



# **Cowra Shire Council**

## **Cowra Heavy Vehicle Bypass Study**

### **Final Report**

June 2013

# Executive summary

*This report is subject to, and must be read in conjunction with, the limitations set out in section 1.3 and the assumptions and qualifications contained throughout the Report.*

This report has been prepared for Cowra Shire Council and identifies and evaluates alternative routes for heavy vehicle traffic passing through Cowra. The route options documented in the Cowra Shire Land-use Strategy were included.

An Origin Destination survey was undertaken to identify the origins and destinations of heavy vehicle traffic passing through Cowra. The pattern of travel identified was applied to the results of traffic counts conducted by Council to determine the numbers of heavy vehicles travelling on the local road network.

A programme of community and stakeholder consultation was undertaken in August and September 2012 to encourage community and stakeholder participation in the study. The aim of the community consultation was to provide opportunities for the community to express their opinions about the possible route options under consideration and to suggest other options. Key stakeholders involved included residents, businesses, the general community and service providers.

The scope of the consultation program was broadened from an initial focus on the options in the Land-Use Strategy study to provide stakeholders and the community the opportunity to suggest other potential options for consideration in the study. The programme was extended to provide for this broader approach. The community feedback indicated a relatively high level of support for a heavy vehicle bypass. Ten possible routes were identified as an outcome of the community consultation programme and are shown in the following table.

## Possible route options

Land Use Strategy	Community	Stakeholders	Combined
Option 1			Option 1
Option 2			
Option 3	Option 5		Option 3/5
Option 4			
	Option 6		
	Option 7	Option C	Option 7/C
		Option B	Option B
		Option A	Option A

The route options considered in the study include the four options proposed in the Cowra Shire Land-use Strategy and the additional options identified through the community consultation process and developed by the study team. Each of the options was described and ranked based on a weighted scoring method.

In consultation with Council, three options were identified to be carried forward to the BCA:

- Option A (amended)
- Option B
- Option 3

Existing travel times were estimated along the main roads in the study area. The vehicle-hours travelled per day was estimated for each route option by multiplying the estimated travel time for each section of road by the daily traffic volume estimated to use the road. Vehicle Kilometres Travelled was determined for each section of road and was used to estimate the vehicle operating cost in the BCA. Crash data for the period from 2005 to 2009 was used to estimate the historical truck crash rate per year on Kendal Street.

The performance of the intersections of Young Road and Boorowa Road with Grenfell Road were assessed. A roundabout at the Boorowa Road intersection would address the existing poor level of service on the Boorowa Road approach without substantially delaying traffic on Grenfell Road. A roundabout would address the existing traffic delays in Boorowa Road and would also manage any increase in traffic at the intersection following the provision of a bypass route.

A benefit cost analysis was undertaken for the three shortlisted options:

- **Option A:** A high capital cost option which would provide a comprehensive bypass route of Cowra;
- **Option 3:** A lower capital cost option which would involve the construction of a section of new road and the upgrade of existing roads; and
- **Option B:** The construction of a portion of Option 3 and the connection to the existing road network at Young Road.

The capital cost of the project included design, property acquisition, project management, construction and contingencies. The benefits were travel time cost savings, vehicle operating cost savings and crash cost savings. No separate allowance was made for externality benefits such as air quality emissions and noise impacts.

The results of the BCA are summarised in the following table.

Route option	Net Present value	BCR
Route A	-\$30,158,000	0.17
Route B	-\$10,726,000	0.31
Route 3	-\$10,366,000	0.37

A public exhibition of the Cowra Heavy Vehicle Bypass Study Draft Report and bypass options was undertaken by Council for a four-week period from 2 to 30 April 2013. Four options were displayed including the three identified shortlisted bypass options A, B and 3 as long-term alternatives, and an additional bypass option as a short-term alternative.

The preferred long term option was Option 3 with almost 34% of submissions supporting this option. This reflects the outcome of the initial community feedback and the results of the benefit cost analysis. Long-term Option A was supported by approximately 30% of submissions and Long-term Option B by less than 20% of submissions. There was approximately 28% support for a short term option.

The following conclusions are made:

1. The results of the community consultation indicate that Option 3 is the most popular option.
2. Options A, 3 and B were the highest ranked options of the eight options considered.
3. The BCA results show that Option 3 is the most cost-effective of the three highest ranked options.
4. The BCA results show that although Option B has a marginally lower cost than Option 3, it provides less benefits in terms of reductions in travel time and vehicle operating costs compared to Option 3.
5. The construction of a roundabout at Grenfell Road/ Boorowa Road would ease the traffic delays in Boorowa Road.

It is recommended that Option 3 be adopted as the most preferable route for a heavy vehicle bypass of Cowra.



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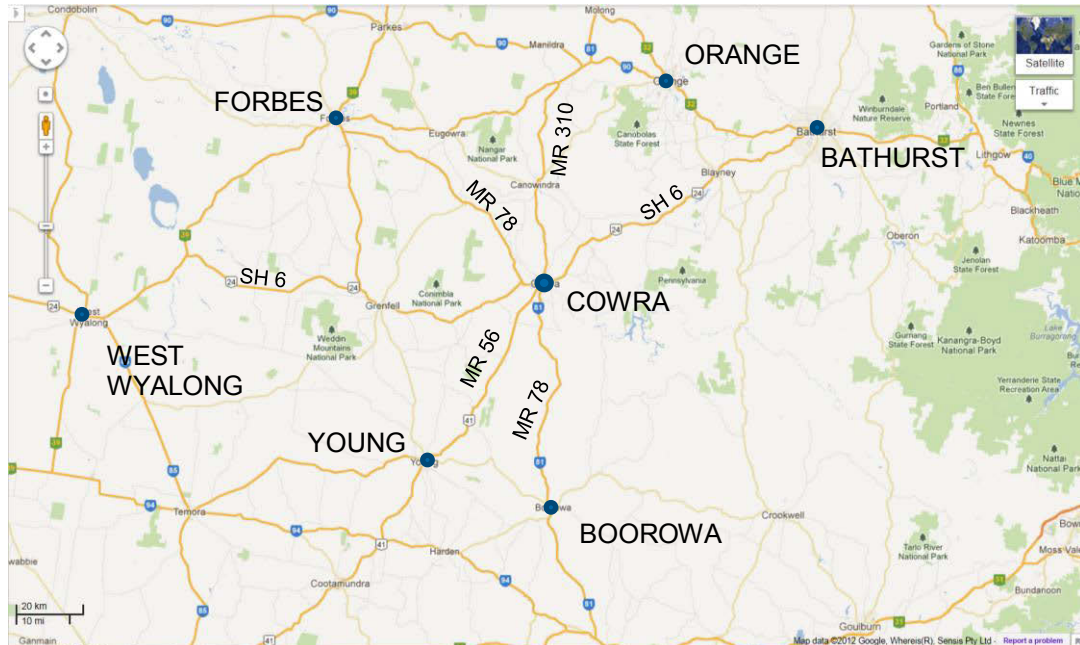
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Appendix A - Origin destination survey results
Appendix B - Council traffic counts
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# 1. Introduction

## 1.1 Background

Cowra is a rural town in the Central West region of New South Wales. It has a population of around 10,000 people. It is situated on several major trucking routes, namely Mid-Western Highway (SH 6), Lachlan Valley Way (MR 56), Olympic Way (MR 78) and Canowindra Road (MR 310).



**Figure 1 Locality map**

The Mid-Western Highway connects Cowra to Grenfell and West Wyalong in the west and Blayney and Bathurst in the east. Lachlan Valley Way (Boorowa Road) links to Forbes in the northwest and to Boorowa in the south. Olympic Way (Young Road) connects Cowra with Young, Cootamundra, Wagga Wagga and Albury to the south. Canowindra Road provides a link to Orange via Canowindra.

Currently heavy vehicles use the State Highways and Main Roads to travel through Cowra. The number and size of heavy vehicles adversely impact the amenity of the CBD precinct, exposing road users to the risk of injury and adding to congestion and delays on CBD streets.

The Cowra Shire Land-use Strategy (2009) was prepared as part of Cowra's Local Environmental Plan and proposed several options for routes to bypass the CBD.

## 1.2 Purpose of this report

This report has been prepared for Cowra Shire Council and presents the methodology used to identify and evaluate a range of alternative routes for heavy vehicle traffic passing through Cowra.

The purpose of this study is to identify an alternative route or routes for heavy vehicles that use Kendal Street to travel through Cowra.

This study has evaluated the route options that were documented in the Cowra Shire Land-use Strategy as well as additional route options developed during the study.

### 1.3 Scope and limitations

The scope of work is set out in the client Request for Quotation and in GHD's Fee Proposal. Agreed extensions to the scope of work included:

- Intersection traffic surveys on Grenfell Road
- Additional meetings in Cowra with Councillors
- Additional community consultation sessions at Cowra show.

The initial requirement to review and evaluate the options identified in the Cowra Shire Land Use Strategy was extended to consider a broader range of route options developed by the community and stakeholders.

### 1.4 Disclaimer

*This report: has been prepared by GHD for Cowra Shire Council and may only be used and relied on by Cowra Shire Council for the purpose agreed between GHD and the Cowra Shire Council as set out in Section 1.2 of this report.*

*GHD otherwise disclaims responsibility to any person other than Cowra Shire Council arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in 1.5 and throughout this report. GHD disclaims liability arising from any of the assumptions being incorrect.*

*GHD has prepared this report on the basis of information provided by Cowra Shire Council and others who provided information to GHD including Government authorities], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.*

*GHD has prepared the concept cost estimate set out in section 6.1.1 of this report ("Cost Estimate") using information reasonably available to the GHD employee(s) who prepared this report; and based on assumptions and judgments made by GHD.*

*The Cost Estimate has been prepared for the purpose of the benefit cost analysis and must not be used for any other purpose.*

*The Cost Estimate is a preliminary estimate only. Actual prices, costs and other variables may be different to those used to prepare the Cost Estimate and may change. Unless as otherwise specified in this report, no detailed quotation has been obtained for actions identified in this report. GHD does not represent, warrant or guarantee that the project can or will be undertaken at a cost which is the same or less than the Cost Estimate.*

*Where estimates of potential costs are provided with an indicated level of confidence, notwithstanding the conservatism of the level of confidence selected as the planning level, there remains a chance that the cost will be greater than the planning estimate, and any funding would not be adequate. The confidence level considered to be most appropriate for planning purposes will vary depending on the conservatism of the user and the nature of the project. The user should therefore select appropriate confidence levels to suit their particular risk profile.*

## **1.5 Assumptions**

- The Origin Destination survey results represent the pattern of heavy vehicle traffic distribution on main roads in the study area.
- For the purpose of estimating vehicle travel time it is assumed that vehicles would not exceed the posted speed limit.
- A growth rate of 5% per annum for heavy vehicles over the 30 year evaluation period has been assumed for the purposes of the BCA.

## **1.6 Report structure**

The sections of the report are briefly summarised as follows:

- Section 2 Describes and reviews the data used in the study
- Section 3 Summarises the community and stakeholder consultation processes and feedback
- Section 4 Describes the route options and presents the results of the multi criteria analysis
- Section 5 Presents the results of the traffic analysis
- Section 6 Presents the benefit cost analysis of the options
- Section 7 Reviews the submissions from the Public Exhibition.
- Section 8 Conclusions
- Section 9 Recommendations



## 2. Data collection

### 2.1 Traffic surveys

#### 2.1.1 Origin destination survey

An Origin Destination (OD) survey was undertaken on Wednesday 8<sup>th</sup> August 2012 between 06:00 and 18:00. The purpose of the survey was to identify the origins and destinations of heavy vehicle traffic passing through Cowra. OD counting stations were located as shown on Figure 2.



**Figure 2 Origin destination survey station locations**

Source: Google Maps

For the purpose of the OD Survey, a 100% sample of heavy vehicles was captured. The heavy vehicle types were classified into Austroads Class 5 vehicles and below and Class 6 and above. The results of the OD survey are summarised in Table 1 showing the distribution of heavy vehicles on the main roads in the study area and detailed in Appendix A.

**Table 1 Percentage distribution of heavy vehicles**

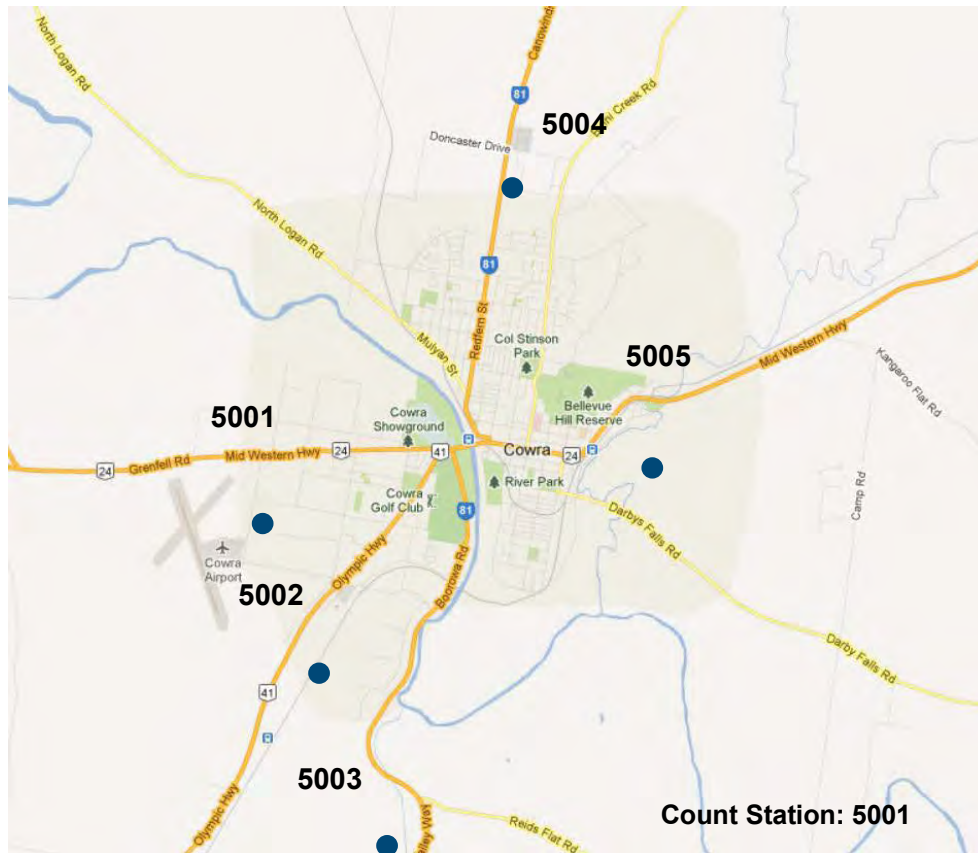
Inbound	1EB	2NB	3WB	4SB	5SB
1WB	0%	2%	31%	62%	5%
2SB	0%	14%	39%	36%	11%
3EB	38%	13%	13%	10%	25%
4NB	64%	20%	14%	0%	2%
5NB	20%	28%	28%	13%	13%

Source: OD survey results

### 2.1.2 Council traffic count

Cowra Shire Council undertook a program of traffic counts at five locations within the study area to provide recent comprehensive data for use in the study.

The traffic counts locations are shown on Figure 3.



**Figure 3 Traffic count locations**

The traffic count data was collected at each of the five stations from 16<sup>th</sup> May to 1<sup>st</sup> July 2012. Additional counts were conducted at sites 5001 and 5005 from 16<sup>th</sup> to 27<sup>th</sup> November 2012. Traffic data was collected for the following three groups of vehicle types:

- Cars
- Light trucks (Austroads Class 3 to 5)
- Heavy vehicles (Austroads Class 6 and above)

The data for heavy vehicles is summarised in Table 2. The detailed counts are included in Appendix B.

**Table 2 Traffic count data**

Station No.	Heavy Vehicles (daily average)	Survey period
5001	365	16 Nov 2012 – 27 Nov 2012
5002	149	16 May 2012 – 23 July 2012
5003	201	16 May 2012 – 16 July 2012
5004	201	16 May 2012 – 16 July 2012
5005	511	16 Nov 2012 – 27 Nov 2012

Source: Cowra Shire Council

Note: Heavy vehicles are Austroads Class 3 and above

### 2.1.3 RMS traffic counts

Traffic count data was available from the RMS website for Mid Western Highway at Count Station 93.103 at Cowra. AADT data (in vehicles) for the period from 1996 to 2005 are summarised in Table 3 to provide a basis for estimating the historical traffic growth rate.

**Table 3 Historical traffic growth on Mid Western Highway**

Year	1996	1999	2002	2005
AADT (vehicles)	2494	2570	2722	2788

Source: RMS website and CSC traffic counts

The resultant trend growth rate on Mid Western Highway is 1.3% per annum.

### 2.1.4 Intersection counts

Traffic counts were undertaken at the intersection of Grenfell Road and Young Road and at the intersection of Grenfell Road and Boorowa Road. The counts were conducted between 07:00 and 10:00 and between 15:30 and 18:30 on Tuesday 14<sup>th</sup> August 2012 by Skyhigh Traffic Survey Company. The counts identified the number of light and heavy vehicles as well as the number of pedestrians crossing in the vicinity of the intersections. The results of the intersection counts are included in Appendix C.

## 2.2 Crash data

Crash data for was provided by Cowra Shire Council for the years 2005 to 2009. The data was analysed to determine the truck crash rate per year on Kendal Street. The detailed crash data is included in Appendix D.

### 3. Community consultation

Community and stakeholder consultation was undertaken between August and September 2012 to encourage broad participation in the study. The aim of the community consultation was to provide opportunities for the community to express their opinions about possible route options under consideration and to suggest other options.

Key stakeholders who were identified as having an interest in this project are:

- Residents directly impacted by the proposed routes
- Businesses with economic interest in the heavy vehicles that currently pass through the town.
- Commercial establishments on the proposed and the existing route
- The general community impacted through changes to traffic movement in the town
- Service providers and service users of community facilities impacted.

Initially the consultation programme was focussed on assessing the four options developed during the Land-Use Strategy study. However, after discussion with Council it was agreed that the study should not be constrained to these options and that key stakeholders and the community should be given the opportunity to suggest other potential options for consideration. As a result, the consultation program was broadened to increase the level of response and allow other options to be considered.

There was a high level of community response to the consultation process with 176 feedback forms received. Option 3 was the most popular route option, with around 65% either selecting it as their preferred option (91 respondents) or suggesting elements of Option 3 as part of an alternate route (23 respondents). The most popular alternate route suggested was a combination of Option 3 and Option 2. There was a relatively high level of opposition to Option 1 due to safety concerns such as the proximity of the route to the local school.

Analysis of community feedback indicated a relatively high level of support for a heavy vehicle bypass due to the expected positive pedestrian, traffic and community impacts. The key concerns raised about a heavy vehicle bypass included the potential impact of a bypass on residential areas and traffic and pedestrian safety risks.

The full community consultation report is included in Appendix E.

## 4. Multi criteria analysis

### 4.1 Introduction

This section provides an analysis of the route options developed during the course of the study. It includes the four options proposed in the Cowra Shire Land-use Strategy and the additional options identified through the community consultation process and developed by the study team. Each of the options is described and ranked based on a weighted scoring method.

### 4.2 Route options

#### 4.2.1 Cowra Shire Land-use Strategy

The Cowra Shire Land-use Strategy identified four possible routes for a bypass of Cowra CBD. They are shown in Appendix F and described below:

##### Option 1

The Vaux Street / Brougham Street Link Road was identified as a short term solution to provide low cost solution to address the traffic related problems experienced in the Cowra CBD.

##### Option 2

The Northern Ring Road option proposed a comprehensive solution to remove heavy vehicle bypass. It proposed a long term strategy that linked industrial areas and surrounding regional destinations.

##### Option 3

The Southern Ring Road aimed to reduce heavy vehicle traffic passing through Cowra by providing a route linking Mid Western Highway at Campbell Street, skirting to the south of the railway and connecting to Grenfell Road via Airport Road.

##### Option 4

The Showground Link Road is not effective in removing traffic from the CBD. Minor advantages may be derived from improved transport linkages between southern and northern parts of the Cowra Township.

#### 4.2.2 Additional options

The additional routes identified during the community and stakeholder consultation and developed in the study are shown in Appendix G and described below. Options 5, 6 and 7 were suggested during the community consultation session and Options A, B and C were developed during the stakeholder consultation sessions.

##### Option 5

Option 5 is a development of Option 3 and extends the route along Airport Road to connect with Grenfell Road.

##### Option 6

Option 6 proposes a short link road connecting Canowindra Road with Grenfell Road via a new river crossing. The proposal would provide an alternative route for traffic that currently uses the Lachlan Street traffic signals. This option would not be effective in reducing traffic on Kendal Street.

### Option 7

Option 7 proposes a route along Campbell Street and the disused railway corridor and connecting to Boorowa Road. This option does not provide a long term solution and passes through a residential area.

### Option A

This option combines elements of Option 2 and Option 3 and connects the north-south and east-west main roads.

### Option B

Option B is similar to Option 3 but does not extend to the west of Young Road. It proposes the use of Young Road and Williams Street to connect to Grenfell Road. This option may be considered as a staged development of Option 3.

### Option C

This option is the same as Option 7.

Following a review of the ten options, 3 and 5 were merged as option 3/5 and 7 and C were merged as option 7/C.

**Table 4 Summary of options**

Land Use Strategy	Community	Stakeholders	Combined
Option 1			Option 1
Option 2			
Option 3	Option 5		Option 3/5
Option 4			
	Option 6		
	Option 7	Option C	Option 7/C
		Option B	Option B
		Option A	Option A

## 4.3 Options ranking

The options identified in the study were evaluated against a set of criteria prepared by the study team. Each criterion was allocated a weighting by Council, representing the relative implications of each option. The agreed criteria and weightings are listed in Table 5.



**Table 5 Selection criteria**

Criteria	Weighting
Effectiveness in diverting unnecessary heavy vehicle traffic away from CBD	30
Effectiveness in reducing impact on residential amenity (noise, vibration, visual, odour, access, safety)	15
Effectiveness in addressing the long term transport needs of Cowra	20
Effectiveness in serving industrial and commercial areas as identified in the LEP	10
Potential to service a rail/road/air transport hub	15
Effectiveness in enhancing regional connectivity	10

Each option was scored against the criteria with a score of 5 indicating an option that fully meets a criteria and a score of 1 indicating that an option does not satisfy the criteria.

Table 7 gives the results of the options evaluations and ranking based on the raw scores.

**Table 6 Unweighted score and ranking**

Criteria	1	2	3/5	4	6	7/C	A	B
Effectiveness in diverting unnecessary heavy vehicle traffic away from CBD	1	1	4	2	2	4	4	3
Effectiveness in reducing impact on residential amenity (noise, vibration, visual, odour, access, safety)	1	4	4	3	2	3	4	3
Effectiveness in addressing the long term transport needs of Cowra	1	3	3	2	2	1	4	3
Effectiveness in serving industrial and commercial areas as identified in the LEP	1	4	4	2	2	1	4	3
Potential to service a rail/road/air transport hub	1	4	4	2	1	1	4	4
Effectiveness in enhancing regional connectivity	1	4	3	2	2	1	4	4
Total Score	6	20	22	13	11	11	24	20
<b>Unweighted Order</b>	<b>8</b>	<b>4</b>	<b>2</b>	<b>5</b>	<b>7</b>	<b>6</b>	<b>1</b>	<b>3</b>

Table 8 presents the results of the options evaluation and ranking based on the weighted scores.

**Table 7 Weighted score and ranking**

Criteria	1	2	3/5	4	6	7/C	A	B
Effectiveness in diverting unnecessary heavy vehicle traffic away from CBD	30	30	120	60	60	120	120	90
Effectiveness in reducing impact on residential amenity (noise, vibration, visual, odour, access, safety)	15	60	60	45	30	45	60	45
Effectiveness in addressing the long term transport needs of Cowra	20	60	60	40	40	20	80	60
Effectiveness in serving industrial and commercial areas as identified in the LEP	10	40	40	20	20	10	40	30
Potential to service a rail/road/air transport hub	15	60	60	30	15	15	60	60
Effectiveness in enhancing regional connectivity	10	40	30	20	20	10	40	40
Total Score	100	290	370	215	185	220	400	325
<b>Weighted Order</b>	<b>8</b>	<b>4</b>	<b>2</b>	<b>6</b>	<b>7</b>	<b>5</b>	<b>1</b>	<b>3</b>

#### 4.4 Option shortlisting

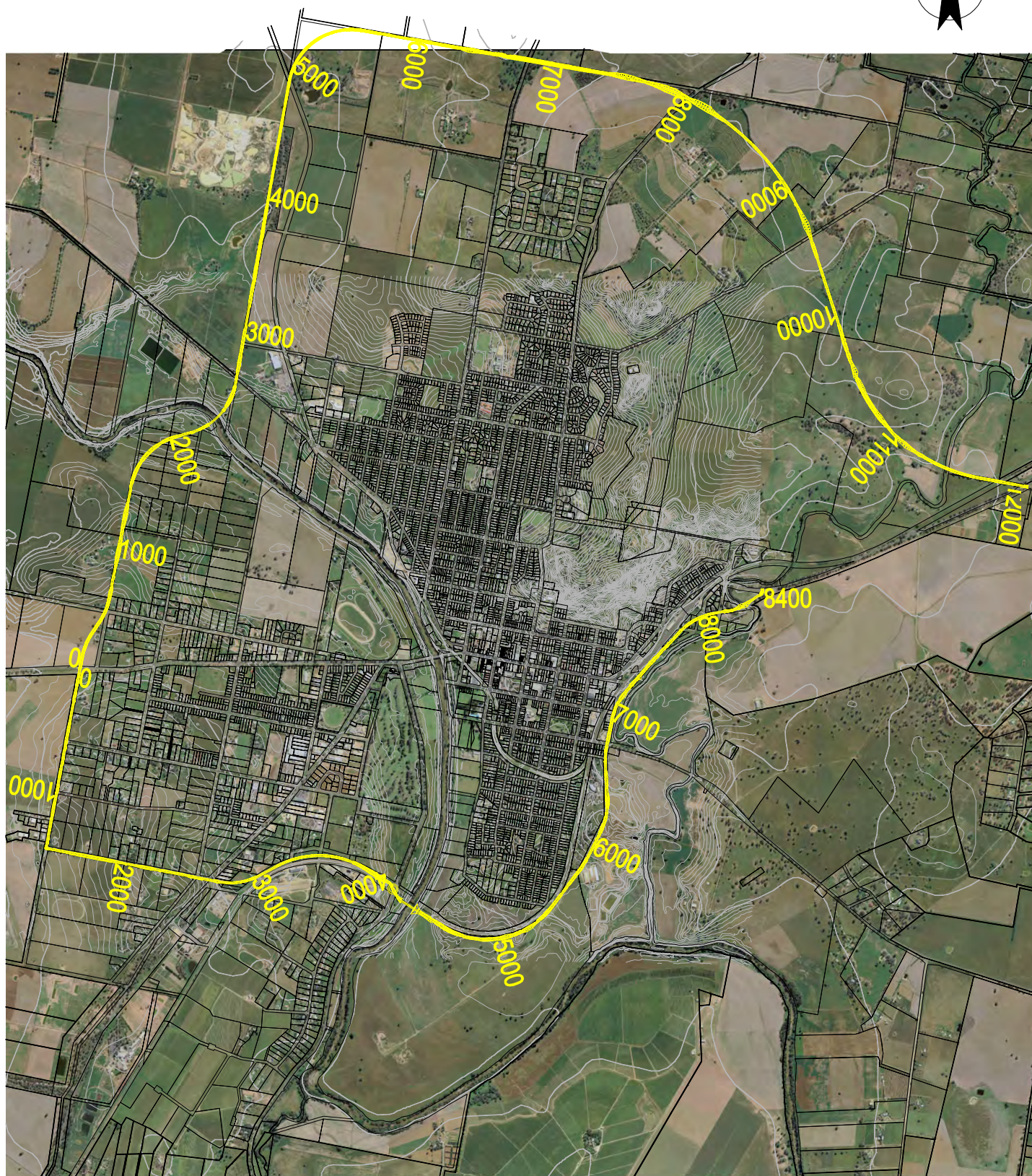
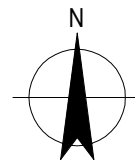
The ranked options were further reviewed to identify those options to be carried forward for more detailed analysis.

In consultation with Council, several of the lower ranked options were removed from further consideration in the project. In view of the similarity of Options 2 and A, Council advised that Option A be modified to extend eastwards from Canowindra Road to Mid Western Highway and that the section south of Boundary Road be deleted. Option 2 was to be removed from further consideration in the study. The options to be carried forward to the BCA were:

- Option A (amended)
- Option B
- Option 3

These options are illustrated in Figure 4 to Figure 6 on the following page.





0 400 800 1200m  
SCALE 1:40,000 AT ORIGINAL SIZE



COWRA SHIRE COUNCIL  
COWRA HEAVY VEHICLE  
BYPASS STUDY  
OPTION A

Job Number | 23-16385  
Revision | A  
Date | NOV 2012

Figure 04

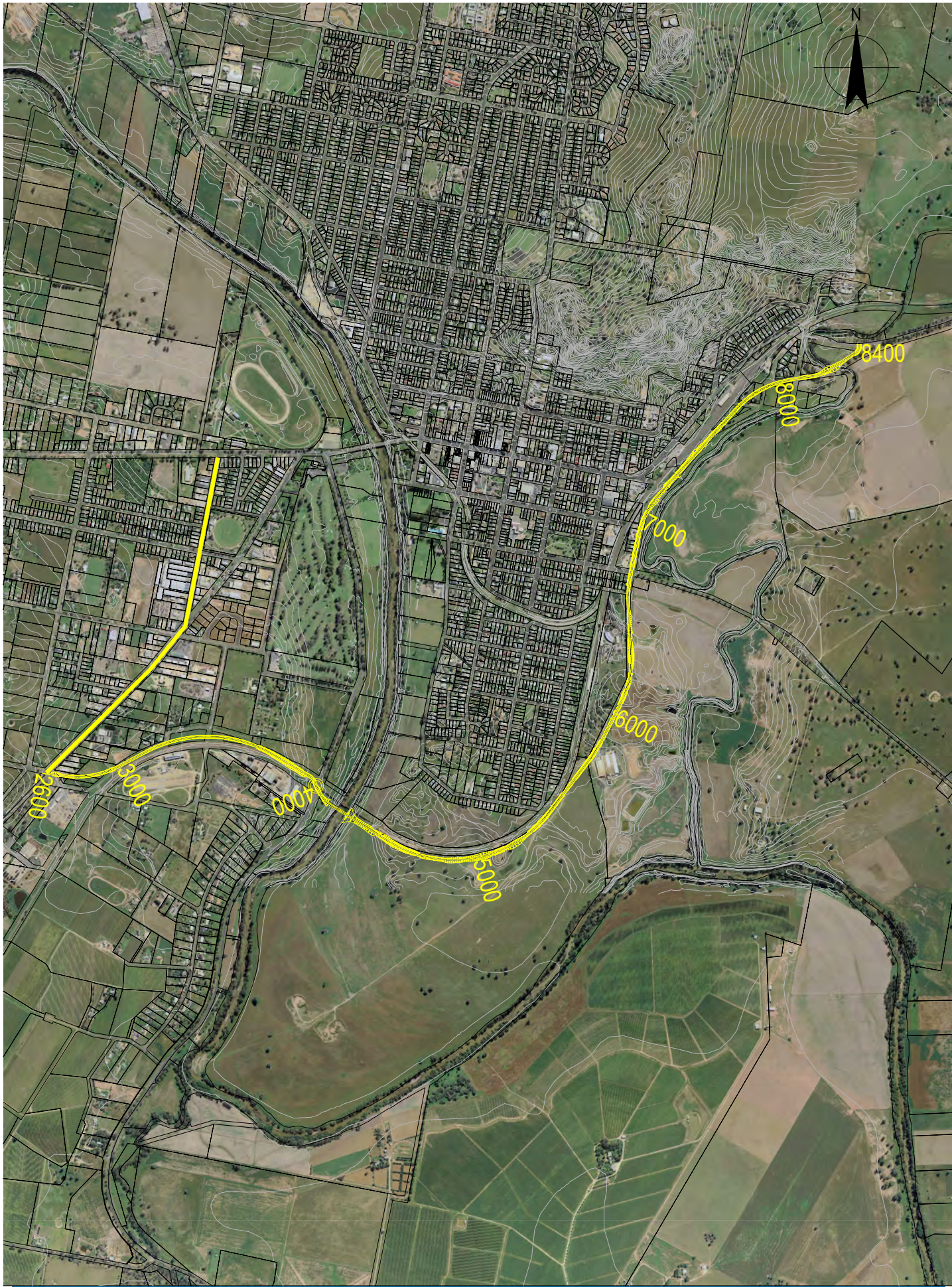
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Plot Date: 3 December 2012 - 3:12 PM

Plotted by: Karli Hoare

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SCALE 1:25,000 AT ORIGINAL SIZE

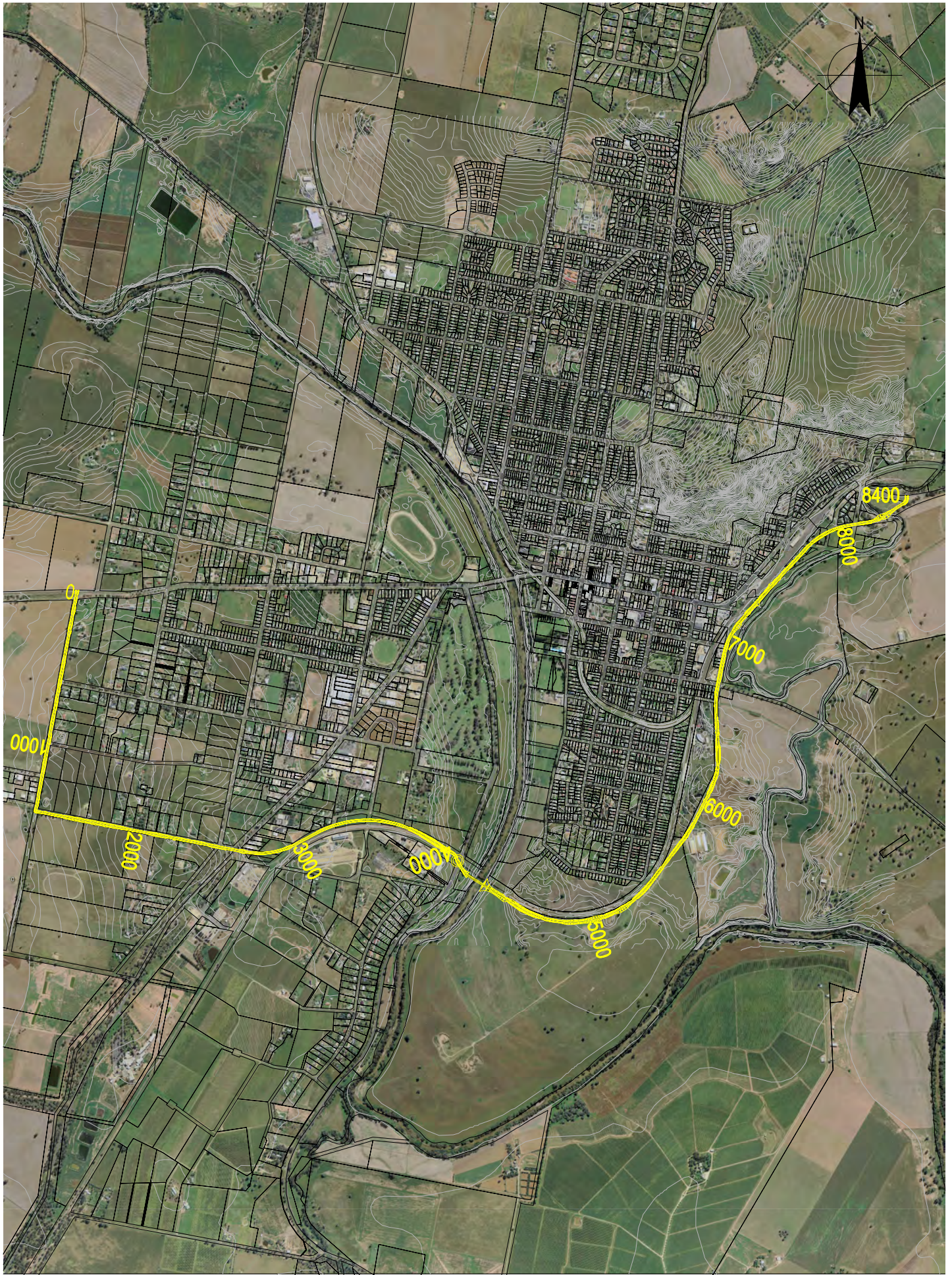


COWRA SHIRE COUNCIL  
COWRA HEAVY VEHICLE  
BYPASS STUDY  
OPTION B

Job Number 23-16385  
Revision A  
Date NOV 2012

Figure 05





0 300 600 900m  
SCALE 1:30,000 AT ORIGINAL SIZE



COWRA SHIRE COUNCIL  
COWRA HEAVY VEHICLE  
BYPASS STUDY  
OPTION 3

Job Number | 23-16385  
Revision | A  
Date | NOV 2012

**Figure 06**

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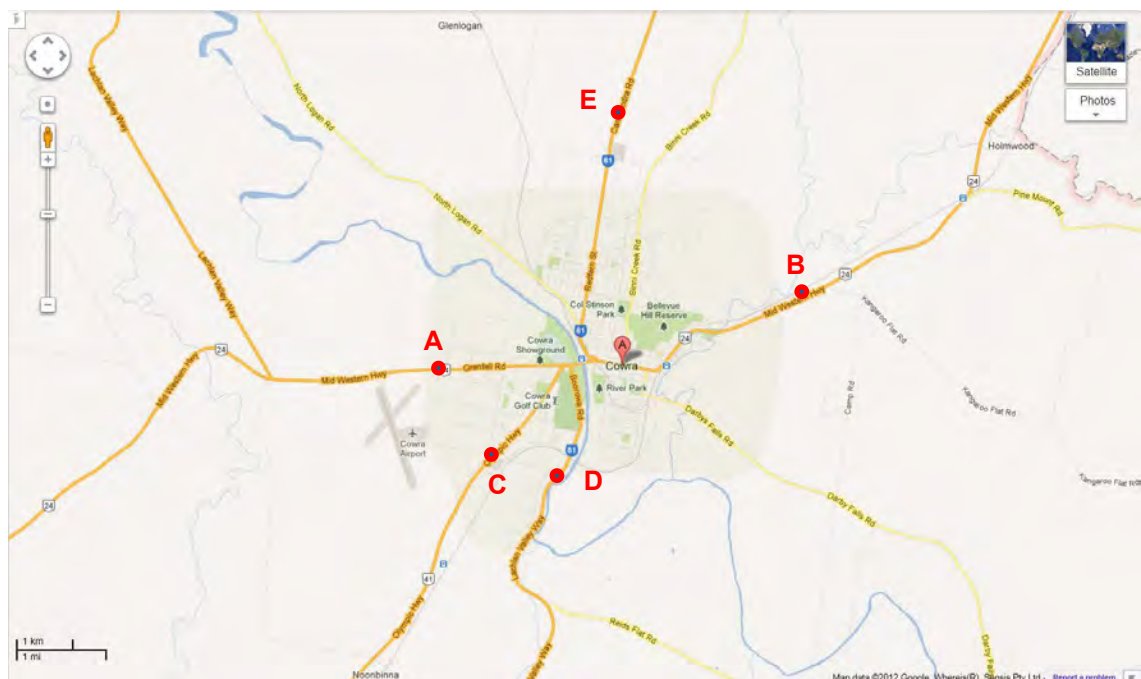
## 5. Traffic analysis

### 5.1 Travel time assessment

#### 5.1.1 Existing travel time

Existing travel times were estimated along the main roads in the study area. The 'vehicle following' method was used to estimate the travel time along Grenfell Road/Kendal Street/Mid Western Highway due to the variability of travel speeds affected by traffic lights, pedestrian crossing and vehicles parking. Travel time estimates on the other main roads were based on posted speed limits and distances measured for each section. Allowance was made for average delays at intersections.

The reference points for the extents of the sections of roads surveyed are shown on Figure 7.



Source: Google Maps

**Figure 7 Travel time reference points**

The reference points used for the travel time estimates were:

- Location A: The intersection of Grenfell Road and Airport Road;
- Location B: Mid Western highway approximately 100 metres south of Kangaroo Flat Road
- Location C: The intersection of Young Road and Boundary Road
- Location D: Boorowa Road at the railway bridge
- Location E: Canowindra Road approximately 500 metres north of Doncaster Drive;

The estimated travel times for heavy vehicles based on this survey are presented in Table 8.



**Table 8 Existing travel times**

Trip	Trip description	Mins
A – B	Grenfell Road – Kendal Street – Mid Western Highway	8.70
C – B	Young Road – Kendal Street – Mid Western Highway	8.30
D – B	Boorowa Road – Kendal Street – Mid Western Highway	8.50
E – B	Canowindra Road – Kendal Street – Mid Western Highway	10.70

### 5.1.2 Travel time for route options

Journey times were estimated for vehicles that would travel between the various reference points via each of the three shortlisted options. The journey time estimates were based on the estimated travel speeds and distances along sections of each route. The estimated travel times are summarised in Table 9.

**Table 9 Change in travel time for options**

Trip Section	Base travel times (mins)	Option A (mins)	Option B (mins)	Option 3 (mins)
A – B	8.70	8.72	9.75	8.72
C – B	8.30	5.84	5.44	5.84
D – B	8.50	4.91	4.91	4.91
E – B	10.70	3.80	n/a	n/a

*n/a no link proposed in this option*

The base case travel times for traffic travelling through Cowra along Kendal Street are similar to the estimated travel times on alternative routes A and 3. Travel times offered by bypass routes between C and B, D and B and E and B are substantially lower than base case travel times via Kendal Street.

As travel times are estimated to be generally lower on all bypass options compared to the base case, it is expected that each of the options would have the potential to attract heavy vehicle traffic from Kendal Street. For the purpose of this study it is assumed that all heavy vehicles would divert to the bypass route in each option.

### 5.1.3 Estimation of vehicle-hours travelled

The vehicle-hours travelled per day were estimated for each route option by multiplying the estimated travel time for each section of road by the daily traffic volume estimated to use the road. The estimated vehicle-hours travelled in the base case and for the route options are summarised in Table 10 .

**Table 10 Base case and route options travel in vehicle-hours (2014)**

Trip Section	Base (veh-hrs/day)	Option A (veh-hrs/day)	Option B (veh-hrs/day)	Option 3 (veh-hrs/day)
A – B	49.3	49.7	56.4	49.7
C – B	65.5	44.5	44.5	44.5
D - B	10.6	6.1	6.1	6.1
E - B	2.3	0.8	-	2.3
<b>Total</b>	<b>127.7</b>	<b>101.1</b>	<b>107.0</b>	<b>102.6</b>

*Note travel time values include travel in both directions for each section*

## 5.2 Vehicle kilometres travelled

Vehicle Kilometres Travelled (VKT) is the product of the traffic volume and travelled length for each section of road. VKT is used to estimate the vehicle operating cost in the BCA.

### 5.2.1 Estimation of VKT

Table 11 presents the results of the analysis to estimate VKT for existing main roads in the study area. The VKT was estimated between the reference points shown on Figure 7 above.

**Table 11 Existing VKT for main roads**

Trip	Trip Description	VKT/ day
A – B	Grenfell Road – Kendal Street – Mid Western Highway	2483
C – B	Young Road – Kendal Street – Mid Western Highway	3363
D - B	Boorowa Road – Kendal Street – Mid Western Highway	501
E - B	Canowindra Road – Kendal Street – Mid Western Highway	110

The VKT was estimated for each of the route options by considering the traffic volume and distance travelled for each of the affected roads. The estimated VKT on existing roads and on route options are summarised in Table 12

**Table 12 Base case and route options travel in vehicle-hours (2014)**

Trip	Existing (VKT/day)	Option A (VKT/day)	Option B (VKT/day)	Option 3 (VKT/day)
A – B	2483	2976	3168	2976
C – B	3363	3482	3482	3482
D - B	501	504	504	504
E - B	110	93	110	110
<b>Total</b>	<b>6457</b>	<b>7055</b>	<b>7624</b>	<b>7072</b>

The results in Table 12 show that due to the longer distances travelled, all of the three options would result in an increase in VKT compared to existing.

### 5.3 Road crashes

Crash data for was provided by Cowra Shire Council for the years 2005 to 2009. The data was analysed to determine the historical truck crash rate per year on Kendal Street. The results of the analysis are summarised by crash severity in Table 13.

**Table 13 Kendal Street crashes by severity**

Crash severity	2005	2006	2007	2008	2009	Average truck crash rate (per year)
Property only	2		2	2	1	1.4
Injury		1			1	0.4

*Note: there were no fatalities recorded for Kendal Street during the 5 year period*

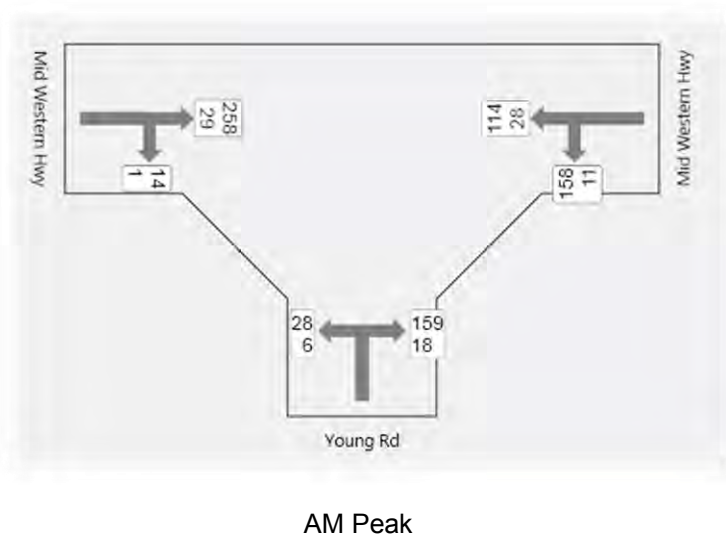
The analysis results also showed that most of the crashes reported were typical of urban crashes as follows:

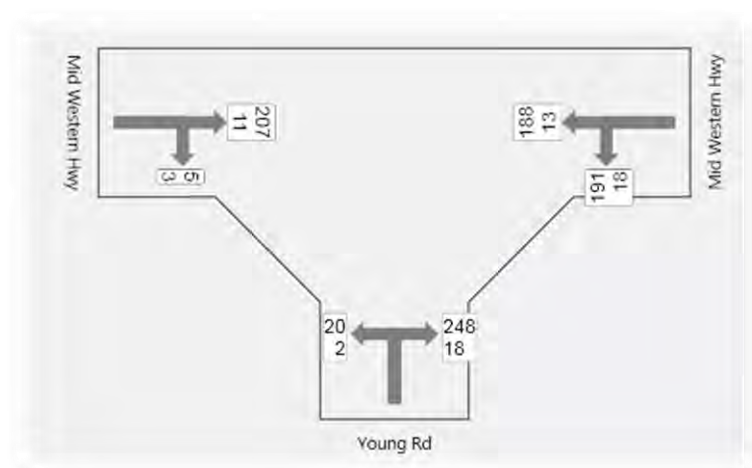
- 1 'opposed direction, right-through'
- 6 'same direction, rear-end'
- 1 'opposed direction, head-on'
- 1 'right angle'

### 5.4 Grenfell Road intersections

#### 5.4.1 Existing conditions

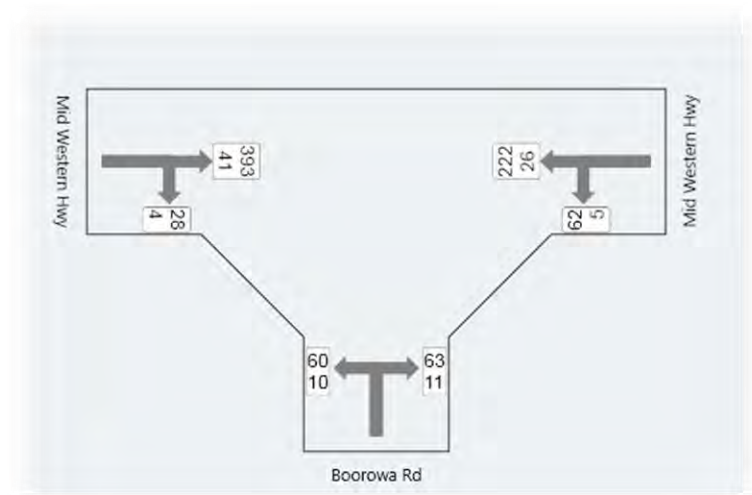
The intersections of Young Road and Boorowa Road with Grenfell Road are separated by approximately 100 metres. A requirement of the study was to assess the existing performance of these intersections. The results of the peak hour traffic surveys are provided in Appendix C and summarised in Figure 8 and Figure 9 . The diagrams show light vehicle and heavy vehicle traffic volumes separately for each intersection movement.



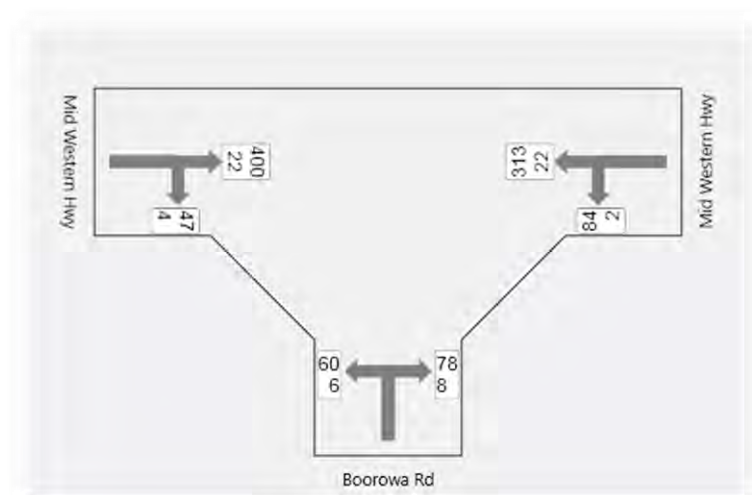


PM Peak

**Figure 8 Grenfell Road/Young Road peak hour counts**



AM Peak



PM Peak

**Figure 9 Grenfell Road/Boorowa Road peak hour counts**

The intersection turn volumes were analysed using SIDRA 5.1. The results of the SIDRA analyses are summarised in Table 14 to Table 17 showing Level of Service (LoS), Average

Delay and Degree of Saturation (DoS). The SIDRA Movement Summary Reports in Appendix H provide details of the SIDRA results.

**Table 14 Existing AM Performance Results - Grenfell Road/Young Road**

Approach	Movement	Level of Service	Ave Delay (seconds)	Degree of Saturation	95 <sup>th</sup> Percentile Queue	
					(veh)	(m)
Young Road	L	A	9.7	0.046	0.2	1.30
	R	A	13.1	0.336	1.7	13.0
Grenfell Road (east)	L	A	8.4	0.100	0.0	0.0
	T	A	0.0	0.086	0.0	0.0
Grenfell Road (west)	T	A	0.0	0.165	0.0	0.0
	R	A	9.8	0.016	0.1	0.4

**Table 15 Existing PM performance results - Grenfell Road/Young Road**

Approach	Movement	Level of Service	Ave Delay (seconds)	Degree of Saturation	95 <sup>th</sup> Percentile Queue	
					(veh)	(m)
Young Road	L	A	9.6	0.029	0.1	0.8
	R	B	16.5	0.532	3.9	29.2
Grenfell Road (east)	L	A	8.5	0.126	0.0	0.0
	T	A	0.0	0.113	0.0	0.0
Grenfell Road (west)	T	A	0.0	0.122	0.0	0.0
	R	A	13.0	0.014	0.1	0.5

**Table 16 Existing AM performance results - Grenfell Road/Boorowa Road**

Approach	Movement	Level of Service	Ave Delay (seconds)	Degree of Saturation	95 <sup>th</sup> Percentile Queue	
					(veh)	(m)
Boorowa Road	L	A	10.9	0.098	0.4	2.8
	R	C	34.8	0.428	1.8	14.2
Grenfell Road (east)	L	A	8.5	0.183	0.0	0.0
	T	A	0.0	0.183	0.0	0.0
Grenfell Road (west)	T	A	0.0	0.249	0.0	0.0
	R	A	10.3	0.037	0.1	1.1

**Table 17 Existing PM performance results - Grenfell Road/Boorowa Road**

Approach	Movement	Level of Service	Ave Delay (seconds)	Degree of Saturation	95 <sup>th</sup> Percentile Queue	
					(veh)	(m)
Boorowa Road	L	A	11.3	0.098	0.3	2.6
	R	C	38.2	0.512	2.3	17.0
Grenfell Road (east)	L	A	8.3	0.238	0.0	0.0
	T	A	0.0	0.238	0.0	0.0
Grenfell Road (west)	T	A	0.0	0.236	0.0	0.0
	R	A	10.7	0.063	0.2	1.8

**Level of service definition**

The descriptions for each level of service are provided below in Table 18.

**Table 18 Description of level of service**

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	<14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity; requires other control mode

Source: RTA Guide to Traffic Generating Developments

From the analysis results, all movements operate at LoS C or better during the peak periods.

**5.4.2 Improvement options for Grenfell Road/Boorowa Road**

The existing AM and PM peak hour volumes were modelled for a roundabout and traffic signals using SIDRA. The SIDRA Performance Index (PI) is a measure that combines several other performance statistics from the analysis results, and therefore can be used as a basis for choosing between various design options (the best design is the one which gives the smallest value of PI). Table 19 compares the PI of the roundabout and traffic signals against the PI of the existing give way arrangement.



**Table 19 Comparative performance at Grenfell Road/Boorowa Road**

Case	Performance Index	
	AM	PM
Existing	13.2	16.7
Roundabout	15.3	19.0
Traffic Signals	32.1	38.7

The existing arrangement has the best Performance Index as it causes least delays to the high volume of traffic using Grenfell Road. However the roundabout effectively addresses the existing poor level of service on the Boorowa Road approach without substantially delaying traffic on Grenfell Road. Traffic signals would marginally improve traffic conditions for Boorowa Road traffic but would substantially increase delays for traffic on the Mid Western Highway.

#### **5.4.3 Context for route bypass options**

The construction of a bypass that removes heavy vehicles from the Mid Western Highway would tend to reduce delays for Boorowa Road traffic entering the highway. On the other hand, bypass options that may encourage more traffic to turn into Boorowa Road from Grenfell Road (west) may add to the delays experienced by traffic entering the Mid Western Highway from Boorowa Road.

The construction of a roundabout would address the existing traffic delays in Boorowa Road and would also manage any increase in traffic that may use the intersection following the provision of a bypass route.

## 6. Benefit cost analysis

### 6.1 Costs

#### 6.1.1 Capital costs

The cost of new road construction was estimated by applying typical rates for the construction tasks to develop a cost rate per kilometre for a single carriageway two lane rural road. The cost of widening existing roads was based on construction cost rates provide by Council. Table 20 summaries the lengths of new and upgraded roads for each option.

**Table 20 New and upgraded roads**

Construction Type	Option A	Option B	Option 3
New Road	15.5 km	5.7 km	5.7 km
Road upgrading/widening	2.6 km	-	2.6 km

*Note: No upgraded roads in Option B*

A typical road cross section was adopted comprising two 3.5 metre wide lanes and 2.5 metre wide shoulders for an overall road formation width of 12 metres.

The road construction cost estimates for the three options are based on the following assumptions:

- Pavement
  - 2 coat 10/14 seal
  - 300mm base course
  - 300mm sub base course
  - 300mm select material
- Average height of cut/fill one metre
- Road bridge width 10 metres
- Bridge over rivers to be 'Mid-Level' design
- Property acquisition costs included

The project cost estimates include design, property acquisition, project management, construction and contingencies are summarised in Table 21. It should be noted that contingency sums have been excluded from the BCA.

**Table 21 Construction cost summary**

Cost element	Option A	Option B	Option 3
New Roads	\$32,965,918	\$12,069,606	\$12,069,606
New Bridges	\$10,500,000	\$5,400,000	\$5,400,000
Road Widening	\$520,000	-	\$520,000
Property Acquisition (agricultural)	\$67,560	-	-
Property Acquisition (industrial)	3,780,000	\$2,772,000	\$2,772,000
Total	\$47,833,478	\$20,241,606	\$20,761,606

Details of the capital cost estimate for each option are provided in Appendix I.

### 6.1.2 Maintenance costs

CSC provided an estimate of recurrent maintenance costs to apply to new roads over the 30 year evaluation period. These costs are set out in Table 22.

**Table 22 Recurrent maintenance costs**

Year	Total cost (\$/year)
Years 1 to 15	\$2900/km
Years 16 to 30	\$2900/km

Source: Cowra Shire Council

## 6.2 Benefits

The benefits that have been monetised for existing and diverted heavy goods vehicles for the base case and project case scenarios are as follows:

- Travel time saving benefits;
- Vehicle operating cost savings; and
- Reduction in crash rates.

No separate allowance is made for externality benefits such as air quality emissions and noise impacts.

The historic traffic growth rate on Mid Western Highway was estimated to be 1.3% over the period from 1996 to 2012 (refer Section 2.1.3). Within this growth trend it is expected there will be a doubling of growth every 20 years for heavy vehicles, equivalent to an average annual growth rate of 5%. This is considered to be consistent with known national heavy road vehicle forecasts within Australia. A growth rate of 5% per annum for heavy vehicles over the 30 year evaluation period has been assumed for the purposes of this BCA.

### 6.2.1 Travel time

Table 23 provides an estimation of the change in travel time for each option compared to existing travel times, expressed as a function of current and projected traffic volumes.

**Table 23 Reduction in vehicle hours**

Route Option	Reduction in Travel Time (veh-hrs per day)	
	2014	2044
Option A	26.6	66.6
Option B	20.7	51.8
Option 3	25.1	62.8

The value of time has been valued based on Austroads 2012 which provides estimates of the value of time saved by vehicle class. The relevant value is presented in Table 24.

**Table 24 Travel time cost parameter**

Type of vehicle	Non-urban Travel Time \$/hr
B-double	29.02

Source: Table 16, Austroads 2012 (2012 prices)

### 6.2.2 Vehicle operating costs

The change in vehicle kilometres travelled (VKT) by heavy vehicles (due to the different route distance) will affect the vehicle operating costs. The change in vehicle operating cost is shown in Table 25 and the cost parameter used in the BCA is provided in Table 26.

**Table 25 Change in travel time**

Route Option	Change in VKT per day	
	2014	2044
Option A	-646	-1615
Option B	-808	-2019
Option 3	-615	-1657

Note negative values indicate an increase in VKT

**Table 26 Vehicle operating cost parameter**

Type of vehicle	\$/km
Heavy vehicles and trucks (including B-double)	0.263

Source: Table 2.6, Austroads 2012 (2012 prices)

### 6.2.1 Crash costs

As all three route options would provide a reduced travel time compared to the existing travel time along Kendal Street, heavy vehicles are expected to be attracted from Kendal Street resulting in a reduction in the reported truck related crashes. From Section 5.3 above, the average truck crash rate is 1.4 'property only' crashes and 0.4 'injury' crashes per year. For the purposes of the BCA it is assumed that each option would result in an estimated reduction of 1.4 'property only' crashes and 0.4 'injury' crashes in the first year.

Applying the value of crash costs on non-urban roads in NSW in Table 27, the estimated crash cost reduction for each option is given in Table 28.

**Table 27 Estimated average crash costs on non-urban roads in NSW**

	Fatal	Injury	Property damage
Crash costs	\$2,746,800	\$232,133	\$9,115

Source: Austroads Table 4.3 (converted to 2012 prices)

**Table 28 Estimated average crash costs on non-urban roads in NSW**

	2014	2044
All options	\$105,614	\$396,783

## 6.2.2 Summary

The cost savings due to changes in travel time, vehicle VKT, road crashes are summarised in Table 29. Details are provided in Appendix J.

**Table 29 Summary of benefits**

Item	Option A (\$)		Option B (\$)		Option 3 (\$)	
	2014	2044	2014	2044	2014	2044
Travel time cost savings	282,107	705,268	219,576	548,941	266,298	665,745
Vehicle Operating Cost Savings	-57,451	-143,627	-77,516	-193,791	-59,069	-159,040
Crashes Cost Savings	105,614	311,377	105,614	311,377	105,614	311,377
<b>Total</b>	<b>330,270</b>	<b>873,018</b>	<b>247,674</b>	<b>666,527</b>	<b>312,843</b>	<b>818,082</b>

## 6.3 BCA results

This section presents the results of the BCA for the project cases over the base case for the following options:

- **Option A: A high capital cost option which would provide a comprehensive bypass route of Cowra;**
- **Option 3: A lower capital cost option which would involve the construction of a section of new road and the upgrade of existing roads; and**
- **Option B: The construction of a portion of Option 3 and the connection to the existing road network at Young Road.**

The results of the BCA are summarised in Table 30. Details are included in Appendix K and include the results of sensitivity analysis for discount rates of 4% and 10%.

**Table 30 Results of BCA - 7% discount rate**

Route option	Net Present value	BCR
Route A	-\$30,158,000	0.17
Route B	-\$10,726,000	0.31
Route 3	-\$10,366,000	0.37

It is clear from the results of the BCA that Option A due to its greater length of new road and greater area of property acquisition is the least cost effective of the three options. Options B and 3 are each approximately one-third of the cost of Option A. Option 3 is marginally more cost effective than Option B.

In order to test the sensitivity of the BCA results to changes in VOC, it was assumed that the vehicle operating costs associated with the longer travel distances in each option are offset by the savings due to the reduction in wear and tear and stop start conditions on Kendal Street. The results of the sensitivity analysis are given in Table 31.

**Table 31 Results of Sensitivity to Changes in VOC - 7% discount rate**

Route option	Net Present value	BCR
Route A	-\$29,081,000	0.20
Route B	-\$9,271,000	0.41
Route 3	-\$9,211,000	0.44

## 7. Review of public submissions

A public exhibition of the Cowra Heavy Vehicle Bypass Study Draft Report and bypass options was undertaken by Council for a four-week period from 2 to 30 April 2013. Four options were displayed including the three identified shortlisted bypass options A, B and 3 as long-term alternatives, and an additional bypass option as a short-term alternative.

The Cowra community was encouraged to make submissions in response to the recommendations in the draft report and the additional short-term option. The feedback form noted that a long-term bypass option may not be implemented for at least 20 years on current estimates.

During the exhibition period, displays were open to the public both at Council Chambers and at Council's Kendal Street shopfront. The shopfront opening times were as follows:

- Tuesdays and Thursdays, 4 April to 23 April from 10am – 2pm
- Thursday, 11 April from 4 - 6pm
- Saturday, 20 April from 10am - 12pm

Notice of the public exhibition times was advertised each Friday in the Cowra Guardian, on Council's website and via a poster on the shopfront door.

Display materials included the Draft Report, poster size maps of each of the four options and a feedback form which attendees were encouraged to complete. Copies of the Draft Report and the feedback form were also available on Council's website.

328 people attended the shopfront display and a small number of people visited Council Chambers to enquire about the display.

186 individual submissions were received, including a petition from the Erambie Aboriginal community signed by 82 people. Over half of those who made submissions indicated they had not previously provided feedback during the community consultation undertaken in August and September 2012. 176 feedback forms were received in response to the first community consultation.

The preferred long term option was Option 3 with almost 34% of submissions supporting this option. This reflects the outcome of the initial community feedback and the results of the benefit cost analysis. Long-term Option A was supported by approximately 30% of submissions and Long-term Option B by less than 20% of submissions.

The majority of respondents (almost 70%) indicated they were happy to wait for a long-term option.

In contrast to this, 66% of respondents indicated that they did not support a short-term option to remove heavy vehicles from Kendal Street via the Canowindra Rail Corridor with 28% supporting a short-term option.

In conclusion, the majority of the Cowra community supports a long-term bypass option over a short-term option, and the preferred route is Option 3.

Comments from the submissions can be found in the feedback summary table in Appendix M



## 8. Conclusions and Recommendations

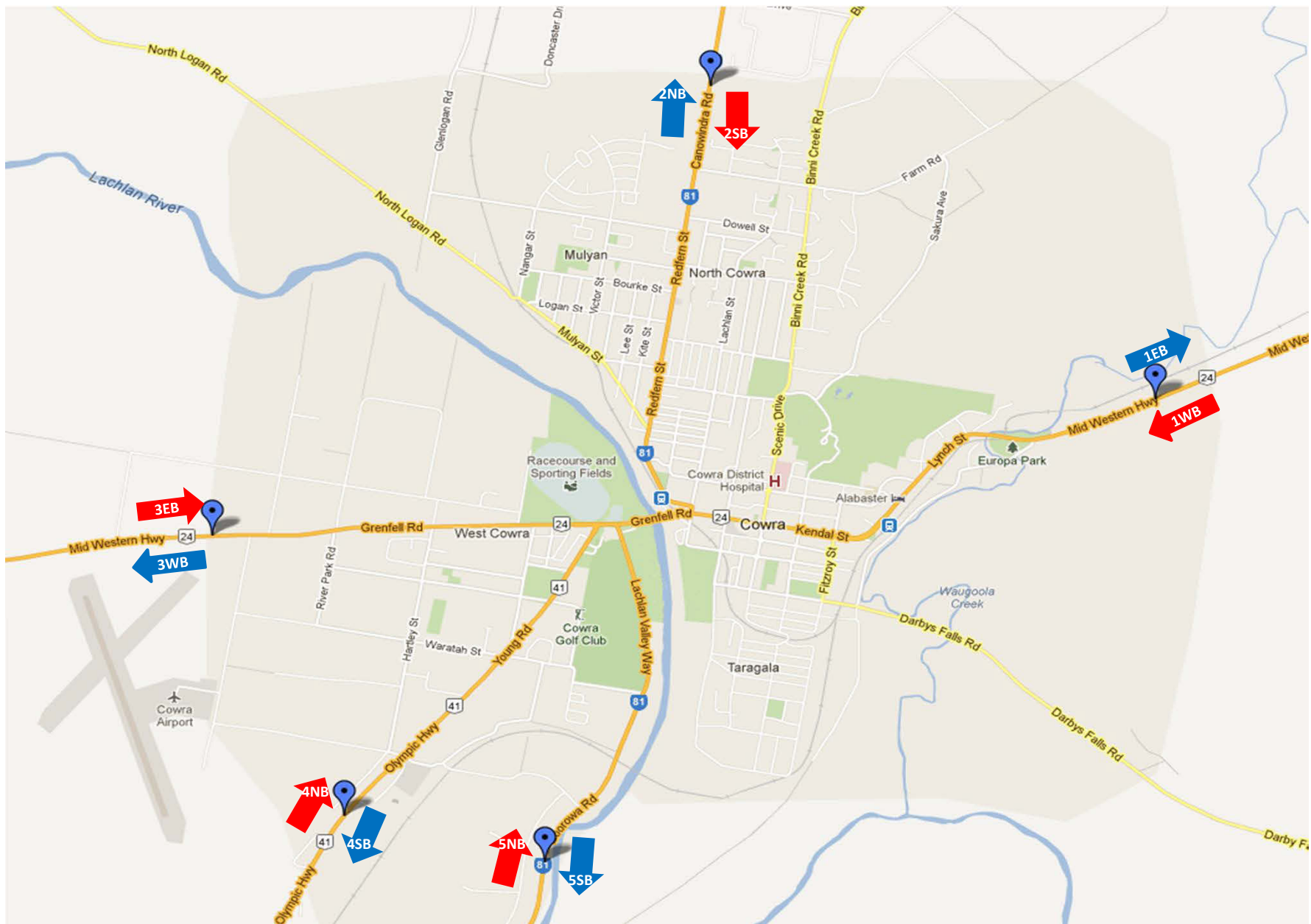
The following conclusions are made:

1. The results of the community consultation indicate that Option 3 is the most popular option.
2. Options A, 3 and B were the highest ranked options of the eight options considered.
3. The BCA results show that Option 3 is the most cost-effective of the three highest ranked options.
4. The BCA results show that although Option B has a marginally lower cost than Option 3, it provides less benefits in terms of reductions in travel time and vehicle operating costs compared to Option 3.
5. The construction of a roundabout at Grenfell Road/ Boorowa Road would ease the traffic delays in Boorowa Road.

It is recommended that Option 3 be adopted as the most preferable route for a heavy vehicle bypass of Cowra.

# Appendices

## **Appendix A** - Origin destination survey results



**Job No.** : A8  
**Job** : Cowra OD  
**Description** : Origin - Destination Survey 100% Sample(All heavy vehicles)  
**Day/Date** : Wed, 8th August 2012  
**Time Period** : 6am to 6pm (12hours)  
**Vehicle Type** : All heavy vehicles  
 30mins trip limit



**SKYHIGH - THE TRAFFIC SURVEY COMPANY**

**[Raw Matching]**

	Outbound	1EB	2NB	3WB	4SB	5SB	Total	
Inbound	Vehicles	162	69	117	126	78	552	
1WB	173	0	1	15	35	3	54	31.2%
2SB	62	0	1	3	3	1	8	12.9%
3EB	94	16	5	5	4	11	41	43.6%
4NB	127	31	9	6	0	1	47	37.0%
5NB	80	6	8	8	4	4	30	37.5%
Total	536	53	24	37	46	20	180	33.6%
		32.7%	34.8%	31.6%	36.5%	25.6%	32.6%	

**[EXP factors]**

	Outbound	1EB	2NB	3WB	4SB	5SB
Inbound	EXP	1.218	1.327	1.300	1.125	1.130
1WB	1.559	1.899	2.069	2.027	1.754	1.762
2SB	2.818	3.432	3.739	3.663	3.170	3.184
3EB	1.033	1.258	1.371	1.343	1.162	1.167
4NB	1.095	1.334	1.453	1.424	1.232	1.237
5NB	1.081	1.317	1.434	1.405	1.216	1.222

**[Final Matching]**

	Outbound	1EB	2NB	3WB	4SB	5SB	Total	
Inbound	Vehicles	162	69	117	126	78	552	
1WB	173	0	2	30	61	5	98	56.6%
2SB	62	0	4	11	10	3	28	45.2%
3EB	94	20	7	7	5	13	52	55.3%
4NB	127	41	13	9	0	1	64	50.4%
5NB	80	8	11	11	5	5	40	50.0%
Total	536	69	37	68	81	27	282	52.6%
		42.6%	53.6%	58.1%	64.3%	34.6%	51.1%	

## **Appendix B** - Council traffic counts

## MetroCount Traffic Executive CSC Split Direction Class Bins

### CustomList-291 -- English (ENA)

#### Datasets:

Site: [5001] MID WESTERN HWY - 120m W AIRPORT RD  
 Direction: 8 - East bound A>B, West bound B>A. Lane: 0  
 Survey Duration: 10:16 Friday, 16 November 2012 => 9:01 Tuesday, 27 November 2012  
 Zone: Australia (VIC ACT NSW)  
 File: 500127Nov2012.EC0 (Plus)  
 Identifier: R635VNJZ MC56-L5 [MC55] (c)Microcom 19Oct04  
 Algorithm: Factory default (v3.21 - 15275)  
 Data type: Axle sensors - Paired (Class/Speed/Count)

#### Profile:

Filter time: 11:32 Friday, 16 November 2012 => 9:01 Tuesday, 27 November 2012  
 Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
 Speed range: 10 - 160 km/h.  
 Direction: North, East, South, West (bound)  
 Separation: All - (Headway)  
 Name: Default Profile  
 Scheme: Vehicle classification (AustRoads94)  
 Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

#### Column Legend:

0 [Time]	24-hour time (0000 - 2359)
1 [Dir]	Direction code
2 [Total]	Number in time step
3 [Cls]	Class totals

## \* Friday, 16 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1003	835	36	58	13	0	1	2	3	31	23	1	0
0000	BA	792	618	38	57	13	1	0	2	4	35	21	2	1

## \* Saturday, 17 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1097	933	52	50	12	0	2	0	2	16	29	1	0
0000	BA	1063	902	57	47	13	0	3	2	1	15	22	1	0

## \* Sunday, 18 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	973	818	75	37	7	3	0	3	3	19	8	0	0
0000	BA	976	846	39	38	7	2	4	3	0	27	10	0	0

## \* Monday, 19 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1336	1068	49	87	18	0	3	6	7	54	43	1	0
0000	BA	1288	1034	49	73	20	1	4	4	5	60	36	2	0

## \* Tuesday, 20 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1301	987	46	95	19	1	5	7	10	69	61	1	0
0000	BA	1284	991	43	72	24	2	5	6	4	66	69	2	0

## \* Wednesday, 21 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1299	981	37	112	28	6	5	8	4	52	65	1	0
0000	BA	1352	1060	41	76	32	8	3	4	3	58	66	1	0

## \* Thursday, 22 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1320	1020	47	91	14	7	3	5	5	67	61	0	0
0000	BA	1347	1045	52	82	20	5	3	6	4	71	58	1	0

## \* Friday, 23 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1437	1139	57	100	21	5	4	6	8	54	43	0	0
0000	BA	1526	1244	54	83	25	6	4	8	7	48	45	2	0

## \* Saturday, 24 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1066	895	37	52	11	1	0	4	4	34	28	0	0
0000	BA	1063	903	55	25	12	1	1	6	0	33	27	0	0

## \* Sunday, 25 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	982	832	53	46	1	1	5	5	5	26	8	0	0
0000	BA	914	782	53	35	3	1	2	2	1	20	15	0	0

## \* Monday, 26 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1273	1003	40	83	27	0	4	10	13	40	52	1	0
0000	BA	1247	976	48	75	28	0	6	6	6	46	55	1	0

## \* Tuesday, 27 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	216	141	5	25	10	0	0	1	2	15	16	1	0
0000	BA	289	239	7	15	4	0	0	1	1	10	11	1	0



## \* Virtual Day (Partial days = 11.42)

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	6	6	0	0	0	0	0	0	0	0	0	0	0
0000	BA	6	5	0	0	0	0	0	0	0	1	0	0	0
0100	AB	4	2	0	0	0	0	0	0	1	0	0	0	0
0100	BA	3	2	0	0	0	0	0	0	0	0	0	0	0
0200	AB	3	2	0	0	0	0	0	0	0	0	0	0	0
0200	BA	2	2	0	0	0	0	0	0	0	0	0	0	0
0300	AB	3	2	0	0	0	0	0	0	0	1	0	0	0
0300	BA	4	3	0	0	0	0	0	0	0	1	0	0	0
0400	AB	4	2	0	0	0	0	0	0	0	0	1	0	0
0400	BA	4	3	0	0	0	0	0	0	0	0	0	0	0
0500	AB	10	7	0	0	0	0	0	0	0	1	1	0	0
0500	BA	12	11	0	1	0	0	0	0	0	0	0	0	0
0600	AB	34	23	2	4	1	0	0	0	0	2	3	0	0
0600	BA	34	29	1	2	1	0	0	0	0	1	0	0	0
0700	AB	51	36	2	7	1	0	0	1	0	2	3	0	0
0700	BA	50	39	3	2	1	0	0	0	0	2	3	0	0
0800	AB	55	39	2	5	2	0	0	0	0	3	3	0	0
0800	BA	103	86	3	7	2	0	0	0	0	3	2	0	0
0900	AB	60	44	3	6	1	0	0	0	0	2	2	0	0
0900	BA	91	75	4	5	2	0	0	0	0	2	2	0	0
1000	AB	72	54	4	6	2	0	0	0	0	3	2	0	0
1000	BA	94	77	5	4	1	0	0	1	0	3	2	0	0
1100	AB	78	61	5	4	1	0	0	0	1	4	2	0	0
1100	BA	90	71	5	5	2	0	0	1	0	3	3	0	0
1200	AB	86	70	4	4	1	0	0	0	0	4	2	0	0
1200	BA	85	69	4	4	1	0	0	0	0	3	3	0	0
1300	AB	89	70	5	6	1	0	0	1	0	4	3	0	0
1300	BA	84	66	4	5	1	0	0	0	0	4	3	0	0
1400	AB	93	75	4	5	1	0	0	0	0	3	4	0	0
1400	BA	83	65	3	5	2	0	0	0	0	5	2	0	0
1500	AB	103	85	2	7	1	0	0	0	0	3	3	0	0
1500	BA	89	69	5	5	1	0	0	0	1	4	3	0	0
1600	AB	112	96	3	5	1	0	0	0	1	3	3	0	0
1600	BA	85	69	3	5	1	0	0	0	0	3	2	0	0
1700	AB	114	100	4	6	0	0	0	0	0	2	1	0	0
1700	BA	83	69	2	4	1	0	0	0	0	2	4	0	0
1800	AB	74	64	2	3	1	0	0	0	0	2	2	0	0
1800	BA	61	51	3	2	0	0	0	0	0	2	2	0	0
1900	AB	51	43	2	2	0	0	0	0	0	1	1	0	0
1900	BA	40	34	1	1	1	0	0	0	0	1	2	0	0
2000	AB	34	29	1	2	0	0	0	0	0	0	0	0	0
2000	BA	28	23	1	1	1	0	0	0	0	1	1	0	0
2100	AB	22	18	1	1	0	0	0	0	0	1	0	0	0
2100	BA	17	14	0	1	0	0	0	0	0	1	1	0	0
2200	AB	19	15	1	1	1	0	0	0	0	0	1	0	0
2200	BA	12	9	0	0	0	0	0	0	0	1	1	0	0
2300	AB	13	11	0	1	0	0	0	0	0	0	1	0	0
2300	BA	7	6	0	0	0	0	0	0	0	0	0	0	0

## \* Virtual Week (Partial weeks = 1.71)

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
Mon	AB	1305	1036	45	85	23	0	4	8	10	47	48	1	0
Mon	BA	1268	1005	49	74	24	1	5	5	6	53	46	2	0
Tue	AB	759	564	26	60	15	1	3	4	6	42	39	1	0
Tue	BA	787	615	25	44	14	1	3	4	3	38	40	2	0
Wed	AB	1299	981	37	112	28	6	5	8	4	52	65	1	0
Wed	BA	1352	1060	41	76	32	8	3	4	3	58	66	1	0
Thu	AB	1320	1020	47	91	14	7	3	5	5	67	61	0	0
Thu	BA	1347	1045	52	82	20	5	3	6	4	71	58	1	0
Fri	AB	1220	987	47	79	17	3	3	4	6	43	33	1	0
Fri	BA	1159	931	46	70	19	4	2	5	6	42	33	2	1
Sat	AB	1082	914	45	51	12	1	1	2	3	25	29	1	0
Sat	BA	1063	903	56	36	13	1	2	4	1	24	25	1	0
Sun	AB	978	825	64	42	4	2	3	4	4	23	8	0	0
Sun	BA	945	814	46	37	5	2	3	3	1	24	13	0	0

## \* Grand Total

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
--	-	13303	10652	534	836	181	24	32	57	66	477	437	7	0
--	BA	13141	10640	536	678	201	27	35	50	36	489	435	13	1

In profile: Vehicles = 26444 / 26678 (99.12%)

## MetroCount Traffic Executive Class Bins Virtual Day and Week

### CustomList-271 -- English (ENA)

#### Datasets:

**Site:** [5002] OLYMPIC HWY - 110m S Abbitor Ent (100/80 sign)  
**Direction:** 5 - South bound A>B, North bound B>A. Lane: 0  
**Survey Duration:** 12:00 Wednesday, 16 May 2012 => 15:02 Monday, 16 July 2012  
**Zone:** Australia (VIC ACT NSW)  
**File:** 500216Jul2012.EC0 (Plus)  
**Identifier:** K3619C28 MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** Factory default (v3.21 - 15275)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

45B

#### Profile:

**Filter time:** 12:00 Wednesday, 16 May 2012 => 7:49 Sunday, 1 July 2012  
**Included classes:** 1, 2, 3  
**Speed range:** 10 - 160 km/h.  
**Direction:** AB  
**Separation:** All - (Headway)  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94 Aggregate (0 1 1 2 2 2 3 3 3 3 3 3 13 ))  
**Units:** Metric (meter, kilometer, m/s, km/h, kg, tonne)

#### Column Legend:

**0 [Time]** 24-hour time (0000 - 2359)  
**1 [-/n]** Normalise divisor  
**2 [Total]** Number in time step  
**3 [Cls]** Class totals

#### \* Virtual Day (Partial days = 45.83)

Time	-/n	Total	Cls 1	Cls 2	Cls 3
0000	46	2	2	0	0
0100	46	2	1	0	1
0200	46	1	1	0	1
0300	46	1	0	0	0
0400	46	3	1	0	2
0500	46	5	3	1	2
0600	46	10	7	1	1
0700	46	21	17	2	2
0800	45	28	22	4	2
0900	45	37	31	4	2
1000	45	36	30	4	3
1100	45	39	32	4	3
1200	46	35	29	3	3
1300	46	36	31	3	3
1400	46	37	31	3	3
1500	46	44	37	4	3
1600	46	42	36	3	3
1700	46	43	37	3	3
1800	46	23	19	2	2
1900	46	15	12	1	2
2000	46	12	9	1	2
2100	46	9	7	0	1
2200	46	6	4	0	1
2300	46	3	2	0	1

#### \* Virtual Week (Partial weeks = 6.57)

Time	-/n	Total	Cls 1	Cls 2	Cls 3
Mon	6	507	411	47	49
Tue	6	498	399	40	58
Wed	7	502	407	40	54
Thu	7	560	439	60	61
Fri	7	554	440	62	51
Sat	7	372	329	30	14
Sun	6	403	356	28	19

In profile: Vehicles = 22361 / 44712 (50.01%)

## MetroCount Traffic Executive Class Bins Virtual Day and Week

### CustomList-271 -- English (ENA)

#### Datasets:

**Site:** [5002] OLYMPIC HWY - 110m S Abbitor Ent (100/80 sign)  
**Direction:** 5 - South bound A>B, North bound B>A. Lane: 0  
**Survey Duration:** 12:00 Wednesday, 16 May 2012 => 15:02 Monday, 16 July 2012  
**Zone:** Australia (VIC ACT NSW)  
**File:** 500216Jul2012.EC0 (Plus)  
**Identifier:** K3619C28 MC56-6 [MC55] (c)Microcom 02/03/01  
**Algorithm:** Factory default (v3.21 - 15275)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

4NB

#### Profile:

**Filter time:** 12:00 Wednesday, 16 May 2012 => 7:49 Sunday, 1 July 2012  
**Included classes:** 1, 2, 3  
**Speed range:** 10 - 160 km/h.  
**Direction:** BA  
**Separation:** All - (Headway)  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94 Aggregate (0 1 1 2 2 2 3 3 3 3 3 3 13 ))  
**Units:** Metric (meter, kilometer, m/s, km/h, kg, tonne)

#### Column Legend:

0 [Time] 24-hour time (0000 - 2359)  
 1 [-/n] Normalise divisor  
 2 [Total] Number in time step  
 3 [Cls] Class totals

#### \* Virtual Day (Partial days = 45.83)

Time	-/n	Total	Cls 1	Cls 2	Cls 3
0000	46	2	1	0	1
0100	46	1	1	0	0
0200	46	1	1	0	1
0300	46	1	1	0	1
0400	46	4	3	0	1
0500	46	9	7	0	1
0600	46	15	12	1	2
0700	46	27	23	2	2
0800	45	46	42	2	2
0900	45	43	38	2	3
1000	45	39	36	2	2
1100	45	39	35	2	2
1200	46	31	28	2	2
1300	46	30	27	2	1
1400	46	36	32	2	2
1500	46	36	32	2	2
1600	46	38	33	3	2
1700	46	32	28	1	2
1800	46	21	18	1	2
1900	46	12	10	0	2
2000	46	8	7	0	1
2100	46	8	6	0	2
2200	46	4	3	0	1
2300	46	2	1	0	1

#### \* Virtual Week (Partial weeks = 6.57)

Time	-/n	Total	Cls 1	Cls 2	Cls 3
Mon	6	493	425	28	41
Tue	6	495	417	31	46
Wed	7	490	415	30	44
Thu	7	544	463	35	47
Fri	7	557	485	31	41
Sat	7	384	357	11	16
Sun	6	411	385	13	13

In profile: Vehicles = 22216 / 44712 (49.69%)

## MetroCount Traffic Executive Class Bins Virtual Day and Week

### CustomList-271 -- English (ENA)

#### Datasets:

**Site:** [5003] LACHLAN VALLEY WAY S - 70m S OLD BOOROWA RD (Bridge MELT)  
**Direction:** 7 - North bound A>B, South bound B>A. Lane: 0  
**Survey Duration:** 12:00 Wednesday, 16 May 2012 => 15:19 Monday, 16 July 2012  
**Zone:** Australia (VIC ACT NSW)  
**File:** 500316Jul2012.EC0 (Plus)  
**Identifier:** A596FRT9 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default (v3.21 - 15275)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

5NB

#### Profile:

**Filter time:** 12:00 Wednesday, 16 May 2012 => 7:49 Sunday, 1 July 2012  
**Included classes:** 1, 2, 3  
**Speed range:** 10 - 160 km/h.  
**Direction:** AB  
**Separation:** All - (Headway)  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94 Aggregate (0 1 1 2 2 2 3 3 3 3 3 3 13 ))  
**Units:** Metric (meter, kilometer, m/s, km/h, kg, tonne)

#### Column Legend:

0 [Time] 24-hour time (0000 - 2359)  
 1 [-/n] Normalise divisor  
 2 [Total] Number in time step  
 3 [Cls] Class totals

#### \* Virtual Day (Partial days = 45.83)

Time	-/n	Total	Cls 1	Cls 2	Cls 3
0000	46	3	2	0	1
0100	46	2	1	0	1
0200	46	1	1	0	1
0300	46	3	1	0	2
0400	46	3	2	0	1
0500	46	6	4	1	1
0600	46	17	13	1	2
0700	46	25	21	1	3
0800	45	53	45	4	3
0900	45	56	48	3	4
1000	45	57	50	3	4
1100	45	61	54	3	4
1200	46	61	54	3	4
1300	46	60	52	3	5
1400	46	62	55	3	4
1500	46	66	57	4	5
1600	46	61	54	4	4
1700	46	56	50	3	4
1800	46	44	39	2	3
1900	46	27	24	1	2
2000	46	20	16	1	3
2100	46	12	10	0	2
2200	46	8	6	0	2
2300	46	5	4	0	1

#### \* Virtual Week (Partial weeks = 6.57)

Time	-/n	Total	Cls 1	Cls 2	Cls 3
Mon	6	776	660	43	73
Tue	6	649	524	44	81
Wed	7	601	481	42	78
Thu	7	717	584	52	82
Fri	7	1012	882	52	79
Sat	7	815	755	28	32
Sun	6	762	708	28	26

In profile: Vehicles = 35142 / 70421 (49.90%)

## MetroCount Traffic Executive Class Bins Virtual Day and Week

### CustomList-271 -- English (ENA)

#### Datasets:

**Site:** [5003] LACHLAN VALLEY WAY S - 70m S OLD BOOROWA RD (Bridge MELT)  
**Direction:** 7 - North bound A>B, South bound B>A. Lane: 0  
**Survey Duration:** 12:00 Wednesday, 16 May 2012 => 15:19 Monday, 16 July 2012  
**Zone:** Australia (VIC ACT NSW)  
**File:** 500316Jul2012.EC0 (Plus)  
**Identifier:** A596FRT9 MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default (v3.21 - 15275)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

558

#### Profile:

**Filter time:** 12:00 Wednesday, 16 May 2012 => 7:21 Tuesday, 19 June 2012  
**Included classes:** 1, 2, 3  
**Speed range:** 10 - 160 km/h.  
**Direction:** BA  
**Separation:** All - (Headway)  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94 Aggregate (0 1 1 2 2 2 3 3 3 3 3 3 13 ))  
**Units:** Metric (meter, kilometer, m/s, km/h, kg, tonne)

#### Column Legend:

0 [Time] 24-hour time (0000 - 2359)  
 1 [-/n] Normalise divisor  
 2 [Total] Number in time step  
 3 [Cls] Class totals

#### \* Virtual Day (Partial days = 33.83)

Time	-/n	Total	Cls 1	Cls 2	Cls 3
0000	34	2	1	0	0
0100	34	1	1	0	0
0200	34	1	1	0	0
0300	34	2	1	0	0
0400	34	4	3	0	1
0500	34	7	5	1	1
0600	34	18	15	1	2
0700	34	31	26	2	2
0800	33	43	37	2	4
0900	33	51	45	2	4
1000	33	56	49	3	5
1100	33	65	56	3	6
1200	34	64	56	2	5
1300	34	65	58	2	5
1400	34	70	63	3	4
1500	34	75	65	4	5
1600	34	70	64	2	4
1700	34	57	53	2	3
1800	34	37	33	1	3
1900	34	24	21	1	3
2000	34	14	13	0	2
2100	34	12	10	0	2
2200	34	5	5	0	1
2300	34	3	2	0	1

#### \* Virtual Week (Partial weeks = 4.86)

Time	-/n	Total	Cls 1	Cls 2	Cls 3
Mon	5	846	741	34	71
Tue	4	678	550	41	88
Wed	5	580	471	37	73
Thu	5	727	607	39	82
Fri	5	905	798	41	66
Sat	5	742	692	19	30
Sun	5	898	849	22	27

In profile: Vehicles = 26199 / 52187 (50.20%)

## MetroCount Traffic Executive Class Bins Virtual Day and Week

CustomList-271 -- English (ENA)

**Datasets:**

**Site:** [5004] CANOWINDRA RD - 300m N DONCASTER DR (100/80 Sign)  
**Direction:** 5 - South bound A>B, North bound B>A. Lane: 0  
**Survey Duration:** 12:00 Wednesday, 16 May 2012 => 16:14 Thursday, 12 July 2012  
**Zone:** Australia (VIC ACT NSW)  
**File:** 500416Jul2012.EC0 (Plus)  
**Identifier:** EG24YQVY MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default (v3.21 - 15275)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

25B

**Profile:**

**Filter time:** 12:00 Wednesday, 16 May 2012 => 7:49 Sunday, 1 July 2012  
**Included classes:** 1, 2, 3  
**Speed range:** 10 - 160 km/h.  
**Direction:** AB  
**Separation:** All - (Headway)  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94 Aggregate (0 1 1 2 2 2 3 3 3 3 3 3 13 ))  
**Units:** Metric (meter, kilometer, m/s, km/h, kg, tonne)

**Column Legend:**

0 [Time] 24-hour time (0000 - 2359)  
 1 [-/n] Normalise divisor  
 2 [Total] Number in time step  
 3 [Cls] Class totals

**\* Virtual Day (Partial days = 45.83)**

Time	-/n	Total	Cls 1	Cls 2	Cls 3
0000	46	3	2	0	1
0100	46	3	2	0	0
0200	46	1	1	0	1
0300	46	2	1	0	1
0400	46	2	2	0	0
0500	46	8	7	0	1
0600	46	20	18	1	1
0700	46	35	31	2	2
0800	45	67	60	4	3
0900	45	73	65	4	3
1000	45	75	67	5	3
1100	45	75	67	4	3
1200	46	69	62	4	3
1300	46	66	60	3	3
1400	46	74	67	4	3
1500	46	82	75	5	3
1600	46	81	74	4	3
1700	46	71	65	3	2
1800	46	45	41	2	2
1900	46	21	19	1	1
2000	46	14	12	1	1
2100	46	10	9	0	1
2200	46	6	6	0	1
2300	46	5	4	0	1

**\* Virtual Week (Partial weeks = 6.57)**

Time	-/n	Total	Cls 1	Cls 2	Cls 3
Mon	6	912	815	52	45
Tue	6	897	785	56	57
Wed	7	848	745	55	48
Thu	7	959	840	61	57
Fri	7	1054	944	64	47
Sat	7	803	760	27	16
Sun	6	822	777	22	23

In profile: Vehicles = 41440 / 83417 (49.68%)

## MetroCount Traffic Executive Class Bins Virtual Day and Week

### CustomList-271 -- English (ENA)

#### Datasets:

**Site:** [5004] CANOWINDRA RD - 300m N DONCASTER DR (100/80 Sign)  
**Direction:** 5 - South bound A>B, North bound B>A. **Lane:** 0  
**Survey Duration:** 12:00 Wednesday, 16 May 2012 => 16:14 Thursday, 12 July 2012  
**Zone:** Australia (VIC ACT NSW)  
**File:** 500416Jul2012.EC0 (Plus)  
**Identifier:** EG24YQVY MC56-L5 [MC55] (c)Microcom 19Oct04  
**Algorithm:** Factory default (v3.21 - 15275)  
**Data type:** Axle sensors - Paired (Class/Speed/Count)

ZNB

#### Profile:

**Filter time:** 12:00 Wednesday, 16 May 2012 => 7:49 Sunday, 1 July 2012  
**Included classes:** 1, 2, 3  
**Speed range:** 10 - 160 km/h.  
**Direction:** BA  
**Separation:** All - (Headway)  
**Name:** Default Profile  
**Scheme:** Vehicle classification (AustRoads94 Aggregate (0 1 1 2 2 2 3 3 3 3 3 3 13 ))  
**Units:** Metric (meter, kilometer, m/s, km/h, kg, tonne)

#### Column Legend:

0 [Time] 24-hour time (0000 - 2359)  
 1 [-/n] Normalise divisor  
 2 [Total] Number in time step  
 3 [Cls] Class totals

#### \* Virtual Day (Partial days = 45.83)

Time	-/n	Total	Cls 1	Cls 2	Cls 3
0000	46	3	2	0	0
0100	46	2	1	0	1
0200	46	2	1	0	1
0300	46	3	1	1	1
0400	46	5	3	1	1
0500	46	10	6	2	1
0600	46	27	19	5	2
0700	46	46	38	6	3
0800	45	58	50	5	3
0900	45	63	54	6	3
1000	45	65	57	5	3
1100	45	73	65	5	3
1200	46	77	69	5	3
1300	46	79	70	6	3
1400	46	74	66	5	3
1500	46	81	73	6	3
1600	46	80	74	5	2
1700	46	67	63	3	1
1800	46	39	36	2	1
1900	46	23	21	1	1
2000	46	16	15	1	1
2100	46	12	10	1	1
2200	46	9	8	0	1
2300	46	5	4	0	0

#### \* Virtual Week (Partial weeks = 6.57)

Time	-/n	Total	Cls 1	Cls 2	Cls 3
Mon	6	913	797	68	48
Tue	6	908	777	78	54
Wed	7	856	734	74	48
Thu	7	971	830	89	51
Fri	7	1094	957	92	45
Sat	7	831	764	47	20
Sun	6	787	726	37	24

In profile: Vehicles = 41907 / 83417 (50.24%)

## MetroCount Traffic Executive CSC Split Direction Class Bins

### CustomList-291 -- English (ENA)

#### Datasets:

Site: [5005] MID WESTERN HWY E - 140m E RAILWAY LINE (Bridge MELT)  
 Direction: 6 - West bound A>B, East bound B>A. Lane: 0  
 Survey Duration: 11:31 Friday, 16 November 2012 => 9:32 Tuesday, 27 November 2012  
 Zone: Australia (VIC ACT NSW)  
 File: 500527Nov2012.EC0 (Plus)  
 Identifier: EF52K8XT MC56-L5 [MC55] (c)Microcom 19Oct04  
 Algorithm: Factory default (v3.21 - 15275)  
 Data type: Axle sensors - Paired (Class/Speed/Count)

#### Profile:

Filter time: 11:32 Friday, 16 November 2012 => 9:32 Tuesday, 27 November 2012  
 Included classes: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12  
 Speed range: 10 - 160 km/h.  
 Direction: North, East, South, West (bound)  
 Separation: All - (Headway)  
 Name: Default Profile  
 Scheme: Vehicle classification (AustRoads94)  
 Units: Metric (meter, kilometer, m/s, km/h, kg, tonne)

#### Column Legend:

0 [Time]	24-hour time (0000 - 2359)
1 [Dir]	Direction code
2 [Total]	Number in time step
3 [Cls]	Class totals



## \* Friday, 16 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1093	822	49	124	15	6	5	10	5	39	18	0	0
0000	BA	1310	1086	69	58	13	6	1	7	5	38	25	2	0

## \* Saturday, 17 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1459	1183	42	152	8	3	12	9	5	23	21	1	0
0000	BA	1443	1241	78	52	8	5	4	5	1	19	30	0	0

## \* Sunday, 18 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1421	1143	64	141	9	4	9	17	8	13	13	0	0
0000	BA	1414	1225	84	45	6	6	3	5	9	21	9	1	0

## \* Monday, 19 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1632	1164	46	228	22	5	16	13	12	81	40	5	0
0000	BA	1566	1262	69	98	23	3	5	3	9	70	23	1	0

## \* Tuesday, 20 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1536	1091	46	195	28	6	8	17	9	79	54	3	0
0000	BA	1534	1192	63	98	26	7	3	7	6	80	51	1	0

## \* Wednesday, 21 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1650	1171	49	215	32	9	8	13	12	83	53	5	0
0000	BA	1634	1307	47	103	23	8	5	5	14	76	46	0	0

## \* Thursday, 22 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1626	1192	42	206	21	8	9	5	10	87	44	2	0
0000	BA	1550	1259	55	88	15	6	4	5	6	75	37	0	0

## \* Friday, 23 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1827	1358	56	225	25	7	9	13	11	75	45	3	0
0000	BA	1775	1469	71	97	25	4	4	7	5	54	38	1	0

## \* Saturday, 24 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1352	1112	59	126	11	1	5	4	4	19	10	1	0
0000	BA	1318	1169	50	50	7	2	1	9	0	17	12	1	0

## \* Sunday, 25 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1265	1016	61	112	12	4	4	11	5	21	17	2	0
0000	BA	1278	1094	82	36	7	5	2	6	5	25	15	1	0

## \* Monday, 26 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	1621	1153	43	216	30	9	7	11	13	83	49	7	0
0000	BA	1581	1265	56	103	30	7	4	13	12	55	32	4	0

## \* Tuesday, 27 November 2012

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	450	329	9	56	12	2	3	6	3	13	17	0	0
0000	BA	340	256	4	25	12	5	1	0	2	25	10	0	0

## \* Virtual Day (Partial days = 11.42)

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
0000	AB	7	6	0	1	0	0	0	0	0	0	0	0	0
0000	BA	5	4	0	0	0	0	0	0	0	0	0	0	0
0100	AB	5	3	0	0	0	0	0	0	1	0	0	0	0
0100	BA	3	2	0	0	0	0	0	0	0	0	0	0	0
0200	AB	4	2	0	1	0	0	0	0	0	0	1	0	0
0200	BA	4	2	0	0	0	0	0	0	0	1	0	0	0
0300	AB	4	2	0	1	0	0	0	0	0	0	1	0	0
0300	BA	3	2	0	0	0	0	0	0	0	1	0	0	0
0400	AB	8	4	0	1	0	0	0	0	0	1	1	0	0
0400	BA	7	5	0	1	0	0	0	0	0	1	1	0	0
0500	AB	23	15	0	3	0	0	1	0	0	2	1	0	0
0500	BA	17	13	0	1	0	0	0	0	0	2	1	0	0
0600	AB	49	34	1	8	1	0	0	1	0	3	1	0	0
0600	BA	35	27	1	1	2	0	0	0	0	1	2	0	0
0700	AB	56	39	2	7	1	1	1	1	0	2	2	0	0
0700	BA	59	44	1	6	2	0	0	0	1	3	1	0	0
0800	AB	119	94	3	13	2	0	1	1	0	2	2	0	0
0800	BA	73	59	3	5	1	1	0	0	0	2	2	0	0
0900	AB	112	90	3	13	1	0	1	1	0	3	1	0	0
0900	BA	97	77	5	5	2	1	0	1	0	3	2	0	0
1000	AB	119	92	5	14	1	0	0	1	0	3	1	0	0
1000	BA	98	81	6	4	1	0	0	1	0	3	1	0	0
1100	AB	111	80	5	14	2	0	1	1	1	5	2	0	0
1100	BA	113	95	5	6	1	0	0	1	0	2	2	0	0
1200	AB	107	80	4	13	1	0	0	1	1	5	2	0	0
1200	BA	111	93	6	5	1	0	0	1	0	3	2	0	0
1300	AB	100	73	4	12	2	0	1	0	0	4	3	0	0
1300	BA	125	103	7	6	2	1	0	1	0	4	2	0	0
1400	AB	119	90	3	13	2	1	1	0	1	5	2	0	0
1400	BA	120	97	6	7	2	1	1	0	1	5	1	0	0
1500	AB	112	85	4	13	2	0	1	1	1	3	2	0	0
1500	BA	133	110	6	7	2	0	0	1	0	4	2	0	0
1600	AB	121	89	5	16	1	0	1	1	1	4	2	0	0
1600	BA	123	106	5	5	1	0	0	0	0	3	2	0	0
1700	AB	101	79	3	12	1	0	0	1	1	3	1	0	0
1700	BA	128	110	5	5	0	0	0	0	1	3	2	0	0
1800	AB	83	66	2	9	0	0	0	1	0	3	1	0	0
1800	BA	85	74	3	3	0	0	0	0	1	2	1	0	0
1900	AB	56	45	2	5	0	0	0	0	0	2	1	0	0
1900	BA	55	48	2	2	0	0	0	0	0	2	1	0	0
2000	AB	40	29	2	4	1	0	0	0	0	4	1	0	0
2000	BA	41	34	1	1	0	0	0	0	1	2	2	0	0
2100	AB	22	16	1	3	0	0	0	0	0	1	1	0	0
2100	BA	31	26	1	1	0	0	0	0	1	2	1	0	0
2200	AB	17	11	1	2	1	0	0	0	0	1	1	0	0
2200	BA	21	18	1	1	0	0	0	0	0	1	0	0	0
2300	AB	10	7	0	1	0	0	0	0	0	0	1	0	0
2300	BA	8	7	0	0	0	0	0	0	0	0	1	0	0

## \* Virtual Week (Partial weeks = 1.71)

Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
Mon	AB	1627	1159	45	222	26	7	12	12	13	82	45	6	0
Mon	BA	1574	1264	63	101	27	5	5	8	11	63	28	3	0
Tue	AB	993	710	28	126	20	4	6	12	6	46	36	2	0
Tue	BA	937	724	34	62	19	6	2	4	4	53	31	1	0
Wed	AB	1650	1171	49	215	32	9	8	13	12	83	53	5	0
Wed	BA	1634	1307	47	103	23	8	5	5	14	76	46	0	0
Thu	AB	1626	1192	42	206	21	8	9	5	10	87	44	2	0
Thu	BA	1550	1259	55	88	15	6	4	5	6	75	37	0	0
Fri	AB	1460	1090	53	175	20	7	7	12	8	57	32	2	0
Fri	BA	1543	1278	70	78	19	5	3	7	5	46	32	2	0
Sat	AB	1406	1148	51	139	10	2	9	7	5	21	16	1	0
Sat	BA	1381	1205	64	51	8	4	3	7	1	18	21	1	0
Sun	AB	1343	1080	63	127	11	4	7	14	7	17	15	1	0
Sun	BA	1346	1160	83	41	7	6	3	6	7	23	12	1	0

## \* Grand Total

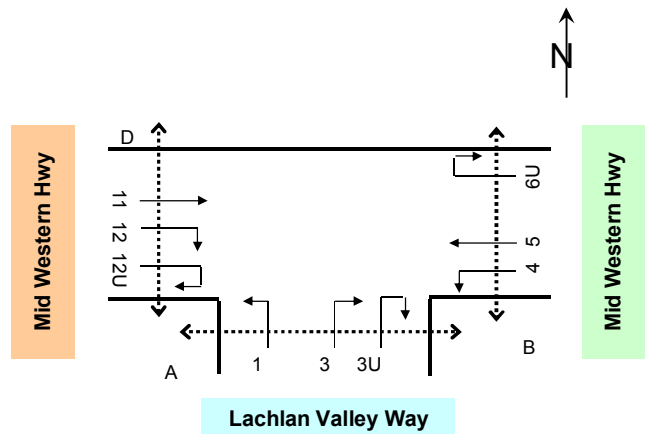
Time	Dir	Total	Cls 1	Cls 2	Cls 3	Cls 4	Cls 5	Cls 6	Cls 7	Cls 8	Cls 9	Cls 10	Cls 11	Cls 12
--	-	16932	12734	566	1996	225	64	95	129	97	616	381	29	0
--	BA	16743	13825	728	853	195	64	37	72	74	555	328	12	0

In profile: Vehicles = 33675 / 33701 (99.92%)

## **Appendix C** - Grenfell Road intersections counts

**Job No.** : N889  
**Client** : GHD  
**Suburb** : Cowra  
**Location** : 2. Mid Western Hwy / Lachlan Valley Way

**Day/Date** : Tue, 14th Aug 2012  
**Weather** : Fine  
**Description** : Classified Intersection Count  
 : Peak Hour Summary

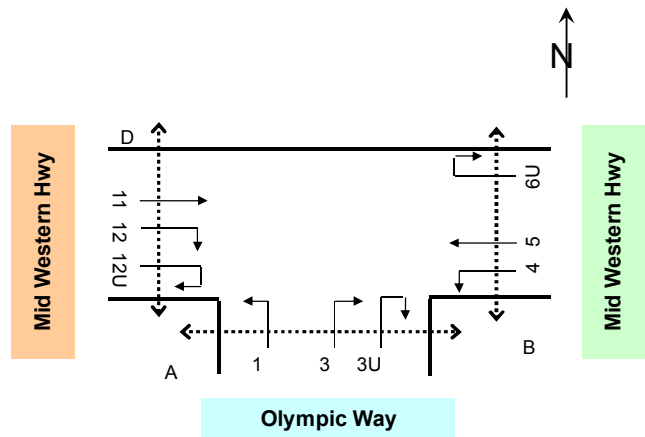


Approach		Lachlan Valley Way			Mid Western Hwy			Mid Western Hwy			Grand Total
Time Period		Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	
AM	8:15 to 9:15	123	21	144	284	31	315	421	45	466	925
PM	16:15 to 17:15	138	14	152	397	24	421	447	26	473	1046

Approach		Lachlan Valley Way			Mid Western Hwy			Mid Western Hwy			Grand Total
Time Period		Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	
7:00 to 8:00		83	7	90	245	31	276	175	30	205	571
7:15 to 8:15		97	6	103	255	34	289	215	31	246	638
7:30 to 8:30		112	6	118	261	28	289	280	31	311	718
7:45 to 8:45		125	13	138	286	31	317	354	39	393	848
8:00 to 9:00		132	14	146	289	30	319	409	46	455	920
8:15 to 9:15		123	21	144	284	31	315	421	45	466	925
8:30 to 9:30		112	19	131	296	33	329	394	43	437	897
8:45 to 9:45		104	15	119	292	36	328	361	33	394	841
9:00 to 10:00		96	16	112	295	37	332	327	25	352	796
AM Totals		311	37	348	829	98	927	911	101	1012	2287
15:30 to 16:30		143	18	161	397	42	439	393	24	417	1017
15:45 to 16:45		138	17	155	413	29	442	415	25	440	1037
16:00 to 17:00		134	17	151	388	28	416	433	29	462	1029
16:15 to 17:15		138	14	152	397	24	421	447	26	473	1046
16:30 to 17:30		143	10	153	400	20	420	428	19	447	1020
16:45 to 17:45		135	11	146	381	21	402	401	22	423	971
17:00 to 18:00		122	11	133	406	17	423	387	15	402	958
17:15 to 18:15		111	8	119	363	14	377	328	13	341	837
17:30 to 18:30		96	4	100	319	14	333	286	16	302	735
PM Totals		382	32	414	1116	76	1192	1107	59	1166	2772

**Job No.** : N889  
**Client** : GHD  
**Suburb** : Cowra  
**Location** : 1. Mid Western Hwy / Olympic Way

**Day/Date** : Tue, 14th Aug 2012  
**Weather** : Fine  
**Description** : Classified Intersection Count  
 : Peak Hour Summary



Approach		Olympic Way			Mid Western Hwy			Mid Western Hwy			Grand Total
Time Period		Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	
AM	8:15 to 9:15	187	24	211	272	39	311	272	30	302	824
PM	16:00 to 17:00	268	20	288	379	31	410	212	14	226	924

Approach		Olympic Way			Mid Western Hwy			Mid Western Hwy			Grand Total
Time Period		Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	
7:00 to 8:00		100	24	124	227	23	250	101	15	116	490
7:15 to 8:15		107	25	132	245	24	269	134	17	151	552
7:30 to 8:30		138	24	162	253	23	276	176	17	193	631
7:45 to 8:45		169	24	193	284	30	314	228	27	255	762
8:00 to 9:00		182	26	208	275	34	309	268	31	299	816
8:15 to 9:15		187	24	211	272	39	311	272	30	302	824
8:30 to 9:30		167	24	191	278	39	317	256	30	286	794
8:45 to 9:45		155	21	176	265	35	300	225	19	244	720
9:00 to 10:00		160	14	174	260	37	297	192	18	210	681
AM Totals		442	64	506	762	94	856	561	64	625	1987
15:30 to 16:30		229	15	244	394	40	434	218	21	239	917
15:45 to 16:45		250	16	266	402	30	432	205	20	225	923
16:00 to 17:00		268	20	288	379	31	410	212	14	226	924
16:15 to 17:15		266	18	284	377	27	404	207	16	223	911
16:30 to 17:30		253	14	267	387	20	407	192	12	204	878
16:45 to 17:45		221	15	236	369	22	391	193	15	208	835
17:00 to 18:00		206	12	218	385	19	404	189	15	204	826
17:15 to 18:15		160	10	170	350	16	366	169	12	181	717
17:30 to 18:30		141	14	155	300	16	316	154	9	163	634
PM Totals		623	43	666	1081	76	1157	564	42	606	2429

## **Appendix D** - Crash history data

Year	2005				2006				2007				2008				2009			
Event	Truck Involved		Other		Truck Involved		Other		Truck Involved		Other		Truck Involved		Other		Truck Involved		Other	
	Fatality	Injury	Fatality	Injury	Fatality	Injury	Fatality	Injury	Fatality	Injury	Fatality	Injury	Fatality	Injury	Fatality	Injury	Fatality	Injury	Fatality	Injury
1	0	0					0	1			0	0			0	2			0	1
2	0	0					0	4			0	1			0	2	0	0		
3			0	0			0	1			0	1			0	1(P/C,OMV)			0	1
4			0	1			0	1(ATKR)			0	1			0	1	0	0		
5			0	2							0	0							0	1
6			0	2							0	0(RTKR,OMV)								
7			0	0							0	1								
8			0	1																
9																				
10																				
11																				
12																				

ATKR     artic tanker  
 RTKR     rigid tanker  
 OMV     other motor vehicle, possibly farm machinery

## **Appendix E** – Community consultation report



# Community and Stakeholder Consultation

## 1. Introduction

GHD was invited to facilitate community and stakeholder consultation between August 2012 and September 2012 to identify key stakeholder and community opinions about the various social, economic and environmental costs and benefits of the four route options developed during the Cowra Shire Land-Use Strategy (Collie Pty Ltd, 2009).

Key stakeholders who were identified as having an interest in this project are:

- Residents directly impacted by the proposed routes
- Businesses with economic interest in the heavy vehicles that currently pass through the town.
- Commercial establishments on the proposed and the existing route
- The general community impacted through changes to traffic movement in the town
- Service providers and service users of community facilities impacted.

Consultation was undertaken with the Cowra community in the Land-Use Strategy study. Issues associated with the presence of heavy vehicles in the Cowra CBD included congestion, parking problems, traffic and pedestrian safety risks, noise and vibration and general amenity impacts.

The high level of engagement and community interest during this current study demonstrates the ongoing support for a heavy vehicle bypass of Cowra that was evident from the Land-Use Strategy study.

Initially the consultation program was focussed on assessing the four options developed during the Land-Use Strategy study. However, after discussion with Council it was agreed that the study should not be constrained by these four options and that key stakeholders and the community should be given the opportunity to suggest other potential options for Council to consider. As a result, the consultation program was broadened to increase the level of response and allow other options to be considered.

## 2. Consultation methodology

The consultation activities undertaken between August and September 2012 aimed to provide the community and stakeholders with information on the study process and as well as the opportunity to raise issues and concerns and suggest alternate routes options.

For the purpose of this report, Stakeholder and Community feedback has been documented separately in Section 3 and Section 4 respectively.

Materials at each event included:

- A poster size map of the study area

- A poster size map showing the possible route options identified in the Land-Use Strategy study
- Feedback forms, including a map of the study area on the back

These materials can be found in Appendix A.

**Table 1 Consultation activities**

<b>Activity</b>	<b>Group</b>	<b>Date</b>	<b>Detail</b>
<b>Stakeholder meeting</b>	Key stakeholders	27 August 2012 12 midday to 2 pm	<p>One meeting was held with key stakeholders identified by Council. The meeting was held at the Cowra Council Chambers.</p> <p>Council sent personal invitations to stakeholders inviting them to identify issues and constraints they wished to be considered in the study and to provide input and feedback on potential heavy vehicle route options.</p> <p>16 stakeholders were invited to the meeting, of which 11 attended.</p> <p>The meeting was attended by three Council staff and two GHD staff, who facilitated the meeting.</p>
<b>Councillor meeting</b>	Local government	27 August 2012 2 pm to 4 pm	<p>One meeting was held with local Councillors at the Cowra Council Chambers.</p> <p>Councillors discussed the proposed route options in detail and were invited to raise any considerations and constraints they perceived.</p> <p>The meeting was attended by Council and two GHD staff, who facilitated the meeting</p>
<b>Community drop-in session</b>	Community	27 August 2012 4 pm and 7 pm.	<p>One community drop-in session was held at Council's temporary shopfront in Kendal Street Cowra.</p> <p>The session provided an opportunity for Cowra residents to speak with the project team about the study process, raise issues or concerns and provide feedback on the proposed route options. They were also encouraged to suggest additional options that they wanted to be considered.</p>

			The drop-in session was attended by Council and GHD staff.
<b>Stand at Cowra Show</b>	Community	11 & 12 September 2012 9 am to 7 pm	A project stand was erected at the Cowra Show to provide information on the study process to the broader community.  The stand was attended by Council technical staff and GHD's consultation manager who were on hand to offer technical advice and the opportunity for community feedback.
<b>Advertising</b>	All	24 & 31 August and 7 September	The community information sessions were advertised via a number of mediums, including: <ul style="list-style-type: none"> <li>• Posters at the Council shop front,</li> <li>• Council website</li> <li>• Advertisements in the Cowra Guardian</li> </ul>

## 2.2 Stakeholder meeting

On Monday 27 August 2012 GHD facilitated a meeting with key stakeholders identified by Council. Council invited representatives from local businesses, transport and freight companies, key business bodies and State government authorities to participate in the meeting which was held at the Cowra Shire Chambers.

16 stakeholders were invited to participate, of which 11 attended. Stakeholder details are detailed in the Table 2.

**Table 2 Stakeholder meeting attendance register**

Name	Organisation	Attendance
Pat Charnock	Cowra Bus Service	Yes
Ben Casey	President Cowra Business Chamber	No
Les Lawry	Cowra Business Chamber	Yes
James Keady	James P Keady & Co	Yes
George & Bill Kollas	Lachlan Radio Cabs	No
Phil Beer	Cowra Freight	Yes
Inspector Gerard Powell	Cowra Police	Yes
John Rankin	Natural Resource Management	Yes

	Advisory Committee	
Dylan Gower	Natural Resource Management Advisory Committee	Yes
Chris Cummins	Cowra Breakout River Meats	No
Glen Scott	Sarajane Furniture	Yes
John Thompson	Thompson's Transport	No
Doug Moore	RMS	Yes
Jay Ratnayake	RMS	No
Ian Robertson	Elders Rural	Yes
Geoff Amos	Geoff Amos Transport	Yes

### 2.3 Councillor meeting

On Monday 27 August 2012 GHD facilitated a meeting with local Councillors.

The Councillor meeting was attended by:

- Cowra Mayor, Cr Bill West;
- Deputy Mayor Ian Brown;
- Cr Bruce Miller;
- Cr Judi Smith;
- Dr Rob Watt;
- Cr Robert Bridges;
- Cr Ray Walsh; and
- Cr Peter Wright.

### 2.4 Community consultation

Community consultation undertaken between August 2012 and September 2012 aimed to provide information on the heavy vehicle bypass route options as developed during the Land-Use Strategy study. Initial community consultation was focussed on identifying a preferred route from the four options developed in the Land-Use Strategy, however after discussion with Council it was decided not to restrict the study process and instead invite the community to suggest other alternative options for consideration.

176 feedback forms were received during the August and September consultation period.

Respondents were encouraged to complete the feedback form during the drop in session but they were also able to return their form direct to Council Chambers, via email or post. Feedback forms

were accepted up until Friday 21 September, one week later than the advertised feedback closing date.

A large number of respondents recommended modifications or variations on the four proposed options, of which almost 20% (34 respondents) mapped an alternate route for consideration.

Most respondents were residents of Cowra or surrounding areas. 18 respondents identified they do not live in the town of Cowra, however live in the region. Four indicated they live in Darbys Falls, four live in Woodstock and five live in Wattamondara. Other respondents indicated they live in towns surrounding Cowra, including Grenfell, Lyndhurst, Noonbinna and the locality of Mt Collins. One respondent was visiting from Canberra.

### **3. Stakeholder and Councillor Consultation**

Stakeholder consultation undertaken between August 2012 and September 2012 included one meeting with key stakeholders and another with local Councillors. The aim of the meetings was to provide information on the study process and program, and discuss the four route options developed during the Land-Use Strategy study as well as other potential route options.

The invited stakeholder meeting was attended by a representative of Roads and Maritime Services (RMS) who provided technical advice on the proposed options, guidelines and considerations.

#### **3.2 Stakeholder feedback**

Stakeholders were asked to identify the opportunities and constraints of each proposed route option and suggest alternate routes or route modifications on a map.

Key issues raised during the meeting include:

- RMS representative believes the Blayney-Demondrille railway alignment is the best option
- "Shortest route will dictate the option taken"
- Concern was raised that, as has happened in other towns, heavy vehicle drivers may not use the bypass
- Questions were raised about the need for the bypass to be located near the industrial area and the need for truck stops
- It was suggested that mid-level rather than low-level bridges should be used for river crossings
- Suggestion for an east-west northern route closer to town along one of the existing streets
- RMS representative suggested that local traffic not be included in Bypass considerations

### 3.3 Councillor feedback

Councillors were asked to identify the positives and negatives of each proposed route option and to suggest alternate routes or route modifications on a map.

Key issues raised during the meeting include:

- Comment that the aim should be to designate a route for the long term and not become distracted by staged construction and affordability
- Requirement to link all main roads including Darbys Falls Road (to Wyangala Dam)
- Suggested a low level bridge link the disused rail corridor and Canowindra Road
- Avoid using existing streets as was done in Young
- Locate routes around the edge of town to minimise impacts on residential areas (i.e. Boundary/Airport Road)
- Concern about the cost of constructing mid-level bridge crossings

### 3.4 Comments on bypass route options

The following table outlines the positive and negative comments of each option during the Stakeholder meeting and Councillor meeting. The map showing the four possible route options identified in the Land-Use Strategy study was used in these meetings and additional route options were added to the map during discussions. This working map can be found in Appendix B. Please note the follow options are those which were mapped during the meetings.

**Table 3 Stakeholder and Councillor comments on suggested route option**

Option	Description	Positive	Negative
Option A	Combination of Option 3 and Option 2 continuing north along North Logan Road to Canowindra Road	<ul style="list-style-type: none"><li>• Councillor supported with a suggestion that trucks travel north and use George Russell Drive to access Mid-Western Highway</li><li>• Link to industrial area and airport (North Logan Road, Airport Road, Young Road)</li><li>• Removes heavy vehicles from Kendal Street</li><li>• Provides bypass for five arterial roads</li><li>• Concern regarding the</li></ul>	<ul style="list-style-type: none"><li>• Long route to Mid-Western Highway/Sydney Road from Canowindra Road</li><li>• Requires two bridges</li><li>•</li><li>•</li><li>• Potentially runs through</li></ul>

Option	Description	Positive	Negative
		benefit of continuing past Canowindra Road (i.e.closing the loop between Canowindra Road to Mid-Western Highway across flood plain)	Crown Land
<b>Option B</b>	Variation of Option 3 connecting to Grenfell Road via Young Road	<ul style="list-style-type: none"> <li>• Shorter route than Option 3</li> <li>• Offers staging potential</li> <li>• Potential shared rail/road bridge over river</li> <li>• Potential extension to Glen Logan Road</li> <li>• Sub-option via Waratah Street would avoid rail crossing</li> </ul>	<ul style="list-style-type: none"> <li>• Need to link to Young Road and Canowindra Road</li> <li>• Needs to be located further south to reduce impacts on residential area north of railway</li> <li>• Does not address northern areas</li> </ul>
<b>Option C</b>	Along disused railway corridor and crossing Lachlan River to join Canowindra Road	<ul style="list-style-type: none"> <li>• Shorter distance than Option 3</li> <li>• Shorter term option</li> <li>• Links to masterplan (connects playing fields, walkway potential)</li> </ul>	<ul style="list-style-type: none"> <li>• Councillor objection as it is not a feasible long-term option</li> <li>• Runs adjacent to sport field, pool and residential areas (2)</li> <li>• No linkage to Boorowa Road and Young Road</li> <li>• Possible contamination from rail</li> </ul>

## 4. Community feedback

A total of 176 community feedback forms were received between August 2012 and September 2012. Submissions received included Council/GHD supplied feedback forms, emails and letters. Many feedback forms contained comments about more than one issue.

Most respondents preferred route option 3 (91 respondents), however a large number of respondents (36 respondents) suggested an alternative other than those four possible route options identified in the Land-Use Strategy study. Of the 36 respondents who suggested an alternate route option, 23 suggested a combination of Option 3 and Option 2.

A map showing the key alternative options proposed by the community on the feedback forms can be found in Appendix C.

The key issues raised by the community during consultation include:

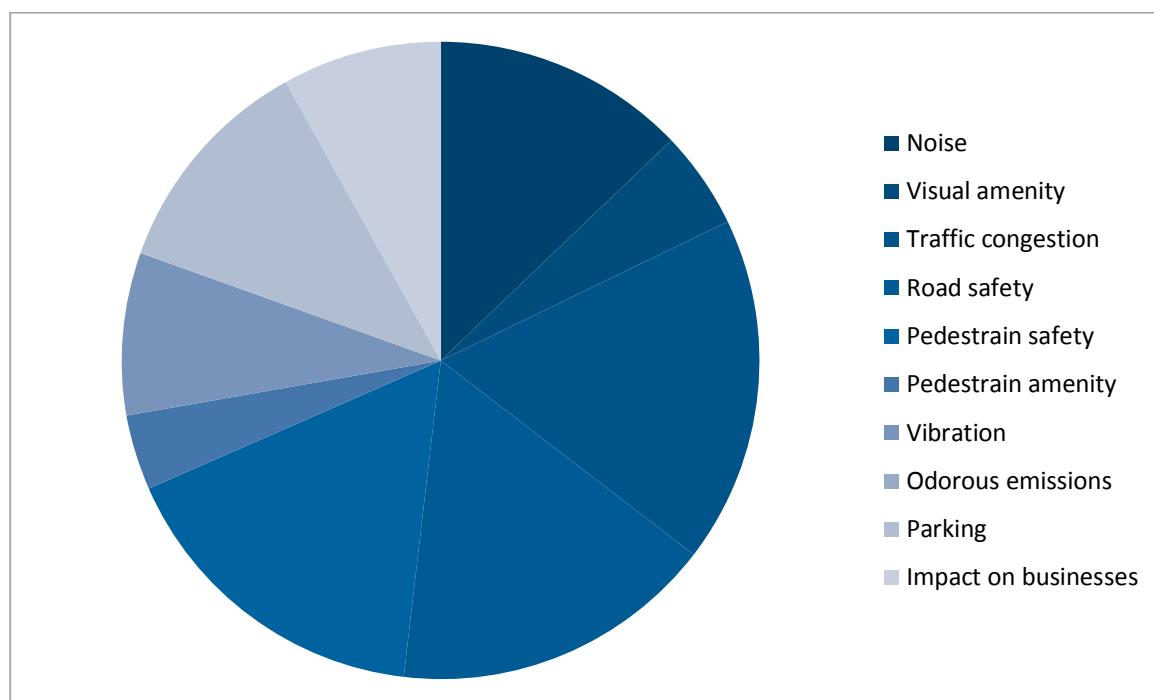
- Objection to Option 1 due to safety concerns for children and families entering and leaving the school located on Vaux Street
- Need for a bypass to be implemented to reduce heavy vehicle traffic volumes along the main street of Cowra
- Concern that bypass options will impact negatively on residential areas.

**Table 4 Community concerns regarding heavy vehicle travel through the centre of town**

Issue	Number of comments
Traffic congestion	124
Pedestrian safety	117
Road safety	116
Noise	91
Parking	81
Odorous emission	58
Impact on businesses	57
Visual amenity	35
Vibration	27
Pedestrian amenity	27
Other comments	<ul style="list-style-type: none"> <li>▸ Bypass is well overdue (3)</li> <li>▸ Local connections should be a secondary consideration</li> <li>▸ Need for a holistic development approach to transport planning</li> <li>▸ Need for ongoing consultation with regular road users (i.e. transport industry)</li> <li>▸ Vehicle breakdowns</li> <li>▸ Speed of vehicles travelling along the main roads (2)</li> <li>▸ Road damage (2)</li> <li>▸ Safety concerns caused by pedestrian impatience in crossing the road (2)</li> <li>▸ Concern about child road safety near local schools</li> <li>▸ Lack of space for heavy vehicles and farm machinery to travel easily</li> </ul>



**Figure 1 Issues of most concern to the community regarding heavy vehicle travel through the centre of town**



#### 4.1 Community feedback on the Land-Use Strategy route options

##### Option 1

Option	Count	Supporting comments
Option 1	5	<ul style="list-style-type: none"> <li>Short to medium term solution (less than 20 years) which is not reliant on government funding</li> <li>Accounts for Morongla Creek recreational through traffic (i.e. boat trailers, caravans)</li> <li>Safer option as it diverts traffic away from CBD</li> <li>Minimise current noise levels in main centre</li> </ul> <p><i>Minor variations to this route include:</i></p> <p>Include a link to Option 2 to Young Road and Grenfell Road</p> <p>Wide vehicles to be directed via Liverpool Street</p> <p>Continue route across Lachlan River to Boorowa Road</p>

Approximately eight responses raised objection to Option 1 as a possible heavy vehicle bypass of the Kendal Street business district. The key issue raised in these submissions is the safety of students entering and leaving Cowra Public School located on Vaux Street.

Other concerns regarding Option 1 included:

- Increased heavy vehicle traffic volumes (3)
- Student safety concerns (4)
- Impact on residential areas (2)
- Increased traffic speeds as a result of the implementation of the bypass
- Perceived reduction in parking spaces
- Difficult route for large vehicles to travel due to terrain and infrastructure (2)
- Air pollution
- Noise pollution (3)
- Concern the option will not fix the current issues regarding heavy vehicles (2)

The Cowra Public School Parents and Citizens Association submitted an objection letter to Option 1 signed by approximately 88 concerned parents.

Six responses requested Option 1 be removed from consideration.

## Option 2

Option	Count	Supporting comments
Option 2	30	<ul style="list-style-type: none"><li>• Another bridge is essential</li><li>• Minimum visual impact</li><li>• Least impact on residential areas and CBD (3)</li><li>• Minimum impact on current noise levels</li><li>• Most benefit to heavy vehicles</li><li>• Connection to all major roads</li></ul>

Respondents raised concern about the impact of Option 2 on local properties and the local agricultural industry. Comments were also made about the potential for flooding and related impacts on heavy vehicle traffic.

Community feedback includes:

- Concern about the serious impact of the proposed route on the operation of the Cowra Estate Vineyard. Passing vehicles along this route could carry diseases that could potentially threaten vines on both sides of Andersons Lane (2)
- The junction of the Boorowa Rd and Andersons Lane could be impacted by flooding from the Morongla Creek

- Option 2 is marked to travel through property
- Concern the route is too long and as such may not deter heavy vehicle traffic from using the main street

### Option 3

Option	Count	Supporting comments
Option 3	89	<ul style="list-style-type: none"> <li>• Most direct/logical route (8)</li> <li>• Most cost-effective (7)</li> <li>• Connects to major roads (3)</li> <li>• Least impact on local traffic</li> <li>• Least impact on schools and hospital (3)</li> <li>• Least impact on Agricultural businesses (2)</li> <li>• Minimal impact on CBD and residential properties (10)</li> </ul> <p><i>Variations to this route include:</i></p> <p>Follow the disused railway line (5)</p> <p>Inclusion of second bridge west of Grenfell Road to connect Boorowa Road and Young Road</p> <p>Link route to Canowindra Road</p>

Respondents raised concern about the existing bridge and the benefit of constructing a new bridge. Comments were also made about the environmental and social impacts of the route for the local community.

Community feedback includes:

- Concern the construction of a new bridge will cause delay – a low level route is a viable alternative
- A new bridge is required as the sharp turns coming off the existing bridge would make it difficult for heavy vehicle use
- Concern about the increase in noise levels and impact of safety
- Option 3 would impact on the Aboriginal community and the preschool located in the vicinity of the proposed route

## Option 4

Option	Count	Supporting comments
Option 4	2	<ul style="list-style-type: none"> <li>Least impact on residents</li> <li>Distance from town</li> <li>Planning ahead should the Airport be extended in the future – cost saving measure</li> </ul>

Respondents raised concern about the cost of the proposed route and the perceived benefits.

## 4.2 Alternative route suggestions from community

Alternative route suggestion			
Option	Suggested variation	Count	Supporting comments
Option 5  Combination of Option 2 and Option 3	<i>North along Airport Road to Grenfell Road</i>	17	<ul style="list-style-type: none"> <li>Concerns regarding the proposal to turn Brougham Street into part of the bypass</li> <li>The shortest route (3)</li> <li>Potential to be built in stages</li> <li>Appears to be the most cost-effective option utilising existing infrastructure (2)</li> <li>Least impact on main residential and CBD area (4)</li> <li>Avoids the town centre</li> <li>Route can lead onto all major roads leaving/entering town</li> <li>There are plenty of roads leading back into town</li> </ul> <p><i>Variations on this route include:</i></p> <p>2 routes follow the existing railway line adjacent to Fishburn Street</p> <p>1 route continues along Killara Road to meet</p>

Alternative route suggestion			
Option	Suggested variation	Count	Supporting comments
			Canowindra Road at the intersection at Doncaster Drive  1 route includes an additional route from the Mid-Western Highway to Canowindra Road
	<i>North along Young Road to Grenfell Road</i>	<b>2</b>	<ul style="list-style-type: none"> <li>• Turn the Grenfell Road traffic back to “Rose Garden” and utilise the rest area</li> <li>• Continuing along Airport Road travels through new residential area and is not necessary</li> </ul>
	<i>Meets Boorowra Road</i>	<b>4</b>	<ul style="list-style-type: none"> <li>• It will re-direct large B-doubles away from the main street, increasing safety for cars and pedestrians, and decreasing the noise and road damage in the main street.</li> <li>• Avoids residential area and schools</li> <li>• Avoids travel along Airport Road</li> </ul>
	<b><i>TOTAL (Option 5)</i></b>	<b>23</b>	
<b>Option 6</b>  <b>Continuation of Canowindra Road with new bridge crossing connecting Grenfell Road</b>	<i>Additional route linking Mid-Western Highway and Canowindra Road</i>  <i>(3 responses)</i>	<b>4</b>	<p>3 responses mapped an additional route, marked as Stage 2. Stage 2 would link Mid-Western Highway and Canowindra Road across the flood plain north-west of the town, enabling traffic travelling in this direction to bypass the town.</p> <p><i>Comments in support of the additional route include:</i></p> <ul style="list-style-type: none"> <li>• The addition of the second route linking Mid-Western Highway and Canowindra Road across the flood plain is in accordance with government policy</li> <li>• Roundabout at the junction of the proposed bridge linking Grenfell Road and Redfern</li> </ul>

### Alternative route suggestion

Option	Suggested variation	Count	Supporting comments
			Street/Canowindra Road
<b>Option 7</b>  <b>Use disused rail corridor through centre of the town</b>	<i>Bridge linking Grenfell Road and Redfern Street/Canowindra Road east of the Racecourse</i>  <i>(3 responses)</i>	<b>4</b>	<ul style="list-style-type: none"> <li>• Quick and short-term fix with perceived long-term benefits (2)</li> <li>• Option connects all major roads</li> <li>• Minimal environmental impacts</li> <li>• Cost-effective alternative</li> </ul> <p>1 response included an additional three roundabouts at key intersections:</p> <ul style="list-style-type: none"> <li>• Substitution of stop lights with roundabout at Lachlan/Kendal Street intersection</li> <li>• Large roundabout at Mid-Western Highway/Lachlan Valley Way intersection</li> </ul>
	<i>Bridge to Taragala Street, continuing along Neila Street to join the disused Railway Corridor then Campbell Street to meet Mid-Western Highway</i>	<b>1</b>	<ul style="list-style-type: none"> <li>• Construct new bridge with pedestrian walkway attached to connect with playing fields on the eastern side of the Lachlan River</li> <li>• The disused rail corridor has high sides which would stop much vehicular noise (extra sound proofing would be required)</li> <li>• Future possibility of constructing large roundabout</li> </ul>
	<b>TOTAL (Option 7)</b>	<b>5</b>	
<b>Option 8</b>  <b>Loop from Mid-</b>	<i>Loop from Mid-Western Highway to Boorowa Road</i>	<b>1</b>	No supporting comments



Alternative route suggestion			
Option	Suggested variation	Count	Supporting comments
<b>Western</b>	<i>Loop from Mid-Western Highway along Westville Road, Biini Creek Road to meet Canowindra Road</i>	<b>1</b>	No supporting comments
	<b>TOTAL (Option 8)</b>	<b>2</b>	
<b>Option 9</b> <b>Fly-over bridge on Kendal or Vaux Street</b>		<b>1</b>	<ul style="list-style-type: none"> <li>• Bridge exclusively for the use of heavy vehicles</li> </ul>
<b>Option 10</b> <b>Combination of Option 3 and Option 4</b>	<i>Use of defunct railway bridge crossing the Lachlan River as single lane road traffic bridge</i>	<b>1</b>	<ul style="list-style-type: none"> <li>• Divert large heavy vehicles away from the main street</li> <li>• Local traffic and cars would continue to use the present bridge</li> <li>• Best solution would be the provision of a new road to the north, across the flat area of the Agricultural Research Station and crossing the river via a new bridge</li> </ul>
<b>TOTAL ALTERNATE SUGGESTIONS</b>		<b>36</b>	

### 4.3 General comments

A small number of respondents commented on the project planning process, particularly in relation to the potential impact of the bypass on the economic livelihood and quality of life of the community.

The key issues raised by in the responses include:

- Comments urging Council to implement the bypass to reduce traffic volumes and improve community safety and quality of life (6)
- Concern about the potential loss of business due to reduced passing traffic volumes as a result of the bypass (3)
- Queries regarding the impact of a “tight” study program on route selection process

Comments were also made about the current study being undertaken by Council to upgrade Kendal Street, including:

- Objection to the inclusion of a median strip along Kendal Street due to the potential obstruction to traffic flow (2)
- Comments urging Council to postpone the Kendal Street upgrade until a bypass option has been selected
- Need for more vegetation around Kendal Street

## **5. Conclusion**

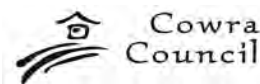
Extensive community and stakeholder consultation was undertaken between August and September 2012 to identify community issues and opinions about the constraints and benefits of the four route options developed during the Land-Use Strategy in 2009. Initially the consultation program was focussed on assessing only these four options, however after discussion with Council it was agreed that the consultation program would be broadened to give key stakeholders and the community the opportunity to propose additional potential route options for Council to consider.

There was a high level of community response to the consultation process with 176 feedback forms received between August and September 2012. Option 3 was the most popular route option, with around 65% either selecting it as their preferred option (91 respondents) or suggesting elements of Option 3 as part of an alternate route (23 respondents). The most popular alternate route suggested was a combination of Option 3 and Option 2. There was a relatively high level of opposition to Option 1 due to safety concerns related to the proximity of the route to the local school.

Analysis of community feedback indicates a relatively high level of support for a heavy vehicle bypass due to the positive pedestrian, traffic and community impacts. The key concerns raised about the heavy vehicle bypass included the potential impact of a bypass on residential areas, traffic and pedestrian safety risks and increased traffic volumes.

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Appendix A  
Consultation materials



## FEEDBACK FORM

### Cowra Shire Council Heavy Vehicle Bypass Study

Cowra Shire Council is seeking to develop a heavy vehicles bypass for Cowra. The community can provide feedback on the issues and concerns arising from heavy vehicles passing through town and potential options for an alternative route.

Name: .....  
Address: .....  
Phone number: .....  
Email: .....

Please indicate which issues concern you most in terms of heavy vehicles travelling through the centre of town.

Noise	<input type="checkbox"/>	Pedestrian amenity	<input type="checkbox"/>
Visual amenity	<input type="checkbox"/>	Vibration	<input type="checkbox"/>
Traffic congestion	<input type="checkbox"/>	Odourous emissions	<input type="checkbox"/>
Road safety	<input type="checkbox"/>	Parking	<input type="checkbox"/>
Pedestrian safety	<input type="checkbox"/>	Impact on business	<input type="checkbox"/>

Other.....  
.....

Do you have a suggested route option you wish to be considered in the study?

**(Please mark the route on the map on the back of this form).**

This is my preferred option because.....  
.....  
.....  
.....

**Or**

Do you prefer one of the possible route options from the Land Use Strategy (2009) that are displayed?

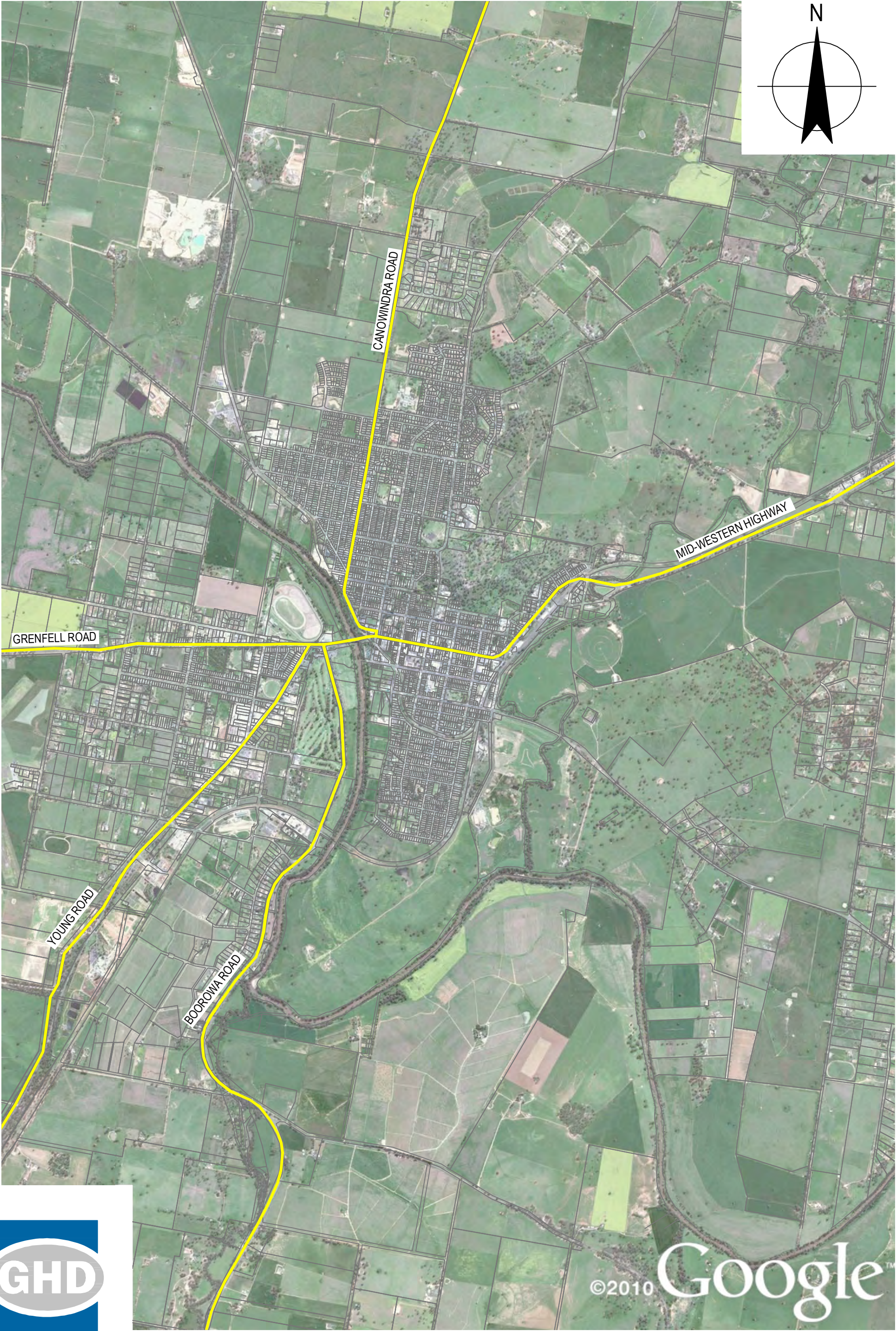
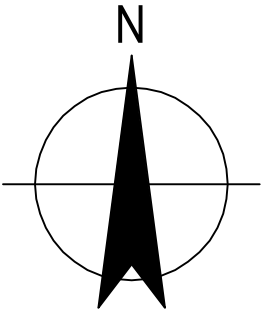
Option 1 ☐ Option 2 ☐ Option 3 ☐ Option 4 ☐

Other comments?.....  
.....  
.....  
.....

For further information, please contact Belinda Thompson on 9239 7235 or [belinda.thompson@ghd.com](mailto:belinda.thompson@ghd.com)  
Completed forms should be returned by Friday 14 September to:  
GHD Reply Paid 83475 Sydney NSW 2000  
or the front counter of Cowra Council Chambers.

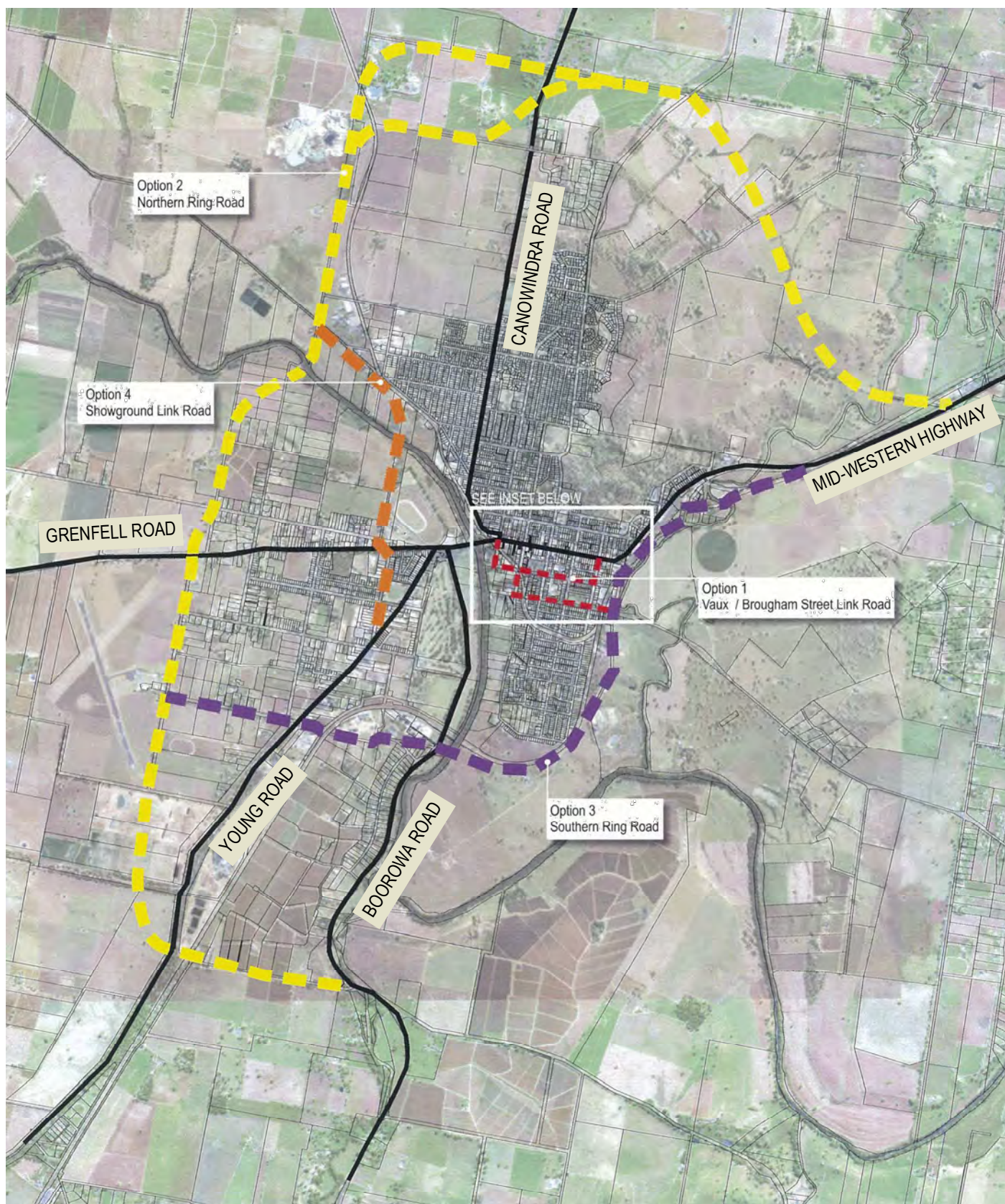


Please mark your preferred option for the Heavy Vehicle Bypass





# Possible route options identified in the Land-Use Strategy 2009



## LEGEND

OPTION 1



OPTION 2



OPTION 3



OPTION 4



0 500 1000 1500 2000 2500m



SCALE 1:50,000 AT ORIGINAL SIZE

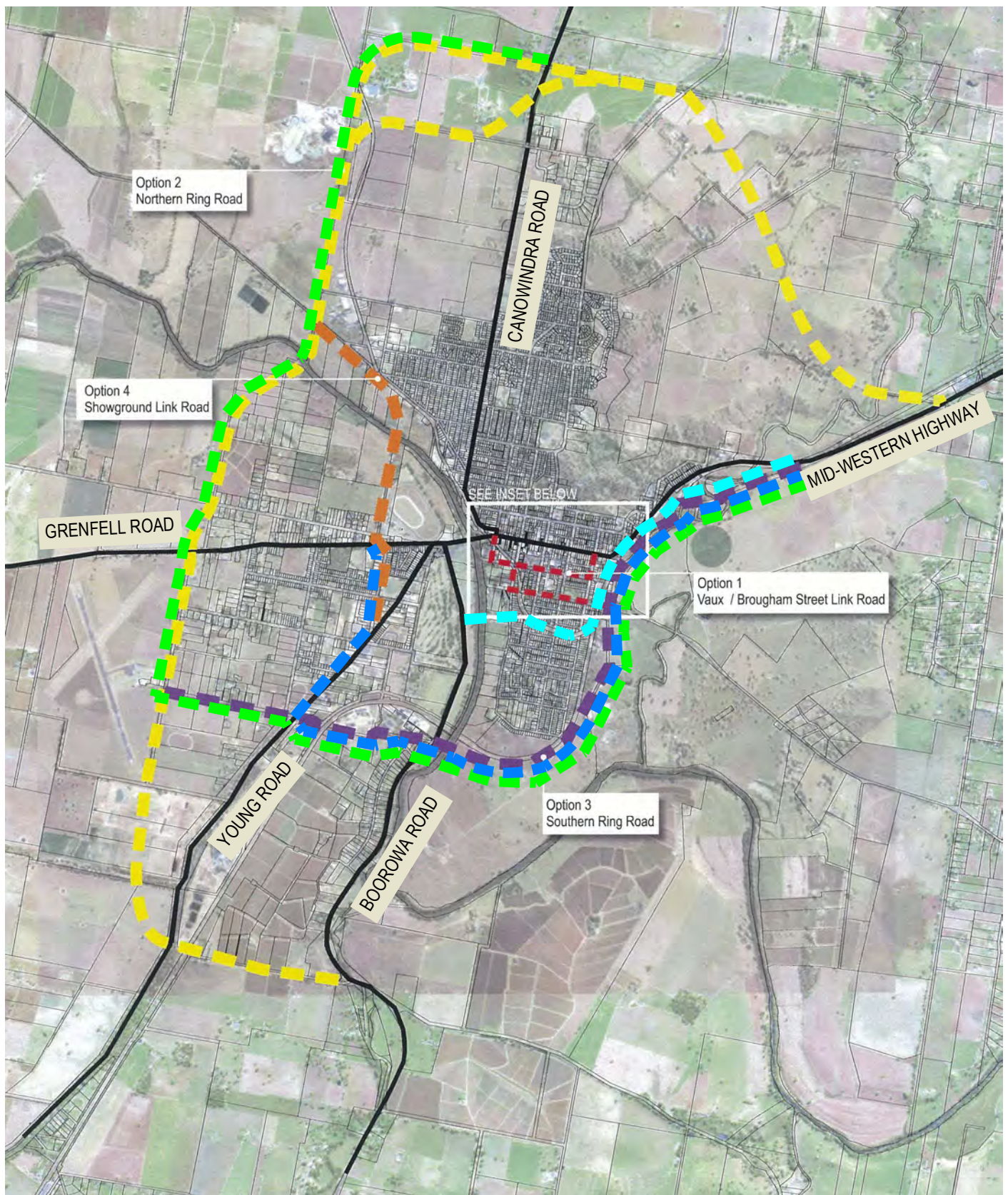
POSSIBLE ROUTE OPTIONS IDENTIFIED IN THE LAND-USE STRATEGY 2009



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## Appendix B

Stakeholder suggested route options



## LEGEND

OPTION 1 --- OPTION 2 --- OPTION 3 --- OPTION 4 --- OPTION A --- OPTION B --- OPTION C ---

0 500 1000 1500 2000 2500m  
 SCALE 1:50,000 AT ORIGINAL SIZE



COWRA SHIRE COUNCIL  
 HEAVY VEHICLE  
 BYPASS STUDY  
 STAKEHOLDER  
 CONSULTATION MAP

Job Number 22-16385  
 Revision A  
 Date OCT 2012

Figure A1

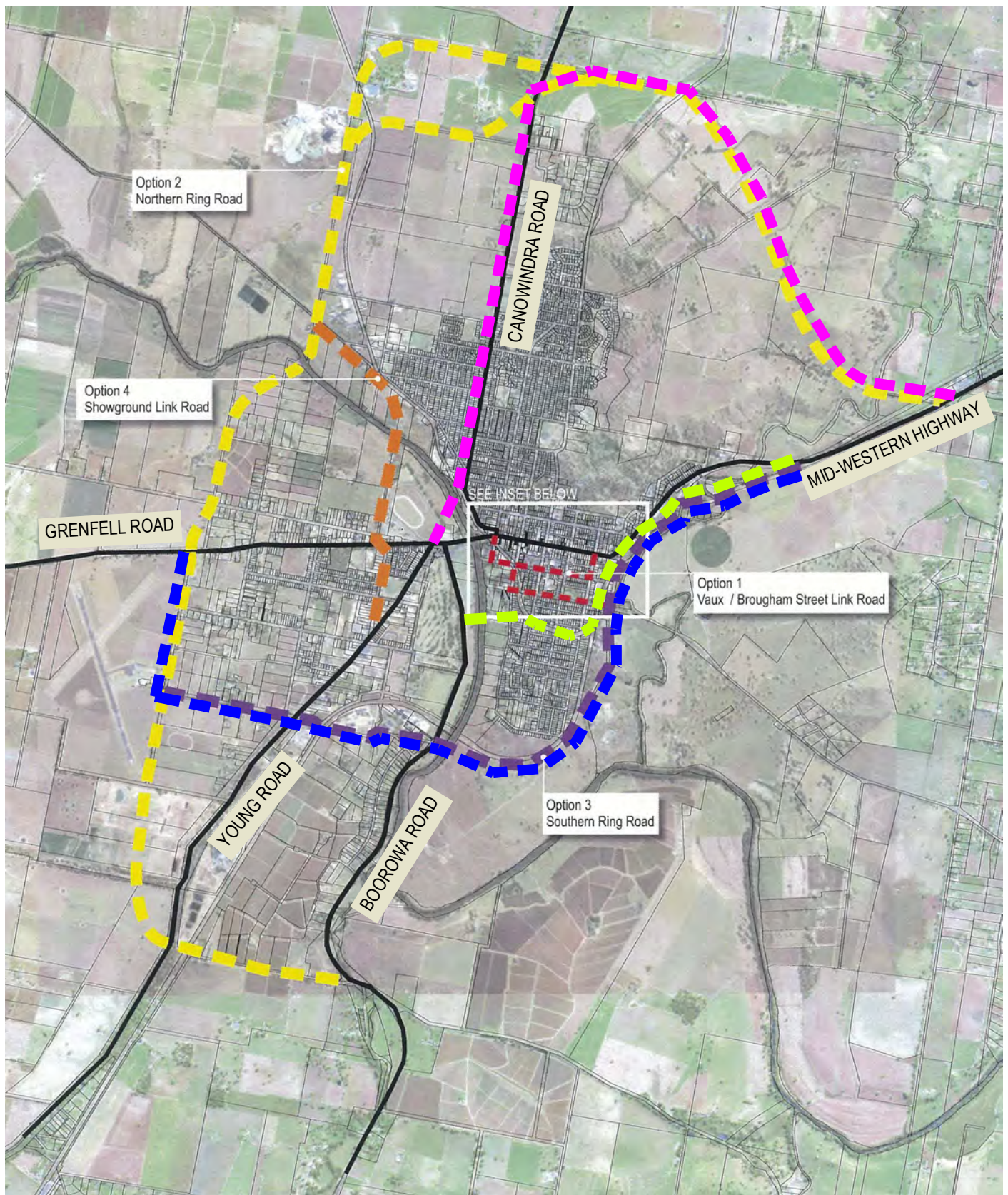
Suite 1, 62 Clarence Street, Port Macquarie NSW 2444 T 61 2 6586 8700 F 61 2 6586 8701 E pqmail@ghd.com W www.ghd.com

DRAFT

## Appendix C

### Community suggested route options





## LEGEND

OPTION 1  
 - - - - -

OPTION 2  
 - - - - -

OPTION 3  
 - - - - -

OPTION 4  
 - - - - -

OPTION 5  
 - - - - -

OPTION 6  
 - - - - -

OPTION 7  
 - - - - -

0 500 1000 1500 2000 2500m

SCALE 1:50,000 AT ORIGINAL SIZE



COWRA SHIRE COUNCIL  
 HEAVY VEHICLE  
 BYPASS STUDY  
 COMMUNITY  
 CONSULTATION MAP

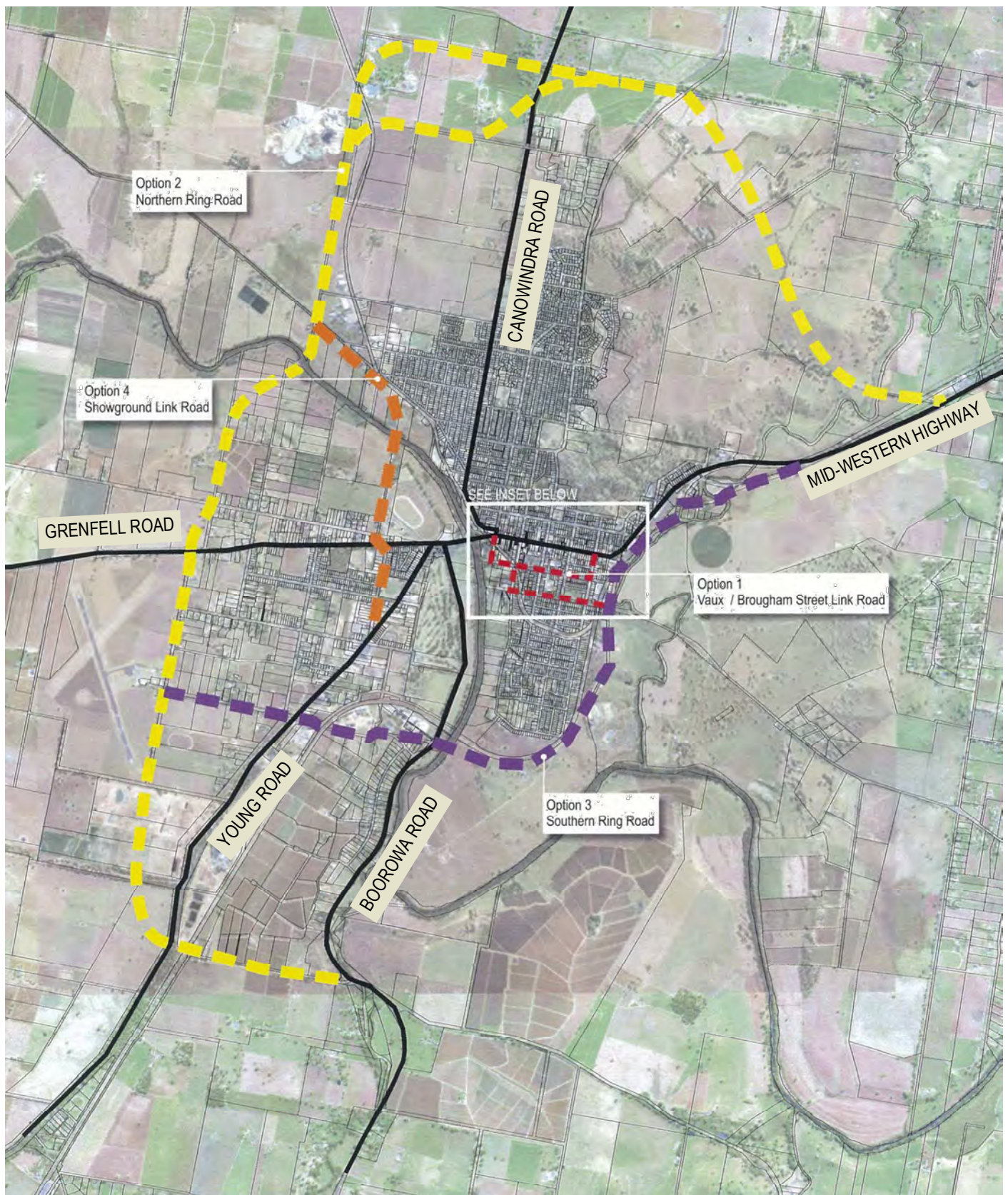
Job Number 22-16385  
 Revision A  
 Date OCT 2012

Figure A2

Suite 1, 62 Clarence Street, Port Macquarie NSW 2444 T 61 2 6586 8700 F 61 2 6586 8701 E pqmail@ghd.com W www.ghd.com

## **Appendix F** – Cowra Shire land-use strategy options





## LEGEND

OPTION 1



OPTION 2



OPTION 3



OPTION 4



0 500 1000 1500 2000 2500m

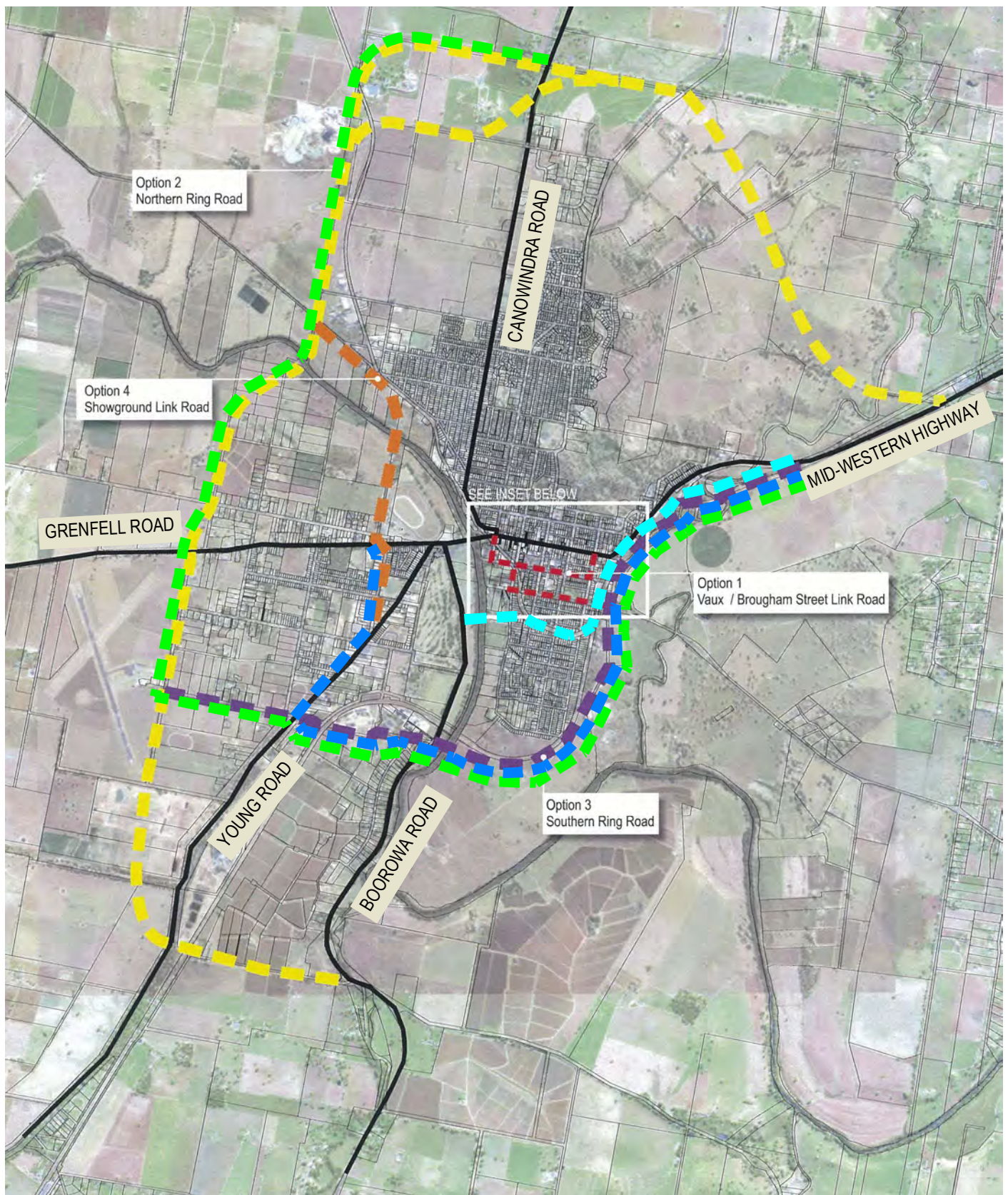


SCALE 1:50,000 AT ORIGINAL SIZE

POSSIBLE ROUTE OPTIONS IDENTIFIED IN THE LAND-USE STRATEGY 2009



## **Appendix G** – Additional route options



## LEGEND

OPTION 1    OPTION 2    OPTION 3    OPTION 4    OPTION A    OPTION B    OPTION C  
 - - - - -    - - - - -    - - - - -    - - - - -    - - - - -    - - - - -    - - - - -

0    500    1000    1500    2000    2500m  
 SCALE 1:50,000 AT ORIGINAL SIZE



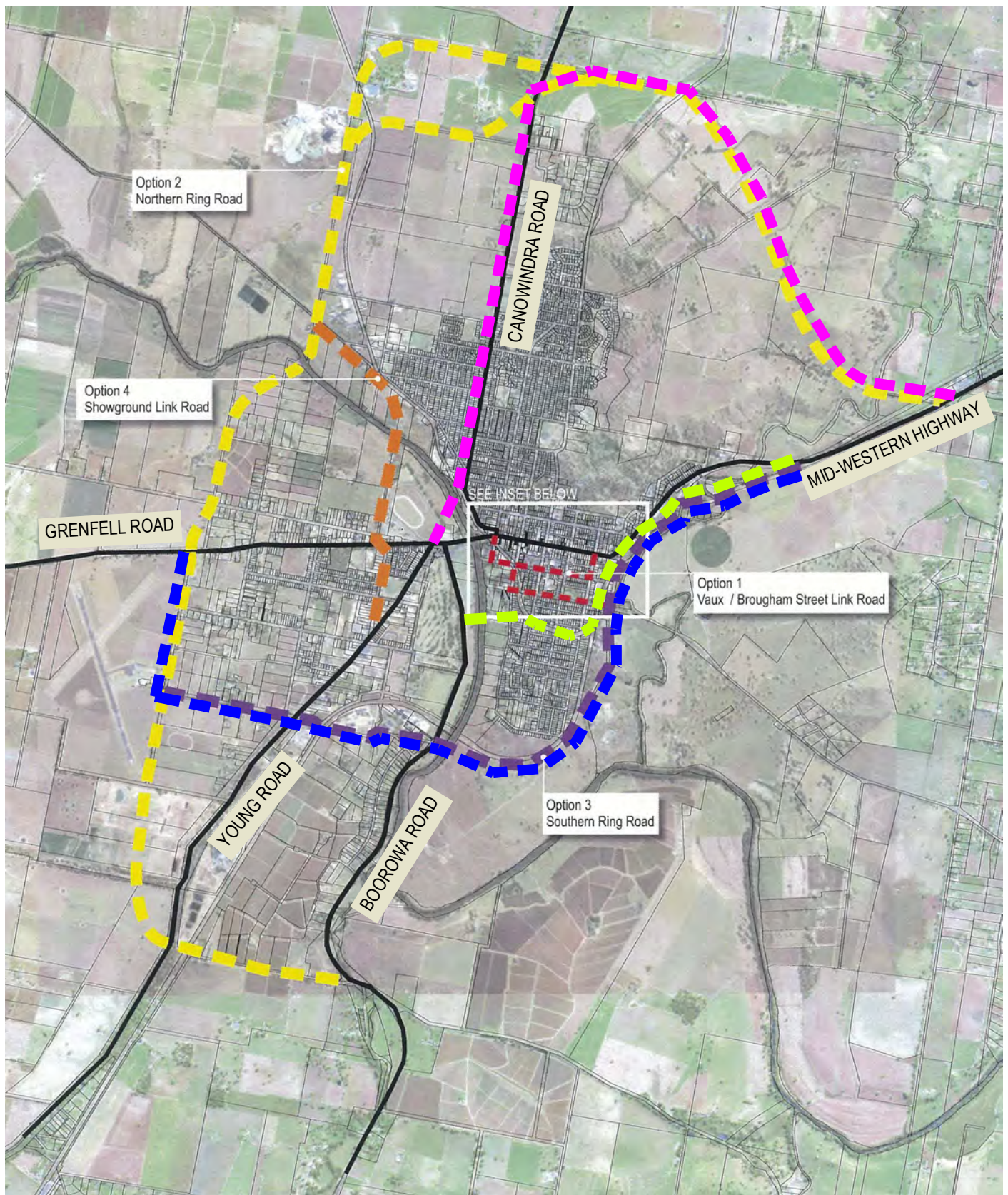
COWRA SHIRE COUNCIL  
 HEAVY VEHICLE  
 BYPASS STUDY  
 STAKEHOLDER  
 CONSULTATION MAP

Job Number | 22-16385  
 Revision | A  
 Date | OCT 2012

Figure A1

Suite 1, 62 Clarence Street, Port Macquarie NSW 2444    T 61 2 6586 8700    F 61 2 6586 8701    E pqmail@ghd.com    W www.ghd.com





## LEGEND

OPTION 1  
 - - - - -

OPTION 2  
 - - - - -

OPTION 3  
 - - - - -

OPTION 4  
 - - - - -

OPTION 5  
 - - - - -

OPTION 6  
 - - - - -

OPTION 7  
 - - - - -



COWRA SHIRE COUNCIL  
 HEAVY VEHICLE  
 BYPASS STUDY  
 COMMUNITY  
 CONSULTATION MAP

Job Number 22-16385  
 Revision A  
 Date OCT 2012

Figure A2

Suite 1, 62 Clarence Street, Port Macquarie NSW 2444 T 61 2 6586 8700 F 61 2 6586 8701 E pqmail@ghd.com W www.ghd.com

## **Appendix H** – SIDRA output

# INTERSECTION SUMMARY

Site: Mid Western Hwy/ Young Rd  
- Existing Control AM

Existing Intersection of Mid Western Hwy/ Young Rd  
Giveway Control AM  
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	867 veh/h	1041 pers/h
Percent Heavy Vehicles	11.3 %	
Degree of Saturation	0.336	
Practical Spare Capacity	138.4 %	
Effective Intersection Capacity	2585 veh/h	
Control Delay (Total)	1.23 veh-h/h	1.48 pers-h/h
Control Delay (Average)	5.1 sec	5.1 sec
Control Delay (Worst Lane)	13.1 sec	
Control Delay (Worst Movement)	13.1 sec	13.1 sec
Geometric Delay (Average)	P sec	
Stop-Line Delay (Average)	P sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	1.7 veh	
95% Back of Queue - Distance (Worst Lane)	13.0 m	
Total Effective Stops	303 veh/h	364 pers/h
Effective Stop Rate	0.35 per veh	0.35 per pers
Proportion Queued	0.14	0.14
Performance Index	12.5	12.5
Travel Distance (Total)	525.6 veh-km/h	630.8 pers-km/h
Travel Distance (Average)	606 m	606 m
Travel Time (Total)	10.0 veh-h/h	12.0 pers-h/h
Travel Time (Average)	41.3 sec	41.3 sec
Travel Speed	52.8 km/h	52.8 km/h
Cost (Total)	374.80 \$/h	374.80 \$/h
Fuel Consumption (Total)	61.2 L/h	
Carbon Dioxide (Total)	153.7 kg/h	
Hydrocarbons (Total)	0.209 kg/h	
Carbon Monoxide (Total)	8.98 kg/h	
NOx (Total)	0.313 kg/h	

P: You need to Process this Site (F9) for this variable to be computed.

Level of Service (LOS) Method: Delay (RTA NSW).

NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	416,337 veh/y	499,604 pers/y
Delay	591 veh-h/y	710 pers-h/y
Effective Stops	145,524 veh/y	174,629 pers/y
Travel Distance	252,308 veh-km/y	302,770 pers-km/y
Travel Time	4,780 veh-h/y	5,736 pers-h/y
Cost	179,905 \$/y	179,905 \$/y
Fuel Consumption	29,371 L/y	
Carbon Dioxide	73,755 kg/y	
Hydrocarbons	100 kg/y	
Carbon Monoxide	4,312 kg/y	
NOx	150 kg/y	



# INTERSECTION SUMMARY

Site: Mid Western Hwy/ Young Rd  
- Existing Control PM

Existing Intersection of Mid Western Hwy/ Young Rd  
Giveway Control PM  
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	973 veh/h	1167 pers/h
Percent Heavy Vehicles	7.0 %	
Degree of Saturation	0.532	
Practical Spare Capacity	50.4 %	
Effective Intersection Capacity	1828 veh/h	
Control Delay (Total)	1.89 veh-h/h	2.27 pers-h/h
Control Delay (Average)	7.0 sec	7.0 sec
Control Delay (Worst Lane)	16.5 sec	
Control Delay (Worst Movement)	16.5 sec	16.5 sec
Geometric Delay (Average)	P sec	
Stop-Line Delay (Average)	P sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	3.9 veh	
95% Back of Queue - Distance (Worst Lane)	29.2 m	
Total Effective Stops	452 veh/h	542 pers/h
Effective Stop Rate	0.46 per veh	0.46 per pers
Proportion Queued	0.21	0.21
Performance Index	15.9	15.9
Travel Distance (Total)	589.1 veh-km/h	707.0 pers-km/h
Travel Distance (Average)	606 m	606 m
Travel Time (Total)	11.7 veh-h/h	14.0 pers-h/h
Travel Time (Average)	43.2 sec	43.2 sec
Travel Speed	50.5 km/h	50.5 km/h
Cost (Total)	429.01 \$/h	429.01 \$/h
Fuel Consumption (Total)	67.1 L/h	
Carbon Dioxide (Total)	168.2 kg/h	
Hydrocarbons (Total)	0.248 kg/h	
Carbon Monoxide (Total)	10.99 kg/h	
NOx (Total)	0.371 kg/h	

P: You need to Process this Site (F9) for this variable to be computed.

Level of Service (LOS) Method: Delay (RTA NSW).

NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	466,863 veh/y	560,236 pers/y
Delay	908 veh-h/y	1,090 pers-h/y
Effective Stops	216,848 veh/y	260,217 pers/y
Travel Distance	282,792 veh-km/y	339,350 pers-km/y
Travel Time	5,601 veh-h/y	6,721 pers-h/y
Cost	205,925 \$/y	205,925 \$/y
Fuel Consumption	32,201 L/y	
Carbon Dioxide	80,746 kg/y	
Hydrocarbons	119 kg/y	
Carbon Monoxide	5,275 kg/y	
NOx	178 kg/y	

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**SIDRA**  
**INTERSECTION**

# INTERSECTION SUMMARY

Site: Mid Western Hwy/ Boorowa Rd - Existing Control AM

Existing Intersection of Mid Western Hwy and Boorowa Rd  
 Giveway Control AM  
 Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	974 veh/h	1168 pers/h
Percent Heavy Vehicles	10.5 %	
Degree of Saturation	0.428	
Practical Spare Capacity	86.9 %	
Effective Intersection Capacity	2275 veh/h	
Control Delay (Total)	1.24 veh-h/h	1.49 pers-h/h
Control Delay (Average)	4.6 sec	4.6 sec
Control Delay (Worst Lane)	34.8 sec	
Control Delay (Worst Movement)	34.8 sec	34.8 sec
Geometric Delay (Average)	P sec	
Stop-Line Delay (Average)	P sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	1.8 veh	
95% Back of Queue - Distance (Worst Lane)	14.2 m	
Total Effective Stops	224 veh/h	269 pers/h
Effective Stop Rate	0.23 per veh	0.23 per pers
Proportion Queued	0.12	0.12
Performance Index	13.2	13.2
Travel Distance (Total)	589.9 veh-km/h	707.9 pers-km/h
Travel Distance (Average)	606 m	606 m
Travel Time (Total)	11.0 veh-h/h	13.2 pers-h/h
Travel Time (Average)	40.8 sec	40.8 sec
Travel Speed	53.4 km/h	53.4 km/h
Cost (Total)	404.64 \$/h	404.64 \$/h
Fuel Consumption (Total)	62.5 L/h	
Carbon Dioxide (Total)	156.9 kg/h	
Hydrocarbons (Total)	0.204 kg/h	
Carbon Monoxide (Total)	7.44 kg/h	
NOx (Total)	0.294 kg/h	

P: You need to Process this Site (F9) for this variable to be computed.

Level of Service (LOS) Method: Delay (RTA NSW).

NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	467,368 veh/y	560,842 pers/y
Delay	594 veh-h/y	713 pers-h/y
Effective Stops	107,697 veh/y	129,237 pers/y
Travel Distance	283,160 veh-km/y	339,792 pers-km/y
Travel Time	5,298 veh-h/y	6,357 pers-h/y
Cost	194,229 \$/y	194,229 \$/y
Fuel Consumption	30,001 L/y	
Carbon Dioxide	75,331 kg/y	
Hydrocarbons	98 kg/y	
Carbon Monoxide	3,573 kg/y	
NOx	141 kg/y	



# INTERSECTION SUMMARY

Site: Mid Western Hwy/ Boorowa Rd - Existing Control PM

Existing Intersection of Mid Western Hwy and Boorowa Rd  
 Giveway Control PM  
 Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1101 veh/h	1321 pers/h
Percent Heavy Vehicles	6.1 %	
Degree of Saturation	0.512	
Practical Spare Capacity	56.3 %	
Effective Intersection Capacity	2151 veh/h	
Control Delay (Total)	1.55 veh-h/h	1.85 pers-h/h
Control Delay (Average)	5.1 sec	5.1 sec
Control Delay (Worst Lane)	38.2 sec	
Control Delay (Worst Movement)	38.2 sec	38.2 sec
Geometric Delay (Average)	P sec	
Stop-Line Delay (Average)	P sec	
Intersection Level of Service (LOS)	NA	
95% Back of Queue - Vehicles (Worst Lane)	2.3 veh	
95% Back of Queue - Distance (Worst Lane)	17.0 m	
Total Effective Stops	276 veh/h	331 pers/h
Effective Stop Rate	0.25 per veh	0.25 per pers
Proportion Queued	0.13	0.13
Performance Index	15.3	15.3
Travel Distance (Total)	667.1 veh-km/h	800.5 pers-km/h
Travel Distance (Average)	606 m	606 m
Travel Time (Total)	12.6 veh-h/h	15.2 pers-h/h
Travel Time (Average)	41.3 sec	41.3 sec
Travel Speed	52.8 km/h	52.8 km/h
Cost (Total)	448.41 \$/h	448.41 \$/h
Fuel Consumption (Total)	65.0 L/h	
Carbon Dioxide (Total)	162.9 kg/h	
Hydrocarbons (Total)	0.226 kg/h	
Carbon Monoxide (Total)	7.89 kg/h	
NOx (Total)	0.315 kg/h	

P: You need to Process this Site (F9) for this variable to be computed.

Level of Service (LOS) Method: Delay (RTA NSW).

NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model used.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	528,505 veh/y	634,206 pers/y
Delay	742 veh-h/y	890 pers-h/y
Effective Stops	132,346 veh/y	158,815 pers/y
Travel Distance	320,195 veh-km/y	384,234 pers-km/y
Travel Time	6,068 veh-h/y	7,282 pers-h/y
Cost	215,236 \$/y	215,236 \$/y
Fuel Consumption	31,190 L/y	
Carbon Dioxide	78,175 kg/y	
Hydrocarbons	109 kg/y	
Carbon Monoxide	3,786 kg/y	
NOx	151 kg/y	

# INTERSECTION SUMMARY

Site: Mid Western Hwy/ Boorowa Rd - Roundabout Control AM

Intersection of Mid Western Hwy and Boorowa Rd  
Roundabout Control AM  
Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	974 veh/h	1168 pers/h
Percent Heavy Vehicles	10.5 %	
Degree of Saturation	0.340	
Practical Spare Capacity	149.8 %	
Effective Intersection Capacity	2861 veh/h	
Control Delay (Total)	2.03 veh-h/h	2.44 pers-h/h
Control Delay (Average)	7.5 sec	7.5 sec
Control Delay (Worst Lane)	12.9 sec	
Control Delay (Worst Movement)	12.9 sec	12.9 sec
Geometric Delay (Average)	P sec	
Stop-Line Delay (Average)	P sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	2.3 veh	
95% Back of Queue - Distance (Worst Lane)	17.1 m	
Total Effective Stops	512 veh/h	615 pers/h
Effective Stop Rate	0.53 per veh	0.53 per pers
Proportion Queued	0.27	0.27
Performance Index	16.7	16.7
Travel Distance (Total)	595.3 veh-km/h	714.3 pers-km/h
Travel Distance (Average)	611 m	611 m
Travel Time (Total)	12.1 veh-h/h	14.5 pers-h/h
Travel Time (Average)	44.8 sec	44.8 sec
Travel Speed	49.2 km/h	49.2 km/h
Cost (Total)	470.88 \$/h	470.88 \$/h
Fuel Consumption (Total)	81.8 L/h	
Carbon Dioxide (Total)	205.4 kg/h	
Hydrocarbons (Total)	0.303 kg/h	
Carbon Monoxide (Total)	16.13 kg/h	
NOx (Total)	0.503 kg/h	

P: You need to Process this Site (F9) for this variable to be computed.

Level of Service (LOS) Method: Delay (RTA NSW).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	467,368 veh/y	560,842 pers/y
Delay	977 veh-h/y	1,172 pers-h/y
Effective Stops	245,966 veh/y	295,159 pers/y
Travel Distance	285,738 veh-km/y	342,885 pers-km/y
Travel Time	5,813 veh-h/y	6,975 pers-h/y
Cost	226,024 \$/y	226,024 \$/y
Fuel Consumption	39,262 L/y	
Carbon Dioxide	98,573 kg/y	
Hydrocarbons	146 kg/y	
Carbon Monoxide	7,743 kg/y	
NOx	241 kg/y	

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**INTERSECTION**

# INTERSECTION SUMMARY

Site: Mid Western Hwy/ Boorowa Rd - Roundabout Control PM

Intersection of Mid Western Hwy and Boorowa Rd  
Roundabout Control  
Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1101 veh/h	1321 pers/h
Percent Heavy Vehicles	6.1 %	
Degree of Saturation	0.339	
Practical Spare Capacity	150.7 %	
Effective Intersection Capacity	3247 veh/h	
Control Delay (Total)	2.31 veh-h/h	2.77 pers-h/h
Control Delay (Average)	7.6 sec	7.6 sec
Control Delay (Worst Lane)	13.1 sec	
Control Delay (Worst Movement)	13.1 sec	13.1 sec
Geometric Delay (Average)	P sec	
Stop-Line Delay (Average)	P sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	2.2 veh	
95% Back of Queue - Distance (Worst Lane)	16.1 m	
Total Effective Stops	587 veh/h	705 pers/h
Effective Stop Rate	0.53 per veh	0.53 per pers
Proportion Queued	0.30	0.30
Performance Index	19.0	19.0
Travel Distance (Total)	673.6 veh-km/h	808.3 pers-km/h
Travel Distance (Average)	612 m	612 m
Travel Time (Total)	13.8 veh-h/h	16.5 pers-h/h
Travel Time (Average)	45.0 sec	45.0 sec
Travel Speed	48.9 km/h	48.9 km/h
Cost (Total)	514.59 \$/h	514.59 \$/h
Fuel Consumption (Total)	83.8 L/h	
Carbon Dioxide (Total)	210.0 kg/h	
Hydrocarbons (Total)	0.325 kg/h	
Carbon Monoxide (Total)	16.40 kg/h	
NOx (Total)	0.509 kg/h	

P: You need to Process this Site (F9) for this variable to be computed.

Level of Service (LOS) Method: Delay (RTA NSW).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	528,505 veh/y	634,206 pers/y
Delay	1,110 veh-h/y	1,332 pers-h/y
Effective Stops	281,886 veh/y	338,263 pers/y
Travel Distance	323,332 veh-km/y	387,999 pers-km/y
Travel Time	6,611 veh-h/y	7,933 pers-h/y
Cost	247,002 \$/y	247,002 \$/y
Fuel Consumption	40,224 L/y	
Carbon Dioxide	100,811 kg/y	
Hydrocarbons	156 kg/y	
Carbon Monoxide	7,874 kg/y	
NOx	244 kg/y	

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**INTERSECTION**

# INTERSECTION SUMMARY

Site: Mid Western Hwy/ Boorowa Rd - Signal Control AM

Intersection of Mid Western Hwy and Boorowa Rd  
Traffic Signal Control AM  
Signals - Fixed Time Cycle Time = 60 seconds (Practical Cycle Time)

Intersection Performance - Hourly Values			
Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total)	974 veh/h	2 ped/h	1170 pers/h
Percent Heavy Vehicles	10.5 %		
Degree of Saturation	0.578	0.001	
Practical Spare Capacity	55.7 %		
Effective Intersection Capacity	1685 veh/h		
Control Delay (Total)	4.36 veh-h/h	0.01 ped-h/h	5.24 pers-h/h
Control Delay (Average)	16.1 sec	22.6 sec	16.1 sec
Control Delay (Worst Lane)	35.4 sec		
Control Delay (Worst Movement)	35.4 sec	24.3 sec	35.4 sec
Geometric Delay (Average)	P sec		
Stop-Line Delay (Average)	P sec		
Intersection Level of Service (LOS)	LOS B	LOS C	
95% Back of Queue - Vehicles (Worst Lane)	8.7 veh		
95% Back of Queue - Distance (Worst Lane)	65.8 m		
Total Effective Stops	667 veh/h	2 ped/h	802 pers/h
Effective Stop Rate	0.68 per veh	0.87 per ped	0.68 per pers
Proportion Queued	0.76	0.87	0.76
Performance Index	32.1	0.0	32.1
Travel Distance (Total)	559.0 veh-km/h	0.1 ped-km/h	670.9 pers-km/h
Travel Distance (Average)	574 m	35 m	573 m
Travel Time (Total)	16.0 veh-h/h	0.0 ped-h/h	19.2 pers-h/h
Travel Time (Average)	59.0 sec	49.5 sec	59.0 sec
Travel Speed	35.0 km/h	2.5 km/h	35.0 km/h
Cost (Total)	544.76 \$/h	0.58 \$/h	545.34 \$/h
Fuel Consumption (Total)	74.0 L/h		
Carbon Dioxide (Total)	185.9 kg/h		
Hydrocarbons (Total)	0.278 kg/h		
Carbon Monoxide (Total)	12.44 kg/h		
NOx (Total)	0.385 kg/h		

P: You need to Process this Site (F9) for this variable to be computed.

Level of Service (LOS) Method: Delay (RTA NSW).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SIDRA Standard Delay Model used.

Intersection Performance - Annual Values			
Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total)	467,368 veh/y	960 ped/y	561,802 pers/y
Delay	2,092 veh-h/y	6 ped-h/y	2,517 pers-h/y
Effective Stops	319,988 veh/y	832 ped/y	384,818 pers/y
Travel Distance	268,334 veh-km/y	34 ped-km/y	322,035 pers-km/y
Travel Time	7,666 veh-h/y	13 ped-h/y	9,213 pers-h/y
Cost	261,486 \$/y	277 \$/y	261,764 \$/y
Fuel Consumption	35,539 L/y		
Carbon Dioxide	89,225 kg/y		
Hydrocarbons	133 kg/y		
Carbon Monoxide	5,971 kg/y		
NOx	185 kg/y		

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# INTERSECTION SUMMARY

Site: Mid Western Hwy/ Boorowa Rd - Signal Control PM

Intersection of Mid Western Hwy and Boorowa Rd  
Traffic Signal Control PM  
Signals - Fixed Time Cycle Time = 60 seconds (Practical Cycle Time)

Intersection Performance - Hourly Values			
Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total)	1101 veh/h	106 ped/h	1427 pers/h
Percent Heavy Vehicles	6.1 %		
Degree of Saturation	0.752	0.044	
Practical Spare Capacity	19.7 %		
Effective Intersection Capacity	1464 veh/h		
Control Delay (Total)	5.62 veh-h/h	0.66 ped-h/h	7.41 pers-h/h
Control Delay (Average)	18.4 sec	22.6 sec	18.7 sec
Control Delay (Worst Lane)	35.7 sec		
Control Delay (Worst Movement)	35.7 sec	24.3 sec	35.7 sec
Geometric Delay (Average)	P sec		
Stop-Line Delay (Average)	P sec		
Intersection Level of Service (LOS)	LOS B	LOS C	
95% Back of Queue - Vehicles (Worst Lane)	12.8 veh		
95% Back of Queue - Distance (Worst Lane)	94.0 m		
Total Effective Stops	824 veh/h	92 ped/h	1081 pers/h
Effective Stop Rate	0.75 per veh	0.87 per ped	0.76 per pers
Proportion Queued	0.81	0.87	0.81
Performance Index	38.7	2.0	40.6
Travel Distance (Total)	632.2 veh-km/h	3.7 ped-km/h	762.4 pers-km/h
Travel Distance (Average)	574 m	35 m	534 m
Travel Time (Total)	18.8 veh-h/h	1.5 ped-h/h	24.0 pers-h/h
Travel Time (Average)	61.4 sec	49.5 sec	60.5 sec
Travel Speed	33.7 km/h	2.5 km/h	31.8 km/h
Cost (Total)	621.98 \$/h	30.62 \$/h	652.61 \$/h
Fuel Consumption (Total)	78.6 L/h		
Carbon Dioxide (Total)	197.0 kg/h		
Hydrocarbons (Total)	0.312 kg/h		
Carbon Monoxide (Total)	13.25 kg/h		
NOx (Total)	0.405 kg/h		

P: You need to Process this Site (F9) for this variable to be computed.

Level of Service (LOS) Method: Delay (RTA NSW).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

SIDRA Standard Delay Model used.

Intersection Performance - Annual Values			
Performance Measure	Vehicles	Pedestrians	Persons
Demand Flows (Total)	528,505 veh/y	50,880 ped/y	685,086 pers/y
Delay	2,699 veh-h/y	319 ped-h/y	3,557 pers-h/y
Effective Stops	395,610 veh/y	44,096 ped/y	518,828 pers/y
Travel Distance	303,464 veh-km/y	1,783 ped-km/y	365,940 pers-km/y
Travel Time	9,016 veh-h/y	700 ped-h/y	11,519 pers-h/y
Cost	298,551 \$/y	14,700 \$/y	313,251 \$/y
Fuel Consumption	37,728 L/y		
Carbon Dioxide	94,555 kg/y		
Hydrocarbons	150 kg/y		
Carbon Monoxide	6,362 kg/y		
NOx	194 kg/y		

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**SIDRA**  
**INTERSECTION**

# INTERSECTION SUMMARY

Site: Combined Olympic/ Boorowa Roundabout AM

Intersection of Mid Western Hwy/ Olympic Hwy/ Boorowa Rd  
Proposed Combined Roundabout AM  
Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1288 veh/h	1546 pers/h
Percent Heavy Vehicles	10.7 %	
Degree of Saturation	0.379	
Practical Spare Capacity	124.0 %	
Effective Intersection Capacity	3395 veh/h	
Control Delay (Total)	2.03 veh-h/h	2.44 pers-h/h
Control Delay (Average)	5.7 sec	5.7 sec
Control Delay (Worst Lane)	8.7 sec	
Control Delay (Worst Movement)	12.8 sec	12.8 sec
Geometric Delay (Average)	P sec	
Stop-Line Delay (Average)	P sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	2.6 veh	
95% Back of Queue - Distance (Worst Lane)	19.9 m	
Total Effective Stops	586 veh/h	704 pers/h
Effective Stop Rate	0.46 per veh	0.46 per pers
Proportion Queued	0.41	0.41
Performance Index	21.5	21.5
Travel Distance (Total)	827.6 veh-km/h	993.2 pers-km/h
Travel Distance (Average)	642 m	642 m
Travel Time (Total)	16.4 veh-h/h	19.7 pers-h/h
Travel Time (Average)	45.8 sec	45.8 sec
Travel Speed	50.4 km/h	50.4 km/h
Cost (Total)	624.75 \$/h	624.75 \$/h
Fuel Consumption (Total)	104.6 L/h	
Carbon Dioxide (Total)	262.7 kg/h	
Hydrocarbons (Total)	0.369 kg/h	
Carbon Monoxide (Total)	18.31 kg/h	
NOx (Total)	0.606 kg/h	

P: You need to Process this Site (F9) for this variable to be computed.

Level of Service (LOS) Method: Delay (RTA NSW).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	618,442 veh/y	742,131 pers/y
Delay	976 veh-h/y	1,171 pers-h/y
Effective Stops	281,429 veh/y	337,715 pers/y
Travel Distance	397,260 veh-km/y	476,712 pers-km/y
Travel Time	7,875 veh-h/y	9,450 pers-h/y
Cost	299,882 \$/y	299,882 \$/y
Fuel Consumption	50,203 L/y	
Carbon Dioxide	126,076 kg/y	
Hydrocarbons	177 kg/y	
Carbon Monoxide	8,786 kg/y	
NOx	291 kg/y	

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SIDRA INTERSECTION 5.1.2.1953

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**SIDRA**  
**INTERSECTION**

# INTERSECTION SUMMARY

Site: Combined Olympic/ Boorowa  
Roundabout PM

Intersection of Mid Western Hwy/ Olympic Hwy/ Boorowa Rd  
Proposed Combined Roundabout PM  
Roundabout

Intersection Performance - Hourly Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	1498 veh/h	1797 pers/h
Percent Heavy Vehicles	6.7 %	
Degree of Saturation	0.415	
Practical Spare Capacity	105.0 %	
Effective Intersection Capacity	3613 veh/h	
Control Delay (Total)	2.45 veh-h/h	2.94 pers-h/h
Control Delay (Average)	5.9 sec	5.9 sec
Control Delay (Worst Lane)	9.2 sec	
Control Delay (Worst Movement)	13.5 sec	13.5 sec
Geometric Delay (Average)	P sec	
Stop-Line Delay (Average)	P sec	
Intersection Level of Service (LOS)	LOS A	
95% Back of Queue - Vehicles (Worst Lane)	3.0 veh	
95% Back of Queue - Distance (Worst Lane)	22.4 m	
Total Effective Stops	716 veh/h	860 pers/h
Effective Stop Rate	0.48 per veh	0.48 per pers
Proportion Queued	0.47	0.47
Performance Index	25.5	25.5
Travel Distance (Total)	965.1 veh-km/h	1158.1 pers-km/h
Travel Distance (Average)	644 m	644 m
Travel Time (Total)	19.3 veh-h/h	23.2 pers-h/h
Travel Time (Average)	46.4 sec	46.4 sec
Travel Speed	50.0 km/h	50.0 km/h
Cost (Total)	712.06 \$/h	712.06 \$/h
Fuel Consumption (Total)	112.7 L/h	
Carbon Dioxide (Total)	282.5 kg/h	
Hydrocarbons (Total)	0.418 kg/h	
Carbon Monoxide (Total)	19.85 kg/h	
NOx (Total)	0.652 kg/h	

P: You need to Process this Site (F9) for this variable to be computed.

Level of Service (LOS) Method: Delay (RTA NSW).

Intersection LOS value for Vehicles is based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model used.

Intersection Performance - Annual Values		
Performance Measure	Vehicles	Persons
Demand Flows (Total)	718,989 veh/y	862,787 pers/y
Delay	1,175 veh-h/y	1,410 pers-h/y
Effective Stops	343,899 veh/y	412,678 pers/y
Travel Distance	463,259 veh-km/y	555,910 pers-km/y
Travel Time	9,274 veh-h/y	11,129 pers-h/y
Cost	341,787 \$/y	341,787 \$/y
Fuel Consumption	54,093 L/y	
Carbon Dioxide	135,613 kg/y	
Hydrocarbons	201 kg/y	
Carbon Monoxide	9,528 kg/y	
NOx	313 kg/y	

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**SIDRA**  
**INTERSECTION**



## **Appendix I** – Capital costs

Section			Road	Upgrade	Bridge	PA	New Road	Rd Upgrade	Bridge	PA Agric	PA Indust	Total	Description
From	To	Distance	Rate/km	Rate/km	Rate/m	Cost/m	Cost	Cost	Cost	Cost	Cost	Cost	
11,800	12,000	200	2,147,617			12	429,523			2,400		431,923	new road PA
11,750	11,800	50			30,000				1,500,000			1,500,000	bridge over rail
11,450	11,750	300	2,147,617			12	644,285			3,600		647,885	new road PA
11,400	11,450	50			30,000				1,500,000			1,500,000	bridge over river
7,400	11,400	4,000	2,147,617			12	8,590,467			48,000		8,638,467	new road PA
6,700	7,400	700	2,147,617				1,503,332					1,503,332	new road existing reserve
5,600	6,700	1,100	2,147,617				2,362,378					2,362,378	new road existing reserve
4,700	5,600	900	2,147,617			720	1,932,855				648,000	2,580,855	new road PA
2,600	4,700	2,100										0	sealed road good alignment
2,270	2,600	330	2,147,617			12	708,714			3,960		712,674	new road PA
2,200	2,270	70			30,000				2,100,000			2,100,000	New river crossing
1,400	2,200	800	2,147,617			12	1,718,093			9,600		1,727,693	new road - PA
500	1,400	900	2,147,617				1,932,855					1,932,855	new road in reserve
0	500	500	2,147,617			720	1,073,808				360,000	1,433,808	new road PA
0	1,350	1,350		200,000				270,000				270,000	Airport Rd to Boundary Rd sealed
1,350	2,600	1,250		200,000				250,000				250,000	Boundary Rd sealed
2,600	4,150	1,550	2,147,617			720	3,328,806				1,116,000	4,444,806	New road and PA
4,150	4,300	150			30,000				4,500,000			4,500,000	New river crossing
4,300	5,800	1,500	2,147,617			720	3,221,425				1,080,000	4,301,425	New road and PA
5,800	7,500	1,700	2,147,617				3,650,949					3,650,949	Upgrade/realign Campbell St
7,500	7,900	400	2,147,617			720	859,047				288,000	1,147,047	Upgrade/realign Campbell St
7,900	8,300	400	2,147,617			720	859,047				288,000	1,147,047	Upgrade/realign Campbell St
8,300	8,330	30			30,000				900,000			900,000	Waugoola Creek crossing
8,330	8,400	70	2,147,617				150,333					150,333	Upgrade/realign Campbell St
<b>TOTAL</b>												<b>47,833,478</b>	

Total length		20,400
New length		15,350
Upgrade		2,600

PA agric					67,560	67,560
PA indust					3,780,000	3,780,000
New road		32,965,918				32,965,918
New Bridge			10,500,000			10,500,000
Road upgrade			520,000			520,000
Total						<b>47,833,478</b>

Maintenance cost	2900 per km =	290	per m	provided by Council
Maintenance cost =	5,205,500			

Section			Road	Upgrade	Bridge	PA	New Road	Rd Upgrade	Bridge	PA Agric	PA Indust	Total	Description
From	To	Distance	Rate/km	Rate/km	Rate/m	Cost/m	Cost	Cost	Cost	Cost	Cost	Cost	
													Existing William St
													Existing Olympic Hwy
2600	4150	1550	2,147,617			\$720	\$3,328,806				\$1,116,000	\$4,444,806	New road and PA
4150	4300	150			\$30,000				\$4,500,000			\$4,500,000	New river crossing
4300	5800	1500	2,147,617			\$720	\$3,221,425				\$1,080,000	\$4,301,425	New road and PA
5800	7500	1700	2,147,617				\$3,650,949					\$3,650,949	Upgrade/realign Campbell St
7500	7900	400	2,147,617			\$720	\$859,047				\$288,000	\$1,147,047	Upgrade/realign Campbell St
7900	8300	400	2,147,617			\$720	\$859,047				\$288,000	\$1,147,047	Upgrade/realign Campbell St
8300	8330	30			\$30,000				\$900,000			\$900,000	Waugoola Creek crossing
8330	8400	70	2,147,617				\$150,333					\$150,333	Upgrade/realign Campbell St
<b>TOTAL</b>												<b>\$20,241,606</b>	

Total length		5800
New road length		5620
Upgrade		0

PA agric					0	0
PA indust					2,772,000	2,772,000
New road		12,069,606				12,069,606
New Bridge			5,400,000			5,400,000
Road upgrade			0			0
Total						<b>20,241,606</b>

Maintenance cost	2900 per km =	290	per m	provided by Council
Maintenance cost =	1,629,800			

Section			Road	Upgrade	Bridge	PA	New Road	Rd Upgrade	Bridge	PA Agric	PA Indust	Total	Description
From	To	Distance	Rate/km	Rate/km	Rate/m	Cost/m	Cost	Cost	Cost	Cost	Cost	Cost	
0	1350	1350		200,000				270,000				270,000	Airport Rd to Boundary Rd sealed
1350	2600	1250		200,000				250,000				250,000	Boundary Rd sealed
2600	4150	1550	2,147,617			720	3,328,806				1,116,000	4,444,806	New road and PA
4150	4300	150			\$30,000				4,500,000			4,500,000	New river crossing
4300	5800	1500	2,147,617			720	3,221,425				1,080,000	4,301,425	New road and PA
5800	7500	1700	2,147,617				3,650,949					3,650,949	Upgrade/realign Campbell St
7500	7900	400	2,147,617			720	859,047				288,000	1,147,047	Upgrade/realign Campbell St
7900	8300	400	2,147,617			720	859,047				288,000	1,147,047	Upgrade/realign Campbell St
8300	8330	30			\$30,000				900,000			900,000	Waugoola Creek crossing
8330	8400	70	2,147,617				150,333					150,333	Upgrade/realign Campbell St
<b>TOTAL</b>												<b>20,761,606</b>	

Total length		8400
New road length		5620
Upgrade		2,600

PA agric						0		0
PA indust							2,772,000	2,772,000
New road		12,069,606						12,069,606
New Bridge				5,400,000				5,400,000
Road upgrade			520,000					520,000
Total								<b>20,761,606</b>

Maintenance cost	2900 per km =	290	per m	provided by Council
Maintenance cost =	2,383,800			

## Cowra Alternative Traffic Route

### New Road per km cost

Width formation		12	Assume 2x1.0m seal shoulders, 2x1.5 unsealed shoulder, 2x3.5m lanes						
Clearing		\$ 60,000							
Earthworks		\$ 400,000	1m average cut/fill						
Select		\$ 162,000	300mm select layer						
Subbase		\$ 252,000	300mm select base						
Base		\$ 288,000	300mm select subbase						
2 coat seal		\$ 72,000	10/14mm seal						
Drainage (open drainage)		\$ 150,000							
Guard Rails/sign/Linemarking		\$ 150,000							
		\$ 1,534,012							
Contingency	40%	\$ 613,605							
		\$ 2,147,617							

### Mid level Bridge per metre cost

		\$ 25,000	Assume 2x1.5m seal shoulders, 2x3.5m lanes and \$2500/ m2						
Contingency	20%	\$ 5,000							
		\$ 30,000							

### Property Acquisition per m cost

agricultural land		12	Assume 24 metre wide reserve and property cost of		\$0.50	per m2
industrial land		720	Assume 24 metre wide reserve and property cost of		\$30.00	per m2

### Road Widening

		200,000	per km	per km	200	per m			
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## **Appendix J** – Travel time, VKT and crash savings

Option A					Dist (km)	TT (mins)		Comment
				8	8400	1.8	1.00	from Google maps
				8400	8000	0.4	0.34	70 approaching intersection
				8000	4500	3.5	2.63	80
				4500	3400	1.1	0.94	70 approaching intersection with Boorowa Rd
				3400	2900	0.5	0.43	70
				2900	2600	0.3	0.30	60 approaching intersection with Young Rd
				2600	1350	1.25	1.50	50 adjacent residences Boundary Rd
				1350	0	1.35	1.62	50 adjacent residences Airport Rd
				600	0	0.6	0.51	70 adjacent residences Killara Rd
				6100	600	5.5	3.30	100
				6300	6100	0.2	0.15	80 approaching intersection with Calowindra Rd
				6500	6300	0.2	0.17	70 approaching intersection with Calowindra Rd
				7000	6500	0.5	0.43	70 approaching intersection with Calowindra Rd
				7300	7000	0.3	0.23	80 approaching intersection with Calowindra Rd
				12000	7300	4.7	2.82	100
						<b>16.37</b>		

#### TT Savings 2014

OD	Existing 2WAY TT (min)	2WAY TT (min)	TT Savings (mins)	vpd	veh-hrs per day	veh-hrs per yr	Rate (\$/veh-hr)	Cost savings per \$/yr
A-B	17.40	17.52	-0.12	170	-0.34	-123	29.02	-\$3,560
C-B	16.60	11.28	5.32	237	21.01	7667	29.02	\$222,517
D-B	17.00	9.82	7.18	37	4.47	1631	29.02	\$47,341
E-B	21.40	7.59	13.81	6	1.49	545	29.02	\$15,809
			26.19		26.63	9720		<b>\$282,107</b>
								<b>TOTAL TT Savings</b>

#### VOC Savings 2014

OD	Existing 2WAY TT (min)	2WAY TT (min)	TT Savings (mins)	vpd	vkt per day	vkt per year	Rate (\$/km)	Cost savings per \$/yr
A-B	17.40		-2.90	170	-493	-180010	0.26	-\$47,343
C-B	16.60		-0.50	237	-118	-43223	0.26	-\$11,368
D-B	17.00		-0.10	37	-4	-1363	0.26	-\$359
E-B	21.40		2.60	6	17	6153	0.26	\$1,618
					-598	-218444		<b>-\$57,451</b>
								<b>TOTAL VOC Savings</b>

#### TT Savings 2044

OD	Existing 2WAY TT (min)	2WAY TT (min)	TT Savings (mins)	vpd	veh-hrs per day	veh-hrs per yr	Rate (\$/veh-hr)	Cost savings per \$/yr
A-B	17.40	17.52	-0.12	425	-0.84	-307	29.02	-\$8,900
C-B	16.60	11.28	5.32	592	52.51	19167	29.02	\$556,292
D-B	17.00	9.82	7.18	93	11.17	4078	29.02	\$118,354
E-B	21.40	7.59	13.81	16	3.73	1362	29.02	\$39,523
			26.19		66.58	24300		<b>\$705,268</b>
								<b>TOTAL TT Savings</b>

#### VOC Savings 2044

OD	Existing 2WAY TT (min)	2WAY TT (min)	TT Savings (mins)	vpd	vkt per day	vkt per year	Rate (\$/km)	Cost savings per \$/yr
A-B	17.40		-2.90	425	-1233	-450026	0.26	-\$118,357
C-B	16.60		-0.50	592	-296	-108058	0.26	-\$28,419
D-B	17.00		-0.10	93	-9	-3408	0.26	-\$896
E-B	21.40		2.60	16	42	15383	0.26	\$4,046
					-1496	-546109		<b>-\$143,627</b>
								<b>TOTAL VOC Savings</b>

Assumed growth rate

5%

Option B					Dist (km)	TT (mins)		Comment
			B	8400	1.8	1.00		from Google maps
			8400	8000	0.4	0.34	70	approaching intersection
			8000	4500	3.5	2.63	80	
			4500	3400	1.1	0.94	70	approaching intersection with Boorowa Rd
			3400	2900	0.5	0.43	70	
			2900	2600	0.3	0.30	60	approaching intersection with Young Rd
					1.05	1.05	60	Existing Young Road
			5900	5020	0.88	1.06	50	Existing William st
					1.8	2.20		At Airport rd
					11.33	9.95		

#### TT Savings 2014

OD	Existing 2W	Option TT 2W	TT Savings (mins)	vpd	veh-hrs per day	veh-hrs per yr	Rate (\$/veh-hr)	Cost savings per \$/yr	
A-B	17.4	19.89	-2.49	170	-7.06	-2577	29.02	-74,780	
C-B	16.6	11.28	5.32	237	21.01	7667	29.02	\$222,517	
D-B	17	9.82	7.18	37	4.47	1631	29.02	\$47,341	
E-B	21.4		21.40	6	2.31	844	29.02	\$24,498	
			31.41		20.73	7566		\$219,576	TOTAL TT Savings

#### VOC Savings 2014

OD			Travel dist reductn (km)	vpd	vkt per day	vkt per year	Rate (\$/km)	Cost savings per \$/yr	
A-B			-4.03	170	-685	-250152	0.26	-\$65,790	
C-B			-0.50	237	-118	-43223	0.26	-\$11,368	
D-B			-0.10	37	-4	-1363	0.26	-\$359	
E-B			0.00	6	0	0	0.26	\$0	
					-808	-294739		-\$77,516	TOTAL VOC Savings

#### TT Savings 2044

OD	Existing 2W	Option TT 2W	TT Savings (mins)	vpd	veh-hrs per day	veh-hrs per yr	Rate (\$/veh-hr)	Cost savings per \$/yr	
A-B	17.4	19.89	-2.49	425	-17.65	-6442	29.02	-\$186,950	
C-B	16.6	11.28	5.32	592	52.51	19167	29.02	\$556,292	
D-B	17	9.82	7.18	93	11.17	4078	29.02	\$118,354	
E-B	21.4		21.40	16	5.78	2110	29.02	\$61,246	
			31.41		51.82	18914		\$548,941	TOTAL TT Savings

#### VOC Savings 2044

OD			Travel dist reductn (km)	vpd	vkt per day	vkt per year	Rate (\$/km)	Cost savings per \$/yr	
A-B			-4.03	425	-1713	-625381	0.26	-\$164,475	
C-B			-0.50	592	-296	-108058	0.26	-\$28,419	
D-B			-0.10	93	-9	-3408	0.26	-\$896	
E-B			0.00	16	0	0	0.26	\$0	
					-2019	-736847		-\$193,791	TOTAL VOC Savings

Assumed growth rate

5%

Option 3					Dist (km)	TT (mins)		Comment
			B	8400	1.8	1.00		from Google maps
			8400	8000	0.4	0.34	70	approaching intersection
			8000	4500	3.5	2.63	80	
			4500	3400	1.1	0.94	70	approaching intersection with Boorowa Rd
			3400	2900	0.5	0.43	70	
			2900	2600	0.3	0.30	60	approaching intersection with Young Rd
			2600	1350	1.25	1.50	50	adjacent residences Boundary Rd
			1350	0	1.35	1.62	50	adjacent residences Airport Rd
					<b>10.2</b>	<b>8.76</b>		

#### Travel Time Savings 2014

OD	Existing TT (min)	Option TT	TT Savings (mins)	vpd	veh-hrs per day	veh-hrs per yr	Rate (\$/veh-hr)	Cost savings per \$/yr
A-B	17.4	17.52	-0.12	170	-0.34	-123	29.02	-\$3,560
C-B	16.6	11.28	5.32	237	21.01	7667	29.02	\$222,517
D-B	17	9.82	7.18	37	4.47	1631	29.02	\$47,341
E-B	21.4		0.00	6	0.00	0	29.02	\$0
			12.38		25.14	9175		<b>\$266,298</b>

#### VOC Savings 2014

OD			Travel dist reductn (km)	vpd	vkt per day	vkt per year	Rate (\$/km)	Cost savings per \$/yr
A-B			-2.90	170	-493	-180010	0.26	-\$47,343
C-B			-0.50	237	-118	-43223	0.26	-\$11,368
D-B			-0.10	37	-4	-1363	0.26	-\$359
E-B			0.00	6	0	0	0.26	\$0
					-615	-224597		<b>-\$59,069</b>

#### Travel Time Savings 2044

OD	Existing TT (min)	Option TT	TT Savings (mins)	vpd	veh-hrs per day	veh-hrs per yr	Rate (\$/veh-hr)	Cost savings per \$/yr
A-B	17.4	17.52	-0.12	425	-0.84	-307	29.02	-\$8,900
C-B	16.6	11.28	5.32	592	52.51	19167	29.02	\$556,292
D-B	17	9.82	7.18	93	11.17	4078	29.02	\$118,354
E-B	21.4			16	0.00	0	29.02	\$0
					62.85	22939		<b>\$665,745</b>

#### VOC Savings 2044

OD			Travel dist reductn (km)	vpd	vkt per day	vkt per year	Rate (\$/km)	Cost savings per \$/yr
A-B			-2.90	425	-1233	-450026	0.26	-\$118,357
C-B			-0.70	592	-414	-151281	0.26	-\$39,787
D-B			-0.10	93	-9	-3408	0.26	-\$896
E-B			0.00	16	0	0	0.26	\$0
					-1657	-604715		<b>-\$159,040</b>

Assumed growth rate

5%

Historical crashes on Kendall St

	2005	2006	2007	2008	2009	average crashes/yr	yearly truck volume 2014	yearly truck volume 2044	Distance (km)	crash rate (per mvkt)	Crashes in 2044
po	2		2	2	1	1.4	116,159	290,397	7.3	1.65	4.13
inj		1			1	0.4	116,159	290,397	7.3	0.47	1.18
fat											
total	2	1	2	2	2						

assumed growth rate 5%

Reduction in crashes on Kendal St in each option in 2014

Year	reduction in po crashes/yr	reduction in injury crashes/yr	Cost per po crash (2012 prices)	Cost per inj crash (2012 prices)	Cost per fat crash (2012 prices)	Total cost savings/yr
2014	1.40	0.40	\$9,115	\$232,133	\$2,746,800	\$105,614
2044	4.13	1.18	\$9,115	\$232,133	\$2,746,800	\$311,377



## **Appendix K** – Benefit cost analysis spreadsheets

## Cowra Heavy Vehicle Route - Option A

DISCOUNTED CASH FLOW ANALYSIS TABLE						
Discount Rates		7.0%	4.0%	10.0%		
Travel time cost (B-double)			\$29.02 per hour			
Vehicle operating cost			\$0.26 per km			
Heavy vehicle growth			5.0% per year			
YEAR	COSTS (shown as -ve)		BENEFITS (shown as +ve)			TOTALS
	Current Prices		Current Prices			Current Prices
	CAPITAL COSTS	RECURRENT Annual Maintenance	Vehicle Operating Cost Savings	Travel Time Savings	Accident Cost Savings	
	(\$'000)	(\$'000)	(\$'000)	(\$'000)	(\$'000)	(\$'000)
2014	(\$36,665)		(\$57)	\$282	\$106	(\$36,334)
2015	\$0	\$0	(\$60)	\$296	\$112	\$349
2016	\$0	\$0	(\$63)	\$310	\$119	\$367
2017	\$0	\$0	(\$66)	\$324	\$126	\$385
2018	\$0	\$0	(\$69)	\$339	\$133	\$403
2019	\$0	\$0	(\$72)	\$353	\$140	\$421
2020	\$0	\$0	(\$75)	\$367	\$147	\$439
2021	\$0	\$0	(\$78)	\$381	\$154	\$456
2022	\$0	\$0	(\$80)	\$395	\$160	\$475
2023	\$0	\$0	(\$83)	\$409	\$167	\$493
2024	\$0	\$0	(\$86)	\$423	\$174	\$511
2025	\$0	\$0	(\$89)	\$437	\$181	\$529
2026	\$0	\$0	(\$92)	\$451	\$188	\$547
2027	\$0	\$0	(\$95)	\$465	\$195	\$565
2028	\$0	\$0	(\$98)	\$480	\$202	\$583
2029	\$0	\$0	(\$101)	\$494	\$208	\$601
2030	\$0	(\$5,206)	(\$103)	\$508	\$215	(\$4,585)
2031	\$0	\$0	(\$106)	\$522	\$222	\$638
2032	\$0	\$0	(\$109)	\$536	\$229	\$656
2033	\$0	\$0	(\$112)	\$550	\$236	\$674
2034	\$0	\$0	(\$115)	\$564	\$243	\$692
2035	\$0	\$0	(\$118)	\$578	\$250	\$710
2036	\$0	\$0	(\$121)	\$592	\$257	\$728
2037	\$0	\$0	(\$124)	\$607	\$263	\$746
2038	\$0	\$0	(\$126)	\$621	\$270	\$765
2039	\$0	\$0	(\$129)	\$635	\$277	\$783
2040	\$0	\$0	(\$132)	\$649	\$284	\$801
2041	\$0	\$0	(\$135)	\$663	\$291	\$819
2042	\$0	\$0	(\$138)	\$677	\$298	\$837
2043	\$0	\$0	(\$141)	\$691	\$305	\$855
2044	\$0	(\$5,206)	(\$144)	\$705	311	(\$4,333)
<b>Total</b>	(\$36,665)	(\$10,411)	(\$3,117)	\$15,304	\$6,463	(\$28,425)
PRESENT VALUES						
PV @ 7%	(\$34,266)	(\$2,447)	(\$1,078)	\$5,294	\$2,179	(\$30,318)
PV @ 4%	(\$35,254)	(\$4,384)	(\$1,613)	\$7,923	\$3,298	(\$30,030)
PV @ 10%	(\$33,331)	(\$1,431)	(\$770)	\$3,783	\$1,540	(\$30,209)
Discount Rate						
	4.0%	7.0%	10.0%			
<b>NPV</b>	(\$29,862)	(\$30,158)	(\$30,079)			
<b>BCR</b>	0.2424	0.1742	0.1310			

## Cowra Heavy Vehicle Route - Option B

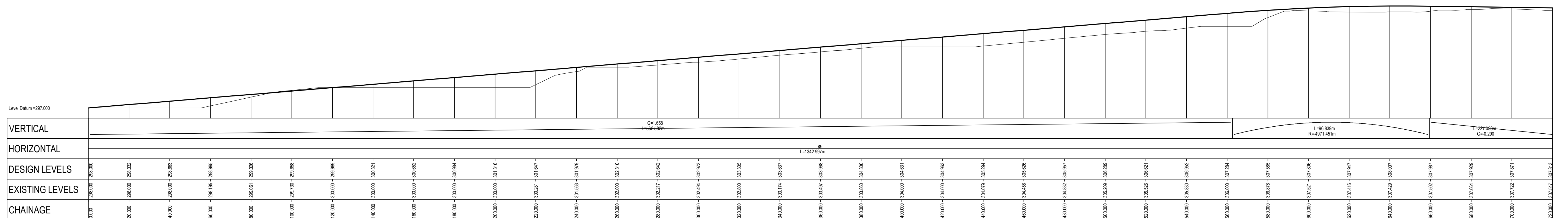
DISCOUNTED CASH FLOW ANALYSIS TABLE						
Discount Rates		7.0%	4.0%	10.0%		
Travel time cost (B-double)			\$29.02 per hour			
Vehicle operating cost			\$0.26 per km			
Heavy vehicle growth			5.0% per year			
YEAR	COSTS (shown as -ve)		BENEFITS (shown as +ve)			TOTALS
	Current Prices		Current Prices			Current Prices
	CAPITAL COSTS	RECURRENT Annual Maintenance	Vehicle Operating Cost Savings	Travel Time Savings	Accident Cost Savings	
	(\$'000)	(\$'000)	(\$'000)	(\$'000)	(\$'000)	(\$'000)
2014	(\$15,893)	\$0	(\$78)	\$220	\$106	(\$15,646)
2015	\$0	\$0	(\$81)	\$231	\$112	\$262
2016	\$0	\$0	(\$85)	\$242	\$119	\$276
2017	\$0	\$0	(\$89)	\$253	\$126	\$290
2018	\$0	\$0	(\$93)	\$263	\$133	\$304
2019	\$0	\$0	(\$97)	\$274	\$140	\$317
2020	\$0	\$0	(\$101)	\$285	\$147	\$331
2021	\$0	\$0	(\$105)	\$296	\$154	\$345
2022	\$0	\$0	(\$109)	\$307	\$160	\$359
2023	\$0	\$0	(\$112)	\$318	\$167	\$374
2024	\$0	\$0	(\$116)	\$329	\$174	\$388
2025	\$0	\$0	(\$120)	\$340	\$181	\$401
2026	\$0	\$0	(\$124)	\$351	\$188	\$415
2027	\$0	\$0	(\$128)	\$362	\$195	\$429
2028	\$0	\$0	(\$132)	\$373	\$202	\$443
2029	\$0	\$0	(\$136)	\$384	\$208	\$457
2030	\$0	(\$1,630)	(\$140)	\$395	\$215	(\$1,159)
2031	\$0	\$0	(\$143)	\$406	\$222	\$485
2032	\$0	\$0	(\$147)	\$417	\$229	\$499
2033	\$0	\$0	(\$151)	\$428	\$236	\$513
2034	\$0	\$0	(\$155)	\$439	\$243	\$527
2035	\$0	\$0	(\$159)	\$450	\$250	\$541
2036	\$0	\$0	(\$163)	\$461	\$257	\$555
2037	\$0	\$0	(\$167)	\$472	\$263	\$568
2038	\$0	\$0	(\$171)	\$483	\$270	\$582
2039	\$0	\$0	(\$174)	\$494	\$277	\$597
2040	\$0	\$0	(\$178)	\$505	\$284	\$611
2041	\$0	\$0	(\$182)	\$516	\$291	\$625
2042	\$0	\$0	(\$186)	\$527	\$298	\$639
2043	\$0	\$0	(\$190)	\$538	\$305	\$652
2044	\$0	(\$1,630)	(\$194)	\$549	311	(\$963)
<b>Total</b>	(\$15,893)	(\$3,260)	(\$4,206)	\$11,912	\$6,463	(\$4,983)
PRESENT VALUES						
PV @ 7%	(\$14,853)	(\$716)	(\$1,455)	\$4,120	\$2,179	(\$10,725)
PV @ 4%	(\$15,282)	(\$1,320)	(\$2,178)	\$6,167	\$3,298	(\$9,315)
PV @ 10%	(\$14,448)	(\$407)	(\$1,040)	\$2,945	\$1,540	(\$11,410)
Discount Rate						
	4.0%	7.0%	10.0%			
<b>NPV</b>	(\$9,315)	(\$10,726)	(\$11,410)			
<b>BCR</b>	0.4389	0.3111	0.2319			

### Cowra Heavy Vehicle Route - Option 3

DISCOUNTED CASH FLOW ANALYSIS TABLE						
Discount Rates		7.0%	4.0%	10.0%		
Travel time cost (B-double)			\$29.02 per hour			
Vehicle operating cost			\$0.26 per km			
Heavy vehicle growth			5.0% per year			
YEAR	COSTS (shown as -ve)		BENEFITS (shown as +ve)			TOTALS
	Current Prices		Current Prices			Current Prices
	CAPITAL COSTS (\$'000)	RECURRENT Annual Maintenance (\$'000)	Vehicle Operating Cost Savings (\$'000)	Travel Time Savings (\$'000)	Accident Cost Savings (\$'000)	(\$'000)
2014	(\$16,413)	\$0	(\$59)	\$266	\$106	(\$16,100)
2015	\$0	\$0	(\$62)	\$280	\$112	\$330
2016	\$0	\$0	(\$66)	\$293	\$119	\$346
2017	\$0	\$0	(\$69)	\$306	\$126	\$363
2018	\$0	\$0	(\$72)	\$320	\$133	\$381
2019	\$0	\$0	(\$76)	\$333	\$140	\$397
2020	\$0	\$0	(\$79)	\$346	\$147	\$414
2021	\$0	\$0	(\$82)	\$360	\$154	\$431
2022	\$0	\$0	(\$86)	\$373	\$160	\$447
2023	\$0	\$0	(\$89)	\$386	\$167	\$464
2024	\$0	\$0	(\$92)	\$399	\$174	\$482
2025	\$0	\$0	(\$96)	\$413	\$181	\$498
2026	\$0	\$0	(\$99)	\$426	\$188	\$515
2027	\$0	\$0	(\$102)	\$439	\$195	\$532
2028	\$0	\$0	(\$106)	\$453	\$202	\$548
2029	\$0	\$0	(\$109)	\$466	\$208	\$566
2030	\$0	(\$2,384)	(\$112)	\$479	\$215	(\$1,801)
2031	\$0	\$0	(\$116)	\$493	\$222	\$599
2032	\$0	\$0	(\$119)	\$506	\$229	\$616
2033	\$0	\$0	(\$122)	\$519	\$236	\$633
2034	\$0	\$0	(\$126)	\$533	\$243	\$649
2035	\$0	\$0	(\$129)	\$546	\$250	\$667
2036	\$0	\$0	(\$132)	\$559	\$257	\$684
2037	\$0	\$0	(\$136)	\$573	\$263	\$700
2038	\$0	\$0	(\$139)	\$586	\$270	\$717
2039	\$0	\$0	(\$142)	\$599	\$277	\$734
2040	\$0	\$0	(\$146)	\$612	\$284	\$750
2041	\$0	\$0	(\$149)	\$626	\$291	\$768
2042	\$0	\$0	(\$152)	\$639	\$298	\$785
2043	\$0	\$0	(\$156)	\$652	\$305	\$801
2044	\$0	(\$2,384)	(\$159)	\$666	\$311	(\$1,566)
<b>Total</b>	(\$16,413)	(\$4,768)	(\$3,379)	\$14,447	\$6,463	(\$3,650)
PRESENT VALUES						
PV @ 7%	(\$15,339)	(\$1,047)	(\$1,155)	\$4,997	\$2,179	(\$10,365)
PV @ 4%	(\$15,782)	(\$1,930)	(\$1,737)	\$7,479	\$3,298	(\$8,672)
PV @ 10%	(\$14,921)	(\$596)	(\$821)	\$3,571	\$1,540	(\$11,227)
Discount Rate						
<b>NPV</b>	<b>4.0%</b>	<b>7.0%</b>	<b>10.0%</b>			
	(\$8,673)	(\$10,366)	(\$11,226)			
<b>BCR</b>	0.5104	0.3674	0.2765			

## **Appendix L** - Concept design drawings





LONG SECTION  
CH 0.0 - 720.0  
SCALE 1:1000H 1:200V

## PRELIMINARY

[illegible]

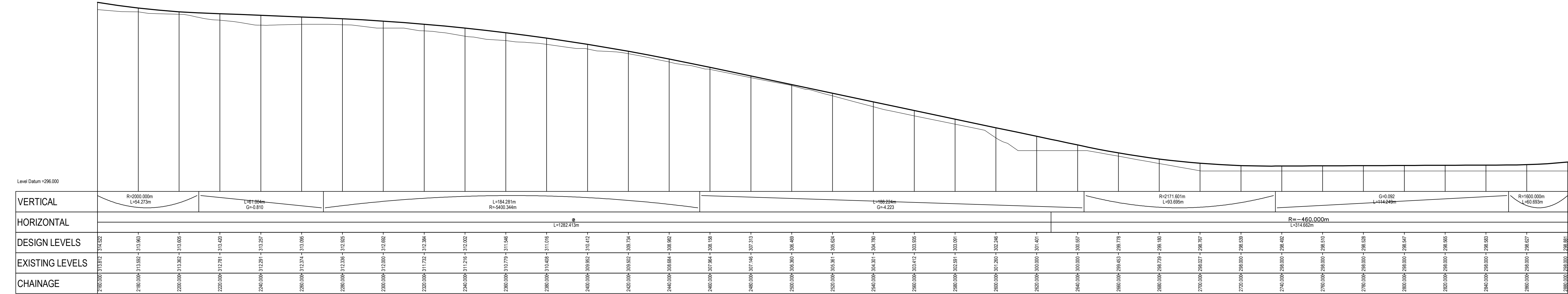












LONG SECTION  
CH 2160.0 - 2880.0  
SCALE 1:1000H 1:200V

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director

Plot Date: 26 November 2012 - 12:09 PM Plotted by: Ryan Stevens

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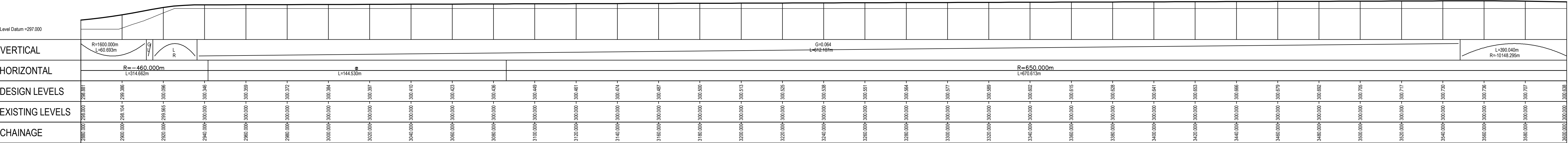
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Drawn	Designer
Drafting Check	Design Check
Approved (Project Director)	Date
Scale	AS SHOWN

Client	COWRA SHIRE COUNCIL
Project	COWRA TRAFFIC RELIEF ROUTE
Title	PLAN AND LONGITUDINAL SECTION CH 2160 TO CH 2880
Original Size	A1
Drawing No:	22-16385-C008
Rev:	A

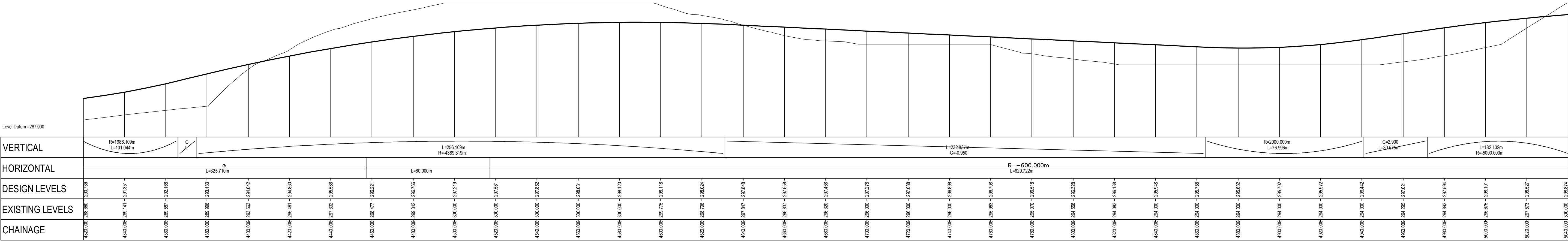










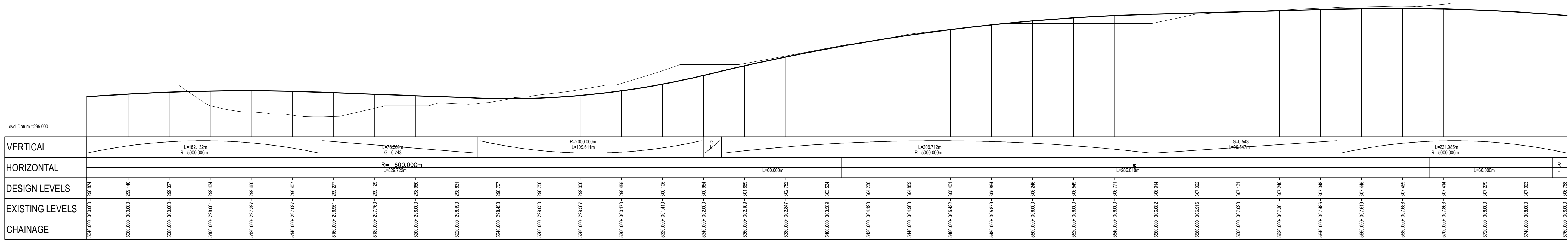


LONG SECTION  
CH 4320.0 - 5040.0  
SCALE 1:1000H 1:200V

PRELIMINARY

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LONG SECTION  
CH 5040.0 - 5760.0  
SCALE 1:1000H 1:200V

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director
					Date

Plot Date: 26 November 2012 - 12:16 PM Plotted by: Ryan Stevens

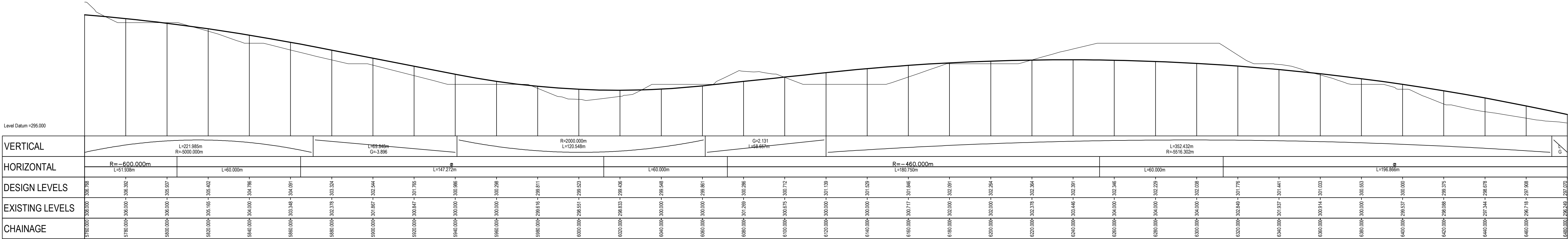
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		Approved (Project Director)		Title	PLAN AND LONGITUDINAL SECTION	
		Date				CH 5040 TO CH 5760
	Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	Original Size	Drawing No:	Rev: A
				A1	22-16385-C012	





LONG SECTION  
CH 5760.0 - 6480.0  
SCALE 1:1000H 1:200V

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director

Plot Date: 26 November 2012 - 12:19 PM Plotted by: Ryan Stevens

Cad File No: G:\22\16385\CADD\Drawings\22-16385-XC\_LS\_ALL.dwg



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**COWRA SHIRE COUNCIL**  
**COWRA TRAFFIC RELIEF ROUTE**  
**PLAN AND LONGITUDINAL SECTION**  
**CH 5760 TO CH 6480**

**A1 Drawing No: 22-16385-C013**

**Rev: A**















## **Appendix M** – Results of Public Submissions



**Cowra Heavy Vehicle Bypass Study**  
**Results of Public Submissions**

Name	Date	Location	Confirmation requested	Initial consultation	Preferred long term	Happy to wait	Support short term	Comments
Aldersey, L	23-Apr	Village/rural	No	No	A	Yes	No	Come to Cowra for business and shopping
Andrews, J	16-Apr	Other	No	No	No Selection	No	Yes	Bypass onto rail corridor at Oliver Toyota Kendal Street
Anonymous	9-Apr	No Selection	No	No		3 Yes	No	
Anonymous	11-Apr	No selection	No selection	No selection	No selection	No	No	No bypass, build parking station (email sent with views)
Anonymous	11-Apr	No selection	No selection	No selection		3 Yes	No	
Anonymous	11-Apr	No selection	No selection	No selection	B	Yes	No	Flyover at Darbys Falls Rd and Campbell Street
Arden, A	11-Apr	West Cowra	No	Yes	A	No	Yes	
Arden, J	11-Apr	West Cowra	No	Yes	A	No	Yes	
Armstrong, IM	9-Apr	West Cowra	Yes	Yes	B	Yes	Yes	Opportunity to utilise rail line for short term / Dept of Water issue for low level bridge
Arthur	9-Apr	Taragala	Yes	No	A	Yes	No	
Bailey, K	18-Apr	West Cowra	No	No		3 No	Yes	Knows long term option will take even longer
Baker, W	9-Apr	Central Cowra	Yes	Yes		3 Yes	No	Where is need for short term? Other comments
Barlow, A	1-May	Boundary/Airport Rd	Yes	Yes	No selection	Yes	No	Bypass should be kept level - involvement of trucks
Bates, C	1-May	Central Cowra	Yes	Yes		3 Yes	No	Doesn't support short term option - better putting resources into permanent option
Bates, R	1-May	Central Cowra	Yes	Yes		3 Yes	No	Short term money into Option 3
Batten, B	1-May	Central Cowra	Yes	Yes	A	No selection	No	Comments about short term option
Batten, P	1-May	Central Cowra	No	No	A	Yes	No	
Beer, D & G	23-Apr	Boundary/Airport Rd	Yes	Yes	B	No	Yes	Concern of B doubles at approach from rail corridor onto bridge / Kendal St improvement delayed for HV bypass / No right turn from Macquarie St far better
Bennett, J	30-Apr	Other	No	Yes		3 Yes	No	Short term will become long term.
Bennett, M	23-Apr	Mulyan	Yes	Yes		3 Yes	No	Essay: "What is a Heavy Vehicle Bypass"
Bridges, F	18-Apr	West Cowra	Yes	Yes	No selection	Yes	No	Adoption of short term will delay later option / other comments
Brown, D	18-Apr	West Cowra	No	No		3 Yes	No	
Brown, P	9-Apr	Campbell St	Yes	Yes	A	Yes	No	Better to go to long term option / Use Lynch Street to Oliver Toyota / Happy to wait for long term
Brown, S	1-May	Campbell St	Yes	Yes	A	Yes	No	
Brown, S	1-May	Central Cowra	No	No	No selection	Yes	No	
Brown, Stephanie	4-Apr	West Cowra	Yes	Yes		3 yes	No	Option 3 - Only way to go / other comments
Brown, Stephanie	18-Apr	West Cowra	Yes	Yes		3 yes	No	Temporary becomes permanent! / Other comments
Bryant, B	1-May	Central Cowra	No	Yes		3 Yes	No	Put money towards bypass / other comments
Bryant, M	16-Apr	Central Cowra	Yes	No	A	Yes	Yes	
Buggy, T	16-Apr	Other	Yes	No	A	Yes	Yes	Short term would be good in mean time / Crazy tractors and sheep on main road / cars to stay out of CBD
Bush, A	11-Apr	Village/rural	No	Yes		3 Yes	No	Forget short term option
Bush, G	1-May	Village/rural	No	No selection		3 Yes	No	Short term bypass not the solution - just merely transfer problems
Butterworth, J	4-Apr	Village/rural	No	No	A	Yes	No	
Cameron, B	4-Apr	Village/rural	No selection	Yes	No selection	No selection	Yes	Large roundabout at Eastern end of existing bridge / other comments
Charman, J	23-Apr	Village/rural	Yes	No selection	No selection	No	Yes	Short term option is better
Chittick, S	23-Apr	North Cowra	Yes	Yes		3 Yes	Yes	Current proposed option involves dangerous intersection on Canowindra Rd
Clark, G	1-May	North Cowra	Yes	Yes		3 Yes	No	Against short term / Also see attachment with N Clark

Name	Date	Location	Confirmation requested	Initial consultation	Preferred long term	Happy to wait	Support short term	Comments
Clark, N	1-May	North Cowra	Yes	No		3 Yes	No	Short term would work by crossing low level bridge / Attached letter
Coates, R	19-Apr	Central Cowra	No	Yes	B	No	Yes	HV drivers are professional. Go for it!
Cobcroft, J	9-Apr	North Cowra	Yes	No	B	Yes	No	
Coliss, B	1-May	Village/rural	No selection	No selection	No selection	No selection	No selection	Written letter and sketch of alternative route/s
Craig, R & S	18-Apr	Mulyan	No	No	A	Yes	No	No point wasting money on short term strategy / other comments
Daley, C	23-Apr	Village/rural	No	No		3 Yes	No	
D'Elboux, C	18-Apr	Village/rural	Yes	No	B	No	Yes	
D'Elboux, C	18-Apr	Village/rural	Yes	Yes	B	No	Yes	Support efforts / Other comments and suggestions
Dodd, D	18-Apr	Village/rural	Yes	No	A	Yes	No	Ridiculous - dividing town with large roundabouts / other comments
Dodd, P	18-Apr	Village/rural	No	No selection	A	Yes	No	Attachment
Druce, Mr & Mrs	19-Apr	Taragala	Yes	No		3 Yes	No	
Drury, C	19-Apr	Village/rural	Yes	Yes		3 Yes	No	Short term too many associated problems / Noise in residential area
Drury, M	18-Apr	Village/rural	No	No		3 Yes	No	Main priority to remove HV and passing traffic from CBD / other comments
Dun, G	29-Apr	North Cowra	No selection	No selection	No selection	No selection	No selection	Letter only, reiteration of previous submissions
Excell, N	23-Apr	Central Cowra	No	No	B	No	No	Short term should only turn left off the main bridge / other comments
Ferguson, G	4-Apr	Taragala	Yes	No		3 Yes	No	Bypass of the town / other comments
Finnimore, J	11-Apr	North Cowra	No	No		3 Yes	No	
Fisher, C	1-May	Boundary/Airport Rd	Yes	No	No selection	No	No	House values drop / Bought because of serenity / Town needs money coming into town / Kendal St congested as all streets end up there
Fisher, D	1-May	Boundary/Airport Rd	Yes	No	No selection	No	No	Does not support bypass - size of road, safety of children, economic and employment opportunities in Cowra
Fisher, M&B	11-Apr	Central Cowra	No	No	B	Yes	No	
Fitzgerald, D	18-Apr	West Cowra	No selection	No	No selection	Yes	Yes	Any option is okay with me
Fitzsimmons, P	30-Apr	Central Cowra	yes	No	B	No	Yes	Short term option should be permanent option - to allow Council plan strategically around road
Fragar, A	16-Apr	West Cowra	No	Yes	B	Yes	Yes	Rail corridor create traffic flow problems / Attachment
Francis, B	18-Apr	West Cowra	Yes	Yes		3 Yes	No	
Francis, M	18-Apr	West Cowra	Yes	Yes		3 Yes	No	
George, B	16-Apr	Mulyan	Yes	No		3 No	Yes	Need bypass ASAP! Traffic lights are a curse / Been here since 1979
Gould, A	24-Apr	Village/rural	Yes	No	No selection	No	Yes	
Gower, D	30-Apr	Central Cowra	No	Yes	A	No	Yes	Some adjustments in northern segment of proposal
Graham, C	1-May	No selection	No selection	No selection	No selection	No selection	No selection	Sketch of alternative solution
Grinter	16-Apr	Canowindra corridor	Yes	Yes	B	Yes	No	Opposed to Short Term Option/ Supports Option B / Attachment included
Hamilton, D	9-Apr	Village/rural	No	No	B	Yes	No	
Hartwig, I	4-Apr	Mulyan	Yes	No	A	Yes	Yes	Short term ok / other comments
Harvey, S	23-Apr	North Cowra	No	No		3 No	Yes	Like to have long term / but short term in immediate period
Hayes, J	18-Apr	Taragala	Yes	Yes		3 Yes	No	Think of safety of children / Parking at rear of shops / other comments
Heffernan, T	30-Apr	North Cowra	Yes	No selection	No selection	No selection	No selection	Email - regarding impact of Option A through DPI
Hindmarch, A	9-Apr	Canowindra corridor	Yes	Yes	B	Yes	No	Value depreciation, Noise, Children safety
Hodder, B	18-Apr	North Cowra	No selection	No		3 Yes	No	
Honeman, O	23-Apr	Taragala	No	Yes	A	Yes	Yes	
Imber, B	24-Apr	West Cowra	Yes	Yes	B	Yes	No	Short term not worthy of consideration
Imber, D	1-May	North Cowra	No	Yes	No selection	No	Yes	Will be a headache whichever way
Isaksen, R	30-Apr	Canowindra corridor	Yes	Yes	B	Yes	No	Short term would ruin town, need complete bypass of Cowra
Jeffery, A	30-Apr	Boundary/Airport Rd	No	Yes	B	No	No	Should have been on plans 50 years ago / other comments



Name	Date	Location	Confirmation requested	Initial consultation	Preferred long term	Happy to wait	Support short term	Comments
Jones, B	11-Apr	Other	No	No	B	Yes	Yes	
Jones, C	23-Apr	Taragala	No	No		3 Yes	No	Short term to send HV through residential area / otehr comments
Kallas, S	9-Apr	Central Cowra	No	No	A	Yes	Yes	How going to work? What will be cost?
Keady, J	4-Apr	Village/rural	No	Yes		3 No	Yes	Short term cheapest option - stop gap / Have to make main street safer
Kiss, C	1-May	Canowindra corridor	Yes	No	A	Yes	No	Do job properly first time, and not waste ratepayers' money / other comments
Kiss, D	1-May	Village/rural	No	No	A	Yes	No	Sons live in town - one next to railway - noise concern / Long term would be less disruption
Kiss, M	1-May	Canowindra corridor	Yes	No	No selection	Yes	No	Should just do the job properly / other comments
Klinger, C	23-Apr	North Cowra	No	No	A	Yes	Yes	
Koen, T	16-Apr	North Cowra	No	No	A	No	No	
Kruisheer, C	16-Apr	North Cowra	No	No	A	Yes	Yes	Single lane roundabouts
Kruisheer, P	16-Apr	North Cowra	No selection	Yes	A	No	Yes	If have to wait - ring road best
Langfield, E	16-Apr	North Cowra	Yes	No	A	Yes	No	Get it right! Lachlan St at school times / Rail to reduce traffic
Langfield, P	1-May	Village/rural	Yes	Yes		3 Yes	No selection	Important to make right decision / other comments
Lawrence, K & L	11-Apr	Central Cowra	No	Yes	A	Yes	No	Short term is waste of money, short term would become long term
Lazarou, B	11-Apr	Taragala	Yes	No	No selection	Yes	No	Property value effect, long term makes more sense (though none selected)
Long, J	18-Apr	North Cowra	Yes	Yes	A	Yes	Yes	Like to see long term planned around future exansion of town.
Long, T	23-Apr	Central Cowra	Yes	Yes		3 Yes	No	Short term likely to become long term solution / Noise for Cowra Public School
Lunn, K	4-Apr	Other	Yes	Yes	No selection	No	Yes	This should have been resolved before Lachlan River bridge was constructed
Lye, N	23-Apr	Mulyan	Yes	Yes		3 Yes	No	Get straight into it / other comments
Lynch, B	4-Apr	North Cowra	Yes	Yes		3 Yes	No	Rail corridor still create blockage down main street and over bridge
Maclean, S	11-Apr	Taragala	Yes	No		3 Yes	No	Short term devalues property and cause more death than Kendal St
Maclean, W	11-Apr	Taragala	Yes	No		3 Yes	No	Short term becomes long term, property value effects
Marotzek, A	23-Apr	Village/rural	Yes	No selection	No selection	No	Yes	Short term option needed NOW!
Martin, A	23-Apr	Other	No	No	A	No	Yes	Get on with it ASAP!
Martin, D	23-Apr	North Cowra	No	No		3 No	Yes	Get it done now please!
McAndrew, P	18-Apr	Central Cowra	No	No	A	Yes	No	No Band-Aids / other comments
McFeeters, C	9-Apr	Central Cowra	Yes	No	A	Yes	No	Do Option A in stages - penny wise, pound foolish doing a short term
McGill, G	30-Apr	North Cowra	No	Yes	A	No	Yes	
McKay, J	11-Apr	Taragala	No	No		3 Yes	No	Short term becomes long term, short term is hazard for children
McKeon, K	11-Apr	Central Cowra	Yes	Yes	A	Yes	No	Short term option is insane
McKeown, K	1-May	Canowindra corridor	Yes	No	A	Yes	No	Nice to see problem solved / Don't want bypass behind property / Has young family
McKeown, W	1-May	Canowindra corridor	Yes	No selection	A	Yes	No	Bypass run behind property / Noise and safety of children / It would be good on Boorowa Rd
McVicar, L	1-May	Boundary/Airport Rd	Yes	Yes	A	No	Yes	Who thought of this mess?
Melchert, A	11-Apr	Campbell St	Yes	No	A	Yes	No	Prefer nothing on Campbell Street
Melchert, M	11-Apr	Campbell St	Yes	No	A	Yes	No	Prefer nothing on Campbell Street
Miller, J & R	1-May	Canowindra corridor	No selection	No selection	B	No selection	No selection	Email
Mooney, P	11-Apr	Campbell St	Yes	No	No selection	Yes	No selection	Concern of heavy vehicles travelling through residential areas, must find solution that is good for everyone
Moore, R	11-Apr	Canowindra corridor	Yes	No	A	Yes	No	Noise concerns for short term option.
Moriarty, B&B	24-Apr	Boundary/Airport Rd	Yes	No		3 No	No	Take to Noonbinna, sun at 5pm in eyes

Name	Date	Location	Confirmation requested	Initial consultation	Preferred long term	Happy to wait	Support short term	Comments
Moriarty, G	4-Apr	Taragala	Yes	No		3 Yes	No	Short term complete waste of time / other comments
Motyka, Z	18-Apr	Taragala	Yes	No		3 No	No	
Muggridge, Dr W	18-Apr	Canowindra corridor	Yes	Yes		3 Yes	No	Option 3 with substantial low level bridge / other comments
Neale, D	16-Apr	Central Cowra	No	No		3 No	No	
Nelligan, M	26-Apr	Taragala	Yes	No	B	Yes	No	Don't split the town in two
Nicholson, C	4-Apr	Mulyan	No	Yes	B	Yes	No selection	Other comments
Nicholson, D	4-Apr	Mulyan	Yes	Yes	A	Yes	No	All options except Option A too close to schools
Norton, Christine	18-Apr	West Cowra	Yes	Yes		3 Yes	No	Forget about bypass until a Permanent one can get done / other comments
O'Brien, S	11-Apr	Campbell St	Yes	No	No selection	Yes	No	Bypass should bypass all residential areas
O'Connor, J	18-Apr	Village/rural	No	Yes	B	No	Yes	Like to see short term option implemented without delay
O'Neill, P & C	23-Apr	Central Cowra	No	No		3 Yes	No	Spend the \$20m on Option 3 - Thank You.
Ousby, H	9-Apr	North Cowra	No	Yes	A	Yes	No	Bypass to be a lasting option / other comments
Palazzi, N & C	18-Apr	West Cowra	No	Yes	A	Yes	No	Definitely not Short Term bypass / Option 3 short to medium term option
Parker, M	9-Apr	Taragala	Yes	No	A	Yes	No	Short term not acceptable / other comments
Parker, Mr & Mrs	9-Apr	Canowindra corridor	No Selection	No	A	Yes	No	Don't wish for short term solutions - trucks run behind property
Parris, C & K	1-May	Canowindra corridor	Yes	No selection	A	No selection	No selection	If short term option - need to install noise barriers
Pearce, J	23-Apr	Central Cowra	No	No	A	Yes	No	Do it once - Do it Properly
Peters, D	30-Apr	Taragala	Yes	Yes	No selection	Yes	No	Feedback attachment
Plukas, A	23-Apr	West Cowra	No	Yes		3 Yes	No	Don't dilly dally - just do it once, and once only.
Pope, A	23-Apr	West Cowra	No	Yes	No selection	Yes	No	Doesn't think trucks cause any harm / no need to rush into anything / Do it right first time
Porter, K & V	9-Apr	North Cowra	No	No	A	No	Yes	Short term not perfect, but better than waiting 25 years
Rae, J	23-Apr	Other	No	No		3 Yes	No	
Ratepayer, A	9-Apr	No selection	No selection	No	No selection	No selection	Yes	
Reeks, M & P	23-Apr	Taragala	No	No		3 Yes	No	
Reid, E	16-Apr	North Cowra	Yes	Yes	B	Yes	No	Attachment: No short term bypass / Don't waste money on consultants /
Rhodes, L	1-May	Taragala	Yes	No	A	Yes	No	New traffic bridge ONLY option
Rowston, C	1-May	Village/rural	Yes	Yes	B	Yes	No	Option A should be pursued / other comments
Ryan, T	4-Apr	North Cowra	Yes	Yes	A	No	Yes	Bypass means remove HV from town CBD, not just relocate to another part
Ryan, T	29-Apr	North Cowra	No selection	No selection	B	No selection	No selection	Short to include New bridge / other comments
Scott-Smith, G	9-Apr	Taragala	Yes	No		3 Yes	No	Numerous comments / attachment email
Scott-Smith, R	9-Apr	Taragala	No	No	B	Yes	No	Canowindra Rail Corridor NOT an option!
Shaw, C	9-Apr	Campbell St	Yes	No	No Selection	Yes	No	No Heavy Vehicles in residential area
Shaw, C	9-Apr	Campbell St	Yes	No	No Selection	Yes	No	Bypass should bypass the town and not inconvenience residential area /
Sheehy, B	30-Apr	Canowindra corridor	No selection	No selection		3 No selection	No selection	other comments
Shirlow, A	4-Apr	Central Cowra	Yes	No selection	A	Yes	No	Disagrees with options / other comments
Siegert, C	23-Apr	West Cowra	No	No		3 Yes	No	Numerous comments / email
Sinclair, J	11-Apr	Mulyan	Yes	Yes		3 No selection	No	Do it in stages - Sydney Rd first
Sinclair, J	23-Apr	Taragala	No	Yes	B	No	Yes	
Sloan, C	18-Apr	Taragala	No	No	B	Yes	No	Big problem with continuous noise
Sloan, K	18-Apr	Taragala	No	No	B	Yes	No	



Name	Date	Location	Confirmation requested	Initial consultation	Preferred long term	Happy to wait	Support short term	Comments
Stolk, C	1-May	Central Cowra	Yes	No	A	Yes	No	Short term option is ridiculous / Stupid idea to spend money on short term / other comments
Stroud, L	23-Apr	Canowindra corridor	Yes	No		3 Yes	No	Short term still take several years / cut town in half / devalue homes / speed track for hoons / other comments
Stubbing, W	4-Apr	Boundary/Airport Rd	No	No	No selection	Yes	No	Leave as rail corridor / other comments
Turmeau, R	4-Apr	West Cowra	No	No selection		3 Yes	Yes	Certainly worth waiting for
Van Haeff, H	23-Apr	Village/rural	No	No	A	No	Yes	3 points and other comments
VanDyke, J	1-May	Village/rural	No	No	B	No	Yes	Support short term that links in with longer term planning / worthwhile removing trucks from Kendal St
Wallace, P	24-Apr	Central Cowra	Yes	Yes	No selection	No	Yes	Numerous comments
Walmsley, M	29-Apr	West Cowra	No	Yes		3 No	Yes	Any of the long term options, lobby hard to make it sooner.
Walsh, D	9-Apr	Village/rural	No	No	A	No	Yes	Main street parking issues / Rail system good idea
Walsh, S	9-Apr	Village/rural	Yes	No	A	No	Yes	Bypass needs for 20 years, gets more urgent as time goes
Warden, E	30-Apr	No selection	Yes	No		3 Yes	No	Email attachment with comments
Warden, W & M	30-Apr	Village/rural	Yes	Yes		3 Yes	No	Attached letter (Email)
Webb, C	11-Apr	Central Cowra	No selection	No	No selection	No selection	No	Extensive comments
Wheelan, S & C	1-May	Campbell St	Yes	No	No selection	Yes	No	Attached letter
Wheeler, C	11-Apr	Campbell St	No	No	No selection	Yes	No	Property values, congestion at bridge not resolved
Wheeler, C	11-Apr	Campbell St	Yes	No selection	No selection	Yes	No	Concern for children's safety and property values
Wheeler, P	11-Apr	Campbell St	Yes	No		3 Yes	No	Consideration given to most affected by any of the routes?
Wheeler, P	16-Apr	Campbell St	Yes	No	A	Yes	No	Short term bypass during day - Kendal St at night / Parallel parking in Kendal / Coordinate traffic lights
Whitcher, L	23-Apr	Canowindra corridor	Yes	No	B	Yes	No	Short term bypass will affect us / Other points of matter
White, G	16-Apr	Village/rural	No	Yes	A	Yes	No	
Williams, S	18-Apr	Central Cowra	No	No	A	Yes	Yes	
Willson, A	23-Apr	Other	Yes	Yes	A	Yes	No	
Wood, C	18-Apr	West Cowra	No	No		3 Yes	No	Waste of funds? / Do bypass before main street
Wood, C	24-Apr	West Cowra	No	Yes	B	No	Yes	Short term is best way to begin removal of heavy traffic from Kendal St
Wood, T	24-Apr	West Cowra	No	Yes	B	No	Yes	Short term is best way to begin removal of heavy traffic from Kendal St
Worthington, J	30-Apr	West Cowra	Yes	No		3 Yes	No	Numerous comments in email
Charnock, P	8-May	Central Cowra	Yes	No		3 Yes	No	Short term option splits town, concerns with pedestrian safety.
Cowra Bus Service	8-May	North Cowra	Yes	Yes		3 Yes	No	40 bus movements per day removed from main street with removal of rail viaducts. These would go back to main street if short term option implemented. Do it right, do it once.

## Summary

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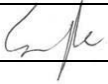

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	M Lyons	S Payne A Boyle		P Parker		6/6/2013