



**Title : Detailed Assessment for Ground Borne Noise**

rev 1 - 1/3 Octave: Based on MTR SIL(E) WP 14 Rev E Implementation  
08-Jan-10

|   |   |            |              |
|---|---|------------|--------------|
| Project No.:  | 248137  |            |              |
| Project Title:  | SIL(E) EIA - Ground Borne Noise Assessment            |            |              |
| Client:   | MTRCL   |            |              |
| Location of Noise Sensitive Receiver:                                   | SOH8 - South Horizons Phase IV - Dover Court Block 25 |            |              |
| No. of Floor:   | 35 + 4 level of Podium                                |            |              |
| Assessment Floor:   | 5   |            |              |
|   | Horizontal  | Vertical   | Slant        |
| Distance from Track (nearside only) :                                   | m   | 4.5        | 0            |
| Rock Head Depth :   | m   | -23        |              |
| Rolling Stock Information:  | MTRCL K-stock   |            |              |
| Train Speed:  | kph   | 35         |              |
| Length of Train:  | m   | 68         |              |
| Passby duration:  | s   | 7.0        |              |
| Total No. of Passby during Assessment Period (both direction together): | nos.  | Day period | Night period |
|   |   | 30         | 16           |
| Assessment Period   | mins.   | 30         | 30           |

Notes: Inclined turnout and resilient trackform have been applied. Assessment floor is located above podium level

| Octave Band Centre Frequency   | Hz  | 12.5        | 16          | 20          | 25          | 31.5        | 40          | 50          | 63          | 80          | 100         | 125         | 160         | 200         | 250         | 315         | 400         | 500         | Overall     |
|--|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Force Density (FDL)  | VdB re lb-ft <sup>5</sup>                                     | 47.6        | 40.8        | 41.8        | 47.5        | 44.6        | 47.6        | 42.7        | 40.6        | 44.7        | 47.7        | 48.5        | 48.0        | 44.1        | 46.3        | 42.1        | 39.0        | 38.1        | 58.0        |
| Source Corrections   |   |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Speed  | dB  | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        |
| Turn out and cross over (TOC)  | dB  | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         |
| Track Form   | dB  | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         |
| Others   | dB  | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         |
| Structure  | dB  | 0.0         | 0.0         | -0.3        | -0.7        | -1.0        | -1.7        | -2.3        | -3.0        | -3.3        | -3.7        | -4.0        | -4.0        | -4.0        | -4.0        | -4.0        | -4.0        | -4.0        | -4.0        |
| <b>Source Vibration Level</b>  | <b>VdB re 1x10<sup>-6</sup> in/s</b>                          | <b>45.4</b> | <b>38.6</b> | <b>39.3</b> | <b>44.7</b> | <b>41.4</b> | <b>43.8</b> | <b>38.2</b> | <b>35.4</b> | <b>39.2</b> | <b>41.9</b> | <b>42.3</b> | <b>41.8</b> | <b>37.9</b> | <b>40.1</b> | <b>35.9</b> | <b>32.8</b> | <b>31.9</b> | <b>53.7</b> |
| Propagation Corrections  |   |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Line Source Response   | dB re (1x10 <sup>6</sup> in/s) / (lb-ft / ft <sup>2.5</sup> ) | 18.6        | 24.0        | 26.9        | 24.3        | 23.9        | 31.2        | 39.0        | 41.4        | 42.2        | 40.8        | 46.1        | 32.1        | 33.0        | 24.1        | 12.9        | 8.2         | 13.0        |             |
| <b>Vibration at NSR Foundation</b>   | <b>VdB re 1x10<sup>-6</sup> in/s</b>                          | <b>64.0</b> | <b>62.6</b> | <b>66.2</b> | <b>69.0</b> | <b>65.3</b> | <b>74.9</b> | <b>77.2</b> | <b>76.8</b> | <b>81.4</b> | <b>82.6</b> | <b>88.4</b> | <b>74.0</b> | <b>70.9</b> | <b>64.2</b> | <b>48.8</b> | <b>41.0</b> | <b>45.0</b> |             |
| Building Corrections   |   |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Building Foundation Coupling Loss  | dB  | -5.7        | -6.0        | -6.7        | -7.3        | -8.0        | -9.0        | -10.0       | -11.0       | -11.7       | -12.3       | -13.0       | -13.3       | -13.7       | -14.0       | -13.3       | -12.7       | -12.0       |             |
| Floor and Wall Correction  | dB  | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       | -10.0       |             |
| Building Structure Resonance   | dB  | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         |             |
| <b>Predicted Groundborne Vibration Level</b>   | <b>VdB re 1x10<sup>-6</sup> in/s</b>                          | <b>54.3</b> | <b>52.6</b> | <b>55.5</b> | <b>57.6</b> | <b>53.3</b> | <b>61.9</b> | <b>63.2</b> | <b>61.8</b> | <b>65.7</b> | <b>66.3</b> | <b>71.4</b> | <b>56.6</b> | <b>53.3</b> | <b>46.2</b> | <b>31.4</b> | <b>24.3</b> | <b>29.0</b> | <b>74.7</b> |
| Room Corrections   |   |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Krad   | dB  | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         |             |
| K A-weighting  | dB  | -63.4       | -56.7       | -50.5       | -44.7       | -39.4       | -34.6       | -30.2       | -26.2       | -22.5       | -19.1       | -16.1       | -13.4       | -10.9       | -8.6        | -6.6        | -4.8        | -3.2        |             |
| Conversion to A-weighted Audible Noise (CTN)   | dB  | -63.4       | -56.7       | -50.5       | -44.7       | -39.4       | -34.6       | -30.2       | -26.2       | -22.5       | -19.1       | -16.1       | -13.4       | -10.9       | -8.6        | -6.6        | -4.8        | -3.2        |             |
| Predicted Ground Borne Noise Level inside NSR  | dBA   | 9.1         | 4.1         | 5.0         | 12.9        | 13.9        | 27.3        | 33.0        | 35.6        | 43.2        | 47.2        | 55.3        | 43.2        | 42.4        | 37.6        | 24.8        | 19.5        | 25.8        | 56.7        |
| Design Factor  | dBA   | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          |             |
| <b>Predicted Ground Borne Noise Level inside NSR (include a 10dBA Design Factor), Lmax (Unm)</b> | <b>dBA</b>  | <b>0.9</b>  | <b>5.9</b>  | <b>15.0</b> | <b>22.9</b> | <b>23.9</b> | <b>37.3</b> | <b>43.0</b> | <b>45.6</b> | <b>53.2</b> | <b>57.2</b> | <b>65.3</b> | <b>53.2</b> | <b>52.4</b> | <b>47.6</b> | <b>34.8</b> | <b>29.5</b> | <b>35.8</b> | <b>66.7</b> |

|  |            |            |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
|--|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Propose Mitigation Treatment   |            |            |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Insertion Loss   | dB         | 0.0        | -1.0       | -4.0        | -5.0        | -3.0        | -3.0        | 0.0         | -9.0        | -13.0       | -10.0       | -12.0       | -12.0       | -13.0       | -12.0       | -10.0       | -5.0        | -5.0        |             |
| <b>Predicted Ground Borne Noise Level inside NSR (include a 10dBA Design Factor), Lmax (Mit)</b> | <b>dBA</b> | <b>0.9</b> | <b>4.9</b> | <b>11.0</b> | <b>17.9</b> | <b>20.9</b> | <b>34.3</b> | <b>43.0</b> | <b>36.6</b> | <b>40.2</b> | <b>47.2</b> | <b>53.3</b> | <b>41.2</b> | <b>39.4</b> | <b>35.6</b> | <b>24.8</b> | <b>24.5</b> | <b>30.8</b> | <b>55.2</b> |

|  |            |             |             |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
|--|------------|-------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Day Period</b>  |            |             |             |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Correction for Passby Duration   | dB         | 8.4         | 8.4         | 8.4        | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         |
| Correction for "Tailing Effect"  | dB         | 0.0         | 0.0         | 0.0        | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         |
| SEL for Passby (include a 10dBA Design Factor)   | dBA        | 9.4         | 14.3        | 23.5       | 31.4        | 32.3        | 45.8        | 51.5        | 54.0        | 61.6        | 65.6        | 73.8        | 61.7        | 60.8        | 56.1        | 43.3        | 38.0        | 44.2        | 75.1        |
| Correction for no. of Train Passby   | dB         | 14.8        | 14.8        | 14.8       | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        |
| Correction for duration effect   | dB         | -32.6       | -32.6       | -32.6      | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       |
| <b>Predicted Ground Borne Noise - LA eq 30mins (include a 10dBA Design Factor)</b>                           | <b>dBA</b> | <b>-8.4</b> | <b>-3.4</b> | <b>5.7</b> | <b>13.6</b> | <b>14.6</b> | <b>28.0</b> | <b>33.7</b> | <b>36.3</b> | <b>43.9</b> | <b>47.8</b> | <b>56.0</b> | <b>43.9</b> | <b>43.0</b> | <b>38.3</b> | <b>25.5</b> | <b>20.2</b> | <b>26.4</b> | <b>57.3</b> |
| Design Target (ANL)  | dBA        |             |             |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             | 55          |
| Margin of Safety   | dBA        |             |             |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             | -2.3        |
| Minimum Attenuation Requirement (Overall)  | dBA        |             |             |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             | 2.3         |
| Propose Mitigation Treatment   |            |             |             |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Insertion Loss   | dB         | 0.0         | -1.0        | -4.0       | -5.0        | -3.0        | -3.0        | 0.0         | -9.0        | -13.0       | -10.0       | -12.0       | -12.0       | -13.0       | -12.0       | -10.0       | -5.0        | -5.0        |             |
| <b>Predicted Ground Borne Noise with Mitigation Treatment - LA eq 30mins (include a 10dBA Design Factor)</b> | <b>dBA</b> | <b>-8.4</b> | <b>-4.4</b> | <b>1.7</b> | <b>8.6</b>  | <b>11.6</b> | <b>25.0</b> | <b>33.7</b> | <b>27.3</b> | <b>30.9</b> | <b>37.8</b> | <b>44.0</b> | <b>31.9</b> | <b>30.0</b> | <b>26.3</b> | <b>15.5</b> | <b>15.2</b> | <b>21.4</b> | <b>45.9</b> |

|  |            |              |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
|--|------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Night Period</b>  |            |              |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Correction for Passby Duration   | dB         | 8.4          | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         |
| Correction for "Tailing Effect"  | dB         | 0.0          | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         |
| SEL for Passby (include a 10dBA Design Factor)   | dBA        | 9.4          | 14.3        | 23.5        | 31.4        | 32.3        | 45.8        | 51.5        | 54.0        | 61.6        | 65.6        | 73.8        | 61.7        | 60.8        | 56.1        | 43.3        | 38.0        | 44.2        | 75.1        |
| Correction for no. of Train Passby   | dB         | 12.0         | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        |
| Correction for duration effect   | dB         | -32.6        | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       |
| <b>Predicted Ground Borne Noise - LA eq 30mins (include a 10dBA Design Factor)</b>                           | <b>dBA</b> | <b>-11.1</b> | <b>-6.2</b> | <b>3.0</b>  | <b>10.9</b> | <b>11.8</b> | <b>25.2</b> | <b>31.0</b> | <b>33.5</b> | <b>41.1</b> | <b>45.1</b> | <b>53.2</b> | <b>41.2</b> | <b>40.3</b> | <b>35.6</b> | <b>22.8</b> | <b>17.5</b> | <b>23.7</b> | <b>54.6</b> |
| Design Target (ANL)  | dBA        |              |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | 45          |
| Margin of Safety   | dBA        |              |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | -9.6        |
| Minimum Attenuation Requirement (Overall)  | dBA        |              |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | 9.6         |
| Propose Mitigation Treatment   |            |              |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Insertion Loss   | dB         | 0.0          | -1.0        | -4.0        | -5.0        | -3.0        | -3.0        | 0.0         | -9.0        | -13.0       | -10.0       | -12.0       | -12.0       | -13.0       | -12.0       | -10.0       | -5.0        | -5.0        |             |
| <b>Predicted Ground Borne Noise with Mitigation Treatment - LA eq 30mins (include a 10dBA Design Factor)</b> | <b>dBA</b> | <b>-11.1</b> | <b>-7.2</b> | <b>-1.0</b> | <b>5.9</b>  | <b>8.8</b>  | <b>22.2</b> | <b>31.0</b> | <b>24.5</b> | <b>28.1</b> | <b>35.1</b> | <b>41.2</b> | <b>29.2</b> | <b>27.3</b> | <b>23.6</b> | <b>12.8</b> | <b>12.5</b> | <b>18.7</b> | <b>43.1</b> |



**Title : Detailed Assessment for Ground Borne Noise**

rev 1 - 1/3 Octave: Based on MTR SIL(E) WP 14 Rev E Implementation  
06-Jan-10

|   |  |            |              |
|---|--|------------|--------------|
| Project No.:  | 248137   |            |              |
| Project Title:  | SIL(E) EIA - Ground Borne Noise Assessment               |            |              |
| Client:   | MTRCL  |            |              |
| Location of Noise Sensitive Receiver:                                   | SOH6 - South Horizons Phase III - Mei Ka Court Block 23A |            |              |
| No. of Floor:   | 39 + 3 level of podium                                   |            |              |
| Assessment Floor:   | 4  |            |              |
|   | Horizontal   | Vertical   | Slant        |
| Distance from Track (nearside only) :                                   | m  | 8          | 0            |
| Rock Head Depth :   | m  | -10        | 8.0          |
| Rolling Stock Information:  | MTRCL K-stock  |            |              |
| Train Speed:  | kph  | 35         |              |
| Length of Train:  | m  | 68         |              |
| Passby duration:  | s  | 7.0        |              |
| Total No. of Passby during Assessment Period (both direction together): | nos.   | Day period | Night period |
|   |  | 30         | 16           |
| Assessment Period   | mins.  | 30         | 30           |

Notes: Inclined turnout and resilient trackform have been applied. Assessment floor is located above podium level

| Octave Band Centre Frequency   | Hz   | 12.5        | 16          | 20          | 25          | 31.5        | 40          | 50          | 63          | 80          | 100         | 125         | 160         | 200         | 250         | 315         | 400         | 500         | Overall     |
|--|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Force Density (FDL)  | VdB re lb-ft/ft <sup>5</sup>                                 | 47.6        | 40.8        | 41.8        | 47.5        | 44.6        | 47.6        | 42.7        | 40.6        | 44.7        | 47.7        | 48.5        | 48.0        | 44.1        | 46.3        | 42.1        | 39.0        | 38.1        | 58.0        |
| Source Corrections   |  |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Speed  | dB   | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        | -7.2        |
| Turn out and cross over (TOC)  | dB   | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         |
| Track Form   | dB   | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         |
| Others   | dB   | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         | 5.0         |
| Structure  | dB   | 0.0         | 0.0         | -0.3        | -0.7        | -1.0        | -1.7        | -2.3        | -3.0        | -3.3        | -3.7        | -4.0        | -4.0        | -4.0        | -4.0        | -4.0        | -4.0        | -4.0        | -4.0        |
| <b>Source Vibration Level</b>  | <b>VdB re 1x10<sup>-6</sup> in/s</b>                         | <b>45.4</b> | <b>38.6</b> | <b>39.3</b> | <b>44.7</b> | <b>41.4</b> | <b>43.8</b> | <b>38.2</b> | <b>35.4</b> | <b>39.2</b> | <b>41.9</b> | <b>42.3</b> | <b>41.8</b> | <b>37.9</b> | <b>40.1</b> | <b>35.9</b> | <b>32.8</b> | <b>31.9</b> | <b>53.7</b> |
| Propagation Corrections  |  |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Line Source Response   | dB re (1x10 <sup>-6</sup> in/s) / (lb-ft / ft <sup>5</sup> ) | 15.8        | 18.9        | 21.5        | 19.7        | 18.7        | 23.5        | 28.4        | 30.0        | 28.7        | 26.2        | 28.1        | 15.0        | 14.8        | 10.4        | 1.1         | -2.7        | 1.1         |             |
| NSR at 6m: WIL D095 #1   |  |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| <b>Vibration at NSR Foundation</b>   | <b>VdB re 1x10<sup>-6</sup> in/s</b>                         | <b>61.3</b> | <b>57.5</b> | <b>60.8</b> | <b>64.4</b> | <b>60.1</b> | <b>67.3</b> | <b>66.6</b> | <b>65.4</b> | <b>67.9</b> | <b>68.1</b> | <b>70.4</b> | <b>56.9</b> | <b>52.7</b> | <b>50.5</b> | <b>37.0</b> | <b>30.1</b> | <b>33.0</b> |             |
| Building Corrections   |  |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Building Foundation Coupling Loss  | dB   | -5.7        | -6.0        | -6.7        | -7.3        | -8.0        | -9.0        | -10.0       | -11.0       | -11.7       | -12.3       | -13.0       | -13.3       | -13.7       | -14.0       | -13.3       | -12.7       | -12.0       |             |
| Floor and Wall Correction  | dB   | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        | -8.0        |             |
| Building Structure Resonance   | dB   | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         | 6.0         |             |
| <b>Predicted Groundborne Vibration Level</b>   | <b>VdB re 1x10<sup>-6</sup> in/s</b>                         | <b>53.6</b> | <b>49.5</b> | <b>52.1</b> | <b>55.0</b> | <b>50.1</b> | <b>56.3</b> | <b>54.6</b> | <b>52.4</b> | <b>54.2</b> | <b>53.7</b> | <b>55.4</b> | <b>41.5</b> | <b>37.0</b> | <b>34.5</b> | <b>21.7</b> | <b>15.4</b> | <b>19.0</b> | <b>64.5</b> |
| Room Corrections   |  |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Krad   | dB   | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         |             |
| K A-weighting  | dB   | -63.4       | -56.7       | -50.5       | -44.7       | -39.4       | -34.6       | -30.2       | -26.2       | -22.5       | -19.1       | -16.1       | -13.4       | -10.9       | -8.6        | -6.6        | -4.8        | -3.2        |             |
| Conversion to A-weighted Audible Noise (CTN)   | dB   | -63.4       | -56.7       | -50.5       | -44.7       | -39.4       | -34.6       | -30.2       | -26.2       | -22.5       | -19.1       | -16.1       | -13.4       | -10.9       | -8.6        | -6.6        | -4.8        | -3.2        |             |
| Predicted Ground Borne Noise Level inside NSR  | dBA  | -9.8        | -7.2        | 1.6         | 10.3        | 10.7        | 21.7        | 24.4        | 26.2        | 31.7        | 34.6        | 39.3        | 28.1        | 26.1        | 25.9        | 15.1        | 10.6        | 15.8        | 41.9        |
| Design Factor  | dBA  | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          | 10          |             |
| <b>Predicted Ground Borne Noise Level inside NSR (include a 10dBA Design Factor), Lmax (Unm)</b> | <b>dBA</b>   | <b>0.2</b>  | <b>2.8</b>  | <b>11.6</b> | <b>20.3</b> | <b>20.7</b> | <b>31.7</b> | <b>34.4</b> | <b>36.2</b> | <b>41.7</b> | <b>44.6</b> | <b>49.3</b> | <b>38.1</b> | <b>36.1</b> | <b>35.9</b> | <b>25.1</b> | <b>20.6</b> | <b>25.8</b> | <b>51.9</b> |

|  |            |            |            |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
|--|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Propose Mitigation Treatment   |            |            |            |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Insertion Loss   | dB         | 0.0        | -1.0       | -4.0       | -5.0        | -3.0        | -3.0        | 0.0         | -9.0        | -13.0       | -10.0       | -12.0       | -12.0       | -13.0       | -12.0       | -10.0       | -5.0        | -5.0        |             |
| MTR Type 1a  |            |            |            |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| <b>Predicted Ground Borne Noise Level inside NSR (include a 10dBA Design Factor), Lmax (Mit)</b> | <b>dBA</b> | <b>0.2</b> | <b>1.8</b> | <b>7.6</b> | <b>15.3</b> | <b>17.7</b> | <b>28.7</b> | <b>34.4</b> | <b>27.2</b> | <b>28.7</b> | <b>34.6</b> | <b>37.3</b> | <b>26.1</b> | <b>23.1</b> | <b>23.9</b> | <b>15.1</b> | <b>15.6</b> | <b>20.8</b> | <b>41.5</b> |

|  |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
|--|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Day Period</b>  |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Correction for Passby Duration   | dB         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         |             |
| Correction for "Tailing Effect"  | dB         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         |             |
| SEL for Passby (include a 10dBA Design Factor)   | dBA        | 8.6         | 11.2        | 20.1        | 28.8        | 29.2        | 40.1        | 42.8        | 44.7        | 50.2        | 53.1        | 57.8        | 46.6        | 44.6        | 44.3        | 33.5        | 29.1        | 34.2        | 60.3        |
| Correction for no. of Train Passby   | dB         | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        | 14.8        |
| Correction for duration effect   | dB         | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       |
| <b>Predicted Ground Borne Noise - LA eq 30mins (include a 10dBA Design Factor)</b>                           | <b>dBA</b> | <b>-9.1</b> | <b>-6.6</b> | <b>2.3</b>  | <b>11.0</b> | <b>11.4</b> | <b>22.4</b> | <b>25.0</b> | <b>26.9</b> | <b>32.4</b> | <b>35.3</b> | <b>40.0</b> | <b>28.8</b> | <b>26.8</b> | <b>26.5</b> | <b>15.7</b> | <b>11.3</b> | <b>16.4</b> | <b>42.5</b> |
| Design Target (ANL)  | dBA        |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | 55          |
| Margin of Safety   | dBA        |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | 12.5        |
| Minimum Attenuation Requirement (Overall)  | dBA        |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             | 0.0         |
| Propose Mitigation Treatment   |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| Insertion Loss   | dB         | 0.0         | -1.0        | -4.0        | -5.0        | -3.0        | -3.0        | 0.0         | -9.0        | -13.0       | -10.0       | -12.0       | -12.0       | -13.0       | -12.0       | -10.0       | -5.0        | -5.0        |             |
| MTR Type 1a  |            |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |             |
| <b>Predicted Ground Borne Noise with Mitigation Treatment - LA eq 30mins (include a 10dBA Design Factor)</b> | <b>dBA</b> | <b>-9.1</b> | <b>-7.6</b> | <b>-1.7</b> | <b>6.0</b>  | <b>8.4</b>  | <b>19.4</b> | <b>25.0</b> | <b>17.9</b> | <b>19.4</b> | <b>25.3</b> | <b>28.0</b> | <b>16.8</b> | <b>13.8</b> | <b>14.5</b> | <b>5.7</b>  | <b>6.3</b>  | <b>11.4</b> | <b>32.2</b> |

|  |            |              |              |             |            |            |             |             |             |             |             |             |             |             |             |             |            |             |             |
|--|------------|--------------|--------------|-------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------|-------------|-------------|
| <b>Night Period</b>  |            |              |              |             |            |            |             |             |             |             |             |             |             |             |             |             |            |             |             |
| Correction for Passby Duration   | dB         | 8.4          | 8.4          | 8.4         | 8.4        | 8.4        | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4         | 8.4        | 8.4         |             |
| Correction for "Tailing Effect"  | dB         | 0.0          | 0.0          | 0.0         | 0.0        | 0.0        | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0         | 0.0        | 0.0         |             |
| SEL for Passby (include a 10dBA Design Factor)   | dBA        | 8.6          | 11.2         | 20.1        | 28.8       | 29.2       | 40.1        | 42.8        | 44.7        | 50.2        | 53.1        | 57.8        | 46.6        | 44.6        | 44.3        | 33.5        | 29.1       | 34.2        | 60.3        |
| Correction for no. of Train Passby   | dB         | 12.0         | 12.0         | 12.0        | 12.0       | 12.0       | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0        | 12.0       | 12.0        | 12.0        |
| Correction for duration effect   | dB         | -32.6        | -32.6        | -32.6       | -32.6      | -32.6      | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6       | -32.6      | -32.6       | -32.6       |
| <b>Predicted Ground Borne Noise - LA eq 30mins (include a 10dBA Design Factor)</b>                           | <b>dBA</b> | <b>-11.9</b> | <b>-9.3</b>  | <b>-0.4</b> | <b>8.3</b> | <b>8.7</b> | <b>19.6</b> | <b>22.3</b> | <b>24.2</b> | <b>29.7</b> | <b>32.6</b> | <b>37.3</b> | <b>26.1</b> | <b>24.1</b> | <b>23.8</b> | <b>13.0</b> | <b>8.6</b> | <b>13.7</b> | <b>39.8</b> |
| Design Target (ANL)  | dBA        |              |              |             |            |            |             |             |             |             |             |             |             |             |             |             |            |             | 45          |
| Margin of Safety   | dBA        |              |              |             |            |            |             |             |             |             |             |             |             |             |             |             |            |             | 5.2         |
| Minimum Attenuation Requirement (Overall)  | dBA        |              |              |             |            |            |             |             |             |             |             |             |             |             |             |             |            |             | 0.0         |
| Propose Mitigation Treatment   |            |              |              |             |            |            |             |             |             |             |             |             |             |             |             |             |            |             |             |
| Insertion Loss   | dB         | 0.0          | -1.0         | -4.0        | -5.0       | -3.0       | -3.0        | 0.0         | -9.0        | -13.0       | -10.0       | -12.0       | -12.0       | -13.0       | -12.0       | -10.0       | -5.0       | -5.0        |             |
| MTR Type 1a  |            |              |              |             |            |            |             |             |             |             |             |             |             |             |             |             |            |             |             |
| <b>Predicted Ground Borne Noise with Mitigation Treatment - LA eq 30mins (include a 10dBA Design Factor)</b> | <b>dBA</b> | <b>-11.9</b> | <b>-10.3</b> | <b>-4.4</b> | <b>3.3</b> | <b>5.7</b> | <b>16.6</b> | <b>22.3</b> | <b>15.2</b> | <b>16.7</b> | <b>22.6</b> | <b>25.3</b> | <b>14.1</b> | <b>11.1</b> | <b>11.8</b> | <b>3.0</b>  | <b>3.6</b> | <b>8.7</b>  | <b>29.5</b> |