Old Bar Precinct 3
Traffic and Transport Assessment

- Final
- October 2007

Old Bar Precinct 3
Traffic and Transport Assessment

- Final
- October 2007

Sinclair Knight Merz
ABN 37 001 024 095
100 Christie Street
PO Box 164
St Leonards NSW
Australia 1590
Tel: +61 2 9928 2100
Fax: +61 2 9928 2500
Web: www.skmconsulting.com

Contents

Document history and status

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
R01	28 Aug 2007	A. Burns	A. Burns	28 Aug 2007	Draft
R02	13 Sept 2007	A. Burns	A. Burns	13 Sept 2007	Final
R03	27 Sept 2007	A. Burns	A. Burns	27 Sept 2007	Final - updated masterplan

Distribution of copies

Revision	Copy no	Quantity	Issued to
R01	1	1 x pdf	Shaun Lawer
R02	1	1 x pdf	Shaun Lawer
R03	1	1 x pdf	Shaun Lawer

Printed:	2 October 2007
Last saved:	2 October 2007 04:27 PM
File name:	I:\INFR\Projects\IN90342\Deliverables\IN90342_T117_TIA_R03.doc
Author:	Patricia Tindall
Project manager:	Alastair Burns
Name of organisation:	Greater Taree City Council
Name of project:	Old Bar Precinct 3 Traffic and Transport Assessment
Name of document:	Old Bar Precinct 3 Traffic and Transport Assessment
Document version:	Final
Project number:	IN90342

1. Introduction

Sinclair Knight Merz was commissioned by Greater Taree City Council to review the master plan of a proposed subdivision in the coastal own of Old Bar. Specifically, the study focused on Precinct 3 of the development. The proposed subdivision consists mainly of residential lands, with an anticipated yield of approximately 1020 dwellings.

The purpose of this report is to assess the requirements of the site in terms of road layout and intersection treatments, public transport, cyclist and pedestrian access incorporating previous studies carried out for both Precinct 3 and for the wider Old Bar-Wallabi Point development. The future impact of traffic generated by the proposed development on the existing road network was estimated using the Cube modelling software package.

Following this introductory section the remainder of the report comprises the following format:

- **Section 2** describes the existing road network, traffic conditions and public transport arrangements;
- **Section 3** describes the proposed Precinct 3 development;
- **Section 4** summarises previous studies and investigations;
- **Section 5** describes the traffic forecasting methodology and the results of the network and intersection analysis;
- **Section 6** describes the Precinct 3 road master plan and road hierarchy as well as management measures to control speed and volumes;
- **Section 7** describes the public transport requirements and the needs of pedestrians and cyclists;
- **Section 8** summarises the findings and conclusions of the study;
- **Appendix A** provides a précis of previous investigations;
- **Appendix B** describes the Maunsell Network Model; and
- **Appendix C** contains intersection layouts and lane configurations.

2. Existing Situation

Old Bar is located on the north coast of New South Wales, approximately 13 kilometres from Taree. It is a small coastal community with a population of approximately 4000.

2.1 Existing Road Conditions

The Pacific Highway links Old Bar and Taree to Sydney and Newcastle in the south and to Port Macquarie and Coffs Harbour in the north. The Pacific Highway is two lanes in each direction in the vicinity of Old Bar with a posted speed limit of 110km/hr.

Old Bar Road is the only connecting road between Old Bar, the Pacific Highway and Taree. It consists of one lane in each direction with narrow shoulders with no overtaking lanes provided. Old Bar Road has a posted speed limit of 90km/hr along the majority of its length. On the western approach to Saltwater Road it decreases to 70km/hr. It then reduces to 50km/hr in the vicinity of Wyden Road, on the approach to the Old Bar township.

The interchange of Old Bar Road, Manning River Drive and the Pacific Highway consists of a large roundabout (of between 100 and 130 metres diameter). Currently, the roundabout is one lane on the southern side (from the Old Bar Road approach) and two lanes on the northern side (from the Manning River Drive approach). To the west, two smaller roundabouts exist within 900 metres of the interchange. The close proximity of the three roundabouts means that the operation of one may have an impact on the operation of the remaining two, with the Pacific Highway Interchange having the greatest impact.

Localised widening occurs on the approach to Malcolms Road and Pampoolah Road, with both intersections having designated turn bays. The Saltwater Road and Warwabi Road intersections are both Type BAR (formerly Type A) intersections with shoulder widening. The intersection of Saltwater Road and Old Bar Road is shown in **Figure 2.1**.

- **Figure 2.1: The intersection of Saltwater Road and Old Bar Road, looking west.**

Saltwater Road is a north-south running two-lane two-way road which connects the town of Wallabi Point with Old Bar. It has a posted speed limit of 90km/hr, which reduces to 70km/hr to the north of Forest Lane. Saltwater Road is shown in **Figure 2.2**.

- **Figure 2.2: Looking south along Saltwater Road, from the Old Bar Road intersection.**

Forest Lane runs east-west and connects the southern areas of Old Bar with Saltwater Road. Forest Lane is sealed from Wyden Street in the east to 100 metres west of the Ocean Links estate. From this point to Saltwater Road, Forest Lane is unsealed and winds through a copse of trees. Sight

distances along this stretch of road are restricted due to the sharp bends and dense vegetation. Forest Lane is depicted in **Figure 2.3**.

- **Figure 2.3: Forest Lane, looking east from Wyden Street.**

Wyden Street joins the eastern end of Forest Lane to Old Bar Road and the township of Old Bar, to the north. It is of sufficient width to allow for parking on both verges (see **Figure 2.4**).

- **Figure 2.4: Wyden Street, looking north from Forest Lane.**

George Street, Lewis Street, Hall Street, Pacific Parade, Rose Street and David Street are all local roads on the south eastern side of Old Bar which currently experience very low traffic volumes. George Street and Rose Street (illustrated in **Figure 2.5** and **Figure 2.6**) are typical of roads within Old Bar.

- **Figure 2.5: George Street, looking north from the southern end.**

- **Figure 2.6: Rose Street, looking west towards Precinct 3 and George Street.**

2.2 Existing Traffic Volumes

Traffic surveys were undertaken as part of previous investigations. Analysis of performance concluded that all intersections surrounding the development were operating at an acceptable Level of Service and within capacity (Traffic Engineering Services, 2005; Maunsell, 2006). The roundabout at the Pacific Highway Interchange was noted to experience some congestion during peak periods (Maunsell, 2006).

2.3 Public Transport

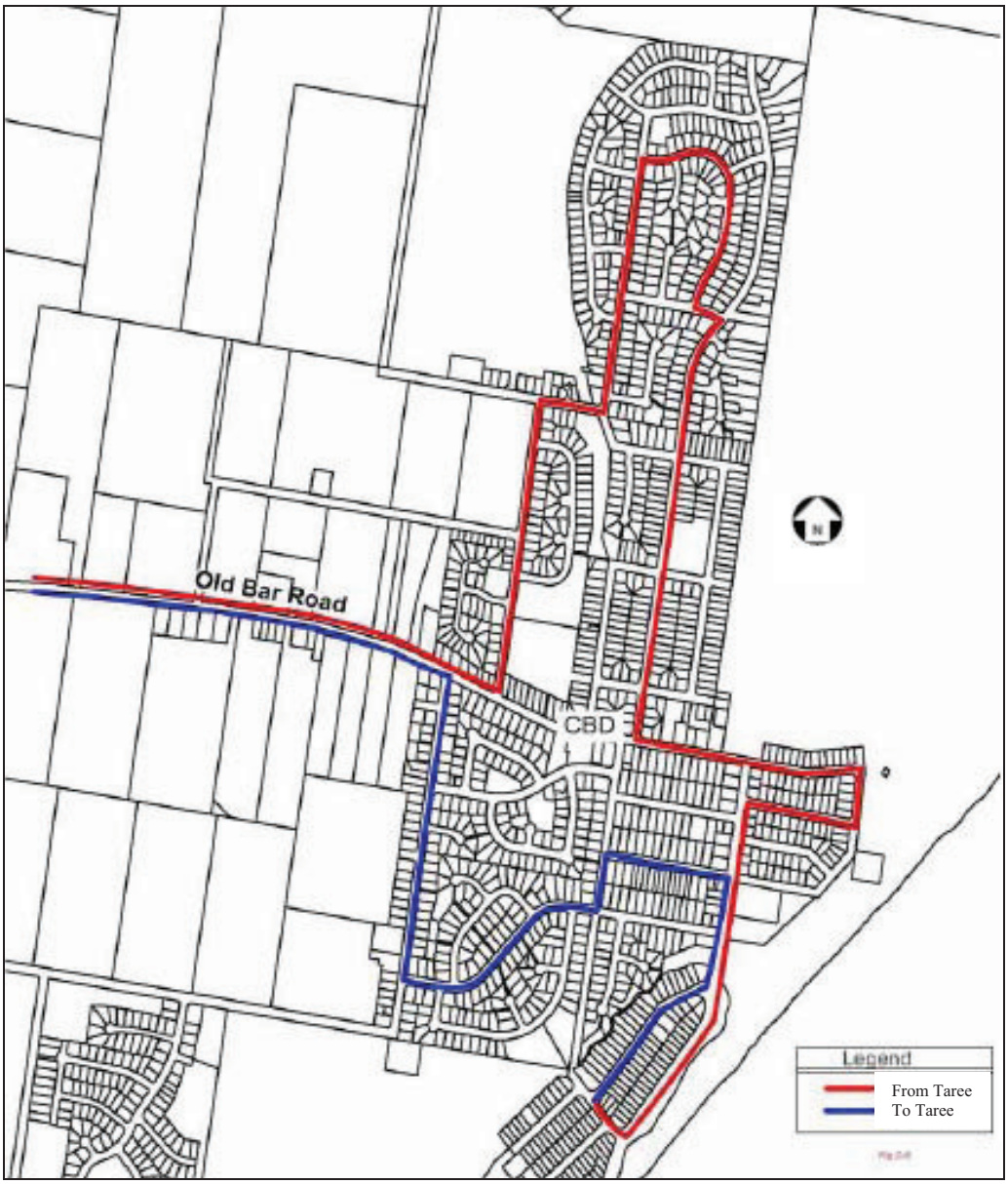
The nearest railway station to Old Bar is located in Taree (13 kilometres to the west of Old Bar), which is part of the NSW Countrylink network. Six trips per direction are scheduled to stop at Taree each day, three of which involve train and bus legs[1]. Trains from Taree travel to Sydney and Newcastle to the south, and Grafton and Brisbane to the north.

Buses linking Old Bar to Taree are operated by Eggins Coaches. There are four scheduled services per day on weekdays, with two services per day operating on school holidays. Buses do not operate on public holidays or weekends[2]. School buses also operate through the area, including two Old Bar School buses and 4 school buses to Taree (Maunsell, 2006). A map of existing bus routes is shown in **Figure 2.7**.

[1] Countrylink (2007). [Online]. Available: www.countrylink.info.com.au (Accessed 07/08/2007).

[2] Eggins Comfort Coaches (2007). [Online]. Available: www.egginscomfortcoaches.con.au (Accessed 07/08/2007).

- **Figure 2.7: Existing bus routes through Old Bar**



Source: Maunsell (2006)[3].

[3] Maunsell Australia (March 2006). Old Bar Precinct 2B Rezoning: Final Traffic Report.

3. Proposed Development

3.1 Old Bar /Wallabi Point

The proposed rezoning of Old Bar is aimed at preventing haphazard development occurring around the existing township, controlling the rate of land release, and ensuring that the type and style of development is in accordance with the values of local residents and Council.

The rezoning is planned to occur in 5 stages:

- Stage 1;
- Stage 2A;
- Stage 2B;
- Stage 3; and
- Stage 4.

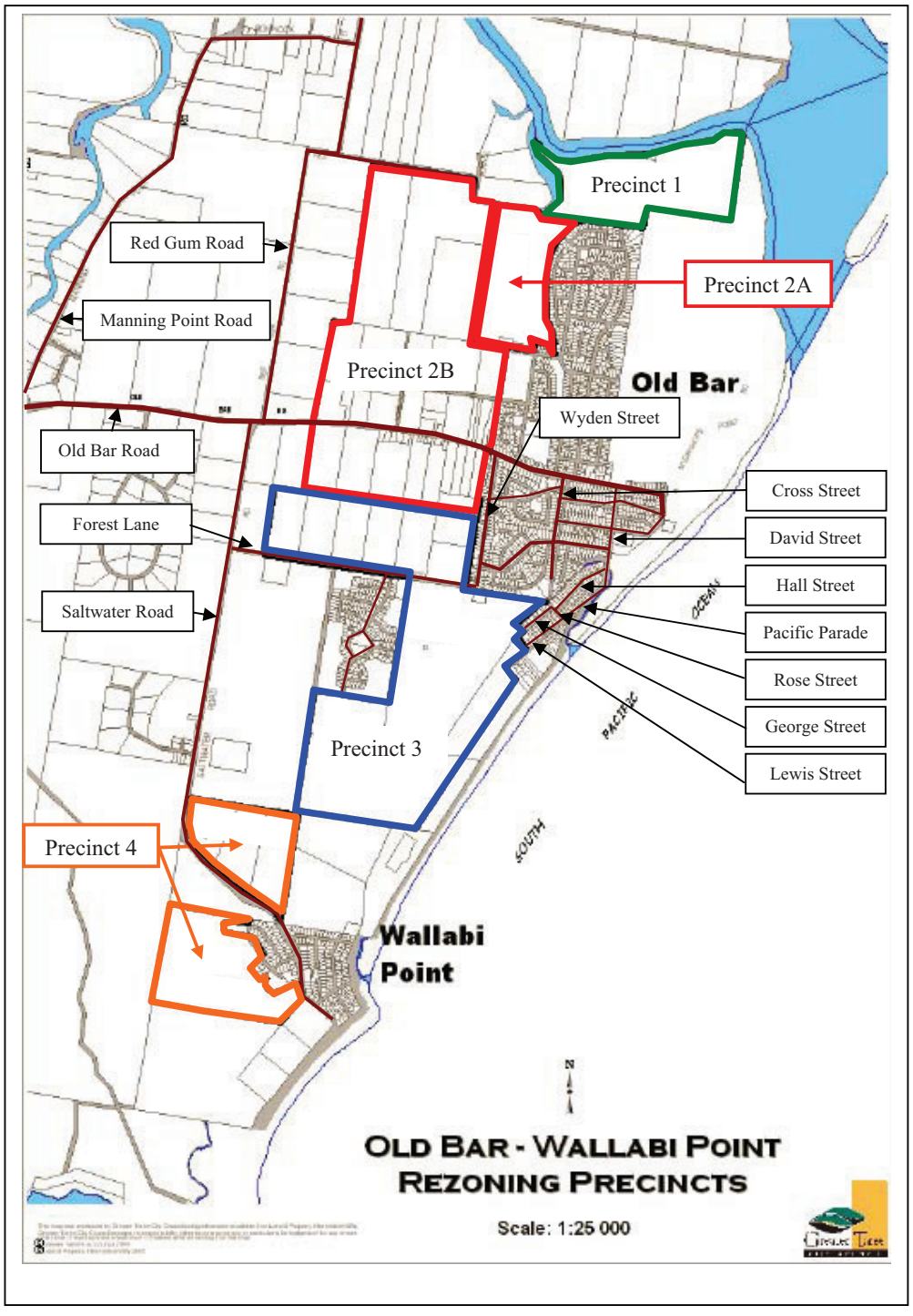
The locations of the various stages within the Old Bar/Wallabi Point area are shown in **Figure 3.1**. Precinct 3 is bound by the existing Old Bar dwellings and the beach to the east, by the Ocean Links estate and the State Forest in the west. To the north, Precinct 3 adjoins Precinct 2B, while to the south it reaches to the northern limits of Precinct 4. Maunsell (2006) estimated that the Old Bar / Wallabi Point development would involve approximately 48,000 daily trips. An estimation of the number of trips within Old Bar after all development is completed is shown in **Table 3-1**.

- **Table 3-1: Trip generation for zones within Precinct 3.**

	Daily Traffic [1]	Peak Hour Traffic	Percentage of Total
Existing Old Bar	15,200	1,520	32%
Precinct 1	2,500	250	5%
Precinct 2A	800	80	2%
Precinct 2B	19,800	1,980	41%
Precinct 3	6,700	670	14%
Existing Wallabi Point	1,800	180	4%
Precinct 4	1,200	120	3%
Total	**48,000**	**4,800**	**100%**

[1] From Maunsell (2006).

- **Figure 3.1: Location of the proposed Old Bar/Wallabi Point development.**

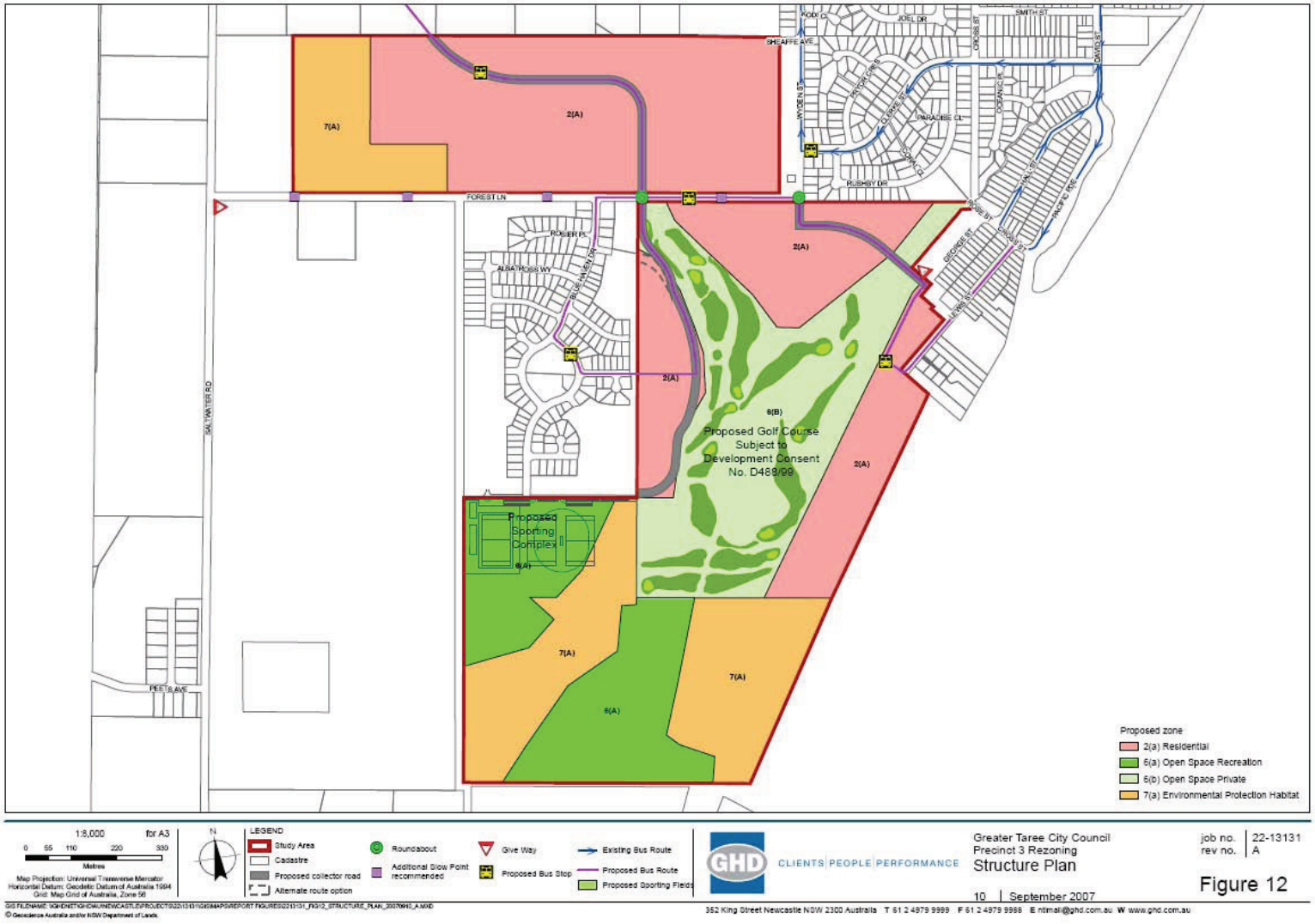


3.2 Precinct 3

The Precinct 3 development is approximately 155 hectares in size and is currently occupied by rural land uses (Terra Consulting, 2004). The proposed development includes mainly low-medium residential land uses with a 9-hole golf course, some public sporting fields, and a small number of corner shops and parks.

Maunsell's *Precinct 2B Rezoning Traffic Report* (2006) assumed that Precinct 3 would yield approximately 1,000 dwellings, or 6,700 daily trips (670 peak hour trips). Recent calculations, based on the master plan (dated 13th August 2007), estimate that there will be approximately 64.46 hectares of residential development, resulting in a total of 1,018 dwellings. The proposed Precinct 3master plan is shown in **Figure 3.2**.

- **Figure 3.2: Precinct 3 master plan.**



4. Review of Previous Studies

A review of previous studies and investigations was carried out in order to ascertain information and recommendations previously gathered on the Old Bar rezoning. The following documents were reviewed:

- Greater Taree City Council (2001). *Old Bar/Wallabi Point Development Strategy*.
- Terra Consulting (2004). *Old Bar Precinct 3 Local Environment Study*.
- Traffic Engineering Services (2005). *Precinct 3 South Old Bar Rezoning Traffic Impact Assessment.*
- Maunsell Australia (March 2006). *Old Bar Precinct 2B Rezoning Final Traffic Report*.
- Sinclair Knight Merz (June 2006). *Precinct 2B Old Bar Precinct Planning Report.*

A detailed summary of each of the above documents is provided in **Appendix A**. The following road and intersection upgrades were recommended as part of accommodating the development of Old Bar:

- Upgrading Old Bar Road to the west of the Precinct 2B trunk collector road. Overtaking lanes would need to be provided, with full duplication considered a possibility. To the east of the Precinct 2B trunk collector road, Old Bar Road would retain the existing two-lane two-way operation, with additional space provided for on road cyclist and parking facilities (Maunsell, 2006);
- The Pacific Highway Interchange may need to be upgraded to two circulating lanes, at least on the southern side of the roundabout (Maunsell, 2006);
- The intersections of Manning Point Road, Saltwater Road and Red Gum Road would need to be upgraded. Manning Point Road would operate satisfactorily in a seagull arrangement, while Red Gum Road should be realigned to form a four-way junction with Saltwater Road. This intersection would operate effectively as a two lane roundabout. Carrying out this upgrade would improve the safety of the site and a roundabout in this location would act as a traffic calming device for vehicles approaching Old Bar from the west (Traffic Engineering Services, 2005; Maunsell, 2006);
- Signals would be required at the intersection of the Precinct 2B truck collector road and Old Bar Road (Maunsell, 2006);
- The intersection of Forest Lane and Saltwater Road would need to be upgraded to a type CHR (formerly Type C), which would provided for a channelised right turn. Traffic Engineering Services (2005) recommended that Forest Lane be upgraded to a sealed two-lane two way road; and
- Some other traffic calming devices were recommended in the existing township of Old Bar (Maunsell, 2006). Roundabouts at key locations within the existing road network would assist

in increasing the capacity of intersections and assist in calming / slowing traffic along existing streets.

The above recommendations and intersection improvements were taken into consideration during the analysis carried out as part of this investigation.

5. Traffic Impacts

5.1 Methodology

In order to determine the impact of the proposed development of Precinct 3 on the surrounding road network, an analysis of the traffic generation of the development was undertaken. This analysis focused on updating the Cube Voyager model created by Maunsell in 2006 for the Precinct 2B traffic assessment to include revised Precinct 3 land uses and road layout assumptions. The future intersection turning movements were input into SIDRA Intersection to assess intersection Level of Service.

The impacts of the development on the following intersections were assessed in detail:

- Old Bar Road / Manning Point Road;
- Old Bar Road / Saltwater Road / Red Gum Road;
- Old Bar Road / Precinct 2B Collector Road;
- Old Bar Road / Precinct 2B Shop Access;
- Precinct 2B Collector Road / Shop Access;
- Forest Lane / Saltwater Road;
- Forest Lane / Collector Road; and
- Forest Lane / Wyden Street.

The Maunsell Cube model did not extend far enough west along Old Bar Road to include the two roundabouts at the Pacific Highway Interchange and Buckets Way. Hence the interchange with the Pacific Highway and the Buckets Way roundabout immediately to the west of the interchange were not analysed.

5.1.1 The Cube Model

A detailed review of the Maunsell Cube Model is included in **Appendix B**.

Maunsell's Cube model was updated to reflect the latest master plan (dated 20th August 2007). No other changes were made to the model outside of the Precinct 3 development. The following features were updated:

- Road network within Precinct 3;
- Traffic generation; and
- Updated the trip matrices to reflect the changes to Precinct 3.

The traffic generation rates utilised in the Maunsell Cube model were adopted to maintain consistency between the two studies. The traffic generation rates utilised by Maunsell were derived from surveys undertaken at Old Bar and Wallabi Point. As these rates are more recent than those in the RTA guide, they were accepted as being more representative of travel patterns in the local area. They vary slightly from standard RTA rates as they are based on the analysis of survey data. The adopted rates, as well as the corresponding RTA rates are shown in **Table 5-1**.

- **Table 5-1: PM Peak Hour Traffic Generation Rates.**

Land Use	Adopted Rates	RTA Rates
Low Density residential (trips per dwelling)	0.7	0.85
High Density Residential / Tourist uses (trips per dwelling)	0.4	0.29
Golf Course (total for 9 holes)	50	-

Land use and estimated daily and peak hour trips for Precinct 3 are described in Error! Reference source not found..

- **Table 5-2: Land use, daily and peak hour trip generation for Precinct 3.**

	Gross Area (Ha)	Dwellings / ha	no. lots	Peak hour Trips (using RTA rates)	Peak Hour Trips (using Maunsell rates)
Residential (Low)	35.52	12	426	362	298
Residential (High)	18.43	15	276	80	111
Environmental Conservation	32.58	-	-		-
Tourism Uses / Residential (High)	10.51	30	315	91	126
Public Recreation (Sporting Fields, parking)	22.67	-	-		-
Private Recreation (9 hole golf course)	33.13	-	-	50	50
TOTAL	**152.84**	**-**	**1,018**	**584**	**585**

5.1.2 Intersection Analysis

The future turning volumes at each of the above mentioned intersections were then extracted and modelled using the SIDRA Intersection modelling software (version 3.1). SIDRA calculates the amount of delay experienced by vehicles using an intersection and provides a Level of Service rating which indicates the relative performance of the intersection using average delay (in seconds per vehicle) experienced by vehicles at each leg of the intersection. For signalised intersections the average delay is taken over all movements, while for non-signalised intersections the worst movement is taken to be representative of overall intersection operation.

The Level of Service criteria, as outlined by the RTA is outlined in **Table 5-3.**

- **Table 5-3: Level of Service Criteria.**

Level of Service	Average Delay (seconds/vehicle)	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	At capacity, requires other control mode
F	More than 70	Roundabouts require other control mode	

Source: RTA (2002). *Guide to Traffic Generating Developments*.

It is generally accepted by the RTA that in the long term, when future conditions have been taken into account, Level of Service should be D or better. Where future traffic volumes have not been included, Level of Service should be C or better. Level of Service D is acceptable for this study, although Level of Service C is preferable.

In addition to the future base scenario, an additional scenario taking into account an additional 15% of traffic was assessed. This was adopted to allow for seasonal fluctuations in traffic volumes, and to account for differences in the trip generation rates.

As the Maunsell Cube model was only developed for the PM scenario, AM turning volumes were estimated by transposing the PM movements to allow for a more balanced approach to intersection design. SIDRA analyses were undertaken for the AM and PM, for both the future base scenario and the future with an additional 15%.

The previously recommended layouts, described in **Section 4,** were tested to ensure they would operate at an acceptable Level of Service with the additional traffic from the proposed development of Precinct 3.

5.2 Intersection Operation

The layouts and geometry considered to be appropriate for each analysed intersection are included in **Appendix C**. The resultant layouts represent the minimum requirements to maintain an acceptable Level of Service. The layouts are described below.

- The Old Bar Road / Manning Point Road intersection would operate effectively as a seagull intersection; with 50m acceleration and deceleration lanes for right turn movements.

- Council advised that Red Gum Road would be realigned to the west to align with the existing Old Bar Road / Saltwater Road intersection. This would minimise the amount of manoeuvring required between the two intersections and act as a traffic calming device for vehicles approaching from the west. The roundabout would operate at an acceptable level of service under Council's proposed layout, with a minimum 20 metre central island, two lanes (one a 50 metre short lane) on the eastern, western and southern approaches and exits. Only one approach lane would be required on the northern approaches.
- The Old Bar Road / Precinct 2B Collector Road intersection would operate effectively as a roundabout or as traffic signals. Traffic signals, operating a simple two-phase cycle, would increase safety for pedestrians crossing the road but would cause greater delays to vehicles. In both scenarios, only one lane is required on each approach.
- The intersections of the Precinct 2B Collector Road and Shop Access, Forest Lane and Saltwater Road, and Old Bar Road and the Precinct 2B Shop Access were found to operate effectively as priority intersections.
- The Forest Lane / Collector Road and Forest Lane / Wyden Street intersections would operate effectively with a 6m island and a 5 metre circulating lane. Only one lane is required on each approach.

The results of the SIDRA analysis adopting the above mentioned layouts and under future traffic volumes with Precinct 3 are shown in **Table 5-4**. Results show that all analysed intersections were forecast to operate at acceptable Levels of Service, with five intersections operating at Level of Service A under all four scenarios.

- **Table 5-4: Existing Intersection Performance.**

Intersection	Level of Service (delay in seconds)			
	Future		Future + 15%	
	AM	PM	AM	PM
Old Bar Road / Manning Point Road	A (13)	C (30)	A (15)	D (47)
Old Bar Road / Saltwater Road / Red Gum Road	C (41)	D (45)	C (42)	D (46)
Old Bar Road / Precinct 2B Collector Road (signals)	B (24)	C (30)	C (29)	C (37)
Old Bar Road / Precinct 2B Collector Road (roundabout)	B (18)	B (18)	B (24)	C (30)
Old Bar Road / Precinct 2B Shop Access	A (10)	A (12)	A (10)	A (13)
Precinct 2B Collector Road / Shop Access	A (11)	A (11)	A (12)	A (12)
Forest Lane / Saltwater Road	A (12)	A (12)	A (12)	A (12)
Forest Lane / Collector Road	A (11)	A (11)	A (12)	A (12)
Forest Lane / Wyden Street	A (11)	A (11)	A (11)	A (12)

5.3 Mid Block Level of Service

The mid block volumes were extracted from the model and compared with those reported by Maunsell (2006), as shown in **Table 5-5**. There was little difference observed between the two models, with the greatest difference being along Old Bar Road near Wyden Street. Volumes increased slightly along Saltwater Road and Old Bar Road near Wyden Street. The differences in traffic volumes at the different locations can be attributed to differences in trip generation between the two models and the modifications made to the road network within Precinct 3.

- **Table 5-5: Comparison of mid block volumes from Maunsell (2006) and this assessment for the peak scenario.**

Location	Forecast Traffic Volumes	Maunsell (2006) Forecast Traffic Volumes	Difference (%)
Old Bar Road east of the Pacific Highway	1,590	1,590	0
Old Bar Road east of Manning point Road	1,270	1,270	0
Old Bar Road east of Saltwater Road	1,000	1,040	- 40 (- 4%)
Manning Point Road north of Old Bar Road	290	290	0
Saltwater Road south of Old Bar Road	435	390	+ 45 (+ 11%)
Old Bar Road west of Wyden Street	710	660	+ 50 (+ 8%)
Old Bar Road west of David Street	290	290	0

Mid block Level of Service was determined for a number of locations along Old Bar Road, Saltwater Road, the Collector Road, Wyden Street and Forest Lane. The results of this analysis are shown in **Table 5-6**. It can be seen that under two-lane two-way operation Old Bar Road would operate at an acceptable Level of Service (D) during normal operation, but would operate at an unacceptable Level of Service in the Future +15% scenario. Widening the road at this location should therefore be considered. All other analysed sections would operate at an acceptable Level of Service in both scenarios.

- **Table 5-6: Mid Block Level of Service.**

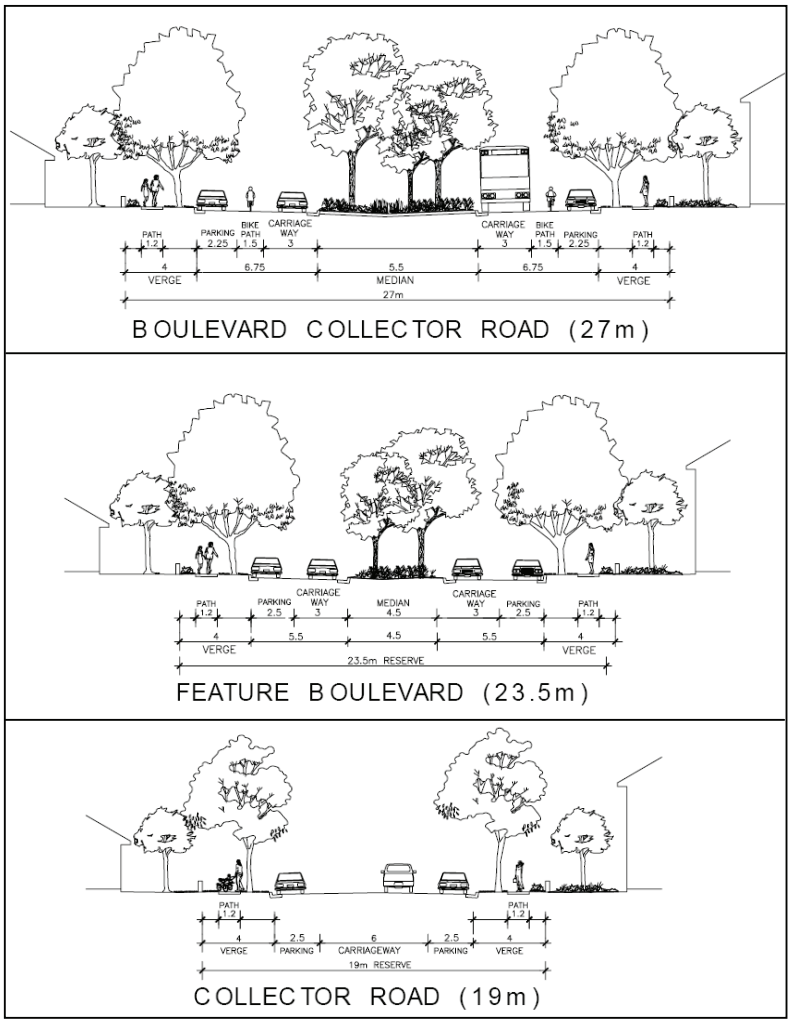
Location	Volumes Peak (Peak + 15%)	V\C Ratio	Level of Service
Old Bar Road east of the Pacific Highway	1590 (1830)	0.57 (0.65)	D (E)
Old Bar Road west of Saltwater Road	1310 (1500)	0.47 (0.54)	D (D)
Old Bar Road east of Red Gum Road	1060 (1120)	0.38 (0.44)	C (D)
Old Bar Road west of Wyden Street	710 (820)	0.25 (0.29)	C (C)
Saltwater Road (south of Old Bar Road)	440 (500)	0.16 (0.18)	B (B)
Collector Road (north of Forest Lane)	130 (150)	0.05 (0.05)	A (A)
Wyden Street (north of Forest Lane)	210 (240)	0.07 (0.08)	B (B)
Forest Lane (east of the Collector Road)	230 (270)	0.08 (0.09)	B (B)

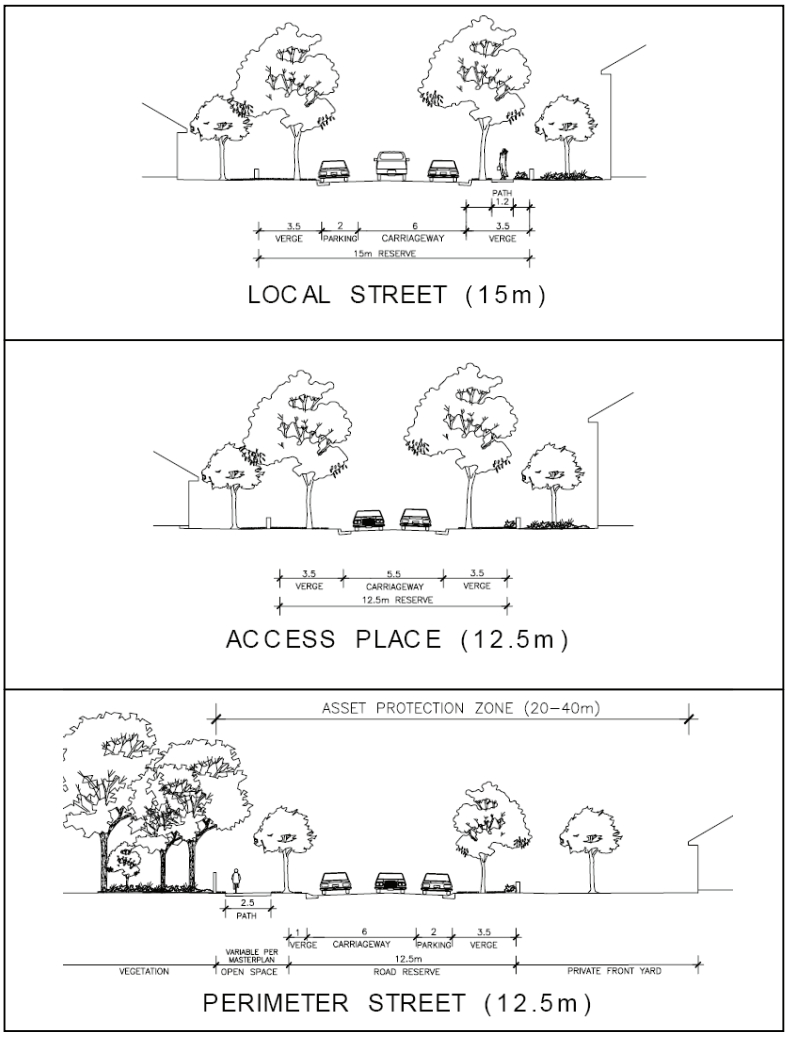
6. Precinct 3 Road Master Plan

6.1 Road Hierarchy

Figure 6.1, extracted from Greater Taree City Council's draft development control plan for Old Bar Precinct 2B, outlines the required street layouts and cross-sections for the road hierarchy. Retaining a similar road layout in Precinct 3 would ensure continuity between the two developments. Hence, the same road layouts have been adopted for Precinct 3.

- **Figure 6.1: Street cross-sections.**





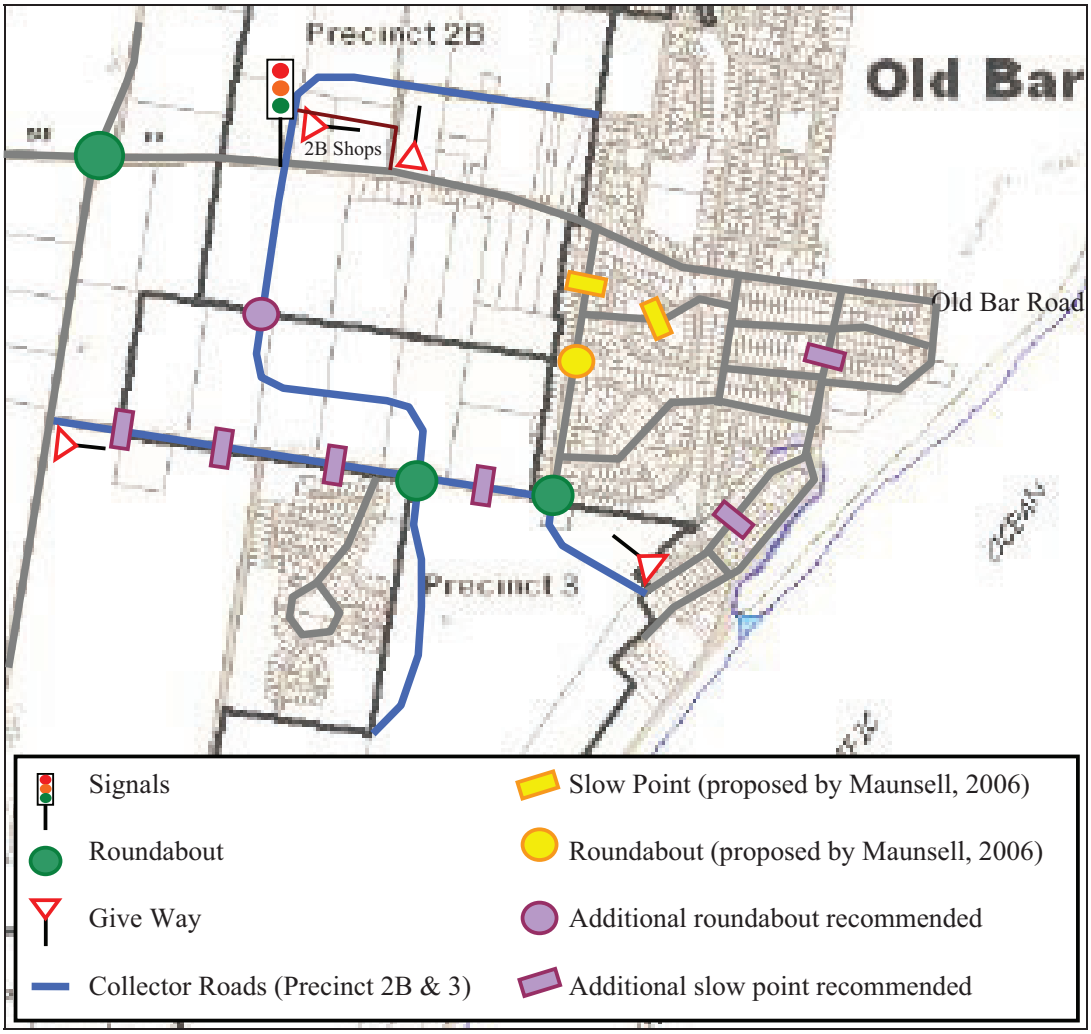
Source: Greater Taree City Council (2006). *Draft Development Control Plan No. 57: Old Bar Precinct 2B.*

Figure 6.2 shows the higher order roads in Precincts 2B and 3. The main Collector Road which connects Precinct 2B to Precinct 3 was classified as a Boulevard Collector Road with a width of 27 metres[4]. The lower forecast traffic volumes along the north-south collector through Precinct 3 warrant collector road status (19 metres wide). However, to maintain consistency with the Precinct 2B Boulevard Collector Road, it is desirable that the roadway between Precinct 2B and Forest Lane be of a Feature Boulevard standard (23.5 metres). The links from Forest Lane to both the sports

[4] Greater Taree City Council (2006). *Draft Development Control Plan No. 57: Old Bar Precinct 2B.*

fields and beach should be of a Collector Road standard (19 metres). Local Streets should be 15m in width, with access places 12.5 metres.

- **Figure 6.2: Precinct 3 road hierarchy.**



Forest Lane should be classified as a "Collector Road" with 19 metres width. A decreased width would encourage drivers to drive slower, hence increasing safety through the site.

All streets within the development should be posted to a speed limit of 50 km/hr.

6.2 Speed and Volume Control Measures

The Collector Road which passes through Precincts 2B and 3 is encouraged to accommodate the majority of trips between the two precincts and provide access to the Precinct 2B retail centre.

Speed will be controlled by the road alignment, posted speed limits, roundabouts and traffic signals along its length. Speed on Forest Lane would need to be controlled by a series of speed humps and other traffic control measures as illustrated in **Figure 6.2**.

6.3 Location of Community Uses

Community or local retail facilities should be located to be accessible to either the Collector Road or Forest Lane. This would allow them to be easily accessed by vehicles, as well as bicycles and pedestrians.

6.4 Surrounding Network

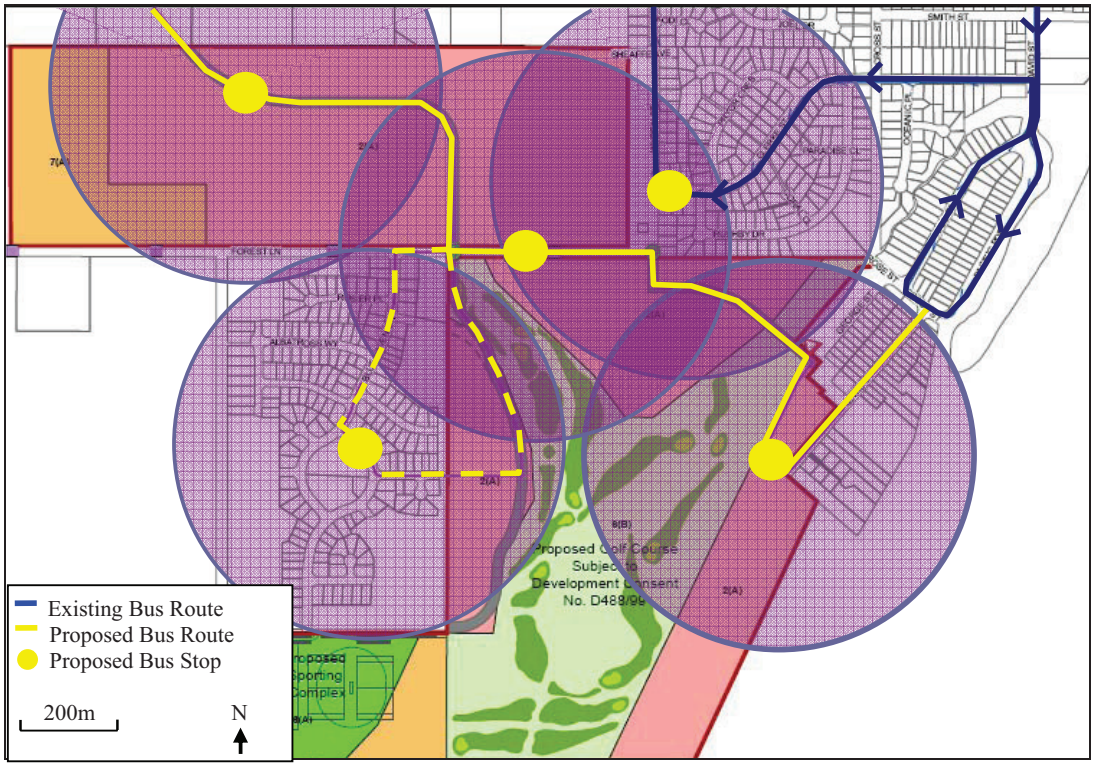
The proposed road network and road hierarchy of Precinct 3 and other developments would result in increased traffic volumes on Wyden Street, George Street, Hall Street, Pacific parade and David Street. Traffic speed control measures, including roundabouts, vertical deflection devices such as speed humps and horizontal deflection devices such as kerb blisters and slow points should be installed as shown in **Figure 6.2** to reduce traffic speeds along these routes. Maunsell (2006) recommended that a roundabout be constructed at the intersection of Wyden Street and the link through to Precincts 2B and 3 (see **Figure 6.2**). Alternatively, it could be located at Belle Villa Parade (immediately to the north). The construction of a roundabout in this location would act as a traffic calming device to restrict rat-running along Wyden Street.

7. Access Impacts

7.1 Public Transport

he existing bus route could be extended or diverted to follow the primary roads through Precinct 3. Buses currently utilise Lewis Street in the south east and then Wyden Street and Forest Lane. The route could proceed along the Collector Road to connect with the routes proposed for Precinct 2B (Maunsell, 2006). There is the potential for an extended route to continue south from Forest Lane along the Collector Road and through the Ocean Links estate. This route is shown in **Figure 7.1**. It is likely that a route would come from the existing Old Bar shops, down David Street and Lewis Street, pass through Precinct 3 then continue north to the Precinct 2B shops. From this location it would continue west to Taree. The location of bus stops in the locations outlined in **Figure 7.1** would result in only a small portion of residences (those in the south east corner) being required to walk more than 400 metres to the nearest bus stop.

- **Figure 7.1: Proposed bus route through Precinct 3.**

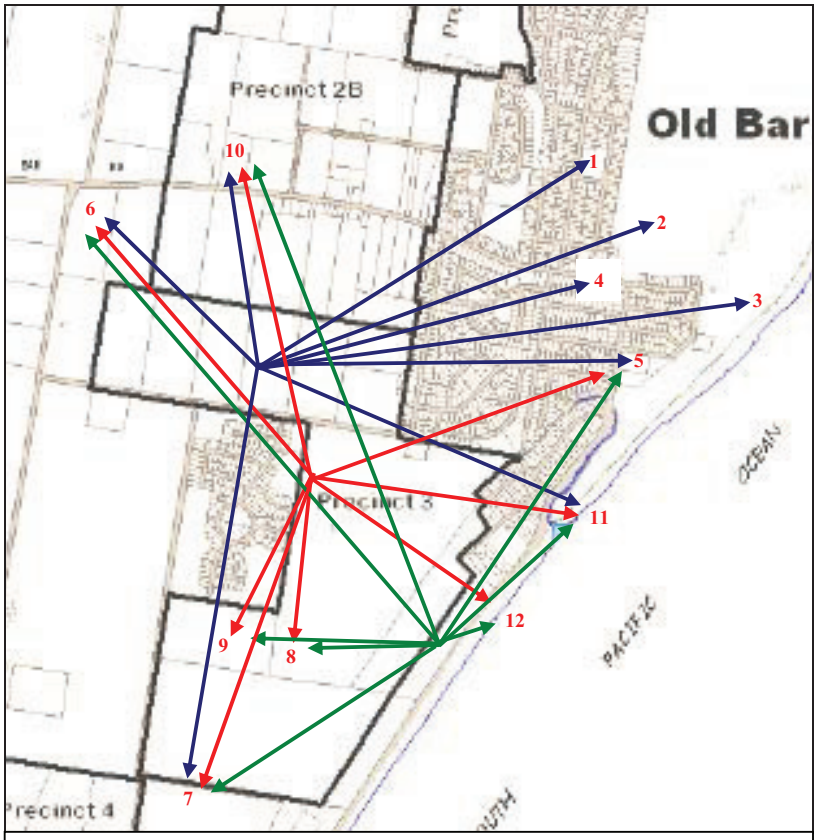


The frequency and hours of operation would depend on patronage levels and would be subject to detailed investigation. However, Old Bar was forecast to more than double the existing population levels. An additional bus service to Precincts 2B and 3 at hourly intervals could be considered. High quality bus stops with good pedestrian access would encourage patrons to travel by bus.

7.2 Pedestrian and Cyclist Access

The main pedestrian and cyclist attractors and desire lines are shown in **Figure 7.2**. The main attractions are shops, schools and recreation facilities, such as beaches, hotels, sports fields, the golf course, and the bowling club.

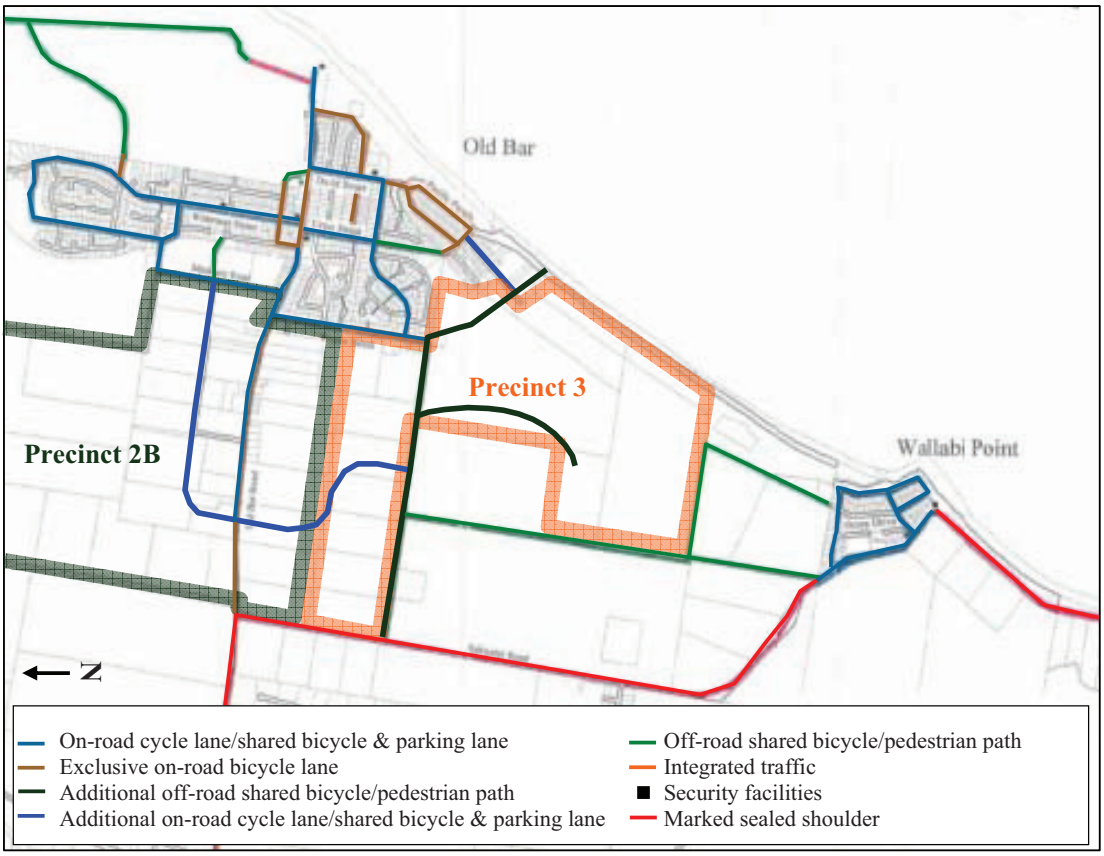
- **Figure 7.2: Pedestrian and cyclist desire lines.**



Existing Attractions:		Future Attractions:	
1	Bowling Club	8	Golf Course Clubhouse
2	Sports Fields	9	Sports Fields
3	Beach	10	Precinct 2B Shops
4	Existing Shops	11	Beach
5	Primary School	12	Beach
6	Hotel and Taree		
7	Wallabi Point		

Cycle routes, including those for Precinct 2B (Maunsell, 2006) and those proposed for Precinct 3 are shown in **Figure 7.3**. Off- road facilities should be provided to connect the Precinct 2B shops with Precinct 3 and the beach / tourist area in the south eastern section of Precinct 3. A route should also be provided to allow easy access to the Precinct 3 sports fields. It is recommended that these paths be 2.5 metres wide to cater for cyclists, pedestrians and motorised wheel chairs.

- **Figure 7.3: Current cycle plan for Old Bar.**



Source: Mitchell McCotter (1996) in Maunsell (2006).

7.3 Parking

The cross-sections displayed in **Figure 6.1** give an indication of where parking should be provided. Generally parking will be permitted on both verges of Boulevard Collector Roads, Feature Boulevards and Collector Roads, with parking permitted on one verge of Local Street and Perimeter Streets. No parking is to be permitted in Access Places. Relevant signage should be posted to ensure that any restrictions are adhered to.

A separate parking area is to be provided for the sports fields at the southern end of Precinct 3, with the Golf Course also providing sufficient parking for players.

8. Summary and Conclusions

This study involved updating Maunsell's (2006) Cube model of Old Bar to reflect the updated Precinct 3 master plan. Turning movements extracted from the model were input into SIDRA Intersection modelling software and Level of Service results were generated. The modelled future traffic volumes differed only slightly from those reported by Maunsell in 2006.

The following upgrades were recommended to accommodate the proposed Old Bar developments, including Precinct 3 and ensure that the road network would operate at a satisfactory level of service:

- All roads within Old Bar and Precinct 3 be posted at 50km/hr;
- Old Bar Road will require upgrading to two lanes per direction west of the Collector Road;
- The Old Bar Road / Collector Road intersection would operate effectively as either signals or a roundabout. Installing signals would improve safety for pedestrians in the vicinity of the intersection. Only one lane is required per approach in either configuration;
- Red Gum Road should be realigned to meet Saltwater Road and Old Bar Road in a four way junction. Two lanes would be required east-west and one lane north-south;
- The following intersections would operate satisfactorily as give way intersections:
  - Forest Lane / Saltwater Road (Saltwater Road priority);
  - Old Bar Road / Precinct 2B shop access (Old Bar Road priority); and
  - Main Collector Road / Precinct 2B shop access (Collector Road priority).
- The Forest Lane / Wyden Street and Forest Lane / Collector Road intersections would operate at acceptable Levels of Service as roundabouts with one lane per approach;
- The intersection of Old Bar Road and Manning Point Road was forecast to operate effectively as a seagull configuration;
- Traffic calming devices (vertical deflection devices such as speed bumps or wombats, or horizontal deflection devices such as kerb blisters, chicanes and slow points) are required along Forest Lane and throughout the existing Old Bar network (namely, along Wyden Street, David Street, Hall Street and George Street) to reduce traffic speeds through these residential streets; and
- On road cycle routes and dedicated footpaths should be provided along the Main Collector Road, Forest Lane between the Collector Road and Wyden Street, and from Forest Lane to the beach near Lewis Street.

Other recommendations included pedestrian and cycle paths and bus route and stop locations.

Appendix A - Review of Previous Studies

A.1 Introduction

Sinclair Knight Merz (SKM) was commissioned by Greater Taree City Council (GTCC) to carry out a review of previous works undertaken to assess the impacts of the proposed Old Bar rezoning on the surrounding road network.

With a number of land owners showing interest in submitting their land for subdivision, GTCC is in the process of developing a series of plans and layouts for the subdivisions, with the aim of preventing haphazard developments, and ensuring that any development which does occur is in accordance with the values of local council and residents, and can be integrated with the existing townships of Old Bar and Wallabi Point.

The Old Bar development is divided into five Precincts, consisting of Precincts 1, 2A, 2B, 3 and 4. A precinct plan for Precinct 2B has already been developed, while Stage 1 of Precinct 4 is already under development. Sinclair Knight Merz was commissioned to determine the traffic impacts of the proposed Precinct 3 development. This file summarises previous traffic investigations into the Precinct 3 development.

A.2 Review of Previous Studies

The following documents were reviewed:

- Greater Taree Council (2001). *Old Bar/Wallabi Point Development Strategy*.
- Terra Consulting (2004). *Old Bar Precinct 3 Local Environment Study*.
- Traffic Engineering Services (2005). *Precinct 3 South Old Bar Rezoning Traffic Impact Assessment.*
- Maunsell (March 2006). *Old Bar Precinct 2B Rezoning Final Traffic Report*.
- Sinclair Knight Merz (June 2006). *Precinct 2B Old Bar Precinct Planning Report.*

The key findings of the investigations are described below.

A.2.1 Old Bar/Wallabi Point Development Strategy

The Old Bar/Wallabi Point Development Strategy was developed by Greater Taree City Council in 2001, in response to a number of applications for sub-division within the area. The strategy highlights the need for further housing within the Old Bar/Wallabi Point area, and outlines areas which are appropriate for sub-division.

Council aims to preserve the existing character of Old Bar and Wallabi Point, and so does not intend to allow a high proportion of medium density development to occur. While the North Coast Urban Planning Strategy suggests 15 dwellings per hectare, the Strategy proposed a rate of

approximately 10 dwellings per hectare. This equates to 1929 lots to be released in the Old Bar/Wallabi Point area (for approximately 250 hectares of subdivision land). Potential lot yields of 375 lots were identified for Precinct 3.

In addition to the land already earmarked for subdivision, there is the potential for an additional 598 dwellings to be built within the established areas of Old Bar and Wallabi Point (p.17). This 'infill' development should be taken into account when determining the future traffic generation of the town.

A.2.2 Old Bar Precinct 3 Local Environment Study

Terra Consulting was commissioned to prepare a Local Environment Study (LES) on the proposed rezoning of Precinct 3, in order to fulfil the requirements of Section 57 of the Environmental Planning and Assessment Act (1979). The LES assessed the155 hectare site, carrying out a full assessment of its appropriateness for subdivision.

Based on concept plans available at the time, lot yields of at least 900 lots were estimated, with approximately half the lots on the northern side of Forest Lane. The analysis was based on the assumption that one dwelling would be constructed per lot. Using the RTA (1995) traffic generation rate of 0.85 peak hour trips per dwelling, it was found that there would be approximately 4050 daily trips into and out of Precinct 3 (8100 in total), with approximately 750 peak hour vehicle trips (p.5-64).

Survey data collected in 2001 was utilised for base model calculations. It was found that the 7 day average vehicle volume was approximately 5,100 vehicles, while the weekday average was approximately 5,200 vehicles. Weekday peak hour volumes ranged between 450 and 575 vehicles.

Precinct 3 was estimated to generate 8,100 trips per day. Between 5,200 and 6,000 of these are likely to use Old Bar Road. Together, Precincts 2A, 2B and 3 would be likely to generate up to 26,600 trips per day on Old Bar Road. This was reported as being Level of Service E.

A.2.3 Precinct 3 South Old Bar Rezoning Traffic Impact Assessment

This Traffic Impact Assessment (TIA) was written by Traffic Engineering Services on behalf of the landowners, and is specific to Precinct 3.

Surveys for this study were undertaken in 2004.

Precinct 3 is expected to yield up to 1,000 lots. In addition, Precinct 4 is expected to yield 500 lots and the background network is expected to experience a 2% increase in traffic. These are lower than recommended RTA rates were used for traffic generation estimation*s* (0.75 peak hour vehicle trips per dwelling, as opposed to 0.85 as recommended by the RTA's *Guide to Traffic Generating Developments,* 1995). Hence, 750 peak hour trips are expected from Precinct 3. Potential

developments at Precincts 1 and 2 were not taken into account, except as part of an additional 2,000 dwellings to the north of Old Bar Road. These trips, however, are not taken into account for the overall network assessment.

The report finds that upgrading of Old Bar Road will be required, as will upgrades of Forest Lane and intersections along Old Bar Road. In particular, improvements to intersections with Manning Point Road and Warwira Road will be needed.

A.2.4 Old Bar Precinct 2B Rezoning Final Traffic Report

This study was undertaken by Maunsell, on behalf of GTCC as a specialist input into the Precinct 2B master plan. This report assesses on the PM peak period only.

Precinct 2B was estimated to contain approximately 1,280 residential lots (based on 12 lots/ha for standard residential and 20 lots/ha for medium residential). An outline of estimated lot yields for the various precincts are shown in **Table A-1**. As can be seen, on retail or commercial development were planned for Precincts 2A, 3 and 4, and the majority of the development will be standard residential.

- **Table A-1: Land use and lot yield per precinct.**

Land Use	Precinct				
	1	2A	2B	3	4
Standard Residential	74	96	1,120	745	155
Medium Residential	114	24	160	255	0
Retail/Commercial (m^2)	1,250	0	9,565	0	0

It was assumed that a high school for 800 students would be built on the corner of Red Gum Road and Old Bar Road, adding an additional 2,200 daily vehicle trips onto the network. This figure looks unusually high and equates to 2.75 daily trips per student. However, it is likely that many of these trips would be diverted from Taree, where the high schools currently exist, and that buses would also replace some vehicles.

The report recommends that re-aligning Red Gum Road to form a four-way intersection with Saltwater Road would improve the safety of that stretch of Old Bar Road. A roundabout would be sufficient as an intersection treatment and would also act as a traffic calming device and provide a 'feature' entry to Old Bar.

Surveys for this study were undertaken in June 2005. Traffic generation rates used in this study were the same as those used in TES (2005) of 0.75 vehicle trips per day. RTA recommended rates were used for medium density residential and retail commercial, while rates for community uses

were inferred. It is unclear why the lower trip rates were adopted, or given that assumption, why the generation rates of medium density lots were also not factored using a similar ratio (despite the possibility that car usage in units is also be likely to decrease, especially given their proposed strategic positioning in relation to shops and transport).

The total number of trips generated in Old Bar/Wallabi Point are presented in **Table A-2**. These forecasts include some infill development and growth in existing locations.

- **Table A-2: Estimated future trip generation.**

Precinct	Daily	% of Total
Existing Old Bar	15,200	31.7
Precinct 1	2,500	5.2
Precinct 2A	800	1.7
Precinct 2B	19,800	41.3
Precinct 3	6,700	14.0
Existing Wallabi Point	1,800	3.8
Precinct 4	1,200	2.5
TOTAL	**48,000**	**100**

Modelling was done in Cube Voyager. Growth rates at the 2005 survey sites were projected for 35 years, with their respective growth rates and projected volumes documented (p.19). Where these growth rates were inferred from or whether the future rates are inputs or outputs of the model are unknown. The PM peak hour was modelled and the volumes then factored out by 10 to give an indication of ADT.

The most significant growth will occur on Old Bar Road, ultimately resulting in its duplication west of Precinct 2B (west of Manning Point Road), as it would be operating at LoS E if left in its existing configuration. Duplication may also be required up to the Oyster Creek crossing (LoS D). Generally, the capacity of Old Bar Road will be restricted by intersection capacity. Intersection capacity should be improved at key intersections, with consideration given to the provision of passing lanes at regular intervals along Old Bar Road prior to full duplication.

Saltwater Road will as also experience significant growth, with up to 4000 vehicles per day utilising it. Local streets likely to experience increased traffic due to Precinct 2B include Banyula Drive-Molong Road, Waterman Street, Berber Road and Wyden Street. Traffic volumes on Medowie Road will decrease as existing users utilise the Banyula Drive extension through Precinct 2B instead. Traffic on other local streets may increase as a result of infill development and the development of Precincts 1 and 3. Upgrading of the roundabouts at the Pacific Highway Interchange may also be required.

5,700 vehicles are expected to utilise the main collector road through Precinct 2B, with up to 7-7,500 vehicles potentially using it on Thursdays and Fridays. A two-lane road would be required to service this number of vehicles.

A.3 Old Bar precinct 2B Precinct Planning Report

This report was written by SKM on behalf of Greater Taree Council, and details the precinct plan for Precinct 2B.

The report acknowledges that Old Bar Road will require upgrading, and the intersection with the Pacific Highway will be near capacity with the full development of all currently identified rezoning precincts. Land take estimates for Precinct 2B are shown in **Table A-3**. Estimated residential mix is 60% 600m^2 lots, 20% 350m^2 lots and 20% other sizes.

- **Table A-3: land take estimates for Precinct 2B.**

Land use	Area
Residential (Approx. 1,540 lots)	124.9Ha (73.2%)
Retail	3.1Ha (1.8%)
Community Uses	5.7Ha (3.4%)
Primary School	3.4Ha (2%)
Parks	4.9Ha (3.4%)
Riparian Corridor	20Ha (11.8%)
Riparian Buffer	6.1Ha (3.6%)
Preserved rural lots	0.6Ha (0.4%)
Dedicated drainage	0.7Ha (0.4%)
Total Site Area	169.4Ha (100%)

A.4 Review of the Network Model (Maunsell, 2006)

A review of the network model is underway. The model reflects documented network configuration and trip generation rates. The model can be easily updated to reflect revised development patterns and land use assumptions and will be used to assess the revised master plan.

A.5 Comments

These reports focus on the PM peak, and do not take into account AM traffic conditions. A number of young families will be moving into the area, and while services such as schools and a shopping centre will be provided within the development, the majority of people living in Old Bar are likely work in Taree, essentially making Old Bar and Wallabi Point satellite towns. It is therefore likely that the AM peak will increase in importance as the precincts develops and matures. The relationship between AM peak, PM peak and daily traffic should be investigated in more detail.

Current observations of the real estate market in the Old Bar/Wallabi Point area indicate that a number of the retirees are leaving the area, as a result of the proposed developments, and would be replaced by families with children. If this pattern continues, trip generation rates may increase as the proportion of students attending school and the proportion of adults in the workforce increases. In this situation, using the RTA recommended traffic generation rates for standard residential dwellings may be appropriate. A number of facilities will be provided as part of the overall Old Bar/Wallabi Point development, which will also impact upon the Self Containment Factor (SCF) of the overall estate, as well as impacting upon internal movements.

The section of Precinct 4 which is located on the northern side of Old Bar Road is currently being released for sale. The number of lots actually released here would give an indication of the reliability of the previous land take estimates.

Few of these reports take into account all of the precincts, with Maunsell's *Old Bar Precinct 2B Rezoning Final Traffic Report* (2006) the most comprehensive.

Whilst a number of discrepancies were identified it is unlikely that any revised assumptions would significantly alter the overall conclusions reached by the previous investigations.

Appendix B - Review of Maunsell's Network Model

In a previous study undertaken by Maunsell (March 2006), as a specialist input into the Precinct 2B master plan, a traffic model was created using Cube Voyager. As part of this study, the existing model would be updated to incorporate the revised master plan for Precinct 3.

The Maunsell study developed a PM peak hour base traffic model for an average weekday using available population, land-use and traffic data. A future model was created by expanding the calibrated base year model using data provided by Council and expected trip rates for the area. The future model was the basis for recommendations made with regards to the road network and hierarchy defined for Precinct 2B and overall future road network improvements.

Our proposal noted that the model achieved an exceptional correlation to existing traffic flows (R^2=0.9989) and since it is unlikely that traffic volumes would have changed significantly since 2005, that the base model would be adopted and refined to assess the proposed Precinct 3 development.

The base and future year model was made available to SKM and this file note details a summary of issues identified and the ramifications for its application to the traffic and transport assignment.

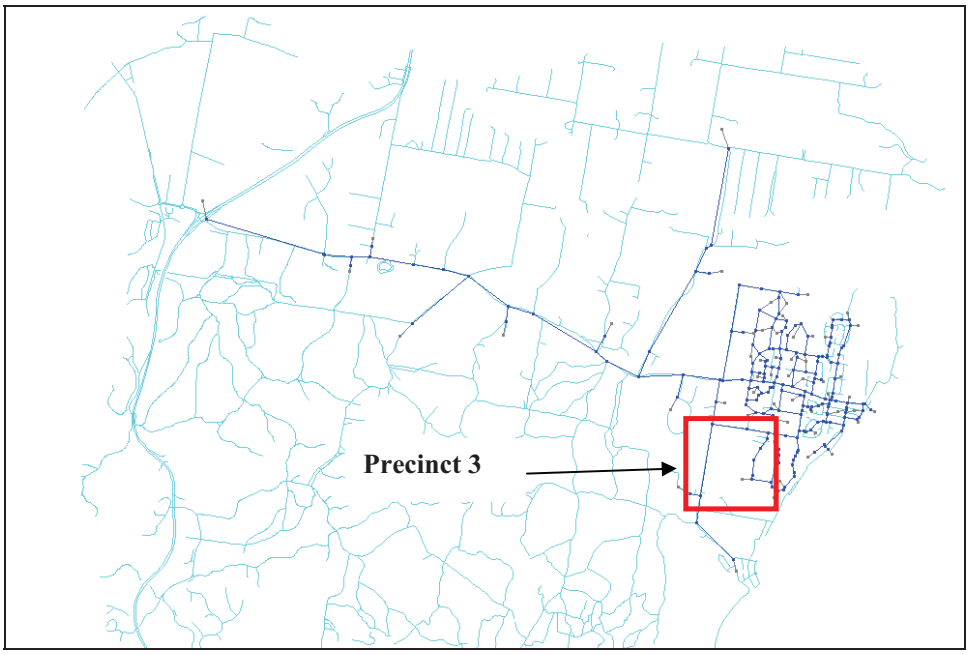
B.1 Data Files

The data files provided with the model consist of the following:

A. Highway Network files

- The base highway network includes Old Bar Road, Saltwater Road, Manning Point Road, Wallabi Point, Red Gum Road, Forest Lane and the local collector roads for Precinct 2B. The base network file requires updating to include additional road links to a local collector level within Precinct 3. In the base model, Precinct 3 comprises of 5 zones. The zones may be further disaggregated to incorporate local access on the network.

- The future highway network reflects road improvement proposals for Precinct 2B. The future network file will need to be updated to include road network improvements for Precinct 3. Confirmation on the status of the proposed network improvements for Precinct 2B is required to establish validity of the future network file for use in the modelling of Precinct 3.



B. Public Transport Network

The traffic model did not include a transit network. The impact of bus routes on traffic could be incorporated by creating a new layer to reflect the public transport network in the study area.

C. OD Matrices

The model comprises 50 internal zones plus 3 external zones. Precinct 3 is shown to be made up of 5 zones. The OD matrices can be refined to include any additional zones for Precinct 3.

D. Land use

The model has incorporated the proposed developments for precincts 1, 2A, 2B, 3 and 4, as shown below in 'Table 3-2' (taken from the Maunsell report).

Accordingly, data for Precincts 1, 2A, 3 and 4 were provided by Council, while data for Precinct 2B was taken from the Precinct 2B Master plan. Should there be changes to the land use for any of the Precincts, the model could be updated accordingly.

Table 3-2: Size of Proposed Developments in Vicinity

Use Category	Precinct				
	1	2A	2B	3	4
Standard residential (lots)	74	96	1,120	745	155
Medium density residential (lots)	114	24	160	255	0
Retail/commercial (sqm)	1,250	0	9,565	0	0

B.2 Assumptions

B.2.1 Traffic generation rates

As reflected in the files provided with the model, the traffic generation rates applied to estimate traffic generation were given as shown in **Table B-1**.

- **Table B-1: Traffic Generation Rates applied in Maunsell's (2006) Cube model.**

Use	PM Rate	Units	Comment
Standard Residential	0.7	per lot	
Higher Density Res	0.4	per lot	
Rural residential	0.8	per lot	
Other rural	1	per lot	
School	0.05	per student	school peak occurs before commuter peak
Retail/commercial	12	per 100 sqm	
Beach	25	1	estimate
Recreation	40	1	estimate
Airport	10	1	estimate
Club	10	per 100 sqm	
Retirement village	0.2	per unit	
Caravan park	0.75	per site	10% utilised in non-holiday periods
Tavern	10	per 100 sqm	
Marina	0.4	per berth	
Golf course	50	1	estimate
Church/sports	40	1	estimate
Zone 41 (Sett Pt)	120	1	external estimate (base year)
Zone 42 (Forest)	30	1	external estimate (base year)
Zone 43 (Taree)	650	1	external estimate (base year)

The rates are generally based on RTA data, but residential trip rates were adjusted according to local counts. It was reported that the traffic generation rate for standard residential was reduced to

0.75 peak hour vehicle trips per dwelling versus the RTA recommended rate of 0.85 peak hour vehicle trips per dwelling. However, as reflected in the above table, the actual rate applied was 0.7 peak hour vehicle trips per dwelling. No description or explanation for the discrepancy is available in the Maunsell report.

B.2.2 Generation/attraction splits

For the base case scenario, it was assumed that the generation/attraction split was 60/40 and for the future scenario 58/42.

B.2.3 Growth Factors

In the calculation of future generation, the traffic generation rates were applied to the future land use, and a growth factor was applied to the total generation of the zones. No explanation was provided in the report as to the assumptions on the growth factors used. The PM peak hour was modelled and the volumes then factored out by 10 to give an indication of ADT.

B.3 Comments

The model is focussed on the PM peak, and is not set up to account for AM peak. Further review of daily traffic count data would be required to support this assumption.

The PM model can be easily updated to reflect the revised development patterns and land use. The issues that need to be resolved in order to update and refine the model are summarized, as follows:

a. Confirm and agree on traffic generation rates to be applied;

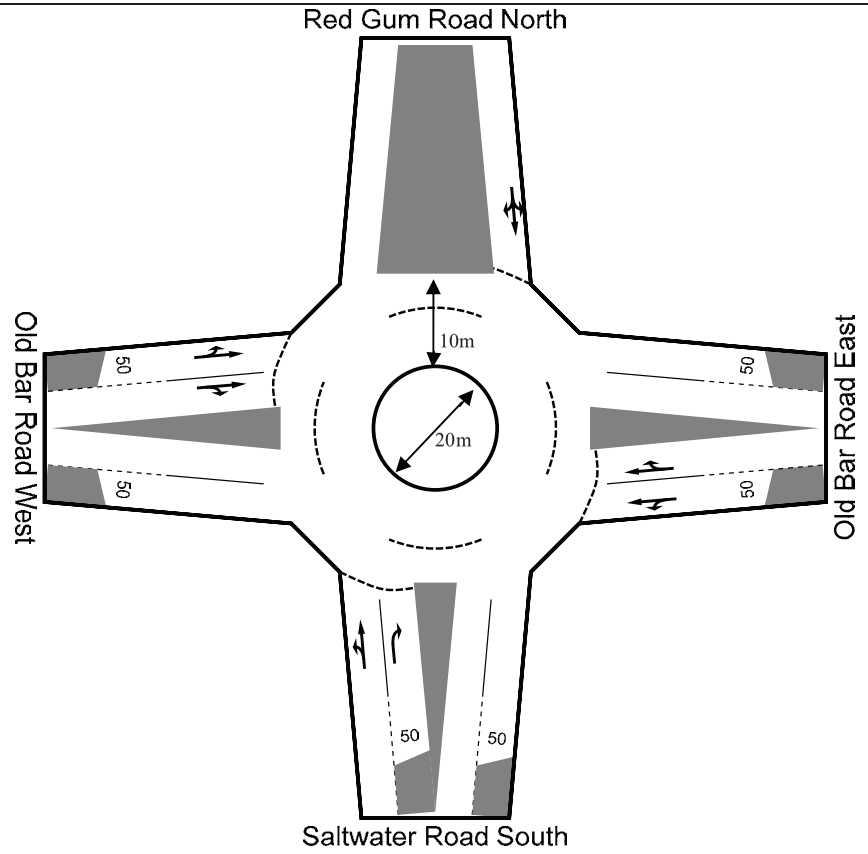
b. Confirm the proposed land use and development intensity for each of the precincts;

c. Confirm future network improvements;

d. Confirm if a transit network layer should be created to model public transport.

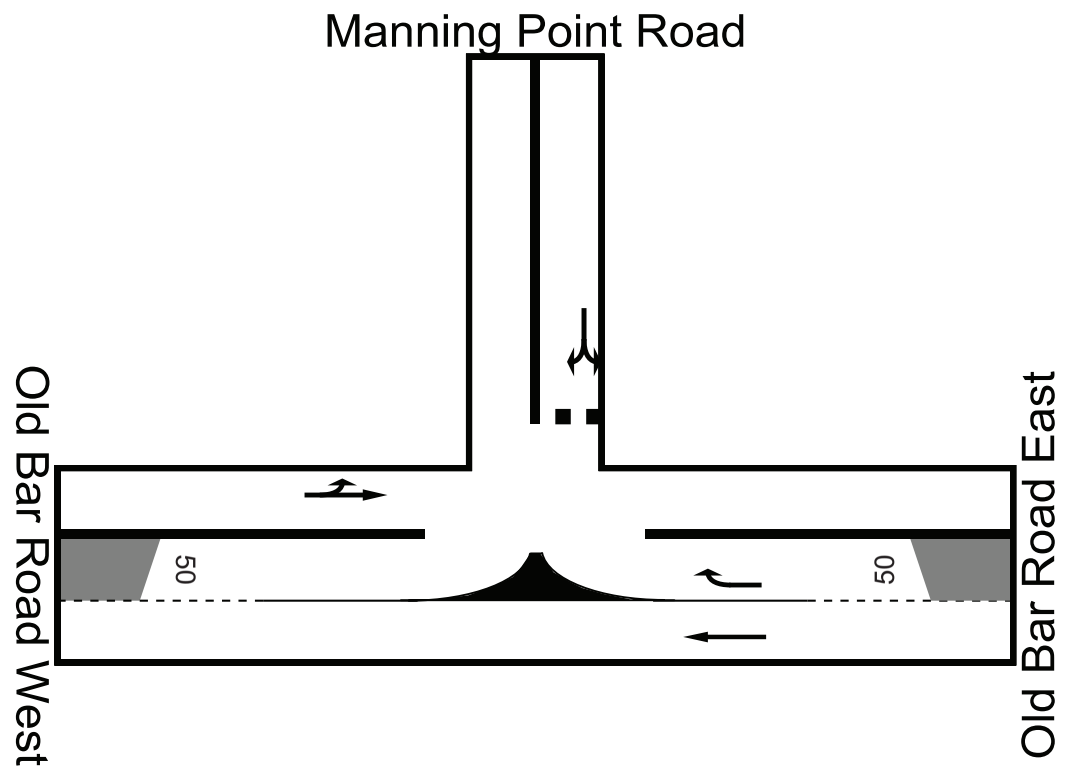
Appendix C - Intersection Layouts

Old Bar Road / Saltwater Road / Red Gum Road



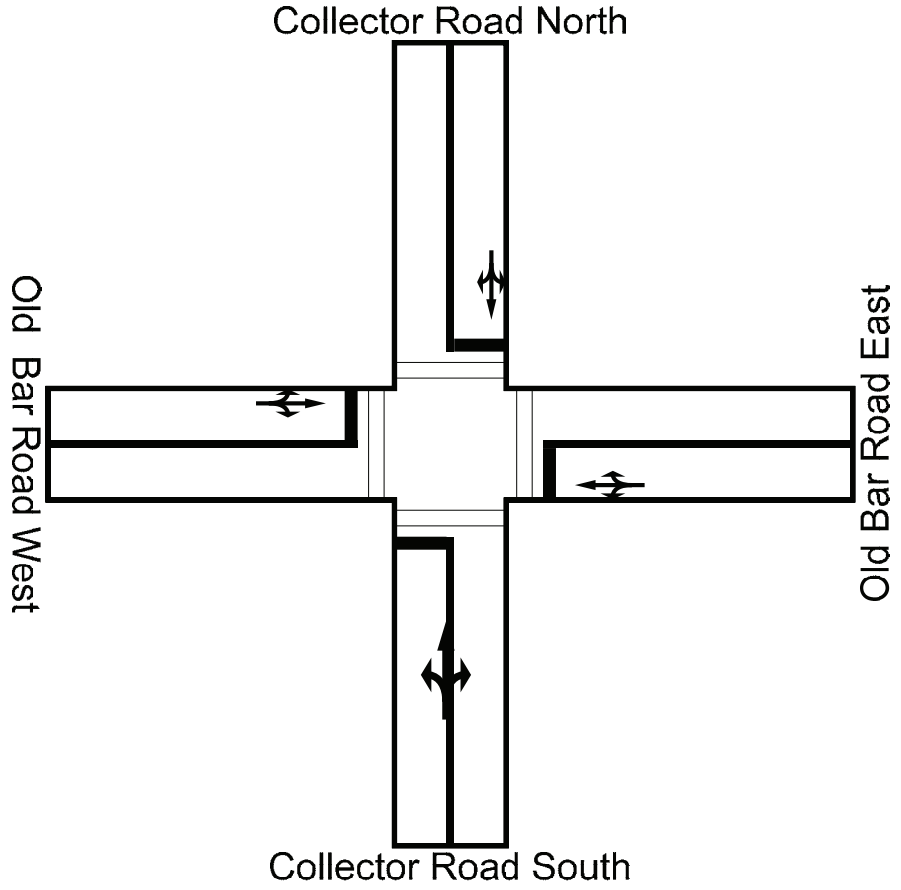
Scenario	LoS	Delay
AM	C	41.3
PM	D	45.1
AM + 15%	C	41.5
PM + 15%	D	46.4

Old Bar Road / Manning Point Road



Scenario	LoS	Delay
AM	A	11.7
PM	A	12.0
AM + 15%	A	11.8
PM + 15%	A	12.2

Old Bar Road / 2B Collector Road - Signals

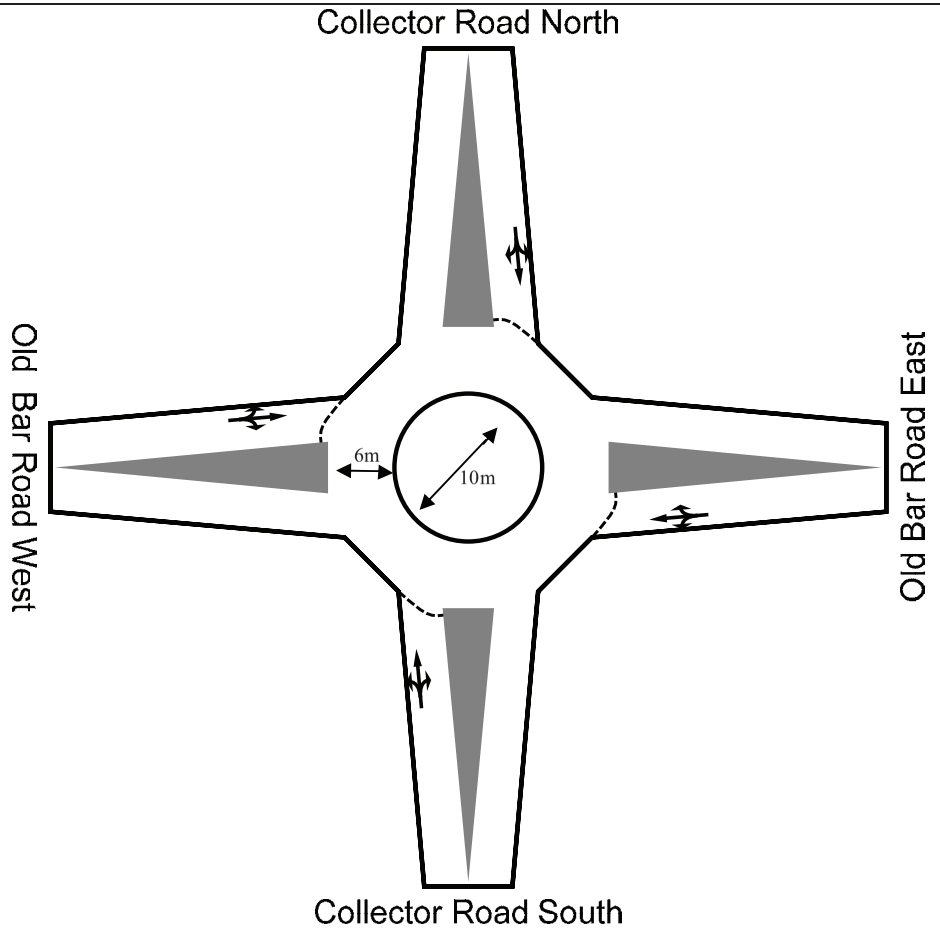


Scenario	LoS	Delay
AM	B	23.5
PM	C	29.7
AM + 15%	C	28.8
PM + 15%	C	36.7

This intersection was modelled with 50 pedestrians on each crossing.

Note: A 5.5 metre median would be provided on all approaches.

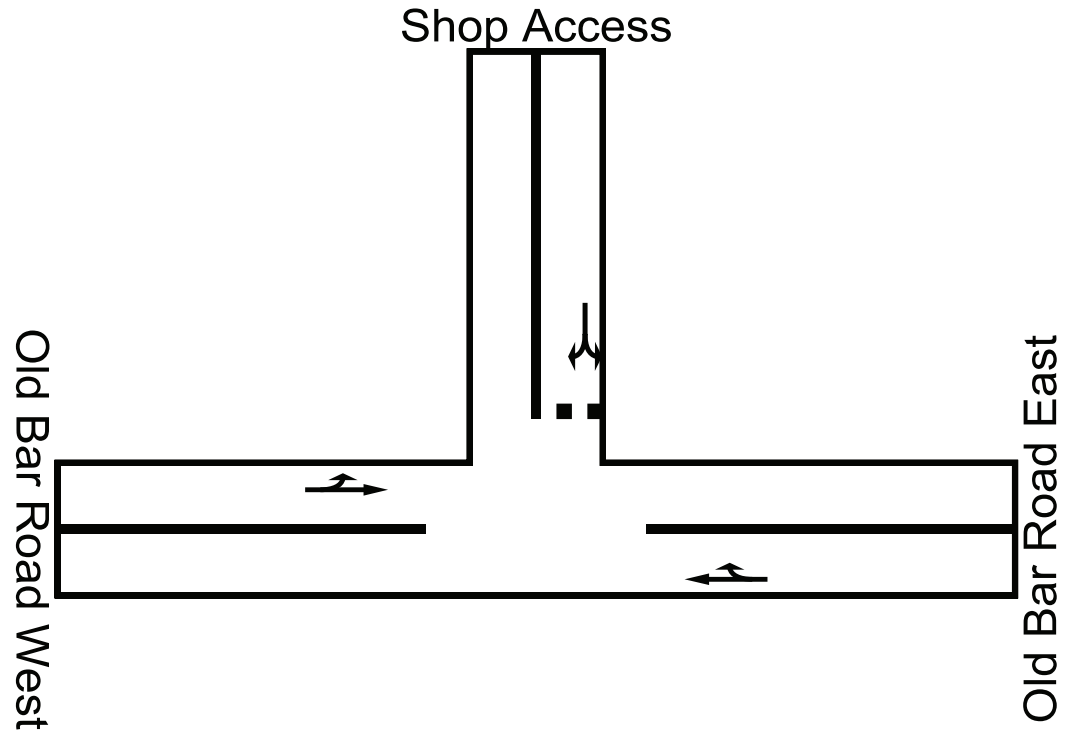
Old Bar Road / 2B Collector Road - Roundabout



Scenario	LoS	Delay
AM	B	17.9
PM	B	18.2
AM + 15%	B	24.0
PM + 15%	C	30.2

Note: A 5.5 metre median would be provided on all approaches.

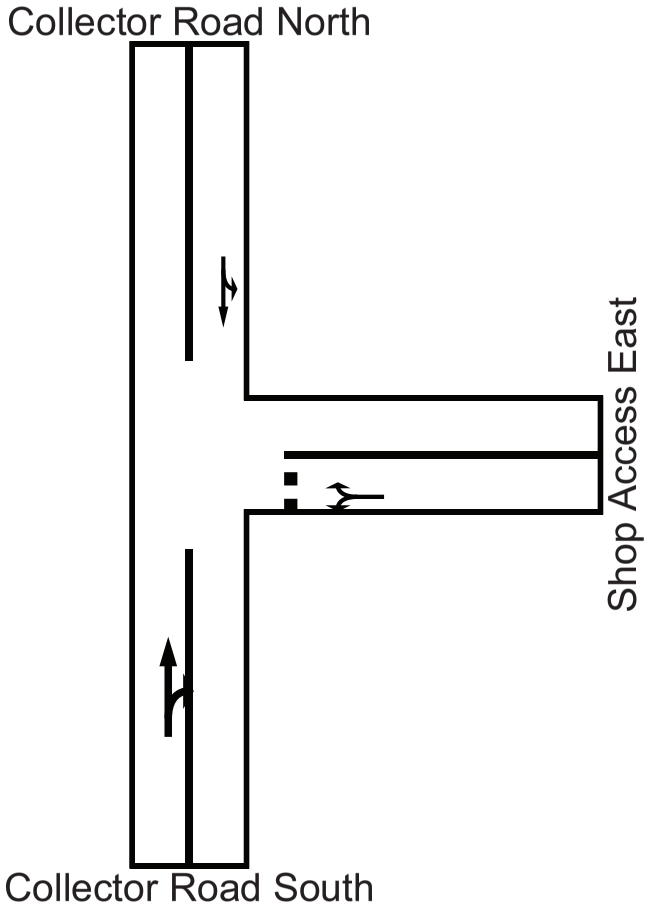
Old Bar Road / 2B Shop Access



Scenario	LoS	Delay
AM	A	9.8
PM	A	11.9
AM + 15%	A	10.2
PM + 15%	A	12.9

Note: A 5.5 metre median would be provided on the eastern and western approaches.

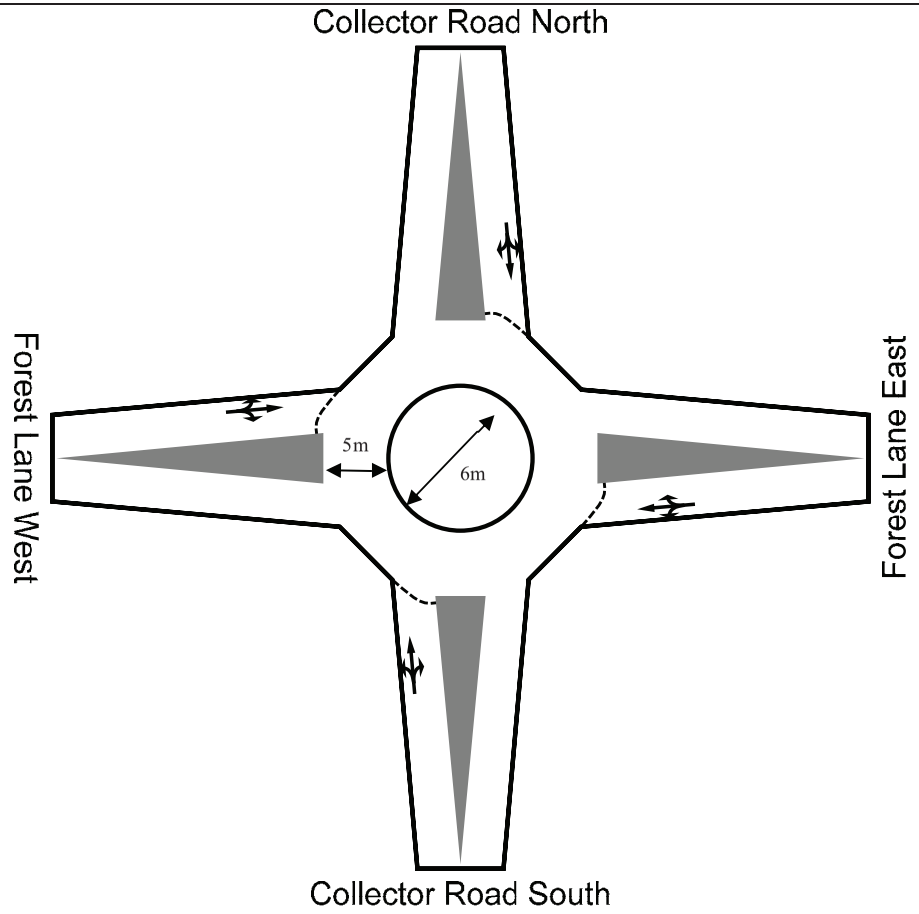
2B Collector Road / 2B Shop Access



Scenario	LoS	Delay
AM	A	11.0
PM	A	10.8
AM + 15%	A	12.1
PM + 15%	A	11.9

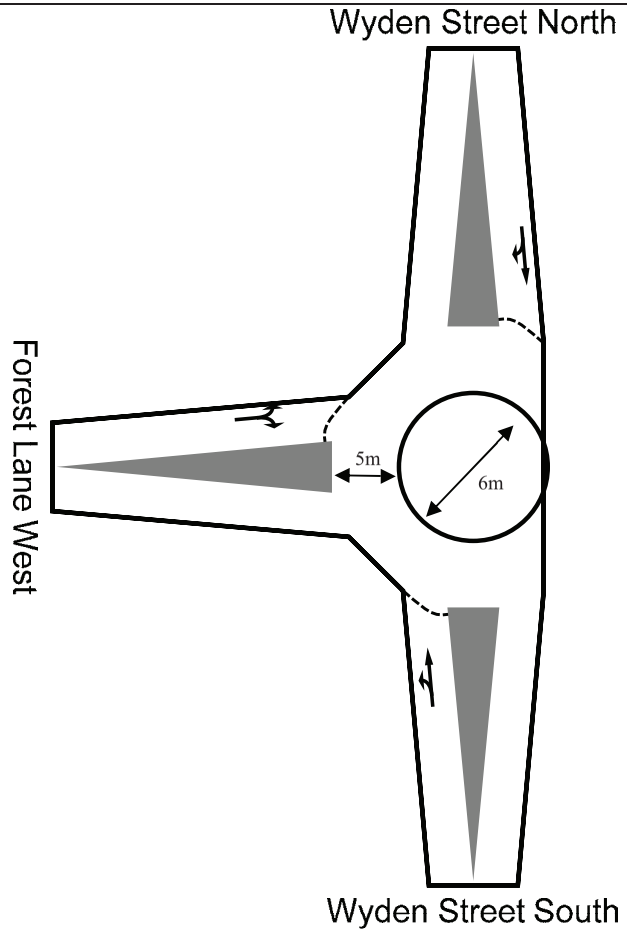
Note: A 5.5 metre median would be provided on the northern and southern approaches.

Forest Lane / Collector Road



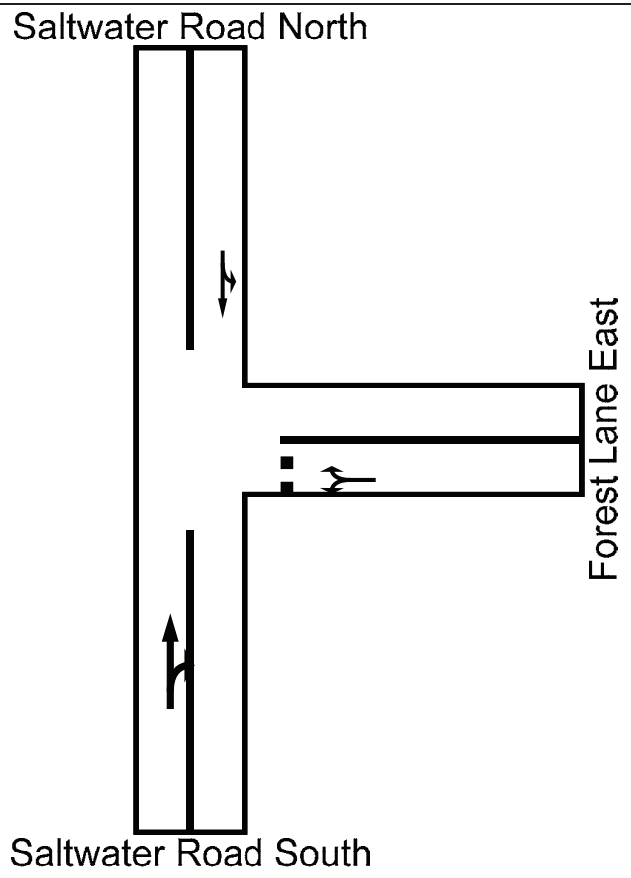
Scenario	LoS	Delay
AM	A	11.4
PM	A	11.4
AM + 15%	A	11.5
PM + 15%	A	11.5

Forest Lane / Wyden Street



Scenario	LoS	Delay
AM	A	11.3
PM	A	11.4
AM + 15%	A	11.3
PM + 15%	A	11.5

Forest Lane / Saltwater Road



Scenario	LoS	Delay
AM	A	11.7
PM	A	12.0
AM + 15%	A	11.8
PM + 15%	A	12.2