THE AUSTRAL BRICK COMPANY PTY LIMITED

ABN: 52 000 005 550

New Berrima Clay/Shale Quarry

Traffic Assessment

Prepared by

Traffic Solutions Pty Ltd

August 2010

Specialist Consultant Studies Compendium:
Part 1

ABN: 52 000 005 550

New Berrima Clay/Shale Quarry

Traffic Assessment

Prepared for:

R.W. Corkery & Co. Pty Limited
1st Floor, 12 Dangar Road
PO Box 239
BROOKLYN NSW 2083

On behalf of:

The Austral Brick Company Pty Limited
PO Box 6550
WETHERILL PARK NSW 1851

Tel: (02) 9830 7879
Fax: (02) 9831 2383

Prepared by:

Traffic Solutions Pty Ltd
PO Box 556
SPRINGWOOD NSW 2777

Tel: 02 4751 6354
Fax: 02 4751 6354
Email: trafficsolutions@ozemail.com.au

August 2010

COPYRIGHT

© Traffic Solutions Pty Ltd, 2010
and
© The Austral Brick Company Pty Limited, 2010

All intellectual property and copyright reserved.

Apart from any fair dealing for the purpose of private study, research, criticism or review, as permitted under the Copyright Act, 1968, no part of this report may be reproduced, transmitted, stored in a retrieval system or adapted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) without written permission. Enquiries should be addressed to Traffic Solutions Pty Ltd.

CONTENTS

Page

EXECUTIVE SUMMARY **1-5**

1. INTRODUCTION **1-7**

2. PROPOSED DEVELOPMENT **1-9**

2.1 The Project Site 1-9
2.2 Project Overview 1-9

3. EXISTING CONDITIONS **1-13**

3.1 Road Hierarchy 1-13
3.2 Traffic and Parking Controls 1-15
3.3 Existing Traffic Flows 1-15
3.4 Midblock Roadway Capacity 1-18
3.5 Existing Intersection Operation 1-18

4. KEY ISSUES **1-21**

4.1 Vehicle Access and Parking 1-21
4.2 Estimated Project-Related Traffic Generation of Proposal 1-21
4.3 Impact on Midblock Capacity 1-22
4.4 Impacts upon Key Intersections 1-23
4.5 Heavy Vehicle Access 1-25

5. CONCLUSIONS **1-26**

FIGURES

Figure 1 Location 1-8
Figure 2 Proposed Truck Transport Route 1-11
Figure 3 Road Hierarchy Plan 1-14
Figure 4 Peak Hour Flows Existing Morning Peak Hour Flows 1-17
Figure 5 Potential Additional Peak Hour Flows 1-24

TABLES

Table 2.1 Proposed Hours of Operation 1-9
Table 3.1 Heavy Vehicle Transport Route Road Classifications 1-13
Table 3.2 Berrima Road Peak Hour Vehicle Volume, Direction and Classification 1-15
Table 3.3 Taylor Avenue Peak Hour Vehicle Volume, Direction and Classification 1-16
Table 3.4 Berrima Road Tube Count Traffic Volume Data 1-16
Table 3.5 Two Way Peak Hour flow on Two-way Rural Roads 1-18
Table 3.6 SIDRA Analysis - Berrima Road and Taylor Avenue, New Berrima 1-19
Table 3.7 Evaluation of the Results of SIDRA 1-20

CONTENTS

Page

Table 4.1 Berrima Road Peak Hour Vehicle Volume, Direction and Classification Comparison 1-22

Table 4.2 Taylor Avenue Peak Hour Vehicle Volume, Direction and Classification Comparison 1-22

Table 4.3 Intersection Modelling Results – Berrima Road and Taylor Avenue 1-23

Table 4.4 Intersection Modelling Results – Berrima Road and Proposed Access, New Berrima (Give Way control type BAR intersection) 1-23

APPENDICES

Appendix 1: Copy of DoP and RTA Letters 1-27

Appendix 2: Project Figures 1-33

Appendix 3: Traffic Counts 1-39

Appendix 4: SIDRA Movement Summary Output 1-45

Appendix 5: Heavy Vehicle Route Assessment 1-51

EXECUTIVE SUMMARY

The Traffic Assessment demonstrates that.

- The existing access driveway onto the Project Site is suitably located and provides good sight distance in both directions along Berrima Road.
- The Project Site with approximately 51 hectares in area would have ample area to provide all necessary car and truck parking areas.
- It is recommended that the intersection of Berrima Road and the site access road be designed and constructed as a type BAR intersection sufficient for 19m articulated vehicles as a minimum.
- The good Level of Service at the intersection of Berrima Road and Taylor Avenue will not change with the estimated additional Project-related traffic generation.
- The additional traffic demand on the intersection of Berrima Road and Taylor Avenue as a consequence of the proposed development would only alter the Degree of Saturation and Total Average Delays minutely.
- The proposed new driveway intersection will operate at a very good level of service with minimal delays.
- Heavy vehicles servicing of the site is restricted to all heavy vehicles up to 19m in length.

This page has been intentionally left blank

1. INTRODUCTION

This report has been prepared to accompany an application to the Department of Planning for a proposed clay/shale quarry at Lot 1 DP 414246, 1 Berrima Road, New Berrima. The Project Site is approximately 51ha in area and located within the "Mandurama" property, which is 100.2ha in area and is owned by The Austral Brick Company Pty Limited. The Project Site effectively incorporates the optimum clay/shale resource area on the "Mandurama" property and the access road between the property entrance and the extraction area (**Figure 1**).

The entrance to the "Mandurama" property is located on Berrima Road approximately 300m north of the intersection of Taylor Avenue and Berrima Road, New Berrima.

The Austral Brick Company Pty Limited is proposing to extract and transport an average of approximately 120,000 tonnes per annum (tpa) of shale, weathered shale, brick clay and some friable sandstone, with an upper limit of 150,000tpa, for a period of 30 years. The upper limit of 150,000tpa is being sought to allow for fluctuations in the demand for the product by Bowral Brick Plant. The operation would employ approximately five part-time personnel for the duration of the project which is estimated to cost approximately $1 million.

The proposal is a major project and as such requires the preparation of an *Environmental Assessment*. The Department of Planning requires the following Traffic and Transport requirements to be addressed and a copy of the Department's letter is attached as **Appendix 1**.

1. A detailed assessment of the potential impacts of the project on the safety and performance of the surrounding road network and entire transport route.

2. A detailed description of any proposed road or intersection upgrades.

To that end, this document examines the implications of the project and assesses the:

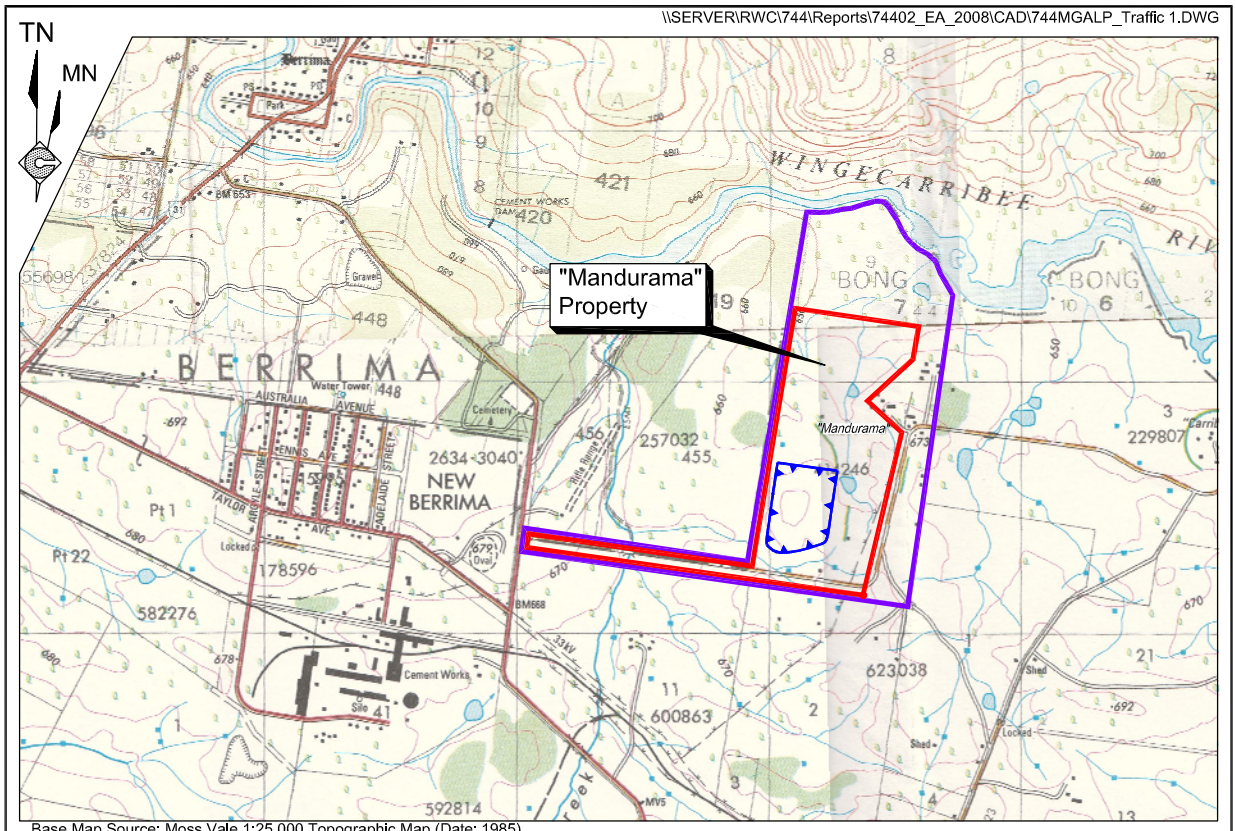
1. Potential traffic generation.

2. Impacts of the estimated traffic generation on the existing road network.

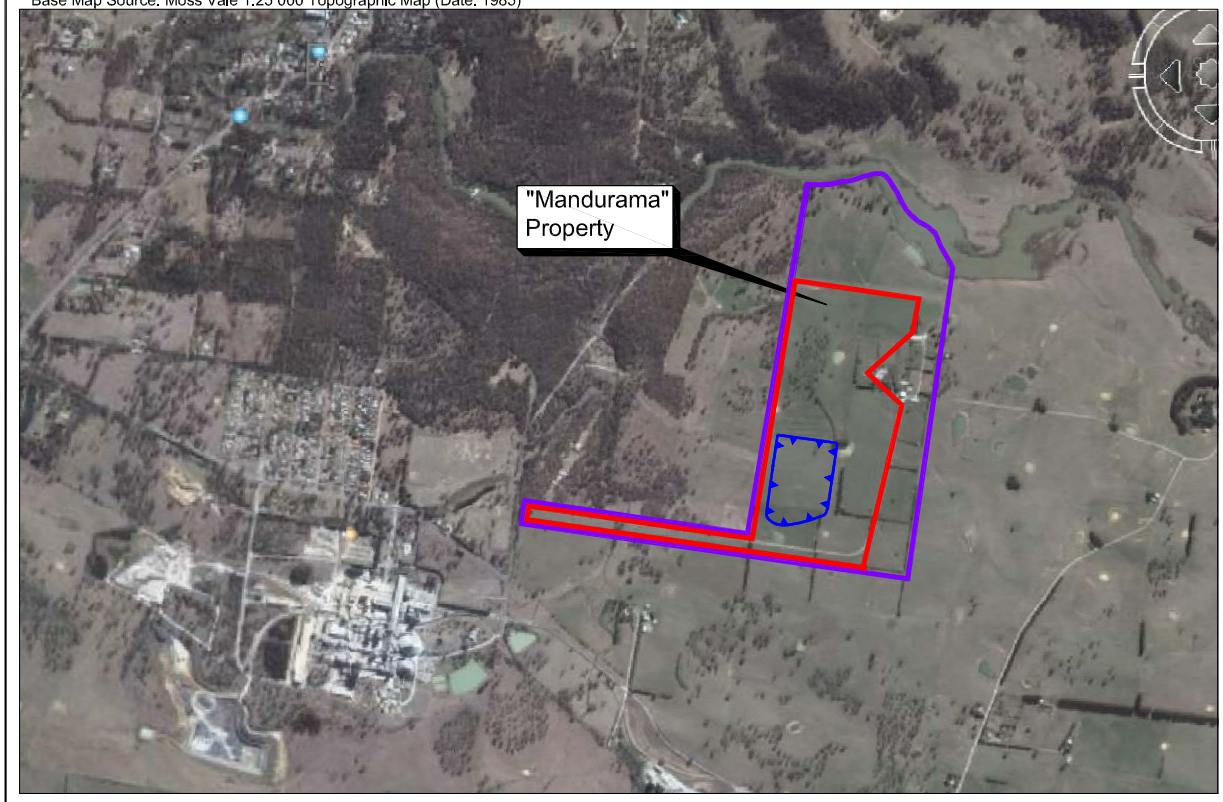
3. Proposed truck access driveway location and suitability.

4. Proposed transport route between the site and the Bowral Brick Plant.

\\SERVER\RWC\744\Reports\74402_EA_2008\CAD\744MGALP_Traffic 1.DWG



Base Map Source: Moss Vale 1:25 000 Topographic Map (Date: 1985)



REFERENCE
- Property Boundary
- Project Site Boundary
- Proposed Limit of Extraction

SCALE 1:30 000

500 0 500 1000 1500 m

Base Photo Source: Google Earth (2010)

Figure 1
LOCATION

2. PROPOSED DEVELOPMENT

2.1 The Project Site

The proposed area to be developed lies within an area referred to as i.e. "the Project Site", an area approximately 51ha within the "Mandurama" property which is described as Lot 1 in DP 414246 at 1 Berrima Road, New Berrima which has a total area of 100.2ha (**Figure 1**).

2.2 Project Overview

The principal features of the extraction operations of the project would include:

- campaign stripping of topsoil and subsoil for use in the construction of amenity bunds and progressive site rehabilitation;
- progressive construction of amenity bunds;
- two or three extraction campaigns per year, each involving the excavation and stockpiling of the product clay/shale on the floor of the extraction area;
- a water management system to manage water collected in the pit and runoff from disturbed areas; and
- full-time transportation of the product clay/shale to the Bowral Brick Plant.

Austral is proposing to extract and transport an average of approximately 120 000 tonnes per annum (tpa) of shale, weathered shale, brick clay and some friable sandstone, with an upper limit of 150 000 tpa, for a period of 30 years. The upper limit of 150 000tpa is being sought to allow for fluctuations in the demand for the products at the Bowral Brick Plant. The operation would employ approximately five part-time personnel for the duration of the project.

Table 2.1 provides the proposed hours of operation for site activities. Transportation of product clay/shale would be predominantly undertaken on week days, however transportation may need to be undertaken on weekends in special circumstances such as following prolonged wet weather.

Table 2.1
Proposed Hours of Operation

Activity	Monday to Friday	Saturday	Sunday
Extraction Operations	7:00am – 5:00pm	7:00am – 2:00pm	nil
Product Clay/Shale Despatch	7:00am – 4:00pm	7.00am - 4.00pm if required due to special circumstances	8.00am - 4.00pm if required due to special circumstances
Repairs & Maintenance	6:00am – 6:00pm	7:00am – 6:00pm	8:00am – 6:00pm

The life of the facility would be approximately 30 years.

The vehicles in use on the site would typically include the following.

- A scraper (eg Cat 637) for initial topsoil removal and subsoil/clay removal and construction of the amenity bund walls.
- A bulldozer (eg Cat D10) for topsoil removal beneath amenity bund walls and ongoing topsoil stripping campaigns, ripping and pushing up weathered shale and unweathered shale; ripping and pushing sandstone.
- An articulated haul truck (eg Cat 740) for relocation of ripped/broken sandstone within the extraction area.
- A front-end loader (eg Cat 966) for loading product clay/shale into highway trucks and ripped/broken sandstone into the articulated haul truck.

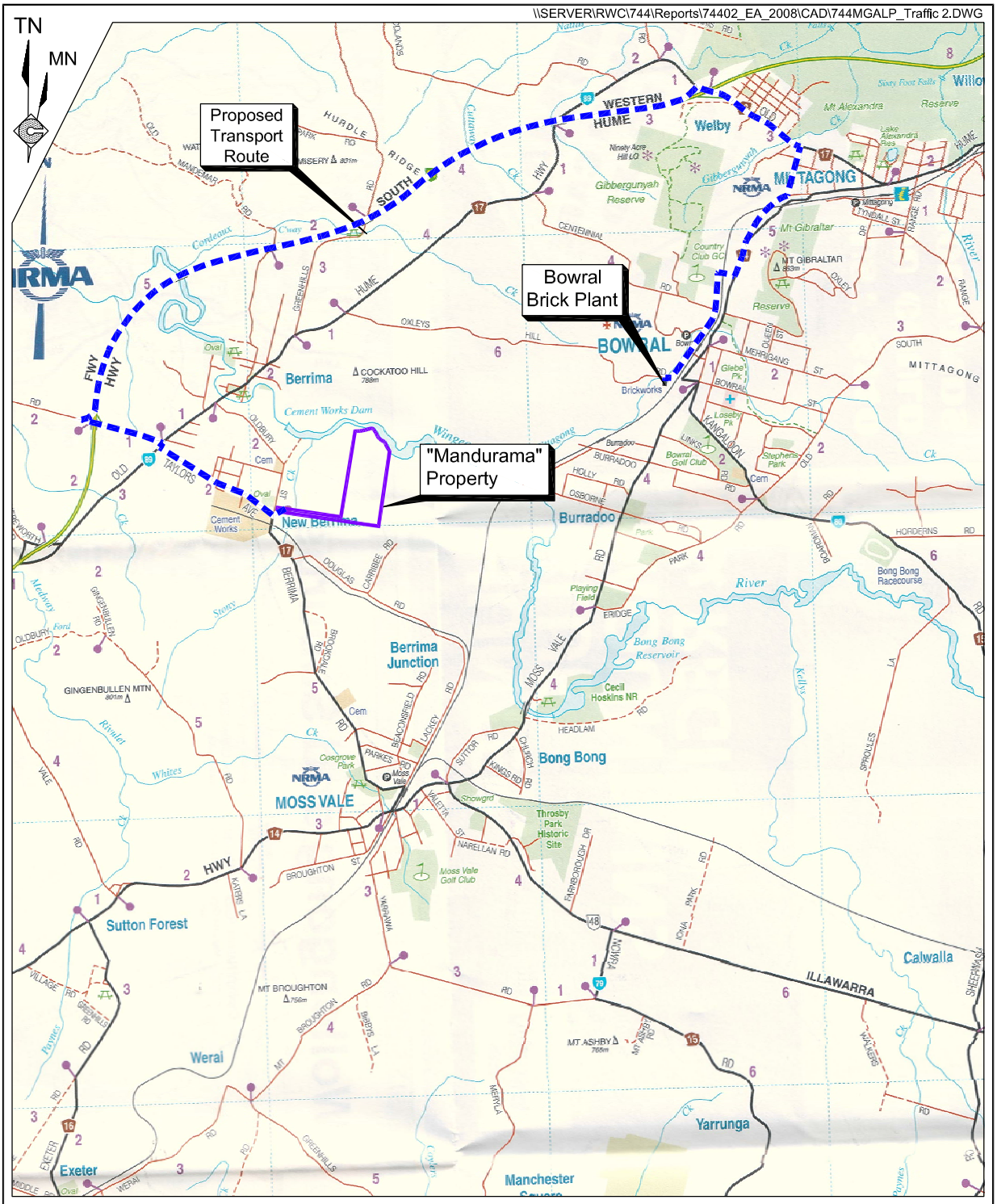
The extraction campaigns would typically produce approximately 2000t per day or an average of 10 000t per week. Based on this weekly yield, each campaign would typically occur over a period of 4 to 6 weeks, depending on limiting weather conditions.

Transportation of the product clay/shale from the quarry would be by road-registered trucks predominantly Monday to Friday. However, in special circumstances, such as following prolonged wet weather, transportation may need to be conducted on Saturdays and Sundays. The trucks would comprise both rigid and articulated configurations including truck and dog trailers with an average load capacity of approximately 30t. All trucks would be operated by an authorised contractor.

Figure 2 is the proposed transport route to be used from the Project Site to the Bowral Brick Works. It should be noted that **Figure 2** indicates that trucks will travel along Mittagong Road (The Highlands Way) then use Lyle Avenue and Kirkham Road. The following route description is the route currently used by heavy vehicles accessing the Bowral Brick Plant site from other satellite quarries.

1. Left turn from site entrance on to Berrima Road.
2. Right turn from Berrima Road into Taylor Avenue
3. Continue straight from Taylor Avenue across the Old Hume Highway into Medway Road via recently completed major roundabout.
4. Right turn from Medway Road onto Hume Highway northbound on ramp.
5. Exit off Hume Highway at Old Hume Highway off ramp to turn right onto Old Hume Highway.
6. Right turn from Old Hume Highway into Cavendish Street, then left onto Old Bowral Road.
7. Right turn from Old Bowral Road onto Mittagong Road.
8. Right turn into Lyle Avenue, over the railway line (tunnel).
9. Continue onto Kirkham Road.
10. Right turn from Kirkham Road into Oxley Hill Road.
11. Left turn from Oxley Hill Road into Kiama Street, then left turn into raw material gates at the rear of the site.

Trucks returning to the Project Site would travel this route in reverse.



REFERENCE
Property Boundary
Clay / Shale Transport Route

Note: Trucks returning to the Project Site would travel this route in reverse.

SCALE 1:100 000

1 0 1 2 3 4 5 km

Base Map Source: NRMA - Hunter, Blue Mountains and Region Road Map

Note: A Colour version of this figure is available on the project CD

Figure 2
PROPOSED TRUCK TRANSPORT ROUTE

The results of the assessment of the proposed heavy vehicle route from the New Berrima Clay/Shale Quarry to/from the Bowral Brick Plant has revealed that the majority of the route is existing RTA approved B-double route. The Proponent, however is only proposing to operate vehicles up to and including 19m articulated vehicles to/from the site. The route assessment did not identify any impediments to these vehicles operating on the proposed route nor any improvements required to existing infrastructure. The route assessment does, however, recommend that heavy vehicles associated with the proposal utilise Cavendish Street in lieu of Lyle Street due to the presence of a school and associated 40 km/h speed limit. A copy of the Heavy Vehicle Route Assessment is attached as **Appendix 5** of this report.

Transportation will be predominantly conducted Monday to Friday on a full-time basis. Assuming full-time transportation, up to approximately 2 500t product clay/shale may be transported to the brick plant each week. With each load being approximately 30t, there would be approximately 17 loads per day, or 34 truck movements per day, for 5 days per week. It is predicted that following periods of wet weather, traffic volumes may need to be as high as 68 loads per day or 132 truck movements per day. This would allow the Bowral Brick Plant to quickly accumulate product clay/shale which it had not been able to access during the wet weather, thus enabling the plant to remain operational.

This report will assess the impact of the higher 132 truck movements per day that could occur after periods of wet weather plus a potential 8 light vehicle movements for staff. i.e. 140 trips per day.

Vehicular access to the Project Site is proposed via a newly constructed type BAR intersection.

This report has been prepared utilising plans prepared by R. W. Corkery & Co. Pty Limited. Figures of the proposed development are reproduced in **Appendix 2** of this report.

All heavy vehicles would approach and depart the Project Site to/from the south via Taylor Road and Berrima Road intersection.

3. EXISTING CONDITIONS

3.1 Road Hierarchy

Table 3.1 provides details of the road classifications and current heavy vehicle restrictions for the truck transport route to be used between the subject site and Berrima Brick Plant. **Figure 3** provides an extract of the RTA's Road hierarchy plan for this area.

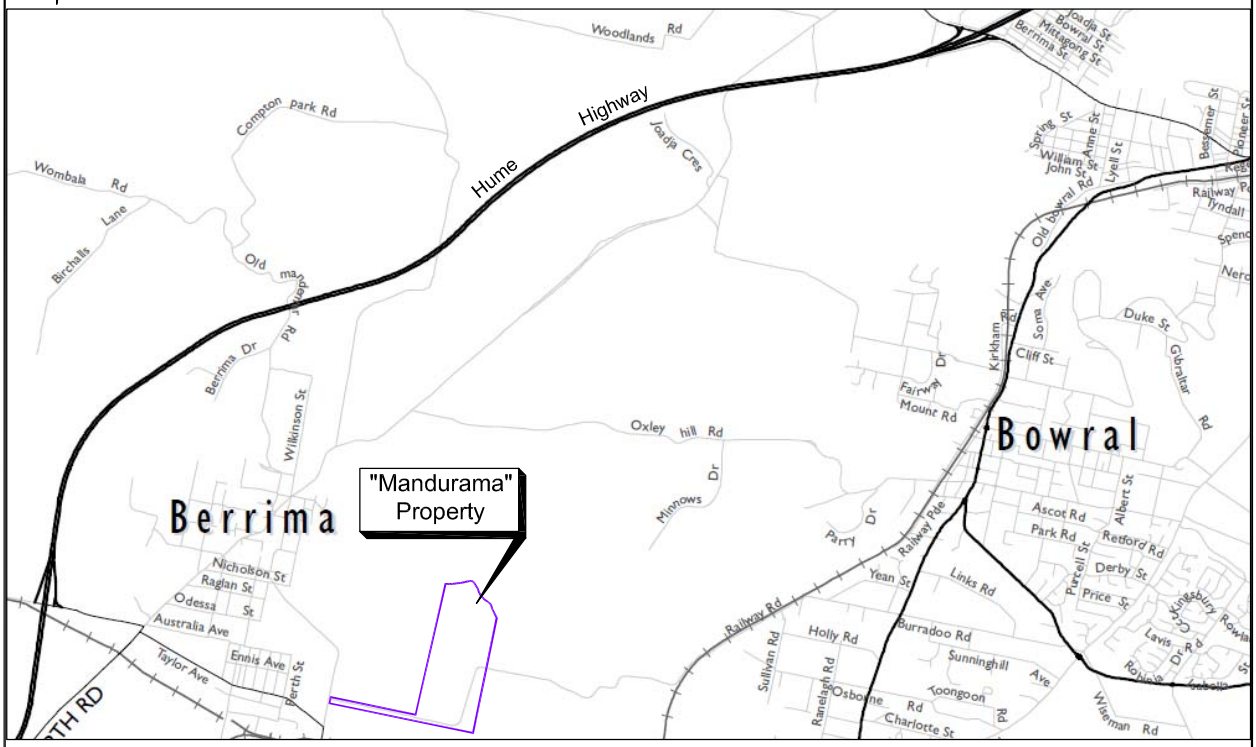
Table 3.1
Heavy Vehicle Transport Route Road Classifications

Road	Section	Classification	RTA approved routes for:
Berrima Road	North of Taylor Avenue	Local Road	19m articulated
Taylor Avenue	full length	Regional Road	23, 25 and 26m B-double
Medway Road	Old Hume Hwy to Hume Hwy	Regional Road	23, 25 and 26m B-double
Hume Highway	Medway Road to Old Hume Highway	State Road	23, 25 and 26m B-double
Old Hume Highway	Hume Highway to Cavendish Street	Regional Road	25 and 26m B-double
Cavendish Street	Old Hume Hwy to Old Bowral Road	Local Road	25 and 26m B-double
Old Bowral Road	Cavendish Street to Mittagong Road	Local Road	25 and 26m B-double
Mittagong Road (The Highlands Way/ Bowral Road)	Old Bowral Road to Lyle Avenue	Regional Road	19m B-double
Lyle Avenue	Mittagong Road (The Highlands Way/ Bowral Road) to Kirkham Road	Local Road	19m articulated
Kirkham Road	Lyle Avenue to Oxley Hills Road	Local road	19m articulated
Oxley Hills Road	Kirkham Road to Kiama Street	Local Road	19m articulated
Kiama Street	Full length	Local Road	19m articulated

Berrima Road north of Taylor Avenue has a 10t load limit restriction imposed by Wingecarribee Shire Council. This restriction is imposed to restrict heavy vehicle traffic travelling through Berrima residential streets and therefore use Taylor Avenue and Old Hume Highway route in lieu. It is not illegal for trucks using the short section of Berrima Road from Taylor Avenue to travel to and from the entrance of the Project Site.

\\SERVER\RWC\744\Reports\74402_EA_2008\CAD\744MGALP_Traffic 3.DWG

TN
MN



REFERENCE
Property Boundary
Highway
Main Road
Local Road

SCALE 1:80 000

1 0 1 2 3 4km

Figure 3
ROAD HIERARCHY PLAN

Note: A Colour version of this figure is available on the project CD

3.2 Traffic and Parking Controls

The main features of the existing traffic controls in the vicinity of the Project Site are as follows.

- Berrima Road has a 90 km/h speed limit in the vicinity of the Project Site and provides one lane in each direction, centre line markings with overtaking permitted at selected locations.
- Taylor Avenue has a 50 km/h speed limit from immediately west of Berrima Road to Howard Avenue and is then 80 km/h as is Old Hume Highway and Medway Road.
- A 10t load limit has been imposed on Berrima Road north of Taylor Avenue.
- Give Way has been provided on Taylor Avenue at Berrima Road.
- Stop signs have been provided in addition to the standard railway level crossing signs on Berrima Road south of Taylor Avenue.

There are no restrictions on parking in the vicinity of the Project Site.

3.3 Existing Traffic Flows

To determine the level of traffic activity in this area, data on the traffic movements in the vicinity of the Project Site have been collected by surveys undertaken by Curtis Traffic Surveys as part of this study from 6.30am – 9.30am and 3.00pm – 6.00pm on Wednesday 20th August 2008 at the intersection of Berrima Road and Taylor Avenue.

The detailed results of the surveys are attached as **Appendix 3**. The peak hour flows at the survey location is depicted on **Figure 4**.

A closer review of the intersection count at Berrima Road and Taylor Avenue during the morning and evening peak hours revealed greater detail on the existing peak hour heavy vehicle trips. The recorded peak hour car and truck flows in Berrima Road (north of Taylor Avenue) and Taylor Avenue (west of Berrima Road) during the peak hours is set out in **Tables 3.2** and **3.3**.

Table 3.2
Berrima Road Peak Hour Vehicle Volume, Direction and Classification

Peak Hour	Northbound[1]		Southbound[2]		Total
	Cars	Trucks (>3t)	Cars	Trucks (>3t)	
AM Peak hour 8.00am – 9.00am	40	5	53	2	100
PM Peak hour 3.00pm – 4.00pm	59	8	59	3	129
[1] – Towards Berrima				[2] – From Berrima	

The existing heavy vehicle volumes represent 5% and 6.2% in the morning and evening peak hours respectively.

Table 3.3
Taylor Avenue Peak Hour Vehicle Volume, Direction and Classification

Peak Hour	Westbound[3]		Eastbound[4]		Total
	Cars	Trucks (>3t)	Cars	Trucks (>3t)	
AM Peak hour 8.00am – 9.00am	50	20	112	23	205
PM Peak hour 3.00pm – 4.00pm	115	28	57	24	224

[3] – Towards the Hume Highway [4] – From the Hume Highway

The existing heavy vehicle volumes represent 21.0% and 23.2% in the morning and evening peak hours respectively along Taylor Avenue.

In addition, tube counters were placed on Berrima Road north of Taylor Avenue (at the 90 km/h sign) from the 22nd to 29th August 2008. The tube surveys recorded every vehicle travelling along Berrima Road over 24hrs over the whole week. The automatic counter recorded the number of vehicles in each direction, speed and classification of all vehicles. The key data collected are set out in **Table 3.4**.

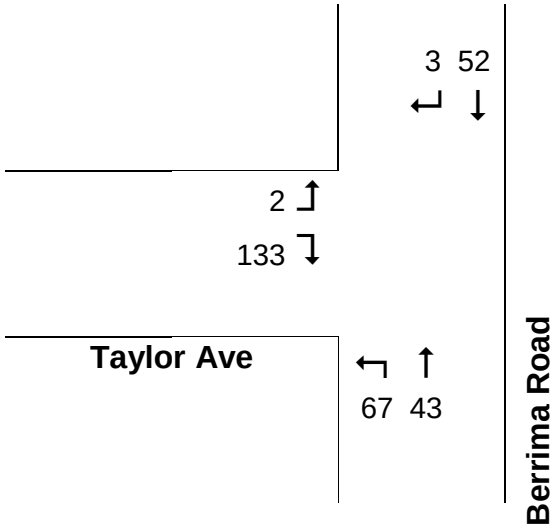
Table 3.4
Berrima Road Tube Count Traffic Volume Data

Location	AADT	Average Weekday peak hours		85th % speed	% of heavy vehicles
		AM	PM		
Northbound[1]	597	97 8.00am – 9.00am	129 4.00pm– 5.00pm	78.9km/h	19.4%
Southbound[2]	550			83.3 km/h	5.8%
Total	1147			80.6 km/h	12.9%

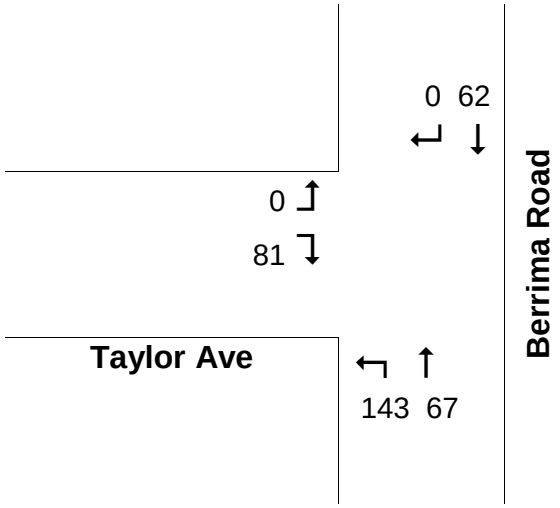
[1] – Towards Berrima [2] – From Berrima

It is apparent from the Road Hierarchy that Berrima Road serves an important link, however, the overall traffic flows are considered low.

AM Peak Hour
8.00am – 9.00am



PM Peak Hour
3.00pm – 4.00pm



PEAK HOUR FLOWS

Fig 4

3.4 Midblock Roadway Capacity

With regards to the capacity of rural roads, the RTA's 'Guide to Traffic Generating Developments, Section 4.2.4. Table 4.5 is reproduced in the following **Table 3.5**.

Table 3.5
Two Way Peak Hour flow on Two-way Rural Roads (veh/hr), 100km/h

Terrain	Level of Service	Percent of heavy vehicles			
		0	**5**	**10**	**15**
Level	B	630	590	560	530
	C	1030	970	920	870
	D	1630	1550	1480	1410
	E	2630	2500	2390	2290
Rolling	B	500	420	360	310
	C	920	760	650	570
	D	1370	1140	970	700
	E	2420	2000	1720	1510
Mountainous	B	340	230	180	150
	C	600	410	320	260
	D	1050	680	500	400
	E	2160	1400	1040	820

The table assumes the following criteria:

- Terrain level with 20% no overtaking.
- Rolling with 40% no overtaking.
- Mountainous with 60% no overtaking.
- 3.7 m traffic lane width with side clearances of at least 2m.
- 60/40 directional split of traffic.

Using this table, the existing operation of Berrima Road with 129 vehicles in the maximum peak hours and 8% heavy vehicles operates at a very good level of service 'A'. Taylor Avenue with 224 vehicles per hour in the maximum peak hour and 22% heavy vehicles also operates at level of service 'A'.

3.5 Existing Intersection Operation

Figure 4 depicts the existing traffic flows at the intersection of Berrima Road and Taylor Avenue.

Using SIDRA v4, a software programme developed for the purpose of analysing signalised, roundabout and sign controlled intersections, the existing operation of this intersection has been assessed. The following **Table 3.6** is the results of the intersection modelling and a copy of the SIDRA movement summary output is attached as **Appendix 4**. A brief guide on evaluating the results of SIDRA analysis is provided in **Table 3.7**.

Table 3.6
SIDRA Analysis - Berrima Road and Taylor Avenue, New Berrima*

	Existing	
	AM	**PM**
Level of Service	A	A
Degree of Saturation	0.155	0.131
Total Average Delay (sec/veh)	8.6s	9.3s
Average delay for right turn from Taylor Avenue	9.9s	12.7s
*Give Way control intersection		

The results of the modelling reveal that the intersection of Berrima Road and Taylor Avenue currently operates at a very good level of service with minimal delays and spare capacity.

Construction has recently been completed of a major roundabout at the intersection of Old Hume Highway, Taylor Avenue and Medway Road which included the realignment of Medway Road to create a cross intersection. This intersection is already 26m B-double approved and Council officers advised that the design of the roundabout included catering for B-triples. Accordingly, no traffic counts or modelling of this intersection was considered warranted.

Table 3.7
Evaluation of the Results of SIDRA

LEVEL OF SERVICE

The level of service for traffic signals, roundabouts and sign control intersections is shown below, this is based on the average delay in seconds per vehicle:

Average Delay per Vehicle	Level of Service	Traffic Signals & Roundabouts	Sign Control
< 14	a	good	Good
15 - 28	b	good with minimal delays and spare capacity	acceptable delays and spare capacity
29 - 42	c	satisfactory with spare capacity	satisfactory but accident study required
43 - 56	d	satisfactory but operating near capacity	near capacity and accident study required
57 - 70	e	at capacity: at signals incidents would cause excessive delays, roundabouts require another control mode	at capacity and requires another control mode
> 70	f	unsatisfactory	unsatisfactory

DEGREE OF SATURATION

The Degree of Saturation is another measure of the operational performance of individual intersections.

For traffic signal controlled intersections both queue length and delay increase rapidly as the Degree of Saturation approaches 1.0, and it is usually attempted to keep it below 0.9.

For roundabouts or sign controlled intersections, over saturation is indicated by a value in excess of 0.8.

AVERAGE VEHICLE DELAY

The average vehicle delay provides a measure of the operational performance of an intersection as indicated in the above table. The average vehicle delays in the table should be used as a guide only as longer delays could be tolerated in some locations.

4. KEY ISSUES

4.1 Vehicle Access and Parking

Vehicular access to the Project Site will be via a reconstructed entrance driveway and intersection at the existing entrance. It is recommended that a Basic Rural intersection treatment (BAR) be constructed at the existing entrance. Site inspection revealed that the existing driveway easily exceeds the Australian Standard requirements AS 2890.1 and 2 for the posted speed limit along Berrima Road.

Geometric design requirements for car park layouts are specified in the '*Australian/New Zealand Standards, Parking Facilities Part 1; Off Street Car Parking (AS/NZS 2890.1)* of 2004. This standard classifies this development as a Class 1A off-street car parking facility. Given that the Project Site has a total area of 51 hectares, ample area would be available for parking of cars and compliance with this standard can be achieved.

In addition to the standards for off-street car parking, the Australian Standards, AS 2890.2:2002 provides the design requirements for varying size heavy vehicles. In this regard, the maximum vehicle to be catered for on site is the 19m articulated semi trailer. This standard suggests that the minimum driveway width for articulated vehicles should be 12.5m, however, the actual width may be greater depending on detailed design of the type BAR intersection treatment.

Wingecarribee Shire Council's "*Development Control Plan 12 Off-street Car Parking, Loading Facilities and Access"* has no requirements applicable to this Project. Austral estimates the quarry will employ five part time staff, however, given the size of the site, ample area is available to cater for the parking of staff cars and contractors trucks as required.

4.2 Estimated Project-Related Traffic Generation of Proposal

As described in Section 2 of this report, transportation will be predominantly conducted Monday to Friday on a full-time basis. Assuming full-time transportation, up to approximately 2 500t product clay/shale may be transported to the brick plant each week. With each load being approximately 30t, there would be approximately 17 loads per day, or 34 truck movements per day, for 5 days per week. It is predicted that following periods of wet weather, traffic volumes may need to be as high as 68 loads per day or 132 truck movements per day. This would allow the Bowral Brick Plant to quickly accumulate product clay/shale which it had not been able to access during the wet weather, thus enabling the plant to remain operational.

This report assesses the impact of the higher 132 truck movements per day that could occur after periods of wet weather plus a potential 8 light vehicle movements for the five staff. i.e. 140 trips per day.

Given this breakdown, it is estimated that during the peak hours approximately 17 vehicle trips could be generated in the morning and evening peak hours respectively based upon a typical 10 hour day (7 trucks and 4 cars approaching and 6 trucks out in the morning and the reverse in the evening).

4.3 Impact on Midblock Capacity

From Section 3.3, the existing operation of Berrima Road with 129 vehicles in the peak hours and 8% heavy vehicles operates at a very good level of service 'A'. Taylor Avenue with 224 vehicles per hour and 22% (see Section 3.4) heavy vehicles also operates at level of service 'A'.

The existing heavy vehicle volumes represent 7% and 8.5% along Berrima Road (north of Taylor Avenue) and 21% and 23.2% along Taylor Avenue in the morning and evening peak hours respectively. **Table 4.1** and **4.2** provides a comparison between the existing and potential flows along Berrima Road and Taylor Avenue with an additional 13 heavy vehicle trips and 4 light vehicle trips during the peak hours during the operation of the project.

Table 4.1
Berrima Road Peak Hour Vehicle Volume, Direction and Classification Comparison

Peak Hour	Existing			Project Operational		
	Cars	Trucks (>3t)	Total	Cars	Trucks (>3t)	Total
AM Peak hour 8.00am – 9.00am	93	7	100	97	20	117
PM Peak hour 3.00pm – 4.00pm	118	11	129	122	24	146

The post development heavy vehicle volumes would represent 17% and 16.4% in the morning and evening peak hours respectively along Berrima Road.

Table 4.2
Taylor Avenue Peak Hour Vehicle Volume, Direction and Classification Comparison

Peak Hour	Existing			Project Operational		
	Cars	Trucks (>3t)	Total	Cars	Trucks (>3t)	Total
AM Peak hour 8.00am – 9.00am	162	43	205	166	56	222
PM Peak hour 3.00pm – 4.00pm	172	52	224	176	65	241

The post development heavy vehicle volumes would represent 25.2% and 27.0% in the morning and evening peak hours respectively along Taylor Avenue.

Using the data in **Table 4.1** and **4.2**, (the post development operation) Berrima Road with 146 vehicles in the peak hours and 17% heavy vehicles will continue to operate at a very good level of service 'A'. Taylor Avenue with 241 vehicles per hour and 27.0% heavy vehicles also operates at level of service 'A'

4.4 Impacts upon Key Intersections

For the purposes of this assessment, the 17 estimated morning and evening peak hour approach and departure vehicle trips (as calculated in Section 4.2) have been assigned proportionally to the adjacent road system on basis of existing flows at the intersection of Berrima Road with the proposed access and Taylor Avenue. **Figure 5** depicts the potential additional morning and afternoon peak hour traffic volumes for the intersections based upon the forecast flows.

A comparison of intersection performance between the existing and projected traffic demands during the morning and evening peak hours upon the intersection of Berrima Road with the proposed driveway to the Project Site and Taylor Avenue has been conducted. **Table 4.3** and **4.4** presents the results of the intersection modelling.

Table 4.3
Intersection Modelling Results – Berrima Road and Taylor Avenue

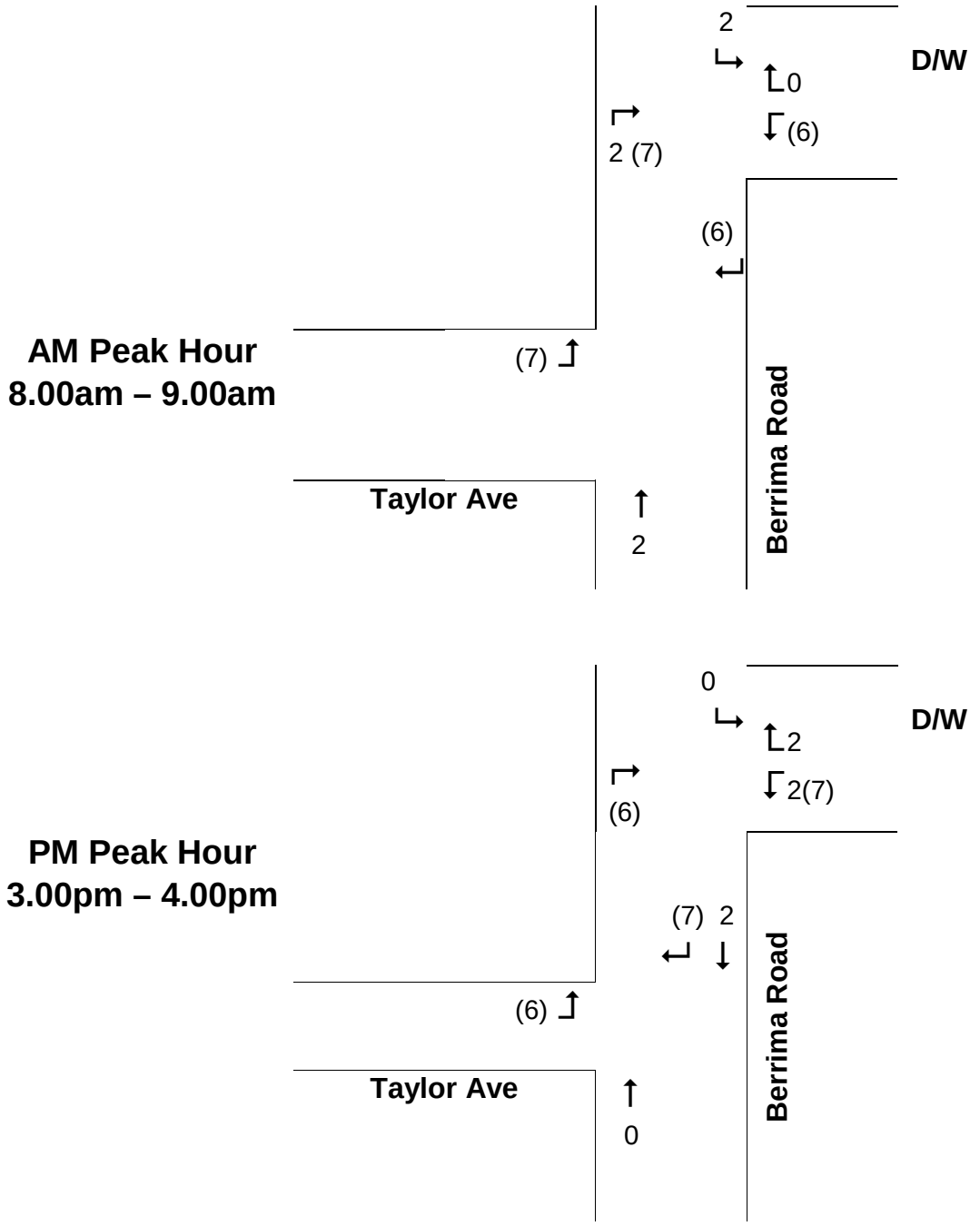
	Berrima Road and Taylor Avenue, New Berrima (Give Way control 'T' intersection)			
	Existing		**Proposed**	
	AM	**PM**	**AM**	**PM**
Level of Service	A	A	A	A
Degree of Saturation	0.155	0.131	0.158	0.131
Total Average Delay (sec/veh)	8.6	9.3	9.1	10.1
Average delay for right turn from Taylor Avenue(sec/veh)	9.9	12.7	16.9	20.5

Table 4.4
Intersection Modelling Results – Berrima Road and Proposed Access, New Berrima (Give Way control type BAR intersection)

	Proposed	
	AM	**PM**
Level of Service	A	A
Degree of Saturation	0.030	0.039
Total Average Delay (sec/veh)	2.4s	2.1s

The results of the modelling reveal that:

- The good Level of Service at the intersection of Berrima Road and Taylor Avenue will not change with the estimated additional Project-related traffic generation.
- The additional traffic demand on the intersection of Berrima Road and Taylor Avenue as a consequence of the proposed development would only alter the Degree of Saturation and Total Average Delays minutely.
- The proposed new driveway intersection will operate at a very good level of service with minimal delays.



Cars (trucks)

POTENTIAL ADDITIONAL PEAK HOUR FLOWS

Fig 5

4.5 Heavy Vehicle Access

As stated previously in Section 2.2, the maximum vehicle to be catered for on site is currently a 19m articulated vehicle. The ability for this size vehicle to travel along the intended heavy vehicle haulage route has been assessed in a separate assessment attached as **Appendix 5**. The route assessment did not identify any impediments to these vehicles operating on the proposed route nor any improvements required to existing infrastructure.

Detailed design of the type BAR intersection access should be undertaken for vehicles up to at least 19m articulated semi trailers.

Consequently, the Project would be able to cater for all heavy vehicles up to 19m articulated semi trailers.

5. CONCLUSIONS

The preceding analysis has demonstrated that:

- The existing access driveway onto the Project Site is suitably located and provides good sight distance in both directions along Berrima Road.
- The Project Site with approximately 51 hectares in area would have ample area to provide all necessary car and truck parking areas.
- It is recommended that the intersection of Berrima Road and the site access road be designed and constructed as a type BAR intersection sufficient for 19m articulated vehicles as a minimum.
- The good Level of Service at the intersection of Berrima Road and Taylor Avenue will not change with the estimated additional Project-related traffic generation.
- The additional traffic demand on the intersection of Berrima Road and Taylor Avenue as a consequence of the proposed development would only alter the Degree of Saturation and Total Average Delays minutely.
- The proposed new driveway intersection will operate at a very good level of service with minimal delays.
- Heavy vehicles servicing of the site is restricted to all heavy vehicles up to 19m in length.

Appendix 1: Copy of DoP and RTA Letters

This page has intentionally been left blank

NSW GOVERNMENT
Department of Planning

Major Project Assessment
Industry & Mining
Phone: (02) 9228 6298
Fax: (02) 9228 6466
Email: kane.winwood @planning.nsw.gov.au
23-33 Bridge Street
GPO Box 39
SYDNEY NSW 2001

Our ref: S08/01473

Mr Adam Davies
Property Development Manager
Austral Bricks Pty Ltd
PO Box 6550
WETHERILL PARK NSW 1851

Dear Mr Davies

New Berrima Clay Shale Project
Director-General's Requirements

The Department has received your application for the New Berrima Clay Shale Project.

I have attached a copy of the Director-General's requirements for the project. These requirements have been prepared in consultation with relevant agencies, and are based on the information that you have provided to date. I have also attached a copy of the agencies' comments for your information.

Please note that the Director-General may alter these requirements at any time.

If your proposal is likely to have a significant impact on matters of National Environmental Significance, it will require an approval under the Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to any approvals required under NSW legislation. It is your responsibility to contact the Department of the Environment, Water, Heritage and the Arts in Canberra (6274 1111 or http://www.environment.gov.au) to determine if the project will require an approval under the EPBC Act. The Commonwealth Government has accredited the NSW environmental assessment process, so if it is determined that an approval is required under the EPBC Act, please contact the Department immediately as supplementary Director-General's requirements may need to be issued.

I would appreciate it if you would contact the Department at least two weeks before you propose to submit your Environmental Assessment of the project. This will allow the Department to determine the:

- applicable fee (see Division 1A, Part 15 of the *Environmental Planning & Assessment Regulation 2000)*; and
- number of copies (hard-copy or CD-ROM) of the Environmental Assessment required for exhibition purposes.

Once it receives the Environmental Assessment, the Department will review it in consultation with the relevant agencies to determine if it adequately addresses the Director-General's requirements, and may require you to revise it prior to public exhibition.

The Department is required to make all the relevant information associated with the project publicly available on its website. Consequently, I would appreciate it if you would ensure that all the documents you subsequently submit to the Department are in a suitable format for the web, and arrange for an electronic version of the Environmental Assessment to be hosted on a suitable website during the exhibition period.

If you have any enquiries about these requirements, please contact Kane Winwood.

Yours sincerely

21.11.04

Chris Wilson
Executive Director
Major Project Assessment
As delegate of the Director-General

Director-General's Requirements

Section 75F of the *Environmental Planning and Assessment Act 1979*

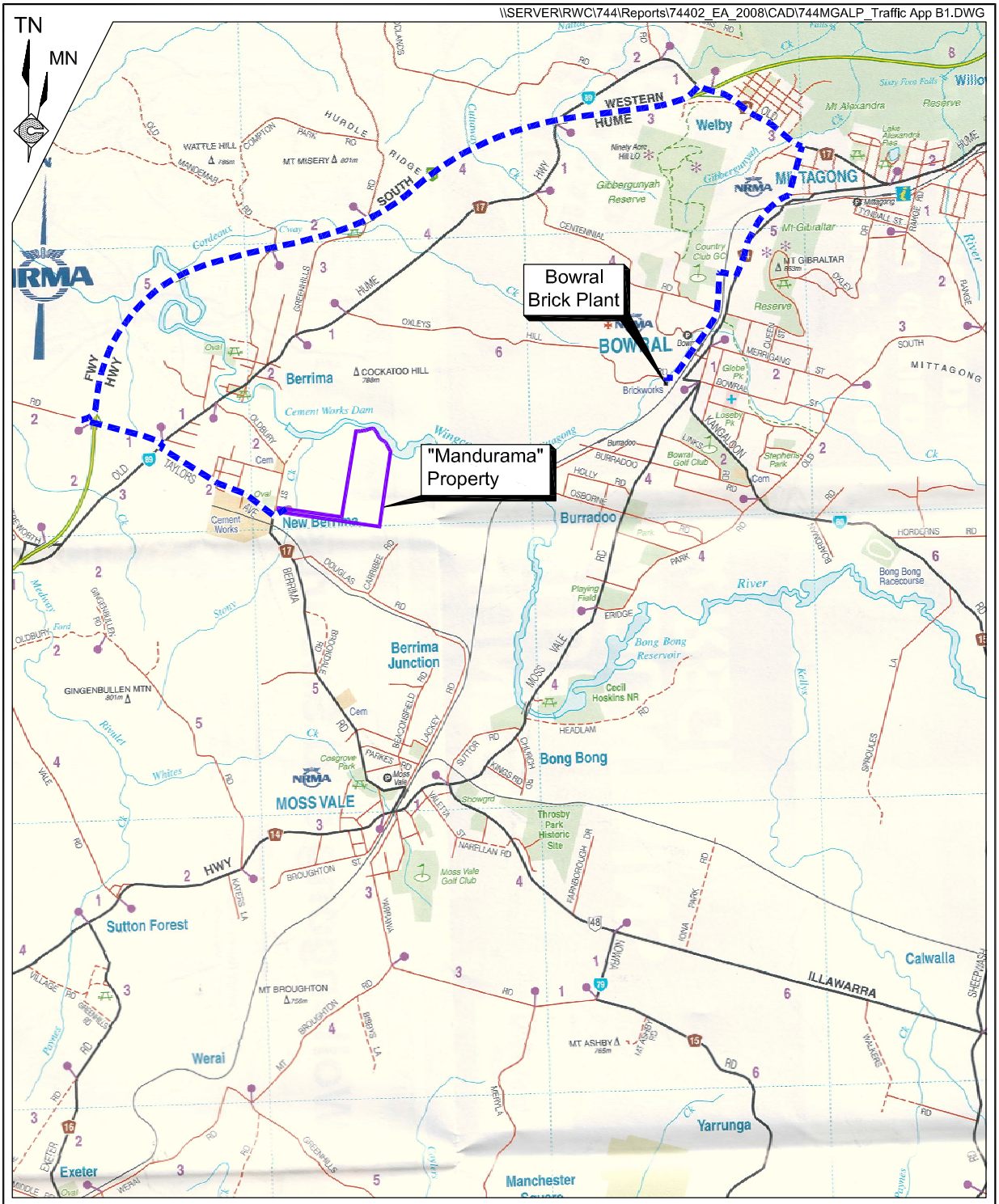
Application Number	MP 08_0212
Project	The New Berrima Clay Shale Quarry Project, which includes: • developing a clay and shale quarry and constructing associated site infrastructure; • transporting up to 120 000 tonnes of extractive material per year by road to Bowral for processing; and • progressively rehabilitating the site.
Site	Lot 1 DP 414246, Berrima Road, New Berrima.
Proponent	Austral Bricks Pty Ltd.
Date of Issue	10 October 2008
General Requirements	The Environmental Assessment of the project must include: • an executive summary; • a detailed description of the project, including the: - need for the project; - alternatives considered, - likely staging of the project; and - plans of any proposed building works; • a risk assessment of the potential environmental impacts of the project, identifying the key issues for further assessment; • a detailed assessment of the key issues specified below, and any other significant issues identified in the risk assessment (see above), which includes: - a description of the existing environment, using sufficient baseline data; - an assessment of the potential impacts of all stages of the project, including any cumulative impacts, taking into consideration any relevant guidelines, policies, plans and statutory provisions (see below); - a description of the measures that would be implemented to avoid, minimise, mitigate, rehabilitate/remediate, monitor and/or offset the potential impacts of the project, including detailed contingency plans for managing any potentially significant risks to the environment; • a statement of commitments, outlining all the proposed environmental management and monitoring measures; • a conclusion justifying the project on economic, social and environmental grounds, taking into consideration whether the project is consistent with the objects of the *Environmental Planning & Assessment Act 1979*; • a signed statement from the author of the Environmental Assessment, certifying that the information contained within the document is neither false nor misleading.
Key Issues	• **Strategic –** assess the project against the strategic land use planning objectives for the area; including those contained in the draft *Wingecarribee Local Environmental Plan 2007* and the *Drinking Water Catchments Regional Environmental Plan No. 1.* • **Transport –** including - a detailed assessment of the potential impacts of the project on the safety and performance of the surrounding road network and entire transport route; - a detailed description of any proposed road or intersection upgrades; • **Visual –** concentrating on minimising the visibility of the site from the surrounding area, particularly from likely affected residences; • **Noise** – a detailed assessment of the noise impacts associated with construction, quarry operation, and road traffic noise taking the entire proposed transport route into account;

	• **Soil & Water –** including a detailed description of the water management system for the site including water quality management, storm water management, erosion and sediment control and monitoring programs; • **Air Quality;** • **Biodiversity –** including a detailed assessment of the potential impacts of the project on any terrestrial and aquatic threatened species, populations, ecological communities or their habitats and regional wildlife habitat corridors; • **Heritage –** both Aboriginal and non-Aboriginal; • **Waste –** including a detailed description of the measures that would be implemented to minimise, reuse, recycle and dispose of any waste produced on site; and • **Rehabilitation –** including a detailed description of the rehabilitation strategy for the site, taking into consideration any relevant strategic land use planning or resource management plans or policies
References	The environmental assessment of the key issues listed above must take into account relevant guidelines, policies, and plans. While not exhaustive, the following attachment contains a list of some of the guidelines, policies, and plans that may be relevant to the environmental assessment of this project.
Consultation	During the preparation of the Environmental Assessment, you should consult with the relevant local, State or Commonwealth Government authorities, service providers, community groups and affected landowners. In particular you must consult with: • Department of Environment and Climate Change; • Department of Primary Industries; • Department of Water and Energy; • Department of Lands; • Sydney Catchment Authority; • Roads and Traffic Authority; and • Wingecarribee Shire Council. The consultation process and the issues raised must be described in the Environmental Assessment.
Deemed Refusal Period	60 days

Appendix 2: Project Figures

This page has intentionally been left blank

\\SERVER\RWC\744\Reports\74402_EA_2008\CAD\744MGALP_Traffic App B1.DWG



REFERENCE
Property Boundary
Clay / Shale Transport Route

SCALE 1:100 000

1 0 1 2 3 4 5 km

Base Map Source: NRMA - Hunter, Blue Mountains and Region Road Map

Note: A Colour Version of this figure is available on the project CD

Figure B.1
LOCALITY PLAN

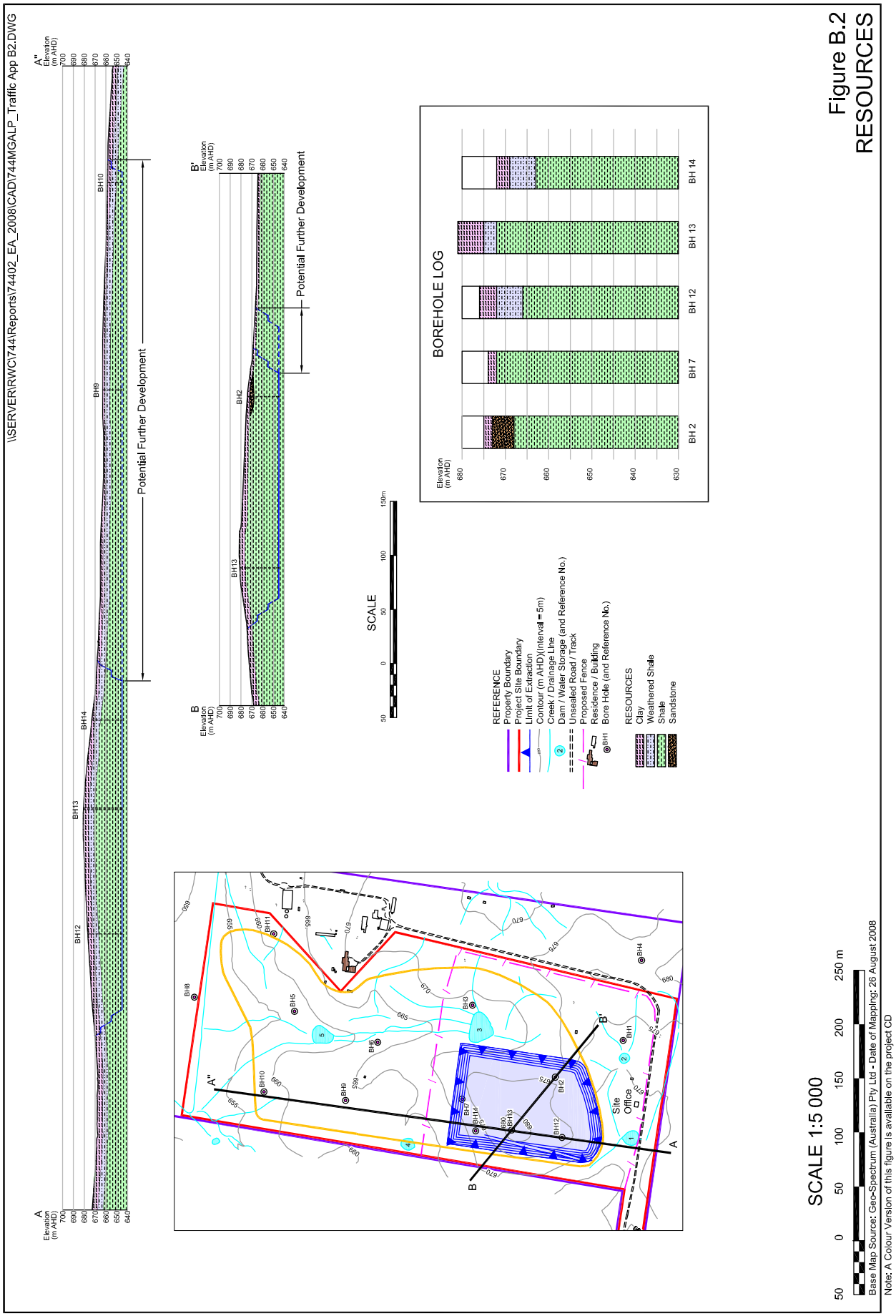


Figure B.2
RESOURCES

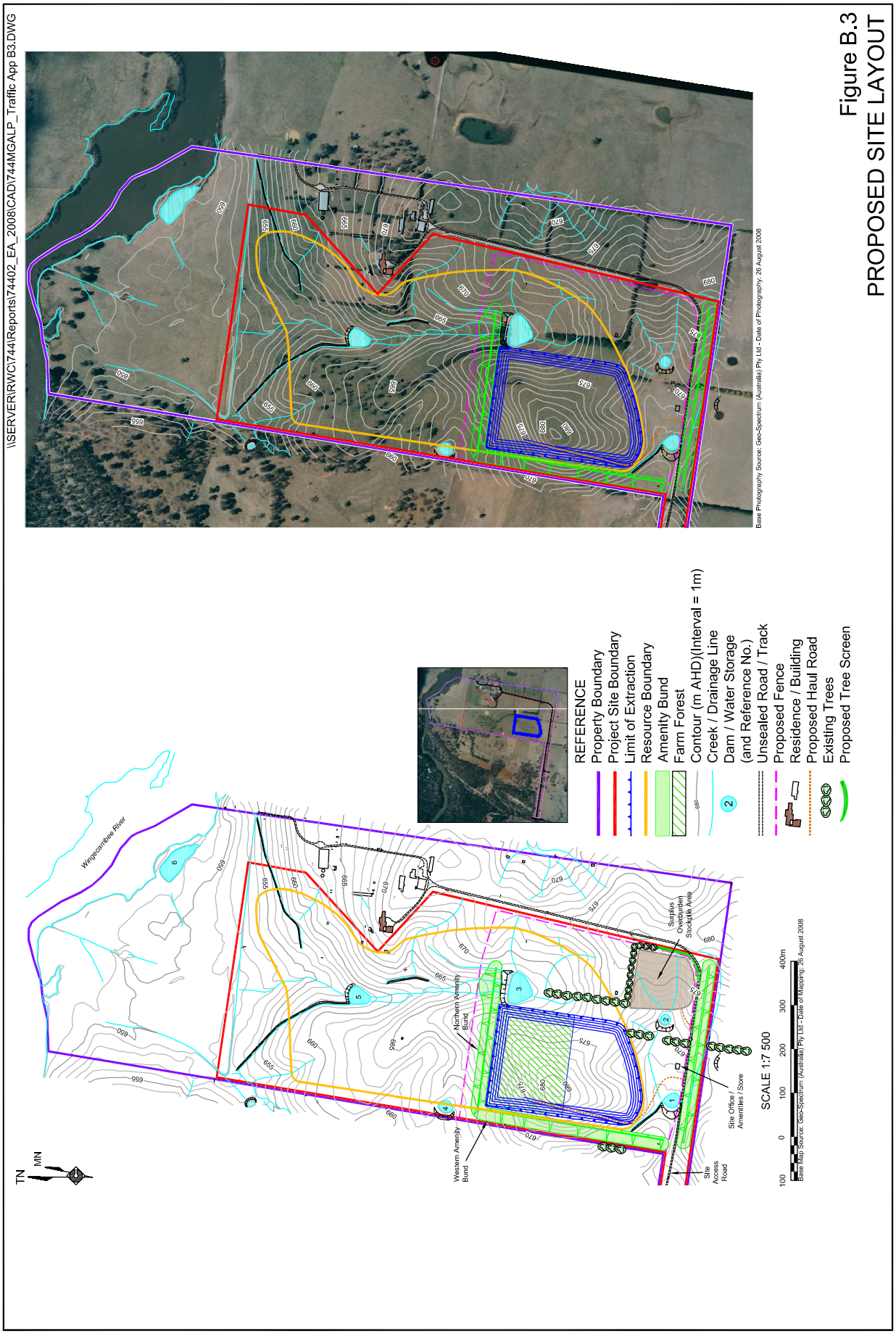


Figure B.3
PROPOSED SITE LAYOUT

Note: A Colour Version of this figure is available on the project CD

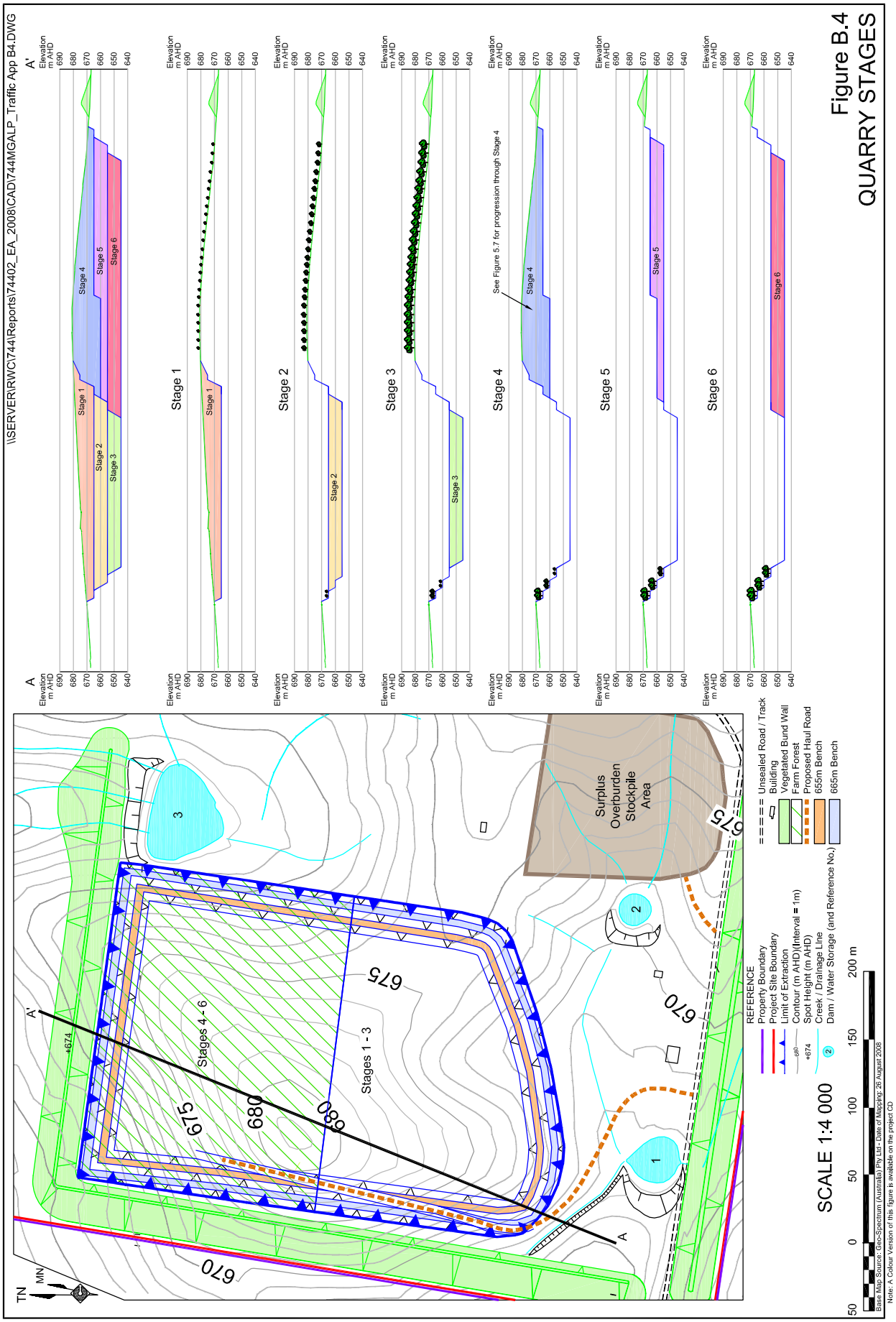


Figure B.4
QUARRY STAGES

Appendix 3: Traffic Counts

This page has intentionally been left blank

CfeIT bob.white@cfeit.com (02) 9740 8600

Traffic Count Summary Report

Count Number	3634	Ref : TSOL	Lat/Long : S34 30.454 / E150 20.602	Berrima Map
Street	BERRIMA ROAD, NEW BERRIMA : Between TAYLOR ROAD & WILKINSON ROAD (bidirectional) :			
Location	North of Taylor Road, opposite Oval, on 90km sign			*Carriageway*

TOTAL COUNT MATRIX

Start Date	22-AUG-08
Start Time	1400
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	70
Weekly 85th Percentile Speed	83
Five Day AADT	1129
Seven Day AADT	1078

	MON 25TH	TUE 26TH	WED 27TH	THU 28TH	FRI 22ND / 29TH	SAT 23RD	SUN 24TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	3	1	0	4	4	2	4	12	2	18	3
1am - 2am	0	0	1	0	0	3	2	1	0	6	1
2am - 3am	1	1	1	2	0	1	2	5	1	8	1
3am - 4am	0	1	2	1	4	1	0	8	2	9	1
4am - 5am	3	5	3	7	7	2	1	25	5	28	4
5am - 6am	10	16	9	14	18	6	6	67	13	79	11
6am - 7am	38	39	44	41	37	4	3	199	40	206	29
7am - 8am	70	72	70	76	65	27	14	353	71	394	56
8am - 9am	107	91	109	91	98	47	28	496	99	571	82
9am - 10am	96	79	59	87	81	79	56	402	80	537	77
10am - 11am	82	90	77	88	74	92	90	411	82	593	85
11am - Midday	91	80	77	58		119	118	306	61	543	91
Midday - 1pm	87	82	83	81		103	101	333	67	537	90
1pm - 2pm	81	82	83	84	89	89	104	419	84	612	87
2pm - 3pm	108	93	85	105	100	97	82	491	98	670	96
3pm - 4pm	114	118	108	101	111	92	87	552	110	731	104
4pm - 5pm	126	103	112	101	100	62	76	542	108	680	97
5pm - 6pm	112	93	93	94	84	58	53	476	95	587	84
6pm - 7pm	63	35	54	50	46	43	31	248	50	322	46
7pm - 8pm	21	22	18	24	21	25	6	106	21	137	20
8pm - 9pm	11	12	20	13	15	24	9	71	14	104	15
9pm - 10pm	25	10	9	22	11	16	4	77	15	97	14
10pm - 11pm	3	8	4	2	10	16	6	27	5	49	7
11pm - Midnight	3	1	5	3	6	7	0	18	4	25	4
Total	1255	1134	1126	1149	981	1015	883	5645	1129	7543	1077

Copyright 1996 CFE Information Technologies

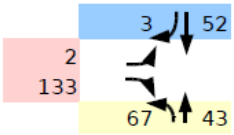
Page : 1

Data displayed has been compiled from pneumatic traffic count processes and is subject to the documented limitations

Curtis Traffic Surveys **Turning movement count**

Job: 080803ts
Day, date Wed 20 Aug 08
Location: Berrima Rd & Taylor Av
Weather: Fine
Client: Traffic Solutions

Peak Hour Volumes



N

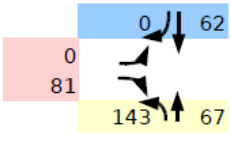
Time Period	From Berrima Rd north Through Light Vehicles	Through Heavy Vehicles	Right Light Vehicles	Right Heavy Vehicles	From Taylor Av Left Light Vehicles	Left Heavy Vehicles	Right Light Vehicles	Right Heavy Vehicles	From Berrima Rd south Left Light Vehicles	Left Heavy Vehicles	Through Light Vehicles	Through Heavy Vehicles	Total vehicle movements
06:30 to 06:45	0	0	0	0	0	0	20	6	5	4	1	1	37
06:45 to 07:00	0	1	0	0	0	0	21	5	7	4	1	3	42
07:00 to 07:15	11	0	0	0	0	0	19	6	9	4	4	2	55
07:15 to 07:30	3	1	0	0	0	0	19	6	12	2	6	0	49
07:30 to 07:45	10	0	0	0	1	0	16	3	14	6	11	4	65
07:45 to 08:00	20	2	0	0	0	0	31	5	6	3	14	0	81
08:00 to 08:15	10	1	1	0	0	0	33	9	10	5	7	1	77
08:15 to 08:30	8	0	0	0	0	0	32	4	7	8	4	2	65
08:30 to 08:45	12	0	1	0	0	0	20	5	12	3	10	0	63
08:45 to 09:00	20	1	1	0	2	0	25	5	18	4	17	2	95 Peak
09:00 to 09:15	6	0	0	0	1	0	24	7	13	6	12	1	70
09:15 to 09:30	8	0	0	0	1	0	9	3	8	2	12	1	44
Hourly Summary	108	6	3	0	5	0	269	64	121	51	99	17	
06:30 to 07:30	14	2	0	0	0	0	79	23	33	14	12	6	183
06:45 to 07:45	24	2	0	0	1	0	75	20	42	16	22	9	211
07:00 to 08:00	44	3	0	0	1	0	85	20	41	15	35	6	250
07:15 to 08:15	43	4	1	0	1	0	99	23	42	16	38	5	272
07:30 to 08:30	48	3	1	0	1	0	112	21	37	22	36	7	288
07:45 to 08:45	50	3	2	0	0	0	116	23	35	19	35	3	286
08:00 to 09:00	50	2	3	0	2	0	110	23	47	20	38	5	300 Peak Hour
08:15 to 09:15	46	1	2	0	3	0	101	21	50	21	43	5	293
08:30 to 09:30	46	1	2	0	4	0	78	20	51	15	51	4	272

Curtis Traffic Surveys

Turning movement count

Job: 080803ts
Day, date: Wed 20 Aug 08
Location: Berrima Rd & Taylor Av
Weather: Fine
Client: Traffic Solutions

Peak Hour Volumes



N

Time Period	From Berrima Rd north: Through Light Vehicles	Through Heavy Vehicles	Right Light Vehicles	Right Heavy Vehicles	From Taylor Av: Left Light Vehicles	Left Heavy Vehicles	Right Light Vehicles	Right Heavy Vehicles	From Berrima Rd south: Left Light Vehicles	Left Heavy Vehicles	Through Light Vehicles	Through Heavy Vehicles	Total vehicle movements	
15:00 to 15:15	17	1	0	0	0	0	15	4	22	8	12	2	81	
15:15 to 15:30	16	0	0	0	0	0	13	5	23	8	11	1	77	
15:30 to 15:45	11	2	0	0	0	0	11	8	36	8	11	4	91	
15:45 to 16:00	15	0	0	0	0	0	18	7	34	4	25	1	104	Peak
16:00 to 16:15	13	0	0	0	1	0	17	4	20	5	10	0	70	
16:15 to 16:30	12	0	0	0	1	1	18	3	21	4	11	1	72	
16:30 to 16:45	12	0	0	0	2	0	12	0	14	5	12	0	57	
16:45 to 17:00	9	0	0	0	1	0	15	2	20	2	13	0	62	
17:00 to 17:15	11	0	1	0	2	0	20	2	28	2	14	1	81	
17:15 to 17:30	9	0	0	0	1	0	18	2	28	7	14	0	79	
17:30 to 17:45	7	0	1	0	0	0	18	2	27	3	12	0	70	
17:45 to 18:00	7	0	0	0	0	0	14	1	19	2	12	1	56	
Hourly Summary	139	3	2	0	8	1	189	40	292	58	157	11		
15:00 to 16:00	59	3	0	0	0	0	57	24	115	28	59	8	353	Peak Hour
15:15 to 16:15	55	2	0	0	1	0	59	24	113	25	57	6	342	
15:30 to 16:30	51	2	0	0	2	1	64	22	111	21	57	6	337	
15:45 to 16:45	52	0	0	0	4	1	65	14	89	18	58	2	303	
16:00 to 17:00	46	0	0	0	5	1	62	9	75	16	46	1	261	
16:15 to 17:15	44	0	1	0	6	1	65	7	83	13	50	2	272	
16:30 to 17:30	41	0	1	0	6	0	65	6	90	16	53	1	279	
16:45 to 17:45	36	0	2	0	4	0	71	8	103	14	53	1	292	
17:00 to 18:00	34	0	2	0	3	0	70	7	102	14	52	2	286	

CfeIT bob.white@cfeit.com (02) 9740 8600

Traffic Count Summary Report

Count Number	3466	Ref : TSOL	Lat/Long : S34 30.454 / E150 20.602	Berrima Map
Street	BERRIMA ROAD, NEW BERRIMA : From TAYLOR ROAD to WILKINSON ROAD : NORTH BOUND			
Location	North of Taylor Road, opposite Oval, on 90km sign			*Carriageway*

TOTAL COUNT MATRIX

Start Date	15-AUG-08
Start Time	1400
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	68
Weekly 85th Percentile Speed	79
Five Day AADT	629
Seven Day AADT	597

	MON 18TH	TUE 19TH	WED 20TH	THU 21ST	FRI 15TH / 22ND	SAT 16TH	SUN 17TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	2	0	1	1	1	3	1	5	1	9	1
1am - 2am	1	0	1	1	1	0	2	4	1	6	1
2am - 3am	0	1	1	0	0	0	0	2	0	2	0
3am - 4am	2	1	1	1	0	0	0	5	1	5	1
4am - 5am	2	2	3	4	4	1	1	15	3	17	2
5am - 6am	2	5	5	5	6	4	3	23	5	30	4
6am - 7am	15	10	12	19	8	10	2	64	13	76	11
7am - 8am	35	29	39	40	30	14	16	173	35	203	29
8am - 9am	40	55	40	42	46	24	19	223	45	266	38
9am - 10am	52	67	50	43	42	52	42	254	51	348	50
10am - 11am	51	44	49	49	41	62	47	234	47	343	49
11am - Midday	55	44	54	39	61	57	64	253	51	374	53
Midday - 1pm	46	39	45	52	53	56	60	235	47	351	50
1pm - 2pm	41	30	45	46	46	76	59	208	42	343	49
2pm - 3pm	48	46	52	45	55	35	51	246	49	332	47
3pm - 4pm	62	66	49	68	65	41	40	310	62	391	56
4pm - 5pm	70	83	61	73	74	26	29	361	72	416	59
5pm - 6pm	55	55	57	47	53	24	25	267	53	316	45
6pm - 7pm	17	19	28	33	13	22	8	110	22	140	20
7pm - 8pm	7	9	7	10	17	12	4	50	10	66	9
8pm - 9pm	5	7	8	7	5	11	4	32	6	47	7
9pm - 10pm	8	10	8	11	5	6	9	42	8	57	8
10pm - 11pm	2	3	4	5	3	4	2	17	3	23	3
11pm - Midnight	1	3	2	2	4	5	2	12	2	19	3
Total	619	628	622	643	633	545	490	3145	629	4180	597

Copyright 1996 CFE Information Technologies

Page : 1

Data displayed has been compiled from pneumatic traffic count processes and is subject to the documented limitations

CfeIT bob.white@cfeit.com (02) 9740 8600

Traffic Count Summary Report

Count Number	3466	Ref : TSOL	Lat/Long : S34 30.454 / E150 20.602	Berrima Map
Street	BERRIMA ROAD, NEW BERRIMA : From WILKINSON ROAD to TAYLOR ROAD : SOUTH BOUND			
Location	North of Taylor Road, opposite Oval, on 90km sign			*Carriageway*

Start Date	15-AUG-08
Start Time	1400
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	73
Weekly 85th Percentile Speed	83
Five Day AADT	593
Seven Day AADT	550

TOTAL COUNT MATRIX

	MON 18TH	TUE 19TH	WED 20TH	THU 21ST	FRI 15TH / 22ND	SAT 16TH	SUN 17TH	5 Day Total	5 Day Average	7 Day Total	7 Day Average
Midnight - 1am	3	1	0	3	1	1	2	8	2	11	2
1am - 2am	1	0	0	0	0	2	0	1	0	3	0
2am - 3am	2	1	1	0	1	1	0	5	1	6	1
3am - 4am	0	1	2	2	1	1	1	6	1	8	1
4am - 5am	1	4	1	3	2	2	2	11	2	15	2
5am - 6am	7	9	11	11	14	1	2	52	10	55	8
6am - 7am	20	24	23	20	18	3	1	105	21	109	16
7am - 8am	41	38	46	38	28	6	3	191	38	200	29
8am - 9am	48	48	58	53	57	18	11	264	53	293	42
9am - 10am	34	46	39	34	36	25	19	189	38	233	33
10am - 11am	36	35	37	23	45	39	36	176	35	251	36
11am - Midday	52	43	34	42	42	41	40	213	43	294	42
Midday - 1pm	36	46	41	39	47	51	39	209	42	299	43
1pm - 2pm	38	35	43	42	45	40	35	203	41	278	40
2pm - 3pm	44	49	57	55	67	46	43	272	54	361	52
3pm - 4pm	58	68	56	78	58	45	59	318	64	422	60
4pm - 5pm	54	70	55	52	53	46	43	284	57	373	53
5pm - 6pm	42	43	36	39	47	49	41	207	41	297	42
6pm - 7pm	16	19	34	26	20	12	18	115	23	145	21
7pm - 8pm	12	10	4	10	13	9	5	49	10	63	9
8pm - 9pm	5	5	4	8	6	5	10	28	6	43	6
9pm - 10pm	4	5	5	6	6	7	6	26	5	39	6
10pm - 11pm	2	11	4	3	5	8	1	25	5	34	5
11pm - Midnight	1	0	0	3	6	5	0	10	2	15	2
Total	557	611	591	590	618	463	417	2967	593	3847	549

Copyright 1996 CFE Information Technologies Page : 1

Data displayed has been compiled from pneumatic traffic count processes and is subject to the documented limitations

CfeIT bob.white@cfeit.com (02) 9740 8600

Daily Classification Summary

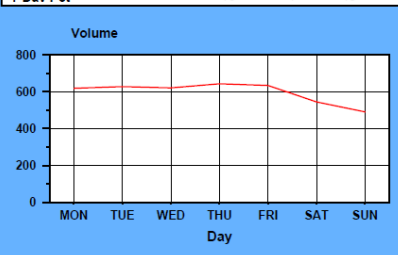
Count Number	3466	Ref : TSOL	Lat/Long : S34 30.454 / E150 20.602	Berrima Map
Street	BERRIMA ROAD, NEW BERRIMA : From TAYLOR ROAD to WILKINSON ROAD : NORTH BOUND			
Location	North of Taylor Road, opposite Oval, on 90km sign			*Carriageway*

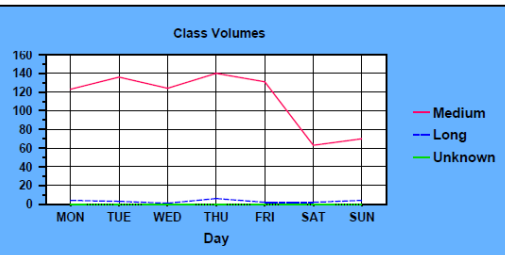
Start Date	15-AUG-08
Start Time	1400
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	68
Weekly 85th Percentile Speed	79
Five Day AADT	629
Seven Day AADT	597

THE BODY OF THIS REPORT SHOWS : SEVENDAY TRAFFIC

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
MONDAY	1	483	8	121	2	0	4	0	0	0	0	0	0	0	619
TUESDAY	1	479	9	132	4	0	3	0	0	0	0	0	0	0	628
WEDNESDAY	2	489	6	112	12	0	0	1	0	0	0	0	0	0	622
THURSDAY	1	492	4	124	15	1	4	1	0	1	0	0	0	0	643
FRIDAY	0	488	12	123	8	0	2	0	0	0	0	0	0	0	633
SATURDAY	1	470	9	63	0	0	2	0	0	0	0	0	0	0	545
SUNDAY	0	408	8	68	1	1	4	0	0	0	0	0	0	0	490
5 Day Total	5	2431	39	612	41	1	13	2	0	1	0	0	0	0	3145
5 Day Pct		77	1	19	1										
7 Day Total	6	3309	56	743	42	2	19	2	0	1	0	0	0	0	4180
7 Day Pct		79	1	18	1										





Copyright 1996 CFE Information Technologies Page : 1

Data displayed has been compiled from pneumatic traffic count processes and is subject to the documented limitations

CfeIT bob.white@cfeit.com (02) 9740 8600

Daily Classification Summary

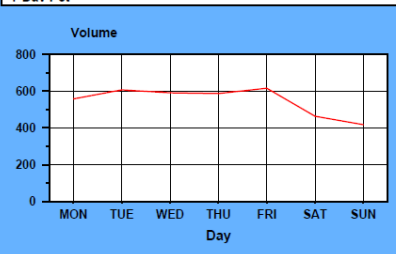
Count Number	**3466**	Ref : **TSOL**	**Lat/Long : S34 30.454 / E150 20.602**	**Berrima Map**
Street	**BERRIMA ROAD, NEW BERRIMA : From WILKINSON ROAD to TAYLOR ROAD : SOUTH BOUND**			
Location	North of Taylor Road, opposite Oval, on 90km sign			*Carriageway*

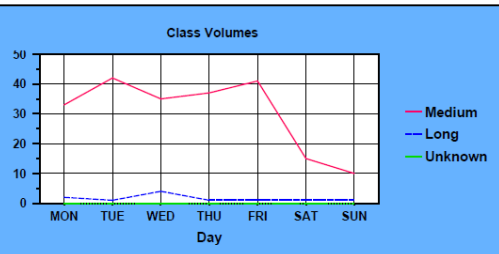
Start Date	15-AUG-08
Start Time	1400
Duration	7 DAYS
Interval	1 HOUR

Weekly 50th Percentile Speed	**73**
Weekly 85th Percentile Speed	**83**
Five Day AADT	**593**
Seven Day AADT	**550**

THE BODY OF THIS REPORT SHOWS : SEVENDAY TRAFFIC

Day	00	01	02	03	04	05	06	07	08	09	10	11	12	13	Total
MONDAY	0	516	6	31	2	0	1	0	0	1	0	0	0	0	557
TUESDAY	5	549	14	34	8	0	0	0	1	0	0	0	0	0	611
WEDNESDAY	1	540	11	25	10	0	2	0	0	1	1	0	0	0	591
THURSDAY	4	536	12	26	11	0	1	0	0	0	0	0	0	0	590
FRIDAY	3	560	13	34	7	0	1	0	0	0	0	0	0	0	618
SATURDAY	0	437	10	13	2	0	1	0	0	0	0	0	0	0	463
SUNDAY	0	392	14	7	2	1	1	0	0	0	0	0	0	0	417
5 Day Total	13	2701	56	150	38	0	5	0	1	2	1	0	0	0	2967
5 Day Pct		91	2	5	1										
7 Day Total	13	3530	80	170	42	1	7	0	1	2	1	0	0	0	3847
7 Day Pct		92	2	4	1										





Copyright 1996 **CFE Information Technologies** **Page : 1**

Data displayed has been compiled from pneumatic traffic count processes and is subject to the documented limitations

Appendix 4: SIDRA Movement Summary Output

This page has intentionally been left blank

MOVEMENT SUMMARY

Site: Existing AM Peak

Berrima Road and Taylor Avenue
Existing AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	Berrima Road sth										
1	L	71	29.9	0.071	13.2	LOS A	0.0	0.0	0.00	0.89	60.5
2	T	45	11.6	0.071	6.7	LOS A	0.0	0.0	0.00	0.34	71.4
Approach		116	22.7	0.071	10.7	LOS A	0.0	0.0	0.00	0.67	64.4
North	Berrima Road nth										
8	T	55	3.8	0.031	0.5	LOS A	0.2	1.6	0.26	0.00	78.8
9	R	3	0.0	0.031	12.2	LOS A	0.2	1.6	0.26	1.10	61.9
Approach		58	3.6	0.031	1.1	LOS A	0.2	1.6	0.26	0.06	77.9
West	Taylor Ave										
10	L	2	0.0	0.003	7.9	LOS A	0.0	0.1	0.19	0.59	47.3
12	R	140	17.3	0.155	9.9	LOS A	0.8	6.2	0.30	0.67	47.0
Approach		142	17.0	0.155	9.8	LOS A	0.8	6.2	0.30	0.67	47.0
All Vehicles		316	16.7	0.155	8.6	NA	0.8	6.2	0.18	0.56	56.3

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

Processed: Wednesday, 10 February 2010 9:22:27 AM
SIDRA INTERSECTION 4.0.14.1049
Project: C:\Traffic Solutions\20082009\022\BerrimaandTaylorAve.sip
8000870, TRAFFIC SOLUTIONS PTY LTD, LIMITED

Copyright ©2000-2009 Akcelik & Associates Pty Ltd
www.sidrasolutions.com

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Existing PM Peak

Berrima Road and Taylor Avenue
Existing PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	Berrima Road sth										
1	L	151	19.6	0.131	12.7	LOS A	0.0	0.0	0.00	0.85	60.5
2	T	71	11.9	0.131	6.7	LOS A	0.0	0.0	0.00	0.33	71.4
Approach		221	17.1	0.131	10.8	LOS A	0.0	0.0	0.00	0.68	63.6
North	Berrima Road nth										
8	T	65	4.8	0.035	1.0	LOS A	0.3	2.1	0.38	0.00	75.1
9	R	1	0.0	0.035	12.7	LOS A	0.3	2.1	0.38	1.05	62.5
Approach		66	4.8	0.035	1.2	LOS A	0.3	2.1	0.38	0.02	74.9
West	Taylor Ave										
10	L	1	0.0	0.001	8.3	LOS A	0.0	0.0	0.26	0.58	47.0
12	R	85	29.6	0.119	11.7	LOS A	0.6	4.9	0.38	0.71	46.3
Approach		86	29.3	0.119	11.7	LOS A	0.6	4.9	0.38	0.71	46.3
All Vehicles		374	17.7	0.131	9.3	NA	0.6	4.9	0.15	0.57	59.6

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

Processed: Wednesday, 10 February 2010 9:38:51 AM
SIDRA INTERSECTION 4.0.14.1049
Project: C:\Traffic Solutions\20082009\022\BerrimaandTaylorAve.sip
8000870, TRAFFIC SOLUTIONS PTY LTD, LIMITED

Copyright ©2000-2009 Akcelik & Associates Pty Ltd
www.sidrasolutions.com

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Post Dev AM Peak

Berrima Road and Taylor Avenue
Post Developemnt AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	Berrima Road sth										
1	L	71	29.9	0.072	13.2	LOS A	0.0	0.0	0.00	0.90	60.5
2	T	47	11.1	0.072	6.7	LOS A	0.0	0.0	0.00	0.34	71.4
Approach		118	22.3	0.072	10.6	LOS A	0.0	0.0	0.00	0.67	64.5
North	Berrima Road nth										
8	T	55	3.8	0.042	1.4	LOS A	0.4	3.5	0.38	0.00	73.9
9	R	9	66.7	0.042	16.9	LOS B	0.4	3.5	0.38	1.31	62.3
Approach		64	13.1	0.042	3.7	LOS B	0.4	3.5	0.38	0.19	72.3
West	Taylor Ave										
10	L	9	77.8	0.027	13.9	LOS A	0.1	0.8	0.26	0.63	46.9
12	R	140	17.3	0.158	10.0	LOS A	0.8	6.3	0.31	0.68	47.0
Approach		149	21.1	0.158	10.2	LOS A	0.8	6.3	0.31	0.67	47.0
All Vehicles		332	20.0	0.158	9.1	NA	0.8	6.3	0.21	0.58	55.6

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

Processed: Wednesday, 10 February 2010 9:52:46 AM
SIDRA INTERSECTION 4.0.14.1049
Project: C:\Traffic Solutions\20082009\022\BerrimaandTaylorAve.sip
8000870, TRAFFIC SOLUTIONS PTY LTD, LIMITED

Copyright ©2000-2009 Akcelik & Associates Pty Ltd
www.sidrasolutions.com

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Post Dev PM Peak

Berrima Road and Taylor Avenue
Post developemnt PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	Berrima Road sth										
1	L	151	19.6	0.131	12.7	LOS A	0.0	0.0	0.00	0.85	60.5
2	T	71	11.9	0.131	6.7	LOS A	0.0	0.0	0.00	0.33	71.4
Approach		221	17.1	0.131	10.8	LOS A	0.0	0.0	0.00	0.68	63.6
North	Berrima Road nth										
8	T	67	4.7	0.053	3.9	LOS A	0.7	5.9	0.58	0.00	67.9
9	R	8	87.5	0.053	20.5	LOS B	0.7	5.9	0.58	1.24	60.2
Approach		76	13.9	0.053	5.8	LOS B	0.7	5.9	0.58	0.14	67.2
West	Taylor Ave										
10	L	7	85.7	0.024	15.8	LOS B	0.1	0.8	0.36	0.65	45.8
12	R	85	29.6	0.122	11.9	LOS A	0.6	5.0	0.40	0.72	46.2
Approach		93	34.1	0.122	12.2	LOS B	0.6	5.0	0.39	0.72	46.2
All Vehicles		389	20.5	0.131	10.1	NA	0.7	5.9	0.21	0.59	58.4

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

Processed: Wednesday, 10 February 2010 10:42:57 AM
SIDRA INTERSECTION 4.0.14.1049
Project: C:\Traffic Solutions\20082009\022\BerrimaandTaylorAve.sip
8000870, TRAFFIC SOLUTIONS PTY LTD, LIMITED

Copyright ©2000-2009 Akcelik & Associates Pty Ltd
www.sidrasolutions.com

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: AM Peak

Berrima Road and site access (type BAR)
AM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	Berrima Road south										
2	T	47	11.1	0.026	0.0	LOS A	0.0	0.0	0.00	0.00	90.0
3	R	9	77.8	0.016	18.5	LOS B	0.1	0.7	0.19	0.70	59.9
Approach		57	22.2	0.026	3.1	LOS B	0.1	0.7	0.03	0.12	84.5
East	site access road										
4	L	6	100.0	0.013	12.1	LOS A	0.1	0.7	0.21	0.58	46.6
6	R	1	0.0	0.013	6.7	LOS A	0.1	0.7	0.21	0.61	41.2
Approach		7	85.7	0.013	11.3	LOS A	0.1	0.7	0.21	0.59	46.0
North	Berrima Road nth										
7	L	2	0.0	0.030	13.0	LOS A	0.0	0.0	0.00	1.06	61.3
8	T	55	3.8	0.030	0.0	LOS A	0.0	0.0	0.00	0.00	90.0
Approach		57	3.7	0.030	0.5	LOS A	0.0	0.0	0.00	0.04	88.9
All Vehicles		121	17.4	0.030	2.4	NA	0.1	0.7	0.03	0.11	80.4

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

Processed: Wednesday, 10 February 2010 11:12:41 AM
SIDRA INTERSECTION 4.0.14.1049
Project: C:\Traffic Solutions\20082009\022\BerrimaAccess.sip
8000870, TRAFFIC SOLUTIONS PTY LTD, LIMITED

Copyright ©2000-2009 Akcelik & Associates Pty Ltd
www.sidrasolutions.com

MOVEMENT SUMMARY

Site: PM Peak

Berrima Road and site access (type BAR)
PM Peak
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South	Berrima Road south										
2	T	71	11.9	0.039	0.0	LOS A	0.0	0.0	0.00	0.00	90.0
3	R	9	77.8	0.016	18.4	LOS B	0.1	0.7	0.19	0.70	59.9
Approach		80	19.7	0.039	2.2	LOS B	0.1	0.7	0.02	0.08	86.1
East	site access road										
4	L	9	77.8	0.018	10.8	LOS A	0.1	0.9	0.20	0.58	41.2
6	R	2	0.0	0.018	6.6	LOS A	0.1	0.9	0.20	0.62	41.2
Approach		12	63.6	0.018	10.0	LOS A	0.1	0.9	0.20	0.58	41.2
North	Berrima Road nth										
7	L	1	0.0	0.030	13.0	LOS A	0.0	0.0	0.00	1.06	61.3
8	T	55	5.8	0.030	0.0	LOS A	0.0	0.0	0.00	0.00	90.0
Approach		56	5.7	0.030	0.2	LOS A	0.0	0.0	0.00	0.02	89.4
All Vehicles		147	17.9	0.039	2.1	NA	0.1	0.9	0.03	0.10	80.4

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS B. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

Processed: Wednesday, 10 February 2010 11:19:45 AM
SIDRA INTERSECTION 4.0.14.1049
Project: C:\Traffic Solutions\20082009\022\BerrimaAccess.sip
8000870, TRAFFIC SOLUTIONS PTY LTD, LIMITED

Copyright ©2000-2009 Akcelik & Associates Pty Ltd
www.sidrasolutions.com

This page has intentionally been left blank

Appendix 5: Heavy Vehicle Route Assessment

This page has intentionally been left blank

Traffic Solutions Pty Ltd

NEW BERRIMA CLAY/SHALE PROJECT TO BOWRAL BRICK PLANT

HEAVY VEHICLE ROUTE ASSESSMENT

March 2010

Ref: 08.09.022

P.O Box Springwood NSW 2777 Phone / Fax: (02) 4751 6354
Email: trafficsolutions@ozemail.com.au

CONTENTS

1. INTRODUCTION 1-55

2. WESTERN SYDNEY ORBITAL ROUTE 1-56

2. WESTERN SYDNEY ORBITAL ROUTE 1-57

3. AVAILABLE ROAD ROUTES 1-58

3. AVAILABLE ROAD ROUTES 1-64

APPENDIX A – RTA APPROVED B-DOUBLE ROUTE PLAN

1. INTRODUCTION

This report has been prepared to assess the proposed heavy vehicle haulage route from the New Berrima Clay/Shale Project on Berrima Road New Berrima to the Bowral Brick Plant on Oxley Hill Road, Bowral (via Hume Highway).

It is noted that the section of this proposed route from the Hume Highway to the Bowral Brick Plant site is identical to that currently used for Haulage of raw materials from other quarries to the brick plant.

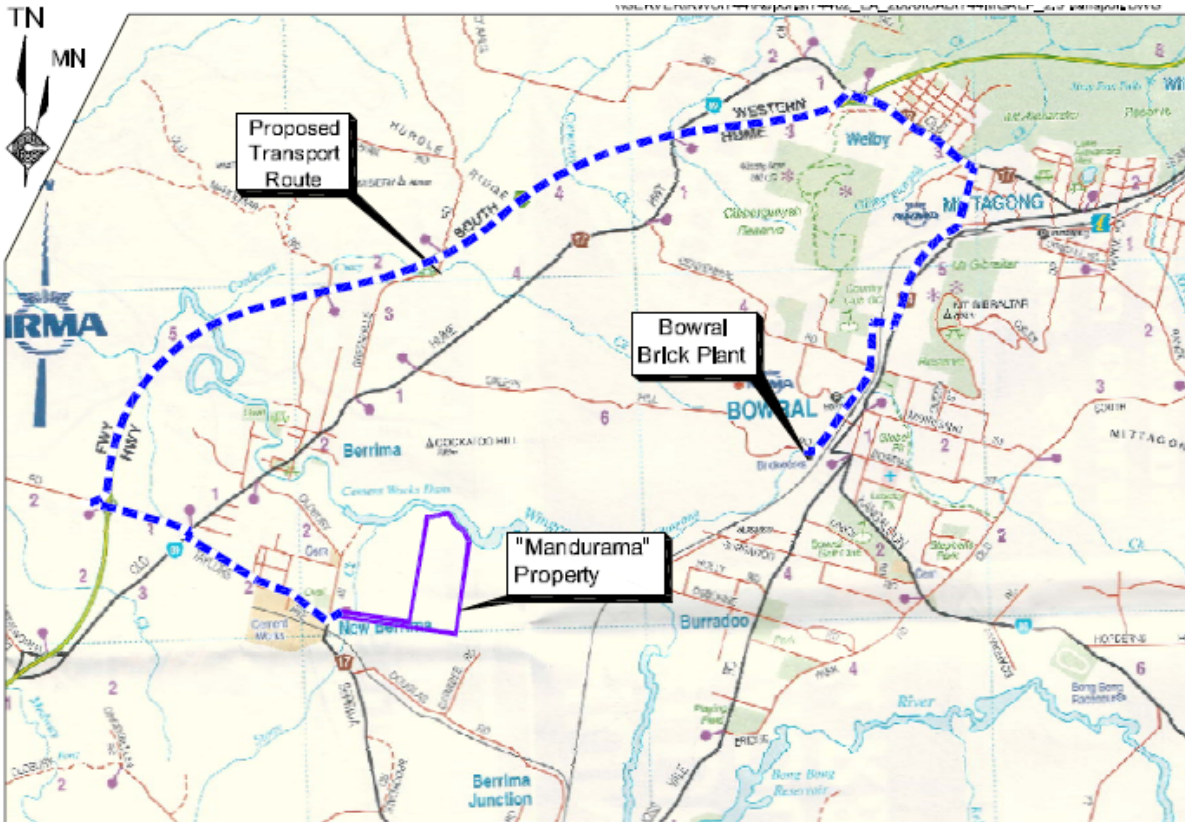
This report examines the existing route which is proposed to be used as part of transporting the raw material Clay/shale from the quarry to the Brick works and will:

- Assess the status of the route.
- Describe the route.
- Assess the route for adequacy to cope with expected vehicle sizes.

It should be noted that this is an assessment of the route from a practical traffic viewpoint and ability for heavy vehicles to physically travel this route. This assessment does not include a pavement analysis.

2. PROPOSED HEAVY HAULAGE ROUTE

The following figure is the proposed transport route to be used from Berrima Road site to the Bowral Brick Works:



The following route description is the route proposed which utilises the RTA approved heavy vehicle route:

1. Left turn from site entrance on to Berrima Road.
2. Right turn from Berrima Road into Taylor Avenue.
3. Continue straight from Taylor Avenue across the Old Hume Highway into Medway Road via recently completed major roundabout.
4. Right turn from Medway Road onto Hume Highway northbound on ramp.
5. Exit off Hume Highway at Old Hume Highway off ramp to turn right onto Old Hume Highway.
6. Right turn from Old Hume Highway into Cavendish Street, then left onto Old Bowral Road.
7. Right turn from Old Bowral Road onto Mittagong Road.
8. Right turn into Lyell Avenue, over the railway line.
9. Continue onto Kirkham Road.
10. Right turn from Kirkham Road into Oxley Hill Road.
11. Left turn from Oxley Hill Road into Kiama Street, then left turn into raw material gates at the rear of the site.

Trucks returning to the Berrima site would travel this route in reverse.

3. EXISTING B_DOUBLE APPROVED ROUTES

The majority of the route described in section 2 is approved as heavy vehicle routes by the Roads and Traffic Authority. The following provides details of the restrictions applicable to each section of the route and attached as appendix A is a copy of the RTA travel restriction route maps.

Road	Section	Classification	RTA approved routes
Berrima Road	North of Taylor Avenue	Local Road	19m articulated
Taylor Avenue	full length	Regional Road	23, 25 and 26m B-double approved
Old Hume Hwy	Taylor Ave to Medway Road	Regional Road	23, 25 and 26m B-double approved
Medway Road	Old Hume Hwy to Hume Hwy	Regional Road	23, 25 and 26m B-double approved
Hume Highway	Medway Road to Old Hume Highway	State Road	23, 25 and 26m B-double approved
Old Hume Highway	Hume Highway to Cavendish Street	Regional Road	25 and 26m B-double approved
Cavendish Street	Old Hume Hwy to Old Bowral Road	Local Road	25 and 26m B-double approved
Old Bowral Road	Cavendish Street to Mittagong Road	Local Road	25 and 26m B-double approved
Mittagong Road (The Highlands Way/ Bowral Road)	Old Bowral Road to Lyell Avenue	Regional Road	19m B-double approved
Lyell Avenue	Mittagong Road (The Highlands Way/ Bowral Road) to Kirkham Road.	Local Road	19m articulated
Kirkham Road	Lyell Avenue to Oxley Hills Road	Local road	19m articulated
Oxley Hills Road	Kirkham Road to Kiama Street	Local Road	19m articulated
Kiama Street	Full length	Local Road	19m articulated

Accordingly, the following sections of the proposed haulage route from the New Berrima Clay/shale quarry to Bowral Brick Plant are not approved for b-doubles:

- Berrima Road north of Taylor Avenue, New Berrima.
- Lyell Avenue between Mittagong Road and Kirkham Road, Bowral.
- Kirkham, Oxley Hill Road and Kiama Streets, Bowral.
- Oxley Hills Road, Bowral and
- Kiama Street, Bowral.

Berrima Road north of Taylor has a 10t load limit restriction imposed by Council. This restriction is most likely imposed to restrict heavy vehicle through traffic travelling through Berrima residential streets and requires use of Taylor Avenue and Old Hume Highway route in lieu.

There is no legal requirement to alter the 10t load limit if approval is granted for the proposal as trucks greater than 10t can use load limited roads provided that they have a legitimate destination and they travel to that destination on the most direct route.

4. HEAVY VEHICLE ROUTE ASSESSMENT

The key criteria in assessing heavy vehicle routes are road width and the ability for the prescribed vehicles to undertake required turns at intersections.

As the majority of the route in question is approved for B-doubles, these sections have not been assessed in detail for road widths. However, all intersections along the proposed routes have been assessed for their adequacy to cater for articulated vehicles up to 19m. This size vehicle is the maximum vehicle size proposed to be used on the proposed haulage route from Berrima to Bowral and is also the maximum permitted on the local roads at each end of the RTA approved routes. The following intersection review is in the order that laden heavy vehicles would travel from the site to Bowral Brick works, however, the reverse (or unladen direction is also reviewed).

Intersection of site access road and Berrima Road, New Berrima

A detailed survey of site access gate to determine suitability is required, however, it is likely that articulated vehicles will not be able to be catered for under the present gate arrangement. In addition the present arrangement does not allow two heavy vehicles to pass simultaneously. Whilst the probability of this occurring is low, (given the low heavy vehicle trips) the speed limit along Berrima Road is 90 km/h and approaching vehicle speeds are high and any heavy vehicle stopping or reversing on Berrima Road is a safety concern.

Existing gate into “Mandurama” from Berrima Road

Intersection of Berrima Road and Taylor Avenue, New Berrima

This intersection is extremely generous in widths and heavy vehicles will have no trouble negotiating any turn at this intersection.

Council officers advised that they already have concerns over the existing intersection treatment at the Berrima Road and Taylor Avenue intersection (currently give way). This intersection is immediately south of the subject site access road and all of the truck traffic generated by the proposal will be required to turn at this intersection. Currently this intersection is a very wide open layout which does encourage corner cutting. Council indicated that they may seek contributions from any development which added additional traffic through this intersection. Council's thoughts are that the intersection may need median island treatment to reinforce the priority and eliminate/reduce corner cutting.

View looking north along Berrima Road at Taylor Avenue

Intersection of Taylor Avenue, Old Hume Highway and Medway Road, New Berrima

The construction of a major roundabout at this intersection included the realignment of Medway Road to create a cross intersection. This intersection is already 26m B-double approved and Council officers advised that the design of the roundabout included catering for B-triples.

Intersection of Medway Road and Hume Highway, on and off ramps

These ramps have been designed to cater for all vehicles and inspections revealed no issues.

Intersection of Hume Highway and Old Hume Highway on and off ramps

These ramps have been designed to cater for all vehicles and inspections revealed no issues.

Intersection of Old Hume Highway with Lyell Street and Cavendish Street, Mittagong

Whilst both Lyell and Cavendish Streets are 26m B-double approved routes and controlled by 'Give Way' signposting, it is suggested that heavy vehicles travelling to/from Bowral Brick Works from the subject site will utilise Cavendish Street for the following reasons:

1. Lyell Street has a 40 km/h school zone and parking is permitted on both sides.
2. Cavendish Street is more direct and parking is restricted to one side of the road.

Notwithstanding, both intersections were inspected and whilst some minor damage is occurring on the south western corners of both intersections, the visible damage was minimal and is unlikely to be the result of vehicles not being able to undertake the left turn onto the highway.

Looking north along Cavendish Street towards Old Hume Highway

Minor damage to kerb and grassed footpath on south western corner Cavendish Street towards Old Hume Highway

Looking north along Lyell Street towards Old Hume Highway

Minor damage to kerb and grassed footpath on south western corner Lyell Street towards Old Hume Highway

Intersection of Old Bowral Road and Mittagong Road (The Highland Way), Mittagong

This intersection is signalised and inspections revealed no issues.

Intersection of Mittagong Road (The Highland Way) and Lyell Street railway over bridge

This intersection is controlled by a line marked seagull intersection treatment with ample turning width for heavy vehicles turning paths.

View from Mittagong Road south towards Lyell Street

Intersection of Wingecarribee Street railway over bridge and Kirkham Road

This intersection is controlled by 'Stop' signposting giving priority to traffic on the bridge. No issues associated with heavy vehicles proceeding straight through this intersection.

Looking north along Kirkham Street towards railway overbridge

Intersection of Oxley Hill Road and Kirkham Road

Heavy vehicles are constantly undertaking turns at this intersection. There are no issues associated with heavy vehicles turning at this intersection.

Intersection of Oxley Hill Road and Kiama Street

Heavy vehicles are constantly undertaking turns at this intersection. There are no issues associated with heavy vehicles turning at this intersection.

4. CONCLUSIONS AND RECOMMENDATION

The results of the assessment of the proposed heavy vehicle route from the New Berrima Clay/Shale Project to/from the Bowral Brick Plant has revealed that the majority of the route is existing RTA approved B-double route. The proposal is to operate vehicles up to and including 19m articulated vehicles only between the two sites and our assessment has not identified any impediments to these vehicles operating on the proposed route nor any improvements required to existing infrastructure.

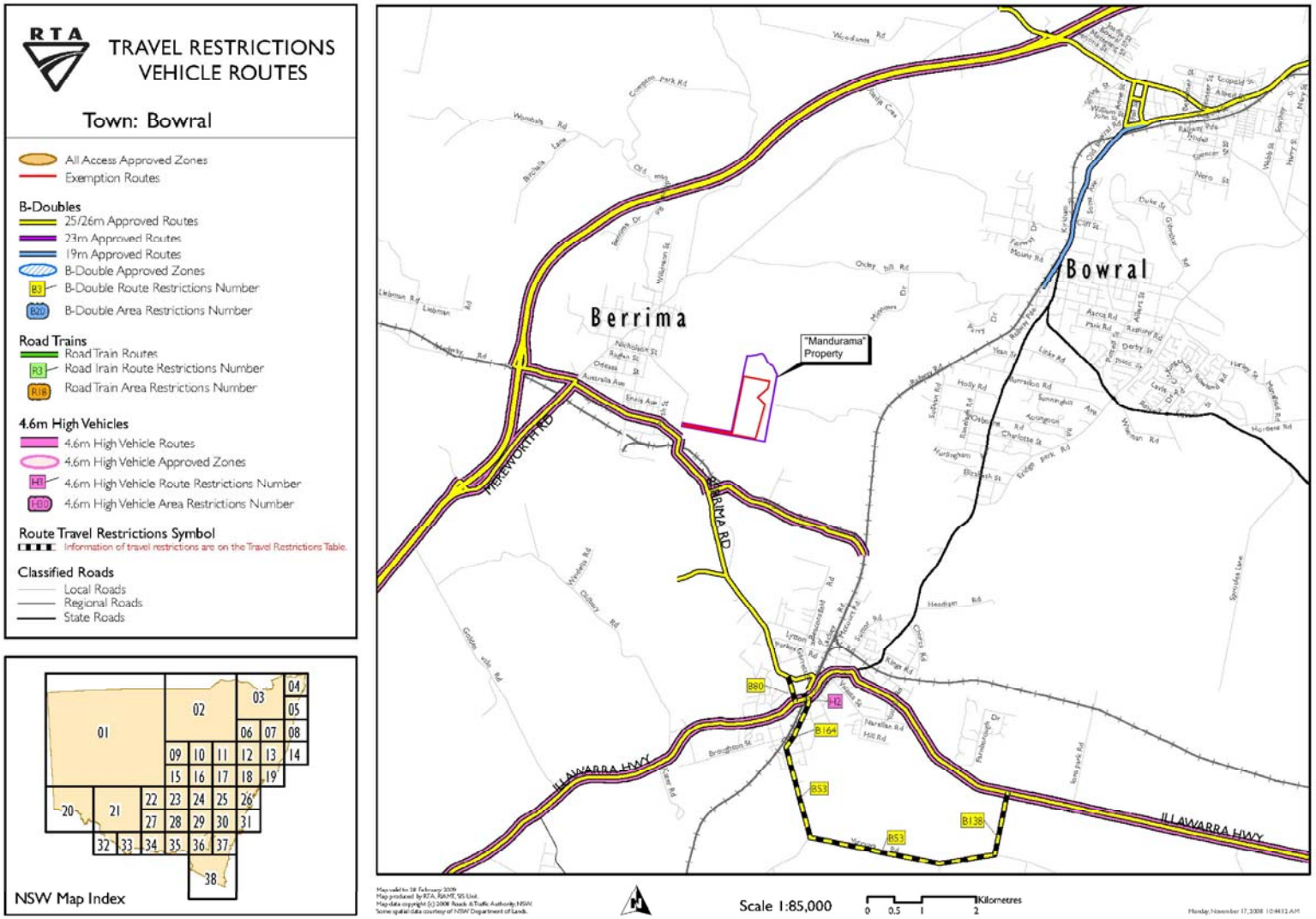
However, it is recommended that the heavy vehicles travelling between the new Berrima Clay/Shale Project and Bowral Brick Plant use Cavendish Street not Lyell Street at Mittagong for the following reasons:

1. Lyell Street has a 40 km/h school zone and parking permitted on both sides.
2. Cavendish Street is more direct and parking is restricted to one side of the road.

This page has been intentionally left blank

APPENDIX A – RTA APPROVED B-DOUBLE ROUTE PLAN

This page has been intentionally left blank


RTA
TRAVEL RESTRICTIONS
VEHICLE ROUTES
Town: Bowral
All Access Approved Zones
Exemption Routes
B-Doubles
25/26m Approved Routes
23m Approved Routes
19m Approved Routes
B-Double Approved Zones
B-Double Route Restrictions Number
B-Double Area Restrictions Number
Road Trains
Road Train Routes
Road Train Route Restrictions Number
Road Train Area Restrictions Number
4.6m High Vehicles
4.6m High Vehicle Routes
4.6m High Vehicle Approved Zones
4.6m High Vehicle Route Restrictions Number
4.6m High Vehicle Area Restrictions Number
Route Travel Restrictions Symbol
Information of travel restrictions are on the Travel Restrictions Table.
Classified Roads
Local Roads
Regional Roads
State Roads
NSW Map Index
Berrima
Bowral
"Mandurama" Property
MERIDIAN RD
BERRIMA RD
ILLAWARRA HWY
Scale 1:85,000
Kilometres

This page has been intentionally left blank