Appendix I

Tunnelling vibration maps

Appendix I Tunnelling vibration maps

Tunnel Alignment

Vibration Velocity, mm/s

0.14 0.2

NorthConnex

Groundborne Vibration - Tunneling Works

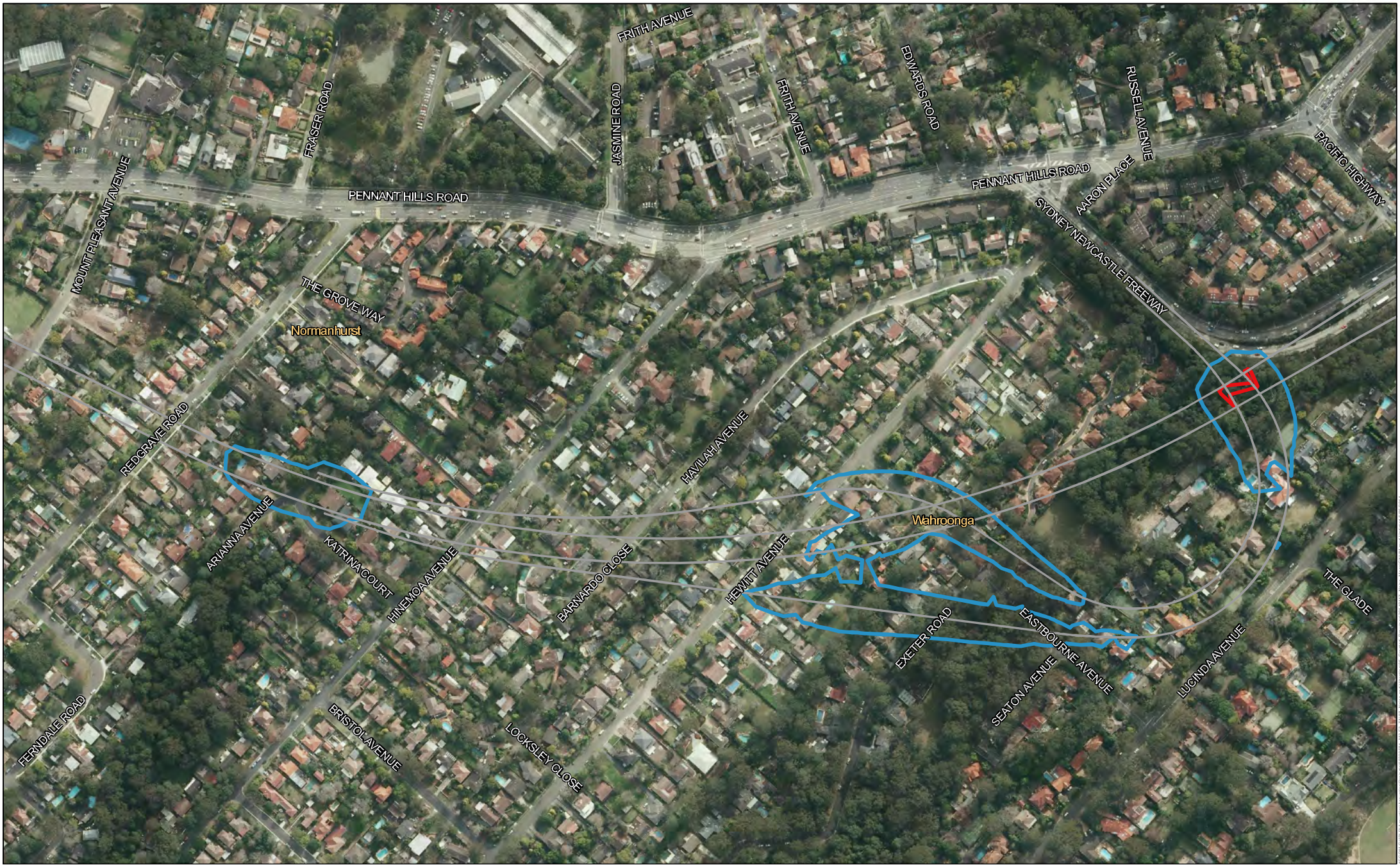
0 50 100 200 m

N

JUN 2014

60300684

Fig. **1**



Tunnel Alignment

Vibration Velocity, mm/s

0.14 0.2

NorthConnex

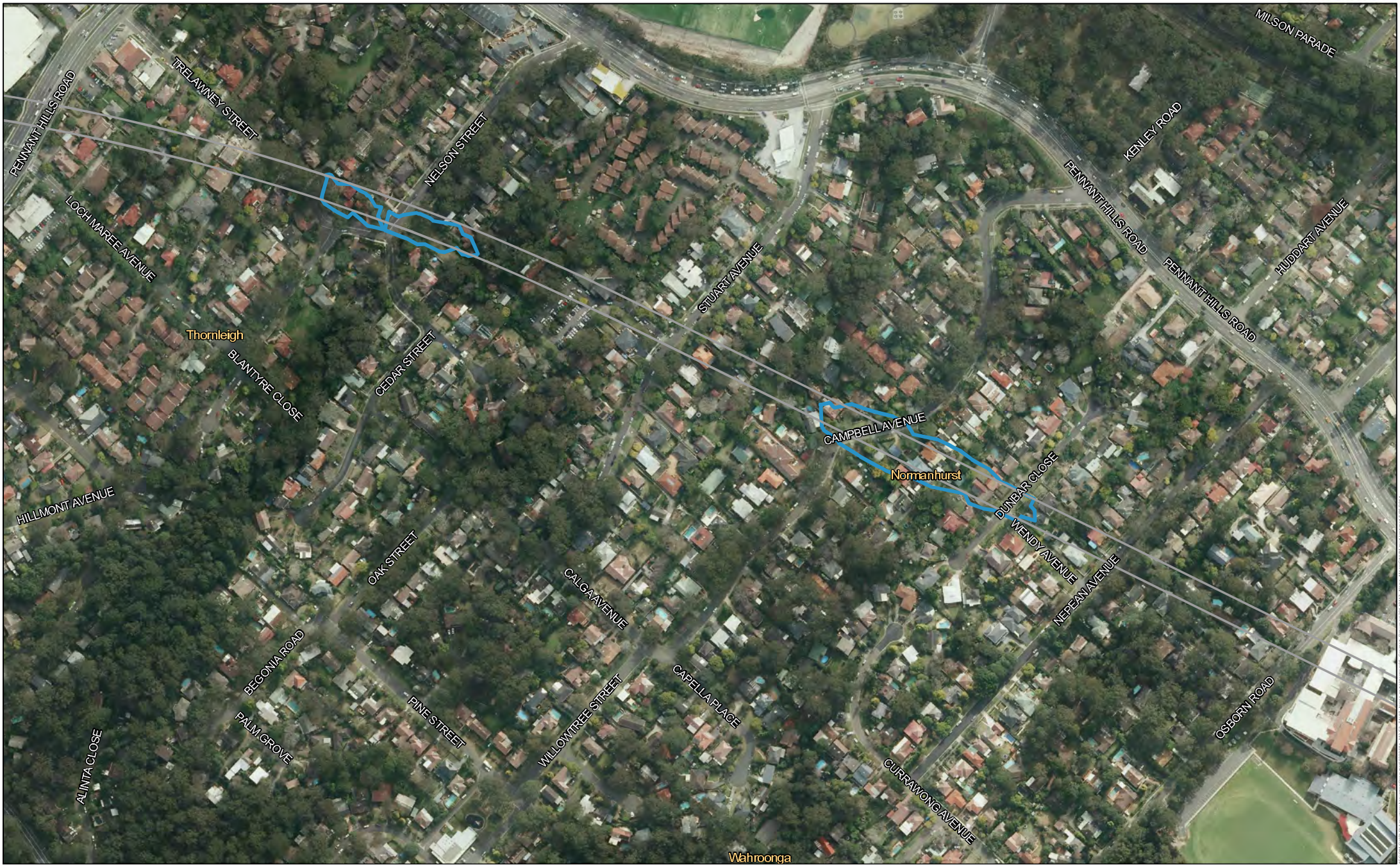
Groundborne Vibration - Tunneling Works

JUN 2014

60300684

0 50 100 200 m

Fig. **2**



Tunnel Alignment

Vibration Velocity, mm/s

0.14 0.2

NorthConnex

Groundborne Vibration - Tunneling Works

JUN 2014

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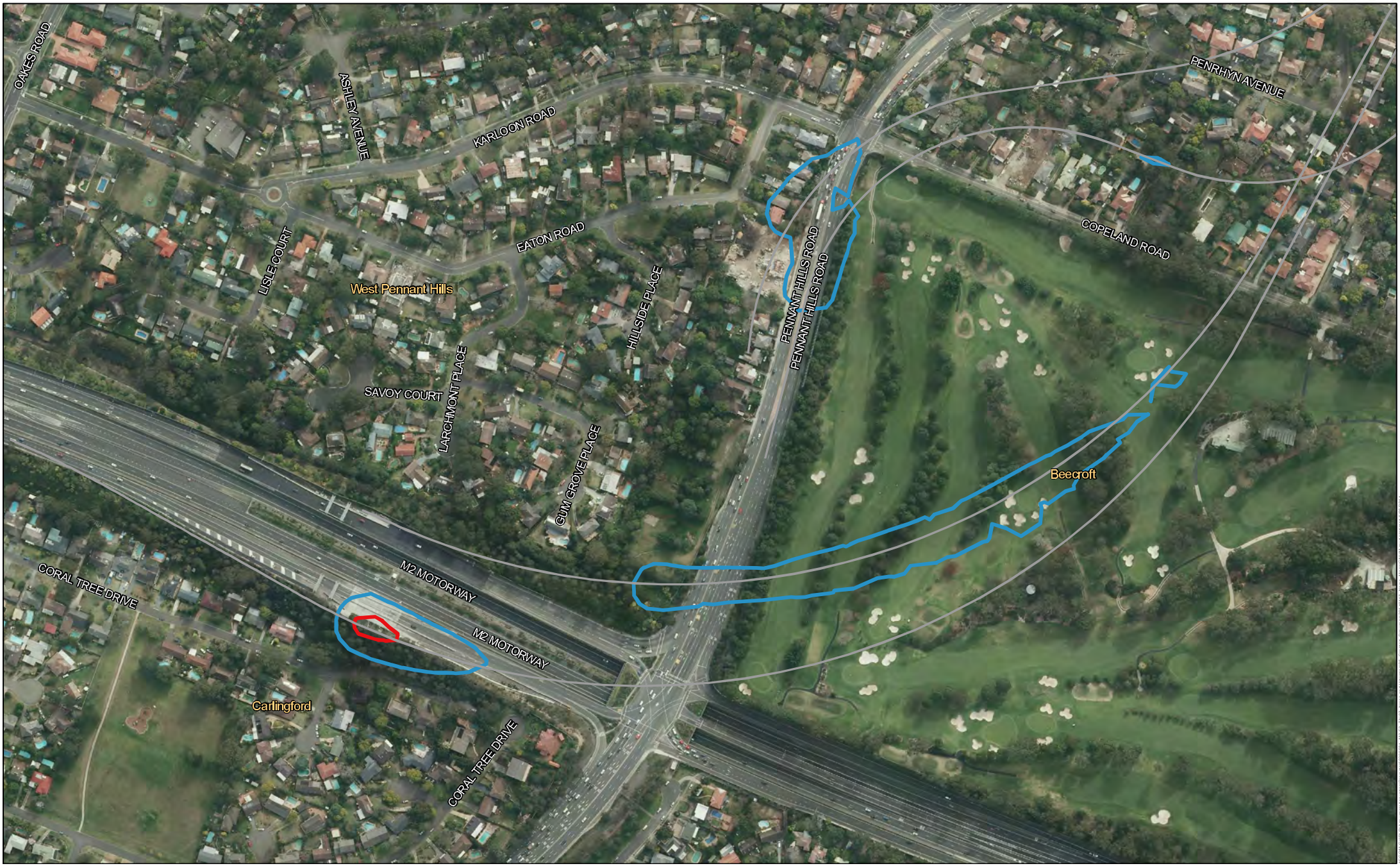
0 50 100 200 m

Fig. **3**



Tunnel Alignment

Vibration Velocity, mm/s

0.14 0.2

NorthConnex

Groundborne Vibration - Tunneling Works

0 50 100 200 m

JUN 2014

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Fig. **4**

Appendix J

Operational noise results

Appendix J Operational noise results

Northern interchange – Predicted noise levels with existing barriers

Table 79 Northern interchange – Predicted day-time noise levels

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
667	8 Lochville Street, Wahroonga	Residential	60	62	64	1.8	63	65	1.8	Yes	Yes
673	118a Coonanbarra Road, Wahroonga	Residential	60	55	58	2.4	56	58	2.4	No	No
691	27 Woonona Avenue N, Wahroonga	Residential	60	60	62	1.8	60	62	1.8	No	No
722	114 Coonabarra Road, Wahroonga	Residential	60	55	58	2.4	56	59	2.4	No	No
730	31 Bareena Avenue, Wahroonga	Residential	60	56	58	2.6	56	59	2.6	No	No
735	37b Bareena Avenue, Wahroonga	Residential	60	58	60	2.8	58	61	2.8	No	Yes
737	Lot 2 Bareena Avenue, Wahroonga	Residential	60	60	62	1.7	61	62	1.7	No	No
743	37a Bareena Avenue, Wahroonga	Residential	60	57	62	4.6	58	63	4.6	No	Yes
775	37a Bareena Avenue, Wahroonga	Residential	60	59	61	2.4	59	62	2.4	No	Yes
785	28 Bareena Avenue, Wahroonga	Residential	60	60	62	2	61	63	2	No	No
929	1 Burns Road, Wahroonga	Residential	60	59	63	4.1	60	64	4.1	No	Yes
936	44 Woonona Avenue, Wahroonga	Residential	60	67	69	1.9	68	70	1.9	Yes	Yes
951	1-3 Burns Road, Wahroonga	Residential	60	59	62	3.6	59	63	3.6	No	Yes
966	1-3 Burns Road, Wahroonga	Residential	60	62	64	2.5	62	65	2.5	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
972	9-11 Benson Close, Wahroonga	Residential	60	65	69	4.1	65	70	4.1	Yes	Yes
976	9 Woniora Avenue, Wahroonga	Residential	60	60	62	1.9	61	63	1.9	No	No
1017	7a Benson Close, Wahroonga	Residential	60	64	64	0.3	65	65	0.3	Yes	Yes
1053	5 Benson Close, Wahroonga	Residential	60	64	64	0	65	65	0	Yes	Yes
1084	28 Woonona Avenue, Wahroonga	Residential	60	65	66	0.1	66	66	0.1	Yes	Yes
1088	3a Benson Close, Wahroonga	Residential	60	65	65	-0.1	65	65	-0.1	Yes	Yes
1147	1 Benson Close, Wahroonga	Residential	60	63	63	-0.2	64	64	-0.2	No	No
1574	1711 Pacific Highway, Wahroonga	Church	NA	71	75	4.3	72	76	4.3	Yes	Yes
1575	1707 Pacific Highway, Wahroonga	Residential	60	71	75	3.7	72	76	3.7	Yes	Yes
1577	1709 Pacific Highway, Wahroonga	Residential	60	71	75	4.3	71	76	4.3	Yes	Yes
1580	1711 Pacific Highway, Wahroonga	Church	NA	71	75	3.8	71	75	3.8	Yes	Yes
1605	1740 Pacific Highway, Wahroonga	Residential	60	70	73	3.7	70	74	3.7	Yes	Yes
1606	1740 Pacific Highway, Wahroonga	Residential	60	70	73	3.4	71	74	3.4	Yes	Yes
1614	1707 Pacific Highway, Wahroonga	Residential	60	60	63	2.4	61	63	2.4	No	Yes
1616	1740 Pacific Highway, Wahroonga	Residential	60	63	67	3.5	64	68	3.5	Yes	Yes
1617	7 Lucinda Avenue, Wahroonga	Residential	60	65	67	1.8	66	68	1.8	Yes	Yes
1619	1740 Pacific Highway, Wahroonga	Residential	60	62	65	2.5	63	65	2.5	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
1622	1740 Pacific Highway, Wahroonga	Residential	60	68	68	0.2	69	69	0.2	Yes	Yes
1626	9 Lucinda Avenue, Wahroonga	Residential	60	60	62	2	61	63	2	No	No
1648	11 Lucinda Avenue, Wahroonga	Residential	60	56	58	2.2	56	58	2.2	No	No
1654	1740 Pacific Highway, Wahroonga	Residential	60	67	67	-0.4	68	67	-0.4	Yes	Yes
1656	11a Lucinda Avenue, Wahroonga	Residential	60	63	65	1.2	64	65	1.2	Yes	Yes
1661	15 Lucinda Avenue, Wahroonga	Residential	60	57	59	2.1	57	59	2.1	No	No
1754	1740 Pacific Highway, Wahroonga	Residential	60	65	65	-0.7	66	65	-0.7	Yes	Yes
1777	1740 Pacific Highway, Wahroonga	Residential	60	63	64	1.5	64	65	1.5	Yes	Yes
1780	1707 Pacific Highway, Wahroonga	Residential	60	59	62	2.7	60	62	2.7	No	Yes
1781	13 Kingsley Close, Wahroonga	Residential	60	58	65	6.7	59	65	6.7	Yes	Yes
1782	14 Kingsley Close, Wahroonga	Residential	60	58	60	2.6	58	61	2.6	No	Yes
1783	1707 Pacific Highway, Wahroonga	Residential	60	58	61	2.6	59	61	2.6	No	Yes
1787	1740 Pacific Highway, Wahroonga	Residential	60	62	63	1.2	63	64	1.2	No	No
1800	10 Kingsley Close, Wahroonga	Residential	60	63	66	3	64	67	3	Yes	Yes
1801	9 Kingsley Close, Wahroonga	Residential	60	55	58	3.3	56	59	3.3	No	No
1822	11a Hewitt Avenue, Wahroonga	Residential	60	62	65	2.8	63	65	2.8	Yes	Yes
1828	1 Aaron Place, Wahroonga	Residential	60	63	64	1.9	63	65	1.9	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
1829	1 Aaron Place, Wahroonga	Residential	60	69	73	3.6	70	73	3.6	Yes	Yes
1833	13 Hewitt Avenue, Wahroonga	Residential	60	60	62	1.9	61	63	1.9	No	No
1839	1 Aaron Place, Wahroonga	Residential	60	62	64	2.1	63	65	2.1	Yes	Yes
1843	1 Aaron Place, Wahroonga	Residential	60	69	72	3.1	69	73	3.1	Yes	Yes
1844	3 Aaron Place, Wahroonga	Residential	60	62	66	3.8	63	66	3.8	Yes	Yes
1850	9 Hewitt Avenue, Wahroonga	Residential	60	62	65	2.7	63	65	2.7	Yes	Yes
1852	11 Hewitt Avenue, Wahroonga	Residential	60	61	62	1	62	63	1	No	No
1856	1 Aaron Place, Wahroonga	Residential	60	70	72	2.3	71	73	2.3	Yes	Yes
1890	14 Pennant Hills Road, Wahroonga	Residential	60	70	73	3.1	71	74	3.1	Yes	Yes
1892	52 Russell Avenue, Wahroonga	Residential	60	69	73	3.3	70	73	3.3	Yes	Yes
1896	61 Russell Avenue, Wahroonga	Residential	60	63	66	2.3	64	66	2.3	Yes	Yes
1897	59 Russell Avenue, Wahroonga	Residential	60	57	60	2.7	58	61	2.7	No	Yes
1899	53 Russell Avenue, Wahroonga	Residential	60	55	58	2.6	56	59	2.6	No	No
1908	55 Russell Avenue, Wahroonga	Residential	60	62	67	4.4	63	67	4.4	Yes	Yes
1914	16 Pennant Hills Road, Wahroonga	Residential	60	70	72	2.2	71	73	2.2	Yes	Yes
1917	50 Russell Avenue, Wahroonga	Residential	60	56	58	2.6	56	59	2.6	No	No
1926	18 Pennant Hills Road, Wahroonga	Residential	60	71	73	1.9	72	74	1.9	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
1931	20 Pennant Hills Road, Wahroonga	Residential	60	72	74	1.3	73	74	1.3	Yes	Yes
1971	22 Pennant Hills Road, Wahroonga	Residential	60	72	73	0.6	73	74	0.6	Yes	Yes
1982	24 Pennant Hills Road, Wahroonga	Residential	60	74	74	0.1	75	75	0.1	Yes	Yes
1986	2 Havilah Avenue, Wahroonga	Residential	60	61	64	3.1	62	65	3.1	Yes	Yes
1989	26 Pennant Hills Road, Wahroonga	Residential	60	73	74	0.2	74	74	0.2	Yes	Yes
1992	2a Edwards Road, Wahroonga	Residential	60	65	64	-1.1	66	65	-1.1	Yes	Yes
1996	4 Havilah Avenue, Wahroonga	Residential	60	60	62	2.7	60	63	2.7	No	Yes
1998	27 Pennant Hills Road, Wahroonga	Residential	60	74	72	-2.2	75	72	-2.2	Yes	Yes
728	37b Bareena Avenue, Wahroonga	Residential	60	59	62	2.4	60	63	2.4	No	Yes
1582	3 Pacific Highway, Wahroonga	Residential	60	71	72	1	72	73	1	Yes	Yes
1590	1 Pacific Highway, Wahroonga	Residential	60	70	73	3.2	71	74	3.2	Yes	Yes
1859	2 Pennant Hills Road, Wahroonga	Residential	60	70	75	5.6	70	76	5.6	Yes	Yes
1860	4 Pennant Hills Road, Wahroonga	Residential	60	69	74	5.7	69	75	5.7	Yes	Yes
1862	6 Pennant Hills Road, Wahroonga	Residential	60	71	76	5.7	71	77	5.7	Yes	Yes
1893	12 Pennant Hills Road, Wahroonga	Residential	60	69	73	4.4	69	74	4.4	Yes	Yes
1895	10 Pennant Hills Road, Wahroonga	Residential	60	66	71	4.9	67	72	4.9	Yes	Yes
1904	8 Pennant Hills Road, Wahroonga	Residential	60	68	73	4.8	68	73	4.8	Yes	Yes

Table 80 Northern interchange – Predicted night-time noise levels with existing barriers

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
667	8 Lochville Street, Wahroonga	Residential	55	60	61	1.5	60	62	1.5	Yes	Yes
673	118a Coonanbarra Road, Wahroonga	Residential	55	53	55	2.1	53	56	2.1	No	Yes
691	27 Woonona Avenue N, Wahroonga	Residential	55	57	59	1.5	58	60	1.5	Yes	Yes
722	114 Coonabarra Road, Wahroonga	Residential	55	53	55	2.1	54	56	2.1	No	Yes
730	31 Bareena Avenue, Wahroonga	Residential	55	53	56	2.3	54	56	2.3	No	Yes
735	37b Bareena Avenue, Wahroonga	Residential	55	55	58	2.4	56	58	2.4	No	Yes
737	Lot 2 Bareena Avenue, Wahroonga	Residential	55	57	59	1.4	58	60	1.4	Yes	Yes
743	37a Bareena Avenue, Wahroonga	Residential	55	55	59	4.4	56	60	4.4	Yes	Yes
775	26 Bareena Avenue, Wahroonga	Residential	55	56	58	1.9	57	59	1.9	No	No
785	28 Bareena Avenue, Wahroonga	Residential	55	58	59	1.4	59	60	1.4	Yes	Yes
929	1 Burns Road, Wahroonga	Residential	55	57	60	3.5	58	61	3.5	Yes	Yes
936	44 Woonona Avenue, Wahroonga	Residential	55	65	66	1.1	66	67	1.1	Yes	Yes
951	1-3 Burns Road, Wahroonga	Residential	55	56	60	3.2	57	60	3.2	Yes	Yes
966	1-3 Burns Road, Wahroonga	Residential	55	59	61	1.8	60	62	1.8	Yes	Yes
972	9-11 Benson Close, Wahroonga	Residential	55	62	66	3.2	63	66	3.2	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
976	9 Woniora Avenue, Wahroonga	Residential	55	58	59	1.2	58	60	1.2	Yes	Yes
1017	7a Benson Close, Wahroonga	Residential	55	62	61	-0.5	63	62	-0.5	Yes	Yes
1053	5 Benson Close, Wahroonga	Residential	55	62	62	-0.7	63	62	-0.7	Yes	Yes
1084	28 Woonona Avenue, Wahroonga	Residential	55	63	62	-0.6	64	63	-0.6	Yes	Yes
1088	3a Benson Close, Wahroonga	Residential	55	62	62	-0.9	63	62	-0.9	Yes	Yes
1147	1 Benson Close, Wahroonga	Residential	55	61	60	-1	62	61	-1	Yes	Yes
1574	1711 Pacific Highway, Wahroonga	Church	NA	67	72	4.9	68	73	4.9	Yes	Yes
1575	1707 Pacific Highway, Wahroonga	Residential	55	68	72	3.9	69	73	3.9	Yes	Yes
1577	1709 Pacific Highway, Wahroonga	Residential	55	67	72	4.8	68	73	4.8	Yes	Yes
1580	1711 Pacific Highway, Wahroonga	Church	NA	67	72	4.3	68	72	4.3	Yes	Yes
1605	1740 Pacific Highway, Wahroonga	Residential	55	66	71	4.1	67	71	4.1	Yes	Yes
1606	1740 Pacific Highway, Wahroonga	Residential	55	67	71	3.8	68	71	3.8	Yes	Yes
1614	1707 Pacific Highway, Wahroonga	Residential	55	58	60	2.3	58	61	2.3	Yes	Yes
1616	1740 Pacific Highway, Wahroonga	Residential	55	61	64	3.7	61	65	3.7	Yes	Yes
1617	7 Lucinda Avenue, Wahroonga	Residential	55	63	64	1.6	63	65	1.6	Yes	Yes
1619	1740 Pacific Highway, Wahroonga	Residential	55	60	62	2.6	60	63	2.6	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
1622	1740 Pacific Highway, Wahroonga	Residential	55	66	65	-0.5	66	66	-0.5	Yes	Yes
1626	9 Lucinda Avenue, Wahroonga	Residential	55	57	59	1.8	58	60	1.8	Yes	Yes
1648	11 Lucinda Avenue, Wahroonga	Residential	55	53	55	2.2	54	56	2.2	No	Yes
1654	1740 Pacific Highway, Wahroonga	Residential	55	65	63	-1.4	65	64	-1.4	Yes	Yes
1656	11a Lucinda Avenue, Wahroonga	Residential	55	61	62	0.7	62	62	0.7	Yes	Yes
1661	15 Lucinda Avenue, Wahroonga	Residential	55	54	56	2.1	55	57	2.1	No	Yes
1754	1740 Pacific Highway, Wahroonga	Residential	55	63	61	-1.8	64	62	-1.8	Yes	Yes
1777	1740 Pacific Highway, Wahroonga	Residential	55	61	61	0.3	62	62	0.3	Yes	Yes
1780	1707 Pacific Highway, Wahroonga	Residential	55	57	59	2.6	57	60	2.6	Yes	Yes
1781	13 Kingsley Close, Wahroonga	Residential	55	56	62	6	57	63	6	Yes	Yes
1782	14 Kingsley Close, Wahroonga	Residential	55	55	57	1.9	56	58	1.9	No	No
1783	1707 Pacific Highway, Wahroonga	Residential	55	56	58	2.4	56	59	2.4	No	Yes
1787	1740 Pacific Highway, Wahroonga	Residential	55	60	60	0.1	61	61	0.1	Yes	Yes
1800	10 Kingsley Close, Wahroonga	Residential	55	61	63	2	62	64	2	Yes	Yes
1801	9 Kingsley Close, Wahroonga	Residential	55	53	56	2.9	53	56	2.9	No	Yes
1822	11a Hewitt Avenue, Wahroonga	Residential	55	60	62	1.7	61	62	1.7	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
1828	1 Aaron Place, Wahroonga	Residential	55	61	61	0.9	61	62	0.9	Yes	Yes
1829	1 Aaron Place, Wahroonga	Residential	55	66	70	3.8	67	71	3.8	Yes	Yes
1833	13 Hewitt Avenue, Wahroonga	Residential	55	58	59	0.9	59	60	0.9	Yes	Yes
1839	1 Aaron Place, Wahroonga	Residential	55	60	61	1.3	60	62	1.3	Yes	Yes
1843	1 Aaron Place, Wahroonga	Residential	55	66	69	3.4	67	70	3.4	Yes	Yes
1844	3 Aaron Place, Wahroonga	Residential	55	60	63	3	60	63	3	Yes	Yes
1850	9 Hewitt Avenue, Wahroonga	Residential	55	60	62	1.6	61	62	1.6	Yes	Yes
1852	11 Hewitt Avenue, Wahroonga	Residential	55	59	60	0.3	60	60	0.3	Yes	Yes
1856	1 Aaron Place, Wahroonga	Residential	55	67	70	2.5	68	70	2.5	Yes	Yes
1890	14 Pennant Hills Road, Wahroonga	Residential	55	67	70	3.1	68	71	3.1	Yes	Yes
1892	52 Russell Avenue, Wahroonga	Residential	55	67	70	3.3	67	71	3.3	Yes	Yes
1896	61 Russell Avenue, Wahroonga	Residential	55	61	63	2.2	62	64	2.2	Yes	Yes
1897	59 Russell Avenue, Wahroonga	Residential	55	55	57	2.7	55	58	2.7	No	Yes
1899	53 Russell Avenue, Wahroonga	Residential	55	53	56	2.6	54	56	2.6	No	Yes
1908	55 Russell Avenue, Wahroonga	Residential	55	60	64	4.6	60	65	4.6	Yes	Yes
1914	16 Pennant Hills Road, Wahroonga	Residential	55	67	69	2	68	70	2	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
1917	50 Russell Avenue, Wahroonga	Residential	55	53	56	2.5	54	56	2.5	No	Yes
1926	18 Pennant Hills Road, Wahroonga	Residential	55	69	70	1.5	69	71	1.5	Yes	Yes
1931	20 Pennant Hills Road, Wahroonga	Residential	55	70	70	0.8	70	71	0.8	Yes	Yes
1971	22 Pennant Hills Road, Wahroonga	Residential	55	70	70	0	71	71	0	Yes	Yes
1982	24 Pennant Hills Road, Wahroonga	Residential	55	71	71	-0.6	72	72	-0.6	Yes	Yes
1986	2 Havilah Avenue, Wahroonga	Residential	55	59	62	2.6	60	62	2.6	Yes	Yes
1989	26 Pennant Hills Road, Wahroonga	Residential	55	71	70	-0.6	72	71	-0.6	Yes	Yes
1992	2a Edwards Road, Wahroonga	Residential	55	63	62	-1.6	64	62	-1.6	Yes	Yes
1996	4 Havilah Avenue, Wahroonga	Residential	55	57	60	2.2	58	60	2.2	Yes	Yes
1998	27 Pennant Hills Road, Wahroonga	Residential	55	71	69	-2.6	72	69	-2.6	Yes	Yes
728	37b Bareena Avenue, Wahroonga	Residential	55	57	59	2	58	60	2	Yes	Yes
1582	3 Pacific Highway, Wahroonga	Residential	55	68	69	1.4	69	70	1.4	Yes	Yes
1590	1 Pacific Highway, Wahroonga	Residential	55	67	70	3.4	67	71	3.4	Yes	Yes
1859	2 Pennant Hills Road, Wahroonga	Residential	55	67	72	5.8	67	73	5.8	Yes	Yes
1860	4 Pennant Hills Road, Wahroonga	Residential	55	66	72	5.8	67	72	5.8	Yes	Yes
1862	6 Pennant Hills Road, Wahroonga	Residential	55	68	74	5.9	68	74	5.9	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
1893	12 Pennant Hills Road, Wahroonga	Residential	55	66	70	4.5	67	71	4.5	Yes	Yes
1895	10 Pennant Hills Road, Wahroonga	Residential	55	64	69	5	64	69	5	Yes	Yes
1904	8 Pennant Hills Road, Wahroonga	Residential	55	65	70	4.9	66	71	4.9	Yes	Yes

Southern interchange and Hills M2 Motorway integration works – Predicted noise levels with existing barriers

Table 81 Southern interchange and Hills M2 Motorway integration works Predicted daytime noise levels

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
3468	50a Coral Tree Drive, Carlingford	Residential	60	70	69	-0.8	71	70	-0.8	Yes	Yes
3481	20 Gum Grove Place, West Pennant Hills	Residential	60	57	60	2.4	58	60	2.4	No	No
4237	5 Carmen Drive, Carlingford	Residential	60	63	64	0.9	64	65	0.9	Yes	Yes
4257	7 Carmen Drive, Carlingford	Residential	60	62	63	0.9	63	64	0.9	No	No
4444	25 Carmen Drive, Carlingford	Residential	60	63	64	1.2	64	65	1.2	Yes	Yes
4459	27 Carmen Drive, Carlingford	Residential	60	66	68	1.5	67	69	1.5	Yes	Yes
4475	29 Carmen Drive, Carlingford	Residential	60	70	71	1.4	70	72	1.4	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
4477	46 Carmen Drive, Carlingford	Residential	60	61	63	1.8	62	64	1.8	No	No
4483	31 Carmen Drive, Carlingford	Residential	60	67	68	1.4	67	69	1.4	Yes	Yes
4515	48 Carmen Drive, Carlingford	Residential	60	62	64	1.7	63	65	1.7	Yes	Yes
4518	31 Carmen Drive, Carlingford	Residential	60	72	73	1.2	72	74	1.2	Yes	Yes
4529	50 Carmen Drive, Carlingford	Residential	60	62	64	1.7	63	65	1.7	Yes	Yes
4540	52 Carmen Drive, Carlingford	Residential	60	62	64	1.6	63	64	1.6	No	No
4565	56 Carmen Drive, Carlingford	Residential	60	63	64	1.2	64	65	1.2	Yes	Yes
4631	70 Westmore Drive, West Pennant Hills	Residential	60	61	62	0.7	62	63	0.7	No	No
4668	74 Westmore Drive, West Pennant Hills	Residential	60	62	63	0.7	63	63	0.7	No	No
4681	76 Westmore Drive, West Pennant Hills	Residential	60	62	63	0.8	63	64	0.8	No	No
4702	78 Westmore Drive, West Pennant Hills	Residential	60	62	63	0.8	63	64	0.8	No	No
4717	80 Westmore Drive, West Pennant Hills	Residential	60	63	63	0.6	64	64	0.6	No	No
4762	9 Wilshire Avenue, Carlingford	Residential	60	61	62	1.2	62	63	1.2	No	No
4770	11 Wilshire Avenue, Carlingford	Residential	60	63	65	1.5	64	66	1.5	Yes	Yes
4884	15 Wilshire Avenue, Carlingford	Residential	60	69	70	1.3	70	71	1.3	Yes	Yes
4889	13 Wilshire Avenue, Carlingford	Residential	60	62	63	0.7	63	64	0.7	No	No
5155	24 Yale Close, North Rocks	Residential	60	64	66	1.2	65	66	1.2	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
5434	37 Mill Drive, North Rocks	Residential	60	63	63	0.3	63	64	0.3	No	No
5574	118 Barclay Road, North Rocks	Residential	60	62	62	0.3	63	63	0.3	No	No
5587	120 Barclay Road, North Rocks	Residential	60	62	62	0.3	63	63	0.3	No	No
5607	124 Barclay Road, North Rocks	Residential	60	63	63	0.1	64	64	0.1	No	No
5617	10 Rajola Place, North Rocks	Residential	60	63	64	1	63	64	1	No	No
5623	7 Rajola Place, North Rocks	Residential	60	61	62	1	62	63	1	No	No
5638	8 Rajola Place, North Rocks	Residential	60	65	67	1.4	66	68	1.4	Yes	Yes
5647	6 Rajola Place, North Rocks	Residential	60	62	63	1.4	63	64	1.4	No	No
5692	11 Williams Road, North Rocks	Residential	60	62	64	1.3	63	64	1.3	No	No
5698	13 Williams Road, North Rocks	Residential	60	62	63	1.1	62	63	1.1	No	No
5706	15 Williams Road, North Rocks	Residential	60	64	66	1.6	65	66	1.6	Yes	Yes
5720	17 Williams Road, North Rocks	Residential	60	64	66	1.5	65	67	1.5	Yes	Yes
5731	19 Williams Road, North Rocks	Residential	60	63	65	1.4	64	65	1.4	Yes	Yes
5743	21 Williams Road, North Rocks	Residential	60	68	69	1.5	68	70	1.5	Yes	Yes
5754	23 Williams Road, North Rocks	Residential	60	63	65	1.5	64	66	1.5	Yes	Yes
5770	25 Williams Road, North Rocks	Residential	60	64	65	1.4	64	66	1.4	Yes	Yes
5777	27 Williams Road, North Rocks	Residential	60	61	62	0.8	62	63	0.8	No	No

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
5790	29 Williams Road, North Rocks	Residential	60	65	66	1.2	65	66	1.2	Yes	Yes
5876	48 Roland Avenue, Northmead	Residential	60	63	65	2.2	64	66	2.2	Yes	Yes
5879	35 Roland Avenue, Northmead	Residential	60	60	62	2.4	61	63	2.4	No	Yes
5882	46 Dremeday Street, Northmead	Residential	60	67	69	1.9	68	70	1.9	Yes	Yes
5884	46 Roland Avenue, Northmead	Residential	60	63	65	1.9	63	65	1.9	Yes	Yes
5888	42-44 Dremeday Street, Northmead	Residential	60	63	65	1.4	64	65	1.4	Yes	Yes

Table 82 Southern interchange and Hills M2 integration works – night-time noise levels

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
3468	50a Coral Tree Drive, Carlingford	Residential	55	68	66	-1.6	68	67	-1.6	Yes	Yes
3481	20 Gum Grove Place, West Pennant Hills	Residential	55	54	57	2.3	55	57	2.3	No	Yes
4237	5 Carmen Drive, Carlingford	Residential	55	61	61	-0.3	62	62	-0.3	Yes	Yes
4257	7 Carmen Drive, Carlingford	Residential	55	60	60	-0.3	61	61	-0.3	Yes	Yes
4444	25 Carmen Drive, Carlingford	Residential	55	62	62	0	62	62	0	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
4459	27 Carmen Drive, Carlingford	Residential	55	65	65	0.3	65	66	0.3	Yes	Yes
4475	29 Carmen Drive, Carlingford	Residential	55	68	68	0.2	69	69	0.2	Yes	Yes
4477	46 Carmen Drive, Carlingford	Residential	55	60	60	0.5	60	61	0.5	Yes	Yes
4483	31 Carmen Drive, Carlingford	Residential	55	65	65	0.3	65	66	0.3	Yes	Yes
4515	48 Carmen Drive, Carlingford	Residential	55	61	61	0.4	61	62	0.4	Yes	Yes
4518	31 Carmen Drive, Carlingford	Residential	55	70	70	0	70	70	0	Yes	Yes
4529	50 Carmen Drive, Carlingford	Residential	55	60	61	0.5	61	62	0.5	Yes	Yes
4540	52 Carmen Drive, Carlingford	Residential	55	60	61	0.4	61	61	0.4	Yes	Yes
4565	56 Carmen Drive, Carlingford	Residential	55	61	61	0	62	62	0	Yes	Yes
4631	70 Westmore Drive, West Pennant Hills	Residential	55	59	59	-0.3	60	60	-0.3	Yes	Yes
4668	74 Westmore Drive, West Pennant Hills	Residential	55	60	60	-0.2	60	60	-0.2	Yes	Yes
4681	76 Westmore Drive, West Pennant Hills	Residential	55	60	60	-0.3	61	61	-0.3	Yes	Yes
4702	78 Westmore Drive, West Pennant Hills	Residential	55	60	60	-0.3	61	60	-0.3	Yes	Yes
4717	80 Westmore Drive, West Pennant Hills	Residential	55	61	60	-0.5	61	61	-0.5	Yes	Yes
4762	9 Wilshire Avenue, Carlingford	Residential	55	59	59	0	60	60	0	Yes	Yes
4770	11 Wilshire Avenue, Carlingford	Residential	55	61	62	0.3	62	62	0.3	Yes	Yes
4884	15 Wilshire Avenue, Carlingford	Residential	55	67	67	0.1	68	68	0.1	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
4889	13 Wilshire Avenue, Carlingford	Residential	55	60	60	-0.4	61	61	-0.4	Yes	Yes
5155	24 Yale Close, North Rocks	Residential	55	63	62	-0.1	63	63	-0.1	Yes	Yes
5434	37 Mill Drive, North Rocks	Residential	55	61	60	-1	61	60	-1	Yes	Yes
5574	118 Barclay Road, North Rocks	Residential	55	60	59	-1.1	61	60	-1.1	Yes	Yes
5587	120 Barclay Road, North Rocks	Residential	55	60	59	-1	61	60	-1	Yes	Yes
5607	124 Barclay Road, North Rocks	Residential	55	61	60	-1.2	62	61	-1.2	Yes	Yes
5617	10 Rajola Place, North Rocks	Residential	55	61	61	-0.3	62	61	-0.3	Yes	Yes
5623	7 Rajola Place, North Rocks	Residential	55	60	59	-0.4	61	60	-0.4	Yes	Yes
5638	8 Rajola Place, North Rocks	Residential	55	64	64	0.2	64	65	0.2	Yes	Yes
5647	6 Rajola Place, North Rocks	Residential	55	61	61	0	61	61	0	Yes	Yes
5692	11 Williams Road, North Rocks	Residential	55	61	61	-0.1	61	61	-0.1	Yes	Yes
5698	13 Williams Road, North Rocks	Residential	55	60	60	-0.2	61	61	-0.2	Yes	Yes
5706	15 Williams Road, North Rocks	Residential	55	63	63	0.1	63	63	0.1	Yes	Yes
5720	17 Williams Road, North Rocks	Residential	55	63	63	0.1	64	64	0.1	Yes	Yes
5731	19 Williams Road, North Rocks	Residential	55	62	62	0.1	62	62	0.1	Yes	Yes
5743	21 Williams Road, North Rocks	Residential	55	66	66	0.2	67	67	0.2	Yes	Yes
5754	23 Williams Road, North Rocks	Residential	55	62	62	0.1	62	63	0.1	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
5770	25 Williams Road, North Rocks	Residential	55	62	62	0	63	63	0	Yes	Yes
5777	27 Williams Road, North Rocks	Residential	55	59	59	-0.4	60	60	-0.4	Yes	Yes
5790	29 Williams Road, North Rocks	Residential	55	62	62	0	63	63	0	Yes	Yes
5876	48 Roland Avenue, Northmead	Residential	55	61	62	0.4	62	63	0.4	Yes	Yes
5879	35 Roland Avenue, Northmead	Residential	55	58	59	0.6	59	60	0.6	Yes	Yes
5882	46 Dremeday Street, Northmead	Residential	55	65	66	0.1	66	66	0.1	Yes	Yes
5884	46 Roland Avenue, Northmead	Residential	55	61	61	0.1	62	62	0.1	Yes	Yes
5888	42-44 Dremeday Street, Northmead	Residential	55	61	61	-0.2	62	62	-0.2	Yes	Yes

Northern interchange – Predicted noise levels with design barriers

Table 83 Northern interchange – Predicted day-time noise levels

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
667	8 Lochville Street, Wahroonga	Residential	60	62	64	1.8	63	65	1.8	Yes	Yes
673	118a Coonanbarra Road, Wahroonga	Residential	60	55	58	2.4	56	58	2.4	No	No
691	27 Woonona Avenue N, Wahroonga	Residential	60	60	62	1.8	60	62	1.8	No	No
722	114 Coonabarra Road, Wahroonga	Residential	60	55	58	2.4	56	59	2.4	No	No
730	31 Bareena Avenue, Wahroonga	Residential	60	56	58	2.6	56	59	2.6	No	No
735	37b Bareena Avenue, Wahroonga	Residential	60	58	60	2.8	58	61	2.8	No	Yes
737	Lot 2 Bareena Avenue, Wahroonga	Residential	60	60	62	1.7	61	62	1.7	No	No
743	37a Bareena Avenue, Wahroonga	Residential	60	57	62	4.6	58	63	4.6	No	Yes
775	26 Bareena Avenue, Wahroonga	Residential	60	59	61	2.4	59	62	2.4	No	Yes
785	28 Bareena Avenue, Wahroonga	Residential	60	60	62	2	61	63	2	No	No
929	1 Burns Road, Wahroonga	Residential	60	59	63	4.1	60	64	4.1	No	Yes
936	44 Woonona Avenue, Wahroonga	Residential	60	67	69	1.9	68	70	1.9	Yes	Yes
951	1-3 Burns Road, Wahroonga	Residential	60	59	62	3.6	59	63	3.6	No	Yes
966	1-3 Burns Road, Wahroonga	Residential	60	62	64	2.5	62	65	2.5	Yes	Yes
972	9-11 Benson Close, Wahroonga	Residential	60	65	69	4.1	65	70	4.1	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
976	9 Woniora Avenue, Wahroonga	Residential	60	60	62	1.9	61	63	1.9	No	No
1017	7a Benson Close, Wahroonga	Residential	60	64	64	0.3	65	65	0.3	Yes	Yes
1053	5 Benson Close, Wahroonga	Residential	60	64	64	0	65	65	0	Yes	Yes
1084	28 Woonona Avenue, Wahroonga	Residential	60	65	66	0.1	66	66	0.1	Yes	Yes
1088	3a Benson Close, Wahroonga	Residential	60	65	65	-0.1	65	65	-0.1	Yes	Yes
1147	1 Benson Close, Wahroonga	Residential	60	63	63	-0.2	64	64	-0.2	No	No
1574	1711 Pacific Highway, Wahroonga	Church	NA	71	75	4.3	72	76	4.3	Yes	Yes
1575	1707 Pacific Highway, Wahroonga	Residential	60	71	75	3.7	72	76	3.7	Yes	Yes
1577	1709 Pacific Highway, Wahroonga	Residential	60	71	75	4.3	71	76	4.3	Yes	Yes
1580	1711 Pacific Highway, Wahroonga	Church	NA	71	75	3.8	71	75	3.8	Yes	Yes
1605	1740 Pacific Highway, Wahroonga	Residential	60	70	73	3.7	70	74	3.7	Yes	Yes
1606	1740 Pacific Highway, Wahroonga	Residential	60	70	73	3.4	71	74	3.4	Yes	Yes
1614	1707 Pacific Highway, Wahroonga	Residential	60	60	63	2.4	61	63	2.4	No	Yes
1616	1740 Pacific Highway, Wahroonga	Residential	60	63	67	3.5	64	68	3.5	Yes	Yes
1617	7 Lucinda Avenue, Wahroonga	Residential	60	65	67	1.8	66	68	1.8	Yes	Yes
1619	1740 Pacific Highway, Wahroonga	Residential	60	62	65	2.5	63	65	2.5	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
1622	1740 Pacific Highway, Wahroonga	Residential	60	68	68	0.2	69	69	0.2	Yes	Yes
1626	9 Lucinda Avenue, Wahroonga	Residential	60	60	62	2	61	63	2	No	No
1648	11 Lucinda Avenue, Wahroonga	Residential	60	56	58	2.2	56	58	2.2	No	No
1654	1740 Pacific Highway, Wahroonga	Residential	60	67	67	-0.4	68	67	-0.4	Yes	Yes
1656	11a Lucinda Avenue, Wahroonga	Residential	60	63	65	1.2	64	65	1.2	Yes	Yes
1661	15 Lucinda Avenue, Wahroonga	Residential	60	57	59	2.1	57	59	2.1	No	No
1754	1740 Pacific Highway, Wahroonga	Residential	60	65	65	-0.7	66	65	-0.7	Yes	Yes
1777	1740 Pacific Highway, Wahroonga	Residential	60	63	64	1.5	64	65	1.5	Yes	Yes
1780	1707 Pacific Highway, Wahroonga	Residential	60	59	62	2.7	60	62	2.7	No	Yes
1781	13 Kingsley Close, Wahroonga	Residential	60	58	63	4.7	59	64	5.4	Yes	Yes
1782	14 Kingsley Close, Wahroonga	Residential	60	58	59	1.6	58	60	2.1	No	Yes
1783	1707 Pacific Highway, Wahroonga	Residential	60	58	61	2.6	59	61	2.6	No	Yes
1787	1740 Pacific Highway, Wahroonga	Residential	60	62	63	1.2	63	64	1.2	No	No
1800	10 Kingsley Close, Wahroonga	Residential	60	63	65	3	64	65	1.7	Yes	Yes
1801	9 Kingsley Close, Wahroonga	Residential	60	55	57	3.3	56	58	2.3	No	No
1822	11a Hewitt Avenue, Wahroonga	Residential	60	62	63	2.8	63	64	1.5	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
1828	1 Aaron Place, Wahroonga	Residential	60	63	64	1.9	63	65	1.9	Yes	Yes
1829	1 Aaron Place, Wahroonga	Residential	60	69	73	3.6	70	73	3.6	Yes	Yes
1833	13 Hewitt Avenue, Wahroonga	Residential	60	60	61	1.9	61	62	0.8	No	No
1839	1 Aaron Place, Wahroonga	Residential	60	62	64	2.1	63	65	2.1	Yes	Yes
1843	1 Aaron Place, Wahroonga	Residential	60	69	72	3.1	69	73	3.1	Yes	Yes
1844	3 Aaron Place, Wahroonga	Residential	60	62	66	3.8	63	66	3.8	Yes	Yes
1850	9 Hewitt Avenue, Wahroonga	Residential	60	62	63	2.7	63	64	1.4	Yes	Yes
1852	11 Hewitt Avenue, Wahroonga	Residential	60	61	61	1	62	62	0.2	No	No
1856	1 Aaron Place, Wahroonga	Residential	60	70	72	2.3	71	73	2.3	Yes	Yes
1890	14 Pennant Hills Road, Wahroonga	Residential	60	70	73	3.1	71	74	3.1	Yes	Yes
1892	52 Russell Avenue, Wahroonga	Residential	60	69	73	3.3	70	73	3.3	Yes	Yes
1896	61 Russell Avenue, Wahroonga	Residential	60	63	66	2.3	64	66	2.3	Yes	Yes
1897	59 Russell Avenue, Wahroonga	Residential	60	57	60	2.7	58	61	2.7	No	Yes
1899	53 Russell Avenue, Wahroonga	Residential	60	55	58	2.6	56	59	2.6	No	No
1908	55 Russell Avenue, Wahroonga	Residential	60	62	67	4.4	63	67	4.4	Yes	Yes
1914	16 Pennant Hills Road, Wahroonga	Residential	60	70	72	2.2	71	73	2.2	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
1917	50 Russell Avenue, Wahroonga	Residential	60	56	58	2.6	56	59	2.6	No	No
1926	18 Pennant Hills Road, Wahroonga	Residential	60	71	73	1.9	72	74	1.9	Yes	Yes
1931	20 Pennant Hills Road, Wahroonga	Residential	60	72	74	1.3	73	74	1.3	Yes	Yes
1971	22 Pennant Hills Road, Wahroonga	Residential	60	72	73	0.6	73	74	0.6	Yes	Yes
1982	24 Pennant Hills Road, Wahroonga	Residential	60	74	74	0.1	75	75	0.1	Yes	Yes
1986	2 Havilah Avenue, Wahroonga	Residential	60	61	64	3.1	62	65	3.1	Yes	Yes
1989	26 Pennant Hills Road, Wahroonga	Residential	60	73	74	0.2	74	74	0.2	Yes	Yes
1992	2a Edwards Road, Wahroonga	Residential	60	65	64	-1.1	66	65	-1.1	Yes	Yes
1996	4 Havilah Avenue, Wahroonga	Residential	60	60	62	2.7	60	63	2.7	No	Yes
1998	27 Pennant Hills Road, Wahroonga	Residential	60	74	72	-2.2	75	72	-2.2	Yes	Yes
728	37b Bareena Avenue, Wahroonga	Residential	60	59	62	2.4	60	63	2.4	No	Yes
1582	3 Pacific Highway, Wahroonga	Residential	60	71	72	1	72	73	1	Yes	Yes
1590	1 Pacific Highway, Wahroonga	Residential	60	70	73	3.2	71	74	3.2	Yes	Yes
1859	2 Pennant Hills Road, Wahroonga	Residential	60	70	75	5.6	70	76	5.6	Yes	Yes
1860	4 Pennant Hills Road, Wahroonga	Residential	60	69	74	5.7	69	75	5.7	Yes	Yes
1862	6 Pennant Hills Road, Wahroonga	Residential	60	71	76	5.7	71	77	5.7	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
1893	12 Pennant Hills Road, Wahroonga	Residential	60	69	73	4.4	69	74	4.4	Yes	Yes
1895	10 Pennant Hills Road, Wahroonga	Residential	60	66	71	4.9	67	72	4.9	Yes	Yes
1904	8 Pennant Hills Road, Wahroonga	Residential	60	68	73	4.8	68	73	4.8	Yes	Yes

Table 84 Northern interchange – Predicted night-time noise levels

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
667	8 Lochville Street, Wahroonga	Residential	55	60	61	1.5	60	62	1.5	Yes	Yes
673	118a Coonanbarra Road	Residential	55	53	55	2.1	53	56	2.1	No	Yes
691	27 Woonona Avenue N, Wahroonga	Residential	55	57	59	1.5	58	60	1.5	Yes	Yes
722	114 Coonabarra Road, Wahroonga	Residential	55	53	55	2.1	54	56	2.1	No	Yes
730	31 Bareena Avenue, Wahroonga	Residential	55	53	56	2.3	54	56	2.3	No	Yes
735	37b Bareena Avenue, Wahroonga	Residential	55	55	58	2.4	56	58	2.4	No	Yes
737	Lot 2 Bareena Avenue, Wahroonga	Residential	55	57	59	1.4	58	60	1.4	Yes	Yes
743	37a Bareena Avenue, Wahroonga	Residential	55	55	59	4.4	56	60	4.4	Yes	Yes
775	26 Bareena Avenue, Wahroonga	Residential	55	56	58	1.9	57	59	1.9	No	No

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
785	28 Bareena Avenue, Wahroonga	Residential	55	58	59	1.4	59	60	1.4	Yes	Yes
929	1 Burns Road, Wahroonga	Residential	55	57	60	3.5	58	61	3.5	Yes	Yes
936	44 Woonona Avenue, Wahroonga	Residential	55	65	66	1.1	66	67	1.1	Yes	Yes
951	1-3 Burns Road, Wahroonga	Residential	55	56	60	3.2	57	60	3.2	Yes	Yes
966	1-3 Burns Road, Wahroonga	Residential	55	59	61	1.8	60	62	1.8	Yes	Yes
972	9-11 Benson Close, Wahroonga	Residential	55	62	66	3.2	63	66	3.2	Yes	Yes
976	9 Woniora Avenue, Wahroonga	Residential	55	58	59	1.2	58	60	1.2	Yes	Yes
1017	7a Benson Close, Wahroonga	Residential	55	62	61	-0.5	63	62	-0.5	Yes	Yes
1053	5 Benson Close, Wahroonga	Residential	55	62	62	-0.7	63	62	-0.7	Yes	Yes
1084	28 Woonona Avenue, Wahroonga	Residential	55	63	62	-0.6	64	63	-0.6	Yes	Yes
1088	3a Benson Close, Wahroonga	Residential	55	62	62	-0.9	63	62	-0.9	Yes	Yes
1147	1 Benson Close, Wahroonga	Residential	55	61	60	-1	62	61	-1	Yes	Yes
1574	1711 Pacific Highway, Wahroonga	Church	NA	67	72	4.9	68	73	4.9	Yes	Yes
1575	1707 Pacific Highway, Wahroonga	Residential	55	68	72	3.9	69	73	3.9	Yes	Yes
1577	1709 Pacific Highway, Wahroonga	Residential	55	67	72	4.8	68	73	4.8	Yes	Yes
1580	1711 Pacific Highway, Wahroonga	Church	NA	67	72	4.3	68	72	4.3	Yes	Yes
1605	1740 Pacific Highway, Wahroonga	Residential	55	66	71	4.1	67	71	4.1	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
1606	1740 Pacific Highway, Wahroonga	Residential	55	67	71	3.8	68	71	3.8	Yes	Yes
1614	1707 Pacific Highway, Wahroonga	Residential	55	58	60	2.3	58	61	2.3	Yes	Yes
1616	1740 Pacific Highway, Wahroonga	Residential	55	61	64	3.7	61	65	3.7	Yes	Yes
1617	7 Lucinda Avenue, Wahroonga	Residential	55	63	64	1.6	63	65	1.6	Yes	Yes
1619	1740 Pacific Highway, Wahroonga	Residential	55	60	62	2.6	60	63	2.6	Yes	Yes
1622	1740 Pacific Highway, Wahroonga	Residential	55	66	65	-0.5	66	66	-0.5	Yes	Yes
1626	9 Lucinda Avenue, Wahroonga	Residential	55	57	59	1.8	58	60	1.8	Yes	Yes
1648	11 Lucinda Avenue, Wahroonga	Residential	55	53	55	2.2	54	56	2.2	No	Yes
1654	1740 Pacific Highway, Wahroonga	Residential	55	65	63	-1.4	65	64	-1.4	Yes	Yes
1656	11a Lucinda Avenue, Wahroonga	Residential	55	61	62	0.7	62	62	0.7	Yes	Yes
1661	15 Lucinda Avenue, Wahroonga	Residential	55	54	56	2.1	55	57	2.1	No	Yes
1754	1740 Pacific Highway, Wahroonga	Residential	55	63	61	-1.8	64	62	-1.8	Yes	Yes
1777	1740 Pacific Highway, Wahroonga	Residential	55	61	61	0.3	62	62	0.3	Yes	Yes
1780	1707 Pacific Highway, Wahroonga	Residential	55	57	59	2.6	57	60	2.6	Yes	Yes
1781	13 Kingsley Close, Wahroonga	Residential	55	56	61	6	57	61	4.7	Yes	Yes
1782	14 Kingsley Close, Wahroonga	Residential	55	55	56	1.6	56	57	1.6	No	No
1783	1707 Pacific Highway, Wahroonga	Residential	55	56	58	2.4	56	59	2.4	No	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
1787	1740 Pacific Highway, Wahroonga	Residential	55	60	60	0.1	61	61	0.1	Yes	Yes
1800	10 Kingsley Close, Wahroonga	Residential	55	61	62	2	62	62	0.7	Yes	Yes
1801	9 Kingsley Close, Wahroonga	Residential	55	53	55	2.9	53	55	1.9	No	Yes
1822	11a Hewitt Avenue, Wahroonga	Residential	55	60	60	1.7	61	61	0.4	Yes	Yes
1828	1 Aaron Place, Wahroonga	Residential	55	61	61	0.9	61	62	0.9	Yes	Yes
1829	1 Aaron Place, Wahroonga	Residential	55	66	70	3.8	67	71	3.8	Yes	Yes
1833	13 Hewitt Avenue, Wahroonga	Residential	55	58	58	0.9	59	59	0.2	Yes	Yes
1839	1 Aaron Place, Wahroonga	Residential	55	60	61	1.3	60	62	1.3	Yes	Yes
1843	1 Aaron Place, Wahroonga	Residential	55	66	69	3.4	67	70	3.4	Yes	Yes
1844	3 Aaron Place, Wahroonga	Residential	55	60	63	3	60	63	3	Yes	Yes
1850	9 Hewitt Avenue, Wahroonga	Residential	55	60	60	1.6	61	61	0.3	Yes	Yes
1852	11 Hewitt Avenue, Wahroonga	Residential	55	59	59	0.3	60	59	0.9	Yes	Yes
1856	1 Aaron Place, Wahroonga	Residential	55	67	70	2.5	68	70	2.5	Yes	Yes
1890	14 Pennant Hills Road, Wahroonga	Residential	55	67	70	3.1	68	71	3.1	Yes	Yes
1892	52 Russell Avenue, Wahroonga	Residential	55	67	70	3.3	67	71	3.3	Yes	Yes
1896	61 Russell Avenue, Wahroonga	Residential	55	61	63	2.2	62	64	2.2	Yes	Yes
1897	59 Russell Avenue, Wahroonga	Residential	55	55	57	2.7	55	58	2.7	No	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
1899	53 Russell Avenue, Wahroonga	Residential	55	53	56	2.6	54	56	2.6	No	Yes
1908	55 Russell Avenue, Wahroonga	Residential	55	60	64	4.6	60	65	4.6	Yes	Yes
1914	16 Pennant Hills Road, Wahroonga	Residential	55	67	69	2	68	70	2	Yes	Yes
1917	50 Russell Avenue, Wahroonga	Residential	55	53	56	2.5	54	56	2.5	No	Yes
1926	18 Pennant Hills Road, Wahroonga	Residential	55	69	70	1.5	69	71	1.5	Yes	Yes
1931	20 Pennant Hills Road, Wahroonga	Residential	55	70	70	0.8	70	71	0.8	Yes	Yes
1971	22 Pennant Hills Road, Wahroonga	Residential	55	70	70	0	71	71	0	Yes	Yes
1982	24 Pennant Hills Road, Wahroonga	Residential	55	71	71	-0.6	72	72	-0.6	Yes	Yes
1986	2 Havilah Avenue, Wahroonga	Residential	55	59	62	2.6	60	62	2.6	Yes	Yes
1989	26 Pennant Hills Road, Wahroonga	Residential	55	71	70	-0.6	72	71	-0.6	Yes	Yes
1992	2a Edwards Road, Wahroonga	Residential	55	63	62	-1.6	64	62	-1.6	Yes	Yes
1996	4 Havilah Avenue, Wahroonga	Residential	55	57	60	2.2	58	60	2.2	Yes	Yes
1998	27 Pennant Hills Road, Wahroonga	Residential	55	71	69	-2.6	72	69	-2.6	Yes	Yes
728	37b Bareena Avenue, Wahroonga	Residential	55	57	59	2	58	60	2	Yes	Yes
1582	3 Pacific Highway, Wahroonga	Residential	55	68	69	1.4	69	70	1.4	Yes	Yes
1590	1 Pacific Highway, Wahroonga	Residential	55	67	70	3.4	67	71	3.4	Yes	Yes
1859	2 Pennant Hills Road, Wahroonga	Residential	55	67	72	5.8	67	73	5.8	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
1860	4 Pennant Hills Road, Wahroonga	Residential	55	66	72	5.8	67	72	5.8	Yes	Yes
1862	6 Pennant Hills Road, Wahroonga	Residential	55	68	74	5.9	68	74	5.9	Yes	Yes
1893	12 Pennant Hills Road, Wahroonga	Residential	55	66	70	4.5	67	71	4.5	Yes	Yes
1895	10 Pennant Hills Road, Wahroonga	Residential	55	64	69	5	64	69	5	Yes	Yes
1904	8 Pennant Hills Road, Wahroonga	Residential	55	65	70	4.9	66	71	4.9	Yes	Yes

Southern interchange and Hills M2 Motorway integration works – Predicted noise levels with design barriers

Table 85 Southern interchange and Hills M2 Motorway integration works – Predicted day-time noise levels

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
3468	50a Coral Tree Drive, Carlingford	Residential	60	70	69	-0.8	71	70	-0.8	Yes	Yes
3481	20 Gum Grove Place, West Pennant Hills	Residential	60	57	60	2.4	58	60	2.4	No	No
4237	5 Carmen Drive, Carlingford	Residential	60	63	64	0.9	64	65	0.9	Yes	Yes
4257	7 Carmen Drive, Carlingford	Residential	60	62	63	0.9	63	64	0.9	No	No
4444	25 Carmen Drive, Carlingford	Residential	60	63	64	1.2	64	65	1.2	Yes	Yes
4459	27 Carmen Drive, Carlingford	Residential	60	66	68	1.5	67	69	1.5	Yes	Yes
4475	29 Carmen Drive, Carlingford	Residential	60	70	71	1.4	70	72	1.4	Yes	Yes
4477	46 Carmen Drive, Carlingford	Residential	60	61	63	1.8	62	64	1.8	No	No
4483	31 Carmen Drive, Carlingford	Residential	60	67	68	1.4	67	69	1.4	Yes	Yes
4515	48 Carmen Drive, Carlingford	Residential	60	62	64	1.7	63	65	1.7	Yes	Yes
4518	31 Carmen Drive, Carlingford	Residential	60	72	73	1.2	72	74	1.2	Yes	Yes
4529	50 Carmen Drive, Carlingford	Residential	60	62	64	1.7	63	65	1.7	Yes	Yes
4540	52 Carmen Drive, Carlingford	Residential	60	62	64	1.6	63	64	1.6	No	No
4565	56 Carmen Drive, Carlingford	Residential	60	63	64	1.2	64	65	1.2	Yes	Yes
4631	70 Westmore Drive, West Pennant Hills	Residential	60	61	62	0.7	62	63	0.7	No	No

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
4668	74 Westmore Drive, West Pennant Hills	Residential	60	62	63	0.7	63	63	0.7	No	No
4681	76 Westmore Drive, West Pennant Hills	Residential	60	62	63	0.8	63	64	0.8	No	No
4702	78 Westmore Drive, West Pennant Hills	Residential	60	62	63	0.8	63	64	0.8	No	No
4717	80 Westmore Drive, West Pennant Hills	Residential	60	63	63	0.6	64	64	0.6	No	No
4762	9 Wilshire Avenue, Carlingford	Residential	60	61	62	1.2	62	63	1.2	No	No
4770	11 Wilshire Avenue, Carlingford	Residential	60	63	65	1.5	64	66	1.5	Yes	Yes
4884	15 Wilshire Avenue, Carlingford	Residential	60	69	70	1.3	70	71	1.3	Yes	Yes
4889	13 Wilshire Avenue, Carlingford	Residential	60	62	63	0.7	63	64	0.7	No	No
5155	24 Yale Close, North Rocks	Residential	60	64	66	1.2	65	66	1.2	Yes	Yes
5434	37 Mill Drive, North Rocks	Residential	60	63	63	0.3	63	64	0.3	No	No
5574	118 Barclay Road, North Rocks	Residential	60	62	62	0.3	63	63	0.3	No	No
5587	120 Barclay Road, North Rocks	Residential	60	62	62	0.3	63	63	0.3	No	No
5607	124 Barclay Road, North Rocks	Residential	60	63	63	0.1	64	64	0.1	No	No
5617	10 Rajola Place, North Rocks	Residential	60	63	63	0.2	63	64	0.2	No	No
5623	7 Rajola Place, North Rocks	Residential	60	61	62	0.4	62	62	0.4	No	No
5638	8 Rajola Place, North Rocks	Residential	60	65	66	0.7	66	67	0.7	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(15hour)}$ dB(A)			Design Year (2029) $L_{Aeq(15hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Change in noise level	No Build	Build	Change in noise level		
5647	6 Rajola Place, North Rocks	Residential	60	62	63	0.5	63	63	0.5	No	No
5692	11 Williams Road, North Rocks	Residential	60	62	63	0.5	63	63	0.5	No	No
5698	13 Williams Road, North Rocks	Residential	60	62	62	0.2	62	63	0.2	No	No
5706	15 Williams Road, North Rocks	Residential	60	64	65	0.5	65	65	0.5	Yes	Yes
5720	17 Williams Road, North Rocks	Residential	60	64	65	0.8	65	66	0.8	Yes	Yes
5731	19 Williams Road, North Rocks	Residential	60	63	64	0.4	64	64	0.4	Yes	Yes
5743	21 Williams Road, North Rocks	Residential	60	68	69	1.2	68	70	1.2	Yes	Yes
5754	23 Williams Road, North Rocks	Residential	60	63	65	1.2	64	65	1.2	Yes	Yes
5770	25 Williams Road, North Rocks	Residential	60	64	65	1.3	64	66	1.3	Yes	Yes
5777	27 Williams Road, North Rocks	Residential	60	61	62	0.9	62	63	0.9	No	No
5790	29 Williams Road, North Rocks	Residential	60	65	65	0.8	65	66	0.8	Yes	Yes
5876	48 Roland Avenue, Northmead	Residential	60	63	65	2.2	64	66	2.2	Yes	Yes
5879	35 Roland Avenue, Northmead	Residential	60	60	62	2.4	61	63	2.4	No	Yes
5882	46 Dremeday Street, Northmead	Residential	60	67	69	1.9	68	70	1.9	Yes	Yes
5884	46 Roland Avenue, Northmead	Residential	60	63	65	1.9	63	65	1.9	Yes	Yes
5888	42-44 Dremeday Street, Northmead	Residential	60	63	65	1.4	64	65	1.4	Yes	Yes

Table 86 Southern interchange and Hills Motorway integration works – Predicted night-time noise levels

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
3468	50a Coral Tree Drive, Carlingford	Residential	55	68	66	-1.6	68	67	-1.6	Yes	Yes
3481	20 Gum Grove Place, West Pennant Hills	Residential	55	54	57	2.3	55	57	2.3	No	Yes
4237	5 Carmen Drive, Carlingford	Residential	55	61	61	-0.3	62	62	-0.3	Yes	Yes
4257	7 Carmen Drive, Carlingford	Residential	55	60	60	-0.3	61	61	-0.3	Yes	Yes
4444	25 Carmen Drive, Carlingford	Residential	55	62	62	0	62	62	0	Yes	Yes
4459	27 Carmen Drive, Carlingford	Residential	55	65	65	0.3	65	66	0.3	Yes	Yes
4475	29 Carmen Drive, Carlingford	Residential	55	68	68	0.2	69	69	0.2	Yes	Yes
4477	46 Carmen Drive, Carlingford	Residential	55	60	60	0.5	60	61	0.5	Yes	Yes
4483	31 Carmen Drive, Carlingford	Residential	55	65	65	0.3	65	66	0.3	Yes	Yes
4515	48 Carmen Drive, Carlingford	Residential	55	61	61	0.4	61	62	0.4	Yes	Yes
4518	31 Carmen Drive, Carlingford	Residential	55	70	70	0	70	70	0	Yes	Yes
4529	50 Carmen Drive, Carlingford	Residential	55	60	61	0.5	61	62	0.5	Yes	Yes
4540	52 Carmen Drive, Carlingford	Residential	55	60	61	0.4	61	61	0.4	Yes	Yes
4565	56 Carmen Drive, Carlingford	Residential	55	61	61	0	62	62	0	Yes	Yes
4631	70 Westmore Drive, West Pennant Hills	Residential	55	59	59	-0.3	60	60	-0.3	Yes	Yes
4668	74 Westmore Drive, West Pennant Hills	Residential	55	60	60	-0.2	60	60	-0.2	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
4681	76 Westmore Drive, West Pennant Hills	Residential	55	60	60	-0.3	61	61	-0.3	Yes	Yes
4702	78 Westmore Drive, West Pennant Hills	Residential	55	60	60	-0.3	61	60	-0.3	Yes	Yes
4717	80 Westmore Drive, West Pennant Hills	Residential	55	61	60	-0.5	61	61	-0.5	Yes	Yes
4762	9 Wilshire Avenue, Carlingford	Residential	55	59	59	0	60	60	0	Yes	Yes
4770	11 Wilshire Avenue, Carlingford	Residential	55	61	62	0.3	62	62	0.3	Yes	Yes
4884	15 Wilshire Avenue, Carlingford	Residential	55	67	67	0.1	68	68	0.1	Yes	Yes
4889	13 Wilshire Avenue, Carlingford	Residential	55	60	60	-0.4	61	61	-0.4	Yes	Yes
5155	24 Yale Close, North Rocks	Residential	55	63	62	-0.1	63	63	-0.1	Yes	Yes
5434	37 Mill Drive, North Rocks	Residential	55	61	60	-1	61	60	-1	Yes	Yes
5574	118 Barclay Road, North Rocks	Residential	55	60	59	-1.1	61	60	-1.1	Yes	Yes
5587	120 Barclay Road, North Rocks	Residential	55	60	59	-1	61	60	-1	Yes	Yes
5607	124 Barclay Road, North Rocks	Residential	55	61	60	-1.2	62	61	-1.2	Yes	Yes
5617	10 Rajola Place, North Rocks	Residential	55	61	60	-1.2	62	61	-1.2	Yes	Yes
5623	7 Rajola Place, North Rocks	Residential	55	60	59	-1.1	61	59	-1.1	Yes	Yes
5638	8 Rajola Place, North Rocks	Residential	55	64	63	-0.6	64	64	-0.6	Yes	Yes
5647	6 Rajola Place, North Rocks	Residential	55	61	60	-0.9	61	60	-0.9	Yes	Yes
5692	11 Williams Road, North Rocks	Residential	55	61	60	-0.9	61	61	-0.9	Yes	Yes

ID	Address	Usage	Criteria	Year of Opening (2019) $L_{Aeq(9hour)}$ dB(A)			Design Year (2029) $L_{Aeq(9hour)}$ dB(A)			Acute	Eligible
				No Build	Build	Increase	No Build	Build	Increase		
5698	13 Williams Road, North Rocks	Residential	55	60	59	-1.2	61	60	-1.2	Yes	Yes
5706	15 Williams Road, North Rocks	Residential	55	63	62	-0.9	63	62	-0.9	Yes	Yes
5720	17 Williams Road, North Rocks	Residential	55	63	62	-0.5	64	63	-0.5	Yes	Yes
5731	19 Williams Road, North Rocks	Residential	55	62	61	-1	62	61	-1.0	Yes	Yes
5743	21 Williams Road, North Rocks	Residential	55	66	66	-0.1	67	66	-0.1	Yes	Yes
5754	23 Williams Road, North Rocks	Residential	55	62	62	-0.2	62	62	-0.2	Yes	Yes
5770	25 Williams Road, North Rocks	Residential	55	62	62	0	63	63	0.0	Yes	Yes
5777	27 Williams Road, North Rocks	Residential	55	59	59	-0.3	60	60	-0.3	Yes	Yes
5790	29 Williams Road, North Rocks	Residential	55	62	62	-0.3	63	63	-0.3	Yes	Yes
5876	48 Roland Avenue, Northmead	Residential	55	61	62	0.4	62	63	0.4	Yes	Yes
5879	35 Roland Avenue, Northmead	Residential	55	58	59	0.6	59	60	0.6	Yes	Yes
5882	46 Dremeday Street, Northmead	Residential	55	65	66	0.1	66	66	0.1	Yes	Yes
5884	46 Roland Avenue, Northmead	Residential	55	61	61	0.1	62	62	0.1	Yes	Yes
5888	42-44 Dremeday Street, Northmead	Residential	55	61	61	-0.2	62	62	-0.2	Yes	Yes

Appendix K

Operational noise mitigation

Appendix K Operational noise mitigation

The noise barrier assessment has been undertaken incorporating the existing noise barrier survey heights, obtained from the Aerial Survey and Lidar (ASL) data. In some locations the noise barrier height changes relative to the ground due to changes in the terrain over its length. For these situations the following assessments state a single assumed noise barrier height. In most cases the maximum height of the noise barrier is used. In situations where short anomalous segments have an increased height, the typical maximum is used (eg the height representing the majority of the existing noise barrier).

This noise barrier assessment considers incremental increases or decreases in barrier height referenced back to the maximum height of the existing barrier (RL). That is, the model assesses noise barriers at different incremental heights (0 metres to eight metres). For example, an existing noise barrier has an RL of five metres, but due to terrain, the barrier may have an actual height of 3.5 metres above actual ground level in some locations. Should the assessment recommend a six metre noise barrier, then the 3.5 metre noise barrier would need to be increased by one metre (ie one metre above the maximum five metre RL). Alternatively, if the assessment recommends that a five metre noise barrier is appropriate, then the 3.5 metre noise barrier would remain at its current height. When modelled at different increment heights (0 metres to 8 metres), the existing profile along the noise barriers extents is maintained.

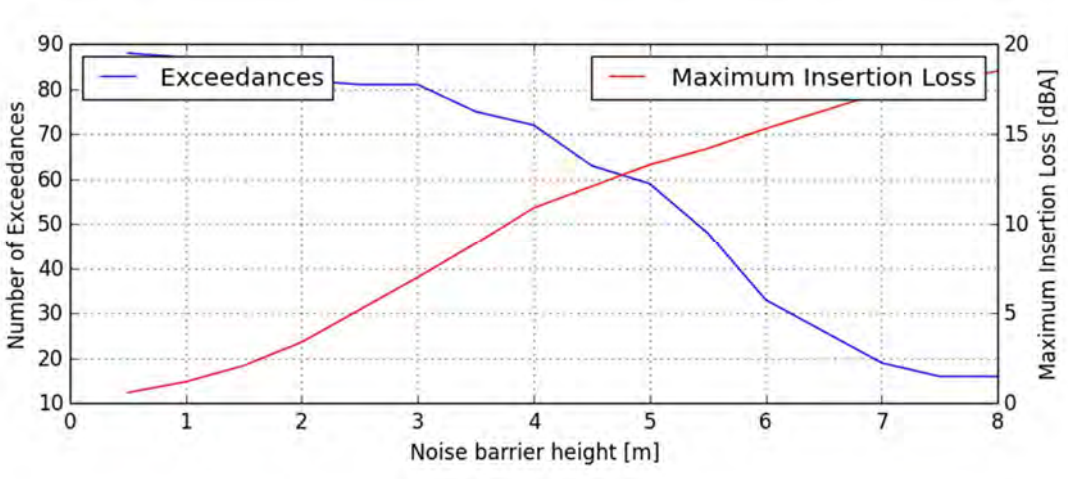
Northern interchange

Provided in the following sections are noise barrier assessment in accordance with Practice Note (iv) of the ENMM. Drawings of the noise barriers, receiver identification numbers and noise contours are provided at the end of this Appendix.

Noise barrier assessment NWM1NB02

A comparison of noise reductions for a range of barrier heights has been carried out for the most affected residences within the catchment area. The graph provided in **Figure 8** shows the relation between barrier height and resulting noise levels for the design year (2029).

Figure 8 Maximum insertion loss



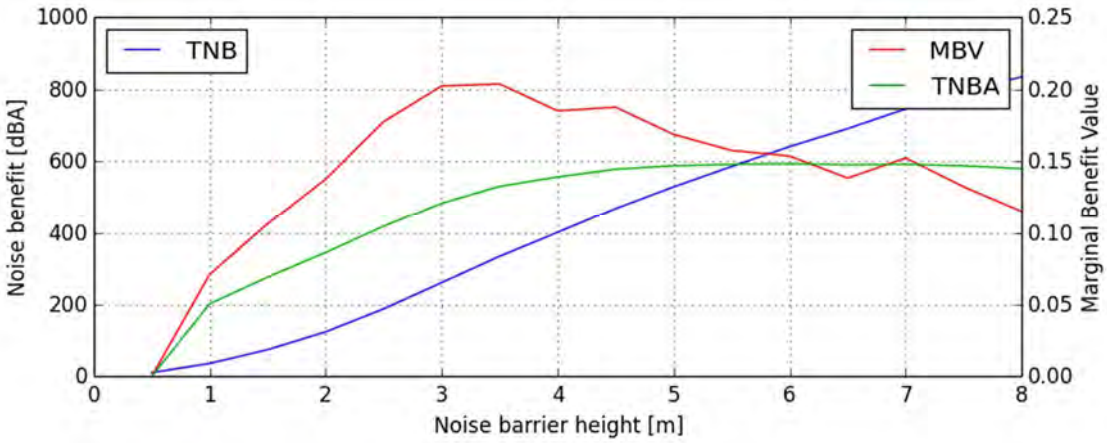
The graph provided in **Figure 8** shows the maximum insertion loss at any receiver and the maximum sound pressure level at any receiver. Over the varying barrier heights the specific receiver may not be the same, hence the decrease in insertion loss is not necessarily consistent with the maximum noise level.

The graph in **Figure 8** shows that 5 dB(A) insertion loss is achieved with a noise barrier height of around 2.5 metres. A 10 dB(A) insertion loss is achieved with a noise barrier height of 3.5 metres. A noise barrier less than five metres high must have a minimum insertion loss of around 5 dB(A) to be considered reasonable. A noise barrier equal to or greater than five metres high must have a minimum insertion loss of around 10 dB(A) to be considered reasonable. Hence the noise barriers could be considered viable in this instance.

The 'target barrier' is the barrier that achieves compliance with the appropriate noise criteria at all sensitive receivers. The graph provided in **Figure 8** indicates that the 'target barrier' (the minimum barrier required to achieve the applicable noise criteria at all receiver locations) is greater than eight metres. As such there is no 'target barrier' for this barrier design.

The graph provided in **Figure 9** illustrates the Total Noise Benefit (TNB), the Marginal Benefit Value (MBV) and the Total Noise Benefit per Unit Area (TNBA). The TNB is the sum of the noise reduction provided by the barrier. The MBV is the increase in TNB, divided by the increase in barrier height. The TNBA is the TNB divided by the total area of the barrier.

Figure 9 Noise benefit



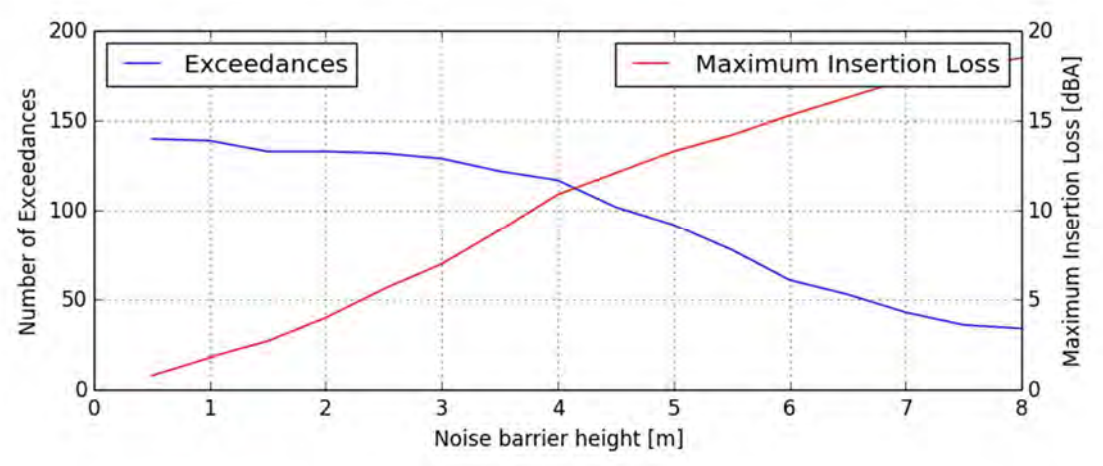
The 'assessed barrier' is the barrier option selected after considering the TNB, MBV and TNBA. In this instance the MBV peaks at 3 metres and the TNBA peaks at six metres. A three metre noise barrier is recommended in this instance as the 'assessed barrier'.

Considering there is no 'target barrier' and the assessed barrier is three metres (below the existing barrier height), no change to the existing barrier height is recommended in this location.

Noise barrier assessment NWM1NB04

A comparison of noise reductions for a range of barrier heights has been carried out for the most affected residences within the catchment area. The graph provided in **Figure 10** shows the relation between barrier height and resulting noise levels for the design year (2029).

Figure 10 Maximum insertion loss



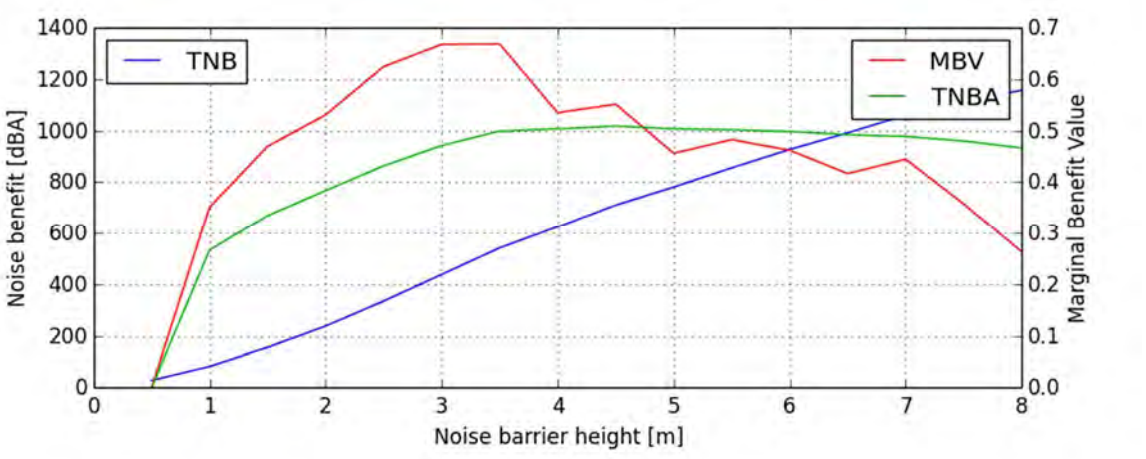
The graph provided in **Figure 10** shows the maximum insertion loss at any receiver and the maximum sound pressure level at any receiver. Over the varying barrier heights the specific receiver may not be the same, hence the decrease in insertion loss is not necessarily consistent with the maximum noise level.

The graph in **Figure 10** shows that 5 dB(A) insertion loss is achieved with a noise barrier height of around 2.5 metres. A 10 dB(A) insertion loss is achieved with a noise barrier height of 3.5 metres. A noise barrier less than five metres high must have a minimum insertion loss of around 5 dB(A) to be considered reasonable. A noise barrier equal to or greater than five metres high must have a minimum insertion loss of around 10 dB(A) to be considered reasonable. Hence noise barriers could be considered viable in this instance.

The 'target barrier' is the barrier that achieves compliance with the appropriate noise criteria at all sensitive receivers. The graph provided in **Figure 10** indicates that the 'target barrier' (the minimum barrier required to achieve the applicable noise criteria at all receiver locations) is greater than eight metres. As such there is no 'target barrier' for this barrier design.

The graph provided in **Figure 11** illustrates the Total Noise Benefit (TNB), the Marginal Benefit Value (MBV) and the Total Noise Benefit per Unit Area (TNBA). The TNB is the sum of the noise reduction provided by the barrier. The MBV is the increase in TNB, divided by the increase in barrier height. The TNBA is the TNB divided by the total area of the barrier.

Figure 11 Noise benefit



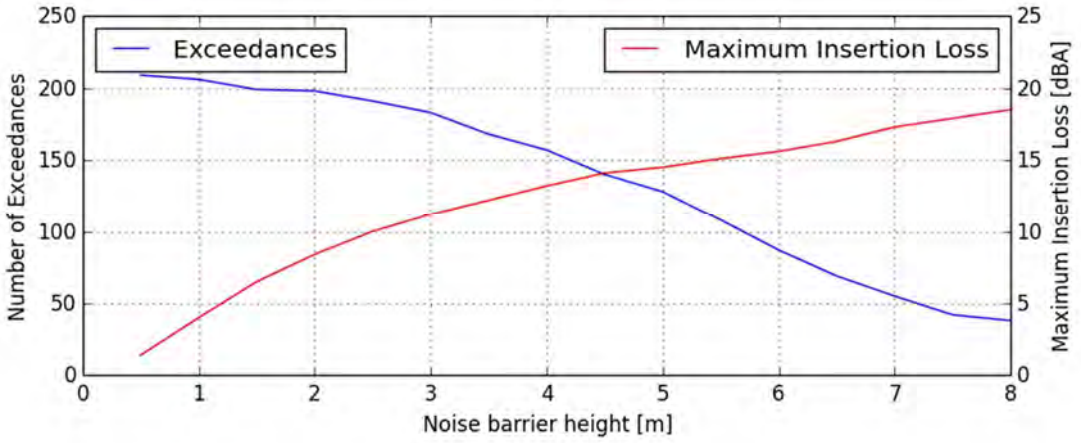
The 'assessed barrier' is the barrier option selected after considering the TNB, MBV and TNBA. In this instance the MBV peaks at 3.5 metres and the TNBA peaks at greater than 4.5 metres. A 3.5 metre noise barrier is recommended in this instance as the 'assessed barrier'.

Considering there is no 'target barrier' and the 'assessed barrier' is 3.5 metres, (below the existing barrier height), no change to the existing barrier height is recommended in this location.

Noise barrier assessment NWM1SB02

A comparison of noise reductions for a range of barrier heights has been carried out for the most affected residences within the catchment area. The graph provided in **Figure 12** shows the relation between barrier height and resulting noise levels for the design year (2029).

Figure 12 Maximum insertion loss



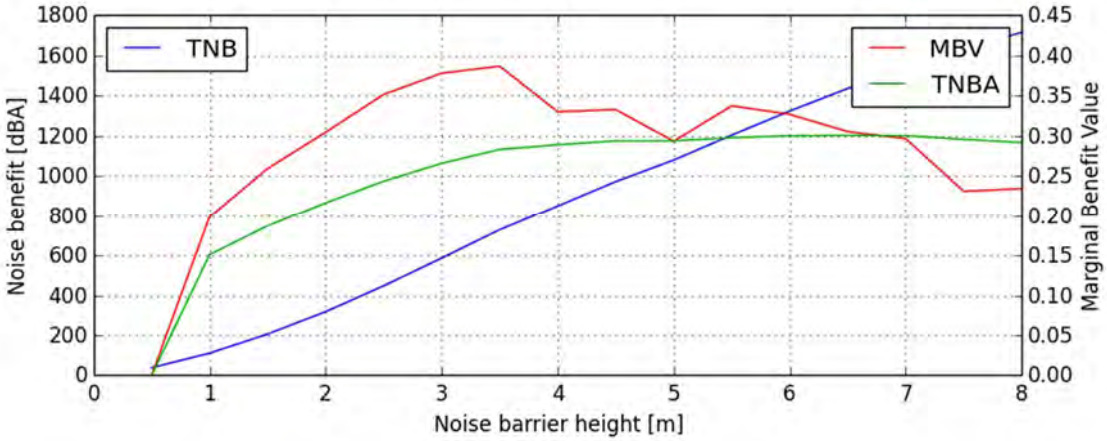
The graph provided in **Figure 12** shows the maximum insertion loss at any receiver and the maximum sound pressure level at any receiver. Over the varying barrier heights the specific receiver may not be the same, hence the decrease in insertion loss is not necessarily consistent with the maximum noise level.

The graph in **Figure 12** shows that 5 dB(A) insertion loss is achieved with a noise barrier height of around 1.5 metres. A 10 dB(A) insertion loss is achieved with a noise barrier height of 2.5 metres. A noise barrier less than five metres high must have a minimum insertion loss of around 5 dB(A) to be considered reasonable. A noise barrier equal to or greater than five metres high must have a minimum insertion loss of around 10 dB(A) to be considered reasonable. Hence noise barriers could be considered viable in this instance.

The 'target barrier' is the barrier that achieves compliance with the appropriate noise criteria at all sensitive receivers. The graph provided in **Figure 12** indicates that the 'target barrier' (the minimum barrier required to achieve the applicable noise criteria at all receiver locations) is greater than eight metres. As such there is no 'target barrier' for this barrier design.

The graph provided in **Figure 13** illustrates the Total Noise Benefit (TNB), the Marginal Benefit Value (MBV) and the Total Noise Benefit per Unit Area (TNBA). The TNB is the sum of the noise reduction provided by the barrier. The MBV is the increase in TNB, divided by the increase in barrier height. The TNBA is the TNB divided by the total area of the barrier.

Figure 13 Noise benefit



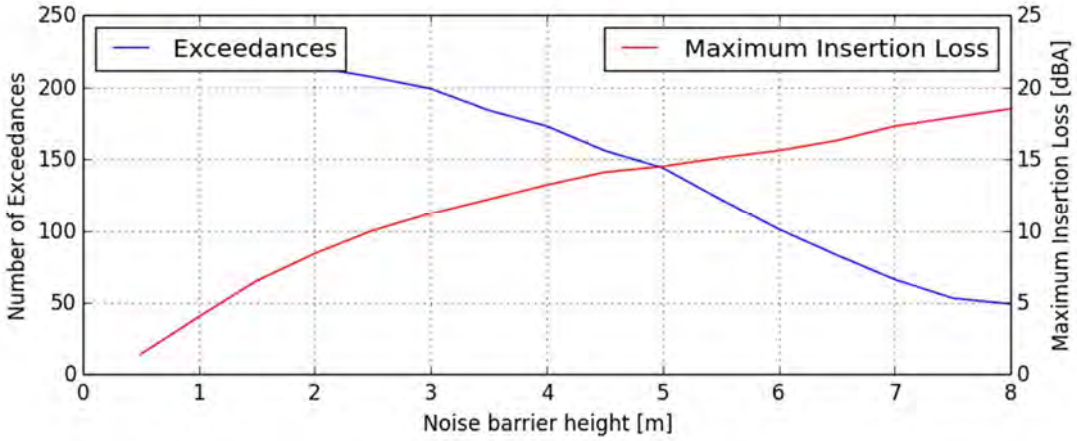
The 'assessed barrier' is the barrier option selected after considering the TNB, MBV and TNBA. In this instance the MBV peaks at three metres and the TNBA peaks at seven metres. A 3.5 metre noise barrier is recommended in this instance as the 'assessed barrier'.

Considering there is no 'target barrier' and the assessed barrier is 3.5 metres (below the existing barrier height), no change to the existing barrier height is recommended in this location.

Noise barrier assessment NWM1SB04

A comparison of noise reductions for a range of barrier heights has been carried out for the most affected residences within the catchment area. The graph provided in **Figure 14** shows the relation between barrier height and resulting noise levels for the design year (2029).

Figure 14 Maximum insertion loss



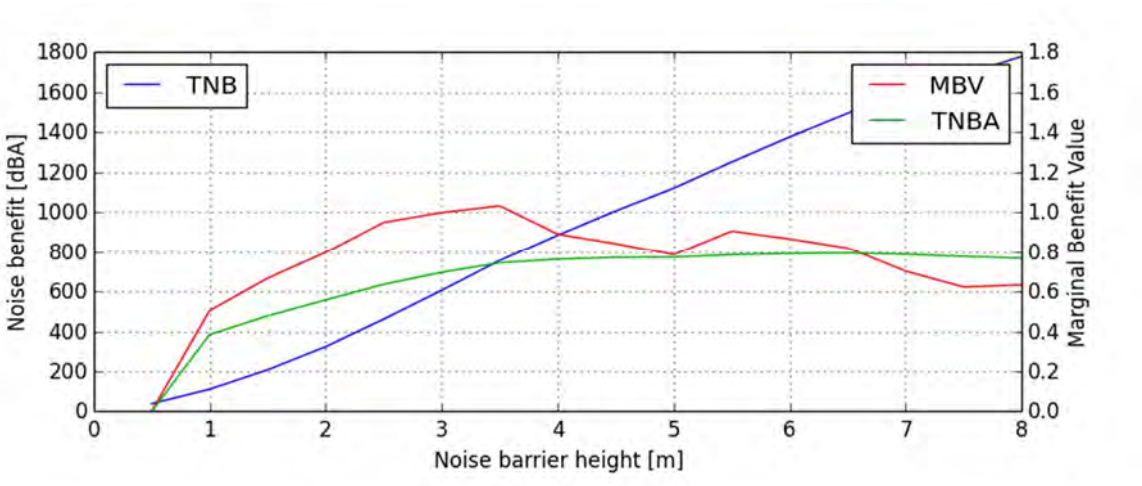
The graph provided in **Figure 14** shows the maximum insertion loss at any receiver and the maximum sound pressure level at any receiver. Over the varying barrier heights the specific receiver may not be the same, hence the decrease in insertion loss is not necessarily consistent with the maximum noise level.

The graph in **Figure 14** shows that 5 dB(A) insertion loss is achieved with a noise barrier height of around 1.5 metres. A 10 dB(A) insertion loss is achieved with a noise barrier height of 2.5 metres. A noise barrier less than five metres high must have a minimum insertion loss of around 5 dB(A) to be considered reasonable. A noise barrier equal to or greater than five metres high must have a minimum insertion loss of around 10 dB(A) to be considered reasonable. Hence noise barriers could be considered viable in this instance.

The 'target barrier' is the barrier that achieves compliance with the appropriate noise criteria at all sensitive receivers. The graph provided in **Figure 14** indicates that the 'target barrier' (the minimum barrier required to achieve the applicable noise criteria at all receiver locations) is greater than eight metres. As such there is no 'target barrier' for this barrier design.

The graph provided in **Figure 15** illustrates the Total Noise Benefit (TNB), the Marginal Benefit Value (MBV) and the Total Noise Benefit per Unit Area (TNBA). The TNB is the sum of the noise reduction provided by the barrier. The MBV is the increase in TNB, divided by the increase in barrier height. The TNBA is the TNB divided by the total area of the barrier.

Figure 15 Noise benefit



The 'assessed barrier' is the barrier option selected after considering the TNB, MBV and TNBA. In this instance the MBV peaks at 3.5 metres and the TNBA peaks at seven metres. A 3.5 metre noise barrier is recommended in this instance as the 'assessed barrier'.

Considering there is no 'target barrier' and the 'assessed' barrier is 3.5 metres, the existing barrier height is recommended in this location.

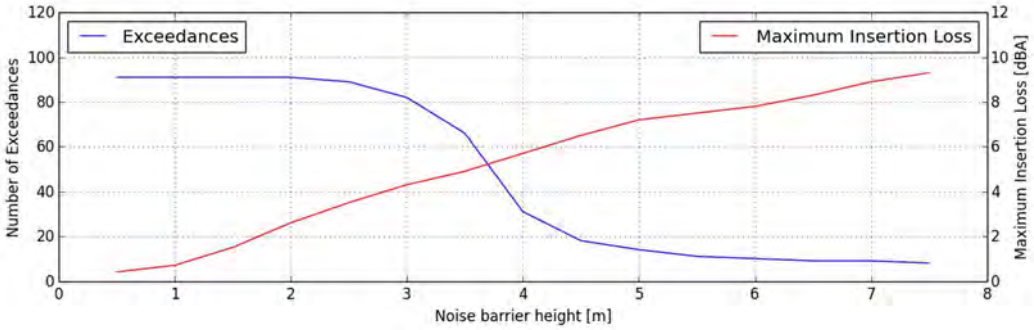
Southern interchange

Provided in the following sections are noise barrier assessment in accordance with Practice Note (iv) of the ENMM. Drawings of the noise barriers, receiver identification numbers and noise contours are provided at the end of this Appendix.

Noise barrier assessment NWM2EB01

A comparison of noise reductions for a range of barrier heights has been carried out for the most affected residences within the catchment area. The graph provided in **Figure 16** shows the relation between barrier height and resulting noise levels for the design year (2029).

Figure 16 Maximum insertion loss



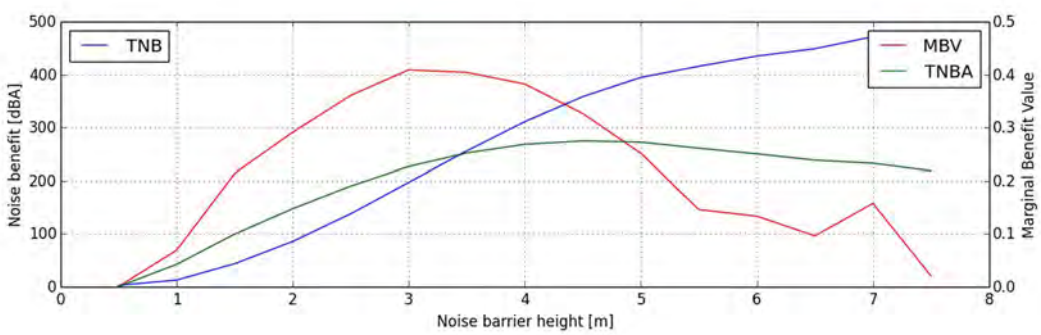
The graph provided in **Figure 16** shows the maximum insertion loss at any receiver and the maximum sound pressure level at any receiver. Over the varying barrier heights the specific receiver may not be the same, hence the decrease in insertion loss is not necessarily consistent with the maximum noise level.

The graph in **Figure 16** shows that 5 dB(A) insertion loss is achieved with a noise barrier height of around 3.5 metres. A 10 dB(A) insertion loss is not achieved. A noise barrier less than five metres high must have a minimum insertion loss of around 5 dB(A) to be considered reasonable. A noise barrier equal to or greater than five metres high must have a minimum insertion loss of around 10 dB(A) to be considered reasonable. Hence a noise barrier five metres or lower could be considered viable in this instance.

The 'target barrier' is the barrier that achieves compliance with the appropriate noise criteria at all sensitive receivers. The graph provided in **Figure 16** indicates that the 'target barrier' (the minimum barrier required to achieve the applicable noise criteria at all receiver locations) is greater than eight metres. As such there is no 'target barrier' for this barrier design.

The graph provided in **Figure 17** illustrates the Total Noise Benefit (TNB), the Marginal Benefit Value (MBV) and the Total Noise Benefit per Unit Area (TNBA). The TNB is the sum of the noise reduction provided by the barrier. The MBV is the increase in TNB, divided by the increase in barrier height. The TNBA is the TNB divided by the total area of the barrier.

Figure 17 Noise benefit



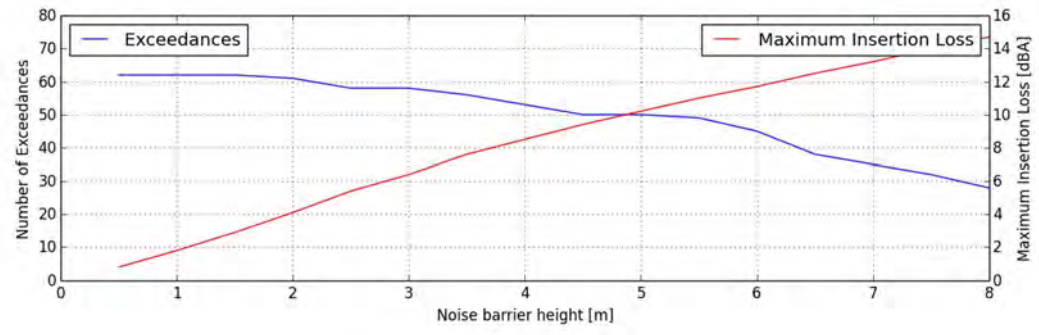
The 'assessed barrier' is the barrier option selected after considering the TNB, MBV and TNBA. In most instances the MBV curve is the preferred selection. In this instance the MBV peaks at three metres and the TNBA peaks at greater than 4.5 metres. The MBV curve is typically the preferred. As such a three metre noise barrier has been designated as the 'assessed barrier'.

Considering there is no 'target barrier', the 'assessed' barrier (three metres) would normally be recommended in this location. However the existing noise barrier is around 4.2 metres. As such it is recommended that the noise barrier be replaced with one of the same height to ensure that noise levels do not increase as a result of the project.

Noise barrier assessment NWM2WB01

A comparison of noise reductions for a range of barrier heights has been carried out for the most affected residences within the catchment area. The graph provided in **Figure 18** shows the relation between barrier height and resulting noise levels for the design year (2029).

Figure 18 Maximum insertion loss



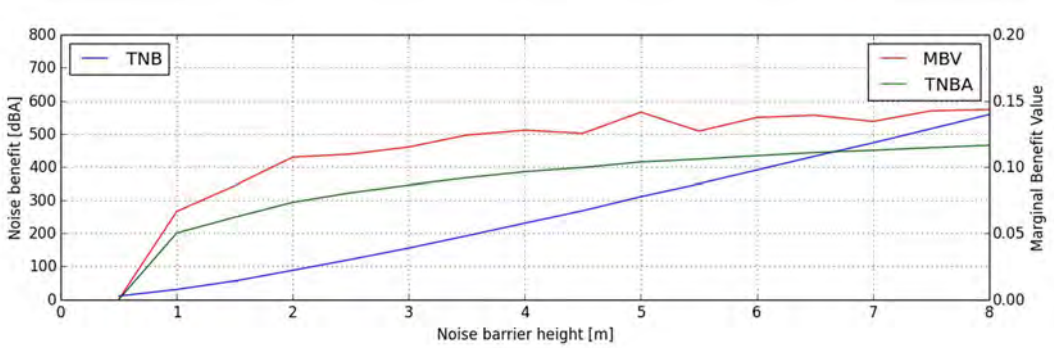
The graph provided in **Figure 18** shows the maximum insertion loss at any receiver and the maximum sound pressure level at any receiver. Over the varying barrier heights the specific receiver may not be the same, hence the decrease in insertion loss is not necessarily consistent with the maximum noise level.

The graph in **Figure 18** shows that 5 dB(A) insertion loss is achieved with a noise barrier height of around 2.5 metres. A 10 dB(A) insertion loss is achieved with a noise barrier height of five metres. A noise barrier less than five metres high must have a minimum insertion loss of around 5 dB(A) to be considered reasonable. A noise barrier equal to or greater than five metres high must have a minimum insertion loss of around 10 dB(A) to be considered reasonable. Hence noise barriers could be considered viable in this instance.

The 'target barrier' is the barrier that achieves compliance with the appropriate noise criteria at all sensitive receivers. The graph provided in **Figure 18** indicates that the 'target barrier' (the minimum barrier required to achieve the applicable noise criteria at all receiver locations) is greater than eight metres. As such there is no 'target barrier' for this barrier design.

The graph provided in **Figure 19** illustrates the Total Noise Benefit (TNB), the Marginal Benefit Value (MBV) and the Total Noise Benefit per Unit Area (TNBA). The TNB is the sum of the noise reduction provided by the barrier. The MBV is the increase in TNB, divided by the increase in barrier height. The TNBA is the TNB divided by the total area of the barrier.

Figure 19 Noise benefit



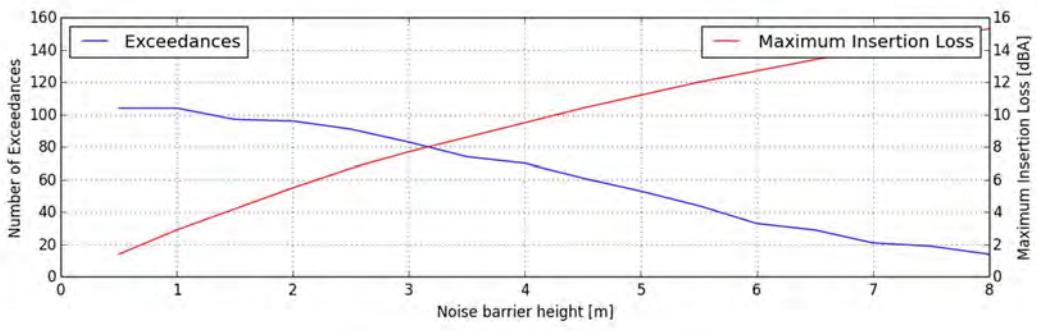
The 'assessed barrier' is the barrier option selected after considering the TNB, MBV and TNBA. In most instances the MBV curve is the preferred selection. In this instance the MBV peaks at five metres and the TNBA peaks at greater than eight metres. A five metre noise barrier is recommended in this instance as the 'assessed barrier'.

Considering there is no 'target barrier', the 'assessed barrier' (five metres) is recommended in this location.

Noise barrier assessment NWM2WB04

A comparison of noise reductions for a range of barrier heights has been carried out for the most affected residences within the catchment area. The graph provided in **Figure 20** shows the relation between barrier height and resulting noise levels for the design year (2029).

Figure 20 Maximum insertion loss



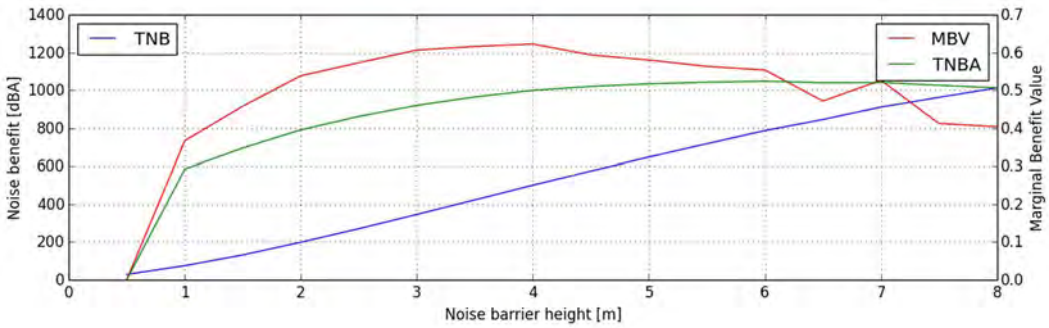
The graph provided in **Figure 20** shows the maximum insertion loss at any receiver and the maximum sound pressure level at any receiver. Over the varying barrier heights the specific receiver may not be the same, hence the decrease in insertion loss is not necessarily consistent with the maximum noise level.

The graph in **Figure 20** shows that 5 dB(A) insertion loss is achieved with a noise barrier height of around 1.5 metres. A 10 dB(A) insertion loss is achieved with a noise barrier height of 4.5 metres. A noise barrier less than five metres high must have a minimum insertion loss of around 5 dB(A) to be considered reasonable. A noise barrier equal to or greater than five metre high must have a minimum insertion loss of around 10 dB(A) to be considered reasonable. Hence noise barriers could be considered viable in this instance.

The 'target barrier' is the barrier that achieves compliance with the appropriate noise criteria at all sensitive receivers. The graph provided in **Figure 20** indicates that the 'target barrier' (the minimum barrier required to achieve the applicable noise criteria at all receiver locations) is greater than eight metres. As such there is no 'target barrier' for this barrier design.

The graph provided in **Figure 21** illustrates the Total Noise Benefit (TNB), the Marginal Benefit Value (MBV) and the Total Noise Benefit per Unit Area (TNBA). The TNB is the sum of the noise reduction provided by the barrier. The MBV is the increase in TNB, divided by the increase in barrier height. The TNBA is the TNB divided by the total area of the barrier.

Figure 21 Noise benefit



The 'assessed barrier' is the barrier option selected after considering the TNB, MBV and TNBA. In most instances the MBV curve is the preferred selection. In this instance the MBV peaks at four metres and the TNBA peaks at greater than six metres. A four metre noise barrier is recommended in this instance as the 'assessed barrier'.

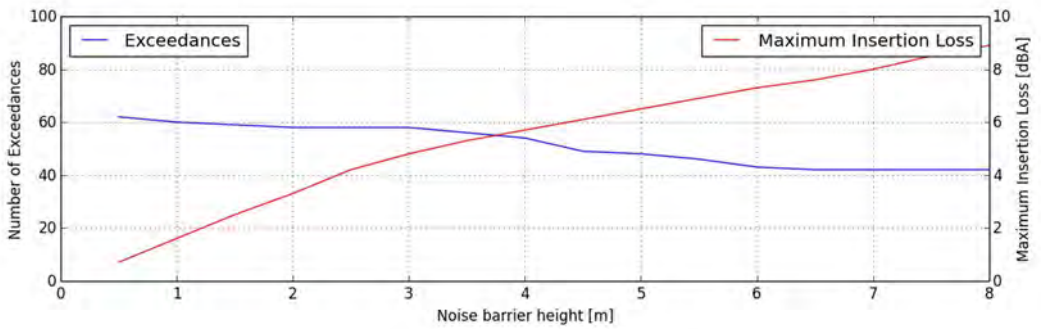
Considering there is no 'target barrier', the 'assessed barrier' (four metres) is recommended in this location. The existing noise wall was surveyed at around five metres in this location. As such it is recommended that the existing barrier height be maintained in this location.

Where existing barrier height has been recommended, the top of the new noise barrier should be no lower than the top of the existing noise barrier (that is, the reduced level (RL) of the top of the existing barrier must be maintained).

Noise barrier assessment NWM2WB06

A comparison of noise reductions for a range of barrier heights has been carried out for the most affected residences within the catchment area. The graph provided in **Figure 22** shows the relation between barrier height and resulting noise levels for the design year (2029).

Figure 22 Maximum insertion loss



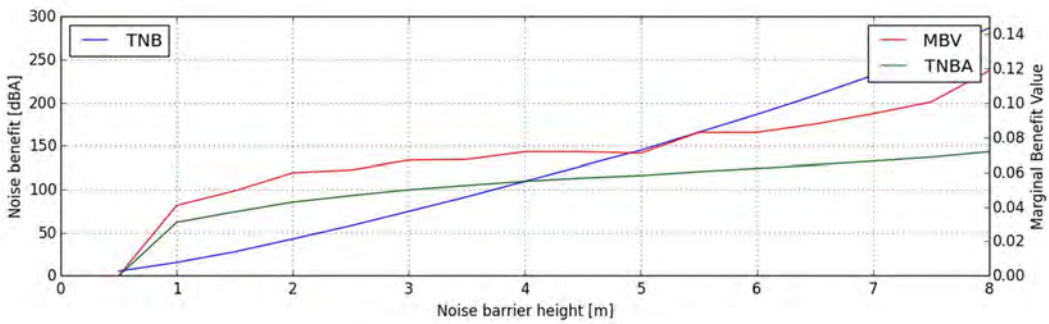
The graph provided in **Figure 22** shows the maximum insertion loss at any receiver and the maximum sound pressure level at any receiver. Over the varying barrier heights the specific receiver may not be the same, hence the decrease in insertion loss is not necessarily consistent with the maximum noise level.

The graph in **Figure 22** shows that 5 dB(A) insertion loss is achieved with a noise barrier height of around 3.5 metres. A 10 dB(A) insertion loss is not achieved for this barrier. A noise barrier less than five metres high must have a minimum insertion loss of around 5 dB to be considered reasonable. A noise barrier equal to or greater than five metres high must have a minimum insertion loss of around 10 dB(A) to be considered reasonable. Hence noise barriers five metres or smaller could be considered viable in this instance.

The 'target barrier' is the barrier that achieves compliance with the appropriate noise criteria at all sensitive receivers. The graph provided in **Figure 22** indicates that the 'target barrier' (the minimum barrier required to achieve the applicable noise criteria at all receiver locations) is greater than eight metres. As such there is no 'target barrier' for this barrier design.

The graph provided in **Figure 23** illustrates the Total Noise Benefit (TNB), the Marginal Benefit Value (MBV) and the Total Noise Benefit per Unit Area (TNBA). The TNB is the sum of the noise reduction provided by the barrier. The MBV is the increase in TNB, divided by the increase in barrier height. The TNBA is the TNB divided by the total area of the barrier.

Figure 23 Noise benefit



The 'assessed barrier' is the barrier option selected after considering the TNB, MBV and TNBA. In most instances the MBV curve is the preferred selection. In this instance the MBV peaks at 5.5 metres and eight metres, and the TNBA peaks at greater than six metres. Considering a 10 dB(A) noise barrier insertion loss is not achieved, a five metre noise barrier is considered the 'assessed barrier' in this instance.

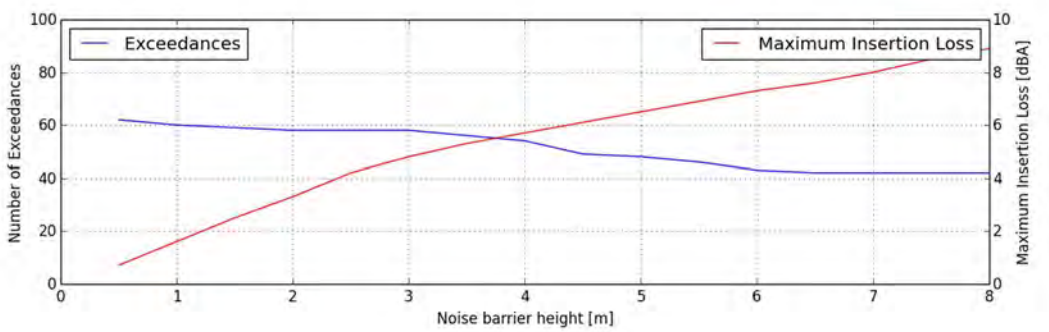
Considering there is no 'target barrier', the 'assessed barrier' (five metres) is recommended in this location. This assessment has an assumed existing noise barrier height of five metres (based on relative height). The actual surveyed barrier height is between 4.5 metres and eight metres. As discussed at the beginning of this section the actual modelled height is the relative level height.

Where existing barrier height has been recommended, the top of the new noise barrier should be no lower than the top of the existing noise barrier (that is, the reduced level (RL) of the top of the existing barrier must be maintained).

Noise barrier assessment NWM2WB07

A comparison of noise reductions for a range of barrier heights has been carried out for the most affected residences within the catchment area. The graph provided in **Figure 24** shows the relation between barrier height and resulting noise levels for the design year (2029).

Figure 24 Maximum insertion loss



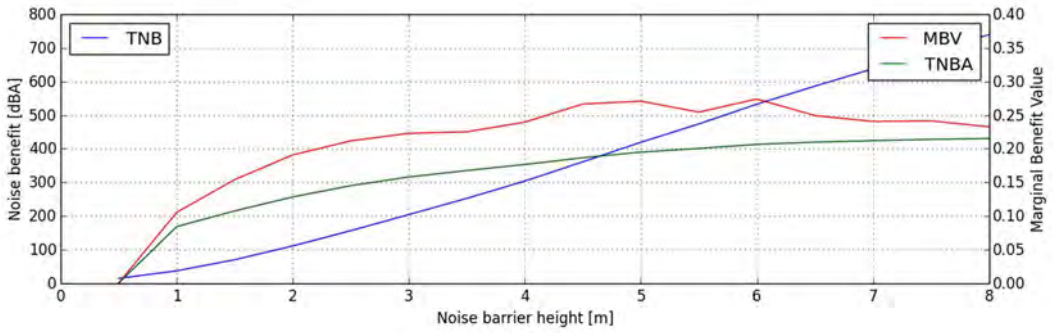
The graph provided in **Figure 24** shows the maximum insertion loss at any receiver and the maximum sound pressure level at any receiver. Over the varying barrier heights the specific receiver may not be the same, hence the decrease in insertion loss is not necessarily consistent with the maximum noise level.

The graph in **Figure 24** shows that 5 dB(A) insertion loss is achieved with a noise barrier height of around three metres. A 10 dB(A) insertion loss is not achieved for this barrier. A noise barrier less than five metres high must have a minimum insertion loss of around 5 dB(A) to be considered reasonable. A noise barrier equal to or greater than five metres high must have a minimum insertion loss of around 10 dB(A) to be considered reasonable. Hence noise barriers five metres or smaller could be considered viable in this instance.

The 'target barrier' is the barrier that achieves compliance with the appropriate noise criteria at all sensitive receivers. The graph provided in **Figure 24** indicates that the 'target barrier' (the minimum barrier required to achieve the applicable noise criteria at all receiver locations) is greater than eight metres. As such there is no 'target barrier' for this barrier design.

The graph provided in **Figure 25** illustrates the Total Noise Benefit (TNB), the Marginal Benefit Value (MBV) and the Total Noise Benefit per Unit Area (TNBA). The TNB is the sum of the noise reduction provided by the barrier. The MBV is the increase in TNB, divided by the increase in barrier height. The TNBA is the TNB divided by the total area of the barrier.

Figure 25 Noise benefit



The 'assessed barrier' is the barrier option selected after considering the TNB, MBV and TNBA. In most instances the MBV curve is the preferred selection. In this instance the MBV peaks at five metres and six metres, and the TNBA peaks at greater than eight metres. Considering a 10 dB(A) noise barrier insertion loss is not achieved, a five metre noise barrier is considered that assessed barrier in this instance.

Considering there is no 'target barrier', the 'assessed barrier' (five metres) is recommended in this location.

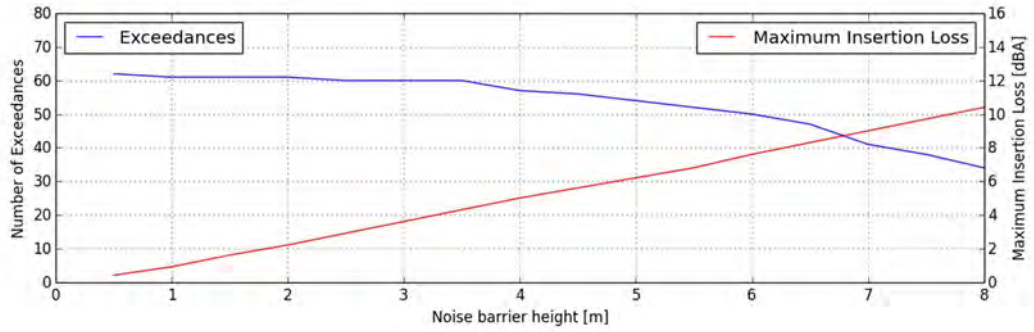
This assessment has an assumed noise barrier height of five metres (based on relative height). The actual surveyed barrier height is between 3.6 metres and six metres. As discussed at the beginning of this section the actual modelled height is the relative level height.

Where existing barrier height has been recommended, the top of the new noise barrier should be no lower than the top of the existing noise barrier (that is, the reduced level (RL) of the top of the existing barrier must be maintained).

Noise barrier assessment NWM2WB08

A comparison of noise reductions for a range of barrier heights has been carried out for the most affected residences within the catchment area. The graph provided in **Figure 26** shows the relation between barrier height and resulting noise levels for the design year (2029).

Figure 26 Maximum insertion loss



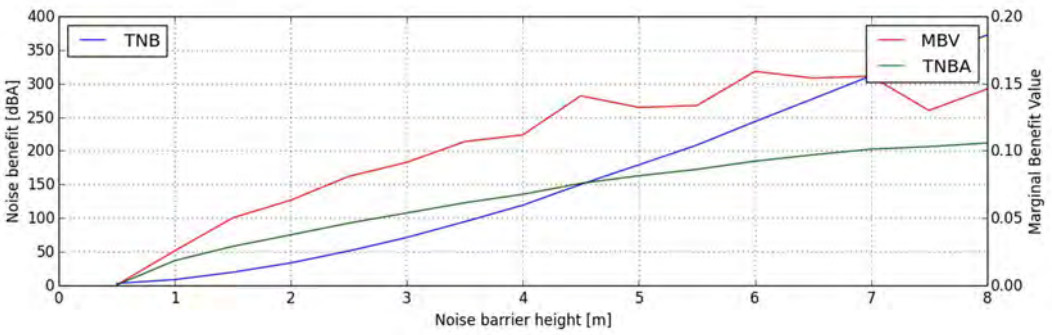
The graph provided in **Figure 26** shows the maximum insertion loss at any receiver and the maximum sound pressure level at any receiver. Over the varying barrier heights the specific receiver may not be the same, hence the decrease in insertion loss is not necessarily consistent with the maximum noise level.

The graph in **Figure 26** shows that 5 dB(A) insertion loss is achieved with a noise barrier height of around four metres. A 10 dB(A) insertion loss is achieved with a noise barrier height of around eight metres. A noise barrier less than five metres high must have a minimum insertion loss of around 5 dB(A) to be considered reasonable. A noise barrier equal to or greater than five metres high must have a minimum insertion loss of around 10 dB(A) to be considered reasonable. Hence noise barriers between four metres and five metres, or seven metres and eight metres could be considered viable in this instance.

The 'target barrier' is the barrier that achieves compliance with the appropriate noise criteria at all sensitive receivers. The graph provided in **Figure 26** indicates that the 'target barrier' (the minimum barrier required to achieve the applicable noise criteria at all receiver locations) is greater than eight metres. As such there is no 'target barrier' for this barrier design.

The graph provided in **Figure 27** illustrates the Total Noise Benefit (TNB), the Marginal Benefit Value (MBV) and the Total Noise Benefit per Unit Area (TNBA). The TNB is the sum of the noise reduction provided by the barrier. The MBV is the increase in TNB, divided by the increase in barrier height. The TNBA is the TNB divided by the total area of the barrier.

Figure 27 Noise benefit

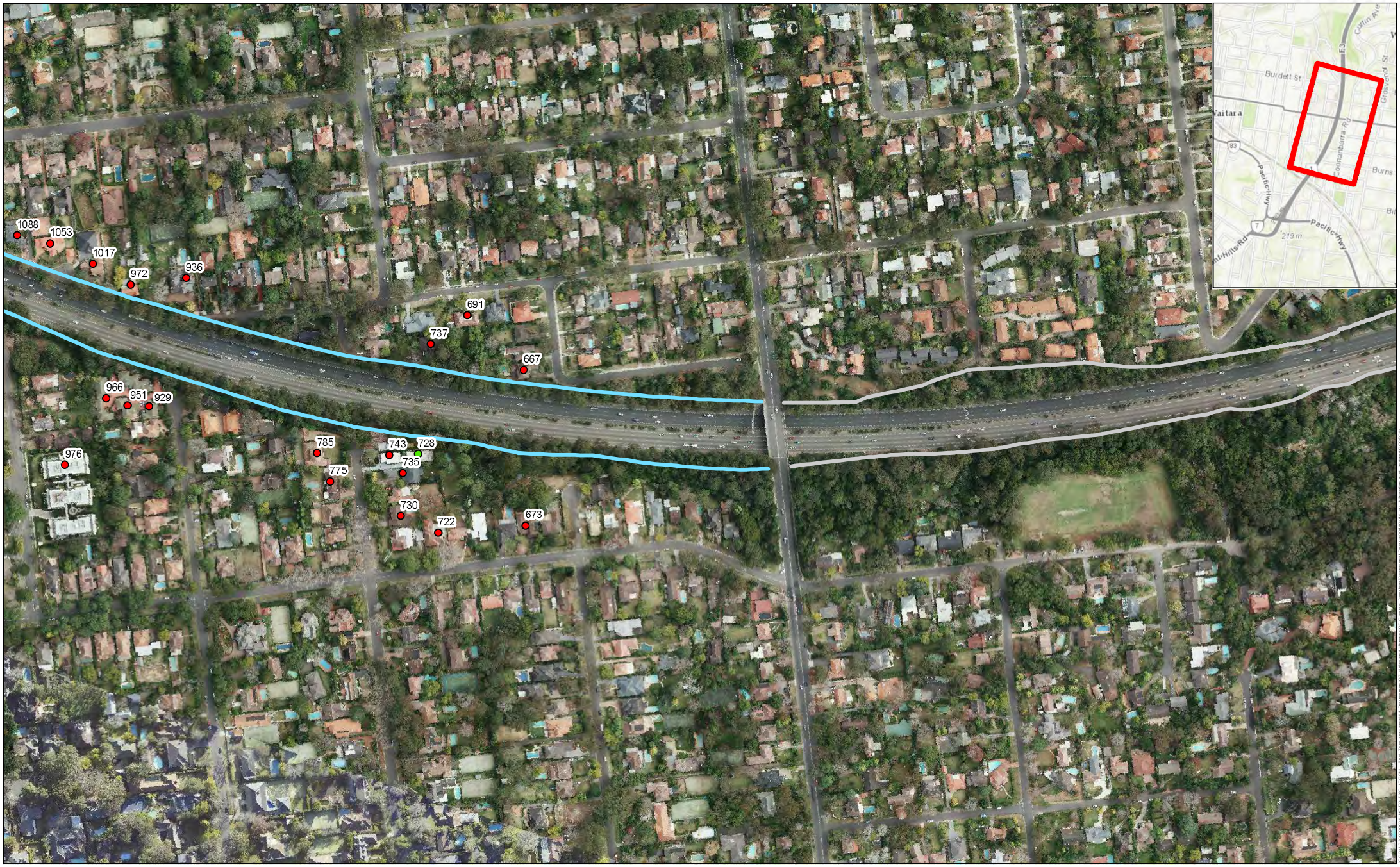


The ‘assessed barrier’ is the barrier option selected after considering the TNB, MBV and TNBA. In most instances the MBV curve is the preferred selection. In this instance the MBV peaks at 4.5 metres and six metres, and the TNBA peaks at greater than eight metres. Considering a 10 dB(A) noise barrier insertion loss is not achieved, a 4.5 metres noise barrier is considered the assessed barrier in this instance.

Considering there is no ‘target barrier’, the ‘assessed barrier’ (4.5 metres) is recommended in this location.

This assessment has an assumed noise barrier height of five metres (based on relative height). As such it is recommended that the noise barrier be replaced with one of the same height to ensure that noise levels do not increase as a result of the project. The actual surveyed barrier height at this location is between 3.6 metres and six metres. As discussed at the beginning of this section the actual modelled height is the relative level height.

Where existing barrier height has been recommended, the top of the new noise barrier should be no lower than the top of the existing noise barrier (that is, the reduced level (RL) of the top of the existing barrier must be maintained).



Assessed Noise Barrier - Existing Height

Assessed Noise Barrier - Increased Height

Existing Noise Barrier

Eligible for Consideration of Architectural Treatment

To Be Aquired and Eligible for Consideration of Architectural Treatment

NorthConnex

Northern Interchange - Predicted night-time noise levels with proposed noise mitigation

Source:

JUN 2014

60300684

N

0 100 200 400 m

Fig. 1

AECOM

Assessed Noise Barrier - Existing Height

Assessed Noise Barrier - Increased Height

Existing Noise Barrier

Eligible for Consideration of Architectural Treatment

To Be Aquired and Eligible for Consideration of Architectural Treatment

NorthConnex

Northern Interchange - Predicted night-time noise levels with proposed noise mitigation

Source:

JUN 2014

60300684

0 100 200 400 m

Fig. **2**

Assessed Noise Barrier - Existing Height

Assessed Noise Barrier - Increased Height

Existing Noise Barrier

Eligible for the Consideration of Noise Mitigation

NorthConnex

Southern Interchange - Predicted night-time noise levels with proposed noise mitigation

Source:

N

0 100 200 400 m

JUN 2014

60300684

Fig. 1

Assessed Noise Barrier - Existing Height

Assessed Noise Barrier - Increased Height

Existing Noise Barrier

Eligible for the Consideration of Noise Mitigation

NorthConnex

Southern Interchange - Predicted night-time noise levels with proposed noise mitigation

Source:

N

0 100 200 400 m

JUN 2014

60300684

Fig. **2**

Assessed Noise Barrier - Existing Height

Assessed Noise Barrier - Increased Height

Existing Noise Barrier

Eligible for the Consideration of Noise Mitigation

NorthConnex

Southern Interchange - Predicted night-time noise levels with proposed noise mitigation

Source:

N

0 100 200 400 m

JUN 2014

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Fig. 3

carbon neutral

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CONSUMER

The RMS uses
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