RENZO TONIN & ASSOCIATES
inspired to achieve

Consultants in Acoustics, Vibration & Structural Dynamics
email: sydney@renzotonin.com.au
website: www.renzotonin.com.au

Doc Ref: TD261-10F01 (rev 2) Supplementary Report

Date: 2 September 2009

To: Coal and Allied

Attn: MR SCOTT FRAZER Email: sfrazer@catylis.com

From: Michael Chung

RE: LOWER HUNTER LAND DEVELOPMENT: MINMI – SUPPLEMENTARY NOISE REPORT

This supplementary noise report has been prepared following comments issued by various regulatory agencies and should be read in conjunction with the previous noise assessment report prepared by Renzo Tonin & Associates (TD261-02F02 (rev 5), 9 January 2009).

Noise modelling of traffic noise impacting the proposed Minmi development was based on predicted 2031 traffic volumes for the F3 Freeway, Newcastle Link Road, Woodford Street, Minmi Road South and the proposed Minmi Boulevard. However, it is anticipated that by the year 2013, a new major road development, the Hunter Expressway (previously the F3 Freeway to Branxton (F32B) Link), will be constructed and in operation. Based on the Hunter Expressway, it is expected that traffic volumes along the F3 Freeway and the Newcastle Link Road will be affected. Therefore, remodelling of traffic noise from these roads has been undertaken to account for the changes in traffic volumes and to determine likely impacts to the proposed Minmi development.

The revised 2031 traffic volumes for the F3 Freeway and the Newcastle Link Road due to the implementation of the Hunter Expressway, which have been used for the remodelling, are presented in the table below.

Table 1 – 2031 Traffic Volume & Composition Data for Freeway / Arterial Roads

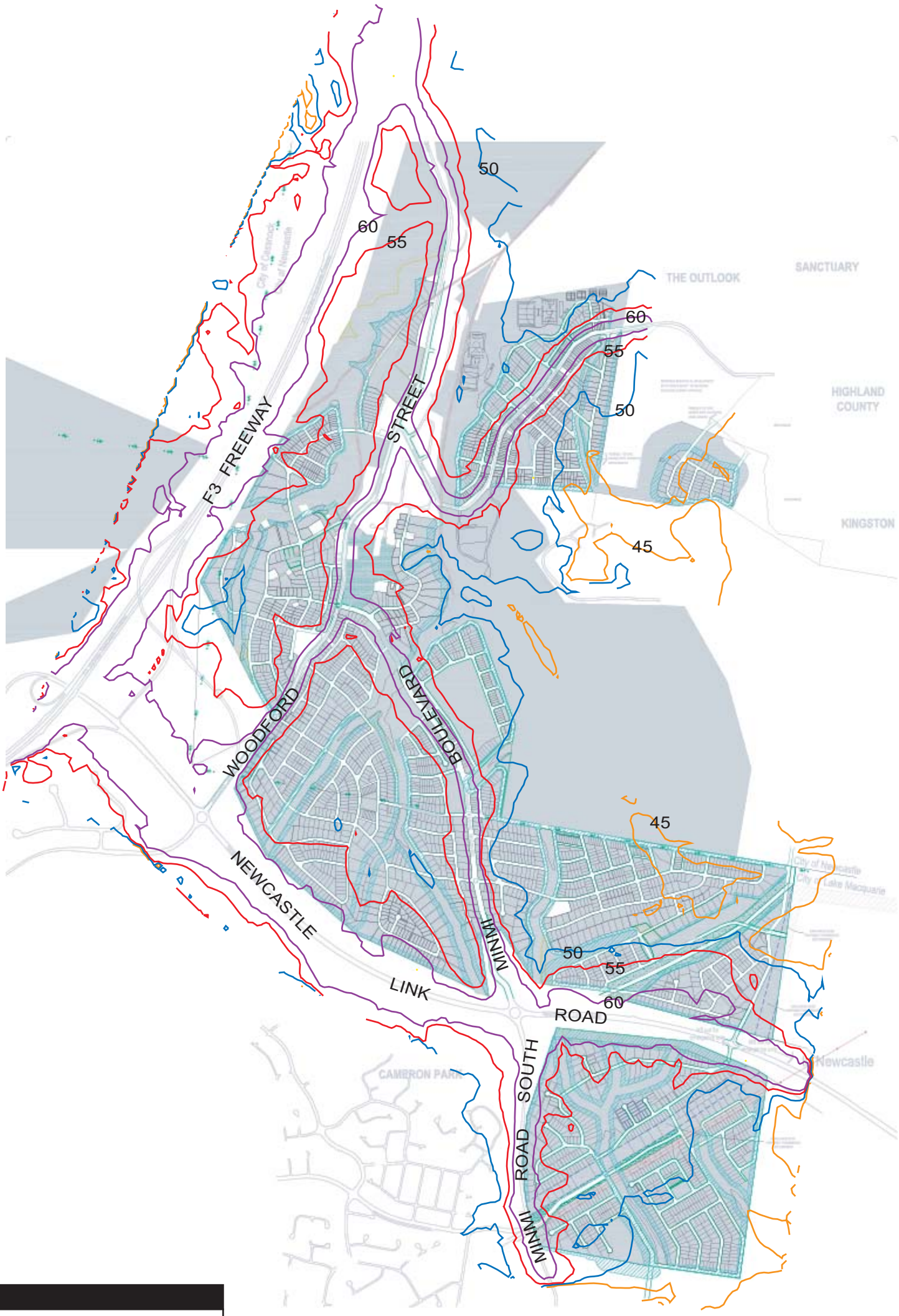
Road	Year	Direction	Day (7am-10pm)		Night (10pm-7am)		Speed
			Volume	%HV	Volume	%HV	km/h
F3 Freeway	2031[1]	Two way	38,509	11	6,291	23	110
Newcastle Link Road west of Woodford St	2031[1]	Two way	66,008	14	10,392	21	90
Newcastle Link Road between Woodford St and Minmi Rd	2031[1]	Two way	59,832	15	8,368	23	90
Newcastle Link Road east of Minmi Rd	2031[1]	Two way	51,968	15	7,132	25	90

Note: 1. 2031 traffic count data based on the Hunter Expressway implemented

25 1982-2007 ACOUSTIC ENGINEERING EXCELLENCE

Various heights for proposed noise walls / mounds were recommended in the pervious noise assessment report, ranging from 2m to 6m in height. Using the revised traffic volumes summarised above, noise contours for the range of noise wall / mound heights previously recommended have been revised. Noise contours for no noise walls / mounds have also been revised. It is noted that noise contours for increasing wall / mound heights were prepared for the day period only as this was the most critical period that would experience the highest exceedances. However, for the noise contours showing no noise walls / mounds, both the day and night periods were produced.

Noise contours are shown below in Figures 1 to 7.



Legend	
	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St

RENZO TONIN & ASSOCIATES
inspired to achieve
Consultants in Acoustics, Vibration and Structural Dynamics
Email: acoustics@rtagroup.com.au www.renzotonin.com.au
Sydney - Ph: (02) 8218 0500 Fax: (02) 8218 0501
Melbourne - Ph: (03) 9606 0041 Fax: (03) 9606 0042
Brisbane - Ph: (07) 3211 9155 Fax: (07) 3211 9188
Gold Coast - Ph: (07) 5593 5633 Fax: (07) 5593 5635
Kuwait - Ph: +0011 965 653 1520
Member of the Association of Australian Acoustical Consultants

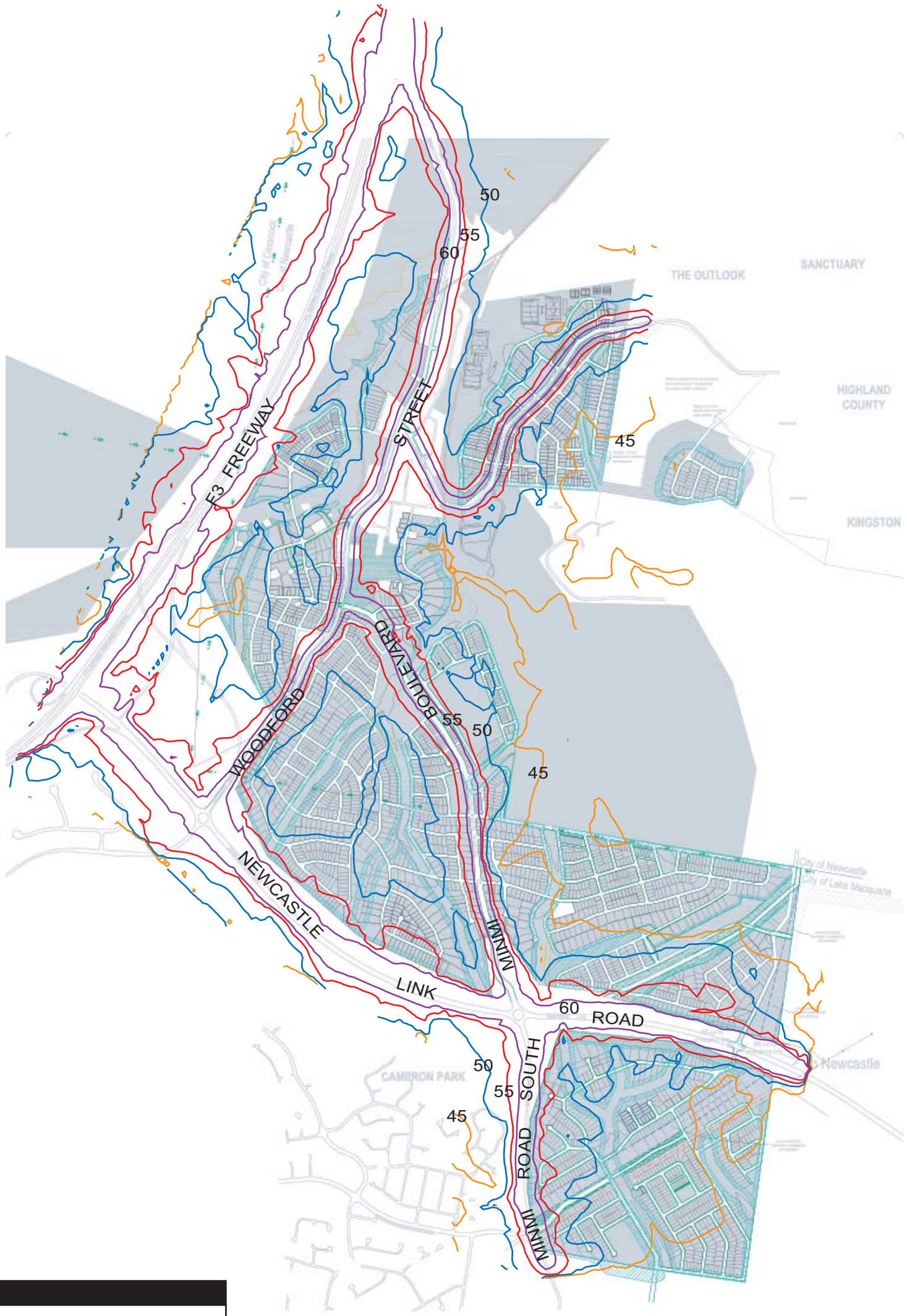
Title : Figure 1 - Minmi and North & South Link Roads - 2031 Road Traffic Noise Impacts (Day period 7am to 10pm)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 26/08/09

Ref : TD261-10P01 (rev 0)



Legend	
	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St

RENZO TONIN & ASSOCIATES
inspired to achieve
Consultants in Acoustics, Vibration and Structural Dynamics
Email: acoustics@rtagroup.com.au www.renzotonin.com.au
Sydney - Ph: (02) 8218 0500 Fax: (02) 8218 0501
Melbourne - Ph: (03) 9606 0041 Fax: (03) 9606 0042
Brisbane - Ph: (07) 3211 9155 Fax: (07) 3211 9188
Gold Coast - Ph: (07) 5593 5633 Fax: (07) 5593 5635
Kuwait - Ph: +0011 965 653 1520
Member of the Association of Australian Acoustical Consultants

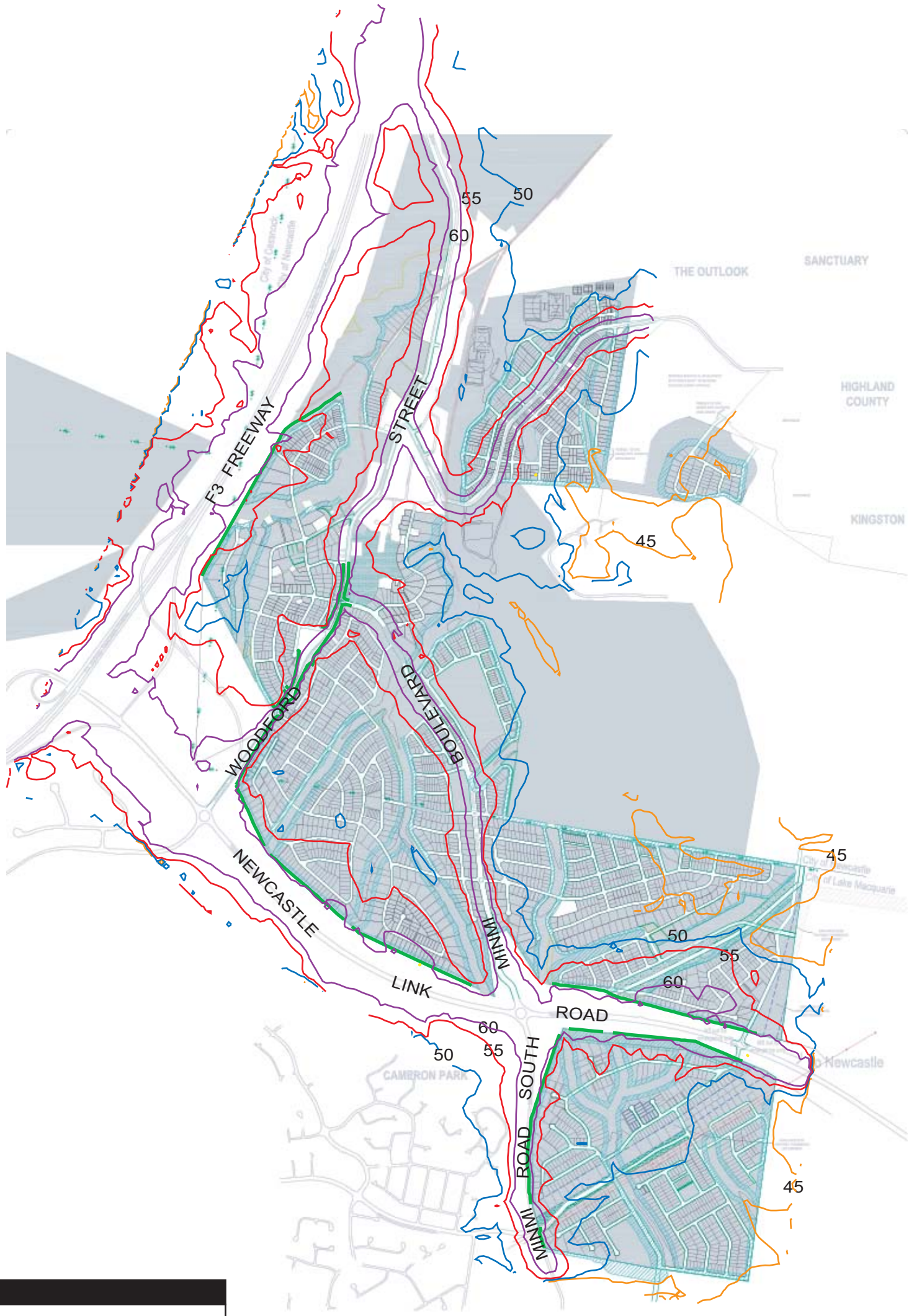
Title : Figure 2 - Minmi and North & South Link Roads - 2031 Road Traffic Noise Impacts (Night Period - 10pm to 7am)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 26/08/09

Ref : TD261-10P02 (rev 0)



Legend

	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St
	2m High Noise Wall

RENZO TONIN & ASSOCIATES
inspired to achieve
Consultants in Acoustics, Vibration and Structural Dynamics
Email: acoustics@rtagroup.com.au www.renzotonin.com.au
Sydney - Ph: (02) 8218 0500 Fax: (02) 8218 0501
Melbourne - Ph: (03) 9606 0041 Fax: (03) 9606 0042
Brisbane - Ph: (07) 3211 9155 Fax: (07) 3211 9188
Gold Coast - Ph: (07) 5593 5633 Fax: (07) 5593 5635
Kuwait - Ph: +0011 965 653 1520
Member of the Association of Australian Acoustical Consultants

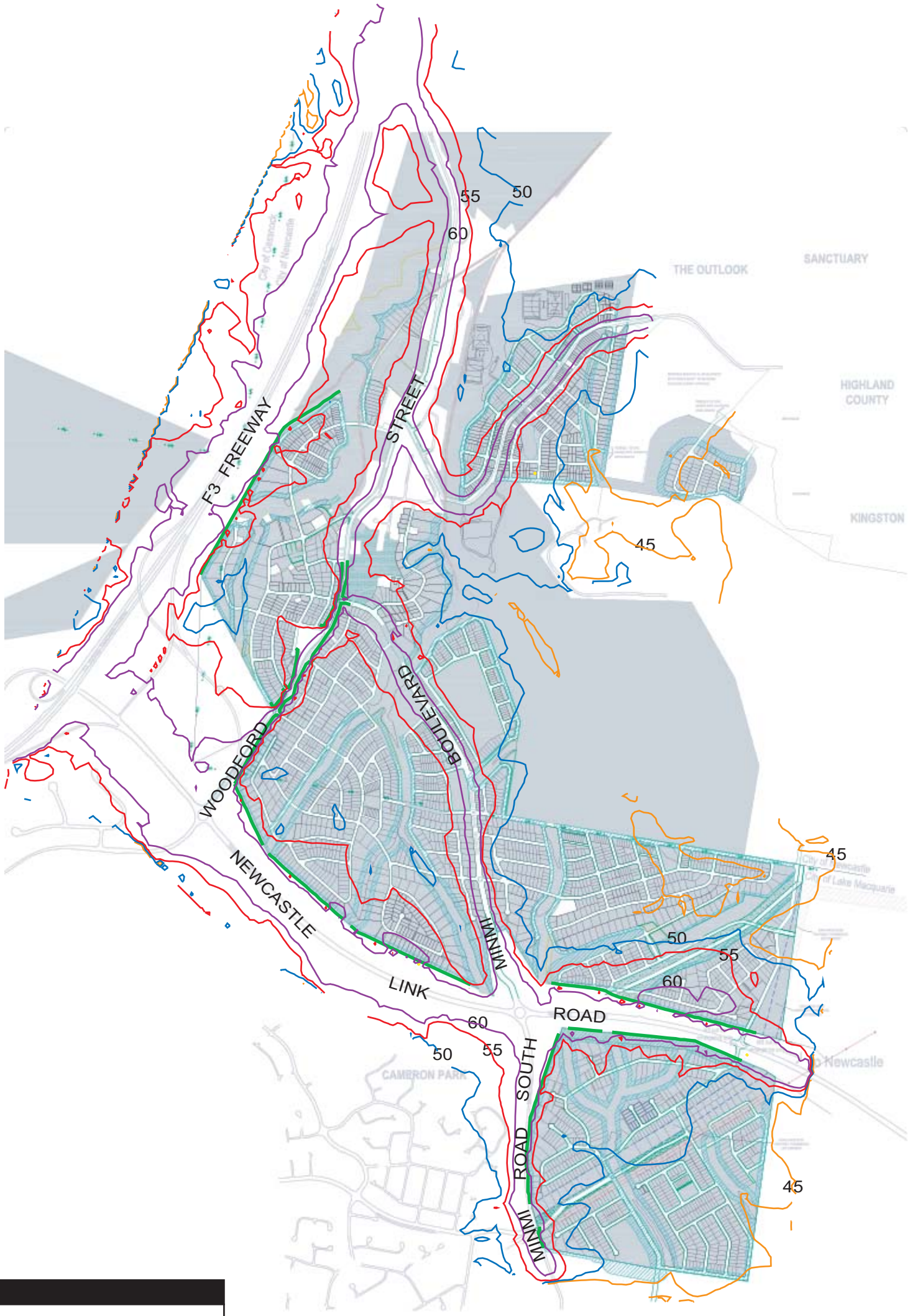
Title : Figure 3 - Minmi and North & South Link Roads - 2m Noise Wall
2031 Road Traffic Noise Impacts
(Day Period - 7am to 10pm)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 26/08/09

Ref : TD261-10P03 (rev 0)



Legend	
	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St
	3m High Noise Wall

RENZO TONIN & ASSOCIATES
inspired to achieve
Consultants in Acoustics, Vibration and Structural Dynamics
Email: acoustics@rtagroup.com.au www.renzotonin.com.au
Sydney - Ph: (02) 8218 0500 Fax: (02) 8218 0501
Melbourne - Ph: (03) 9606 0041 Fax: (03) 9606 0042
Brisbane - Ph: (07) 3211 9155 Fax: (07) 3211 9188
Gold Coast - Ph: (07) 5593 5633 Fax: (07) 5593 5635
Kuwait - Ph: +0011 965 653 1520
Member of the Association of Australian Acoustical Consultants

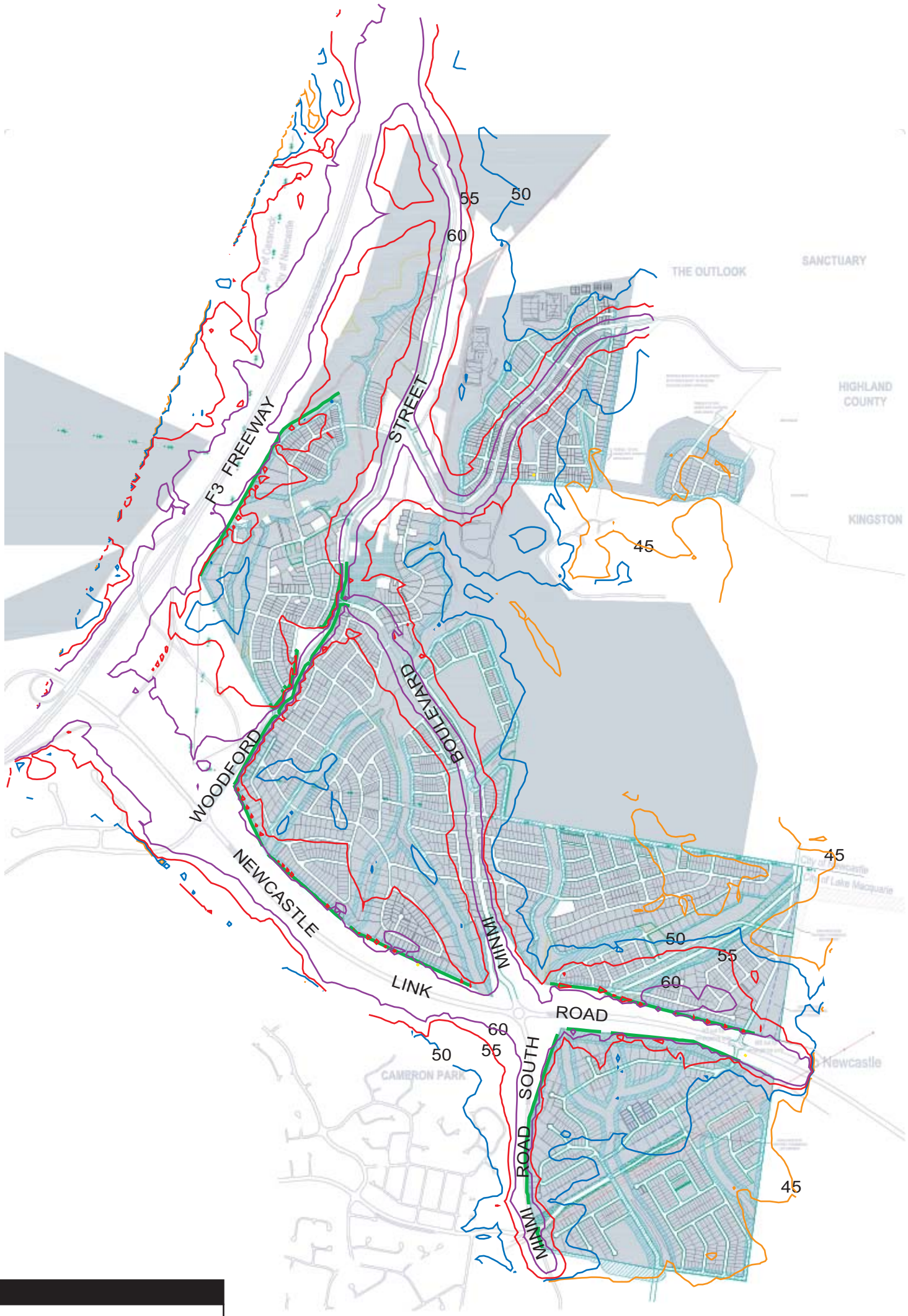
Title : Figure 4 - Minmi and North & South Link Roads - 3m Noise Wall
2031 Road Traffic Noise Impacts
(Day Period - 7am to 10pm)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 26/08/09

Ref : TD261-10P04 (rev 0)



Legend

	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St
	4m High Noise Wall

RENZO TONIN & ASSOCIATES
inspired to achieve
Consultants in Acoustics, Vibration and Structural Dynamics
Email: acoustics@rtagroup.com.au www.renzotonin.com.au
Sydney - Ph: (02) 8218 0500 Fax: (02) 8218 0501
Melbourne - Ph: (03) 9606 0041 Fax: (03) 9606 0042
Brisbane - Ph: (07) 3211 9155 Fax: (07) 3211 9188
Gold Coast - Ph: (07) 5593 5633 Fax: (07) 5593 5635
Kuwait - Ph: +0011 965 653 1520
Member of the Association of Australian Acoustical Consultants

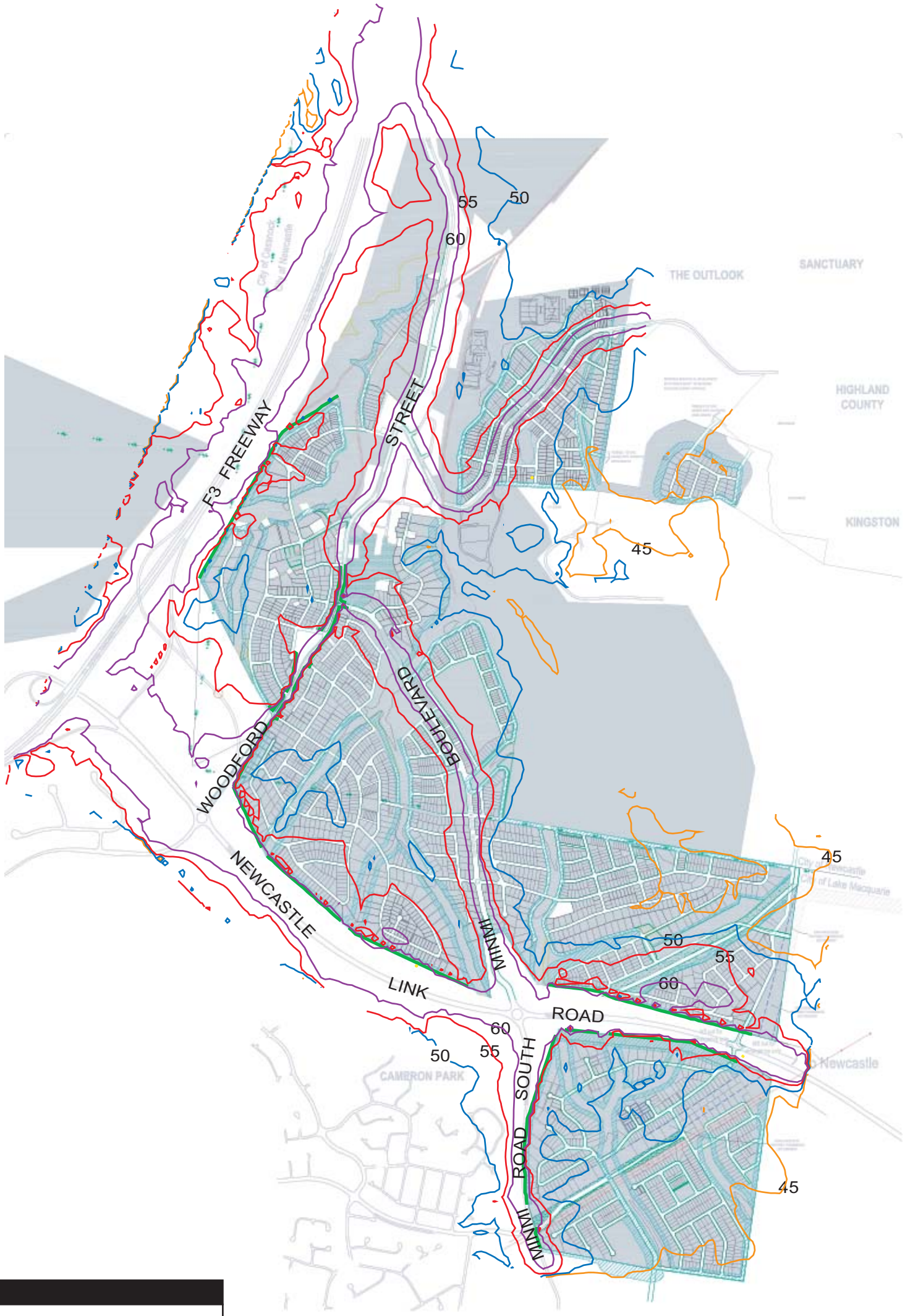
Title : Figure 5 - Minmi and North & South Link Roads - 4m Noise Wall
2031 Road Traffic Noise Impacts
(Day Period - 7am to 10pm)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 26/08/09

Ref : TD261-10P05 (rev 0)



Legend	
	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St
	5m High Noise Wall

RENZO TONIN & ASSOCIATES
inspired to achieve
Consultants in Acoustics, Vibration and Structural Dynamics
Email: acoustics@rtagroup.com.au www.renzotonin.com.au
Sydney - Ph: (02) 8218 0500 Fax: (02) 8218 0501
Melbourne - Ph: (03) 9606 0041 Fax: (03) 9606 0042
Brisbane - Ph: (07) 3211 9155 Fax: (07) 3211 9188
Gold Coast - Ph: (07) 5593 5633 Fax: (07) 5593 5635
Kuwait - Ph: +0011 965 653 1520
Member of the Association of Australian Acoustical Consultants

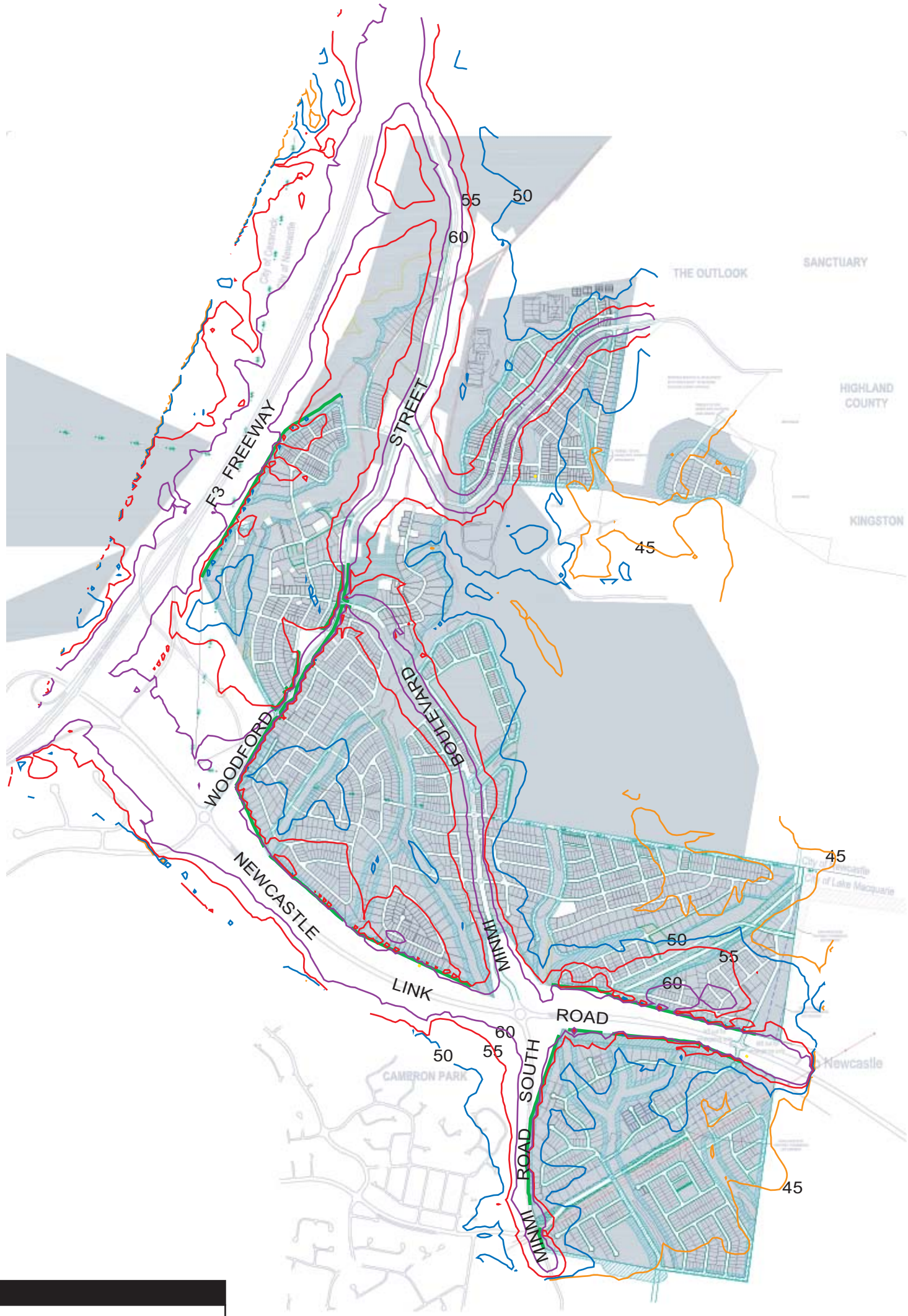
Title : Figure 6 - Minmi and North & South Link Roads - 5m Noise Wall
2031 Road Traffic Noise Impacts
(Day Period - 7am to 10pm)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 26/08/09

Ref : TD261-10P06 (rev 0)



Legend

	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St
	6m High Noise Wall

RENZO TONIN & ASSOCIATES
inspired to achieve
Consultants in Acoustics, Vibration and Structural Dynamics
Email: acoustics@rtagroup.com.au www.renzotonin.com.au
Sydney - Ph: (02) 8218 0500 Fax: (02) 8218 0501
Melbourne - Ph: (03) 9606 0041 Fax: (03) 9606 0042
Brisbane - Ph: (07) 3211 9155 Fax: (07) 3211 9188
Gold Coast - Ph: (07) 5593 5633 Fax: (07) 5593 5635
Kuwait - Ph: +0011 965 653 1520
Member of the Association of Australian Acoustical Consultants

Title : Figure 7 - Minmi and North & South Link Roads - 6m Noise Wall
2031 Road Traffic Noise Impacts
(Day Period - 7am to 10pm)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 26/08/09

Ref : TD261-10P07 (rev 0)

The tables below present the number of residential properties from the proposed Minmi development that will still exceed the noise criteria, as sitpulated in the NSW Department of Environment, Climate Change and Water's (DECCW) 'Environmental Criteria for Road Traffic Noise' (ECRTN) and presented in the previous report, for different noise wall / mound heights.

Based on the revised 2031 traffic volumes for the F3 Freeway and Newcastle Link Road, Table 2 presents the number of residential properties that would exceed the applicable ECRTN criteria (ie. $L_{Aeq(15hr)}$ 55dB(A) for new residential developments impacted by freeways and arterial roads during the day period) due to traffic noise from the F3 Freeway and Newcastle Link Road for increasing noise wall / mound heights. The areas where residential properties are impacted by the F3 Freeway and Newcastle Link Road and are protected by the proposed noise walls / mounds are east of the F3 Freeway, north of Newcastle Link Road (west and east of the proposed Minmi Boulevard) and south of Newcastle Link Road, which are shown in Figure 8 as Areas F, G, H and I, respectively.

Table 2 – Residential Properties Affected by Freeway / Arterial Road Traffic Noise

Noise Wall / Mound Height	Number of Residential Properties Exceeding Criteria[1]			
	Area F	Area G	Area H	Area I
0m	28	157	143	27
2m	28	155	141	23
3m	26	153	138	21
4m	25	153	137	16
5m	24	150	135	8
6m	20	142	128	5

Notes: 1. ECRTN criterion for new residential developments affected by a freeways or arterial road is $L_{Aeq(15hr)}$ 55dB(A) during the day period

In addition to traffic noise from the F3 Freeway and Newcastle Link Road, traffic noise from collector roads (ie. Woodford Street, Minmi Road South and the proposed Minmi Boulevard) would also potentially impact the proposed Minmi development.

Table 3 below presents the number of residential properties that would exceed the applicable ECRTN criteria (ie. $L_{Aeq(1hr)}$ 60dB(A) for new residential developments impacted by collector roads during the day period) due to traffic noise from Woodford Street and Minmi Road South where noise walls / mounds have been recommended. The areas where residential properties have been included and are protected by the proposed noise walls / mounds are west of Woodford Street, east of Woodford Street and east of Minmi Road South, which are shown in Figure 8 as Areas A, B and E, respectively. Furthermore, residential properties impacted upon by the proposed Minmi Boulevard are also presented in the table and are shown in Figure 8 as Areas C and D. However, these properties are not protected by noise walls / mounds due to feasibility issues (eg. access to properties).

Table 3 – Residential Properties Affected by Collector Roads Traffic Noise

Noise Wall / Mound Height	Number of Residential Properties Exceeding Criteria[1]				
	Area A	Area B	Area C[2]	Area D[2]	Area E
0m	21	31	35	68	17
2m	7	10	35	68	14
3m	5	3	35	68	12
4m	2	3	35	68	11
5m	1	2	35	68	10
6m	1	1	35	68	9

Notes: 1. *ECRTN criterion for new residential developments affected by a collector road is $L_{Aeq(1hr)}$ 60dB(A) during the day period*

2. *Areas C and D not protected by noise walls / mounds*

From the Tables 2 and 3 it can be seen that as the noise wall / mound heights increase, the number of residential properties still exceeding the relevant ECRTN noise criteria decreases (except for Areas C and D where no noise walls / mounds are proposed). However, even with a maximum height of 6m, sufficient noise attenuation cannot be achieved to reduce noise to compliant levels at all residential properties. Therefore, architectural treatment to future dwellings will need to be considered and should be determined in the design stages in accordance with the requirements of the NSW Infrastructure SEPP (2008) and the Department of Planning's (DoP) 'Development Near Rail Corridors and Busy Roads – Interim Guideline'. The extent of the treatment will depend on the noise wall / mound height implemented and the residual noise exceedance experienced at each dwelling.

The various options of architectural treatment are as follows:

- **Option 1** **Mechanical ventilation only**

  <5dB(A) reduction

  Where external noise levels are less than 5dB(A) above the ECRTN 'target' criteria, the internal noise goals may be achieved with windows closed. A light framed building with single glazed windows will provide a minimum noise reduction of up to 15dB(A) from outside to inside when windows are closed. If the ECRTN internal noise goals can only be achieved with windows closed, then mechanical ventilation or air conditioning must be provided to ensure fresh airflow inside the dwelling so to meet the requirements of the Building Code of Australia.

  The estimated cost for providing the above treatment is in the order of $5,000 - $10,000 per dwelling.

- **Option 2** **Mechanical ventilation and sealing of wall vents**

  5-10 dB(A) reduction

  Where external noise levels are less than 10dB(A) above the ECRTN 'target' criteria, the internal noise goals may be achieved with windows closed. A light framed building with single glazed windows will provide a minimum noise reduction of up to 20dB(A) from outside to inside (RTA Noise Management

Manual p20) when windows are closed and wall vents are sealed. If the internal noise goals can only be achieved with windows closed, then mechanical ventilation or air conditioning must be provided to ensure fresh airflow inside the dwelling so to meet the requirements of the Building Code of Australia.

It is important to ensure that mechanical ventilation does not provide a new noise leakage path into the dwelling and does not create a noise nuisance to neighbouring residential premises.

The estimated cost for providing the above treatment is in the order of $5,000 - $15,000 per dwelling (RTA Environmental Noise Management Manual p111 sets a limit of $15,000 per residence for RTA funded projects).

- **Option 3** **Upgraded seals for windows and doors**

10-12dB(A) reduction

Where external noise levels are only slightly greater than 10dB(A) above the ECRTN 'target' criteria, then additional to installing mechanical ventilation systems (Option 1), special acoustic grade seals should be installed on windows and perimeter doors exposed to road traffic noise to enable the internal noise criteria to be achieved with windows and doors shut.

The estimated cost for providing the combined treatment of both Options 1 and 2 is in the order of $10,000 - $20,000 per dwelling (RTA Environmental Noise Management Manual p111 sets a limit of $20,000 per residence for RTA funded projects).

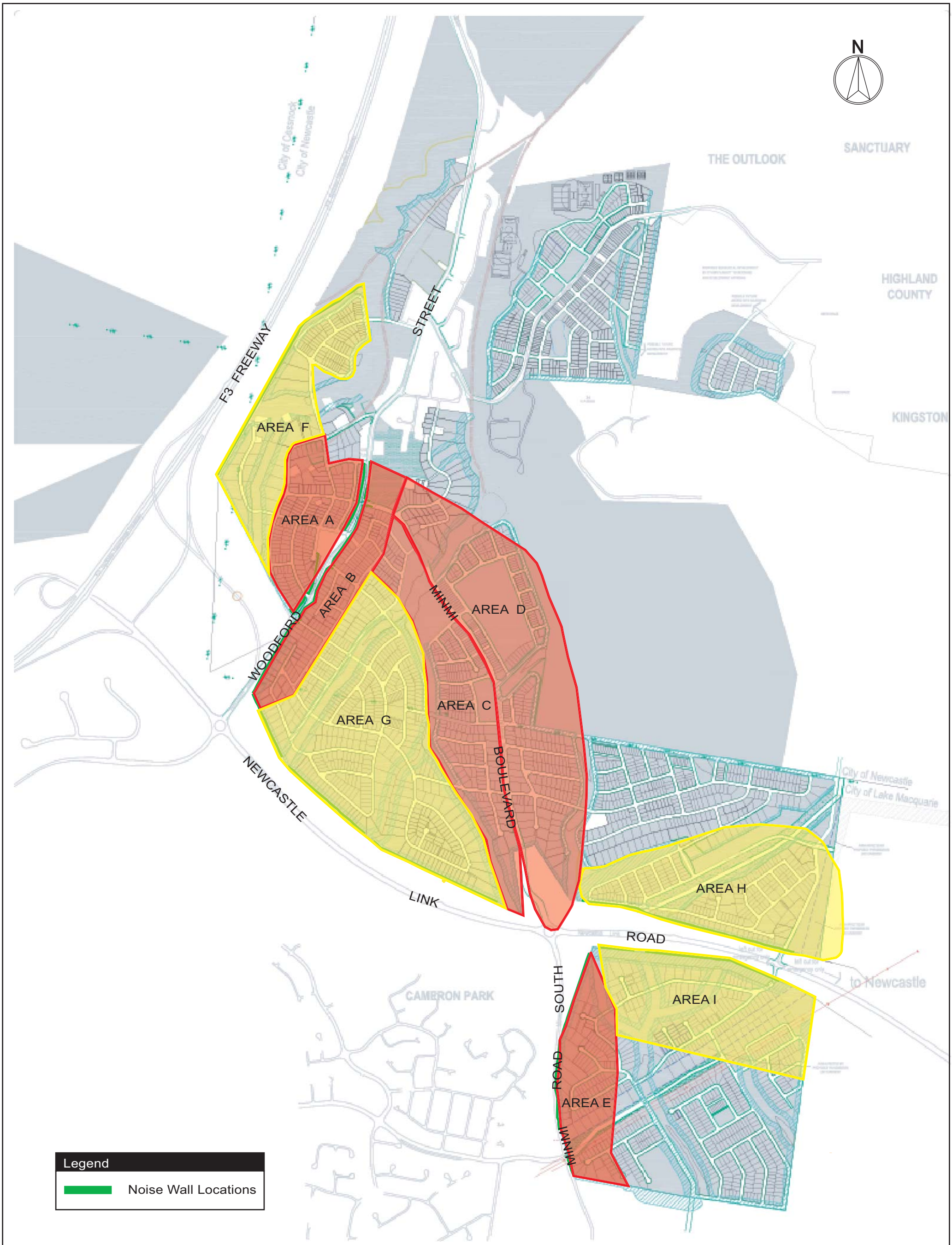
- **Option 4** **Upgraded windows, glazing and doors**

>12 dB(A) reduction

Where the predicted external noise level exceeds the ECRTN 'target' criteria by significantly more than 10dB(A), then upgraded windows and glazing and the provision of solid core doors will be required on the facades exposed to the proposed upgrade, in addition to the mechanical ventilation described in Option 1. Note that these upgrades are only suitable for masonry buildings. It is unlikely that this degree of upgrade would provide significant benefits to light framed structures should there be no acoustic insulation in the walls.

The estimated cost for providing the above treatment is in the order of $25,000 - $30,000 per dwelling (RTA Environmental Noise Management Manual p111 sets a limit of $20,000 per residence for RTA funded projects).

In addition to the above options for architectural treatment, good planning and design practices should also be considered, such as locating sensitive areas away from the traffic noise sources. These planning and design practices were presented in Section 4.5 of the previous Renzo Tonin & Associates noise assessment report.



RENZO TONIN & ASSOCIATES
inspired to achieve
Consultants in Acoustics, Vibration and Structural Dynamics
Email: acoustics@rtagroup.com.au www.renzotonin.com.au
Sydney - Ph: (02) 8218 0500 Fax: (02) 8218 0501
Melbourne - Ph: (03) 9606 0041 Fax: (03) 9606 0042
Brisbane - Ph: (07) 3211 9155 Fax: (07) 3211 9188
Gold Coast - Ph: (07) 5593 5633 Fax: (07) 5593 5635
Kuwait - Ph: +0011 965 653 1520
Member of the Association of Australian Acoustical Consultants

Title : Figure 8 - Minmi and North & South Link Roads: Residential Areas Impacted by Traffic Noise

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 26/08/09

Ref : TD261-10P08 (rev 0)

DOCUMENT CONTROL

Date	Revision History	Non-Issued Revision	Issued Revision	Prepared By (initials)	Instructed By (initials)	Reviewed & Authorised by (initials)
02/06/09	Draft report	-	0	MCH	-	MCH
26/08/09	Revise report	-	1	MCH	-	MCH
02/09/09	Finalise report	-	2	MCH	-	MCH

The work presented in this document was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001.

This document is issued subject to review and authorisation by the Team Leader noted by the initials printed in the last column above. If no initials appear, this document shall be considered as preliminary or draft only and no reliance shall be placed upon it other than for information to be verified later.

This document is prepared for our Client's particular requirements which are based on a specific brief with limitations as agreed to with the Client. It is not intended for and should not be relied upon by a third party and no responsibility is undertaken to any third party without prior consent provided by Renzo Tonin & Associates. The information herein should not be reproduced, presented or reviewed except in full. Prior to passing on to a third party, the Client is to fully inform the third party of the specific brief and limitations associated with the commission.

The information contained herein is for the purpose of acoustics only. No claims are made and no liability is accepted in respect of design and construction issues falling outside of the specialist field of acoustics engineering including and not limited to structural integrity, fire rating, architectural buildability and fit-for-purpose, waterproofing and the like. Supplementary professional advice should be sought in respect of these issues.