



**Sydney Cricket Ground Trust**

**ALLIANZ STADIUM: EVENT NOISE  
MONITORING - ED SHEERAN, 9  
DECEMBER 2015**

**December 2015**

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## **Executive Summary**

Monitoring of noise levels at sensitive receptors in the area surrounding Allianz Stadium was undertaken during rehearsals and the Ed Sheeran concert on the 9<sup>th</sup> December 2015 to determine compliance with the following noise criteria defined in the site's Noise Management Plan (NMP):

*'During sound test(s), rehearsal(s) and concert(s),  $L_{Amax}$  and the  $L_{Cmax}$  measured at the specified locations described in Section 15.4 will not exceed:*

*ii) For activities conducted at the SFS: 80 dB(A) and 100dB(C).'*

*Throughout the monitoring, noise levels were recorded every two minutes, and observations were made as to the source of noise and potential exceedances at each location. The noise level recorded represents the highest RMS noise level recorded during the two minute period. Hence, even where exceedances are identified it is possible that for the majority of the two minute period, receptor noise levels were compliant with the NMP criteria.*

*During the sound checks/rehearsals on the 9<sup>th</sup> December (during the period 1:49 pm until 3:25 pm) Event Noise Management (ENM) staff completed tests to determine adjustments to the sound system to reduce external noise levels to achieve compliance. Brief exceedances of the dB(C) criteria occurred at 2:27 pm and 3:18 pm by 3.7 and 1.2 dB respectively. The sound engineers were informed and adjustments to volume and system implemented. Subsequent measurement periods indicated the adjustments were effective.*

*During the first two support acts 'Foy Vance' and 'Passenger' occurring from 6:00pm – 6:20pm and 6:30 pm – 6:55 pm respectively, the measured levels were compliant with criteria. During the support act 'Rudimental' occurring from 7:20 pm – 8:00 pm the opening volume was 5 dB above the dB(C) criteria, and the sound engineers worked to reduce levels in the following period. The NMP makes allowance for this initial correction and therefore, this single exceedance does not constitute a breach of the noise conditions. During the remainder of this act there were 14 x two-minute periods, with a measured exceedance of the dB(C) criteria of between 1 and 4 dB(C).*

*Heavy rain and thunderstorm activity delayed the scheduled start time of 'Ed Sheeran' performance by 8 minutes, which also restricted the measurable noise at the nominated positions during the opening two songs. Overall during the rain period, the volume of music was found to be reduced and measurements indicated compliance.*

*The rain eased from 8:58 pm, however the thunderstorm continued and elevated winds returned. A measured exceedance of 2.5 dB(C) occurred, and sound engineers reduced the noise levels. The NMP makes allowance for this initial correction and, therefore, this single exceedance does not constitute a breach of the noise conditions.*

*During the remainder of the performance maximum dB(C) levels measured external to the venue fluctuated from 90 – 105 dB(C), with two occurrences of levels above 105 dB(C) at 9:22 pm (107.6) and 10:16 pm (108.8). During the 1 hour 50 minute performance there were 21 measured exceedances of the 100 dB(C) criteria.*

*During the show SCGT staff and Event Noise Management staff continually informed the sound engineers and head of production of the ongoing exceedances and the need to reduce the*



*overall volume of the show to achieve compliant operating volumes.*

*During the event 5 complaints were received by the Trust during the performance, 4 of which were pertaining to the amplified noise from the concert on the 9<sup>th</sup> December 2015. The complaints related to the elevated levels of low frequency noise from the venue.*

*The event personnel were informed that the NMP requires the event to conclude at 22:30 hrs. The stage performance and all amplification on the 9<sup>th</sup> concluded at 22:28 hrs.*

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# 1 INTRODUCTION

## 1.1 SCOPE OF ASSESSMENT

Sydney Cricket Ground Trust commissioned Air Noise Environment Pty Ltd to conduct event noise monitoring during the Ed Sheeran concert as required under the Noise Management Plan (NMP) for the facility<sup>1</sup>.

This report presents a summary of the results of the monitoring and a comparison with the noise criteria for the event as defined in the NMP.

## 1.2 EVENT DETAILS

The concert events were held at Allianz Stadium (SFS) on Wednesday 9 December 2015, with sound checks and rehearsals early in the day, as well as on Tuesday 8 December, 2015. This report presents the noise monitoring and results for the rehearsal, sound checks and performance on the 9 December 2015.

The approximate schedule for the amplified rehearsal and event were as follows:

- Sound checks and rehearsals: 1:49 pm – 3:25 pm
- Gates Open, with background pre-recorded music: 4:30 pm – 6:00 pm
- Support Act 'Foy Vance': 6:00 pm – 6:20 pm
- Support Act 'Passenger': 6:30 pm – 6:55 pm
- Support Act 'Rudimental': 7:20 pm – 8:00 pm
- 'Ed Sheeran': 8:38 pm - 10:28 pm.

## 1.3 EVENT NOISE CRITERIA

Noise limits for concert events held at Allianz Stadium are provided in the site's NMP as follows:

### ***'3.2.2 Concerts, Rehearsals and Sound Tests***

*Both dB(A) and dB(C) limits are specified for concerts as a particular impact on local receptors of amplified music is low-tone bass sounds – measured in dB(C).*

*During sound test(s), rehearsal(s) and concert(s),  $L_{Amax}$  and the  $L_{Cmax}$  measured at the monitoring locations will not exceed:*

- *For activities conducted at the SFS: 80 dB(A) and 100dB(C). '*

Section 6.2.1 of the NMP details the monitoring positions that must be considered as follows:

### ***'Monitoring Locations***

*For both sporting events and concerts attended monitoring locations will be as set out*

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<sup>1</sup> Sydney Cricket and Sports Ground Trust (SCGT) Noise Management Plan for Sydney Cricket and Sports Ground Trust (November 2008 )

below.

**For activities taking place at Allianz Stadium:**

- *At a point within one (1) metre of the boundary nearest to Allianz Stadium at 234 Moore Park Road, Paddington; and*
- *At a point within one (1) metre of the boundary nearest to Allianz Stadium of 10 Alexander Street, Paddington'*

The NMP also presents the following considerations relevant to concert performance noise:

- An exceedance of the noise level limit by a maximum of 5 dB(A) and/or 5 dB(C) during a single (5) minute period during the first ten (10) minutes of the performance of each new act will not be taken to be a breach of the limits.
- Noise levels measured when wind speed exceeds 5 m/s (at microphone height) should not be used to measure compliance with noise limits in the Notice, as wind generated noise may limit measurement accuracy. During periods of wind greater than 5 m/s the Trust must continue to take all reasonable and feasible actions to minimise noise.
- **Concerts:** A concert must not commence prior to 1000 hours or finish after 2230 hours on any day. Notwithstanding the above, concerts may continue until 2300 hours if an occurrence beyond the control of the Trust delays the concert. The total length of a concert must not be greater than five (5) hours.
- **Rehearsals:** Rehearsals will not commence prior to 1000 hours or finish after 1900 hours. The total duration of rehearsals will be kept to an absolutely minimum; and
- **Sound Tests:** Sound test(s) will not commence prior to 1000 hours or finish after 1900 hours. The total duration of sound tests will be kept to an absolute minimum.

The exemption for exceedances at the start of new performances is intended to give the mixing desk operators time to respond to changes in conditions (e.g. meteorology), or unfamiliarity with the system (new operator). Subsequent exceedances will be considered as normal.



## 2 MONITORING METHODOLOGY

### 2.1 MONITORING POSITIONS

Monitoring during the sound checks and rehearsal were undertaken at two fixed monitoring positions as required by the NMP. Table 2.1 presents a summary of the monitoring locations assessed during the event, with the monitoring positions identified on Figure 1.

**TABLE 2.1: SUMMARY OF MONITORING POSITIONS**

Position	Description
1	Fixed monitoring position located within 1 m of the front boundary of 234 Moore Park Road
2	Fixed monitoring position located within 1 m of the front boundary of 10 Alexander Street



**Figure 1: Noise Monitoring Positions (External Fixed Locations)**

In addition to the external compliance monitoring, Event Noise Management staff were present at the front of house (FOH) position to advise the compliance status of noise levels to the production team throughout the event. It was noted that a dedicated sound engineer was in control of the overall volumes throughout the show, and ENM personnel were positioned in close proximity allowing swift advice when changes were required to operating volumes to maintain



compliance.

## 2.2 OPERATORS

During the monitoring undertaken on 9 December 2015, Air Noise Environment personnel were located at each position identified in Figure 1. The monitoring exercise was undertaken by the following personnel:

- Mixing Desk: Beau Weyers, BEng(Mech), RPEQ, MAAS;
- Position 1: Brett Verran: BSc (Env); and
- Position 2: Roger Treagus: BA, MA Env. Stud, MAAS.

## 2.3 MONITORING EQUIPMENT

Table 2.2 presents a summary of the equipment used the monitoring. The sound level meters used for the monitoring conform to Australian Standard 1259 "Acoustics - Sound Level Meters", (1990) Type 1 (precision sound level meter), and have an accuracy suitable for both field and laboratory use.

The sound level meters and calibrator have been checked, adjusted and aligned to conform to the Type 1 specifications by a third party NATA accredited laboratory within the last 24 months and issued with a conformance certificate.

**TABLE 2.2: SUMMARY OF MONITORING EQUIPMENT**

Position	Instrument Model	Instrument Serial	Instrument Calibration Due Date	Calibrator Model	Calibrator Serial	Calibrator Calibration Due Date
1	B&K 2250 Lite	2741104	23/10/17	Pulsar 105	62686	4/11/16
2	B&K 2250 Lite	2741105	22/1/17	Pulsar 105	62686	4/11/16
Front of House	Norsonic 140	1404663	6/7/17	Pulsar 105	62686	4/11/16

Field calibrations of each of the instruments were also undertaken prior to and immediately after the monitoring was completed. Less than 0.5 dB drift occurred over the measurement periods. All instruments were fitted with a windshield and monitoring was completed at a height of 1.5 m above ground level.

## 2.4 WEATHER CONDITIONS DURING THE EVENT

During the sound check and rehearsal, a moderate north-easterly breeze was observed with generally clear skies. Just prior to the start of the main act, the weather became changeable and 12.6 mm of rain fell within a 30 minute period. During the main act, wind direction varied frequently and remained moderate. Temperatures started from 30°C and reduced to 23°C after the rain.

Table 2.3 presents a summary of the meteorological data from Observatory Hill Sydney and Sydney Airport for the rehearsal afternoon and performance evening.

**TABLE 2.3: SUMMARY OF METEOROLOGICAL DATA**

Date time	Temp	Cloud <sup>a</sup>	Cloud base <sup>a</sup> (m)	Gust <sup>a</sup> (kmh)	Press	Rain (mm)	Rel hum	Wind dir	Wind spd (kmh)
09/10:30pm	22.9	Mostly clear	600	33	1013.8	12.4	76	ENE	17
09/10:00pm	22.7	Partly cloudy	600	41	1013.2	12.4	75	ESE	30
09/09:30pm	23.3	Partly cloudy	1500	39	1013.4	12.4	80	ESE	24
06/09:00pm	23.1	Mostly cloudy	1000	54	1011.8	12.4	75	NE	15
06/08:30pm	25.6	Partly cloudy	1200	46	1013.1	1.6	69	WSW	17
06/08:00pm	27.5	Partly cloudy	1200	33	1011	0.2	57	NNE	19
06/07:30pm	27.4	Mostly clear	1500	39	1010.8	0.2	55	NNE	26
06/07:00pm	27.9	Mostly clear	1500	41	1010.9	0.2	55	NNE	17
06/06:30pm	29.1	Mostly clear	1500	43	1010.8	0.2	50	NNE	26
09/06:00pm	28.7	Partly cloudy	1000	50	1010.7	0.2	51	NE	24
09/05:30pm	28	Mostly clear	1800	44	1010.8	0.2	55	NE	13
09/05:00pm	27.3	Mostly clear	1800	46	1010.9	0.2	56	ENE	15
09/04:30pm	27.8	Mostly clear	1800	43	1011.1	0.2	56	ENE	13
09/04:00pm	27.9	-	-9999	37	1011.5	0.2	57	ENE	20
09/03:30pm	27.8	-	-9999	33	1012	0.2	56	ENE	19
09/03:00pm	27.5	Partly cloudy	1500	37	1012.2	0.2	58	ENE	17
09/02:30pm	28	-	-9999	32	1012.5	0.2	56	ENE	20
09/02:00pm	28.3	-	-9999	30	1012.9	0.2	54	E	24
09/01:30pm	29.7	Partly cloudy	1950	26	1013.2	0.2	48	E	20

<sup>a</sup> Data obtained from Sydney Airport meteorological station (not measured at Observatory Hill station)

## **3 RESULTS OF MONITORING**

### **3.1 MONITORING RESULTS**

Noise monitoring results were recorded at each location every two minutes throughout the monitoring period (1:49 pm to 10:28 pm). During each two minute period notes were also made regarding the sources of noise in the area and the source of any potential exceedances of the noise criteria. It is noted that the noise level recorded represents the highest RMS noise level recorded during the two minute period. Hence, even where exceedances are identified it is possible that for the majority of the two minute period, receptor noise levels were compliant with the NMP criteria.

During the sound checks/rehearsals completed on the 8<sup>th</sup> of December Event Noise Management (ENM) staff completed tests to determine adjustments to the sound system to reduce external noise levels. These changes included reduction of the volume of specific performers and songs, and of problem frequencies, instruments, and speaker arrays. The sound engineer made adjustments to achieve compliance, and programmed them into the system. It was noted that north-easterly winds prevalent during the rehearsal.

During the sound checks/rehearsals carried out intermittently on the 9<sup>th</sup> December from 1:49 pm until 3:25 pm, Event Noise Management (ENM) staff completed additional tests to determine adjustments to the sound system to reduce external noise levels to achieve compliance during the support acts. Similar adjustments were made to those of 8<sup>th</sup> December. Again, during these tests north-easterly winds were prevalent. This wind direction was predicted to continue during the performance, with a potential change to a southerly (source to receiver) wind during the feature act. The sound engineers were informed that further reductions may be required in the case of change in wind direction.

During the sound checks, brief exceedances of the dB(C) criteria occurred at 2:27 pm and 3:18 pm by 3.7 and 1.2 dB respectively. The sound engineers were informed and adjustments to volume and system implemented, and subsequent measurement periods indicated the adjustments were effective.

During the first two support acts 'Foy Vance' and 'Passenger' occurring from 6:00 pm – 6:20 pm and 6:30 pm – 6:55 pm respectively, the measured levels were compliant with criteria.

During the support act 'Rudimental' occurring from 7:20 pm – 8:00 pm the opening volume was 5 dB above the dB(C) criteria, and the sound engineers worked to reduce levels in the following period. The NMP makes allowance for this initial correction and therefore, this single exceedance does not constitute a breach of the noise conditions. Despite efforts to reduce levels externally, there were 14 x two-minute periods with a measured exceedance of the dB(C) criteria (of between 1 and 4 dB(C)). Total compliance was only achieved during the final song, and a noted reduction in sound quality within the venue was noted. Various periods also exceeded the dB(C) criteria due to traffic noise.

Prior to the main act, discussions with the sound engineers were held to advise that similar reductions would be necessary to achieve compliance during the headline act 'Ed Sheeran'. In particular, the sound engineers were advised to reduce the volume from the elevated sub-woofer arrays.

Heavy rain and thunderstorm activity delayed the scheduled time of 'Ed Sheeran' performance

by 8 minutes. This also restricted the measured noise levels at the nominated positions during the opening two songs. As far as practicable measurements were made in a nearby sheltered position. Overall, during the rain period, the volume of music was found to be reduced and measurements indicated compliance.

The rain eased from 8:58 pm, however the thunderstorm continued and elevated winds returned. A measured exceedance of 2.5 dB(C) occurred at the commencement of the main act, and sound engineers were responded quickly to a request to reduce the levels. The NMP makes allowance for this initial correction and therefore, this single exceedance does not constitute a breach of the noise conditions.

During the remainder of the performance maximum dB(C) levels measured external to the venue fluctuated from 90 – 105 dB(C), with two occurrences of levels above 105 dB(C) at 9:22pm (107.6) and 10:16pm (108.8).

Overall, during the 1 hour 50 minute performance there were 21 measured exceedances of the 100 dB(C) criteria. The sound engineers identified concerns about reducing noise levels inside the venue to the levels identified as suitable during the rehearsals, as these would be significantly below that required for audience satisfaction.

Most live acts operate at noise levels between 100 – 110 dB(A), and 115 – 125 dB(C) when measured at the front of house (FOH) position. Following the adjustments during the rehearsals, the sound system for the Ed Sheeran concert was typically operating at between 90 – 95 dB(A) with occasional vocal spikes to 102 dB(A), and 105 – 116 dB(C) with occasional vocal spikes to 120 dB(C). These levels are considered to be below those that are generally considered suitable for audience satisfaction.

During the performance, the levels typically operated at between 105 – 115 dB(C) during ballads only, and more typically 115 – 122 dB(C) during popular songs. The vocal and mid-range frequencies were typically in the range of 98 – 108 dB(A). The performance levels were higher than the adjusted rehearsal levels.

The periods of non-compliance were associated with the bass heavy 'pop' performances, where amplified 40 – 63 Hz frequencies prevailed. During the ballad type songs, compliance was achieved (including the period with special guest 'Sir Elton John'). This confirms that the measured non-compliances were associated with bass frequencies.

During the show SCGT staff and Event Noise Management staff continually informed the sound engineers and head of production of the ongoing exceedances and the need to reduce the overall volume of the show to achieve compliant operating volumes.

The event personnel were informed that the NMP requires the event to conclude at 22:30 hrs. The stage performance and all amplification on the 9<sup>th</sup> concluded at 22:28 hrs.

Appendix B presents a summary of the recorded noise levels and observations during the sound check and rehearsal, with exceedances of the criteria identified as originating from amplified sources within the Allianz Stadium shown in bold.

## **3.2 CONCERT HOTLINE**

During the event 5 complaints were received by the Trust during the performance, 4 of which

were pertaining to the amplified noise from the concert on the 9<sup>th</sup> December 2015. The complaints related to the elevated levels of low frequency noise from the venue. It is noted that the complaints were generally at a distance from the site, and may have been influenced by more localised noise activities (unrelated to the event).

A register of the complaints recorded by the Sydney Cricket Ground Trust for the concert and sound checks on 89/12/15 is provided in Appendix C.

# **APPENDIX A**

## **ACOUSTIC GLOSSARY**



## APPENDIX A: GLOSSARY OF ACOUSTIC TERMINOLOGY

<b>A-Weighting</b>	A response provided by an electronic circuit which modifies sound in such a way that the resulting level is similar to that perceived by the human ear.
<b>dB (decibel)</b>	This is the scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and the reference pressure (0.00002 N/m <sup>2</sup> ).
<b>dB(A)</b>	This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
<b>dB(C)</b>	This is a standard weighting of the audible frequencies, commonly used for the measurement of Peak Sound Pressure level.
<b>Facade Noise Level</b>	Refers to a sound pressure level determined at a point close to an acoustically reflective surface (in addition to the ground). Typically a distance of 1 metre is used.
<b>Free Field</b>	Refers to a sound pressure level determined at a point away from reflective surfaces other than the ground with no significant contribution due to sound from other reflective surfaces; generally as measured outside and away from buildings.
<b>Hertz (Hz)</b>	A measure of the frequency of sound. It measures the number of pressure peaks per second passing a point when a pure tone is present.
<b>L<sub>Aeq</sub> Equivalent Continuous Sound Level</b>	This is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over the given period. For a steady sound with small fluctuations, its value is close to the average sound pressure level.
<b>L<sub>A90,T</sub></b>	This is the dB(A) level exceeded 90% of the time, T.
<b>L<sub>A10,T</sub></b>	This is the dB(A) level exceeded 10% of the time, T.
<b>L<sub>Amax</sub></b>	is the maximum A-weighted sound pressure level recorded over the period stated.
<b>L<sub>Cmax</sub></b>	is the maximum C-weighted sound pressure level recorded over the period stated.

# **APPENDIX B**

## **DETAILED MONITORING DATA (FIXED POSITIONS)**



## EVENT NOISE MANAGEMENT

<b>Project Number:</b>	4390	<b>Date:</b>	WED 09/12/2015
<b>Project Description:</b>	Ed Sheeran		
<b>Monitoring Location:</b>	1 - SFS at 234 Moore Park Road, Paddington		
<b>Operator:</b>	Brett Verran		
<b>Instrument:</b>	Bruel & Kjaer 2250L	<b>Calibrator Model:</b>	Pulsar Model 105
<b>Instrument Serial:</b>	2741104	<b>Calibrator Serial:</b>	62686
<b>Instrument NATA Calibration Date:</b>	23/10/15	<b>Calibrator NATA Calibration Date:</b>	4/11/15
<b>Pre-calibration:</b>	93.9	<b>Post calibration:</b>	93.9

Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
14:22	84.7	92.5	Traffic defining maximums. Drums and line checks audible at low volumes.
14:24	81.3	97.6	Traffic defining maximums. Drums measured up to 94 dB(C).
14:26	89.6	103.7	Traffic defining dB(A) maximum. <b>Amplified drums up to 103.7 dB(C) in last 1 second of measure.</b>
14:28	83.3	103.7	Traffic defining dB(A) maximum. <b>Amplified drums up to 103.7 dB(C) in first 1 second of measure. Sound Engineers informed of need to reduce levels.</b>
14:30	83.9	92.5	Traffic defining maximums. Music audible.
14:32	86.0	101.6	
14:34	82.1	92.9	
14:36	91.9	97.3	
14:38	86.6	95.4	Traffic defining maximums. Music inaudible.
14:40	88.8	94.6	
14:42	76.3	91.4	
14:44	83.9	91.9	
14:46	74.5	83.3	
14:48	82.1	94.2	
14:50	87.9	95.1	Traffic defining maximums. Music inaudible.
14:52	84.2	88.9	
14:54	81.9	94.0	
14:56	83.9	104.8	
14:58	83.8	93.3	Traffic defining maximums. Guitar line checks audible, well below criteria.

Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
15:00	79.1	87.1	Traffic defining maximums. Guitar line checks audible, well below criteria.
15:02	83.7	92.9	
15:04	78.8	84.7	Traffic defining maximums. Music inaudible.
15:06	83.5	100.2	Traffic defining maximums (Motorbike). Music inaudible.
15:08	79.9	97.0	Traffic defining dB(A) maximum. Amplified music defining dB(C).
15:10	83.0	99.2	Traffic defining maximums. Music inaudible.
15:12	88.8	96.0	
15:14	79.3	92.1	
15:16	91.2	97.9	
15:18	77.0	101.2	Traffic defining maximums. <b>Music up to 100 dB(C), sound engineers informed of potential breach of criteria.</b>
15:20	86.3	100.7	Traffic defining maximums. Music audible.
15:22	78.2	100.7	
15:24	79.4	92.3	
15:26	85.7	96.6	Traffic defining maximums. Music inaudible.
15:28	82.9	97.9	
15:30	75.1	88.5	
15:32	87.0	97.2	
15:34	73.0	82.1	
			Traffic defining maximums. Music inaudible.
16:36	88.9	98.4	
16:38	81.2	92.8	
16:40	90.3	97.5	
16:42	84.1	90.1	
16:44	84.7	98.5	
16:46	96.8	101.0	
16:48	77.1	91.5	
16:50	79.3	94.9	
16:52	89.6	95.3	
16:54	90.4	98.3	
16:56	79.4	89.8	

Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
16:58	80.0	94.0	Traffic defining maximums. Music inaudible.
17:00	83.0	91.0	
17:02	84.9	91.2	
17:04	88.8	95.2	
17:06	77.6	85.1	Traffic defining maximums. Music inaudible.
			Unit turned off during unamplified period to save battery. FOH monitoring continues to identify any unexpected elevated levels.
17:50	71.4	80.8	Traffic defining maximums. Music inaudible.
17:52	77.5	89.3	
17:54	77.3	88.4	
17:56	87.7	97.9	
17:58	82.9	94.3	Traffic defining maximums. Music audible from venue 'Foy Vance' introduction music.
18:00	83.4	97.3	Traffic and resident talking defining maximums. Music clearly audible.
18:02	93.7	98.6	
18:04	82.7	99.4	
18:06	81.2	98.9	
18:08	84.2	93.0	
18:10	91.0	93.9	Traffic defining maximums. Music clearly audible.
18:12	79.5	95.9	
18:14	86.0	96.4	Traffic defining maximums. <b>Music clearly audible, vocals 70-75 dB(A), bass 90-94 dB(C).</b>
18:16	88.1	98.6	Traffic defining maximums. Music clearly audible.
18:18	89.3	100.8	Traffic defining maximums (Motorcycle). Music clearly audible.
18:20	87.4	90.9	Traffic defining maximums. Music clearly audible.
18:22	80.3	90.9	Traffic defining maximums. Music inaudible.
18:24	85.4	88.4	
18:26	80.4	97.4	
18:28	89.3	97.1	
18:30	89.3	96.6	Traffic defining maximums. Amplified vocals clearly audible.
18:32	91.6	96.3	

Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
18:34	101.1	100.5	Ambulance defining maximums. Music 70-73 dB(A), 85-90 dB(C)
18:36	76.6	98.7	Traffic defining maximums. Music clearly audible.
18:38	77.7	100.3	
18:40	77.6	101.0	Pedestrian defining maximum (yelling). Music clearly audible.
18:42	88.1	98.5	Traffic defining maximums. Music audible.
18:44	90.8	98.2	
18:46	94.3	100.1	
18:48	81.8	97.2	
18:50	76.0	85.9	
18:52	83.1	100.2	
18:54	86.3	97.8	
18:56	76.5	86.4	
18:58	72.4	84.7	
19:14	81.3	90.0	Traffic defining maximums. Music inaudible.
19:16	90.8	91.0	
19:18	73.1	98.6	
19:20	83.4	<b>105.2</b>	<b>Amplified bass exceeding dB(C) criteria. Sound engineers requested to reduce volume.</b> Traffic defining dB(A) maximum.
19:22	85.0	<b>104.9</b>	<b>Awaiting reduction to bass frequencies, remaining clearly audible.</b> Traffic defining dB(A) maximum.
19:24	92.0	105.7	Heavy rainfall influencing measured values.
19:26	93.9	101.0	Heavy rainfall influencing measured values.
19:28	82.3	<b>103.7</b>	<b>Music clearly audible and defining dB(C) values, sound engineers informed of ongoing exceedances. Generally compliant with occasional maximum spikes above criteria.</b> Resident noise defining dB(A) values.
19:30	92.3	<b>101.4</b>	
19:32	81.0	<b>103.4</b>	
19:34	81.7	<b>102.8</b>	
19:36	90.2	<b>102.8</b>	
19:38	81.7	<b>102.2</b>	
19:40	86.5	<b>101.3</b>	



Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
19:42	89.1	<b>102.1</b>	<b>Music clearly audible and defining dB(C) values, sound engineers informed of ongoing exceedances.</b> Generally compliant with occasional maximum spikes. Traffic defining dB(A).
19:44	88.8	<b>104.1</b>	
19:46	86.3	<b>103.9</b>	
19:48	85.5	<b>101.0</b>	
19:50	89.5	99.6	Music clearly audible and defining dB(C) values. Traffic defining dB(A) values.
19:52	82.0	100.0	
19:54	79.1	97.9	
19:56	85.4	<b>101.4</b>	<b>Music clearly audible and defining dB(C) values, sound engineers informed of new exceedance.</b> Resident activities defining dB(A) values.
19:58	78.9	97.1	Traffic defining maximums. Music inaudible.
20:00	78.6	92.6	
20:02	91.9	102.4	
20:04	76.4	89.0	
			Noise meter turned off during unamplified period to save battery. FOH monitoring continues.
20:28	79.4	83.6	Heavy rainfall. Monitoring completed at adjacent property entry (covered). Rain and traffic defining maximums.
20:30	89.9	94.0	
20:32	89.5	96.5	
20:34	82.4	88.5	
20:36	85.2	94.0	
20:38	84.7	92.7	Rainfall continues. Headline act commenced. Traffic defining maximums.
20:40	86.8	96.8	
20:42	92.6	97.5	
20:44	86.4	96.2	
20:46	80.2	93.2	Rainfall continues. Music clearly audible. Motorcycle defining maximums.
20:48	94.3	100.0	
20:50	83.1	95.0	Music clearly audible defining dB(C). Traffic defining dB(A) maximums.
20:52	80.7	95.0	
20:54	84.2	92.9	Crowd cheer defining dB(A), traffic defining dB(C) maximums.
20:56	95.0	102.6	Traffic defining maximums. Music clearly audible.

Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
20:58	81.3	<b>102.5</b>	Rain ceased, returned to 234 Moore Park Road frontage. <b>Music defining dB(C), sound engineer informed of exceedance and requested to reduce.</b> Traffic defining dB(A).
21:00	87.2	106.7	Traffic defining maximums (Motorbike). Music clearly audible.
21:02	87.8	<b>101.9</b>	<b>Music defining dB(C) dominant at 40 and 63Hz, sound engineers informed of exceedance and requested to reduce.</b> Traffic defining dB(A).
21:04	84.8	<b>101.0</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
21:06	88.0	95.4	Music defining dB(C), traffic defining dB(A).
21:08	79.3	98.0	
21:10	78.5	98.6	
21:12	83.0	98.7	
21:14	81.2	<b>102.2</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
21:16	84.7	<b>101.2</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Crowd cheer defining dB(A).
21:18	80.5	<b>103.1</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
21:20	81.2	<b>102.4</b>	
21:22	93.0	<b>107.6</b>	<b>Music defining dB(C), sound engineers informed of significant spike in noise, and requested to apply a limit on bass, especially to flown sub-woofer speakers.</b> Traffic defining dB(A).
21:24	83.2	88.8	Traffic defining maximums. Music audible.
21:26	76.6	92.3	Music defining dB(C), traffic defining dB(A).
21:28	75.6	90.8	
21:30	90.0	100.0	Motorcycle defining levels.
21:32	80.7	<b>101.2</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
21:34	97.2	102.5	Traffic defining maximums. Amplified vocals clearly audible.
21:36	81.8	101.4	Resident talking near microphone defining levels.
21:38	90.7	<b>101.0</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
21:40	78.1	94.1	Music defining dB(C), traffic defining dB(A).
21:42	88.1	96.2	Music defining dB(C), traffic defining dB(A).
21:44	92.8	96.0	Music defining dB(C), traffic defining dB(A).

Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
21:46	95.7	<b>100.6</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
21:48	82.8	94.0	Music defining dB(C), traffic defining dB(A).
21:50	87.5	<b>100.1</b>	<b>Music defining dB(C), sound engineers informed.</b> Crowd cheers defining dB(A).
21:52	81.3	99.7	Music defining dB(C), traffic defining dB(A).
21:54	86.2	99.2	
21:56	77.3	90.2	
21:58	94.6	96.5	Car horn defining maximums
22:00	88.6	91.4	Music defining dB(C), traffic defining dB(A).
22:02	87.0	92.0	
22:04	83.7	92.2	
22:06	83.8	90.3	
22:08	80.1	93.6	
22:10	76.2	92.2	
22:12	85.0	<b>104.4</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
22:14	79.6	<b>104.5</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
22:16	83.4	<b>108.8</b>	<b>Music defining dB(C), sound engineers informed level reached loudest level thus far (loud short low frequency), and requested to reduce urgently and significantly.</b> Traffic defining dB(A).
22:18	83.4	<b>104.3</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
22:20	85.2	<b>105.2</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
22:22	84.3	<b>102.5</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
22:24	80.2	<b>102.6</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
22:26	82.2	<b>104.1</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A).
22:28	84.8	<b>103.8</b>	<b>Music defining dB(C), sound engineers requested to reduce.</b> Traffic defining dB(A). <u>Amplification ceased 10:28.</u>
22:30	-	-	Amplified music ceased. PA power turned off. Instrument battery died.

<sup>1</sup> *Bold represents exceedance in criteria as a result of amplified music*



## EVENT NOISE MANAGEMENT

<b>Project Number:</b>	4390	<b>Date:</b>	TUE 08/12/2015
<b>Project Description:</b>	Ed Sheeran		
<b>Monitoring Location:</b>	2 – SFS at 10 Alexander Street, Paddington		
<b>Operator:</b>	Roger Treagus		
<b>Instrument:</b>	Bruel & Kjaer 2250L	<b>Calibrator Model:</b>	Pulsar Model 105
<b>Instrument Serial:</b>	2741105	<b>Calibrator Serial:</b>	62686
<b>Instrument NATA Calibration Date:</b>	22/01/15	<b>Calibrator NATA Calibration Date:</b>	4/11/15
<b>Pre-calibration:</b>	93.9	<b>Post calibration:</b>	93.7

Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
16:48	68.3	79.5	Traffic defining measured levels. No amplified noise audible.
16:50	75.5	82.1	
16:52	67.1	82.0	
16:54	64.6	78.8	
16:56	66.1	76.8	
16:58	61.8	77.4	
17:00	62.3	76.0	
17:02	66.0	78.7	
17:04	62.7	75.0	
17:06	63.4	76.8	
17:08	64.4	77.1	
17:10	75.4	83.0	
17:12	66.6	85.8	
17:14	76.0	83.6	
17:16	68.5	79.6	
17:18	62.4	77.3	
17:20	75.2	81.9	
17:22	60.8	72.9	
17:24	64.8	76.9	

Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
17:26	64.3	78.8	Traffic defining measured levels. No amplified noise audible.
17:28	67.2	76.8	
17:30	65.4	80.8	
17:32	72.8	91.8	
17:34	74.8	83.6	
17:36	68.2	75.9	
17:38	77.4	80.4	
17:40	71.8	79.0	
17:42	65.8	74.5	
17:44	68.2	86.2	
17:46	77.2	81.6	
17:48	64.8	78.5	
17:50	66.4	81.7	
17:52	72.5	88.7	
17:54	73.6	87.3	
17:56	68.0	76.9	Traffic defining measured levels. Event just audible, approximately 50 dB(A), 70 dB(C)
17:58	65.6	76.1	
18:00	68.9	91.7	
18:02	62.2	83.7	
18:04	63.0	75.8	
18:06	74.4	79.9	Traffic defining measured levels. Event noise barely audible.
18:08	61.3	74.1	
18:10	73.1	81.5	
18:12	63.1	76.5	
18:14	77.1	81.2	
18:16	69.3	80.6	
18:18	69.3	77.9	Traffic defining measured levels. Event noise barely audible.
18:20	74.1	81.6	

Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
18:22	70.3	81.0	Traffic defining measured levels. Event noise barely audible.
18:24	74.8	87.6	
18:26	66.8	80.9	
18:28	64.9	78.8	
18:30	72.7	77.9	
18:32	67.9	79.7	
18:34	69.2	82.0	
18:36	72.3	80.0	
18:38	70.7	80.9	
18:40	73.0	81.1	
18:42	65.7	80.1	
18:44	71.1	79.7	Traffic defining measured levels. Event inaudible.
18:46	73.4	84.1	
18:48	66.9	80.4	
18:50	73.6	78.0	
18:52	61.9	79.0	
18:54	73.5	78.6	
18:56	75.4	83.8	
18:58	68.4	84.6	
19:00	76.8	80.0	
19:02	77.3	84.3	
19:04	72.1	83.2	
19:06	62.7	79.2	
19:08	68.2	84.8	
19:10	78.3	81.3	
19:12	76.5	88.8	
19:14	71.5	85.4	
19:16	68.6	85.0	



Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
19:18	72.5	83.0	Traffic defining measured levels. Event inaudible.
19:20	73.0	81.9	
19:22	70.4	93.8	Traffic defining measured levels. Event noise audible, increased bass content, 55 dB(A), 78 dB(C).
19:24	78.3	99.5	
19:26	70.6	84.2	
19:28	69.5	83.1	
19:30	69.2	84.7	
19:32	68.6	83.5	
19:34	68.7	87.1	
19:36	67.0	82.3	Traffic defining measured levels. Event noise audible, increased bass content, 55 dB(A), 81 dB(C)
19:38	64.4	82.5	
19:40	70.5	83.9	
19:42	65.0	82.8	Traffic defining measured levels. Event noise audible, increased bass content, 55 dB(A), 83 dB(C)
19:44	63.7	82.1	
19:46	70.2	80.4	Traffic defining measured levels. Event noise audible, increased bass content, 55 dB(A), 78 dB(C).
19:48	65.0	78.5	
19:50	70.3	84.3	
19:52	67.1	79.5	
19:54	67.4	83.0	
19:56	66.2	81.7	
19:58	65.9	83.0	
20:00	72.6	78.5	
20:02	63.9	77.4	
20:04	65.7	84.2	
20:06	70.9	85.7	
20:08	62.7	84.2	
20:10	62.1	83.3	
20:12	70.0	91.7	

Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
20:14	68.5	77.6	Traffic defining measured levels. No audible event noise.
20:16	69.2	76.3	
20:18	69.7	84.7	
20:20	74.8	91.0	
20:22	71.9	79.8	
20:24	68.3	80.8	
20:26	76.5	82.3	Heavy rain defining noise levels. No audible event noise.
20:28	73.3	81.2	
20:30	73.8	84.7	
20:32	74.0	84.3	
20:34	88.1	89.5	
20:36	84.5	92.1	
20:38	77.6	83.1	
20:40	76.5	84.4	
20:42	76.0	80.8	Rain continues, event noise audible up to 60 dB(A), 78 dB(C). Traffic defining maximums.
20:44	74.3	85.3	
20:46	75.0	79.1	
20:48	70.5	87.8	
20:50	67.8	82.2	
20:52	72.4	81.1	Rain reducing, event noise becoming dominant source.
20:54	70.5	82.9	Event noise dominant. Traffic contributing.
20:56	73.8	87.6	
20:58	68.2	83.5	
21:00	70.9	84.0	
21:02	70.1	85.6	
21:04	78.1	86.4	
21:06	70.4	81.2	
21:08	79.4	83.3	

Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
21:10	69.0	84.3	Event noise dominant. Traffic contributing.
21:12	67.6	79.8	
21:14	76.0	79.9	
21:16	71.4	84.1	
21:18	85.6	87.1	
21:20	67.8	78.5	
21:22	72.8	85.5	
21:24	64.8	76.3	
21:26	68.4	92.6	
21:28	62.1	71.3	
21:30	75.9	81.9	
21:32	71.0	78.8	
21:34	64.4	78.3	
21:36	62.8	81.7	
21:38	74.5	88.4	
21:40	67.8	81.1	
21:42	62.5	77.8	
21:44	70.6	82.0	
21:46	63.6	79.0	
21:48	74.3	77.7	
21:50	71.1	83.8	
21:52	75.5	84.5	
21:54	71.7	81.3	
21:56	58.7	75.8	
21:58	70.9	85.7	
22:00	63.8	79.6	
22:02	67.0	83.6	
22:04	69.6	86.8	

Time	L <sub>max</sub> dB(A)	L <sub>max</sub> dB(C)	Description of Noise
22:06	70.0	89.0	Event noise dominant. Traffic contributing.
22:08	73.9	83.5	
22:10	68.8	85.5	
22:12	68.2	79.2	
22:14	71.8	86.5	
22:16	67.1	82.7	
22:18	69.1	79.5	
22:20	63.6	79.6	
22:22	69.6	78.2	
22:24	63.3	79.9	
22:26	64.8	79.6	
22:28	66.1	81.3	Event concluded. Traffic movements defining maximums
22:30	72.8	84.9	Traffic defining measured levels. Event inaudible.
22:32	65.3	75.8	



# **APPENDIX C**

## **SCGT COMPLAINTS REGISTER**



Sydney Cricket & Sports Ground Trust

**HOTLINE REGISTER**

**EVENT NAME:** Ed Sheeran

**PAGE NUMBER:** 1 of 3

**DATE:** Tuesday 8<sup>th</sup> and Wednesday 9<sup>th</sup> December 2015

Date	Time	Method	Complainant's Name	Complainant Details	Nature of Complaint	Action taken by the Trust





Sydney Cricket & Sports Ground Trust  
**HOTLINE REGISTER**

**EVENT NAME:** Ed Sheeran

**PAGE NUMBER:** 2 of 3

**DATE:** Tuesday 8<sup>th</sup> and Wednesday 9<sup>th</sup> December 2015

Date	Time	Method	Complainant's Name	Complainant Details	Nature of Complaint	Action taken by the Trust
<b>Calls Received Post Wednesday 9<sup>th</sup> December</b>						
9/12	18:18	Phone Call		Kensington	Too Loud.	Luke notified and action was taken
9/12	18:27	Phone Call		Centennial Park	Music is too loud and she can't go outside to avoid it.	Luke notified and action was taken
9/12	19:43	Phone Call		Zetland	Music especially the bass is too loud and heavy, worried about damage being caused to his fish tank	Luke notified and action was taken
9/12	20:35	Phone Call			People have been driving around his block looking for parking for approx. 3.5 hours. They said parking on driver avenue is shut.	Informed Malcolm about the issue



Sydney Cricket & Sports Ground Trust  
**HOTLINE REGISTER**

**EVENT NAME:** Ed Sheeran

**PAGE NUMBER:** 3 of 3

**DATE:** Tuesday 8<sup>th</sup> and Wednesday 9<sup>th</sup> December 2015

Date	Time	Method	Complainant's Name	Complainant Details	Nature of Complaint	Action taken by the Trust
9/12	21:00	Phone Call		Redfern	Music is too loud and the person had to close his windows and front door	Luke notified and action was taken

Date	Time	Method	Complainant's Name	Complainant Details	Nature of Complaint	Action taken by the Trust
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Sydney Cricket & Sports Ground Trust

# HOTLINE REGISTER

**EVENT NAME:** Ed Sheeran

**PAGE NUMBER:** 4 of 3

**DATE:** Tuesday 8<sup>th</sup> and Wednesday 9<sup>th</sup> December 2015
