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**REPORT No EN-MS-141109AJ**

**Parramatta Stadium**

11-13 O'Connell Street  
PARRAMATTA



**Measurements of noise emanating from  
Australasian Supercross Championships 2009 held at Parramatta Stadium on 14 November 2009**

**December 2009**



**Pollution Control Consultancy and Design (PCCD)**  
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  
Principal Consultant of Pollution Control Consultancy and Design (PCCD)**

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Appendix 1: Locations of noise measurements along residential boundaries.



## 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  $20\mu\text{Pa}$ .

### 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).

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

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).

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

the A-weighted highest value of sound pressure level that occurs during a specific time interval, as measured with an instrument that performs a running average on  $p^2(t)$ , the square of the instantaneous sound pressure during the measurement time  $T$ , [dB(A)].

### Linear Peak Sound Pressure Level ( $L_{L\text{Peak}, T}$ ):

the unweighted largest instantaneous sound pressure magnitude that occurs during the measurement time  $T$ , [dB(L)].



## EXECUTIVE SUMMARY

This report presents results of noise measurements [A-weighted maximum sound pressure levels ( $L_{AMax}$ ) and linear peak sound pressure level ( $L_{LPeak}$ )] that were carried out by Pollution Control Consultancy and Design (PCCD) during Australasian Supercross Championship 2009 (**Super X 2009**) (a motor sport event) held at Parramatta Stadium in 11-13 O'Connell Street, Parramatta (Appendix 1), on Saturday, 14 November 2009.

The measurements were carried out:

- (1) along residential boundaries marked with red lines in Appendix 1; and
- (2) at Old Government House, including Lachlans Restaurant, south of Parramatta Stadium, and Parramatta Park Café (Kiosk) / Events Centre (Conference Facilities) north-west of Parramatta Stadium;

and their results show that the:

- $L_{AMax}$  emanating from Parramatta Stadium during Super X 2009 was below the limits from *Noise Management Plan* of Parramatta Stadium in all locations except on the top floor of Convent of Sisters of Mercy in 6 Victoria Street, where it exceeded the relevant limit by 2 dB(A);
- $L_{LPeak}$  emanating from the pyrotechnic display at the commencement of the event (5.30 pm) exceeded the limit from the plan by 15 dB(L); however it was only one, single blast during the entire pyrotechnic display.



## 1. LIMITS ON NOISE DURING SUPERCROSS

In this report, the level of noise emanating from Super X 2009 (a motor sport event) is assessed in terms of limits proposed in Report No EN-OAC-030809AJ of 14 September 2009: *Parramatta Stadium - 11-13 O'Connell Street, PARRAMATTA - NOISE MANAGEMENT PLAN for open air concerts and Australasian Supercross Championship*. The limits are provided in Sections 1.1 to 1.3, below:

### 1.1. Limits on noise from Supercross - residential premises

The A-weighted maximum sound pressure level ( $L_{A_{Max}}$ ) emanating from Australasian Supercross Championship held at Parramatta Stadium 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.

### 1.2. Limit on noise from pyrotechnics - residential premises

The linear peak sound pressure level ( $L_{L_{Peak}}$ ) emanating from pyrotechnic displays during Australasian 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.

### 1.3. Limit on noise from Supercross - commercial premises

The A-weighted maximum sound pressure level ( $L_{A_{Max}}$ ) emanating from Australasian Supercross Championship held at Parramatta Stadium should not exceed 80 dB(A), when measured at any commercial premises.

## 2. LOCATION AND TIME OF NOISE MEASUREMENTS

### 2.1. Location of noise measurements at residential premises

For the purpose of this report, the noise measurements at residential premises were carried 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.



2.2. Location of noise measurements at commercial premises

For the purpose of this report, the noise measurements were carried 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; shown on the map in Appendix 1.

2.3. Time of noise measurements

The noise measurements at the residential and commercial premises were carried out on Saturday, 14 November 2009, between 12.00 pm and 1.10 pm (practise sessions) and between 5.40 pm and 9.30 pm (races).

**3. INSTRUMENTATION AND CALIBRATION**

For the purpose of this report, the measurements of the A-weighted maximum sound pressure level ( $L_{A_{Max}}$ ) and the linear peak sound pressure level ( $L_{LP_{Peak}}$ ) were carried out with NATA-calibrated, class 1, Brüel and Kjær (B&K) modular, precision, real-time sound analyzers type 2260 Investigator, serial numbers: 1823768 and 2001750, with ½" prepolarized, condenser, free-field microphones type 4189, serial numbers: 1783817 and 2385971, respectively.

The instruments were calibrated acoustically with a NATA-calibrated, B&K sound level calibrator type 4231, serial number: 1821262, before and after the measurements, when the calibration drifts were lesser than 1 dB and thus, according to Australasian Standard: Acoustics - Description and measurement of environmental noise (AS 1055.1-3 - 1997), the results from the instruments are valid.



#### 4. RESULTS OF NOISE MEASUREMENTS

##### 4.1. Noise from Supercross

Table 1 below provides results of measurements of the A-weighted maximum sound pressure levels ( $L_{AMax}$ ) emanating from Super X 2009 and the public address system used during the event (Parramatta Stadium's permanent public address system).

Table 1

No	Location	Start	Race	Assessment
<b>RESIDENTIAL PREMISES</b>				
1	<b>Fennell Street</b> (between Fleet Street and Northcott Lane)	65	63	At the limit of 65 dB(A)
2	<b>Northcott Lane</b>	Audible noise; too low to measure		
3	<b>Ross Street</b> (between O'Connell Street and Trott Street)	71	69	4 dB below the limit of 75 dB(A)
4	<b>6 Victoria Street</b> (top floor of Convent of Sisters of Mercy)	<b>76</b>	<b>77</b>	<b>2 dB above the limit of 75 dB(A)</b>
5	<b>1 Macquarie Street</b> (Central Park Apartments)	Audible noise; too low to measure		
6	<b>Campbell Street</b> (between O'Connell Street and Pitt Street)	Just audible noise		
7	<b>Parkside Lane/Lichen Place</b>	63	65	At the limit of 65 dB(A)
8	<b>Park Avenue</b> (between Hainsworth Street and Railway Parade)	63	61	2 dB below the limit of 65 dB(A)
<b>COMMERCIAL PREMISES</b>				
1	<b>Lachlans Restaurant</b> (Old Government House)	72	69	8 dB below the limit of 80 dB(A)
2	<b>Kiosk</b> (Parramatta Park Café / Conference Centre)	74	70	6 dB below the limit of 80 dB(A)

The results show that the  $L_{AMax}$  were below the limits from Sections 1.1 and 1.3 above at all locations, except on the top floor of Convent of Sisters of Mercy in 6 Victoria Street, where the  $L_{AMax}$  exceeded the limit from Section 1.1 by 2 dB(A).

The  $L_{AMax}$  exceeding the limit from your Noise Management Plan were caused not by direct noise from motorbikes, but by the public address system (predominantly, from very enthusiastic commentaries of races).

##### 4.2. Noise from pyrotechnics

The linear peak sound pressure level ( $L_{LPeak}$ ) emanating from the pyrotechnic display at the commencement of Super X 2009 (5.30 pm) reached 115 dB(L), i.e. it exceeded the limit from Section 1.2 above by 15 dB(L) - however, it occurred only once (only one, single blast at the end of the pyrotechnic display).



## 5. NOISE COMPLAINTS

During Super X 2009 both Parramatta Stadium and Pollution Control Consultancy and Design (PCCD) maintained “hot lines” to allow any persons affected by noise from the event lodging noise complaints that could be followed by immediate noise measurements in areas of concern.

No noise complaints were lodged through the hot lines and/or other means either during Super X 2009 or afterwards.

## 6. RECOMMENDATION

During the measurements, Pollution Control Consultancy and Design (PCCD) asked several times for reduction of the volume of the public address system.

We recommend that this system be ‘tuned up’ based on results of measurements on environmental noise at residential premises, at least on measurements carried out:

- on the top floor of Convent of Sisters of Mercy in 6 Victoria Street;
- along north-eastern boundaries of residences in Parkside Lane;
- at western end of Fennell Street; and
- at the corner of Park Avenue and Helen Street.





## **Pollution Control Consultancy and Design**

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

and its principal consultant is a Corporate Member of  
The Institution of Engineers, Australia (MIEAust)  
and Australasian 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 ( — ) .

## NOTES