GLENELLA
GROUP

Description: Glenella Quarry Pty Ltd DA 73/2007 Condition Modification – Mod 1 – PAN- 205523

This application proposes to modify Condition 14 of Consent 73/2007 in line with the following:

For the Morongla Road / Reids Flat Road intersection; that condition 14 be amended to reflect the recommendations of Section 6.1, Improvement 1 of Appendix 5 'Traffic Impact Assessment' of the 'Glenella Quarry Production Increase Environmental Impact Statement (April 2007). Draft condition wording:

'The intersection of Reids Flat and Morongla Roads shall be designed and constructed to maintain the priority of through-traffic along Reids Flat Road and ~~not~~ Morongla Road; not priority of through traffic along Reids Flat Road. In this regard the final design of the intersection shall incorporate the following:

- *No speed reduction from existing speed zone.*
- *The northern section of Reids Flat Road to form the terminating leg of the intersection.*
- *Regulatory signposting to define road priority and to accord with sight distance provisions.*
- *Provision of line marking and guideposts on the approaches to the intersection for a minimum of 250 metres on each road approach or to start at a point where Approach Sight Distance to the line marking can be achieved generally in accordance with AS 1742.*
- *Sealed pavement widths at the intersection to accommodate the swept paths of heavy vehicles.*

The final intersection design is to accommodate the expected vehicle types and traffic volumes generated by the development and to comply with the RTA Road Design Guide. The final intersection design and construction plans are to be submitted to Council for approval prior to works commencing. Intersection upgrading is to be completed prior to production at the Glenella Quarry increasing beyond the current operating capacity of five truck loads per day, averaged over a weekly period. In this regard, the Applicant is to maintain a logbook detailing the number of truck loads leaving the property each day and Council is to be advised when the five loads per day limit is reached. All costs associated with the provision of new and upgraded roads/intersections shall be at full cost to the Applicant and no cost to either Cowra Shire Council or Transport for NSW.'

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Notice of Determination of Development Application
Issued Under Section 81 (1)
Environmental Planning and Assessment Act, 1979

Issued to:	Glenella Quarry Pty Ltd **Outward Doc:** 7072/2007 483 Battery Road COWRA NSW 2794
Development Application:	73/2007
Description of Development:	Continuation and expansion of production at "Glenella Quarry"
Property Description:	Lot 35 and 44 DP 752935, Battery Road Cowra via Morongla
Consent to Operate from:	27 August 2007
Consent to Lapse on:	27 August 2012
Building Code of Australia Building Classification:	N/A
Determination:	Consent granted subject to conditions described below:

Conditions of Consent:

Approved Plans and Documentation

1. Consent is granted for the operation of an Extractive Industry on land known as Lots 35 and 44 DP 752935, Battery Road, Cowra via Morongla for a period of 40 years from the date of this consent.

2. The quarry operation shall be undertaken generally in accordance with:

   (i) DA 73/2007 lodged with Cowra Shire Council on 30 April 2007;

   (ii) Environmental Impact Statement for the Glenella Quarry, prepared by R.W. Corkery & Co Pty Limited dated 30 April 2007; and

   (iii) Additional information letters prepared by R.W Corkery & Co Pty Limited dated 8 June 2007, 3 July 2007, 12 July 2007, 13 July 2007 and 25 July 2007, unless otherwise modified by the conditions of this consent.

General Terms of Approval:

3. The following General Terms of Approval have been integrated with this consent and must be adhered to by the Applicant and respective Approval Body in the carrying out of this development:

   (i) General Terms of Approval - Rivers and Foreshores Improvement Act 1948, for the construction of road crossing on, in or under protected land, issued by the NSW Department of Water and Energy dated 16 July 2007;

   (ii) General Terms of Approval - Protection of the Environment Operations Act 1997, for the granting of an Environment Protection Licence, issued by the NSW Department of Environment and Climate Change dated 25 July 2007; and

   (iii) General Terms of Approval - Roads Act 1993, for the granting of a permit to undertake road works on the Lachlan Valley Way, issued by the NSW Roads and Traffic Authority dated 15 June 2007.

   A copy of the General Terms of Approval issued by the relevant Approval Bodies for this development is attached to this consent.

Limitations on Consent:

4. The quarry shall not be used for any forms of public or private land fill/waste disposal. In addition, all domestic waste products generated at the quarry (eg: rubbish from office/amenities buildings, tyres, fuel drums) shall be disposed of at a licensed landfill and/or by recycling off the premises. Temporary storage of domestic waste in a suitable waste container/area shall only be permitted.

   Note: Waste is deemed to be product not required for further use on the site.

5. The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.

6. Activities occurring in or on the premises must be carried out in a manner that will minimise the generation or emission from the premises, of wind-blown or traffic generated dust.

7. Trucks entering and leaving the premises that are carrying loads must be covered at all times, except during loading and unloading.

8. Noise generated at the premises must not exceed the noise limits presented in the table below:

Location	Day		Evening		Night		
"Lachoona" Residence & "Glenavon" Residence	L_{Aeq} (15 minute)	$L_{Aeq(day)}$	L_{Aeq} (15 minute)	$L_{Aeq(evening)}$	L_{Aeq} (15 minute)	$L_{Aeq(night)}$	$L_{A1(1}$ minute)
	35	NA	35	NA	35	NA	45

Note 1: Day is defined as the period from 7.00am to 6.00pm Monday to Saturday and 8.00am to 6.00pm Sundays and Public Holidays;

Evening is defined as the period from 6.00pm to 10.00pm

Night is defined as the period from 10.00pm to 7.00am Monday to Saturday and 10.00pm to 8.00am Sundays and Public Holidays

Note 2: Noise from the premises is to be measured at the most affected point within 30 metres of the dwelling (to determine compliance with the $L_{Aeq\ (15\ minute)}$ noise limits.

Note 3: Noise from the premises is to be measured at 1 metre from the dwelling façade to determine compliance with $L_{A1(1\ minute)}$ noise limits.

Note 4: The noise emissions limits identified in the condition under meteorological conditions of:

- Wind speed up to 3m/s at 10 metres above ground level.
- Temperature inversion conditions of up to 3°C/100m and wind speed up to 2m/s at 10 metres above the ground.

9. Activities at the premises must only be carried on between the hours specified in the table below:

Activity	Monday to Friday	Saturday	Sunday
Extraction Activities	7.00am to 5.00pm	7.00am to 3.00pm	Not permitted
Blasting	9.00am to 5.00pm	Not permitted	Not permitted
Crushing	7.00am to 6.00pm	7.00am to 3.00pm	Not permitted
Loading	7.00am to 10.00pm	7.00am to 4.00pm	Not permitted

Note: This condition does not apply to the delivery of material outside the hours of operation permitted by condition if that delivery is required by police or other authorities for safety reasons; and/or the operation or personnel or equipment are endangered. In such circumstances, prior notification is provided to the Department of Environment and Climate Change, Council and affected residents as soon as possible, or within a reasonable period in the case of emergency.

10. Ground vibration peak particle velocity from the blasting operations at the premises must not exceed:

- 5mm/s for more than 5% of the total number of blasts over a period of 12 months; and
- 10mm/s at any time.

Note 1: Ground vibration levels must be measured at the "Glenavon" and "Lachoona" residences for all blasts carried out in or on the premises.

Note 2: Instrumentation used to monitor compliance must meet the requirements of Australian Standard 2187.2 of 1993.

11. The overpressure level from blasting operations on the premises must not exceed:

- 115dB (Lin Peak) for more than 5% of the total number of blasts over a period of 12 months; and
- 120dB (Lin Peak) at any time,

Note 1: Ground vibration levels must be measured at the "Glenavon" and "Lachoona" residences for all blasts carried out in or on the premises.

Note 2: Instrumentation used to monitor compliance must meet the requirements of Australian Standard 2187.2 of 1993.

Roads, Traffic and Access:

12. No trucks are permitted to enter the transport route from Lachlan Valley Way prior to 5.00am.

13. The intersection of Battery, Reids Flat and Bennett Springs Roads shall be designed and constructed to maintain the priority of through-traffic along Reids Flat and Bennet Springs Roads and not Battery Road. In this regard the final design of the intersection shall incorporate the following:

- No speed reduction from existing speed zone.
- Battery Road to form the terminating leg of the intersection.
- Regulatory signposting to define road priority and to accord with sight distance provisions, including the provision of 'STOP' signs on Battery Road.
- Installation of appropriate warning signs to warn drivers of the intersection as well as the 'STOP' control in Battery Road, the curve alignment and advisory speed and the crest of the road.
- Installation of a painted median with rumble bar inserts on the Battery Road approach to the intersection.
- Provision of line marking and guideposts on the approaches to the intersection for a minimum of 250 metres on each road approach or to start at a point where Approach Sight Distance to the line marking can be achieved generally in accordance with AS 1742.
- Sealed pavement widths at the intersection to accommodate the swept paths of heavy vehicles.

The final intersection design is to accommodate the expected vehicle types and traffic volumes generated by the development and to comply with the RTA Road Design Guide. The final intersection design and construction plans are to be submitted to Council and the Roads and Traffic Authority for approval prior to works commencing. Intersection upgrading is to be completed prior to production at the Glenella Quarry increasing beyond the current operating capacity of five truck loads per day, averaged over a weekly period. In this regard, the Applicant is to maintain a log book detailing the number of truck loads leaving the property each day and Council is to be advised when the five loads per day limit is reached.

All costs associated with the provision of new and upgraded roads/intersections shall be at full cost to the Applicant and no cost to either Cowra Shire Council or the Roads and Traffic Authority.

14. The intersection of Reids Flat and Morongla Roads shall be designed and constructed to maintain the priority of through-traffic along Reids Flat Road and not Morongla Road. In this regard the final design of the intersection shall incorporate the following:

- No speed reduction from existing speed zone.
- Morongla Road to form the terminating leg of the intersection.
- Regulatory signposting to define road priority and to accord with sight distance provisions.
- Provision of line marking and guideposts on the approaches to the intersection for a minimum of 250 metres on each road approach or to start at a point where Approach Sight Distance to the line marking can be achieved generally in accordance with AS 1742.
- Sealed pavement widths at the intersection to accommodate the swept paths of heavy vehicles.

The final intersection design is to accommodate the expected vehicle types and traffic volumes generated by the development and to comply with the RTA Road Design Guide. The final intersection design and construction plans are to be submitted to Council and the Roads and Traffic Authority for approval prior to works commencing. Intersection upgrading is to be completed prior to production at the Glenella Quarry increasing beyond the current operating capacity of five truck loads per day, averaged over a weekly period. In this regard, the Applicant is to maintain a log book detailing the number of truck loads leaving the property each day and Council is to be advised when the five loads per day limit is reached. All costs associated with the provision of new and upgraded roads/intersections shall be at full cost to the Applicant and no cost to either Cowra Shire Council or the Roads and Traffic Authority.

15. The intersection of Morongla Road and Lachlan Valley Way shall be designed and constructed generally in accordance with Figure 5.10 of the EIS and shall also incorporate the following:

- Widening of the western side (northbound traffic) of the Lachlan Valley Way to provide an auxiliary right turn lane (AUR Type Treatment).
- Regulatory signposting to define road priority and to accord with sight distance provisions.
- Provision of line marking and guideposts on the approaches to the intersection for a minimum of 250 metres on each road approach or to start at a point where Approach Sight Distance to the line marking can be achieved generally in accordance with AS 1742.
- Sealed pavement widths at the intersection to accommodate the swept paths of heavy vehicles and installation of a traffic island and tertiary 'Give Way' sign on the Morongla Road approach to the intersection.

The final intersection design is to accommodate the expected vehicle types and traffic volumes generated by the development and to comply with the RTA Road Design Guide. The final intersection design and construction plans are to be submitted to Council and the Roads and Traffic Authority for approval prior to works commencing. Intersection upgrading is to be completed prior to production at the Glenella Quarry increasing beyond the current operating capacity of five truck loads per day, averaged over a weekly period. In this regard, the Applicant is to maintain a log book detailing the number of truck loads leaving the property each day and Council is to be advised when the five loads per day limit is reached. All costs associated with the provision of new and upgraded roads/intersections shall be at full cost to the Applicant and no cost to either Cowra Shire Council or the Roads and Traffic Authority.

16. The two-cell box culvert located on Morongla Road (chainage 0.63 kilometres from Reids Flat Road) shall be widened 2.4 metres on its northside and shall include a compacted road base and seal overlay. The final design and construction plans are to be submitted to Council for approval prior to works commencing.

Note 1: The developer will contribute 40% of the costs of widening the culvert.

Note 2: Box culvert upgrading is to be completed prior to production at the Glenella Quarry increasing beyond the current operating capacity of five truck loads per day, averaged over a weekly period. In this regard, the Applicant is to maintain a log book detailing the number of truck loads leaving the property each day and Council is to be advised when the five loads per day limit is reached.

17. The following box culverts located on Reids Flat Road shall be upgraded and include compacted road base and seal overlay:

Box Culvert	Chainage (from Battery Road intersection)	Road Work Required	Side of Culvert to be Widened
1	0.14km	Widen by 2.44m	downstream side
2	0.67km	Widen by 2.44m	downstream side
3	1.05km	Widen by 2.44m	downstream side
4	1.2km	Widen by 2.44m	downstream side
		Widen by 1.22m	upstream side
5	1.38km	Widen by 2.44m	downstream side
		Widen by 2.44m	upstream side
6	1.58km	Widen by 2.44m	downstream side
7	1.74km	Widen by 2.44m	downstream side
		Widen by 1.22m	upstream side
8	1.89km	Widen by 2.44m	downstream side
		Widen by 1.22m	upstream side
9	2.19km	Widen by 2.44m	downstream side
10	2.61km	Widen by 2.44m	downstream side
11	2.8km	Widen by 1.22m	downstream side
12	3.4km	Raise headwalls on existing box culvert to existing road surface level	
13	4.0km	Widen by 1.22m and raise headwalls on existing box culvert to existing road surface level	upstream side

The final design and construction plans are to be submitted to Council for approval prior to works commencing. Box culvert upgrading is to be completed prior to production at the Glenella Quarry increasing beyond the current operating capacity of five truck loads per day, averaged over a weekly period. In this regard, the Applicant is to maintain a log book detailing the number of truck loads leaving the property each day and Council is to be advised when the five load per day limit is reached.

Note 1: The developer will contribute 40% of the costs of upgrading the culverts.

Note 2: Box culvert upgrading is to be completed prior to production at the Glenella Quarry increasing beyond the current operating capacity of five truck loads per day, averaged over a weekly period. In this regard, the Applicant is to maintain a log book detailing the number of truck loads leaving the property each day and Council is to be advised when the five loads per day limit is reached.

Planning Agreement:

18. The Applicant is required to contribute to the upgrading of Morongla and Reids Flat Roads in accordance with the Attached Planning Agreement, signed by Glenella Quarry Pty Limited and Cowra Shire Council.

Maintenance Agreement:

19. The Applicant is required to enter into a maintenance agreement for the maintenance of Morongla and Reids Flat Roads in accordance with the Attached Maintenance Agreement, signed by Glenella Quarry Pty Limited and Cowra Shire Council.

Driver Code of Conduct:

20. The Applicant shall prepare a detailed and specific road traffic noise assessment for the movement of empty and loaded trucks at affected residences along Morongla Road, Reids Flat Road and Battery Road. The assessment should include truck speed. Should the assessment find that road noise traffic criteria are exceeded, the assessment must include proposed reasonable and feasible measures to minimise and/or mitigate noise impacts associated with heavy vehicles on local roads.

21. The Applicant must prepare a Driver Code of Conduct. The Code of Conduct should be a practical document, which can be used effectively on the ground by the relevant quarry personnel as well as any haulage contractors, and allow for a high level of accountability and include, but not necessarily be limited to, strategies to achieve the following:

- Road safety along the proposed transport route, including procedures dealing with vehicle speeds and noise controls as well as procedures to avoid conflict with school bus routes/timetables;
- Contingencies and procedures dealing with poor weather conditions; and
- Maintenance of all product haulage trucks to ensure they are being maintained in a proper and efficient condition.

- The Code of Conduct is to be prepared in consultation with Cowra Shire Council, local bus operators and residents potentially affected by haulage operations on the transport route.

  Note: Nothing in the Code of Conduct prevents the Council from administering the Roads Act 1993 and Protection of the Environment Operations Act 1997.

Stormwater/Sediment Control:

22. The Applicant must prepare an updated Soil and Water Management Plan (SWMP) for the quarry site. The plan must detail the design requirements for all modifications to drainage lines and required crossings and drainage structures to withstand flows generated by a 1 in 20 year ARI rainfall event. The SWMP must cover all works on protected land and in protected waters, and staging and maintenance requirements. The SWMP should be prepared generally in accordance with the requirements for such plans outlined in Managing Urban Stormwater: Soils and Construction (available from LANDCOM) required to be completed in conjunction with the application for a Part 3A Permit under the Rivers and Foreshores Improvement Act 1948.

Groundwater Protection:

23. If excavation activities encounter groundwater, the Applicant must cease operations and seek advice from the Department of Water and Energy regarding a dewatering licence under the Water Act 1912. The Department of Water and Energy may require additional information to assess this application.

Flora and Fauna Management Plan:

24. Rehabilitation measures are to be employed to establish vegetative cover on constructed drainage channels and other disturbed sites immediately following construction. The re-spreading of topsoil to a minimum depth of 50mm shall be applied prior to re-vegetation of sites. For temporary short term cover, exotic grasses and cover crop species are most effective because of their rapid germination and growth and ready availability of seed. For long term cover, native grasses, shrubs and trees will be more appropriate.

25. Any vegetation or other material removed from the area of operations shall be disposed of lawfully to an appropriate site where the material cannot be swept into protected waters during a flood. Burning must not be carried out unless approval has been obtained from relevant authority(ies).

Heritage Protection:

26. Compliance with the recommendations made in Section 5.5.4 of the EIS prepared by R.W. Corkery & Co Pty Limited dated April 2007, except as covered by other conditions contained within this consent.

27. Appropriate protective measures must be applied to ensure the protection and management of Aboriginal artefacts found during the construction and operation of the quarry. Should any item of potential Aboriginal heritage be located during the construction or operation of the mine, work should cease and advice sought from the Department of Environment and Climate Change.

28. Any waste generated from the workshop, vehicle wash down areas or the like, shall be collected and properly treated to standards acceptable to Cowra Shire Council's Director - Environmental Services. Full details of the proposed methods of treatment of liquid waste shall be submitted to Council for approval.

29. Any toilet, kitchen, shower or laundry facilities on the site shall be serviced by an approved on-site sewage management system.

Compliance Reporting:

30. The Applicant must lodge an Environmental Management Report (EMR) with Cowra Shire Council and the Department of Water and Energy on or before 30 June each year or at dates otherwise directed. The EMR must:

- report on progress in respect of rehabilitation completion criteria; and
- include monitoring results for the previous 12 months; and
- include an outline of proposed activities to be undertaken over the next 12 months; and
- report on the extent of compliance with regulatory requirements;

Recording of Pollution Complaints:

31. The quarry operator must keep a legible record of all complaints made to the quarry company or any employee or agent of the quarry company. The record must include details of the following:

- the date and time of the complaint;
- the method by which the complaint was made;
- any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- the nature of the complaint;
- the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
- if no action was taken by the licensee, the reasons why no action was taken.

The record of a complaint must be kept for at least 4 years after the complaint was made. The record must be produced to any authorised officer of the Council who asks to see them.

Other Approvals:	• Section 68 (On-site Waste Management System) – Local Government Act 1993 • Section 138 Permit (Road Occupancy Licence) – Roads Act 1993 • Part 3A Permit – Rivers and Foreshores Improvement Act 1948 • Environment Protection Licence – Protection of the Environment Operations Act 1997
Right of Review:	Section 82A of the Environmental Planning and Assessment Act 1979 confers the right for an applicant to request the Council to review its determination at any time, other than after the time limited for the making of an appeal under Section 97 expires (if no such appeal is made against the determination) or after an appeal under Section 97 against the determination is disposed of by the Court (if such an appeal is made against the determination). Any request for a review is required to be accompanied by a fee as set by Council's Revenue Policy.
Right of Appeal:	Section 97 of Environmental Planning and Assessment Act 1979 confers the right for an applicant who is dissatisfied with Council's determination to appeal to the Land and Environment Court within 12 months after the date on which you receive this notice.
Signed:	On behalf of the consent authority:
Signature:	
Name:	Michael Carter **Director – Environmental Services**
Date:	6 September 2007

Reasons for Imposition of Conditions:

Development Application No. 73/2007 was assessed using current procedures developed by the Cowra Shire Council and other resource information. This includes:

- The requirements of Section 79C(1) of the Environmental Planning and Assessment Act 1979 which states:

  Section 79C(1) Matters for consideration – general

  In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application:

  (a) the provisions of:

  (i) any environmental planning instrument, and

  (ii) any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority, and

  (iii) any development control plan, and

  (iiia) any planning agreement that has been entered into under section 93F, or any draft planning agreement that a developer has offered to enter into under section 93F, and

  (iv) any matters prescribed by the regulations that apply to the land to which the development application relates.

  (b) the likely impacts of that development, including environmental impacts on both the natural and built environments and social and economic impacts in the locality.

  (c) the suitability of the site for the development.

  (d) any submissions made in accordance with this Act or the regulations.

  (e) the public interest.

- The requirements of Cowra Local Environmental Plan 1990.

  The requirements of the Cowra Shire Council Development Control Plan – Guidelines for Rural Development.

Appendix 5

(No. of pages excluding this page = 54)

Glenella Quarry Pty Limited

ABN: 75 117 019 155

Glenella Quarry Production Increase

Traffic Impact Assessment

Prepared by

Rodney Wallace Consulting

Traffic Impact Assessment

of the

Glenella Quarry Production Increase

Prepared for: R.W. Corkery & Co. Pty. Limited
75 Kite Street
PO Box 80
ORANGE NSW 2800

On behalf of: Glenella Quarry Pty Limited
483 Battery Road
COWRA NSW 2794

Prepared by: Rodney Wallace Consulting
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April, 2007

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PLATES

(Please note: All plates are presented in colour on the Project CD)

1 INTRODUCTION

This Study has been prepared to assess the impacts of increased traffic levels arising from the proposed production increase from the Glenella Quarry. **Figures 1** and **2** show Glenella Quarry is located 18km southeast of Cowra.

2 REGIONAL AND LOCAL ROAD NETWORK

2.1 Regional Road Network

Figure 1 presents the Glenella Quarry within its regional context in central western NSW. Distribution of quarry products is, and would continue to be, via a series of local roads (see Section 2.2 for further description), before transport on more regional roads and highways to either local destinations (throughout central western NSW) or markets in the Sydney Metropolitan area and Australian Capital Territory.

Lachlan Valley Way

Lachlan Valley Way (SR 81) is the most significant regional road as this links the product delivery route to either the Hume Highway to the south, or Cowra and the Mid-Western Highway to the north.

Lachlan Valley Way extends from the Hume Highway west of Yass to the Mid-Western Highway west of Cowra and is an RTA-designated B-double route. Although variable overs its length, Lachlan Valley Way generally comprises a 7m to 8m wide sealed pavement, with a 1m to 2m shoulder, and centre-line marking (see **Plates 1** and **2**). Guide posts are also provided and water management is generally via graded V drains.

Plate 1 Lachlan Valley Way north of Morongla Road (Ref: 685_I056)

Plate 2 Lachlan Valley Way south of Morongla Road (Ref: 685_I057)

Inspection of the road between Morongla and Cowra found that conditions are generally good, with some minor pavement edge break-off observed. The speed limit is variable over the length of the road but limited to 80km/hr for a distance of approximately 800m through Morongla, ie. approximately 400m either side of the Morongla Road intersection with Lachlan Valley Way.

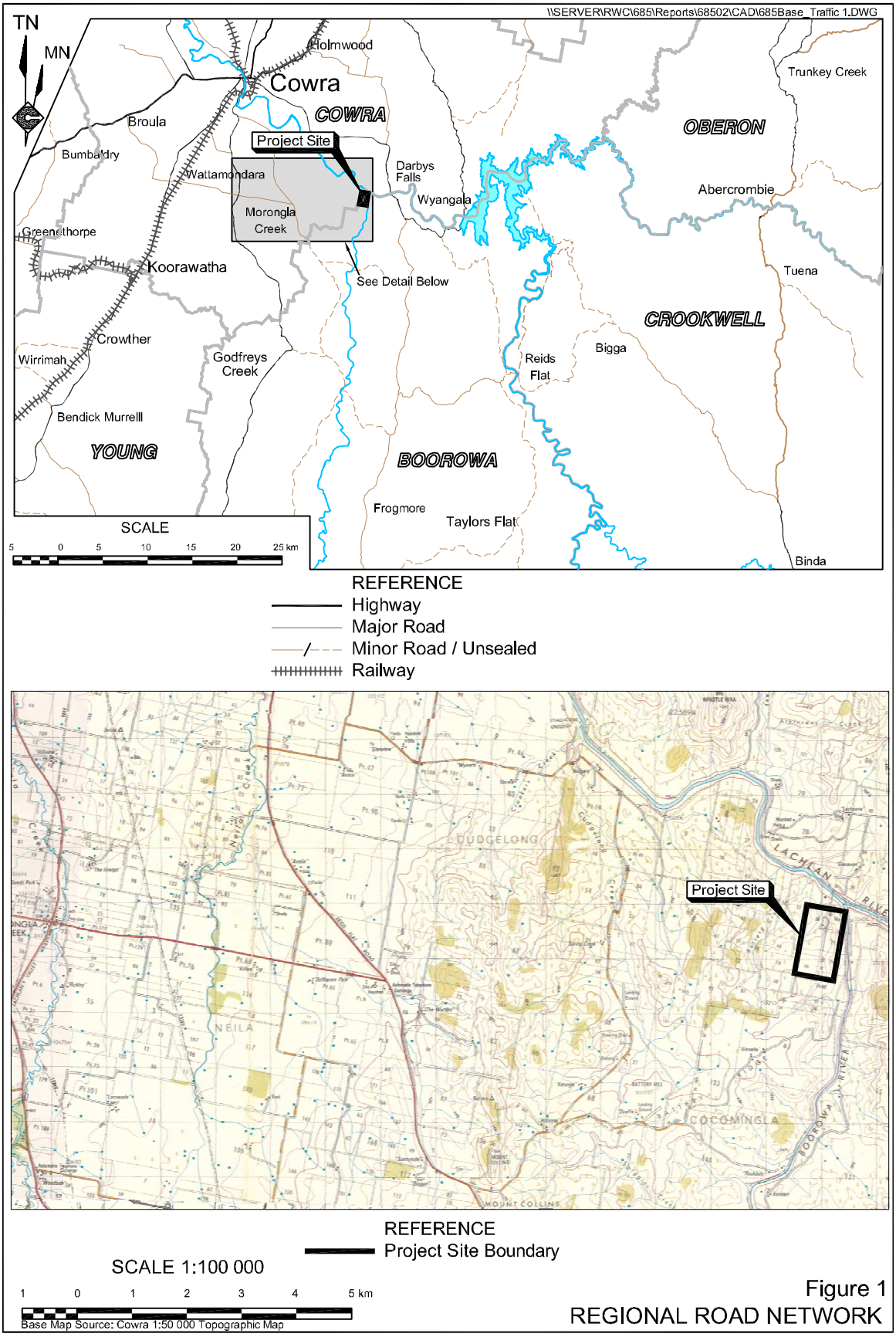

Figure 1
REGIONAL ROAD NETWORK

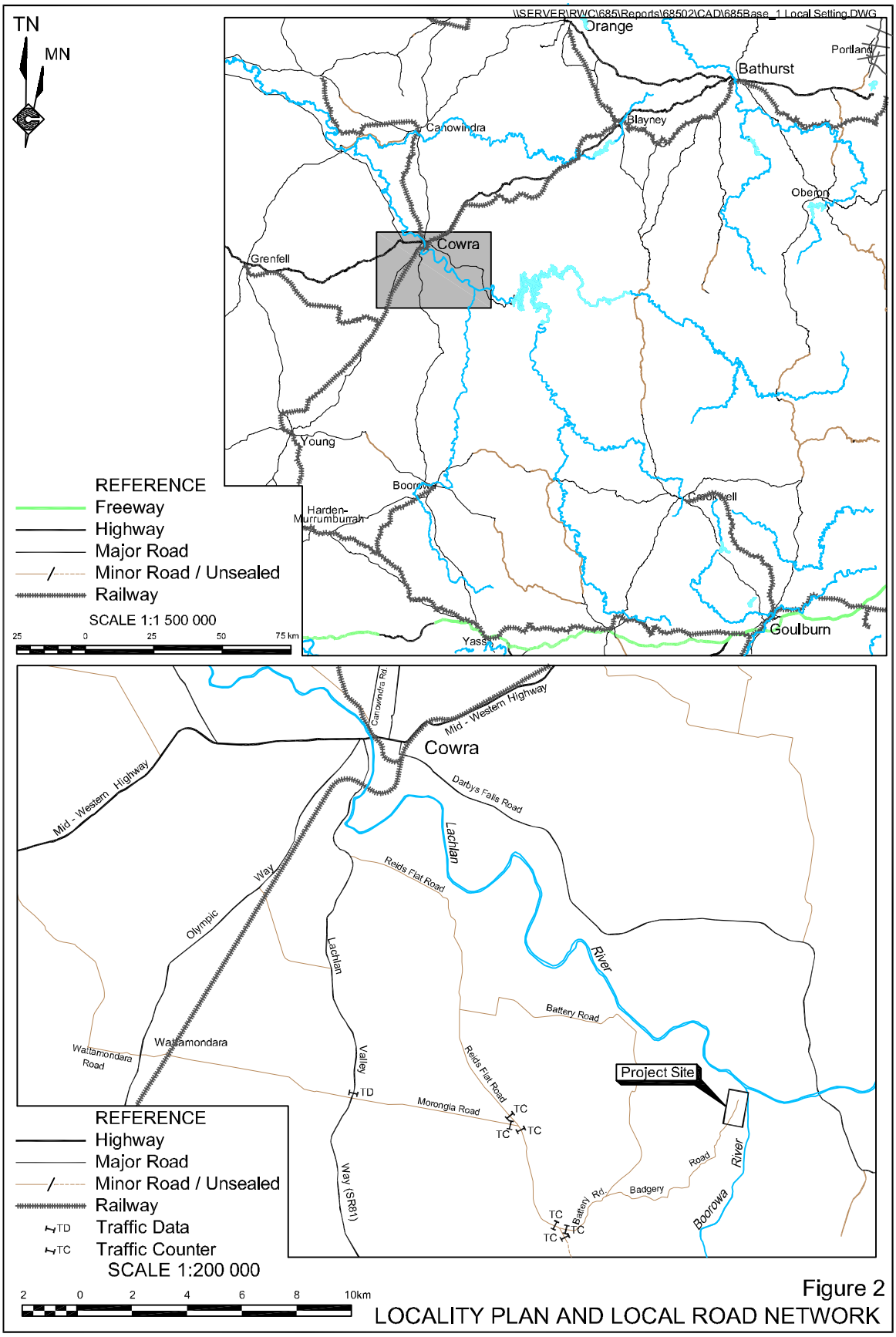

Figure 2
LOCALITY PLAN AND LOCAL ROAD NETWORK

Traffic levels on Lachlan Valley Way, as measured in January 2004 by Cowra Shire Council are presented in **Table 1**.

Table 1
AADT* of the Glenella Quarry Transport Route

Road	Traffic Count Date	Direction of travel	Light Vehicles	Heavy Vehicles
Battery Road	6 – 13 December 2006	East	17.5	5.6
		West	18.9	5.7
Reids Flat Road (100m north of Morongla Road)	23 November – 1 December 2006	North	39.6	0.3
		South	35.1	0.7
Reids Flat Road (100m south of Morongla Road)	23 November – 1 December 2006	North	53.9	5.9
		South	55.1	6
Morongla Road (200m west of Reids Flat Road)	23 November – 1 December 2006	East	27.1	5.4
		West	21.5	5.7
Lachlan Valley Way (145m north of Morongla Road	16 January – 5 February 2004	North	716	69
		South	751	74
Source: Cowra Shire Council			*Annual Average Daily Traffic	

Mid-Western Highway

The Mid-Western Highway is a primary distributor road from the Great Western Highway in Bathurst to Blayney, Cowra, Grenfell and towns further west. It is generally a sealed two lane road with centre line markings and gravel shoulders with a legal speed limit of 100km/hr. While not inspected as part of the current assessment, previous records suggest the current pavement condition of the Mid Western Highway in the vicinity of Cowra is in good condition with no potholes, corrugation or other evident deformation (RWC, 2007)[1].

Hume Highway

The Hume Highway is one of Australia's busiest highways, linking southwestern Sydney to Victoria. The highway was not inspected as part of the assessment, but suffice to say that as one Australia's primary transport corridors, it is maintained in excellent condition along its entire length.

2.2 Local Road Network

2.2.1 Introduction

Figure 2 presents the local road network along which the Glenella Quarry products are, and would continue to be delivered. This section concentrates on those roads which form part of the product delivery route, namely, Battery Road[2], Reids Flat Road[2] and Morongla Road[2].

[1] Environmental Impact Statement for the Broula Magnetite and Limestone Mine, prepared by R.W. Corkery & Co. Pty Limited on behalf of Ferromin Pty Ltd, January 2007.
[2] Local roads are not assigned a road reference number by Cowra Shire Council

2.2.2 Traffic Levels

Current traffic levels for the roads comprising the product delivery route were obtained from historic and project specific traffic counts completed by Cowra Shire Council. **Figure 2** identifies the traffic count locations and **Table 1** summarises this data to provide existing Annual Average Daily Traffic (AADT) levels on Battery Road, Reids Flat Road, Morongla Road and Lachlan Valley Way, ie. the average number of vehicles travelling along that section of the road each day.

The AADT data illustrates that Battery Road, Reids Flat Road and Morongla Road are very lightly used. Notably, product delivery from the Glenella Quarry (about 5 truck loads per day), accounts for approximately 90% of all heavy vehicle traffic on these roads.

The volume of traffic using Lachlan Valley Way is still considered relatively light and well within the capacity of the road. Traffic from the Glenella Quarry currently accounts for <10% of southbound and <2% of small northbound heavy vehicle traffic on this road.

2.2.3 Local Road Conditions

Battery Road

Battery Road is 4.9km long and extends from the existing entrance to the "Glenella" property to its intersection with Reids Flat Road. The existing road comprises a light gravel formation except for a 400m sealed section adjacent to the "Duallie" residence.

Pavement width ranges from 5.0m to 6.0m but in general, only 3.5m is routinely traversed by vehicles with a consequent built-up of loose gravel on the outer sections of the formation (see **Plate 3**).

Plate 3 Battery Road (Ref: 685_D040)

Plate 4 Roadside vegetation and drainage of Battery Road (Ref: 685_D037)

Roadside drainage is via a combination of V-drains and mitre drains with culverts positioned in natural drainage lines (see **Plate 4**). Both the unsealed and sealed pavement conditions are generally good but with isolated areas of the unsealed pavement exhibiting corrugations. The road generally follows the natural topography and incorporates a number of dips which are subject to short-term inundation during high intensity rainfall.

The speed limit on Battery Road, though not signposted, is presumed to be 80km/hr on the basis of road width and alignment.

Reids Flat Road

Reids Flat Road intersects with Lachlan Valley Way approximately 5km south of Cowra and becomes Bennett Springs Road at the Cowra – Boorowa LGA boundary, ie. where it intersects with Battery Road. It comprises a 5.5m dual-laned sealed pavement with 1m to 2m wide gravel or grassed shoulders and roadside "V" drains (see **Plates 5** and **6**). No centre-line or barrier lines are provided.

Pavement conditions are generally good, with only minor areas exhibiting any pavement deformation and / or edge break-off, however, there are existing deficiencies in safety fencing and signage (see Section 5.1).

Cowra Shire Council has advised that the Reids Flat Road pavement would require strengthening and widening to enable its regular use by project-related heavy vehicles. Dames and Moore (1999) notes that Cowra Shire Council had previously proposed to upgrade Reids Flat Road by widening the sealed pavement to 7m and total road width to 9m.

Reids Flat Road is currently a School Bus route. It is also used as a grain haulage route and for 2 weeks of a good years harvest, it is not unreasonable to expect up to 30 bogie drive truck and quadaxle trailer units, tri-axle trailers or B-Doubles negotiating this road (and Morongla Road).

Plate 5 Reids Flat Road (view towards intersection with Battery Road) (Ref: 685_I031)

Plate 6 General condition of Reids Flat Road (Ref: 685_I035)

Morongla Road

Morongla Road is approximately 6.1km in length and extends from Reids Flat Road to Lachlan Valley Way.

Morongla Road comprises a 100km/hr speed limit, 5.3m to 6.2m (predominantly 5.5m) wide sealed pavement with 2m to 3m wide trafficable shoulders and roadside v-drains (see **Plates 7** and **8**). Morongla Road traverses to drainage lines via bridged culverts with no road shoulder present at these crossings.

Plate 7 Morongla Road (view from intersection with Reids Flat Road) (Ref: 685_I051)

Plate 8 Morongla Road (view to intersection with Reids Flat Road) (Ref: 685_I045)

Pavement conditions are generally good, although minor areas of pavement edge break-off and other potential pavement failure are evident. No barrier or centre-line marking is provided on Morongla Road and there are existing deficiencies in safety fencing and signage (see Section 5.1).

2.2.4 Traffic Accident Data

Traffic Accident data was not available for the purposes of this study. Indications were given by Council representatives that data was not kept (or not available) for Morongla Road, Reids Flat Road or Battery Road. A report (unconfirmed by statistical data) of a death as a result of an collision between two (2) light vehicles at the Morongla Road – Lachlan Valley Way intersection, less than 4 years ago was received from a nearby resident.

3 PROJECT DESCRIPTION

3.1 Quarry Operations

The Glenella Quarry is located 18km southeast of Cowra and currently covers an area of less than 5ha. At present the operations produce quartz / pebble (10 000 tonnes per annum), sand (5 000 tonnes per annum), clay and basalt (10 000 tonnes per annum). The products that would continue to be produced at the Glenella Quarry would include road construction materials and sealing aggregates for road maintenance, sand for construction materials and landscaping, decorative pebbles and clay for brick and tile manufacture.

The proposal would increase total annual production to a maximum of 200 000 tonnes per annum and increase the disturbance footprint of the quarry to approximately 30ha. The basalt, sand, quartz pebble and clay would continue to be excavated from the quarry through a combination of load and haul operations for the more fractured basalt and sand/quartz pebble/clay resources, with drill and blast conducted to fracture the more competent and less fractured basalt. As currently, the sand and quartz pebble would be washed and wet screened to produce products to the desired customer specifications. The clay would be excavated and stockpiled for sale (subject to quality and customer requirements) and the basalt would be crushed using a mobile primary crusher.

Based on the extraction of up to 200 000tpa of materials, the Glenella Quarry has a life of approximately 30 years. The quarry would be progressively rehabilitated through the backfilling of the created void with overburden (including weathered basalt and non-marketable clay) and replacing the previously removed soil layer. The final landform would be variously revegetated with pasture species over the elevated northern section, native woodland species on the moderate slopes and riparian vegetation within the re-established drainage features of the site.

3.2 Product Delivery Route

As noted in Section 2, the product delivery route currently followed by product trucks is as follows (see **Figure 2**).

- From the Glenella Quarry Project Site via a private site access road to the "Glenella" property gate (4.7km). The site access road itself is referred to in two sections reflecting a 2.3km section between the property gate and the site facilities area adjacent to the "Glenella" property homestead (Section 1) and a 2.4km section between the site facilities area and the quarry (Section 2).
- From the "Glenella" property gate, the product delivery route follows Battery Road to the intersection with Reids Flat Road / Bennett Springs Road (4.9km) (referred to as Intersection 1 in this document).
- The product delivery route follows Reids Flat Road northwards to the intersection with Morongla Road (4.2km) (Intersection 2 in this document).
- From Intersection 2, the product delivery route follows Morongla Road to its termination at Lachlan Valley Way (6.1km) (Intersection 3 in this document).

Reids Flat Road and Morongla Road are entirely within Cowra Local Government Area (LGA) Battery Road is located within two LGAs (Boorowa and Cowra) and Lachlan Valley Way commences within Cowra LGA but then enters Boorowa LGA to the south of Intersection 3. The intersection of Battery Road and Reids Flat Road / Bennett Springs Road at Mt Collins is on the Shire LGA boundary between Cowra and Boorowa.

From the intersection of Morongla Road and Lachlan Valley Way, it is estimated that 80% of product trucks will travel southwards on Lachlan Valley Way and 20% of product trucks will travel northwards on Lachlan Valley Way.

3.3 Current Agreed Works

Prior to the completion of this study, an undertaking to complete significant private and public road improvements, to increase road user safety and amenity, has been made by the Applicant, Glenella Quarry Pty Limited. The road improvements to which the Applicant has committed are as follows.

1. A shared arrangement has been reached between Boorowa Shire Council and the Applicant to realign Battery Road (in places) and widen the road to a 9 metre formation width in the near future. This will be then provided with a 7.6 metre wide bitumen sealed pavement, utilising aggregate from the quarry.
2. To seal part of the private site access road. Details are not available and it is not part of the brief.

This Study endorses the works referred to in (1.) above, as being the most urgent needed along the route so as to combat the dust nuisance and to overcome the loss of sight distance from this nuisance, especially for passing vehicles. This Study endorses the width chosen and provided some realignment, or level adjustment, is incorporated to overcome the loss of sight (blind spot) in a gully at (about) 1.3km from Intersection 1, this should produce a very satisfactory (and safe) outcome.

Given that this work is agreed, and there is no detailed design provided for the works proposed, this Study will hereafter not address any issues east of the effects on Intersection 1. Reliance will be placed in the Engineering Staff at Boorowa Shire Council to ensure a satisfactory outcome.

4 STUDY METHODOLOGY AND ASSUMPTIONS

4.1 Study Methodology

The scope of study agreed between the Applicant, R.W. Corkery & Co., representatives of Boorowa Shire Council and Cowra Shire Council and Rodney Wallace Consulting was to conduct a basic Road Safety Audit of the product delivery route, a Traffic Impact Assessment of the proposed production increase, and then to use this information to provide recommendations for a prioritised, staged program of road upgrading. The brief confined the study to Battery Road, Reids Flat Road, Morongla Road and the three (3) intersections noted in Section 3.2.

Rodney Wallace Consulting has reviewed the correspondence relating to the original conditions of development consent issued by Cowra Shire Council in September 1987 (23/84) and Boorowa Shire Council in September 1992 (4/84) for the operation of the quarry under the previous operator. These would suggest that the original approval was very basic, and did not impose any conditions in respect to road upgrading or on-going maintenance, except for the acceptance of an offer to maintain "*Battery Road from "Glenella" to its intersection with Badgery Road.*" This approval appeared to be for "*an unlimited quantity over an unlimited period*".

A transportation assessment report prepared in support of a second development application (prepared by Dames and Moore 1999) for the quarry site was also reviewed. As it is acknowledged that whilst this second development application was approved in November 2000 but never proceeded, the conditional requirements imposed were reviewed for general guidance only.

Following a review of the brief and conditions of the November 2000 development consent, an inspection of the entire product delivery route between the Project Site and Intersection 3 was conducted on the day and night of 6 December 2006 to identify existing road safety deficiencies and review the current level of service and condition of the road pavement and intersections.

In order to determine the adequacy of the road pavement, intersections and road signage / markings for the proposed additional quarry-related traffic, the information provided in Sections 2.2 and 4.2 on current and proposed future traffic numbers was obtained. This information includes both recent traffic count data and estimates provided by the Applicant.

4.2 Estimated & Collected Traffic Data

Current output from the quarry is reportedly (about) 5 heavy articulated trucks per day (10 traffic movements per day). Projections for average heavy truck movements of 23 loads per day in each direction (46 truck movements) are expected. The maximum number of loads despatched daily would be 35 which would generate a maximum of 70 truck movements.

As noted in Section 2.2.2, traffic counts were taken over two, 7 day periods at both Intersections 1 and 2. Although this is a small sample, it is in the writer's opinion, representative of actual observations during inspections. The traffic count data is presented in **Appendices 1** and **2** and summarised in **Table 1**. The data demonstrates a heavy articulated truck volume at Intersection 2 (Morongla Road/Reids Flat Road) of (about) 5 vehicles per day, in both directions, with 0.5 vehicles per day entering from Reids Flat Road from the north. Current traffic counts indicate a heavy articulated truck volume at Intersection 1 (Reids Flat Road/Battery Road) of (about) 4.5 vehicles per day on Battery Road, in both directions, and (about) 0.5 vehicles per day on Bennett Springs Road. Up to 5 loads via B-Doubles are being currently hauled to and from the quarry, per week. Thus, by deduction, in theory for average quarry output predictions, ie. 23 truckloads per day:

- the total proportion of articulated heavy traffic on the product delivery route, currently due to the quarry operation (as per actual traffic counts), is (about) 4.5/5 or (about) 90%; and
- the additional quarry-related traffic would be likely to increase the articulated heavy traffic loading on the Morongla Road / Reids Flat Road section of the product delivery route by (about) 18/5.5, ie. (about) 327%; and / or
- the total proportion of articulated heavy traffic on the product delivery route due to the additional quarry-related traffic (as per quarry output predictions, and current traffic assessments) will be (about) 18:23.5 or (about) 77%[4]

Considering the maximum number of truckloads per day (35), the following theoretical impacts are deduced.

- Articulated heavy traffic loading on the Morongla Road / Reids Flat Road section of the product delivery route would increase by (about) 30/5.5, ie. (about) 545%.
- The total proportion of articulated heavy traffic on the product delivery route due to the additional quarry-related traffic would be (about) 25 / 30.5 or (about) 82%[3].
- The total proportion of articulated heavy traffic on the product delivery route due to the total quarry operation would be between 23 / 23.5 and 30 / 30.5, ie. about 98%[4].

Traffic counts on Lachlan Valley Way (SR 81) have been previously collected by the RTA, dated January 2004 (**Annexure 3**). Allowing 5% growth per annum, it is determined that :

[3] This proportion will vary, ie. will reduce, at harvest time, and at times of other intermittent farm activity. However, for the purpose of this exercise, it is assumed 98% of articulated vehicles would be quarry related and **the increase in articulated heavy vehicles due to the proposed production increase would be between 77% and 82%.**

- southbound articulated vehicles is currently 933 vehicles in 20 days and therefore, the additional quarry-related traffic could result in an increase of heavy vehicle traffic on the Lachlan Valley Way of (about) 34% to the south; and
- northbound articulated vehicles is currently 875 vehicles in 20 days and therefore, the additional quarry-related traffic could result in an increase of heavy vehicle traffic on the Lachlan Valley Way of (about) 11% to the north.

Considering this State Road has sufficient operating capacity, the proposed increase is not expected to create any negative impact for northbound traffic. However, southbound traffic may be impacted, especially in respect to the turning movements in and out of Morongla Road.

5 STUDY RESULTS

5.1 Existing Road Safety Deficiencies

The following deficiencies were identified during the site investigation.

1. Attention is needed to confine/define **movements at intersections** to reduce conflict between slow moving turning vehicles and faster through traffic.
2. **Pavement widths** are inadequate for heavy trucks passing other traffic, especially other trucks, at speed.
3. **Safety fencing** is deficient with warrants not being met. Existing safety fencing is deficient with minimum lengths and terminal ends not being standard.
4. **Reflectorisation and signage** is bad with scant guideposting, aged reflectors and aged (and scant) warning signs.
5. At (about) 1km south of Intersection 2, on Reids Flat Road, there is a poorly reflectorised slight S bend with a hollow in which **sight of a vehicle is momentarily lost.**

Current Safety Fence Upgrades Required

Morongla Road - From Lachlan Valley Way (Route 81)

0.1km	lengthen to minimum 24m each side + 4 new terminal ends
2.9km	lengthen to minimum 24m each side + 4 new terminal ends
5.4km	lengthen to meet warrants, correct splays, and provide 4 new terminal ends

Reids Flat Road – South from Morongla Rd

0.3km	provide (about) 50m LHS + returns + terminal ends
	provide 24m RHS including returns + terminal ends
1km	provide (about) 30m LHS & RHS + returns + new terminal ends
2.5km	provide (about) 30m LHS + returns + terminal ends
2.6km	provide 24m LHS including returns + terminal ends
3.0km	provide 24m LHS including returns + terminal ends
3.2km	provide (about) 50m LHS including returns + terminal ends
3.55km	provide 24m LHS & RHS including returns + terminal ends

Current Signage Upgrades Required

Morongla Rd - From Lachlan Valley Way (Route 81)

0.15km	provide oversize advance warning of crossroads – reposition
1.8km	provide advance warning of side road
4.3km	provide advance warning of crossroads
end	provide advance warning of Reids Flat Rd intersection

Reids Flat Road – South from Morongla Rd

0.15km	provide advance warning of intersection
0.8km	upgrade chevrons for advance curve warning
1.2km	upgrade chevrons for advance curve warning
3.35km	provide advance warning of side road
end	provide advance warning of Battery Road intersection

Attention to these signage and safety fence deficiencies would be needed irrespective of whether approval is granted to increase production from the Glenella Quarry.

5.2 Intersection Performance

5.2.1 Intersection 1 (Battery Road – Reids Flat Road/Bennett Springs Road)

Figure 3 displays the current configuration of Intersection 1.

Whilst this Study does not suggest that this intersection is high risk, due to the relatively low traffic volume and the obvious care exercised by loaded trucks entering the Reids Flat/Bennetts Springs through road, it does suggest that the circumstances could be improved to overcome the potential for accidents due to the sight restrictions on this through road.

At Intersection 1, there is currently only (about) 125 metres of sight distance to northwest for traffic attempting to enter Reids Flat Road from Battery Road. This sight restriction is due to the existing crest and curvature on Reids Flat/Bennett Springs Road. Stopping Sight Distance for 100kph is 150m and therefore speeding cars approaching the intersection from the west do pose a risk.

Sight distance from truck to truck is (about) 150 metres due to greater height of vehicles. Therefore, collisions between trucks travelling to or from the quarry are unlikely due to adequate sight, slow approach speed and familiarity with the circumstances. Sight distance down Bennett Springs Road from Battery Road and vice versa is ample although this could be improved by the clearing and maintenance of some vegetation on the road verge.

The road pavement at the intersection is in good condition and currently incorporates a 38m long seal (note proposed full length sealing of Battery Road) on Battery Road and generous sealed tapers. Thus there is no difficulty in respect to truck turning circles etc. Furthermore, this Study suggests there would not be an elevated potential for accident being caused by the truck movements. However, reaction time and inattention could be a potential problem in

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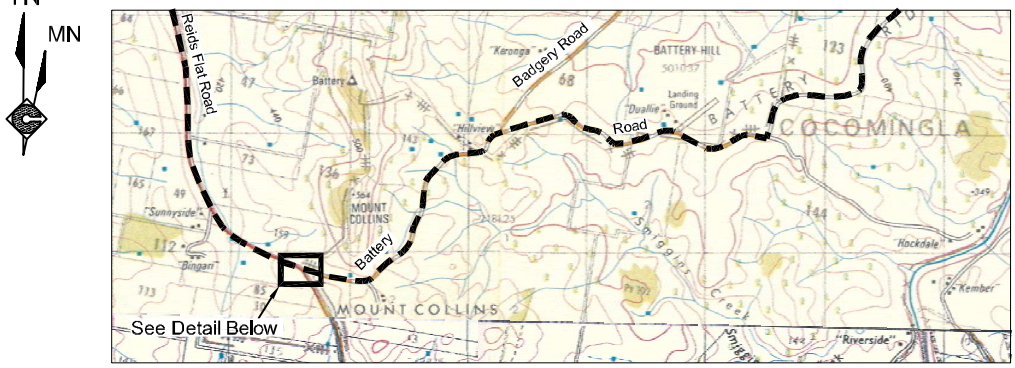

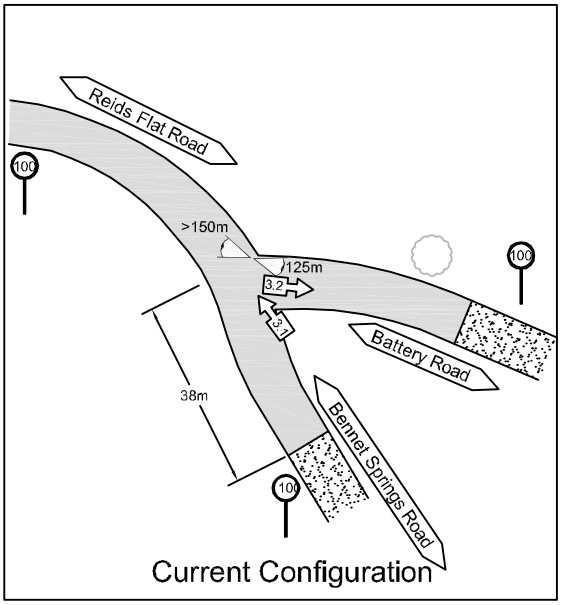

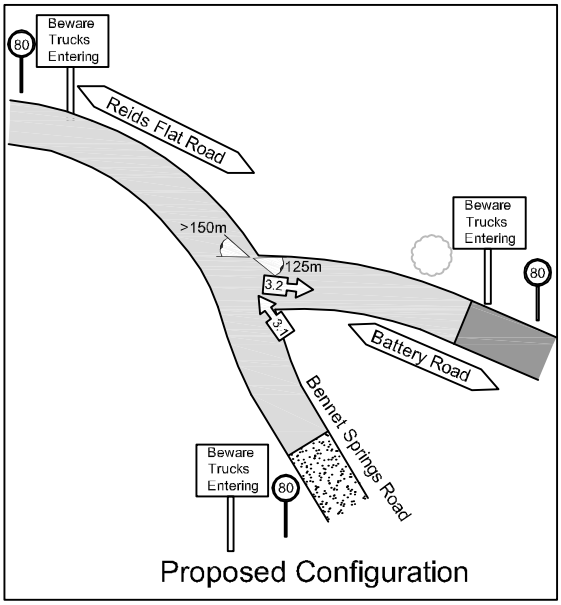

REFERENCE
Existing Sealed Road
Existing Unsealed Road
Proposed Sealed Road
125m Sight Distance
3.1 Plate Location and Reference

Plate 3.1

Plate 3.2

Base Map Source: Cowra 1:50 000 Topographic Map

Figure 3

respect to through traffic on the Reids Flat Road/Bennetts Springs Road as we have the scenario where the predominant traffic is going to be focussed on the turning Reids Flat Road/Battery Road leg of the intersection. It could be argued that an increase in frequency of turning truck traffic could reduce the potential for accidents, as local traffic becomes more accustomed to this types and origin or traffic, however, this study prefers to err on the side of caution.

Given the Stopping Sight Distance for an 80kph zone is 100m, ie. within the existing sight distance of the intersection the following recommendation is made.

Improvement 2: An 80kph speed limit on all legs of the intersection should be established and "*Beware – Trucks Turning*" signs on the Reids Flat Road and the Bennetts Springs Road approaches to this intersection erected.

Consideration was given to the installation of Give Way controls on northbound traffic on Bennetts Springs Road. Whilst this would be an added safeguard, and an option if problems arise in the future, this Study does not consider this warranted at this point in time.

Consideration was given to a climbing lane on the southern approach, but this doesn't appear necessary due to:

- relatively low traffic volume overall: and
- all traffic entering the quarry will be unladen and thus not extremely slow, relative to most other traffic on the route.

Consideration was also given to an "ultimate" reconstruction of the intersection. This would involve excavation to clearly distinguish the Reids Flat/Battery Road as the through road with the Bennetts Springs Road entering more squarely at approximately 75m down Battery Road. This would involve (some) land resumption, removal of a significant white gum specimen and could cost (about) $300k, depending on road standards aimed for in the design. However, the overall increase in sight distance would be minimal, and this Study has concluded that the abovementioned cheaper recommendation puts an adequate traffic safety regime in place. Nonetheless, this Report does suggest that if the future traffic volume were to increase significantly on the Reids Flat Road /Bennetts Springs Road leg of this intersection, then reconstruction as suggested herein may be appropriate.

5.2.2 Intersection 2 (Reids Flat Road – Morongla Road)

Figure 4 displays the current configuration of Intersection 2.

Whilst this Study does not suggest that this intersection is high risk, due to the relatively low traffic volume and the reasonably open vision on approaches, it does suggest that the circumstances could be improved with minimum improvements.

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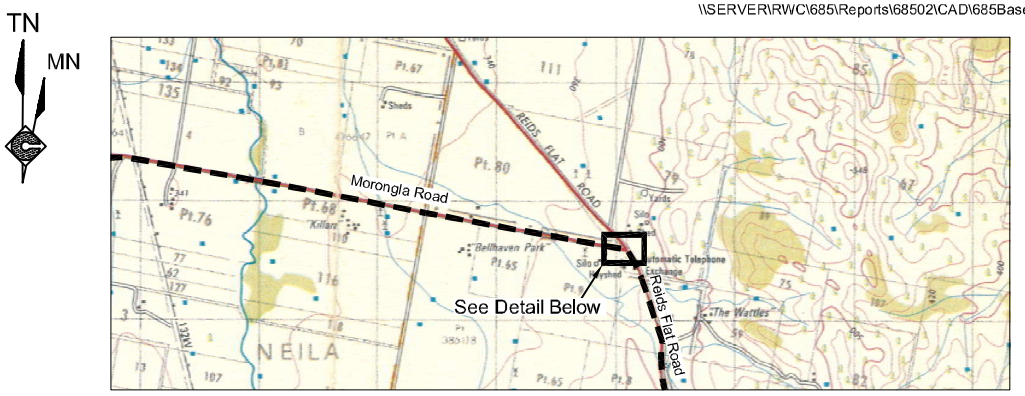

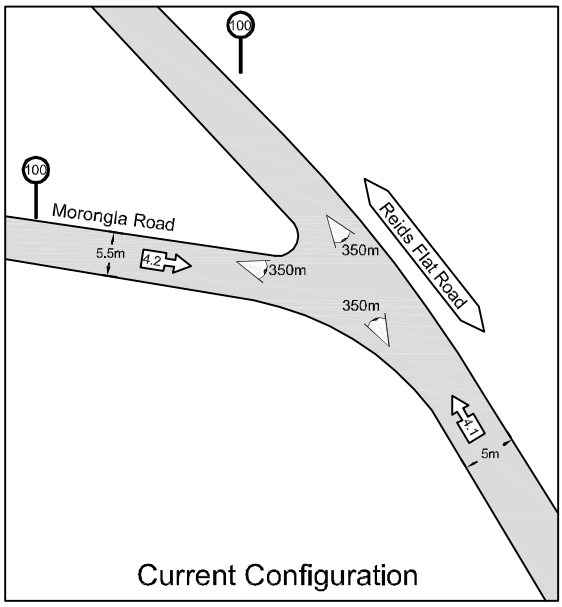

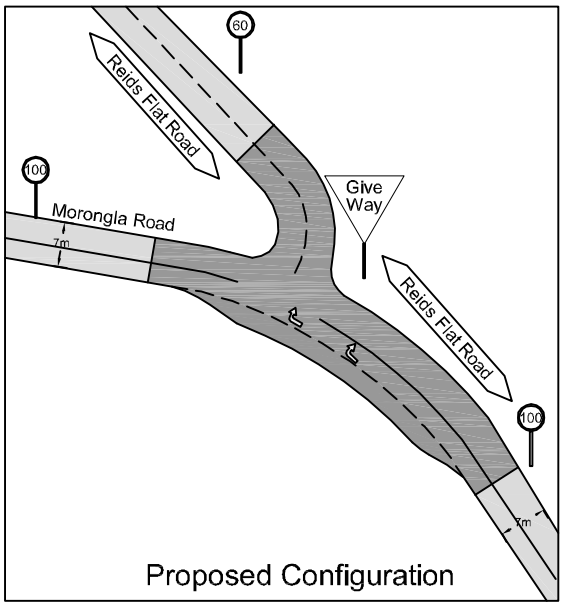

REFERENCE
Existing Sealed Road
Proposed Sealed Road
125m Sight Distance
4.1 Plate Location and Reference

Plate 4.1

Plate 4.2

Base Map Source: Cowra 1:50 000 Topographic Map

Figure 4

There is currently a restricted sight distance between traffic travelling east on Morongla Road and traffic travelling southwest on Reids Flat Road, due to roadside vegetation. This vegetation also momentarily blocks vision of traffic travelling north on Reids Flat Road to traffic approaching from the northwest. This latter restriction is minimal and unlikely to cause a collision. Otherwise sight distance is (generally) 350m in all directions.

There are very wide tapers at this intersection and it is not clear which leg should yield. It is a Y intersection with the appearance, from layout, that Reids Flat Road is the through road, but from road pavement use pattern, and factual traffic volumes, it appears that Reids Flat Road/Morongla Road is the through road. Whilst the speed limit on all roads is 100km/hr, a safe speed (determined by the writer on safe travel speed criteria) on Reids Flat Road/Morongla Road westbound lane is (only about) 60km/hr.

The current predominant heavy vehicle traffic at this intersection is clearly the Morongla Road/Reids Flat Road leg. Articulated heavy vehicles on Reids Flat north represents only (about) 10% of total heavy vehicles (see traffic counts **Annexure A**). Current traffic counts indicate (about) 5 articulated heavy vehicle per day on Morongla Road/Reids Flat Road leg (see **Table 1**) with it proposed to increase this loading to 25 when full production is reached in (say) 4 years.

To improve the performance and safety of this intersection, this study provides the following recommendations, together referred to as Improvement 1.

Improvement 1:

1. **Minor reconstruction to increase curve radius on Reids Flat Road/Morongla Road westbound, thus allowing:**
    - **the existing westbound lane to be used as a holding bay for right turning traffic wishing to continue to northwest on Reids Flat Road; and/or**
    - **the construction of a slip lane for through traffic on the Reids Flat Road/Morongla Road leg.**
2. **Introduction of a barrier to force Reids Flat Road south bound traffic to approach Morongla Road at (about) 90º.**
3. **Installation of Give Way signs for all traffic approaching the intersection from Reids Flat Road north.**

This Study recommends Improvement 1 as the minimum amount of work required to make the intersection safe. If agreement can be negotiated to incorporate the intent of the intersection improvements into the reconstruction of the Reids Flat Road/Morongla Road curve alignment to achieve a safe speed of 100km/hr, then this would be a most satisfactory outcome.

5.2.3 Intersection 3 (Morongla Road – Lachlan Valley Way)

Figure 5 displays the current configuration of Intersection 3.

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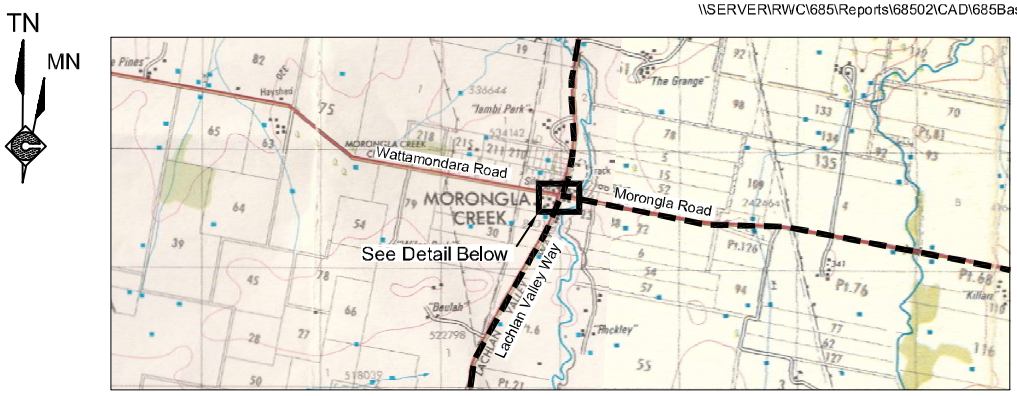

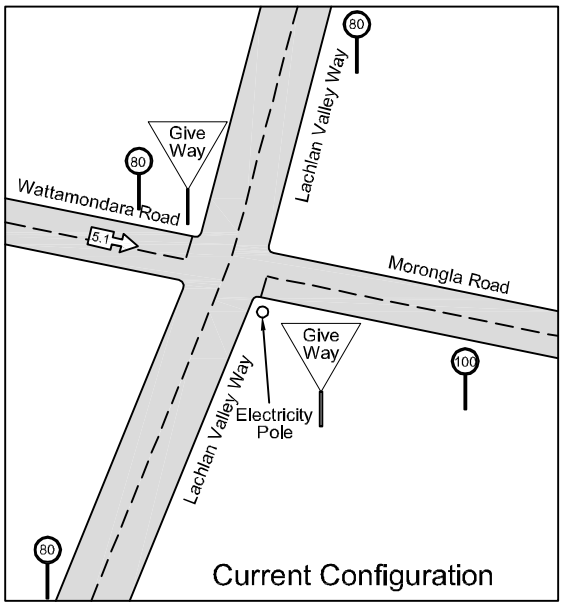

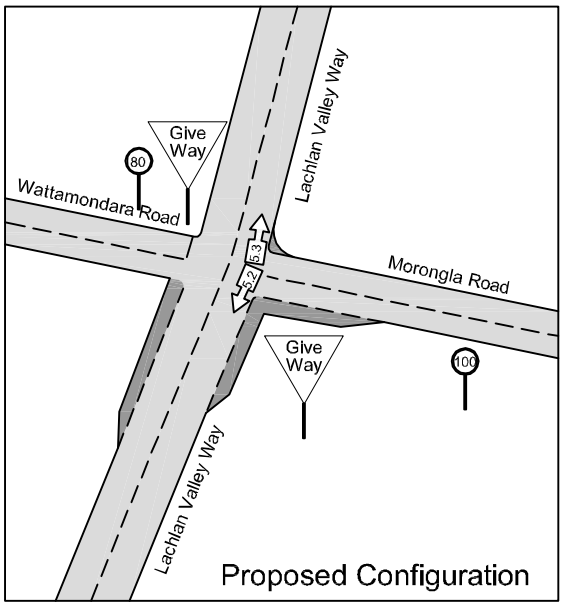

REFERENCE
Existing Sealed Road
Proposed Sealed Road
125m Sight Distance
5.1 Plate Location and Reference

Plate 5.1 Plate 5.2 Plate 5.3

Base Map Source: Cowra 1:50 000 Topographic Map

Figure 5

This is a potentially dangerous intersection for unfamiliar traffic of all classes due to:

- current ineffective intersection warning signage from the east;
- somewhat restricted sight from the east;
- the visual impression that the Morongla Road/Wattamondara Road is a through road when approaching from east (vision is good from west although signage is missing); and
- the volume of traffic, of all classes, on Lachlan Valley Way.

It is acknowledged that this potential danger is (to a large extent) alleviated by the current 80km/hr speed limit within Morongla. Nonetheless, traffic on the Lachlan Valley Way may be (generally) oblivious to the traffic entering the intersection from the side roads.

The intersection layout is currently below standard in that there are no splays at the intersection and inadequate turning circles, for standard design criteria for standard traffic, let alone the fact that articulated heavy vehicles (including B doubles) currently use the intersection.

From Page 1-8 of the Transportation Assessment for the Glenella Quartz Mine prepared by Dames and Moore Pty Ltd in 1999, it is noted that "the junction of Morongla Road and the Lachlan Valley Way will require widening to provide adequate turning space for B-Double trucks. It will be necessary for RTA to have design input into the upgrading of the junction."

This Study recommends that:

1. an acceleration lane for loaded southbound laden trucks is needed; and
2. a deceleration, right turn lane for unladen northbound trucks (slip lane for through traffic) is needed.

The increase in the movement of trucks to destinations south of Intersection 3 (the Applicant anticipates 80% south : 20% north) is of such significance that it would be required to ensure the continuing level of safety and intersection performance at Intersection 3. This would be expensive as telecommunication cables and electricity poles would need to be relocated. These electricity poles are currently within the clear zone and therefore other authorities should bear some responsibility to this cost of relocation, (as these are currently a hazard). Although increased traffic to and from the north is not significant, it is suggested that because of the disturbance that will be caused to traffic flow during the above works, it would be prudent to redesign and reconstruct the full intersection at the one time.

This Study suggests that it could be argued that the Applicant should only be responsible for a portion of the cost of these works, due to:

- nil affect on movements to and from the north;
- the intersection layout being currently below standard in that there are no splays at the intersection and inadequate turning circles, for standard design criteria for standard traffic;

- the inadequacy of the intersection to accommodate for current farm related truck traffic, especially during harvest time;
- the need to relocate electricity poles which are currently within the clear zone and therefore these are currently a hazard; and
- the fact that there is a current hazard present due to the visual impression that the Morongla Road/Wattamondara Road is a through road when approaching from east.

Thus this Study notes the fact that a hazard exists currently and would only be proportionally increased with increased traffic. In fact, it could be argued that an increase in frequency of turning truck traffic could reduce the potential for accidents at the intersection, due to a proportion of the through traffic developing an increased awareness of "the problem" as turning trucks become a more familiar sight.

Whilst no attempt has been made to quantify the proportion due by the three (3) parties, the Applicant has advised that it would contribute to the required intersection upgrade but requests that the work be delayed until the level of product despatch has increased substantially. The remaining cost should be borne by Cowra Shire Council and/or Roads and Traffic Authority to account for the current shortfalls in the level of service at the existing intersection. This Study suggests that a delay may also assist Roads and Traffic Authority and/or Cowra Shire Council funding programming. The proposed intersection upgrade is identified as Improvement 4 as follows.

IMPROVEMENT 4: involves the upgrading of the Morongla Road / Lachlan Valley Way intersection as follows.

- **Construct sealed splay on Morongla Road for south-bound laden trucks.**
- **Widen Lachlan Valley Way to allow for the construction of an acceleration lane for south-bound laden trucks and a deceleration, right turn lane for unladen north-bound trucks.**
- **Relocate the telecommunication cables and electricity poles located at the southeastern fork of the intersection.**

A delay is anticipated to allow Glenella Quarry management and Cowra Shire Council and/or Roads and Traffic Authority to set funds aside and for design details to be finalised. In the interim, hazard warning signage should be upgraded.

A strategy for managing this interim hazard warning signage is examined in Section 6.3.

5.3 Pavement Width and Condition

Reids Flat Road is a bitumen dual lane (non-linemarked) carriageway of variably 5.3m to 5.6m wide – predominantly 5.5m wide. The pavement is currently quite sound and is not showing pavement failure due the current heavy traffic volume. It is impossible to predict the degree to which an increase of 78% in quarry traffic would increase deterioration of the pavement. This

Study suggests that any deterioration is likely to be more a product of ageing, weather conditions and the level of maintenance provided to drains etc, than an increase in traffic volume. Certainly, this increase would escalate the wear of the surface aggregate, but it could be argued that the increase in traffic would benefit the actual bitumen coating.

Morongla Road is a bitumen dual lane (non-linemarked) carriageway of variably 5.3m to 6.2m wide – predominantly 5.5m wide. The pavement is currently quite sound although showing some evidence of potential pavement failure due the current heavy traffic volume. While it is likely that an increase of 83% may contribute to an increase in deterioration of the pavement, this Study suggests that any deterioration is likely to be more a product of ageing, weather conditions and the level of maintenance provided to drains etc, than an increase in traffic volume. Certainly, this increase would escalate the wear of the surface aggregate, but it could be argued that the increase in traffic would benefit the actual bitumen coating.

From Page 1-8 of the Transportation Assessment for the Glenella Quartz Mine prepared by Dames and Moore Pty Ltd in 1999, it is noted that:

1. "Cowra Council has indicated in (its) Road Improvement Plan that Reids Flat Road requires strengthening in some locations and widening the sealed pavement to 7m with unsealed shoulders extending it to a width of 9m"; and
2. "Cowra Council has indicated that Morongla Road requires strengthening in some locations and widening the sealed pavement to 7m with unsealed shoulders extending it to a width of 9m."

Further, from Page 1-22 it is noted that "The Council proposes to upgrade these roads to a suitable standard to accommodate these (heavy) vehicles. A sealed carriageway wide enough to let two trucks pass would provide a good quality of service with up to 1000vpd using it. Thus subject to the proposed upgrading, there will be no problems on these roads." Thus, this Study concludes that these improvements were needed, and were agreed to be carried out by Cowra Shire Council regardless of the expansion of the quarry or not.

Clearly, these widening improvements have not yet been carried out. There is some evidence of pavement strengthening and widening to 6.2m on Morongla Road. This Study recommends the following as Improvements 3 and 5.

IMPROVEMENT 3: The Morongla Road sealed pavement be widened by (about) 1.2m on each side, or 2.4m on one side, (ie. targeting a minimum sealed width of approximately 7.5m) over its entire length except over narrow structures protected by safety fence.

IMPROVEMENT 5: The sealed pavement on Reids Flat Road, from Morongla Road to Battery Road be widened by (about) 1.2m on each side, or 2.4m on one side (ie. targeting a minimum sealed width of approximately 7.5m) over its entire length except over narrow structures protected by safety fence.

Whilst it could be argued that the quarry operation should be responsible for 78% of the cost of these works, attention is drawn to Cowra Shire Council's acknowledgement that "Morongla Road requires strengthening in some locations and widening the sealed pavement to 7m with unsealed shoulders extending it to a width of 9m", regardless of whether this proposal

proceeds or not. Thus the Applicant has advised that it would contribute construction materials to the proposed road widening works with labour and traffic control to be provided by Cowra Shire Council. This proposed level of contribution would be dependent on:

- the improvements utilising materials from the Glenella Quarry;
- Council attending to, and paying for, traffic control issues; and
- staging to fit in with the Applicant's cash flow.

6 RECOMMENDED WORKS AND SCHEDULE

6.1 Urgent Works

This Study recommends that the following works are put in place within one month of the proposal being approved, ie. subject to all construction plans and permits being in place.

- An upgraded sign strategy on SR 81 (Lachlan Valley Way), warning of trucks turning at Morongla Road.
- improvement to existing signage on Morongla Road approaching SR 81.

This Study also recommends that Improvements 1 and 2 be carried out within 3 months of the increased production being approved. It is acknowledged that the Speed Restriction recommended in Improvement 2 would need to be endorsed by the appropriate authorities. It is envisaged that this work would be 100% at cost to the Applicant.

IMPROVEMENT 1:

1. **Minor reconstruction to increase curve radius on Reids Flat Road/Morongla Road westbound, thus allowing:**
   - **the existing westbound lane to be used as a holding bay for right turning traffic wishing to continue to northwest on Reids Flat Road; and/or**
   - **the construction of a slip lane for through traffic on the Reids Flat Road/Morongla Road leg.**
2. **Introduction of a barrier to force Reids Flat Road south bound traffic to approach Morongla Road at (about) 90º.**
3. **Installation of Give Way signs for all traffic approaching the intersection from Reids Flat Road north.**

IMPROVEMENT 2: An 80kph speed limit on all legs of the intersection should be established and "*Beware – Trucks Turning*" signs on the Reids Flat Road and the Bennetts Springs Road approaches to this intersection erected.

This Study also recommends that all signage deficiencies be corrected by the respective Councils as a matter of urgency.

Authorities should make their own assessment as to the undertaking and proportional responsibility for upgrading signage deficiencies (information listed in Section 5.1 is a guide only). It is envisaged that the cost of this work would be borne by Cowra Shire Council.

6.2 High Priority Works

This Study recommends that Improvement 3 be commenced once production exceeds 35 000tpa or be carried out within 6 months of the increased production being approved OR under an arrangement to be negotiated between the parties and that this work be completed as soon as possible after commencement.

IMPROVEMENT 3: The Morongla Road sealed pavement be widened by (about) 1.2m on each side, or 2.4m on one side, (ie. targeting a minimum sealed width of approximately 7.5m) over its entire length except over narrow structures protected by safety fence.

It is envisaged that the Applicant would contribute to the cost of this improvement and the writer suggests that a reasonable approach would be for the Applicant to supply all material ex-quarry and thence have all other works carried out by, and funded by, Cowra Shire Council.

This Study recommends that, as soon as it is affordable after completion of Improvement 3 that new guideposting be put in place, and that safety fencing deficiencies be corrected on Morongla Road (information listed in Section 5.1 is a guide only).

It is envisaged that this guideposting work should be 100% at cost to Cowra Shire Council, but it is recognised that a shared arrangement may be negotiated in respect to the safety fencing.

6.3 Staged Works

This Study recommends that Improvements 4 and 5 be carried out within 18 months of the increased production being approved OR as early as possible after production from the quarry reaches (about) 75 000tpa (combined), and/or after agreement is reached on design details and funding arrangements.

IMPROVEMENT 4: involves the upgrading of the Morongla Road / Lachlan Valley Way intersection as follows.

- **Construct sealed splay on Morongla Road for south-bound laden trucks.**
- **Widen Lachlan Valley Way to allow for the construction of an acceleration lane for laden south-bound trucks and a deceleration, right turn lane for unladen north-bound trucks.**
- **Relocate the telecommunication cables and electricity poles located at the southeastern fork of the intersection.**

A delay is anticipated to allow the Applicant and Cowra Shire Council and/or Roads and Traffic Authority to set funds aside and for design details to be finalised. In the interim, hazard warning signage should be upgraded.

IMPROVEMENT 5: The sealed pavement on Reids Flat Road, from Morongla Road to Battery Road be widened by (about) 1.2m on each side, or 2.4m on one side (ie. targeting a minimum sealed width of approximately 7.5m) over its entire length except over narrow structures protected by safety fence.

It is envisaged that the Applicant would contribute to the cost of this improvement and the writer suggests that a reasonable approach would be for the Applicant to supply all material ex-quarry and thence have all other works carried out by, and funded by, Cowra Shire Council.

This Study recommends that, as soon as it is affordable after Improvement 5 is complete that new guideposting be put in place, and that safety fencing deficiencies be corrected on Reids Flat Road from Morongla Road to Bennetts Springs/Battery Road intersection.

It is envisaged that this guideposting work should be 100% at cost to Cowra Shire Council, but it is recognised that a shared arrangement may be negotiated in respect to the safety fencing.

6.4 School Bus Route Considerations

This Study recommends that, during February of each year during the operation of the quarry, the Applicant and/or Cowra Shire Council liaise with the operator of the School Bus in respect to possible dangers at new pick up and/or set down points on the haulage route. If any attention is required in respect to new School Bus Stops then, providing the requests are reasonable, this work be carried out as soon as possible by the Applicant.

This Study suggests that fully sealed bus bays are not necessary on roads of this relatively low traffic volume.

6.5 Other Works (Linemarking)

This Study recommends that consideration be given to including Morongla Road and the relevant section of Reids Flat Road on future linemarking programs, when significant lengths are widened. It is envisaged that this should be at 100% cost to Cowra Shire Council and/or Roads and Traffic Authority.

ANNEXURES

(No. of pages excluding this page = 15)

Annexure 1 *Traffic Counts at Battery Road / Reids Flat Road / Bennetts Springs Road Intersection – Intersection 1 – November /December 2006*

Annexure 2 *Traffic Counts at Morongla Road / Reids Flat Road Intersection – Intersection 2 – November 2006*

Annexure 3 *Traffic Counts on Lachlan Valley Way (SR 81) – January 2004*

Annexure 4 *Extract from Austroads 94 Document Explaining Traffic Counter Readings*

Annexure 1

Traffic Counts at Battery Road / Reids Flat Road / Bennetts Springs Road Intersection – Intersection 1 – November /December 2006

(No. of pages excluding this page = 6)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-625 -- English (ENA)

Datasets:

Site:	**[135] Battery rd 100m E Reids Flat rd**
Direction:	6 - West bound A>B, East bound B>A., **Lane:** 0
Survey Duration:	15:17 Wednesday, 6 December 2006 => 13:44 Wednesday, 13 December 2006
File:	L:\MetroCount v313\User\Data\13513Dec2006.EC0 (Plus)
Identifier:	R635VNJZ MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**15:17 Wednesday, 6 December 2006 => 13:44 Wednesday, 13 December 2006**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	East (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	155 Vehicles

Class Bins (Vehicles in Profile = 155)

Class 1 - 104 (67.10%)
Class 2 - 3 (1.94%)
Class 3 - 9 (5.81%)
Class 4 - 6 (3.87%)
Class 5 - 1 (0.65%)
Class 6 - 0 (0.00%)
Class 7 - 3 (1.94%)
Class 8 - 5 (3.23%)
Class 9 - 19 (12.26%)
Class 10 - 5 (3.23%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-626 -- English (ENA)

Datasets:

Site:	**[135] Battery rd 100m E Reids Flat rd**
Direction:	6 - West bound A>B, East bound B>A., **Lane:** 0
Survey Duration:	15:17 Wednesday, 6 December 2006 => 13:44 Wednesday, 13 December 2006
File:	L:\MetroCount v313\User\Data\13513Dec2006.EC0 (Plus)
Identifier:	R635VNJZ MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**15:17 Wednesday, 6 December 2006 => 13:44 Wednesday, 13 December 2006**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	West (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	165 Vehicles

Class Bins (Vehicles in Profile = 165)

Class 1 - 110 (66.67%)
Class 2 - 4 (2.42%)
Class 3 - 11 (6.67%)
Class 4 - 6 (3.64%)
Class 5 - 1 (0.61%)
Class 6 - 0 (0.00%)
Class 7 - 3 (1.82%)
Class 8 - 5 (3.03%)
Class 9 - 19 (11.52%)
Class 10 - 6 (3.64%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-620 -- English (ENA)

Datasets:

Site:	**[136] Reids Flat rd 150m N Battery rd**
Direction:	7 - North bound A>B, South bound B>A., **Lane:** 0
Survey Duration:	15:39 Wednesday, 6 December 2006 => 13:49 Wednesday, 13 December 2006
File:	L:\MetroCount v313\User\Data\13613Dec2006.EC0 (Plus)
Identifier:	A596FRT9 MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**15:39 Wednesday, 6 December 2006 => 13:49 Wednesday, 13 December 2006**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	North (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	289 Vehicles

Class Bins (Vehicles in Profile = 289)

Class 1 - 216 (74.74%)
Class 2 - 7 (2.42%)
Class 3 - 27 (9.34%)
Class 4 - 6 (2.08%)
Class 5 - 1 (0.35%)
Class 6 - 1 (0.35%)
Class 7 - 3 (1.04%)
Class 8 - 2 (0.69%)
Class 9 - 21 (7.27%)
Class 10 - 5 (1.73%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-621 -- English (ENA)

Datasets:

Site:	**[136] Reids Flat rd 150m N Battery rd**
Direction:	7 - North bound A>B, South bound B>A., **Lane:** 0
Survey Duration:	15:39 Wednesday, 6 December 2006 => 13:49 Wednesday, 13 December 2006
File:	L:\MetroCount v313\User\Data\13613Dec2006.EC0 (Plus)
Identifier:	A596FRT9 MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**15:39 Wednesday, 6 December 2006 => 13:49 Wednesday, 13 December 2006**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	South (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	271 Vehicles

Class Bins (Vehicles in Profile = 271)

Class 1 - 188 (69.37%)
Class 2 - 8 (2.95%)
Class 3 - 37 (13.65%)
Class 4 - 6 (2.21%)
Class 5 - 1 (0.37%)
Class 6 - 1 (0.37%)
Class 7 - 3 (1.11%)
Class 8 - 3 (1.11%)
Class 9 - 19 (7.01%)
Class 10 - 5 (1.85%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-623 -- English (ENA)

Datasets:

Site:	**[134] Reids Flat rd 50m S Battery rd**
Direction:	5 - South bound A>B, North bound B>A., **Lane:** 0
Survey Duration:	14:58 Wednesday, 6 December 2006 => 13:46 Wednesday, 13 December 2006
File:	L:\MetroCount v313\User\Data\13413Dec2006.EC0 (Plus)
Identifier:	E92863TC MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**14:58 Wednesday, 6 December 2006 => 13:46 Wednesday, 13 December 2006**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	South (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	159 Vehicles

Class Bins (Vehicles in Profile = 159)

Class 1 - 129 (81.13%)
Class 2 - 8 (5.03%)
Class 3 - 13 (8.18%)
Class 4 - 6 (3.77%)
Class 5 - 0 (0.00%)
Class 6 - 1 (0.63%)
Class 7 - 0 (0.00%)
Class 8 - 2 (1.26%)
Class 9 - 0 (0.00%)
Class 10 - 0 (0.00%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-622 -- English (ENA)

Datasets:

Site:	**[134] Reids Flat rd 50m S Battery rd**
Direction:	5 - South bound A>B, North bound B>A., **Lane:** 0
Survey Duration:	14:58 Wednesday, 6 December 2006 => 13:46 Wednesday, 13 December 2006
File:	L:\MetroCount v313\User\Data\13413Dec2006.EC0 (Plus)
Identifier:	E92863TC MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**14:58 Wednesday, 6 December 2006 => 13:46 Wednesday, 13 December 2006**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	North (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	159 Vehicles

Class Bins (Vehicles in Profile = 159)

Class 1 - 126 (79.25%)
Class 2 - 7 (4.40%)
Class 3 - 17 (10.69%)
Class 4 - 2 (1.26%)
Class 5 - 0 (0.00%)
Class 6 - 1 (0.63%)
Class 7 - 0 (0.00%)
Class 8 - 5 (3.14%)
Class 9 - 1 (0.63%)
Class 10 - 0 (0.00%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)

Annexure 2

Traffic Counts at Morongla Road / Reids Flat Road Intersection – Intersection 2 – November 2006

(No. of pages excluding this page = 6)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-594 -- English (ENA)

Datasets:

Site:	**[129] Morongla rd 200m W Reids Flat rd**
Direction:	8 - East bound A>B, West bound B>A., **Lane:** 0
Survey Duration:	14:46 Thursday, 23 November 2006 => 15:10 Friday, 1 December 2006
File:	L:\MetroCount v313\User\Data\12901Dec2006.EC0 (Plus)
Identifier:	A596FRT9 MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**15:00 Thursday, 23 November 2006 => 15:00 Friday, 1 December 2006**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	East (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	221 Vehicles

Class Bins (Vehicles in Profile = 221)

Class 1 - 154 (69.68%)
Class 2 - 12 (5.43%)
Class 3 - 13 (5.88%)
Class 4 - 10 (4.52%)
Class 5 - 0 (0.00%)
Class 6 - 1 (0.45%)
Class 7 - 2 (0.90%)
Class 8 - 3 (1.36%)
Class 9 - 24 (10.86%)
Class 10 - 2 (0.90%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-593 -- English (ENA)

Datasets:

Site:	**[129] Morongla rd 200m W Reids Flat rd**
Direction:	8 - East bound A>B, West bound B>A., **Lane:** 0
Survey Duration:	14:46 Thursday, 23 November 2006 => 15:10 Friday, 1 December 2006
File:	L:\MetroCount v313\User\Data\12901Dec2006.EC0 (Plus)
Identifier:	A596FRT9 MC56-1 [MC55] (c)Microcom 07/06/99
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time: **15:00 Thursday, 23 November 2006 => 15:00 Friday, 1 December 2006** (With Exclusions)

Vehicles are excluded at the following times:
None
The following entire days are excluded:
None

Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	West (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	183 Vehicles

Class Bins (Vehicles in Profile = 183)

Class 1 - 118 (64.48%)
Class 2 - 13 (7.10%)
Class 3 - 10 (5.46%)
Class 4 - 9 (4.92%)
Class 5 - 0 (0.00%)
Class 6 - 1 (0.55%)
Class 7 - 2 (1.09%)
Class 8 - 0 (0.00%)
Class 9 - 28 (15.30%)
Class 10 - 2 (1.09%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-598 -- English (ENA)

Datasets:

Site:	**[132] Reids Flat rd 100m N Morongla rd**
Direction:	7 - North bound A>B, South bound B>A., **Lane:** 0
Survey Duration:	10:01 Thursday, 2 November 2006 => 15:15 Friday, 1 December 2006
File:	L:\MetroCount v313\User\Data\13201Dec2006.EC0 (Plus)
Identifier:	E92863TC MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**15:00 Thursday, 23 November 2006 => 15:00 Friday, 1 December 2006**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	North (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	279 Vehicles

Class Bins (Vehicles in Profile = 279)

Class 1 - 249 (89.25%)
Class 2 - 13 (4.66%)
Class 3 - 15 (5.38%)
Class 4 - 2 (0.72%)
Class 5 - 0 (0.00%)
Class 6 - 0 (0.00%)
Class 7 - 0 (0.00%)
Class 8 - 0 (0.00%)
Class 9 - 0 (0.00%)
Class 10 - 0 (0.00%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-597 -- English (ENA)

Datasets:

Site:	**[132] Reids Flat rd 100m N Morongla rd**
Direction:	7 - North bound A>B, South bound B>A., **Lane:** 0
Survey Duration:	10:01 Thursday, 2 November 2006 => 15:15 Friday, 1 December 2006
File:	L:\MetroCount v313\User\Data\13201Dec2006.EC0 (Plus)
Identifier:	E92863TC MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**15:00 Thursday, 23 November 2006 => 15:00 Friday, 1 December 2006**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	South (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	251 Vehicles

Class Bins (Vehicles in Profile = 251)

Class 1 - 201 (80.08%)
Class 2 - 14 (5.58%)
Class 3 - 31 (12.35%)
Class 4 - 1 (0.40%)
Class 5 - 0 (0.00%)
Class 6 - 3 (1.20%)
Class 7 - 0 (0.00%)
Class 8 - 0 (0.00%)
Class 9 - 1 (0.40%)
Class 10 - 0 (0.00%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-601 -- English (ENA)

Datasets:

Site:	**[133] Reids Flat rd 100m S Morongla rd**
Direction:	7 - North bound A>B, South bound B>A., **Lane:** 0
Survey Duration:	10:30 Thursday, 2 November 2006 => 15:13 Friday, 1 December 2006
File:	L:\MetroCount v313\User\Data\13301Dec2006.EC0 (Plus)
Identifier:	R635VNJZ MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**15:00 Thursday, 23 November 2006 => 15:00 Friday, 1 December 2006**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	North (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	418 Vehicles

Class Bins (Vehicles in Profile = 418)

Class 1 - 330 (78.95%)
Class 2 - 20 (4.78%)
Class 3 - 27 (6.46%)
Class 4 - 9 (2.15%)
Class 5 - 0 (0.00%)
Class 6 - 0 (0.00%)
Class 7 - 3 (0.72%)
Class 8 - 2 (0.48%)
Class 9 - 25 (5.98%)
Class 10 - 2 (0.48%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-599 -- English (ENA)

Datasets:

Site:	**[133] Reids Flat rd 100m S Morongla rd**
Direction:	7 - North bound A>B, South bound B>A., **Lane:** 0
Survey Duration:	10:30 Thursday, 2 November 2006 => 15:13 Friday, 1 December 2006
File:	L:\MetroCount v313\User\Data\13301Dec2006.EC0 (Plus)
Identifier:	R635VNJZ MC56-L5 [MC55] (c)Microcom 19Oct04
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**15:00 Thursday, 23 November 2006 => 15:00 Friday, 1 December 2006**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	South (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	428 Vehicles

Class Bins (Vehicles in Profile = 428)

Class 1 - 342 (79.91%)
Class 2 - 20 (4.67%)
Class 3 - 24 (5.61%)
Class 4 - 12 (2.80%)
Class 5 - 0 (0.00%)
Class 6 - 2 (0.47%)
Class 7 - 2 (0.47%)
Class 8 - 2 (0.47%)
Class 9 - 22 (5.14%)
Class 10 - 2 (0.47%)
Class 11 - 0 (0.00%)
Class 12 - 0 (0.00%)

Annexure 3

Traffic Counts on Route 81 – January 2004

(No. of pages excluding this page = 2)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-534 -- English (ENA)

Datasets:

Site:	**[57] MR 56 STH - 145m N Morongla rd**
Direction:	5 - South bound A>B, North bound B>A., **Lane:** 0
Survey Duration:	10:20 Friday, 16 January 2004 => 16:35 Thursday, 5 February 2004
File:	L:\MetroCount v313\User\Data\Morongla Village.EC0 (Plus)
Identifier:	E92863TC MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**10:20 Friday, 16 January 2004 => 16:35 Thursday, 5 February 2004**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	South (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	11556 Vehicles

Class Bins (Vehicles in Profile = 11556)

Class 1 - 9405 (81.39%)
Class 2 - 719 (6.22%)
Class 3 - 396 (3.43%)
Class 4 - 160 (1.38%)
Class 5 - 30 (0.26%)
Class 6 - 34 (0.29%)
Class 7 - 52 (0.45%)
Class 8 - 79 (0.68%)
Class 9 - 513 (4.44%)
Class 10 - 165 (1.43%)
Class 11 - 3 (0.03%)
Class 12 - 0 (0.00%)

MetroCount Traffic Executive
Class Bin Chart

ClassBin-535 -- English (ENA)

Datasets:

Site:	**[57] MR 56 STH - 145m N Morongla rd**
Direction:	5 - South bound A>B, North bound B>A., **Lane:** 0
Survey Duration:	10:20 Friday, 16 January 2004 => 16:35 Thursday, 5 February 2004
File:	L:\MetroCount v313\User\Data\Morongla Village.EC0 (Plus)
Identifier:	E92863TC MC56-6 [MC55] (c)Microcom 02/03/01
Algorithm:	Factory default
Data type:	Axle sensors - Paired (Class, Speed, Count)

Profile:

Filter time:	**10:20 Friday, 16 January 2004 => 16:35 Thursday, 5 February 2004**
Included classes:	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12
Speed range:	0 - 160 km/h.
Direction:	North (bound)
Separation:	Greater than 4.00 seconds. - (Headway)
Name:	COWRA SHIRE COUNCIL
Scheme:	Vehicle classification (AustRoads94)
Units:	Metric (meter, kilometer, m/s, km/h, kg, tonne)
In profile:	10979 Vehicles

Class Bins (Vehicles in Profile = 10979)

Class 1 - 8930 (81.34%)
Class 2 - 668 (6.08%)
Class 3 - 420 (3.83%)
Class 4 - 139 (1.27%)
Class 5 - 28 (0.26%)
Class 6 - 35 (0.32%)
Class 7 - 56 (0.51%)
Class 8 - 77 (0.70%)
Class 9 - 486 (4.43%)
Class 10 - 133 (1.21%)
Class 11 - 7 (0.06%)
Class 12 - 0 (0.00%)

Annexure 4

Extract from Austroads 94 Document Explaining Traffic Counter Readings

(No. of pages excluding this page = 1)

ARX Classification Scheme

Level 1	Level 2		Level 3	ARX Classification			
Length	Axles and Groups		Vehicle Type				
Type	Axles	Groups	Description	Class		Parameters	Dominant Vehicle
	Light Vehicles						
Short up to 5.5m	2	1 or 2	Very Short Bicycle or Motorcycle	MC	1	d(1) < 1.7m and axles = 2	
	2	1 or 2	Short Sedan, Wagon, 4WD, Utility, Light Van, Bicycle, Motorcycle, etc.	SV	2	d(1) >= 1.7m, d(1) <= 3.2m and axles = 2	
Medium 5.5m to 14.5m	3, 4 or 5	3	Short - Towing Trailer, Caravan, Boat, etc.	SVT	3	groups = 3, d(1) >= 2.1m, d(1) <= 3.2m, d(2) >= 2.1m and axles = 3,4,5	
	Heavy Vehicles						
	2	2	Two Axle Truck or Bus	TB2	4	d(1) > 3.2m and axles = 2	
	3	2	Three Axle Truck or Bus	TB3	5	axles = 3 and groups = 2	
	> 3	2	Four Axle Truck	T4	6	axles > 3 and groups = 2	
Long 11.5m to 19.0m	3	3	Three Axle Articulated Three axle articulated vehicle or Rigid vehicle and trailer	ART3	7	d(1) > 3.2m, axles = 3 and groups = 3	
	4	> 2	Four Axle Articulated Four axle articulated vehicle or Rigid vehicle and trailer	ART4	8	d(2) < 2.1m or d(1) < 2.1m or d(1) > 3.2m axles = 4 and groups > 2	
	5	> 2	Five Axle Articulated Five axle articulated vehicle or Rigid vehicle and trailer	ART5	9	d(2) < 2.1m or d(1) < 2.1m or d(1) > 3.2m axles = 5 and groups > 2	
	>= 6	> 2	Six Axle Articulated Six (or more) axle articulated vehicle or Rigid vehicle and trailer	ART6	10	axles = 6 and groups > 2 or axles > 6 and groups = 3	
Medium and Long Combination Over 17.5m	> 6	4	B Double B Double or Heavy truck and trailer	BD	11	groups = 4 and axles > 6	
	> 6	>=5	Double or Triple Road Train Double road train or Heavy truck and two trailers	DRT	12	groups = 5 or 6 and axles > 6	
	Ungrouped Classes						
			Unclassifiable Vehicle		13		
			Unclassifiable Axle Event		0		