TRAFFIC NOISE MEASUREMENTS

FRANCIS STREET, YARRAVILLE, 2001

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EXECUTIVE SUMMARY

Noise levels from traffic on Francis Street Yarraville was monitored during July to August 2001. The results indicate that the levels of road traffic noise are typically higher than the range of noise objectives for other States in Australia. Francis Street has a high proportion of truck traffic which contributes to the noise levels.

The monitoring suggests that action should be taken to reduce the levels of road traffic noise. The results provide a basis for assessing any action (eg. traffic management) taken over time to reduce the road traffic noise.

BACKGROUND

Local residents in the Francis Street, Yarraville area are concerned with the increased level of heavy diesel truck traffic and attendant degradation of their local environment. Concerns relate to the potential detrimental health effects from exposure to airborne particles emitted from trucks and a loss of amenity due to traffic noise. The volume of traffic along Francis Street during a typical weekday day is approximately 16,000 vehicles, of which 25-30% is diesel commercial traffic. Noise measurements were undertaken to establish traffic noise levels in Francis Street, Yarraville.

RESULTS

EPA Victoria conducted noise monitoring near the community centre in Francis Street. On an hourly basis, the A-weighted energy equivalent (L_{Aeq}), L_{A10} and L_{A90} noise levels were recorded. The results of these measurements are shown in Appendix 1.

The one hour L_{Aeq} averaged over the full day, an 18 hour period (06:00 – 24:00), a 15 hour period (07:00 – 22:00), and a 9 hour period during the night (22:00 – 07:00) for the days is presented in Table 1.

Table 1: L_{Aeq} averages for 24 hours, 18 hours, 15 hours and 9 hours periods

	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Wed	Thu	Fri	Sat	Sun
	7-Jul	8-Jul	9-Jul	10-Jul	11-Jul	12-Jul	20-Jul	21-Jul	22-Jul	1-Aug	2-Aug	3-Aug	4-Aug	5-Aug
L_{Aeq} 24hr	63.8	61.3	67.9	67.7	68.0	68.1	67.8	63.6	61.5	68.9	68.4	68.6	64.9	63.3
L_{Aeq} 18hr	64.3	62.1	69.3	69.0	69.1	69.3	69.1	64.1	62.7	69.9	69.5	69.7	65.6	64.5
L_{Aeq} 15hr	64.6	62.2	70.0	69.6	69.7	69.9	69.6	64.6	62.8	70.5	70.0	70.4	66.1	64.8
L_{Aeq} 9hr	62.3	59.6	64.1	64.6	64.9	65.3	64.6	63.0	58.8	66.1	65.6	65.9	63.7	60.6

To represent the typical noise levels recorded at the measurement point, the hourly L_{Aeq} have the averaged for weekdays and weekends and is displayed in Figure 1. The typical trend shown is that weekends are about 5dBA quieter than weekdays with noise levels rising quickly after 5:00 am.

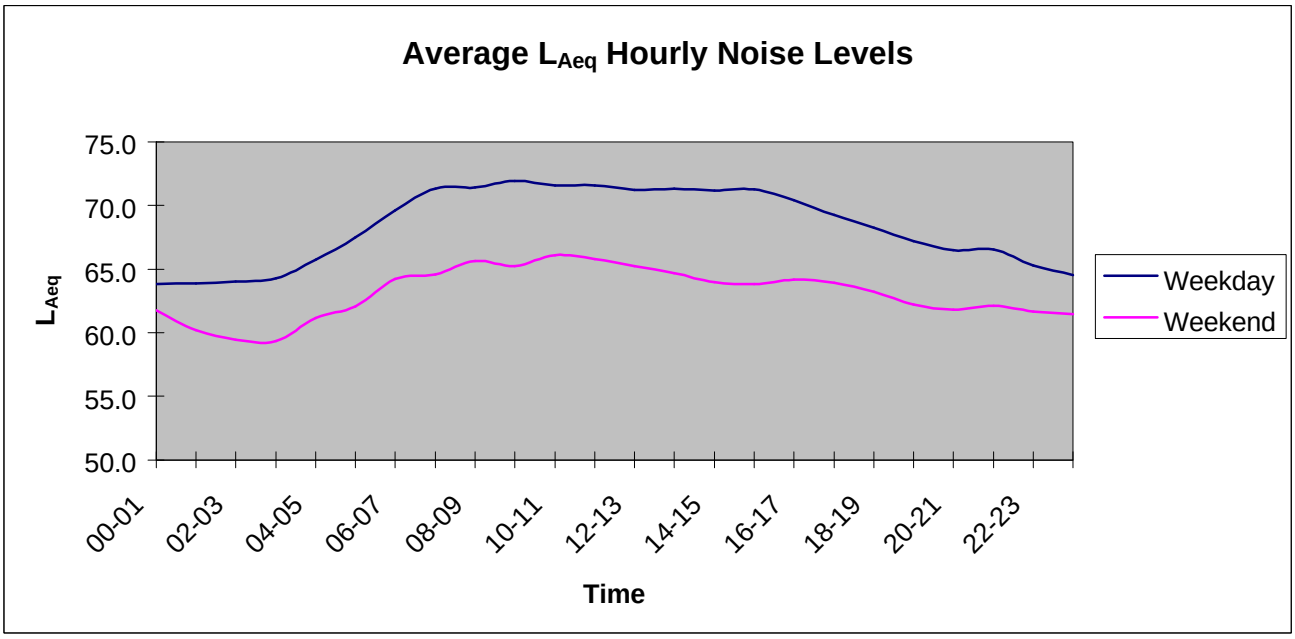


Figure 1: Average weekday and weekend 1 hour L_{Aeq} noise levels

The average daily noise levels, 18 hour periods, measured in Francis Street are compared with the common reference noise objectives in Figure 2. On 9 of the 14 days, levels exceeded these objectives.

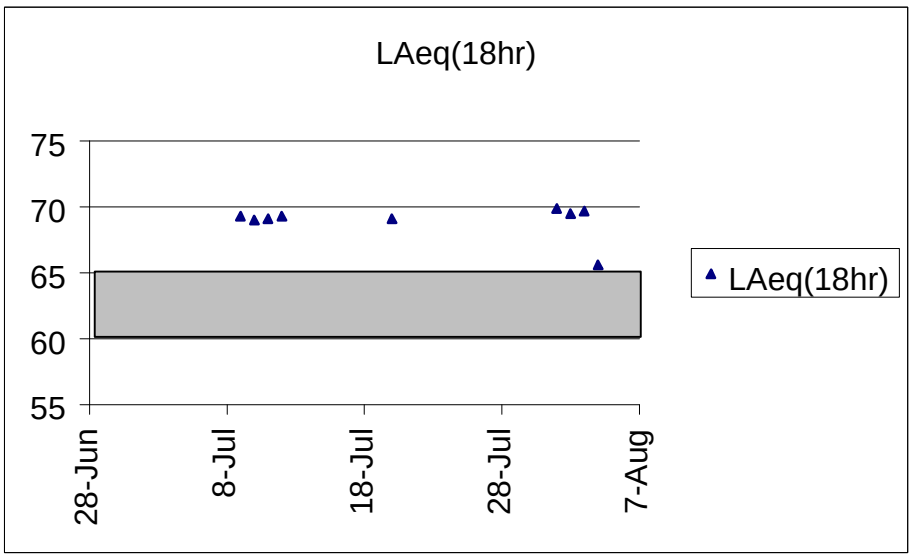


Figure 2: L_{Aeq} (18hr) compared to common traffic noise objectives.

NATIONAL TRAFFIC NOISE POLICIES

Many countries and most states of Australia have traffic noise objectives. All set noise objectives during the day period and some set separate objectives during the night period. A summary of the noise objectives for Australian jurisdictions is presented in Table 2. The criteria used for implementation of these objectives in Table 2 differ and therefore the noise objectives in different states cannot be taken at face value.

There is variation in the indicators used both in the averaging time and in the direct measure of noise - some being L_{Aeq} and some being L_{A10} or the average of hourly values. The standards are therefore not directly comparable, however, in Table 2 below the objectives are represented as L_{Aeq} values at 1 metre from the facade of a dwelling which in some cases are approximately converted from the actual objective.

Table 2 Summary of Australian Residential Noise Objectives for Major Roads[a]

Agency		Residential External Noise Objective					
		New roads	Upgraded roads	Existing roads (not being upgraded)	Averaging period	New Roads - Night	Night Averaging Period
ACT	Planning and Land Management Authority	60[b]	60[b]	-	18hr	-	
NSW	NSW EPA	55	60	60	15hr	50	9hr
QLD	Department of Main Roads	60[b]	65[b]	65[b]	18hr		
QLD	EPA Queensland	60 – 65	60 – 65	60 – 65[c]	18hr	60	1hr
VIC	VicRoads	60[b]	60[b]	65[b]	18hr	-	
WA	Main Roads Western Australia	60[b]	60[b]	-	18hr	-	

a. Day period unless stated otherwise.
b. Figure converted from L_{10} to L_{eq} by applying a -3dB correction.
c. 65 dBA for a state-controlled road and 60 dBA for any other public road.

National data taken from Austroads, Road Facts 2000 (Table 3.1), show the population in major cities exposed to noise levels above 55 L_{Aeq} averaged over 24 hours. These figures show that in Melbourne in 1996-97, 4 per cent of the population experienced traffic noise levels in excess of 70 dB(A).

Table 3.1 Traffic noise in urban areas — Australia — 1996–97

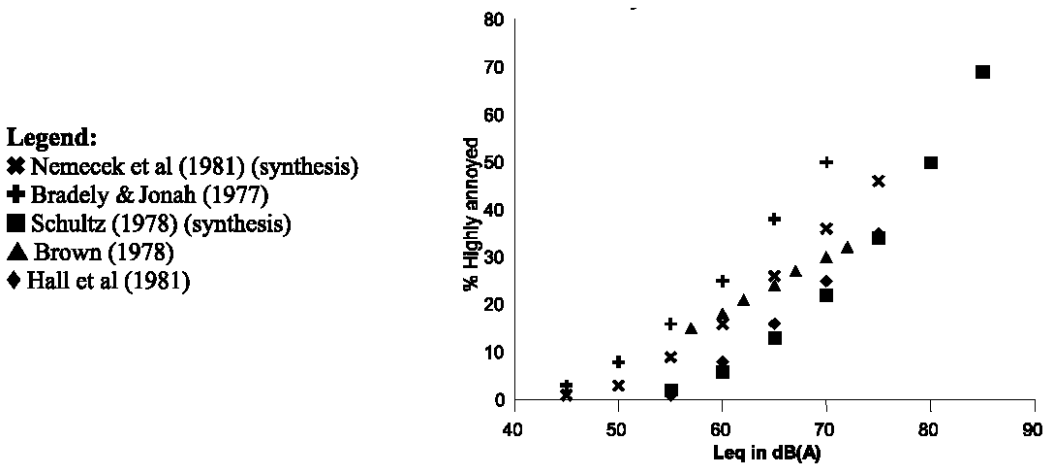
Noise level $L_{eq-24hr}$	Sydney	Melbourne	Brisbane	Perth	Adelaide
55	24.5	16.0	16.5	19.0	14.0
56	23.5	15.5	16.0	17.0	13.5
57	22.0	15.0	16.0	16.0	12.0
58	20.5	14.0	14.5	15.0	11.0
59	19.5	13.5	14.0	11.5	8.5
60	19.0	13.0	11.5	10.0	8.0
61	18.5	12.0	9.5	8.0	6.0
62	17.5	10.5	8.0	6.0	5.0
63	15.0	10.0	7.0	5.5	5.0
64	13.0	9.0	7.0	5.0	4.5
65	9.5	8.5	6.0	5.0	4.0
66	7.5	8.0	6.0	4.0	3.0
67	5.5	7.0	5.0	3.5	2.0
68	4.5	5.5	2.5	2.5	2.0
69	3.0	4.5	1.5	2.5	1.5
70	2.0	4.0	0.5	2.5	1.5
71	2.0	3.0	0.0	1.0	0.5
72	2.0	2.5	0.0	1.0	0.0
73	2.0	1.5	0.0	1.0	0.0
74	2.0	1.5	0.0	0.5	0.0
75	0.5	1.0	0.0	0.0	0.0

Source: Austroads (1998)

Taken from Austroads, Road Facts 2000, An overview of Australian and New Zealand road systems.

Research on the effect of noise indicates that people find high levels of traffic noise highly annoying. NSW EPA summarises the research into this matter in its "*Environmental criteria for road traffic noise"* issued in May 1999. Figure B1 of the NSW policy is shown below.

Figure B1 Percentage of people highly annoyed by road traffic noise



Environmental criteria for road traffic noise

CONCLUSION

- Residents in Francis Street, Yarraville experience levels of traffic noise that exceed some common traffic noise objectives currently in use.
- Approximately 5.5 percent of the people in the Melbourne urban area experience traffic noise levels of the same magnitude as those measured in Francis Street, Yarraville.

GLOSSARY OF ACOUSTIC TERMS

A-Weighting	An adjustment made to sound level measurements, by means of an electronic filter, to approximate the response of the human ear which is most sensitive to sound at 3000 hertz but less sensitive at very high and very low frequencies.
Background Sound Level	Generally, the sound level in the absence of any intrusive noise as represented by the L_{90} unit. In this case, the background Noise level represents the noise level when the noise is less intrusive.
Decibel (dB)	A measure of sound. It is equal to 10 times the logarithm (base 10) of the ratio of a given sound pressure to a reference sound pressure. The reference sound pressure used is 20 micropascals, which is the lowest audible sound.
L_{Aeq}	Equivalent continuous sound pressure level. This is an average sound level that would produce the same energy equivalence as the fluctuating sound level actually occurring. This is an A-weighted value.
L_{10}	The sound pressure level that is exceeded for 10 percent of an hour, representing the higher noise levels during the measurement interval.
L_{90}	The sound pressure level that is exceeded for 90 percent of an hour, representing the lower, background, noise levels during the measurement interval.

APPENDIX 1

	Fri	6-Jul-01		**Sat**	7-Jul-01		**Sun**	8-Jul-01		**Mon**	9-Jul-01	
	Leq	L90	*L10*	**Leq**	L90	*L10*	**Leq**	L90	*L10*	**Leq**	L90	*L10*
00-01				**64**	44.75	*65*	**60.3**	49	*61.75*	**62.6**	44.5	*63.25*
01-02				**61.4**	42.75	*61.75*	**58.5**	47.25	*58.5*	**62.5**	42.25	*63.75*
02-03				**61.4**	41.5	*62.75*	**57.7**	47	*58*	**63.1**	42.5	*64*
03-04				**62.5**	40	*63.75*	**56.7**	46.5	*57*	**63.4**	41.75	*64*
04-05				**62.6**	40	*65.25*	**59.5**	46.25	*61.5*	**65.3**	44	*67.25*
05-06				**62.8**	42.25	*63.5*	**60.2**	46	*61.75*	**66.2**	48	*67.25*
06-07				**66.5**	45	*67.5*	**61.3**	47.75	*63.25*	**69.3**	52.75	*71*
07-08				**67.9**	46.5	*69.25*	**61.1**	48.25	*63*	**70.7**	56	*72*
08-09				**68**	50	*68.75*	**61.2**	48.75	*62.25*	**70.9**	56	*73.5*
09-10				**67.4**	51.5	*69*	**61.2**	50	*63*	**74.7**	56.5	*77.5*
10-11				**68.1**	52.25	*70*	**63.7**	51.25	*64.75*	**71.6**	53.75	*75.75*
11-12				**66.6**	53	*68*	**63.5**	53	*65*	**71.2**	53.25	*76*
12-13				**65.4**	51.25	*67.25*	**62.9**	54	*65.75*	**71.2**	54	*74*
13-14				**65.1**	51.75	*67*	**63.1**	53.75	*64.75*	**71**	53.75	*73*
14-15				**64.4**	50.75	*66*	**61.9**	53.5	*64.5*	**71.5**	55	*73.25*
15-16				**64.2**	51.75	*66*	**60.7**	53.25	*63*	**71.5**	56.5	*73.75*
16-17	**70.1**	54.5	*71.5*	**63.6**	52.25	*64.75*	**62.9**	54	*68*	**70.3**	55.75	*71.5*
17-18	**70.7**	55	*72*	**63.1**	54.25	*65.5*	**63.4**	54.25	*67.25*	**68.8**	54.75	*70.5*
18-19	**67.4**	54.25	*69.75*	**62.2**	52	*64.5*	**61.2**	52.75	*64*	**68.6**	53.25	*71.5*
19-20	**66**	52	*66.75*	**62.3**	51.75	*63.25*	**61.7**	50.5	*66.5*	**67.6**	51.25	*71.25*
20-21	**65.5**	49.75	*67.25*	**59.7**	49.25	*61*	**62.1**	50	*64*	**65.4**	49.75	*65*
21-22	**66.8**	48.25	*67.25*	**60.4**	49.75	*62.25*	**61.8**	49.25	*64.25*	**65.2**	49.25	*65.75*
22-23	**65.6**	48	*54.75*	**61.6**	50.5	*63*	**62.6**	46	*62.75*	**64.6**	48.25	*65*
23-00	**64.7**	46.5	*64.75*	**60.5**	50.25	*61.25*	**61.8**	46	*62*	**63.2**	46.75	*64.25*

	Tue	10-Jul-01		**Wed**	11-Jul-01		**Thur**	12-Jul-01		**Fri**	13-Jul-01	
	Leq	L90	*L10*	**Leq**	L90	*L10*	**Leq**	L90	*L10*	**Leq**	L90	*L10*
00-01	**62.1**	45.5	*62.5*	**63.1**	45	*65*	**63.3**	40.25	*63.25*	**64.7**	44.5	*63*
01-02	**63.2**	45	*63.75*	**63.6**	48.5	*65.75*	**63.6**	42.25	*62.25*	**64.1**	44	*63.75*
02-03	**64.1**	44.5	*66.75*	**64.4**	46.5	*65.75*	**64.7**	43.75	*64.75*	**63.8**	43.25	*64.25*
03-04	**62.8**	44.25	*67.5*	**64.7**	43.5	*65*	**63.7**	44.25	*62.75*	**63**	43.5	*63.5*
04-05	**65.3**	47	*66.5*	**64.5**	43.5	*66.5*	**65.6**	47	*65*	**65.1**	44.25	*66*
05-06	**66.8**	50	*68*	**67.1**	44.75	*69*	**67.4**	47.75	*67*	**67.2**	47.75	*69.25*
06-07	**69**	54.75	*71.5*	**68.9**	50	*72.75*	**69.2**	51.25	*71*	**69.2**	52	*70.25*
07-08	**70.7**	57	*72.25*	**70.4**	53	*72.5*	**70.4**	55.5	*70*	**71.2**	55.5	*71.25*
08-09	**70.9**	57	*72.25*	**71.5**	54.75	*74*	**71.2**	55.75	*73*	**72.1**	56.25	*74*
09-10	**71.5**	56.5	*72.5*	**71.8**	54.25	*74*	**70.9**	56.25	*71.75*			
10-11	**71.3**	55	*73.75*	**71**	53	*73.25*	**71.6**	55.25	*75.75*			
11-12	**70.9**	54.5	*72.75*	**71.6**	52.25	*73.25*	**72.2**	55	*78*			
12-13	**70.7**	55	*72.5*	**70.5**	52.5	*73*	**71**	52.75	*73*			
13-14	**71.7**	54.5	*73.5*	**71.3**	55	*73.5*	**71.3**	54.5	*74.25*			
14-15	**70.6**	55.5	*72.5*	**70.8**	54.25	*74*	**71.3**	53.75	*73*			
15-16	**71.2**	56.5	*71.5*	**70.9**	54.25	*72.5*	**71.2**	53.25	*71.5*			
16-17	**69.7**	55.25	*71.25*	**70.8**	55	*73*	**70.2**	51.75	*71.5*			
17-18	**68.9**	54.5	*70*	**68.5**	54	*69.5*	**68.3**	52.25	*69*			
18-19	**67.8**	52.5	*68.5*	**67.2**	52.25	*69.5*	**68.1**	51.75	*69.5*			
19-20	**66.8**	49.75	*67.5*	**66.8**	51.25	*67.25*	**66.9**	49	*68.25*			
20-21	**65.7**	47.75	*66*	**65.8**	46.25	*67*	**67.3**	48.5	*66.75*			
21-22	**65.9**	47.5	*66.5*	**66.2**	44.75	*67.5*	**66.5**	45.5	*66*			
22-23	**64.2**	46.25	*65*	**65.5**	43	*65.75*	**63.6**	44.5	*64*			
23-00	**64**	45.5	*64.5*	**64.9**	42	*63.5*	**65.4**	44.5	*68.5*			

	Thur	19-Jul-01		**Fri**	20-Jul-01		**Sat**	21-Jul-01		**Sun**	22-Jul-01	
	Leq	L90	*L10*	**Leq**	L90	*L10*	**Leq**	L90	*L10*	**Leq**	L90	*L10*
00-01				**64.1**	44.5	*66*	**63.6**	47.5	*65.25*	**59.2**	46.5	*60*
01-02				**62.7**	43	*63*	**61.8**	42.75	*62.5*	**57.8**	41.5	*57.5*
02-03				**62.1**	42	*64*	**60.6**	42.25	*62*	**56.3**	40	*55.5*
03-04				**63.8**	42.25	*65*	**61.5**	40.75	*62.25*	**56.4**	40	*56*
04-05				**64.7**	43.25	*64.25*	**61.6**	40.5	*61*	**58.5**	40	*56*
05-06				**66.8**	48.5	*65.5*	**63.6**	43.75	*63*	**59.9**	40	*60*
06-07				**69.4**	53.75	*70.75*	**65**	47.25	*64.25*	**61.7**	44	*62*
07-08				**72**	58	*72.75*	**65.9**	48.5	*66.25*	**60.4**	45.5	*60.75*
08-09				**71.1**	56	*73*	**65.8**	50.5	*66.25*	**63.3**	46.2	*62.25*
09-10				**71.3**	56.5	*73.25*	**66.5**	49.5	*67.25*	**61.4**	45.75	*61*
10-11				**70.9**	56.25	*70.75*	**66**	52	*67.5*	**63**	46	*62*
11-12	**70.3**	56.5	*72.75*	**71.2**	56.75	*73*	**65.9**	52	*65.75*	**63**	45.75	*63.25*
12-13	**69.9**	56	*72.5*	**70.9**	57.25	*71.25*	**66.2**	52.25	*67.5*	**63**	45.25	*63.5*
13-14	**70.5**	56	*72*	**70.7**	57.25	*71.75*	**65.8**	50	*65*	**62.6**	45.5	*61.25*
14-15	**70.4**	55.5	*72.75*	**71.1**	57.25	*72*	**64.3**	48.75	*65*	**62.5**	46	*62.5*
15-16	**70.6**	57.75	*73.75*	**70.9**	57.5	*71.75*	**64.7**	49.25	*64*	**63.3**	48.75	*63.25*
16-17	**70.2**	56.5	*72*	**69.9**	57.5	*70*	**63.9**	48.75	*64.5*	**64.3**	50.5	*63.75*
17-18	**69.3**	55.25	*71*	**68.5**	55	*70*	**63.4**	49.75	*63.5*	**63.9**	52	*64*
18-19	**68**	54.5	*69*	**68**	54	*69.25*	**63**	48.25	*64*	**65**	50.25	*65.5*
19-20	**66.4**	52	*68*	**66**	52.5	*68*	**62.3**	45	*62.5*	**62.2**	49.5	*62.5*
20-21	**65**	49.75	*66.5*	**65.3**	50.25	*66.25*	**60.9**	45	*60.75*	**62.1**	46.75	*62.5*
21-22	**65.9**	47	*67.25*	**66.5**	51	*67*	**64.2**	45.5	*64*	**62.6**	44.5	*63*
22-23	**64.3**	47.25	*65.75*	**65.2**	50.5	*65.75*	**59.9**	44.75	*60.75*	**61.8**	44.75	*61.75*
23-00	**63.7**	46	*64.25*	**64.1**	49.25	*65*	**59.3**	46.5	*59*	**62.4**	43.25	*64.25*

	Mon	23-Jul-01			**Tues**	31-Jul-01		**Wed**	1-Aug-01		**Thursday**	2-Aug-01	
	Leq	L90	*L10*		**Leq**	L90	*L10*	**Leq**	L90	*L10*	**Leq**	L90	*L10*
00-01	**61.2**	41.75	*60*					**64.7**	43.5	*67*	**64.3**	43.75	*66.5*
01-02	**62.2**	49	*62.75*					**64.7**	47	*66.75*	**64.4**	43.5	*66*
02-03	**62.6**	41.5	*63*					**64.5**	46.5	*66.25*	**63.7**	42.75	*65*
03-04	**63.3**	42.75	*64.25*					**65.5**	44.75	*67.5*	**63.8**	43.25	*66.25*
04-05	**64.4**	45.25	*64*					**66.7**	45.5	*69.5*	**66**	44.75	*69.25*
05-06	**66.5**		*66.75*					**68.5**	51.5	*72.5*	**67.8**	48.5	*72*
06-07	**68.8**	51.75	*70.75*					**70.4**	56.25	*74.5*	**69.7**	52.5	*73.75*
07-08	**70.2**	55.25	*70.25*					**72.2**	58.5	*76*	**71.7**	56.75	*75.5*
08-09	**71.1**	58.75	*74*					**71.8**	58	*76*	**71.7**	56	*75.75*
09-10								**72**	58.5	*76.25*	**72**	56	*75.75*
10-11								**72.2**	58.25	*76.5*	**71.7**	54.25	*75.75*
11-12								**72**	58.25	*76.25*	**71.5**	55.5	*75.5*
12-13								**71.7**	58.5	*75.5*	**71.3**	55.5	*75.5*
13-14								**71.4**	57.25	*75.75*	**71.3**	55.25	*75*
14-15								**72**	58	*76*	**71**	54.25	*74.5*
15-16								**72**	58.5	*76*	**70.8**	54.25	*74.5*
16-17								**71**	57.5	*74.5*	**70**	56.5	*73.5*
17-18					**69.5**	55.5	*72.75*	**69.7**	55.5	*73*	**69.1**	54	*72.75*
18-19					**68.9**	51.75	*72.75*	**68.6**	51.25	*72*	**68.4**	50.5	*71.5*
19-20					**67**	49	*70.5*	**67.4**	49	*71*	**66.5**	48.75	*70.5*
20-21					**66.7**	47.75	*69.75*	**66.6**	48.5	*70.25*	**67.2**	45	*69.75*
21-22					**67**	47	*70.25*	**67**	48.75	*69.75*	**66.2**	44	*69.5*
22-23					**65.3**	46.5	*68.5*	**66.7**	47.5	*69.5*	**66.1**	44	*69*
23-00					**64.3**	43.75	*66.5*	**64.3**	45.75	*67.25*	**65.1**	42.5	*68.25*

	Friday	3-Aug-01		**Sat**	4-Aug-01		**Sun**	5-Aug-01	
	Leq	L90	*L10*	**Leq**	L90	*L10*	**Leq**	L90	*L10*
00-01	**64.5**	41.75	*67.5*	**63**	43	*65.5*	**60.5**	43.75	*64.25*
01-02	**64.4**	41.25	*67.25*	**61.6**	42.5	*63.25*	**60**	42.5	*61.75*
02-03	**64.7**	41.25	*67*	**61.7**	42.5	*63.25*	**59**	42.75	*58*
03-04	**64.9**	41.25	*67.25*	**62.7**	43.75	*63*	**56.2**	41.75	*52.5*
04-05	**66.1**	43.25	*69.25*	**63.3**	43	*65.25*	**61.3**	42.25	*58.75*
05-06	**67.7**	47	*72.5*	**64.9**	44	*68.25*	**61**	43.75	*61.25*
06-07	**69.8**	52.5	*73.75*	**67**	47.25	*71*	**63.7**	43.5	*66.75*
07-08	**71.3**	56.25	*75.5*	**68.6**	50	*73*	**63.7**	44	*64.75*
08-09	**71.4**	57	*75.5*	**69.4**	51	*73.75*	**66.1**	45.5	*68.75*
09-10	**71.5**	55.25	*75.5*	**69**	49.75	*72.25*	**65.9**	46	*69.25*
10-11	**71.6**	54.25	*76*	**69.3**	49.5	*72.25*	**66.5**	46	*69.25*
11-12	**71.6**	54.5	*75.5*	**69.2**	50.5	*72*	**66.5**	49	*69.5*
12-13	**71.6**	55.25	*75.25*	**67.2**	48.75	*70.25*	**66.7**	50.5	*69.75*
13-14	**71.4**	54	*75.75*	**66.4**	48.75	*69.25*	**65.2**	51.25	*68.75*
14-15	**70.8**	54.5	*74.75*	**66.2**	48	*69.25*	**64.5**	48.25	*68.25*
15-16	**71.2**	56.25	*75.25*	**65.6**	48.75	*70*	**64.4**	48.5	*68.25*
16-17	**70.8**	55	*74.75*	**66.2**	47.5	*69.5*	**64**	49.25	*68.5*
17-18	**70.5**	55.5	*74*	**64.2**	47.75	*68.25*	**65.6**	50.25	*69.25*
18-19	**68.5**	51.5	*72.25*	**63.5**	47.25	*67.5*	**64.4**	48.25	*68.75*
19-20	**68.6**	50	*71.75*	**62.4**	46.25	*66.75*	**62.4**	46.25	*66.25*
20-21	**67.1**	46.5	*70*	**62.6**	44.25	*65.5*	**63.3**	45	*66.75*
21-22	**67.7**	45.75	*71*	**61.1**	44.25	*64.75*	**62.6**	44.25	*65.75*
22-23	**64.7**	43.75	*68*	**61.8**	43.75	*65.25*	**62.3**	43.75	*65.5*
23-00	**64.8**	44.75	*68.25*	**61.8**	45.5	*65.5*	**62.8**	42.75	*64.25*

All measurements are A-weighted sound pressure levels.