

# STOCKLAND WETHERILL PARK OPERATIONAL NOISE ASSESSMENT FOR STAGE 2

TF010-02F02 (REV 0) OPERATIONAL NOISE ASSESSMENT

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## DOCUMENT CONTROL

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# **1 INTRODUCTION**

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Renzo Tonin & Associates were engaged to conduct an environmental noise assessment for the operation of the proposed Stage 2 expansion of the existing Stockland Shopping Centre located on Polding Street, Wetherill Park. More specifically, this report quantifies the noise impact from the operation of the proposed Stage 2 expansion and assesses the potential impact on neighbouring premises close to the site.

Noise emissions from the site are assessed in accordance with the requirements set out in the NSW Office of Environment and Heritage's (OEH) 'Industrial Noise Policy' (INP), while traffic noise on public roads as a result of the site generated traffic is assessed against the OEH's 'Road Noise Policy' (RNP).

This report is to form part of the Development Application to be submitted to Fairfield City Council for the proposed Stage 2 expansion.

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.

## 2 PROJECT DESCRIPTION

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### 2.1 Background

As part of the Council approved Stage 1 expansion, the existing Stockland Wetherill Park shopping centre is to be expanded to include additional specialty shops, a supermarket, a mini-major retailer and basement, level 1 and roof top car parking areas.

Further to the Stage 1 expansion, Stage 2 will include additional specialty shops, mini-major retailers, a food court and basement, level 1 and roof top car parking areas.

This report forms part of the Development Application (DA) that is to be submitted to the Fairfield City Council for the proposed Stage 2 expansion. In accordance with Council guidelines, operational noise from the proposed redeveloped site is assessed against the OEH's INP and RNP.

### 2.2 Site Description

The site is located in Wetherill Park and is bound by Restwell Road to the south, the Liverpool-Parramatta Transitway to the west, Polding Street to the north and Prairiewood High School to the east. Residential properties are located within the vicinity of the site to the west (across the Transitway), to the north (across Polding Street) and to the east (sharing a common boundary). Existing commercial premises, including a cinema, library and childcare centre are located within the site.

The nearest and potentially worst affected sensitive receivers were identified during a site inspection. These sensitive receivers are as follows:

- **Receiver R1 – 13 Housman Street, Wetherill Park**  
Residential property approximately 50m north of the site and across Polding Street. Noise environment representative of residences along Housman Street and/or adjacent to Polding Street.
- **Receiver R2 – 40 Belair Place, Wetherill Park**  
Residential property adjoining the site to the east and sharing a common boundary. Noise environment representative of residences east of the site.
- **Receiver R3 – Prairiewood High School**  
High school adjoining the site to the east and sharing a common boundary.

- **Receiver R4 – 13 Wheller Street, Bossley Park**

Residential property approximately 50m west of the site and across the Liverpool-Parramatta Transitway and Wheller Street. Noise environment representative of residences along Wheller Street.

Figure 1 is a locality map showing the site, its surrounding area and receiver locations.

## **2.3 Hours of Operation**

The proposed Stage 2 areas of the shopping centre are anticipated to operate under the same general operating hours of the existing shopping centre. That is:

- 9.00am to 5.30pm, Monday to Wednesday and Fridays
- 9.00am to 9.00pm on Thursdays
- 9.00am to 5.00pm on Saturdays
- 10.00am to 4.00pm on Sundays

## **2.4 Noise Issues**

Potential noise emissions from the Stage 2 development impacting upon nearby residential and commercial premises include:

- Continuous noise from mechanical plant;
- General car park noise from the proposed multi-storey car park; and
- Traffic noise on public roads due to additional traffic generated by the Stage 2 development.

### 3 EXISTING ACOUSTIC ENVIRONMENT

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Background noise varies over the course of any 24 hour period, typically from a minimum at 3am in the morning to a maximum during morning and afternoon traffic peak hours. Therefore, the NSW INP requires that the level of background and ambient noise be assessed separately for the daytime, evening and night-time periods. The INP defines these periods as follows:

- **Day** is defined as 7:00am to 6:00pm, Monday to Saturday and 8:00am to 6:00pm Sundays & Public Holidays.
- **Evening** is defined as 6:00pm to 10:00pm, Monday to Sunday & Public Holidays.
- **Night** is defined as 10:00pm to 7:00am, Monday to Saturday and 10:00pm to 8:00am Sundays & Public Holidays.

Traffic noise levels are assessed separately for daytime and night time periods, defined by the RNP as follows:

- **Day** is defined as 7:00am to 10:00pm;
- **Night** is defined as 10:00pm to 7:00am.

#### 3.1 Noise Monitoring Locations

Noise measurements were previously undertaken at the following locations as part of the Stage 1 DA submission and presented in the Renzo Tonin & Associates report (ref. TF010-01F03 (rev 1), dated 15 November 2010).

- **Location M1 – 9 Housman Street, Wetherill Park**

Noise monitor was located in the front yard and positioned in the free field (ie. away from any buildings). The noise environment was dominated by traffic noise from Polding Street and natural sounds (eg. birds and insects). Noise levels at this location were considered representative of Receiver R1.

- **Location M2 – 40 Belair Place, Wetherill Park**

Noise monitor was located in the rear yard and positioned in the free field (ie. away from any buildings). The noise environment was dominated by natural sounds (eg. birds and insects) and distant traffic noise from Polding Street and the shopping centre car park areas. Noise levels at this location were considered representative of Receivers R2 and R3.

In addition to the above monitoring locations, additional noise monitoring was undertaken at the following location as part of the Stage 2 expansion.



- **Location M3 – 13 Wheller Street, Bossley Park**

Noise monitor was located in the front yard and positioned in the free field (ie. away from any buildings). The noise environment was dominated by traffic and patron noise from the Liverpool-Parramatta Transitway, distant traffic noise from Polding Street and natural sounds (eg. birds and insects). Noise levels at this location were considered representative of Receiver R4.

To quantify the existing ambient noise environment, long-term unattended noise monitoring was conducted at Location M3 over seven (7) days, between Friday 11<sup>th</sup> and Friday 18<sup>th</sup> May 2012.

Figure 1 shows the long term monitoring locations.

### 3.2 Existing Background & Ambient Noise Levels

Previously and recently monitored background and ambient noise levels are presented in Table 3.1 below.

The noise monitoring was conducted outdoors in the open (ie away from building facades) at the locations presented. Operational noise from the proposed Stage 2 development should be assessed away from the facade at the potentially most affected residential boundaries and therefore the representative noise levels listed in Table 3.1 are directly applicable.

**Table 3.1 – Measured Existing Background (L<sub>90</sub>) & Ambient (L<sub>eq</sub>) Noise Levels, dB(A)**

Noise Monitoring Locations	L <sub>90</sub> Background Noise Levels			L <sub>eq</sub> Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Location M1 – 9 Housman Street <sup>1</sup>	47	46	40	59	58	54
Location M2 – 40 Belair Place <sup>1</sup>	45	46	39	55	55	51
Location M3 – 13 Wheller Street <sup>2</sup>	44	43	36	54	52	47

Notes: 1. Monitoring at these location undertaken previously and presented in previous Renzo Tonin & Associates report (ref. TF010-01F03 (rev 1), dated 15<sup>th</sup> November 2010)

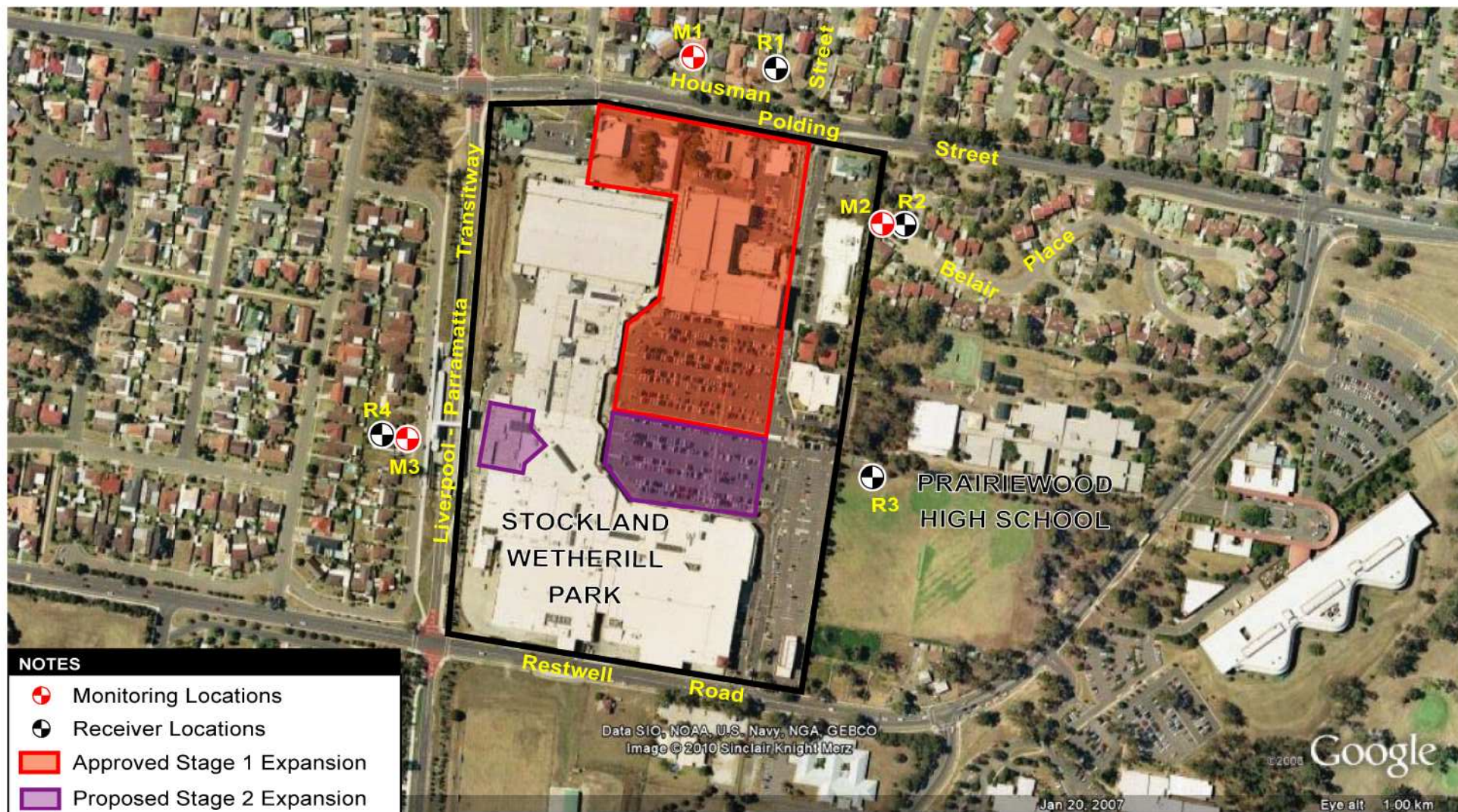
2. Monitoring at this location undertaken as part of the Stage 2 DA submission

The noise monitor located at Location M1 was also exposed to traffic noise from Polding Street and the measured traffic noise level results are shown below. It is noted that in accordance with the RNP, Polding Street is classified as a sub-arterial road. Road traffic noise from the site should be measured at 1m from the building facade most exposed to traffic noise. Therefore the representative noise levels listed in Table 3.2 have been corrected to allow for façade reflections [ie. + 2.5dB(A)].

**Table 3.2 – Measured Existing Road Traffic (L<sub>eq</sub>) Noise Levels**

Noise Monitoring Location	Road Traffic Noise Source	Distance From Road	L <sub>Aeq</sub> Traffic Noise Levels, dB(A)	
			L <sub>Aeq</sub> (15hr) Day	L <sub>Aeq</sub> (9hr) Night
Location M1 – 9 Housman St	Polding St	29m	61	57

Notes: 1. Noise levels monitored previously as part of the Stage 1 DA submission  
2. Noise levels have been corrected for façade reflections; ie. + 2.5dB(A)



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**Title:** Figure 1 : Site, Surrounds, Receivers & Monitoring Locations

**Date :** 04/07/12

**Scale:** NTS

**Project:** TF010-02 Stockland Wetherill Park - Stage 2

**Ref :** TF010-02P01 (rev 0)



## 4 OPERATIONAL NOISE CRITERIA

All noise emissions associated with the operation of the Stage 2 development, including mechanical plant and carpark activities are assessed in accordance with the OEH's 'Industrial Noise Policy' (INP). The assessment procedure in terms of the INP has two components:

- Controlling intrusive noise impacts in the short term for residences; and
- Maintaining noise level amenity for particular land uses for residences and other land uses.

### 4.1 Intrusiveness Criteria

According to the INP, the intrusiveness of a mechanical noise source may generally be considered acceptable if the equivalent continuous (energy-average) A-weighted level of noise from the source (represented by the  $L_{Aeq}$  descriptor), measured over a 15-minute period, does not exceed the background noise level measured in the absence of the source by more than 5dB(A). It is noted that this is applicable to residential properties only.

Therefore, the intrusiveness criterion for residential noise receptors as summarised in the INP is as follows:

$$L_{Aeq, 15 \text{ minute}} \leq \text{Rating Background Level } (L_{A90}) + 5 \text{ dB(A)}$$

Based on the monitored background noise levels presented in Table 3.1, the intrusiveness criteria for the potentially most affected residential receivers are presented below.

**Table 4.1 – Intrusiveness Noise Criteria, dB(A)**

Receiver	Intrusiveness Criteria, $L_{Aeq,15min}$		
	Day	Evening	Night
Receiver R1 – 13 Housman Street	47 + 5 = <b>52</b>	46 + 5 = <b>51</b>	40 + 5 = <b>45</b>
Receiver R2 – 40 Belair Place	45 + 5 = <b>50</b>	46 + 5 = <b>51</b>	39 + 5 = <b>44</b>
Receiver R4 – 13 Wheller Street	44 + 5 = <b>49</b>	43 + 5 = <b>48</b>	36 + 5 = <b>41</b>

Based on the operating hours of the proposed new Stage 2 areas of the shopping centre, the day and evening periods would be applicable for the noise assessment and therefore will be assessed against from herein.

### 4.2 Amenity Criteria

To limit continuing increases in noise levels, the maximum ambient noise level within an area from industrial noise sources should not normally exceed the acceptable noise levels specified in Table 2.1 of the NSW INP, the applicable parts of which are reproduced below.

Nearby critical receivers consists of residential properties situated in a suburban area and a high school with classrooms and playground areas. Based on the nature of these receivers, the following amenity criteria ( $L_{Aeq}$ ) will be applied.

**Table 4.2 – Amenity Noise Criteria, dB(A)**

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended L <sub>Aeq</sub> Noise Level	
			Acceptable	Maximum
Residence <sup>1</sup>	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
School classroom - internal	All	Noisiest 1-hour period when in use	35	40
Active recreation area (eg. school playground)	All	When in use	55	60

Notes: 1. Residential locations have been categorised as 'Suburban'. Given that the existing noise environment is not influenced by existing industry, the Amenity Criteria have not been modified in accordance with Table 4.1, NSW INP.

As a general rule, masonry / brick type building structures would typically provide a 15dB(A) reduction from external noise levels to internal noise levels. Therefore, the equivalent external amenity noise criterion for school classrooms would be **50dB(A)**.

### 4.3 Summary

In assessing noise impact, both criteria components must be taken into account to form the project specific noise levels (PSNLs) for each receiver location.

The applicable PSNLs (including intrusive and amenity criteria) are presented in the table below.

**Table 4.3 – INP Project Specific Noise Levels, dB(A)**

Receiver	Intrusiveness Criteria L <sub>Aeq,15min</sub>		Amenity Criteria L <sub>Aeq,period</sub>	
	Day	Evening	Day	Evening
Receiver R1 – 13 Housman Street	52	51	55	45
Receiver R2 – 40 Belair Place	50	51		
Receiver R3 – Prairiewood HS <sup>2</sup>	Classroom	N/A	50 <sup>1</sup>	N/A
	Playground	N/A	55	N/A
Receiver R4 – 13 Wheller Street	49	48	55	45

Notes: 1. Equivalent external noise level  
2. School only operates during the day period

From the above table it can be seen that the evening period for Receivers R1 and R4 is the most stringent for both the intrusiveness and amenity criteria, while for Receiver R2 the day and evening periods for the intrusiveness and amenity criteria, respectively, are the most stringent.

Therefore, the most stringent periods will be assessed against from herein for each receiver location and each INP assessment criteria.

## 5 NOISE SOURCES

### 5.1 Mechanical Plant

The main sources of mechanical plant noise from the proposed Stage 2 development are expected to include:

- Carpark exhaust fans
- Kitchen exhaust fans
- Toilet exhaust fans
- Supply air intake fans

Details of the proposed mechanical plant and their locations are unknown at this early stage of the Stage 2 development. However, reducing noise emission levels from the proposed mechanical plant to achieve the design criteria described above is uncomplicated and can readily be achieved, if necessary, using standard noise control treatments and commonly available building materials.

Therefore, noise emissions from the proposed mechanical plant are not assessed further from herein.

### 5.2 Carpark Activities

Noise generated by activities from the Stage 2 carpark which may contribute to the overall  $L_{Aeq}$  noise level emission from the site includes vehicle doors closing, vehicle engines starting, vehicles accelerating and vehicles moving. To assess the carpark noise, the  $L_{Aeq}$  noise level at the nearest affected receivers was determined based on the number of vehicle activities expected to occur during that operation of the new Stage 2 carpark areas. Sound Exposure Level (SEL) measurements from our database and library files were used for the purpose of this assessment.

The sound power levels generated by car park activities associated with the Stage 2 expansion, as used in the predictive noise modelling for this project, are presented in Table 5.1 below.

**Table 5.1 – Sound Power Levels for Stage 2 Car Park Activities**

Activity	Sound Power Level, dB(A) re 1pW	
	SEL	L1
Vehicle door closing	84	100
Vehicle engine starting	90	100
Vehicle accelerating	93	95
Vehicle moving (10-30km/h)	84	85

Based on the traffic assessment report prepared by Colston Budd Hunt & Kafes Pty Ltd (ref. 8547/1, dated June 2012) and for noise modelling purposes, it has been assumed that up to **355** vehicle movements will occur in a one hour period as a result of the proposed Stage 2 new areas. Furthermore, it has also been assumed that all the car parking spaces in the new Stage 2 multi-storey car park (up to **281** parking spaces) will be filled up in a one hour period.

## 6 NOISE ASSESSMENT

Noise emissions were determined by modelling the noise sources, receiver locations, topographical features of the intervening area and existing building structures using the Cadna-A Version 4.2.139 computer program. The program calculates the contribution of each noise source at each specified receptor point and allows for the prediction of the total noise from a site.

The noise prediction models takes into account:

- Location of noise sources and receiver locations;
- Height of sources and receivers;
- Separation distances between sources and receivers; and
- Attenuation from existing structures (natural and purpose built).

The following noise predictions have been based on architectural drawings prepared by Stockland (drawing no. DA002-A to DA005-A; and DA201-A to DA205-A, dated 15<sup>th</sup> May 2012) and source noise levels presented in Section 5 above.

Furthermore, the following assumptions have also been used in the noise predictions as a 'worst case' scenario:

- Cars will enter and exit the site via the existing carpark driveways off Polding Street and Restwell Road;
- Up to 355 additional car movements in the car park area per hour;
- All 281 car parking spaces in the new Stage 2 multi-storey car park will be filled up in a one hour period; and

Table 6.1 below presents the predicted noise levels at the nearest affected receivers due to the operation of the proposed new Stage 2 areas of Stockland Wetherill Park.

**Table 6.1 – Predicted Noise Levels at Sensitive Receivers, dB(A)**

Noise Source	Intrusiveness Assessment	Amenity Assessment
<i>Receiver R1 – 13 Housman Street</i>		
<i>INP Noise Criteria</i>	51	45
Driveway	35	35
Carpark	21	21
Cumulative (all sources)	35	35
Complies?	Yes	Yes



Noise Source	Intrusiveness Assessment	Amenity Assessment	
Receiver R2 – 40 Belair Place			
INP Noise Criteria	50	45	
Driveway	33	33	
Carpark	15	15	
Cumulative (all sources)	33	33	
Complies?	Yes	Yes	
Receiver R3 – Prairiewood High School			
INP Noise Criteria	N/A <sup>3</sup>	50 <sup>1</sup>	55 <sup>2</sup>
Driveway			39
Carpark			25
Cumulative (all sources)			39
Complies?			Yes
Receiver R4 – 13 Wheller Street			
INP Noise Criteria	50	45	
Driveway	<20	<20	
Carpark	22	22	
Cumulative (all sources)	22	22	
Complies?	Yes	Yes	

Notes: 1. Equivalent external noise level for school classrooms  
2. Noise criteria for school playground  
3. Intrusiveness assessment only applicable to residential receivers

Predicted noise levels presented in the above table indicate that operational noise of the proposed new Stage 2 carpark and driveway areas of Stockland Wetherill Park during the typical operating hours of the shopping centre (Section 2.3) will comply with the applicable noise criteria.

## 7 RECOMMENDATIONS

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The following recommendations provide in-principle noise control solutions to maintain noise compliance to the nearest affected receiver locations. This information is presented for the purpose of Council approvals process and cost planning and shall not be used for construction unless otherwise approved in writing by the acoustic consultant.

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.

As the type of mechanical plant items are not yet finalised at this early stage of the design process, all mechanical plant, once selected, shall have their noise specifications and their proposed locations checked prior to their installation on site, to ensure that they shall not either singularly or in total emit noise levels which exceed the noise limits specified in Section 4 above.

If noise emissions from these plant items are calculated to be in excess of the set criteria at the affected receivers during the detailed design stage, then further appropriate acoustic treatment shall be implemented to ensure compliance with the relevant noise criteria. In general, noise controls for mechanical plant are standard and commercially available, and can be readily added to silence any potentially noisy plant. Such noise control treatment may include any of the following:

- procurement of 'quiet' plant;
- installation of commercially available silencers over noisy fans;
- installation of acoustic screens and barriers between plant and sensitive neighbouring premises; and/or
- installation of partially-enclosed or fully-enclosed acoustic enclosures over plant.

In addition to the above noise control measures, the following recommendation is provided for the carpark area:

- The new carpark's floor slab surface should be finished using a rough grade concrete or asphalt (ie without floor sealer) in order to minimise noise from tyre squeal.

## 8 ROAD TRAFFIC NOISE ASSESSMENT

### 8.1 Road Traffic Noise Criteria

The  $L_{eq}$  noise level or the 'equivalent continuous noise level' correlates best with the human perception of annoyance associated with traffic noise. The NSW *Road Noise Policy* (RNP) uses the  $L_{Aeq(15hr)}$ ,  $L_{Aeq(9hr)}$  and  $L_{Aeq(1hr)}$  to assess traffic noise impact. The RNP is used to assess the potential traffic noise impact from the site onto residential receivers only. Therefore, given that residences within the vicinity of the site are generally impacted by traffic noise along Polding Street, noise due to additional traffic from the proposed new Stage 2 areas of Stockland Wetherill Park travelling along Polding Street will be assessed from herein.

Table 3 in the RNP, 'Road traffic noise assessment criteria for residential land uses', divides land uses into different categories and lists the respective noise criteria for each case.

According to the RNP, Polding Street is categorised as a 'sub-arterial' road. The applicable criteria for the day and night periods are summarised in Table 8.1 below.

**Table 8.1 – Applicable Road Traffic Noise Criteria, dB(A)**

Road category	Type of project/land use	Assessment criteria – dB(A)	
		Day (7am-10pm)	Night (10pm-7am)
Freeway / arterial / sub-arterial roads	3. Existing residences affected by <b>additional traffic</b> on existing freeway/arterial/sub-arterial roads generated by land use developments	$L_{Aeq(15hr)}$ 60 (external)	$L_{Aeq(9hr)}$ 55 (external)

Given that the typical operating hours of the proposed Stage 2 areas of Stockland Wetherill Park will coincide with the typical operating hours of the existing shopping centre, as detailed in Section 2.3, only the day period will be applicable for the assessment of traffic noise.

### 8.2 Predicted Road Traffic Noise

Based on Section 3.20 of the traffic report prepared by Colston Budd Hunt & Kafes Pty Ltd (ref. 8547/1, dated June 2012), up to 100 additional vehicles per hour (two way) are expected to occur along Polding Street as a result of the operation of the proposed Stage 2 areas of Stockland Wetherill Park.

The existing traffic noise levels and the traffic noise levels due to the operation of the proposed Stage 2 areas of the shopping centre at Receiver R1, which represents residential receivers impacted by traffic noise along Polding Street, are presented in Table 8.2 below for the day period.

It is noted that for a conservative assessment, it has been assumed that the 100 additional vehicles per hour, as presented in the traffic report, would occur continuously throughout the day period (ie. 7am to 10pm).

**Table 8.2 – Traffic Noise Levels at Receiver R1, dB(A)**

<b>Period</b>	<b>Existing Traffic Noise Level</b>	<b>Traffic Noise as a Result of Proposed New Areas</b>	<b>Cumulative Traffic Noise Level</b>
Day	60 <sup>1</sup>	53	61

Notes: 1. Existing traffic noise levels based monitoring undertaken at Location M1 as described in Section 3.1  
2. Only day period assessed, coinciding with the typical operating hours of the proposed new areas of the shopping centre

Based on the assumed additional traffic movements to and from the shopping centre as a result of the proposed Stage 2 areas, it was predicted that overall traffic noise levels at Receiver R1 during the day period would increase by 1 dB(A). However, a 1dB(A) increase is considered to be insignificant and inconsequential and is in accordance with the requirements of the RNP (as per page 23).

Therefore, traffic noise along Polding Street as a result of the traffic movements associated with the operation of the proposed Stage 2 areas of the shopping centre will comply with the relevant traffic noise criteria.

## 9 CONCLUSION

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Renzo Tonin & Associates have completed an assessment of the environmental noise impact from the operation of the expansion of the existing Stockland Shopping Centre located on Polding Street, Wetherill Park. Noise impact from the proposed Stage 2 development of the shopping centre upon the potentially most affected noise sensitive locations, has been quantified and compared to the noise guidelines set by the NSW Office of Environment and Heritage and Fairfield City Council for operational and road traffic noise.

Operational noise emissions from the site are expected to comply with the relevant noise criteria based on a traffic assessment report prepared by Colston Budd Hunt & Kafes Pty Ltd. In-principal noise control measures have been recommended and should be considered once detailed information is obtained during the detailed design stage of the project.

Road traffic noise along Polding Street impacting residences as a result of traffic movements associated with the operation of the proposed Stage 2 development of the shopping centre was also determined to comply with the applicable RNP criteria.

## APPENDIX A - GLOSSARY OF ACOUSTIC TERMS

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

<i>Adverse Weather</i>	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).
<i>Ambient Noise</i>	The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.
<i>Assessment Period</i>	The period in a day over which assessments are made.
<i>Assessment Point</i>	A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.
<i>Background Noise</i>	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 <b>L<sub>90</sub></b> noise level (see below).
<i>Decibel [dB]</i>	<p>The units that sound is measured in. The following are examples of the decibel readings of every day sounds:</p> <p>0dB     The faintest sound we can hear</p> <p>30dB    A quiet library or in a quiet location in the country</p> <p>45dB    Typical office space. Ambience in the city at night</p> <p>60dB    Martin Place at lunch time</p> <p>70dB    The sound of a car passing on the street</p> <p>80dB    Loud music played at home</p>

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  $L_{90}$  noise level expressed in units of dB(A).

<i>L<sub>eq</sub></i>	The “equivalent noise level” is the summation of noise events and integrated over a selected period of time.
<i>Reflection</i>	Sound wave changed in direction of propagation due to a solid object obscuring its path.
<i>SEL</i>	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.
<i>Sound</i>	A fluctuation of air pressure which is propagated as a wave through air.
<i>Sound Absorption</i>	The ability of a material to absorb sound energy through its conversion into thermal energy.
<i>Sound Level Meter</i>	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
<i>Sound Pressure Level</i>	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
<i>Sound Power Level</i>	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
<i>Tonal noise</i>	Containing a prominent frequency and characterised by a definite pitch.



## APPENDIX B - NOISE MONITORING METHODOLOGY

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### B.1 Noise Monitoring Equipment

All long term noise monitoring was conducted using RTA Technology noise loggers. The noise monitoring equipment used here complies with Australian Standard 1259.2-1990 "Acoustics - Sound Level Meters" and is designated as a Type 2 instrument suitable for field use.

A noise monitor consists of a sound level meter and a computer housed in a weather resistant enclosure. Ambient noise levels were recorded at a rate of 10 samples per second. Every 15 minutes, the data is processed statistically and stored in memory. The equipment was calibrated prior and subsequent to the measurement period using a Bruel & Kjaer Type 4230 calibrator. No significant drift in calibration was observed.

For short-term monitoring, a CEL593 precision sound level meter was used. This instrument complies with Australian Standard 1259.2-1990 "Acoustics - Sound Level Meters - Part 2: Integrating - averaging" and is designated as Type 1 instrument having an accuracy suitable for field and laboratory use.

The sound level analyser was calibrated prior and subsequent to the measurements using a Bruel & Kjaer Type 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 provided meteorological data, which is considered representative of the site, for the duration of the noise monitoring period.

### B.3 Noise vs Time Graphs

Noise almost always varies with time. Noise environments can be described using various descriptors to show how a noise ranges about a level. In this report, noise values measured or referred to include the **L<sub>10</sub>**, **L<sub>90</sub>**, and **L<sub>eq</sub>** levels. The statistical descriptors **L<sub>10</sub>** and **L<sub>90</sub>** measure the noise level exceeded for 10% and 90% of the sample measurement time. The **L<sub>eq</sub>** level is the equivalent continuous noise level or the level averaged on an equal energy basis. Measurement sample periods are usually ten to fifteen minutes. The Noise -vs- Time graphs representing measured noise levels at the noise monitoring locations in Appendix C illustrate these concepts.

Noise levels are commonly measured in units of A-weighted decibels or dB(A). The "A-weighting" refers to a standardised amplitude versus frequency curve used to "weight" sound measurements to represent the response of the human ear. The human ear is less sensitive to low pitch sound than it is to high pitch sound. Overall A-weighted measurements quantify sound with a single number to represent how people subjectively hear different frequencies at different levels.

Background noise is the term used to describe the noise measured in the absence of the noise under investigation. 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 time period. This is represented as the **L<sub>90</sub>** noise level.

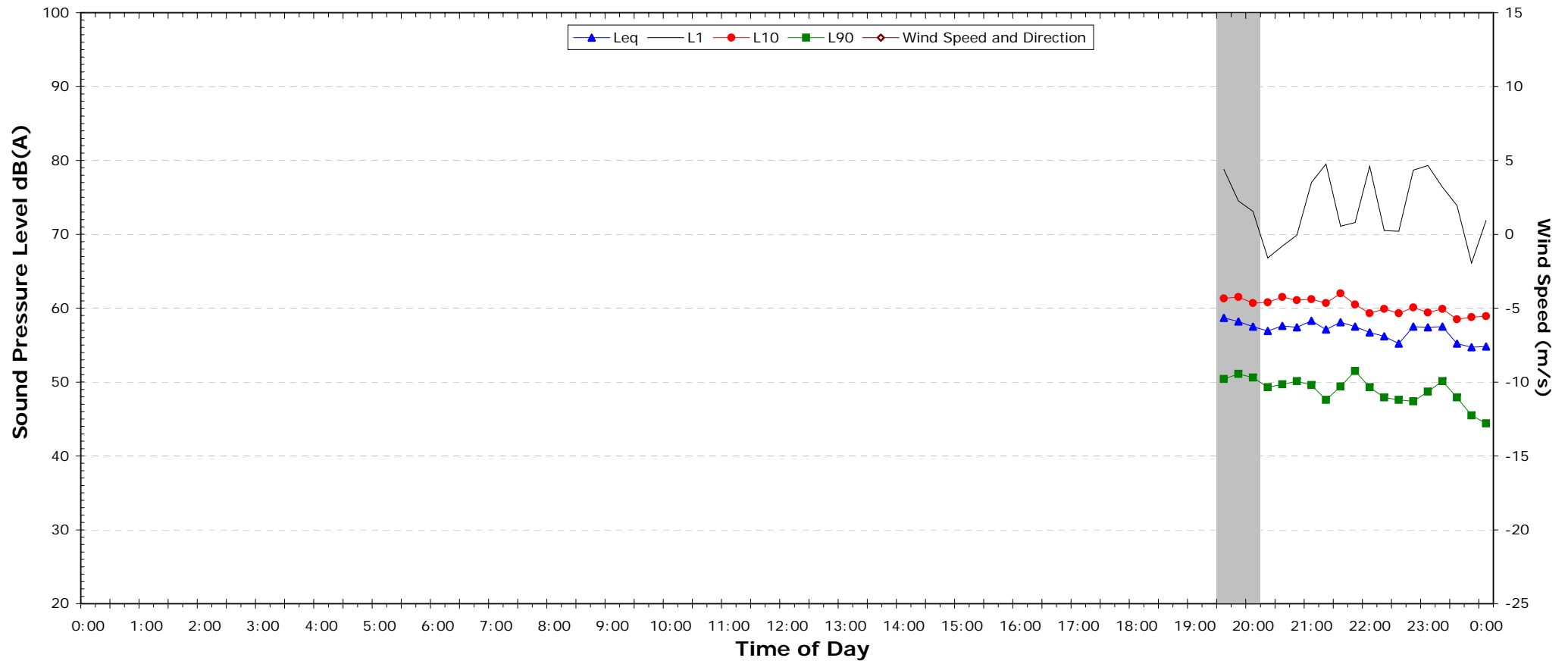
## **APPENDIX C - NOISE MONITORING RESULTS**

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# EXISTING AMBIENT NOISE LEVELS

Frontyard of 9 Houseman St

Friday, 15 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	-	47.6	41.3
Leq (see note 3)	-	57.5	54.2

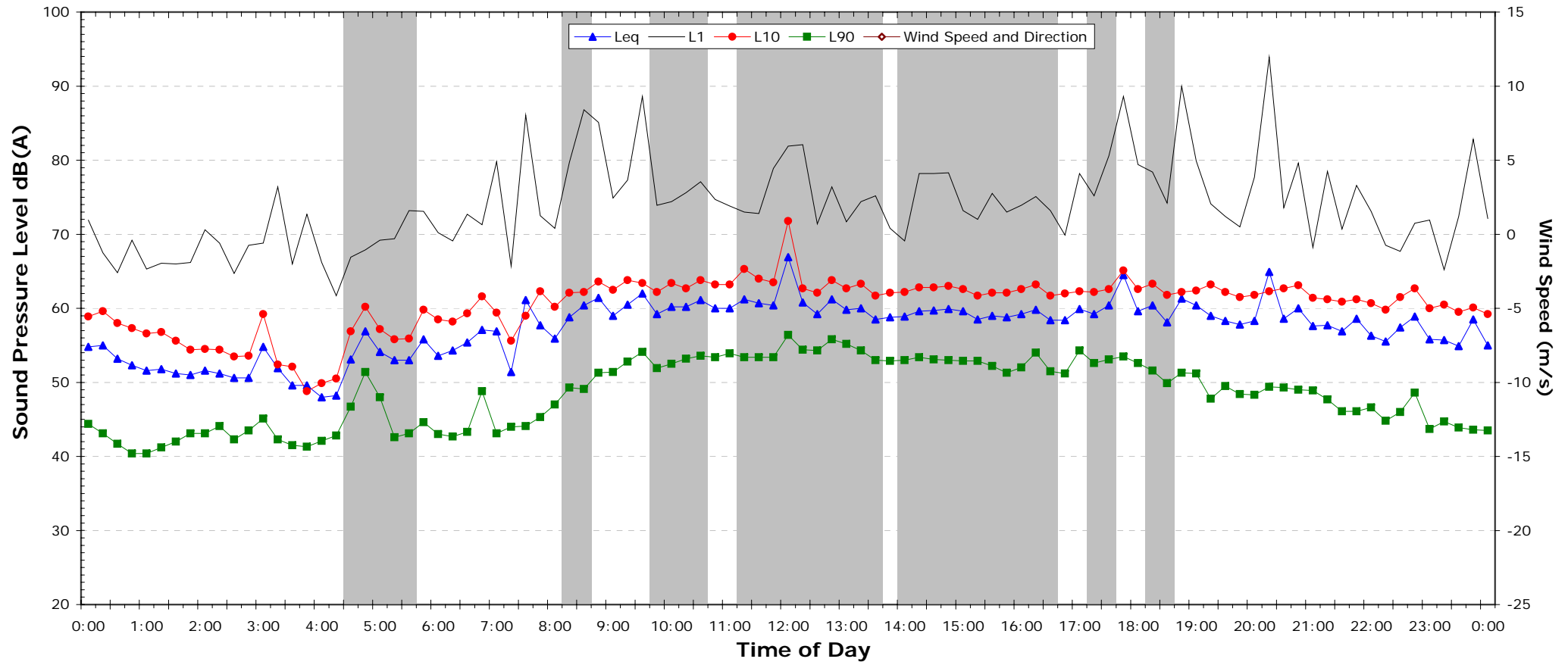
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Frontyard of 9 Houseman St

Saturday, 16 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	44.1	46.1	40.3
Leq (see note 3)	60.1	59.6	53.6

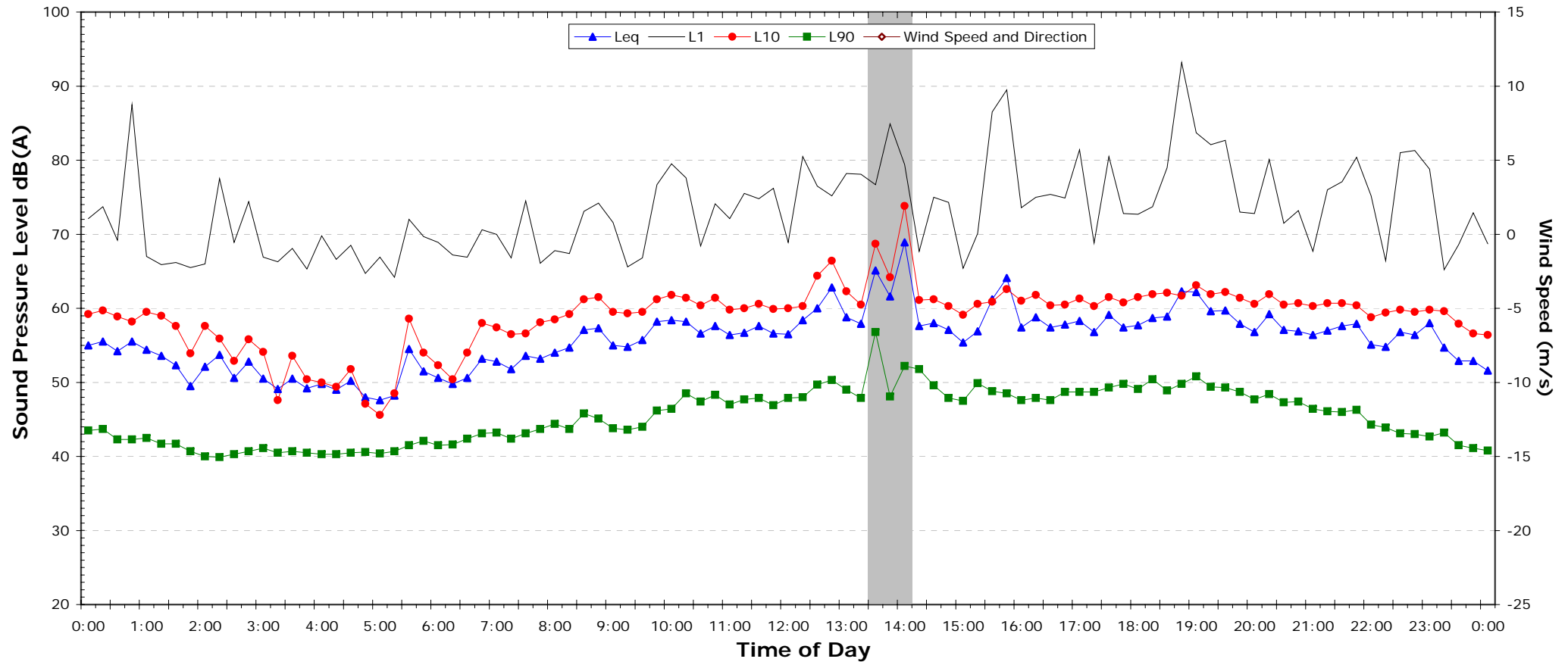
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Frontyard of 9 Houseman St

Sunday, 17 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	43.7	46.0	38.6
Leq (see note 3)	58.0	58.8	54.4

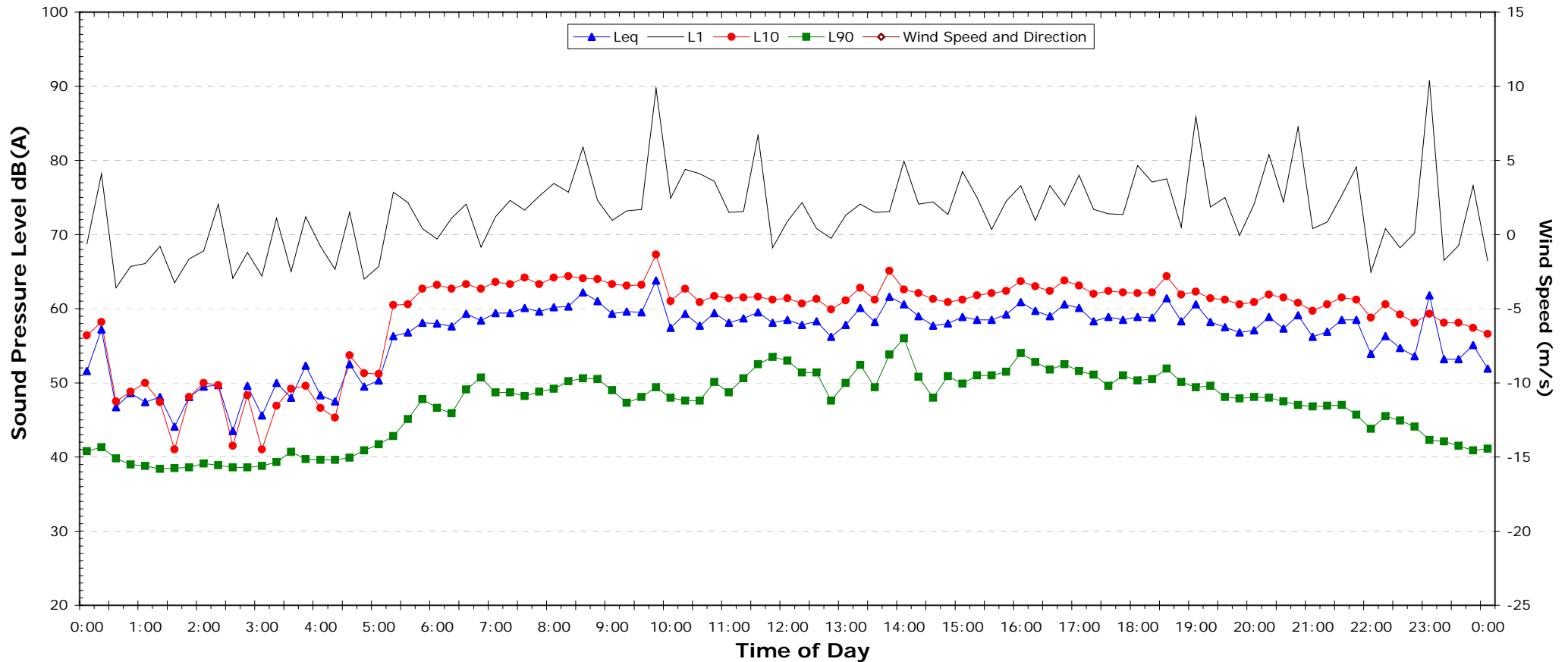
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Frontyard of 9 Houseman St

Monday, 18 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	48.0	45.7	39.7
Leq (see note 3)	59.5	58.3	55.1

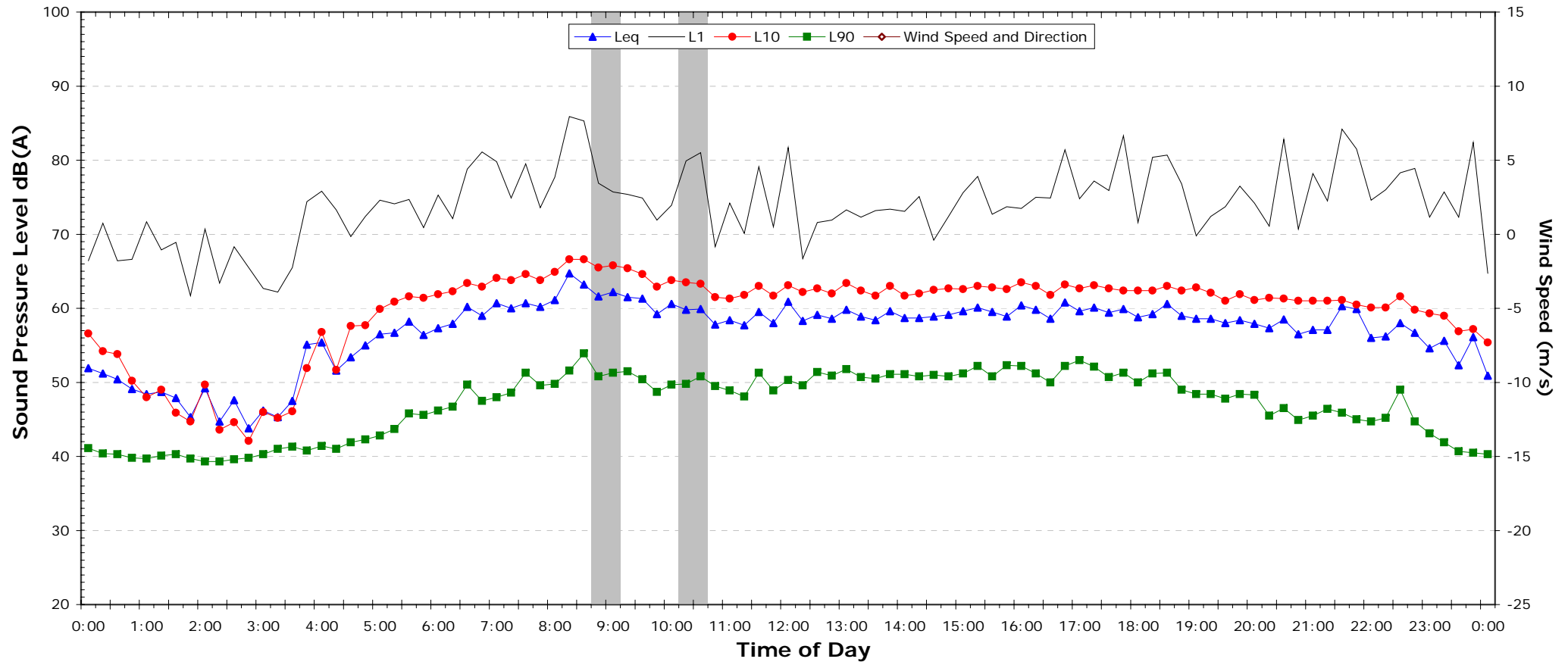
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Frontyard of 9 Houseman St

Tuesday, 19 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	48.9	44.9	39.9
Leq (see note 3)	60.0	58.5	55.4

## NOTES:

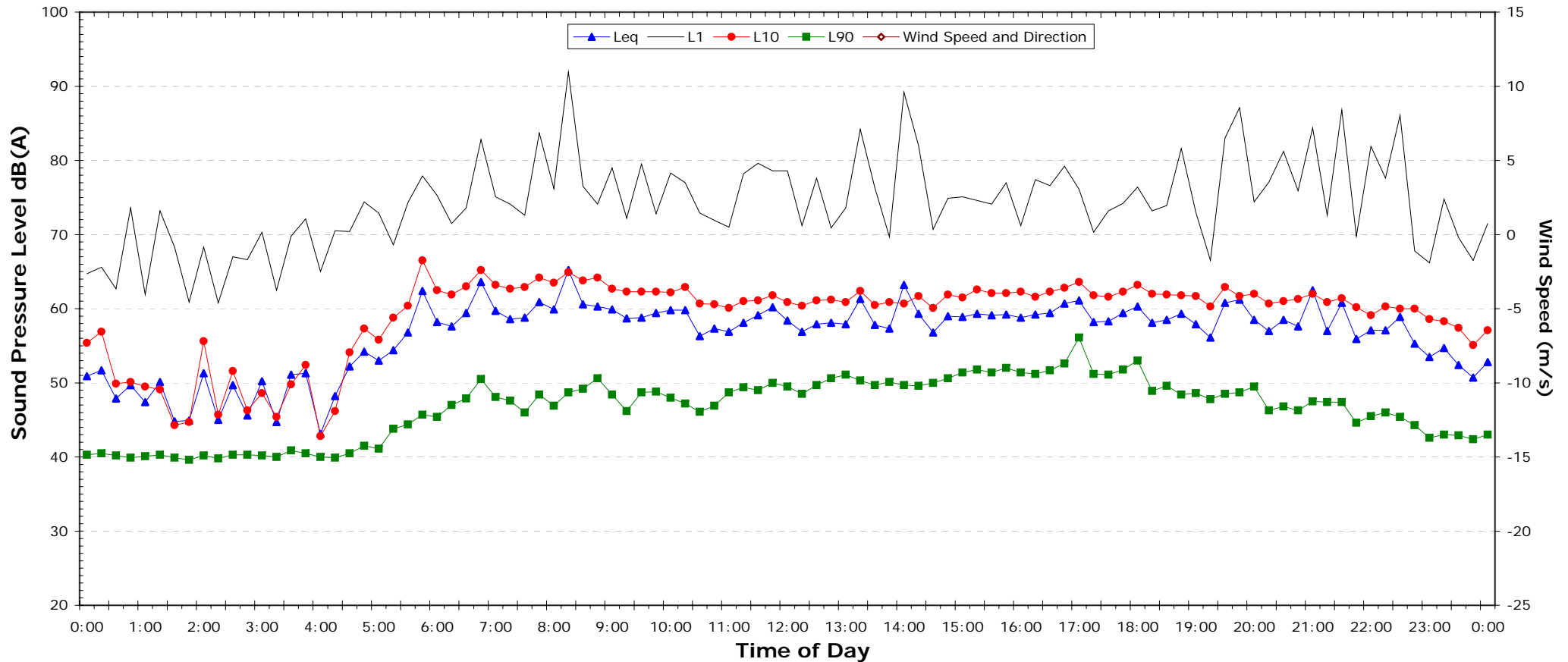
1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected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



# EXISTING AMBIENT NOISE LEVELS

Frontyard of 9 Houseman St

Wednesday, 20 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	46.9	45.5	40.8
Leq (see note 3)	59.6	59.0	53.9

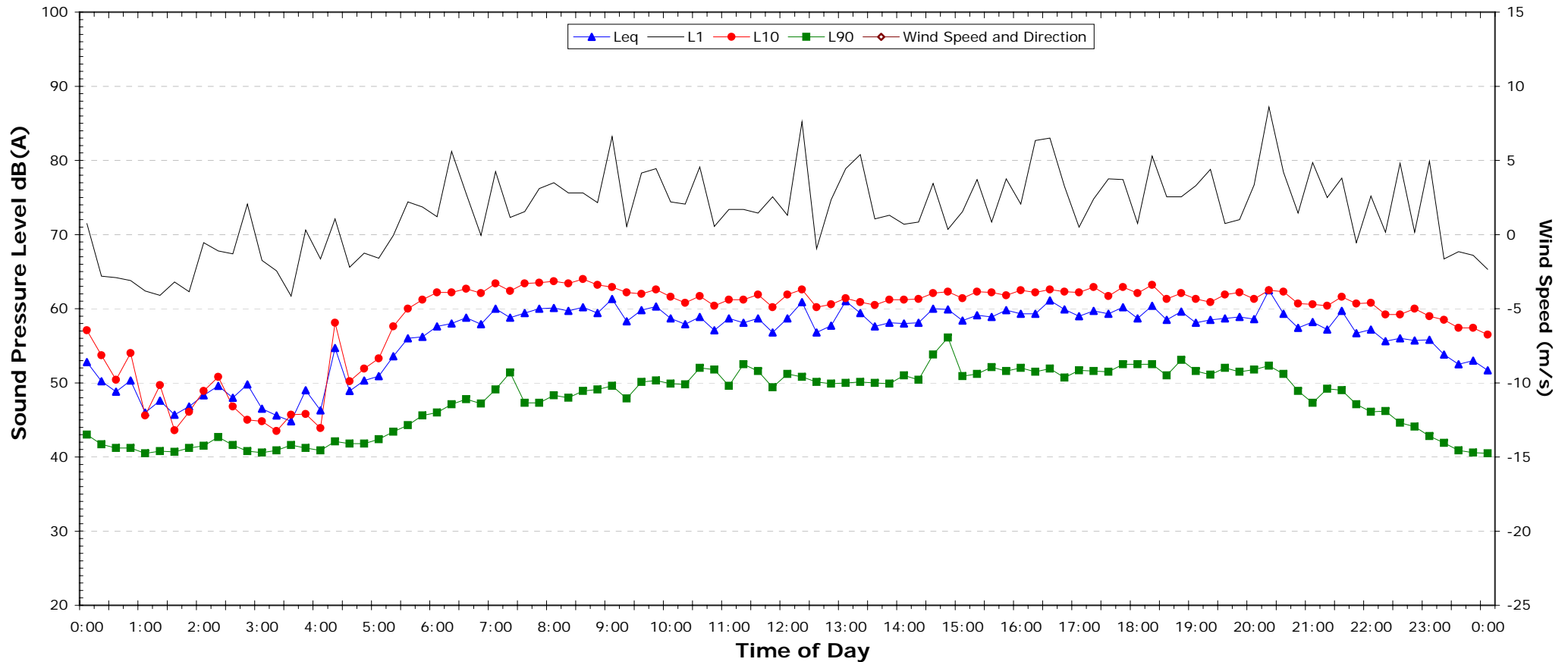
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Frontyard of 9 Houseman St

Thursday, 21 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	48.3	47.1	40.4
Leq (see note 3)	59.3	59.0	55.0

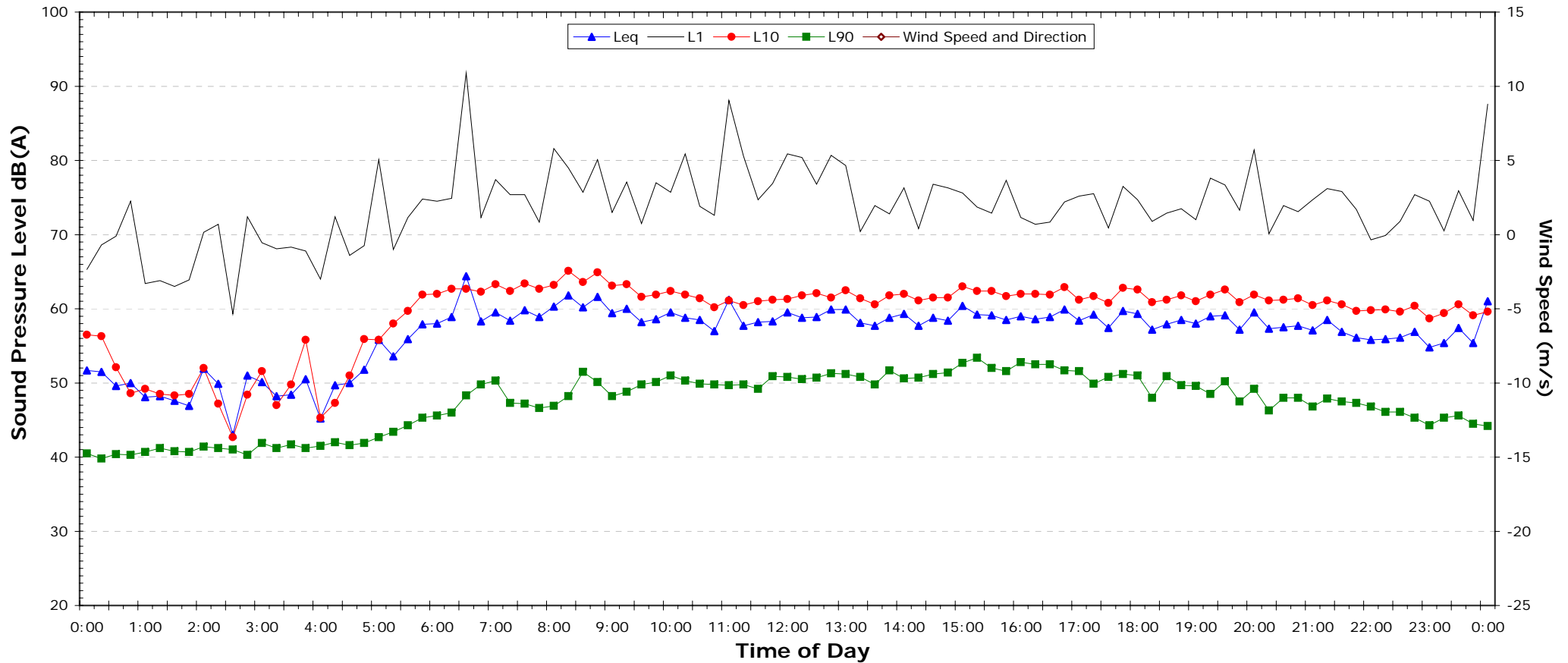
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Frontyard of 9 Houseman St

Friday, 22 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	48.2	46.8	41.5
Leq (see note 3)	59.2	57.8	54.2

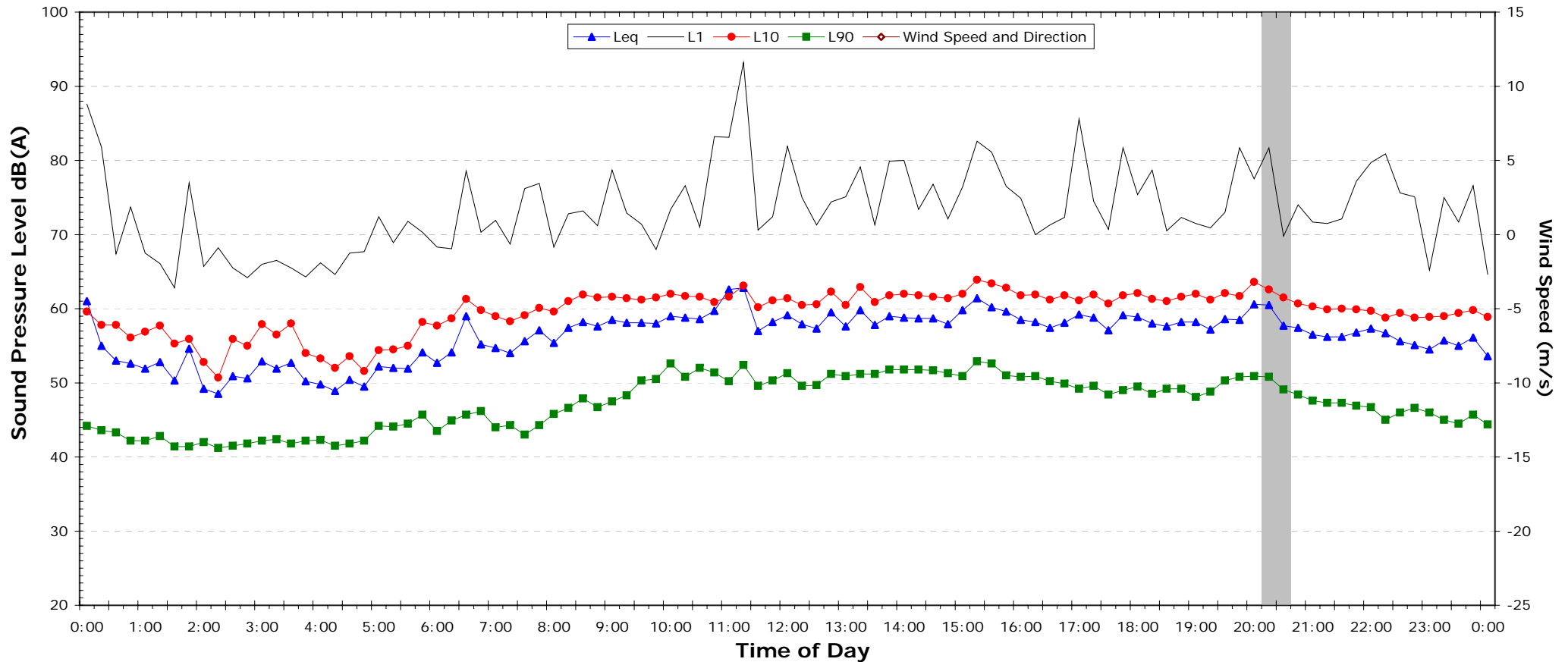
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Frontyard of 9 Houseman St

Saturday, 23 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	46.6	46.9	41.7
Leq (see note 3)	58.8	57.8	53.1

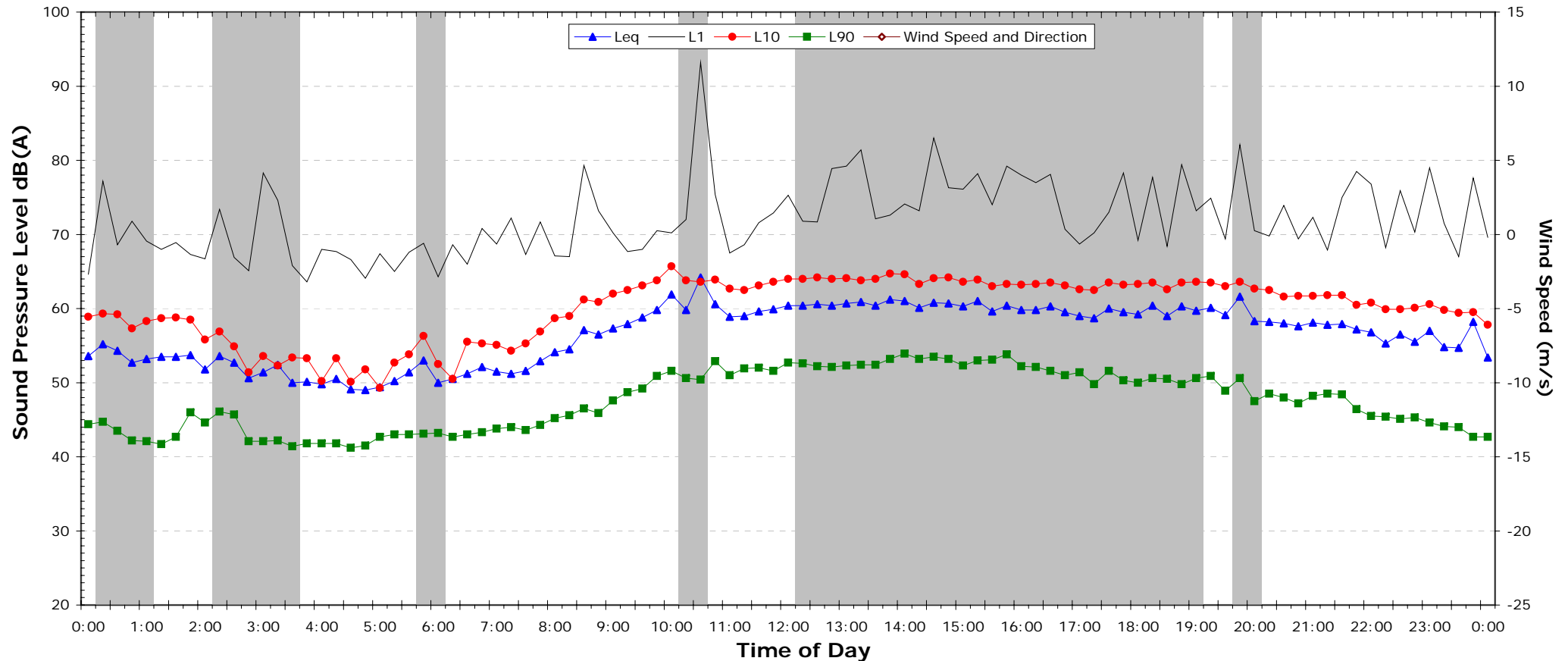
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Frontyard of 9 Houseman St

Sunday, 24 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	44.0	46.0	40.4
Leq (see note 3)	58.3	58.2	54.6

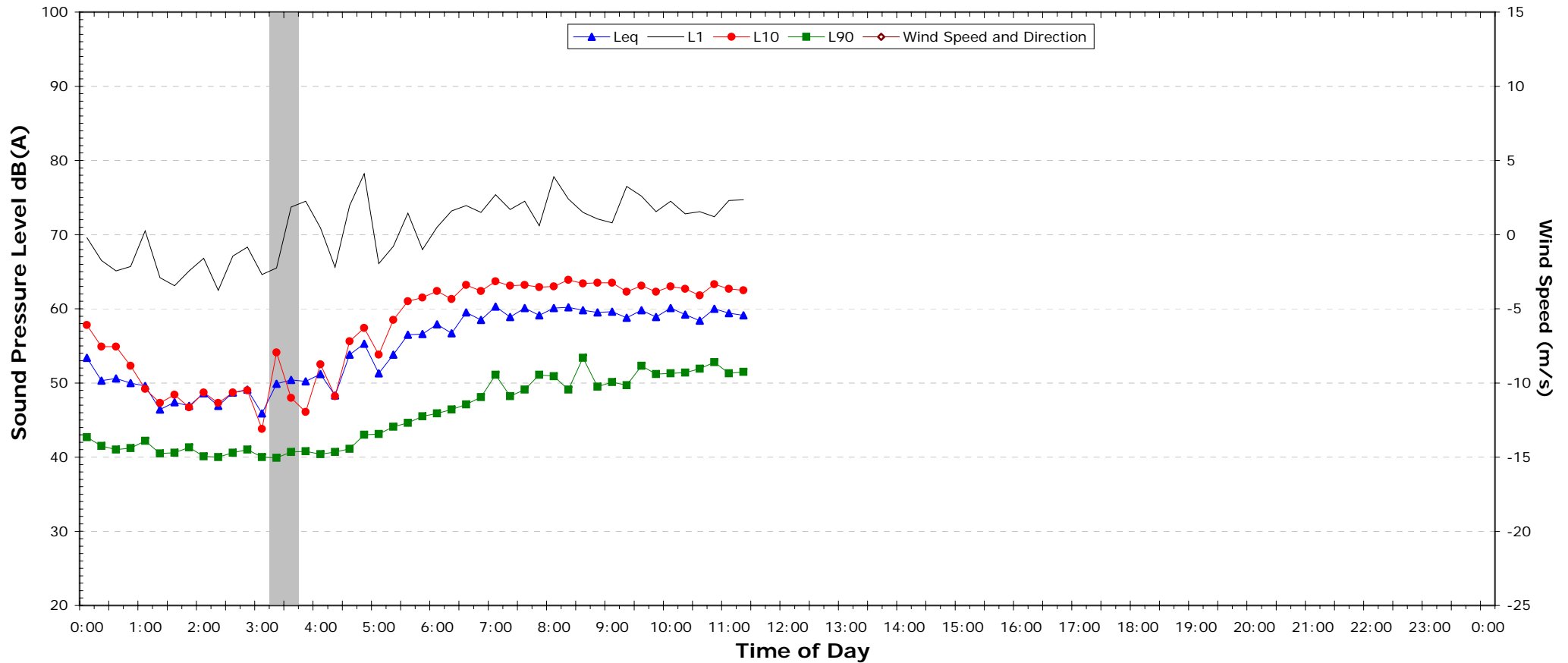
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Frontyard of 9 Houseman St

Monday, 25 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	49.1	-	-
Leq (see note 3)	59.5	-	-

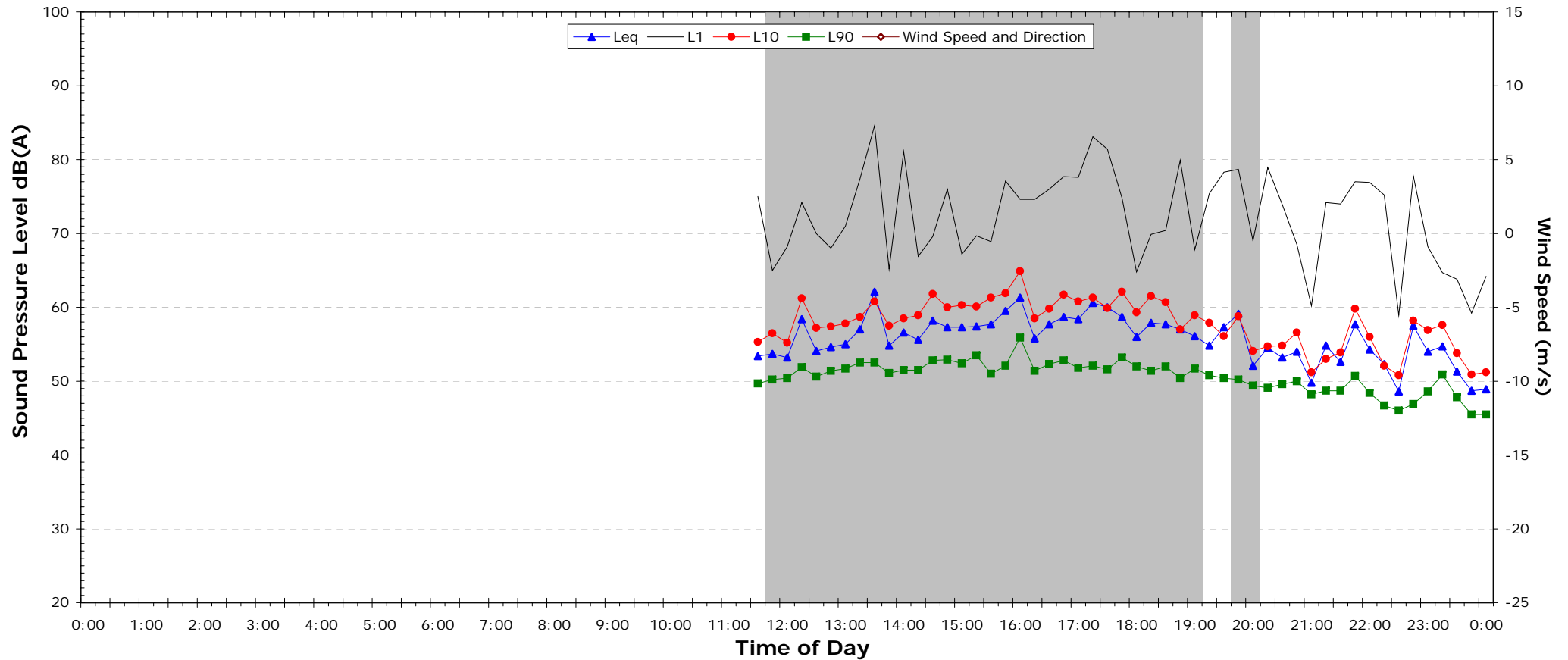
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Rear Yard 40 Belair PI

Friday, 15 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	49.7	48.3	41.6
Leq (see note 3)	53.4	54.8	51.2

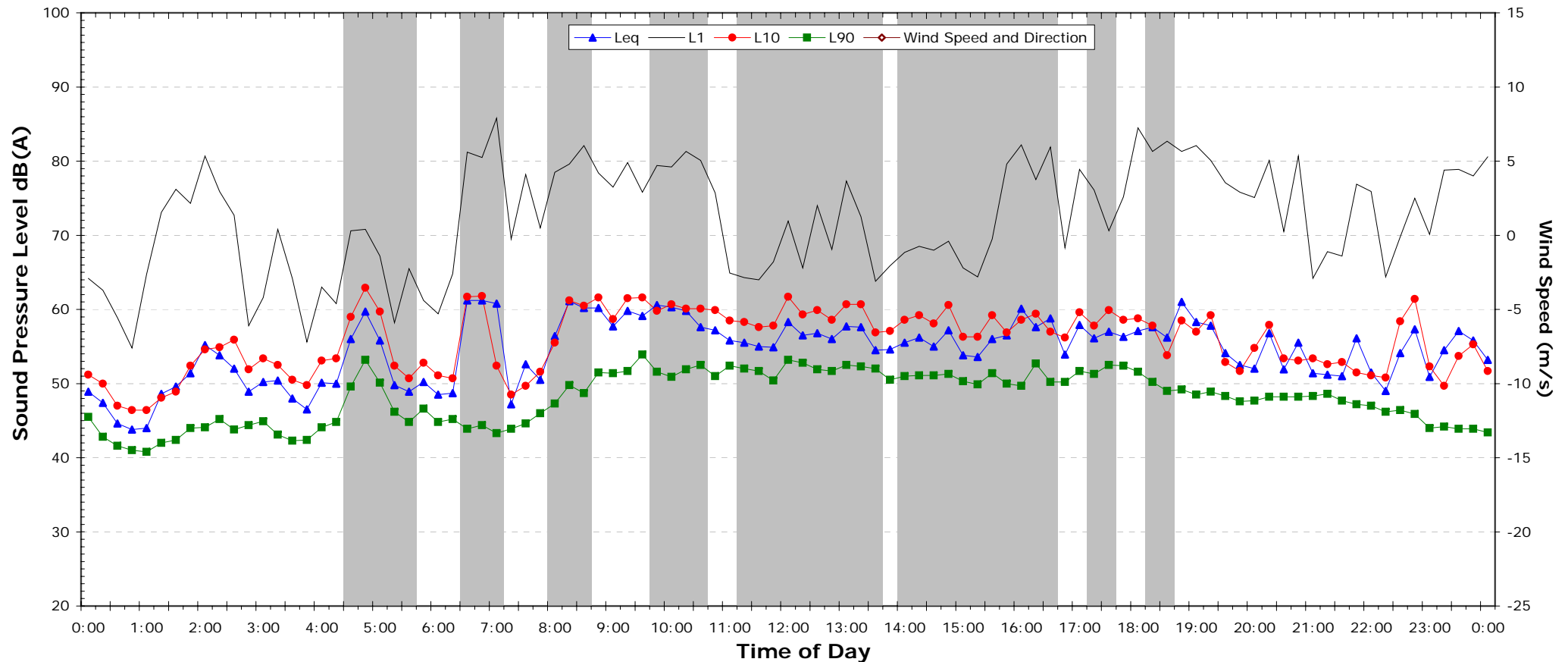
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Rear Yard 40 Belair PI

Saturday, 16 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	44.6	47.2	40.6
Leq (see note 3)	56.8	55.6	49.9

## NOTES:

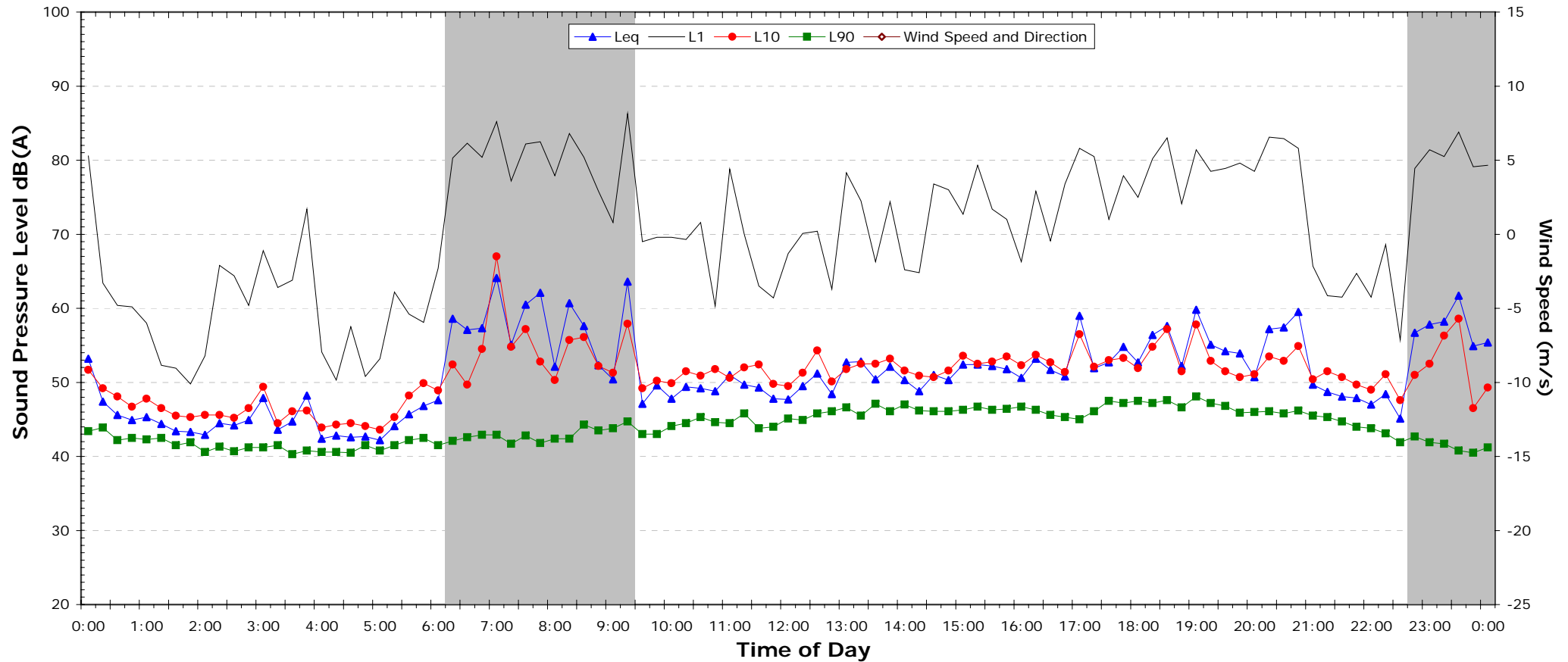
1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected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



# EXISTING AMBIENT NOISE LEVELS

Rear Yard 40 Belair PI

Sunday, 17 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	44.0	44.0	38.7
Leq (see note 3)	51.6	55.3	52.2

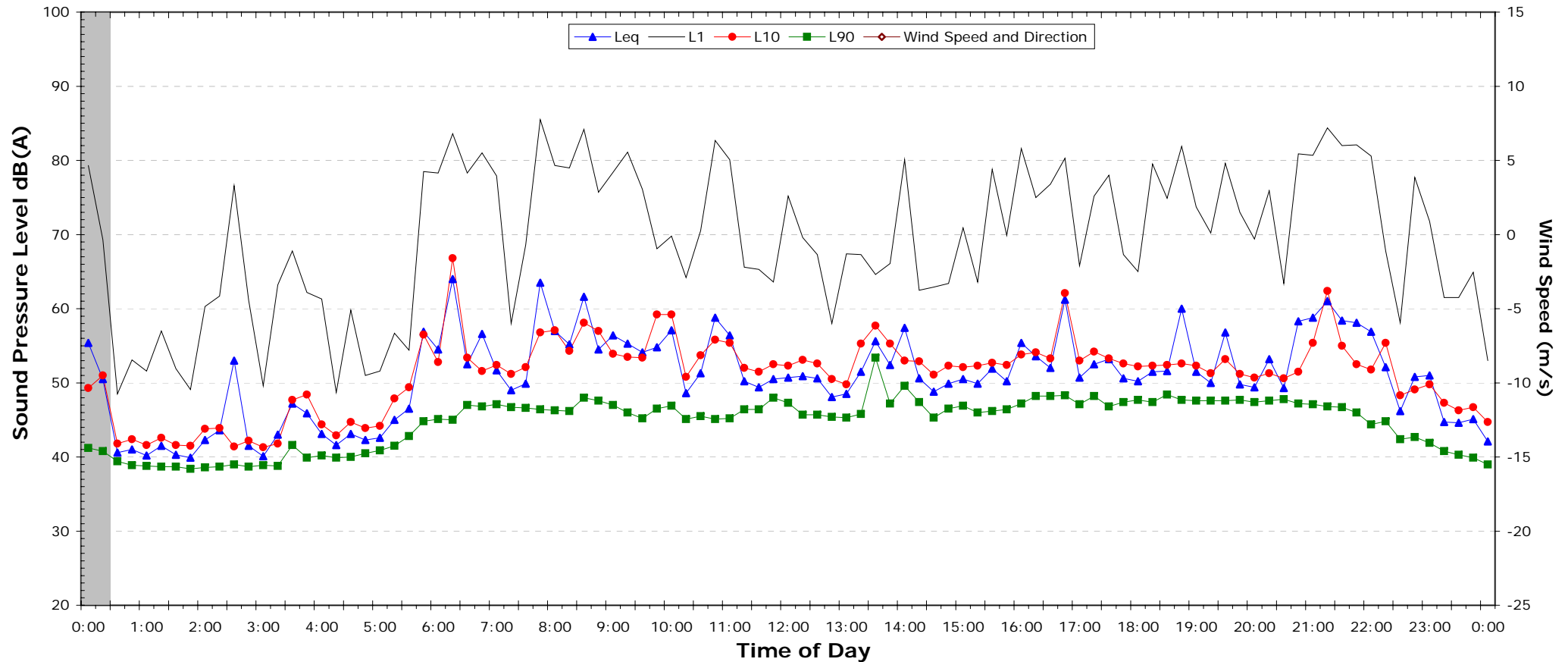
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Rear Yard 40 Belair PI

Monday, 18 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	45.3	46.0	37.5
Leq (see note 3)	55.0	56.4	48.7

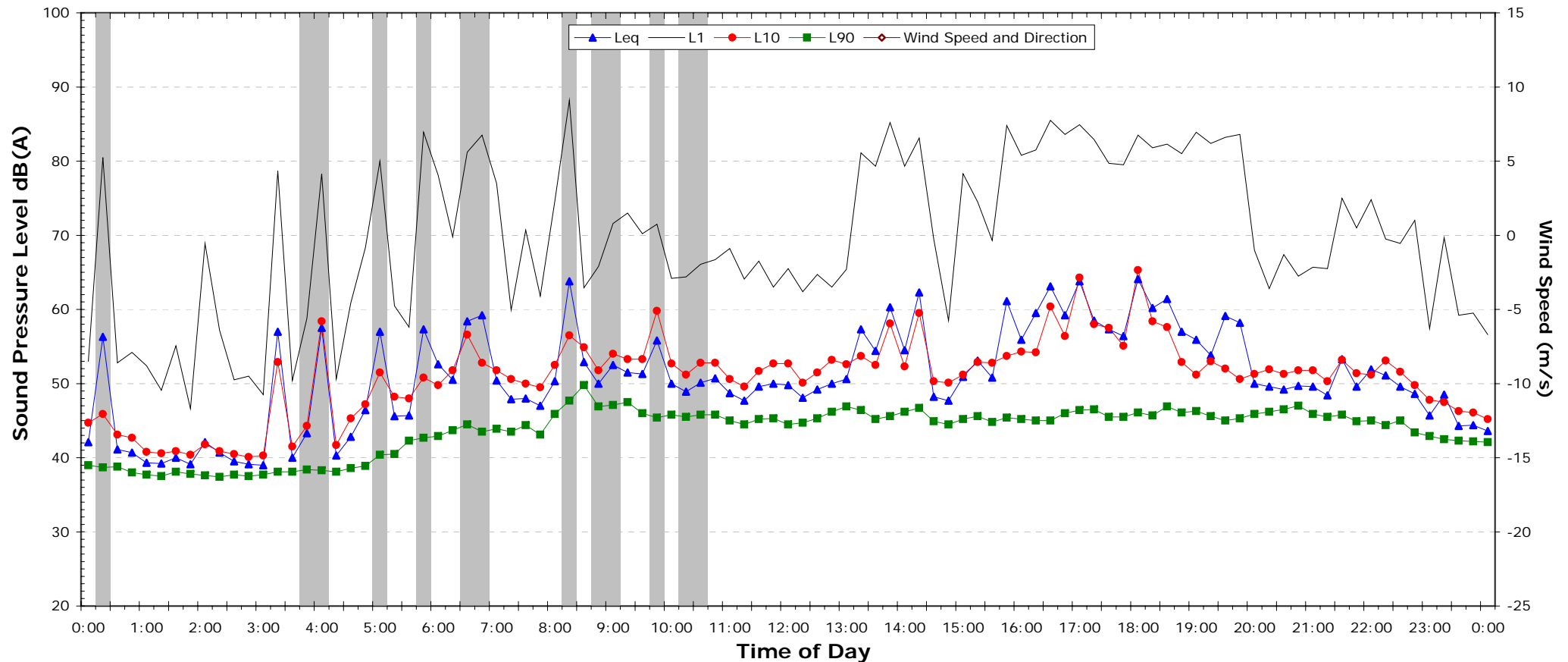
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Rear Yard 40 Belair PI

Tuesday, 19 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	44.5	45.0	41.9
Leq (see note 3)	56.8	55.8	50.8

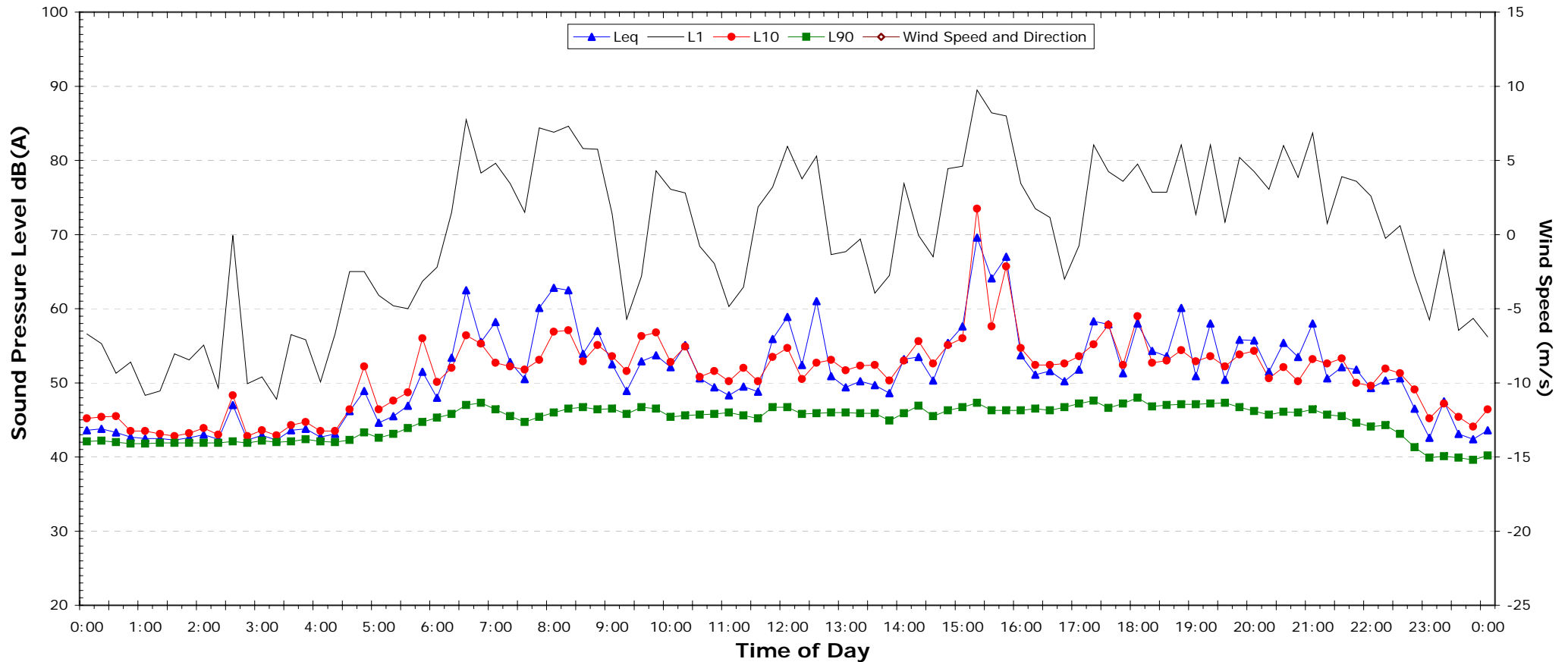
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Rear Yard 40 Belair PI

Wednesday, 20 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	45.4	44.6	38.2
Leq (see note 3)	58.5	54.9	49.6

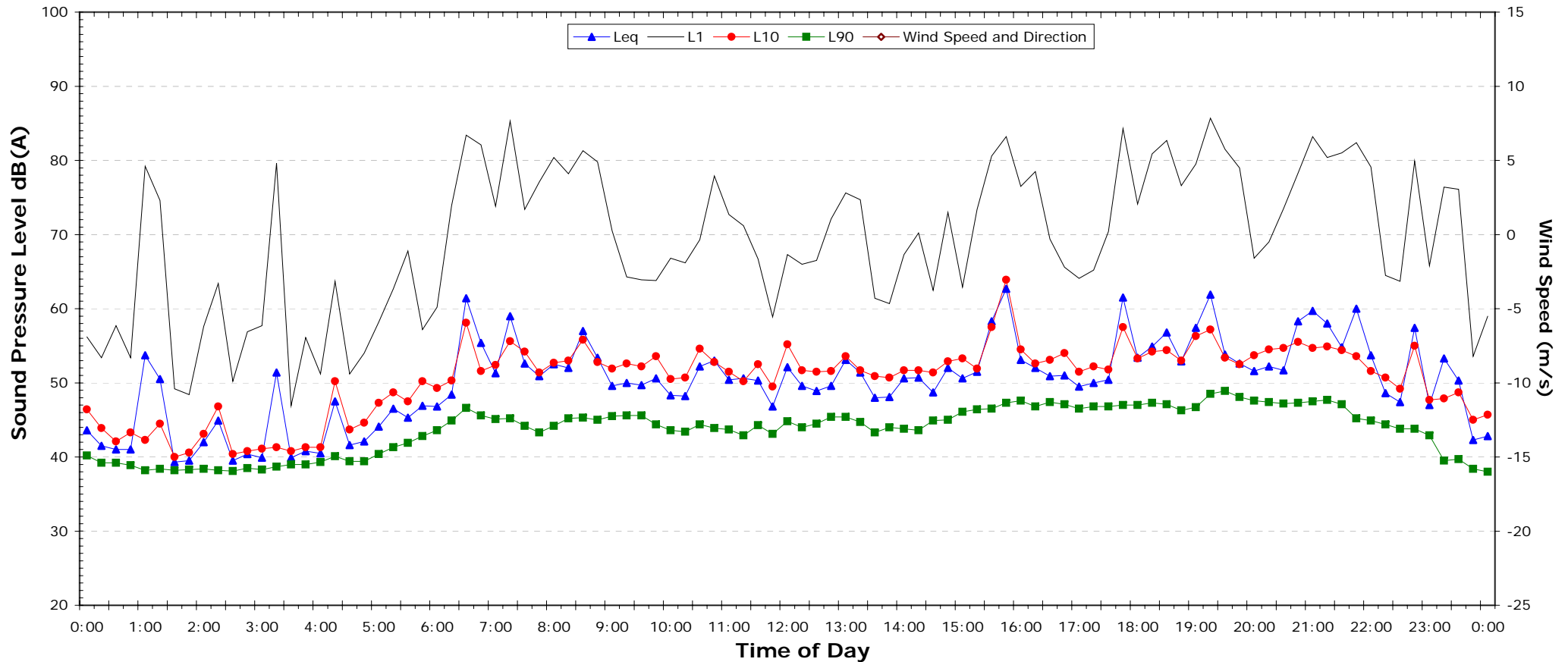
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Rear Yard 40 Belair PI

Thursday, 21 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	43.4	45.2	37.2
Leq (see note 3)	53.6	56.8	49.5

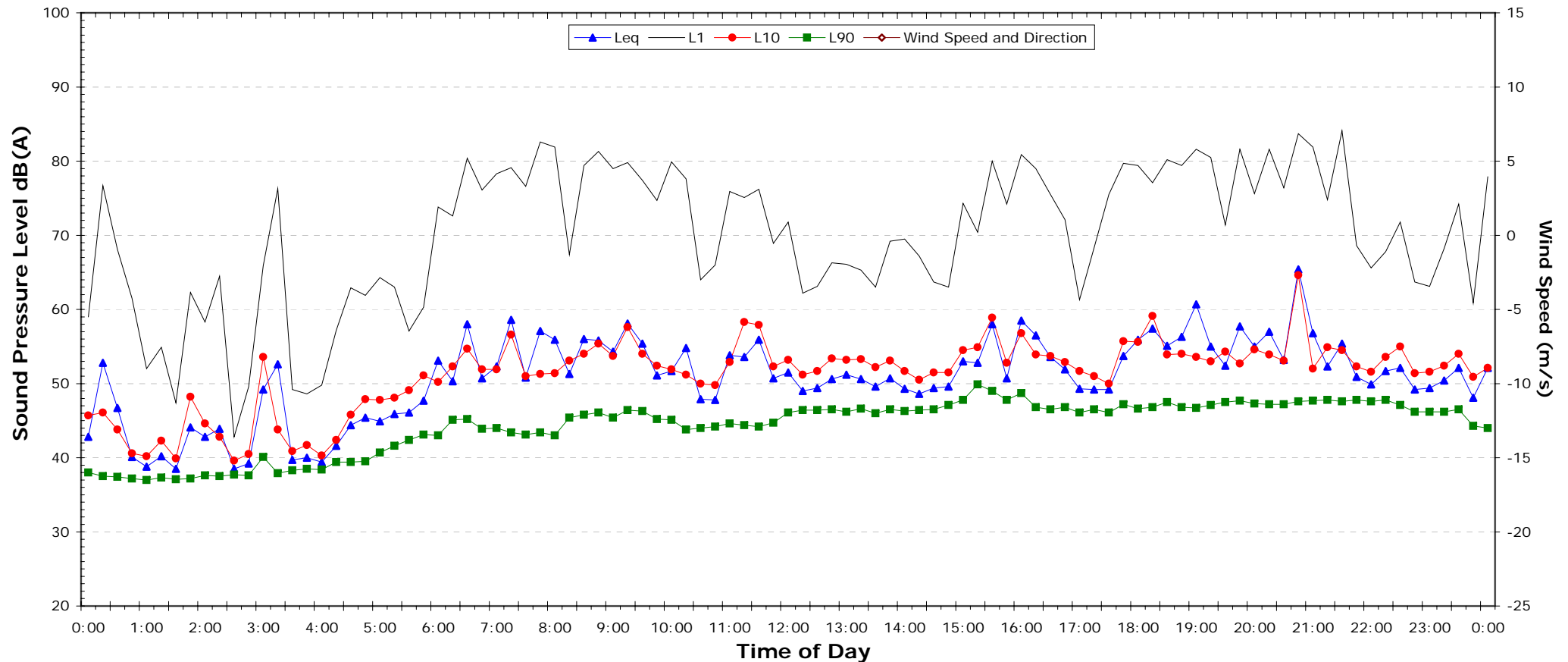
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Rear Yard 40 Belair PI

Friday, 22 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	43.8	46.8	39.1
Leq (see note 3)	53.7	57.6	50.8

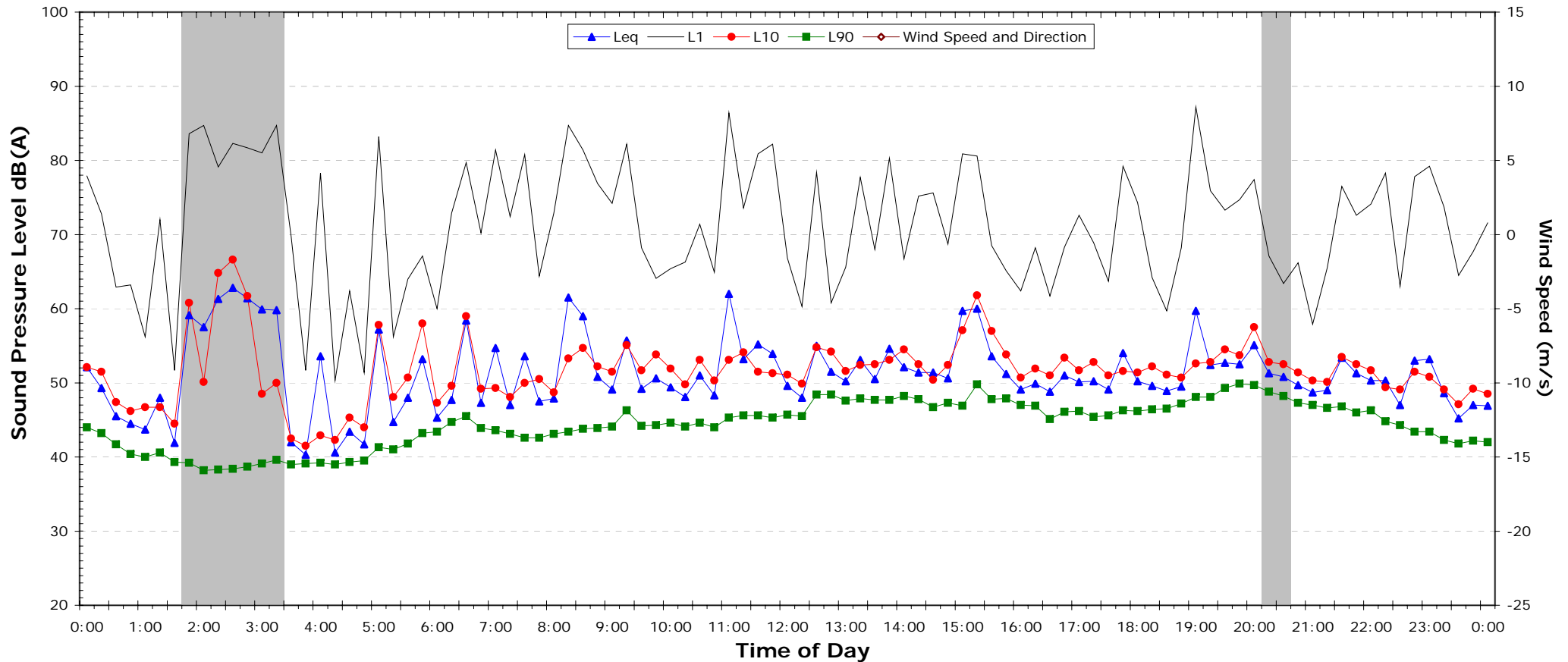
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Rear Yard 40 Belair PI

Saturday, 23 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	43.4	46.3	37.6
Leq (see note 3)	54.1	52.9	49.6

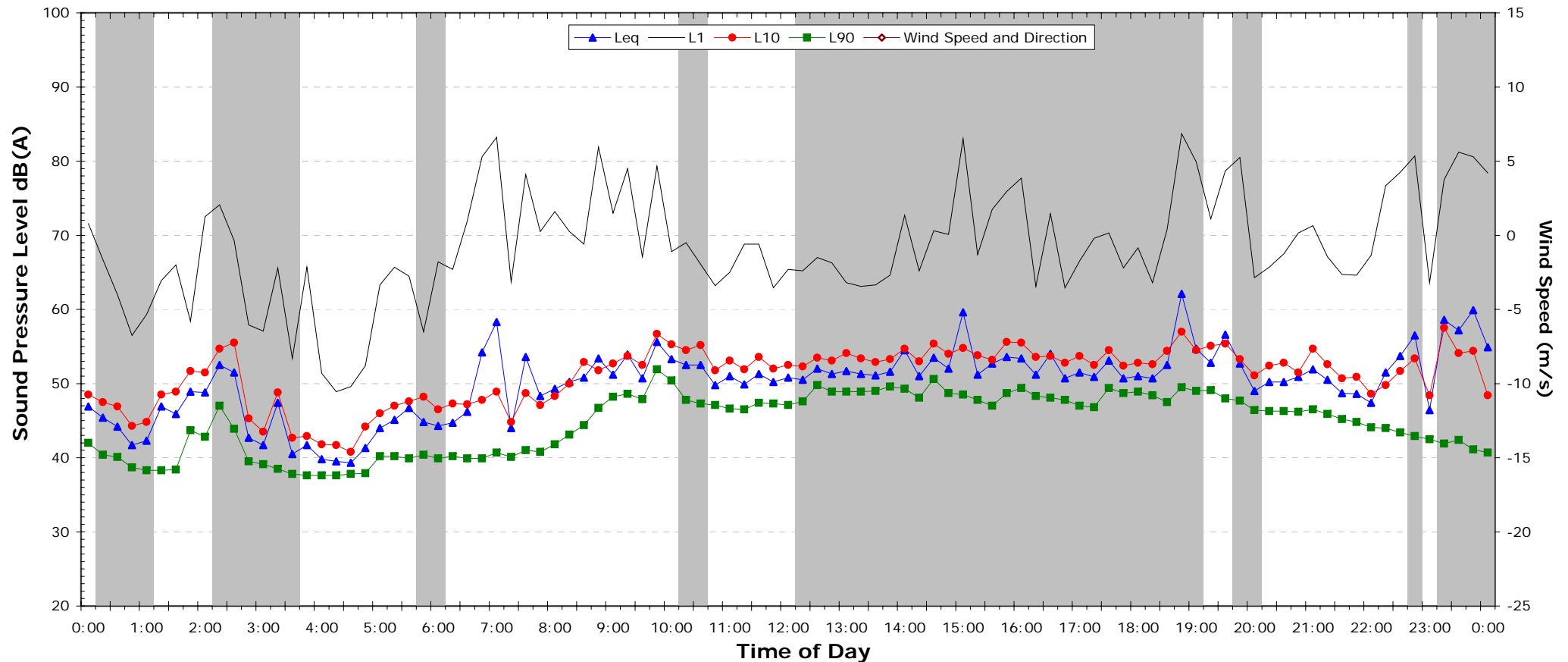
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Rear Yard 40 Belair PI

Sunday, 24 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	40.8	44.5	38.3
Leq (see note 3)	51.6	51.6	52.6

## NOTES:

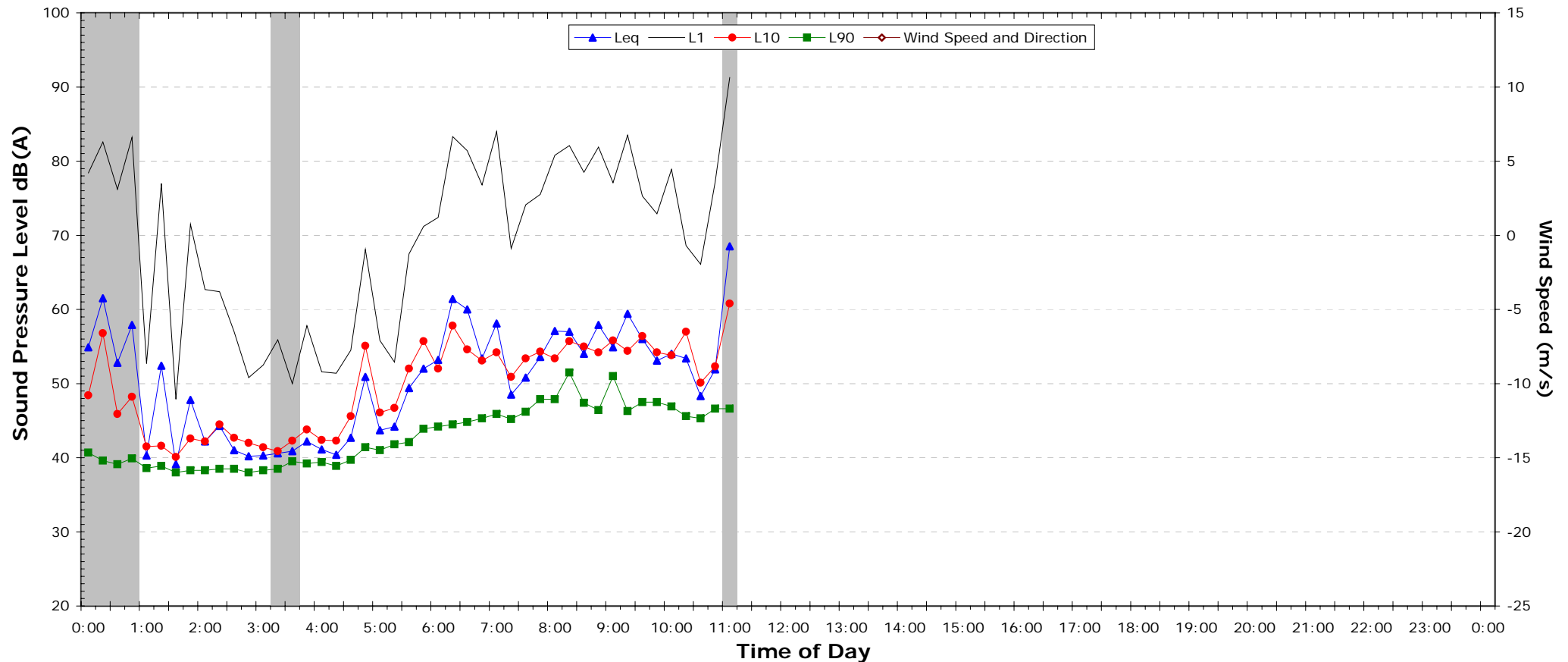
1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected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



# EXISTING AMBIENT NOISE LEVELS

Rear Yard 40 Belair PI

Monday, 25 October 2010



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	45.3	-	-
Leq (see note 3)	55.0	-	-

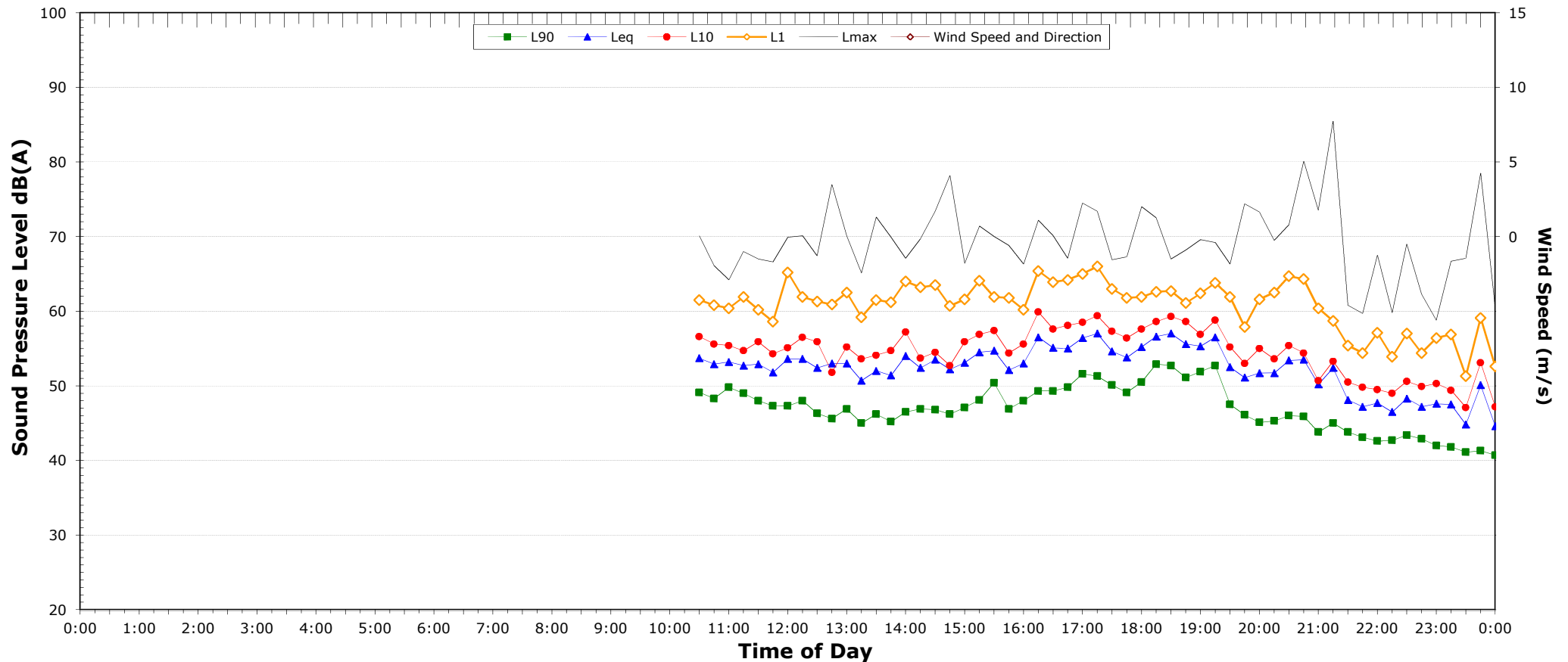
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Frontyard 13 Wheller St

Friday, 11 May 2012



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	46.2	43.1	36.0
Leq	53.8	53.5	46.0

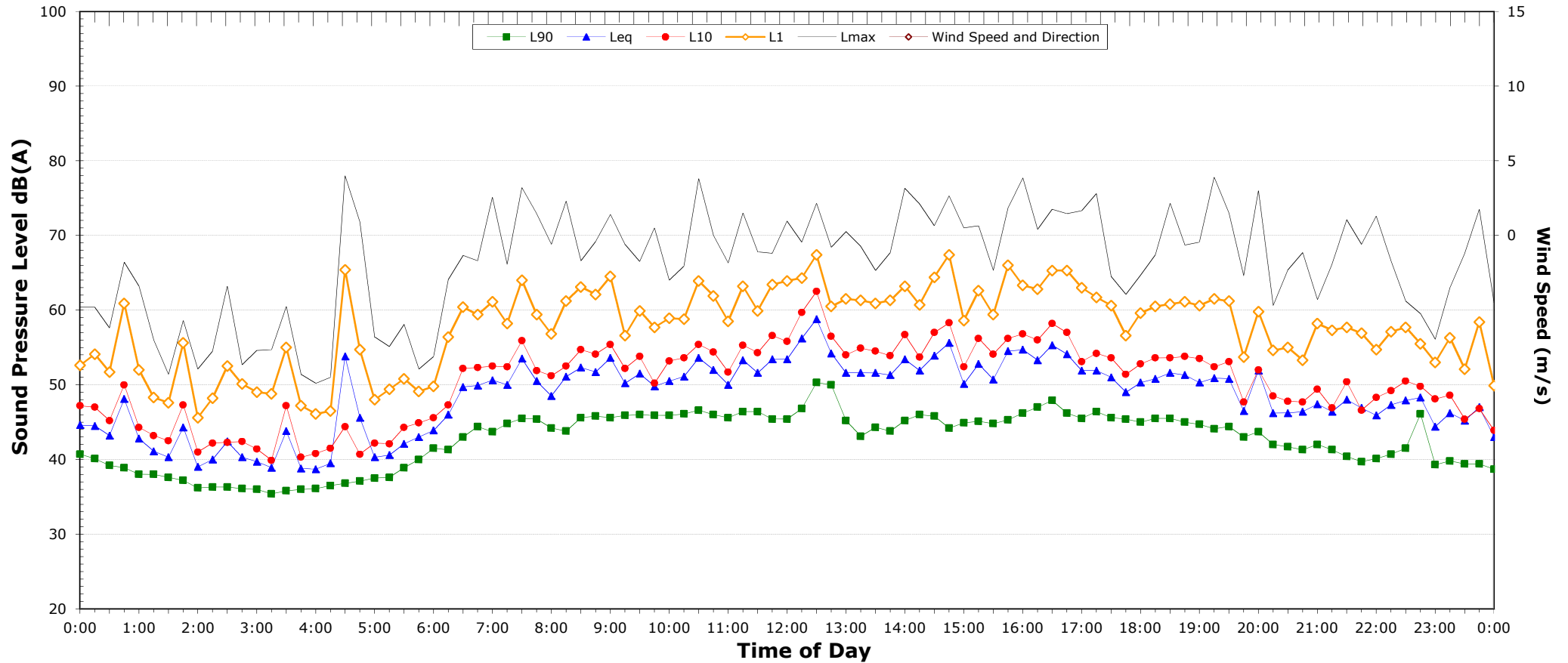
## NOTES:

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)

# EXISTING AMBIENT NOISE LEVELS

Frontyard 13 Wheller St

Saturday, 12 May 2012



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	44.2	40.1	34.9
Leq	52.8	49.2	44.4

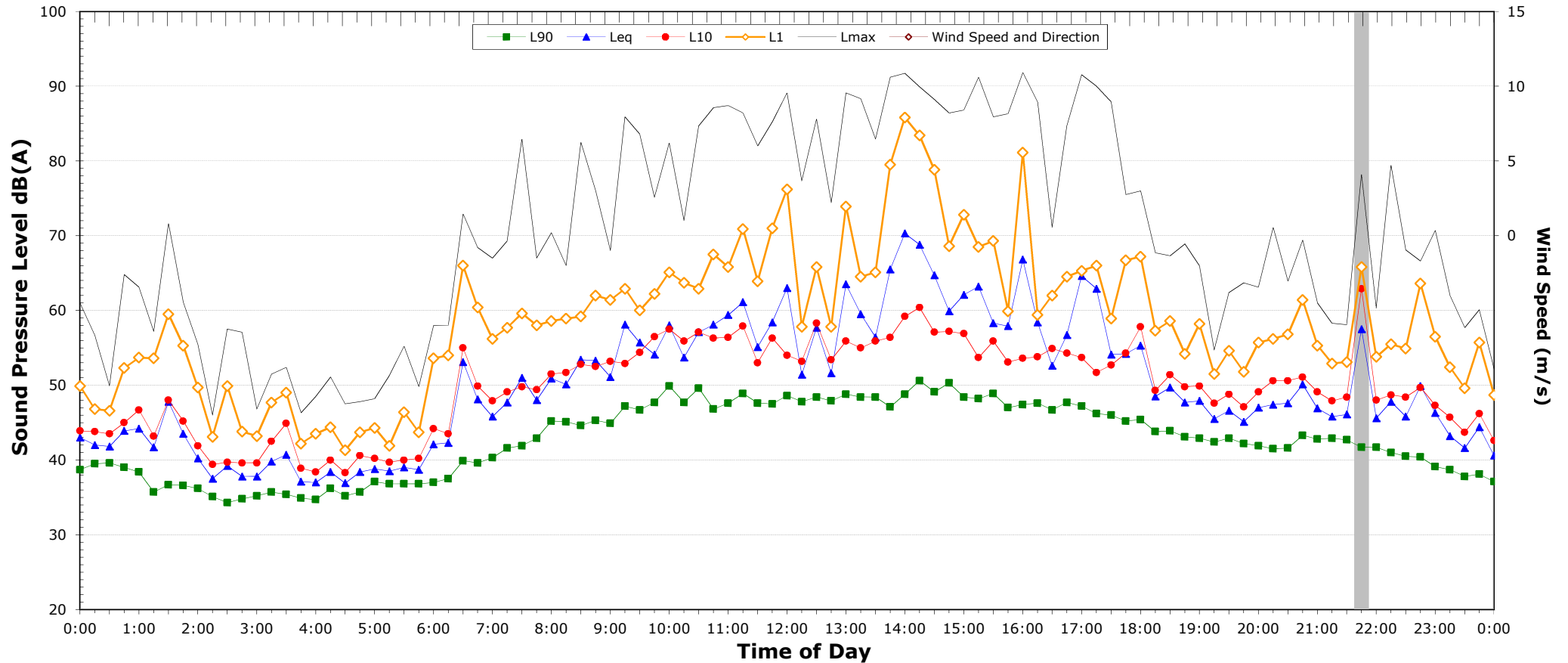
## NOTES:

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)

# EXISTING AMBIENT NOISE LEVELS

Frontyard 13 Wheller St

Sunday, 13 May 2012



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	44.9	41.6	35.6
Leq	61.1	47.4	47.1

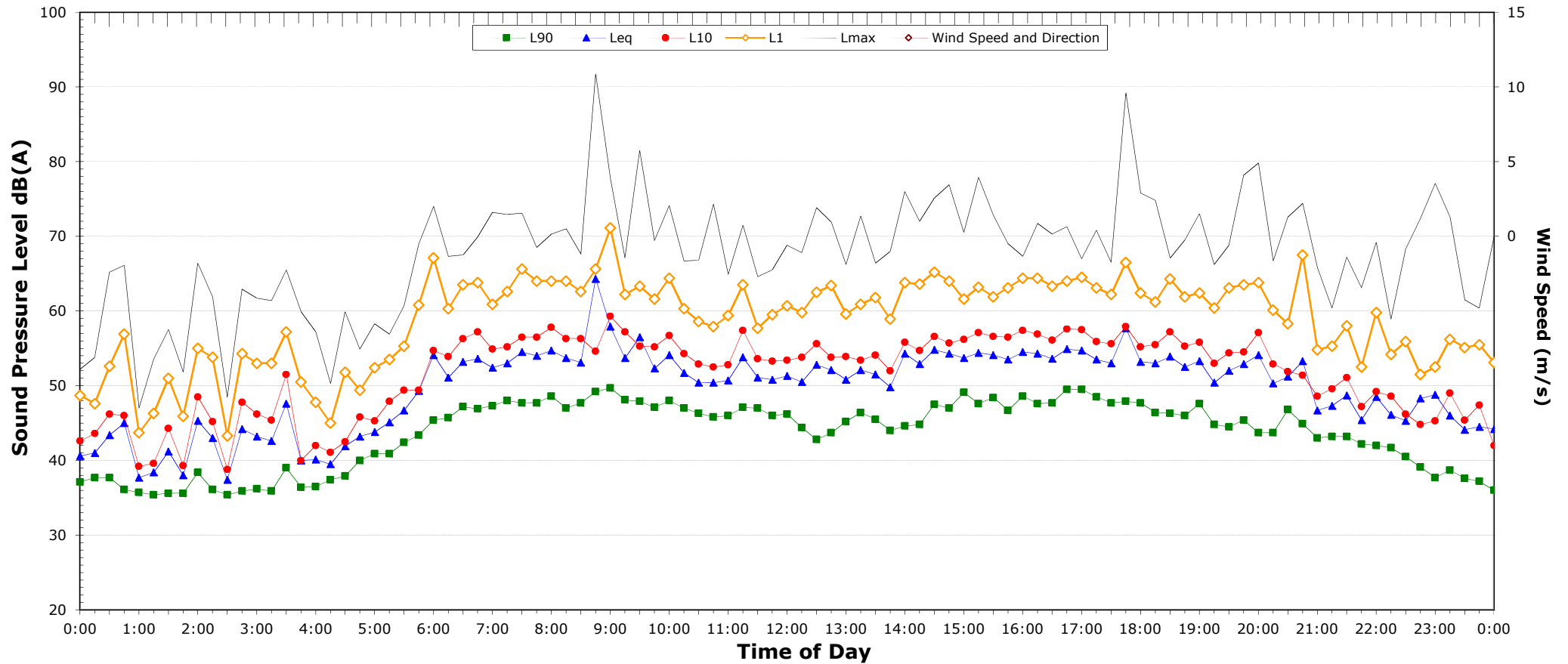
## NOTES:

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 L<sub>max</sub> values are shown only where L<sub>max</sub> > 65dB(A) and where L<sub>max</sub>-Leq ≥ 15dB(A)

# EXISTING AMBIENT NOISE LEVELS

Frontyard 13 Wheller St

Monday, 14 May 2012



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	44.6	42.2	35.0
Leq	54.6	51.6	47.0

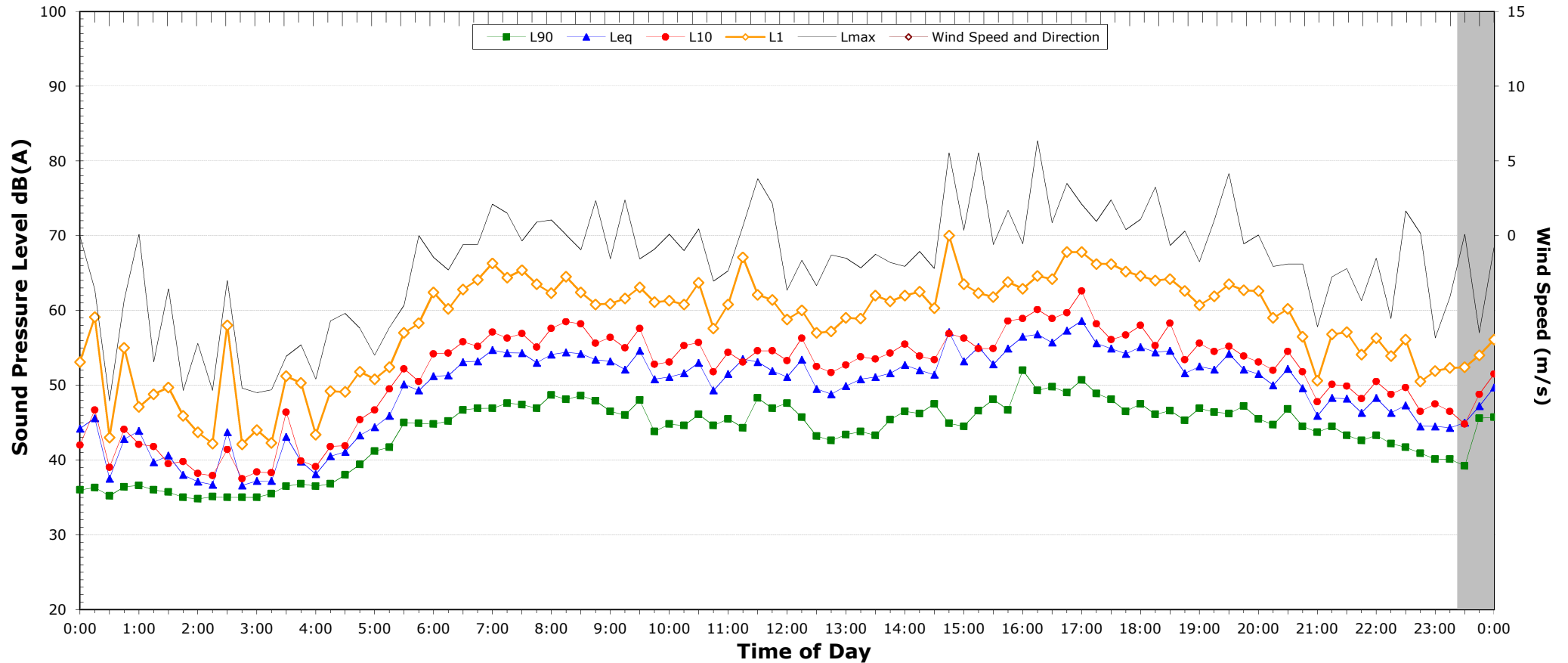
## NOTES:

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)

# EXISTING AMBIENT NOISE LEVELS

Frontyard 13 Wheller St

Tuesday, 15 May 2012



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	43.8	43.3	35.9
Leq	53.8	51.5	47.8

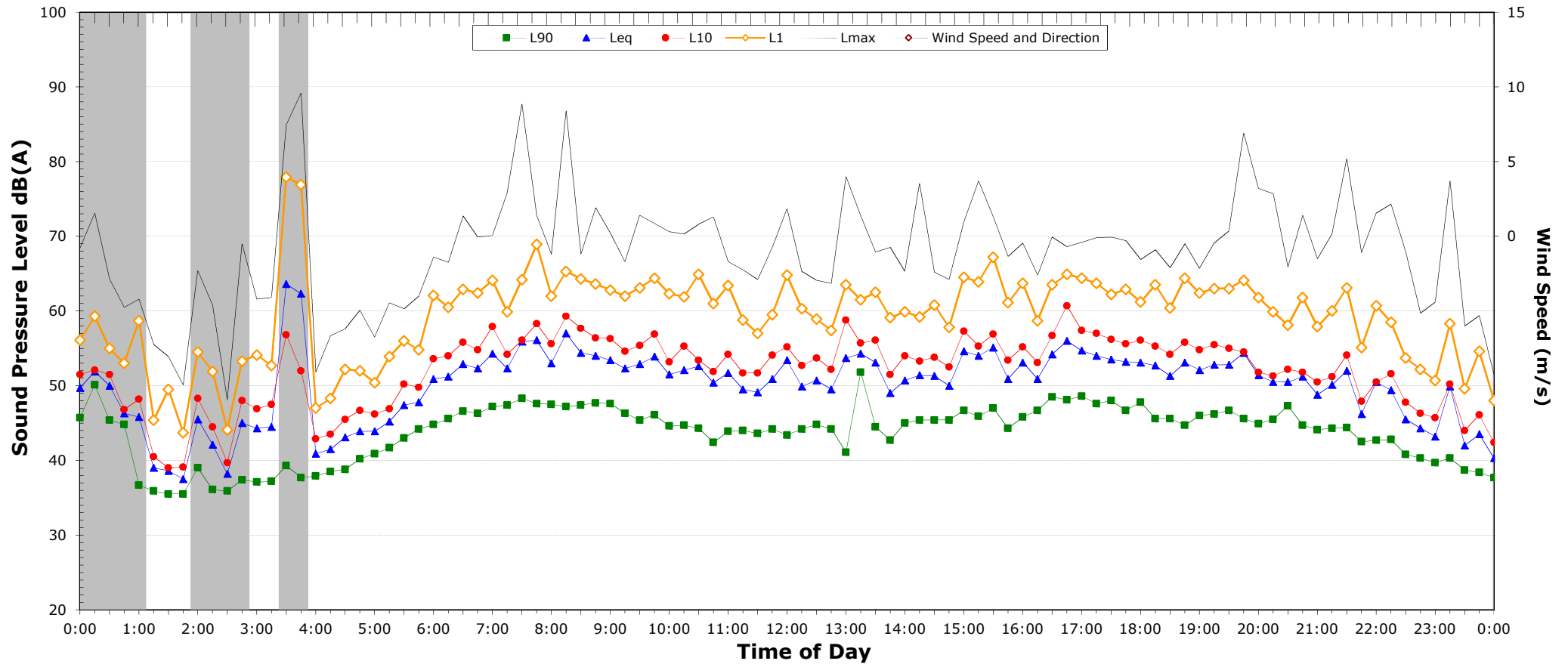
## NOTES:

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)

# EXISTING AMBIENT NOISE LEVELS

Frontyard 13 Wheller St

Wednesday, 16 May 2012



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	43.6	42.7	36.0
Leq	53.1	51.6	48.0

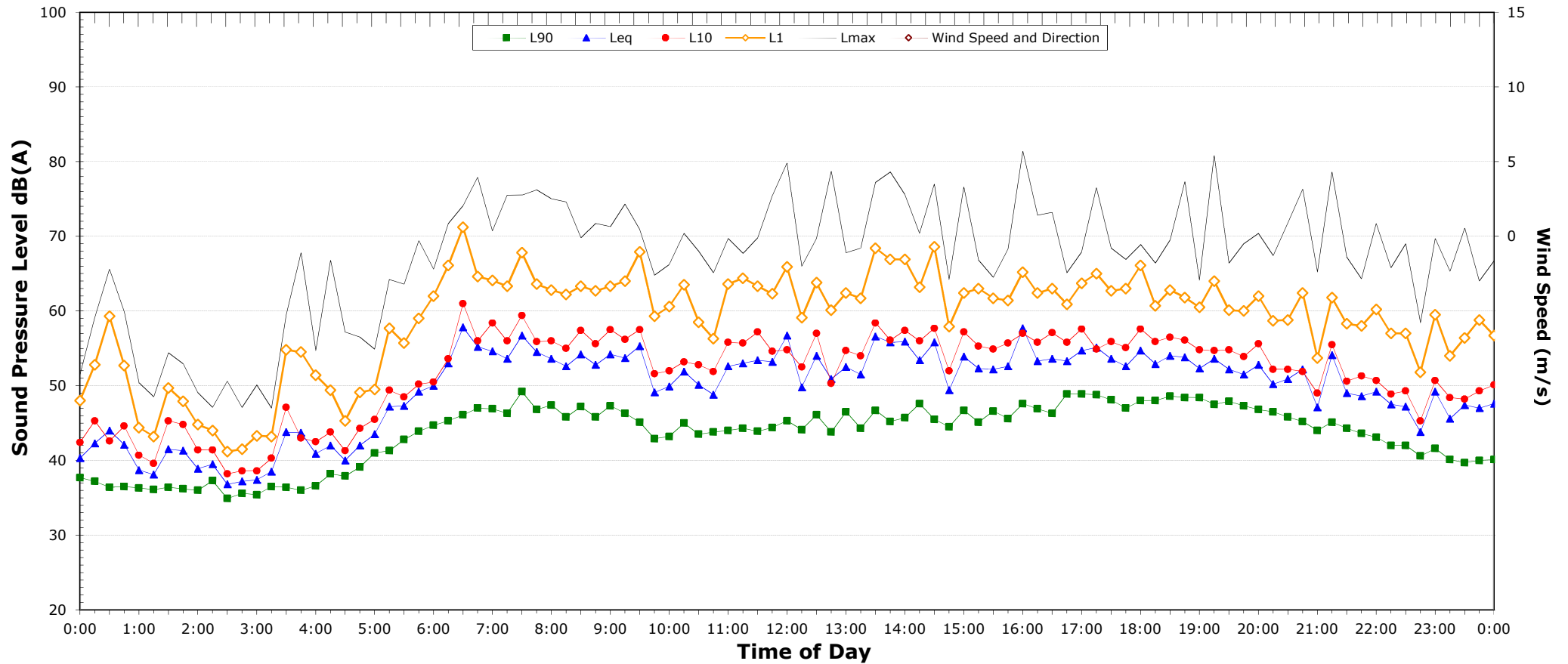
## NOTES:

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)

# EXISTING AMBIENT NOISE LEVELS

Frontyard 13 Wheller St

Thursday, 17 May 2012



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	43.8	43.6	36.1
Leq	53.8	52.0	48.2

## NOTES:

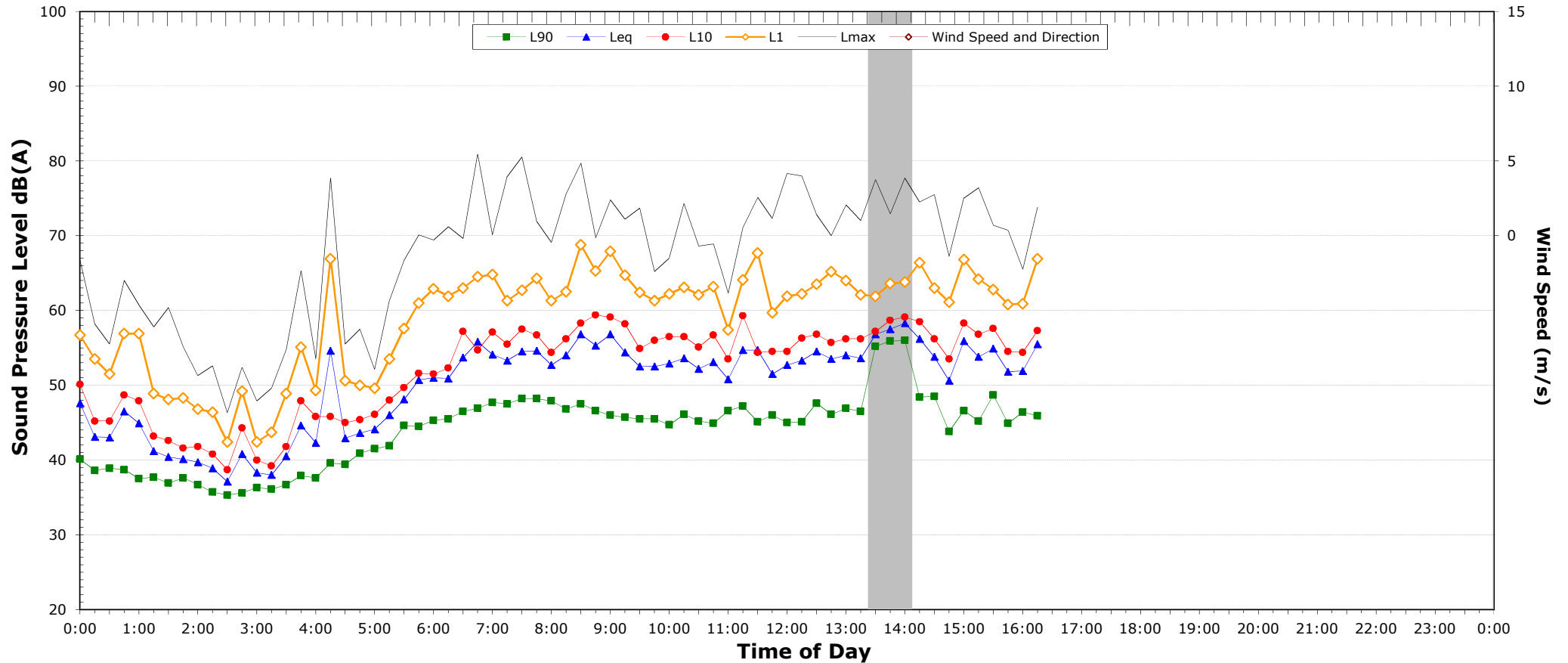
1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.
2. "Night" relates to period from 10pm on this graph to 7am on the following graph.
3. Graphed data measured in free-field; tabulated results facade corrected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



# EXISTING AMBIENT NOISE LEVELS

Frontyard 13 Wheller St

Friday, 18 May 2012



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night <sup>2</sup>
	7am-6pm	6pm-10pm	10pm-7am
L <sub>90</sub>	44.9	-	-
Leq	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)