

APPENDIX L

Traffic Assessment Report

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Ettalong Beach
218-220 Memorial Avenue & 47-50 The Esplanade
Ettalong Beach Town Centre

Development Application

January 2010

TRAFFIC ASSESSMENT REPORT

FOR

PROPOSED

MIXED USE

DEVELOPMENT

ETTALONG BEACH

21 JANUARY 2010

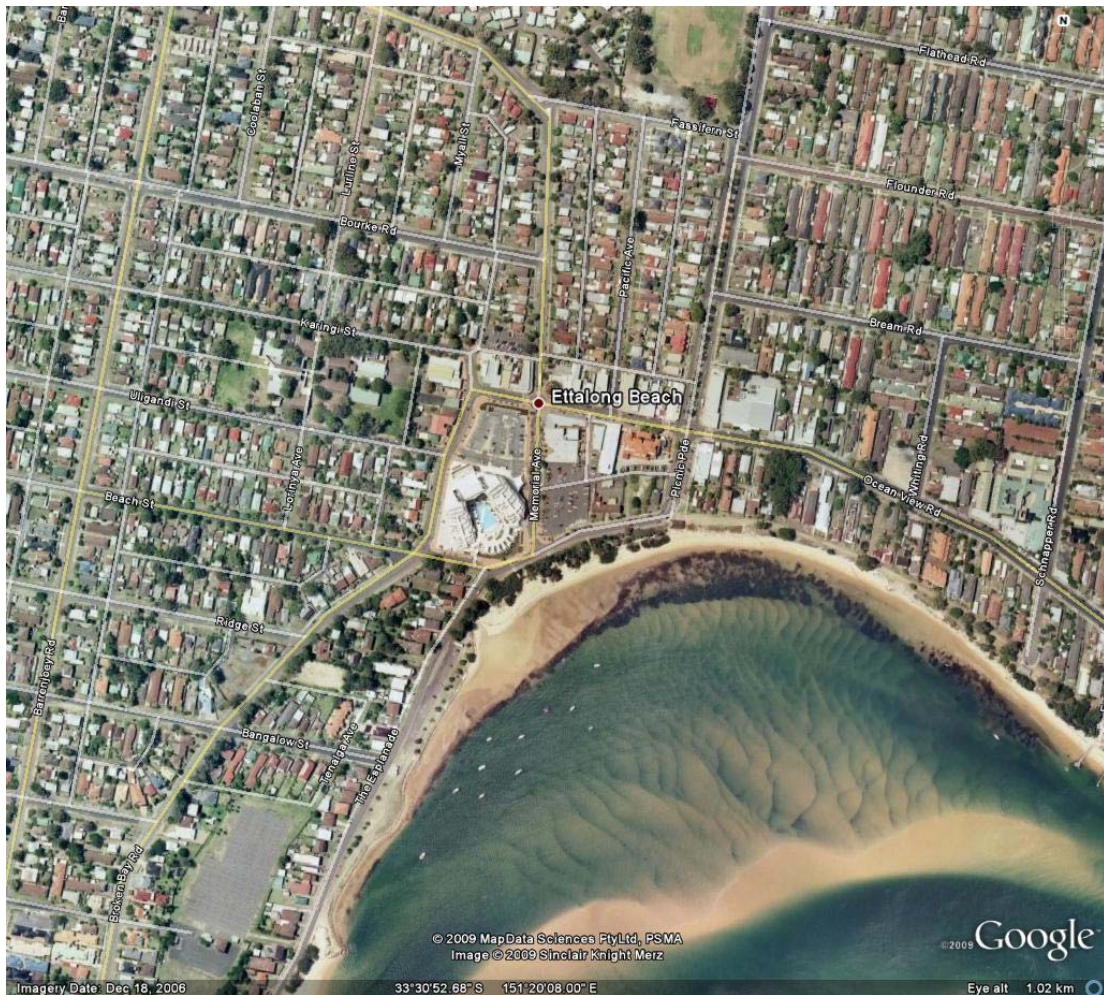
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1.0 INTRODUCTION

The purpose of this Traffic Assessment Report is to evaluate the potential traffic and parking impacts of a proposed mixed use development on the corner of Memorial Ave and The Esplanade, Ettalong Beach.

The proposal involves the development of the land owned by Tesrol Ettalong Pty Ltd (Tesrol) that was previously leased by the Ettalong Beach War Memorial Club as a temporary car park. The new complex will incorporate retail, commercial and residential components, and associated car parking.

2.0 LOCALITY DIAGRAM



3.0 REFERENCE DOCUMENTS

The following documents have been used as references in the preparation of this Traffic Assessment Report:

Australian / New Zealand Standards

- AS2890.1 – 2004 Parking Facilities Part 1: Off-street car parking (*Reference text for car parking dimensions and layout*)
- AS2890.2 – 2002 Parking Facilities Part 2: Off-street commercial vehicle facilities (*Reference text for service vehicle area dimensions and layout*)
- AS2890.6 – 2009 Parking Facilities Part 6: Off-street car parking for people with disabilities (*Reference text for service vehicle area dimensions and layout*)

Gosford City Council Development Control Plans

- DCP No. 111 – Car Parking (*Used as reference for car parking numbers although not directly applicable to high-rise, high density developments*)
- DCP No. 100 – Medium density housing (*Used as reference for car parking numbers although not directly applicable to residential developments in excess of 3 storeys*)

Roads and Traffic Authority

- RTA Guide to Traffic Generating Developments (*Recognised Guide used as reference for traffic generation rates and also for car parking numbers for high-density residential developments*)

4.0 EXISTING USE OF SITE

The existing property consists of open bitumen car parking adjacent to the Outrigger Resort Building which is also the home of the Ettalong Beach War Memorial Club.

The site consists of two areas separated by a public laneway connecting Memorial Avenue and Picnic Parade. The laneway also connects with a short length of north-south laneway that provides access to 18 car spaces associated with businesses in the north-south laneway and businesses along Ocean View Road.

The east-west laneway also provides access to the Ettalong Beach Hotel, which provides 22 at-grade parking spaces and security basement parking for residential units above the Hotel. The lane is also utilised by service vehicles that deliver goods for the IGA supermarket and the BWS retail liquor outlet.

5.0 EXISTING KERBSIDE PARKING

Kerbside parking is currently available along the both sides of Memorial Avenue, both sides of most of The Esplanade, both sides of Beach Street, Ocean View Road, Broken Bay Road and Picnic Parade.

Most parking close to the Ettalong Beach CBD is time-restricted between 8.30am to 6.00pm weekdays, and 8.30am to 12.30pm Saturdays. All kerbside parking is unrestricted after 6pm weekdays and 12.30pm Saturdays.

Kerbside parking is unrestricted along both sides of The Esplanade between Picnic Parade and Memorial Avenue.

Picnic Parade central angle parking is unrestricted along the median close to Bream Street.

Beach Street parking is unrestricted along both sides.

Council's DCP No. 111 provides a concession for visitor parking in the Ettalong area that visitor parking may be provided on-street where safe unrestricted kerbside parking is available within 60 metres of the development.

Unrestricted Kerbside Parking near the proposed Mixed Use Development is tabulated below.

STREET	NO. OF KERBSIDE PARKING SPACES WITHIN 60M OF TESROL SITE
The Esplanade (between Memorial Ave & Picnic Parade) – northern side	24
The Esplanade (between Memorial Ave & Picnic Parade) – southern side	16
Total	40

6.0 ADJACENT DEVELOPMENTS

The Ettalong Beach War Memorial Club is located towards the western end of the Ettalong CBD. There is a variety of retail, commercial and hospitality development along Ocean View Road, Memorial Avenue, The Esplanade and Picnic Parade.

The subject site is within the Ettalong Beach CBD and is zoned part 3(a) – Business General and part 3(b) – Business Special.

Some of the more significant developments close to the Tesrol site are tabulated below.

DEVELOPMENT	COMPONENTS	NO. OF CARPARKS	TIMING	IMPACT
Outrigger Resort	228 units / apartments	349	Existing	<i>Traffic considered in this report. Parking adequate for development</i>
	3,778 m ² club		Existing	<i>Traffic considered in this report. Parking adequate for development</i>
Ettalong Motel	12 rooms	≈ 14	Existing	<i>Existing Traffic considered in this report. Parking adequate for development</i>
Ettalong Beach Hotel	14 apartments	<i>Basement parking unknown</i>	Existing	<i>Existing Traffic considered in this report. Parking adequate for development</i>
	bar/restaurant (areas unknown)	22	Existing	

7.0 PROPOSED DEVELOPMENT

The proposal is to construct a new two-stage mixed-use complex containing commercial and retail space together with residential units above and basement car parking. Stage 2 of the proposed development will involve the construction of a two-storey retail / commercial development on the northern side of the existing east-west laneway between Memorial Avenue and Picnic Parade and open air car parking.

Stage 1 of the proposed development will provide a new seven-storey building which will have frontage to The Esplanade and Memorial Avenue. It is also proposed that the building will be set back from the eastern boundary providing a new 6m wide pedestrian lane way connecting Ocean View Road to The Esplanade and beachfront.

The components of the proposed development will be:

Component	No. of Units / Tenancies	Floor Area (m ²)	No. of Car Spaces
Retail (Stage 1)	7	512	
Retail and Commercial (Stage 2)	Retail Commercial	338 571	
1-bedroom units	5	-	
2-bedroom units	34	-	
3-bedroom units	6	-	
Car Parking			(Stage 1) 81 (Stage 2) 12 Total = 93

The retail spaces will be provided at existing street level. Two of the retail shops will have frontage to Memorial Avenue, one will have frontage Memorial Avenue and also The Esplanade, one will have frontage to The Esplanade and three will have frontage to the north-south lane that connects the east-west lane and Ocean View Road.

The stage 2 retail / commercial building will have frontage to Memorial Avenue

8.0 ACCESS PROVISIONS

It is proposed that vehicular access to the proposed development will be as follows:

- Entry to and exit from the basement parking levels and open parking area of the development and the service area will be via the existing east-west lane, connecting to Memorial Avenue and Picnic Parade.

AS2890.1 – 2004 classifies parking areas according to usage. A Class 1 parking facility is for employee and commuter parking, and is generally for all-day parking. A Class 1A parking facility is for residential, domestic and employee parking. A Class 2 parking facility is for long-term city and town centre parking, sports facilities, entertainment centres, hotels, motels, airport visitors, and is generally medium-term parking.

The parking facility associated with the proposed mixed use development will be a mixture of the uses classified in AS2890.1 - 2004. However, the majority of usage of the site would correspond with a Class 1A parking facility.

The existing laneway operates as a two-way roadway between Memorial Avenue and the existing north-south lane that provides access to shops and cafés just north of the site and some shops along Ocean View Road. The east-west laneway is one-way eastbound between the north-south lane and Picnic Parade.

The official width of the existing east-west lane is approximately 6.1 metres. The east-west laneway is currently delineated by pine fencing that provides a clearance of approximately 5.3 metres between the fences along the two-way section.

AS2890.1 – 2004 recommends the minimum width of a two-way roadway should be 5.5 metres, plus 300mm clearance on each side. The lane way will be utilised by pedestrians to link with the existing north-south laneway and the proposed new pedestrian link to The Esplanade. The existing east-west laneway is currently signposted as two-way between Memorial Avenue and the north-south laneway, and as one-way eastbound between the north-south laneway and Picnic Parade.

The lane way will be utilised by pedestrians to link with the existing north-south laneway and the proposed new pedestrian link to The Esplanade. The width of the laneway is compromised by existing timber street lighting posts and it is therefore desirable to convert the east-west laneway between Memorial Avenue and the north-south laneway to one-way eastbound operation for its entire length. This will enable pedestrian pathways to be incorporated to enhance pedestrian safety.

The minimum width recommended by AS2890.1 – 2004 for a one-way operation is 3.0 metres, plus 300mm clearance on each side.

The minimum width for operation of a medium rigid vehicle or an articulated vehicle recommended in AS2890.2 – 2002 is also 3.5 metres between kerbs.

The proposed building on the southern side of the east-west laneway will be offset from the boundary which will enable pedestrians to walk along the edge of the building as well as providing an indented area for temporary parking for service vehicles.

Although articulated vehicles will not be required to service the proposed development, they do currently access the lane to service the IGA supermarket and the BWS retail liquor outlet that have frontage to Ocean View Road with rear access off the east-west laneway.

9.0 CONSTRUCTION ACCESS

Trucks accessing the site during the excavation and construction phases should utilise Picnic Parade and The Esplanade from Maitland Bay Drive.

This route enables connection to the site without traversing the shopping centre along Ocean View Road and provides easy access via the roundabout at Memorial Avenue / Barrenjoey Road, and the seagull junction at Maitland Bay Drive.

It is intended that construction access will be onto The Esplanade to minimise any traffic impacts adjacent to the driveways on the western side of Memorial Avenue associated with the Ettalong War Memorial Club and Outrigger Resort.

10.0 TRAFFIC ENVIRONMENT ON OCEAN VIEW ROAD

Ocean View Road is a local road connecting Broken Bay Road and Murray Street, and is aligned generally east-west. Ocean View Road is located north of the site and no direct vehicular access will be available to Ocean View Road. Ocean View Road will provide access to the site via other connecting streets.

Ocean View Road has a carriageway width of approximately 12.6 metres kerb through the Ettalong Beach CBD.

Ocean View Road has relatively level grades past the site and a straight alignment through the Ettalong Beach CBD.

There is kerb and gutter along both sides of Ocean View Road in the vicinity of the site.

There is street lighting along Ocean View Road.

There are paved footpaths along both sides of Ocean View Road.

The speed zone on Ocean View Road is 50km/h.

There are bus zones on both sides of Ocean View Road in the Ettalong Beach CBD.

11.0 TRAFFIC ENVIRONMENT ON BROKEN BAY ROAD

Broken Bay Road is a residential street, connecting Barrenjoey Road and Karingi Street. It is aligned generally north-south and is 1 block west of the site. Broken Bay Road will provide access to the site via other connecting streets.

Broken Bay Road has a relatively level gradient for its entire length.

There is kerb and gutter on both sides of Broken Bay Road in the vicinity of the proposed development.

Broken Bay Road has a pavement width of approximately 11.0 metres between kerb faces.

12.0 TRAFFIC ENVIRONMENT ON BEACH STREET

Beach Street is a local street aligned generally east-west, connecting Springwood Street and The Esplanade. The Beach Street junction with Memorial Avenue is a short distance west of the site and will provide access to the site via other connecting streets.

Beach Street has a pavement width of approximately 12.7 metres between kerb faces, reducing to approximately 8.1 metres at the new kerb blisters near The Esplanade.

The speed zone on Beach Street is 50km/h.

A pedestrian crossing has been installed on Beach Street at its junction with The Esplanade.

13.0 TRAFFIC ENVIRONMENT ON MEMORIAL AVENUE

Memorial Avenue is a main access into the Ettalong CBD from Maitland Bay Drive, aligned generally north-south. Memorial Avenue runs along the western side of the site and will provide vehicular access to the east-west laneway, and the car parking and service vehicle area.

Memorial Avenue connects Maitland Bay Drive and The Esplanade.

Memorial Avenue has a pavement width of approximately 11.0 metres between kerb faces.

There are paved footpaths along both sides of Memorial Avenue in the vicinity of the site.

The speed zone on Memorial Avenue is 50km/h.

14.0 TRAFFIC ENVIRONMENT ON THE ESPLANADE

The Esplanade serves a local road function between the Picnic Parade and Norman Street.

The Esplanade has a relatively straight horizontal alignment and a flat gradient past the site, with curves near Picnic Parade and Beach Street. The Esplanade runs along the southern boundary of the site and will provide access to the site via Picnic Parade, Beach Street and Memorial Avenue.

The Esplanade has a variable pavement width of approximately 9.3 metres between Picnic Parade and Memorial Avenue, reducing to approximately 8.4

metres at the new pedestrian crossing between Memorial Avenue and Beach Street.

There are paved footpaths along both sides of The Esplanade between Picnic Parade and Beach Street.

The speed zone on The Esplanade is 50km/h.

The Ettalong Beach Motel is located just east of the site and has all vehicular access to The Esplanade. The existing footpath on the northern side of The Esplanade is relatively narrow and is not conducive to safe pedestrian activity at present. The footpath along the southern side has recently been widened to facilitate safe pedestrian and cycle activity along the waterfront.

15.0 TRAFFIC ENVIRONMENT ON PICNIC PARADE

Picnic Parade serves a local road function between The Esplanade and Maitland Bay Drive. The site has no frontage to Picnic Parade which is generally east of the site. Picnic Parade will provide vehicular egress from the east-west laneway and the car parking area and service vehicle area.

Picnic Parade has a straight horizontal alignment and a relatively flat gradient.

There is 45° front-in angle parking along the centre of Picnic Parade between Ocean View Road and Bream Road. There is 45° front-in angle parking along the eastern side of Picnic Parade between Ocean View Road and The Esplanade. The centre 45° angle parking north of Ocean View Road consists of some timed spaces and also some unrestricted parking spaces at the northern end.

The speed zone on Picnic Parade is 50km/h.

There are bus zones on both sides of Picnic Parade just north of Ocean View Road.

16.0 PUBLIC TRANSPORT ACCESSIBILITY

There are bus stops on both sides of Memorial Avenue adjacent to the proposed development. Busways operates Routes 51, 52, 53, 54, 57, 59 and 60 between Umina, Ettalong Beach and Woy Woy.

The bus trip to and from the stop outside the site and the Woy Woy railway station takes approximately 12 – 15 minutes.

These bus connections will form an important connection for those intending to visit the cafes and restaurants within the proposed development as well as other amenities that surround the site.

The Palm Beach Ferry also provides a commuter service that is an alternative to car transport for some commuters. The Palm Beach Ferry operates seven days a week, leaving Ettalong Beach wharf from 6.00am weekdays, 8.00am Saturdays and 9.30am Sundays. The last service to Palm Beach departs Ettalong Beach at 5.30pm, except during daylight saving periods when the last service departs at 6.40pm Saturdays and Sundays only. The Palm Beach Ferry departs Palm Beach at 6.30am weekdays, 7.30am Saturdays and 9.00am Sundays. The last service from Palm Beach to Ettalong Beach departs Palm Beach at 6.15pm weekdays, and the same time on Saturdays and Sundays during daylight saving hours.

A fast ferry to Circular Quay has previously been proposed and was to have a new jetty located approximately 300 metres from the site. However, it appears that the fast ferry service that would have provided a new convenient transport alternative between Ettalong Beach and Sydney is unlikely to eventuate in the near future.

17.0 PARKING PROVISION

The proposed development will provide 81 off-street car parking spaces and also bicycle parking in stage 1, and a further 12 car spaces in stage 2.

Gosford City Council's DCP 111 - Car Parking, requires parking for stand-alone developments, as follows:

Retail:

1 space per 30 m² gross floor area outside the Gosford CBD

The proposed development will provide seven retail space areas in Stage 1 with a total floor area of 512 m², and a further 338 m² in Stage 2.

Required parking for the retail component of the proposed development, in accordance with DCP No. 111, is therefore

$$512 + 338 = 850 \text{ m}^2 @ 1 \text{ space per } 30 \text{ m}^2 = 28.3 \text{ spaces}$$

Commercial

1 space per 40 m² gross floor area outside the Gosford CBD

The Stage 2 development will provide 571 m² of commercial space.

Required parking for the commercial component of the proposed development, in accordance with DCP No. 111, is therefore

$$571 \text{ m}^2 @ 1 \text{ space per } 40 \text{ m}^2 = 14.3 \text{ spaces}$$

**TOTAL REQUIRED FOR RETAIL AND COMMERCIAL COMPONENTS
(DCP 111)**

**42.6
Say 43 spaces**

Residential Units

The residential component of the proposed development does not fit Council's category for medium-density residential development. However, as Council does not have a category for high-rise high-density residential development outside the Gosford City Centre, the medium-density category has been utilised as an assessment for comparison purposes only.

Parking requirements have therefore been calculated in accordance with Council's DCP 111 using the medium-density housing category, as follows:

Medium-density units

45 units @ 1.5 spaces per unit = 67.5 spaces

Visitors:

45 units @ 1 space per 5 units = 9 spaces *

(Visitor parking may be excluded in Ettalong for a development less than 4 units or where unrestricted kerbside parking is available within 60 metres of the development)

No on-site visitor parking is therefore required, as unrestricted street parking is available within 60 metres of the site (40 spaces).

Total DCP 100 / 111 requirement for the residential component of 45 units would be 67.5 spaces (excluding visitor spaces)

A comparison can also be made with the Category for shop-top housing in DCP 111 which requires parking at a rate of 1 space per dwelling, or 45 spaces if applied to the proposed residential component.

The ready availability of public transport along Memorial Avenue will provide convenient links with rail services at Woy Woy and will be highly attractive to commuters. Many residents will be retirees and many will be one-car families.

Comparison of Residential Parking Requirement with the RTA Guide to Traffic Generating Developments.

The RTA Guide to Traffic Generating Developments designates developments containing more than 20 units as high-density, and can be used as an alternative document to assess the parking requirement for the residential component of the development.

The RTA Guide to Traffic Generating Developments defines metropolitan regional centres (Central Business District) as providing high levels of local employment as well as access to rail and bus services, thus requiring lower parking numbers. The RTA Guide to Traffic Generating Developments does not define a metropolitan sub-regional centre, but it is considered the Ettalong CBD would be considered as a metropolitan sub-regional centre as it does provide some local employment, offers bus transport that also links with train transport at Woy Woy.

Therefore the RTA publication "Guide to Traffic Generating Developments" is a more appropriate benchmark for residential parking assessment in high-density residential developments than DCP No. 111.

The RTA Guide to Traffic Generating Developments recommends the following car parking be provided for high-density residential flat buildings in metropolitan sub-regional centres:

RTA Parking Requirements for Metropolitan Sub-Regional Centres:

- 0.6 spaces per 1 bedroom unit
- 0.9 spaces per 2 bedroom unit
- 1.40 spaces per 3 bedroom unit
- 1 space per 5 units (visitor parking)

Application of the RTA Guidelines to Traffic Generating Developments' parking rates for high-rise residential flat buildings in metropolitan sub-regional centres, would require residential parking at the proposed development as follows:

5	x	1 bedroom units @ 0.6 spaces per unit	= 3 spaces
34	x	2 bedroom units @ 0.9 spaces per unit	= 30.6 spaces
6	x	3 bedroom units @ 1.4 spaces per unit	= 8.4 spaces
Visitors: 45 units @ 1 space per 5 units			= 9 spaces

TOTAL REQUIRED (RTA Guidelines) 51 SPACES

(Visitor parking not required by DCP 111)

Net RTA requirement if visitor parking excluded **42 spaces**

Variation between Peak Requirements.

It is important to consider the following differences in operational peaks of the various components of the proposed development.

Visitor parking during weekday business hours would not normally be at full demand. It is assumed that visitor parking would be maximised after business hours when residents were more likely to be at home, or on weekends.

The retail areas would be closed after business hours weekdays, and possibly after the morning period on Saturdays. The peak activity periods for the commercial areas would not generally coincide with the peak activity periods for the residential development.

The various operational peaks for the proposed development would vary from mid-week working hours to after-hours, as tabulated below:

Assessed Peak Parking Requirements Based on Council's DCP 100 and DCP 111 for All Components

Development Component	Assessed Parking requirement total	Assumed Requirement, business hours weekdays (%)	Number of spaces Required during business hours	Assumed Requirement, after business hours, weekdays (%)	Number of spaces Required
Retail / Commercial	43	100	43	0	0
Residential + Visitors (See note below)	68 (residential + 0 visitor) ¹	Tenants – 100 ² Visitors - 25	68	Tenants - 100 Visitors - 100	68
TOTALS	111		111		68

Notes ¹ Visitor parking not required because of the concessional provision in DCP No. 111 whereby visitor parking can be on-street where unrestricted parking is available within 60 metres of site.

² Although resident car parking would usually be less than 100% utilised during business hours, it is shown as 100% because residential spaces will be allocated to residential units and it would be inappropriate to allocate such spaces for other purposes on a part-time basis.

Assessed Peak Parking Re uirements Based on RTA Guide to Traffic Generating Developments for Residential Component

Development Component	Assessed Parking requirement – total	Assumed Requirement, business hours weekdays (%)	Number of spaces Required during business hours	Assumed Requirement, after business hours, weekdays (%)	Number of spaces Required
Retail / Commercial	43	100	43	0	0
Residential + Visitors (See note below)	51 (42 residential + 9 visitor spaces)	Tenants - 100 Visitors - 25	45	Tenants - 100 Visitors - 100	51
TOTALS	94		88		51

The proposed development will provide a total of 93 off-street car parking spaces in the two stages of the development.

As indicated in the above tabulation, the proposed parking is less (by 18 spaces) than the calculations based on accordance with Council's DCP No. 111 - Car Parking, and DCP 100, during normal business hours, and 25 spaces greater than required after business hours.

However, as discussed earlier in this section, Council's DCP 100 and 111 are not applicable to developments as proposed.

When the residential component is assessed in accordance with the RTA Guide to Traffic Generating Developments for high-rise residential units in a Metropolitan Sub-Regional Centres the number of spaces provided exceeds the number required by 5 spaces during business hours and by 42 spaces after business hours, even with visitor spaces included.

The provision of 93 car spaces will be satisfactory for the proposed mixed use development.

By virtue of the sites location, the additional retail space will become part of the existing Ettalong Beach CBD which contains retail, commercial and hospitality developments. In everyday behaviour, there would be a percentage of customers of the new retail shops who would also be attending the Ettalong Beach CBD for other reasons.

It is reasonable to discount the parking required for the retail and commercial component by approximately 20% to reflect the shared usage of car parking within the Ettalong CBD. This discount also reflects the use of the car parking provided by the Ettalong War Memorial Club for patrons who may also attend adjacent retail and commercial establishments in the Ettalong CBD during their visits.

The recommended level of car parking necessary for the proposed mixed use development is therefore:

<u>Retail / Commercial:</u>	43 spaces x 0.8 (discounted)	= 35 spaces
<u>Residential</u>	(as outlined above)	= 51 spaces

Total Minimum Parking Recommended 86 spaces

The proposed parking complies with the requirements of the RTA Guide to Traffic Generating Developments for Metropolitan Sub-Regional Centres for high-density residential flat buildings.

The provision of 93 car spaces would be satisfactory and there is unrestricted kerbside parking within 60 metres of the site. The provision of 93 car spaces is 7 spaces greater than the assessed discounted requirement.

The provision of 93 car spaces would adequately satisfy parking demand associated with the proposed development.

The basement car parking areas have been designed in accordance with AS2890.1 – 2004. Parking bay widths comply with the AS2890.1 – 2004 requirements.

The design requirements of AS2890.6 – 2009 will also be generally complied with. However, the requirement for 2.5 metres headroom above each disabled space cannot be provided as the design was prepared prior to the recently issued AS2890.1 – 2009 and it would be unreasonable for that requirement to be applicable to this development.

Aisle widths will comply with AS2890.1 – 2004 requirements.

The service area has been designed to enable service vehicles to enter and leave in a forward direction via the east-west laneway.

The service area will be located on the southern side of the east-west laneway, and clear of the laneway. The service area will not impede the laneway for other motorists needing to access existing developments such as cafés and shops adjacent to the north-south laneway connection, and also the Ettalong Beach Hotel.

The service area for the proposed development will separate service vehicles from cars needing to access the car parking areas below the building.

The internal aisles have been designed as two-way aisles in accordance with AS2890.1 – 2004.

18.0 TRAFFIC GENERATION FROM PROPOSED DEVELOPMENT

The proposed development provides for retail space at street level, commercial space in level 2 of stage 2 and residential units above the retail level of stage 1. Traffic generation from the proposed mixed use development has been calculated in accordance with the RTA publication "Guide to Traffic Generating Developments", where data is available.

This publication indicates that traffic generation for the various components of mixed use development would be as follows:

Retail:

RTA Guidelines to Traffic Generating Developments suggest the following traffic generation rates for specialty retail shops in shopping centres:

The traffic generation rates for specialty shops in shopping centres during the Friday evening peak is: → 56 trips per 1,000 m²

The GFA of the proposed retail spaces (Stages 1 and 2) will be 850 m². The estimated peak hour traffic generation is therefore approximately:

850 m² @ 56 trips per 1,000 m² → 47.6

48 trips per hour.

Commercial

The RTA Guidelines for Traffic Generating Developments suggests the following traffic generation rates for commercial developments:

Evening peak hour vehicle trips = 2 per 100 m² gross floor area.

Daily vehicle trips = 10 per 100m² gross floor area

The approximate total floor area of the commercial tenancy will be 571 m²

Evening peak hour traffic generation from the three cafés will be:

571 m² @ 2 trips per 100 m²

= 11.4 trips per hour

Residential Units

RTA Guidelines to Traffic Generating Developments suggests the following traffic generation rates for medium density residential units:

Smaller units and flats (up to 2 bedrooms)

Daily vehicle trips = 4-5 per dwelling

Evening peak hour vehicle trips = 0.4-0.5 per dwelling

Larger units and townhouses (3 or more bedrooms)

Daily vehicle trips = 5.0-6.5 per dwelling

Evening peak hour vehicle trips = 0.5-0.65 per dwelling

5	x	1 bedroom units @ 0.5 trips per unit	= 2.5 trips
34	x	2 bedroom units @ 0.5 trips per unit	= 17 trips
6	x	3 bedroom units @ 0.65 trips per unit	= <u>3.9 trips</u>
Total Residential			= 23.4 trips
			Say 23 trips

That is, the evening peak hour traffic generation resulting from all of the components of the proposed development would therefore be approximately:

- Eighty-two (82) trips in the morning peak, and
- Eighty-two (82) trips in the evening peak,

(based on RTA Guidelines for Traffic Generating Developments.)

It should however be noted that the proposed retail space will become part of the Ettalong CBD retail and commercial development and will attract the majority of customers from those already attending the Ettalong CBD for other reasons. The estimated traffic generation above is therefore considered to be an overestimate of traffic generation that will eventuate from the proposed development.

The Traffic and Parking Report published by Sinclair Knight Merz (SKM) for the recently built Outrigger Resort development indicated that traffic associated with the resort hotel could possibly be reduced by 50% because of public transport use, coach and tour operators, the proposed fast ferry, courtesy bus operation and cross use of facilities. The SKM Report published the following table:

Table 5 – Reductions for Future Traffic Flows

Transport Item	Reduction Value
Public Transport	5%
Coach Tours	30%
Courtesy Bus	5%
Cross-use	5%
Fast Ferry	5%
Total reductions	50%

The discounting factors for the proposed mixed use development would be slightly different to those for the Outrigger Resort. Coach and tour operations may provide some reduction for the retail component as a result of visitors to the Outrigger Resort also utilising the proposed / existing retail areas, and also the existing cafés. Public transport would enable some residents to travel to other regions by connecting with train services at Woy Woy, and the use of the Palm Beach ferry and possible future fast ferry to Sydney. There would also be some cross-use between retail and commercial areas and hospitality developments throughout the Ettalong CBD and the proposed retail spaces.

The fast ferry discounting will not be considered as part of the traffic generation discounting because it would only generally apply to the residential component and would be subject to the future implementation of the fast ferry service.

I recommend discounting the residential traffic generation by 10% to reflect public transport usage and location of the development in the Ettalong CBD which would provide a reduction of trips associated with local services such as banks, restaurants and shops.

I suggest that the discounting of the retail commercial traffic generation could be 20% to reflect public transport usage, the impact of coach tours associated with the Outrigger Resort and the cross-use associated with attendance by customers of other retail and commercial establishments whilst in the Ettalong CBD.

The suggested discounted traffic generation associated with the mixed use development is therefore:

Retail / Commercial:	59 trips x 0.8 (<i>discount factor</i>)	47 trips
Residential	23 trips x 0.9 (<i>discount factor</i>)	21 trips

Estimated Discounted Traffic Generation 68 trips

19.0 ORIGIN / DESTINATION CONSIDERATIONS

Based on traffic patterns along Memorial Avenue, Broken Bay Road, Beach Street, Ocean View Road and The Esplanade and the location of the Tesrol site relative to adjacent residential areas and the likely trip demands of residents, tenants or customers, it is estimated that the proportion of inward and outward trips would be as follows:

Morning Peak:

Retail Shops / Commercial

Inward → ≈ 75%

Outward → ≈ 25%

Residential Units

Inward → ≈ 20%

Outward → ≈ 80%

Evening Peak:

Inward → ≈ 25%

Outward → ≈ 75%

Inward → ≈ 80%

Outward → ≈ 20%

That is, the suggested trip patterns would be:

AM Peak Hour

Inward Trips 40 trips

Outward trips 28 trips

PM Peak Hour

Inward Trips 28 trips

Outward trips 40 trips

The location of the proposed development in the Ettalong Beach CBD suggests that trips may be evenly distributed towards the south, north and west.

Arrivals:

Traffic arriving to the Ettalong Town Centre from areas north and east of Ettalong Beach may use Memorial Avenue and Maitland Bay Drive.

Arrivals from areas generally west may use several local streets culminating in Broken Bay Road or The Esplanade.

Departures:

All departures from the Tesrol development will be via the one-way laneway onto Picnic Parade.

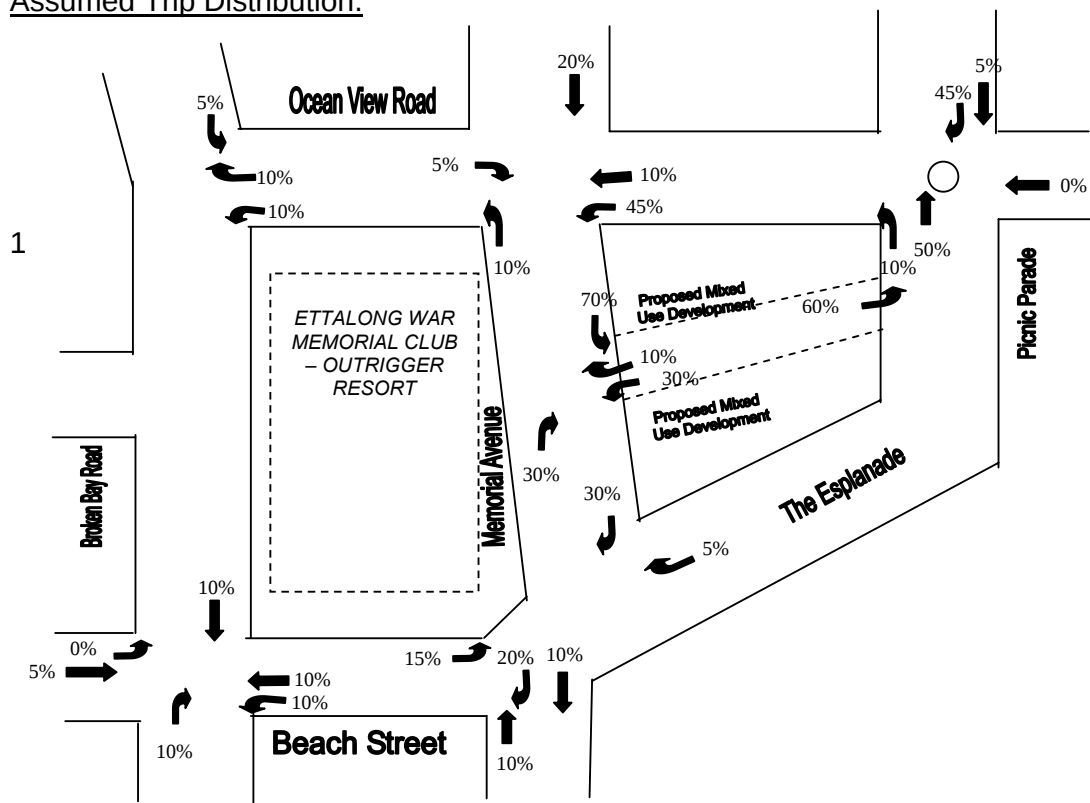
Departures towards areas generally west may utilise either Ocean View Road or The Esplanade and Beach Street.

Departures towards areas generally east may use Ocean View Road or Picnic Parade and Maitland Bay Drive.

Departures towards areas generally north may travel north on Picnic Parade to Maitland Bay Drive.

The assumed average distribution of additional trips associated with the proposed development is shown diagrammatically below:

Assumed Trip Distribution.



Distribution of trips based on the above split are shown for the AM and PM peaks on the following diagrams.

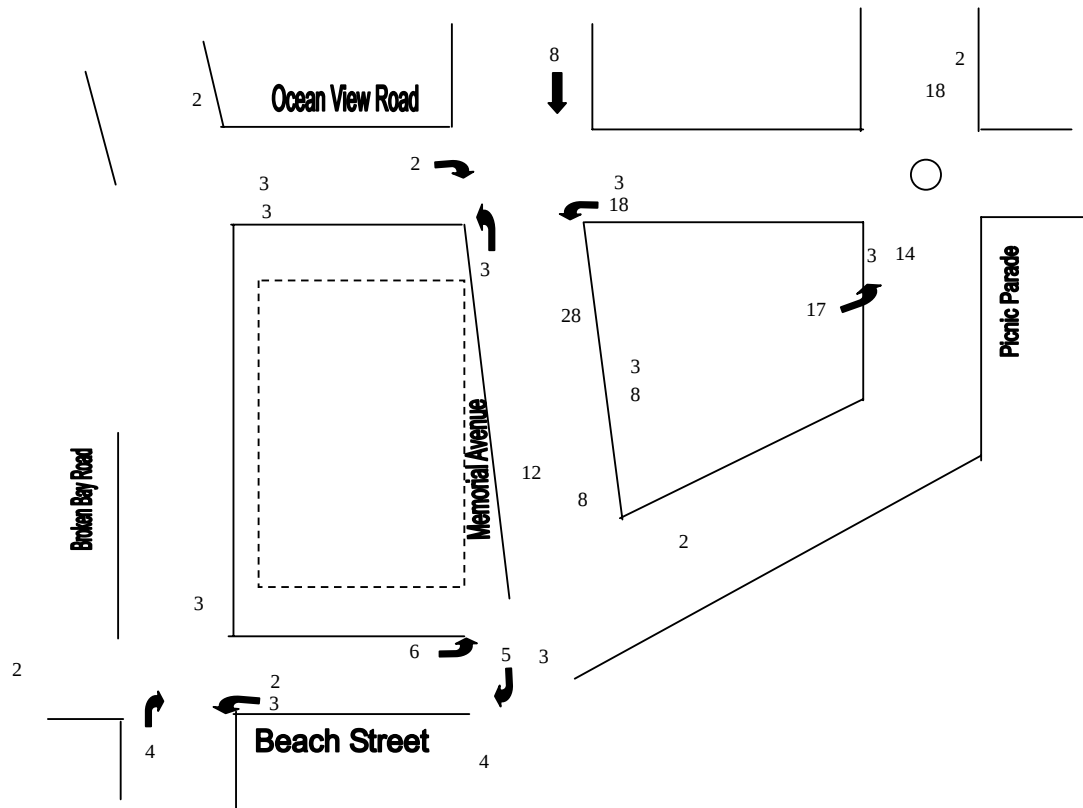
Although these trip patterns would not remain constant, they represent a reasonable average distribution of trips associated with the proposed development considering the various intersections, and roads in and adjacent to the Ettalong Beach CBD.

AM Peak Hour

Assumed Average Traffic Distribution for Proposed Mixed Use Development

40 Inward Trips

28 Outward Trips

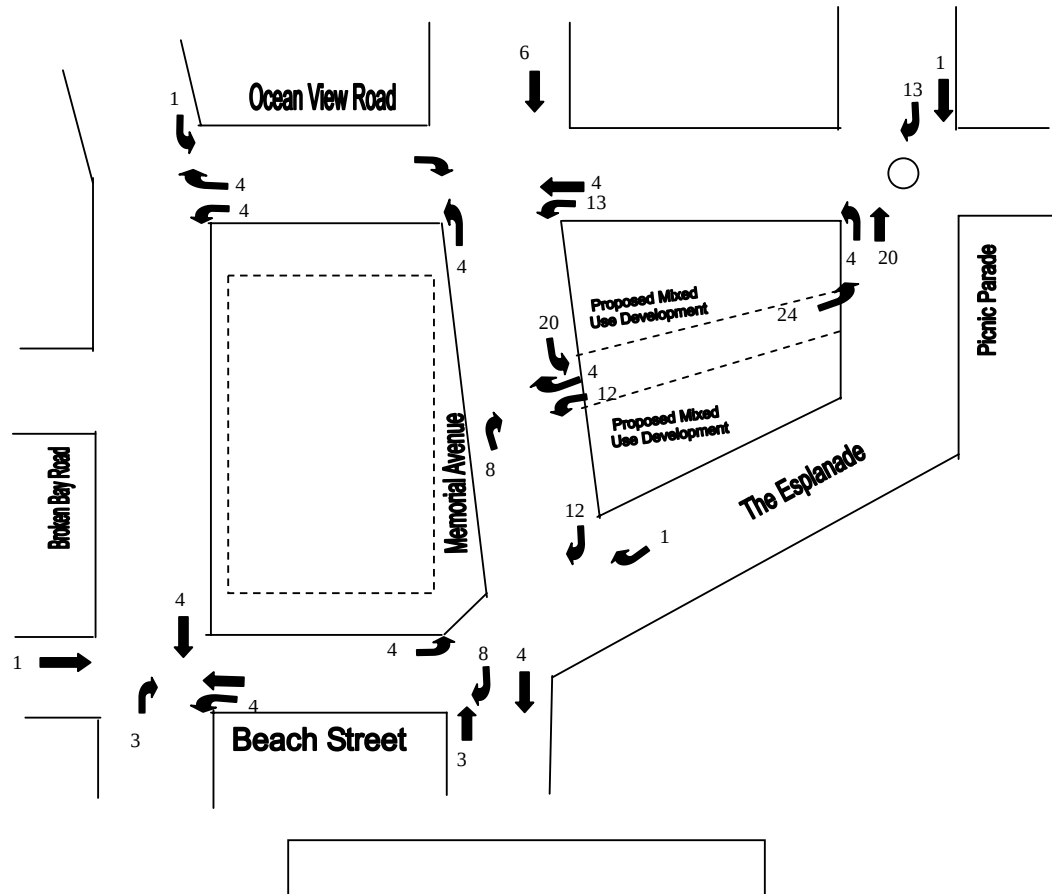


PM Peak Hour

Assumed Average Traffic Distribution for Proposed Mixed Use Development

28 Inward Trips

40 Outward Trips



As shown in the above diagram, the additional traffic estimated to be generated by the proposed mixed use development would be distributed around several intersections in the Ettalong Beach area. Although the above distribution would not be static, it is likely that the distribution would not vary markedly from that assumed in normal circumstances.

20.0 PEDESTRIAN FACILITIES

Footpaths along Broken Bay Road, Memorial Avenue, Ocean View Road, Picnic Parade, The Esplanade and Beach Street are paved along both sides.

The majority of pedestrian activity in The Esplanade and Memorial Avenue is associated with persons accessing the existing retail / commercial / cafes developments in the Ettalong CBD or exercising along the foreshore reserve.

The intersection of Ocean View Road and Memorial Avenue has pedestrian crossings on all four legs of the intersection.

A pedestrian crossing has been provided on The Esplanade between Memorial Avenue and Beach Street. Similarly, pedestrian crossings have also been provided on Beach Street and Memorial Avenue near The Esplanade.

The existing and proposed pedestrian facilities in the Ettalong Beach CBD will adequately cater for the increased pedestrian activity that will be associated with the proposed development.

The Tesrol development will provide a new pedestrian link between the existing north-south laneway and The Esplanade along the eastern boundary next to the Ettalong Beach Motel. This will provide a convenient pedestrian link to the waterfront and enhance the visual amenity of the Ettalong Beach area via the new view corridor from Ocean View Road.

21.0 STATE ENVIRONMENTAL PLANNING POLICY NO. 66 (SEPP)

The proposed residential development provides frontage to Memorial Avenue and The Esplanade.

The proposed development will offer convenient access to bus stops on Ocean View Road and there are also bus stops on Memorial Avenue immediately adjacent to the site. There are a reasonable number of bus routes that operate along Ocean View Road and Memorial Avenue.

The site is well serviced by public transport and is highly accessible to a range of services within the Ettalong Beach CBD. In this regard the proposed development is consistent with the intention of the Integrated Land Use and Transport Package including SEPP 66, which seeks to locate higher density residential development in locations that benefit from good access to public transport and services.

22.0 SERVICING REQUIREMENTS

The servicing requirements of the various components of the proposed mixed use development will be minimal.

As discussed earlier in this report, the components of the proposed mixed use development are:

- Retail shops
- Commercial space
- Residential Units

Residential Units

Apart from initial furniture deliveries and equipment when the building is being commissioned, ongoing requirements for the residential units would be minimal.

Servicing requirements are likely to involve cleaners, miscellaneous supplies, couriers and similar small volume deliveries. Servicing would be carried out using small rigid trucks or light vans.

Retail and Commercial

Servicing of the retail shops and commercial space will be via the loading area located on the southern side of the east-west laneway at street level, clear of the laneway boundary. The retail shops would require servicing by small rigid trucks or vans only.

Garbage / Waste Management

Each floor of the development will have garbage chutes that will enable garbage to be deposited into garbage rooms on the ground floor.

The garbage rooms will contain a rotational compactor where 5 standard bins will be positioned on a turntable, compacted and rotated when full.

A caretaker will collect full bins and deliver them to the loading area on the southern side of the east-west lane for emptying.

Garbage storage rooms will be located in the ground floor car parking area and bins will be collected by a garbage truck that will enter the east-west lane via Memorial Avenue and exit onto Picnic Parade.

23.0 SIGHT DISTANCE CONSIDERATIONS

Sight distances at the proposed exit driveways for the development are as follows:

Memorial Avenue / Laneway

Towards the right (north)	> 100 metres #
Towards the left (south)	≈ 45 metres*

Picnic Parade – Laneway

Towards the right (south)	≈ 45 metres
Towards the left (north)	> 100 metres

Notes # : *Sight distance towards the right is past the intersection at Ocean View Road. Traffic entering Memorial Avenue does so at relatively low speeds after negotiating the intersection.*

Sight distance towards the left is to the junction with The Esplanade. Traffic entering Memorial Avenue does so at relatively low speeds after negotiating the intersection.

AS2890.1 - 2004 suggests sight distances should be provided as follows:

Frontage Road Speed (km/h)	Minimum Sight Distance	Desirable Sight Distance
50	45	69

Sight distances comply with AS2890.1 - 2004 recommendations for the traffic environment on Memorial Avenue and Picnic Parade. Traffic entering Memorial Avenue from Ocean View Road and The Esplanade does so at speeds slower than 40km/h as a result of negotiating the corners and having to yield to traffic on Ocean View Road.

Traffic turning left from The Esplanade into Picnic Parade must do so at relatively slow speeds and the sight distance towards the right at the exit from the east-west laneway is therefore acceptable.

24.0 TRAFFIC VOLUMES AT BROKEN BAY ROAD / OCEAN VIEW ROAD

Traffic volumes at the intersection of Broken Bay Road and Ocean View Road were recorded by Sinclair Knight Merz and published in their traffic and Parking Report dated April 1998.

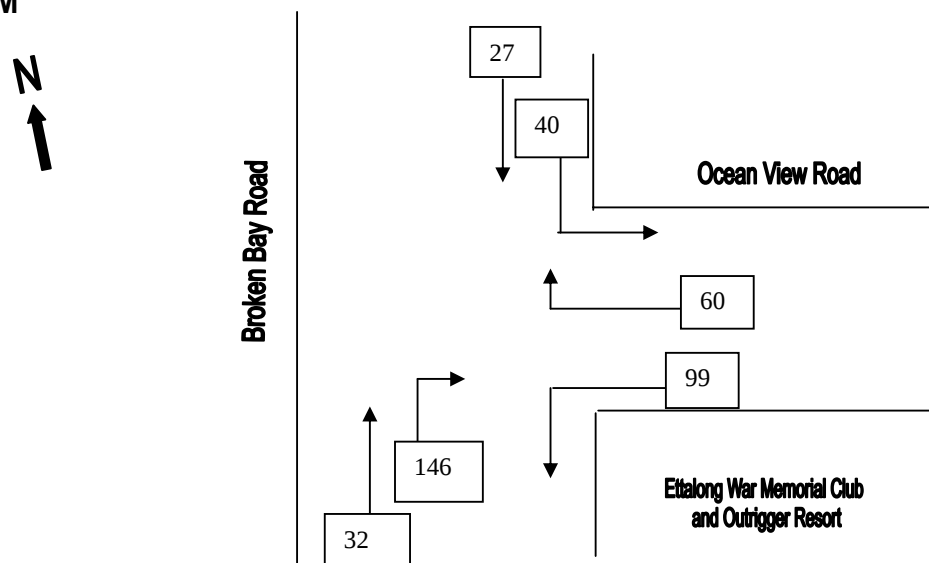
The intersection counts were undertaken at the following times:

4.00 and 7.00pm.

Peak Friday evening intersection volumes were found to be between 4.15 and 5.15 pm.

The 1998 traffic volumes at the intersection of Ocean View Road and Broken Bay Road are shown diagrammatically below:

4.15-5.15 PM
(1998)



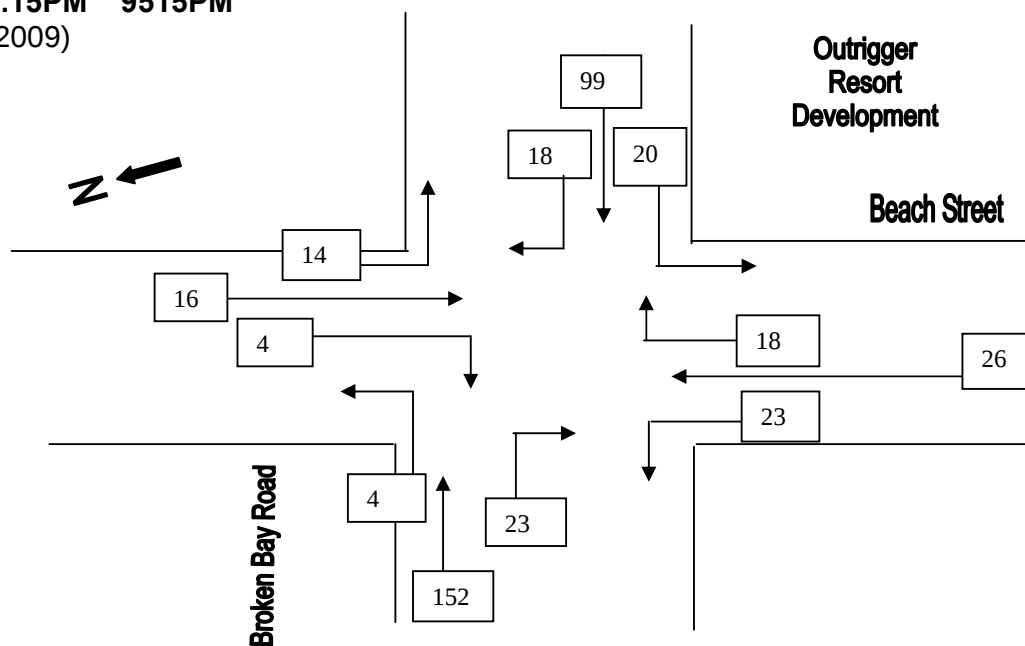
25.0 TRAFFIC VOLUMES AT BROKEN BAY ROAD / BEACH STREET

Traffic volumes at the intersection of Broken Bay Road and Ocean View Road were recorded by Sinclair Knight Merz and published in their Traffic and Parking Report dated April 1998.

Peak Friday evening hourly traffic volumes during the survey period was found to be between 4.15pm and 5.15pm.

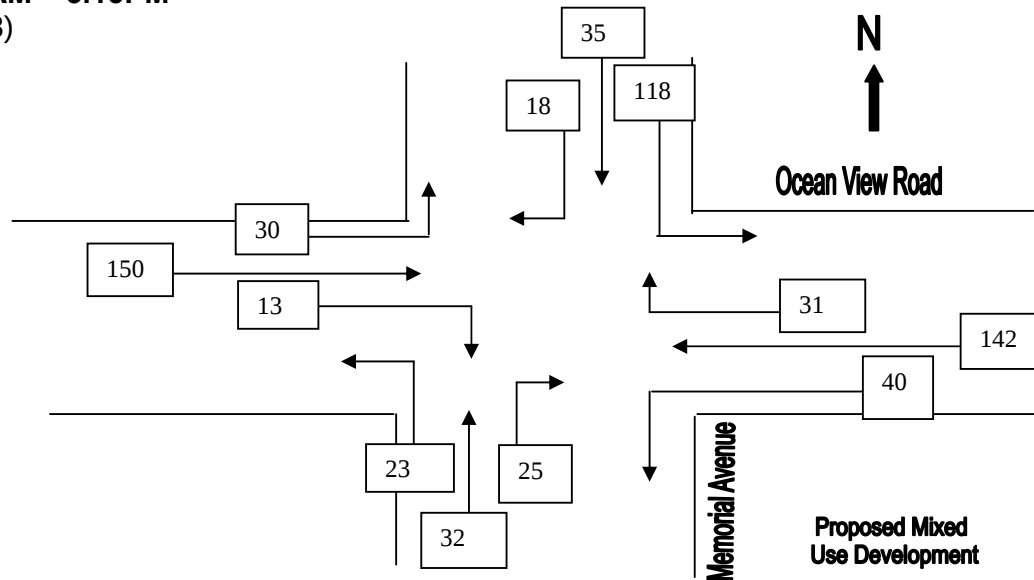
The 1998 peak hourly traffic volumes have been increased by an annual growth rate of 2% to represent the 2009 traffic volumes.

4.15PM 9515PM
(2009)



26.0 TRAFFIC VOLUMES AT OCEAN VIEW ROAD / MEMORIAL AVENUE

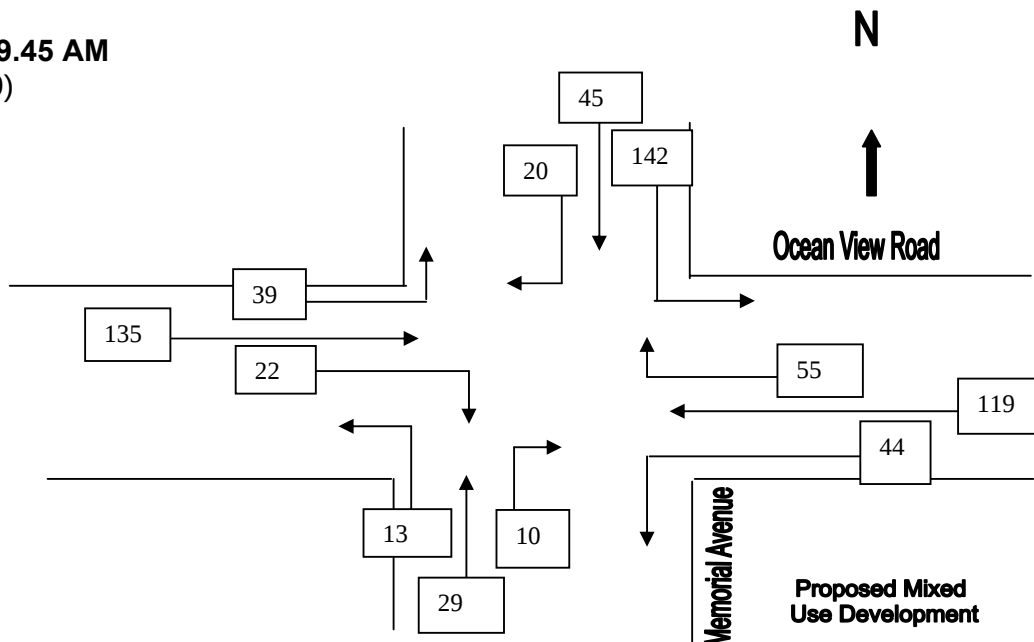
4.15AM 5.15PM
(1998)



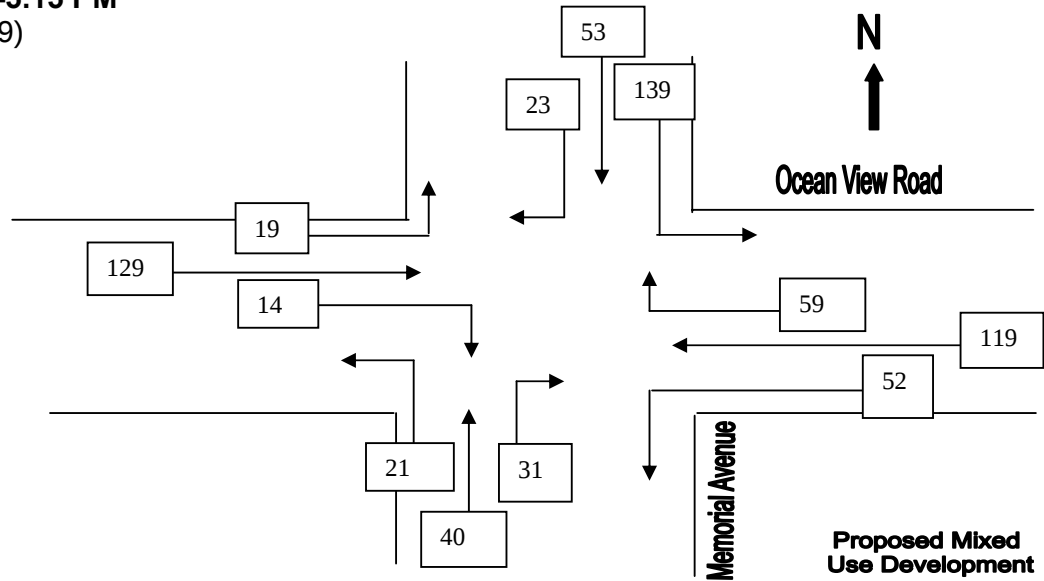
Additional traffic surveys were also undertaken at this intersection on Friday 11 February 2005 to check that traffic volumes have not altered substantially since the SKM surveys in 1998. The surveys were undertaken between 8.00am and 10.00am, and also between 3.30pm and 5.30pm.

Peak hourly volumes at the intersection were found to be between 8.45am and 9.45am, and also between 4.15pm and 5.15pm.

8.45-9.45 AM
(2009)



4.15-5.15 PM
(2009)



Traffic volumes in the Ettalong CBD in 2005 had not varied substantially since the SKM traffic surveys in 1998 and would not have altered substantially since 2005. Some volumes actually decreased between 1998 and 2005.

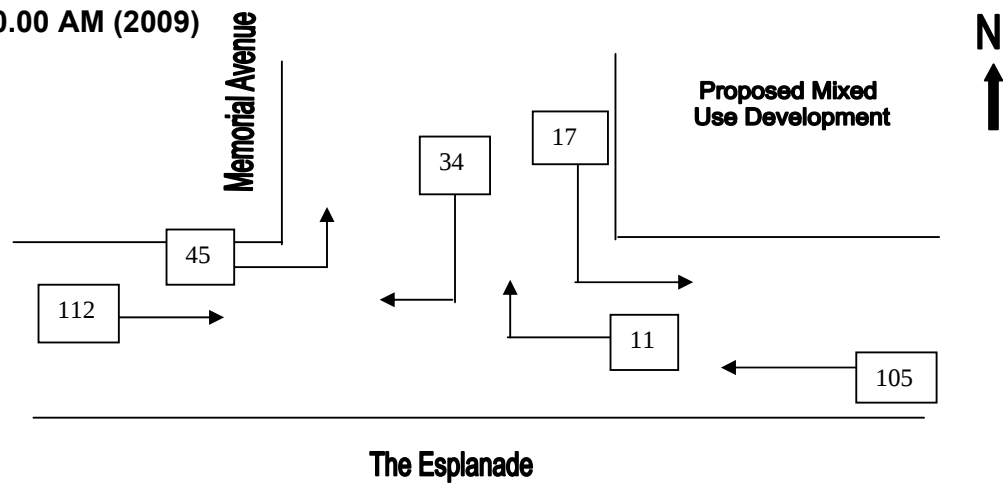
The 2005 traffic volumes have been increased by an annual growth rate of 2% to represent the 2009 traffic volumes.

27.0 TRAFFIC VOLUMES AT MEMORIAL AVENUE AND THE ESPLANADE

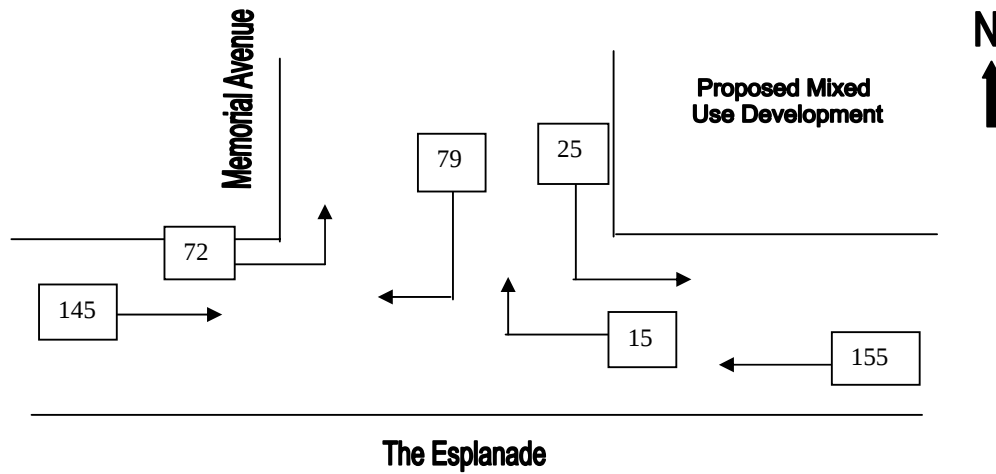
Traffic surveys were also undertaken at this intersection on Friday 11 February 2005 to check that traffic volumes have not altered substantially since the SKM surveys in 1998. The February 2005 surveys were undertaken between 8.00am and 10.00am, and also between 3.30pm and 5.30pm.

Peak hourly volumes at the intersection were found to be between 9.00am and 10.00am, and also between 3.45pm and 4.45pm, and are shown diagrammatically below. The 2005 traffic volumes have been increased by 10% to reflect traffic growth since 2005.

9.00-10.00 AM (2009)



3.45-4.45 PM (2009)



28.0 TRAFFIC VOLUMES AT OCEAN VIEW ROAD AND PICNIC PARADE

Traffic volumes at the intersection of Picnic Parade and Ocean View Road were surveyed on 25 November 2004.

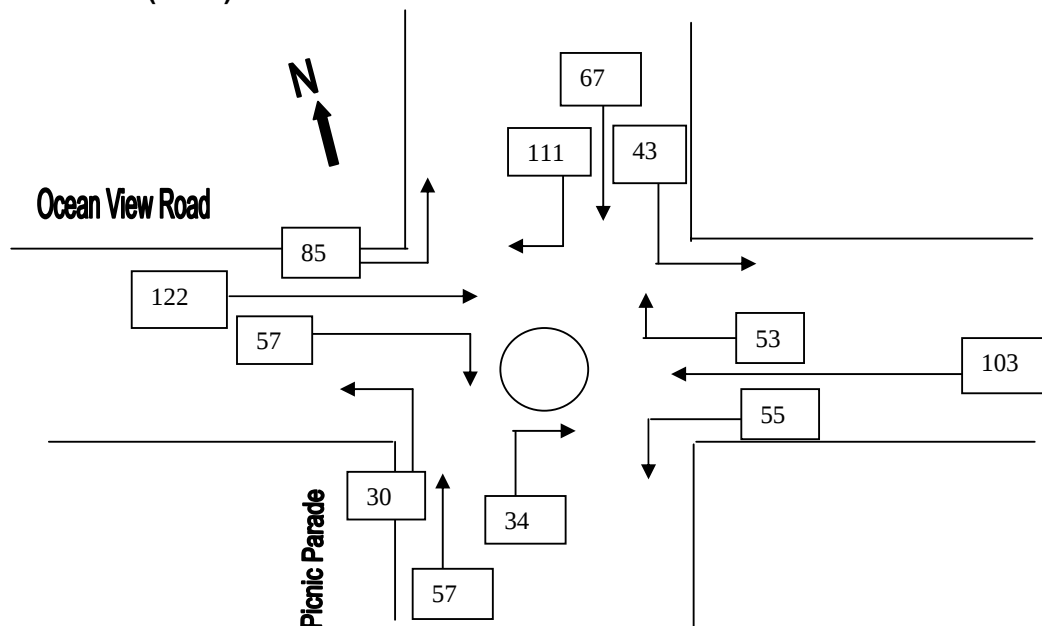
The intersection surveys were undertaken at the following times:

8.00am to 10.00am.
3.30pm to 5.30pm

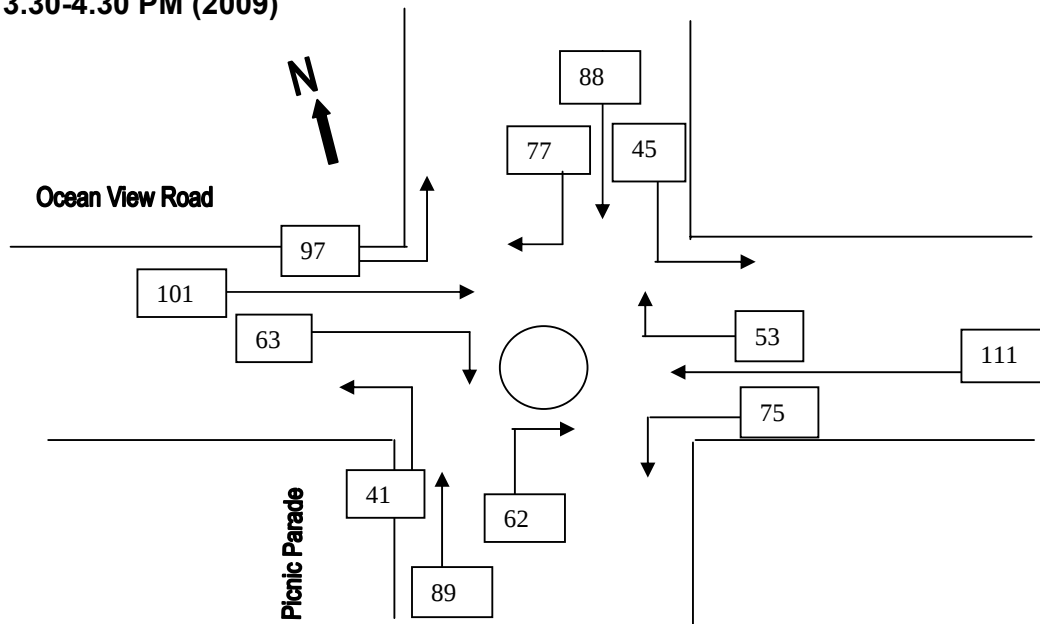
Peak intersection volumes were found to be between 8.30am and 9.30am and also between 3.30pm and 4.30 pm.

The 2004 traffic volumes at the intersection of Ocean View Road and Picnic Parade have been increased by an annual growth rate of 2% to represent the 2009 traffic volumes and are shown diagrammatically below:

8.30-9.30 AM (2009)



3.30-4.30 PM (2009)



29.0 SIDRA SIMULATIONS

The SIDRA program was developed in conjunction with ARRB Transport Research Ltd to analyse the operation of intersections controlled by traffic signals, Give Way signs, Stop signs, conventional roundabouts and signal controlled roundabouts. It is widely used by consulting traffic engineers and is recognised and used by the Roads and Traffic Authority of NSW. SIDRA is now owned and developed by Akcelik & Associates Pty Ltd.

The parameters used in the SIDRA program are measured against the following performance standards developed by the Roads and Traffic Authority of NSW and the American Transportation Research Board.

Level of Service for Unsignalised Intersections Controlled by Stop or Give Way Signs.

Average Delay per vehicle (secs)	Level of Service	Operational Conditions
0 to 14	A	Good
15 to 28	B	Acceptable delays and spare capacity
29 to 42	C	Satisfactory but accident study required
43 to 56	D	Near capacity and accident study required
57 to 70	E	At capacity and requires other control mode
> 70	F	Unsatisfactory and requires other control mode

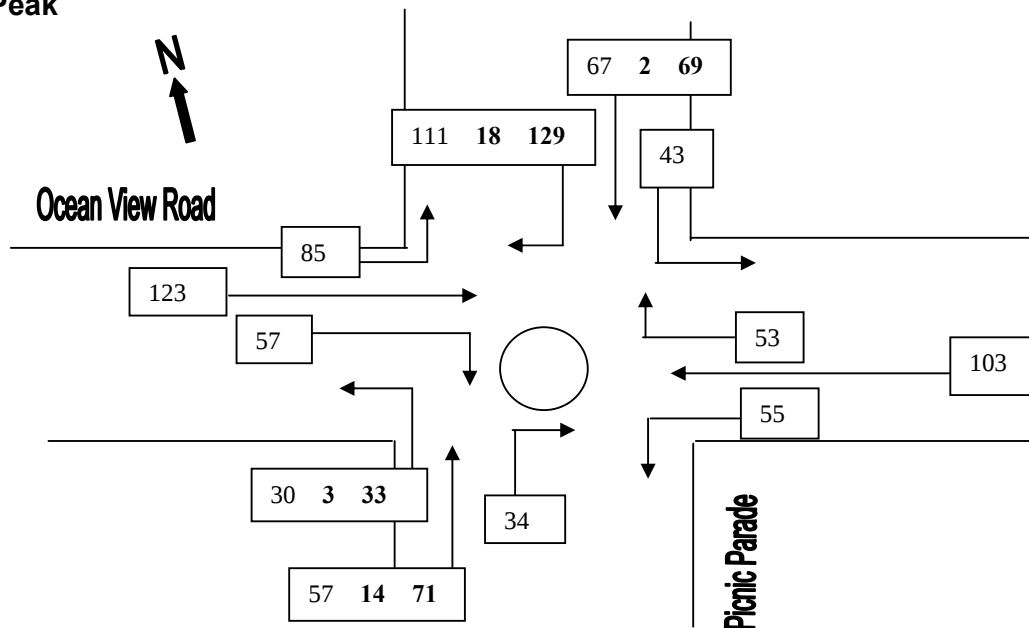
Level of Service for Roundabouts.

Average Delay per vehicle (secs)	Level of Service	Operational Conditions
0 to 14	A	Good
15 to 28	B	Acceptable delays and spare capacity
29 to 42	C	Satisfactory
43 to 56	D	Near capacity
57 to 70	E	At capacity and requires other control mode
> 70	F	Unsatisfactory and requires other control mode

SIDRA simulations have been undertaken for the intersections of Picnic Parade / Ocean View Road, Ocean View Road / Memorial Avenue, Broken Bay Road and Beach Street and Memorial Avenue / The Esplanade. The simulations undertaken are for projected 2009 traffic volumes and also with traffic generated by the proposed development superimposed.

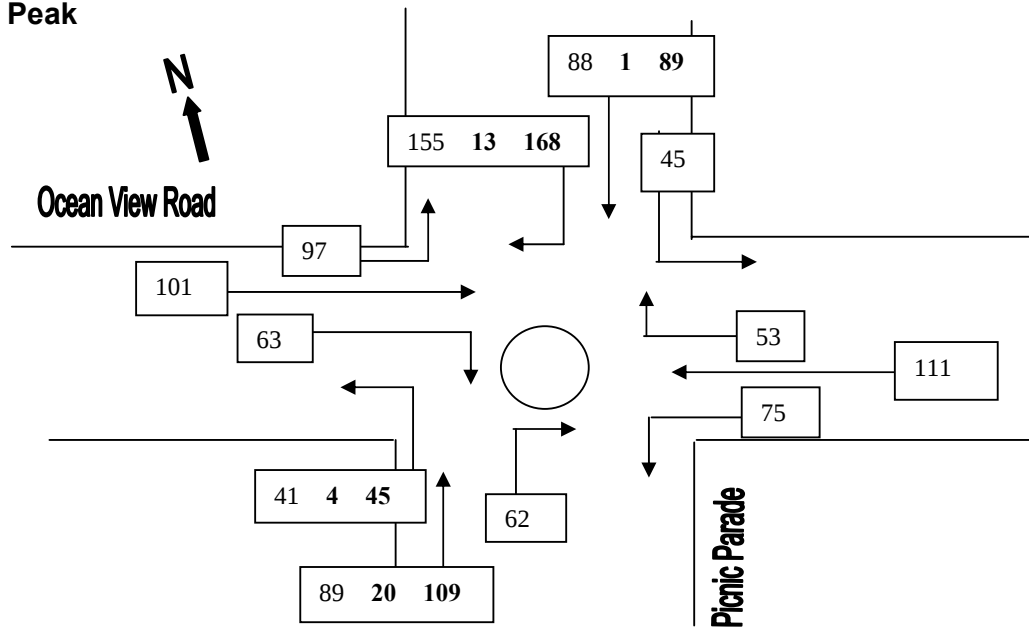
The traffic volumes used in the SIDRA simulations are as shown on the following diagrams:

AM Peak

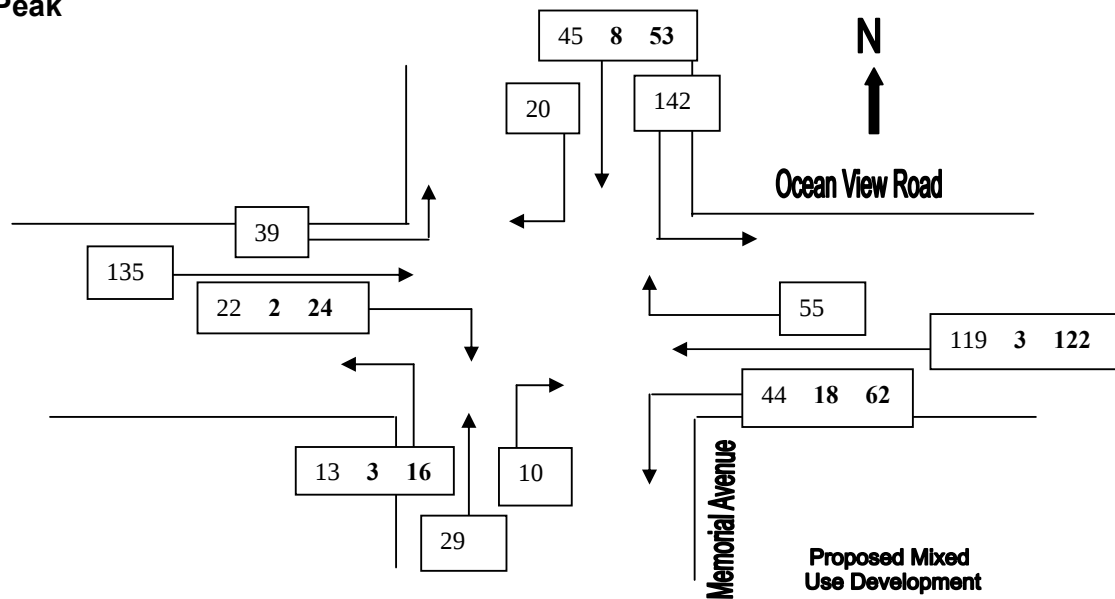


Notes: Numerals in bold font represent traffic generated by the proposed mixed use development.

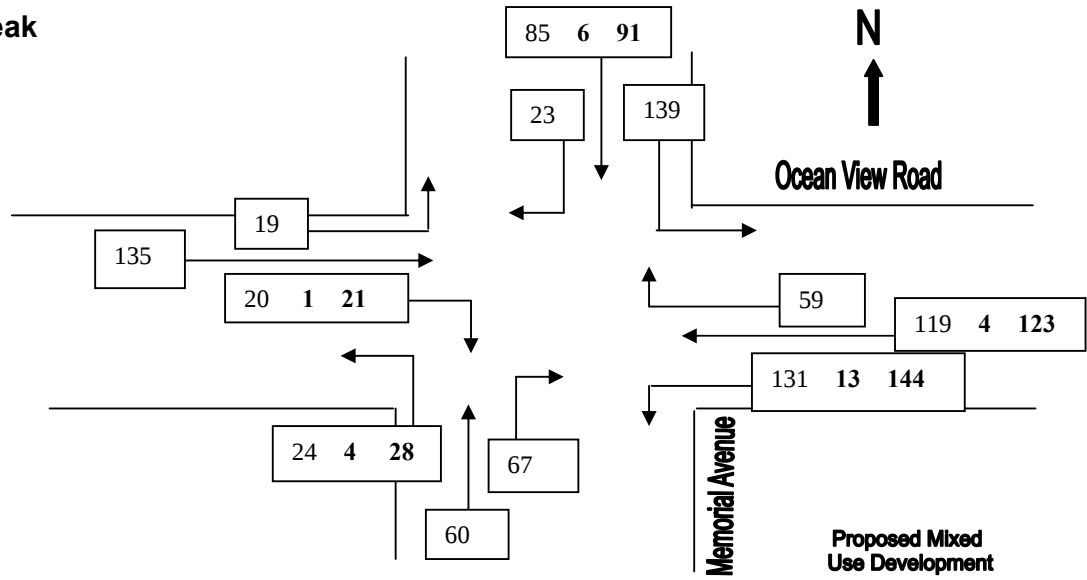
PM Peak



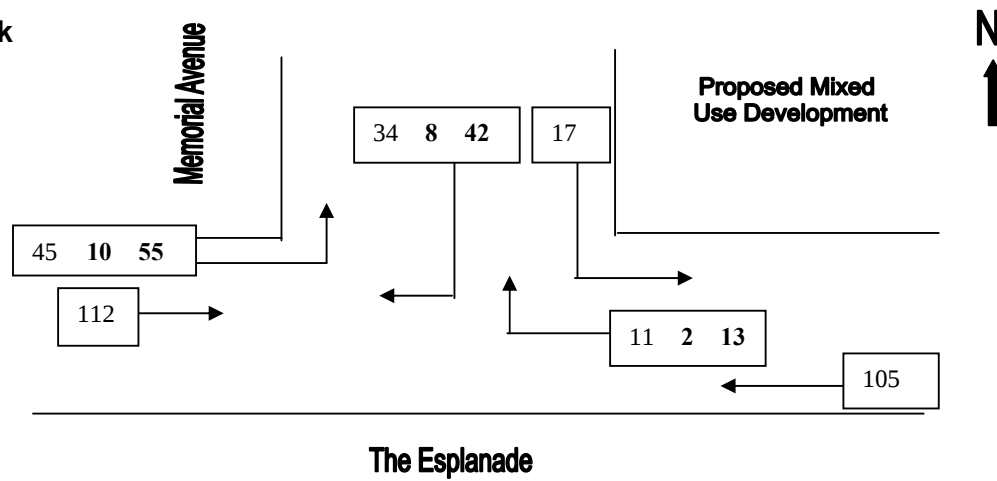
AM Peak



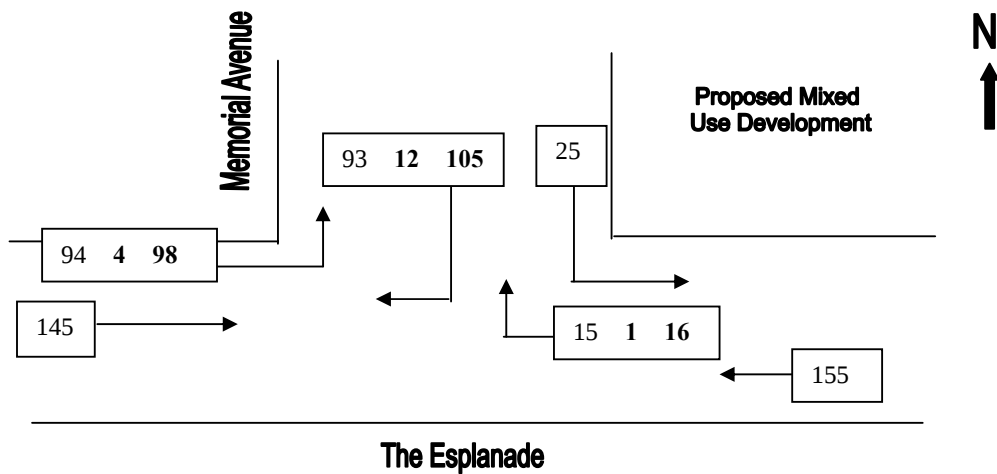
PM Peak



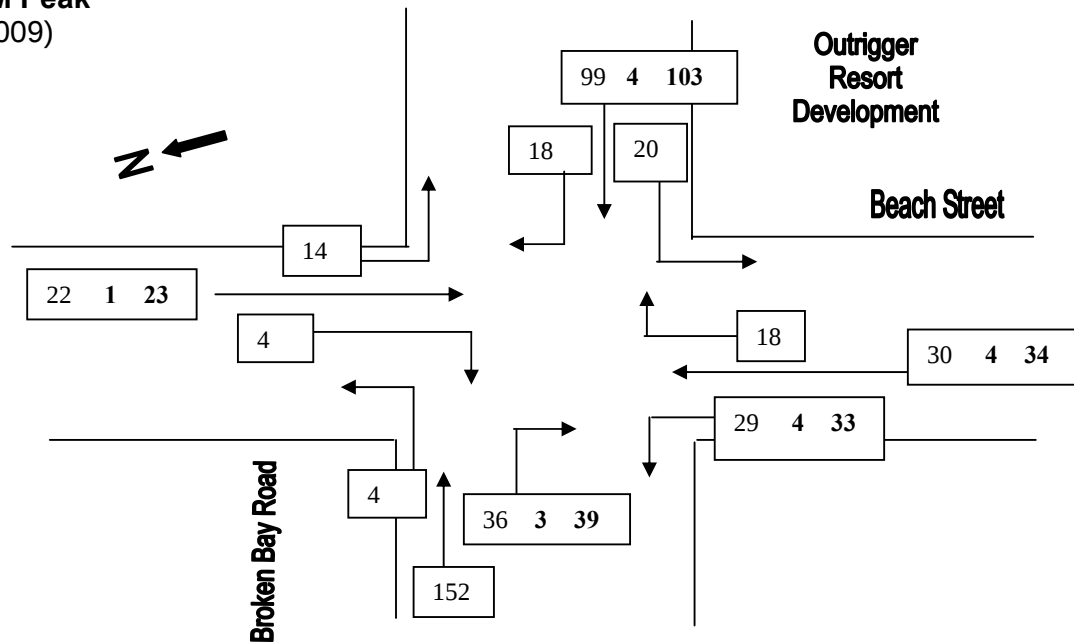
AM Peak



PM Peak



**PM Peak
(2009)**



Average Delays for Movements at Ocean View Road / Picnic Parade AM Peak

Movement	Average Delays for Movement 2009 traffic (secs / veh)	Level of Service	Average Delays for Movement 2009 traffic Proposed Mixed Use Development (secs / veh)	Level of Service
Northbound on Picnic Parade, left into Ocean View Road	7.2	A	7.3	A
Northbound through on Picnic Parade	5.7	A	5.8	A
Northbound on Picnic Parade, right into Ocean View Road	10.1	A	10.2	A
Westbound on Ocean View Road left into Picnic Parade	6.4	A	6.6	A
Westbound through on Ocean View Road	5.9	A	6.0	A
Westbound on Ocean View Road right into Picnic Parade	10.3	A	10.4	A
Southbound on Picnic Parade, left into Ocean View Road	7.1	A	7.1	A
Southbound through on Picnic Parade	5.6	A	5.7	A
Southbound on Picnic Parade, right into Ocean View Road	10.0	A	10.1	A
Eastbound on Ocean View Road left into Picnic Parade	6.0	A	6.1	A
Eastbound through on Ocean View Road	5.4	A	5.5	A
Eastbound on Ocean View Road right into Picnic Parade	9.7	A	9.8	A
Overall Average Delays	7.2	A	7.3	A

The SIDRA simulations indicate that the additional traffic generated by the proposed development will have a negligible impact on average delays for all movements at Ocean View Road and Picnic Parade during the morning peak.

The SIDRA simulations indicate that the average delays for all movements would be at level of service A, even with the additional development traffic included.

Average Delays for Movements at Ocean View Road / Picnic Parade PM Peak

Movement	Average Delays for Movement 2009 traffic (secs / veh)	Level of Service	Average Delays for Movement 2009 traffic Proposed Mixed Use Development (secs / veh)	Level of Service
Northbound on Picnic Parade, left into Ocean View Road	7.5	A	7.6	A
Northbound through on Picnic Parade	6.1	A	6.2	A
Northbound on Picnic Parade, right into Ocean View Road	10.5	A	10.6	A
Westbound on Ocean View Road left into Picnic Parade	6.9	A	7.0	A
Westbound through on Ocean View Road	6.4	A	6.5	A
Westbound on Ocean View Road right into Picnic Parade	10.7	A	10.8	A
Southbound on Picnic Parade, left into Ocean View Road	7.2	A	7.2	A
Southbound through on Picnic Parade	5.8	A	5.8	A
Southbound on Picnic Parade, right into Ocean View Road	10.2	A	10.2	A
Eastbound on Ocean View Road left into Picnic Parade	6.4	A	6.5	A
Eastbound through on Ocean View Road	5.8	A	5.9	A
Eastbound on Ocean View Road right into Picnic Parade	10.1	A	10.3	A
Overall Average Delays	7.7	A	7.8	A

The SIDRA simulations indicate that the additional traffic generated by the proposed development will have a negligible impact on average delays for all movements at Ocean View Road and Picnic Parade during the evening peak.

The SIDRA simulations indicate that the average delays for all movements would be at level of service A, even with the additional development traffic included.

Average Delays for Movements at Ocean View Road / Memorial Avenue AM Peak

Movement	Average Delays for Movement 2009 traffic (secs / veh)	Level of Service	Average Delays for Movement 2009 traffic Proposed Mixed Use Development (secs / veh)	Level of Service
Northbound on Memorial Avenue, left into Ocean View Road	9.7	A	9.6	A
Northbound through on Picnic Parade	8.4	A	8.3	A
Northbound on Memorial Avenue, right into Ocean View Road	9.8	A	9.7	A
Westbound on Ocean View Road left into Memorial Avenue	7.2	A	7.2	A
Westbound through on Ocean View Road	0.8	A	0.8	A
Westbound on Ocean View Road right into Memorial Avenue	7.2	A	7.2	A
Southbound on Memorial Avenue, left into Ocean View Road	8.4	A	8.5	A
Southbound through on Memorial Avenue	7.1	A	7.2	A
Southbound on Memorial Avenue, right into Ocean View Road	8.5	A	8.6	A
Eastbound on Ocean View Road left into Memorial Avenue	7.1	A	7.2	A
Eastbound through on Ocean View Road	0.7	A	0.8	A
Eastbound on Ocean View Road right into Memorial Avenue	7.3	A	7.4	A
Overall Average Delays	5.2	A	5.3	A

The SIDRA simulations indicate that the additional traffic generated by the proposed development will have a negligible impact on average delays for all movements at Ocean View Road and Memorial Avenue during the morning peak.

The SIDRA simulations indicate that the average delays for all movements would be at level of service A, even with the additional development traffic included.

Average Delays for Movements at Ocean View Road / Memorial Avenue PM Peak

Movement	Average Delays for Movement 2009 traffic (secs / veh)	Level of Service	Average Delays for Movement 2009 traffic Proposed Mixed Use Development (secs / veh)	Level of Service
Northbound on Memorial Avenue, left into Ocean View Road	12.4	A	12.5	A
Northbound through on Picnic Parade	11.1	A	11.2	A
Northbound on Memorial Avenue, right into Ocean View Road	12.5	A	12.6	A
Westbound on Ocean View Road left into Memorial Avenue	7.1	A	7.1	A
Westbound through on Ocean View Road	0.7	A	0.7	A
Westbound on Ocean View Road right into Memorial Avenue	7.2	A	7.2	A
Southbound on Memorial Avenue, left into Ocean View Road	8.9	A	9.0	A
Southbound through on Memorial Avenue	7.6	A	7.7	A
Southbound on Memorial Avenue, right into Ocean View Road	9.0	A	9.1	A
Eastbound on Ocean View Road left into Memorial Avenue	7.5	A	7.6	A
Eastbound through on Ocean View Road	1.1	A	1.2	A
Eastbound on Ocean View Road right into Memorial Avenue	7.8	A	7.9	A
Overall Average Delays	6.6	A	6.7	A

The SIDRA simulations indicate that the additional traffic generated by the proposed development will have a negligible impact on average delays for all movements at Ocean View Road and Memorial Avenue during the evening peak.

The SIDRA simulations indicate that the average delays for all movements would be at level of service A, even with the additional development traffic included.

Average Delays for Movements at Memorial Avenue / The Esplanade AM Peak

Movement	Average Delays for Movement 2009 traffic (secs / veh)	Level of Service	Average Delays for Movement 2009 traffic Proposed Mixed Use Development (secs / veh)	Level of Service
Westbound through on The Esplanade	0.6	A	0.7	A
Westbound on The Esplanade right into Memorial Avenue	7.2	A	7.2	A
Memorial Avenue southbound left into The Esplanade	11.2	A	11.4	A
Memorial Avenue southbound right into The Esplanade	11.2	A	11.4	A
Eastbound on The Esplanade left into Memorial Avenue	6.4	A	6.4	A
Eastbound through on The Esplanade	0	A	0	A
Overall Average Delays	3.1	A	3.5	A

The SIDRA simulations indicate that the additional traffic generated by the proposed development will have a negligible impact on average delays for all movements at The Esplanade and Memorial Avenue during the morning peak.

The SIDRA simulations indicate that the average delays for all movements would be at level of service A, even with the additional development traffic included.

Average Delays for Movements at Memorial Avenue / The Esplanade PM Peak

Movement	Average Delays for Movement 2009 traffic (secs / veh)	Level of Service	Average Delays for Movement 2009 traffic Proposed Mixed Use Development (secs / veh)	Level of Service
Westbound through on The Esplanade	1.1	A	1.1	A
Westbound on The Esplanade right into Memorial Avenue	7.6	A	7.6	A
Memorial Avenue southbound left into The Esplanade	13.2	A	13.4	A
Memorial Avenue southbound right into The Esplanade	13.2	A	13.4	A
Eastbound on The Esplanade left into Memorial Avenue	6.4	A	6.4	A
Eastbound through on The Esplanade	0	A	0	A
Overall Average Delays	4.6	A	4.9	A

The SIDRA simulations indicate that the additional traffic generated by the proposed development will have a negligible impact on average delays for all movements at The Esplanade and Memorial Avenue during the evening peak.

The SIDRA simulations indicate that the average delays for all movements would be at level of service A, even with the additional development traffic included.

Average Delays for Movements at Broken Bay Road / Beach Street PM Peak

Movement	Average Delays for Movement 2009 traffic (secs / veh)	Level of Service	Average Delays for Movement 2009 traffic Proposed Mixed Use Development (secs / veh)	Level of Service
Northbound on Beach Street left into Broken Bay Road	8.0	A	8.1	A
Northbound through on Beach Street	6.7	A	6.8	A
Northbound on Beach Street right into Broken Bay Road	7.8	A	7.9	A
Westbound on Broken Bay Road, left into Beach Street	8.1	A	8.1	A
Westbound through on Broken Bay Road	1.7	A	1.7	A
Westbound on Broken Bay Road, right into Beach Street	7.8	A	7.8	A
Southbound on Beach Street left into Broken Bay Road	8.3	A	8.4	A
Southbound through on Beach Street	7.0	A	7.1	A
Southbound on Beach Street right into Broken Bay Road	8.0	A	8.1	A
Eastbound on Broken Bay Road, left into Beach Street	7.8	A	7.9	A
Eastbound through on Broken Bay Road	1.4	A	1.5	A
Eastbound on Broken Bay Road, right into Beach Street	8.0	A	8.1	A
Overall Average Delays	4.2	A	4.3	A

The SIDRA simulations at the intersection of Broken Bay Road and Beach Street using the projected 2009 traffic volumes indicate that the proposed development will have negligible impact on the average delays for all movements at the intersection.

The SIDRA simulations indicate that the average delays for all movements would be at level of service A, even with the additional development traffic included.

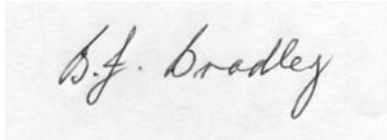
30.0 SUMMARY AND RECOMMENDATIONS

30.1 SUMMARY

- i. The proposed development can be described as a mixed-use development consisting of 850 m² of retail, 571 m² of commercial, 45 residential apartments and 93 on site car spaces. The site is located on the corner of Memorial Ave and The Esplanade, in an area that is characterized by commercial, retail, hospitality and residential uses.
- ii. A new pedestrian link will be created between the north-south laneway and The Esplanade along the eastern boundary of the site.
- iii. The SIDRA simulations indicate that the additional traffic generated by the proposed development will have a negligible impact on average delays for all movements on streets surrounding the site during both morning and the evening peak periods.
- iv. The proposed development will provide off-street parking for 93 spaces to service the residential units and retail / commercial tenancies which will be satisfactory, particularly given the shared parking usage that will occur between the proposed mixed use development and the various developments that exist within the Ettalong Beach CBD.
- v. The proposed development will utilise the existing east-west laneway that links Memorial Avenue and Picnic Parade, enabling access via Memorial Avenue. It is proposed that the east-west lane be converted to one-way operation eastbound to improve traffic efficiency and pedestrian safety in the area.

30.2 RECOMMENDATIONS

- I recommend approval to the proposed development as it would have no adverse impacts on the level of service, the level of traffic or pedestrian safety, or capacity of streets or the laneway in the Ettalong Beach area.
- I recommend approval of 93 car spaces as adequate for the proposed mixed use development in the Ettalong Beach area.

A handwritten signature in cursive script, reading "B.J. Bradley", on a light-colored background.

B J Bradley BE Grad Dip Man MIEAust CPEng

APPENDIX A

SIDRA DATA

1.0 Movement Summary

Ocean View Road and Picnic Parade

2009 Traffic - AM Peak

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Picnic Parade S Leg										
1	L	30	0.0	0.116	7.2	LOS A	5	0.39	0.62	42.2
2	T	57	0.0	0.116	5.7	LOS A	5	0.39	0.54	43.1
3	R	34	0.0	0.116	10.1	LOS A	5	0.39	0.67	40.2
Approach		121	0.0	0.116	7.3	LOS A	5	0.39	0.60	42.0
Ocean View Road E leg										
4	L	55	0.0	0.196	6.4	LOS A	10	0.44	0.58	42.6
5	T	103	1.0	0.197	5.9	LOS A	10	0.44	0.55	42.9
6	R	53	0.0	0.196	10.3	LOS A	10	0.44	0.66	40.1
Approach		211	0.5	0.197	7.1	LOS A	10	0.44	0.59	42.1
Picnic Parade N leg										
7	L	43	0.0	0.206	7.1	LOS A	9	0.39	0.62	42.2
8	T	67	0.0	0.206	5.6	LOS A	9	0.39	0.54	43.1
9	R	111	0.9	0.206	10.0	LOS A	9	0.39	0.67	40.2
Approach		221	0.5	0.206	8.1	LOS A	9	0.39	0.62	41.4
Ocean View Road W leg										
10	L	85	1.2	0.223	6.0	LOS A	11	0.35	0.53	42.9
11	T	122	0.0	0.223	5.4	LOS A	11	0.35	0.50	43.3
12	R	57	0.0	0.223	9.7	LOS A	11	0.35	0.64	40.3
Approach		264	0.4	0.223	6.5	LOS A	11	0.35	0.54	42.5
All Vehicles		817	0.4	0.223	7.2	LOS A	11	0.39	0.58	42.0

2.0 Movement Summary

Ocean View Road and Picnic Parade

2009 Traffic - PM Peak

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Picnic Parade S Leg										
1	L	41	0.0	0.192	7.5	LOS A	8	0.45	0.66	42.0
2	T	89	0.0	0.191	6.1	LOS A	8	0.45	0.59	42.9
3	R	62	0.0	0.191	10.5	LOS A	8	0.45	0.69	40.0
Approach		192	0.0	0.191	7.8	LOS A	8	0.45	0.64	41.7
Ocean View Road E leg										
4	L	75	0.0	0.237	6.9	LOS A	12	0.51	0.62	42.3
5	T	111	0.9	0.237	6.4	LOS A	12	0.51	0.60	42.6
6	R	53	0.0	0.237	10.7	LOS A	12	0.51	0.69	39.8
Approach		239	0.4	0.237	7.5	LOS A	12	0.51	0.63	41.8
Picnic Parade N leg										
7	L	45	0.0	0.269	7.2	LOS A	13	0.42	0.63	42.1
8	T	88	0.0	0.270	5.8	LOS A	13	0.42	0.56	43.0
9	R	155	1.3	0.270	10.2	LOS A	13	0.42	0.68	40.1
Approach		288	0.7	0.270	8.4	LOS A	13	0.42	0.63	41.2
Ocean View Road W leg										
10	L	97	1.0	0.238	6.4	LOS A	12	0.43	0.57	42.6
11	T	101	0.0	0.238	5.8	LOS A	12	0.43	0.54	43.0
12	R	63	0.0	0.238	10.1	LOS A	12	0.43	0.66	40.1
Approach		261	0.4	0.238	7.1	LOS A	12	0.43	0.58	42.1
All Vehicles		980	0.4	0.270	7.7	LOS A	13	0.45	0.62	41.7

3.0 Movement Summary

Ocean View Road and Picnic Parade

2009 Traffic - AM Peak + Mixed Use Development

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Picnic Parade S Leg										
1	L	33	0.0	0.134	7.3	LOS A	6	0.41	0.63	42.2
2	T	71	0.0	0.134	5.8	LOS A	6	0.41	0.55	43.1
3	R	34	0.0	0.134	10.2	LOS A	6	0.41	0.68	40.2
Approach		138	0.0	0.134	7.3	LOS A	6	0.41	0.60	42.1
Ocean View Road E leg										
4	L	55	0.0	0.200	6.6	LOS A	10	0.46	0.59	42.5
5	T	103	1.0	0.200	6.0	LOS A	10	0.46	0.56	42.8
6	R	53	0.0	0.200	10.4	LOS A	10	0.46	0.67	40.0
Approach		211	0.5	0.200	7.3	LOS A	10	0.46	0.60	42.0
Picnic Parade N leg										
7	L	43	0.0	0.225	7.1	LOS A	10	0.40	0.62	42.2
8	T	69	0.0	0.225	5.7	LOS A	10	0.40	0.54	43.1
9	R	129	0.8	0.225	10.1	LOS A	10	0.40	0.67	40.2
Approach		241	0.4	0.225	8.3	LOS A	10	0.40	0.62	41.3
Ocean View Road W leg										
10	L	85	1.2	0.228	6.1	LOS A	12	0.37	0.54	42.8
11	T	123	0.0	0.228	5.5	LOS A	12	0.37	0.51	43.2
12	R	57	0.0	0.228	9.8	LOS A	12	0.37	0.64	40.3
Approach		265	0.4	0.228	6.6	LOS A	12	0.37	0.55	42.4
All Vehicles		855	0.4	0.228	7.3	LOS A	12	0.41	0.59	41.9

4.0 Movement Summary

Ocean View Road and Picnic Parade

2009 Traffic - PM Peak + Mixed Use Development

Roundabout

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Picnic Parade S Leg										
1	L	45	0.0	0.217	7.6	LOS A	10	0.47	0.67	42.0
2	T	109	0.0	0.217	6.2	LOS A	10	0.47	0.60	42.8
3	R	62	0.0	0.217	10.6	LOS A	10	0.47	0.70	40.0
Approach		216	0.0	0.217	7.8	LOS A	10	0.47	0.64	41.8
Ocean View Road E leg										
4	L	75	0.0	0.240	7.0	LOS A	12	0.53	0.63	42.2
5	T	111	0.9	0.240	6.5	LOS A	12	0.53	0.61	42.5
6	R	53	0.0	0.240	10.8	LOS A	12	0.53	0.69	39.8
Approach		239	0.4	0.240	7.6	LOS A	12	0.53	0.63	41.8
Picnic Parade N leg										
7	L	45	0.0	0.283	7.2	LOS A	14	0.43	0.63	42.1
8	T	89	0.0	0.283	5.8	LOS A	14	0.43	0.56	43.0
9	R	168	1.2	0.282	10.2	LOS A	14	0.43	0.68	40.1
Approach		302	0.7	0.283	8.5	LOS A	14	0.43	0.64	41.2
Ocean View Road W leg										
10	L	97	1.0	0.243	6.5	LOS A	13	0.45	0.59	42.5
11	T	101	0.0	0.243	5.9	LOS A	13	0.45	0.56	42.8
12	R	63	0.0	0.243	10.3	LOS A	13	0.45	0.66	40.0
Approach		261	0.4	0.243	7.2	LOS A	13	0.45	0.59	42.0
All Vehicles		1018	0.4	0.283	7.8	LOS A	14	0.47	0.63	41.6

5.0 Movement Summary

Ocean View Road and Memorial Avenue

2009 Traffic - AM Peak

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Memorial Ave S leg										
1	L	13	0.0	0.083	9.7	LOS A	3	0.42	0.58	40.6
2	T	29	0.0	0.083	8.4	LOS A	3	0.42	0.63	41.6
3	R	10	0.0	0.083	9.8	LOS A	3	0.42	0.72	40.5
Approach		52	0.0	0.083	9.0	LOS A	3	0.42	0.64	41.1
Ocean View Rd E leg										
4	L	44	0.0	0.130	7.2	LOS A	7	0.35	0.40	42.1
5	T	119	0.8	0.130	0.8	LOS A	7	0.35	0.00	47.0
6	R	55	0.0	0.130	7.2	LOS A	7	0.35	0.60	42.0
Approach		218	0.5	0.130	3.7	LOS A	7	0.35	0.23	44.6
Memorial Ave N leg										
7	L	142	0.0	0.249	8.4	LOS A	10	0.37	0.62	41.6
8	T	45	0.0	0.249	7.1	LOS A	10	0.37	0.65	42.7
9	R	20	0.0	0.250	8.5	LOS A	10	0.37	0.71	41.5
Approach		207	0.0	0.249	8.1	LOS A	10	0.37	0.63	41.8
Ocean View Rd W leg										
10	L	39	0.0	0.108	7.1	LOS A	6	0.34	0.40	42.1
11	T	135	0.7	0.108	0.7	LOS A	6	0.34	0.00	47.0
12	R	22	0.0	0.108	7.3	LOS A	6	0.34	0.61	42.0
Approach		196	0.5	0.108	2.7	LOS A	6	0.34	0.15	45.4
All Vehicles		673	0.3	0.250	5.2	Not Applicable	10	0.36	0.36	43.6

6.0 Movement Summary

Ocean View Road and Memorial Avenue

2009 Traffic - PM Peak

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Memorial Ave S leg										
1	L	24	0.0	0.296	12.4	LOS A	12	0.56	0.69	38.5
2	T	60	0.0	0.297	11.1	LOS A	12	0.56	0.76	39.4
3	R	67	0.0	0.296	12.5	LOS A	12	0.56	0.84	38.4
Approach		151	0.0	0.297	11.9	LOS A	12	0.56	0.78	38.8
Ocean View Rd E leg										
4	L	131	0.0	0.179	7.1	LOS A	10	0.39	0.37	41.9
5	T	119	0.8	0.179	0.7	LOS A	10	0.39	0.00	46.6
6	R	59	0.0	0.179	7.2	LOS A	10	0.39	0.59	41.9
Approach		309	0.3	0.179	4.7	LOS A	10	0.39	0.27	43.6
Memorial Ave N leg										
7	L	139	0.0	0.317	8.9	LOS A	13	0.40	0.62	41.2
8	T	85	0.0	0.316	7.6	LOS A	13	0.40	0.67	42.2
9	R	23	0.0	0.315	9.0	LOS A	13	0.40	0.74	41.1
Approach		247	0.0	0.316	8.5	LOS A	13	0.40	0.65	41.5
Ocean View Rd W leg										
10	L	19	0.0	0.097	7.5	LOS A	6	0.41	0.36	41.8
11	T	135	0.7	0.098	1.1	LOS A	6	0.41	0.00	46.5
12	R	20	0.0	0.098	7.8	LOS A	6	0.41	0.64	41.7
Approach		174	0.6	0.098	2.6	LOS A	6	0.41	0.11	45.3
All Vehicles		881	0.2	0.317	6.6	Not Applicable	13	0.43	0.43	42.4

7.0 Movement Summary

Ocean View Road and Memorial Avenue

2009 Traffic - AM Peak + Mixed Use Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Memorial Ave S leg										
1	L	16	0.0	0.087	9.6	LOS A	3	0.42	0.59	40.6
2	T	29	0.0	0.087	8.3	LOS A	3	0.42	0.63	41.6
3	R	10	0.0	0.087	9.7	LOS A	3	0.42	0.72	40.5
Approach		55	0.0	0.087	9.0	LOS A	3	0.42	0.64	41.1
Ocean View Rd E leg										
4	L	62	0.0	0.142	7.2	LOS A	8	0.36	0.39	42.0
5	T	122	0.8	0.142	0.8	LOS A	8	0.36	0.00	46.8
6	R	55	0.0	0.141	7.2	LOS A	8	0.36	0.60	42.0
Approach		239	0.4	0.141	3.9	LOS A	8	0.36	0.24	44.3
Memorial Ave N leg										
7	L	142	0.0	0.262	8.5	LOS A	10	0.38	0.62	41.5
8	T	53	0.0	0.262	7.2	LOS A	10	0.38	0.66	42.6
9	R	20	0.0	0.263	8.6	LOS A	10	0.38	0.72	41.4
Approach		215	0.0	0.262	8.2	LOS A	10	0.38	0.64	41.8
Ocean View Rd W leg										
10	L	39	0.0	0.110	7.2	LOS A	6	0.36	0.39	42.0
11	T	135	0.7	0.110	0.8	LOS A	6	0.36	0.00	46.8
12	R	24	0.0	0.111	7.4	LOS A	6	0.36	0.62	41.9
Approach		198	0.5	0.110	2.9	LOS A	6	0.36	0.15	45.2
All Vehicles		707	0.3	0.263	5.3	Not Applicable	10	0.37	0.37	43.5

8.0 Movement Summary

Ocean View Road and Memorial Avenue

2009 Traffic - PM Peak + Mixed Use Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Memorial Ave S leg										
1	L	28	0.0	0.304	12.5	LOS A	13	0.56	0.71	38.4
2	T	60	0.0	0.305	11.2	LOS A	13	0.56	0.77	39.3
3	R	67	0.0	0.305	12.6	LOS A	13	0.56	0.85	38.3
Approach		155	0.0	0.305	12.1	LOS A	13	0.56	0.79	38.7
Ocean View Rd E leg										
4	L	144	0.0	0.188	7.1	LOS A	11	0.40	0.37	41.9
5	T	123	0.8	0.188	0.7	LOS A	11	0.40	0.00	46.5
6	R	59	0.0	0.188	7.2	LOS A	11	0.40	0.60	41.9
Approach		326	0.3	0.188	4.7	LOS A	11	0.40	0.27	43.5
Memorial Ave N leg										
7	L	139	0.0	0.328	9.0	LOS A	13	0.41	0.62	41.1
8	T	91	0.0	0.327	7.7	LOS A	13	0.41	0.68	42.1
9	R	23	0.0	0.329	9.1	LOS A	13	0.41	0.75	41.0
Approach		253	0.0	0.328	8.6	LOS A	13	0.41	0.65	41.4
Ocean View Rd W leg										
10	L	19	0.0	0.099	7.6	LOS A	6	0.42	0.35	41.8
11	T	135	0.7	0.099	1.2	LOS A	6	0.42	0.00	46.3
12	R	21	0.0	0.099	7.9	LOS A	6	0.42	0.65	41.7
Approach		175	0.6	0.099	2.7	LOS A	6	0.42	0.12	45.2
All Vehicles		909	0.2	0.329	6.7	Not Applicable	13	0.43	0.44	42.3

9.0 Movement Summary

Junction of Memorial Avenue and The Esplanade

2009 Traffic - AM Peak

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
The Esplanade E leg										
5	T	105	0.0	0.063	0.6	LOS A	3	0.29	0.00	47.4
6	R	11	0.0	0.063	7.2	LOS A	3	0.29	0.59	42.2
Approach		116	0.0	0.063	1.2	LOS A	3	0.29	0.06	46.8
Memorial Avenue N leg										
7	L	17	0.0	0.071	11.2	LOS A	2	0.35	0.83	39.9
9	R	34	0.0	0.071	11.2	LOS A	2	0.35	0.91	39.9
Approach		51	0.0	0.071	11.2	LOS A	2	0.35	0.88	39.9
The Esplanade W leg										
10	L	45	0.0	0.082	6.4	LOS A	0	0.00	0.61	43.3
11	T	112	0.0	0.082	0.0	LOS A	0	0.00	0.00	50.0
Approach		157	0.0	0.082	1.8	LOS A		0.00	0.18	47.9
All Vehicles		324	0.0	0.082	3.1	Not Applicable	3	0.16	0.24	46.1

10.0 Movement Summary

Junction of Memorial Avenue and The Esplanade

2009 Traffic - PM Peak

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
The Esplanade E leg										
5	T	155	0.0	0.093	1.1	LOS A	5	0.38	0.00	46.7
6	R	15	0.0	0.093	7.6	LOS A	5	0.38	0.63	41.9
Approach		170	0.0	0.093	1.6	LOS A	5	0.38	0.06	46.2
Memorial Avenue N leg										
7	L	25	0.0	0.207	13.2	LOS A	7	0.50	0.84	38.6
9	R	93	0.0	0.206	13.2	LOS A	7	0.50	0.97	38.6
Approach		118	0.0	0.206	13.2	LOS A	7	0.50	0.94	38.6
The Esplanade W leg										
10	L	94	0.0	0.125	6.4	LOS A	0	0.00	0.61	43.3
11	T	145	0.0	0.125	0.0	LOS A	0	0.00	0.00	50.0
Approach		239	0.0	0.125	2.5	LOS A		0.00	0.24	47.1
All Vehicles		527	0.0	0.207	4.6	Not Applicable	7	0.23	0.34	44.6

11.0 Movement Summary

Junction of Memorial Avenue and The Esplanade

2009 Traffic - AM Peak + Mixed Use Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
The Esplanade E leg										
5	T	105	0.0	0.064	0.7	LOS A	3	0.30	0.00	47.3
6	R	13	0.0	0.064	7.2	LOS A	3	0.30	0.60	42.1
Approach		118	0.0	0.064	1.4	LOS A	3	0.30	0.07	46.7
Memorial Avenue N leg										
7	L	17	0.0	0.085	11.4	LOS A	3	0.37	0.83	39.8
9	R	42	0.0	0.085	11.4	LOS A	3	0.37	0.91	39.8
Approach		59	0.0	0.085	11.4	LOS A	3	0.37	0.89	39.8
The Esplanade W leg										
10	L	55	0.0	0.087	6.4	LOS A	0	0.00	0.61	43.3
11	T	112	0.0	0.087	0.0	LOS A	0	0.00	0.00	50.0
Approach		167	0.0	0.087	2.1	LOS A		0.00	0.20	47.6
All Vehicles		344	0.0	0.087	3.5	Not Applicable	3	0.17	0.27	45.7

12.0 Movement Summary

Junction of Memorial Avenue and The Esplanade

2009 Traffic - PM Peak + Mixed Use Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
The Esplanade E leg										
5	T	155	0.0	0.094	1.1	LOS A	6	0.39	0.00	46.6
6	R	16	0.0	0.094	7.6	LOS A	6	0.39	0.63	41.9
Approach		171	0.0	0.094	1.7	LOS A	6	0.39	0.06	46.1
Memorial Avenue N leg										
7	L	25	0.0	0.231	13.4	LOS A	8	0.51	0.84	38.5
9	R	105	0.0	0.231	13.4	LOS A	8	0.51	0.97	38.5
Approach		130	0.0	0.231	13.4	LOS A	8	0.51	0.95	38.5
The Esplanade W leg										
10	L	98	0.0	0.127	6.4	LOS A	0	0.00	0.61	43.3
11	T	145	0.0	0.127	0.0	LOS A	0	0.00	0.00	50.0
Approach		243	0.0	0.127	2.6	LOS A		0.00	0.25	47.1
All Vehicles		544	0.0	0.231	4.9	Not Applicable	8	0.24	0.35	44.4

13.0 Movement Summary

Broken Bay Road and Beach Street - PM Peak

2009 Traffic - PM Peak

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Beach St S leg										
1	L	29	0.0	0.085	8.0	LOS A	3	0.30	0.56	41.9
2	T	30	0.0	0.085	6.7	LOS A	3	0.30	0.59	43.0
3	R	18	0.0	0.085	7.8	LOS A	3	0.30	0.61	42.1
Approach		77	0.0	0.085	7.5	LOS A	3	0.30	0.58	42.4
Broken Bay Rd E leg										
4	L	20	0.0	0.087	8.1	LOS A	7	0.45	0.34	41.7
5	T	99	0.0	0.087	1.7	LOS A	7	0.45	0.00	46.1
6	R	18	0.0	0.087	7.8	LOS A	7	0.45	0.60	41.9
Approach		137	0.0	0.087	3.4	LOS A	7	0.45	0.13	44.8
Beach St N leg										
7	L	14	0.0	0.048	8.3	LOS A	2	0.37	0.57	41.7
8	T	22	0.0	0.048	7.0	LOS A	2	0.37	0.59	42.8
9	R	4	0.0	0.048	8.0	LOS A	2	0.37	0.60	41.9
Approach		40	0.0	0.048	7.5	LOS A	2	0.37	0.59	42.3
Broken Bay Rd W leg										
10	L	4	0.0	0.129	7.8	LOS A	10	0.39	0.37	41.9
11	T	152	0.0	0.129	1.4	LOS A	10	0.39	0.00	46.6
12	R	36	0.0	0.129	8.0	LOS A	10	0.39	0.62	41.9
Approach		192	0.0	0.129	2.8	LOS A	10	0.39	0.12	45.5
All Vehicles		446	0.0	0.129	4.2	Not Applicable	10	0.39	0.25	44.4

14.0 Movement Summary

Broken Bay Road and Beach Street - PM Peak

2009 Traffic - PM Peak + Mixed Use Development

Give-way

Vehicle Movements

Mov ID	Turn	Dem Flow (veh/h)	% HV	Deg of Satn (v/c)	Aver Delay (sec)	Level of Service	95 % Back of Queue (m)	Prop. Queued	Eff. Stop Rate	Aver Speed (km/h)
Beach St S leg										
1	L	33	0.0	0.095	8.1	LOS A	3	0.31	0.56	41.8
2	T	34	0.0	0.094	6.8	LOS A	3	0.31	0.60	42.9
3	R	18	0.0	0.095	7.9	LOS A	3	0.31	0.61	42.0
Approach		85	0.0	0.095	7.5	LOS A	3	0.31	0.59	42.3
Broken Bay Rd E leg										
4	L	20	0.0	0.089	8.1	LOS A	7	0.45	0.34	41.7
5	T	103	0.0	0.089	1.7	LOS A	7	0.45	0.00	46.1
6	R	18	0.0	0.089	7.8	LOS A	7	0.45	0.60	41.8
Approach		141	0.0	0.089	3.4	LOS A	7	0.45	0.12	44.9
Beach St N leg										
7	L	14	0.0	0.050	8.4	LOS A	2	0.37	0.57	41.6
8	T	23	0.0	0.050	7.1	LOS A	2	0.37	0.60	42.7
9	R	4	0.0	0.050	8.1	LOS A	2	0.37	0.60	41.9
Approach		41	0.0	0.050	7.6	LOS A	2	0.37	0.59	42.2
Broken Bay Rd W leg										
10	L	4	0.0	0.133	7.9	LOS A	10	0.40	0.37	41.9
11	T	152	0.0	0.133	1.5	LOS A	10	0.40	0.00	46.6
12	R	39	0.0	0.133	8.1	LOS A	10	0.40	0.62	41.8
Approach		195	0.0	0.133	3.0	LOS A	10	0.40	0.13	45.4
All Vehicles		462	0.0	0.133	4.3	Not Applicable	10	0.39	0.25	44.4