PROPOSED REZONING FOR RESIDENTIAL SUBDIVISION

BUNDEENA ROAD AND BOTTLE BRUSH DRIVE, GLENNING VALLEY

Assessment of Road and Traffic Implications

February 2011

Reference 10107

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1. INTRODUCTION

This report has been prepared as part of the "Gateway" process for a proposed rezoning of land in Glenning Valley to permit residential subdivision (Fig 1). The "Lakes" area on the Central Coast is experiencing significant urban development due to its natural attributes and proximity to the Gosford and Wyong Regional centres.

The subject site is adjoined by existing residential subdivisions in the northern part of the Glenning Valley with convenient access to the arterial road system and bus services as well as the railway stations at Wyong and Ourimbah. The proposed rezoning would permit a subdivision of some 400 lots with access road systems connecting to Bundeena Road and Bottlebrush Drive.

The purpose of this report is to:

* describe the site and the envisaged subdivision subject to the rezoning
* provide an assessment of the envisaged road geometry and road network access.
* provide an assessment of the potential traffic implications of subdivision development
* provide an assessment of potential implications for walking, cycling and public transport services

LEGEND

LOCATION

FIG 1

2. PROPOSED DEVELOPMENT SCHEME

2.1 SITE, CONTEXT AND EXISTING USE

The site (Figure 2) is a consolidation of 5 lots occupying a total area of 50.065ha being:

Lot 2 in DP1100181
Lot 455 in DP786675
Lot 4 in DP1078468
Lot 21 in DP740435
Lot 22 in DP740435
Lot 511 in DP 205919
Lot 413 in 500951
Pt Lot 413 in DP 868340
Pt Lot 414 in DP 868340
Pt Lot 52 in DP 1039187
Pt Lot 1111 in DP 1143167
Pt Lot 1112 in DP 1143167

The site consists of open grassland with areas of forestation and there is a depression through the centre which facilitates drainage. The site has an extensive frontage to Bottlebrush Drive and lesser frontages to Berkeley Road, Bundeena Road and Torrellia Way.

The adjoining and surrounding uses comprise:

* an industrial subdivision in the northern part with adjacent Public Reserve
* residential subdivision in the north eastern part
* residential lots along Bottlebrush Drive and Bundeena Road
* rural properties along the western part

The small Berkeley Park Vale Centre is located just to the north east while there are large industrial uses to the north of Enterprise Drive and a number of nearby schools, educational facilities and aged persons accommodation.

LEGEND

N

SITE

FIG 2

2.2 PROPOSED REZONING

The envisaged subdivisions will occupy the north-eastern and north-western parts of the site having regard to the central forested gully area and buffers to the adjoining industrial land and Public Reserve along the northern boundary.
The two subdivision areas will not have road connection and will be separately accessed with:

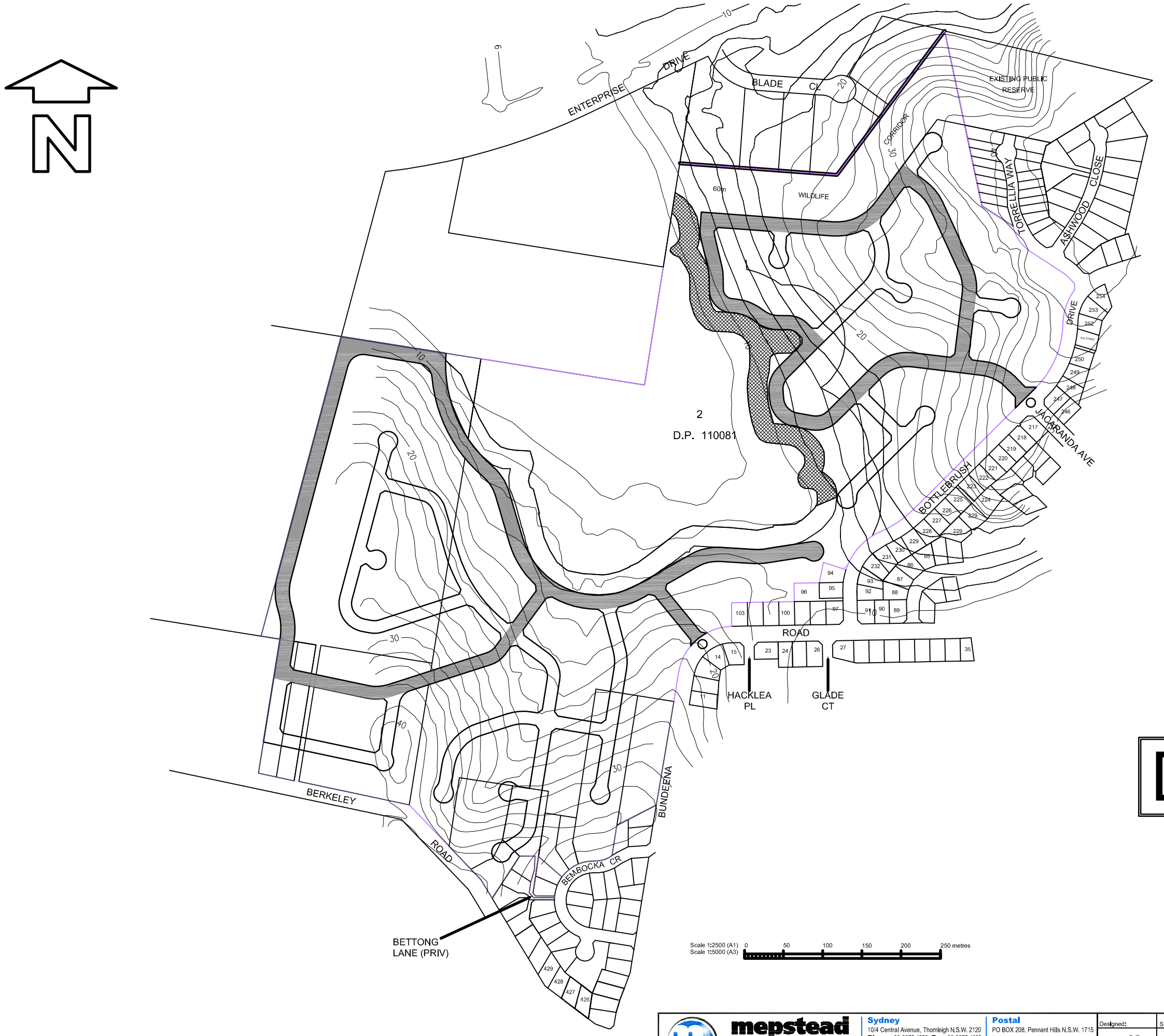
- the north-eastern part having road connection to Bottlebrush Drive opposite Jacaranda Avenue

- the south-western part having road connection to Bundeena Road on the bend just to the west of Bottlebrush Drive

- a shared pedestrian/cycle network connecting through the site and the external network.

The north-eastern section will yield some 150 lots while the south-western section will yield some 250 lots. The subdivision road systems will reflect a traditional curvilinear alignment with numerous cul-de-sacs responding to the contours of the land and boundary circumstances.

Details of the proposal are provided on the plan prepared by Mepstead Associates which is reproduced overleaf.



DRAFT

mepstead & ASSOCIATES
REGISTERED SURVEYORS AND DEVELOPMENT CONSULTANTS
Sydney
10/4 Central Avenue, Thornleigh N.S.W. 2120
Phone 02 9875 4500 **Fax** 02 9875 4833
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PO BOX 208, Pennant Hills N.S.W. 1715
Internet
mepstead@mepstead.com.au
www.mepstead.com.au

Designed:	Scale: 1:2500	Principal:	Drg. No. 3740-FIG.7
Drawn: B.E.	Datum:	Project: PRELIMINARY ROAD LAYOUT OVER RE-ZONED LAND BUNDEENA RD, GLENNING VALLEY	Sheet No. 1 of 1 sheets
Checked: D.A.M.	Date: 05/11/2010		Our Ref: 3740
L.G.A: WYONG	A1		

3. ROAD NETWORK AND TRAFFIC CONDITIONS

3.1 ROAD NETWORK

The road network serving the site (Figure 3) is framed around the north-south interstate routes of the F3 Freeway and Pacific Highway and the constraints presented by the Main Northern Railway Line, Tuggerah Lake and the Wyong River. The network comprises:

- *F3 Freeway* – a principal arterial route which runs to the west of Wyong connecting between Sydney and New England Highway at Hexham

- *Pacific Highway* – a arterial route which runs along the western side of the railway line in connecting between Gosford and Newcastle through Wyong

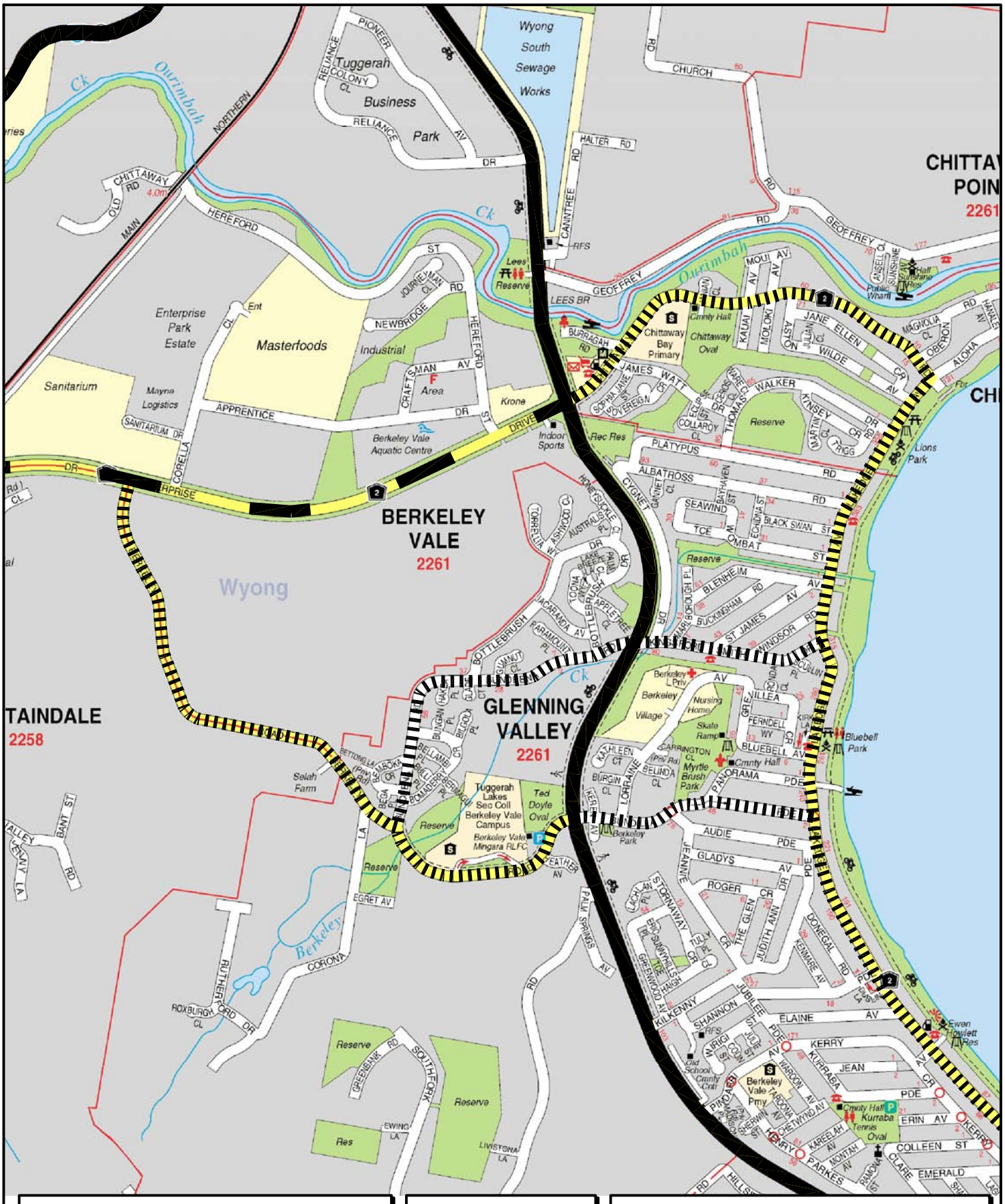
- *Wyong Road* – a sub-arterial route which connects between the F3 interchange and The Entrance intersecting with the Highway at Tuggerah

- *Enterprise Drive* – a sub-arterial road linking between the Pacific Highway at Ourimbah and Chittaway Bay

- *Berkeley Road* – a collector route connecting between Enterprise Drive and Wyong Road

- *Bundeena Road* – a minor collector route connecting between Berkeley Road and Wyong Road

- *Bottlebrush Drive* – an access circuit connecting the northern part of Glenning Valley



LEGEND

- ARTERIAL
- SUB-ARTERIAL
- COLLECTOR

ROAD NETWORK

FIG 3

3.2 ROAD GEOMETRY

The external road system of Bundeena Road and Bottlebrush Drive has a somewhat curvilinear alignment with some minor undulations. Both roads are some 13m wide with kerb and gutter both sides. Berkeley Road has a similar road geometry along its central and southern part but narrows to a 2 lane rural road into northern part.

3.3 TRAFFIC CONTROLS

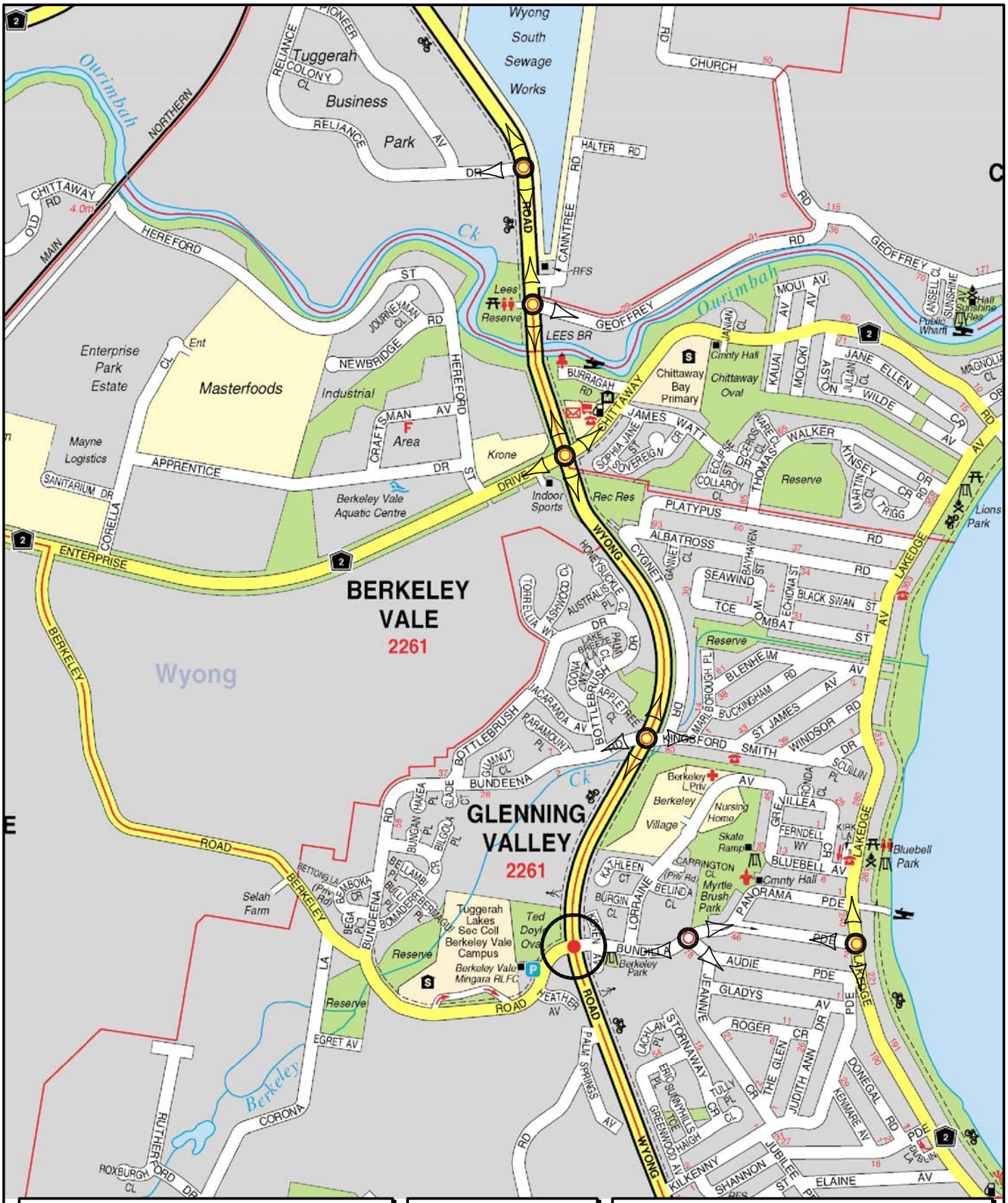
The traffic controls on the road system in the vicinity of the site (Figure 4) comprise:

* the roundabout at the intersection of Wyong Road / Enterprise Drive
* the roundabout at the intersection of Wyong Road and Bundeena Road
* the traffic control signal at the intersection of Wyong Road / Berkeley Road
* the 50 kph on the collector/local road system and 70 kph on the northern part of Berkeley Road
* the “seagull” treatment at the Enterprise Drive/Berkeley Road intersection
* the GIVE WAY control on the northern arm of Berkeley Road at the Bundeena Road intersection

3.4 TRAFFIC CONDITIONS

An indication of the prevailing traffic conditions on the road system serving the site is provided by 7 day Average Daily Traffic as follows:

Wyong Road N of Enterprise Drive	35,266
Enterprise Drive W of Wyong Road	11,000 (est)



LEGEND

TRAFFIC CONTROLS

FIG 4

Traffic surveys have been undertaken at a number of intersections on the road system serving the site. The results of the surveys are summarised in the following:

		AM	PM
Enterprise Drive	EB	362	568
	RT	92	326
	WB	326	312
	LT	45	30
Berkeley Road	RT	73	16
	LT	502	146
Berkeley Road	EB	78	367
	LT	12	59
	WB	574	183
	RT	27	50
Bundeena Road	RT	55	29
	LT	36	23
Bundeena Road	EB	49	53
	LT	7	15
	WB	86	60
	RT	3	7
Bottlebrush Drive	RT	25	6
(West)	LT	1	6
Bundeena Road	EB	73	54
	LT	-	8
	WB	47	85
	RT	43	73
Bottlebrush Drive	RT	12	1
(East)	LT	63	44

Wyong Road	NB	1592	776
	RT	5	3
	LT	29	29
	SB	596	1660
	RT	17	96
	LT	13	75
Bundeena Road	EB	8	17
	RT	21	25
	LT	92	71
Kingsford Smith Drive	WB	90	40
	RT	31	45
	LT	28	21

The operational performance of these intersections has been assessed using SIDRA and the results are provided in Appendix B and summarised in the following while the criteria for interpreting SIDRA results is provided overleaf.

	AM			PM		
	LOS	**DS**	**AVD**	**LOS**	**DS**	**AVD**
Berkeley/Enterprise	A-B	0.346	10.1	A-D	0.335	7.5
Berkeley/Bundeena W	A	0.049	2.1	A	0.038	2.1
Berkeley/Bundeena E	A	0.078	4.4	A	0.103	4.2
Wyong/Bundeena	A	0.618	5.6	A	0.623	5.6
Berkeley/Bundeena	A	0.340	8.6	A-B	0.640	11.3

3.5 TRANSPORT SERVICES, PEDESTRIAN & CYCLISTS TRANSPORT SERVICES

Bus services in the area are provided by Red Bus Services with three routes which operate along Bundeena Road and one service along Wyong Road as follows:

Route 14 – Wyong to Tuggerah Station (Bundeena Road)
Route 15 – Bay Village to Tuggerah Station (Wyong Road)
Route 24 – The Entrance to Wyong Hospital (Bundeena Road)
Route 25 – The Entrance to Wyong Plaza (Bottlebrush Drive)

Details of their services are provided in Appendix B and bus stops are located on both Bundeena Road and Bottlebrush Drive but without bus shelters. Their service provider has advised that the existing bus services are not heavily utilised and if extra capacity were required more frequent services could be introduced responding to demand created by additional housing in the area.

3.6 FUTURE CIRCUMSTANCES

The only future circumstance relevant to “traffic issues” in the planning assessment being undertaken by Council to upgrade intersections along the Wyong Road route.

Criteria for Interpreting Results of SIDRA Analysis

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good	Good
'B'	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
'C'	Satisfactory	Satisfactory but accident study required
'D'	Operating near capacity	Near capacity and accident study required
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
'F'	Unsatisfactory and requires additional capacity	Unsatisfactory and requires other control mode

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

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

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by **traffic signals**[1] both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

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[1] *the values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs*

4. ENVISAGED SUBDIVISION ROAD SYSTEM

4.1 ROAD SYSTEM

The envisaged road system will adopt the design requirements of Councils DCP criteria and will reflect the nature of the other existing subdivisions in the area. The new subdivision roads will be curvilinear in alignment with numerous cul-de-sacs and roundabout control at cross intersections.

4.2 ACCESS CONNECTIONS

The proposed access connections on Bundeena Road and Bottlebrush Drive will incorporate mini-roundabout treatments. These intersections will be located where there are suitable sight distances available and the roundabout treatments will act to constrain vehicle speeds and assist pedestrian and cyclist crossings.

4.3 TRAFFIC MANAGEMENT AND SAFETY

The layout of the subdivision road continues the adopted principles of:

- slight curvilinear alignment
- discontinuity (some with cul-de-sacs)
- relatively limited ‘straight line’ travel and vehicle speeds.

The combination of these measures will achieve the objective of 30 - 40 kmph vehicle speed constraint as specified in the RTA Development Guidelines Section 7.2. At the same time the road system and its traffic management will facilitate the movement of service vehicles.

5. TRAFFIC IMPLICATIONS

There are a total of 202 existing occupied dwellings access by Bottlebrush Drive and the traffic surveys undertaken during the morning and afternoon peak periods recorded the various access movements. This data provides the following details:

Traffic Generation per dwelling:

AM – 0.76 vtph

PM – 0.79 vtph

	AM	**PM**
IN FROM EAST	30%	50%
IN FROM WEST	4.5%	14.3%
OUT TO EAST	41.5%	31.4%
OUT TO WEST	24%	4.3%

Application of this criteria to the separate 250 and 150 lot areas the following access vehicle movements:

	Western Intersection			Eastern Intersection	
	AM	PM		AM	PM
RT IN	57	99	RT IN	34	59
LT IN	9	28	LT IN	5	17
RT OUT	46	8	RT OUT	28	5
LT OUT	79	62	LT OUT	47	37

The majority of generated vehicle movements will access the arterial road system through the Wyong Road/Bundeena Road intersection. Lesser movements will occur through the Wyong Road/Berkeley Road intersection (traffic signal control) and through the Enterprise Drive/Berkeley Road intersection (seagull island control).

The operational performance of the Wyong Road/Bundeena Road/Kingsford Smith Drive intersection with the additional movements generated by the developed subdivision has been assessed using SIDRA. The results of that assessment are provided in Appendix C and summarised in the following:

	AM	**PM**
LOS	A	A
DS	0.657	0.687
AVD	6.3	6.3

These results indicate that this intersection will continue to operate with a quite satisfactory level of service with some significant space capacity.

The Wyong Road/Berkeley Road and Enterprise Drive Berkeley Road intersections, as well as the intersections along Bundeena Road and Bottlebrush Drive will all operate quite satisfactorily due to the existing/proposed controls, the existing operational performances and the small additional traffic movements.

Environmental Impact

The RTA's Development Guidelines contains criteria in relation to traffic related environmental objectives. That criteria is reproduced in the following:

Road Class	**Road Type**	**Max Speed kmph**	**Max Hourly Volume**
Local	Accessway	25	100
	Street	40	200 goal
			300 maximum
Collector	Street	50	300 goal
			500 maximum

The traffic volume outcome for both the subdivision road system and the adjoining roads will be 'within keeping' of RTA Guidelines. As such there will be no unsatisfactory or inappropriate traffic related environmental outcomes, except that traffic to/from the northern subdivision would be divided along the short by steep

section of Jacaranda Avenue connecting between the eastern and western sections of Bottlebrush Drive. It would be more appropriate for this traffic to travel along Bottlebrush Drive being a minor collector road with more gentle grades.

It would be necessary to apply traffic movement restrictions to the northern end of Jacaranda Avenue and this could involve:

* no egress
* ingress for service and emergency vehicles only.

6. TRANSPORT SERVICES, PEDESTRIANS AND CYCLISTS

Transport Services

There are convenient existing bus services which run along Bundeena Road and Bottlebrush Drive although:

* these services have limited frequency

* the bus stops do not have shelters and could have improved access provisions

* the provision of a Stop adjacent to the new southern access intersection would be beneficial.

The increased patronage for the bus services generated by the additional houses in the envisaged subdivision would assist in supporting the existing services and to encourage more frequent services. It would be anticipated that correct conditions for the subdivision would require:

* provision of bus shelters
* provision of appropriate lighting and paved access
* review of existing bus stop locations.

Pedestrians and Cyclists

It is envisaged that there would be an internal shared pedestrian/cyclist network which would link between and through the two subdivision areas. It is envisaged that this internal network would be connected to the existing external facilities along Berkeley Road and Wyong Road.

7. SERVICING

The proposed access road systems will facilitate the movements of service vehicles and particularly garbage removal being designed to accord with Councils DCP criteria.

The road width and intersection arrangements will accommodate the movements of 'large rigid trucks' including Fire Brigade vehicles.

8. CONCLUSION

The assessment provided in this report has concluded that the development of subdivisions subject to the proposed rezoning scheme will:

* not have any adverse traffic capacity, safety or environmental related implications

* suitably provide for transport services, pedestrians, cyclists or service vehicles

* not present any access or circulation difficulties for resident motorists.

APPENDIX A

TRAFFIC SURVEYS

R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : T.T.P.A

Job No/Name : 3298 BERKELY VALE Samples Count

Day/Date : Monday 20th September 2010

AM

All Vehicles	WEST		NORTH		EAST		
	Bundeena Rd		*Bottlebrush Dr West*		*Budeena Rd*		
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**TOTAL**
0700 - 0715	1	8	2	1	6	0	18
0715 - 0730	1	9	7	0	7	0	24
0800 - 0815	3	11	5	0	40	1	60
0815 - 0830	2	21	11	0	33	2	69
Period End	**7**	**49**	**25**	**1**	**86**	**3**	**171**

All Vehicles	WEST		NORTH		EAST		
	Bundeena Rd		*Bottlebrush Dr East*		*Budeena Rd*		
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**TOTAL**
0730 - 0745	0	23	2	17	10	10	62
0745 - 0800	0	19	4	14	14	7	58
0830 - 0845	0	12	6	19	13	13	63
0845 - 0900	0	19	0	13	10	13	55
Period End	**0**	**73**	**12**	**63**	**47**	**43**	**238**

PM

All Vehicles	WEST		NORTH		EAST		
	Bundeena Rd		*Bottlebrush Dr West*		*Budeena Rd*		
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**TOTAL**
1500 - 1515	1	9	2	1	19	1	33
1515 - 1530	3	12	2	0	11	3	31
1600 - 1615	3	11	1	3	16	4	38
1615 - 1630	4	15	2	1	18	1	41
1700 - 1715	5	12	1	0	14	1	33
1715 - 1730	3	15	2	2	12	1	35
Period End	**19**	**74**	**10**	**7**	**90**	**11**	**211**

All Vehicles	WEST		NORTH		EAST		
	Bundeena Rd		*Bottlebrush Dr East*		*Budeena Rd*		
Time Per	**L**	**T**	**R**	**L**	**T**	**R**	**TOTAL**
1530 - 1545	1	15	0	8	23	14	61
1545 - 1600	0	12	0	13	26	11	62
1630 - 1645	3	18	0	13	20	19	73
1645 - 1700	1	12	0	6	19	19	57
1730 - 1745	3	14	1	15	26	22	81
1745 - 1800	1	10	0	10	20	13	54
Period End	**9**	**81**	**1**	**65**	**134**	**98**	**388**

** Note : House Occupied : 202 houses*

APPENDIX B

BUS SERVICES

Red Bus Services Bus Route Map

Red Bus Services

14 Wyong to Tuggerah Station via Berkeley Vale, Glenning Valley.

15 Bay Village to Tuggerah Station via Glenning Valley & Berkeley Vale.

16 The Entrance to Tuggerah Station via Long Jetty, Killarney Vale, & Chittaway Bay.

24 The Entrance to Wyong Hospital via Toowoon Bay, Bay Village, Killarney Vale, Glenning Valley, Chittaway Bay, Berkeley Vale, Tuggerah, Mardi and Wyong.

25 The Entrance to Wyong Plaza via Toowoon Bay, Bay Village, Eastern Road, Mingara Recreation Club, Berkeley Vale, Glenning Vale, Tuggerah and Mardi.

26 The Entrance to Wyong Hospital via Toowoon Bay, Bay Village, Killarney Vale, Berkeley Vale, Chittaway Bay, Tuggerah and Wyong.

27 Chittaway Point to Wyong via Tuggerah.

30 Tacoma South to Wyong Loop via South Tacoma Road.

Additional Services operate to The Entrance. Please refer to the Bay Village Timetable for further details.

Additional Services operate in the Bay Village & The Entrance areas. Please refer to the Bay Village Timetable & Gosford to The Entrance Time table for further details.

Map Legend

- Hospitals
- Shopping Centres
- Railway Station
- Schools
- Bus Routes
- 25 Bus Route Number
- 25 Bus Route Terminus
- (A) Timing Point - See Timetable

See other side → for Timetables for Bus Routes 24, 25, 26 & 27.

Connecting Bus Services at Wyong Station

- Mardi
- Tuggerah
- South Tacoma
- Chittaway
- Berkeley Vale
- Glenning Valley
- Tumbi Umbi
- Killarney Vale
- Bay Village
- Bateau Bay
- Shelly Beach
- Long Jetty
- Toowoon Bay
- Blue Bay
- The Entrance
- North Entrance
- Kangy Angy
- Ourimbah

For details please call **Red Bus Services** on (02) 4332 8655 or visit www.redbus.com.au

- Watanobbi
- Kanwal
- Lake Haven
- Toukley
- Budgewoi
- San Remo
- Bluehaven
- Lake Munmorah
- Chain Valley Bay
- Summerland Pt
- Gwandalan

For details please call **Busways** on (02) 4392 6666 or visit www.busways.com.au

- Jilliby
- Wamervale
- Wyee
- Dooralong

For details please call **Coastal Liner Coaches** on (02) 4392 3050

Street Legend
1. Kingsford Smith Dr
2. Albatross Rd
3. Thomas Walker Dr

Wyong Hospital · Wyong Hospital · Kanwal · Craigie Park · Kanwal Oval · Watanobbi · Wadalba · Pacific Hwy · Wyong Golf Course · Wyong Regional Sports Complex · Wyong · Wyong Racecourse & Showground · Alison Rd · Wyong Plaza · Porter St · Wyong Railway Stn · Wyong Railway Station · Mardi · Tacoma · South Tacoma Rd · Wyong River · Tacoma South · Woodbury Park Dr · Johnson Rd · Tuggerah · Tuggerah Railway Station · Wyong Rd · Bryant Dr · Lake Rd · Tuggerah Supacentre · Tuggerah Lake · Gavenlock Rd · Westfield Tuggerah Shoppingtown · Church Rd · Chittaway Point · Oberon Rd · Geoffrey Rd · Chittaway Rd · Chittaway Bay · Berkeley Vale · Platypus Rd · Lakedge Ave · Chittaway Point · Pelican Island · Terilbah Island · The Entrance Bus Terminal · Berkeley Rd · Fountaindale · Berkeley Private Hospital · Bundilla Panorama Pde · Berkeley Rd · Jubilee Pde · Glenning Valley · Kerry Cres · Tumbi Creek Rd · Watson Ave · Killarney Vale · The Entrance & Long Jetty Hospital · Long Jetty · Toowoon Bay Rd · Watkins St · Nirvana St · Stella St · Swadling St · Toowoon Bay · Little Bay · Shelly Beach · Grandview St · Lindsay St · The Entrance Rd · Mingara Recreation Club · Northumberland Wy · Roberta St · Tumbi Rd · South St · Robertson Rd · Service Rd · Sherry St · Tumbi Umbi · Eastern Rd · Bay Village Rd · Bay Village · Blue Lagoon

Red Bus Services

Wyong to The Entrance

Buses operate in

The Entrance / Toowoon Bay / Killarney Vale / Glenning Valley / Berkeley Vale / Chittaway Bay / Tuggerah / Mardi / Wyong / Tacoma /

See back for detailed route descriptions

Red Bus Services Route Numbers

24 The Entrance to Wyong Hospital via Toowoon Bay, Bay Village, Killarney Vale, Glenning Valley, Chittaway Bay, Berkeley Vale, Tuggerah, Mardi and Wyong.

25 The Entrance to Wyong Plaza via Toowoon Bay, Bay Village, Eastern Road, Mingara Recreation Club, Berkeley Vale, Glenning Vale, Tuggerah and Mardi.

26 The Entrance to Wyong Hospital via Toowoon Bay, Bay Village, Killarney Vale, Berkeley Vale, Chittaway Bay, Tuggerah and Wyong.

27 Chittaway Point to Wyong via Tuggerah.

30 Tacoma South to Wyong Loop via South Tacoma Road.

Red Bus Services

bus times, fares and information
www.redbus.com.au
or call Transport Infoline on 131 500

Welcome Aboard

This guide details the various bus services operated by Red Bus Services in the Bay Village, Tumbi Umbi, Bateau Bay and The Entrance areas.

Our user friendly buses will enable you to go shopping, to work, to school or social events quickly and comfortably. Simply stand on the side of the road where it is safe for the bus to stop and hail the bus driver as the bus approaches. Where possible, tender the correct fare.

Please move to the back of the bus and make the seats in the front rows of the bus available for elderly or less abled passengers. For the comfort of all our passengers, please do not smoke, eat or drink when traveling.

Separate timetables are available from:
- Wyong to The Entrance Services
- Gosford City Services
- Gosford to The Entrance Services

Copies of timetables and other information about services we operate are available from:
- Our Website
- Onboard all buses
- Our bus depot
- Most local Clubs
- Local Information Centres
- Major Shopping Centres

How to use this timetable

1. Find the two timing points you are located between on the route map.
2. Locate these two timing points on the timetables.
3. Your bus is timetabled to arrive between the times shown for these points. For example, if your street is between (A) and (B) on the map, the bus is timetabled to arrive between the time listed for (A) and the time listed for (B).

Red Bus Services

Red Bus Services Pty Ltd
ABN 44 000 103 524

Address: Oakridge Road, Bateau Bay NSW 2261

Telephone: 02 4332 8655

Facsimile: 02 4332 1512

Email: info@redbus.com.au

Explanations

(for Routes 14, 15 & 16)

(R) Bus operates to Wyong Hospital via Woodbury Pl & Brisbenden, Wyong Station & Wyong Plaza.

See the Central Coast with Red Bus Services

Spend a day travelling the Central Coast! Buses operate frequently on these routes which will allow you to circulate the area from either Gosford, Wyong, Tuggerah or The Entrance. Visit our website for full details on how you can make this fun filled day trip!

Hail & Ride

All services operating outside the central business district operate as Hail & Ride. Simply stand on the side of the road where it is safe for the bus to stop and hail the bus driver as the bus approaches. Many suburban areas have designated bus stops which should be used where available.

Accessible Bus Services

Our fleet of modern low floor air-conditioned city buses are used extensively on our regular services. Please contact our office before making your travel plans to ensure that one of our step-less entry buses is operating on the route you wish to use.

Train Times & Late Trains

Train times shown in this timetable are effective as at 11 October 2009 and are subject to change. Please consult latest CityRail timetables for up to date details.

On Monday to Fridays after 4pm buses will wait a reasonable time for late arriving trains. This may cause some buses to run late when operating to and from a railway station.

14, 15, 16 The Entrance to Wyong via Bay Village, Mingara & Tuggerah

Weekdays (Monday To Friday)

		A	B	E	F	G	I	J	L	M	O	R	T	S	U
		The Entrance Terminal	Central Coast Hwy & Pacific St	Bay Village	Wyong Rd & Scenic Dr	Eastern Rd & Grant St	Wyong Rd & Pioneer Ave	Wyong Rd & Lakedge Ave	Wyong Rd & Mingara Dr	Wyong Rd & Berkeley Rd	Lakedge Ave & Alkaroo Rd	Wyong Rd & Chittaway Rd	Tuggerah Station Eastern Side	Tuggerah Station Western Side	Westfield Tuggerah
15		4.15	4.38	...	4.48	...	...	4.48	...	...	4.53	4.56	5.02	5.07	...
15		...	...	5.13	...	5.19	5.23	...	5.28	...	...	5.27	5.33	5.38	...
14		...	...	...	...	...	...	...	...	5.20	5.21	5.24	5.27	5.33	5.38
16		5.28	5.48	...	5.48	...	...	5.52	...	...	...	5.54	5.57	6.03	6.08
14		...	...	...	...	...	...	...	...	5.50	5.51	5.54	5.57	6.03	6.08
15		...	...	6.13	...	6.19	6.23	...	...	6.20	...	...	6.27	6.33	6.38
14		...	...	...	...	...	...	...	...	6.20	6.21	6.24	6.27	6.33	6.38
14		...	...	...	...	...	...	...	...	6.40	6.44	6.47	6.50	6.56	7.05
16		6.42	6.47	...	6.52	...	...	6.58	...	...	...	7.01	7.06	7.12	7.17
16		...	...	7.18	...	7.21	7.26	...	...	7.22	7.23	7.26	7.29	7.36	7.41
16		7.00	7.08	...	7.02	...	...	7.08	...	...	...	7.26	7.30	7.36	7.41
15		...	...	4.33	...	4.32	4.38	...	...	4.40	...	...	4.42	4.49	...
15		...	...	5.20	...	5.24	5.30	...	...	5.32	...	...	5.34	5.41	5.50
16		6.00	6.06	...	6.01	...	...	6.07	...	...	...	6.11	6.14	6.20	6.29

14, 15, 16, Wyong to The Entrance via Tuggerah, Mingara & Bay Village

Weekdays (Monday To Friday)

		U	S	T	R	O	M	L	J	I	Q	F	E	B	A
		Westfield Tuggerah	Tuggerah Station Eastern Side	Wyong Rd & Chittaway Rd Ptn A	Lakedge Ave & Alkaroo Rd	Berkeley Rd & Buckeye Rd	Wyong Rd & Berkeley Rd	Wyong Rd & Mingara Dr	Wyong Rd & Pioneer Ave	Eastern Rd & Scenic Dr	Wyong Rd & South St	Bay Village	Central Coast Hwy & Pacific St	The Entrance Terminal
15		...	5.47	5.51	...	...	5.53	...	...	5.58	6.01	...	6.08	...	...
16		5.09	6.13	6.17	6.20	...	...	6.22	...	...	...	6.31	...	6.36	6.40
15		6.32	6.47	6.51	...	...	6.53	...	...	6.58	7.01	...	7.08	...	...
16		6.54	7.00	7.06	7.08	...	...	7.13	...	...	...	7.22	...	7.27	7.33
14/15		2.00	3.00	3.05	3.08	3.12	3.13	...	...	3.18	3.20	...	3.28	...	...
15		3.54	4.00	4.06	...	...	4.10	...	...	4.12	4.18	...	4.25	...	...
14		3.58	4.00	4.06	4.08	4.12	4.14	...	...	...	...	...	...	...	...
16		4.09	4.54	5.00	5.03	...	...	5.07	...	...	...	5.16	...	5.21	5.27
15		4.39	4.54	5.00	...	...	5.02	...	...	5.04	5.12	...	5.18	...	...
14		4.40	4.54	5.00	5.03	5.07	5.08	...	...	...	...	...	...	...	...
14		5.25	5.31	5.36	5.39	5.42	5.44	...	...	...	...	...	...	...	...
15		5.40	5.14	5.18	...	...	5.21	...	...	5.23	5.27	...	5.34	...	...
14		5.40	5.14	5.18	5.21	5.25	5.25	...	...	...	...	...	...	...	...
16		5.25	6.38	6.42	6.47	...	...	6.52	...	...	...	6.58	...	7.04	7.10
14		6.24	6.52	6.56	6.59	7.03	7.04	...	...	7.30	7.34	...	7.43	7.49	7.56
14/15		7.21	7.16	7.20	7.23	7.27	7.28	...	...	...	...	...	...	...	...

30 Westfield Tuggerah Loop to South Tacoma

Red Bus Services

Weekdays (Monday To Friday)

	U	X	1	X	2	U
	Westfield Tuggerah	Wyong Station	South Tacoma	Wyong Station	Westfield Tuggerah	Westfield Tuggerah
30	...	...	8.15	8.32A	8.50	8.43A
30	12.23	12.32	12.42	12.53	1.26	1.04
30	...	2.50	3.40S	3.50S	...	4.10S
30	...	2.58	3.00H	3.15H	3.30H	3.48

Explanations (for Route 30)

A. For travel to Westfield transfer to route 25 from Wyong Station.
H Bus operates on Public school holidays only.
S Bus operates on school days only.

Route 30 does not operate Saturday, Sunday & Public Holidays.

Red Bus Services Bus Route Map

Red Bus Services

14 Wyong to Tuggerah Station via Berkeley Vale, Glenning Valley.

15 Bay Village to Tuggerah Station via Glenning Valley & Berkeley Vale.

16 The Entrance to Tuggerah Station via Long Jetty, Killarney Vale, & Chittaway Bay.

24 The Entrance to Wyong Hospital via Toowoon Bay, Bay Village, Killarney Vale, Glenning Valley, Chittaway Bay, Berkeley Vale, Tuggerah, Mardi and Wyong.

25 The Entrance to Wyong Plaza via Toowoon Bay, Bay Village, Eastern Road, Mingara Recreation Club, Berkeley Vale, Glenning Vale, Tuggerah and Mardi.

26 The Entrance to Wyong Hospital via Toowoon Bay, Bay Village, Killarney Vale, Berkeley Vale, Chittaway Bay, Tuggerah and Wyong.

27 Chittaway Point to Wyong via Tuggerah.

30 Tacoma South to Wyong Loop via South Tacoma Road.

Map Legend

- Hospitals
- Shopping Centres
- Railway Station
- Schools
- Bus Routes
- 25 Bus Route Number
- Bus Route Terminus
- (A) Timing Point - See Timetable

24, 25, 26 & 27 The Entrance to Wyong via Bay Village, Mingara & Tuggerah

Red Bus Services

Weekdays (Monday To Friday)

Saturday

Sunday & Public Holidays

Explanations

(for table left)

- B For travel to Wyong from Toowoon Bay catch bus up to stop at The Entrance.
- C Catch Coastwide service and transfer to Wyong Bus at Bay Village.
- D Bus departs via Berkeley Vale High School on school days.
- E Bus operates via Tuggerah Business Park via Reliance Dr & Pioneer Ave in lieu of Wyong Rd.
- H Bus operates on public school holidays only.
- P Time shown is for the roundabout at Gwdfrey Rd and Wyong Rd.
- R Journey starts at Toowoon Bay and operates to The Entrance before proceeding to Wyong via Long Jetty.
- S Bus operates on public school days only.
- T Bus operates via Wyong TAFE.
- U Catch Coastwide service and transfer to Wyong Bus at Killarney Vale.

See other side for Route Map and Timetables for Route 30 Service. →

Explanations

(for table right)

- A Journey operates direct along Wyong Rd.
- B On school days only the route 25 service operates via Thomas Walker Dr - transfer at stop opposite The Entrance High for travel to The Entrance.
- C For travel to Long Jetty transfer to Coastwide bus at Bay Village.
- D Transfer at Cherry St for travel to Killarney Vale and Long Jetty.
- E Bus operates via Tuggerah Business Park via Reliance Dr and Pioneer Ave in lieu of Wyong Rd.
- H Bus operates on public school holidays only.
- J Bus terminates at Bay Village. To continue journey transfer to bus from Coastwide at Bay Village.
- N Bus diverts via Killarney Vale Public School on school days only.
- P Time shown is for the roundabout at Gwdfrey Rd and Wyong Rd.
- R Journey operates through Long Jetty to The Entrance and returns through Toowoon Bay.
- S Bus operates on public school days only.
- T Bus operates via Wyong TAFE.
- U For travel to Long Jetty transfer to Coastwide Bus at Killarney Vale.
- V Bus operates through Toowoon Bay and returns through Long Jetty, dropping passengers only.
- X Bus service terminates at The Entrance North.
- Y Bus operates on Thursday nights only.
- Z On school days, for travel to The Entrance catch route 25 service and transfer at Bay Village.
- Ⓢ Bus diverts via St Peters College on School days only.

24, 25, 26 & 27 Wyong to The Entrance via Tuggerah, Mingara & Bay Village

Red Bus Services

Weekdays (Monday To Friday)

Saturday

Sunday & Public Holidays

APPENDIX C

SIDRA RESULTS

MOVEMENT SUMMARY

Site: EX AM

Bundeena Road and Bottlebrush Drive East
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
East: RoadName											
5	T	49	0.0	0.059	0.3	LOS A	0.4	2.5	0.18	0.00	55.9
6	R	45	0.0	0.059	8.7	LOS A	0.4	2.5	0.18	0.80	48.4
Approach		95	0.0	0.059	4.3	LOS A	0.4	2.5	0.18	0.38	52.1
North: RoadName											
7	L	66	0.0	0.078	8.8	LOS A	0.4	2.6	0.19	0.62	48.1
9	R	13	0.0	0.078	9.0	LOS A	0.4	2.6	0.19	0.71	47.9
Approach		79	0.0	0.078	8.8	LOS A	0.4	2.6	0.19	0.63	48.1
West: RoadName											
10	L	1	0.0	0.040	8.2	LOS A	0.0	0.0	0.00	1.08	49.0
11	T	77	0.0	0.040	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		78	0.0	0.040	0.1	LOS A	0.0	0.0	0.00	0.01	59.8
All Vehicles		252	0.0	0.078	4.4	NA	0.4	2.6	0.13	0.35	52.8

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.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: EX PM

Bundeena Road and Bottlebrush Drive East
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
East: RoadName											
5	T	89	0.0	0.103	0.3	LOS A	0.7	4.6	0.17	0.00	56.2
6	R	77	0.0	0.103	8.7	LOS A	0.7	4.6	0.17	0.81	48.4
Approach		166	0.0	0.103	4.2	LOS A	0.7	4.6	0.17	0.37	52.3
North: RoadName											
7	L	46	0.0	0.043	8.5	LOS A	0.2	1.4	0.15	0.62	48.3
9	R	1	0.0	0.042	8.8	LOS A	0.2	1.4	0.15	0.72	48.1
Approach		47	0.0	0.043	8.5	LOS A	0.2	1.4	0.15	0.62	48.3
West: RoadName											
10	L	8	0.0	0.034	8.2	LOS A	0.0	0.0	0.00	1.00	49.0
11	T	57	0.0	0.034	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		65	0.0	0.034	1.1	LOS A	0.0	0.0	0.00	0.13	58.3
All Vehicles		279	0.0	0.103	4.2	NA	0.7	4.6	0.13	0.36	52.8

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.

MOVEMENT SUMMARY

Site: EX AM

Bundeena Road and Bottlebrush Drive West
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
East: RoadName											
5	T	91	0.0	0.049	0.2	LOS A	0.3	2.4	0.17	0.00	56.8
6	R	3	0.0	0.049	8.7	LOS A	0.3	2.4	0.17	1.04	48.8
Approach		94	0.0	0.049	0.5	LOS A	0.3	2.4	0.17	0.04	56.5
North: RoadName											
7	L	1	0.0	0.038	9.5	LOS A	0.2	1.2	0.30	0.55	47.4
9	R	26	0.0	0.037	9.8	LOS A	0.2	1.2	0.30	0.66	47.2
Approach		27	0.0	0.037	9.8	LOS A	0.2	1.2	0.30	0.66	47.2
West: RoadName											
10	L	7	0.0	0.030	8.2	LOS A	0.0	0.0	0.00	1.01	49.0
11	T	52	0.0	0.030	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		59	0.0	0.030	1.0	LOS A	0.0	0.0	0.00	0.13	58.4
All Vehicles		180	0.0	0.049	2.1	NA	0.3	2.4	0.13	0.16	55.4

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 A. LOS Method for individual vehicle movements: Delay (RTA NSW).

Approach LOS values are based on the worst delay for any vehicle movement.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: EX PM

Bundeena Road and Bottlebrush Drive West
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
East: RoadName											
5	T	63	0.0	0.038	0.3	LOS A	0.3	1.8	0.18	0.00	56.4
6	R	7	0.0	0.038	8.7	LOS A	0.3	1.8	0.18	0.98	48.8
Approach		71	0.0	0.038	1.1	LOS A	0.3	1.8	0.18	0.10	55.5
North: RoadName											
7	L	6	0.0	0.014	8.9	LOS A	0.1	0.5	0.20	0.59	48.0
9	R	6	0.0	0.014	9.2	LOS A	0.1	0.5	0.20	0.67	47.9
Approach		13	0.0	0.014	9.0	LOS A	0.1	0.5	0.20	0.63	48.0
West: RoadName											
10	L	16	0.0	0.037	8.2	LOS A	0.0	0.0	0.00	0.95	49.0
11	T	56	0.0	0.037	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		72	0.0	0.037	1.8	LOS A	0.0	0.0	0.00	0.21	57.2
All Vehicles		155	0.0	0.038	2.1	NA	0.3	1.8	0.10	0.20	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 A. LOS Method for individual vehicle movements: Delay (RTA NSW).

Approach LOS values are based on the worst delay for any vehicle movement.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: EX AM

Berkey Road and Bundeena Road
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: RoadName											
1	L	604	0.0	0.340	8.2	LOS A	0.0	0.0	0.00	0.68	49.0
2	T	28	0.0	0.338	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		633	0.0	0.340	7.8	LOS A	0.0	0.0	0.00	0.65	49.4
North: RoadName											
8	T	38	0.0	0.105	4.1	LOS A	0.7	4.7	0.58	0.00	48.3
9	R	58	0.0	0.105	12.5	LOS A	0.7	4.7	0.58	0.91	45.5
Approach		96	0.0	0.105	9.2	LOS A	0.7	4.7	0.58	0.55	46.6
West: RoadName											
10	L	13	0.0	0.194	13.4	LOS A	0.9	6.6	0.56	0.75	43.6
12	R	82	0.0	0.194	13.7	LOS A	0.9	6.6	0.56	0.86	43.5
Approach		95	0.0	0.194	13.7	LOS A	0.9	6.6	0.56	0.85	43.5
All Vehicles		823	0.0	0.340	8.6	NA	0.9	6.6	0.13	0.66	48.3

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.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: EX PM

Berkey Road and Bundeena Road
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: RoadName											
1	L	193	0.0	0.131	8.2	LOS A	0.0	0.0	0.00	0.73	49.0
2	T	53	0.0	0.131	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		245	0.0	0.131	6.4	LOS A	0.0	0.0	0.00	0.57	51.0
North: RoadName											
8	T	24	0.0	0.039	1.0	LOS A	0.2	1.7	0.34	0.00	52.7
9	R	31	0.0	0.039	9.4	LOS A	0.2	1.7	0.34	0.76	48.1
Approach		55	0.0	0.039	5.7	LOS A	0.2	1.7	0.34	0.43	50.0
West: RoadName											
10	L	62	0.0	0.640	14.4	LOS A	8.6	60.3	0.63	0.78	42.7
12	R	386	0.0	0.640	14.7	LOS B	8.6	60.3	0.63	0.91	42.7
Approach		448	0.0	0.640	14.7	LOS B	8.6	60.3	0.63	0.89	42.7
All Vehicles		748	0.0	0.640	11.3	NA	8.6	60.3	0.40	0.75	45.6

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.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: EX AM

Enterprise Drive and Berkeley Road
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: RoadName											
1	L	528	0.0	0.285	7.6	NA[9]	NA[9]	NA[9]	0.00	0.60	49.7
3	R	77	0.0	0.346	27.5	LOS B	1.7	12.2	0.82	1.00	34.1
Approach		605	0.0	0.346	10.1	LOS B	1.7	12.2	0.10	0.65	47.0
East: RoadName											
4	L	47	0.0	0.036	7.9	LOS A	0.2	1.3	0.20	0.56	48.7
5	T	343	0.0	0.176	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		391	0.0	0.176	1.0	LOS A	0.2	1.3	0.02	0.07	58.3
West: RoadName											
11	T	381	0.0	0.195	8.9	LOS A	0.0	0.0	0.00	0.73	48.1
12	R	97	0.0	0.096	9.7	LOS A	0.5	3.3	0.42	0.70	47.1
Approach		478	0.0	0.195	9.1	LOS A	0.5	3.3	0.09	0.72	47.9
All Vehicles		1474	0.0	0.346	7.4	NA	1.7	12.2	0.08	0.52	49.9

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.

9 Continuous movement

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: EX PM

Enterprise Drive and Berkeley Road
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: RoadName											
1	L	154	0.0	0.083	7.6	NA[9]	NA[9]	NA[9]	0.00	0.60	49.8
3	R	17	0.0	0.189	50.8	LOS D	0.7	5.1	0.92	0.98	25.0
Approach		171	0.0	0.190	11.8	LOS D	0.7	5.1	0.09	0.64	45.4
East: RoadName											
4	L	32	0.0	0.031	9.0	LOS A	0.1	1.0	0.40	0.63	47.6
5	T	328	0.0	0.168	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		360	0.0	0.168	0.8	LOS A	0.1	1.0	0.04	0.06	58.6
West: RoadName											
11	T	598	0.0	0.307	8.9	LOS A	0.0	0.0	0.00	0.73	48.1
12	R	343	0.0	0.335	10.2	LOS A	2.1	14.4	0.49	0.75	46.9
Approach		941	0.0	0.335	9.3	LOS A	2.1	14.4	0.18	0.74	47.7
All Vehicles		1472	0.0	0.335	7.5	NA	2.1	14.4	0.13	0.56	49.7

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 D. LOS Method for individual vehicle movements: Delay (RTA NSW).

Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: EX AM

Wyong Road and Bundeena Road
Existing AM Peak
Roundabout

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: Wyong Road											
1	L	31	0.0	0.623	6.4	LOS A	6.3	43.9	0.46	0.56	49.5
2	T	1676	0.0	0.618	5.3	LOS A	6.3	43.9	0.47	0.48	49.9
3	R	5	0.0	0.585	12.2	LOS A	6.2	43.3	0.48	0.81	46.8
Approach		1712	0.0	0.618	5.3	LOS A	6.3	43.9	0.47	0.48	49.8
East: Kingsford Smith Drive											
4	L	29	0.0	0.172	7.4	LOS A	0.8	5.8	0.50	0.66	49.0
5	T	95	0.0	0.172	6.5	LOS A	0.8	5.8	0.50	0.58	49.2
6	R	33	0.0	0.172	13.3	LOS A	0.8	5.8	0.50	0.91	45.6
Approach		157	0.0	0.172	8.1	LOS A	0.8	5.8	0.50	0.67	48.3
North: Wyong Road											
7	L	14	0.0	0.217	5.7	LOS A	1.5	10.3	0.14	0.51	51.3
8	T	627	0.0	0.216	4.5	LOS A	1.5	10.3	0.14	0.38	52.4
9	R	18	0.0	0.216	11.3	LOS A	1.4	10.1	0.15	0.89	46.7
Approach		659	0.0	0.216	4.7	LOS A	1.5	10.3	0.14	0.40	52.2
West: Bundeena Road											
10	L	97	0.0	0.136	9.4	LOS A	0.9	6.0	0.76	0.83	47.1
11	T	8	0.0	0.062	9.6	LOS A	0.3	2.4	0.74	0.81	46.3
12	R	22	0.0	0.062	16.4	LOS B	0.3	2.4	0.74	0.93	42.7
Approach		127	0.0	0.136	10.7	LOS B	0.9	6.0	0.76	0.85	46.2
All Vehicles		2655	0.0	0.618	5.6	LOS A	6.3	43.9	0.40	0.49	50.1

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

Site: EX PM

Wyong Road and Bundeena Road
Existing PM Peak
Roundabout

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: Wyong Road											
1	L	31	0.0	0.325	6.3	LOS A	2.2	15.7	0.36	0.57	50.0
2	T	817	0.0	0.325	5.1	LOS A	2.2	15.7	0.37	0.47	50.6
3	R	3	0.0	0.316	12.1	LOS A	2.2	15.5	0.38	0.86	46.8
Approach		851	0.0	0.325	5.2	LOS A	2.2	15.7	0.37	0.47	50.6
East: Kingsford Smith Drive											
4	L	22	0.0	0.201	11.3	LOS A	1.1	7.8	0.75	0.87	45.6
5	T	42	0.0	0.201	10.3	LOS A	1.1	7.8	0.75	0.84	45.9
6	R	47	0.0	0.202	17.2	LOS B	1.1	7.8	0.75	0.96	42.5
Approach		112	0.0	0.202	13.4	LOS B	1.1	7.8	0.75	0.90	44.3
North: Wyong Road											
7	L	79	0.0	0.622	5.8	LOS A	7.0	48.7	0.26	0.50	50.5
8	T	1747	0.0	0.623	4.6	LOS A	7.0	48.8	0.28	0.39	51.3
9	R	101	0.0	0.624	11.5	LOS A	7.0	48.8	0.29	0.80	46.6
Approach		1927	0.0	0.623	5.1	LOS A	7.0	48.8	0.28	0.42	51.0
West: Bundeena Road											
10	L	75	0.0	0.073	7.3	LOS A	0.4	2.7	0.54	0.64	48.4
11	T	18	0.0	0.056	6.8	LOS A	0.3	1.9	0.55	0.61	48.4
12	R	26	0.0	0.056	13.6	LOS A	0.3	1.9	0.55	0.84	45.1
Approach		119	0.0	0.073	8.6	LOS A	0.4	2.7	0.54	0.68	47.6
All Vehicles		3008	0.0	0.623	5.6	LOS A	7.0	48.8	0.33	0.46	50.4

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.

SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: PD AM

Wyong Road and Bundeena Road
Post Development AM Peak
Roundabout

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: Wyong Road											
1	L	44	0.0	0.660	6.9	LOS A	6.7	46.7	0.56	0.61	49.0
2	T	1676	0.0	0.657	5.8	LOS A	6.7	46.7	0.57	0.53	49.1
3	R	5	0.0	0.658	12.8	LOS A	6.6	46.4	0.59	0.83	46.5
Approach		1725	0.0	0.657	5.9	LOS A	6.7	46.7	0.57	0.53	49.1
East: Kingsford Smith Drive											
4	L	29	0.0	0.181	7.7	LOS A	0.9	6.3	0.54	0.68	48.8
5	T	95	0.0	0.181	6.7	LOS A	0.9	6.3	0.54	0.61	48.9
6	R	33	0.0	0.181	13.6	LOS A	0.9	6.3	0.54	0.92	45.4
Approach		157	0.0	0.181	8.3	LOS A	0.9	6.3	0.54	0.69	48.1
North: Wyong Road											
7	L	14	0.0	0.253	5.8	LOS A	1.8	12.6	0.23	0.52	50.8
8	T	627	0.0	0.252	4.6	LOS A	1.8	12.6	0.23	0.40	51.6
9	R	85	0.0	0.252	11.5	LOS A	1.8	12.4	0.24	0.81	46.5
Approach		726	0.0	0.252	5.4	LOS A	1.8	12.6	0.23	0.45	50.9
West: Bundeena Road											
10	L	189	0.0	0.282	9.7	LOS A	1.9	13.1	0.81	0.85	46.8
11	T	28	0.0	0.151	9.8	LOS A	0.9	6.0	0.77	0.85	46.3
12	R	42	0.0	0.151	16.6	LOS B	0.9	6.0	0.77	0.96	42.8
Approach		260	0.0	0.282	10.8	LOS B	1.9	13.1	0.80	0.87	46.0
All Vehicles		2868	0.0	0.657	6.3	LOS A	6.7	46.7	0.51	0.55	49.2

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.

MOVEMENT SUMMARY

Site: PD PM

Wyong Road and Bundeena Road
Post Development PM Peak
Roundabout

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: Wyong Road											
1	L	56	0.0	0.372	7.0	LOS A	2.7	18.8	0.49	0.63	49.3
2	T	817	0.0	0.372	5.9	LOS A	2.7	18.8	0.50	0.54	49.6
3	R	3	0.0	0.395	12.8	LOS A	2.6	18.3	0.51	0.88	46.3
Approach		876	0.0	0.372	6.0	LOS A	2.7	18.8	0.50	0.54	49.6
East: Kingsford Smith Drive											
4	L	22	0.0	0.287	12.5	LOS A	1.7	12.0	0.81	0.91	44.7
5	T	67	0.0	0.288	11.5	LOS A	1.7	12.0	0.81	0.89	44.9
6	R	47	0.0	0.287	18.4	LOS B	1.7	12.0	0.81	0.98	41.8
Approach		137	0.0	0.287	14.0	LOS B	1.7	12.0	0.81	0.92	43.7
North: Wyong Road											
7	L	79	0.0	0.686	6.1	LOS A	8.5	59.5	0.40	0.51	49.8
8	T	1747	0.0	0.687	4.9	LOS A	8.5	59.5	0.41	0.43	50.2
9	R	217	0.0	0.686	11.9	LOS A	8.5	59.4	0.43	0.74	46.4
Approach		2043	0.0	0.687	5.7	LOS A	8.5	59.5	0.41	0.46	49.7
West: Bundeena Road											
10	L	148	0.0	0.150	7.4	LOS A	0.8	5.8	0.58	0.65	48.2
11	T	34	0.0	0.102	6.9	LOS A	0.5	3.6	0.59	0.63	48.2
12	R	42	0.0	0.102	13.8	LOS A	0.5	3.6	0.59	0.88	45.0
Approach		224	0.0	0.150	8.6	LOS A	0.8	5.8	0.58	0.69	47.5
All Vehicles		**3280**	**0.0**	**0.687**	**6.3**	**LOS A**	**8.5**	**59.5**	**0.46**	**0.52**	**49.2**

Level of Service (Aver. Int. Delay): LOS A. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.