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Assessment and Engineering Control



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**REPORT N<sup>o</sup> EN-OAC-270908AJ**

**Parramatta Stadium**

11-13 O'Connell Street

PARRAMATTA

**NOISE MANAGEMENT PLAN**

**for open air concerts and Australian Supercross Championship**

**October 2008**

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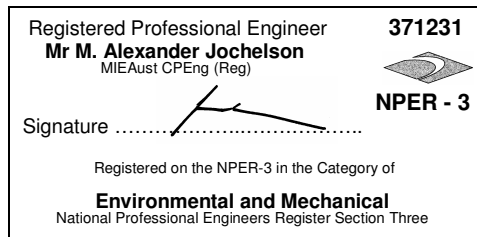
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is an independent, accredited acoustical and environmental engineering consultancy :  
a member of The Association of Consulting Engineers, Australia (ACEA)  
and Association of Australian Acoustical Consultants (AAAC).



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**This report has been checked and endorsed by  
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- Appendix 1: Locations of noise measurements along residential boundaries.  
Appendix 2: Summary of noise control measures.  
Appendix 3: Procedure for noise emission testing (motorbikes).



## GLOSSARY

### Sound Frequency:

a number of fluctuations in the air pressure, which are detected by the human ear, per second, [Hz].

### Sound Pressure:

fluctuations in the air pressure that are detected by the human ear, [Pa].

### Sound Pressure Level ( $L_p$ ):

a sound pressure measured on a decibel scale, [dB] :  $L_p = 10 \log_{10} (p/p_0)^2$ ,

where:

$p$  - is the sound pressure; and

$p_0$  - is the reference sound pressure of 20 $\mu$ Pa.

### A-weighted sound pressure level ( $L_A$ ):

in A-weighted decibels [dB(A)], the sound pressure level, which is corrected to correlate with the human subjective response to different frequencies at low ranges of sound pressure levels (about 40 dB).

### C-weighted sound pressure level ( $L_C$ ):

in C-weighted decibels [dB(C)], the sound pressure level, which is corrected to correlate with the human subjective response to different frequencies at high ranges of sound pressure levels (about 80 dB).

### A- and C-weighted Maximum Sound Pressure Level ( $L_{A\text{Max}, T}$ ):

the maximum A- and C-weighted sound pressure level during the measurement time  $T$ , [dB(A)].

### Equivalent Sound Pressure Level ( $L_{\text{eq}, T}$ ):

the sound pressure level of a steady sound that has the same energy during the measurement time  $T$  as a sound under consideration whose level varies with time, (dB).



## EXECUTIVE SUMMARY

This report provides a Noise Management Plan (NMP) for:

- open air concerts (events with the use of sound amplification systems); and
- Australian Supercross Championship

held at Parramatta Stadium in 11-13 O'Connell Street, Parramatta (Appendix 1).

The NMP was developed by Pollution Control Consultancy and Design (PCCD) based on the:

1. *Sydney Cricket and Sports Ground Trust (SCGT) - Noise Management Plan* prepared by Environmental Resources Management Australia Pty Ltd (ERM) in February 2007, which has been pointed out by New South Wales Department of Environment and Climate Change (DECC) and Parramatta City Council (PCC) as an example of a noise management plan that should be adopted for Parramatta Stadium with site-specific amendments, if required;
2. discussion between representatives of the DECC Environment Protection and Regulation Group, Parramatta Stadium Trust and PCCD that took place at DECC's Parramatta Office, on 13 August 2008;
3. DECC's comments/recommendations of 5 September 2008, arising from the discussion on 13 August 2008 (item 2 above);
4. Parramatta City Council's reports/consent conditions of 10 June 2008 and 8 September 2008, relating to Development Application No 659/2007; and
5. PCCD's experience with open air concerts held at Aussie Stadium (former Sydney Football Stadium), Sydney Cricket Ground (SCG) and former Sydney Showground in Moore Park/Centennial Park area, and at Parramatta Stadium.



# NOISE MANAGEMENT PLAN

Open air concerts (Musical Festivals and Concerts, Kids Big Days Out and Cultural Festivals with the use of sound amplification systems) and Australian Supercross Championship will be held at Parramatta Stadium in 11-13 O'Connell Street, Parramatta, with the following noise control measures:

## 1. DAYS AND TIMES OF EVENTS

Days and times for open air concerts and Australian Supercross Championship held at Parramatta Stadium will be limited as in Table 1 below.

Table 1

Activity	Frequency	Time restrictions
Music festivals and concerts	Maximum of three events per year	<u>Music festivals</u> : only on weekends, between 10 am to 8 pm. <u>Music concerts</u> : only on Fridays and Saturdays, or on Sundays adjacent to a Monday Public Holiday, except Easter Sunday, between 7 pm to 10 pm.
Cultural festival	Maximum of one festival per year	Only on weekends, between 10 am and 8 pm.
Children's carnivals	Maximum of one carnival per year	Only between 10 am and 6 pm.
Motocross	Maximum of one motocross per year	Only on Saturdays till 9.30 pm, and not during the Easter or Christmas public holidays, with practice sessions only on the day of the event.

## 2. CONSULTATION WITH PARRAMATTA PARK TRUST

While choosing dates and times for open air concerts and Australian Supercross Championship held at Parramatta Stadium, Parramatta Stadium Trust will liaise with Parramatta Park Trust to avoid conflicts with noise-sensitive events (e.g. weddings) held within Parramatta Park.

## 3. NOTICE TO CONSENT AUTHORITIES

Parramatta Stadium Trust will notify:

- (1) Department of Environment and Climate Change (DECC); and
- (2) Parramatta City Council's Development Services Unit

of any planned open air concerts and Australian Supercross Championship, by registered mail, at least 60 days before the events, with the exception of Supercross held on 8 November 2008, when Parramatta Stadium Trust will notify the authorities of Supercross as soon as practicable.

The notice to the consent authorities will advise of:

- (1) a nature (description) and size of (expected crowd attending) an event;
- (2) a date and time (duration) of the event, including preliminary practice sessions and/or rehearsals;
- (3) Parramatta Stadium's Hot Line (telephone number) for lodgement of noise complaints; and
- (4) a name and telephone number of the Venue Manager, who will be responsible for compliance with noise limits from sections 8 to 10, below.



#### 4. NOTICE TO RESIDENTS AND BUSINESSES

Parramatta Stadium Trust will notify occupiers of:

- all residential premises within 1 kilometre of Parramatta Stadium and the residential premises listed in section 12.2; and
- commercial premises listed in section 12.3;

of any planned open air concerts and Australian Supercross Championship, by a letterbox drop, at least 60 days before the events, with the exception of Supercross held on 8 November 2008, when Parramatta Stadium Trust will notify the residents and businesses of Supercross as soon as practicable.

The notice to the occupiers of the residential and commercial premises will advise of:

- (1) a nature (description) and size of (expected crowd attending) an event;
- (2) a date and time (duration) of the event, including preliminary practice sessions and/or rehearsals;
- (3) Parramatta Stadium's Hot Line (telephone number) for lodgement of noise complains; and
- (4) the Noise Management Plan available on Parramatta Stadium's website;

and invite post-event feedback.

#### 5. SETUP OF SOUND AMPLIFICATION SYSTEMS

Parramatta Stadium Trust, together with audio specialists installing a sound amplification system and suitably qualified acoustical consultants, will determine a setup of the system that will minimize the impact of noise at the residential and commercial premises listed in sections 12.2 and 12.3.

Based on previous experience with noise from open air concerts held at Parramatta Stadium:

- a) the stage and the main speakers should face the South;
- b) instead of large multiple banks of speakers adjacent to the stage, diffuse smaller speaker arrays at multiple locations should be used, if practical;
- c) instead of fold-back speakers, performers should use *in-ear-monitoring* systems, which are inaudible for the others and decrease the projection of noise to the North, the locations of the nearest residential premises; and
- d) the final set up of a sound amplification system used during the concert should be tuned based on results of noise measurements carried out at the residential and commercial premises during initial sound tests.

#### 6. SET UP OF SUPERCROSS

Parramatta Stadium Trust, together with the promoter of Australian Supercross Championship and suitably qualified acoustical consultants, will determine a setup of the event that will minimize the impact of noise at residential and commercial premises listed in sections 12.2 and 12.3.

#### 7. ELIMINATION OF NOISY MOTORBIKES

Prior to commencement of Australian Supercross Championship, the promoter will carry out, on behalf of Parramatta Stadium Trust, noise measurements according to the Motorcycling Australia procedure for noise emission testing GCR 12.10 (Appendix 3) and bar from races any motorbikes that do not comply with the current limit set up by Motorcycling Australia for Motocross and Supercross.



## 8. LIMITS ON LEVEL OF NOISE DURING OPEN AIR CONCERTS

### 8.1. Limits at residential premises (open air concerts)

The A-weighted and C-weighted maximum sound pressure levels ( $L_{A\text{Max}}$  and  $L_{C\text{Max}}$ ) emanating from open air concerts held at Parramatta Stadium should not exceed:

- 75 dB(A) and 90 dB(C), respectively, when measured:
  - (a) at boundaries of the residential premises at the corner of O'Connell and Ross Streets;
  - (b) at boundaries of the residential premises in Ross Street between O'Connell and Trott Streets;
  - (c) on the balcony on the top floor the Convent of Sisters of Mercy in 6 Victoria Street; and
- 65 dB(A) and 80 dB(L), respectively, when measured at boundaries of any other residential premises.

#### NOTES:

1. Due to heavy traffic in O'Connell Street, the *Background Noise* level at the residential premises at the corner of O'Connell and Ross Streets, and in Ross Street between O'Connell and Trott Streets (measurements in February 2008), and on the balcony on the top floor of the Convent of Sisters of Mercy in 6 Victoria Street (measurements in August 2008) is significantly higher than the *Background Noise* level at any other residential premises affected by noise emanating from Parramatta Stadium (measurements in February 2008). Consequently, the limits on noise at these locations may be less restrictive than the limits at quieter locations.
2. *Sydney Cricket and Sports Ground Trust (SCGT) - Noise Management Plan* prepared by ERM in February 2007, which has been pointed out by New South Wales Department of Environment and Climate Change (DECC) and Parramatta City Council as an example of a noise management plan that should be adopted for Parramatta Stadium, provides the following limits on the  $L_{A\text{Max}}$  and  $L_{C\text{Max}}$  measured at residential premises:
  - 70 dB(A) and 90 dB(L), respectively, for noise emanating from Sydney Cricket Ground (SCG); and
  - 80 dB(A) and 100 dB(C), respectively, for noise emanating from Aussie Stadium (former Sydney Football Stadium).

### 8.2. Limit at commercial premises (open air concerts)

The A-weighted maximum sound pressure level ( $L_{A\text{Max}}$ ) emanating from open air concerts held at Parramatta Stadium should not exceed 80 dB(A), when measured at any commercial premises.

#### NOTES:

The limit of 80 dB(A) for the  $L_{A\text{Max}}$  emanating from open air concerts held at Parramatta Stadium, when measured at the commercial premises, is based on the:

- (1) premise that A-weighted maximum sound pressure level ( $L_{A\text{Max}}$ ) corresponds with the A-weighted, equivalent, fifteen-minute sound pressure level ( $L_{A\text{eq}, 15\text{min}}$ ) plus 15 dB(A); and
- (2) recommended  $L_{A\text{eq}, 15\text{min}}$  of 65 dB(A) at commercial premises from Table 2.1 of *New South Wales Industrial Noise Policy*.

## 9. LIMIT ON LEVEL OF NOISE DURING SUPERCROSS

### 9.1. Limit at residential premises (supercross)

The A-weighted maximum sound pressure level ( $L_{A\text{Max}}$ ) emanating from Australian Supercross Championship held at Parramatta Stadium, with the exception of the first Australian Supercross Championship that will be held at Parramatta Stadium on 8 November 2008, should not exceed:

- 75 dB(A), when measured:
  - (a) at boundaries of the residential premises at the corner of O'Connell and Ross Streets;
  - (b) at boundaries of the residential premises in Ross Street between O'Connell and Trott Streets;
  - (c) on the balcony on the top floor the Convent of Sisters of Mercy in 6 Victoria Street; and
- 65 dB(A), when measured at boundaries of any other residential premises.



**NOTES:**

1. Due to heavy traffic in O'Connell Street, the *Background Noise* level at the residential premises at the corner of O'Connell and Ross Streets, and in Ross Street between O'Connell and Trott Streets (measurements in February 2008), and on the balcony on the top floor of the Convent of Sisters of Mercy in 6 Victoria Street (measurements in August 2008) is significantly higher than the *Background Noise* level at any other residential premises affected by noise emanating from Parramatta Stadium (measurements in February 2008). Consequently, the limits on noise at these locations may be less restrictive than the limits at quieter locations.
2. *Sydney Cricket and Sports Ground Trust (SCGT) - Noise Management Plan* prepared by ERM in February 2007, which has been pointed out by New South Wales Department of Environment and Climate Change (DECC) and Parramatta City Council as an example of a noise management plan that should be adopted for Parramatta Stadium, provides the following limits on the  $L_{A_{Max}}$  and  $L_{C_{Max}}$  measured at residential premises:
  - 70 dB(A) and 90 dB(L), respectively, for noise emanating from Sydney Cricket Ground (SCG); and
  - 80 dB(A) and 100 dB(C), respectively, for noise emanating from Aussie Stadium (former Sydney Football Stadium).

9.2. Limit at commercial premises (supercross)

The A-weighted maximum sound pressure level ( $L_{A_{Max}}$ ) emanating from Australian Supercross Championship held at Parramatta Stadium, with the exception of the first Australian Supercross Championship that will be held at Parramatta Stadium on 8 November 2008, should not exceed 80 dB(A), when measured at any commercial premises.

**NOTES:**

The limit of 80 dB(A) for the  $L_{A_{Max}}$  emanating from Supercross held at Parramatta Stadium, when measured at the commercial premises, is based on the:

- (1) premise that A-weighted maximum sound pressure level ( $L_{A_{Max}}$ ) corresponds with the A-weighted, equivalent, fifteen-minute sound pressure level ( $L_{A_{eq, 15min}}$ ) plus 15 dB(A); and
- (2) recommended  $L_{A_{eq, 15min}}$  of 65 dB(A) at commercial premises from Table 2.1 of *New South Wales Industrial Noise Policy*.

**10. LIMITS ON PYROTECHNICS**

The linear maximum peak sound pressure level [ $L_{L_{Max} (Peak)}$ ] emanating from pyrotechnic displays during open air concerts and Australian Supercross Championship held at Parramatta Stadium should not exceed 100 dB(L), when measured at any residential premises.

A display should not occur for more than 5 minutes and should be completed prior to 10 pm.

**11. PERSON ACCOUNTABLE FOR COMPLIANCE WITH NOISE LIMITS**

Parramatta Stadium Trust will appoint the Venue Manager, who will retain ultimate control of the:

- (a) volume of sound from amplification systems used during open air concerts; and
- (b) course of Australian Supercross Championship;

and be accountable for compliance with the noise limits from sections 8 to 10.

**12. MEASUREMENTS OF NOISE**

12.1. Noise measurements

Parramatta Stadium Trust will engage suitably qualified acoustical consultants to carry out noise measurements during open air concerts and Australian Supercross Championship.

During the measurements, the consultants will be in the efficient telephone contact with the Venue Manager accountable for compliance with the noise limits from sections 8 to 10.



12.2. Location of noise measurements at residential premises

During open air concerts and Australian Supercross Championship held at Parramatta Stadium, noise measurements (checks of compliance with the noise limits from sections 8 to 10) should be carried out along the:

1. southern boundary of residential premises in Fennell Street between Fleet Street and Northcott Lane;
2. western boundary of residential premises in O'Connell Street between Fennell and Gross Streets (boundary off Northcott Lane);
3. western and southern boundary of residential premises at the corner of O'Connell and Ross Streets;
4. southern boundary of residential premises in Ross Street between O'Connell and Trott Streets;
5. balcony on the top floor on the western aspect of the Convent of Sisters of Mercy in Victoria Street (subject to a consent from the Convent);
6. northern boundary of residential premises in Campbell Street between O'Connell and Pitt Streets;
7. north-eastern boundary of residential premises in Parkside Lane and Lichen Place; and
8. south-eastern boundary of the residential premises in Park Avenue between Hainsworth Street and Railway Parade;

as marked with red lines in Appendix 1.

12.3. Location of noise measurements at commercial premises

During open air concerts and Australian Supercross Championship held at Parramatta Stadium, noise measurements (checks of compliance with the noise limits from sections 8 and 9) should be carried out at the following commercial premises:

1. Old Government House, including Lachlans Restaurant, south of Parramatta Stadium; and
2. Parramatta Park Café (Kiosk) and Events Centre (Conference Facilities) north-west of Parramatta Stadium.

12.4. Instrumentation

During open air concerts, the noise measurements should be carried out with NATA-calibrated, class 1, real-time sound analysers that will allow determination of the:

- a. overall A-weighted and C-weighted maximum sound pressure level; and
- b. one-third octave band spectrum

of excessive noise, if any.

During Australian Supercross Championship, the noise measurements should be carried out with NATA-calibrated, class 1, sound level meters that will allow determination of the overall A-weighted maximum sound pressure level.

Both sound analysers and sound level metres should allow to measure the linear maximum peak sound pressure level [ $L_{LMax (Peak)}$ ] emanating from pyrotechnic displays.

12.5. Additional requirements for noise measurements

- (1) the A-weighted maximum sound pressure level ( $L_{AMax}$ ) will be measured at least once, at the beginning of sound tests, rehearsals and concerts, at all locations listed in sections 12.2 and 12.3 (red lines in Appendix 1);
- (2) any oversteps of the limits will be reported immediately through a two-way radio/mobile telephone to the Venue Manager;
- (3) the oversteps during open air concerts will be reported in relevant frequencies (at one-third octave or one octave bands, depending upon the resolution of the graphic equaliser at the mixing desk), which will allow for prompt ("pinpoint") noise reduction, with the minimum deformation of music;
- (4) there will be a *complaint hot line* available to the public during the sound tests, rehearsals and concerts for lodgement of noise complaints; and
- (5) any complaints will be immediately followed by noise measurements at complainants' locations.



### 13. ACTIONS WHEN NOISE APPROACHES AND EXCEEDS LIMITS

#### 13.1. Actions when noise approaches and exceeds limits during open air concerts

Whenever the  $L_{A_{Max}}$  and/or  $L_{C_{Max}}$  emanating from open air concerts held at Parramatta Stadium:

- (1) reach/reaches 3 dB or less below the noise limits from sections 8.1 and 8.2, the acoustical consultants carrying out measurements of noise at the residential and commercial premises listed in sections 12.2 and 12.3 will warn the Venue Manager accountable for compliance with the limits of a likelihood of non-compliance; and
- (2) exceed/exceeds the limits, the consultants will notify the Venue Manager on the required noise reduction in one- or one-third (depending on the type of the mixing desk) octave band spectra.

After receiving a warning or a notification, the Venue Manager will direct the person in control of the mixing desk to reduce the volume of music/announcements according to instructions from the consultants.

#### 13.2. Actions when noise approaches and exceeds limits during supercross

Whenever the  $L_{A_{Max}}$  emanating from Australian Supercross Championship held at Parramatta Stadium:

- (1) reach/reaches 3 dB or less below the noise limits from sections 9.1 and 9.2, the acoustical consultants carrying out measurements of noise at the residential and commercial premises listed in sections 12.2 and 12.3 will warn the Venue Manager accountable for compliance with the limits of a likelihood of non-compliance; and
- (2) exceed/exceeds the limits, the consultants will notify the Venue Manager of non-compliance with the limits and the required noise reduction.

After receiving a warning or a notification, the Venue Manager will direct the promoter of Australian Supercross Championship to check/confirm that all participating motorbikes still comply with the limit set up by Motorcycling Australia for Motocross and Supercross (that no modifications to motorbikes that result in the higher noise emission have been done since the testing at the commencement of the event, as in Section 7 above).

### 14. HOT LINE

During open air concerts and Australian Supercross Championship, Parramatta Stadium Trust will maintain a hot line available to the public for lodgement of noise complaints.

The hot line will notify without delay the acoustical consultants carrying out measurements of noise at the residential and commercial premises listed in sections 12.2 and 12.3 of any complaints.

The consultants will immediately follow all complaints with noise measurements carried out at locations of complainants.

### 15. REGISTER OF NOISE COMPLAINTS

Parramatta Stadium Trust will maintain a register of all noise complaints received during open air concerts and Australian Supercross Championship held at Parramatta Stadium.



## 16. COMMUNITY CONSULTATION

Parramatta Stadium Trust will encourage the:

- (1) occupiers of the residential and commercial premises listed in sections 12.2 and 11.3, by a letterbox drop;
- (2) general public through its website (<http://www.parramattastadium.com.au>) and in local newspapers to express their opinion on the impact of noise emanating from open air concerts and Australian Supercross Championship held at Parramatta Stadium and provide suggestions on minimizing the impact.

## 17. ACOUSTICAL REPORTS

Within 28 days after an open air concert and a supercross held at Parramatta Stadium, Parramatta Stadium Trust will:

- a. submit to the DECC and Parramatta City Council an acoustical report presenting results of noise measurements carried out during the event; and
- b. publish the results of the noise measurements on Parramatta Stadium Trust's website (<http://www.parramattastadium.com.au>).

## 18. NOISE MANAGEMENT PLAN ON INTERNET

Parramatta Stadium Trust will publish on its website (<http://www.parramattastadium.com.au>):

- the Noise Management Plan for; and
- information listed in section 4 about incoming

open air concerts and Australian Supercross Championship held at Parramatta Stadium.

## 19. REVIEW OF NOISE MANAGEMENT PLAN

Parramatta Stadium Trust will regularly review and update the Noise Management Plan taking into account:

- (1) complaints on noise emanating from open air concerts and Australian Supercross Championship;
- (2) results of the community consultation; and
- (3) recommendations from the DECC, Parramatta City Council and acoustical consultants engaged in monitoring of noise during the events.





## **Pollution Control Consultancy and Design**

is a member of The Association of Consulting Engineers, Australia (ACEA)  
and Association of Australian Acoustical Consultants (AAAC),

and its principal consultant is a Corporate Member of  
The Institution of Engineers, Australia (MIEAust)  
and Australian Acoustical Society (M.A.A.S.).

Pollution Control Consultancy and Design (PCCD) is an independent, accredited, acoustical and environmental engineering practice that was established and is managed by **Alex Jochelson**.

Alex has a Master's Degree in Mechanical Engineering (MEMech) and he is a Corporate Member, Chartered Professional Engineer of The Institution of Engineers, Australia, registered on National Professional Engineers Register under No 371231, in the categories of Environmental and Mechanical Engineering [MIEAust CPEng (Reg)].

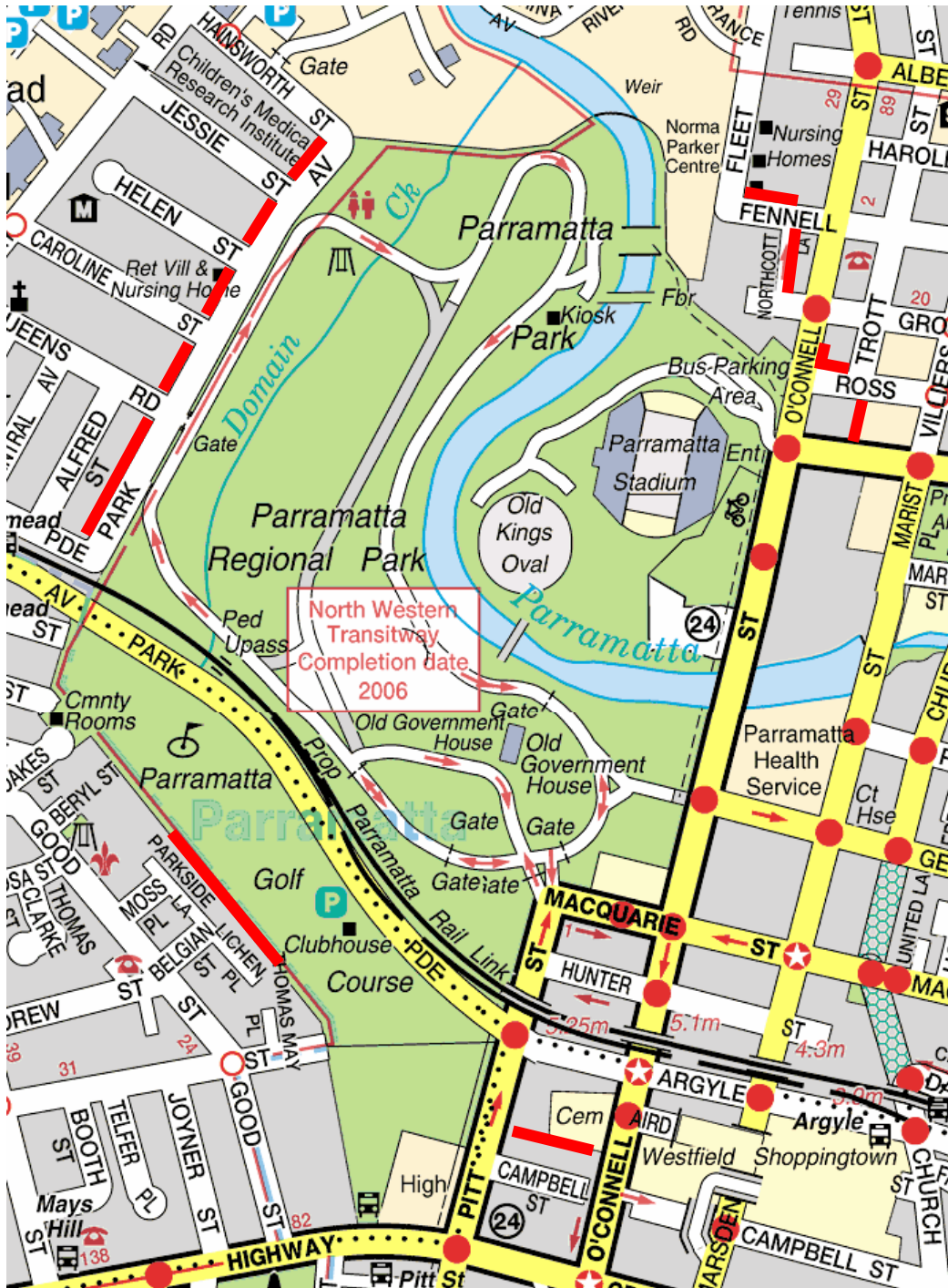
Alex's well balanced, extensive, multi-disciplinary experience in environmental engineering includes:-

- (1) four-year industrial experience (environment protection specialist at ferro-chromium smelting plant);
- (2) four-year research and design experience (research engineer at university);
- (3) nine-year operational, industrial pollution control experience at the Environment Protection Authority of New South Wales - EPA (engineer); and
- (4) the current, since January 1995, engineering consulting experience as the principal consultant of Pollution Control Consultancy and Design (PCCD).

### **Services provided by Pollution Control Consultancy and Design**

Pollution Control Consultancy and Design (PCCD) provides a comprehensive range of services covering all major aspects of the environment protection: air, noise and water pollution control. These services include:-

- a) air, noise and water pollution measurement, assessment and engineering control;
- b) environmental reviews and audits;
- c) environmental management programs (EMPs);
- d) pollution reduction programmes (PRPs);
- e) environment protection policy and strategy;
- f) submissions to and negotiations with the Environment Protection Authority, Department of Planning, Department of Mineral Resources, Sydney Water, Liquor Administration Board and Local Councils;
- g) "environment impact statements" and "statements on environmental effects" for development consents;
- h) applications for pollution control approvals and licences;
- i) compliance audits for environment protection approvals and licences, and development consents;
- j) interpretation of technical requirements of environment protection legislation;
- k) expert witness services for Land and Environment Court and local courts;
- l) proposals of environmentally acceptable and safe operational conditions and procedures;
- m) development of operational manuals for pollution control systems;
- n) process and functional design of air, noise and water pollution control systems;
- o) selection of optimal pollution control technology, equipment and systems;
- p) supervision of construction, commissioning, operation and maintenance of pollution control systems; and
- q) troubleshooting existing air, noise and water pollution control systems.



Locations of noise measurements along residential boundaries, as marked with red lines (  )



Noise Control Measures	Details
<b>PRIOR TO EVENTS</b>	
Appointment of Venue Manager	<a href="#">Section 11 on page 9</a>
Consultation with Parramatta Park Trust	<a href="#">Section 2 on page 6</a>
Notice to DECC and PCC	<a href="#">Section 3 on page 6</a>
Notice to residents and businesses	<a href="#">Section 4 on page 7</a>
Set up of sound amplification system	<a href="#">Section 5 on page 7</a>
Set up of Supercross	<a href="#">Section 6 on page 7</a>
Elimination of noisy motorbikes	<a href="#">Section 7 on page 7</a>
<b>DURING EVENTS</b>	
Maintenance of Hot Line	<a href="#">Section 14 on page 11</a>
Measurements of noise	<a href="#">Section 12 on page 9</a>
Noise reduction, if required	<a href="#">Section 13 on page 11</a>
<b>AFTER EVENTS</b>	
Submission of acoustical report to DECC and PCC	<a href="#">Section 17 on page 12</a>
Publishing results of noise measurements on website	<a href="#">Section 17 on page 12</a>
Review of Noise Management Plan	<a href="#">Section 19 on page 12</a>
<b>ALWAYS</b>	
Maintenance of register of noise complaints	<a href="#">Section 15 on page 11</a>
Noise Management Plan on Parramatta Stadium's website	<a href="#">Section 18 on page 12</a>

**Summary of noise control measures.**



Race circuit noise emission required is part of the circuit hire contract, the noise emission required will prevail over GCR 12.10.1.1.

**12.10.2 Measurement**

12.10.2.1 Noise emissions must be measured with a microphone placed 500mm from the exhaust pipe at an angle of approx 45 degrees measured from the centre line of the exhaust end, and at the height of the exhaust pipe, but at least 200mm above the ground. Where the height of the exhaust outlet makes this impossible, the microphone should be placed at a 45 degree angle above the outlet, see Figs.

12.10.2.2 The reading shall be taken with engine warmed up, running steadily at the specified revs and with the motorcycle out of gear.

12.10.2.3 The test revs depends on the mean piston speed corresponding to the stroke of the engine according to the table below. The revs are calculated using the following formula

$$N = \frac{300,000 \times cm}{l}$$

Where N = prescribed revs

cm = fixed mean piston speed in metres per second, and

l = stroke in mm

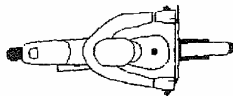
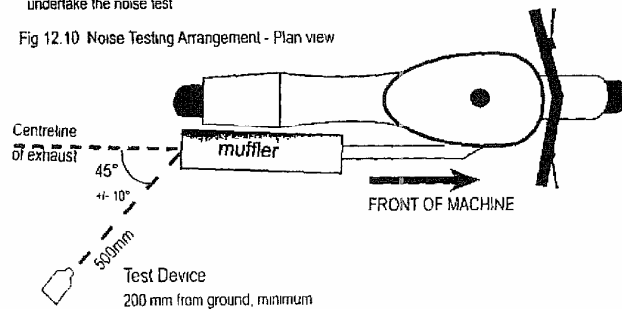


Fig 12.11.2.1

No more than 2 people should undertake the noise test



Fig 12.10 Noise Testing Arrangement - Plan view



Stroke in mm	RPM	Stroke in mm	RPM
Except Motocross (See 17.3)		Except Motocross (See 17.3)	
30	11,000	66	5,000
31	10,645	67	4,925
32	10,313	68	4,853
33	10,000	69	4,783
34	9,706	70	4,714
35	9,429	71	4,648
36	9,167	72	4,583
37	8,919	73	4,521
38	8,684	74	4,459
39	8,462	75	4,400
40	8,250	76	4,342
41	8,049	77	4,286
42	7,857	78	4,231
43	7,674	79	4,177
44	7,500	80	4,125
45	7,333	81	4,074
46	7,174	82	4,024
47	7,021	83	3,976
48	6,875	84	3,929
49	6,735	85	3,882
50	6,600	86	3,837
51	6,471	87	3,793
52	6,346	88	3,750
53	6,226	89	3,708
54	6,111	90	3,667
55	6,000	91	3,626
56	5,893	92	3,587
57	5,789	93	3,548
58	5,689	94	3,511
59	5,593	95	3,474
60	5,500	96	3,438
61	5,410	97	3,402
62	5,323	98	3,367
63	5,238	99	3,333
64	5,156	100	3,300
65	5,077		

**12.10.3 Use of sound level meters**

12.10.3.1 Sound testing apparatus must comply with international standard IEC 651, Type 1 or Type 2.

12.10.3.2 Sound testing apparatus must be set to "slow response" setting. A weighted setting on sound level meter

**12.10.3.3 Correction**

a) Type 1 meter : deduct 1dB(A)

b) Type 2 meter : deduct 2dB(A)

12.10.3.4 The revs shall be measured using a calibrated electronic tachometer or a vibrating reed tachometer held against any solid part of the machine

12.10.3.5 The sound testing apparatus must be equipped with a calibrator for control and adjustment of the meter during periods of use.

12.10.3.6 During a sound test, machines not equipped with a gear box neutral must be placed on a stand.

12.10.3.7 The sound level for engines with more than one cylinder will be measured on each exhaust end.

12.10.3.8 The ambient sound within a 5m radius of the test site should not exceed 80dB(A)

12.10.3.9 Tests shall not take place in rain or excessively damp conditions.

12.10.3.10 In other than moderate wind, machines shall face forward in the wind direction. (Mechanical sound will blow forward, away from microphone).

12.10.3.11 Due to the influence of temperature on sound tests, all figures are correct at 20°C.

a) For tests taken at temperatures below 10°C, there will be a + 1dB(A) tolerance.

b) For tests below 0°C, there will be a + 2 dB(A) tolerance.

12.10.3.12 Always round down meter reading, that is: 103.9dB(A) = 103dB(A).

**12.10.4 Machine testing**

12.10.4.1 Other than the rider, the sound testing operator and a person to hold the front of the machine there should be no person within 3 metres of the testing site

12.10.4.2 Sound level measuring equipment must include a compatible calibrator, which must be used immediately before testing begins and always just prior to a re-test if a disciplinary sanction may be imposed.

12.10.4.3 If a machine fails, it can be represented for re-testing.

12.10.4.4 No person may compete in any event on a machine whose noise emissions exceed the prescribed levels.

12.10.4.5 A machine which does not comply with the sound limits can be presented several times.

12.10.4.6 When presented for examination, the correct stroke must be stamped in a clearly visible position on the crankcase.

**12.10.5 Sound control during competition**

12.10.5.1 The Noise Control Officer (NCO) must arrive in sufficient time for discussions with the Clerk of the Course and other Technical Officials in order that a suitable test site and testing policy can be agreed.

12.10.5.2 In a competition which requires sound control tests during the event, machines must comply with the sound limits.

12.10.5.3 Machines considered excessively noisy must be individually tested if conditions allow.

**12.10 NOISE EMISSIONS -ALL DISCIPLINES**

**12.10.1 Specifications**

12.10.1.1 Noise emissions must not exceed 96dB(A) unless a lower limit is provided for in SR or another limit is shown in the table below

DISCIPLINE	LIMIT dB(A)
Road Racing	102
Historic Road Racing	102
Motocross and Supercross	96
Classic MX & Dirt Track	96
Speedway	98
Dirt Track	96
Track	98
Quads	96
Moto-Trials	96
Supermoto	96
Enduro & Reliability Trials	96
Mmxkhana	95
Record Attempts	No limit

12.10.1.2 Where government regulations or planning orders exist in relation to noise testing, or where a permanent Road

**Procedure for noise emission testing.**



## NOTES