TRAFFIC AND PARKING IMPACT ASSESSMENT

WOOLOOWARE BAY TOWN CENTRE - STAGE 4 RESIDENTIAL / HOTEL

CAPTAIN COOK DRIVE, WOOLOOWARE

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Development Type: **Woolooware Bay Town Centre - Stage 4 Residential / Hotel**

Site Address: **Captain Cook Drive, Woolooware**

Prepared for: **Capital Bluestone**

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1 INTRODUCTION

M^CLaren Traffic Engineering (MTE) was commissioned by *Capital Bluestone* to provide a Traffic and Parking Impact Assessment of the Woolooware Bay Town Centre - Stage 4 Residential / Hotel at Captain Cook Drive, Woolooware.

This report supports a Section 75W Modification Application to the concept plan approval issued by the Planning Assessment Commission (PAC) for the Woolooware Bay Town Centre (WBTC) and has been composed in response to the Secretary's Environmental Assessment Requirements (SEARS) issued on 20 October 2016. The approval is sought for the revised development of the Eastern Precinct at WBTC as described in **Section 3** of this report.

1.1 Site Location

The subject site is known as 455 Captain Cook Drive, Woolooware as shown in the context of the overall WBTC site in **Figure 1** and **Figure 2**. The site is formally described as part Lot1 DP1180482.

The WBTC is a master-planned town centre comprising three precincts, being the Town Centre Precinct, the Residential Precinct and the Stadium Precinct. This application relates to the Town Centre Precinct, generally comprising the land in the eastern portion of the WBTC site.

Site Location

FIGURE 1: SITE CONTEXT – AERIAL

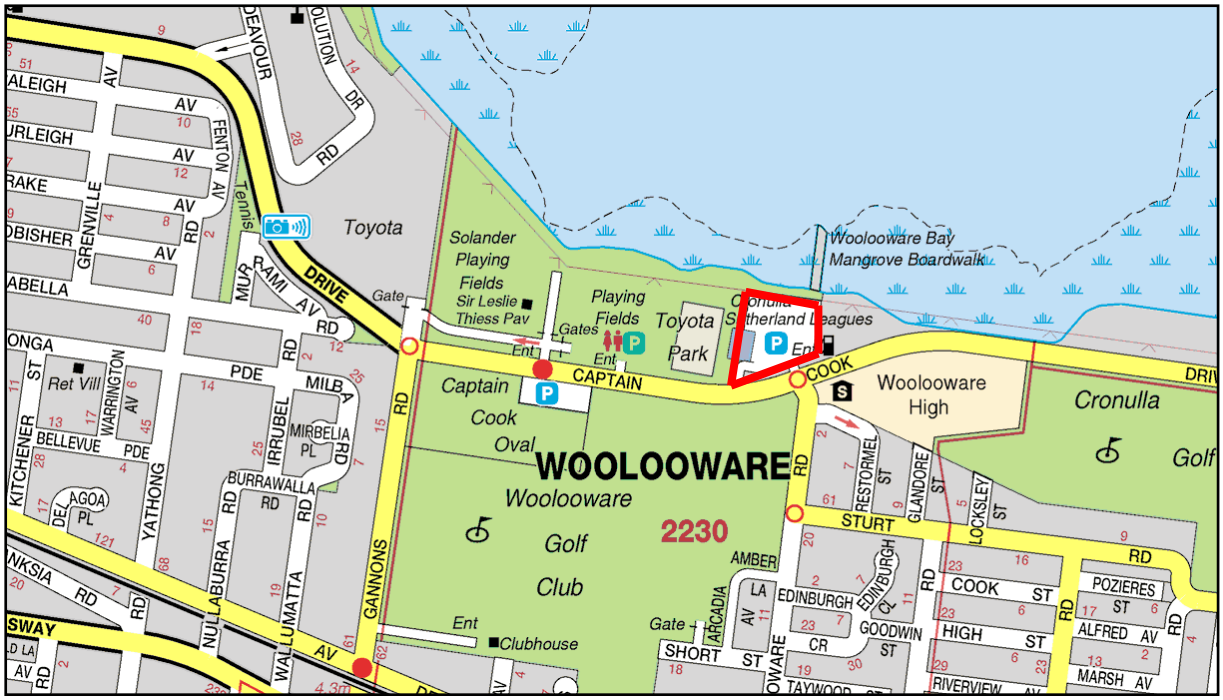


FIGURE 2: SITE CONTEXT - MAP

1.2 Existing Approval

The existing approved development was analysed in regards to traffic and parking in the *Cronulla Sharks Redevelopment – Mixed Used Masterplan - Traffic Management and Accessibility Plan* prepared by M^{C}Laren Traffic Engineering and dated May 2012.

Following the masterplan approval, a project application was lodged and approved with an updated traffic impact assessment report being the "*Cronulla Sharks Leagues Club – Retail Development – Traffic and Parking Impact Assessment*" prepared by *McLaren Traffic Engineering* and dated February 2013. An appendum to this report was issued by *McLaren Traffic Engineering* with title "*Woolooware Bay Town Centre, Transport and Parking Impact Assessment – Response to Department of Planning and Infrastructure*" and dated 24 May 2013. A 75W modification to the approved project was lodged in February 2016, accompanied by the *"Traffic and Parking Impact Assessment of Woolooware Bay Town Centre"* report prepared by *M^{C}Laren Traffic Engineering* and dated February 2016. The approved project application scale, including parking allocation and traffic impact are reproduced in **Section 3** of this report. The parking clauses of the issued consent are reproduced in **Section 3.2** of this report.

1.3 State Environmental Planning Policy (Infrastructure) 2007 Requirements

The proposed development qualifies as a traffic generating development with relevant size or capacity under Clause 104 of State Environmental Planning Policy (Infrastructure) 2007 and has received support from the Road and Maritime Services (RMS). The Project Approval for the Town Centre Precinct includes requirement for the upgrade of the Captain Cook Drive / Woolooware Road intersection plus new signalised access points to Captain Cook Drive for the Town Centre Precinct and the Residential Precinct.

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Surrounding Roads

The road network surrounding the site has the following characteristics:

Captain Cook Drive

- Regional road east of Gannons Road, operating as a 4 lane divided carriageway immediately adjacent to the site;
- State Road west of Gannons Road, operating as a 6 lane divided carriageway;
- Operates as a 2 lane undivided carriageway east of the site during construction of an additional 2 lanes;
- Kerbside parking is generally not permitted along either side of the road adjacent to the site;
- Bicycle lanes are located on both sides of the road adjacent to the site;
- 70km/h speed limit outside of school zone times, 40km/h School Zones apply around Woolooware High School during school zone times.

Woolooware Road North

- Local Road classification;
- 2 lane undivided carriageway;
- Unrestricted kerbside parking generally permitted along both sides of the road;
- 50km/h speed limit, except during school zone times leading up to Captain Cook Drive intersection 40km/h.

Gannons Road

- Regional Road classification;
- 2 lane undivided carriageway;
- Unrestricted kerbside parking generally permitted along both sides;
- 60km/h speed limit.

2.2 Traffic Management

The following prevailing traffic management facilities exist within the immediate vicinity of the site:

- Roundabout at the intersection of Captain Cook Drive / Woolooware Road North / Car Park Access for Cronulla Sharks Club Building. This roundabout operates as a two lane circulating roundabout;
- Wombat crossing in Woolooware Road North immediately south of the new roundabout at the junction of Captain Cook Drive / Woolooware Road North;
- Bicycle lanes on both sides of Captain Cook Drive along the front of the property;
- 40km/h School Zones operate near Woolooware High School;
- Roundabout control at the junction of Captain Cook Drive with Gannons Rd;
- Modified vehicle entry and exit arrangements for the car park serving Captain Cook Oval;
- Indented bus bay on Captain Cook Drive out the front of Sharks Stadium;
- During peak events at Sharks Stadium, such as NRL Rugby League matches, a special event traffic management plan is used to manage the peak traffic & pedestrian activity. This plan was development in 1998 by *M^{C}Laren Traffic Engineering* in consultation with Council's traffic committee and the Sharks. Trial implementation of satellite parking and extended bus services for game day is ongoing;
- Signalised driveway entrance and exit to the Woolooware Bay Residential precinct, including pedestrian crossing.

2.3 Existing Intersection Performance

Traffic surveys were completed at the intersections of Captain Cook Drive / Gannons Road, Captain Cook Drive / Woolooware Road and Captain Cook Drive / Elouera Road on Friday 4th November 2016 between the times of 4:00PM – 7:00PM and on Saturday 5th November between the times of 10:00AM – 2:00PM to ascertain the existing traffic volumes surrounding the site at the times critical to the retail components of the development.

The peak hours identified were Friday 4:45PM – 5:45PM and Saturday 10:00AM – 11:00AM, with the complete survey data reproduced in **Annexure B**.

SIDRA Intersection 7.0 has been used to analyse the existing performance of the surrounding intersections, with the results summarised in **Table 1**.

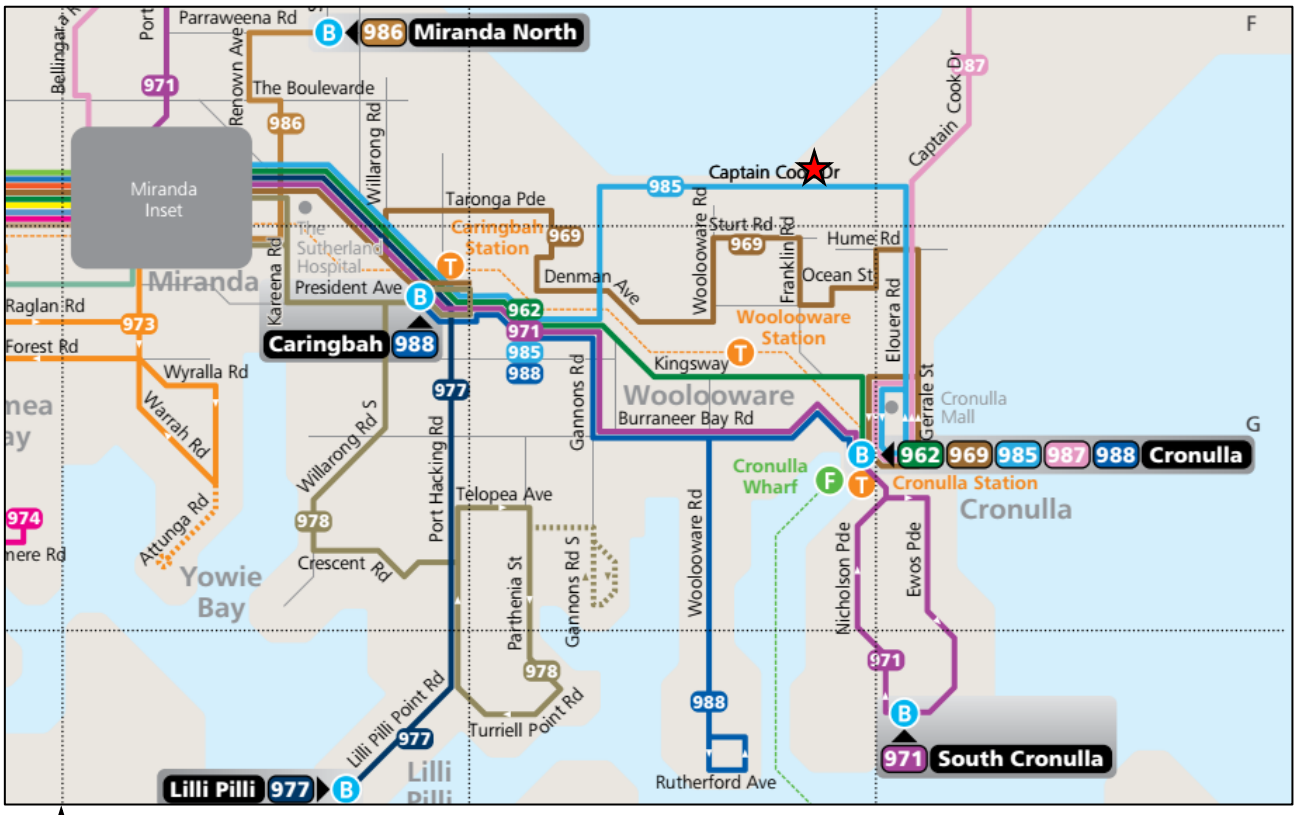
TABLE 1: EXISTING INTERSECTION PERFORMANCES (SIDRA INTERSECTION 7.0)

Intersection	Peak Hour	Degree of Saturation(1)	Average Delay(2) (sec/veh)	Level of Service(3)	Control Type	Worst Movement	95th Percentile Queue
EXISTING PERFORMANCE							
Gannons Rd / Captain Cook Drive	Fri	0.69	8.3 (Worst: 18.6)	**A** (Worst: B)	Give Way	UT from Captain Cook Drive (E)	8.3 veh (58.3m) Captain Cook Drive (W)
	Sat	0.63	7.8 (Worst: 17.2)	**A** (Worst: B)		UT from Captain Cook Drive (E)	5.8 veh (42m) Captain Cook Drive (E)
Woolooware Road / Captain Cook Drive	Fri	0.48	7.4 (Worst: 14.6)	**A** (Worst: B)	Give Way	UT from Captain Cook Drive (E)	3.5 veh (24.6m) Captain Cook Drive (W)
	Sat	0.34	6.6 (Worst: 12.7)	**A** (Worst: A)		UT from Captain Cook Drive (E)	1.8 veh (12.8m) Captain Cook Drive (E)
Elouera Rd / Captain Cook Drive	Fri	0.49	7.4 (Worst: 15.3)	**A** (Worst: B)	Give Way	UT from Captain Cook Drive (E)	4.1 veh (28.7m) Captain Cook Drive (E)
	Sat	0.31	5.8 (Worst: 12.5)	**A** (Worst: A)		UT from Captain Cook Drive (E)	2 veh (14.6m) Captain Cook Drive (E)

NOTES:
(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
(2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
(3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

2.4 Existing Public Transport

Improved public transport was identified as key to the Woolooware Town Centre Masterplan as part of the original *Traffic Management and Accessibility Plan* accompanying the original approval of development on the site. Route 985, which provides access from the site to both Miranda and Cronulla via Caringbah Train Station commenced on 20 November 2016, significantly improving the public transport available to residents of and visitors to the site. Route 985 provides services every half hour in both directions and connects to train services towards the Sydney CBD. The location of the site relative to the surrounding public transport infrastructure is shown in **Figure 3**.



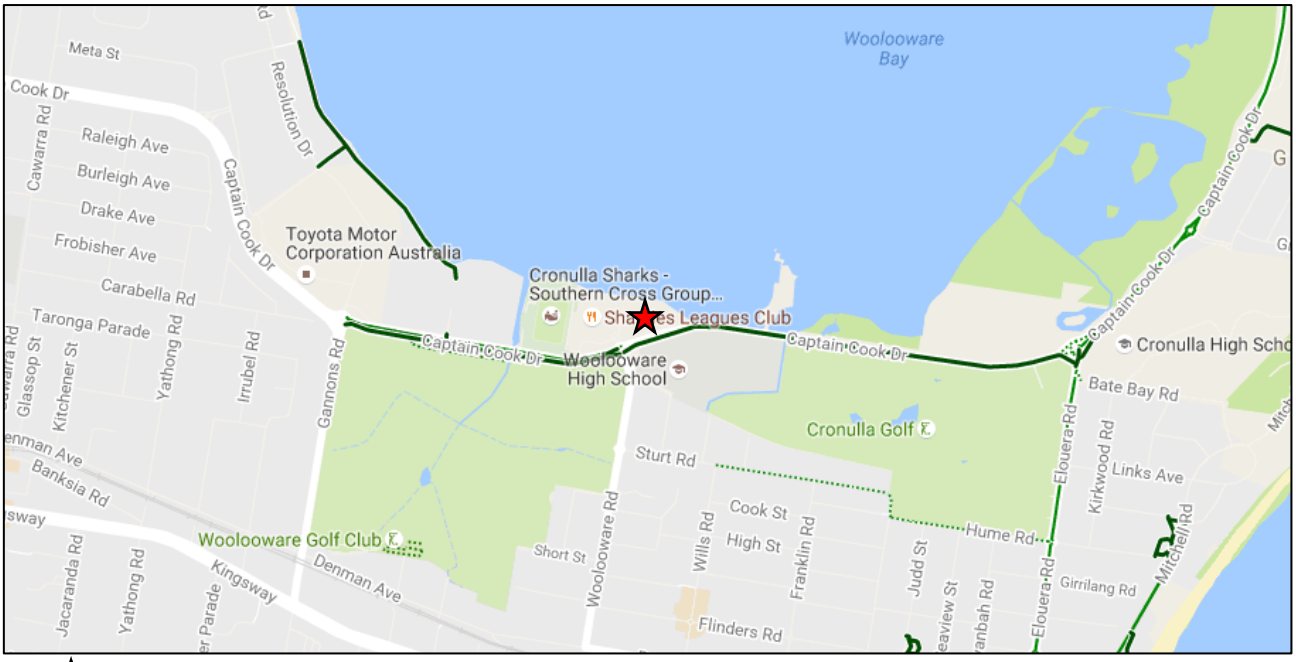
Site Location

FIGURE 3: PUBLIC TRANSPORT MAP

2.5 Existing Bicycle Facilities

Captain Cook Drive is a prominent route for cyclists, particularly on weekends, and a shared path runs along the southern side of Captain Cook Drive, providing a safe option for cyclists travelling to and from Kurnell to the east. The location of the site is shown on an excerpt of the Sydney Cycleways map in **Figure 2**.

At present, no dedicated bicycle lanes are provided along Captain Cook Drive in either direction for cyclists preferring to travel separate to the shared path.



Site Location

FIGURE 4: SYDNEY CYCLEWAYS MAP

3 APPROVED PROJECT APPLICATION

The Planning Assessment Commission approved a Part 3A Concept Plan for the Woolooware Bay Town Centre site in late-2012 comprising a master plan for the redevelopment of the site. This involved the construction of approximately 600 new apartments, upgrades to the Leagues Club and construction of a new Town Centre precinct with supermarkets, specialty retail, leisure uses and a medical centre. The master plan also includes the creation of a new foreshore parkland and upgrades to Southern Cross Group Stadium. Subsequently to this, a Project Application has been approved for the Leagues Club and Town Centre development and Development Applications have been approved for Stages 1 & 2 of the residential component. Further modifications to the project application were made in February 2016, the following section describes the approved Town Centre development approved under Project Application MP10_0230 MOD 6.

3.1 Scale

The approved project application had the following development scale:

- *Major Retail* *8548m²*
- *Speciality Shops* *4146m²*
- *Restaurant* *1065m²*
- *Medical* *633m²*
- *Leisure* *908m²*
- *Club (including Deck)* *4640m²*
- *Child Care Centre* *75 Places*
- *Outdoor Retail Deck* *820m²*
- *Community Use* *518m²*
- *Parking* *770 spaces*

3.2 Parking Volume and Allocation

The approved project application had the following parking volume and allocation:

• *Club*	*180 spaces per 8500* m²	*99 spaces*
• *Supermarket*	*1 space per 23.8* m²	*360 spaces*
• *Specialty Retail*	*1 space per 22.2* m²	*187 spaces*
• *Restaurant*	*1 space per 30m²*	*36 spaces*
• *Medical*	*1 space per 111.1* m²	*6 spaces*
• *Leisure*	*nil parking demand*	*0 spaces*
• *Child Care*	*1 space per 4 places*	*19 spaces (weekday afternoons only)*
• *Dual Use*	*10% of retail*	*55 spaces*
• *Parking Demand*		*601 spaces*
• *Parking Provided*		*770 spaces*

As noted in the February 2016 PPR, the following amount of parking will be available for Club members, guests and others authorised by the club exclusively and free of charge:

- *Monday to Sunday 9am to 5pm – 235 Club spaces (including 50 for staff)*
- *Monday to Friday 5pm to close of Club Trading – 367 Club spaces (including 50 for staff)*
- *Saturday and Sunday – 5pm to close of Club Trading – 488 Club spaces (including 50 for staff and assuming retail is 50% of peak or less)*

3.3 Traffic Volume and Impact

The approved project application had the following traffic generation and traffic impact:

Friday 4:45pm to 5:45pm Traffic Generation

Club	*168 trips per 8500 m²*	*92 trips*
Supermarket	*14.1 trips per 100 m²*	*1205 trips*
Specialty Retail	*5.7 trips per 100 m²*	*236 trips*
Medical	*0.5 trips per 100 m²*	*3 trips*
Leisure	*nil traffic generation*	*0 trips*
Restaurant	*5 trips per 100m²*	*53 trips*
Child Care	*0.7 trips per place*	*53 trips*
Dual Use	*10% of retail*	*144 trips*
Car Ownership	*2.5% higher than RMS*	*Included in rates*
Total Trips		*1500 trips*

Saturday 11:30am to 12:30pm Traffic Generation

Club	*100 per 8500 m²*	*60 trips*
Supermarket	*105% of Friday*	*1244 trips*
Specialty Retail	*105% of Friday*	*248 trips*
Medical	*105% of Friday*	*9 trips*
Leisure	*nil traffic generation*	*0 trips*
Restaurant	*5 trips per 100m²*	*53 trips*
Dual Use	*10% of retail*	*151 trips*
Car Ownership	*2.5% higher than RMS*	*Included in rates*
Total Trips		*1464 trips*

TABLE 2: TRAFFIC IMPACT FOR FRIDAY PM AND SATURDAY MIDDAY BASED ON 2012 PPR

Intersection	*Peak Hour*	*Degree of Saturation*	*Average Delay (s/veh)*	*Level of Service*	*Control Type*
EXISTING PERFORMANCE					
Captain Cook Drive / Gannons Road	*FRI PM*	*1.49*	***>70*** *(>70)*	***F*** *Worst: F*	*Roundabout*
	SAT NOON	*0.75*	***12.0*** *(17.7)*	***A*** *Worst: B*	
Captain Cook Drive / Woolooware Road North	*FRI PM*	*0.77*	***8.3*** *(22.2)*	***A*** *Worst: B*	*Roundabout*
	SAT NOON	*0.53*	***8.2*** *(15.2)*	***A*** *Worst: B*	
Captain Cook Drive / Elouera Road	*FRI PM*	*0.71*	***10.9*** *(13.6)*	***A*** *Worst: A*	*Roundabout*
	SAT NOON	*0.29*	***7.5*** *(11.1)*	***A*** *Worst: A*	
Gannons Road / Kingsway	*FRI PM*	*1.00*	***54.4***	***D***	*Signals*
	SAT NOON	*1.19*	***64.8***	***E***	
Gannons Road / Denman Avenue	*FRI PM*	*0.86*	***19.9***	***B***	*Signals*
	SAT NOON	*1.05*	***32.9***	***C***	
Captain Cook Dr / Boulevard / Taren Pt Rd	*FRI PM*	*1.08*	***>70***	***F***	*Signals*
	SAT NOON	*1.00*	***>70***	***F***	
FUTURE PERFORMANCE BASED ON CONCEPT APPROVAL INCLUDING STAGES 1-4					
Captain Cook Drive / Gannons Road	*FRI PM*	*1.88*	***>70*** *(>70)*	***F*** *Worst: F*	*Roundabout*
	SAT NOON	*0.94*	***21.5*** *(38.8)*	***B*** *Worst: C*	
Captain Cook Drive / Woolooware Road North	*FRI PM*	*0.78*	***16.1***	***B***	*Upgraded Signals*
	SAT NOON	*0.51*	***16.2***	***B***	
Captain Cook Drive / Elouera Road	*FRI PM*	*0.81*	***11.7*** *(17.3)*	***A*** *Worst: B*	*Roundabout*
	SAT NOON	*0.42*	***7.7*** *(11.5)*	***A*** *Worst: A*	
Gannons Road / Kingsway	*FRI PM*	*1.00*	***57.8***	***E***	*Signals*
	SAT NOON	*1.23*	***>70***	***F***	
Gannons Road / Denman Avenue	*FRI PM*	*0.87*	***20.5***	***B***	*Signals*
	SAT NOON	*1.11*	***55.8***	***D***	
Captain Cook Dr / Boulevard / Taren Pt Rd	*FRI PM*	*1.23*	***>70***	***F***	*Signals*
	SAT NOON	*1.02*	***>70***	***F***	
Captain Cook Drive / New Residential Access	*FRI PM*	*0.75*	***2.5***	***A***	*New Signals*
	SAT NOON	*0.74*	***1.8***	***A***	
Captain Cook Dr / New Retail Access	*FRI PM*	*0.84*	***9.4***	***A***	*Proposed New Signals*
	SAT NOON	*0.84*	***11.2***	***A***	

3.4 Approved Public Transport

As detailed previously in **Section 2.4**, the public transport proposed as part of the original master plan commenced as of 20 November 2016. Indented bus bays will be provided on both sides of Captain Cook Drive with pedestrian access provided by the pedestrian crossings as part of both the Residential precinct access (in operation as of November 2016) and the future, approved, retail access and Woolooware Road signalised intersections.

In addition, a travel access guide will be made available for users of the site, as included with the Green Travel Plan submitted in tandem with this Traffic and Parking Impact Assessment.

3.5 Approved Road Network Infrastructure

Several upgrades to the surrounding road network are included as part of the master plan which include:

- Creation of Woolooware Road north, extending approximately 100m north of the existing alignment of Captain Cook Drive;
    - Includes shared path connection from the approved foreshore walk to Captain Cook Drive for pedestrians and cyclists;
- Upgrade of Captain Cook Drive to include dedicated cycling lanes in both directions;
    - Shared path to be reinstated on the southern side;
    - Indented bus bays on both sides of the road to improve amenity for bus services.
- Upgrade of the Woolooware Road / Captain Cook Drive intersection to signals, including:
    - The realignment of the southern approach and construction of a left turn slip lane appropriate for buses;
    - Pedestrian crossings appropriate on three approaches.
- New signalised intersection providing access to the centre and an additional crossing point for pedestrians.

The above works have been subject to an extensive consultation process with Sutherland Shire Council and are subject to a separate application.

4 PROPOSED DEVELOPMENT MODIFICATIONS

TABLE 3: WOOLOOWARE BAY TOWN CENTRE – STAGE 4 MODIFICATIONS

Land Use	WBTC Previously Proposed Scale	Modified Scale		
Parking (spaces)	770	1028		
Specialty Retail	4146 m^2	4391 m^2		
Business Centre	0	299 m^2		
Residential (units)	0	**1 Bed**	**2 Bed**	**3 Bed**
		81	105	36
		Total of 222 Units		
Sharks Accommodation	0	**1 Bed**	**2 Bed**	
		2	2	
		Total of 4 Units		
Leisure	908 m^2	1228 m^2		
Hotel	0	125 keys		

The two sets of signals serving the development have existing approval by RMS and any revisions to turn bay lengths and signal phasing will require further approval by RMS.

5 PARKING ASSESSMENT

5.1 Car Parking

For submissions to the PAC, JRPP and DOPI the subject development was analysed generally in comparison to RMS and Sutherland Shire Council Development Control Plans (DCP) rates for parking demand and supply. The consent clauses relating to retail and club (Town Centre) parking are "*A minimum of 770 spaces for the Retail and Club Precinct*" and "*Retail and Club precinct parking and allocation to uses is to be determined following the submissions of a parking study*". Previously an oversupply of parking was provided based on a conceptual 'growth' within the town centre. This has been incorporated into the current S75W application with more leasable floor space for a mix of uses such as residential, tourist and business centre.

It is important to note that under the most recent Draft DCP 2015, the parking rates have significantly changed for the subject development compared to the 2006 DCP, as per the residential parking rates shown below.

Residential Flat Building / Shop Top Housing

Zone B1, B2, B3 & B4

Minimum 1 space per unit – maximum 2 spaces

No visitor parking

Despite the opportunity to utilise these lower rates, the residential component has been provided parking as per the rates in the existing approved residential precinct.

The new land uses in this application are summarised below.

- Residential Units – Parking based on parking rates for existing, approved residential precinct;
    - Residential visitors to use retail spaces. It should be noted that peak residential visitor times do not coincide with those of a retail centre.
- Sharks Accommodation – no parking allocated, based on the use being by players or player's families who can be allocated parking when required within the Club's parking dedication;
- Business Centre – Patronage surveys of the site show business centre patrons have 31.25% vehicle driver rate (or 1 space per 3.125 patrons);
- Hotels – Parking based on DCP rate for hotels;
- Community Use – Parking based on Office/medical rates contained in RMS 'Guide to Traffic Generation Developments' despite being predominantly ancillary.

Table 4 summarises the parking rates applicable to the subject development.

TABLE 4: PEAK PARKING DEMAND PER LAND USE

Land Use	Peak parking Rate	Derived From
1 Bed Unit(1)	1 space per unit	Existing Residential Approval
2 Bed Unit(1)	1 space per unit	Existing Residential Approval
3 Bed Unit	2 spaces per unit	Existing Residential Approval
Residential Visitor	1 space per 5 units (zero required under DCP)	Existing Residential Approval (zero required under DCP)
Supermarket	4.2 spaces per 100m^2	Existing Retail Approval
Secondary Retail	4.5 spaces per 100m^2	Existing Retail Approval
Medical	0.9 spaces per 100m^2	Existing Retail Approval
Leisure	nil	Existing Retail Approval
Club	180 spaces per 8500 m^2	Site patronage Surveys
Restaurant/cafe	3.3 spaces per 100m^2	DCP
Hotel	1 space per 4 rooms plus 1 space per 2 staff	DCP
Business Centre	1 space per 3.125 patrons	Site Patronage and Staff Surveys
Childcare Centre	1 space per 4 places	DCP
Community Facility	0.9 spaces per 100 m^2	RMS Guide to Traffic Generating Developments
Dual Use of Parking	10% retail discount	Existing Retail Approval

Three major parking periods are identified and analysed below regarding parking accumulation, being Friday before 5:30pm, Friday after 6:30pm and Saturday Midday. These scenarios each have the greatest anticipated overlaps of Town Centre parking. An operating factor has been applied as a comparison to the peak parking accumulation to recognise the changing parking demand of each land use with time. A simple example is the club which has low parking demand during 9am to 5pm with progressively higher parking demand in the PM and a peak at approximately 9pm.

TABLE 5: PARKING ACCUMULATION FRIDAY PRIOR TO 5:30PM

Land Use	Peak Parking Demand (spaces)	Operating Factor	Friday Prior to 5:30PM (spaces)
Residential Parking Areas			
1 Bedroom Unit	81	100%	81
2 Bedroom Unit	105	100%	105
3 Bedroom Unit	72	100%	72
Sub Total	**258**		**258 Spaces**
Retail Parking Areas			
Visitors (Residential)	45	25%	11
Sharks Accommodation	0	100%	0
Supermarket	360	100%	360
Secondary Retail	198	100%	198
Medical Centre	7	100%	7
Club	99	30%	30
Restaurant	35	50%	18
Childcare Centre	19	100%	19
Hotel	34	100%	34
Business Centre	94	10%	9
Leisure	0	100%	0
Community Facility	4	100%	4
Individual Sub-Total			**690 Spaces**
Dual Use	360+198 = 558	-10%	-56
Retail Sub-Total			**634 Spaces**
Total Demand	**892 Spaces**		
Total Supplied	**1028 (770 Retail / 258 Residential)**		

TABLE 6: PARKING ACCUMULATION FRIDAY AFTER 6:30PM

Land Use	Peak Parking Demand (spaces)	Operating Factor	Friday Prior to 5:30PM (spaces)
Residential Parking Areas			
1 Bedroom Unit	81	100%	81
2 Bedroom Unit	105	100%	105
3 Bedroom Unit	72	100%	72
Sub Total	**258**		**258 Spaces**
Retail Parking Areas			
Visitors (Residential)	45	100%	45
Sharks Accommodation	0	100%	0
Supermarket	360	100%	360
Secondary Retail	198	25%	50
Medical Centre	7	100%	7
Club	99	100%	99
Restaurant	45	50%	18
Childcare Centre	19	0%	0
Hotel	34	100%	34
Business Centre	94	100%	94
Leisure	0	100%	0
Community Facility	4	100%	4
Individual Sub-Total			**711 Spaces**
Dual Use	360+198 = 558	-10%	-56
Retail Sub-Total			**655 Spaces**
Total Demand	**913 Spaces**		
Total Supplied	**1028 (770 Retail / 258 Residential)**		

TABLE 7: PARKING ACCUMULATION SATURDAY MIDDAY

Land Use	Peak Parking Demand (spaces)	Operating Factor	Friday Prior to 5:30PM (spaces)
Residential Parking Areas			
1 Bedroom Unit	81	100%	81
2 Bedroom Unit	105	100%	105
3 Bedroom Unit	72	100%	72
Sub Total	**258**		**258 Spaces**
Retail Parking Areas			
Visitors (Residential)	45	50%	23
Sharks Accommodation	4	100%	4
Supermarket	360	100%	360
Secondary Retail	198	100%	198
Medical Centre	7	50%	4
Club	99	70%	69
Restaurant	45	75%	26
Childcare Centre	19	0%	0
Hotel	34	100%	34
Business Centre	94	50%	47
Leisure	0	100%	0
Community Facility	4	100%	4
Individual Sub-Total			**765 Spaces**
Dual Use	360+198 = 558	-10%	-56
Retail Sub-Total			**709 Spaces**
Total Demand	**967 Spaces**		
Total Supplied	**1028 (770 Retail / 258 Residential)**		

It is apparent then that due to the mix of land uses the town centre will operate effectively and with a maximum/peak weekly parking accumulation of 967 spaces on Saturday at midday. 1028 spaces are provided which exceeds the estimate of demand by 63 spaces. It should be noted that the assumed proportion of dual use trips (10%) is conservative and based on studies of similar facilities is closer to 50%. The retail, club and visitor component of the site is provided 770 spaces, as per the current approval, which accommodates a peak weekly occupancy of only 717 non-residential spaces. The parking supply also allows the site to operate effectively as a town centre with a variety of complimentary land uses and a shared pool of parking to serve the needs of the community.

The peak weekly parking demand is not expected to be as high as 967 parking spaces on Saturday, due to a provision of five (5) GoGet vehicles. GoGet is car sharing service which will be operating in the town centre and typically serves to decrease the parking demands of residential, business and accommodation land uses. Utilising the GoGet cars, it is expected that peak parking demand for residential and retail staff will decrease, further reducing the overall peak parking demand.

The quantum of parking is compliant with the minimum requirements set by the existing approval and in excess of the demand found by the parking study, which assumes a conservative level of multi-use trips. The parking provision is therefore satisfactory and supported.

5.2 Parking Allocation

It is required for purposes of crime prevention to secure the residential tenant parking. Two separate residential parking areas are proposed, separated from retail customers on Levels 5 and 6 of the carpark.

Existing approval required allocation of a minimum of fifty (50) spaces be allocated to club staff at all times, though not within the Town Centre precinct necessarily.

The non-residential spaces represent a supply of 770 spaces shared between levels 1, 3, 4 and 5 for use by the club staff, club patrons, retail staff, retail customers, accommodation guests, accommodation staff and residential visitors. Based on the varying demand of the Town Centre precinct, the following approximate parking availability will occur for the use by club and business centre staff/visitors:

- Monday to Sunday 9am to 5pm – 128 Club spaces (including 50 for staff)
- Monday to Friday 5pm to close of Club Trading – 233 Club spaces (including 50 for staff)
- Saturday and Sunday – 5pm to close of Club Trading – 399 Club spaces (including 50 for staff and assuming retail is 50% of peak or less)

On game day it is proposed to allow retail customers and residential visitors to continue to access the Town Centre precinct however only through the eastern signals, and only on the basement floor. This would include 200 spaces for the retail customers and residential visitors which are less than normally available though still a reasonable provision and should be notified to tenants regarding game day operation. The remaining 609 spaces would be for retail staff, club staff and club patrons. This operation will be subject to change following monitoring.

5.3 Car Park Guidance System

There should be a system in place to have higher turnover parking at the lower levels and long stay parking at the higher levels. Since generally the short stay parking will only be retail customers, it will be necessary to discourage the long stay users from the most convenient parking areas in an effort to minimise driver search times for available parking.

This can be done by introducing a scheme such as free untimed parking on levels 4 and 5, free 3-hour parking on levels 1 and 3 between 8am and 7pm and free parking on all levels between 7pm and 8am. This would effectively result in retail, club and accommodation staff parking on the upper levels which is only a minor inconvenience. It would however provide a very high increase to efficiency and attractiveness of the centre for club patrons and retail customers. The management of such an operation should be an automatic parking guidance system, based on the advice of an experienced installer and operator. The uncontrolled situation may result in higher turnover of spaces on the upper levels which is inefficient and undesirable.

It is recommended that an electronic dynamic parking guidance system be installed to direct traffic entering the Town Centre car park to available parking spaces. Such a system could also be used on game days to assist in directing cars to specially assigned internal game day parking spaces. The system could manage the location of time restricted parking in addition to directing drivers to appropriate levels for each land use.

The eventual system installed must be dynamic to deal with the new residential component of the modified development including diverted access on game days if partial road closures occurred. This may involve residents entering the site through the eastern Town Centre signals before internally circulating to the residential express ramp. In principle this operation should be simple to implement.

5.4 Accessible Parking

The accessible parking rate is to be one space per adaptable dwelling, as reviewed in the *Morris-Goding Accessibility Consulting 'Access Review'*. With 66 adaptable units and 77 adaptable spaces, the provision is adequate. Further to the residential rate, it is recommended for 1% to 4% of visitor spaces to be accessible, this rate of accessible parking exists within the retail parking and is therefore acceptable.

5.5 Motorcycle Parking

The approved parking supply of 770 spaces for the Town Centre precinct included nil motorcycle provision. As such the development with nil motorcycle parking is in line with existing approval.

5.6 Bicycle Parking

Council's DCP gives the following bicycle parking rates in relation to this proposed development:

> *5.2 Controls for All Development, Except Dwelling Houses, Dual Occupancies, Multi Dwelling Housing and Residential Flat Building Developments*
>
> *1 per 10 car parking spaces for first 200 car spaces, then 1 space per 20 parking spaces thereafter and 1 unisex shower per 10 employees.*

Of the total 1028 parking spaces provided, 258 cater to residents in the proposed Residential Flat Buildings and are therefore not considered when determining the resulting provision of bicycle spaces. The remaining 770 spaces require a total of forty-nine (49) bicycle spaces/racks are required for the visitors and staff to the Town Centre precinct. The development meets this requirement, providing:

- 10 racks (2 bicycles each) adjacent to the foreshore path;
- 8 racks (2 bicycles each) on the Captain Cook Drive footpath entry;
- 13 secure storage spaces for staff with associated end of trip facilties.

It is recommended that bicycle parking be provided for the residential component of the development. Sutherland Shire Council's DCP 2006, provides bicycle parking rates for residential developments at a rate of 1 per 5 dwellings units, plus 1 visitor space per 10 units. This would require a bicycle provision of 67 bicycle spaces.

Sutherland Shire Council's Draft DCP 2015 does not outline residential bicycle parking rates, as a result the recommended 67 bicycle spaces do not strictly apply. The final bicycle parking provision for the residential portion of the development can be determined by Sutherland Shire Council at the development application stage.

5.7 Car wash bays

Council's DCP gives the following car wash parking rates in relation to the proposed development:

> *Developments with 10 or more dwellings require one designated carwash bay with minimum dimensions of 3m x 7.6m. Additional carwash bays are required in development in excess of 30 dwellings at a rate of 1 per 20 dwellings.*

A strict application of this rate would yield 1+0.05*222 = 12. This is a very high rate and is out of context to the proposed development both in terms of scale, time of application and local available resources. Sutherland Shire Council's assessment for the Residential Stage 1 DA states that:

> Although 11 car wash bays are required based on Council's DCP generation rates, the car wash bays are not required under the concept approval. The proposal is capable of meeting the key objectives for Council's DCP controls for parking despite this non-compliance. Given the availability of commercial car wash facilities in the area and the trend of apartment residents using this service in favor of onsite car wash facilities, the omission of these facilities on site is considered acceptable.

The indicative parking allocation provides for a single car wash bay off-street which is satisfactory and supported.

5.8 Car Parking Design Compliance

Referring to the indicative plans provided in **Annexure A**, the parking layout has been assessed in accordance with AS2890.1:2004, AS2890.2:2002, AS2890.3:2015 AS2890.6:2009 and AS4299:1995 where applicable. In summary, the following notable design details have been achieved:

- Minimum space widths of 2.4m for residents and 2.6m for other user classes;
- Minimum space width of 2.3m for the designated small car bays;
- Disabled parking spaces are 2.4m in width and 5.4m in length. Adjacent shared zones have been provided measuring 2.4m in width and 5.4m in length. Else the parking bay width is 3.8m;
- Widths of circulation aisles and manoeuvring areas according to user class (5.8m for low to medium turnover and 6.2m or 6.6m for high turnover parking). Generally circular one-way systems employed.

The carpark layout has been assessed as compliant, however it is usual and expected that a design certificate be required at the Construction Certificate stage to account for any changes during the development application process.

5.9 Servicing/Loading Dock Provision

No changes are proposed to the general loading dock locations or capacity as part of this modification application. Access and management of these docks has been assessed and approved as part of Project Application MP10-0230.

While all bays were previously overdesigned for 19.0m articulated vehicles, refinement of the intended operators has introduced more bays than previous, albeit with fewer dedicated semi-trailer bays. At least one articulated bay will be made available to each of the large retail tenancies with the smaller tenancies having shared use of an articulated bays and many other rigid vehicle bays. Swept path tests showing 19m semi-trailer access are provided in **Annexure C**.

5.10 Entry control device

If future applications are made to the local traffic committee for paid parking to be implemented on the site, the eastern entry shall not have a boom gate on entry and shall only employ a licence plate recognition or other system not requiring vehicles to stop. This is to prevent queuing upstream of the entry on Woolooware Road North. There is sufficient entry queue length on site for the western entry to be able to implement a boom gate if desired, though it remains the recommendation for a consistent system to be implemented if any such that the western entry would have licence plate recognition also. The entry queue lengths are therefore supported. Exit queue lengths would be managed within the site and except for game day would more likely be limited by the amount of green time at the two sets of traffic signals on Captain Cook Drive than by the exiting boom gate delay.

Game day management arrangements for the Town Centre parking allocation were assessed and approved as part of Project Application MP10-0230. Since game day traffic is largely tidal, inbound prior to the game and outbound following the game, any boom gates installed on exit should have a secondary lane also to allow the additional game day flows.

6 TRAFFIC ASSESSMENT

6.1 Traffic Generation

Previously the site was assessed using the most recent available data from the RMS, being the RMS *'Guide to Traffic Generating Developments'* dated October 2002 (RMS Guide). The modification will utilise the previously applied rates for traffic generation including 2.5% loading on RMS rates, 10% dual use of the retail component and the Saturday peak retail traffic being 105% of the Friday peak retail traffic. Traffic generation for the proposed Town Centre precinct is described in **Table 8** and **Table 9**.

TABLE 8: TRAFFIC GENERATION RATES PER LAND USE

Land Use	Friday 5-6PM (per hour)	Saturday Midday (per hour)	Derived From
High Density Residential	0.29 trips / unit	25% of Friday PM (Previous TMAP)	RMS Guide
Supermarket (or similar)	14.1 trips / 100m^2	14.8 trips / 100m^2	Approved Project Application
Secondary Retail	5.7 trips / 100m^2	6.0 trips / 100m^2	Approved Project Application
Medical	0.5 trips / 100m^2	0.5 trips / 100m^2	Approved Project Application
Community Use	0.5 trips / 100m^2	0.5 trips / 100m^2	Office as in RMS Guide
Club	168 trips / 8500m^2	100 trips / 8500m^2	Approved Project Application
Child Care Centre	0.7 trips / place	Nil	RMS Guide
Leisure	Nil	Nil	Approved Project Application
Restaurant	5.0 trips / 100m^2	5.0 trips / 100m^2	RMS Guide
Hotel	0.5 trips / space	0.5 trips / space	Reasonable Estimation
Business Centre	1 trip per parking demand	1 trip per parking demand	Reasonable Estimation
Major Mixed Use Development in Sutherland Shire	Included in above rates	Included in above rates	Approved Project Application
Dual Use	10% of Retail	10% of Retail	Approved Project Application

TABLE 9: TRAFFIC GENERATION TRIPS PER LAND USE

Land Use	Traffic Generation Friday 5-6PM (Trips per hour)	Traffic Generation Saturday Midday (Trips per hour)
High Density Residential	65	17
Supermarket	1199	1258
Secondary Retail	251	264
Medical	4	4
Community Use	3	3
Club	100	41
Child Care	53	0
Leisure	0	0
Restaurant	54	54
Hotel	17	17
Business Centre	9	47
10% Dual Use of Retail	-145	-153
TOTAL (2016 MOD)	**1626**	**1568**
TOTAL (2015 Approval)	**1500**	**1454**

The updated project application, including new land uses, will produce a slightly increased peak traffic generation of approximately 8.5% for the weekday peak and 8% for the weekend peak. It is noted that the residential component accounts for only 4% (Weekday) and 1.1% (Weekend) of the total traffic generation. The changes are generally to do with the more varied land uses, though the updated application should still be analysed regarding external traffic impact.

6.2 Traffic Impact

Previous site analyses estimated the direction of traffic flows (traffic assignment) for the residential and non-residential components of the precinct and the same percentage assignments are utilised in this analysis of traffic impact.

Previous assessments included 383 trips associated with further development of Kurnell to the east along Captain Cook Drive, these volumes were provided by the RMS to be added to the existing traffic to account for increased future traffic to and from Kurnell. At the time of the most recent surveys (November 2016) a proportion of the Kurnell developments have been completed, being at least 224 low density dwellings, and the traffic generation can reasonably be subtracted from the original 383 trips advised by the RMS. Based on 224 low density dwellings and an associated traffic generation of 0.99 trips per dwelling, the total peak hour traffic generation of the completed dwellings is some 222 (221.8) trips. Assuming that 75% of these trips is along Captain Cook Drive, the original 383 trips can be reduced by some 0.75 x 222 = 166 trips to 383 – 166 = 217 trips.

The traffic volumes modelled include the existing survey counts, reduced RMS recommended 217 trips for Kurnell residential development, Residential Stages 1-3 and the Town Centre Precinct.

The estimated traffic generation of the development has been added to the traffic counts conducted in November 2016, as detailed previously in **Section 2.3**. Previous reports have been based on traffic surveys completed between 2011 and 2013 and it is considered that the modelling based on the updated traffic counts provides a more accurate projection of the future function of the intersections. The previously approved and proposed intersection performance is compared in **Table 10**.

At the time of this report, an application has been made to the RMS to amend the approved signal layouts. SIDRA INTERSECTION 7.0 analysis software has been utilised to assess the revised traffic generation on the proposed signal layouts, which have a reduced capacity compared to the originally approved layout, with the results provided in **Annexure D**.As the proposed signal layouts have less capacity than those approved, it follows that the approved signals will perform at or better than the proposed layouts used in the analysis.

The notable results of the modelling include:

- The two sets of signals serving the Town Centre precinct operate efficiently at Level of Service **A** or **B** in both critical time periods for the proposed scale of development.
- The Gannons Road roundabout operates at Level of Service **C** for both time periods in the currently proposed scenarios. The Level of Service **C** is symptomatic of very high peak hourly eastbound and westbound through volumes and is supported.
    - It should be noted that traffic queues from the Gannons Road / The Kingsway intersection have been observed extending up to the Captain Cook Drive Junction, limiting movements to the southern exit of the intersection with the effect that the constrained eastern approach experiences reduced delays.
    - Delays will be generally experienced by eastbound traffic due to volume in the evening peak hour and for westbound traffic in both time periods due to the number of vehicles turning right across the traffic stream from the eastbound approach. These turning volumes are not caused by the subject development and are in any case a supported and acceptable outcome.
- There is a slight improvement in predicted intersection degree of saturation and average delay time for the Captain Cook Drive / Gannons Road Roundabout when compared to the approved case. This results from a decrease in the two-way traffic associated with the future development of Kurnell, such that there is a net reduction in delays and saturation at the intersection in the future case.

The proposed development modification is therefore supportable on traffic impact grounds.

TABLE 10: INTERSECTION PERFORMANCE COMPARISION
SIDRA INTERSECTION 7.0

Intersection	Peak Hour	Degree of Saturation	Average Delay (s/veh)	Level of Service
Approved Project Application Scale (2011-2013 Surveys) (SIDRA 7.0)				
Western Retail Signals	FRI PM	0.88	7.5	A
	SAT MID	0.82	8.3	A
Captain Cook Drive / Woolooware Road	FRI PM	0.77	13.6	A
	SAT MID	0.57	15.1	B
Captain Cook Drive / Gannons Road	FRI PM	0.95	19.8	B
	SAT MID	1.00	38.7	C
Proposed Project Application Scale (SIDRA 7.0)				
Western Retail Signals	FRI PM	0.90	9.0	A
	SAT MID	0.69	5.1	A
Captain Cook Drive / Woolooware Road	FRI PM	0.92	21.6	B
	SAT MID	0.71	19.9	B
Captain Cook Drive / Gannons Road	FRI PM	1.00	31.3	C
	SAT MID	0.99	26.1	C

7 CONCLUSIONS

The traffic and parking impacts of the proposed modification application to the concept plan, as shown in reduced form in **Annexure A**, have been analysed in regards to projected parking demand and traffic generation.

The retail precinct contains a total of 1028 parking spaces, divided between residential (258 spaces) and other uses (770 spaces). The total of 258 additional parking spaces for residents of the 222 proposed units meet the parking requirements previously approved as part of the concept plan and is considered acceptable. The parking demand of the revised town centre, including the generation of the new land-uses, has been conservatively estimated at a peak of 709 spaces on a Saturday at midday. The provision of 770 spaces is therefore adequate and will provide some surplus parking such that the car park operates efficiently.

The access facilities and parking layout have been generally designed as per the relevant design requirements and objectives of AS2890.1, AS2890.2, AS2890.3, AS2890.6 and AS4299.

The traffic generation of the site, including both the approved and new land-uses, has been estimated as approximately 15% larger than the approved project application. The traffic generation has been added to the existing traffic volumes, based on surveys conducted in November 2016, surrounding the site to assess the future performance of the road network and found to have acceptable impacts on the intersections surrounding the site, with all intersections operating at a Level of Service of **B** or **C** in the Friday PM and Saturday midday peak hours.

In view of the foregoing, the traffic and parking impacts of the proposed modification to the approved project are fully supported.

ANNEXURE A: REDUCED PLANS
(6 SHEETS)

ANNEXURE B: TRAFFIC COUNTS
(8 SHEETS)

Mc Laren
Traffic Engineering &
Road Safety Consultants

ANNEXURE C: LOADING DOCK SWEPT PATHS
(4 SHEETS)

ANNEXURE D: SIDRA MOVEMENT SUMMARIES
(20 SHEETS)