

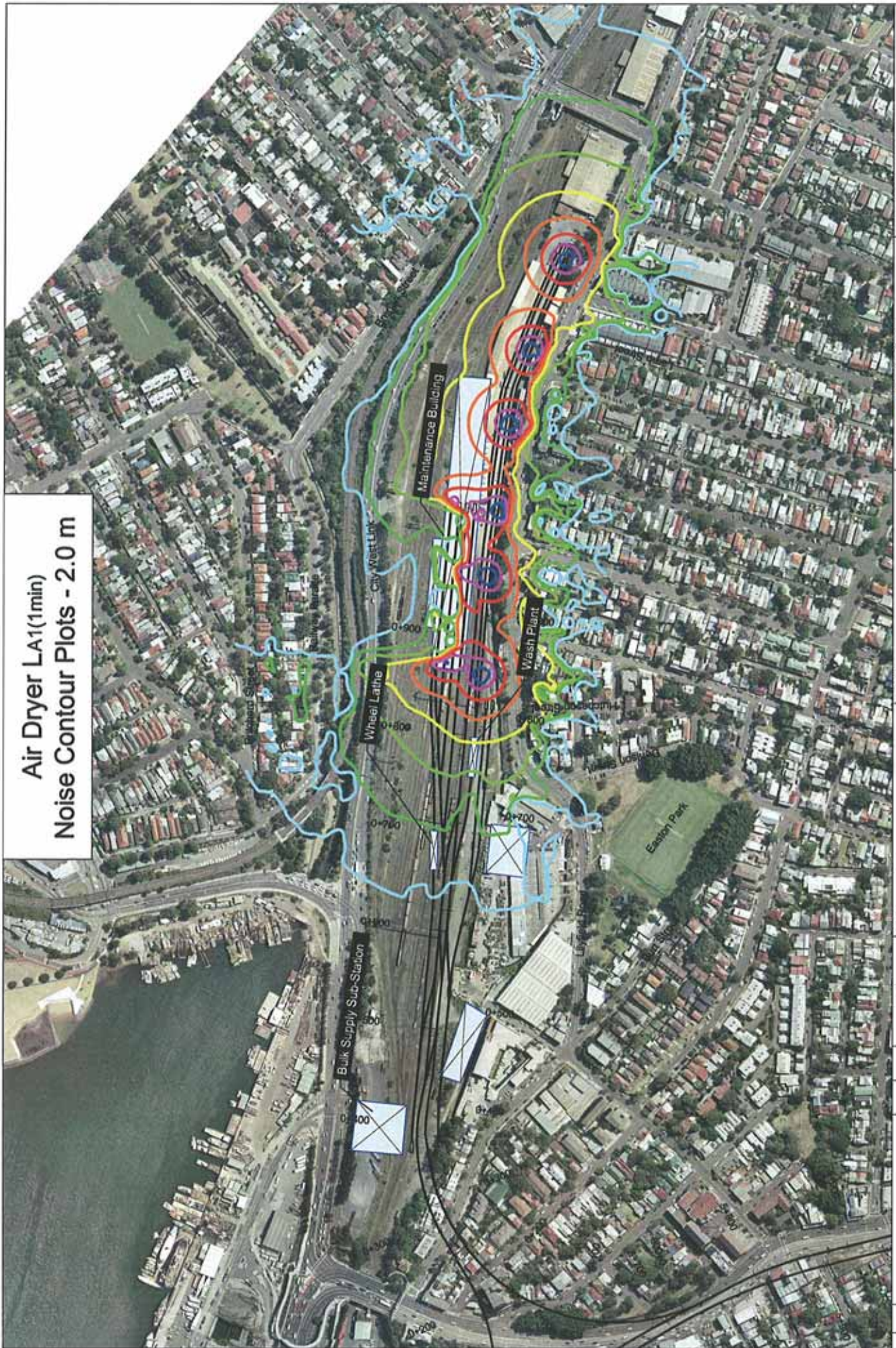
# Appendix L

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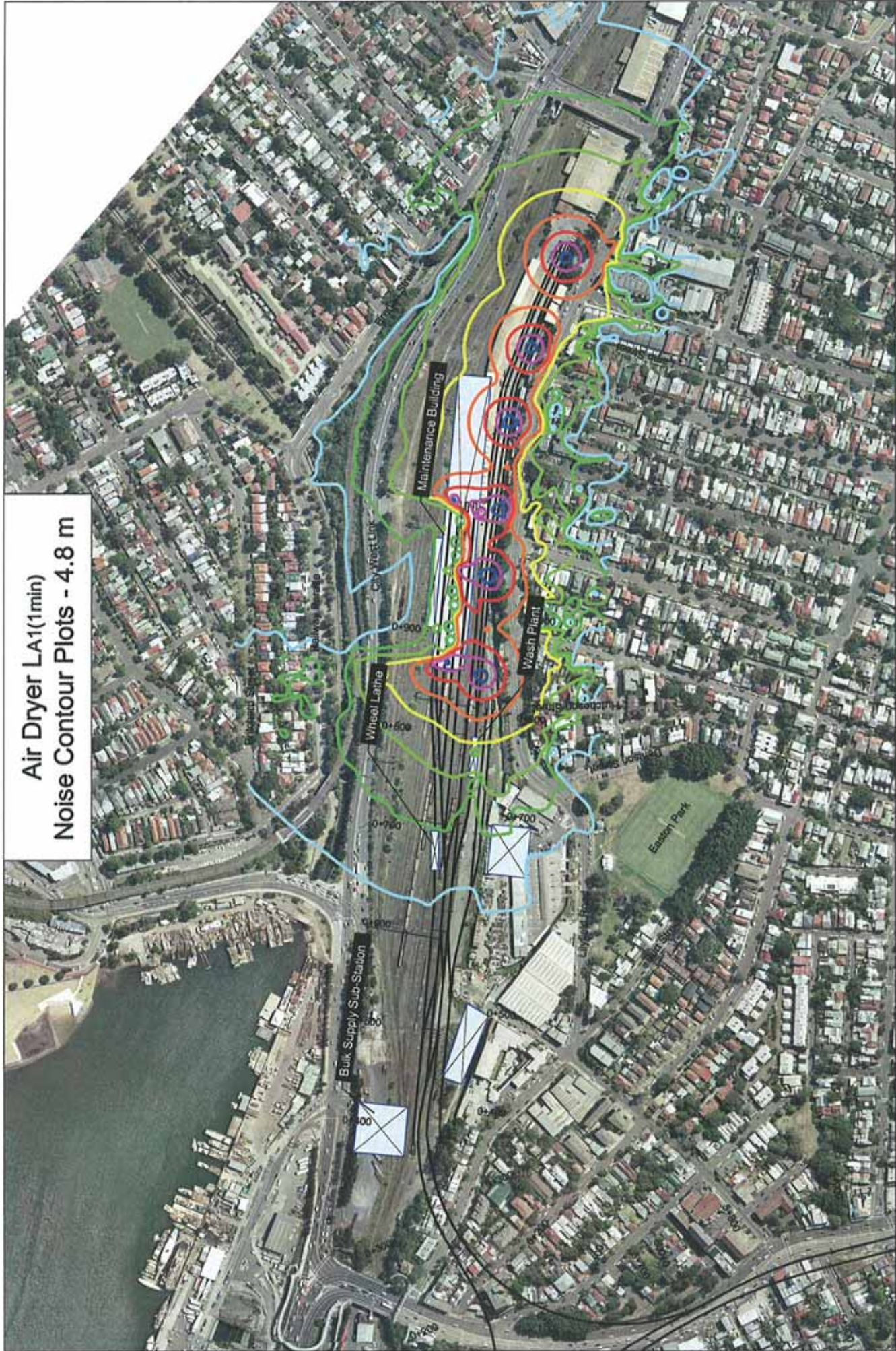
Airborne Noise Assessment (Train Stabling and Maintenance) - Noise Contour Plots (Scenario 3)  
LA1(1min) Air Dryer Scenario

# Air Dryer LA1(1min) Noise Contour Plots - 2.0 m



<p>75 dBA L<sub>1min</sub></p> <p>70 dBA L<sub>1min</sub></p> <p>65 dBA L<sub>1min</sub></p> <p>60 dBA L<sub>1min</sub></p> <p>55 dBA L<sub>1min</sub></p>		<p><b>LEGEND:</b></p> <p>75 dBA L<sub>1min</sub></p> <p>70 dBA L<sub>1min</sub></p> <p>65 dBA L<sub>1min</sub></p> <p>60 dBA L<sub>1min</sub></p> <p>55 dBA L<sub>1min</sub></p>	<p><b>SHEET LOCATION:</b></p> <p>Scale = 1:2500</p>	<p><b>Higgles Pty Ltd</b></p> <p>Level 10/100 2008 Adelaide PO Box 118 Lake One North 5000 Email: admin@higgles.com.au Telephone: 08 8477 8100 Facsimile: 08 8477 8009</p>	<p><b>10-7795 CBD Metro</b> <b>Train Stabling and Maintenance</b> <b>Noise Contour Plots</b></p>	<p>Drawn by: 14-7795_STABMG_0304eb-3_V2</p> <p>Sheet No: 1</p>
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# Air Dryer LA1(1min) Noise Contour Plots - 4.8 m



<p>75 dB(A) Leq/1min</p> <p>70 dB(A) Leq/1min</p> <p>65 dB(A) Leq/1min</p> <p>60 dB(A) Leq/1min</p>	<p>55 dB(A) Leq/1min</p> <p>50 dB(A) Leq/1min</p> <p>45 dB(A) Leq/1min</p> <p>40 dB(A) Leq/1min</p>	<p><b>LEGEND:</b></p>	<p><b>SHEET LOCATION:</b></p> <p>0 35 70 Scale = 1:2500</p>	<p><b>PROJECT:</b></p> <p>10-7785 CBD Metro Train Stabling and Maintenance Noise Contour Plots</p>	<p><b>CLIENT:</b></p> <p>Hogges Pty Ltd Level 10/100 South Avenue Central City Tower 175 Lane Cove NSW 1508 Tel: 02 9439 1000 Fax: 02 9439 1001</p>	<p><b>DATE:</b></p> <p>10/10/2018</p>	<p><b>SCALE:</b></p> <p>1:2500</p>	<p><b>PROJECT NO.:</b></p> <p>10-7785 CBD Metro</p>	<p><b>FILE NAME:</b></p> <p>Stabling and Maint - Scenario 3.dwg</p>	<p><b>PROJECT NO.:</b></p> <p>10-7785 CBD Metro</p>	<p><b>FILE NAME:</b></p> <p>10-7785 CBD Metro - 3.dwg</p>
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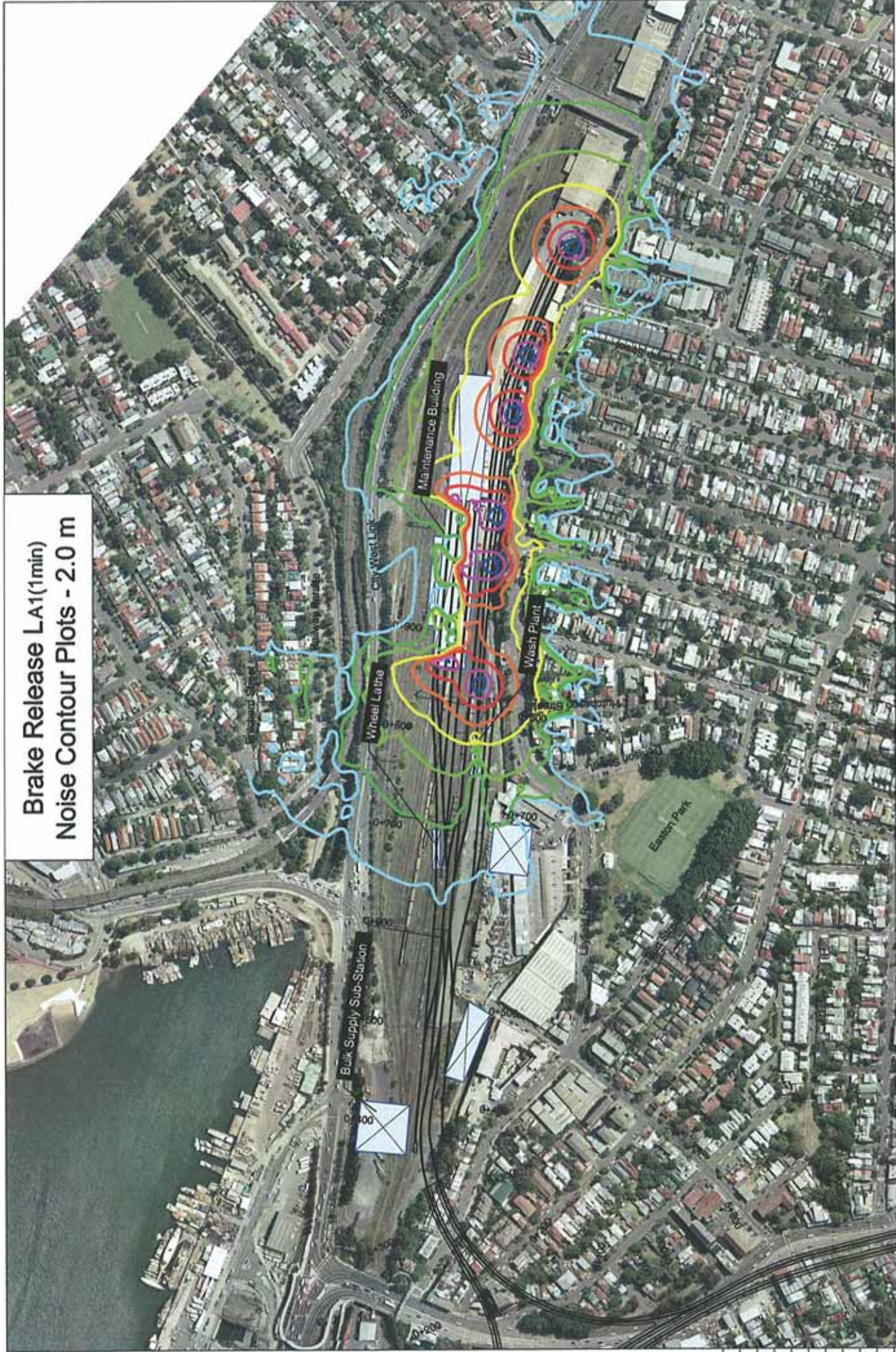
# Appendix M

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Airborne Noise Assessment (Train Stabling and Maintenance) - Noise Contour Plots (Scenario 4)  
LA1(1min) Brake Test Scenario

# Brake Release LA1(1min) Noise Contour Plots - 2.0 m



<p>70 mm ON DROWN 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70</p>	<p>Scale = 1:25000 0 35 70 METRES</p>	<p>SHEET LOCATION: </p>	<p>LEGEND:</p> <table border="0"> <tr> <td></td> <td>75 dB(A) Leq(1min)</td> </tr> <tr> <td></td> <td>70 dB(A) Leq(1min)</td> </tr> <tr> <td></td> <td>65 dB(A) Leq(1min)</td> </tr> <tr> <td></td> <td>60 dB(A) Leq(1min)</td> </tr> <tr> <td></td> <td>55 dB(A) Leq(1min)</td> </tr> <tr> <td></td> <td>50 dB(A) Leq(1min)</td> </tr> </table>		75 dB(A) Leq(1min)		70 dB(A) Leq(1min)		65 dB(A) Leq(1min)		60 dB(A) Leq(1min)		55 dB(A) Leq(1min)		50 dB(A) Leq(1min)	<p>FILE NAME: Stabling and Maint - Scenario A.dwg</p> <p>PROJECT NO: 19-1776_STABLING_COUNTS_L17</p>	<p>CLIENT: Hoggies Pty Ltd 21 Union Street East Coast Bays, Auckland East address: info@hoggies.co.nz Telephone: 021 710 7100 Fax: 021 710 7200</p>	<p>PROJECT: 10-7795 CBD Metro Train Stabling and Maintenance Noise Contour Plots</p> <p>DATE: 1</p>
	75 dB(A) Leq(1min)																	
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## Noise and Vibration Assessment for Pymont Station Alternative 2

## 1 Introduction

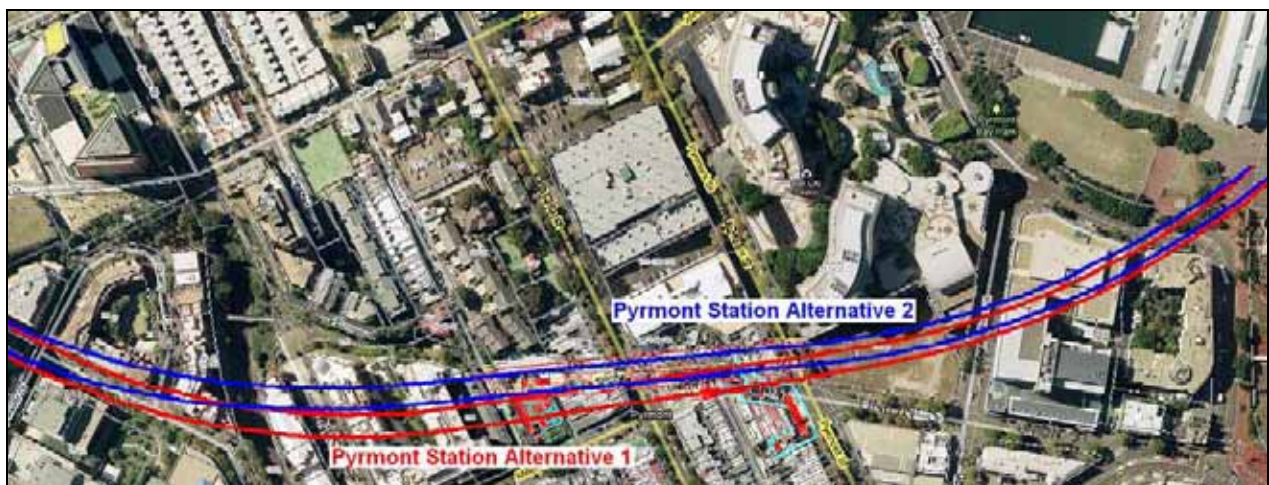
For the proposed CBD Metro station at Pymont, two options are currently being considered. These are referred to as Pymont Station Alternative 1 and Pymont Station Alternative 2.

In the main body of this report, the potential noise and vibration impacts associated with Pymont Station Alternative 1 have been assessed for construction and operations. The potential noise and vibration impacts associated with Pymont Station Alternative 2 are assessed in this Appendix.

## 2 Description of Station Options

A sketch of the Pymont Station Alternative 1 and Pymont Station Alternative 2 horizontal alignments is provided in **Figure 1**.

Figure 1 Horizontal Alignment Sketch of Pymont Station Alternative 1 and Pymont Station Alternative 2



*Image courtesy Google Maps*

On the basis of the above sketch, it can be seen that the Alternative 2 option is located on a more northern alignment compared with Alternative 1. The largest difference occurs at the western end of the proposed Pymont Station (at Union Square) where the Alternative 2 alignment is located approximately 24 m to the north of Alternative 1. For both options, the vertical alignment (ie the depth of the tunnel below ground) is the same. Furthermore whilst the western construction site is essentially the same the eastern construction site now maintains buildings demolished in Alternative 1 and extends the construction site further into Union Street.

## 3 Construction Noise and Vibration Assessment

The nearest noise sensitive receivers to the Pymont Station sites are identified in **Table 1** with the receiver areas illustrated in **Figure 2**.

## Noise and Vibration Assessment for Pymont Station Alternative 2

Figure 2 Pymont Construction Sites and Receiver Areas



Table 1 Nearest Noise Sensitive Receivers - Pymont Station

Station Site/Excavation	Receiver	Location Relative to Works (m)
Miller St/ Mount St	A - Dwellings SW	10
	B - Dwellings N (up cliff)	2
	C - Commercial adjacent E	3
	L - Residential	3
	D - Dwellings SE	19
Union St/ Pymont Street	E - Commercial adjoining W	3
	F - Dwellings W	17
	G - Residential/Commercial N	5
	H - Dwellings adjoining S	3
	I - Casino NE	30
	J - Commercial E	17
	K - Proposed Residential NE	26
Station Cavern	F - Dwellings	30
	C - Commercial	15
	G - Residential	14
	E - Commercial	20







Noise and Vibration Assessment for Pymont Station Alternative 2

- To mitigate impacts, feasible mitigation measures may include the use of 3 m to 6 m high perimeter noise walls or full enclosures of the noise-producing areas of the worksites. Note noise walls are effective for receivers at or near ground level (eg single storey residences and outdoor eating areas). The use of noise walls may also not be feasible during demolition activities. Full enclosures would only be considered at locations where night-time construction activities are proposed to be undertaken for extended periods of time. Indicatively, the enclosure construction could consist of metal cladding with internal insulation faced with sisalation on the walls and roof. Where exceedances for construction activities are predicted using enclosures (eg residences to the south-west of the Miller Street site, and residences adjacent to the Union Street site), the noise insulation of the enclosure element(s) facing the receiver may need to be upgraded using , for example, a double skin or masonry construction. The reasonableness of the identified feasible mitigation measures would be undertaken during the construction planning and site establishment phases of the project.
- Excavation activities are unlikely to be permitted to occur during the evening and night-time periods at the station sites, without significant noise mitigation and careful management of all noise-producing equipment and activities.

Having considered all reasonable and feasible noise mitigation, the CBD Metro ‘*Construction Noise and Vibration Strategy*’ would be implemented to manage the potential noise impacts.

**3.1.3 Ground-borne Noise from Roadheaders**

Roadheaders will be used for the station cavern at Pymont Station.s, cross tunnels, the main tunnels from White Bay to Rozelle stations, the stub tunnels at Rozelle, and the turnback and stub tunnels at Central.

From **Section 7.2.2**, in the main body of this report, internal noise goals of LAeq 45 dBA during the daytime, 40 dBA during the evening and 35 dBA during the night-time have been adopted as assessment goals for these activities at residential receivers.

The nearest receivers to Pymont cavern have been identified and the ground-borne noise levels predicted as well as the anticipated number of days of impact. The results are presented in **Table 8**.

Table 8 Predicted Noise Levels from Roadheader Operation

<b>Station Site / Excavation</b>	<b>Receiver</b>	<b>Location Relative to Works (m)</b>	<b>Predicted Noise Level in dBA</b>	<b>Predicted Number of Days Exceeding Night-time Noise Trigger Level, 35 dBA</b>
Pymont Station Cavern	C - Commercial	15	41	n/a
	E - Commercial	20	38	n/a
	F- Residential	30	35	0 days
	G - Residential	15	41	Up to 22 days

The results presented in **Table 8** show only a marginal exceedance of up to 6 dBA of the night-time noise goals at all the nearest residences. Where feasible, it may be necessary to maximise the distance between the roadheader and receivers during night-time periods. If this is not feasible, and ground-borne noise levels remain above the design goals during night-time periods, there may be a requirement to offer affected residents alternative temporary accommodation during these works. This process will be described in Sydney Metro’s ‘*Construction Noise and Vibration Strategy*’.

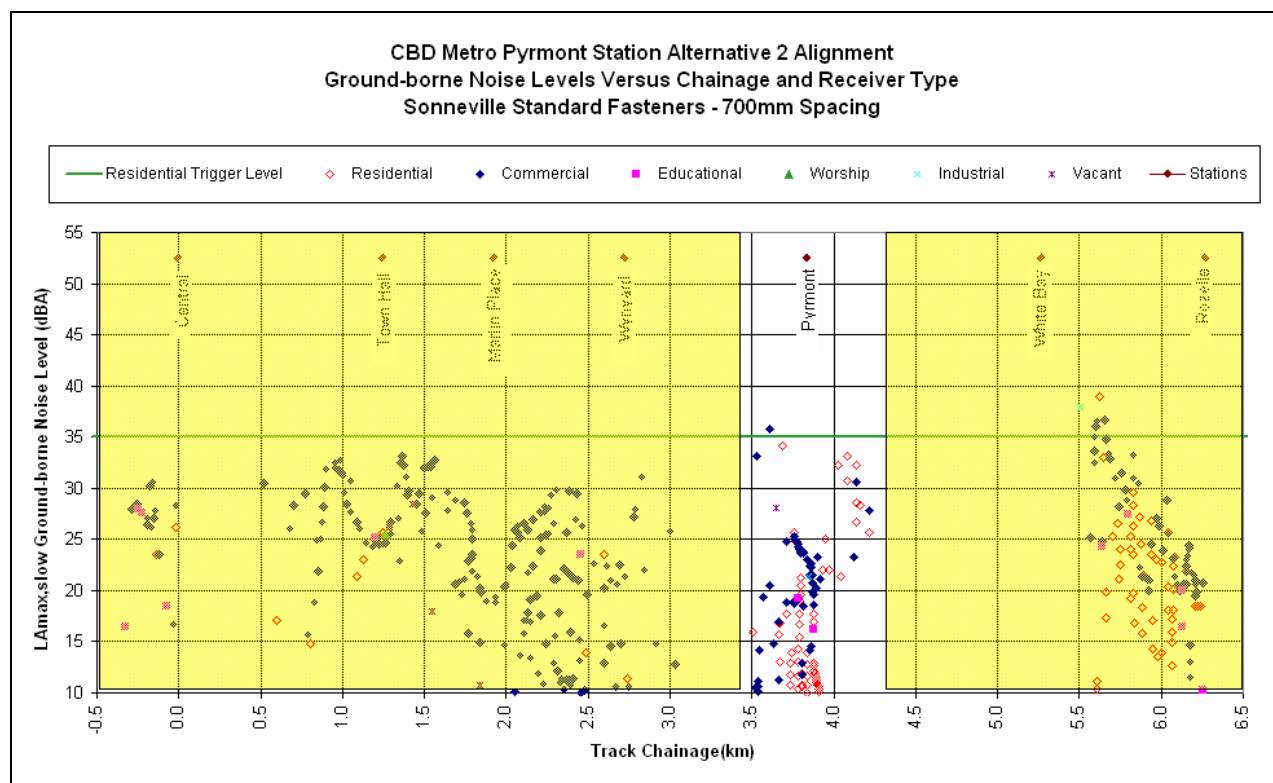
## 4 Operational Noise and Vibration Assessment

The calculation process for determining the ground-borne noise and vibration levels during train operations is described in **Section 12** and **Section 13** of the main document.

### 4.1 Ground-borne Vibration Assessment

On the basis of the ground-borne vibration modelling assumptions, the proposed speed profile and the vertical and horizontal alignments for Pymont Station Alternative 2, **Figure 3** presents a summary of the predicted ground-borne vibration levels for buildings located above or near the alignment between Pirrama Road (track chainage 3.45 km) and Quarry Master Drive (track chainage 4.24 km). The modelling results indicate that compliance with the ground-borne vibration goals will be achieved for all sensitive receiver locations above or near the alignment.

Figure 3 Predicted Ground-borne Vibration Levels (Standard Attenuation Track) - Pymont Station Alternative 2



Note: Calculated vibration levels in the shaded regions are the same as indicated in Section 12.4 of the main document.

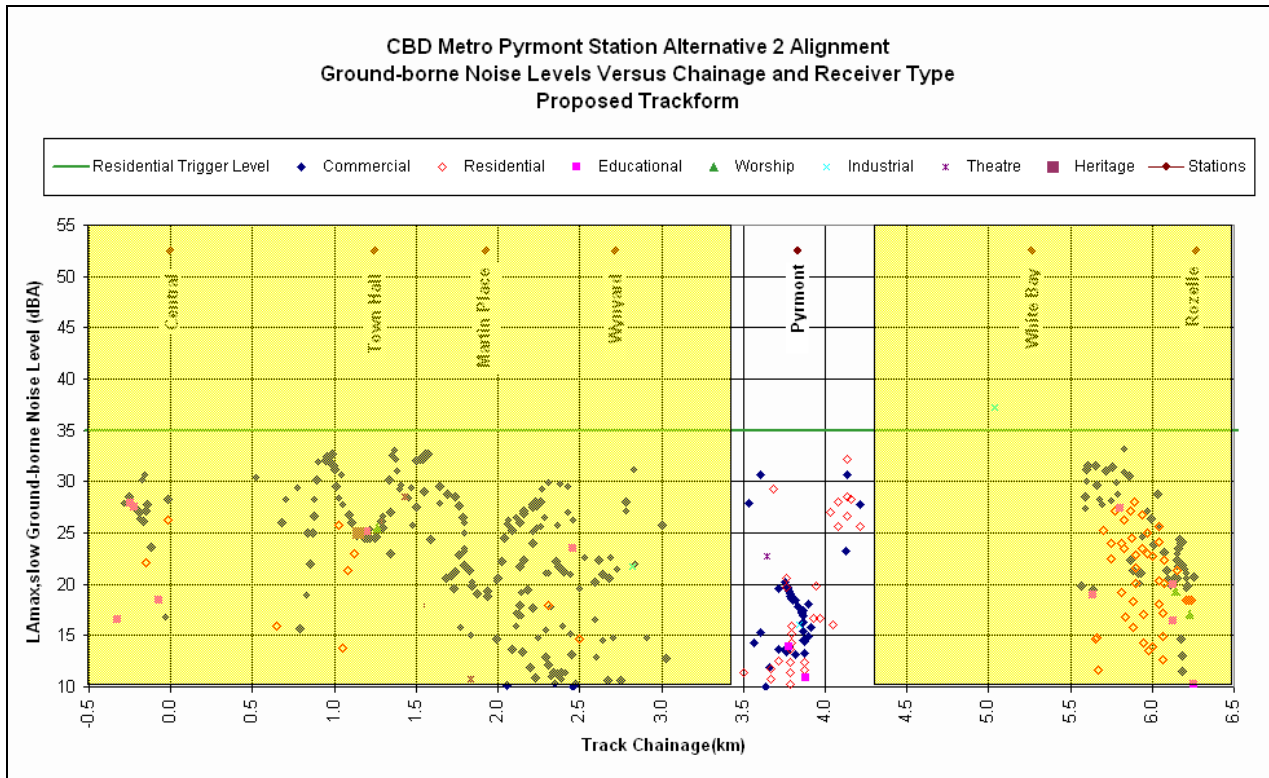
### 4.2 Ground-borne Noise Assessment

Consistent with the Pymont Station Alternative 1 alignment, a high attenuation trackform is proposed at this location in order to achieve compliance with the ground-borne noise design goals.

A summary of the predicted ground-borne noise levels with the proposed trackform is provided in **Figure 4** for buildings located above or near the alignment between Pirrama Road and Quarry Master Drive. The modelling results indicate that compliance with the ground-borne noise goals will be achieved for all sensitive receiver locations above or near the alignment.

Noise and Vibration Assessment for Pymont Station Alternative 2

Figure 4 Predicted Ground borne Noise Levels (Proposed Track) - Pymont Station Alternative 2



Note: Calculated Ground-borne noise levels in the shaded regions are the same as indicated in Section 13.7 of the main document

At the Star City Lyric Theatre, the predicted ground-borne noise levels are less than 25 dBA with the proposed high attenuation trackform. On this basis, ground-borne noise levels are not anticipated to be significant at this sensitive receiver location.

### 4.3 Conclusion for Ground-borne Noise and Vibration Assessment during Operations

The ground-borne noise and vibration modelling indicates that a trackform design which incorporates high attenuation rail fasteners will be sufficient to achieve compliance with the ground-borne noise and vibration goals at all sensitive receiver locations between Pirrama Road and Quarry Master Drive for the Pymont Station Alternative 2 alignment.

This is consistent with the ground-borne noise and vibration assessment for Pymont Station Alternative 1 which is assessed in the main body of this report.

