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18 NOVEMBER 2010

Appendix

LOWER HUNTER LANDS PROJECT - BLACK HILL & TANK PADDOCK

ENVIRONMENTAL ASSESSMENT - NOISE

TD261-12F07 (REV 2) BH - NOISE EA FINAL DRAFT NOVEMBER 2010

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DOCUMENT CONTROL

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CONTENTS

List of Tables

List of Figures

1 INTRODUCTION

Renzo Tonin & Associates were engaged to provide a noise assessment for the proposed development of Coal & Allied Industries Limited (Coal & Allied) land at Black Hill, known as the Black Hill & Tank Paddock Estate.

Noise impacts onto the proposed development and onto nearby noise sensitive areas as a result of the proposed development are assessed against applicable noise criteria and recommendations for the mitigation of noise are provided, where required.

It is proposed that the site will be rezoned for 'employment uses' and the development of the site would be completed by the year 2031. It is anticipated that future land uses will include distribution and logistics centres; a range of manufacturing and warehousing facilities; showrooms and bulky goods storerooms; and training and education facilities. A central, small local centre is also proposed, which would include business premises, childcare centre, retail/ convenience store, food outlet, service station, indoor recreation facilities, car parking and possibly a hotel/ motel.

Noise impacts to the proposed Black Hill development Estate from traffic on surrounding roads, namely John Renshaw Drive and the F3 Sydney-Newcastle Freeway, have been measured and predicted. Noise contours have been generated to present noise levels from road traffic and predicted noise levels are assessed against the NSW Environmental Criteria for Road Traffic Noise (ECRTN).

Noise impacts to the proposed Black Hill development Estate from other sources, including the Donaldson Open-Cut Mine and the Abel Underground Mine approx 700 metres to the north west of the Estate are assessed in accordance with the NSW Industrial Noise Policy (INP) and the Environmental Noise Control Manual (ENCM), as appropriate.

As a future 'employment uses' zone, potential noise impacts from the Estate's future activities onto the proposed residential development to the west of the Estate and existing rural-residential development to the east of the F3 Sydney-Newcastle Freeway have also been assessed in accordance with the NSW Industrial Noise Policy (INP).

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

2.1 Background Information

This acoustic study report has been prepared to assess noise impacts to and from the developable lands owned by Coal & Allied at Black Hill. The land is proposed to be rezoned for 'employment uses'. The land is proposed to be rezoned/listed as a "State Significant Site" (SSS) in Schedule 3 of the State Environmental Planning Policy (Major Development). A draft Schedule 3 listing will be prepared with the Concept Plan application.

Noise impact to and from the proposed development was quantified and compared to the noise guidelines set by the NSW Department of Environment, Climate Change and Water (DECCW).

2.2 Site Description

The Black Hill Estate is bound by John Renshaw Drive to the north and the F3 Sydney-Newcastle Freeway to the east. Largely rural land bounds the Estate to the south and west. There is rural-residential land located to the east of the Estate, on the eastern side of the F3 Freeway and to the south of the Estate. To the north of the Estate and John Renshaw Drive is an industrial business park, with the exception of the open cut coal mine to the northwest.

In the north eastern corner of the Estate there is an old quarry that is currently operated as an asphalt site by Boral Asphalt. It is understood that the Boral site will not be operational when the Black Hill Estate is developed as employment land. Noise from this site is therefore not assessed in this report.

The Estate is currently largely unoccupied, with the exception of some buildings associated with the Boral site, some (unsealed) roads and power lines.

The development of the Estate is not expected to commence before June 2013.

2.3 Noise Issues

Noise sources identified from aerial photography, GIS data and site inspection include:

- F3 Sydney-Newcastle Freeway, a 'freeway / arterial road' as defined by the NSW *Environmental Criteria for Road Traffic Noise*, to the east of the Estate;
- John Renshaw Drive, an 'arterial road' as defined by the NSW *Environmental Criteria for Road Traffic Noise*, to the north of the Estate;
- Donaldson Open Cut Coal Mine, approx 700 metres to the north west of the Estate;
- Abel Underground Mine, access to which will be obtained from the Donaldson Open Cut Mine above;

- Business Park (under construction) to the north of John Renshaw Drive. The Business Park is unlikely to generate noise impact onto the Estate, and is not further addressed in this report; and
- Noise impact from future 'employment uses' within the Estate onto the existing rural residential properties to the south, rural land to the west and existing rural residential properties to the east of the F3 Sydney-Newcastle Freeway. Future employment uses are proposed to be 'light industry' type uses (eg. mechanic workshops, warehouses, etc).

3 EXISTING ACOUSTIC ENVIRONMENT

3.1 Study Area

This study concentrates on the Black Hill Estate and surrounds. Site investigations found that the existing acoustic environment of the site is dominated by natural sounds, with some influence (depending on location) from traffic noise generated by the F3 Sydney-Newcastle Freeway and John Renshaw Drive. Long term, unattended noise monitoring was completed to capture the existing acoustic environment at various areas of the site.

3.2 Noise Monitoring Locations (Refer to Figure 1)

To determine current L_{eq} traffic noise levels and background L_{90} noise levels at the Black Hill Estate, long term unattended noise monitoring was carried out at the locations summarised below. To quantify the existing ambient noise environment, long-term unattended noise monitoring was conducted at each location over ten (full) days, between Monday 10th December and Thursday 20th December 2007.

- **Location M1 – Lot 30 / DP870411 F3 Freeway**
  Within bushland, approximately 80m west of the F3 Freeway carriageway and approx 1,100m south of the Boral site road access. Monitoring was conducted in the free field (ie. away from any buildings) and the noise environment was representative of ambient and background noise levels on the eastern side of the Black Hill Estate site, and of traffic noise levels from the F3 Freeway. Posted speed limit on the F3 Freeway adjacent to the noise monitoring location is 110km/h.

- **Location M2 – Lot 30 / DP870411 John Renshaw Drive**
  Within bushland, approximately 20m south of the John Renshaw Drive carriageway. Monitoring was conducted in the free field (ie. away from any buildings) and the noise environment was representative of ambient and background noise levels on the northern side of the Black Hill Estate site, and of traffic noise levels from John Renshaw Drive. Posted speed limit on John Renshaw Drive adjacent to the noise monitoring location is 80km/h.

- **Location M3 – Lot 30 / DP870411**
  Within an open paddock surrounded by bushland, approximately 500m south of the northern site boundary and 800m west of the eastern site boundary. Monitoring was conducted in the free field (ie. away from any buildings) and the noise environment was representative of ambient and background noise levels at the central and western side of the Black Hill Estate site. The noise environment dominated by insect

and bird noise with no contribution from road traffic noise. Therefore, only background and ambient noise levels measured at this location will be used.

Weather information for the area was obtained from the Bureau of Meteorology for the monitoring period and any data adversely affected by rain, wind or extraneous noise was discarded.

Appendix A of this report presents a description of acoustic terms. Appendix B details the noise monitoring methodology. The graphical recorded output from long term noise monitoring is included in Appendix C to this report. The graphs in Appendix C were analysed to determine an assessment background level (ABL) for each day, evening and night period in each 24 hour period of noise monitoring, and based on the median of individual ABLs an overall single Rating Background Level (RBL) for the day, evening and night period was determined over the entire monitoring period in accordance with the NSW 'Industrial Noise Policy' (INP).

In order to assess existing traffic noise, $L_{Aeq(15hr)}$ and $L_{Aeq(9hr)}$ traffic noise descriptors were measured as suited for freeways and arterial roads.

3.3 Existing Background & Ambient Noise Levels

Background noise varies over the course of any 24 hour period, typically from a minimum at 3am to a maximum during morning and afternoon traffic peak hours. Therefore, the NSW 'Industrial Noise Policy' (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 measurements were conducted to determine whether existing traffic noise levels already exceed the traffic noise criteria. Traffic noise levels are assessed separately for daytime and night time periods, defined by the NSW 'Environmental Criteria for Road Traffic Noise' (ECRTN) as follows:

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

Existing background, ambient noise levels and road traffic noise levels are presented in Table 3.1 and Table 3.2 below.

Noise levels at all locations were measured in the 'free field', in accordance with the requirements for background and ambient noise measurements. Therefore, the L_{90} background noise levels and the L_{eq} ambient noise levels presented in Table 3.1 below are directly applicable.

Table 3.1 – Measured Existing Background (L_{90}) & Ambient (L_{eq}) Noise Levels, dB(A)

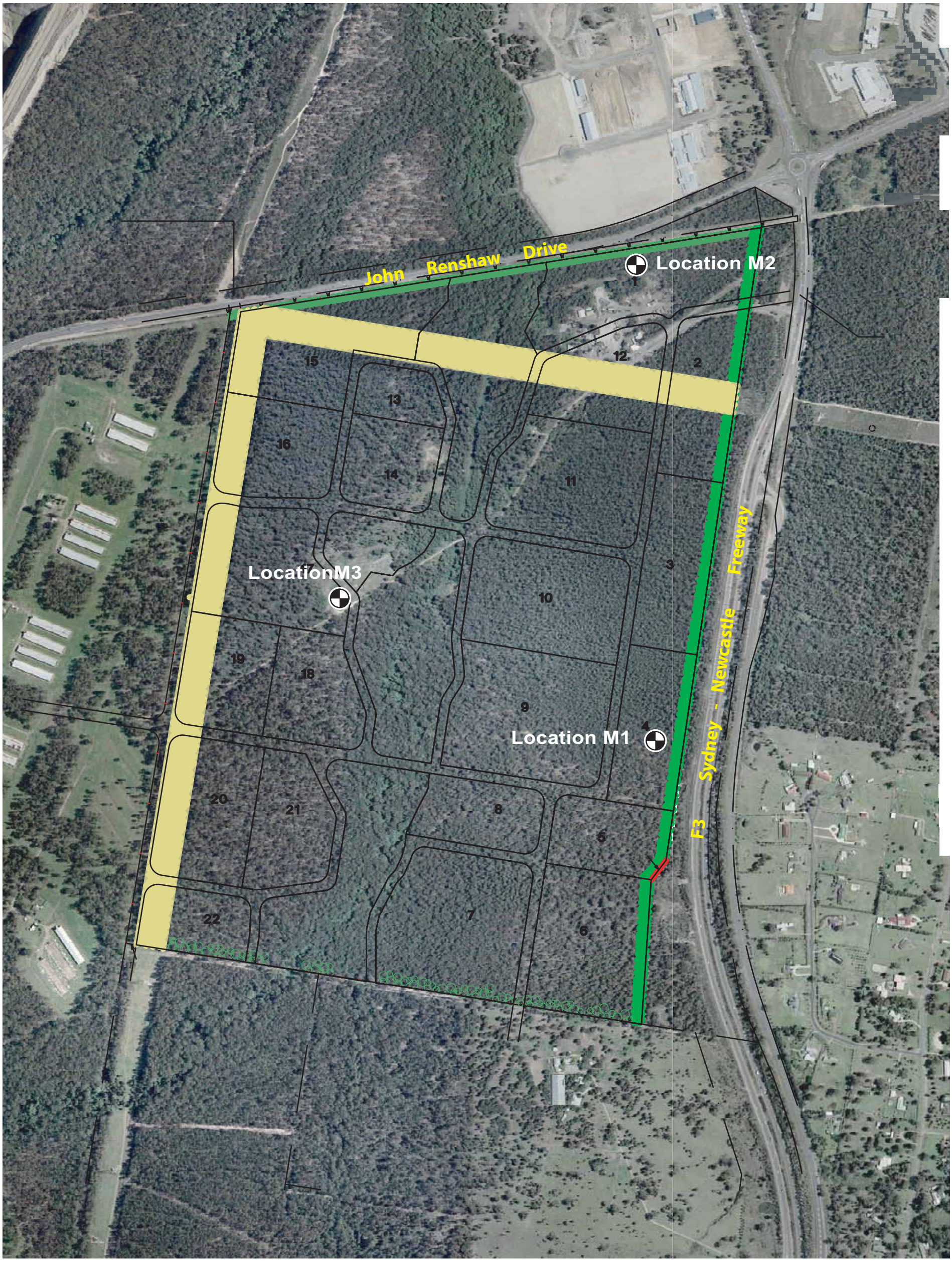
Noise Monitoring Location	L_{90} Background Noise Levels			L_{eq} Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Location M1 – F3 Freeway	56	49	46	61	60	59
Location M2 – John Renshaw Dr	50	46	41	63	61	59
Location M3 – Central Estate	41	41	38	48	51	46

Conversely, traffic noise levels should be measured at the facade (1m from facade) and should include facade reflection. Therefore, the L_{eq} traffic noise levels measured at all the 'free field' locations presented in Table 3.2 have been corrected to represent 'at facade' conditions at all monitoring locations by adding 2.5dB(A) to the measured noise levels.

Table 3.2 – Measured Existing Road Traffic (L_{eq}) Noise Levels

Noise Monitoring Location	Distance from nearest kerb (m)	L_{eq} Traffic Noise Levels, dB(A)[1]	
		$L_{Aeq,15hr}$ Day[2]	$L_{Aeq,9hr}$ Night[2]
Location M1 – F3 Freeway	80	64	62
Location M2 – John Renshaw Dr	20	66	63

Notes: 1. L_{eq} noise level corrected to represent 'at-facade' conditions by adding 2.5dB(A) to the measured results
2. Day is defined as 7:00am to 10:00pm; Night is defined as 10pm to 7am



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Title : Figure 1 - Black Hill & Tank Paddock Proposed Employment Lands : Locality Map

Project: Lower Hunter Land Project

Scale: NTS

Date : 15/02/11

Ref : TD261-12P01B (rev 1)

4 ROAD TRAFFIC NOISE INVESTIGATION

4.1 Road Traffic Noise Criteria

Noise impact from traffic on roads near the development site is assessed against the *NSW Environmental Criteria for Road Traffic Noise* (the "ECRTN", Environment Protection Authority 1999).

The ECRTN sets out criteria to be applied to particular types of road and land uses. These noise criteria are to be applied when assessing noise impact and determining mitigation measures for developments that are potentially affected by road traffic noise, with the aim of preserving the amenity appropriate to the land use.

Given that training and education facilities as well as a childcare centre are proposed as part of the Black Hill Estate development, then the assessment of road traffic noise impacts should be considered for noise sensitive areas such as classrooms and outdoor play and learning areas.

Table 2.1 of the ECRTN summarises the road traffic noise criteria based on the type of land use development and the road type. Table 4.1 summarises the road traffic noise criteria applicable to this study.

Table 4.1 – Applicable Road Traffic Noise Criteria

Type of Development	Criteria, dB(A)	
	Day	Night
Proposed school classrooms	$L_{eq(1hr)}$ 40[1]	-
Proposed places of worship	$L_{eq(1hr)}$ 40[1]	$L_{eq(1hr)}$ 40[1]
Proposed active recreation (eg golf courses)	$L_{eq(15hr)}$ 60	-
Proposed passive recreation and school playgrounds	$L_{eq(15hr)}$ 55	-

Note: 1. Internal noise criteria

Further to the criteria set out above, it is appropriate to assess noise impact upon commercial and industrial developments on the basis of the recommended noise levels set out in Australian Standard 2107 – 2000 "Acoustics – Recommended design sound levels and reverberation times for building interiors".

For **industrial buildings**, which may have sick bays, lunch rooms, and assembly lines, the range of recommended interior design sound levels are 50dB(A) to 70dB(A), depending on the usage of the indoor space. This equates to an outdoor noise level of 60dB(A) to 80dB(A), assuming a 10dB(A) drop in traffic noise level through an open window (ECRTN p14).

For **office buildings**, which may have board rooms, private offices and public spaces, the range of recommended interior design sound levels are 40dB(A) to 50dB(A), depending on the use. This equates to an outdoor noise level of 50dB(A) to 60dB(A), assuming a 10 dB(A) reduction in traffic noise level through open windows (ECRTN p14); and would equate to

approximately an outdoor noise level of 60dB(A) to70 dB(A), assuming a 20dB(A) reduction in traffic noise level through a closed facade where the office building is air-conditioned.

4.2 Road Traffic Noise Sources

The proposed development will potentially be affected by traffic along the F3 Freeway and John Renshaw Drive. Hyder Consulting (Hyder) provided 2007 hourly traffic data from traffic counts carried out on John Renshaw Drive in October 2007. Existing traffic volumes for F3 Freeway were also obtained from Hyder. However, as no traffic counts were performed on the F3, Hyder derived a growth factor from historic AADT data collected by the Roads & Traffic Authority in 2001 and 2004. This was then used to project the traffic volume to the estimated 2007 level.

Forecast traffic volumes for the year 2031 were obtained from Hyder Consulting assuming that the Black Hill Estate development goes ahead. It is noted that the traffic volumes along John Renshaw Drive have also been considered based on the construction of a long term infrastructure project – the F3 to Braxton Link (F32B), now known as the Hunter Expressway. Therefore, an assessment of road traffic noise including the Hunter Expressway project is to be undertaken. Forecast traffic volumes along John Renshaw Drive assume the existence of the Hunter Expressway which is now due for completion in 2013

The traffic composition data used for noise modelling are summarised in the table following.

Table 4.2 – Existing and Future Traffic Volume & Composition Data

Road	Year	Direction	Day (7am-10pm)		Night (10pm-7am)		Speed
			Volume	%HV	Volume	%HV	km/h
F3 Freeway	2007[1]	Two way	28,200	14%	4,800	27%	110
	2031[2, 3]	Two way	41,300	14%	7,000	27%	110
John Renshaw Drive	2007[1]	Two way	6,700	10%	1,300	10%	85
	2031[2, 3]	Two way	20,900	10%	4,100	10%	80

Note: 1. 2007 traffic count data provided by Hyder
2. 2031 forecast traffic volumes provided by Hyder
3. With the Hunter Expressway constructed

4.3 Predicted Road Traffic Noise

The noise prediction model used to predict traffic noise levels for the project are contained within the calculation algorithms of the noise model developed by the United Kingdom Department of Environment entitled "Calculation of Road Traffic Noise (1988)" known as the CoRTN88 method. This method has been adapted to Australian conditions and extensively tested by the Australian Road Research Board.

The model predicts noise levels for free flowing traffic and a modified method has been developed which enables an accurate prediction of noise from high truck exhausts to be taken into account. The method predicts the $L_{10(1hour)}$ noise levels within the daytime 15 hour (7am to

10pm) and night-time 9 hour (10pm to 7am) periods and a correction of -3dB(A) is applied to obtain the $L_{eq(1hour)}$ noise levels for each period. The $L_{eq(1hour)}$ noise level for the time period 7am to 10pm is then equated to the daily $L_{eq(15hour)}$ noise level. Similarly, the $L_{eq(1hour)}$ noise level for the time period 10pm to 7am is then equated to the night time $L_{eq(9hour)}$ noise level.

Where traffic is assessed over a 1 hour period, the $L_{10(1hour)}$ noise level is determined based on peak 1 hour traffic volumes for the day/ night period and a correction of -3dB(A) is applied to obtain the $L_{eq(1hour)}$ noise level.

The noise prediction model takes into account the following:

Table 4.3 – Summary of Modelling Inputs

Input Parameters	Data Acquired From
Traffic volumes and mix	See Table 4.2 above
Vehicle speed	See Table 4.2 above
Gradient of roadway	Estimated from Contour Plan provided by Monteath & Powys Pty Ltd dated 27 August 2007 (Ref: 06/221; CADD File: 06221R.dwg)
Source height	0.5m for car exhaust, 1.5m for car and truck engines and 3.6m for truck exhaust and detailed within CoRTN
Ground topography at receiver and road	From Contour Plan provided by Monteath & Powys Pty Ltd dated 27 August 2007 (Ref: 06/221; CADD File: 06221R.dwg)
Angles of view from receiver	160 degrees for all receivers
Reflections from existing barriers, structures and cuttings on opposite side of road	Determined during site inspections and review of concept design. No structures or cuttings identified.
Air and ground absorption	Detailed within CoRTN88, ground absorption varied along route. Numeric values varied between 0 (hard surface) to 1 (100% absorptive)
Receiver Heights	1.5m above ground level
Facade correction	+2.5dB(A)
Australian conditions correction	-1.7dB(A) at 1m from facade
Acoustic properties of road surfaces	Assumed dense graded asphalt
Roadside barriers	Assumes no existing noise barriers
Existing traffic noise levels (LAeq)	Based on short and long term noise monitoring results

4.3.1 Model Verification

The model was verified and calibrated using the long term noise monitoring results obtained for this study. Table 4.4 summarises the results of the traffic noise model verification, providing a comparison of the modelled traffic noise levels for existing conditions compared to the measured traffic noise levels.

Table 4.4 – Noise Model Verification Results

Loc'n	$L_{Aeq(15hr)}$ Noise Level			$L_{Aeq(9hr)}$ Noise Level		
	Measured	Modelled	Variation	Measured	Modelled	Variation
M1	61.7	62.0	0.3	59.9	58.2	-1.7
M2	63.1	63.6	0.5	60.2	59.2	-1.0

The noise model verification tests presented in Table 4.4 above shows the model to predict noise levels that fall within ± 1.7dB(A) of the true noise levels monitored at locations M1 and M2. The accuracy of the CoRTN88 noise algorithms is generally expected to predict noise levels that are within 2.7dB(A) of the true noise levels with an 85% confidence [RTA's Interim Traffic Noise Policy (ITNP), Appendix B, Section 3].

Therefore, the results presented above provide a reasonable level of confidence in the accuracy of the noise model used for predicting future day time and night time traffic noise levels for this project.

4.4 Road Traffic Noise Assessment

4.4.1 Predicted Traffic Noise Levels

As there are numerous potentially noise affected sites along the proposed route, road traffic noise levels are predicted across the Estate using noise contour maps.

The measured and modelled noise levels indicate that exceedances of the noise criteria are higher during the day period and were therefore the controlling factor in terms of potential noise impacts. Therefore, the road traffic noise assessment is for the day period only from herein.

Figure 2 presents the day time noise contours representing $L_{Aeq(15hour)}$ road traffic noise generated by the F3 Freeway and John Renshaw Drive for the year 2031. Figure 3 presents the night-time noise contours representing $L_{Aeq(9hour)}$ road traffic noise generated by the F3 Freeway and John Renshaw Drive for the year 2031. The noise contours were produced assuming no noise control measures have been incorporated into the development other than those measures detailed in Table 4.3. The noise contours were interpolated from a series of calculations to specific points within a regularly spaced grid, 1.5 m above ground level. It is noted that the noise contours are estimates of the predicted noise levels, and that contour values may differ slightly from equivalent spot calculations.

Traffic noise levels presented in Figure 2 and Figure 3 are for ground floor levels only.

4.4.2 Assessment of Impacts

The $L_{Aeq(15hr)}$ 60dB(A) (day) contours shown in Figure 2 indicates the location within the noise contours (ie between the noise contour and road) where road traffic noise levels from the F3 Freeway and John Renshaw Drive comply with the recommendations of the ECRTN for office/

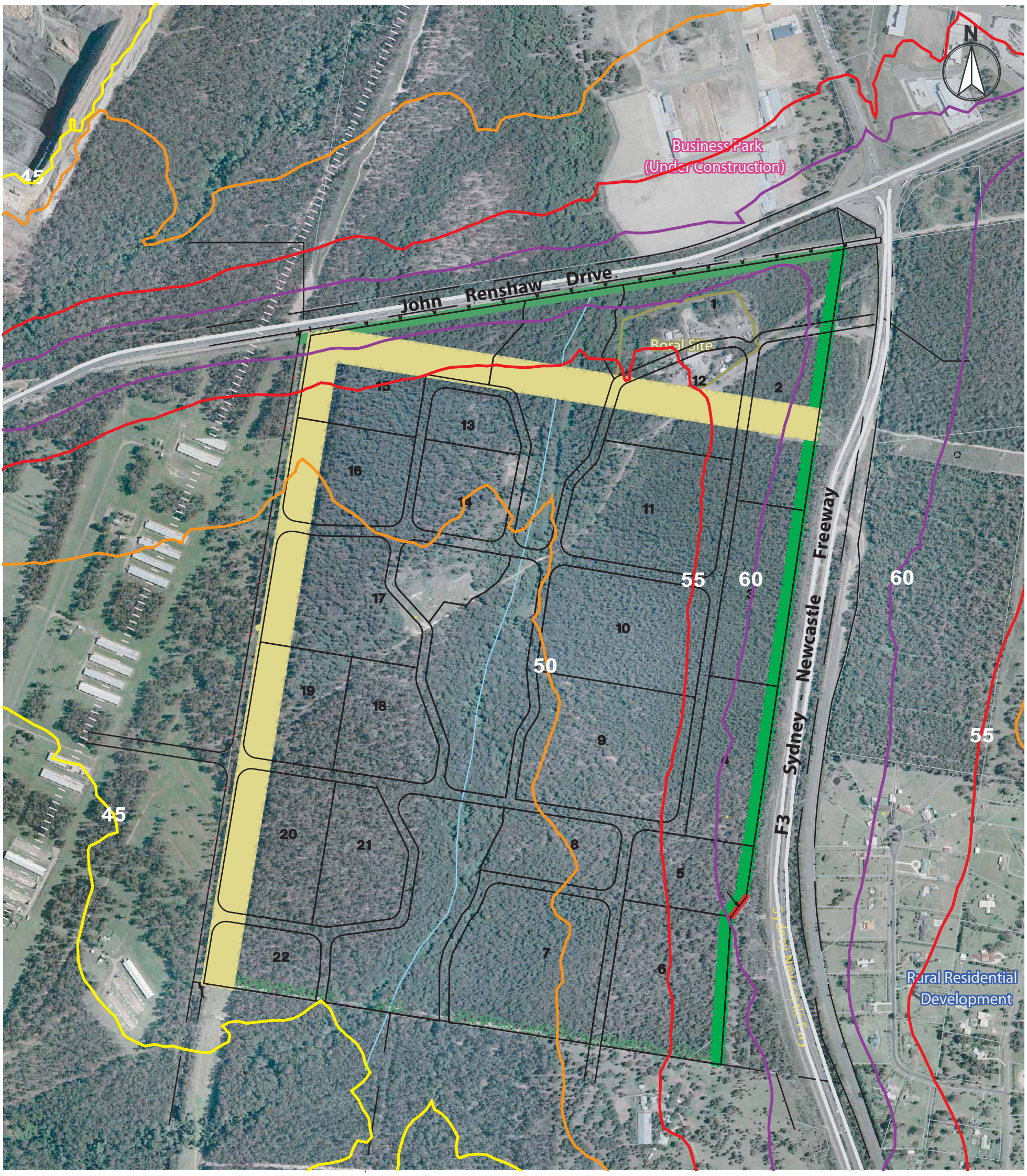
industrial buildings for the year 2031. The modelling shows that the $L_{Aeq(15hr)}$ 60dB(A) (day) contour falls a distance of approximately 50-120 metres from the F3 Freeway alignment, running roughly parallel to the F3. The $L_{Aeq(15hr)}$ 60dB(A) (day) contour generally falls within a distance of approximately 45-110 metres from the John Renshaw Drive alignment.

Depending on the type of use; commercial offices, retail buildings and industrial lots may be constructed within the $L_{Aeq(15hr)}$ 60dB(A) (day) contour and still achieve the acceptable indoor sound levels recommended in the ECRTN and AS2107-2000. It is recommended that more sensitive uses such as training and education facilities and child care centres be restricted from this zone, unless appropriate acoustic mitigation measures are incorporated in the design of the building (see Section 4.5 following). In addition to the above, and assuming there is a direct line-of-sight to the road without any intervening buildings or structures that can provide acoustic shielding:

- Childcare centres should not be constructed within the $L_{Aeq(15hr)}$ 55dB(A) (day) contour (ie approx. 380 metres from the F3 Freeway and within approx. 230 metres from John Renshaw Drive) to achieve satisfactory noise levels in indoor and outdoor areas unless acoustic mitigation measures are considered in the design of the centres; and

- Hotels and/or motels should not be constructed within the $L_{Aeq(9hr)}$ 50dB(A) (night) contour (ie approx. 400 metres from the F3 Freeway and within approx. 190 metres from John Renshaw Drive) unless acoustic mitigation measures are considered in the design of the building, in particular for sleeping areas.

Further to the above, training and education facilities, childcare centres and hotel / motels are proposed to be located centrally on the Black Hill Estate site, which would be beyond the above distances from the F3 Freeway and John Renshaw Drive. In addition to the central location, the noise sensitive developments will also be surrounded by industrial and/or office buildings which would provide acoustic shielding, further reducing noise impacts from the F3 Freeway and John Renshaw Drive.



Noise Level

- 45dB $L_{Aeq(15h)}$
- 50dB $L_{Aeq(15h)}$
- 55dB $L_{Aeq(15h)}$
- 60dB $L_{Aeq(15h)}$

0 1

Kilometres

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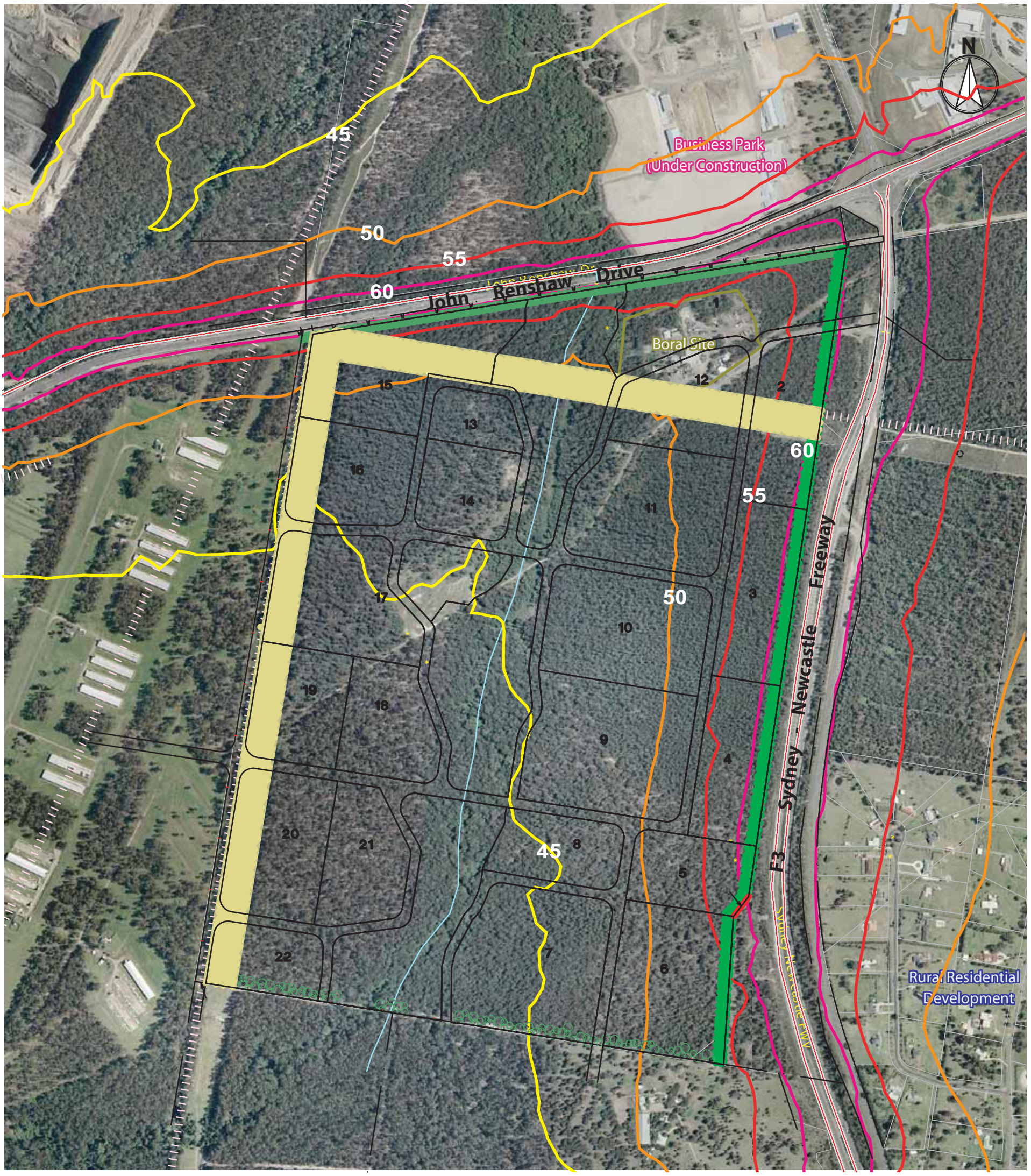
Title : Figure 2 - Black Hill & Tank Paddock Proposed Employment Lands : 2031 Road Traffic Noise Impacts (Day Period - 7am to 10pm) with the Hunter Expressway

Project: Lower Hunter Land Project

Scale: NTS

Date : 15/02/11

Ref :TD261-12P02B (rev 2)



Noise Level

- 45dB $L_{Aeq(15h)}$
- 50dB $L_{Aeq(15h)}$
- 55dB $L_{Aeq(15h)}$
- 60dB $L_{Aeq(15h)}$

0 — 1

Kilometres

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Title : Figure 3 - Black Hill & Tank Padoock Proposed Employment Lands : 2031 Road Traffic Noise Impacts (Night Period - 10pm to 7am) with the Hunter Expressway

Project: Lower Hunter Land Project

Scale: NTS

Date : 15/02/11

Ref : TD261-13P03B (rev 2)

4.5 Recommendations

The following recommendations provide typical noise control solutions commonly used to reduce noise impacts to office/ industrial buildings that may be developed along the F3 Freeway or John Renshaw Drive within the Black Hill development area. This information is presented for the purpose of development assessment only and shall not be used in more detailed design unless otherwise approved in writing by the acoustic consultant.

4.5.1 Noise Barriers

Noise barriers can usually reduce noise levels by 5dB(A) when they are high enough to break line-of-sight and 10-15dB(A) in the acoustic 'shadow zone', with a maximum total noise reduction of 20dB(A).

Noise barriers are not considered appropriate or necessary for this type of land use development. Instead, noise impact to sensitive land uses such as the proposed childcare centre can be better managed through appropriate land use allocation, building setback and/or building treatment on site to achieve acceptable internal noise levels as discussed below.

4.5.2 Building Treatment

The following development types should consider building treatment at the design stage to ensure internal (and external if necessary) noise levels meet the ECRTN guidelines.

- Training and education facilities and childcare centres constructed between the $L_{Aeq(15hr)}$ 55dB(A) (day) contour and the F3 Freeway or John Renshaw Drive as shown in Figure 2; and
- Hotels and/or motels constructed between the $L_{Aeq(9hr)}$ 50dB(A) (night) contour and the F3 Freeway or John Renshaw Drive as shown in Figure 3.

Any building treatment should be designed to satisfy the ECRTN and to achieve the internal sound levels recommended in AS2107:2000 'Acoustics – Recommended design sound levels and reverberation times for building interiors'. The table below provides a summary of typical recommended indoor design sound levels from AS2107:2000. It is noted that this summary is for guidance only and is by no means exhaustive.

Table 4.5 – Recommended Internal Sound Levels based on AS2107:2000

Type of Occupancy	Activity	Recommended Design Sound Level, L_{Aeq} dB(A)	
		Satisfactory	Maximum
Child Care Centre	Teaching Areas	35	45
	Outdoor Play Areas[1]	$L_{Aeq,15hour}$ 55[1]	-
Hotel/ Motel	Sleeping Areas	35	40
Shop Building	Small retail store (general)	45	50
	Supermarkets	50	55
Office Building	Board & conference rooms	30	40
	Private offices	35	40
	General office areas	40	45
Industrial Building	Processing/ manufacturing	-	70
	Foreman's offices	35	40

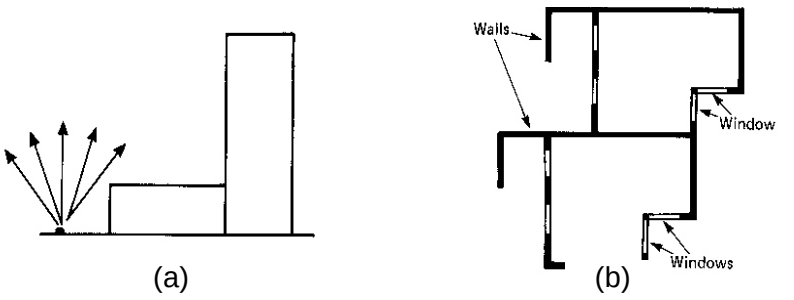
Notes: 1. External noise level, taken from ECRTN (p10) Table 2 – Passive recreation and school playgrounds

4.5.3 Building Design

Buildings to be constructed in areas affected by road traffic noise, as discussed above, should consider building layout design at the design stage to ensure internal noise levels meet the ECRTN guidelines.

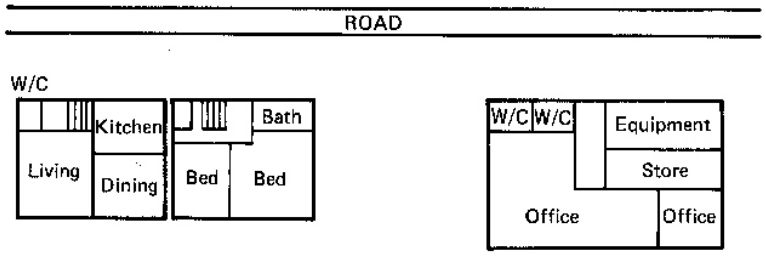
Courtyards and open space areas can be located away from the road, using the building as a buffer to obtain a quiet outdoor environment. Within the building itself, locate less sensitive rooms closest to the road, so that these essentially form a barrier between the road and noise sensitive rooms such as board rooms and offices. Where possible, locate the building further away from the road, thereby reducing road traffic noise at the facade.

Figure 4 below provides examples of 'self protecting' building design.



(a) Podium provides shielding for most of the tower block

(b) Building shape provides shielding for the windows and the solid wing wall provides a quiet courtyard



(c) Arrangement of rooms to minimise traffic noise problems

Figure 4 – Examples of 'Self-Protecting' Buildings

(Nelson P 1987 p11/16)

5 INDUSTRIAL NOISE INVESTIGATION

The types of noise source considered to be 'industrial' include industrial premises, extractive industries, commercial premises, warehousing facilities and their associated machinery and equipment.

For the Black Hill Estate, nearby industrial noise sources that may impact on the future employment uses include the Donaldson Open-Cut Mine and the Abel Underground Mine approximately 700 metres to the north west of the Estate.

Further to this, as there are existing residential developments to the south and east of the Black Hill Estate, potential noise impact from the proposed use of the Estate, which would be considered 'industrial' as defined above, should also be considered.

Noise impact onto the Estate and noise impact from Estate operations are assessed in separate sections below.

5.1 Noise Impact Onto the Estate

The Donaldson Open Cut Mine (DOCM) is located approximately 700 metres to the north west of the Estate, to the north of John Renshaw Drive and to the west of Weakleys Drive.

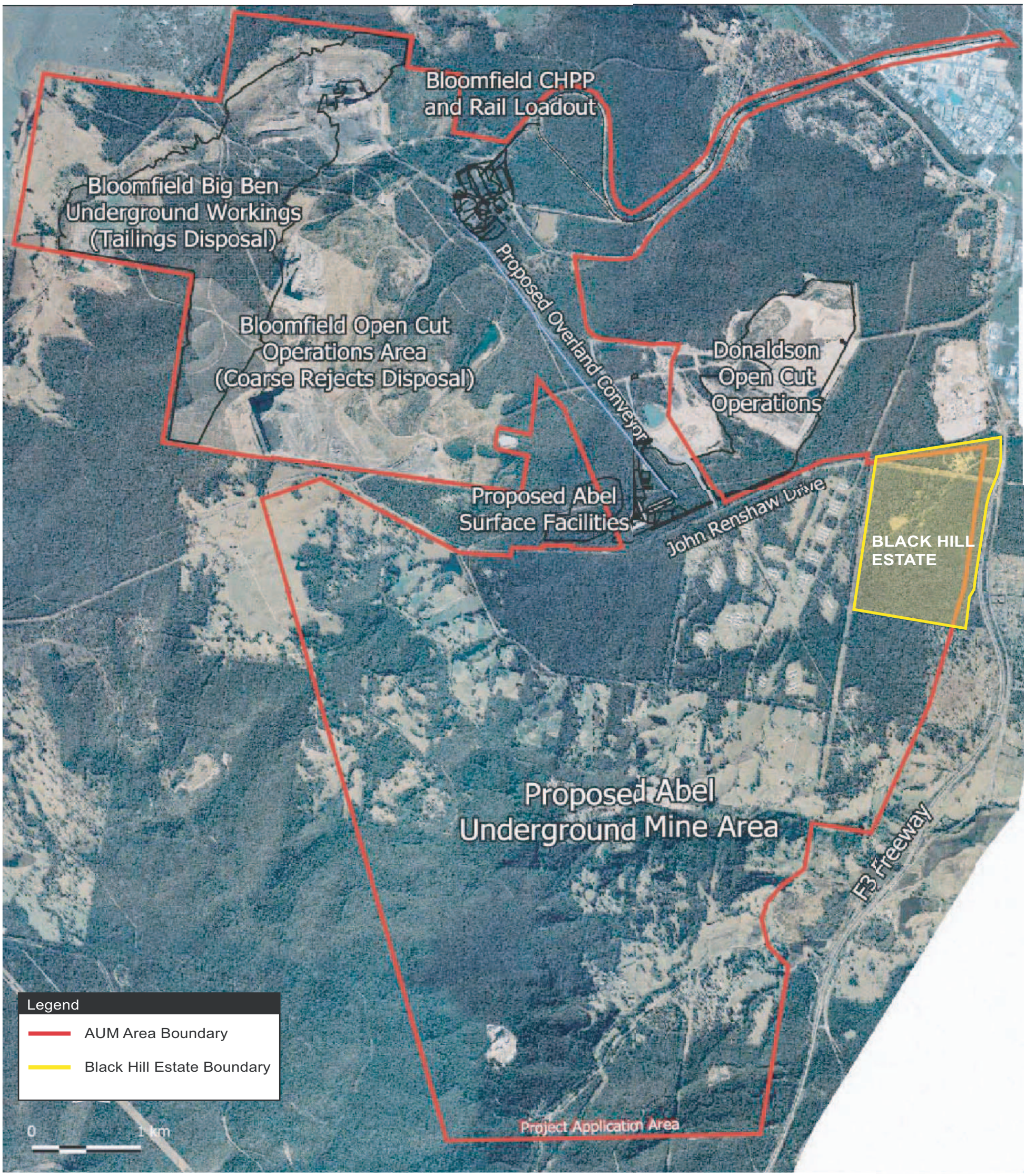
DOCM commenced operation in January 2001. The mine is currently 9 years into its 10-12 year life cycle. While the expiry date on the Mining Lease is December 2020, development consent for the current mining operations expires in March 2011, at which point the economic coal reserves of the mine will be exhausted. Since the development of the Black Hill Estate is not expected to commence until post June 2013, noise emission from the DOCM is unlikely to impact on the Black Hill Estate as mining operations would have ceased.

Donaldson has developed a new underground mine (named 'Abel Underground Mine') that will access coal reserves south of the Open Cut Mine. To minimise surface disturbance, surface facilities for the Abel Underground Mine (AUM) will be located within the Donaldson Open Cut Mine final void. Access to the AUM will be via the Donaldson Open Cut high wall, and the mine will utilise existing surface infrastructure and the existing Bloomfield Coal Handling and Preparation Plant, rail loader and rail loop for coal processing and loading.

The underground mine area, within which coal will be extracted, extends southwards from John Renshaw Drive towards George Booth Drive. It is bounded on the eastern side by the F3 Freeway and on the western side by a geological feature in the vicinity of Buttai Creek.

Figure 5 following shows the layout of the mine in relation to the Black Hill Estate. Mining and subsidence within the Black Hill Estate shall be completed by mid 2013, after which development of the Black Hill Estate will commence. Mining at AUM will be carried out over 20 years.

All underground mining south of John Renshaw Drive, will use continuous miners with secondary extraction. This method allows flexibility to vary the amount of coal extracted at any point to control any subsidence at the surface. From review of the Noise Impact Assessment, prepared as part of the Environmental Assessment for the AUM (Heggies Australia, ref: 30-1409-R1, dated 19 July 2006) there will be no blasting activity at the AUM.



Source: Abel Underground Mine Part 3A Environmental Assessment
(Donaldson Coal Pty Ltd, ref: 05_0136, dated: 22 September 2006)

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Title : Figure 5 - Abel Underground Mine and Black Hill & Tank Paddock

Project: Lower Hunter Land Project

Scale: NTS

Date : 20/05/10

Ref : TD261-13P05B (rev 0)

5.1.1 Noise Criteria

In accordance with the NSW 'Industrial Noise Policy' (the "INP", Environment Protection Authority 2000), noise impact to land used for commercial or industrial purposes should be assessed in terms of noise amenity. To ensure an acceptable noise level in terms of amenity for 'employment' land uses, the following noise criteria should be achieved, based on the INP.

Table 5.1 – Noise Criteria for Acceptable Amenity

Location	Amenity Criteria $L_{Aeq,period}$ dB(A)
Commercial Premises	65
Industrial Premises	70
Child Care Centre (Classroom)	35[1]
Child Care Centre (Outdoor Play Area)	55

Notes: 1. Internal noise level, during the noisiest 1 hour period when in use. Equivalent outdoor noise criteria is 45dB(A), assuming a 10dB(A) loss through an open window.

5.1.2 Existing Noise Sources

The Noise Impact Assessment (NIA), prepared as part of the Environmental Assessment for the AUM (Heggies Australia, ref: 30-1409-R1, dated 19 July 2006) modelled noise emissions from the AUM to nearby sensitive receivers under typical metrological conditions. The NIA locations nearest to the Black Hill Estate include:

- Catholic Diocese land (former Bartter Poultry Farm); and
- Residences in Black Hill, to the east of the F3 Freeway.

The table below summarises the noise modelling results presented in the NIA.

Table 5.2 – Predicted Noise Levels from Abel Underground Mine

NIA Location	Period	Predicted Noise Level $L_{Aeq(15min)}$ dB(A)		
		Calm	NW Wind[1]	SE Wind[1]
Catholic Diocese (former Bartter Poultry Farm)	Day	<30	N/A	N/A
	Evening	<30	N/A	<30
	Night	<30	37	<30
Residences in Black Hill (east of F3 Freeway)	Day	<30	N/A	N/A
	Evening	<30	N/A	<30
	Night	<30	<30	<30

Notes: 1. NW & SE winds were found to occur for more than 30% of the time during the assessment period (day; evening; night) and are therefore considered a feature of the area. Wind effects must be considered under these conditions, in accordance with the INP.

2. N/A = meteorological condition is not relevant during this period.

3. Source: Noise Impact Assessment, Abel Coal Mine (Heggies Australia, ref: 30-1409-R1, dated: 19 July 2006)

Predicted noise levels from the NIA indicate that noise levels from the AUM will be less than 30dB(A) at nearby locations considered representative of the Black Hill Estate. Therefore,

industrial noise levels at the Black Hill Estate from the AUM are expected to comply with the INP. Additional noise mitigation is therefore not required.

5.1.3 Recommendations

During the detailed design phase it should be confirmed that there has been no changes to the proposed operation of the AUM that might increase noise emission to the Black Hill Estate. If the AUM is operational during the detailed design phase, it is recommended that attended noise monitoring be carried out on site to confirm noise emission levels to the Estate do not exceed the criteria outlined in the INP.

5.2 Noise Impact from Estate

Noise emissions from the proposed Estate will include construction noise and operational noise, which would impact upon nearby noise affected sensitive receivers.

5.2.1 Construction Activities

It is anticipated that prior to any works commencing a Construction Environmental Management Plan (CEMP) will be prepared. As part of the CEMP, a Construction Noise and Vibration Management Plan (CNVMP) will be prepared detailing measures to minimise the impact of construction noise and vibration upon nearby sensitive receivers. Furthermore, the methodology for noise and vibration monitoring during construction works will also be incorporated into the CNVMP.

5.2.2 Future Uses

It is anticipated that future land uses will include distribution and logistics centres; a range of manufacturing and warehousing facilities; showrooms and bulky goods storerooms; and training and education facilities. A central, small local centre would also be provided, which would include a business premises, childcare centre, retail/ convenience store, food outlet, service station, indoor recreation facilities, car parking and possibly a hotel/ motel.

Noise generated by the operation of the above development types may potentially impact on the existing residential areas to the south and east of the Estate across the F3 Freeway.

5.2.3 Noise Criteria

As there are existing residences to the south and east of the Black Hill Estate, potential noise impact from the proposed use of the Estate should be considered.

The INP is used as a guide to set the noise limits of industrial noise sources. The assessment procedure from the Industrial Noise Policy has two components:

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

In setting the project specific noise levels, the more stringent of the intrusive and amenity criteria is adopted. In general, the intrusive criteria tend to be more stringent in newly developed areas, whereas the amenity criteria tend to be more stringent in developed areas.

The intrusiveness criterion, which is only applicable to residential type receivers is summarised as follows:

L_{Aeq} ≤ L_{A90} background noise level plus 5dB(A)

The background noise levels measured at Location M3 have been used to represent the affected residences to the south of the proposed Estate. To determine the background noise levels at residences on the eastern side of the F3 Freeway, short term attended noise measurements were completed concurrently with the unattended noise monitoring at Location M3 (see Section 3). The location of the short term measurements was at Cahill Close, Black Hill on the eastern side of the F3 Freeway, considered representative of residences in this area. Based on the background noise monitoring carried out at Black Hill, the intrusive noise criteria for the existing residential areas are summarised in Table 5.3 below.

Table 5.3 – Intrusive Noise Criteria for Existing Residential Receivers, dB(A)

Location	Rating Background Level $L_{A90,15min}$			Intrusiveness Criteria $L_{Aeq,15min}$		
	Day	Evening	Night	Day	Evening	Night
Residences east of F3 Freeway (Measurements @ Location M4)	43	43[1]	40[1]	48	48	45
Residences south of Estate (Monitoring @ Location M3)	41	41	38	46	46	43

Notes: 1. Estimated background noise level correlated from long term monitoring data at Location M3.

To ensure an acceptable noise level in terms of amenity, the following noise amenity criteria for the existing residential area should be achieved, based on the INP.

Table 5.4 – Noise Criteria for Residential Amenity, dB(A)

Location	Amenity Criteria, $L_{Aeq,period}$		
	Day	Evening	Night
Residential Boundary[1]	50	45	40

Notes: 1. The residential areas have been categorised as 'Rural' according to the INP.

The intrusive noise criteria are stricter during the day, while the amenity criteria are stricter during the evening and night periods for the existing residential areas to the south and east of the proposed Estate. Therefore, cumulative noise emission from the future uses of the Black Hill Estate should not exceed the following criteria.

Table 5.5 – Summary of Noise Criteria for Residential Receivers, dB(A)

Receiver	Intrusiveness Criteria $L_{Aeq,15min}$			Amenity Criteria, $L_{Aeq,period}$		
	Day	Evening	Night	Day	Evening	Night
Black Hill Residences (east of Estate)	**48**	48	45	50	**45**	**40**
Black Hill Residences (south of Estate)	**46**	46	43	50	**45**	**40**

*Notes: 1. **Bold** font indicates most stringent criteria to be used for noise assessments*

5.2.4 Noise Assessment

The types of industry to be located within the employment areas of the Estate are not yet known at this stage. However, it is envisaged that various light industries would be accommodated within the Estate. Therefore, a scenario for light industries will be assumed and investigated. Examples of the types of facilities associated with light industries include, but are not limited to, the following:

- Automotive workshops, clothes manufacturers, industrial and commercial retailers, food retailers, etc.

In the course of our work for previous projects, we have conducted noise measurements of typical industrial activities and these results are held in our office library files and databases. Table 5.6 below presents typical noise source levels generated by different types of industries expected at the proposed site, using typical equipment. These noise levels have been used for the purpose of the noise predictions.

Table 5.6 – Sound Power Levels for Light Industry Uses

Industrial Noise Source	Sound Power Level, dB(A)	
	L_{eq}	L_1
Light Industry (per premise)	102	105

Source: Renzo Tonin & Associates past project files & database.

For the purpose of the noise assessment, it has been assumed that light industries will be located across the site. Furthermore, it is assumed that all the industries will be operating concurrently throughout the day, evening and night periods (ie. 24 hour operation).

Noise from the proposed Black Hill Estate impacting on nearby affected residences will be predicted for the following receiver locations:

- **Receiver R1 – 21 Cahill Close, Black Hill**
  Residential property representing the nearest affected residences east of the F3 Freeway.

- **Receiver R2 – 2 Black Hill Road, Black Hill**
  Residential property representing the nearest affected residences to the south of the Estate

Potential increase in noise levels resulting from adverse meteorological conditions have been considered and computed as per the requirements of the NSW INP.

Noise predictions were prepared for each of the following meteorological conditions:

1. Calm & isothermal conditions (acoustically neutral) – no wind and no temperature inversion
2. Slight to gentle breeze – 3m/s wind velocity at 10m from ground level between each noise source and each noise receiver (as per INP default wind conditions). Wind direction was based on wind travelling from the source to the receiver.
3. Moderate temperature inversion – 3^0 Celsius per 100m temperature gradient or 'F-Class' Pasquill stability category (as per INP's default temperature inversion conditions for non-arid areas where more site specific data are unavailable). This meteorological condition is only assessed for the night time period. For a conservative assessment, it has been assumed that the light industry facilities will operate at night.

Based on the noise sources presented in Table 5.6 and the meteorological conditions to be assessed for, the table below summarises the noise modelling results.

Table 5.7 – Predicted Noise Levels from Proposed Black Hill Estate

Receiver Location	Period	Criteria	Predicted Noise Level $L_{Aeq(15min)}$ dB(A)		
			Calm & Isothermal	Adverse Wind	Temp Inversion
Receiver R1	Day	48	43	46	N/A
	Evening	45	43	**46**	N/A
	Night	40	**43**	**46**	**46**
Receiver R2	Day	46	45	**48**	N/A
	Evening	45	45	**48**	N/A
	Night	40	**45**	**48**	**48**

Notes: 1. N/A = meteorological condition is not relevant during this period
*2. **Bold** font indicates exceedance*

Predicted noise levels from proposed light industries operating within the Black Hill site indicate that noise levels would generally comply with the day and evening criteria during calm & isothermal conditions and exceed during adverse wind conditions for both Receivers R1 and R2. During the night period, noise levels were predicted to exceed the applicable criteria for all meteorological conditions at both Receivers R1 and R2. Therefore, in-principle noise mitigation measures are provided below.

5.2.5 Recommendations

The following recommendations provide in-principle noise control solutions to reduce industrial noise from the proposed Black Hill Estate impacting nearby noise sensitive receivers. This information is presented for the purpose of the planning process only and should not be used for construction. More detailed noise mitigation measures should be investigated and determined during the detailed design phase of the development.

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.

- Noise screens / walls should be considered in the design phase of any industrial premise to be located within the Black Hill Estate. The noise screens / wall can form part of boundary fences and should be designed and located so that the screen / wall provides sufficient noise attenuation to reduce noise impacts to neighbouring residential areas.

- Consideration should be given to building layout design at the design stage of an industrial development to ensure that noisy activities are located away from residential areas. For example, noisy areas of the industrial premises (eg. loading docks and driveways) should be located towards the centre of the Black Hill Estate and the buildings located towards the boundaries of the site so that the buildings provide noise shielding of noisy activities to the neighbouring residential areas.

- Limiting the hours of operation for the proposed industrial premises within the Black Hill Estate to between 7.00am and 10.00pm should be considered so that the premises do not operate during the critical night time period (10.00pm to 7.00am).

6 CONCLUSION

Renzo Tonin & Associates have completed an investigation of environmental acoustic impacts onto the proposed Black Hill development Estate. Noise impact to the Estate from existing surrounding noise sources has been quantified and compared to the noise guidelines set by the NSW DECCW. The findings of the assessment are as follows:

Traffic Noise

- Based on the assessment, it is predicted that there will be no unacceptable traffic noise impacts from the F3 Freeway and John Renshaw Drive onto the Estate. Appropriate setback distances and building construction / treatment could be used to ensure no traffic noise impacts from the F3 Freeway and John Renshaw Drive. It is anticipated that sensitive uses such as childcare centres will be located in the centre of the site and as such would not be adversely impacted by noise from the F3 Freeway and John Renshaw Drive. The use of earth mounding or noise walls is not required.

Industrial Noise onto Estate

- Development consent for the Donaldson Open Cut Mine (DOCM) expires in March 2011 and given that the development of the Black Hill Estate is not expected to commence until post 2013, noise from the DOCM is unlikely to impact on the Black Hill Estate as mining operations would have ceased.

- Noise impact from the Abel Underground Mine was previously undertaken by Heggies Australia and presented in a Noise Impact Assessment (ref. 30-1409-R1, dated 19 July 2006). Results from the assessment indicate noise from the mine will comply with the relevant noise criteria.

Industrial Noise from Estate

- The operation of the proposed light industries within the Black Hill Estate are predicted to generally comply with the relevant criteria during the day and evening periods, while exceedances were predicted during the night time period. In-principle noise mitigation measures such as noise screen / walls, building layout design / planning and management of operating hours should be considered during the detailed design phase of the development

The noise mitigation recommendations included in this report are in-principle only. The assistance of an acoustic consultant must be sought at the detailed design phase of the project to provide more accurate design advice when there is more detailed information about building type, lot arrangement and traffic flow information available.

The final selected noise mitigation measures will depend on the location and design of buildings on the Estate.

Overall, based on the outcomes of this acoustic study and the recommendations provided, the proposed Black Hill Estate development will be designed, constructed, operated and maintained so that there are no unacceptable impacts from noise, including traffic noise.

APPENDIX A - GLOSSARY OF ACOUSTIC TERMS

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 $\mathbf{L_{90}}$ 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 Martin Place 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 L_{90} 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 - SITE AND MEASUREMENT LOCATIONS

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.

The equipment used for the short term, attended noise measurements was a Brüel & Kjær Type 2250 precision sound level analyser. Statistical noise levels were acquired in both overall and octave band frequencies. 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 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 $\mathbf{L_{10}}$, $\mathbf{L_{90}}$, 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. 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 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 $\mathbf{L_{90}}$ noise level.

APPENDIX C - LONG TERM NOISE MONITORING RESULTS

Renzo Tonin & Associates

noise logger results

Location M1 - F3 Freeway, Black HIll

BACKGROUND & AMBIENT NOISE MONITORING RESULTS
NSW DEC's 'INDUSTRIAL NOISE POLICY', 2000

Day	L_{A90} Background Noise Levels[5]			L_{Aeq} Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Monday-10-December-2007	-	49	-	-	60	-
Tuesday-11-December-2007	-	-	-	-	-	-
Wednesday-12-December-2007	-	-	-	-	-	-
Thursday-13-December-2007	-	-	47	-	-	61
Friday-14-December-2007	56	52	46	62	61	58
Saturday-15-December-2007	53	48	43	59	58	54
Sunday-16-December-2007	51	-	-	59	-	-
Monday-17-December-2007	-	-	-	-	-	-
Tuesday-18-December-2007	56	49	-	62	60	-
Wednesday-19-December-2007	-	50	46	-	61	60
Representative Level	**56**	**49**	**46**	**61**	**60**	**59**

Notes:

1. Day is taken to be 7:00am to 6:00pm
2. Evening is taken to be 6:00pm to 10:00pm.
3. Night is taken to be the remaining periods.
4. Partial day's monitoring
5. Assessment Background Level (ABL)
6. Rating Background Level (RBL) for L90 and logarithmic average for Leq

TRAFFIC NOISE MONITORING RESULTS
NSW DEC 'ENVIRONMENTAL CRITERIA FOR ROAD TRAFFIC NOISE', 1999

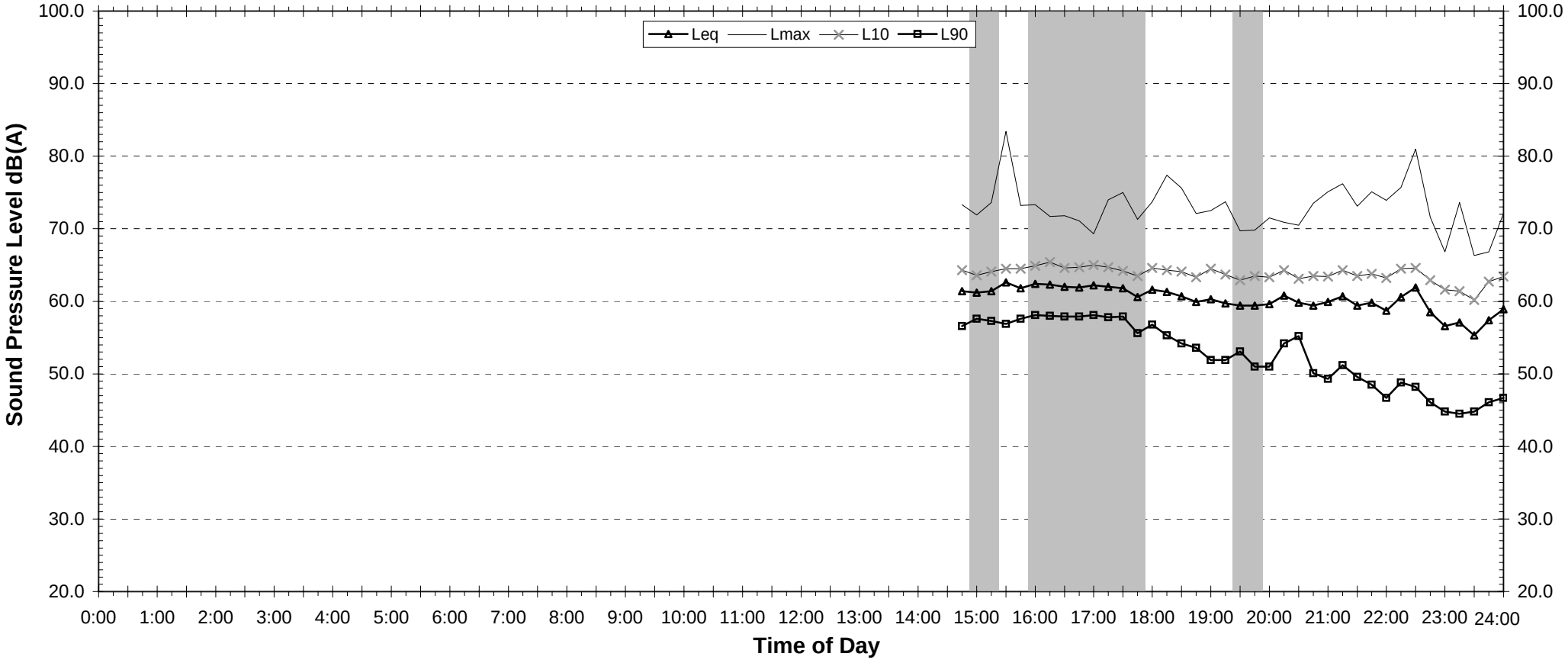
Day	L_{Aeq} Noise Levels		$L_{Aeq\ 1hr}$ Noise Levels			
	Day	Night	Day - Up	Day - Low	Night - Up	Night - Low
Monday-10-December-2007	63	60	65	62	62	60
Tuesday-11-December-2007	64	62	65	62	64	59
Wednesday-12-December-2007	65	63	66	64	66	61
Thursday-13-December-2007	66	64	68	63	66	62
Friday-14-December-2007	64	61	66	63	63	58
Saturday-15-December-2007	61	57	62	60	58	55
Sunday-16-December-2007	62	65	65	59	65	65
Monday-17-December-2007	65	63	66	64	65	59
Tuesday-18-December-2007	64	62	65	62	65	61
Wednesday-19-December-2007	65	63	65	63	66	60
Thursday-20-December-2007	65	-	65	64	-	-
Representative Weekday	**65**	**62**	**66**	**63**	**65**	**60**
Representative Weekend	**62**	**63**	**64**	**59**	**63**	**63**
Representative Week	**64**	**62**	**66**	**63**	**64**	**61**

20 YEARS
1982-2002 ACOUSTIC ENGINEERING EXCELLENCE

EXISTING AMBIENT NOISE LEVELS

Location M1 - F3 Freeway, Black HIll

Monday, 10 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	48.5	-
Leq (see note 3)	-	60.1	-

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.

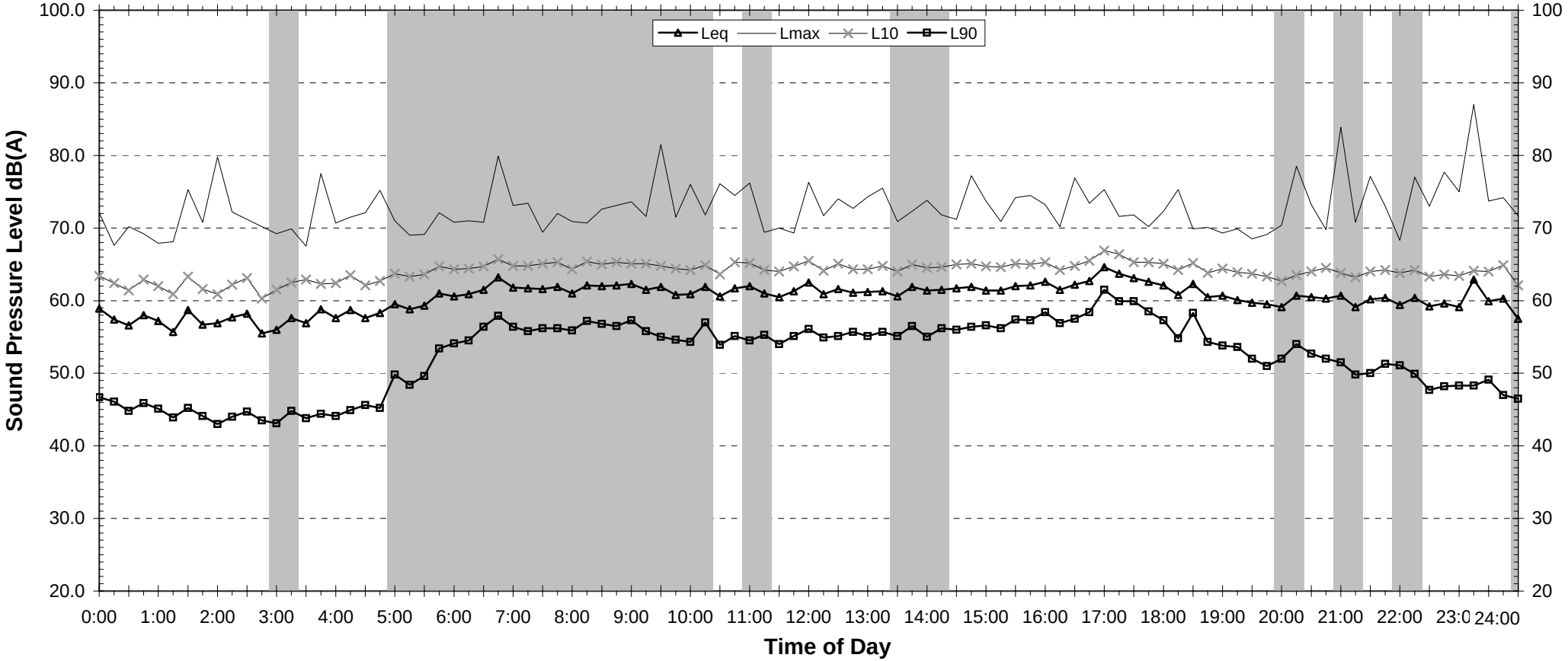
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade)		(see note3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	63.0	60.5
$L_{eq\ 1hr}$ upper 10 percentile	64.7	62.3
$L_{eq\ 1hr}$ lower 10 percentile	62.2	59.6

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	73.6	to	81.0
Lmax - Leq (Range)	16.2	to	22.7

EXISTING AMBIENT NOISE LEVELS
Location M1 - F3 Freeway, Black HIll
Tuesday, 11 December 2007



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

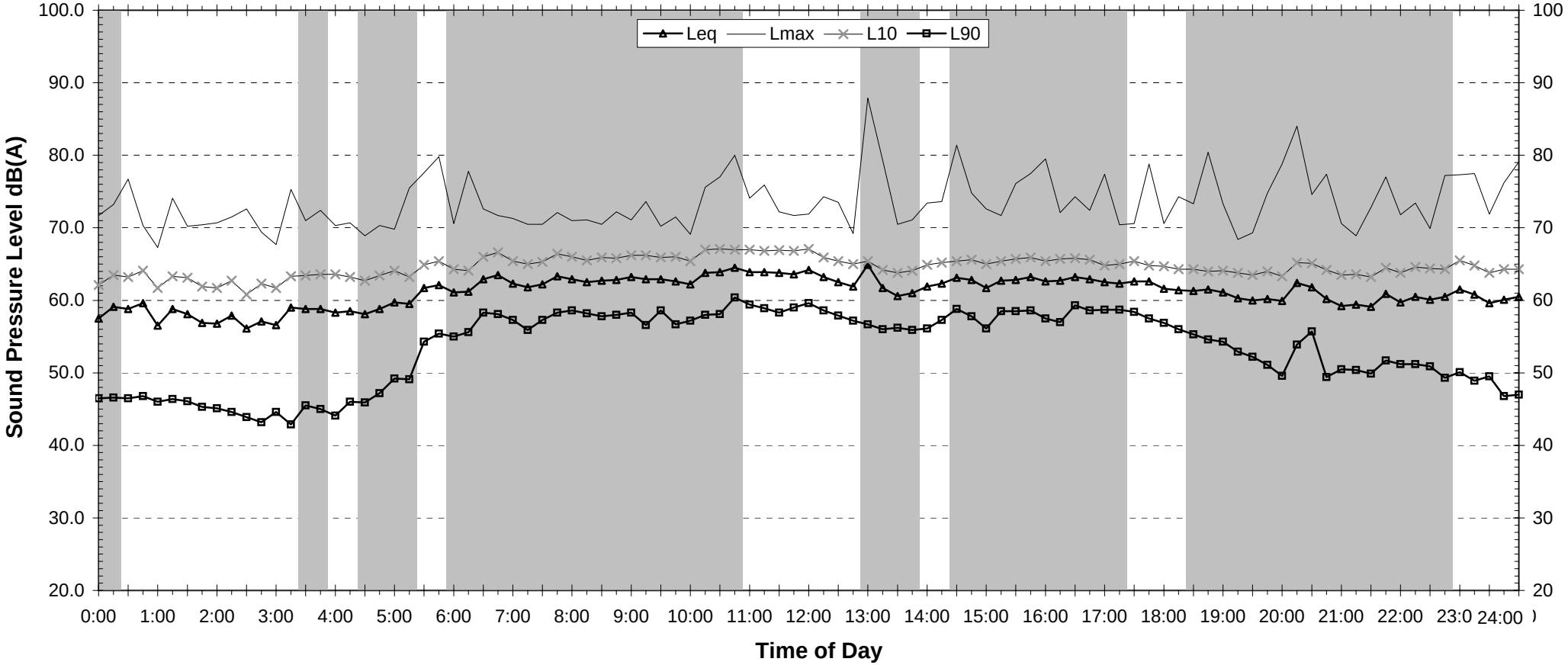
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	64.1	61.7
$L_{eq\ 1hr}$ upper 10 percentile	65.4	64.4
$L_{eq\ 1hr}$ lower 10 percentile	62.4	59.5

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	72.6	to	87.0
Lmax - Leq (Range)	15.6	to	25.8

EXISTING AMBIENT NOISE LEVELS

Location M1 - F3 Freeway, Black HIll

Wednesday, 12 December 2007



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

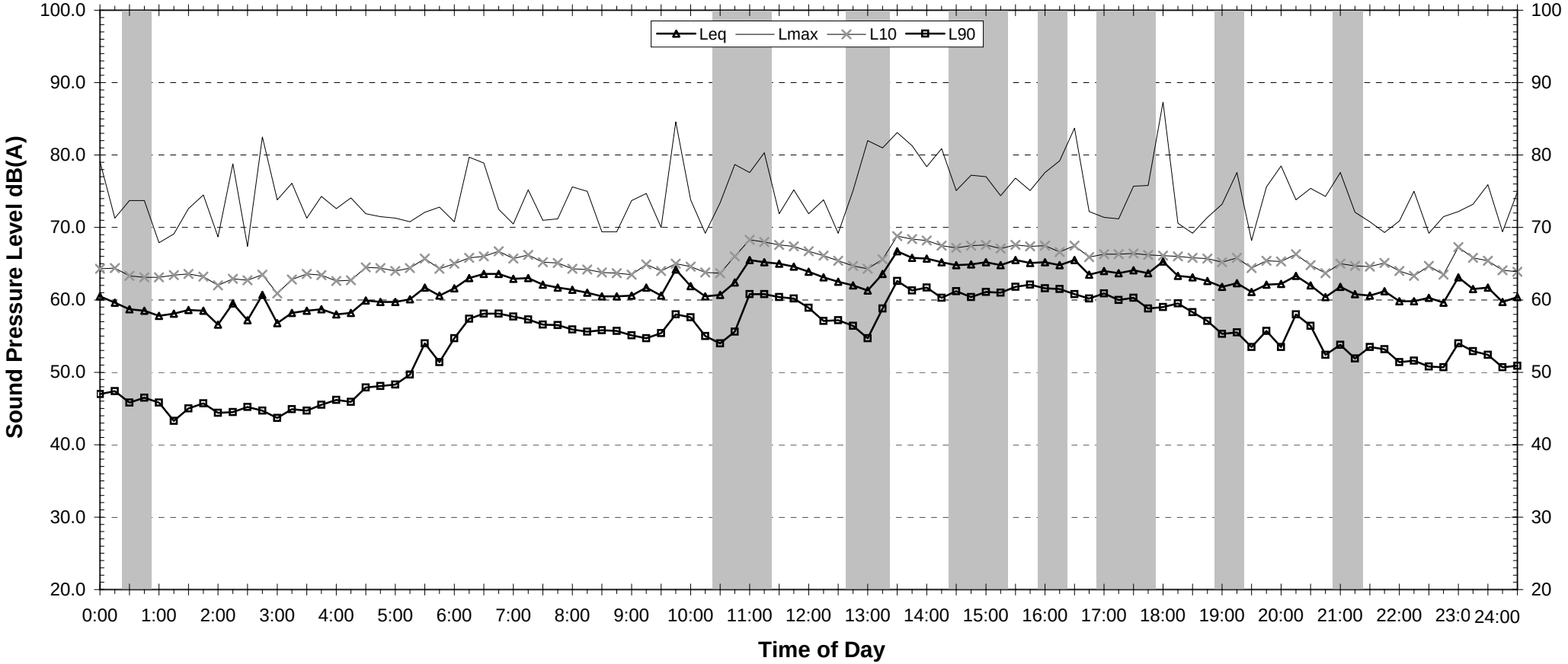
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	65.4	62.7
$L_{eq\ 1hr}$ upper 10 percentile	66.4	65.8
$L_{eq\ 1hr}$ lower 10 percentile	63.9	60.5

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	74.5	to	82.5
Lmax - Leq (Range)	15.8	to	23.6

EXISTING AMBIENT NOISE LEVELS
Location M1 - F3 Freeway, Black HIll
Thursday, 13 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	46.5
Leq (see note 3)	-	-	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.

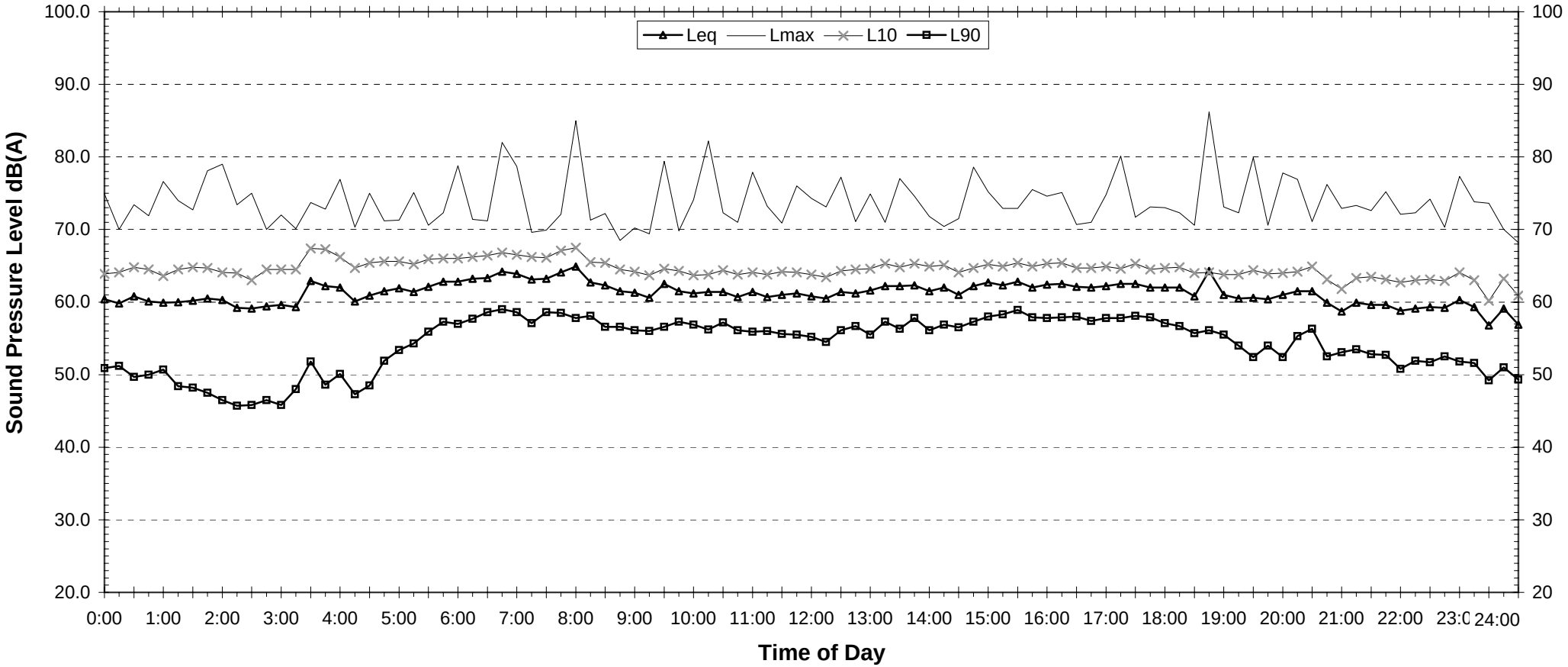
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	65.7	63.8
$L_{eq\ 1hr}$ upper 10 percentile	68.2	66.2
$L_{eq\ 1hr}$ lower 10 percentile	63.0	61.8

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	75.0	to	82.0
Lmax - Leq (Range)	15.1	to	18.7

EXISTING AMBIENT NOISE LEVELS
Location M1 - F3 Freeway, Black HIll
Friday, 14 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	55.6	52.4	45.6
Leq (see note 3)	62.0	60.9	58.1

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.

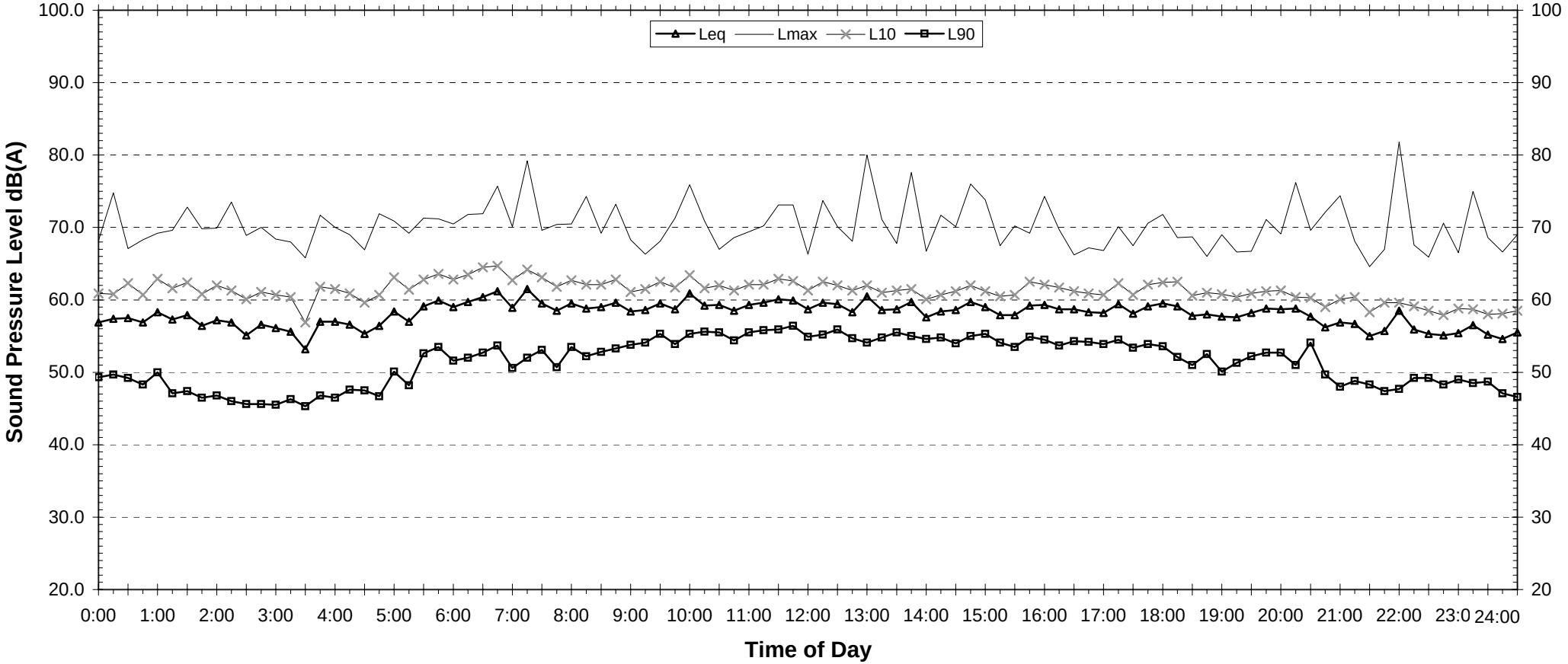
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	64.3	60.6
$L_{eq\ 1hr}$ upper 10 percentile	65.7	62.6
$L_{eq\ 1hr}$ lower 10 percentile	62.6	58.5

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	71.7	to	77.3
Lmax - Leq (Range)	15.1	to	17.8

EXISTING AMBIENT NOISE LEVELS
Location M1 - F3 Freeway, Black HIll
Saturday, 15 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	53.1	47.7	43.1
Leq (see note 3)	59.2	57.7	54.3

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)

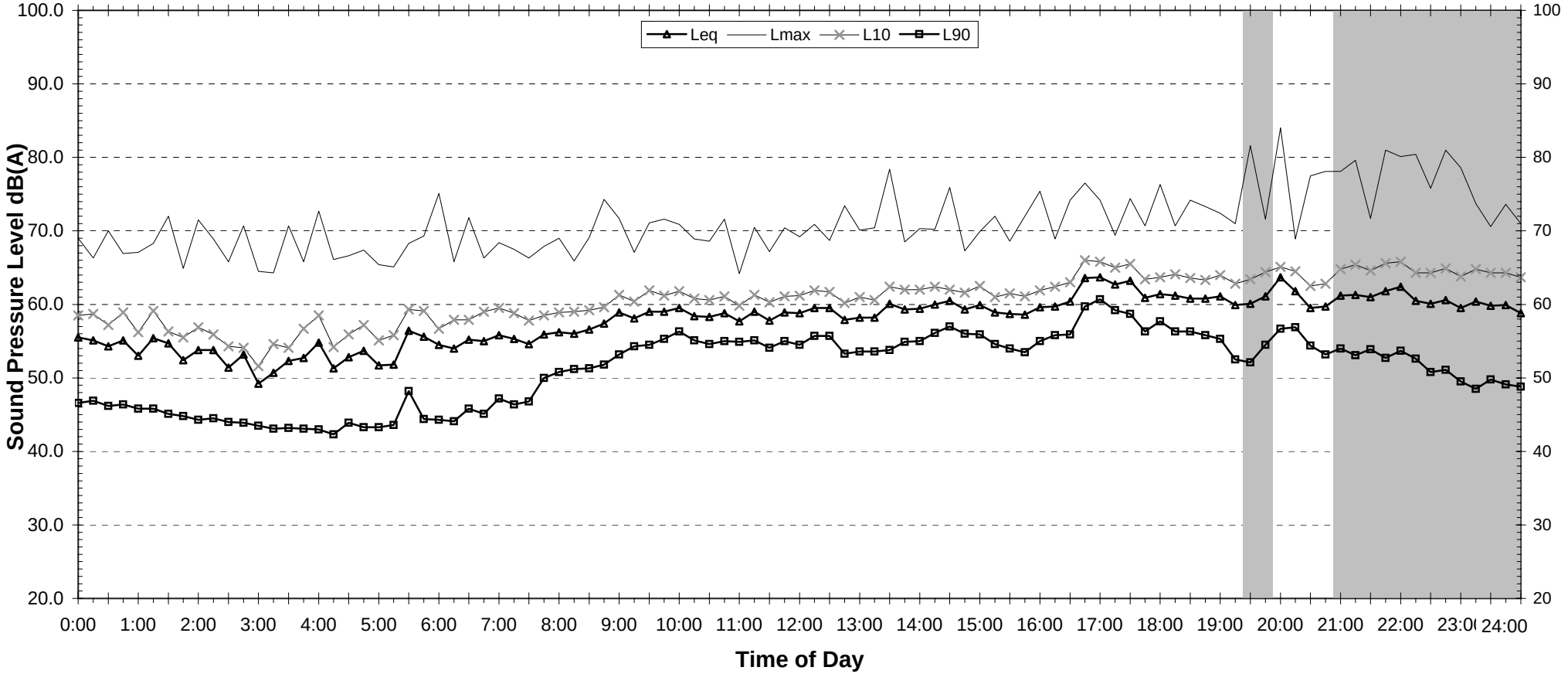
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.3	56.8
$L_{eq\ 1hr}$ upper 10 percentile	62.3	58.0
$L_{eq\ 1hr}$ lower 10 percentile	59.6	54.7

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	70.0	to	75.1
Lmax - Leq (Range)	15.2	to	20.2

EXISTING AMBIENT NOISE LEVELS

Location M1 - F3 Freeway, Black HIll

Sunday, 16 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	51.2	-	-
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 Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

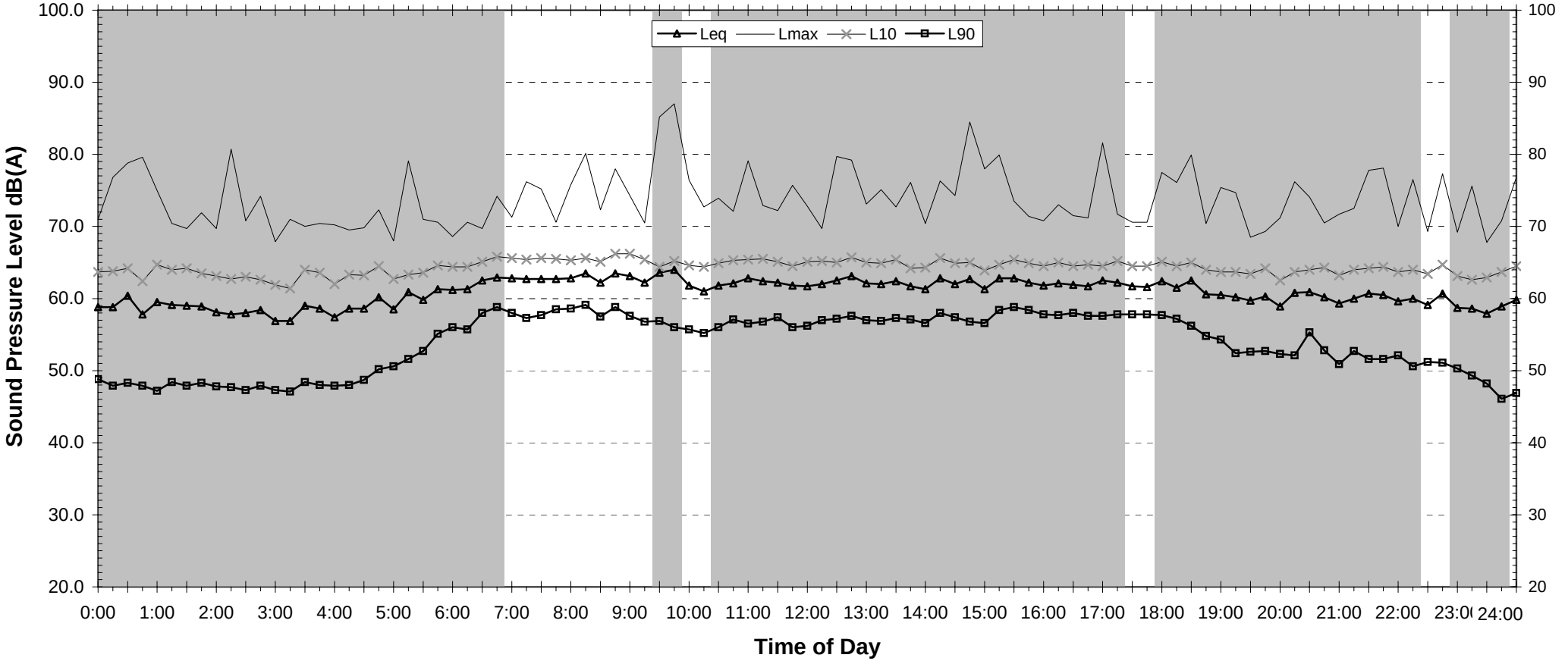
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	62.3	65.3
$L_{eq\ 1hr}$ upper 10 percentile	64.7	65.3
$L_{eq\ 1hr}$ lower 10 percentile	58.9	65.3

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

EXISTING AMBIENT NOISE LEVELS

Location M1 - F3 Freeway, Black HIll

Monday, 17 December 2007



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

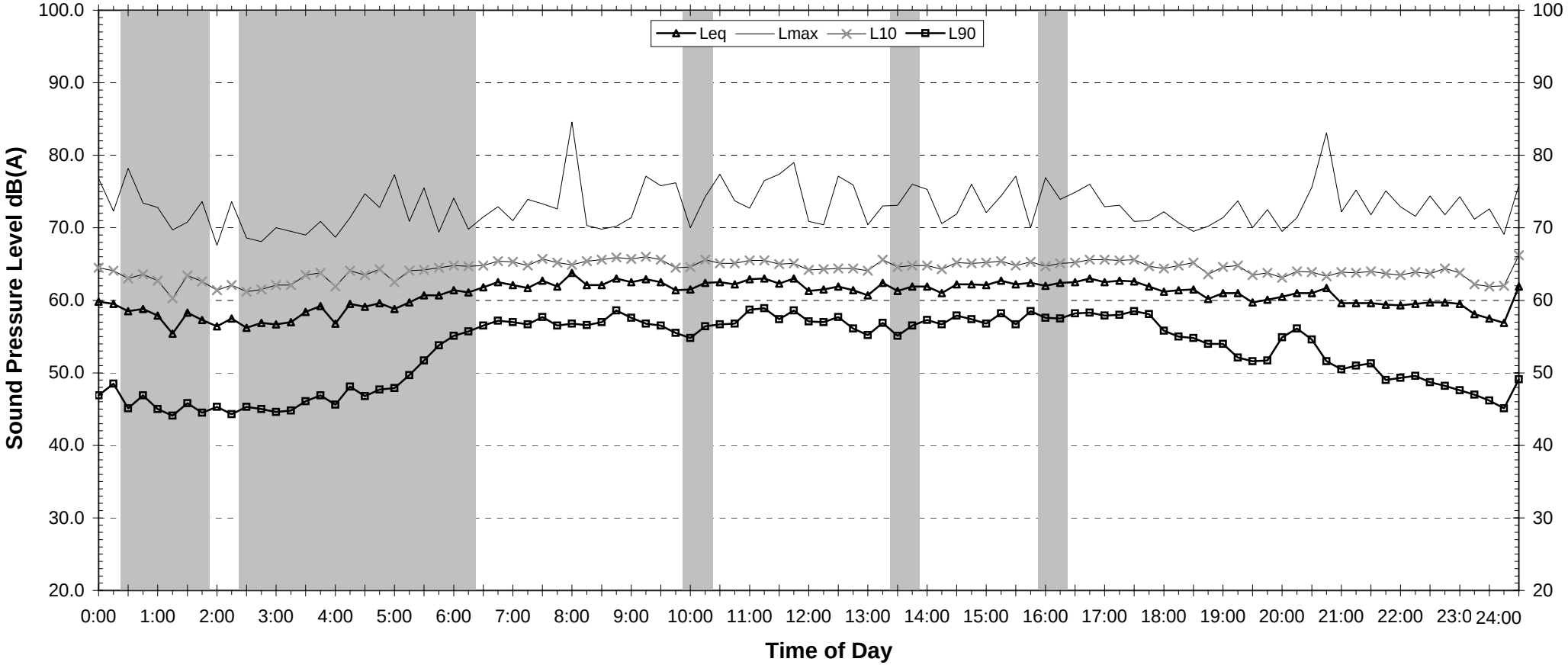
NSW ECRTN Policy (1m from facade)		(see note3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	65.0	62.8
$L_{eq\ 1hr}$ upper 10 percentile	65.6	64.6
$L_{eq\ 1hr}$ lower 10 percentile	63.5	58.9

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	73.6	to	77.3
Lmax - Leq (Range)	16.1	to	17.3

EXISTING AMBIENT NOISE LEVELS

Location M1 - F3 Freeway, Black HIll

Tuesday, 18 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	56.1	49.3	-
Leq (see note 3)	62.3	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)

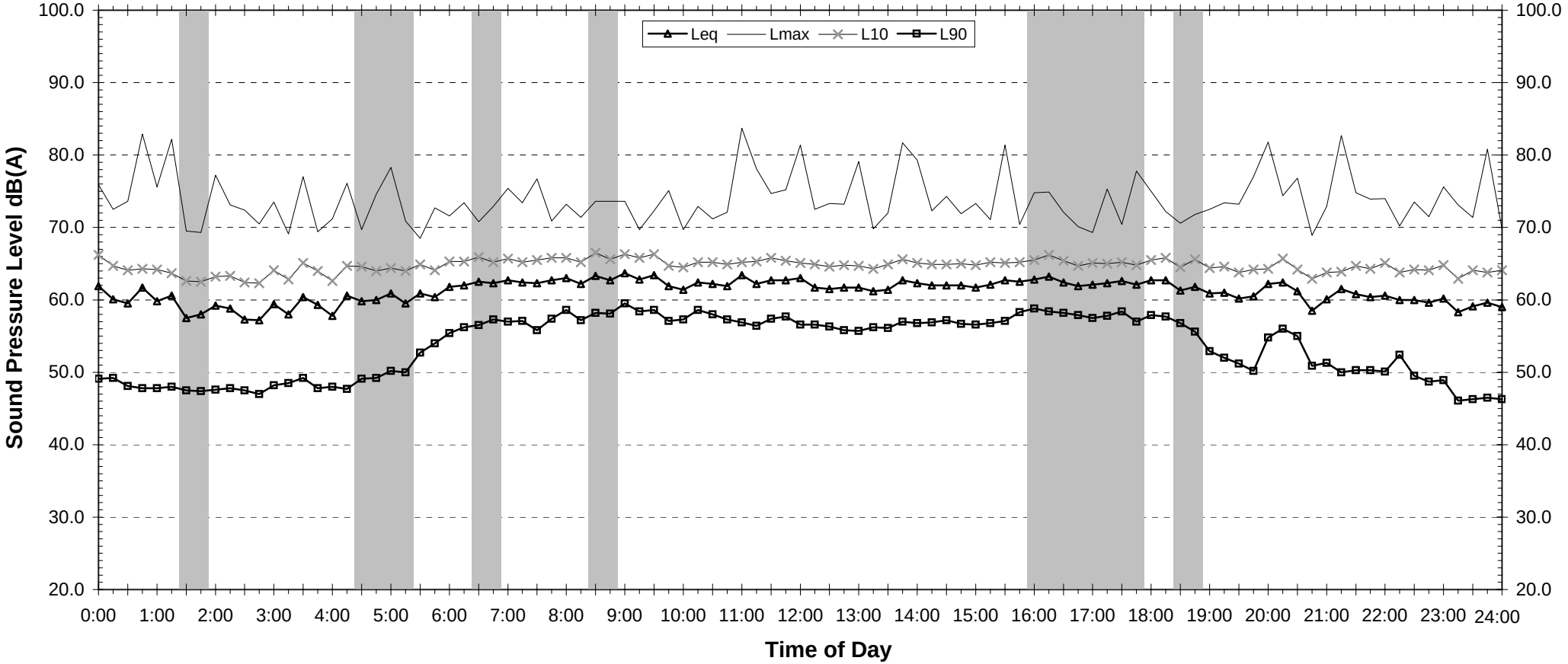
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	64.3	62.4
$L_{eq\ 1hr}$ upper 10 percentile	65.1	64.9
$L_{eq\ 1hr}$ lower 10 percentile	62.4	60.8

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	73.5	to	82.9
Lmax - Leq (Range)	15.2	to	22.5

EXISTING AMBIENT NOISE LEVELS

Location M1 - F3 Freeway, Black HIll

Wednesday, 19 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	50.1	45.8
Leq (see note 3)	-	61.0	60.1

NOTES:

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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)

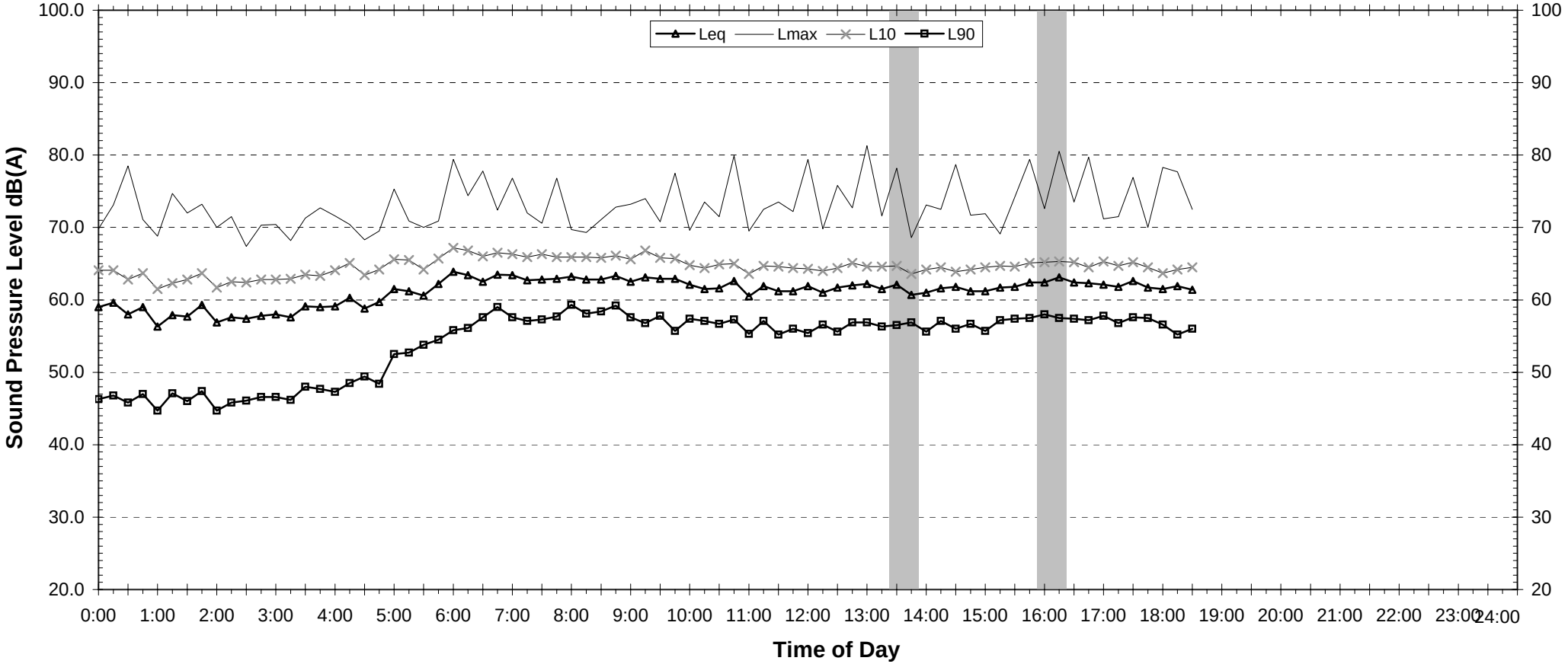
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	64.5	62.6
$L_{eq\ 1hr}$ upper 10 percentile	65.4	65.7
$L_{eq\ 1hr}$ lower 10 percentile	63.3	60.2

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	74.7	to	80.8
Lmax - Leq (Range)	15.1	to	21.8

EXISTING AMBIENT NOISE LEVELS

Location M1 - F3 Freeway, Black HIll

Thursday, 20 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	55.6	-	-
Leq (see note 3)	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 ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	64.6	-
$L_{eq\ 1hr}$ upper 10 percentile	65.4	-
$L_{eq\ 1hr}$ lower 10 percentile	63.8	-

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

Renzo Tonin & Associates

noise logger results

Location M2 - John Renshaw Dr, Black Hill

BACKGROUND & AMBIENT NOISE MONITORING RESULTS
NSW DEC's 'INDUSTRIAL NOISE POLICY', 2000

Day	L_{A90} Background Noise Levels[5]			L_{Aeq} Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Monday-10-December-2007	-	39	-	-	60	-
Tuesday-11-December-2007	-	-	-	-	-	-
Wednesday-12-December-2007	-	-	-	-	-	-
Thursday-13-December-2007	-	-	41	-	-	60
Friday-14-December-2007	50	46	40	64	61	58
Saturday-15-December-2007	41	41	32	61	60	55
Sunday-16-December-2007	41	-	-	60	-	-
Monday-17-December-2007	-	-	-	-	-	-
Tuesday-18-December-2007	50	47	-	64	61	-
Wednesday-19-December-2007	-	49	42	-	61	60
Representative Level	**50**	**46**	**41**	**63**	**61**	**59**

Notes:

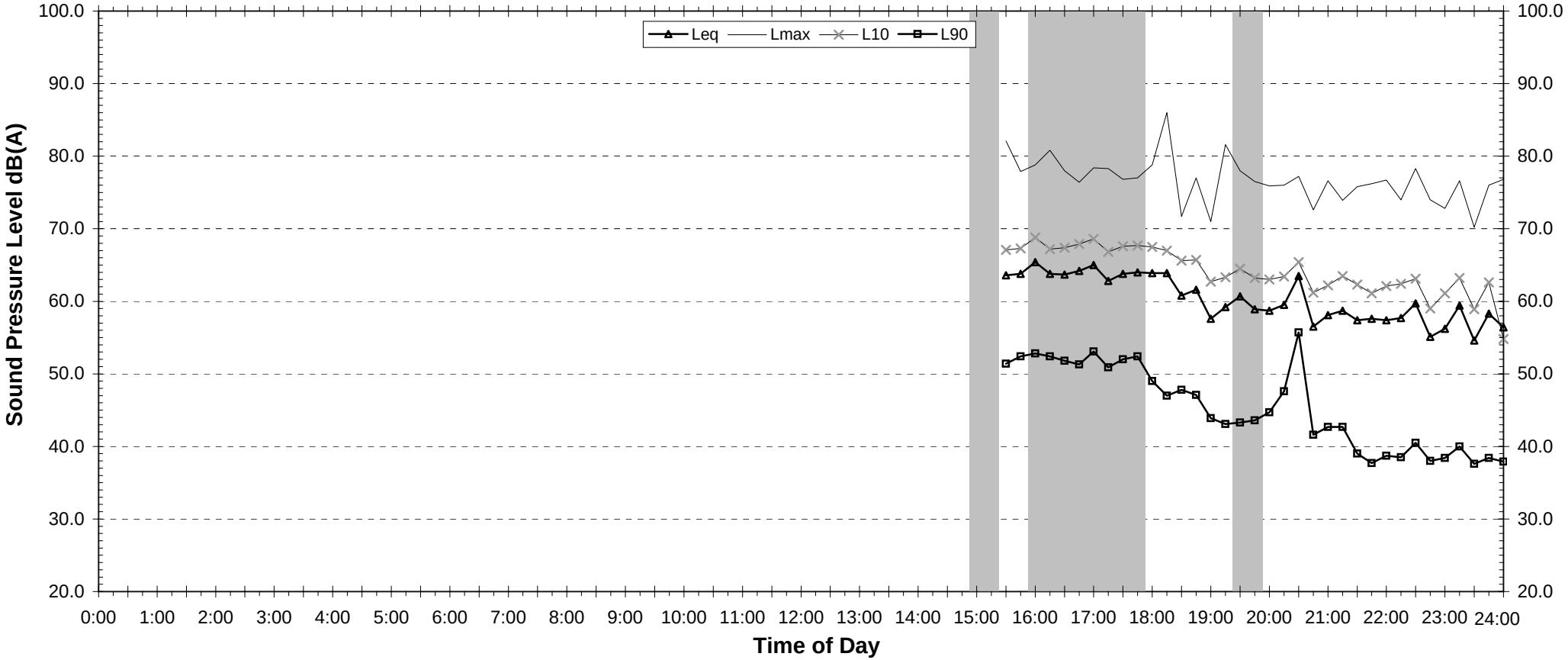
1. Day is taken to be 7:00am to 6:00pm
2. Evening is taken to be 6:00pm to 10:00pm.
3. Night is taken to be the remaining periods.
4. Partial day's monitoring
5. Assessment Background Level (ABL)
6. Rating Background Level (RBL) for L90 and logarithmic average for Leq

TRAFFIC NOISE MONITORING RESULTS
NSW DEC 'ENVIRONMENTAL CRITERIA FOR ROAD TRAFFIC NOISE', 1999

Day	L_{Aeq} Noise Levels		$L_{Aeq\ 1hr}$ Noise Levels			
	Day	Night	Day - Up	Day - Low	Night - Up	Night - Low
Monday-10-December-2007	63	59	66	60	61	56
Tuesday-11-December-2007	66	60	67	62	66	55
Wednesday-12-December-2007	66	63	67	65	68	58
Thursday-13-December-2007	66	62	68	63	68	54
Friday-14-December-2007	66	60	68	62	63	55
Saturday-15-December-2007	63	58	65	62	61	53
Sunday-16-December-2007	63	67	64	61	67	67
Monday-17-December-2007	67	65	68	66	68	59
Tuesday-18-December-2007	66	62	67	62	68	58
Wednesday-19-December-2007	66	63	67	62	68	57
Thursday-20-December-2007	66	-	68	65	-	-
Representative Weekday	**66**	**62**	**68**	**64**	**67**	**57**
Representative Weekend	**63**	**64**	**64**	**61**	**65**	**64**
Representative Week	**66**	**63**	**67**	**63**	**67**	**59**

20 YEARS
1982-2002 ACOUSTIC ENGINEERING EXCELLENCE

EXISTING AMBIENT NOISE LEVELS
Location M2 - John Renshaw Dr, Black Hill
Monday, 10 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	38.7	-
Leq (see note 3)	-	60.0	-

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.

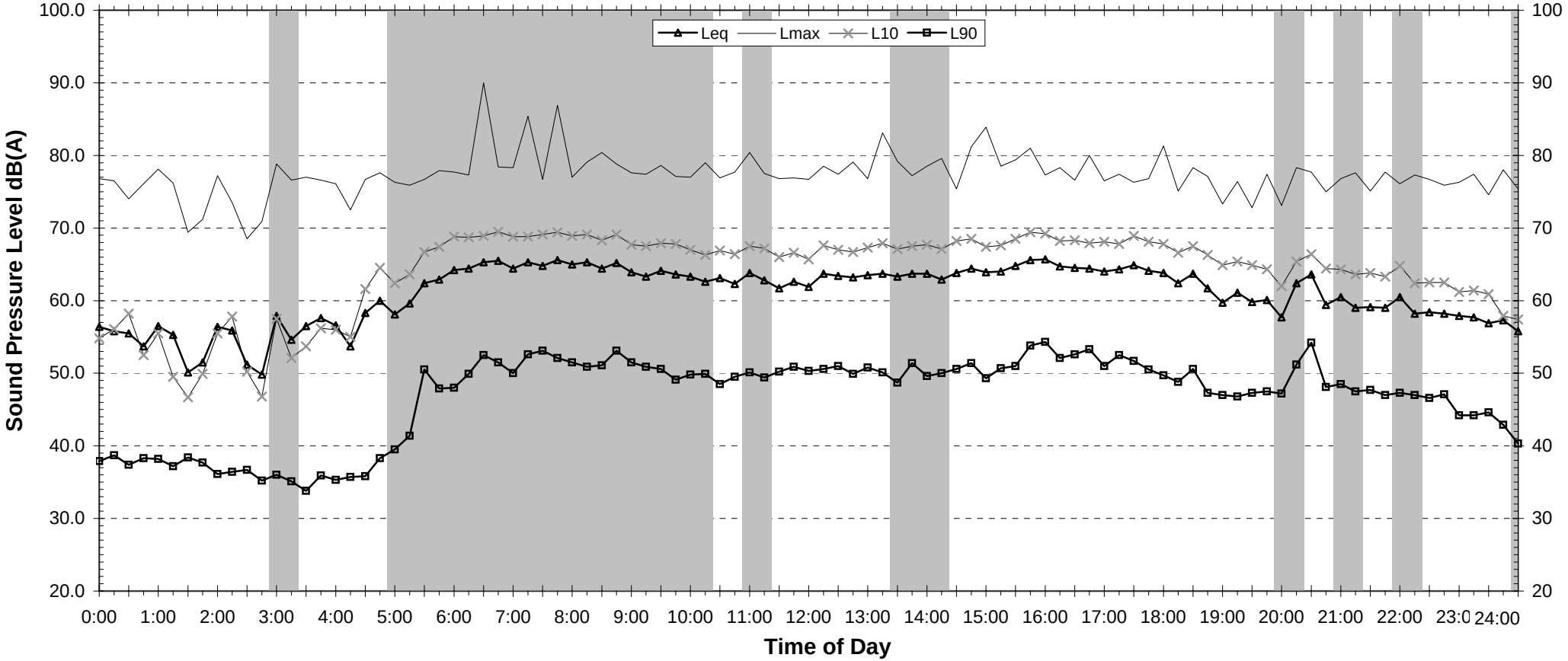
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	63.4	58.9
$L_{eq\ 1hr}$ upper 10 percentile	66.4	60.5
$L_{eq\ 1hr}$ lower 10 percentile	60.3	55.6

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	73.5	to	78.3
Lmax - Leq (Range)	19.3	to	23.1

EXISTING AMBIENT NOISE LEVELS
Location M2 - John Renshaw Dr, Black Hill
Tuesday, 11 December 2007



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

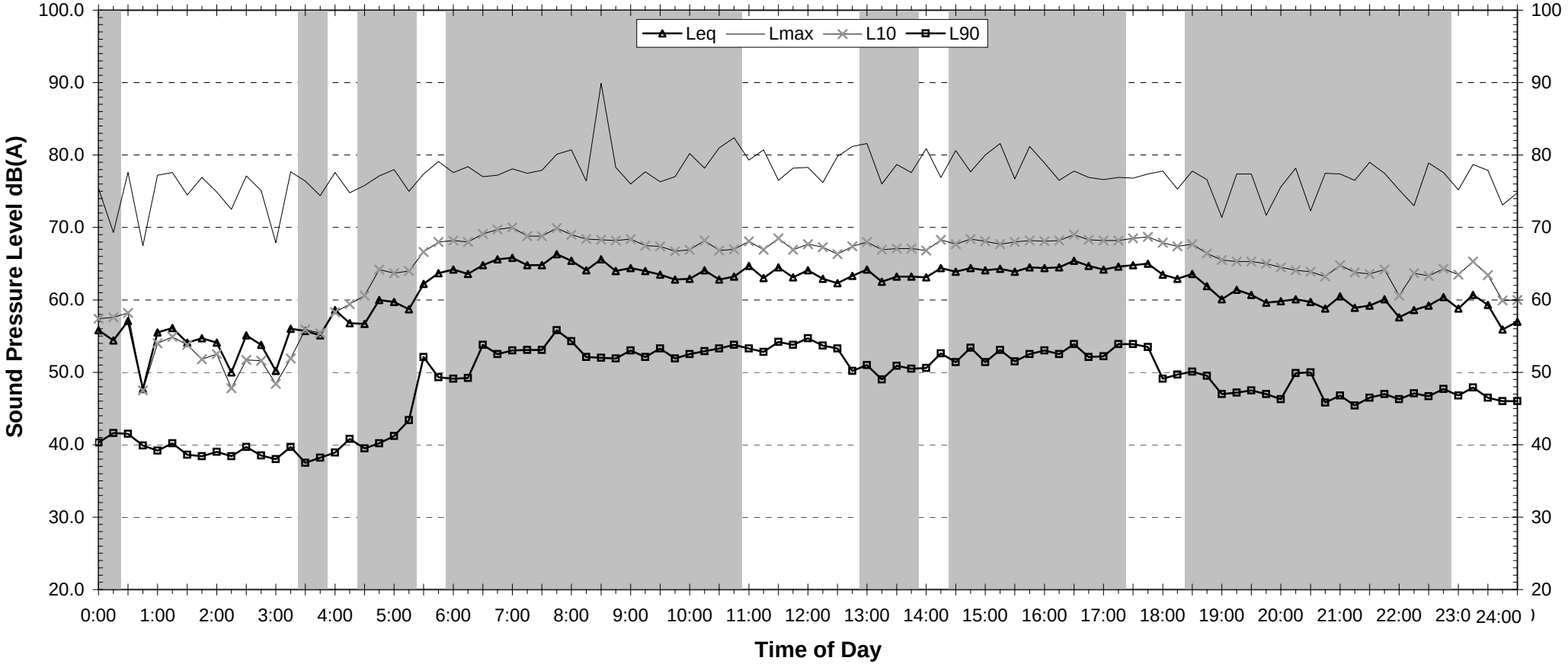
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	65.8	59.9
$L_{eq\ 1hr}$ upper 10 percentile	67.5	65.5
$L_{eq\ 1hr}$ lower 10 percentile	61.8	55.3

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	74.8	to	79.1
Lmax - Leq (Range)	16.1	to	24.3

EXISTING AMBIENT NOISE LEVELS
Location M2 - John Renshaw Dr, Black Hill
Wednesday, 12 December 2007



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

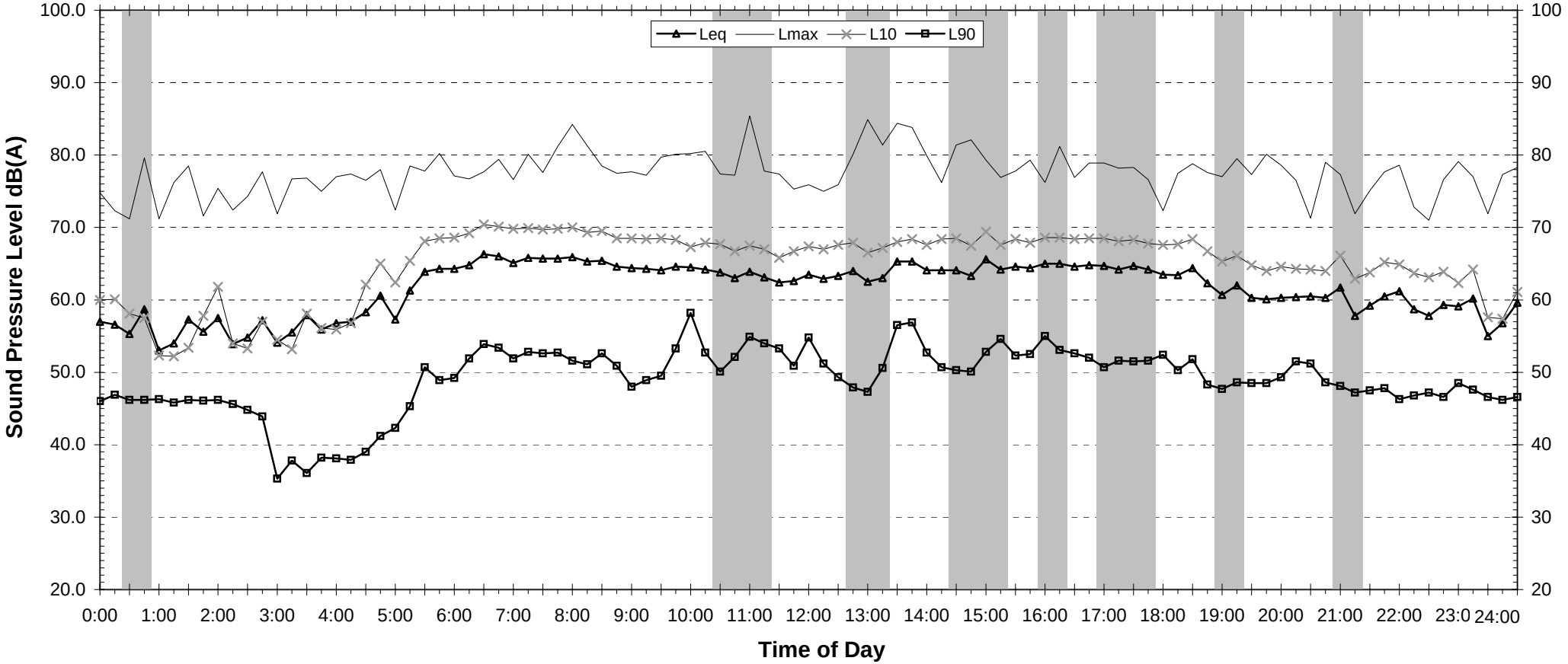
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	66.3	63.1
$L_{eq\ 1hr}$ upper 10 percentile	67.2	68.1
$L_{eq\ 1hr}$ lower 10 percentile	65.4	57.7

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	72.3	to	80.2
Lmax - Leq (Range)	16.4	to	22.5

EXISTING AMBIENT NOISE LEVELS
Location M2 - John Renshaw Dr, Black Hill
Thursday, 13 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	41.4
Leq (see note 3)	-	-	60.0

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.

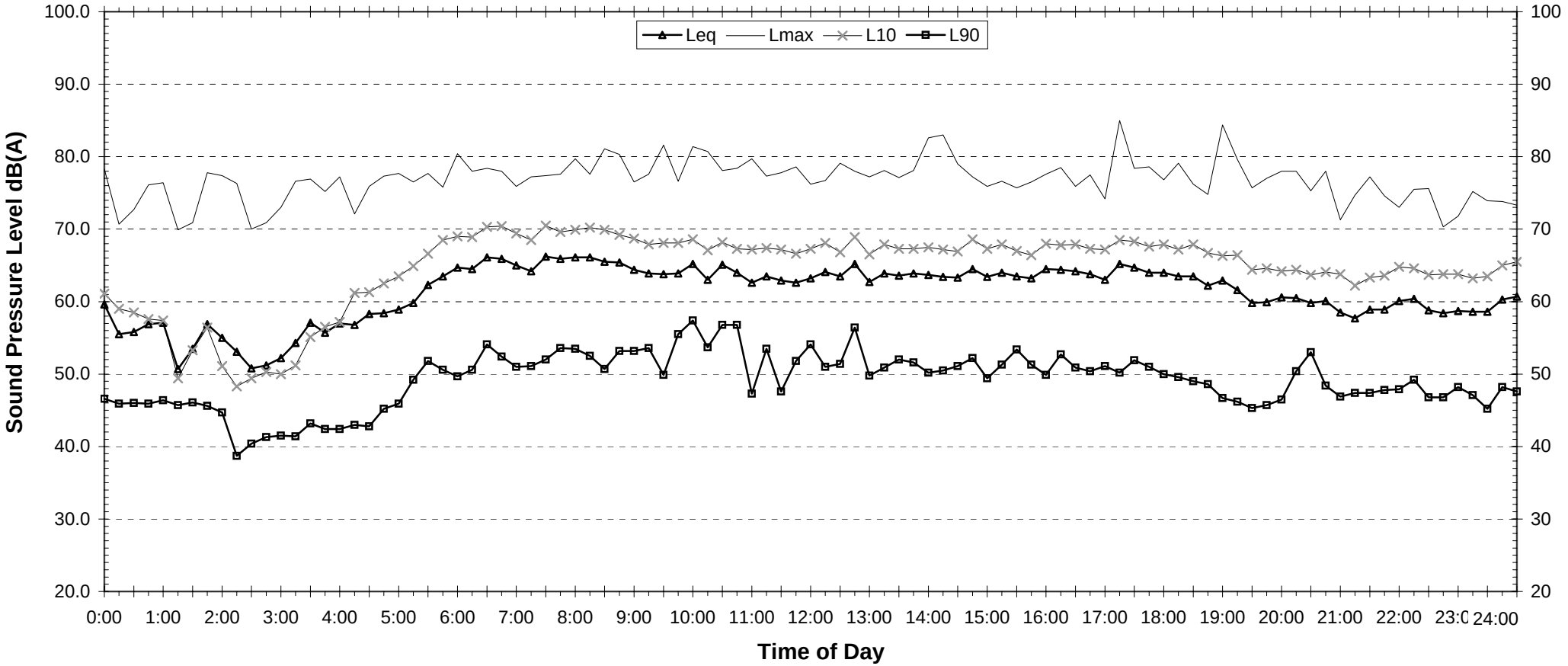
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	66.3	62.5
$L_{eq\ 1hr}$ upper 10 percentile	67.9	67.9
$L_{eq\ 1hr}$ lower 10 percentile	62.8	54.4

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	76.3	to	80.4
Lmax - Leq (Range)	17.5	to	24.4

EXISTING AMBIENT NOISE LEVELS
Location M2 - John Renshaw Dr, Black Hill
Friday, 14 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	49.9	45.7	40.4
Leq (see note 3)	64.2	60.9	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.

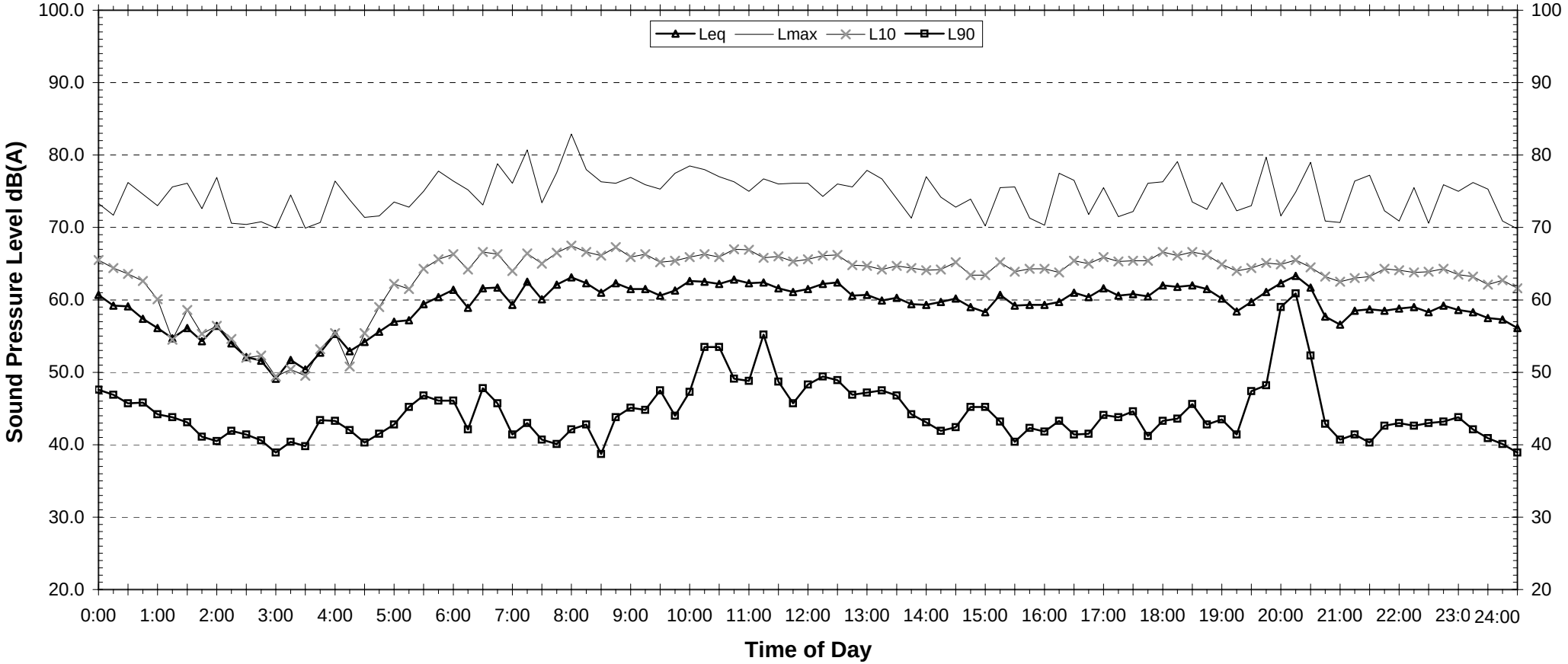
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	66.1	60.4
$L_{eq\ 1hr}$ upper 10 percentile	68.0	63.1
$L_{eq\ 1hr}$ lower 10 percentile	61.9	54.5

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	70.8	to	78.8
Lmax - Leq (Range)	15.5	to	23.5

EXISTING AMBIENT NOISE LEVELS
Location M2 - John Renshaw Dr, Black Hill
Saturday, 15 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	41.2	40.7	32.1
Leq (see note 3)	61.2	60.5	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.

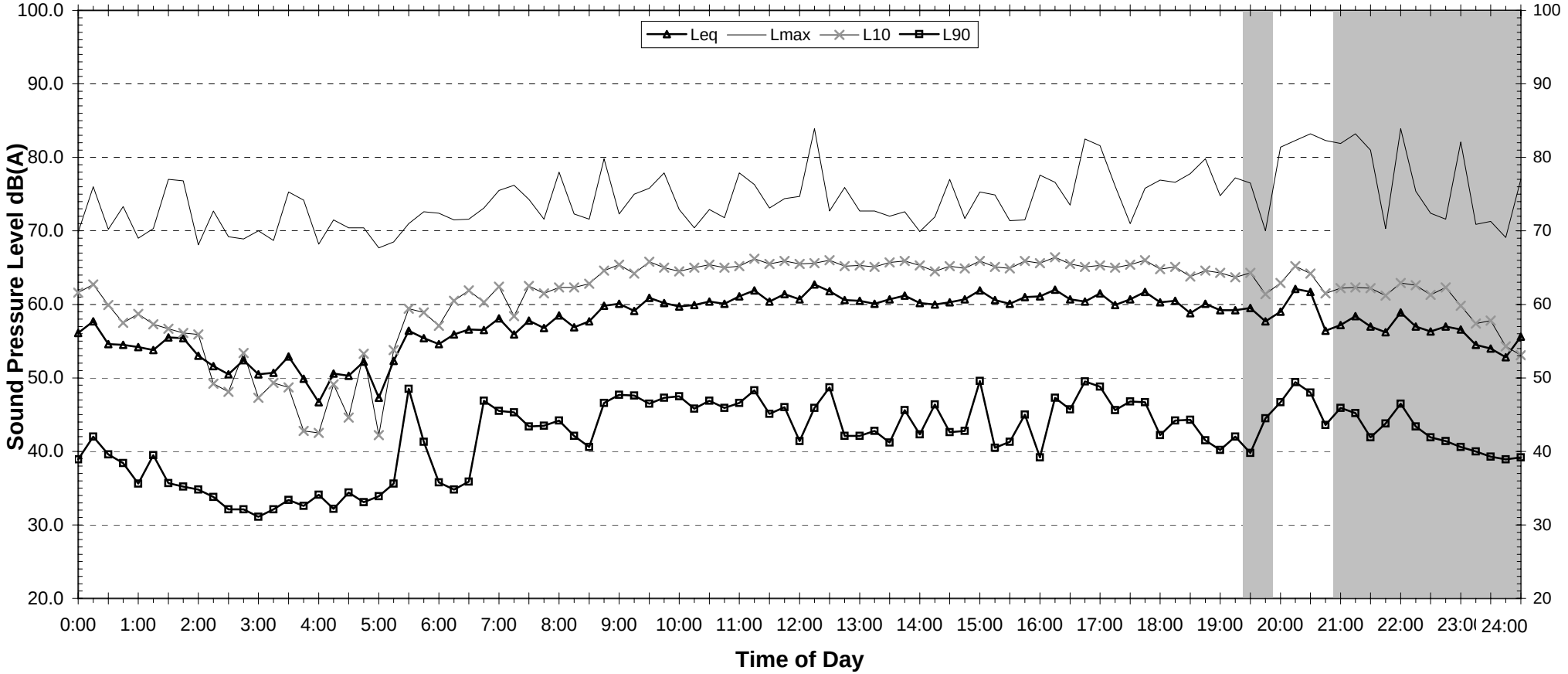
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	63.5	57.9
$L_{eq\ 1hr}$ upper 10 percentile	64.8	61.3
$L_{eq\ 1hr}$ lower 10 percentile	61.5	52.9

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	71.5	to	77.0
Lmax - Leq (Range)	17.1	to	24.7

EXISTING AMBIENT NOISE LEVELS
Location M2 - John Renshaw Dr, Black Hill
Sunday, 16 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	41.3	-	-
Leq (see note 3)	60.4	-	-

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.

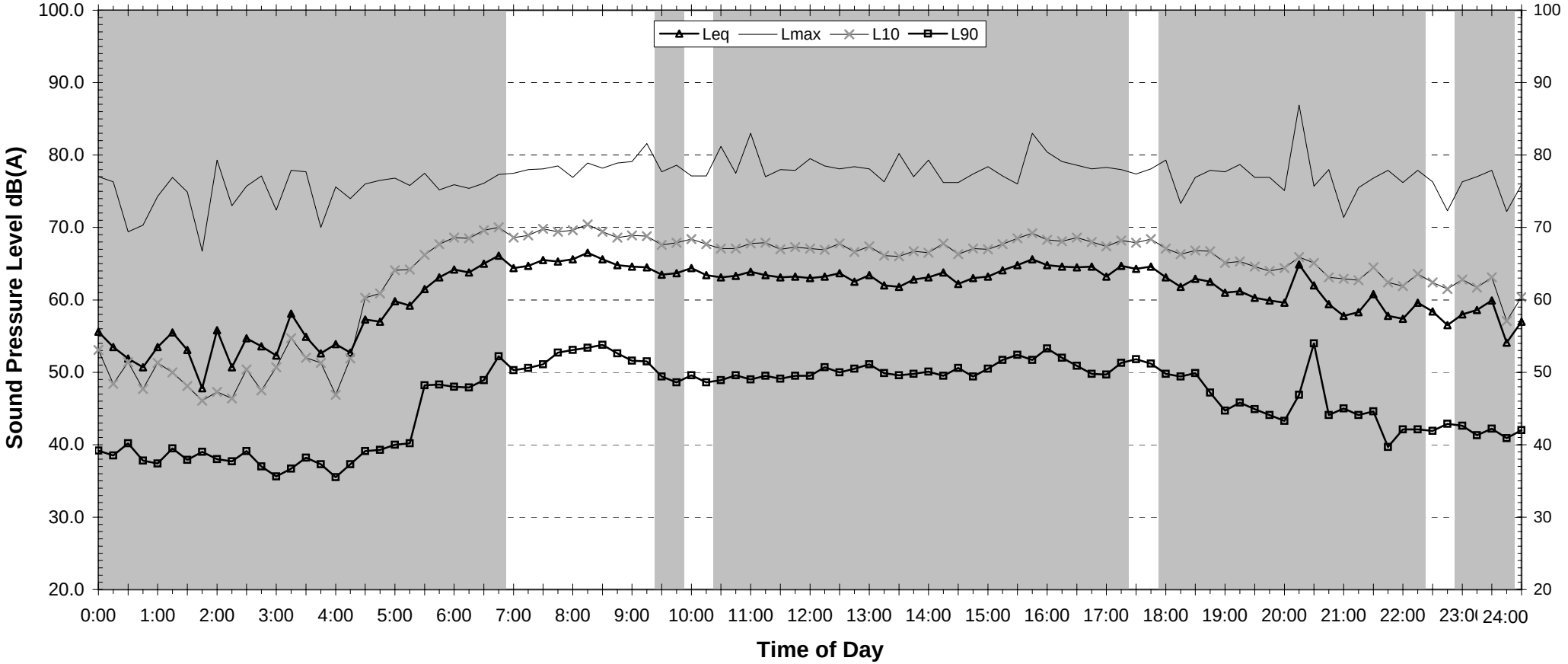
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	62.8	66.9
$L_{eq\ 1hr}$ upper 10 percentile	63.9	66.9
$L_{eq\ 1hr}$ lower 10 percentile	60.5	66.9

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

EXISTING AMBIENT NOISE LEVELS
Location M2 - John Renshaw Dr, Black Hill
Monday, 17 December 2007



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

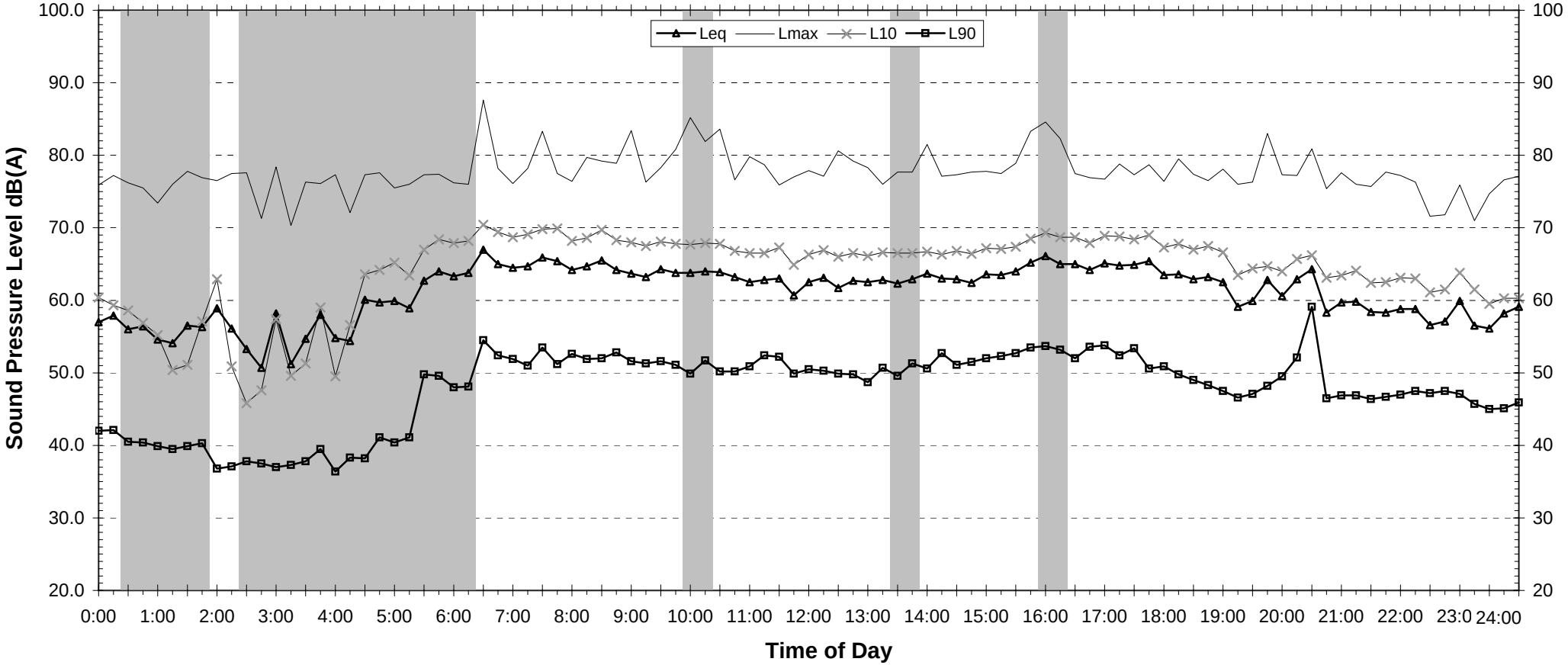
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.5	64.6
$L_{eq\ 1hr}$ upper 10 percentile	67.9	68.1
$L_{eq\ 1hr}$ lower 10 percentile	65.9	58.6

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	75.9	to	87.6
Lmax - Leq (Range)	17.6	to	22.0

EXISTING AMBIENT NOISE LEVELS

Location M2 - John Renshaw Dr, Black Hill

Tuesday, 18 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	49.9	46.5	-
Leq (see note 3)	63.9	61.4	-

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.

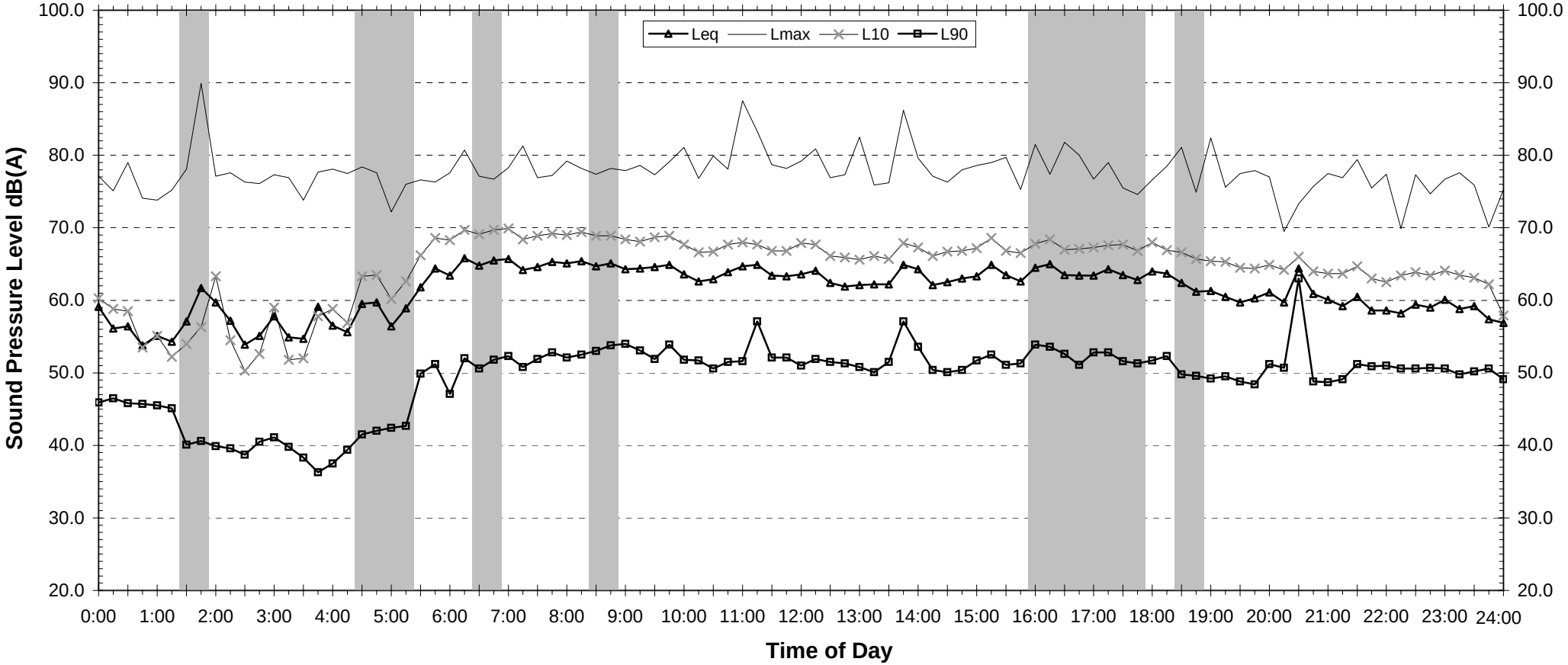
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	65.8	62.1
$L_{eq\ 1hr}$ upper 10 percentile	67.4	68.3
$L_{eq\ 1hr}$ lower 10 percentile	62.5	58.0

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	76.3	to	79.0
Lmax - Leq (Range)	18.0	to	23.5

EXISTING AMBIENT NOISE LEVELS
Location M2 - John Renshaw Dr, Black Hill
Wednesday, 19 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	48.7	41.8
Leq (see note 3)	-	61.0	60.1

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)

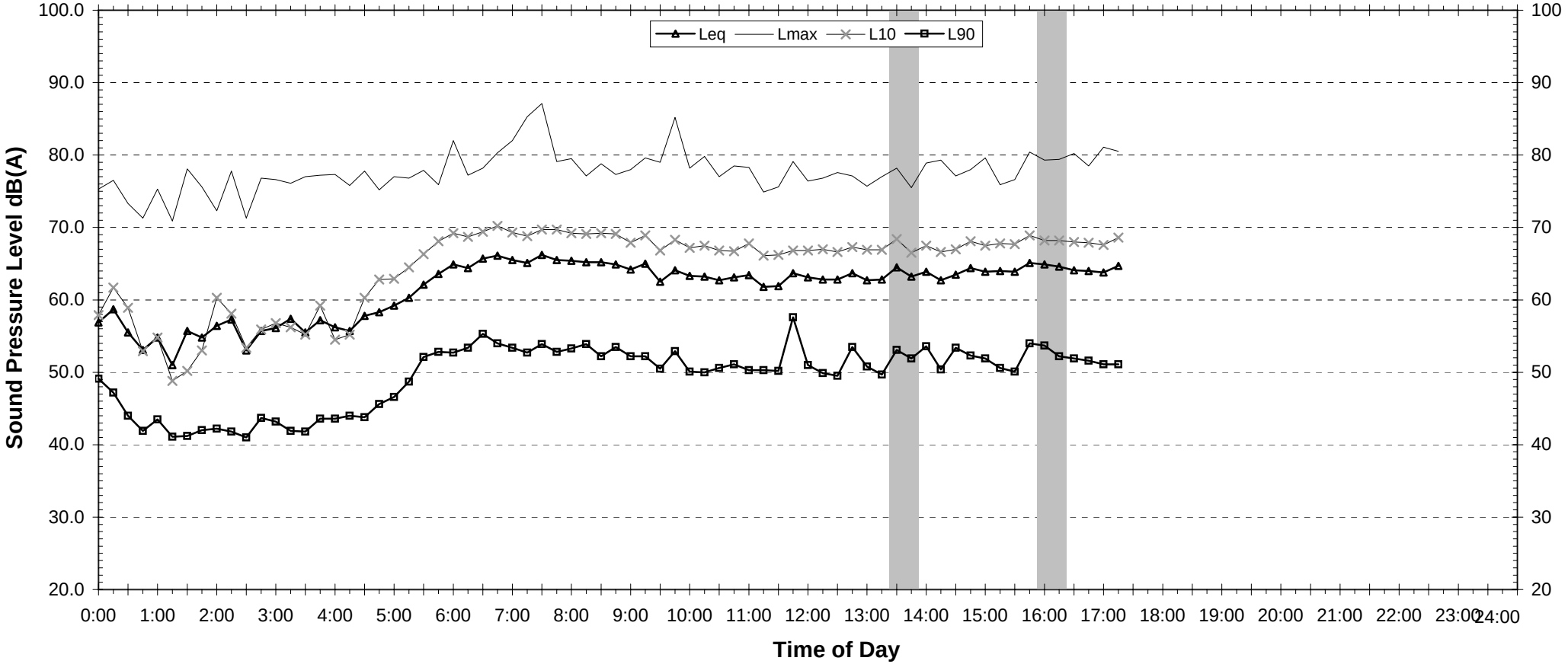
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	65.7	62.6
$L_{eq\ 1hr}$ upper 10 percentile	67.4	68.0
$L_{eq\ 1hr}$ lower 10 percentile	62.3	57.4

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	76.5	to	82.0
Lmax - Leq (Range)	16.5	to	23.2

EXISTING AMBIENT NOISE LEVELS

Location M2 - John Renshaw Dr, Black Hill

Thursday, 20 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	50.0	-	-
Leq (see note 3)	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 ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	66.5	-
$L_{eq\ 1hr}$ upper 10 percentile	68.0	-
$L_{eq\ 1hr}$ lower 10 percentile	65.2	-

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

Renzo Tonin & Associates

noise logger results

Location M3 - Open Paddock, Black Hill

BACKGROUND & AMBIENT NOISE MONITORING RESULTS
NSW DEC's 'INDUSTRIAL NOISE POLICY', 2000

Day	L_{A90} Background Noise Levels[5]			L_{Aeq} Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Monday-10-December-2007	-	38	-	-	47	-
Tuesday-11-December-2007	-	-	-	-	-	-
Wednesday-12-December-2007	-	-	-	-	-	-
Thursday-13-December-2007	-	-	37	-	-	46
Friday-14-December-2007	40	43	39	46	50	45
Saturday-15-December-2007	41	40	35	47	51	45
Sunday-16-December-2007	39	-	-	47	-	-
Monday-17-December-2007	-	-	-	-	-	-
Tuesday-18-December-2007	42	41	-	47	51	-
Wednesday-19-December-2007	-	44	41	-	54	47
Representative Level	**41**	**41**	**38**	**48**	**51**	**46**

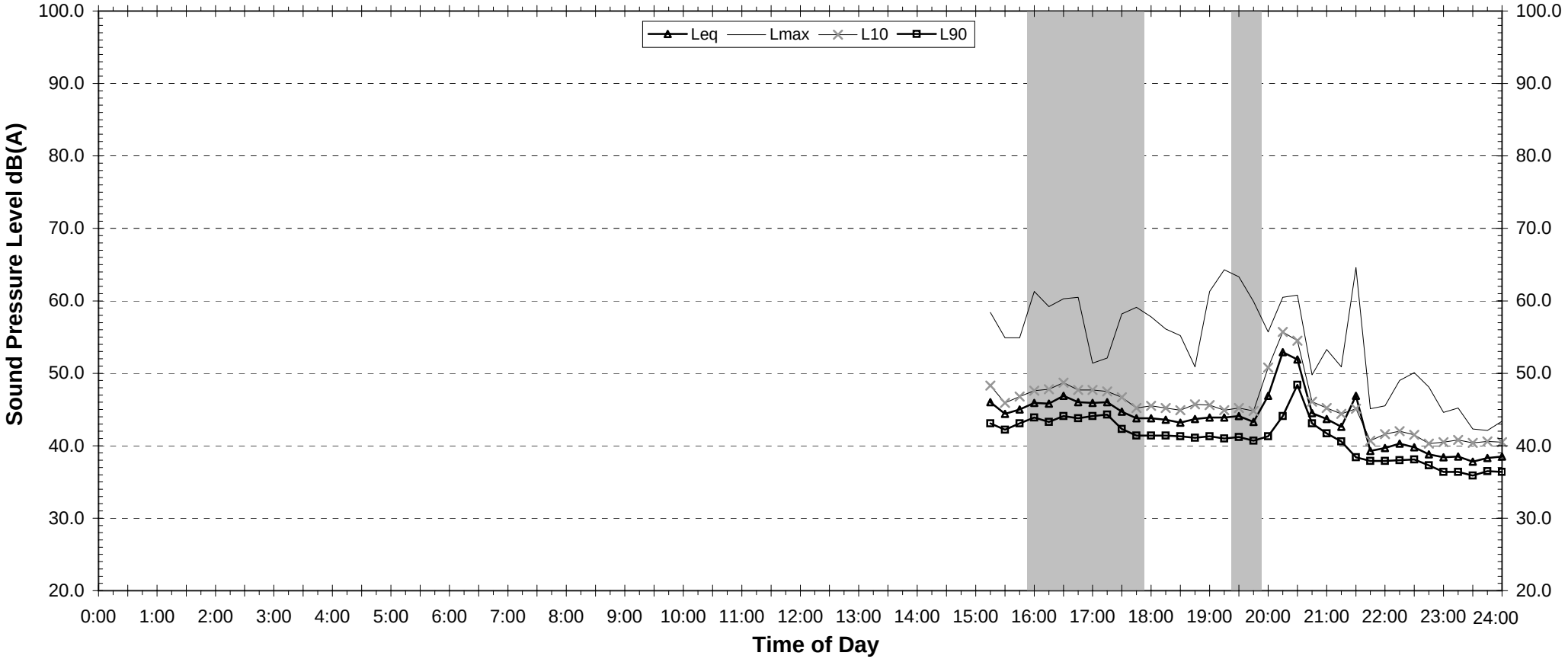
Notes:

1. Day is taken to be 7:00am to 6:00pm
2. Evening is taken to be 6:00pm to 10:00pm.
3. Night is taken to be the remaining periods.
4. Partial day's monitoring
5. Assessment Background Level (ABL)
6. Rating Background Level (RBL) for L90 and logarithmic average for Leq

TRAFFIC NOISE MONITORING RESULTS
NSW DEC 'ENVIRONMENTAL CRITERIA FOR ROAD TRAFFIC NOISE', 1999

Day	L_{Aeq} Noise Levels		$L_{Aeq\ 1hr}$ Noise Levels			
	Day	Night	Day - Up	Day - Low	Night - Up	Night - Low
Monday-10-December-2007	49	41	53	46	42	41
Tuesday-11-December-2007	48	47	51	47	54	43
Wednesday-12-December-2007	50	46	53	46	50	40
Thursday-13-December-2007	54	48	60	46	55	41
Friday-14-December-2007	50	47	55	47	51	44
Saturday-15-December-2007	51	48	56	46	55	40
Sunday-16-December-2007	51	47	57	44	47	47
Monday-17-December-2007	48	45	50	46	48	42
Tuesday-18-December-2007	51	48	56	46	54	43
Wednesday-19-December-2007	53	50	59	48	53	46
Thursday-20-December-2007	52	-	57	48	-	-
Representative Weekday	**51**	**47**	**56**	**47**	**52**	**43**
Representative Weekend	**51**	**47**	**57**	**45**	**53**	**44**
Representative Week	**51**	**47**	**56**	**46**	**52**	**43**

EXISTING AMBIENT NOISE LEVELS
Location M3 - Open Paddock, Black Hill
Monday, 10 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	37.9	-
Leq (see note 3)	-	46.7	-

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.

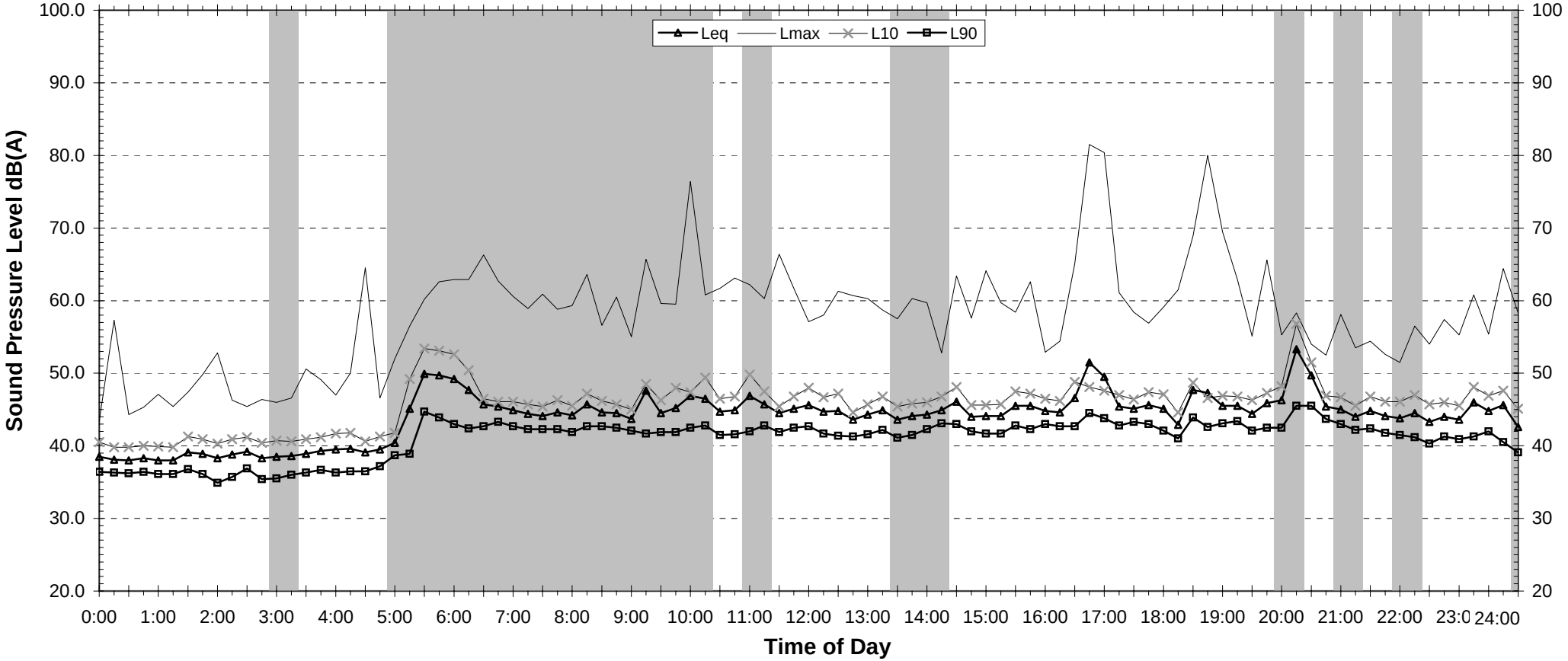
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade)		(see note3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	48.8	41.3
$L_{eq\ 1hr}$ upper 10 percentile	52.5	41.9
$L_{eq\ 1hr}$ lower 10 percentile	45.8	40.6

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	-	to	-
Lmax - Leq (Range)	19.2	to	25.1

EXISTING AMBIENT NOISE LEVELS
Location M3 - Open Paddock, Black Hill
Tuesday, 11 December 2007



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

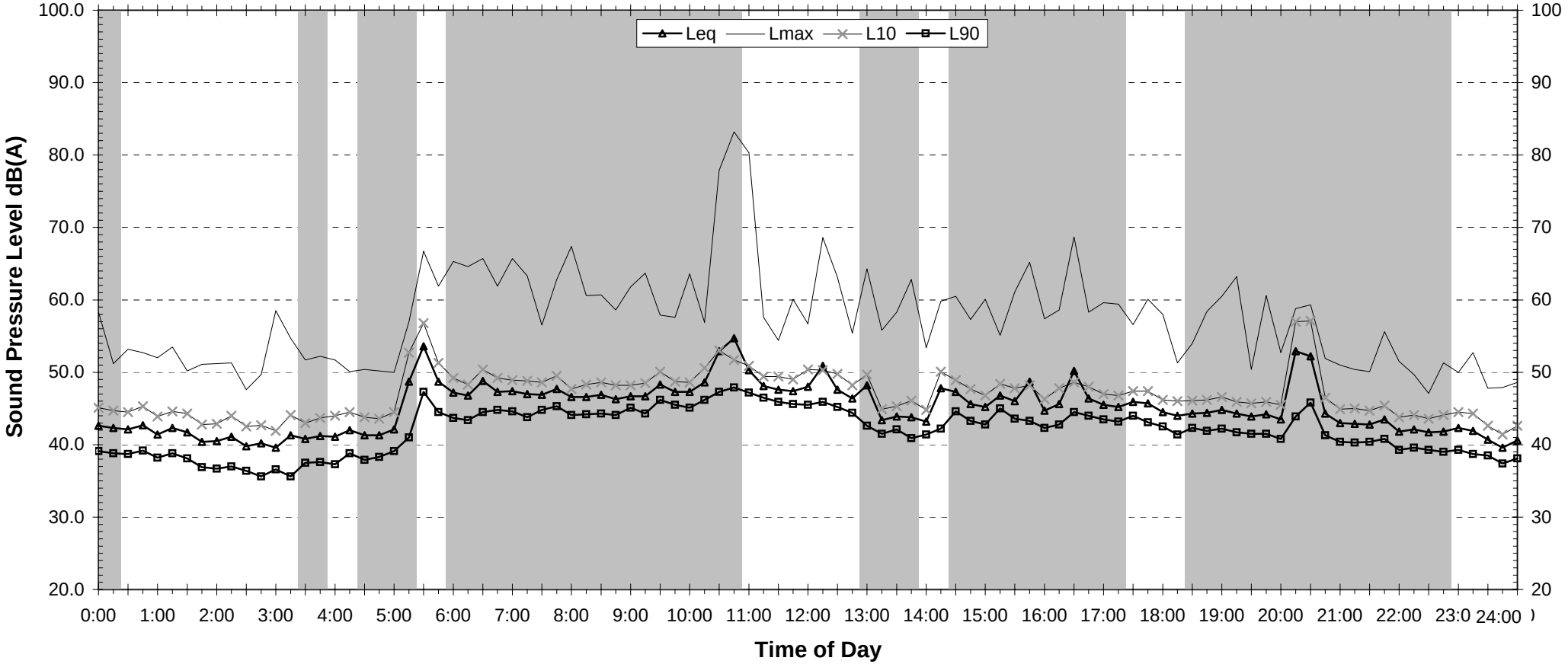
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	48.4	47.3
$L_{eq\ 1hr}$ upper 10 percentile	51.2	54.3
$L_{eq\ 1hr}$ lower 10 percentile	46.9	42.7

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	18.3	to	18.9

EXISTING AMBIENT NOISE LEVELS
Location M3 - Open Paddock, Black Hill
Wednesday, 12 December 2007



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

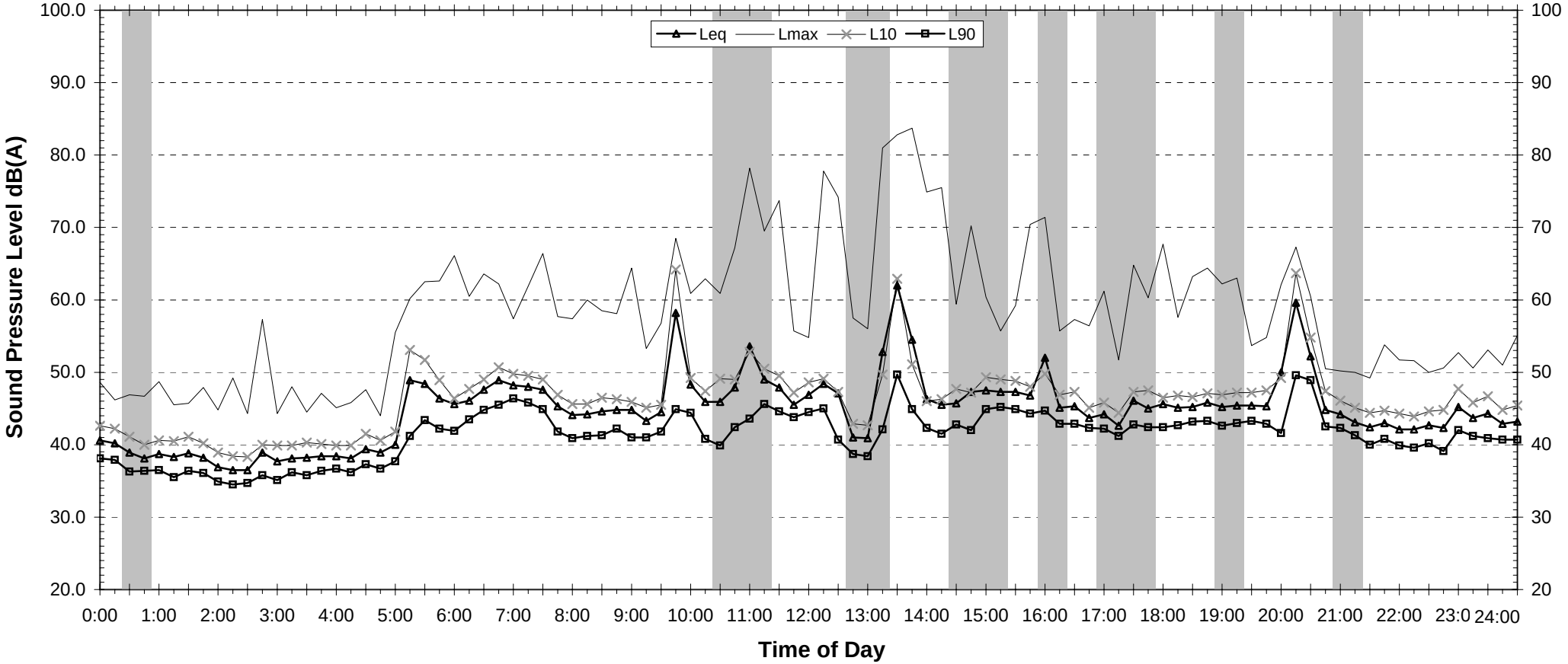
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	50.0	45.8
$L_{eq\ 1hr}$ upper 10 percentile	52.8	50.3
$L_{eq\ 1hr}$ lower 10 percentile	45.7	40.0

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	66.1	to	66.1
Lmax - Leq (Range)	15.8	to	19.8

EXISTING AMBIENT NOISE LEVELS
Location M3 - Open Paddock, Black Hill
Thursday, 13 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	37.0
Leq (see note 3)	-	-	45.9

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.

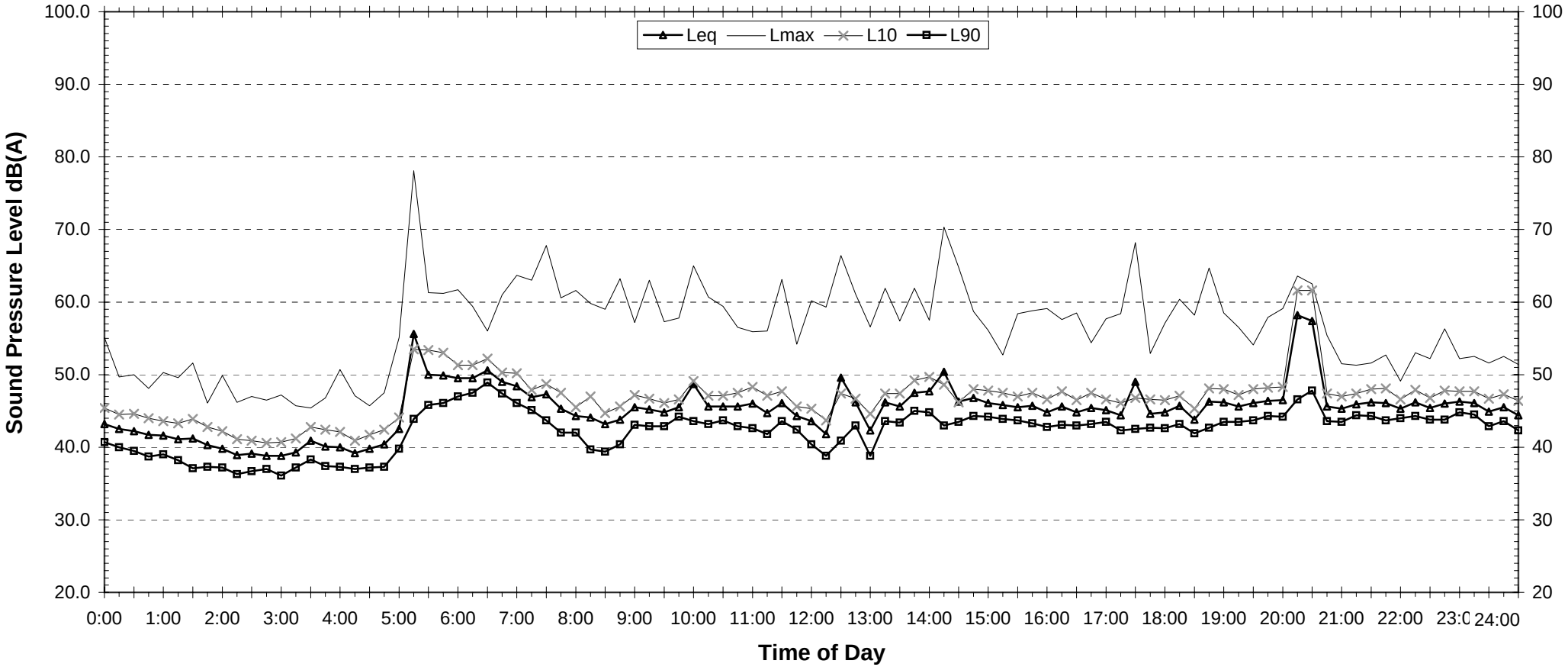
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	53.5	48.4
$L_{eq\ 1hr}$ upper 10 percentile	59.5	54.6
$L_{eq\ 1hr}$ lower 10 percentile	46.2	41.4

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	78.1	to	78.1
Lmax - Leq (Range)	26.0	to	26.0

EXISTING AMBIENT NOISE LEVELS
Location M3 - Open Paddock, Black Hill
Friday, 14 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	40.4	42.7	38.6
Leq (see note 3)	46.0	50.4	45.0

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.

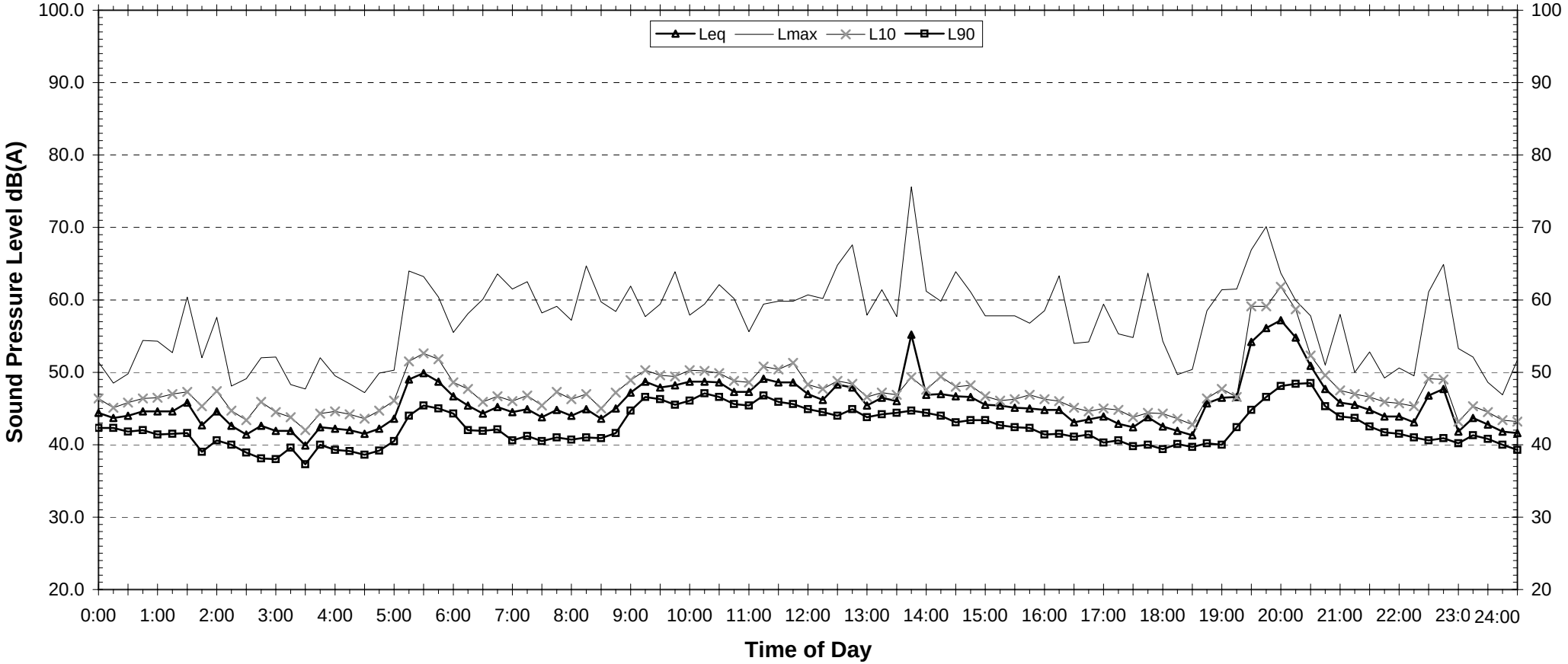
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	50.2	47.5
$L_{eq\ 1hr}$ upper 10 percentile	55.3	51.2
$L_{eq\ 1hr}$ lower 10 percentile	47.0	44.2

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	15.3	to	18.7

EXISTING AMBIENT NOISE LEVELS
Location M3 - Open Paddock, Black Hill
Saturday, 15 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	40.5	40.0	35.0
Leq (see note 3)	47.0	50.9	45.5

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.

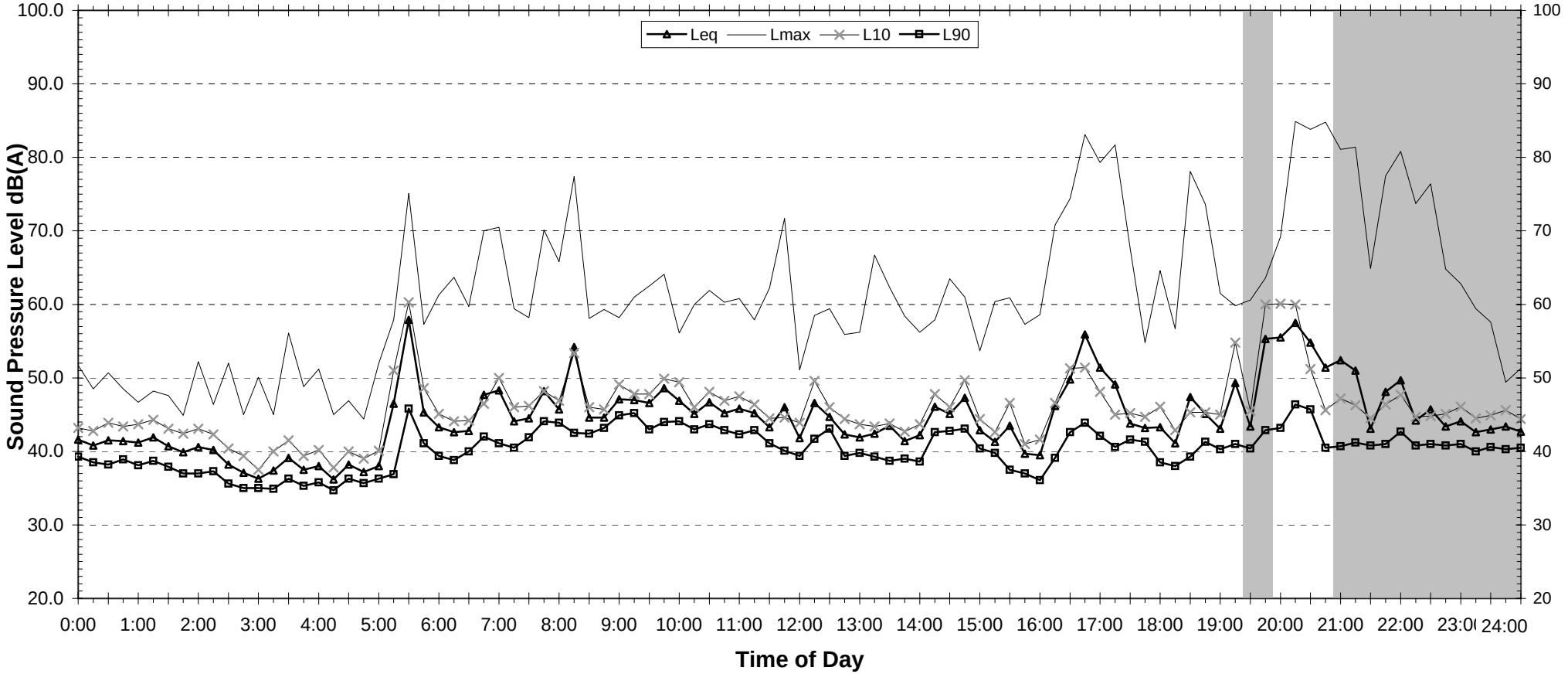
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	50.9	48.0
$L_{eq\ 1hr}$ upper 10 percentile	55.9	55.0
$L_{eq\ 1hr}$ lower 10 percentile	45.9	40.0

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	70.5	to	75.1
Lmax - Leq (Range)	18.0	to	24.4

EXISTING AMBIENT NOISE LEVELS
Location M3 - Open Paddock, Black Hill
Sunday, 16 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	38.6	-	-
Leq (see note 3)	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.

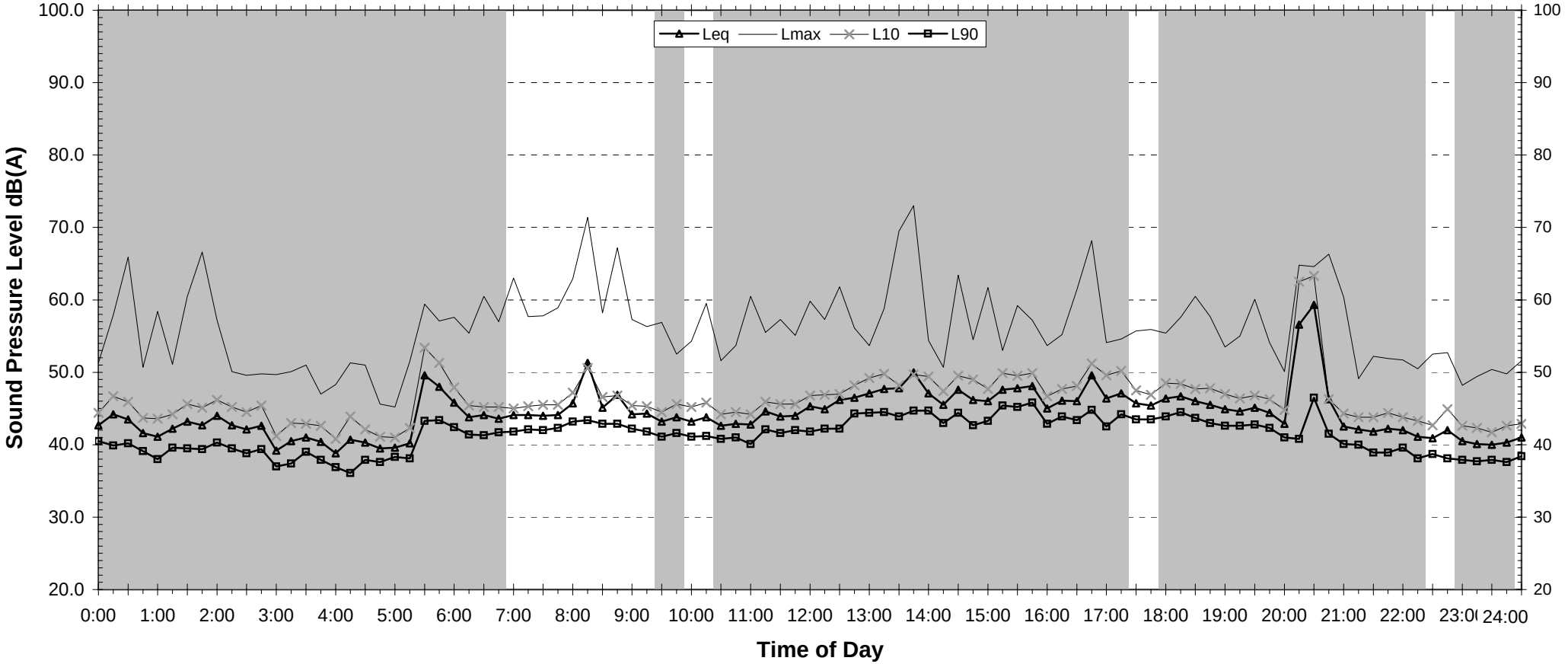
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	51.0	46.6
$L_{eq\ 1hr}$ upper 10 percentile	57.1	46.6
$L_{eq\ 1hr}$ lower 10 percentile	44.3	46.6

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	18.9	to	18.9

EXISTING AMBIENT NOISE LEVELS
Location M3 - Open Paddock, Black Hill
Monday, 17 December 2007



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

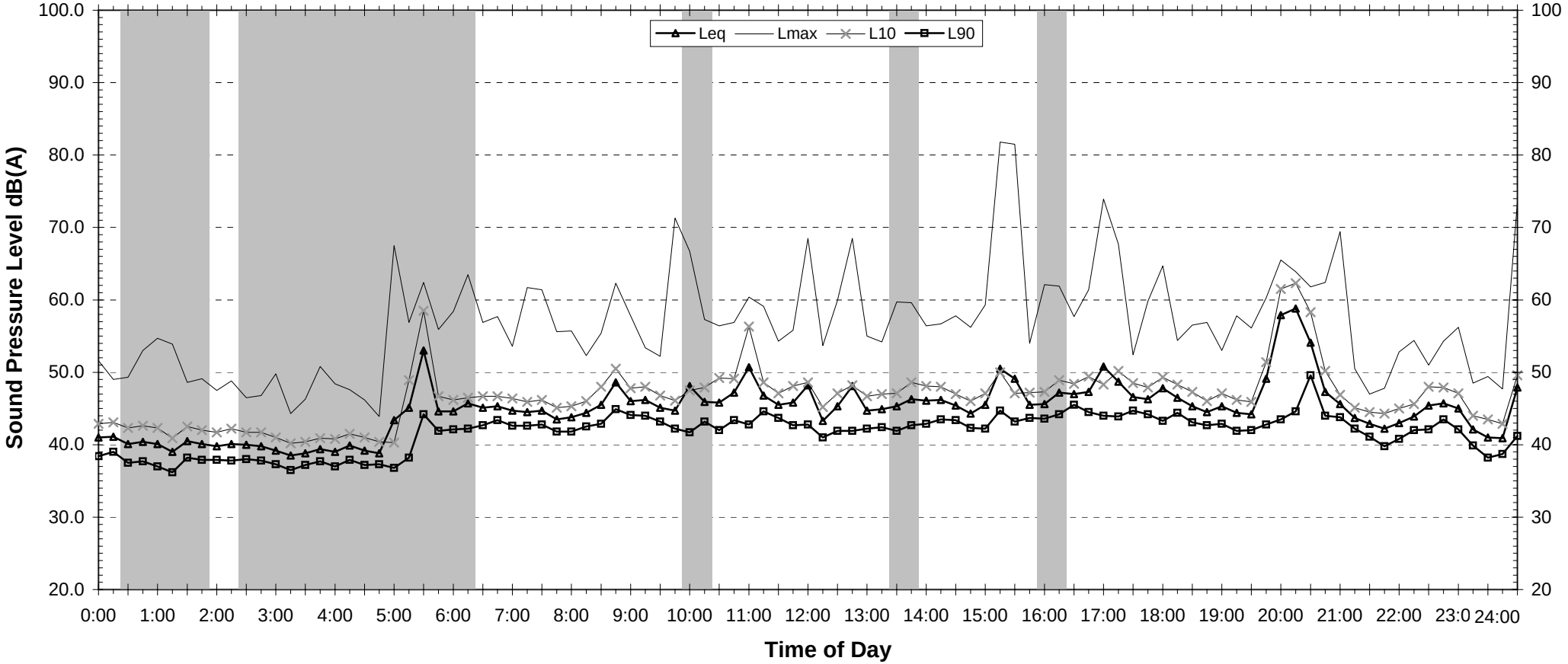
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	48.3	45.2
$L_{eq\ 1hr}$ upper 10 percentile	50.3	47.5
$L_{eq\ 1hr}$ lower 10 percentile	46.3	42.3

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

EXISTING AMBIENT NOISE LEVELS
Location M3 - Open Paddock, Black Hill
Tuesday, 18 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	41.9	40.8	-
Leq (see note 3)	46.8	51.1	-

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.

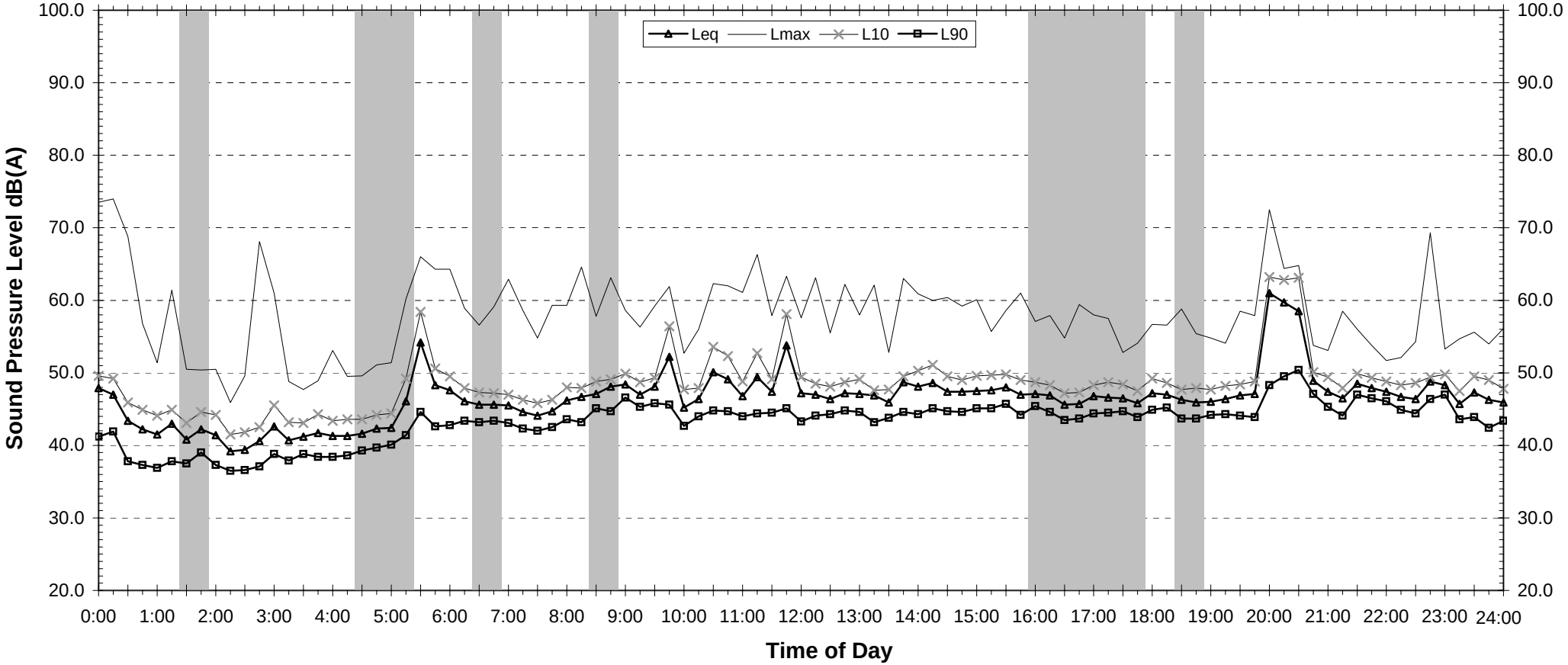
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	51.1	47.8
$L_{eq\ 1hr}$ upper 10 percentile	56.2	53.6
$L_{eq\ 1hr}$ lower 10 percentile	46.1	43.2

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	68.1	to	74.0
Lmax - Leq (Range)	17.1	to	29.9

EXISTING AMBIENT NOISE LEVELS
Location M3 - Open Paddock, Black Hill
Wednesday, 19 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	44.1	41.1
Leq (see note 3)	-	54.0	47.4

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.

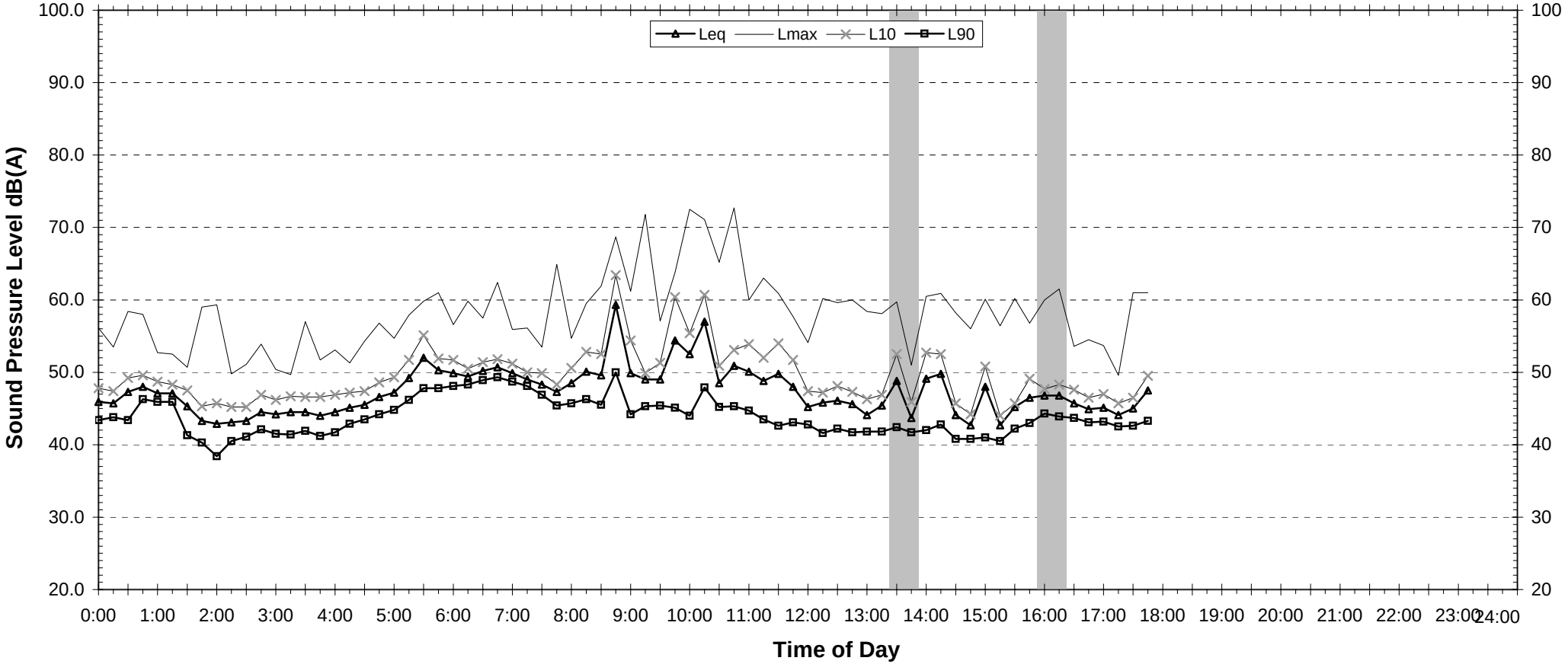
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	53.2	49.9
$L_{eq\ 1hr}$ upper 10 percentile	58.6	53.0
$L_{eq\ 1hr}$ lower 10 percentile	48.2	46.3

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	69.3	to	69.3
Lmax - Leq (Range)	21.6	to	21.6

EXISTING AMBIENT NOISE LEVELS
Location M3 - Open Paddock, Black Hill
Thursday, 20 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	41.0	-	-
Leq (see note 3)	50.0	-	-

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 ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	52.5	-
$L_{eq\ 1hr}$ upper 10 percentile	56.9	-
$L_{eq\ 1hr}$ lower 10 percentile	47.6	-

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