REPORT 30-1399-R1
Revision 0

M7 Business Hub
Noise and Vibration Assessment

Prepared for

Macquarie Goodman Management
c/o BDO Property Pty Limited
GPO Box 2551
Sydney NSW 2001

30 March 2005

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M7 Business Hub
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Reference	Status	Date	Prepared	Checked	Authorised
30-1399-R1	Revision 0	30 March 2005	John Cotterill	Katie Noakes	John Cotterill

EXECUTIVE SUMMARY

This report presents the results and findings of a noise and vibration assessment, carried out by Richard Heggie Associates, into the management of industrial noise and vibration for the proposed development of the M7 Business Hub on land at Eastern Creek.

Noise Emission Limits

The M7 Business Hub is situated on land that is zoned industrial and is a part of a larger area of land that has been released for employment purposes (note: the final precinct plan for this land has yet to be approved). The aim of this assessment is to define a methodology to equitably distribute noise within the M7 Business Hub and adjacent employment land, whilst protecting the noise environment of the residential areas to the north, south and west of the area. To this aim noise emission limits were established for seven industrial zones, approximately based on land holding, for the entire area. The noise emission limits were calculated and optimised for each zone based on residential received amenity levels. A summary of the L_{Aeq} noise emission limits is contained in the **Table E1**.

Table E1 Noise Emission Goals (L_{Aeq}) at Nearest Effected Residential Location

Period	Zone 1	Zone 2	Zone 3	Zone 4	M7 Business Hub	Zone 6	Zone 7
Day	57 dBA	57 dBA	54 dBA	56 dBA	54 dBA	49 dBA	52 dBA
Evening	47 dBA	47 dBA	44 dBA	46 dBA	44 dBA	39 dBA	42 dBA
Night	42 dBA	42 dBA	40 dBA	40 dBA	39 dBA	34 dBA	37 dBA

Although it may appear that noise restrictions at Zone 6 are overly stringent this is not the case. Due to the relative distance of Zone 6 from residential areas it contributes significantly less to the total noise from the industrial estate at the residences. Hence, it is possible for Zone 6 to actually be louder because of its minor contribution to overall noise levels.

Analysis of Potential Impacts

Operational Noise

A computer model was used to predict representative noise emissions from the future development of the Eastern Creek site. Illustrative L_{Aeq} noise contributions were predicted at three representative residential locations in both Minchinbury, Erskine Park and at a representative residential location in Horsley Park, off Burley Road. It was assumed that three heavy industrial operations would operate during each period in Zones 1 to 4 and Zone 7. These hypothetical heavy industries are intended to represent a worst case scenario as this type of development is unlikely to predominate at the Eastern Creek site. Due to the relative size of M7 Business Hub and Zone 6, and their relative distance from nearest affected residences, it was assumed that six heavy industries would operate in each of these zones. Noise modelling was conducted for calm conditions and under a temperature inversion.

A summary of the predicted noise contributions from each zone at selected locations are given in **Table E2** for calm conditions and **Table E3** under a temperature inversion.

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Table E2 Predicted L_{Aeq} Noise Contribution, Heavy Industrial Applications - Calm Conditions

Location		Predicted Noise Levels (dBA)								Acceptable Amenity Limit		
		Zone							Total Noise Contribution	Day	Evening	Night
		1	2	3	4	M7 Hub	6	7				
Erskine Park	1	22	21	< 20	< 20	< 20	< 20	30	31	55	45	40
	2	30	22	< 20	< 20	< 20	21	33	35	55	45	40
	3	36	25	< 20	< 20	< 20	< 20	28	37	60	50	45
Minchinbury	4	< 20	37	41	44	< 20	23	22	46	60	50	45
	5	< 20	38	40	25	< 20	21	< 20	42	60	50	45
	6	35	39	23	< 20	< 20	< 20	22	41	60	50	45
Horsley Park	7	< 20	< 20	< 20	< 20	35	25	< 20	35	55	45	40

Table E3 Predicted L_{Aeq} Noise Contribution, Heavy Industrial Applications - Temperature Inversion

Location		Predicted Noise Levels (dBA)								Acceptable Amenity Limit
		Zone							Total Noise Contribution	Night
		1	2	3	4	M7 Hub	6	7		
Erskine Park	1	30	29	25	< 20	< 20	32	35	39	40
	2	36	31	25	< 20	21	28	38	41	40
	3	39	31	25	24	< 20	26	34	41	45
Minchinbury	4	27	41	45	46	30	32	31	49	45
	5	25	40	43	34	25	26	22	45	45
	6	43	43	27	27	< 20	21	28	46	45
Horsley Park	7	< 20	24	25	25	40	34	25	41	40

Predicted noise levels from a hypothetical industrial development on the Eastern Creek site show that noise levels experienced in the neighbouring residential areas from the cumulative impact of noise from all seven industrial zones comply with the INP amenity criteria for daytime and evening periods.

At night, during calm weather conditions, it is predicted that minor exceedances will occur at residents at the eastern end of Minchinbury. At night during winter, when temperature inversions are likely to occur, exceedances of up to 4 dBA at Minchinbury and 1 dBA at Erskine Park and Horsley Park are predicted to occur assuming 27 heavy industries operate simultaneously at high output during this time. These exceedances would be rare in reality as it is unlikely that the extent of heavy industrial operation assumed in the noise model would occur at the site and particularly would not occur during the night-time period.

EXECUTIVE SUMMARY

Vibration

It is envisaged that there will be no significant impact, with respect to vibration, on the nearest residential locations due to the nature of the industries likely to be attracted to such a development and the distance to the nearest residential locations.

Conclusion

The optimised noise level goals contained in **Table** E1 for each of the seven zones will ensure the equitable distribution of noise between the M7 Business Hub and the adjacent proposed employment land. These zone limits will provide adequate protection of the noise amenity of residential areas surrounding the proposed development at Eastern Creek without unduly restricting the operation of industries within each zone.

Based on the hypothetical analysis contained in this assessment it is concluded that a future industrial area on the Eastern Creek site will have a limited noise and vibration impact on the surrounding residential areas.

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1 INTRODUCTION

Richard Heggie Associates (Heggies) has been commissioned by Macquarie Goodman Management to conduct a noise and vibration assessment for the proposed development of the M7 Business Hub at Eastern Creek. The main objective of the study was to determine a noise management strategy for the proposed development of land within the M7 Business Hub and adjacent proposed employment land at Eastern Creek. This strategy will support a background planning document for a Development Application (DA) that will be lodged under SEPP 34. The management strategy will involve the equitable sharing of noise from the industrial development whilst protecting the acoustic amenity of neighbouring residential areas.

The noise assessment has been prepared in general accordance with Australian Standard AS 1055-1997 "*Description and Measurement of Environmental Noise*" Parts 1, 2 and 3 and with reference to the NSW Industrial Noise Policy (INP).

2 SITE DETAILS

The residential suburb of Erskine Park is located west of the M7 Business Hub. Immediately to the north is located a parcel of land that is zoned as suitable for development as employment land. The M4 Motorway is further north of the site with the residential suburb of Minchinbury to the immediate north of the M4. Wallgrove Road borders the site to the east. A Sydney West Substation, further industrial areas and scattered residential properties are located to the south of the site.

The nearest potentially affected receivers are residents located in Erskine Park to the west, Minchinbury to the north and residences off Burley Road, Horsley Park to the south. See Location Map in **Appendix A** for details.

3 PROCEDURES AND METHODOLOGY

Seven industrial "zones" were established for the proposed development area based upon a conceptual road network and approximate land ownership areas for the site. The zone locations are given in **Appendix A**.

To determine the noise emission goals for the seven zones a hypothetical industrial development was considered to operate in each zone. To obtain a representative indication of likely noise levels from the development the following assumptions were made during the noise modelling and impact analysis.

Ambient noise levels at residential locations in Minchinbury and Erskine Park are dominated by road traffic noise from the M4 and Erskine Park Road with no significant contribution from existing industrial operations. Austral Brick Company Pty Ltd currently conducts operations in Horsley Park and contributes to ambient noise levels at residences in this suburb. However, Austral operates during the daytime only and contributed L_{eq} levels at residential locations in this area are not high enough to affect the amenity criteria.

Three heavy industrial operations would operate during each period in Zones 1 to 4 and Zone 7. Due to the relative size of M7 Business Hub Zone and Zone 6 it was assumed that six heavy industries would operate in each of these zones.

Each potential industry on site would employ best management practice (BMP) and best available technology economically achievable (BETEA) principles in relation to noise.

The proposal is for the planned industries to operate predominantly 24 hours a day, seven days a week. This will include goods receival and despatch as well as operational activities.

A moderate temperature inversion has been assumed to occur at the site at night during winter with a strength of $3^{o}C$ per 100 m.

All industries will operate simultaneously at high output during each period.

4 EXISTING ACOUSTICAL ENVIRONMENT

4.1 Background Noise Survey

Background noise levels were monitored by Heggies at selected locations surrounding the site. The objective of the background monitoring survey was to measure $L_{A90(15minute)}$ and $L_{Aeq(15minute)}$ noise levels at the nearest potentially affected receivers during day, evening and night-time periods to enable the determination of existing industrial noise contribution.

Background noise levels were monitored at three separate locations. Details of monitoring locations are given in **Table 1**.

Table 1 Background Monitoring Locations

Location	Details
NM1	North-eastern boundary of Wonderland theme park adjacent to Minchinbury Reservoir
NM2	Residence: 49 Fantail Crescent, Erskine Park
NM3	Residence: 30 Barossa Drive, Minchinbury

Background noise levels were monitored at Locations 1 and 2 from Wednesday 11 June 2003 to Wednesday 18 June 2003, inclusive and at Location 3 from Monday 7 July 2003 to Monday 14 July 2003, inclusive.

ARL Type EL215 environmental noise loggers were used to monitor the ambient noise levels at each location**.** The noise loggers was programmed to record statistical noise level indices continuously in 15 minute intervals, including the L_{Amax}, L_{A1}, L_{A10}, L_{A50}, L_{A90}, L_{A99}, L_{Amin} and the L_{Aeq}.

Weather data for the survey periods was obtained from the Bureau of Meteorology station at Horsley Park. Noise data during periods of any rainfall and/or wind speed in excess of 5 m/s (approximately 9 knots) were discarded in accordance with INP data exclusion. A summary of the results of the background surveys is given in **Table 2** (see **Appendix B** for details).

Noise monitoring conducted at NM2 was affected by a pool pump operating in the resident's back yard between the hours of 5.00 am - 7.00 am and 5.00 pm - 7.00 pm. The affected data was excluded from the results and did not significantly affect background noise levels recorded at the residence.

Results of monitoring conducted for Austral Bricks Company Pty Ltd by Atkins Acoustics and Associates Pty Ltd contained in report "*Noise Impact Assessment Extraction/Rehabilitation Austral Vineyard Site Horsley Park*" July 2003 was used to determine background noise levels and industrial contributions at Horsley Park.

Table 2 Summary of Existing Ambient Background Noise Levels

Location	Description	Background Noise Level L_{A90} Rating Background Level (RBL)	Existing Industrial Contribution L_{Aeq}
NM1 (Wonderland boundary)	Daytime	43 dBA	N/A
	Evening	42 dBA	N/A
	Night	40 dBA	N/A
NM2 (Fantail Crescent Erskine Park)	Daytime	37 dBA	< 49 dBA
	Evening	39 dBA	< 39 dBA
	Night	33 dBA	< 34 dBA
NM3 (Barossa Drive Minchinbury)	Daytime	47 dBA	< 54 dBA
	Evening	48 dBA	< 44 dBA
	Night	41 dBA	< 39 dBA
NM4 (Burley Road Horsley Park)	Daytime	42 dBA	39 dBA (predicted)
	Evening	43 dBA	< 44 dBA
	Night	41 dBA	< 39 dBA

Note: Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am.
On Sundays and Public Holidays, Daytime 8.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 8.00 am.

The L_{A90} represents the level exceeded for 90% of the interval period and is referred to as the average minimum or background noise level.

L_{Aeq} - The equivalent continuous noise level is defined as the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

4.2 Operator Attended Noise Monitoring

Operator attended noise measurements were conducted during the daytime period at each monitoring location and other surrounding areas to gain a greater appreciation of the existing acoustical environment. The results of the operator attended noise measurements are given in **Table 3**. Ambient noise levels given in the table include all noise sources such as traffic, insects, birds, as well as any other industrial operations.

Table 3 Operator attended noise monitoring

Location Date/Start Time Weather	Measurement Description	Primary Noise Descriptor (dBA re 20 µPa)					Description of Noise Emission and Typical Maximum Levels L_{Amax} - dBA
		L_{Amax}	L_{A1}	L_{A10}	L_{A90}	L_{Aeq}	
NM1 11/06/03 1100 Day W = Still Temp = 16°C	Ambient	66	54	49	44	48	Traffic noise dominant 44-46 Some impact noise from Wonderland 48-49 Birds up to 53
200m from Pioneer boundary 11/06/03 1145 Day W = still Temp=20°C	Ambient	59	57	54	50	53	Truck 56 General Industrial 52
Cnr Cetus Pl/ Weaver St Erskine Park 11/06/03 1435 Day W = 1 m/s Temp = 20°C	Ambient	-	52	46	37	43	Birds to 45 Traffic on M4 to 41 Dog barking to 52 Reversing beeper from NE 38-40 Light aircraft 43
NM2 11/06/03 1415 Day W = 1 m/s Temp = 19°C	Ambient	-	63	53	42	53	Wind in trees to 43 M4 traffic, constant 41 Dog barking to 52 Helicopter overhead to 47 Resident opens gate to 61
Cnr Swamphen St/ Warbler St 11/06/03 1455 Day W = 1 m/s Temp = 16°C	Ambient	-	66	60	51	56	Traffic (mainly Erskine Park Road) 54-56 Local traffic to 67 Birds to 52
NM3 11/06/03 1300 Day W = Still Temp = 21°C	Ambient	-	64	43	37	50	Traffic on M4 to 42 Baby next door to 41 Birds to 39 Local traffic to 46 Industry noise not discernible
4 Booth Place 11/06/03 1315 Day W = Still Temp = 20°C	Ambient	-	45	42	39	41	Local traffic to 47 Traffic on M4 to 43 Birds to 41 Neighbour working on car to 41

5 EFFECTS OF METEOROLOGY ON NOISE LEVELS

Wind

Wind has the potential to increase noise at a receiver when it is light and stable and blows from the direction of the source of the noise. As the strength of the wind increases the noise produced by the wind will obscure noise from most industrial and transport sources.

Wind effects need to be considered when wind is a feature of the area under consideration. Where wind blows from the source to the receiver at speeds up to 3 m/s for more than 30% of the time in any season, then wind is considered to be a feature of the area and noise level predictions must be made under these conditions.

Weather data was obtained, for a period of 12 months, from a Bureau of Meteorology weather station located at Horsley Park. This data was analysed to determine the frequency of occurrence of winds up to speeds of 3 m/s for daytime, evening and night in each season. A summary of the most frequently occurring winds for each period is contained within **Table 4**, **Table 5** and

Table 6.

Table 4 Seasonal Frequency of Occurrence Wind Speed Intervals - Daytime

Period	Calm	Wind Direction	0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Summer	1.6%	NNW	2.6%	5.3%	7.9%
Autumn	13.3%	N	6.1%	7.0%	13.2%
		SSW	5.9%	7.3%	13.2%
Winter	20.4%	NNW	7.8%	6.7%	14.5%
Spring	0.5%	NNW	1.7%	6.8%	8.5%

Table 5 Seasonal Frequency of Occurrence Wind Speed Intervals - Evening

Period	Calm	Wind Direction	0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Summer	1.1%	E	1.0%	7.4%	8.4%
Autumn	26.2%	S	7.1%	10.0%	17.1%
Winter	20.6%	WSW	11.0%	8.5%	19.5%
Spring	5.5%	NE	4.0%	7.6%	11.5%

Table 6 Seasonal Frequency of Occurrence Wind Speed Intervals - Night

Period	Calm	Wind Direction	0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Summer	16.4%	SSW	6.3%	17.0%	23.3%
Autumn	41.4%	SW	8.8%	16.6%	25.3%
Winter	48.2%	WSW	9.9%	9.4%	19.2%
Spring	17.6%	WSW	8.7%	14.1%	22.8%

Seasonal wind records indicate that winds of up to 3 m/s are not a feature of the area, as the frequency of such wind is below the 30% threshold. Modelling under prevailing wind was therefore not conducted as part of this investigation.

Temperature Inversion

Temperature inversions, when they occur, have the ability to increase noise levels by focusing sound waves. Temperature inversions occur predominantly at night during the winter months. For a temperature inversion to be a significant characteristic of the area it needs to occur for approximately 30% of the total night-time during winter, or about 2 nights per week.

The proposal is for the planned industries to operate predominantly 24 hours a day, seven days a week. This will include goods receival and despatch as well as operational activities. Inversion data was not available for the proposed site therefore the worst case has been assumed. Hence, temperature inversion during the night-time period has been considered as part of this report.

6 OPERATIONAL NOISE MODELLING

6.1 Methodology

A computer model was used to predict representative noise emissions from the future development of the Eastern Creek site. The Environmental Noise Model (ENM) used has been produced in conjunction with the EPA. A map giving all relevant topographic information was digitised. The model used this map, together with noise source data, ground cover, shielding by barriers and/or adjacent buildings and atmospheric information to predict noise levels.

Weather conditions under which noise level predictions were made are given in **Table 7**.

Table 7 Weather conditions for noise predictions

	Temperature	Humidity	Wind speed	Wind direction	Temperature gradient
Calm	20°C	65%	N/A	N/A	N/A
Temperature Inversion	10°C	90%	N/A	N/A	3°C/100m

The sound power levels of items of plant and equipment used in the representative industry noise source are summarised in **Table 8**. Details of these sound power levels are given in **Appendix C**.

Table 8 Equipment Sound Power Levels

Equipment	Sound Power Levels
Heavy industry - Metal Fabrication	
Aluminium saw	107 dBA
60 tonne press	112 dBA
240 tonne press	114 dBA
Tube cutting	98 dBA
Guillotine	108 dBA
Lathe	102 dBA
Grinder	106 dBA
Forklift (x 2)	91 dBA each
Delivery Truck	107 dBA

The plant and equipment given in **Table 8** were assumed to operate within an industrial building with the exception of one forklift and a delivery truck which were assumed to operate in a location external to the building.

Illustrative L_{Aeq} noise contributions were predicted at three representative residential locations in both Minchinbury and Erskine Park (ie three residential locations in Minchinbury and three residential locations in Erskine Park) and at a representative residential location in Horsley Park, off Burley Road (see **Appendix A)**.

6.2 Noise Emission Goals

In order to protect the existing occupants of residential land from the adverse effects of noise from proposed industrial sources on the M7 Business Hub and proposed employment lands at Eastern Creek the intrusive and amenity impacts of noise need to be addressed.

To allow for the assessment of the cumulative impact of several industrial sources in the one area the INP sets amenity noise criteria, which set a cap for the cumulative noise from industry, based on land use and associated activities. The amenity criteria relate only to industrial noise and do not include road, rail or community noise. An extract from the INP that relates to the amenity criteria for residential and active recreation areas is given in **Table 9**.

The acoustical environment adjacent to the M4 typifies an urban environment, with heavy and continuous traffic flows, and residences near industrial districts. Therefore, the residences in Minchinbury and the northern-most residences of Erskine Park have been assessed under the “urban” receiver type. Other residential receivers in Erskine Park and Horsley Park have been assessed under the “suburban” receiver type.

Table 9 Amenity Criteria - Recommended L_{Aeq} Noise Levels from Industrial Noise Sources

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended L_{Aeq} Noise Level (dBA)	
			Acceptable	Recommended Maximum
Residence	Rural	Day	50	55
		Evening	45	50
		Night	40	45
	Suburban	**Day**	**55**	**60**
		Evening	**45**	**50**
		Night	**40**	**45**
	Urban	**Day**	**60**	**65**
		Evening	**50**	**55**
		Night	**45**	**50**
	Urban/Industrial Interface (for existing situations only)	Day	65	70
		Evening	55	60
		Night	50	55

Results from attended surveys conducted at potentially affected residential locations in the vicinity of the proposed development indicate that the existing L_{Aeq} at residences in Minchinbury and Erskine Park are dominated by significant continuous traffic noise with negligible contribution from existing industry. The contribution of Austral Brick P/L at the Horsley Park residence has been predicted to be less than 6 dBA below acceptable amenity criterion. Therefore, the amenity levels in **Table 9** will apply without modification, as specified in the INP.

In assessing intrusiveness, the background noise needs to be measured. The intrusiveness criterion essentially means that the equivalent continuous noise level (L_{Aeq}) of the source should not be more than five (5) decibels above the measured background level (L_{A90}). Analysis of the acceptable amenity noise criteria in relation to measured background noise levels indicate that the amenity levels would be the controlling criteria when formulating noise emission limits for evening and night operations. During the daytime period the amenity levels for some zones are above the intrusive criteria. However, when the M7 Business Hub and adjacent employment land at Eastern Creek are fully developed it is expected that the amenity levels would be the limiting criteria. The intrusive impact of individual industries would still need to be addressed at the time of each individual development.

Noise emission goals were calculated and optimised at each residential receiver, based on residential amenity levels, using predicted noise contributions from each zone. The optimised emission goal for each zone is given in **Table 10**.

Table 10 Noise Emission Goals (L_{Aeq}) at Nearest Effected Residential Location

Period	Zone 1	Zone 2	Zone 3	Zone 4	M7 Business Hub	Zone 6	Zone 7
Day	57 dBA	57 dBA	54 dBA	56 dBA	54 dBA	49 dBA	52 dBA
Evening	47 dBA	47 dBA	44 dBA	46 dBA	44 dBA	39 dBA	42 dBA
Night	42 dBA	42 dBA	40 dBA	40 dBA	39 dBA	34 dBA	37 dBA

6.3 Assessment of Noise Impacts

As previously stated, illustrative L_{Aeq} noise contributions were predicted at three representative residential locations in both Minchinbury and Erskine Park and at a representative residential location in Horsley Park, off Burley Road. It was assumed that three heavy industrial operations would operate during each period in Zones 1 to 4 and Zone 7. Due to the relative size of the M7 Business Hub and Zone 6 it was assumed that six heavy industries would operate in each of these zones.

The predicted L_{Aeq} noise contribution at the selected locations is given in **Table 11** for calm weather conditions.

Table 12 contains predictions under temperature inversion.

Table 11 Predicted L_{Aeq} Noise Contribution, Heavy Industrial Applications - Calm Conditions

Location		Predicted Noise Levels (dBA)								Acceptable Amenity Limit		
		Zone							Total Noise Contribution	Day	Evening	Night
		1	2	3	4	M7 Hub	6	7				
Erskine Park	1	22	21	< 20	< 20	< 20	< 20	30	31	55	45	40
	2	30	22	< 20	< 20	< 20	21	33	35	55	45	40
	3	36	25	< 20	< 20	< 20	< 20	28	37	60	50	45
Minchinbury	4	< 20	37	41	44	< 20	23	22	46	60	50	45
	5	< 20	38	40	25	< 20	21	< 20	42	60	50	45
	6	35	39	23	< 20	< 20	< 20	22	41	60	50	45
Horsley Park	7	< 20	< 20	< 20	< 20	35	25	< 20	35	55	45	40

Table 12 Predicted L_{Aeq} Noise Contribution, Heavy Industrial Applications - Temperature Inversion

Location		Predicted Noise Levels (dBA)								Acceptable Amenity Limit
		Zone							Total Noise Contribution	Night
		1	2	3	4	M7 Hub	6	7		
Erskine Park	1	30	29	25	< 20	< 20	32	35	**39**	40
	2	36	31	25	< 20	21	28	38	**41**	40
	3	39	31	25	24	< 20	26	34	**41**	45
Minchinbury	4	27	41	45	46	30	32	31	**49**	45
	5	25	40	43	34	25	26	22	**45**	45
	6	43	43	27	27	< 20	21	28	**46**	45
Horsley Park	7	< 20	24	25	25	40	34	25	**41**	40

Predicted noise levels given in **Table 11** and

Table 12 for a hypothetical industrial development at the M7 Business Hub and on the proposed employment land at Eastern Creek show that noise levels experienced in the neighbouring residential areas from the cumulative impact of noise from all seven industrial zones comply with the INP amenity criteria for daytime and evening periods.

At night, during calm weather conditions, it is predicted that minor exceedances will occur at residents at the eastern end of Minchinbury. At night during winter, when temperature inversions are likely to occur, exceedances of up to 4 dBA at Minchinbury and 1 dBA at Erskine Park and Horsley Park are predicted to occur assuming 27 heavy industries operate simultaneously at high output during this time. These exceedances would be rare in reality as it is unlikely that this magnitude of industrial operation would occur during the night-time period.

7 VIBRATION ASSESSMENT

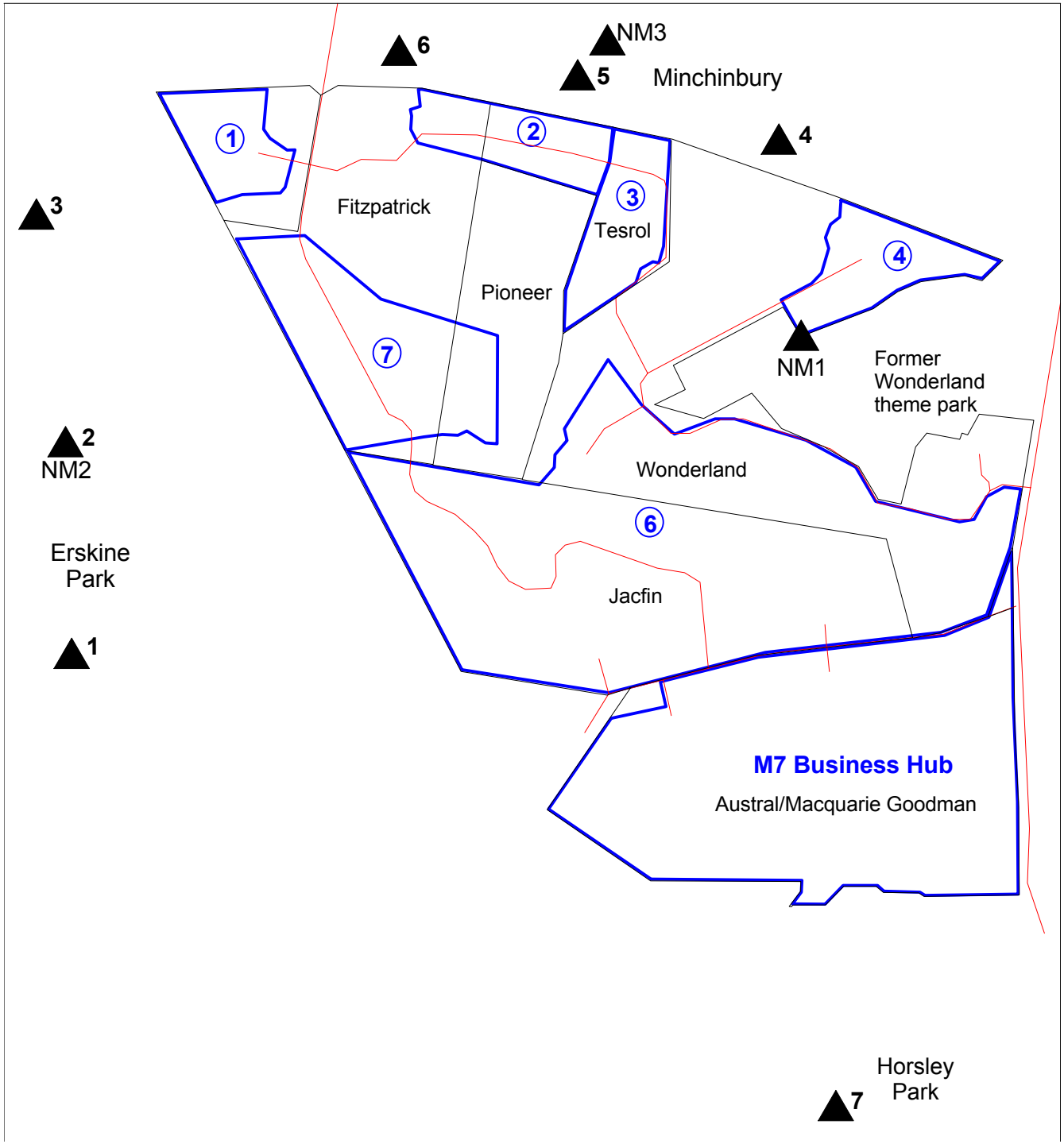
Industries likely to be attracted to the M7 Business Hub will typically consist of warehousing and/or light industrial developments. Heggies has considerable experience in the assessment of vibration impacts from such developments.

From previous assessments of such developments, it is envisaged that there will be no significant impact, with respect to vibration, on the nearest residential locations due to the nature of such industries and the distance to the nearest residential locations.

8 CONCLUSION

The optimised noise level goals contained in **Table 10** for the M7 Business Hub and the other proposed six zones will ensure the equitable distribution of noise within the entire proposed employment land. These zone limits will provide adequate protection of the noise amenity of residential areas surrounding the proposed employment land development at Eastern Creek without unduly restricting the operation of industries within each zone.

Based on the hypothetical analysis contained in this assessment it is concluded that a future M7 Business Hub area at Eastern Creek site will have a limited noise and vibration impact on the surrounding residential and recreational areas.



Appendix A

Heggies Report 30-1399

Site Location Map

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Ownership boundaries

Zone boundaries

Proposed/existing roads

Residential and
Noise Monitoring locations

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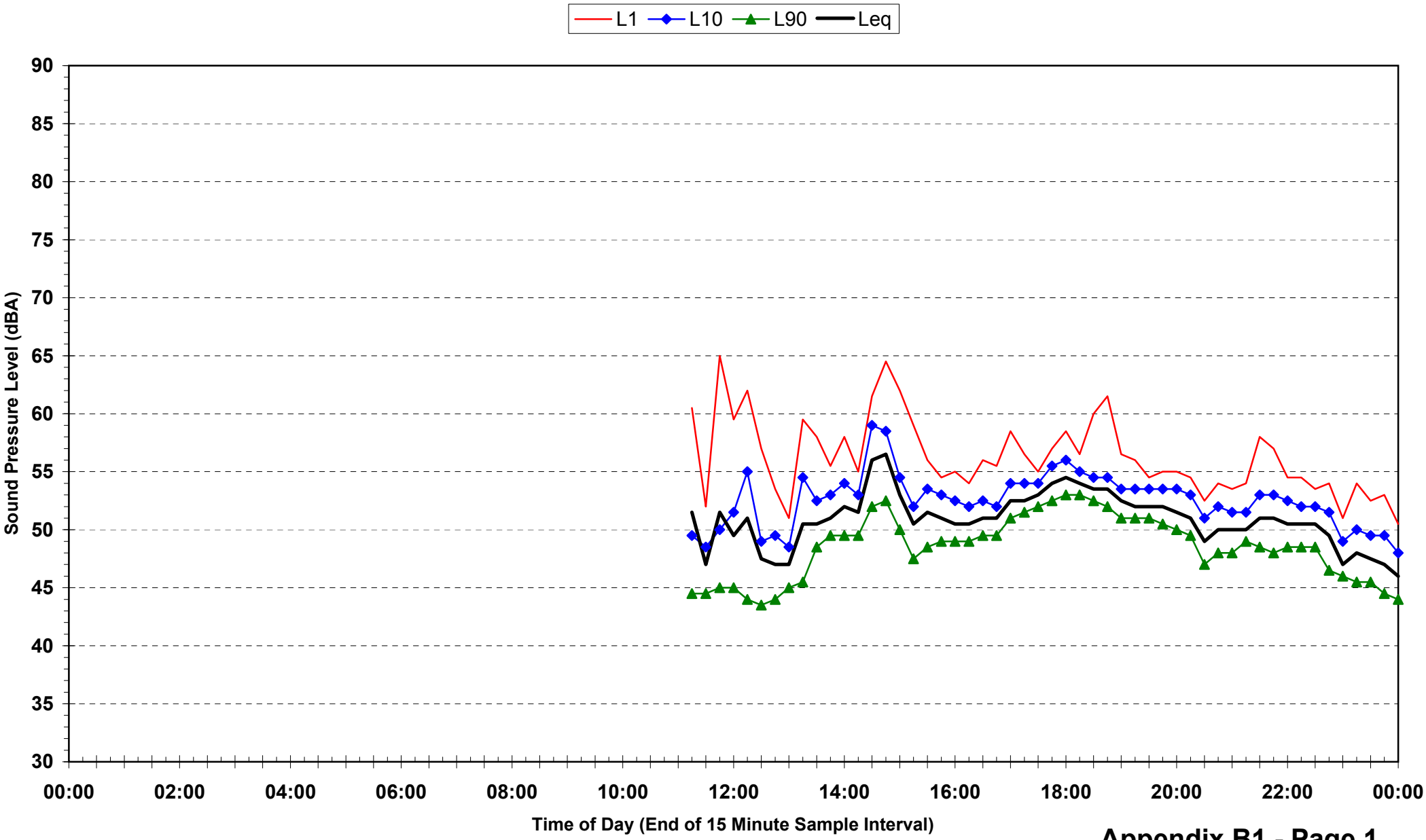
Statistical Ambient Noise Levels
Wonderland boundary - Wednesday 11 June 2003



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Statistical Noise Levels
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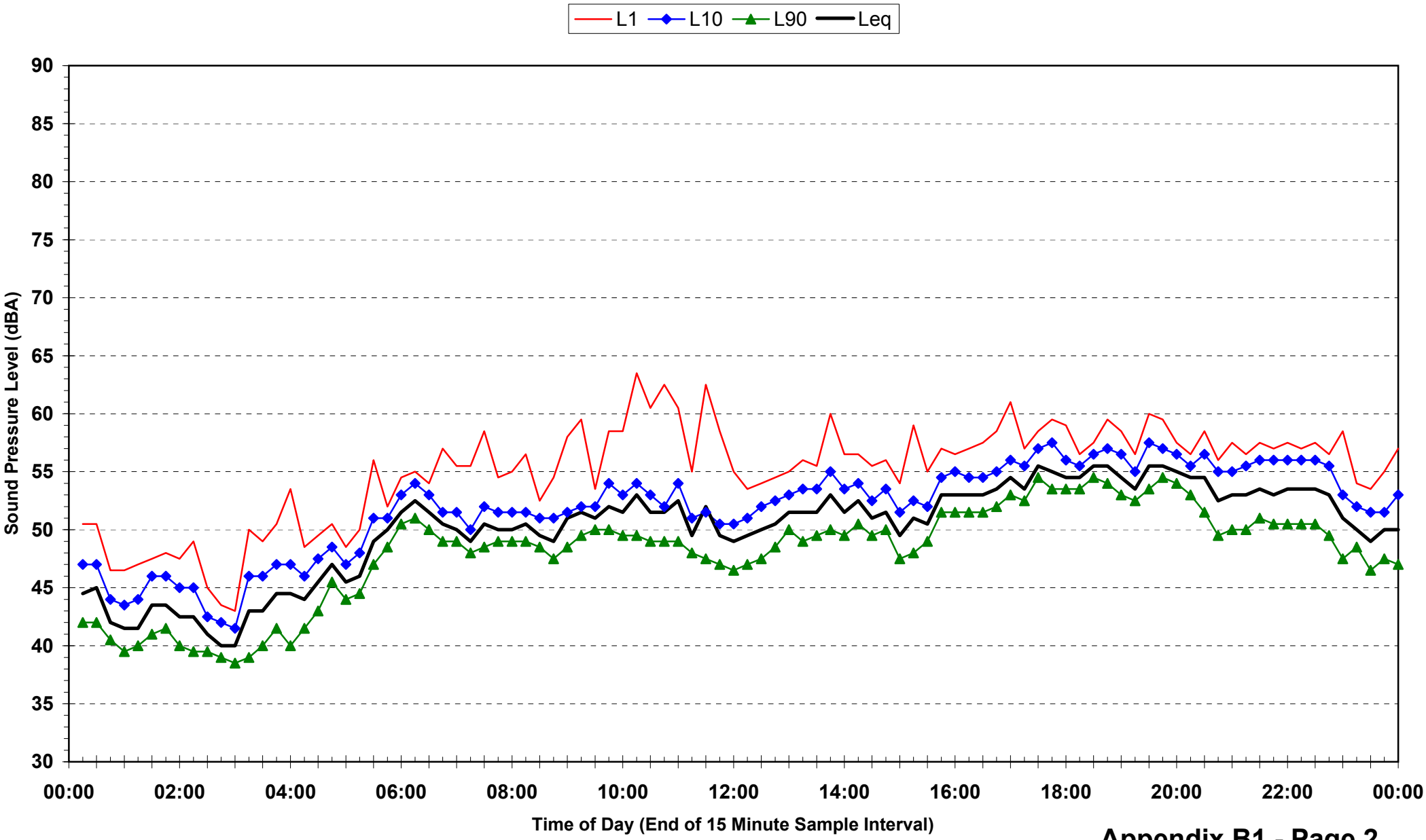
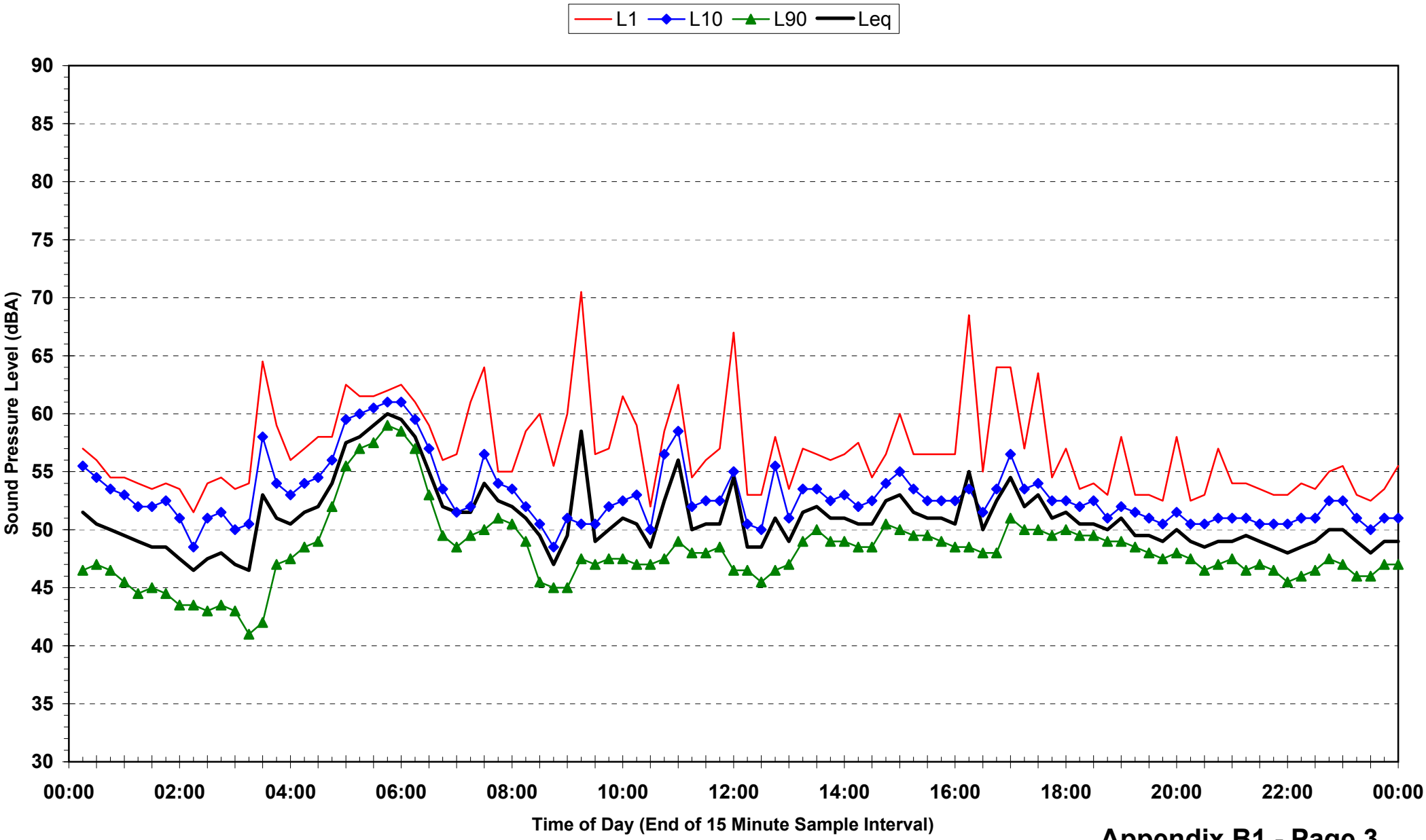
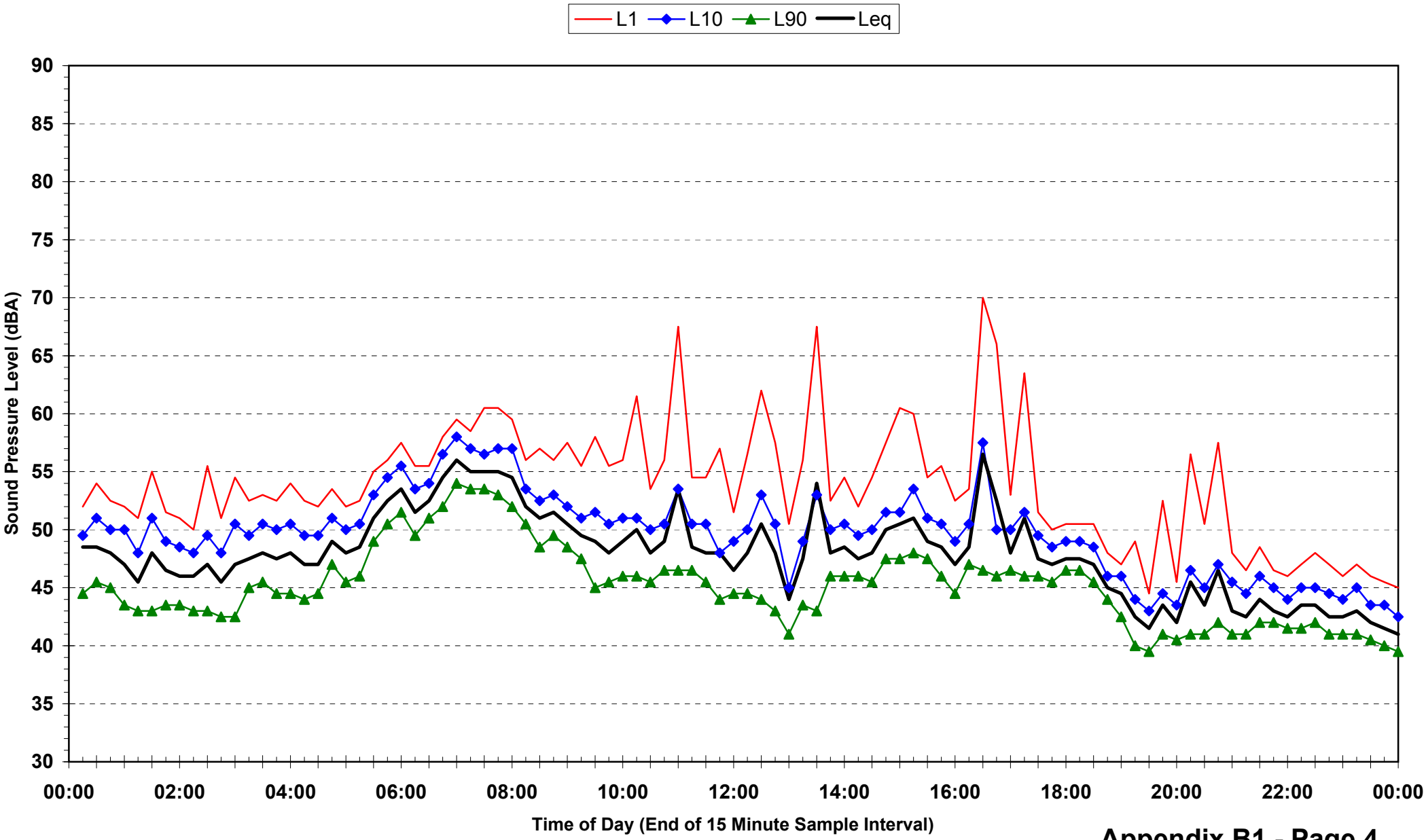
Statistical Ambient Noise Levels
Wonderland boundary - Thursday 12 June 2003



Statistical Ambient Noise Levels
Wonderland boundary - Friday 13 June 2003



Statistical Ambient Noise Levels
Wonderland boundary - Saturday 14 June 2003



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Statistical Noise Levels
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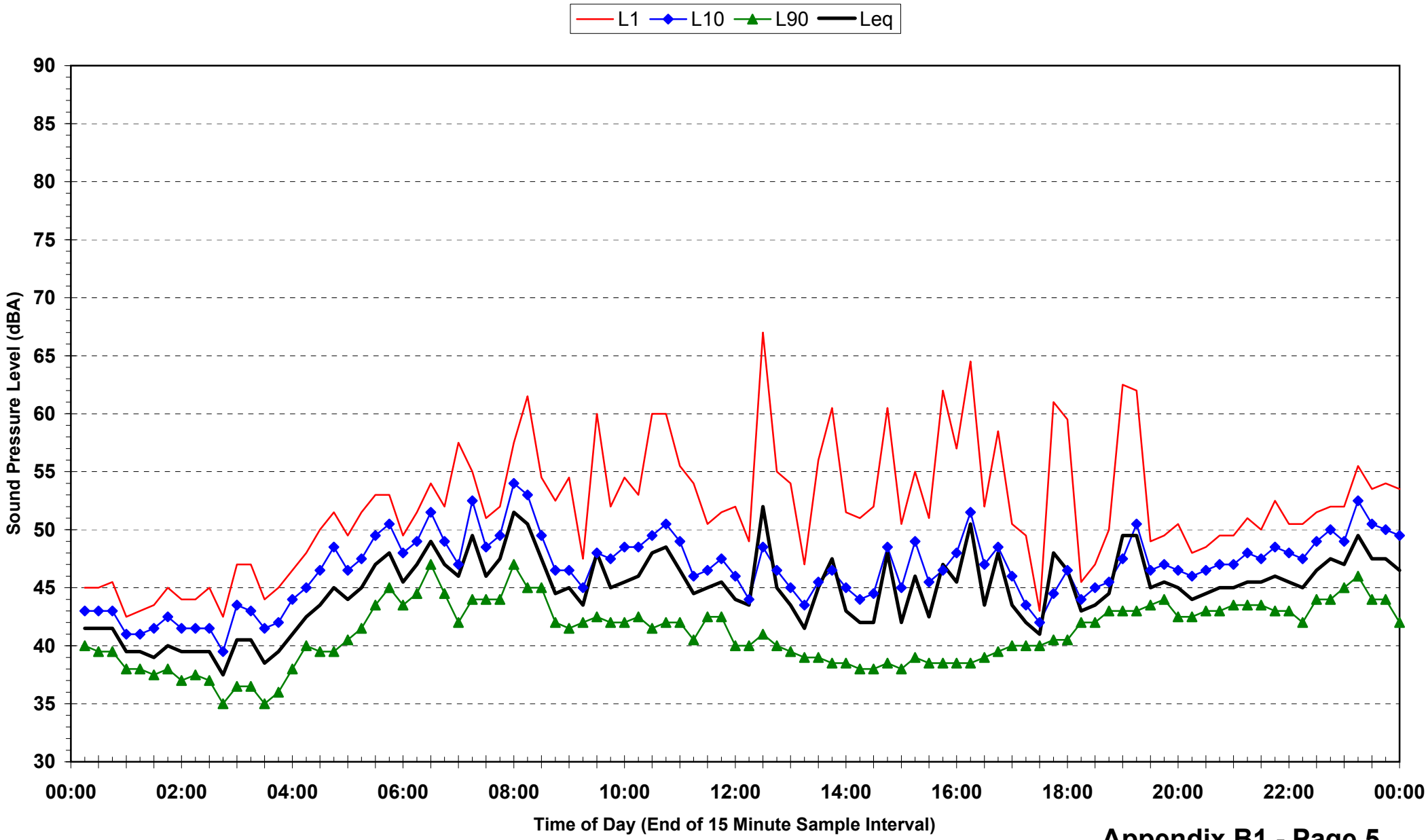
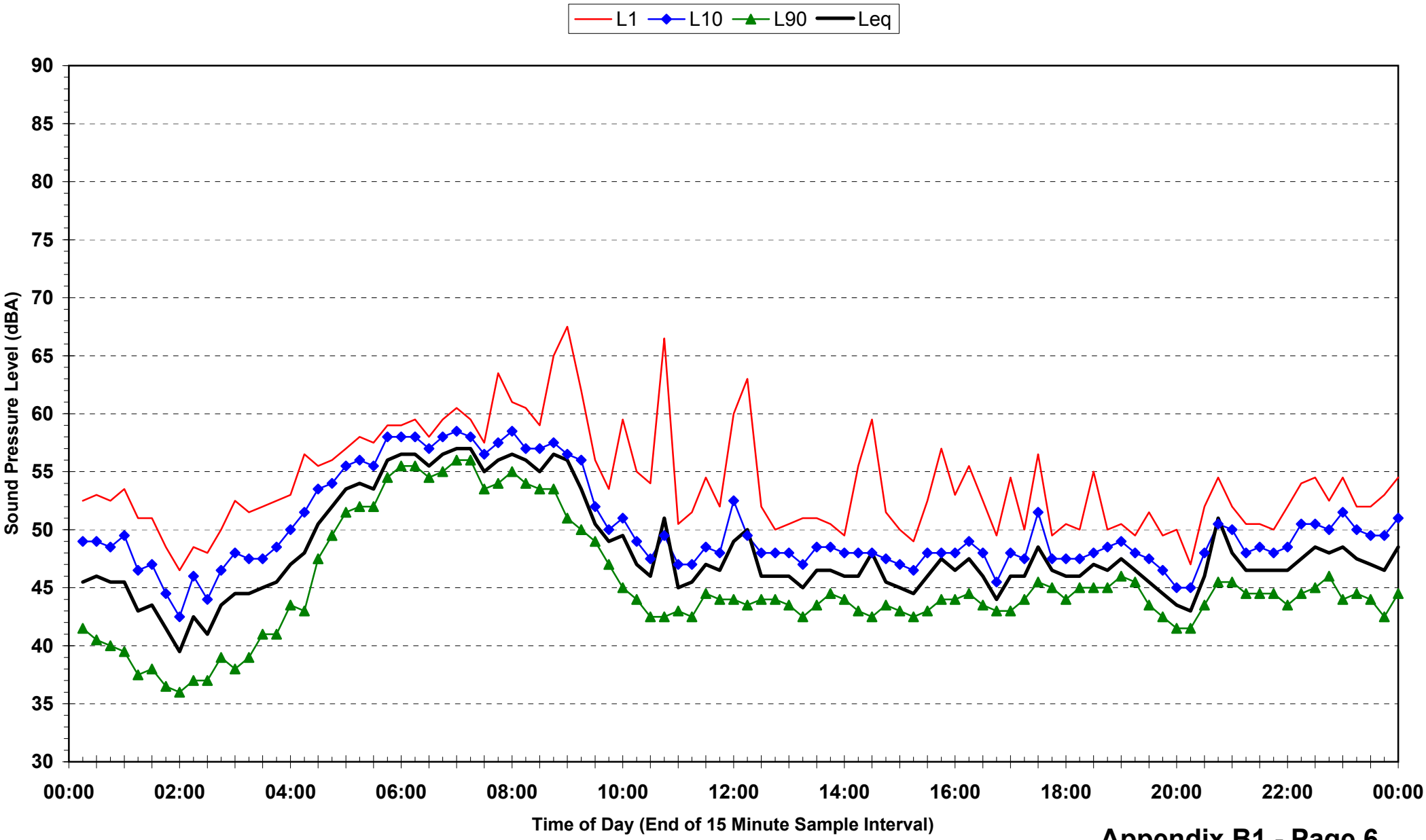
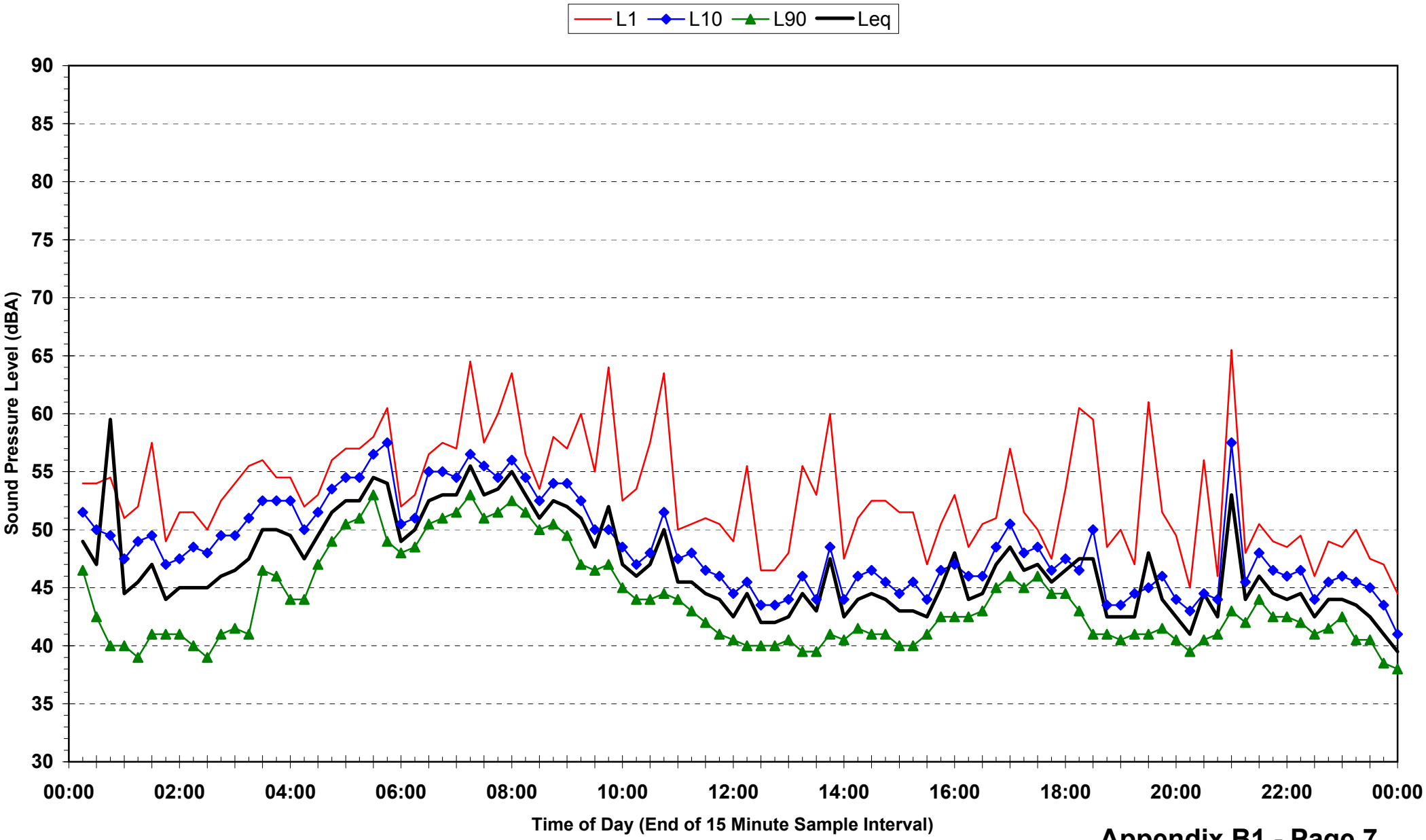
Statistical Ambient Noise Levels
Wonderland boundary - Sunday 15 June 2003



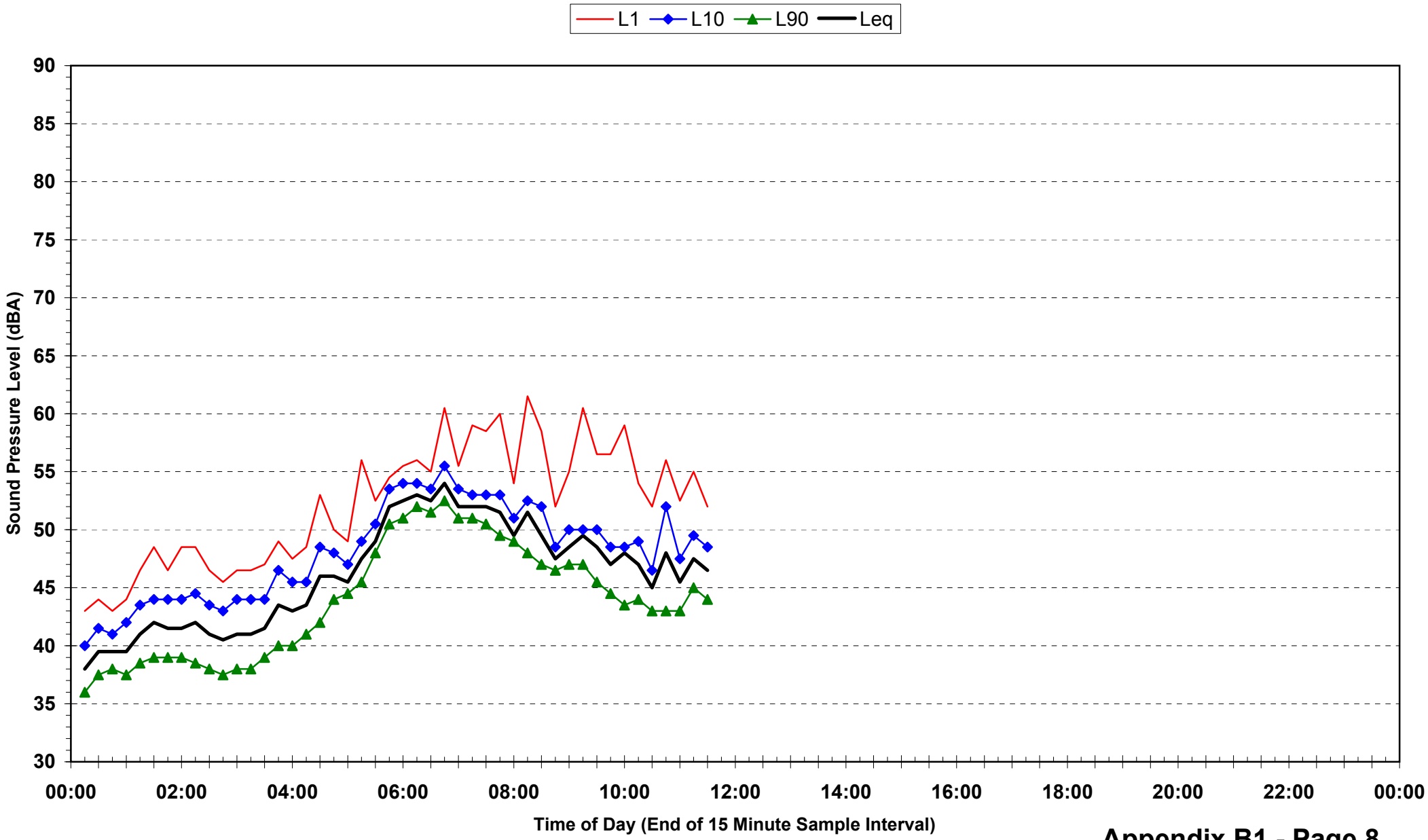
Statistical Ambient Noise Levels
Wonderland boundary - Monday 16 June 2003



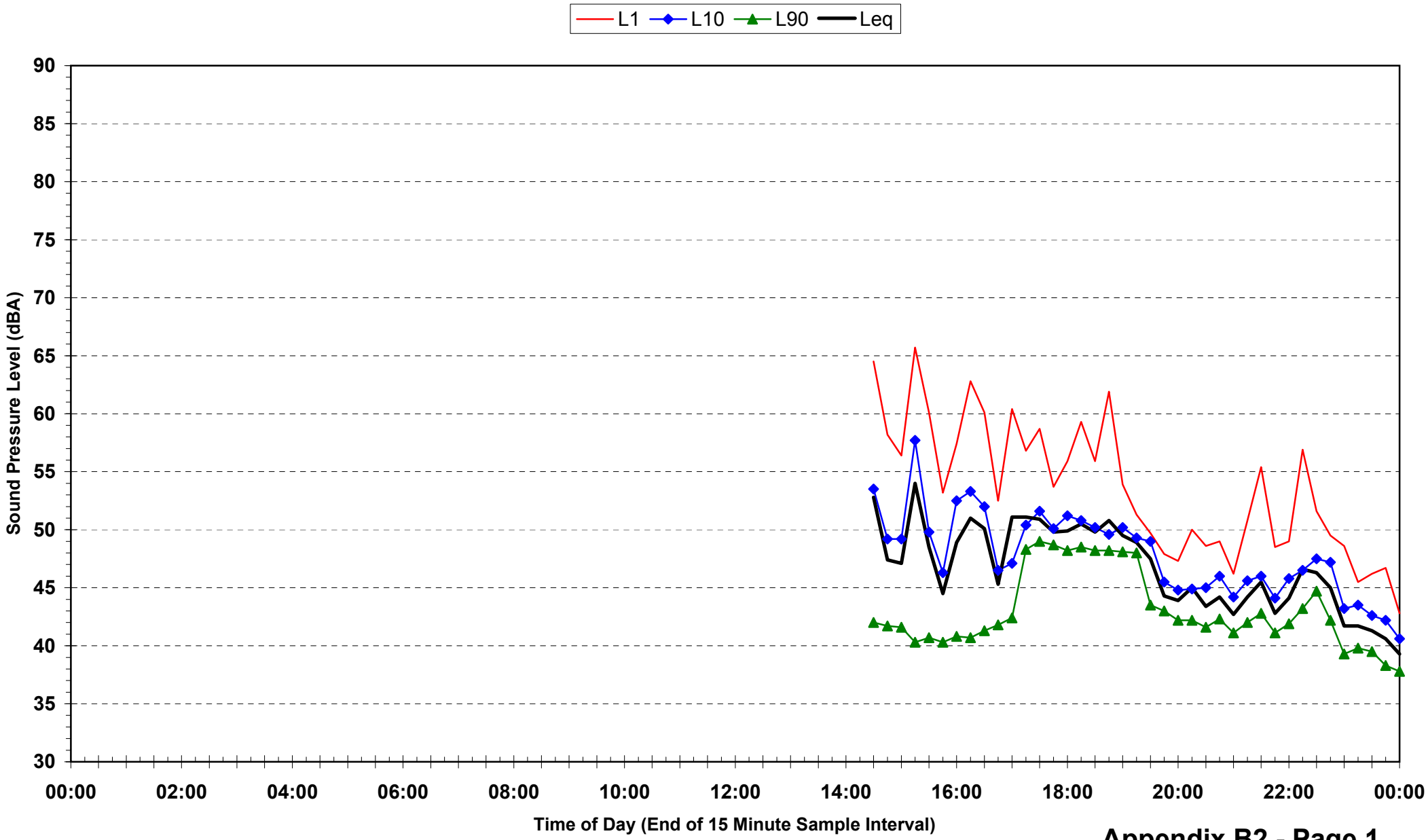
Statistical Ambient Noise Levels
Wonderland boundary - Tuesday 17 June 2003



Statistical Ambient Noise Levels
Wonderland boundary - Wednesday 18 June 2003



Statistical Ambient Noise Levels
49 Fantail Crescent, Erskine Park - Wednesday 11 June 2003



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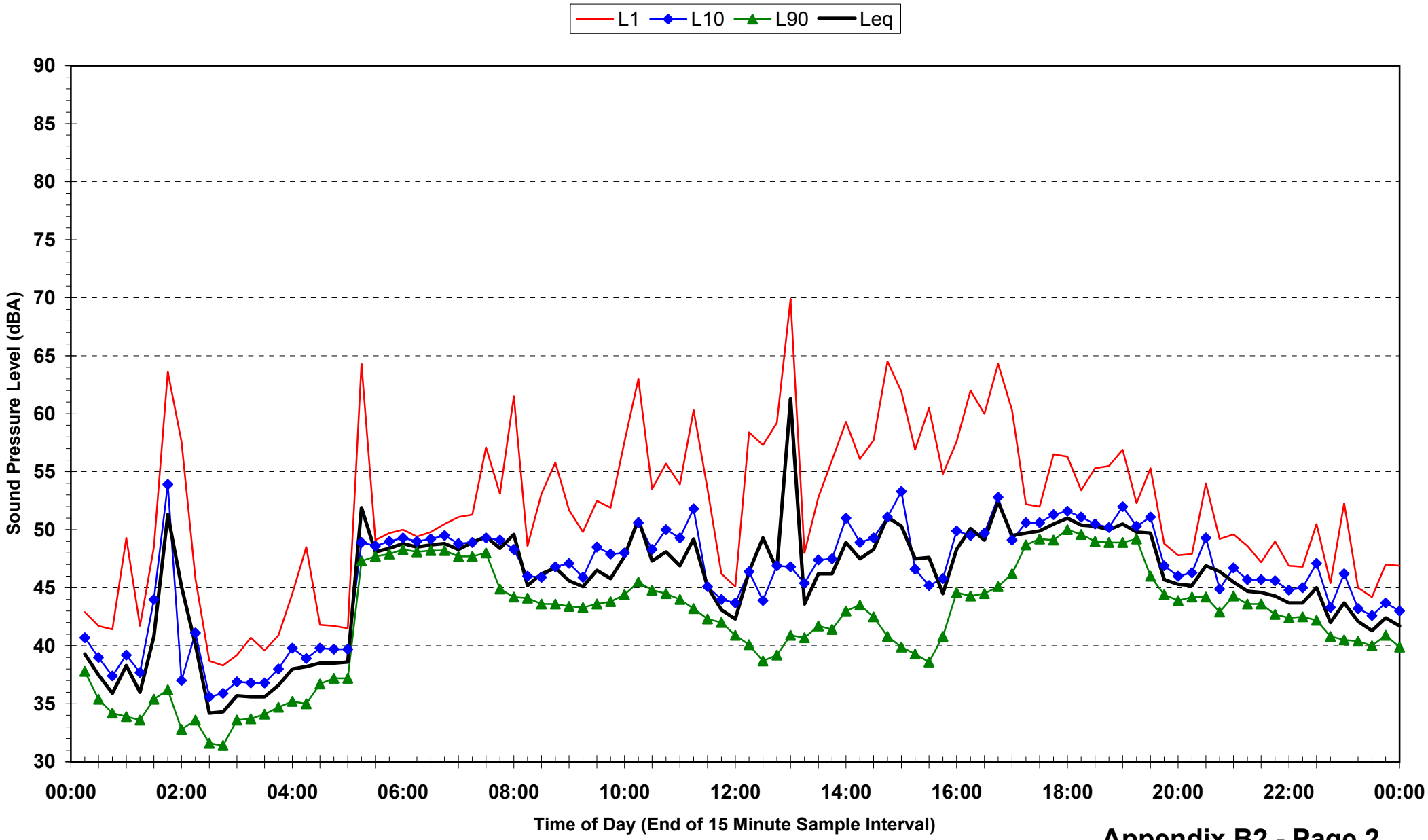
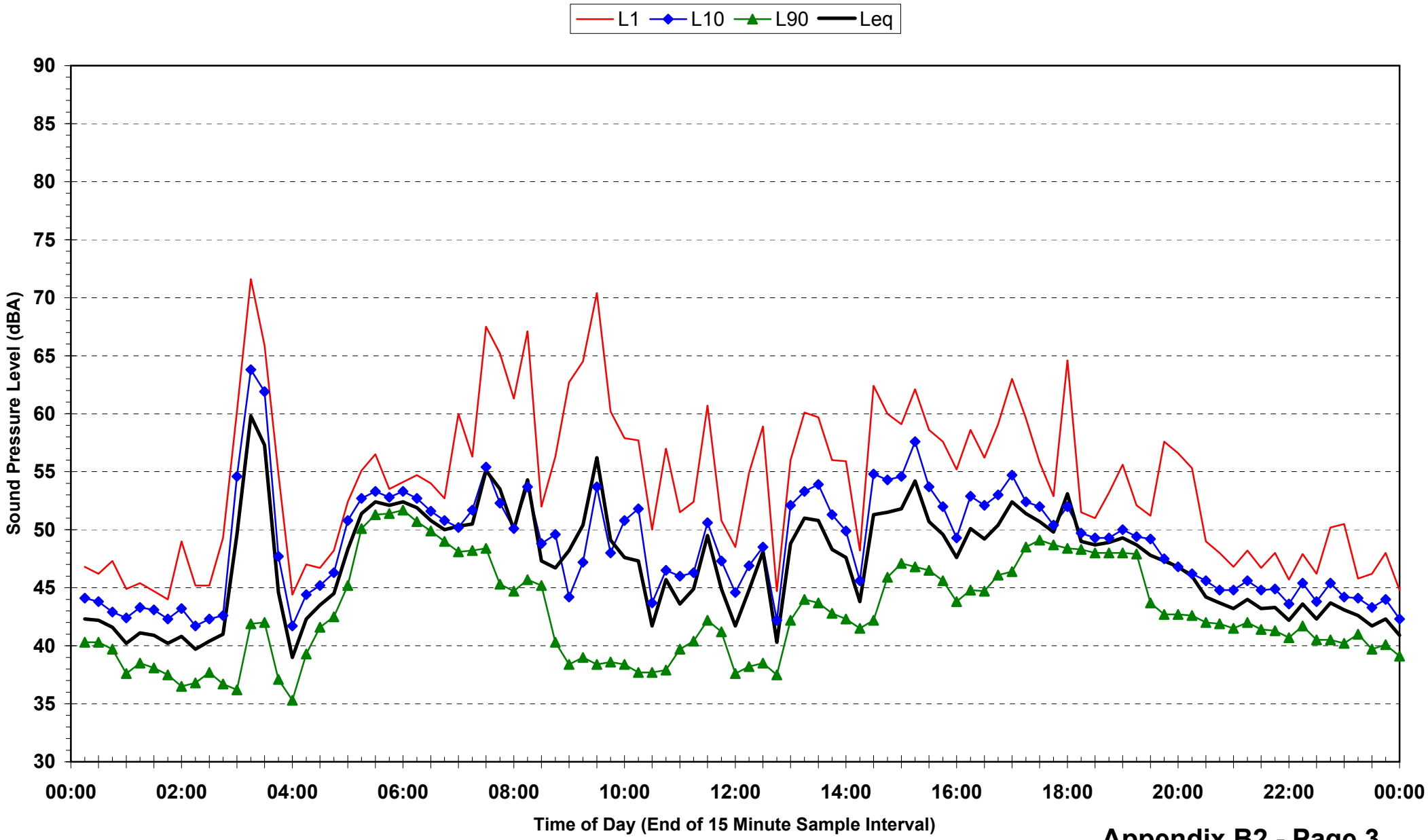
Statistical Noise Levels
RHA Report 30-1399

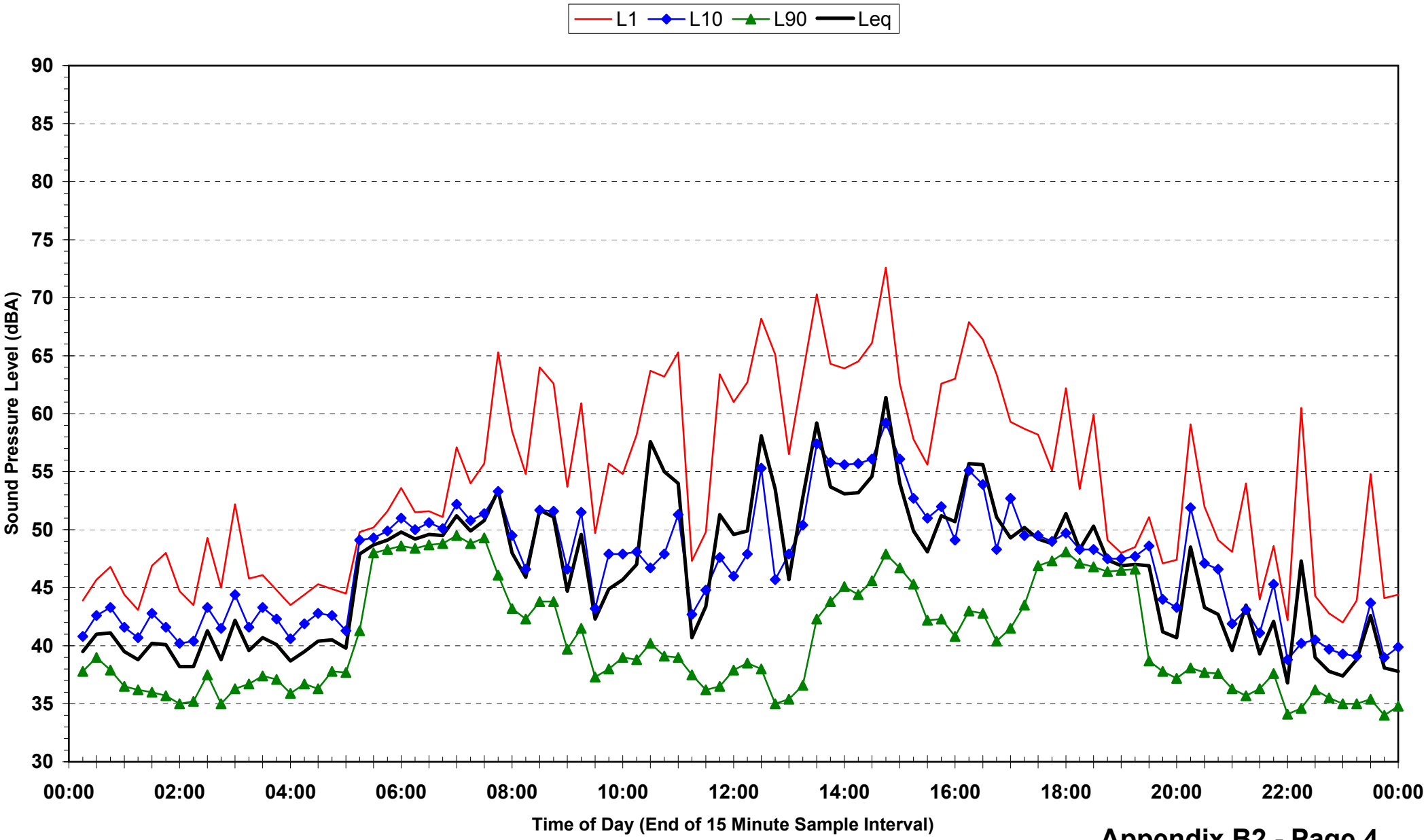
Statistical Ambient Noise Levels
49 Fantail Crescent, Erskine Park - Thursday 12 June 2003



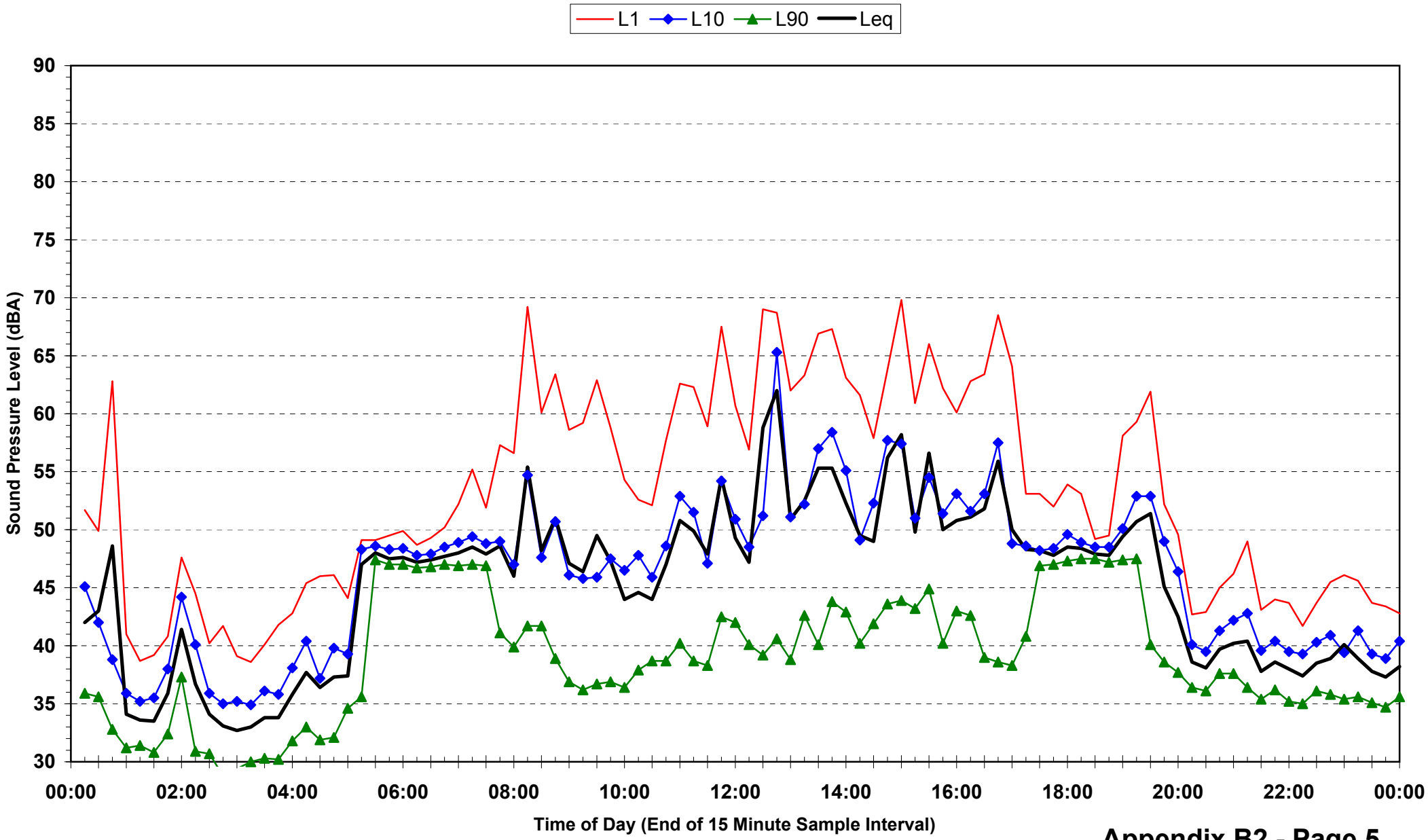
Statistical Ambient Noise Levels
49 Fantail Crescent, Erskine Park - Friday 13 June 2003



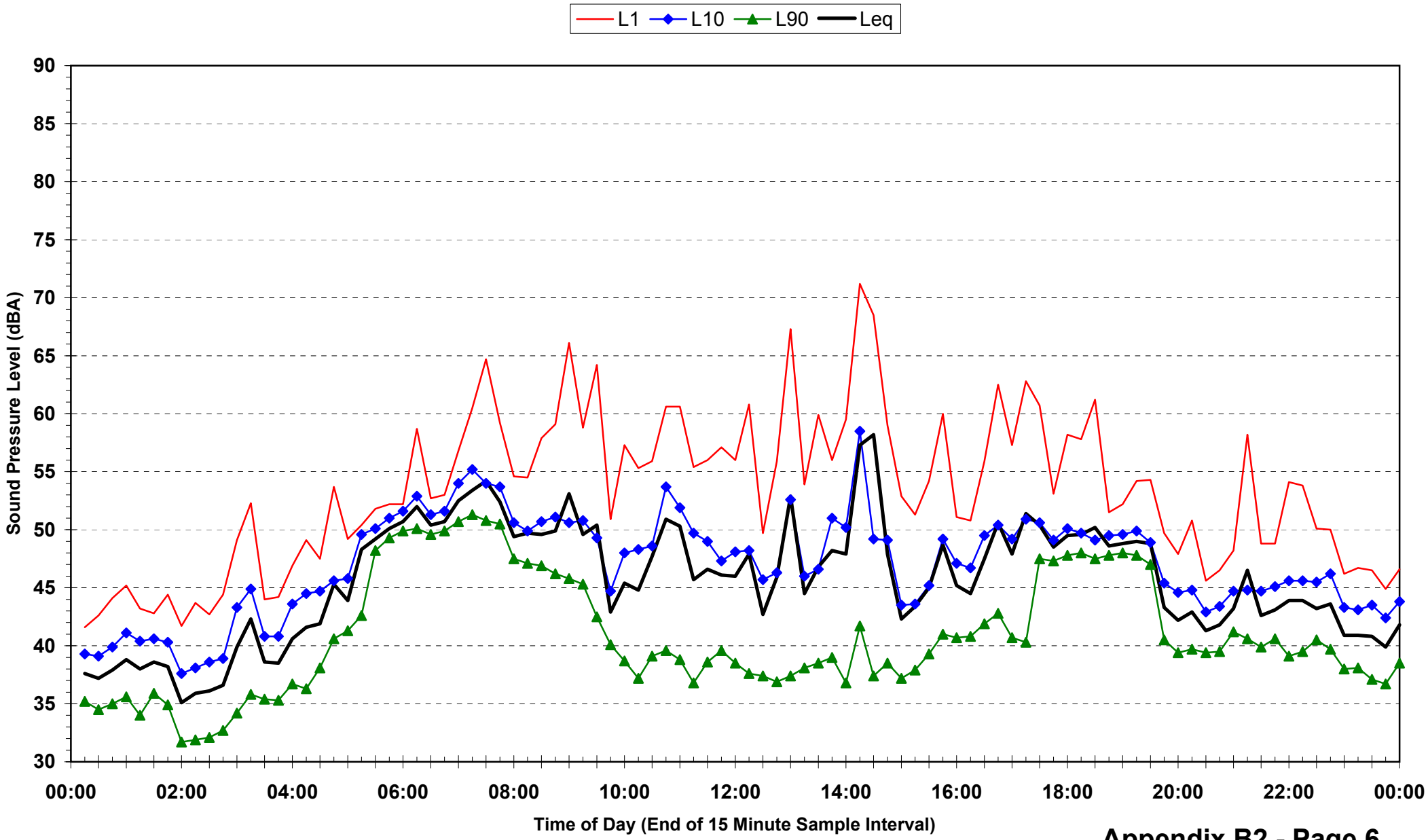
Statistical Ambient Noise Levels
49 Fantail Crescent, Erskine Park - Saturday 14 June 2003



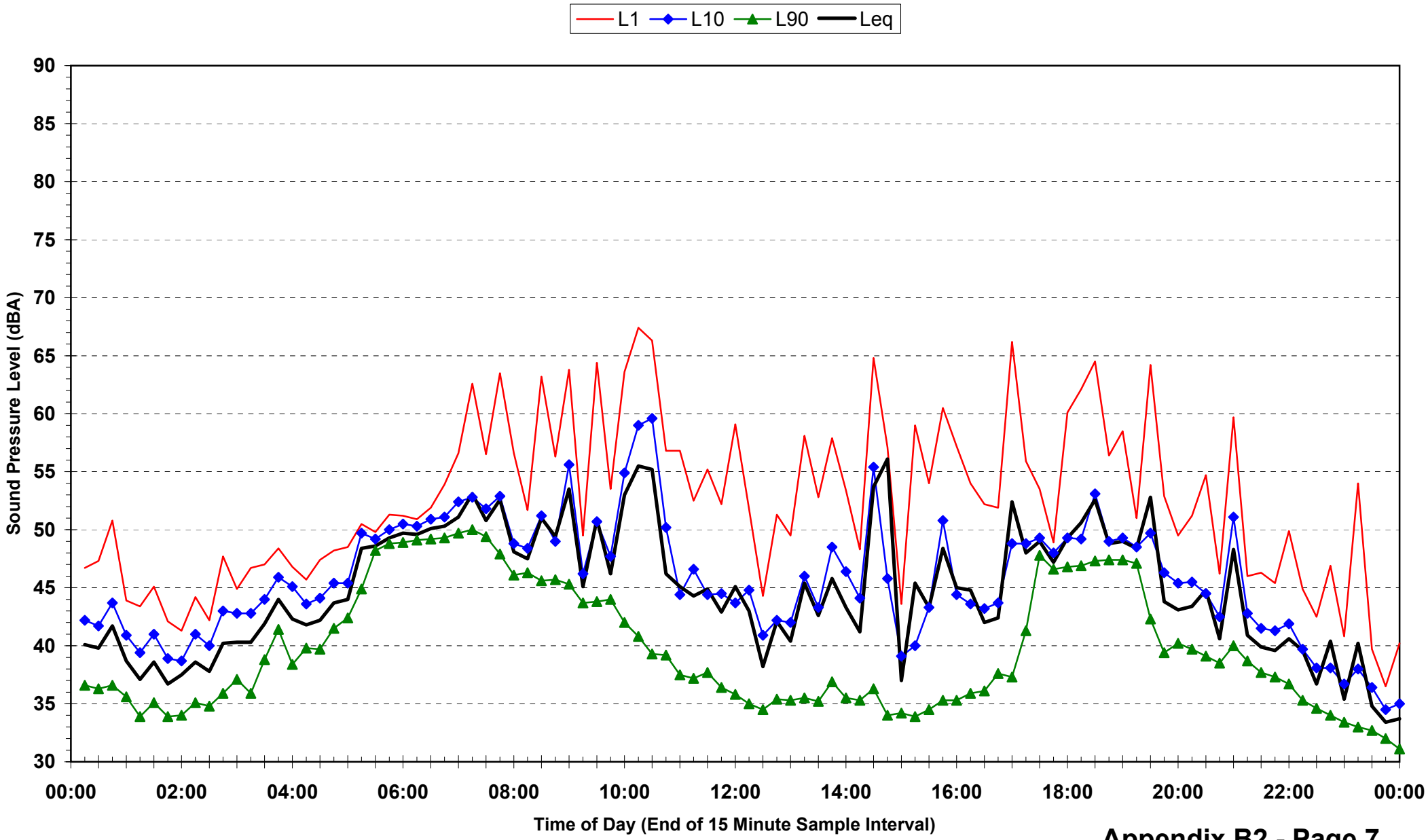
Statistical Ambient Noise Levels
49 Fantail Crescent, Erskine Park - Sunday 15 June 2003



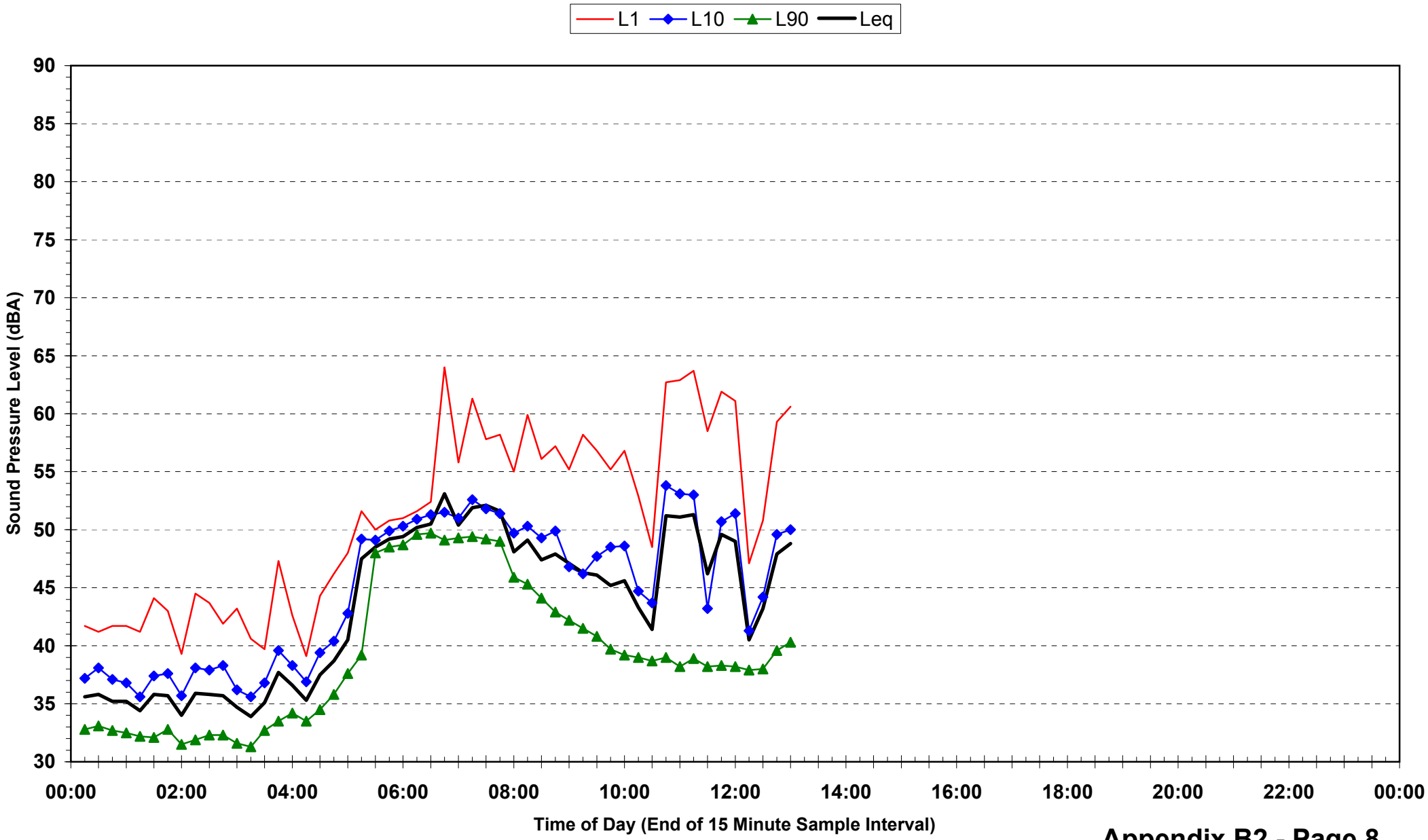
Statistical Ambient Noise Levels
49 Fantail Crescent, Erskine Park - Monday 16 June 2003



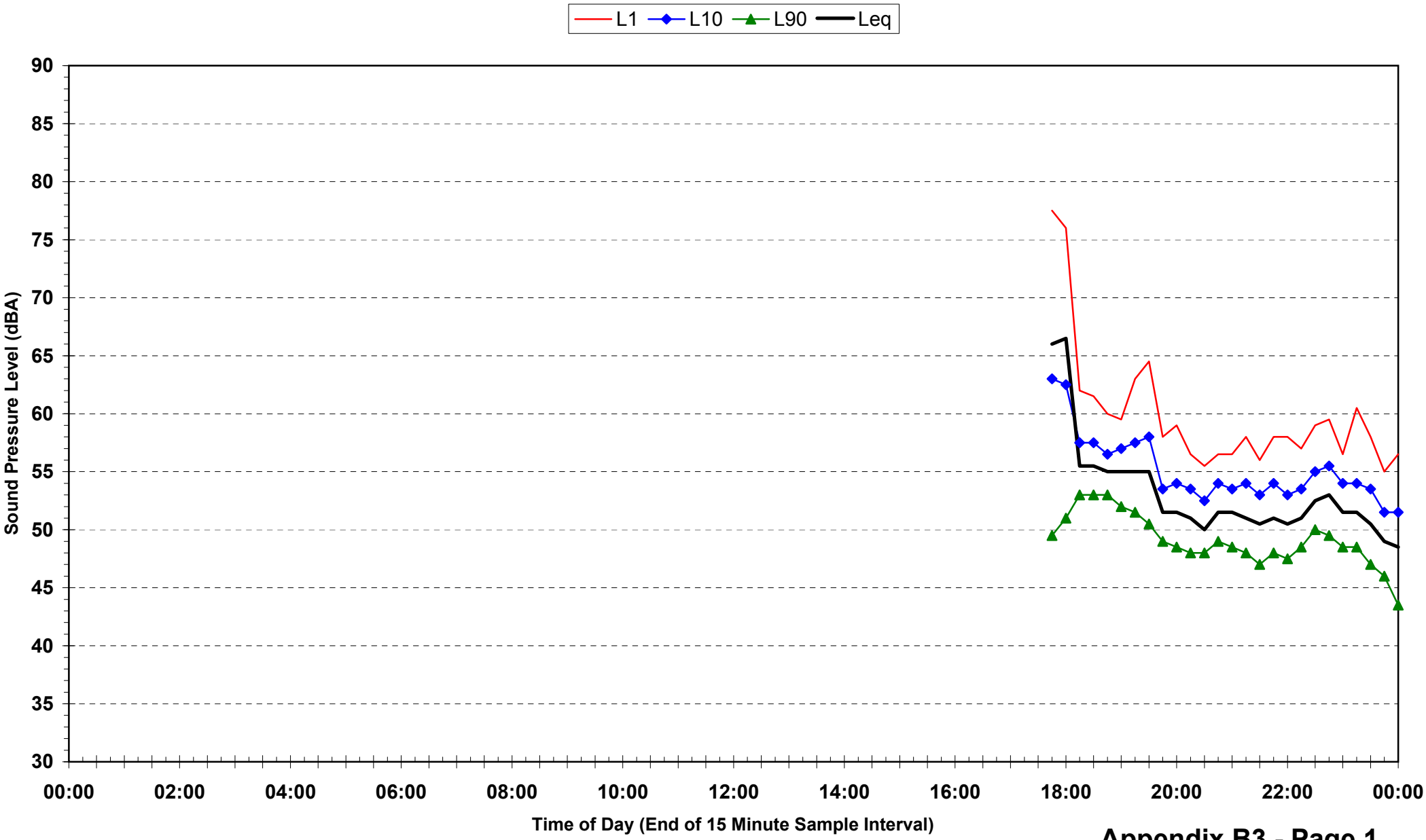
Statistical Ambient Noise Levels
49 Fantail Crescent, Erskine Park - Tuesday 17 June 2003



Statistical Ambient Noise Levels
49 Fantail Crescent, Erskine Park - Wednesday 18 June 2003



Statistical Ambient Noise Levels
30 Barossa Drive, Minchinbury - Monday 7 July 2003



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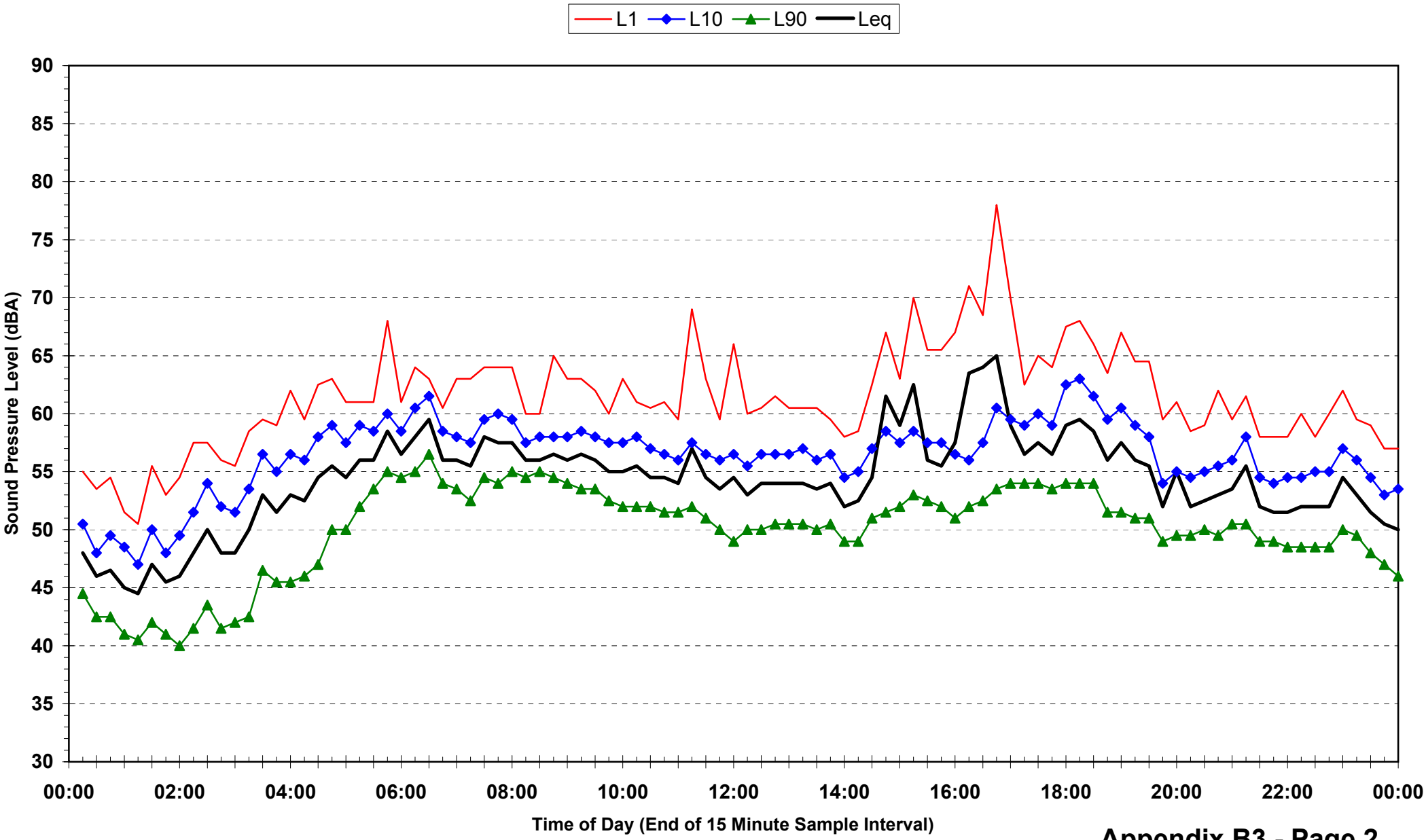
Statistical Noise Levels
RHA Report 30-1399

Statistical Ambient Noise Levels
30 Barossa Drive, Minchinbury - Tuesday 8 July 2003



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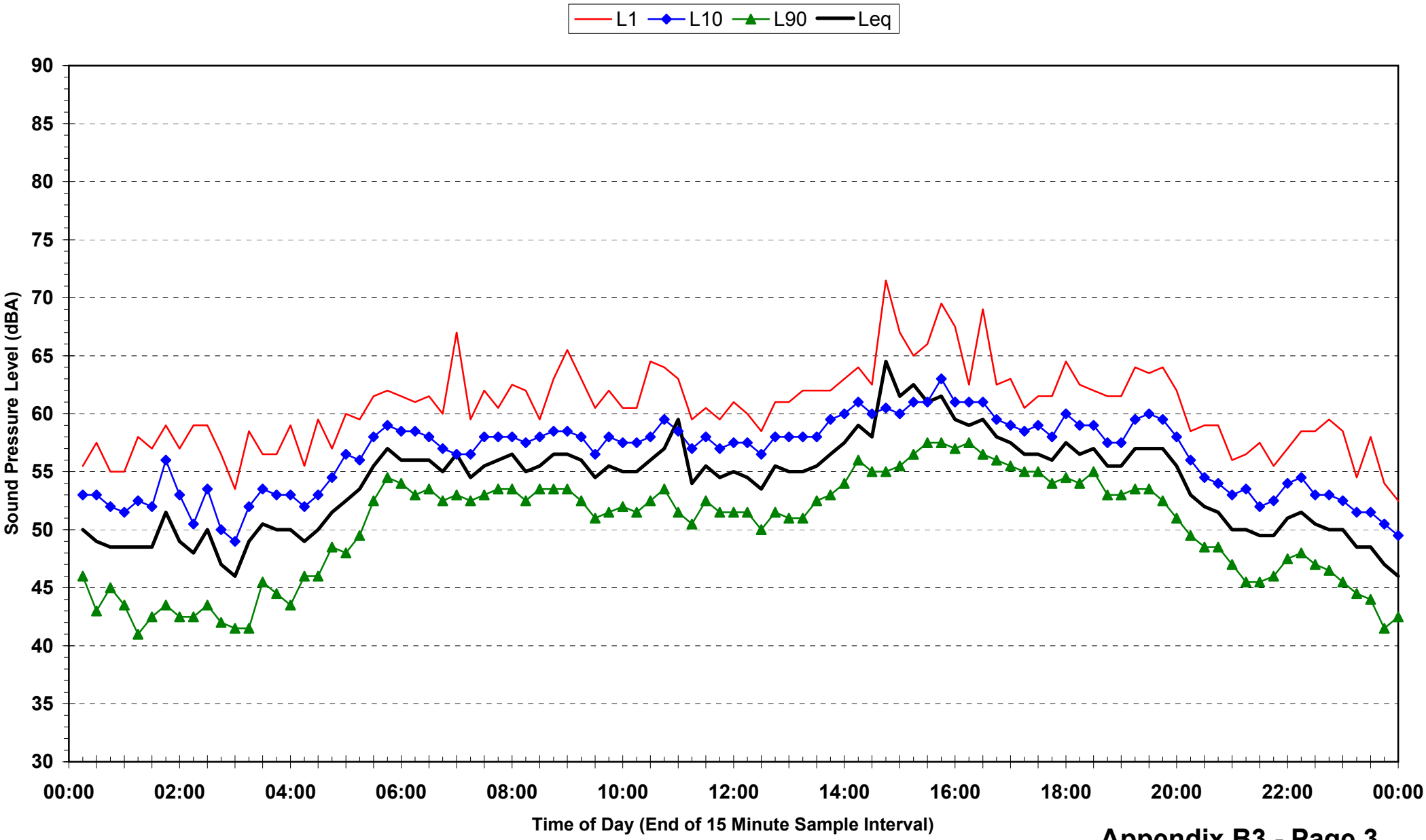
Statistical Noise Levels
RHA Report 30-1399

Statistical Ambient Noise Levels
30 Barossa Drive, Minchinbury - Wednesday 9 July 2003



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Statistical Noise Levels
RHA Report 30-1399

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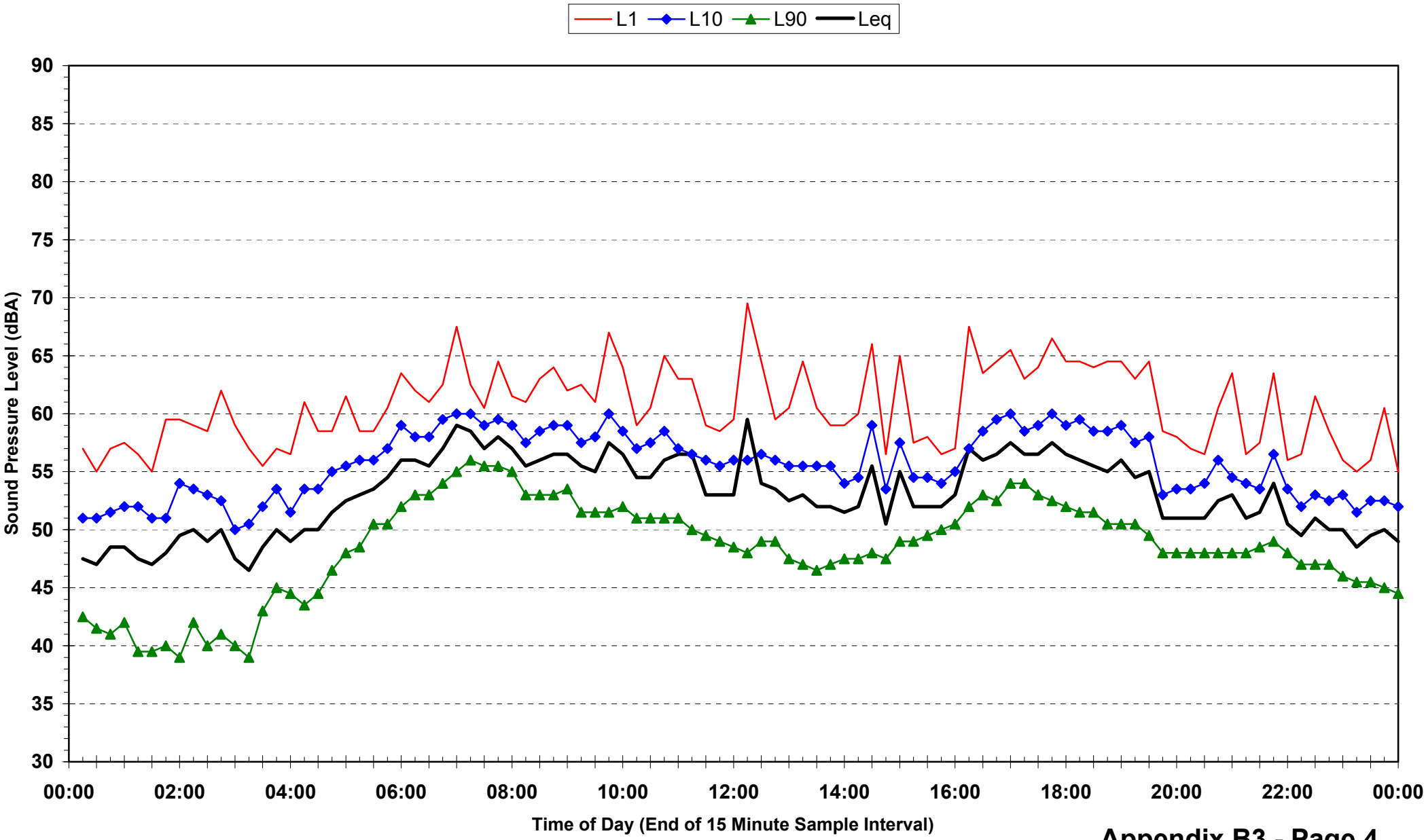
Statistical Ambient Noise Levels
30 Barossa Drive, Minchinbury - Thursday 10 July 2003



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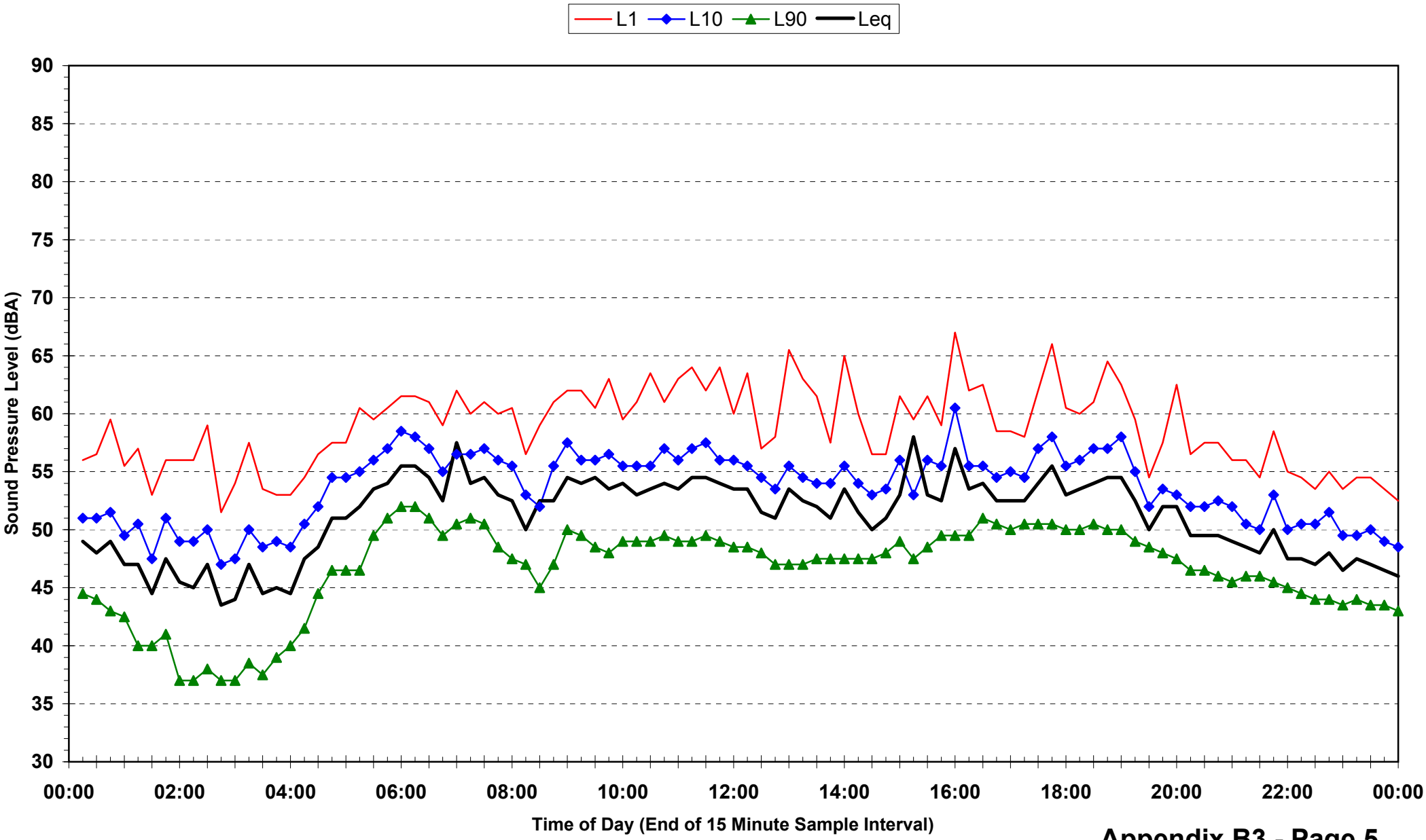
Statistical Noise Levels
RHA Report 30-1399

Statistical Ambient Noise Levels
30 Barossa Drive, Minchinbury - Friday 11 July 2003



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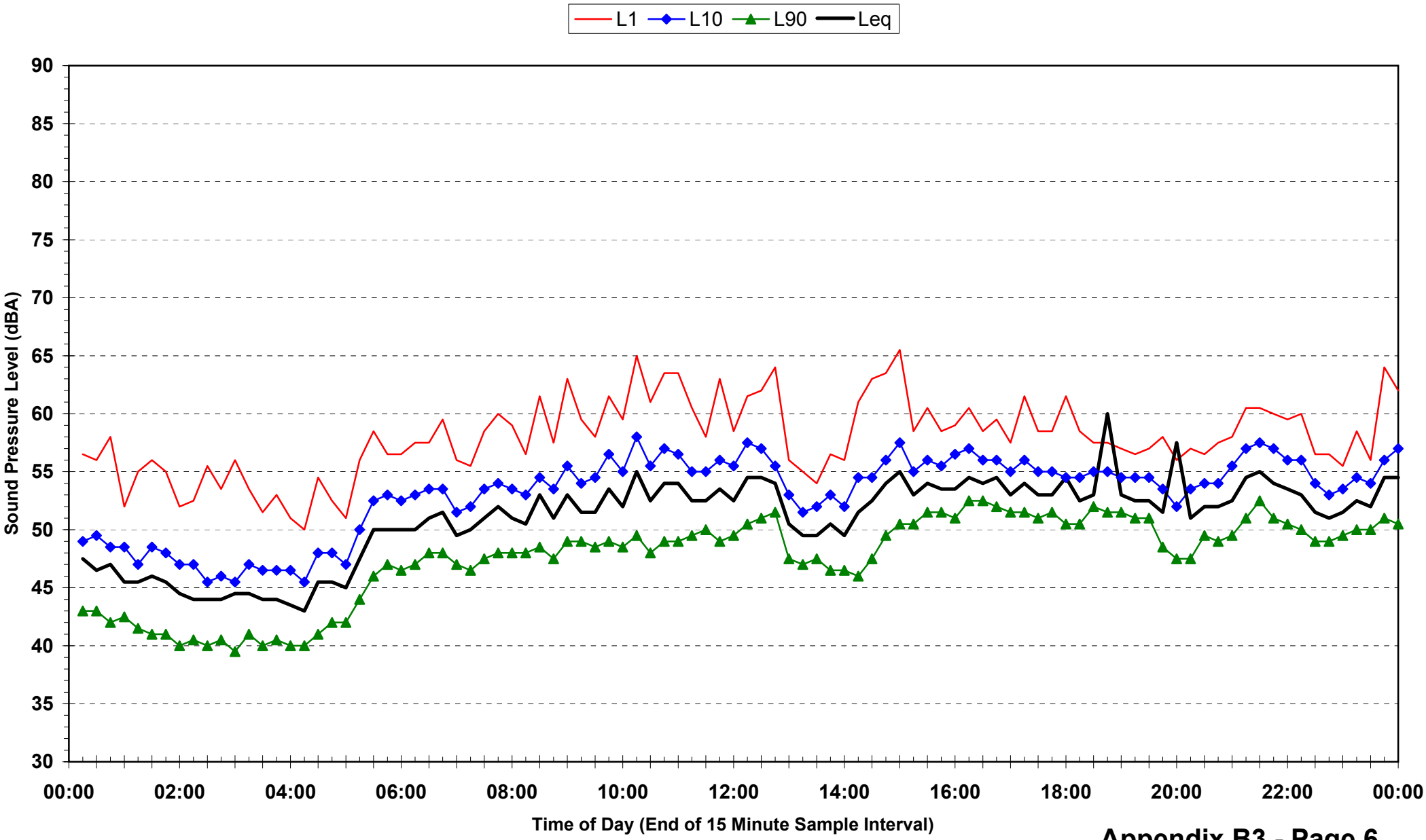
Statistical Noise Levels
RHA Report 30-1399

Statistical Ambient Noise Levels
30 Barossa Drive, Minchinbury - Saturday 12 July 2003



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Statistical Noise Levels
RHA Report 30-1399

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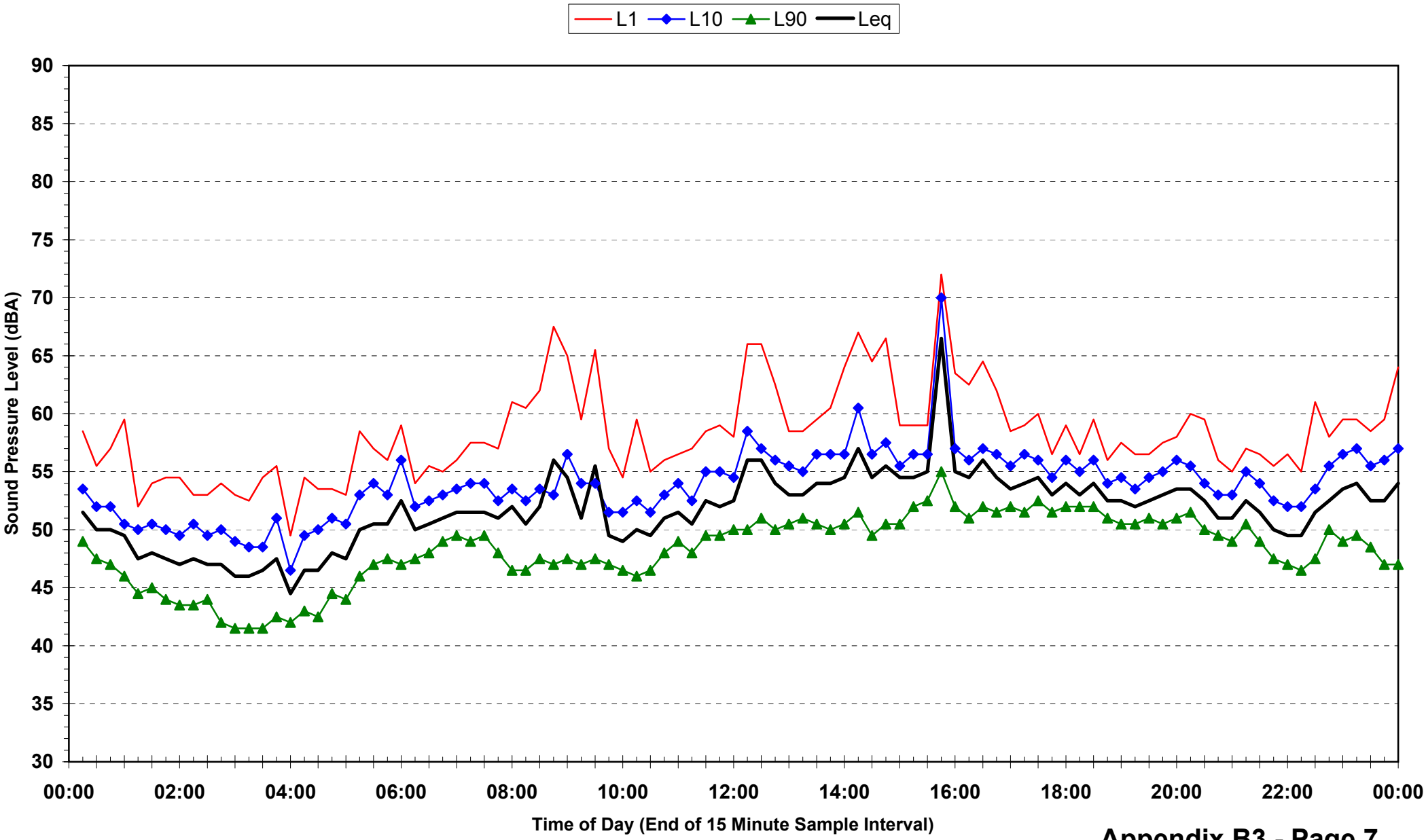
Statistical Ambient Noise Levels
30 Barossa Drive, Minchinbury - Sunday 13 July 2003



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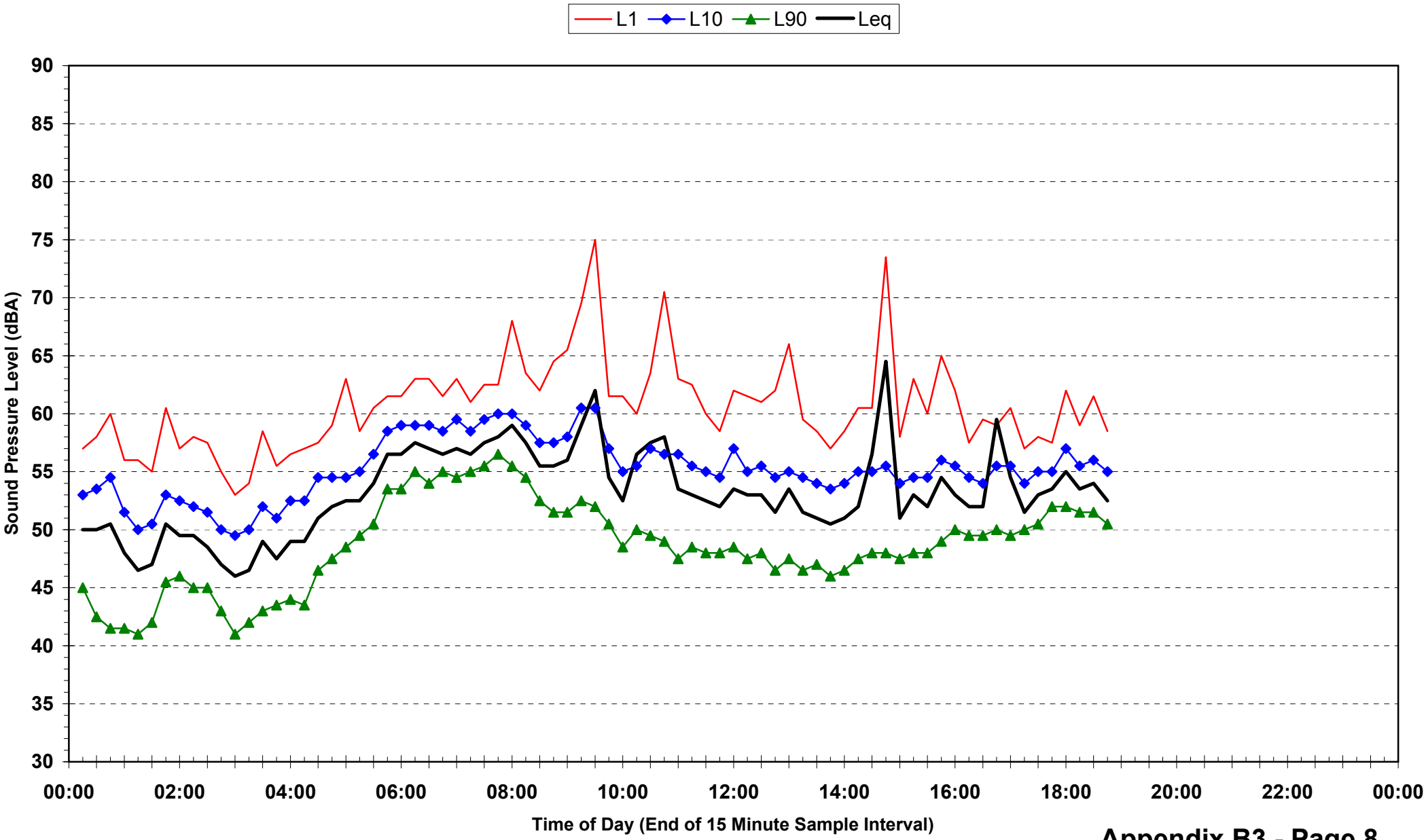
Statistical Ambient Noise Levels
30 Barossa Drive, Minchinbury - Monday 14 July 2003



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Equipment Sound Power Levels												
	Frequency Hz											
Equipment	**16**	**32**	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**	**8000**	**Linear**	**Awt**
Heavy Industrial - Metal Fabrication												
Toyota Gas Forklift CEL 593	103	102	97	91	89	84	81	74	67	64	107	91
Aluminium Saw	77	83	89	86	92	95	101	103	97	88	107	107
240 t press	85	88	105	106	110	108	107	105	99	86	115	114
60 t geared press	95	102	110	105	107	107	102	104	103	98	115	112
Tube Cutting	74	82	95	94	96	94	90	86	80	66	102	98
Guilloteen	93	103	102	102	104	103	100	99	92	87	111	108
Lathe	77	77	83	82	90	99	96	91	78	80	102	102
Grinder	70	77	87	87	87	98	100	101	100	87	106	106
Truck Delivery	106	98	95	95	100	101	101	101	96	85	110	107
Medium to Light Industry - Fresh Food Storage												
Toyota Gas Forklift CEL 593	103	102	97	91	89	84	81	74	67	64	107	91
Air Cond Outlet Duct x2	84	84	84	87	88	86	82	77	74	69	94	90
Condensor 6	100	100	100	93	89	88	87	81	72	72	105	94
Condensor 4	98	98	98	91	87	86	86	79	70	70	103	92
Light Industry - Warehousing												
Toyota Gas Forklift CEL 593	103	102	97	91	89	84	81	74	67	64	107	91