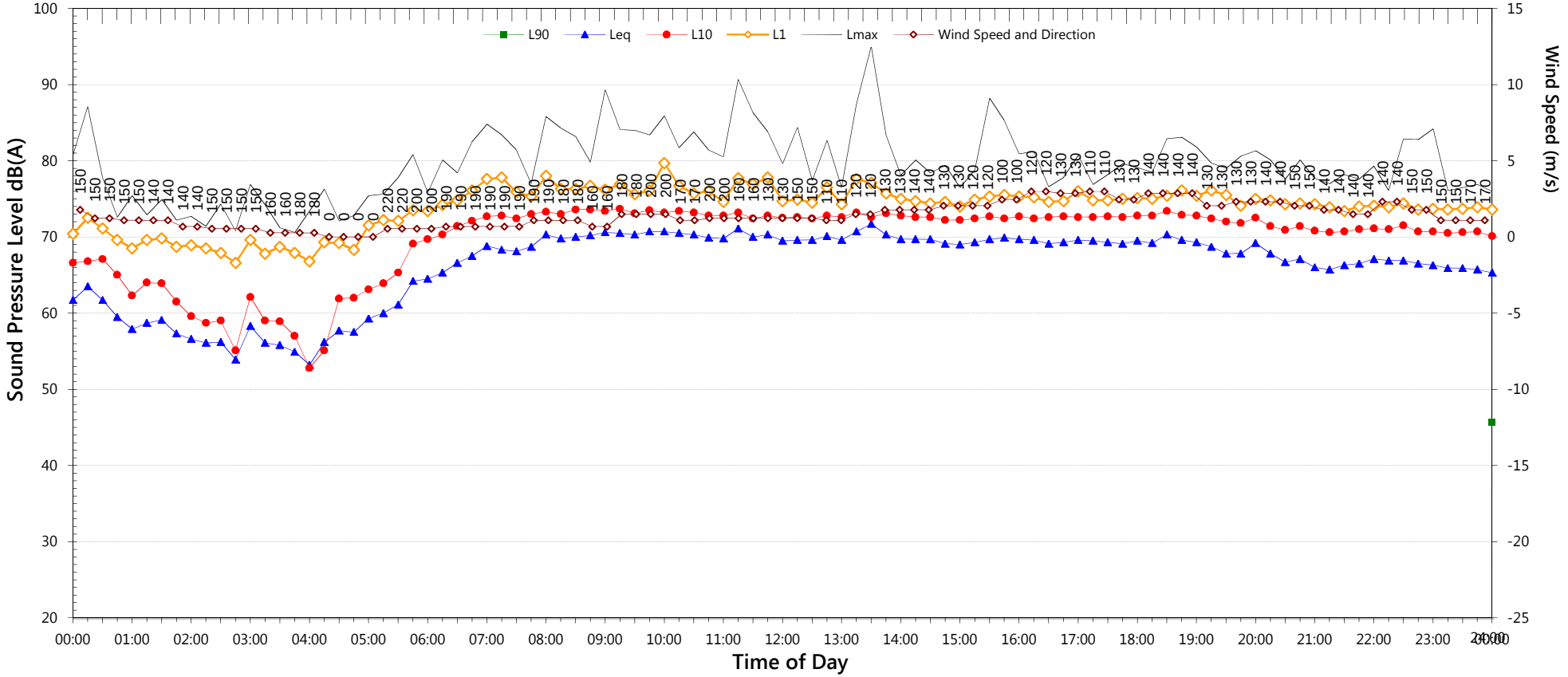
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72.5	64.5
$L_{eq\ 1hr}$ upper 10 percentile	74.6	69.7
$L_{eq\ 1hr}$ lower 10 percentile	69.1	57.6

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	74.2	to	88.7
Lmax - Leq (Range)	16.9	to	26.1

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Saturday, 22 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	55.0	48.1	39.1
Leq	69.9	68.0	63.5

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

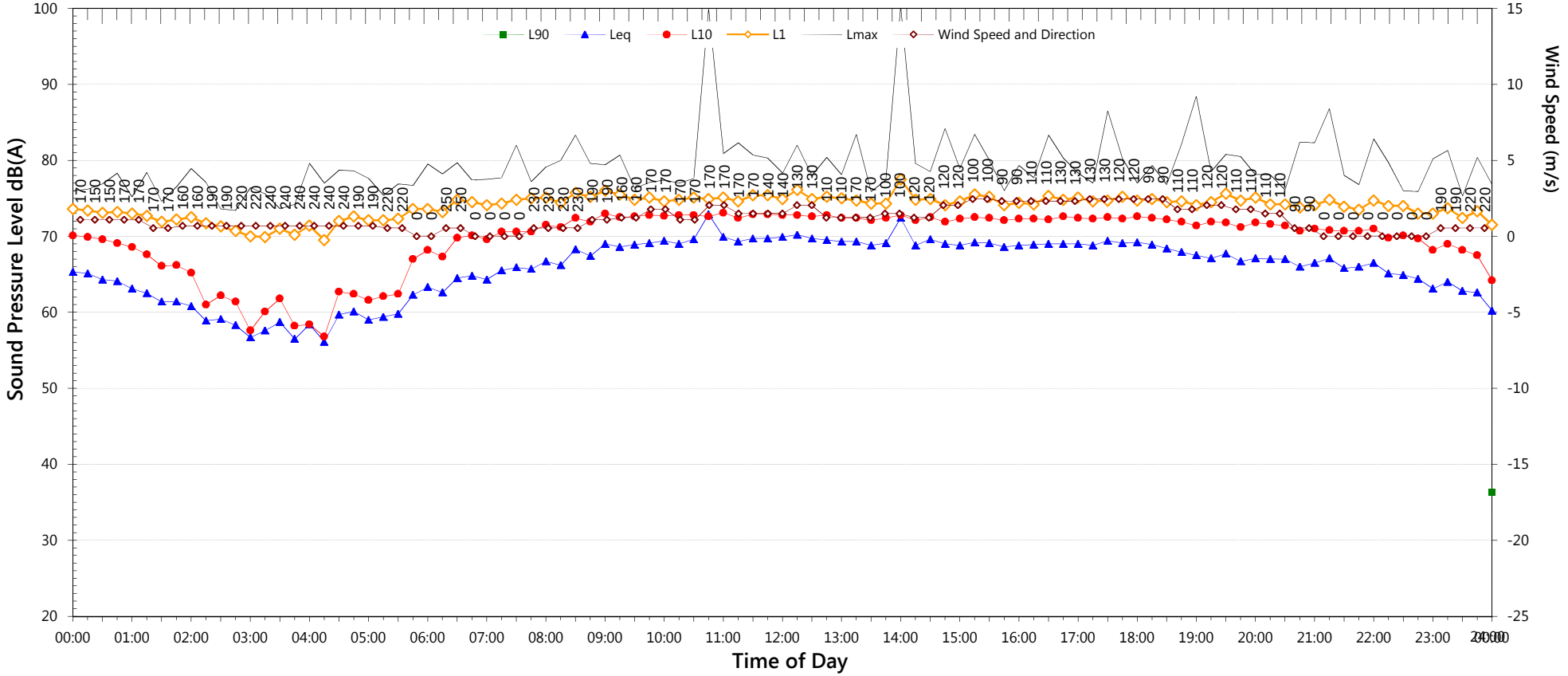
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72.0	66.0
$L_{eq\ 1hr}$ upper 10 percentile	73.1	69.2
$L_{eq\ 1hr}$ lower 10 percentile	69.2	60.4

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	77.1	to	84.2
Lmax - Leq (Range)	15.6	to	21.7

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Sunday, 23 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	51.0	46.8	36.4
Leq	69.4	67.2	64.4

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

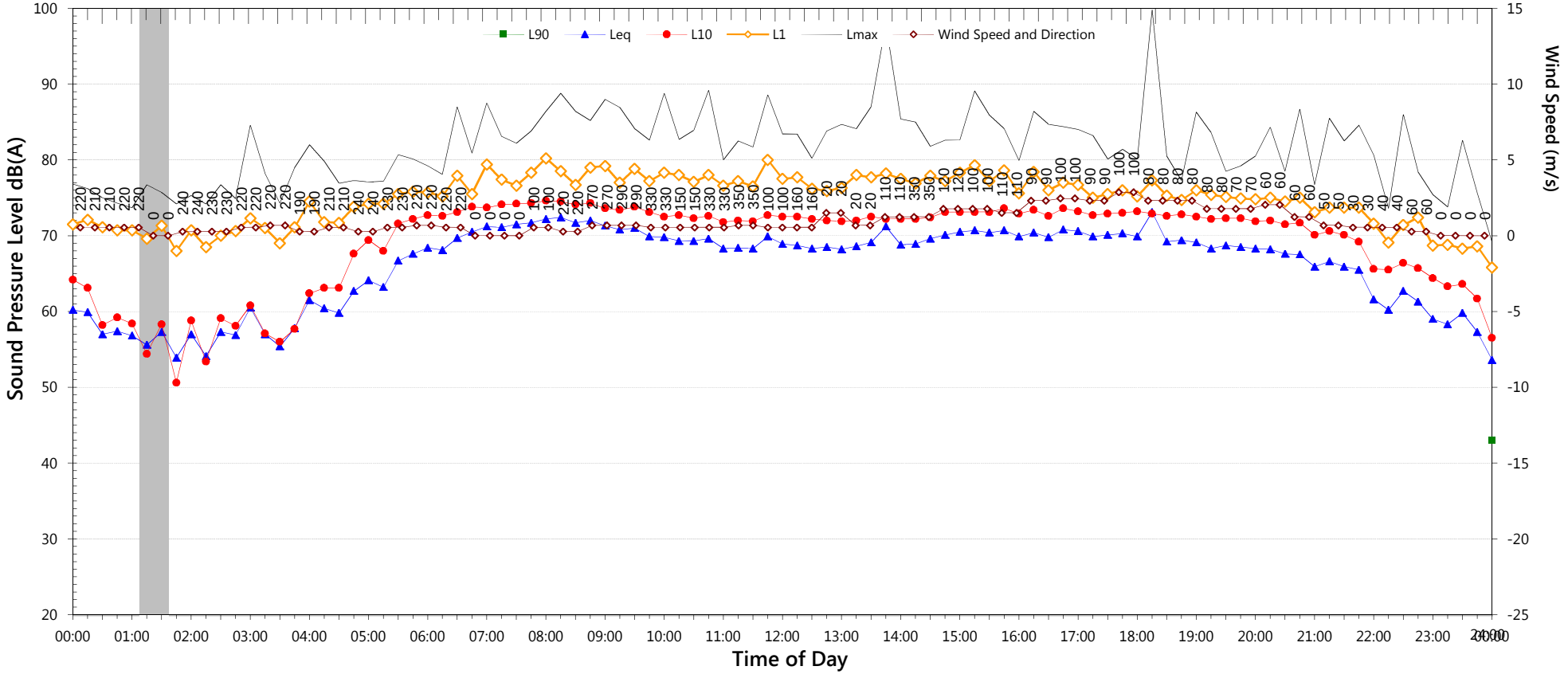
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.2	66.9
$L_{eq\ 1hr}$ upper 10 percentile	72.9	72.5
$L_{eq\ 1hr}$ lower 10 percentile	68.7	58.2

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	75.3	to	87.5
Lmax - Leq (Range)	15.8	to	26.8

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Monday, 24 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	53.5	50.3	41.5
Leq	70.2	68.3	63.6

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

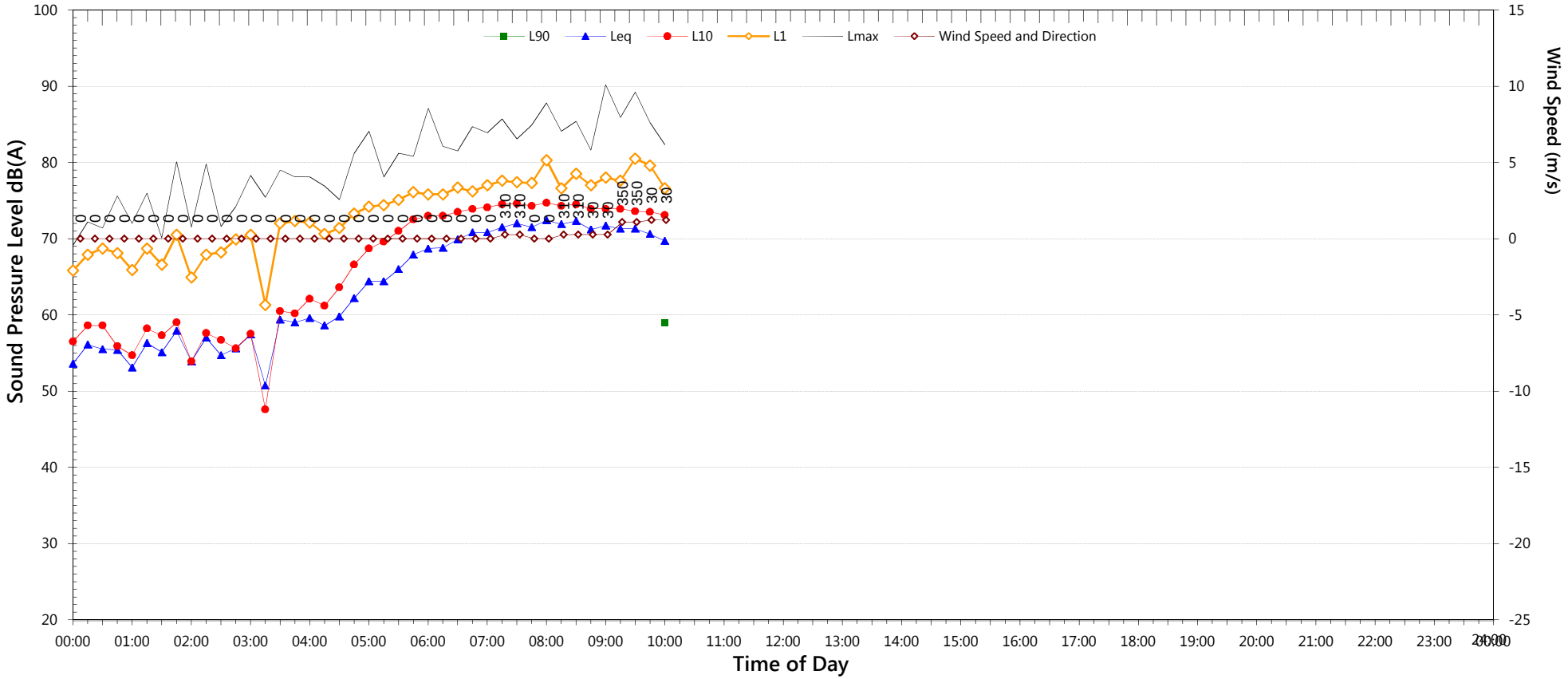
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	72.3	66.1
$L_{eq\ 1hr}$ upper 10 percentile	74.3	72.6
$L_{eq\ 1hr}$ lower 10 percentile	69.0	57.7

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	75.6	to	87.1
Lmax - Leq (Range)	20.0	to	25.0

Unattended Noise Monitoring Results

25 Memorial Ave - Front yard

Tuesday, 25 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

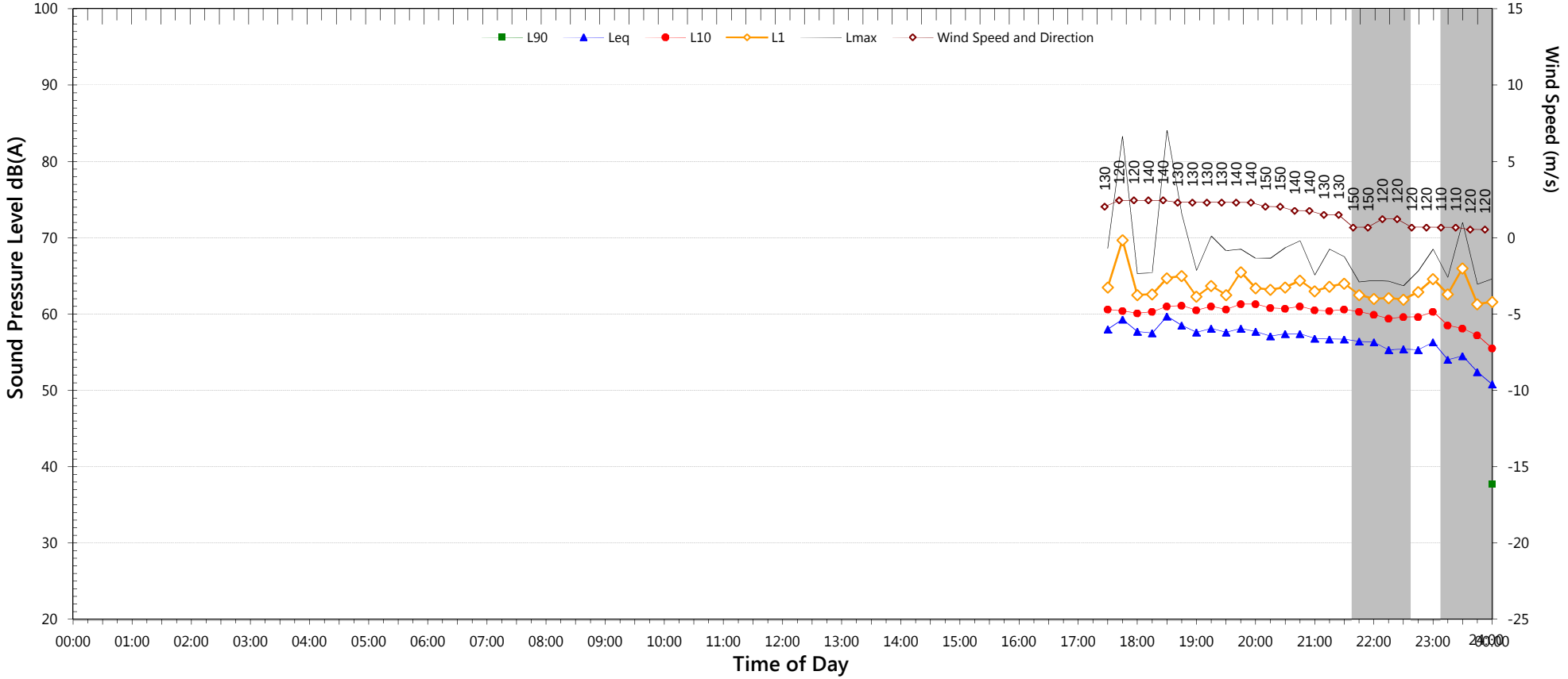
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	74.0	-
$L_{eq\ 1hr}$ upper 10 percentile	74.4	-
$L_{eq\ 1hr}$ lower 10 percentile	73.3	-

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Tuesday, 11 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	46.2	-
Leq	-	57.7	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

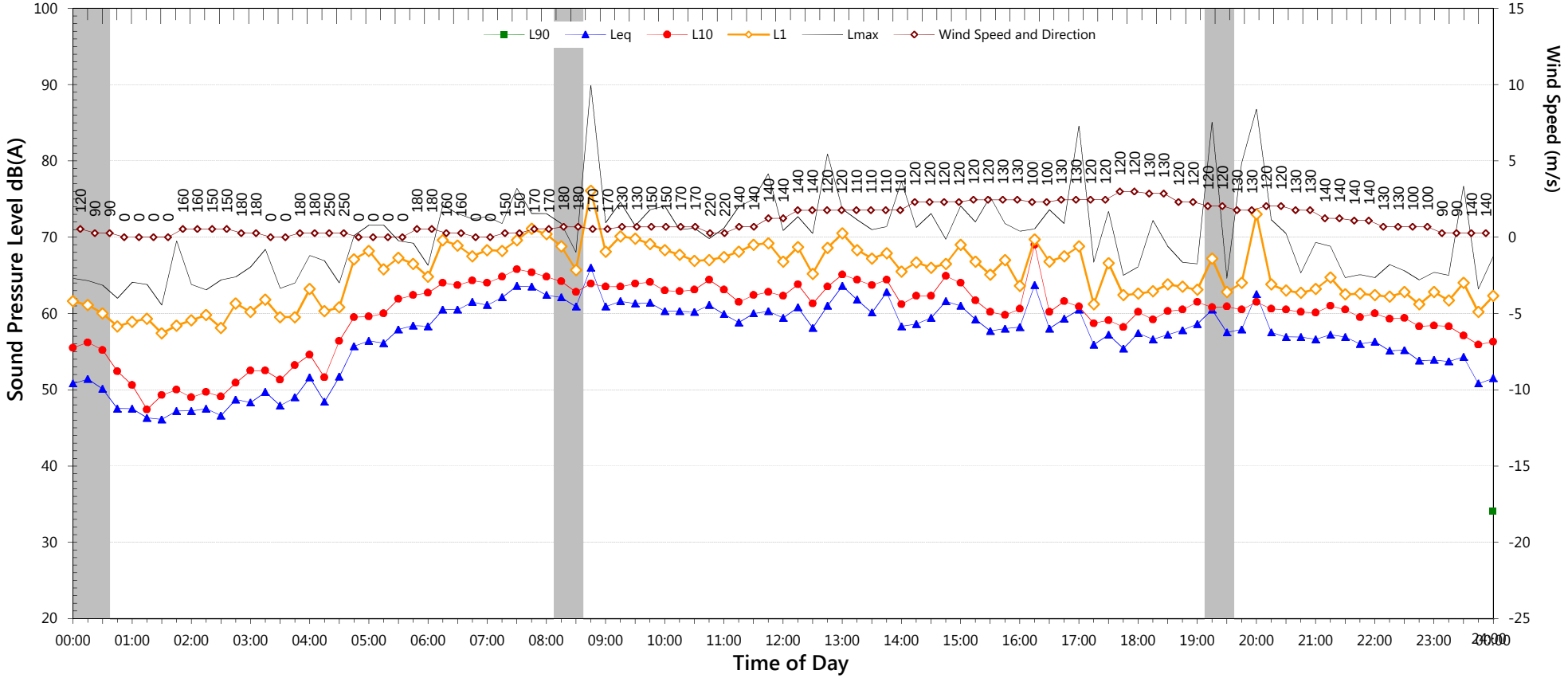
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	60.3	58.1
$L_{eq\ 1hr}$ upper 10 percentile	60.9	63.4
$L_{eq\ 1hr}$ lower 10 percentile	59.2	49.2

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	66.1	to	71.6
Lmax - Leq (Range)	16.6	to	22.8

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Wednesday, 12 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	49.0	45.6	33.9
Leq	60.8	57.9	55.7

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

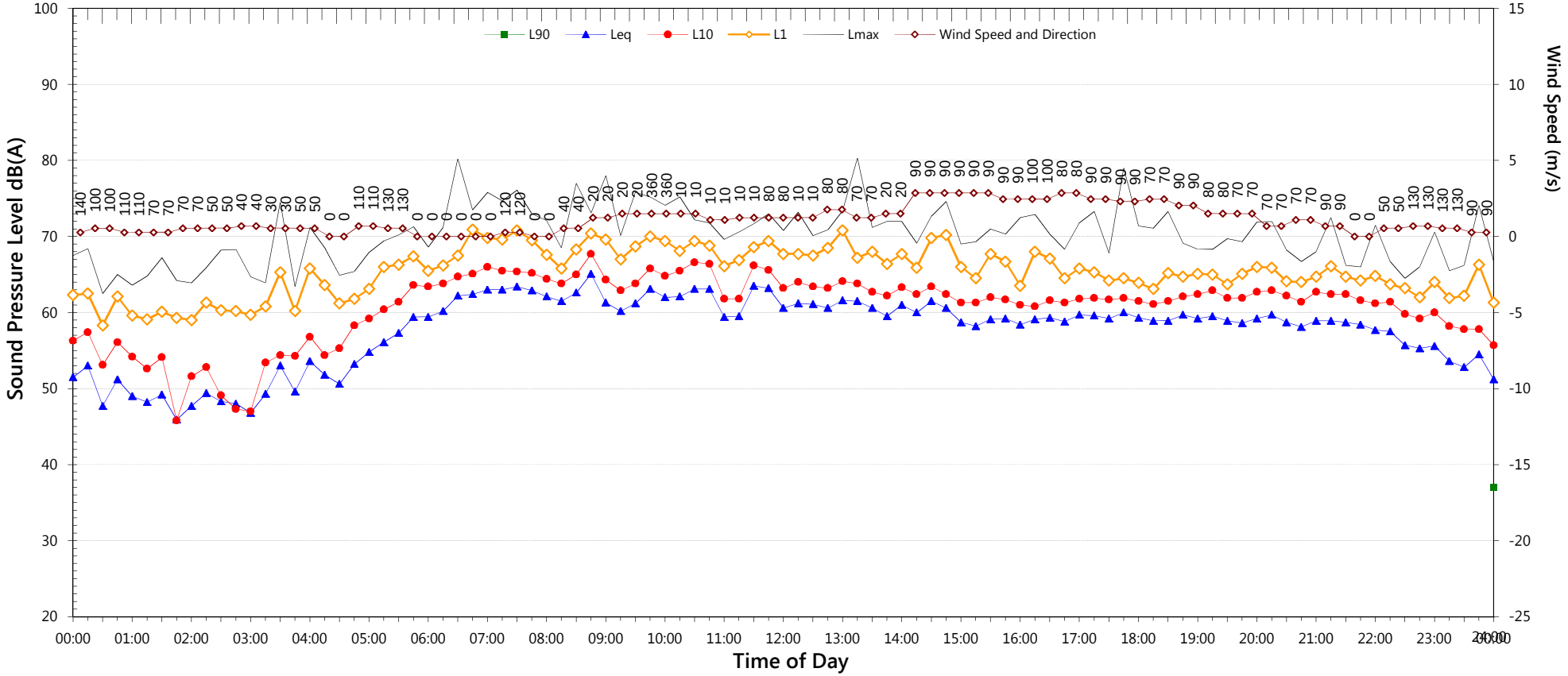
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	62.7	58.2
$L_{eq\ 1hr}$ upper 10 percentile	66.1	64.6
$L_{eq\ 1hr}$ lower 10 percentile	59.1	50.4

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	67.2	to	80.2
Lmax - Leq (Range)	15.6	to	23.9

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Thursday, 13 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	52.1	46.9	-
Leq	61.2	58.9	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

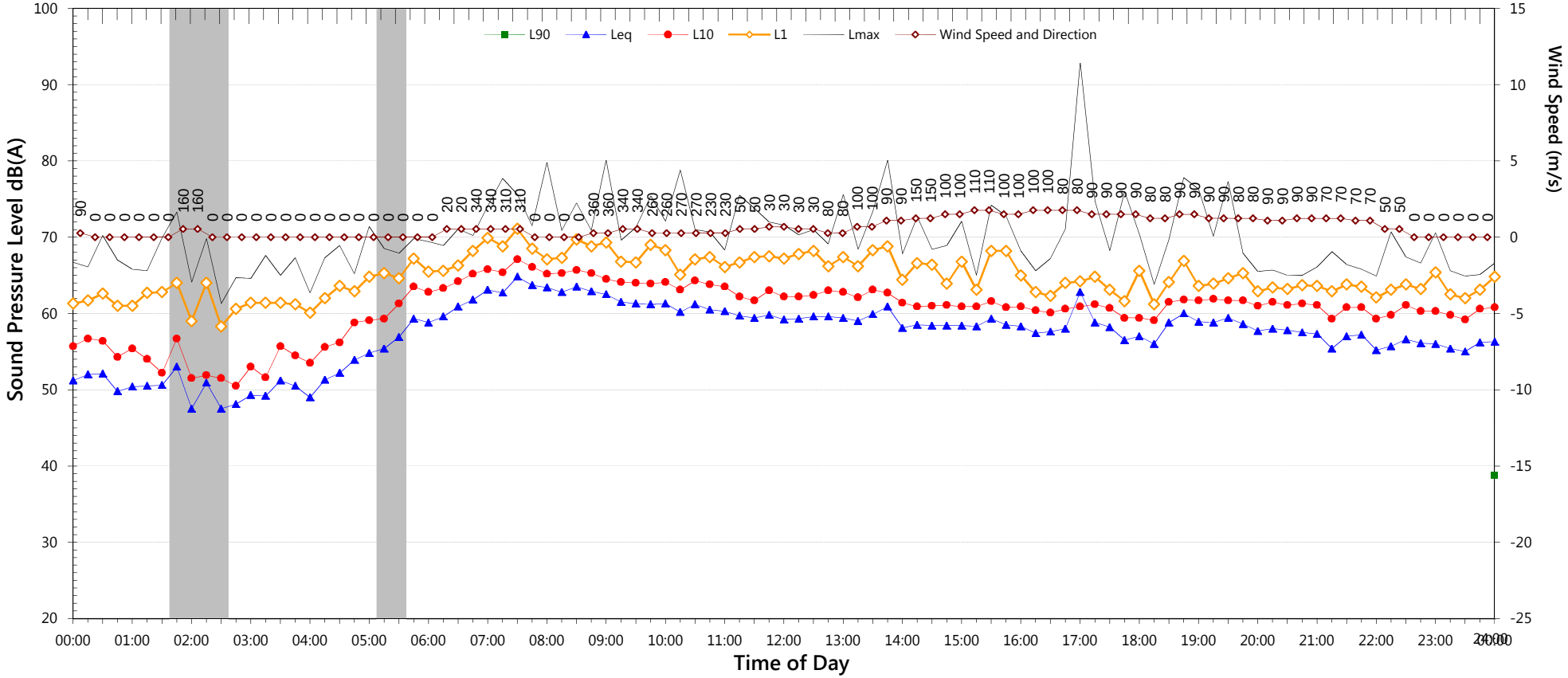
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	63.2	58.5
$L_{eq\ 1hr}$ upper 10 percentile	65.4	64.0
$L_{eq\ 1hr}$ lower 10 percentile	61.1	51.2

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	67.6	to	74.1
Lmax - Leq (Range)	16.0	to	20.9

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Friday, 14 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	49.0	43.5	-
Leq	60.5	57.9	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

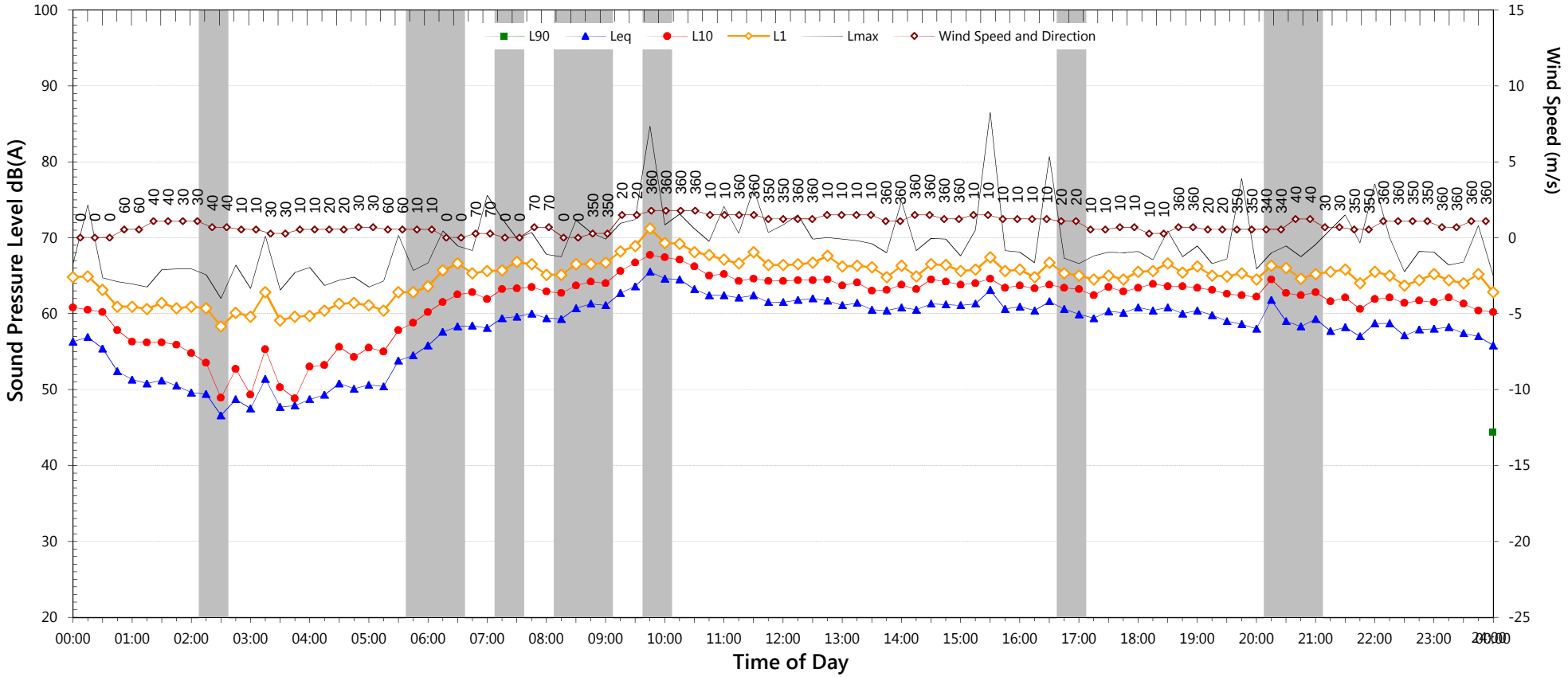
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	62.5	56.4
$L_{eq\ 1hr}$ upper 10 percentile	65.8	60.8
$L_{eq\ 1hr}$ lower 10 percentile	59.5	50.6

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	65.9	to	75.6
Lmax - Leq (Range)	15.3	to	21.0

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Saturday, 15 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

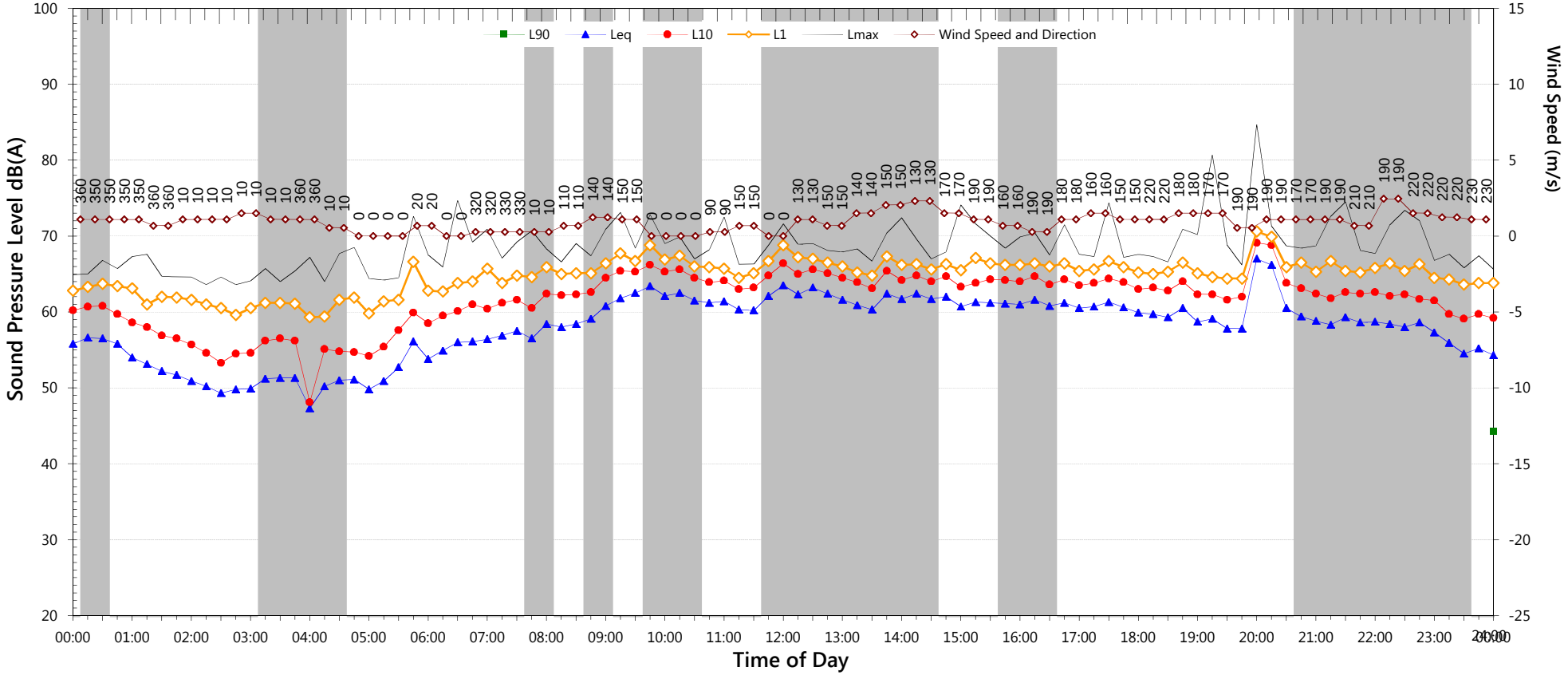
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	63.6	57.7
$L_{eq\ 1hr}$ upper 10 percentile	65.7	60.5
$L_{eq\ 1hr}$ lower 10 percentile	60.8	52.3

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	67.6	to	74.7
Lmax - Leq (Range)	15.6	to	18.8

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Sunday, 16 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

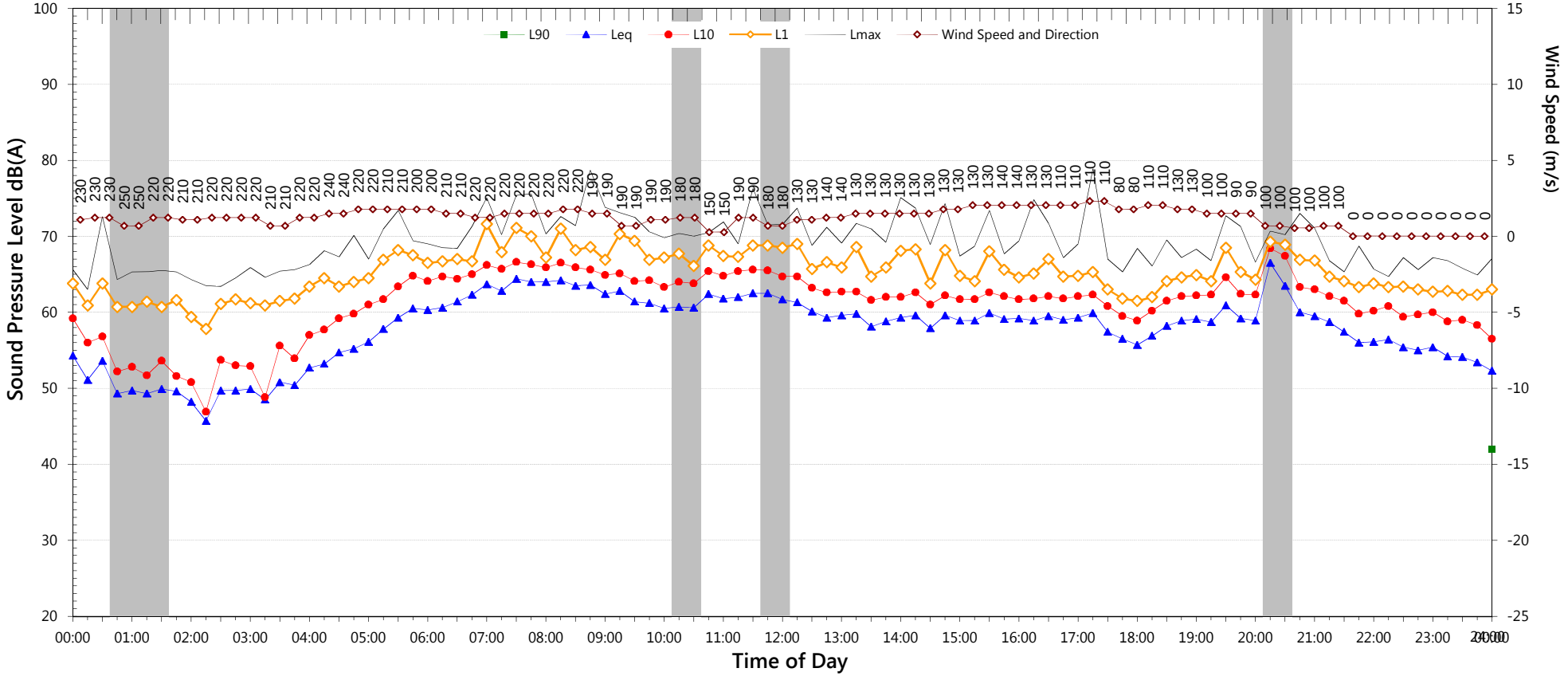
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	63.6	59.6
$L_{eq\ 1hr}$ upper 10 percentile	66.4	64.7
$L_{eq\ 1hr}$ lower 10 percentile	59.9	51.5

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	65.3	to	72.6
Lmax - Leq (Range)	15.2	to	20.1

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Monday, 17 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	48.4	46.1	36.7
Leq	61.0	58.7	55.7

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

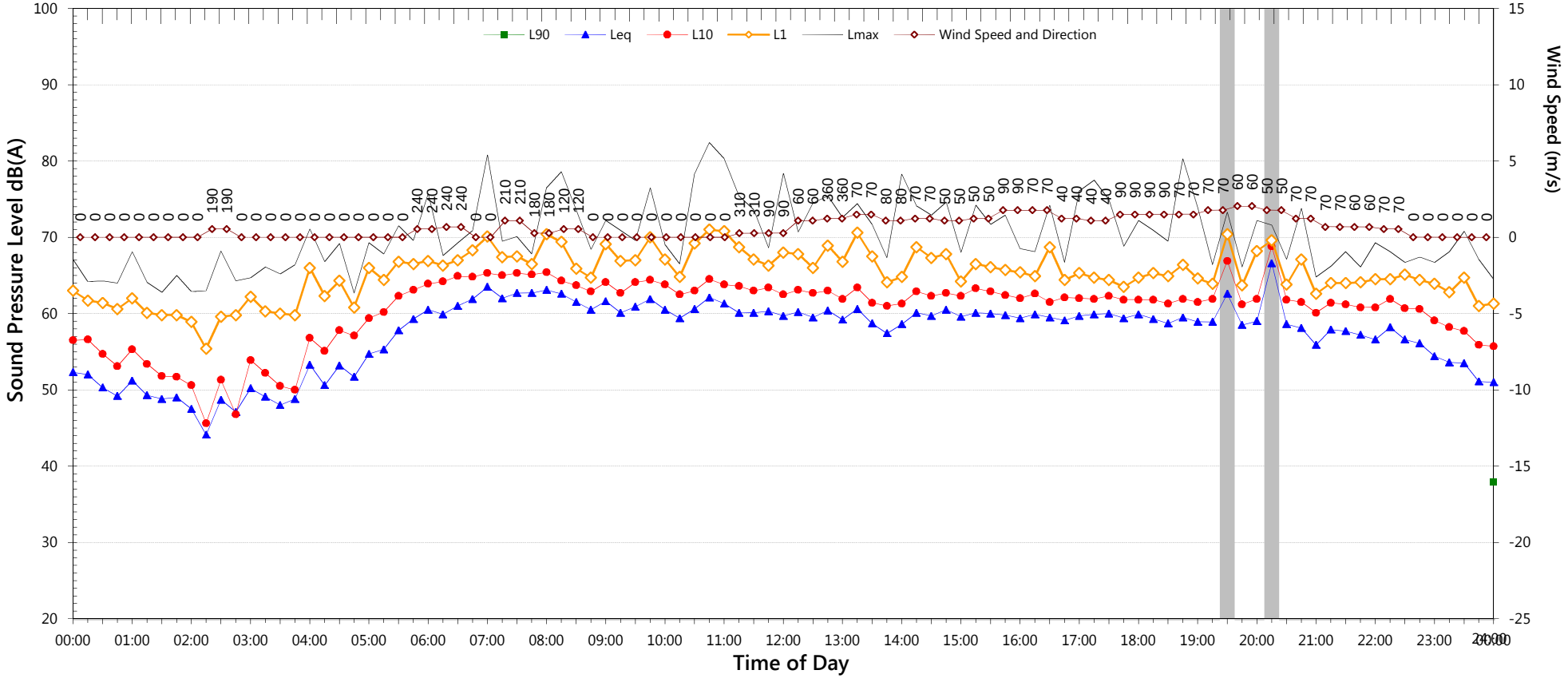
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	63.0	58.2
$L_{eq\ 1hr}$ upper 10 percentile	66.2	64.3
$L_{eq\ 1hr}$ lower 10 percentile	59.9	50.6

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	65.0	to	80.8
Lmax - Leq (Range)	16.3	to	20.7

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Tuesday, 18 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	50.6	43.5	36.6
Leq	60.5	58.3	55.9

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

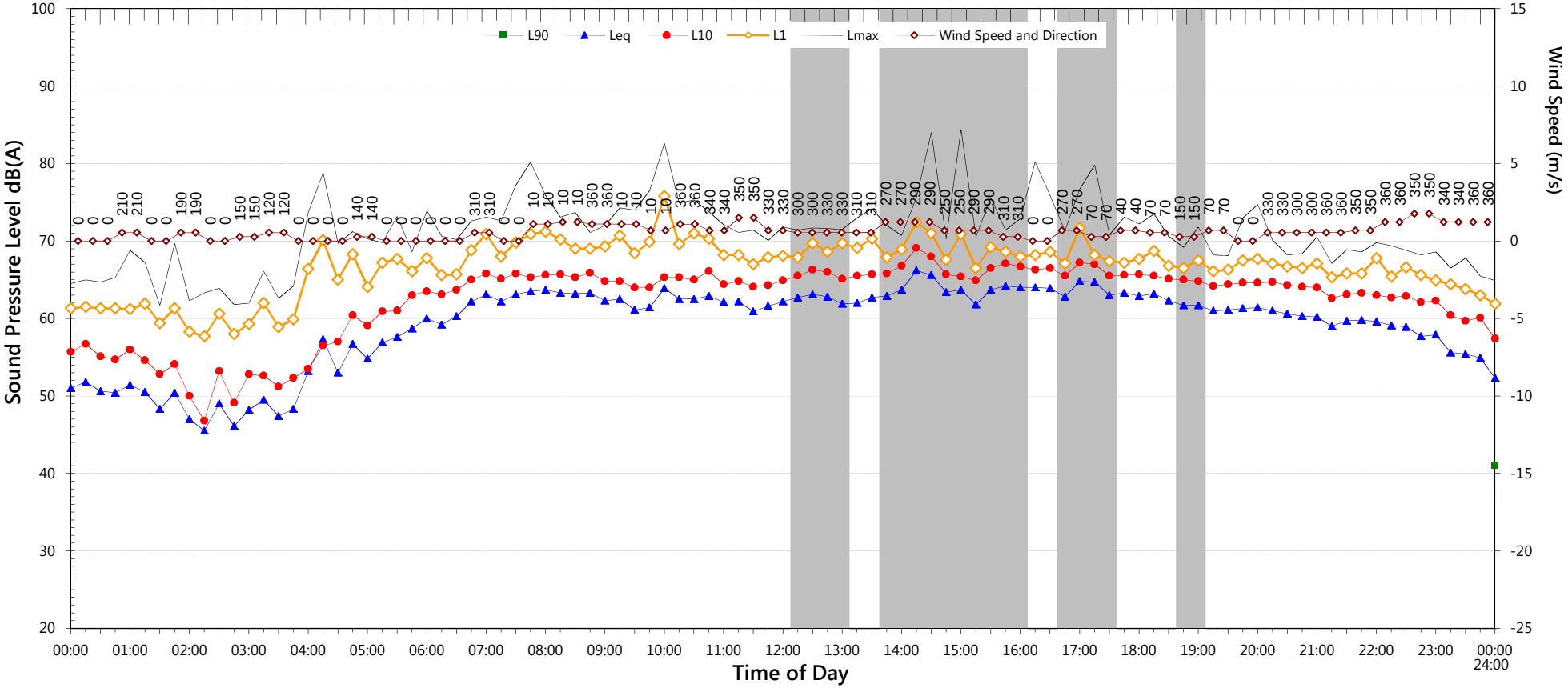
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	62.6	58.4
$L_{eq\ 1hr}$ upper 10 percentile	64.7	64.0
$L_{eq\ 1hr}$ lower 10 percentile	60.0	49.9

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	68.8	to	78.8
Lmax - Leq (Range)	15.4	to	23.5

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Wednesday, 19 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	48.7	38.0
Leq	-	60.9	58.7

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

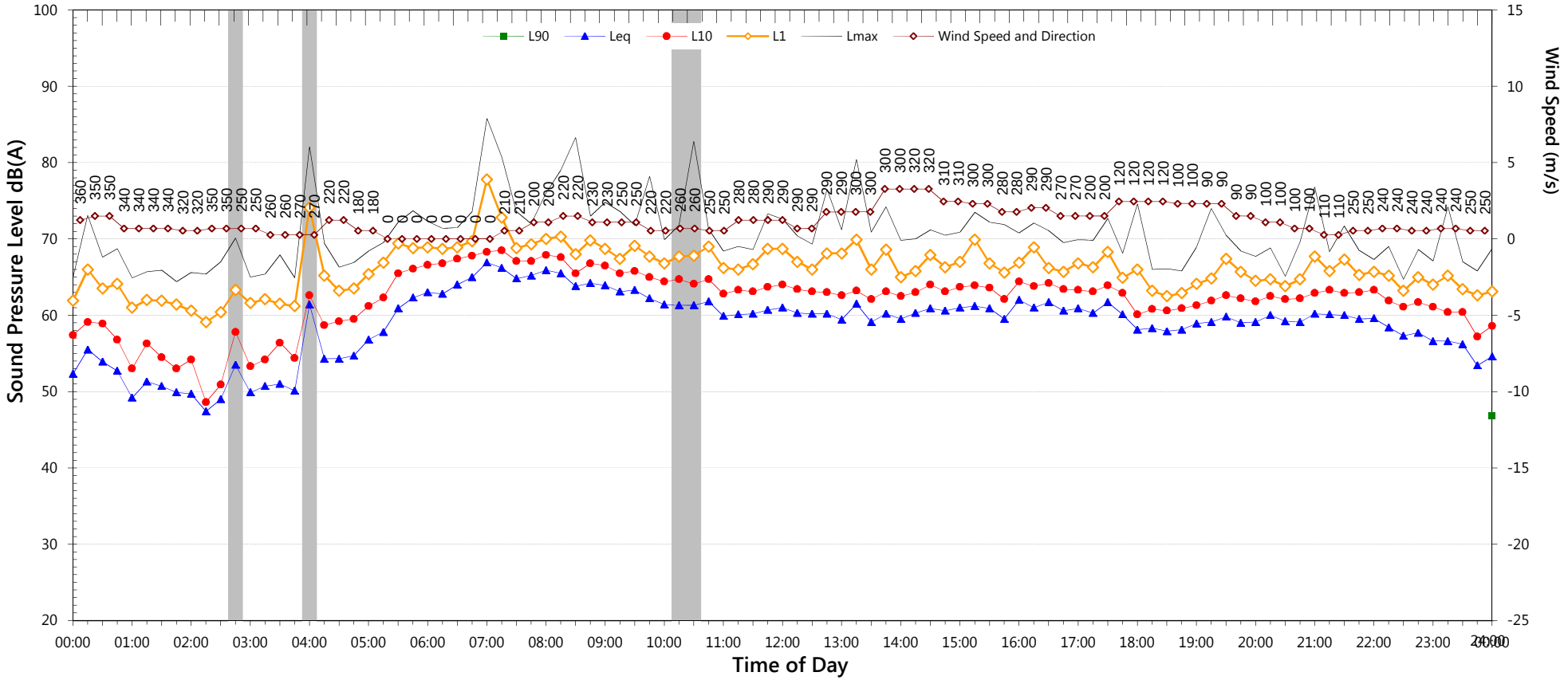
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	64.7	61.2
$L_{eq\ 1hr}$ upper 10 percentile	66.3	67.4
$L_{eq\ 1hr}$ lower 10 percentile	62.3	51.4

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	65.9	to	85.8
Lmax - Leq (Range)	15.5	to	20.9

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Thursday, 20 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	52.3	48.6	44.0
Leq	62.0	59.3	57.3

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

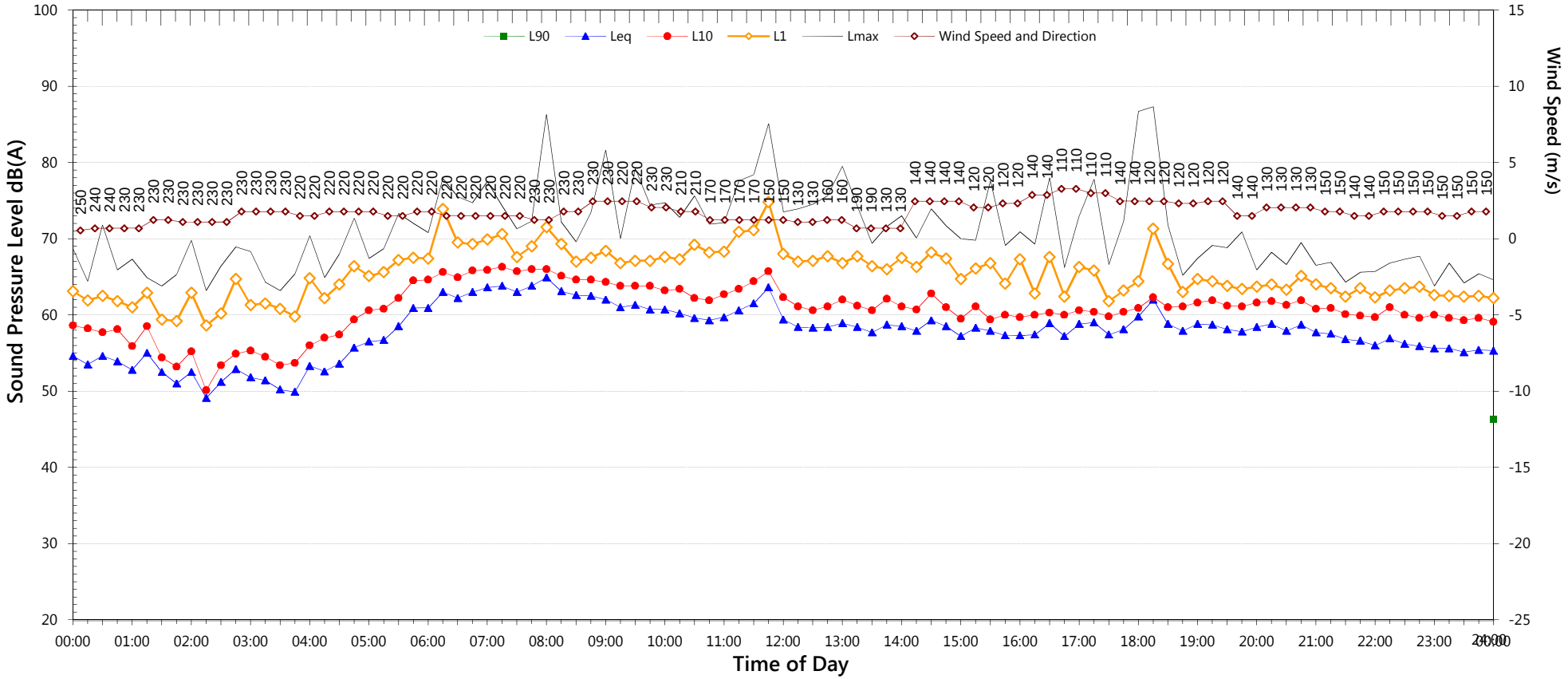
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	63.9	59.8
$L_{eq\ 1hr}$ upper 10 percentile	67.5	65.5
$L_{eq\ 1hr}$ lower 10 percentile	61.3	53.9

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	68.9	to	74.2
Lmax - Leq (Range)	16.8	to	19.0

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Friday, 21 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	48.9	49.1	37.1
Leq	60.4	58.4	54.6

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

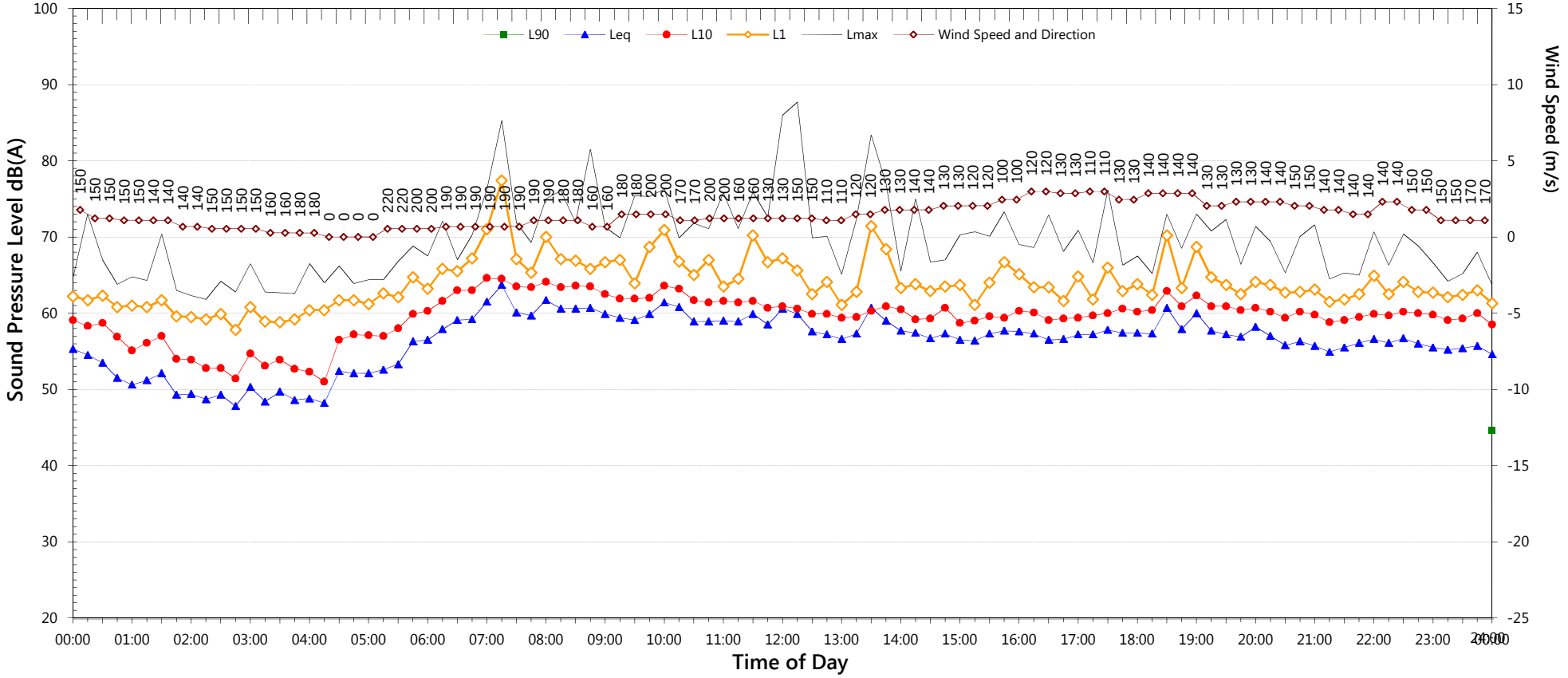
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	62.4	57.1
$L_{eq\ 1hr}$ upper 10 percentile	65.8	62.1
$L_{eq\ 1hr}$ lower 10 percentile	59.8	51.4

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	66.5	to	76.3
Lmax - Leq (Range)	16.7	to	20.2

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Saturday, 22 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	49.3	45.2	38.5
Leq	59.1	57.4	54.0

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

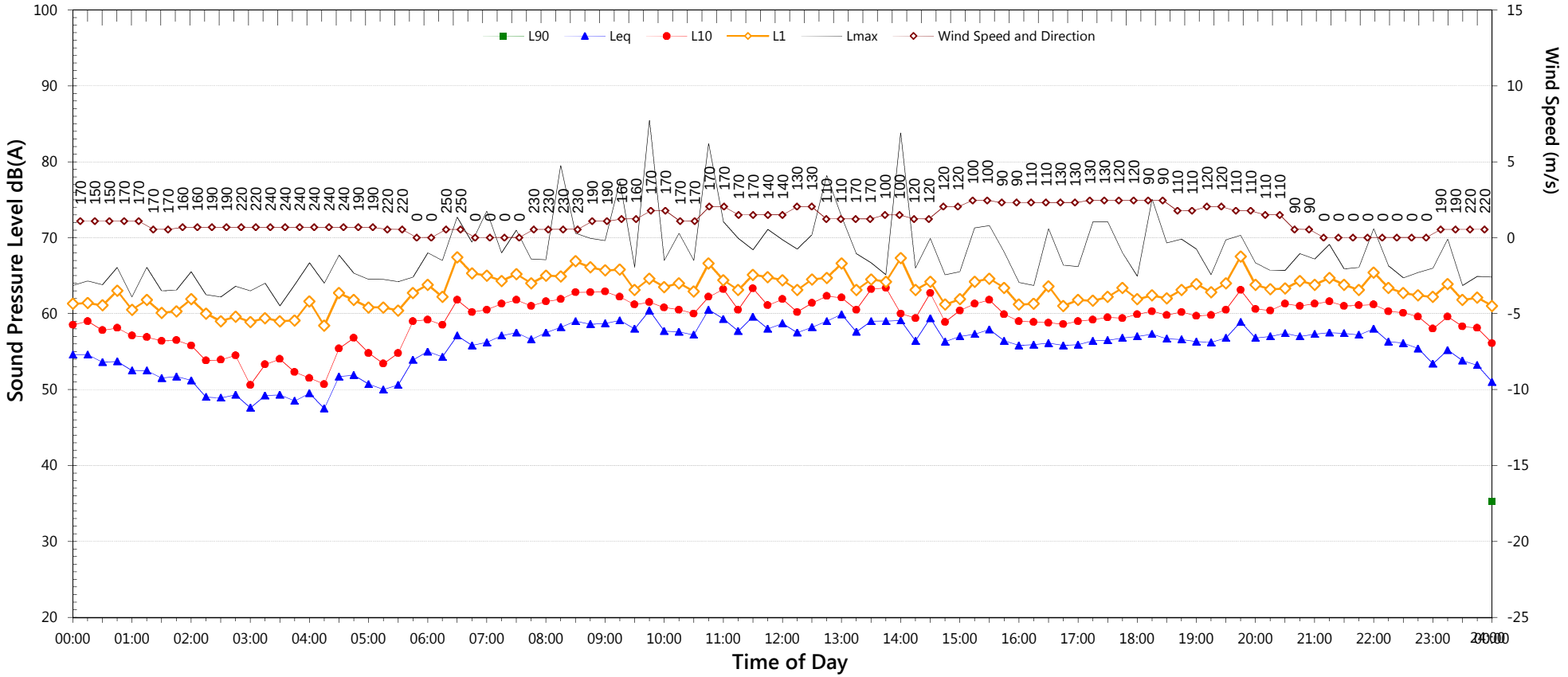
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.2	56.5
$L_{eq\ 1hr}$ upper 10 percentile	63.6	58.6
$L_{eq\ 1hr}$ lower 10 percentile	58.5	51.2

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	66.7	to	73.5
Lmax - Leq (Range)	15.1	to	17.6

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Sunday, 23 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	46.7	46.0	35.8
Leq	58.1	57.2	55.7

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

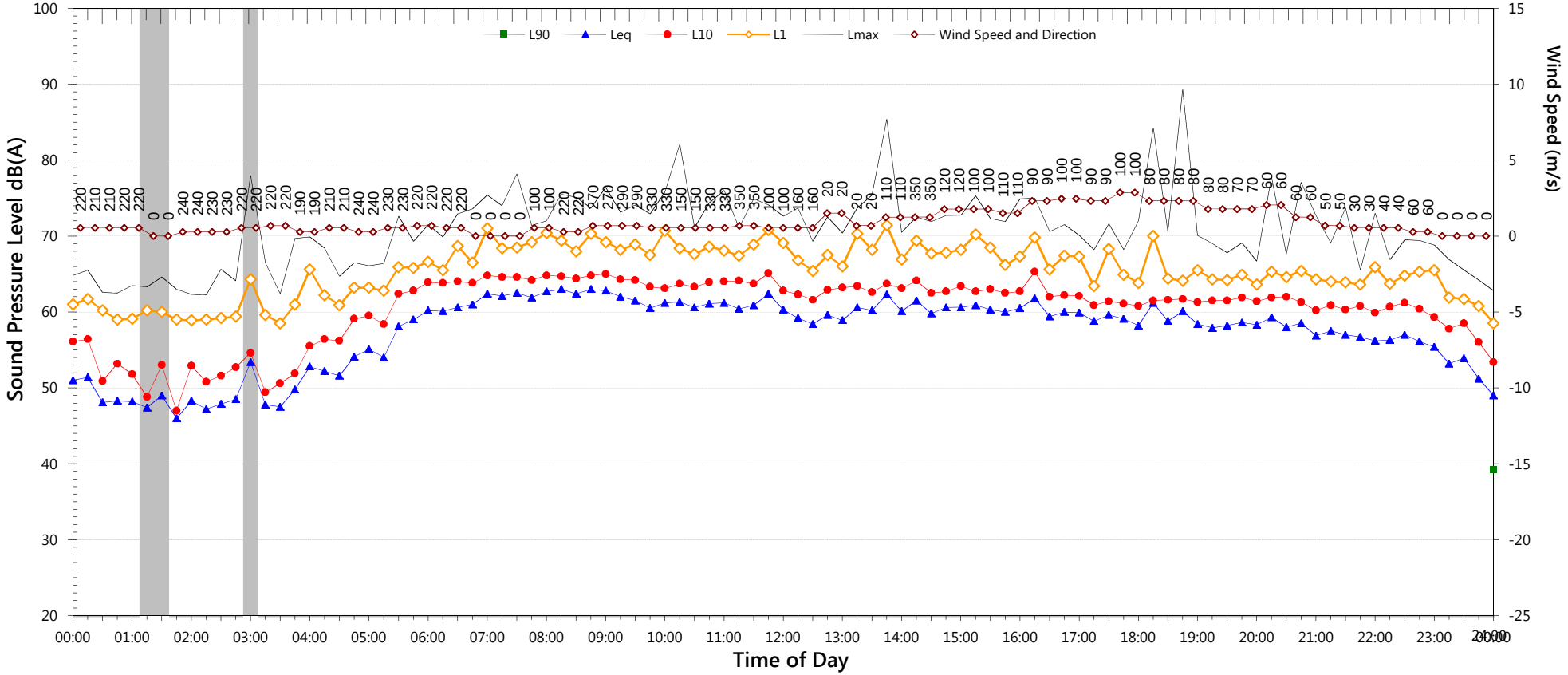
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	60.3	58.2
$L_{eq\ 1hr}$ upper 10 percentile	61.4	63.6
$L_{eq\ 1hr}$ lower 10 percentile	58.8	49.8

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	65.5	to	69.9
Lmax - Leq (Range)	15.7	to	19.9

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Monday, 24 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	51.1	45.9	39.2
Leq	61.0	58.4	56.2

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

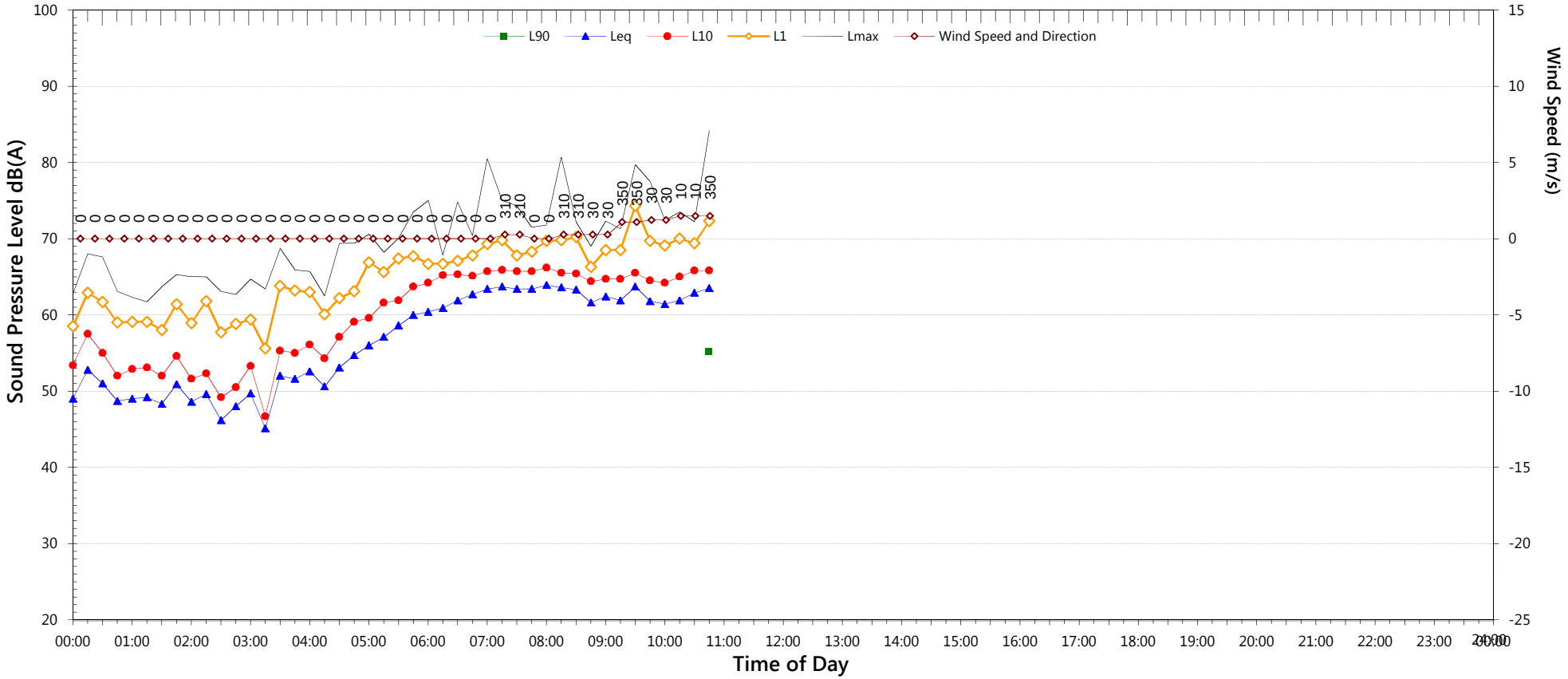
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	62.9	58.7
$L_{eq\ 1hr}$ upper 10 percentile	65.1	64.8
$L_{eq\ 1hr}$ lower 10 percentile	60.1	51.1

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	65.0	to	80.5
Lmax - Leq (Range)	15.8	to	18.2

Unattended Noise Monitoring Results

32 Memorial Ave - Front Yard

Tuesday, 25 February 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

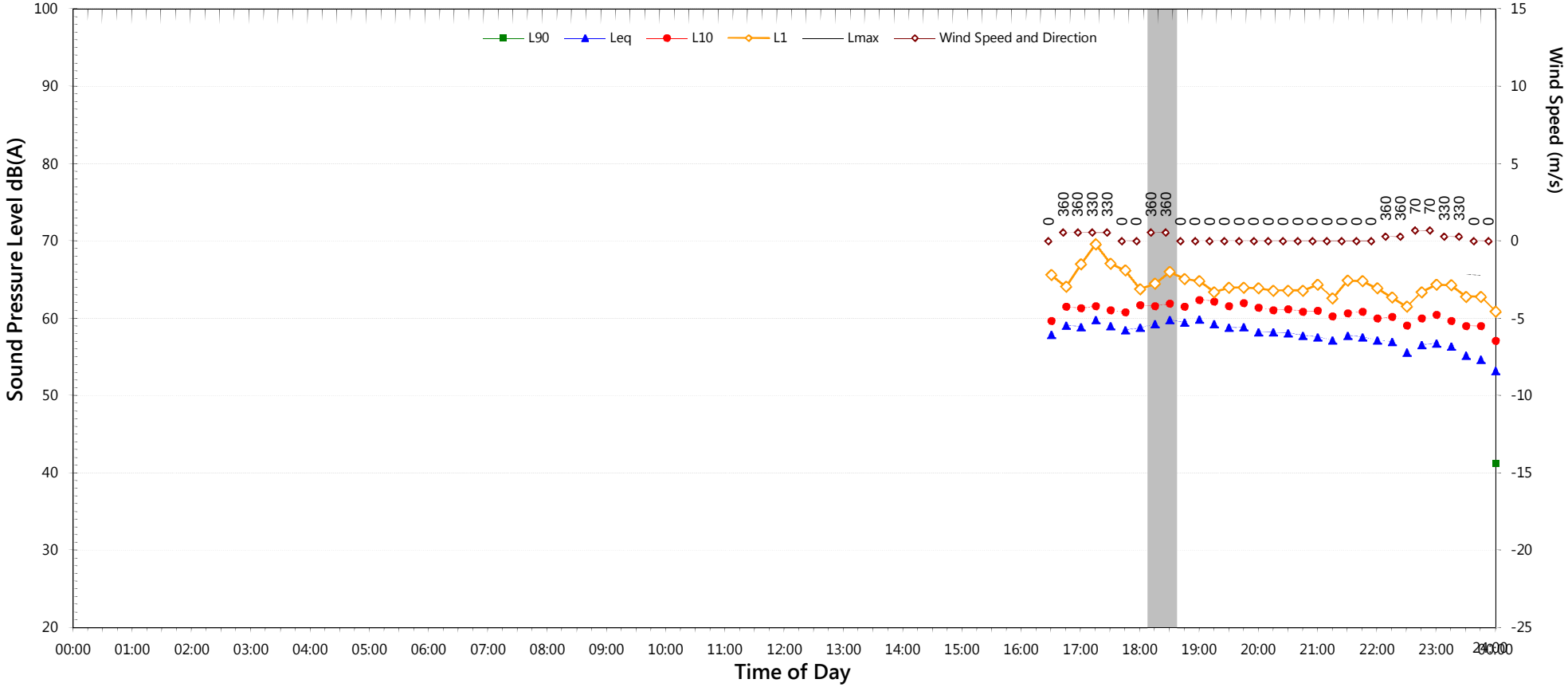
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	65.4	-
$L_{eq\ 1hr}$ upper 10 percentile	66.1	-
$L_{eq\ 1hr}$ lower 10 percentile	64.8	-

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

Unattended Noise Monitoring Results

10 Rothwell Circuit

Tuesday, 15 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	46.6	-
Leq	-	58.4	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

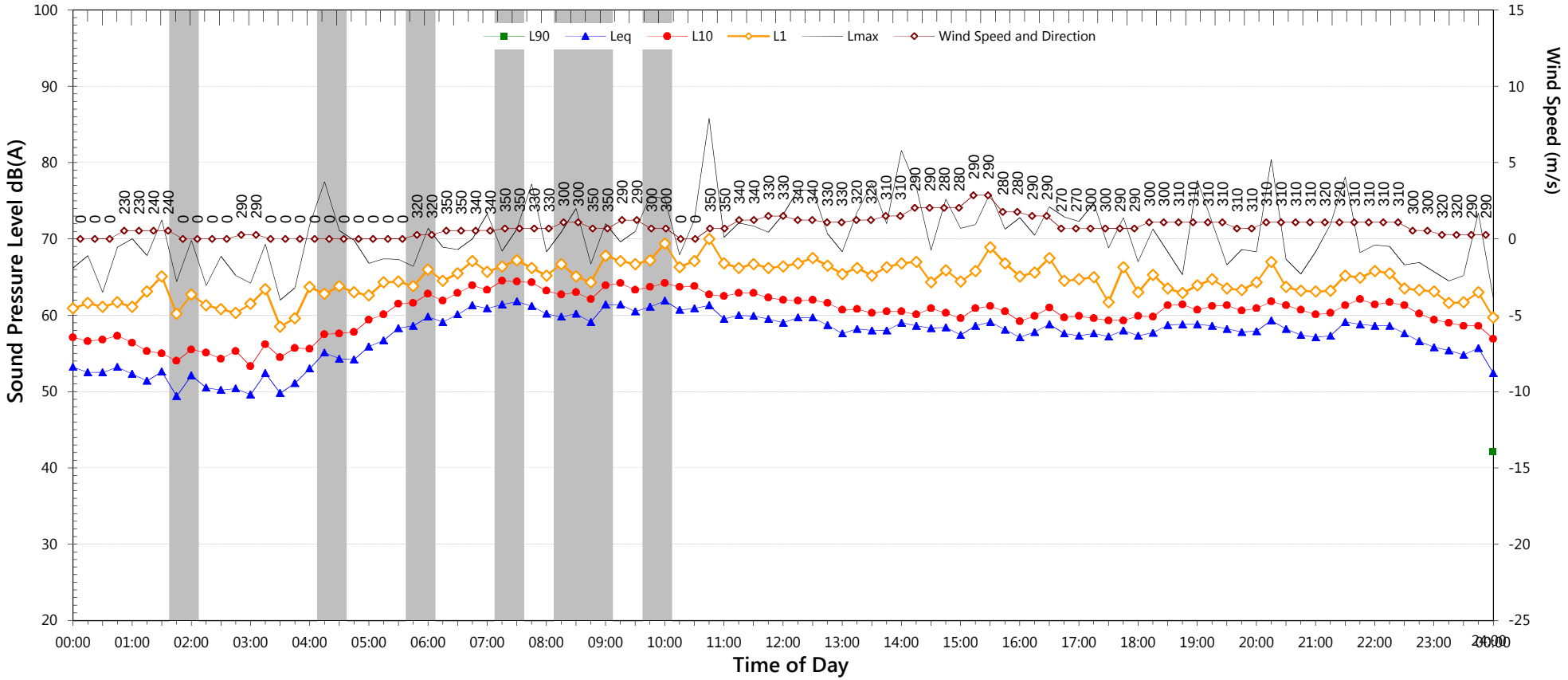
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.1	58.3
$L_{eq\ 1hr}$ upper 10 percentile	62.2	62.9
$L_{eq\ 1hr}$ lower 10 percentile	60.0	52.7

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	67.7	to	72.5
Lmax - Leq (Range)	17.4	to	20.5

Unattended Noise Monitoring Results

10 Rothwell Circuit

Wednesday, 16 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	48.5	48.2	36.5
Leq	59.1	58.3	56.6

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

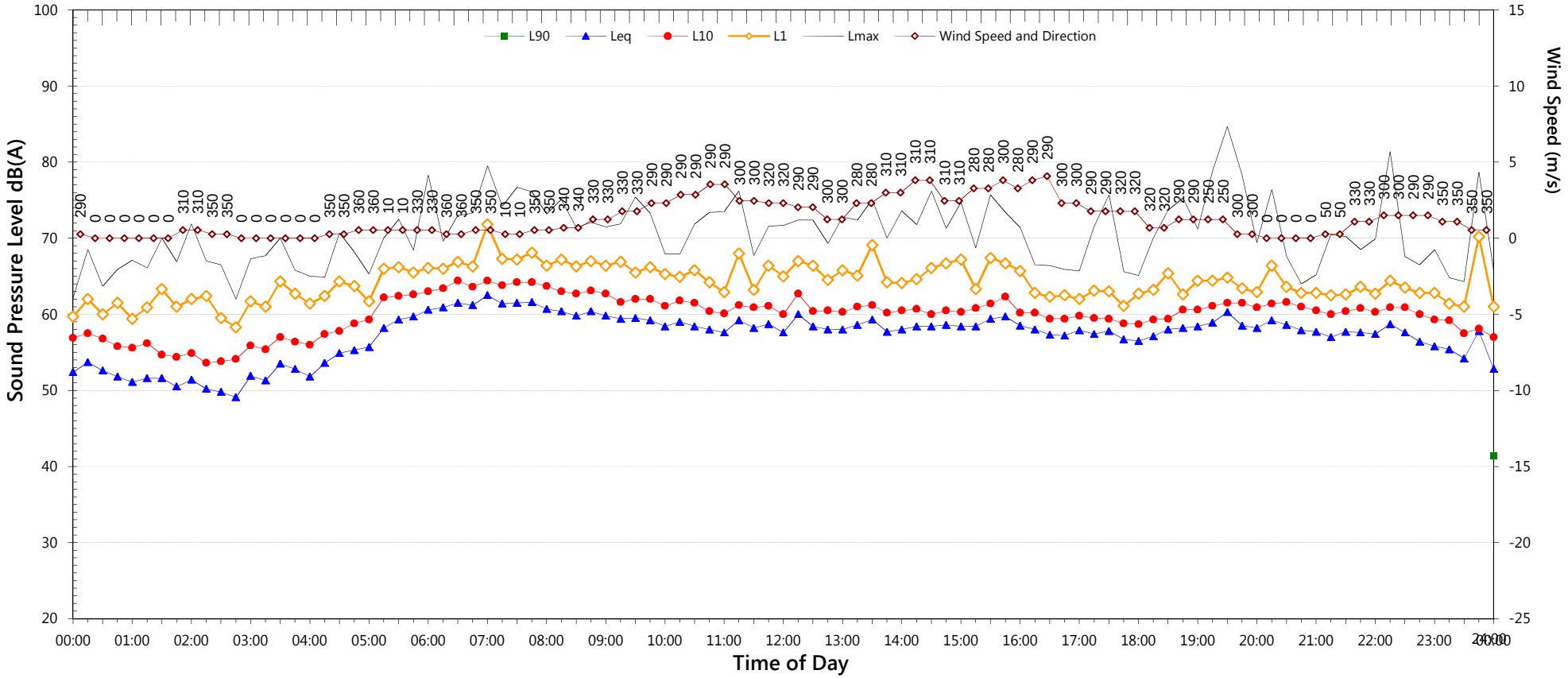
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.4	59.1
$L_{eq\ 1hr}$ upper 10 percentile	63.4	64.1
$L_{eq\ 1hr}$ lower 10 percentile	60.2	52.9

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	67.3	to	79.5
Lmax - Leq (Range)	15.8	to	20.6

Unattended Noise Monitoring Results

10 Rothwell Circuit

Thursday, 17 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	50.7	47.9	37.1
Leq	58.9	58.2	56.0

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

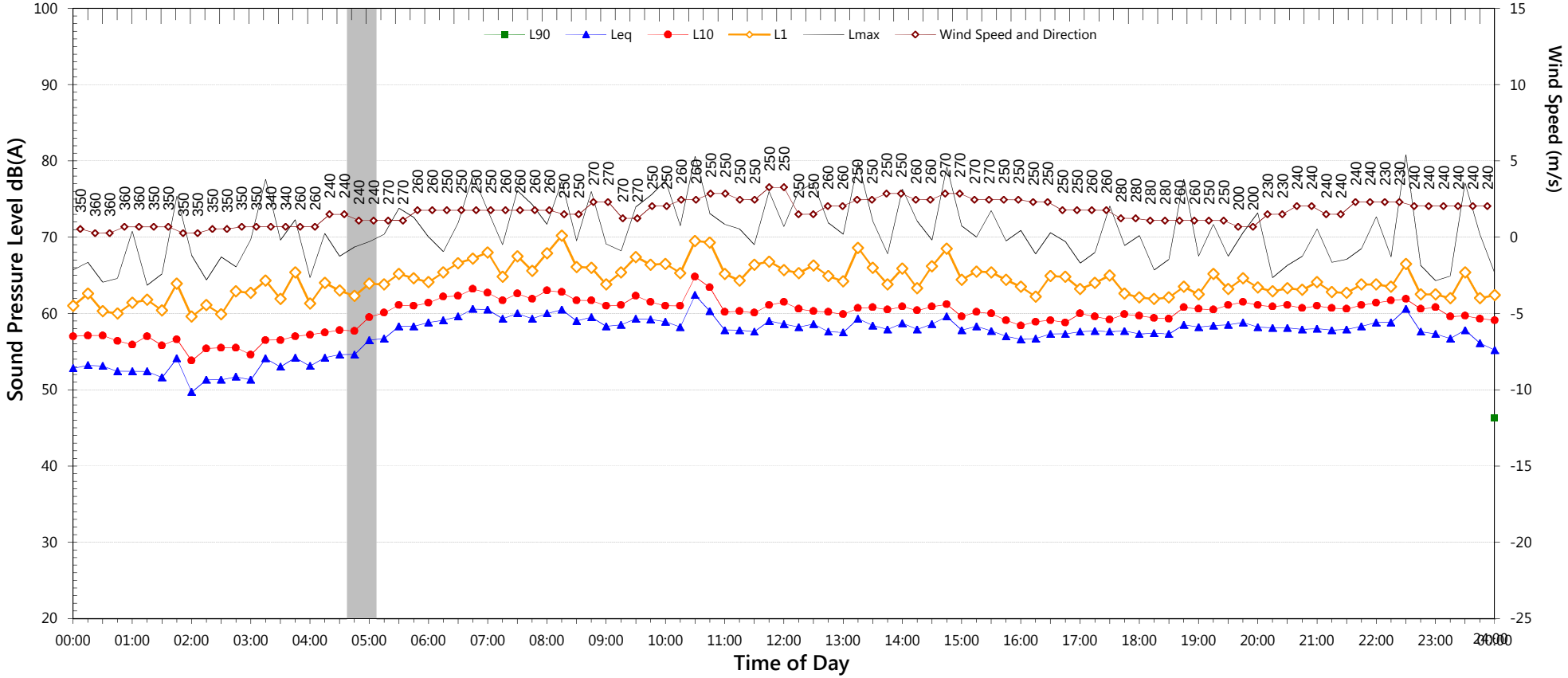
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.3	58.5
$L_{eq\ 1hr}$ upper 10 percentile	63.3	62.5
$L_{eq\ 1hr}$ lower 10 percentile	59.8	53.9

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	69.7	to	81.4
Lmax - Leq (Range)	15.7	to	24.1

Unattended Noise Monitoring Results

10 Rothwell Circuit

Friday, 18 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	50.4	50.4	40.3
Leq	58.6	58.2	55.8

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

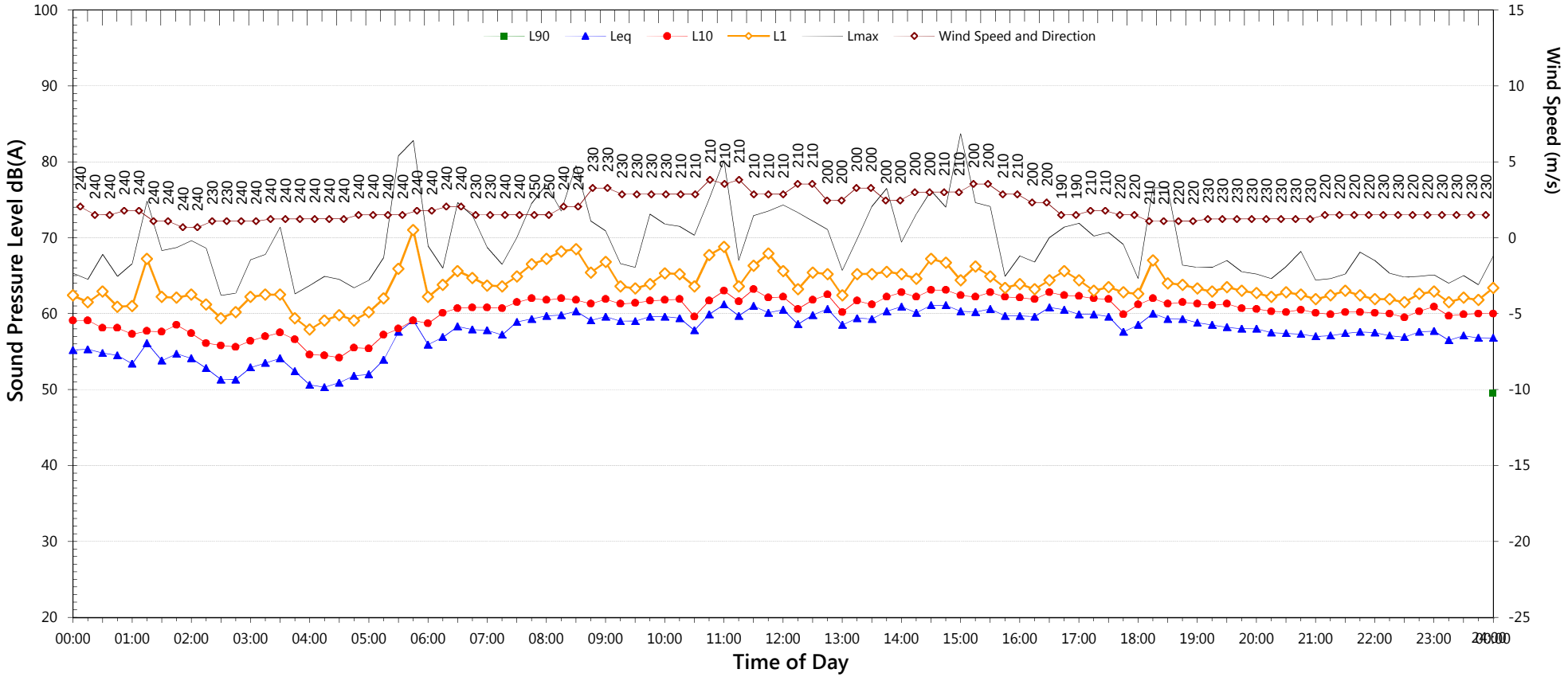
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.0	58.3
$L_{eq\ 1hr}$ upper 10 percentile	62.4	61.3
$L_{eq\ 1hr}$ lower 10 percentile	59.8	53.8

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	68.6	to	82.8
Lmax - Leq (Range)	16.5	to	25.8

Unattended Noise Monitoring Results

10 Rothwell Circuit

Saturday, 19 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	52.8	49.9	37.6
Leq	59.8	58.1	54.4

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

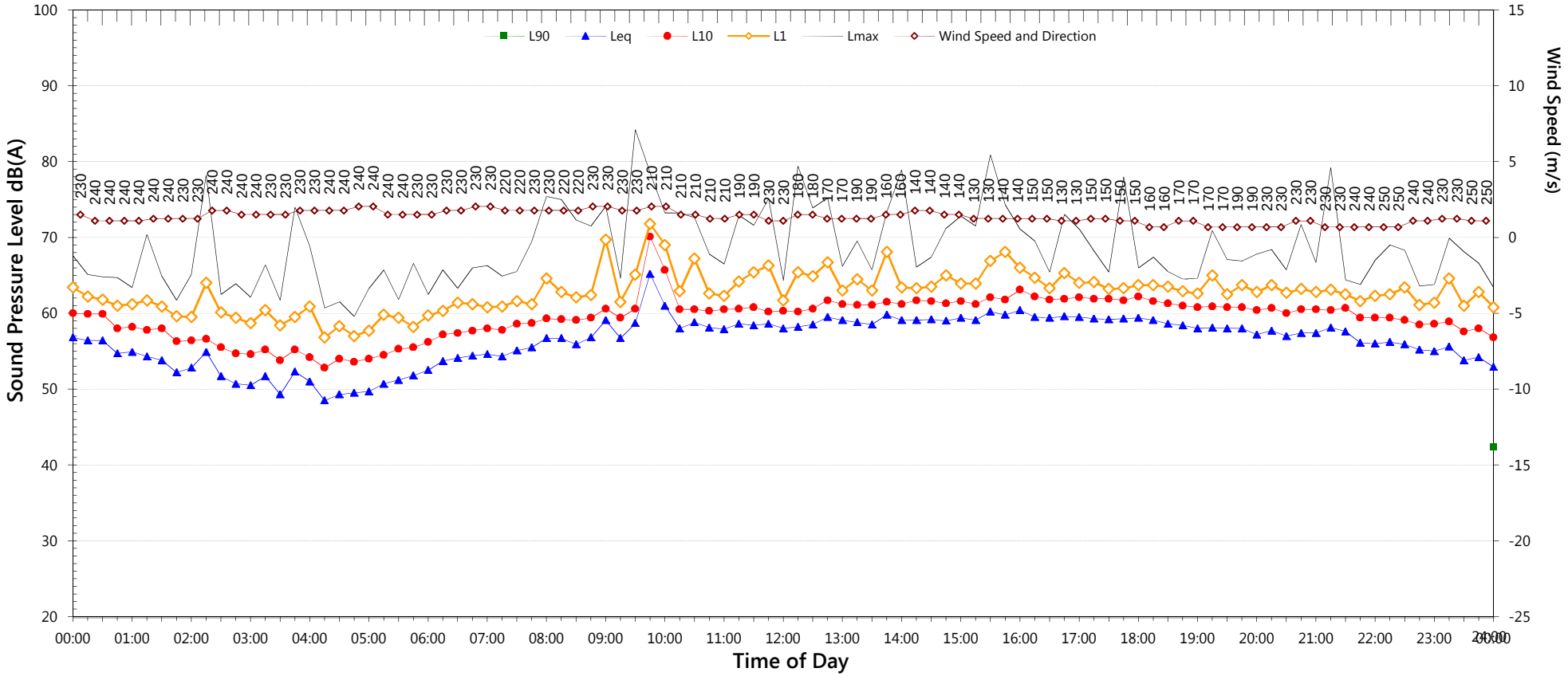
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.9	56.9
$L_{eq\ 1hr}$ upper 10 percentile	63.0	59.8
$L_{eq\ 1hr}$ lower 10 percentile	59.9	51.8

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	70.4	to	78.2
Lmax - Leq (Range)	17.0	to	25.9

Unattended Noise Monitoring Results

10 Rothwell Circuit

Sunday, 20 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	50.5	48.3	36.1
Leq	59.3	57.7	55.5

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

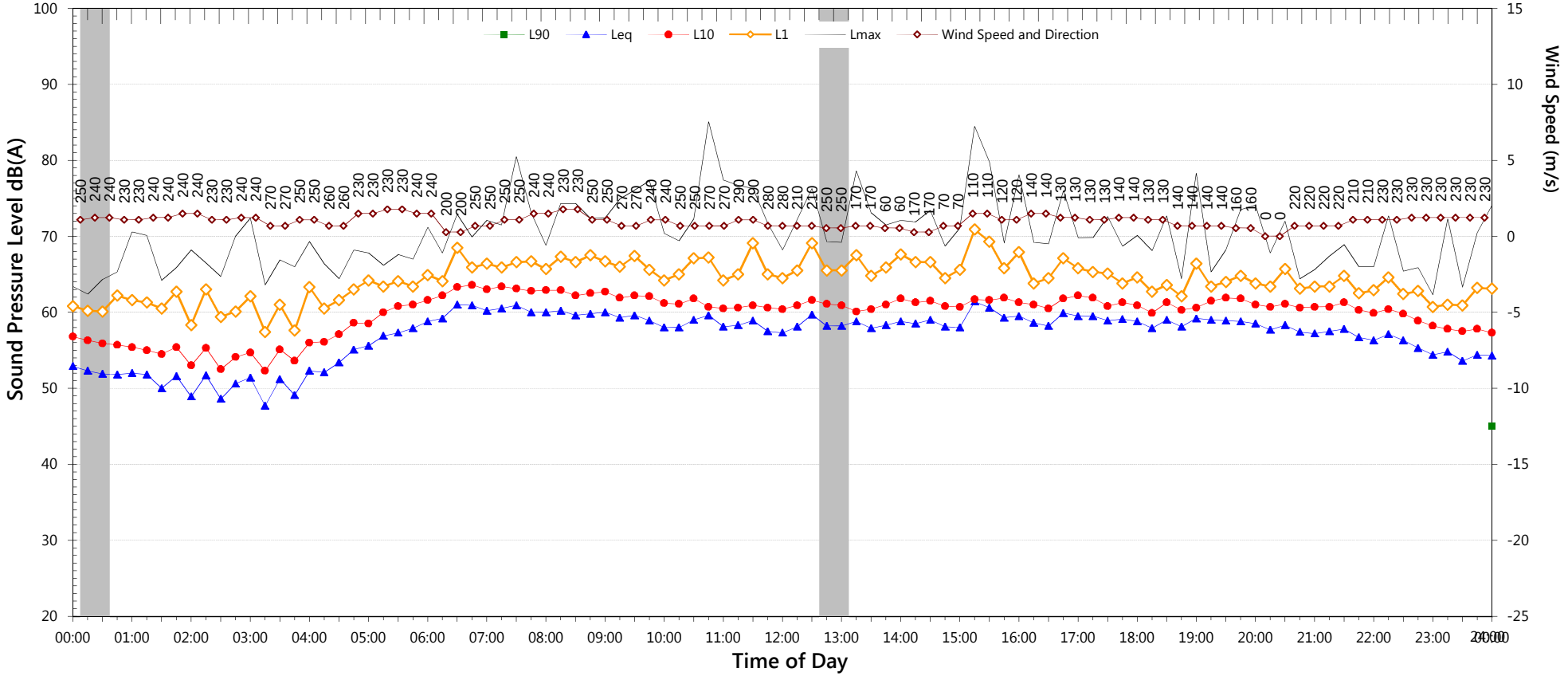
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.2	58.0
$L_{eq\ 1hr}$ upper 10 percentile	63.3	62.9
$L_{eq\ 1hr}$ lower 10 percentile	58.8	52.9

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	69.3	to	72.4
Lmax - Leq (Range)	15.7	to	21.7

Unattended Noise Monitoring Results

10 Rothwell Circuit

Monday, 21 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	47.1	48.2	38.3
Leq	59.2	58.1	56.0

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

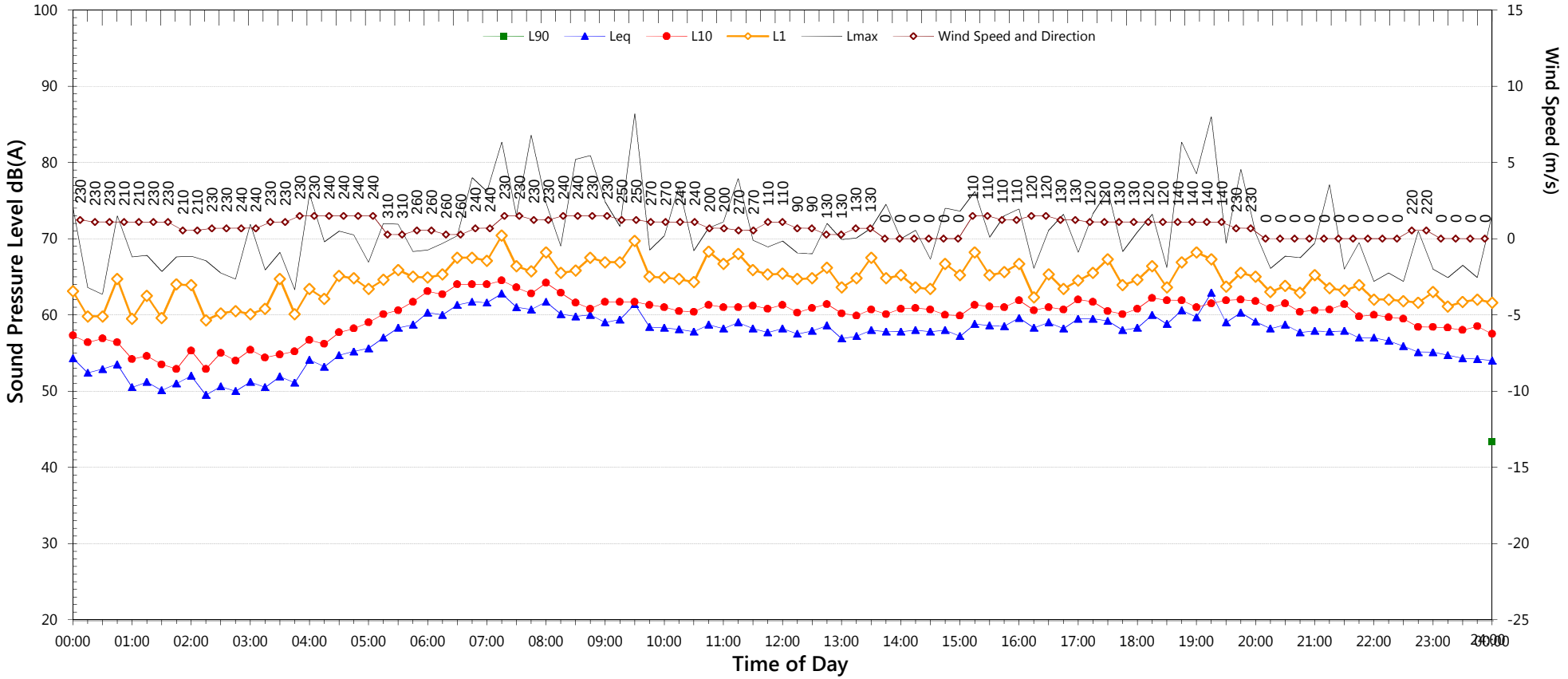
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.4	58.5
$L_{eq\ 1hr}$ upper 10 percentile	62.8	63.7
$L_{eq\ 1hr}$ lower 10 percentile	59.9	52.9

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	67.8	to	78.0
Lmax - Leq (Range)	16.2	to	23.7

Unattended Noise Monitoring Results

10 Rothwell Circuit

Tuesday, 22 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	47.2	49.3	39.4
Leq	59.0	59.2	56.1

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

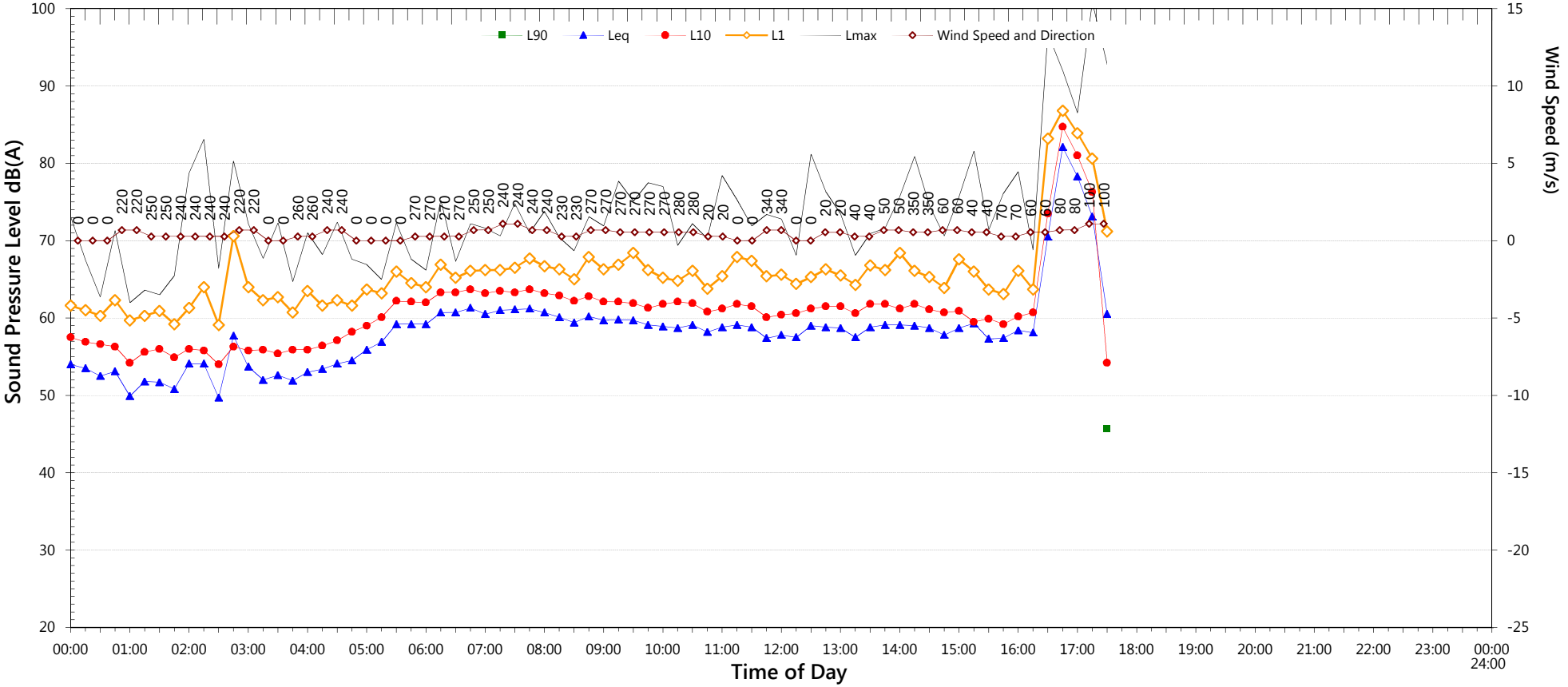
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.5	58.6
$L_{eq\ 1hr}$ upper 10 percentile	63.7	63.3
$L_{eq\ 1hr}$ lower 10 percentile	60.1	54.8

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	71.0	to	83.1
Lmax - Leq (Range)	15.3	to	28.4

Unattended Noise Monitoring Results

10 Rothwell Circuit

Wednesday, 23 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	47.5	-	-
Leq	68.4	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

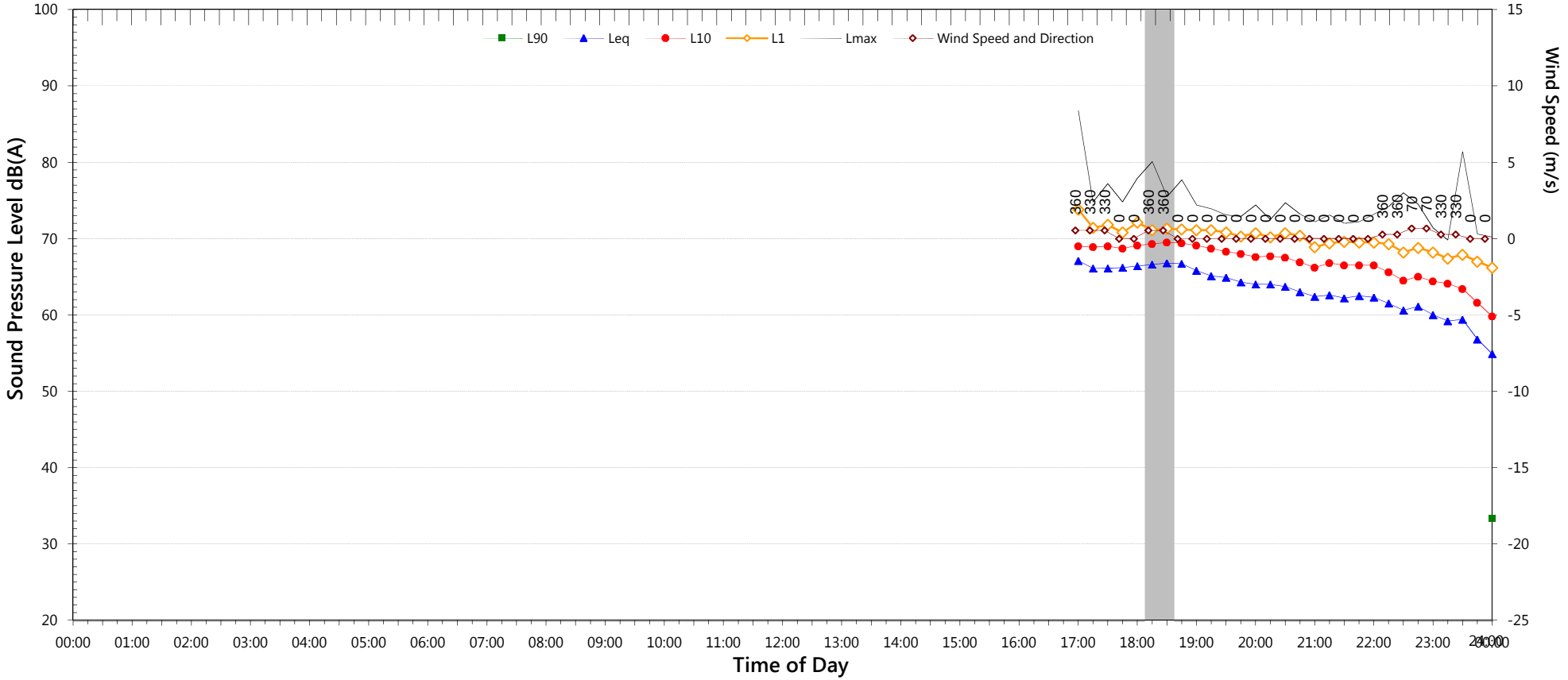
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	70.9	-
$L_{eq\ 1hr}$ upper 10 percentile	79.9	-
$L_{eq\ 1hr}$ lower 10 percentile	60.7	-

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

Unattended Noise Monitoring Results

8 Windsor Road

Tuesday, 15 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	48.8	-
Leq	-	64.0	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

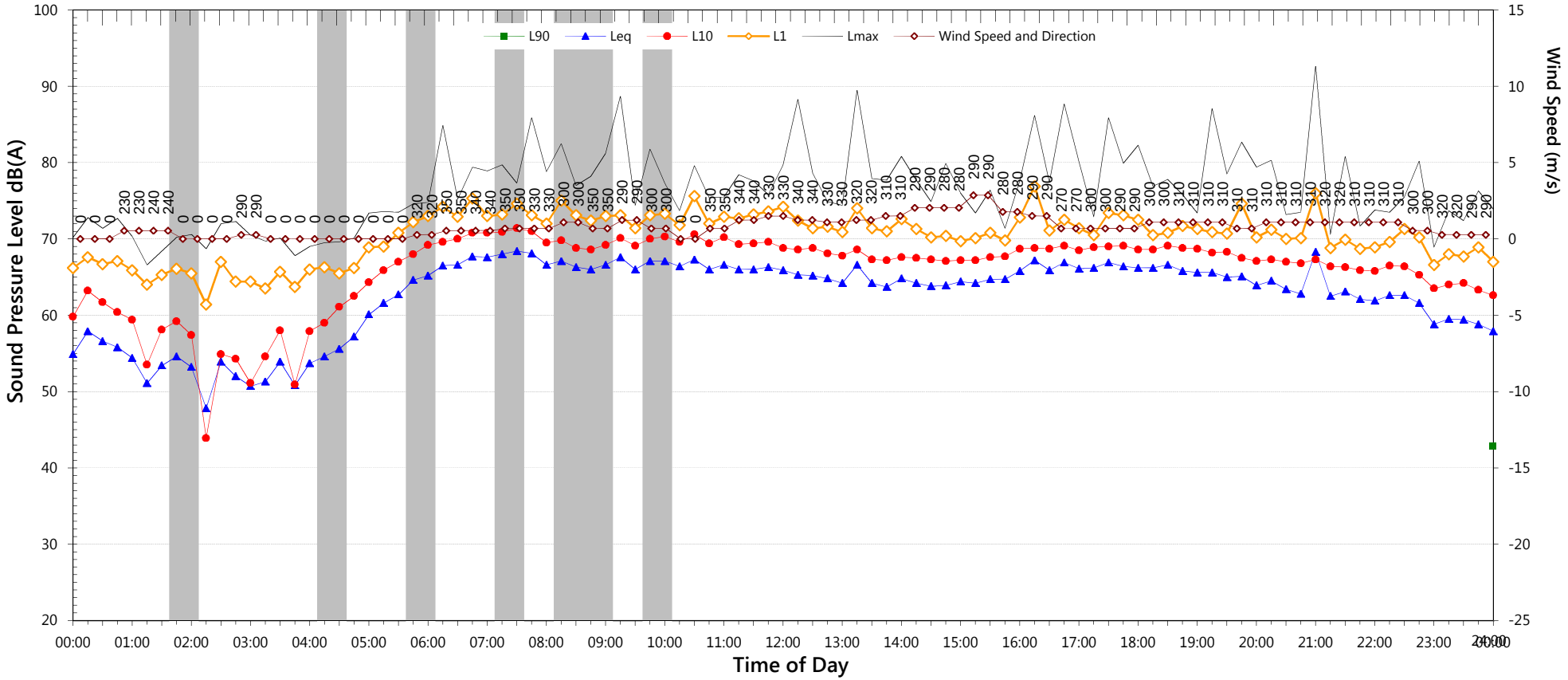
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.3	63.3
$L_{eq\ 1hr}$ upper 10 percentile	69.6	69.6
$L_{eq\ 1hr}$ lower 10 percentile	64.9	54.1

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	68.4	to	84.9
Lmax - Leq (Range)	15.2	to	23.5

Unattended Noise Monitoring Results

8 Windsor Road

Wednesday, 16 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	54.7	50.9	33.5
Leq	65.8	64.9	61.3

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

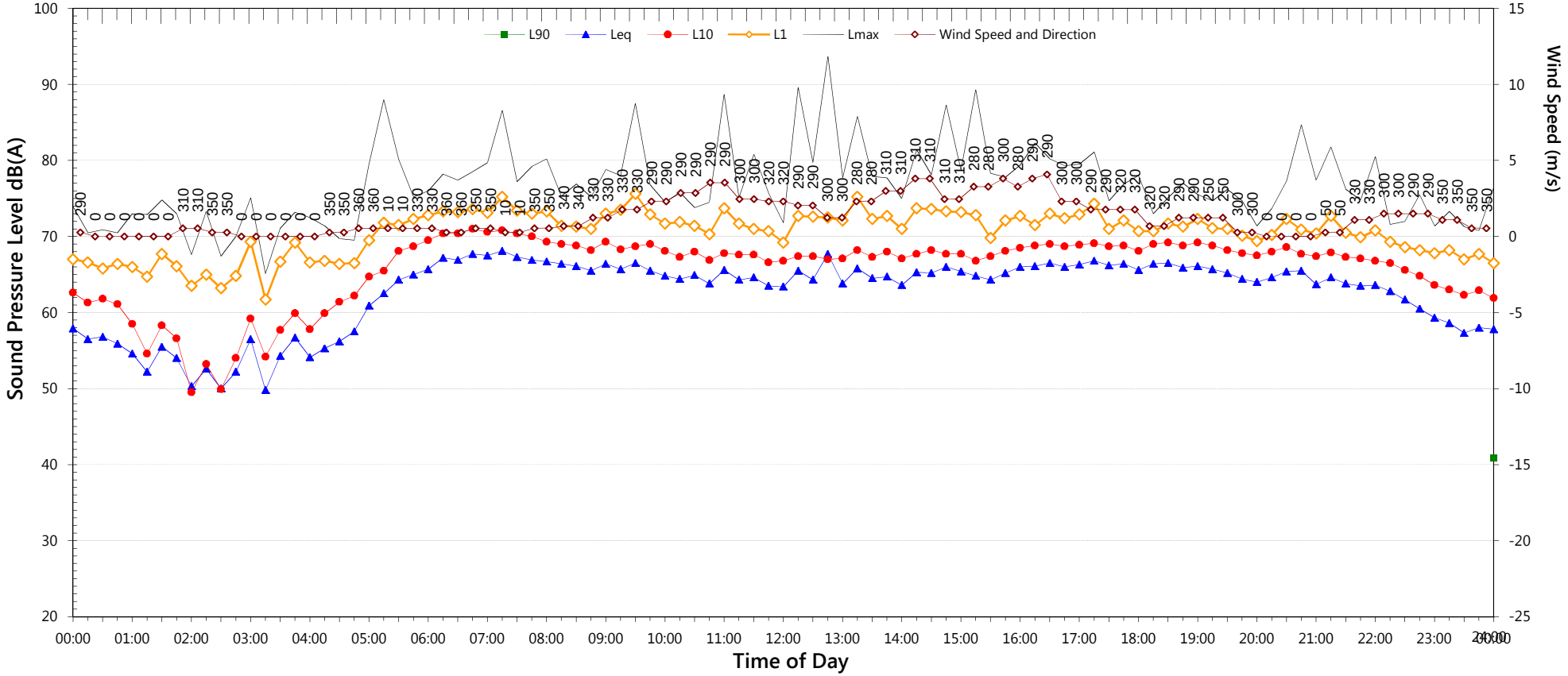
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	68.1	63.8
$L_{eq\ 1hr}$ upper 10 percentile	69.7	69.8
$L_{eq\ 1hr}$ lower 10 percentile	65.7	55.9

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	73.0	to	88.0
Lmax - Leq (Range)	17.0	to	23.5

Unattended Noise Monitoring Results

8 Windsor Road

Thursday, 17 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	55.7	52.2	33.6
Leq	65.7	65.0	60.5

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

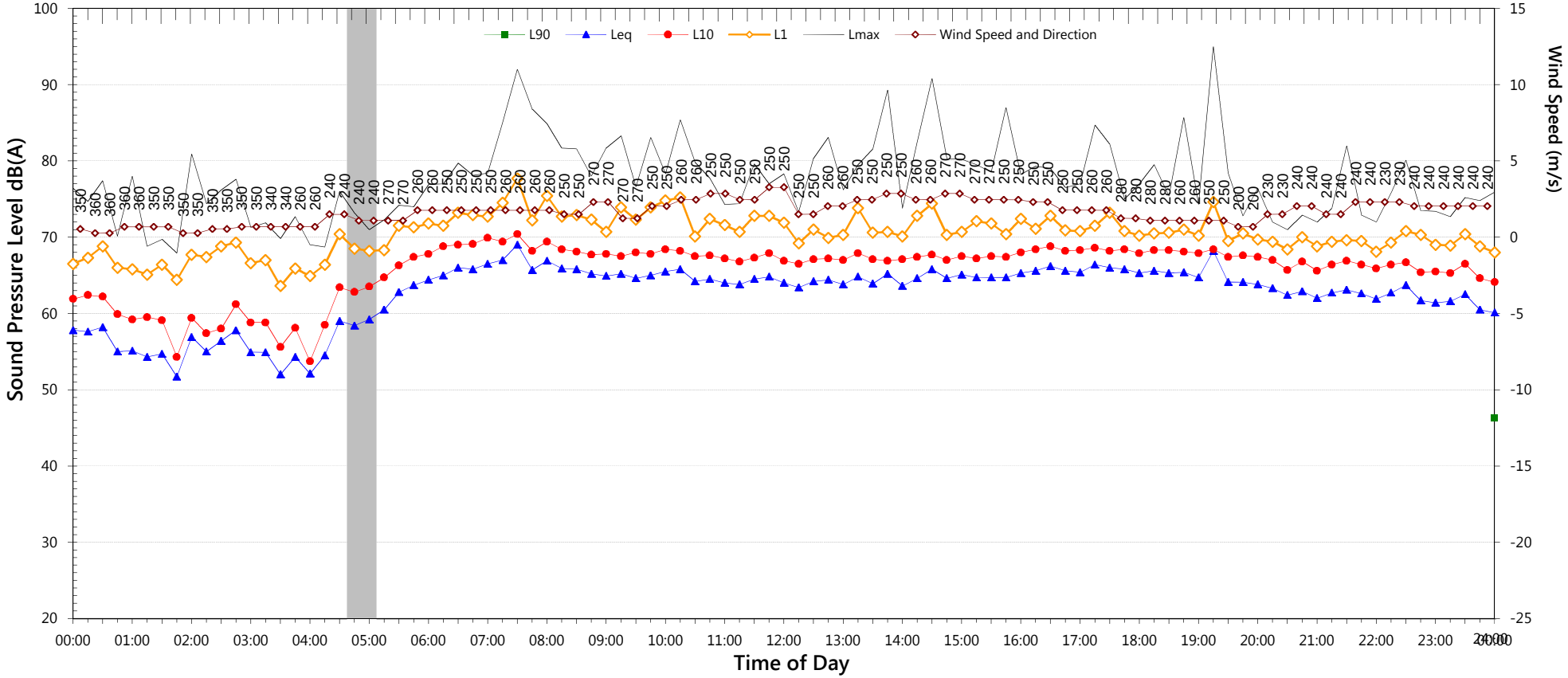
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	68.0	63.0
$L_{eq\ 1hr}$ upper 10 percentile	69.3	68.4
$L_{eq\ 1hr}$ lower 10 percentile	66.4	56.0

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	72.7	to	80.9
Lmax - Leq (Range)	18.4	to	26.1

Unattended Noise Monitoring Results

8 Windsor Road

Friday, 18 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	55.8	51.5	35.7
Leq	65.3	64.2	59.0

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

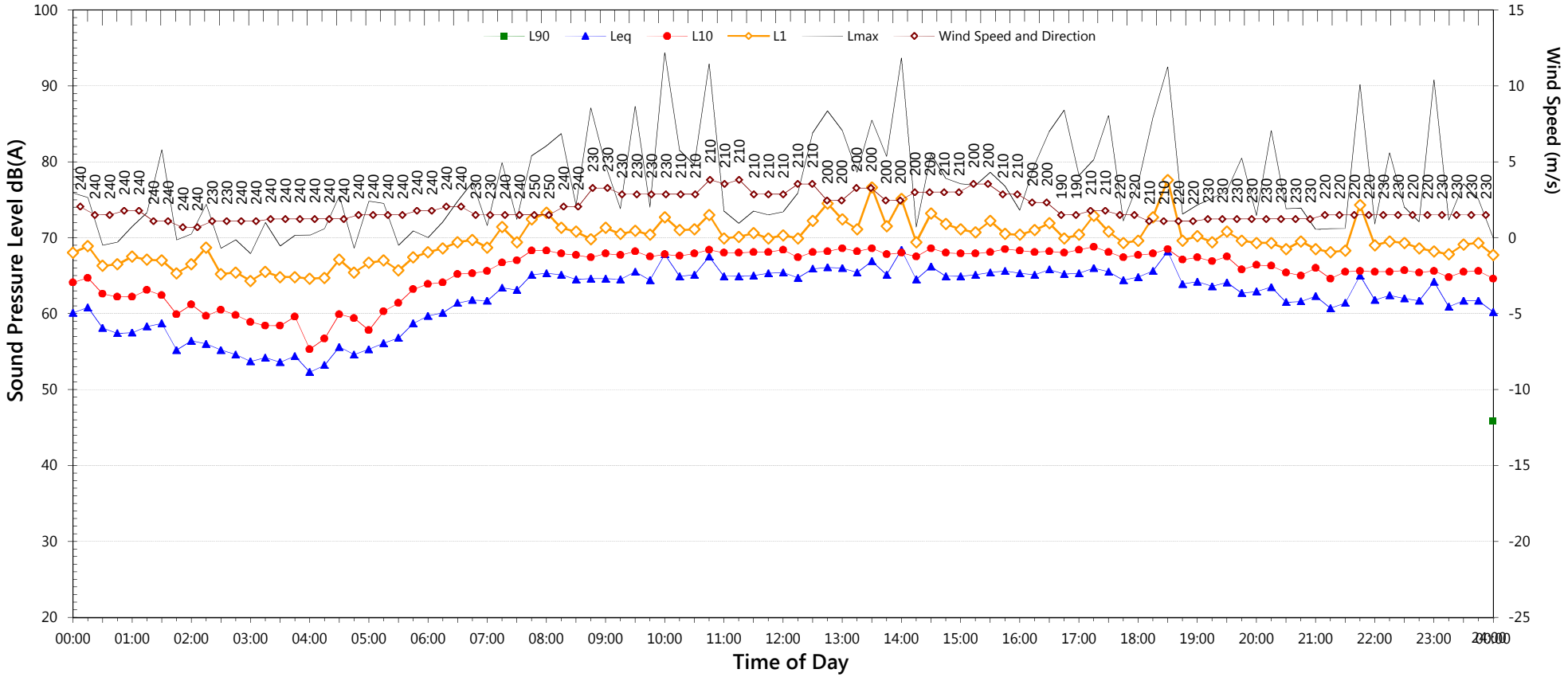
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.5	61.5
$L_{eq\ 1hr}$ upper 10 percentile	69.2	65.0
$L_{eq\ 1hr}$ lower 10 percentile	65.1	56.2

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	72.0	to	81.6
Lmax - Leq (Range)	16.0	to	24.2

Unattended Noise Monitoring Results

8 Windsor Road

Saturday, 19 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	56.7	49.9	35.0
Leq	65.4	63.8	58.8

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

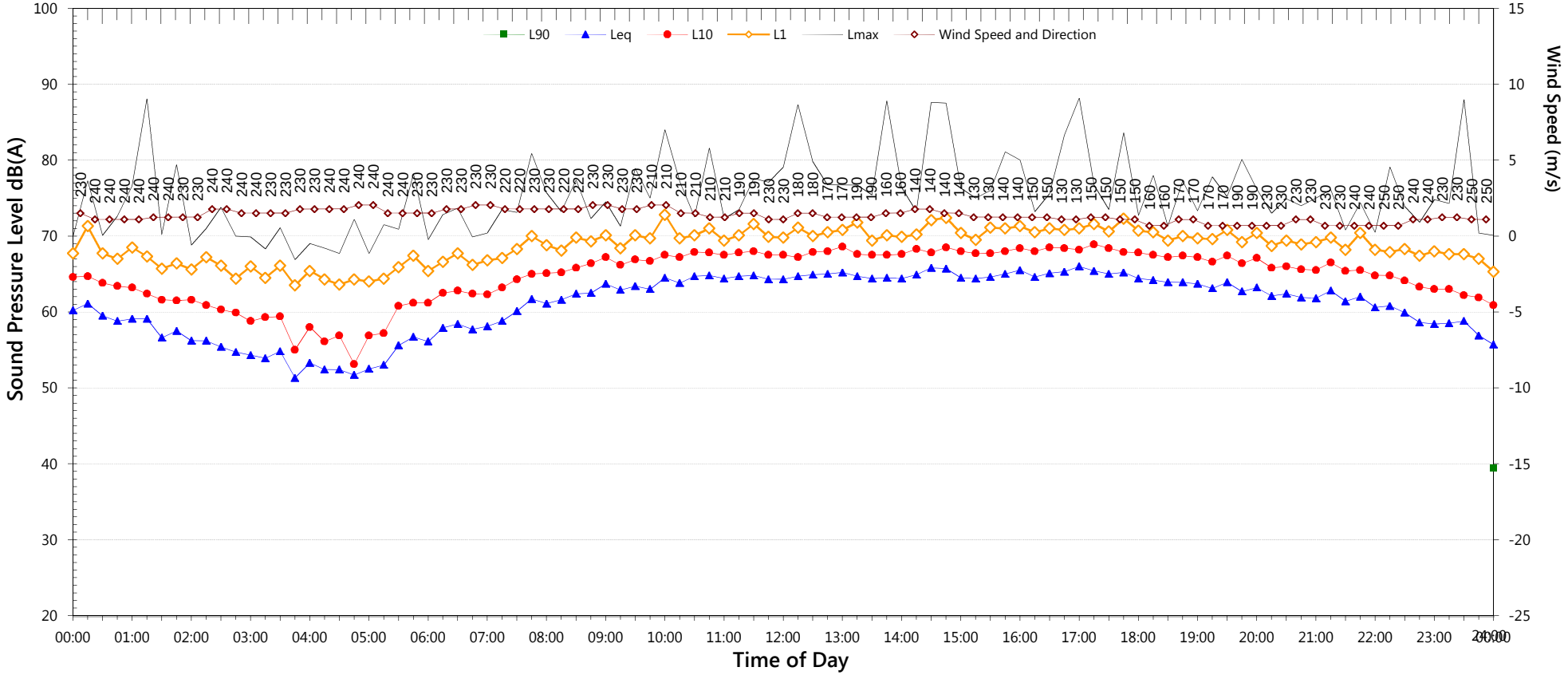
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.5	61.3
$L_{eq\ 1hr}$ upper 10 percentile	68.8	65.2
$L_{eq\ 1hr}$ lower 10 percentile	64.9	54.8

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	71.1	to	90.8
Lmax - Leq (Range)	15.7	to	30.6

Unattended Noise Monitoring Results

8 Windsor Road

Sunday, 20 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	54.6	48.6	34.1
Leq	64.6	62.8	60.3

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

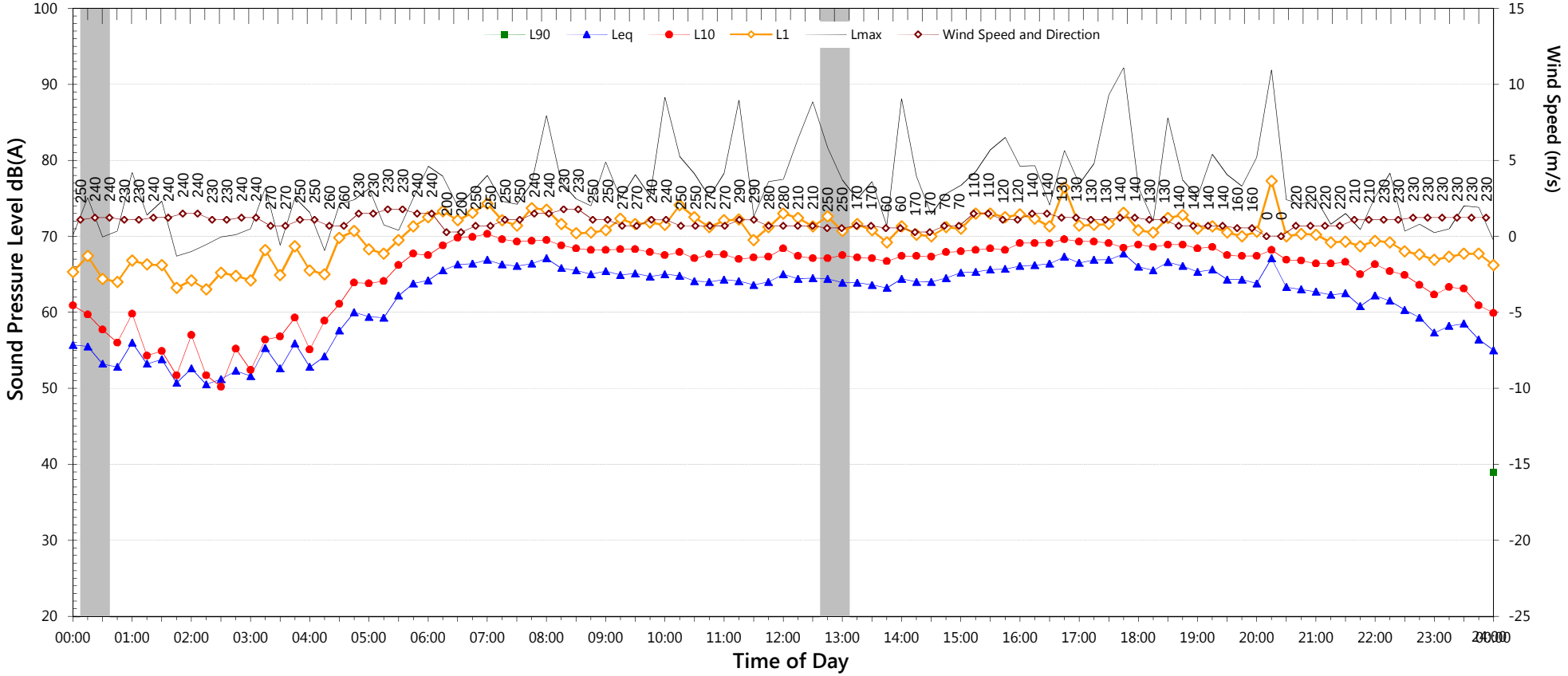
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	66.5	62.8
$L_{eq\ 1hr}$ upper 10 percentile	67.8	68.8
$L_{eq\ 1hr}$ lower 10 percentile	63.7	53.9

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	71.0	to	88.0
Lmax - Leq (Range)	16.4	to	30.4

Unattended Noise Monitoring Results

8 Windsor Road

Monday, 21 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	53.7	49.6	32.6
Leq	65.4	64.4	60.5

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

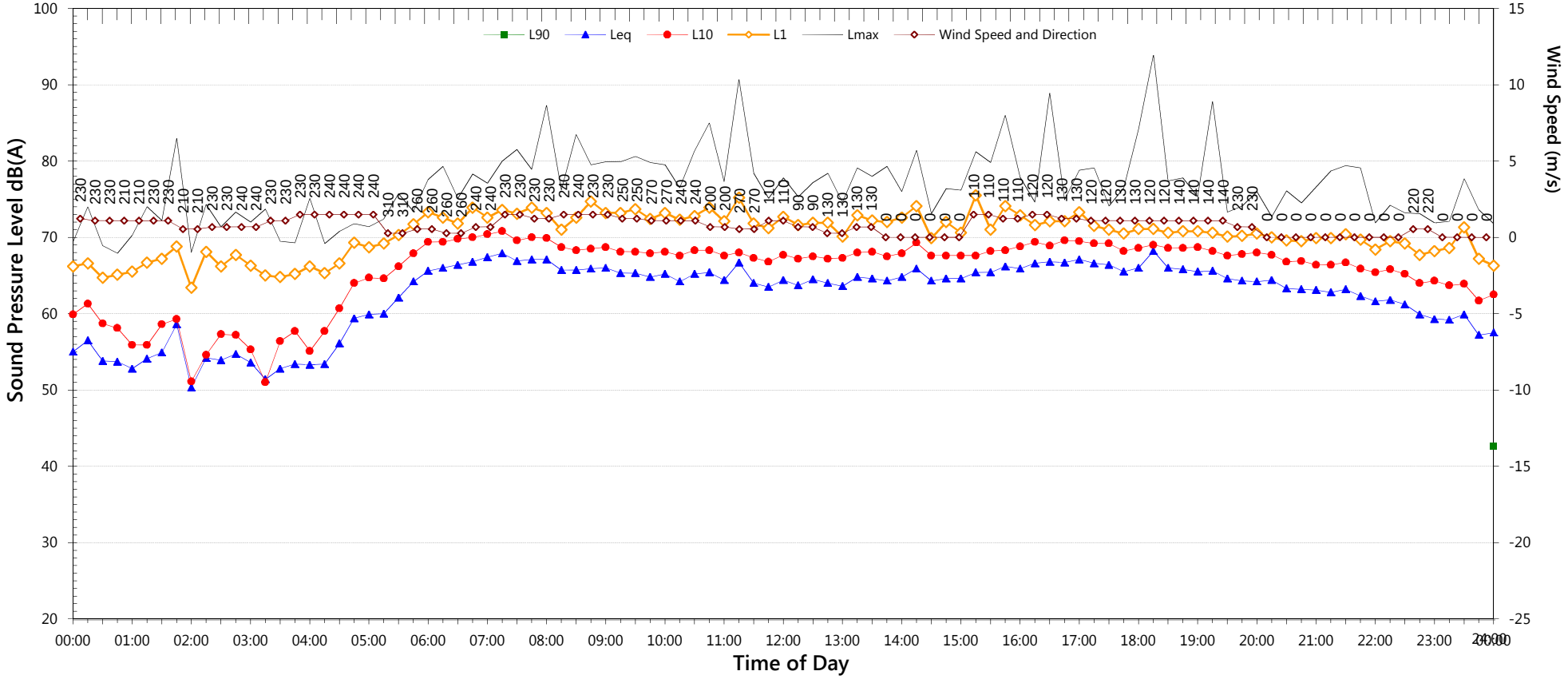
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.6	63.0
$L_{eq\ 1hr}$ upper 10 percentile	69.3	69.2
$L_{eq\ 1hr}$ lower 10 percentile	65.5	55.3

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	74.0	to	83.0
Lmax - Leq (Range)	16.8	to	27.6

Unattended Noise Monitoring Results

8 Windsor Road

Tuesday, 22 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	53.3	50.7	33.4
Leq	65.6	64.6	60.8

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

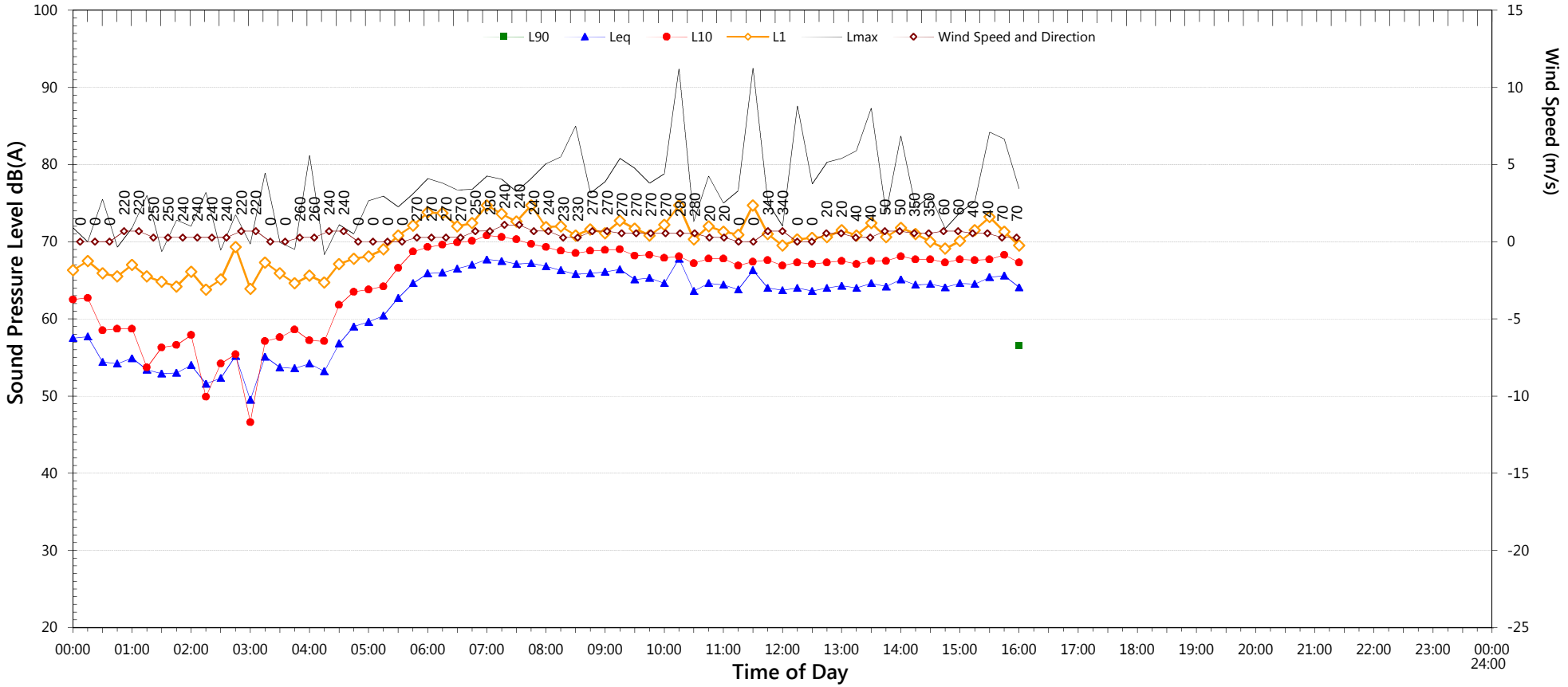
NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.8	63.3
$L_{eq\ 1hr}$ upper 10 percentile	69.5	69.3
$L_{eq\ 1hr}$ lower 10 percentile	65.6	55.1

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	75.3	to	81.2
Lmax - Leq (Range)	17.5	to	27.0

Unattended Noise Monitoring Results

8 Windsor Road

Wednesday, 23 July 2014



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	54.0	-	-
Leq	65.3	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected
4. Night time Lmax values are shown only where Lmax >65dB(A) and where Lmax- Leq ≥15dB(A)

NSW Road Noise Policy (1m from facade)		(see note 3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.8	-
$L_{eq\ 1hr}$ upper 10 percentile	69.7	-
$L_{eq\ 1hr}$ lower 10 percentile	66.5	-

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-