

Appendix 4-4

**Calculation of
Maximum Allowable
Sound Power Levels for
Fixed Noise Sources**

Project: Main Arena of the 2008 Olympic Equestrian Event
Title: Maximum allowable SWL at Stable

| Receiver | Affected by IF (Y/N) | ASR [1] | Noise Levels / Criteria | | | Contributing Noise Sources [2] | Apportioned Criteria (d) adds up to (c) or less | Propagation | | | Corrections, dB(A) | | | | | Permissible SWL, dB(A) | | | | |
|---|-------------------------|---------|-------------------------|------------|------------------------|--------------------------------|--|-------------|----------|--------|--------------------|-----|-----|-----|-----|------------------------|--|--|--|--|
| | | | ANL-5 | Prevailing | Design | | | Dist, m | Dir, deg | Facade | Dist | Dir | Ton | Int | | | | | | |
| | | | (a) | (b) | (c) = min of (a) & (b) | | | | | | | | | | | | | | | |
| N3 - HKJC Staff Quarters Daytime / Evening | N | B | 60 | 59 | 59 | Stable 1 - MVAC Plant | 50 | 311 | 180 | 3 | -58 | 0 | 3 | 0 | 102 | | | | | |
| | | | | | | Stable 2 - MVAC Plant | 50 | 327 | 180 | 3 | -58 | 0 | 3 | 0 | 102 | | | | | |
| | | | | | | Stable 3 - MVAC Plant | 50 | 385 | 180 | 3 | -60 | 0 | 3 | 0 | 104 | | | | | |
| | | | | | | Stable 4 - MVAC Plant | 50 | 420 | 180 | 3 | -60 | 0 | 3 | 0 | 104 | | | | | |
| | | | | | | AHU at Veterinary | 51 | 374 | 180 | 3 | -59 | 0 | 3 | 0 | 104 | | | | | |
| | | | | | | Chiller at Veterinary | 51 | 374 | 180 | 3 | -59 | 0 | 3 | 0 | 104 | | | | | |
| | | | | | | Chiller at central plant | 51 | 397 | 180 | 3 | -60 | 0 | 3 | 0 | 105 | | | | | |
| | | | | | | | 59 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | Night-time | N | B | 50 | 56 | 50 | Stable 1 - MVAC Plant | 41 | 311 | 180 | 3 | -58 | 0 | 3 | 0 | 93 | | | | |
| | | | | | | | Stable 2 - MVAC Plant | 41 | 327 | 180 | 3 | -58 | 0 | 3 | 0 | 93 | | | | |
| | | | | | | | Stable 3 - MVAC Plant | 41 | 385 | 180 | 3 | -60 | 0 | 3 | 0 | 95 | | | | |
| | | | | | | | Stable 4 - MVAC Plant | 41 | 420 | 180 | 3 | -60 | 0 | 3 | 0 | 95 | | | | |
| | | | | | | | AHU at Veterinary | 43 | 374 | 180 | 3 | -59 | 0 | 3 | 0 | 96 | | | | |
| | | | | | | | Chiller at Veterinary | 43 | 374 | 180 | 3 | -59 | 0 | 3 | 0 | 96 | | | | |
| | | | | | | | Chiller at central plant | 43 | 397 | 180 | 3 | -60 | 0 | 3 | 0 | 97 | | | | |
| | | | | | | | | 50 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| N4 - Racecourse Villa Daytime / Evening | N | B | 60 | 55 | 55 | Stable 1 - MVAC Plant | 46 | 306 | 180 | 3 | -58 | 0 | 3 | 0 | 98 | | | | | |
| | | | | | | Stable 2 - MVAC Plant | 46 | 284 | 180 | 3 | -57 | 0 | 3 | 0 | 97 | | | | | |
| | | | | | | Stable 3 - MVAC Plant | 46 | 351 | 180 | 3 | -59 | 0 | 3 | 0 | 99 | | | | | |
| | | | | | | Stable 4 - MVAC Plant | 46 | 340 | 180 | 3 | -59 | 0 | 3 | 0 | 99 | | | | | |
| | | | | | | AHU at Veterinary | 47 | 298 | 180 | 3 | -57 | 0 | 3 | 0 | 98 | | | | | |
| | | | | | | Chiller at Veterinary | 47 | 298 | 180 | 3 | -57 | 0 | 3 | 0 | 98 | | | | | |
| | | | | | | Chiller at central plant | 47 | 375 | 180 | 3 | -59 | 0 | 3 | 0 | 100 | | | | | |
| | | | | | | | 55 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | Night-time | N | B | 50 | 54 | 50 | Stable 1 - MVAC Plant | 41 | 306 | 180 | 3 | -58 | 0 | 3 | 0 | 93 | | | | |
| | | | | | | | Stable 2 - MVAC Plant | 41 | 284 | 180 | 3 | -57 | 0 | 3 | 0 | 92 | | | | |
| | | | | | | | Stable 3 - MVAC Plant | 41 | 351 | 180 | 3 | -59 | 0 | 3 | 0 | 94 | | | | |
| | | | | | | | Stable 4 - MVAC Plant | 41 | 340 | 180 | 3 | -59 | 0 | 3 | 0 | 94 | | | | |
| | | | | | | | AHU at Veterinary | 41 | 298 | 180 | 3 | -57 | 0 | 3 | 0 | 92 | | | | |
| | | | | | | | Chiller at Veterinary | 41 | 298 | 180 | 3 | -57 | 0 | 3 | 0 | 92 | | | | |
| | | | | | | | Chiller at central plant | 43 | 375 | 180 | 3 | -59 | 0 | 3 | 0 | 96 | | | | |
| | | | | | | | | 50 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| N8 - Garden Vista Daytime / Evening | N | B | 60 | 57 | 57 | Stable 1 - MVAC Plant | 48 | 327 | 180 | 3 | -58 | 0 | 3 | 0 | 100 | | | | | |
| | | | | | | Stable 2 - MVAC Plant | 48 | 363 | 180 | 3 | -59 | 0 | 3 | 0 | 101 | | | | | |
| | | | | | | Stable 3 - MVAC Plant | 48 | 304 | 180 | 3 | -58 | 0 | 3 | 0 | 100 | | | | | |
| | | | | | | Stable 4 - MVAC Plant | 48 | 380 | 180 | 3 | -60 | 0 | 3 | 0 | 102 | | | | | |
| | | | | | | AHU at Veterinary | 49 | 391 | 180 | 3 | -60 | 0 | 3 | 0 | 103 | | | | | |
| | | | | | | Chiller at Veterinary | 49 | 391 | 180 | 3 | -60 | 0 | 3 | 0 | 103 | | | | | |
| | | | | | | Chiller at central plant | 49 | 275 | 180 | 3 | -57 | 0 | 3 | 0 | 100 | | | | | |
| | | | | | | | 57 | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| | Night-time | N | B | 50 | 54 | 50 | Stable 1 - MVAC Plant | 41 | 327 | 180 | 3 | -58 | 0 | 3 | 0 | 93 | | | | |
| | | | | | | | Stable 2 - MVAC Plant | 41 | 363 | 180 | 3 | -59 | 0 | 3 | 0 | 94 | | | | |
| | | | | | | | Stable 3 - MVAC Plant | 41 | 304 | 180 | 3 | -58 | 0 | 3 | 0 | 93 | | | | |
| | | | | | | | Stable 4 - MVAC Plant | 41 | 380 | 180 | 3 | -60 | 0 | 3 | 0 | 95 | | | | |
| | | | | | | | AHU at Veterinary | 43 | 391 | 180 | 3 | -60 | 0 | 3 | 0 | 97 | | | | |
| | | | | | | | Chiller at Veterinary | 43 | 391 | 180 | 3 | -60 | 0 | 3 | 0 | 97 | | | | |
| | | | | | | | Chiller at central plant | 43 | 275 | 180 | 3 | -57 | 0 | 3 | 0 | 94 | | | | |
| | | | | | | | | 50 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |

[1] ASR = Area Sensitivity Rating

[2] MVAC = Mechanical Ventilation and Air Conditioning System

[3] The lowest Sound Power Levels (SWL) would be taken for a conservative assessment.

[4] The Central Water-Cooled Chiller plant would be enclosed..

[5] See Chapter 4 Section 4.5 on details of assessment methodology.

| Period | Plant | Max SWL ^[3] , dB(A) |
|------------|--------------------------|--------------------------------|
| Daytime | Stable 1 | 98 |
| | Stable 2 | 97 |
| | Stable 3 | 99 |
| | Stable 4 | 99 |
| | AHU at Veterinary | 98 |
| | Chiller at Veterinary | 98 |
| | Chiller at central plant | 100 |
| Night-time | Stable 1 | 93 |
| | Stable 2 | 92 |
| | Stable 3 | 93 |
| | Stable 4 | 94 |
| | AHU at Veterinary | 92 |
| | Chiller at Veterinary | 92 |
| | Chiller at central plant | 94 |

Project: Main Arena of the 2008 Olympic Equestrian Event
Title: Calculated fixed plant noise level at NSR

| Receiver | Plant | Max SWL ^[1] , dB(A) [a] | Dist. m | Corrections, dB(A) ^[3] | | | | | Noise Level at NSR, dB(A) [g] | Total Noise Level at NSR, dB(A) |
|----------|--------------------------|---------------------------------------|---------|-----------------------------------|-----------------|---------------|-----------------|------------|----------------------------------|---------------------------------|
| | | | | Facade [b] | Distance [c] | Screen [d] | Tonality [e] | Int [f] | | |
| N1 | Stable 1 | 93 | 705 | 3 | -65 | 0 | 3 | 0 | 34 | 41 |
| | Stable 2 | 92 | 746 | 3 | -65 | 0 | 3 | 0 | 33 | |
| | Stable 3 | 93 | 784 | 3 | -66 | 0 | 3 | 0 | 33 | |
| | Stable 4 | 94 | 850 | 3 | -67 | 0 | 3 | 0 | 33 | |
| | AHU at Veterinary | 92 | 807 | 3 | -66 | 0 | 3 | 0 | 32 | |
| | Chiller at Veterinary | 92 | 807 | 3 | -66 | 0 | 3 | 0 | 32 | |
| | Chiller at central plant | 94 | 783 | 3 | -66 | 0 | 3 | 0 | 34 | |
| | | | | | | | | | | |
| N2 | Stable 1 | 93 | 573 | 3 | -63 | 0 | 3 | 0 | 36 | 43 |
| | Stable 2 | 92 | 595 | 3 | -63 | 0 | 3 | 0 | 35 | |
| | Stable 3 | 93 | 650 | 3 | -64 | 0 | 3 | 0 | 34 | |
| | Stable 4 | 94 | 690 | 3 | -65 | 0 | 3 | 0 | 35 | |
| | AHU at Veterinary | 92 | 644 | 3 | -64 | 0 | 3 | 0 | 34 | |
| | Chiller at Veterinary | 92 | 644 | 3 | -64 | 0 | 3 | 0 | 34 | |
| | Chiller at central plant | 94 | 659 | 3 | -64 | 0 | 3 | 0 | 35 | |
| | | | | | | | | | | |
| N3 | Stable 1 | 93 | 311 | 3 | -58 | 0 | 3 | 0 | 41 | 48 |
| | Stable 2 | 92 | 327 | 3 | -58 | 0 | 3 | 0 | 40 | |
| | Stable 3 | 93 | 385 | 3 | -60 | 0 | 3 | 0 | 39 | |
| | Stable 4 | 94 | 420 | 3 | -60 | 0 | 3 | 0 | 39 | |
| | AHU at Veterinary | 92 | 374 | 3 | -59 | 0 | 3 | 0 | 39 | |
| | Chiller at Veterinary | 92 | 374 | 3 | -59 | 0 | 3 | 0 | 39 | |
| | Chiller at central plant | 94 | 397 | 3 | -60 | 0 | 3 | 0 | 40 | |
| | | | | | | | | | | |
| N4 | Stable 1 | 93 | 306 | 3 | -58 | 0 | 3 | 0 | 41 | 49 |
| | Stable 2 | 92 | 284 | 3 | -57 | 0 | 3 | 0 | 41 | |
| | Stable 3 | 93 | 351 | 3 | -59 | 0 | 3 | 0 | 40 | |
| | Stable 4 | 94 | 340 | 3 | -59 | 0 | 3 | 0 | 41 | |
| | AHU at Veterinary | 92 | 298 | 3 | -57 | 0 | 3 | 0 | 41 | |
| | Chiller at Veterinary | 92 | 298 | 3 | -57 | 0 | 3 | 0 | 41 | |
| | Chiller at central plant | 94 | 375 | 3 | -59 | 0 | 3 | 0 | 40 | |
| | | | | | | | | | | |
| N5 | Stable 1 | 93 | 428 | 3 | -61 | 0 | 3 | 0 | 38 | 46 |
| | Stable 2 | 92 | 403 | 3 | -60 | 0 | 3 | 0 | 38 | |
| | Stable 3 | 93 | 470 | 3 | -61 | 0 | 3 | 0 | 37 | |
| | Stable 4 | 94 | 449 | 3 | -61 | 0 | 3 | 0 | 39 | |
| | AHU at Veterinary | 92 | 410 | 3 | -60 | 0 | 3 | 0 | 38 | |
| | Chiller at Veterinary | 92 | 410 | 3 | -60 | 0 | 3 | 0 | 38 | |
| | Chiller at central plant | 94 | 495 | 3 | -62 | 0 | 3 | 0 | 38 | |
| | | | | | | | | | | |
| N6 | Stable 1 | 93 | 378 | 3 | -60 | 0 | 3 | 0 | 39 | 46 |
| | Stable 2 | 92 | 439 | 3 | -61 | 0 | 3 | 0 | 37 | |
| | Stable 3 | 93 | 417 | 3 | -60 | 0 | 3 | 0 | 38 | |
| | Stable 4 | 94 | 514 | 3 | -62 | 0 | 3 | 0 | 37 | |
| | AHU at Veterinary | 92 | 498 | 3 | -62 | 0 | 3 | 0 | 37 | |
| | Chiller at Veterinary | 92 | 498 | 3 | -62 | 0 | 3 | 0 | 37 | |
| | Chiller at central plant | 94 | 392 | 3 | -60 | 0 | 3 | 0 | 40 | |
| | | | | | | | | | | |
| N7 | Stable 1 | 93 | 320 | 3 | -58 | 0 | 3 | 0 | 41 | 48 |
| | Stable 2 | 92 | 373 | 3 | -59 | 0 | 3 | 0 | 39 | |
| | Stable 3 | 93 | 330 | 3 | -58 | 0 | 3 | 0 | 40 | |
| | Stable 4 | 94 | 422 | 3 | -61 | 0 | 3 | 0 | 39 | |
| | AHU at Veterinary | 92 | 418 | 3 | -60 | 0 | 3 | 0 | 38 | |
| | Chiller at Veterinary | 92 | 418 | 3 | -60 | 0 | 3 | 0 | 38 | |
| | Chiller at central plant | 94 | 300 | 3 | -58 | 0 | 3 | 0 | 42 | |
| | | | | | | | | | | |
| N8 | Stable 1 | 93 | 327 | 3 | -58 | 0 | 3 | 0 | 40 | 49 |
| | Stable 2 | 92 | 363 | 3 | -59 | 0 | 3 | 0 | 39 | |
| | Stable 3 | 93 | 304 | 3 | -58 | 0 | 3 | 0 | 41 | |
| | Stable 4 | 94 | 380 | 3 | -60 | 0 | 3 | 0 | 40 | |
| | AHU at Veterinary | 92 | 391 | 3 | -60 | 0 | 3 | 0 | 39 | |
| | Chiller at Veterinary | 92 | 391 | 3 | -60 | 0 | 3 | 0 | 39 | |
| | Chiller at central plant | 94 | 274 | 3 | -57 | 0 | 3 | 0 | 43 | |
| | | | | | | | | | | |
| N9 | Stable 1 | 93 | 340 | 3 | -59 | 0 | 3 | 0 | 40 | 49 |
| | Stable 2 | 92 | 366 | 3 | -59 | 0 | 3 | 0 | 39 | |
| | Stable 3 | 93 | 301 | 3 | -58 | 0 | 3 | 0 | 41 | |
| | Stable 4 | 94 | 362 | 3 | -59 | 0 | 3 | 0 | 40 | |
| | AHU at Veterinary | 92 | 381 | 3 | -60 | 0 | 3 | 0 | 39 | |
| | Chiller at Veterinary | 92 | 381 | 3 | -60 | 0 | 3 | 0 | 39 | |
| | Chiller at central plant | 94 | 273 | 3 | -57 | 0 | 3 | 0 | 43 | |
| | | | | | | | | | | |
| N10 | Stable 1 | 93 | 383 | 3 | -60 | 0 | 3 | 0 | 39 | 48 |
| | Stable 2 | 92 | 397 | 3 | -60 | 0 | 3 | 0 | 38 | |
| | Stable 3 | 93 | 330 | 3 | -58 | 0 | 3 | 0 | 40 | |
| | Stable 4 | 94 | 372 | 3 | -59 | 0 | 3 | 0 | 40 | |
| | AHU at Veterinary | 92 | 399 | 3 | -60 | 0 | 3 | 0 | 38 | |
| | Chiller at Veterinary | 92 | 399 | 3 | -60 | 0 | 3 | 0 | 38 | |
| | Chiller at central plant | 94 | 306 | 3 | -58 | 0 | 3 | 0 | 42 | |
| | | | | | | | | | | |

Notes:

[1] Based on Appendix 4-4 Lowest Sound Power Level (SWL).

[2] Noise Level at NSR [g] = [a] + [b] + [c] + [d] + [e] + [f]

[3] See Chapter 4 Section 4.5 on details of assessment methodology.