

Appendix 4-5

**Predicted Crowd & PA
Noise Levels and
Combined Operational
Noise Levels**

Project: Main Arena of the 2008 Olympic Equestrian Event
Description: Noise Survey Summary during a horseracing day
Location: Jockey Club Shatin Racecourse Grandstand
Date: 13 November 2005 (Sunday)
Time: 1230 - 1800 hours

Grandstand Location Reference	Measured Noise Level Leq, dB(A)		
	Upper Level	Middle Level	Lower Level
1	73.6	72.2	70.3
1	73.4	72.0	70.3
1	73.0	72.7	72.0
2	71.9	-	72.4
2	71.1	74.7	73.6
2	71.2	73.9	74.7
2	72.5	74.0	76.4
3	75.9	72.9	71.8
3	74.4	73.3	71.9
3	73.1	72.2	70.2
3	74.7	73.1	72.6
4	71.5	72.1	71.4
4	70.6	71.5	71.1
4	70.9	71.3	71.8
4	70.9	71.6	70.4
4	71.4	71.8	70.5
5	-	71.4	71.4
5	-	71.1	71.1
5	-	71.8	71.8
Average Noise Level, dB(A)			73 (rounded)

Notes:

- [1] Measurement periods are based on 30 minutes with acclimation noise excluded.
- [2] Microphone locations are at 1.2m above floor level at the Grandstand.
- [3] 22,676 persons were recorded for entrance to the Racecourse.

Project: Main Arena of the 2008 Olympic Equestrian Event
Title: Calculation of Crowd Noise and PA Noise Level

Measured Average Crowd Noise and PA Noise Level, Leq dB(A) ^[1] **73**
 Corrected Typical Crowd Noise Level (-5 dB(A) for Equestrian Event) ^[2] **68**

	Spectator			
	North	East	South	West
Dimension (Length x Width), m	66 x 12	98 x 31	68 x 33	106 x 17
Area of Spectator Seating, m ²	792	3038	2244	1802
Area Correction, dB ^[3]	29	35	34	33
[a] Sound Power Level, dB(A)	97	102	101	100

Horizontal Distance, m (NSR to spectator)	Spectator			
	North	East	South	West
N1	618	615	513	522
N2	464	506	429	391
N3	198	261	220	148
N4	213	312	335	250
N5	334	433	444	358
N6	411	314	284	369
N7	394	295	319	390
N8	426	339	396	450
N9	448	371	441	486
N10	496	429	508	545

[b] Distance Correction, dB ^[4]	Spectator			
	North	East	South	West
N1	-64	-64	-62	-62
N2	-61	-62	-61	-60
N3	-54	-56	-55	-51
N4	-55	-58	-58	-56
N5	-58	-61	-61	-59
N6	-60	-58	-57	-59
N7	-60	-57	-58	-60
N8	-61	-59	-60	-61
N9	-61	-59	-61	-62
N10	-62	-61	-62	-63

[c] Screening Correction, dB ^[5]	Spectator			
	North	East	South	West
N1	0	0	0	0
N2	0	0	0	0
N3	0	0	0	-5
N4	-5	0	0	0
N5	0	0	0	0
N6	0	0	0	0
N7	0	0	0	0
N8	0	0	0	0
N9	0	0	0	0
N10	0	0	0	0

[d] Individual Free Field Sound Pressure Level at NSR, Leq (30min)	Spectator				[e] Facade Correction	[f] Total Leq, (30min)
	North	East	South	West		
N1	33	39	39	38	3	47
N2	35	40	40	40	3	49
N3	43	46	46	44	3	54
N4	37	45	43	44	3	52
N5	38	42	40	41	3	49
N6	36	44	44	41	3	51
N7	37	45	43	40	3	51
N8	36	44	41	39	3	50
N9	36	43	40	38	3	49
N10	35	42	39	37	3	48

Notes:

- [1] Crowd noise and PA noise levels are based on noise measurements on 13 November 2005 at Jockey Club Shatin Racecourse during a horseracing day.
- [2] For a conservative assessment, the adopted crowd and PA noise level of the equestrian event is assumed to be 5 dB(A) below the measured horseracing event level due to quieter nature of equestrian event.
- [3] Area Correction = 10 log (S), where S = Area of Spectator seating.
- [4] Distance correction = -20 log R - 8 based on hemi-spherical radiation, where R = distance in metre between source and NS
- [5] Screening correction of -5 dB(A) is applied when the spectator is not visible from the NSR and screened.
- [6] Individual free field noise level [d] = [a] + [b] + [c]; Total Noise Level [f] = [d] + [e]
- [7] See Chapter 4 Section 4.5 on details of assessment methodology.

Project: Main Arena of the 2008 Olympic Equestrian Event
Title: Combined Crowd Noise, PA Noise and Fixed Plant Noise level at NSR

Receiver	Time Period	Calculated Crowd Noise + PA Noise Level, dB(A) ^[1]	Calculated Fixed Plant Noise Level, dB(A) ^[2]	Combined Noise Level, dB(A) ^[3]	ASR ^[4]	Noise Levels / Criteria			Noise Criteria met?
						ANL-5 [a]	Prevailing [b]	Design [c] = Min. of [a] & [b]	
N1	Daytime / Evening	47	41	48	B	60	55 ^[5]	55	Yes
N2		49	43	50	B	60	55 ^[5]	55	Yes
N3		54	48	55	B	60	59	59	Yes
N4		52	49	54	B	60	55	55	Yes
N5		50	46	51	B	60	55 ^[5]	55	Yes
N6		52	46	53	B	60	55 ^[5]	55	Yes
N7		51	48	53	B	60	55 ^[5]	55	Yes
N8		50	49	53	B	60	57	57	Yes
N9		49	49	52	B	60	55 ^[5]	55	Yes
N10		48	48	51	B	60	55 ^[5]	55	Yes
N1	Night-time	0	41	41	B	50	54 ^[5]	50	Yes
N2		0	43	43	B	50	54 ^[5]	50	Yes
N3		0	48	48	B	50	56	50	Yes
N4		0	49	49	B	50	54	50	Yes
N5		0	46	46	B	50	54 ^[5]	50	Yes
N6		0	46	46	B	50	54 ^[5]	50	Yes
N7		0	48	48	B	50	54 ^[5]	50	Yes
N8		0	49	49	B	50	54	50	Yes
N9		0	49	49	B	50	54 ^[5]	50	Yes
N10		0	48	48	B	50	54 ^[5]	50	Yes

Notes:

[1] Based on Appendix 4-5 Crowd Noise and PA Noise calculation.

[2] Based on Appendix 4-4 Fixed plant noise calculation.

[3] Adding Crowd/PA noise and Fixed plant noise levels.

[4] ASR = Area Sensitive Rating.

[5] Lowest prevailing background noise level is adopted for a conservative assessment.