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Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

1 August 2017 Reference: 17230.01FA

Capital Bluestone
Level 9, 23 O'Connell Street,
Sydney NSW 2000
Attention: Matt Loader

LETTER RESPONSE TO DEPARTMENT OF PLANNING AND ENVIRONMENT WITH REGARD TO THE WOOLOOWARE BAY TOWN CENTRE AT 471 CAPTAIN COOK DRIVE, WOOLOOWARE

Dear Matt,

Reference is made to your request to provide a response to the comments provided by the New South Wales Department of Planning and Environment (DPE) in their letter dated 28/4/2017 and by Sutherland Shire Council (SSC) in their letter dated 20 April 2017 with regards to the proposed modifications to the approved Woolooware Bay Town Centre (MP10_0229 MOD 2 & MP10_0230 MOD 6) as shown on reduced plans in **Annexure A**. Responses to the DPE and SSC are provided in **Sections 1** and **2** below. **Section 3** of this letter includes amended Parking Impact and Traffic Impact assessments to address the modified plans; the content of **Section 3** should be considered an addendum to the Traffic and Parking Impact Assessment dated 13 January by M^CLaren Traffic Engineering which accompanied the original submission.

1 Department of Planning and Environment Comments

Each of the relevant comments is reproduced in *italics* and responded to below. A table summarising the response to the DPE comments is provided in **Annexure B**.

1.1 Reduction of Traffic and Parking Demands

3. Further consideration should be given to strategies and mechanisms to reduce the traffic and parking demands of the development. In particular:

a. a specific commitment to providing a minimum amount of car share spaces along with justification for how this number was derived;

b. retaining or reinstating the shuttle bus to Woolooware station to provide residents with a direct link to the nearest train station for services to the city and other centres on the rail network; and

c. a commitment to increased bicycle parking.

1.1.1 Provision of Car Share Spaces

The provision of four car share spaces has been negotiated with the Car Share provider (GoGet) based on viability. The car sharing provider GoGet has advised that two share cars each for the residential and hotel components of the development would be appropriate, resulting in a total provision of four share car vehicles. It is envisaged that these shared vehicles will be utilised predominantly by residents or by hotel guests and provide a net improvement to the development in terms of traffic and parking impacts, rather than serve to compensate for a shortfall in on-site parking, noting in this case that no shortfall exists.

While Car Sharing arrangements are relatively new to the transport planning environment, a report in 2012 by SGS Economics and Planning estimated that each share-car reduces the number of privately owned cars in the surrounds by 13, or a net reduction of 12 when the share-car is taken into account.

1.1.2 Link to Woolooware Train Station

It should be noted that the initiative taken as part of the original masterplan approval has resulted in the establishment of bus route 985 by Transport for New South Wales (TFNSW). The bus route committed to as part of the master plan approval, to be operated initially by a private shuttle, included Woolooware Train Station and it was expected that the Woolooware Station stop would be maintained when TFNSW assumed the service.

Consultation has been undertaken with TFNSW to assess whether there would be any material benefit for a bus service that stops at Woolooware Train Station and it has been advised by email that:

- *TfNSW, at this time, will not be altering the existing route 985. However, TfNSW will continually review the development progress in the area, with any enhancements to existing bus services would be subjected to TfNSW Growth Services Program. The Program has certain criteria and funding limitations, so it cannot be guaranteed or assumed;*
- *TfNSW believes that the 985 connects users of the development to the transport interchanges of Miranda, Caringbah and Cronulla – which operates the same Heavy Rail train line from Woolooware. It should also be noted that TfNSW is restricted to the bus services that operate via Woolooware Station (particularly the eastern end of Denman Avenue) due to the restricted road space available and the ability to accommodate a 14.5m bus.*

The complete email from TfNSW is provided in **Annexure D**.

Based on a practical assessment of the 985 bus route and the advice from TfNSW, the provision of a separate service to and from Woolooware Train Station would not be materially beneficial to the uptake of public transport services. It has been advised that the developer will be issuing regular updates to TfNSW, such that the Bus service can be amended when and if necessary.

1.1.3 Increased Bicycle Parking

A total of 83 bicycle storage spaces are proposed in addition to the 36 visitor bicycle storage spaces included in the retail development. These additional bicycle storage racks are located as detailed below:

- 8 racks at the entrance to Level 1 for visitors (for a total of 16 bikes);
- 5 racks within both the Level 4 and Level 5 car park (for a total of 20 bikes);
- 25 racks (three one-sided) within the Level 6 car park (for a total of 47 bikes).

It should be noted that the Sutherland Shire Council Draft Development Control Plan 2015 does not require that bicycle storage be provided as part of residential flat building developments. The overall provision for residents of 57 bicycle storage spaces is equivalent to providing storage to 22.5% of units and the provision of 62 visitor spaces in is equivalent to providing visitor storage to 24.5% of residents. The NSW Planning Guidelines for Walking and Cycling (NSW Walking and Cycling Guidelines) recommend that bicycle storage be provided to between 20% to 30% of residential units and that visitor storage be provided to between 5% to 10% of units. The proposal meets this recommendation. The relevant extract from the NSW Walking and Cycling Guidelines is provided in **Annexure C** for reference.

1.2 Improved Performance of Captain Cook Drive/Gannons Road Roundabout

> *4. A further explanation should be provided on how the Captain Cook Drive/ Gannons Road roundabout is improved from level of service F to C in the Saturday peak.*

The intersections were previously assessed using SIDRA INTERSECTION 5.1 and the latest set of analyses have been completed using the most recent version of the software, SIDRA INTERSECTION 7.0. Further, during the process of conversion between the software versions, a previous error was observed and corrected. The lane disciplines for the roundabout at Gannons Road/Captain Cook Drive had been incorrectly assigned, as the eastern approach to the intersection the right-hand lane was previously modelled as RIGHT though is supposed to be RIGHT & THROUGH, which correctly increases capacity on this leg by approximately 70%. The intersection Level of Service of "F" resulted from this error and, when modelled correctly, the intersection Level of Service is "B" as provided in the most recent analysis.

1.3 Management of Vehicle Access and Parking

> *5. Further details on the management of access and parking for each of the land uses, including consideration on whether shared or separate access will be provided, ease of access for visitors and dispersion of traffic to minimise queuing on both arrival and exiting the site.*

1.3.1 Parking Allocation

The original application allocated parking spaces for the hotel within the shared retail parking area, however with further consideration and input from potential operators this arrangement is likely to prove operationally insufficient. An amended hotel layout, including dedicated parking spaces for 91 vehicles, including 69 for the hotel and 22 for residents, and access from the Level 3 roadway is proposed. This will remove the parking demand associated with the hotel from the shared retail parking areas and ultimately increase the number of parking spaces available for visitors to the retail centre and visitors to residents. The resulting parking demand on the retail parking areas is provided in **Table 1**.

As shown, the peak total demand on the 770 proposed retail parking spaces has been reduced from 709 to 679 spaces, which will improve the function of the car park and constitutes superior outcome for the operation of the centre.

TABLE 1: RETAIL PARKING DEMAND

Land Use	Peak Parking Demand (spaces)	Friday Before 5:30 PM		Friday After 6:30 PM		Saturday Midday	
		Operating Factor	Spaces	Operating Factor	Spaces	Operating Factor	Spaces
Visitors (Residential)	45	25%	11	100%	45	50%	23
Sharks Accommodation	0	100%	0	100%	0	100%	4
Supermarket	360	100%	360	100%	360	100%	360
Secondary Retail	198	100%	198	25%	50	100%	198
Medical Centre	7	100%	7	100%	7	50%	4
Club	99	30%	30	100%	99	70%	69
Restaurant	35	50%	18	50%	18	75%	26
Childcare Centre	19	100%	19	0%	0	0%	0
Business Centre	94	10%	9	100%	94	50%	47
Leisure	0	100%	0	100%	0	100%	0
Community Facility	4	100%	4	100%	4	100%	4
Sub-Total		**656 Spaces**		**677 Spaces**		**735 Spaces**	
Dual Use	-10% of Retail	-56		-56		-56	
Total Retail Demand		**600 Spaces**		**621 Spaces**		**679 Spaces**	

1.3.2 Access Management

1.3.2.1 Access Locations

Two separate access points are provided for the development, via a signalised intersection on Captain Cook Drive and via Woolooware Road (N). These access points have previously been assessed and approved as part of the original Concept Plan and Project Application. No changes are sought to the external configuration of these traffic signals/access points as part of MOD 2.

The access from Captain Cook Drive will directly serve:

- Residents;
- Hotel patrons and staff;
- Vehicles dropping off at the club;
- Access to the retail/club car park – level 3 (internal ramps provide access to other car parking levels).

The access from Woolooware Road (N) will directly serve:

- Access to the retail/club car park – level 1 (internal ramps provide access to other car parking levels).

The entry and exit points of the development are illustrated in **Figure 1**.

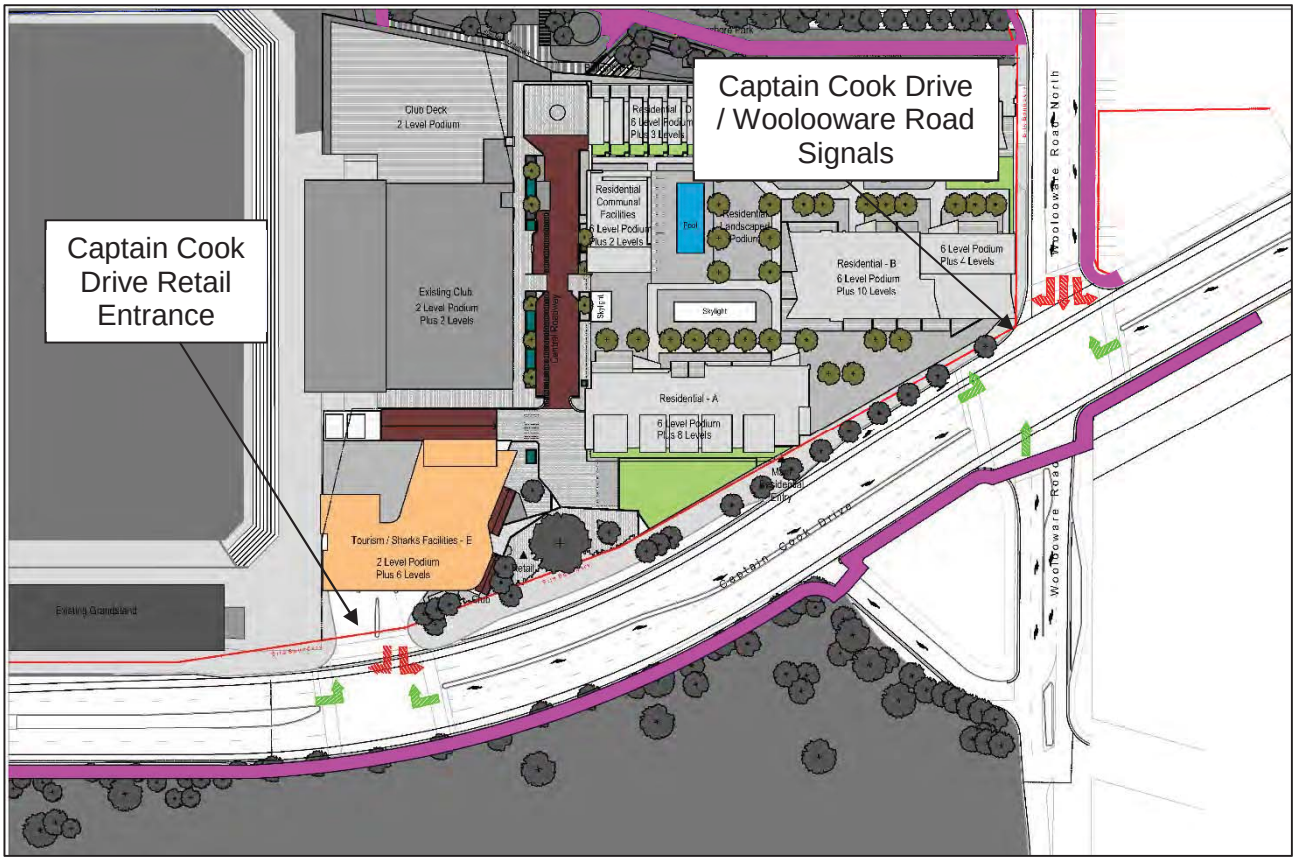


FIGURE 1: CENTRE ENTRY AND EXIT POINTS

1.3.2.2 Delays at Intersections

Extensive traffic modelling has been undertaken throughout the project to ensure that delays and queue lengths upon entering and exiting the centre are acceptable. The average delays for entering and exiting the centre or Woolooware Road (N) from/onto Captain Cook Drive are provided in **Table 2**.

TABLE 2: AVERAGE DELAYS – ENTERING AND EXITING AT INTERSECTIONS
VOLUMES AND DELAYS SHOWN FOR FRIDAY PM COMMUTER PEAK HOUR

Intersection		Direction To/From								
		East			West			South		
		Vehicles	Average Delay (s)	Level of Service	Vehicles	Average Delay (s)	Level of Service	Vehicles	Average Delay (s)	Level of Service
Captain Cook Drive Retail Entrance	Entry	88	5.8	A	199	7.6	A	N/A	N/A	
	Exit	155	53.0	D	202	55.1	D	N/A	N/A	
Captain Cook Drive / Woolooware Road	Entry	232	19.2	B	80	14.3	A	238	33.9	C
	Exit	152	52.4	D	38	42.4	D	228	47.8	D

Note: (s) denotes seconds.

As shown, the estimated delays at the signalised intersections serving entry and exit to the site are acceptable. It should be noted that the volumes and delays shown above correspond to the peak period with highest delays reflected by the modelling and that delays will be less than those shown during off-peak hours.

1.3.2.3 Operation of Retail/Club Car Park Entry Points

To facilitate efficient entry into the retail/club car park, a number-plate reader system will be implemented. The operation of this system does not require drivers to stop at a boom gate and has sufficient capacity for approximately 1250 vehicles per hour per entrance lane; a peak of approximately 590 vehicles per hour per entrance is expected. This equates to a 98th percentile queue length of 5 vehicles and a 50th percentile queue length of nil (0) vehicles (ie. under average operation there will be no vehicles queued at the number plate readers).

1.3.2.4 Operation of Retail/Club Car Park Exit Points

Each exit from the retail/club car park is provided with two barriers/payment terminals. Queue lengths have been calculated using a low-range estimate that 50% of the parking will be prepaid (at a ticket machine within the centre), resulting in an approximate 5-second delay and that 50% will be paid at the terminal, resulting in an approximate 10-second delay using contactless payment. This results in a 98th percentile queue of 6 cars and a 50th percentile queue of nil (0) cars.

1.3.2.5 Function of Hotel and Residential Parking Entry/Exit Points

The entry/exit points to the hotel and residential parking areas are separate from the retail/club car parking and will experience significantly less demand. Hotel guests will be able to enter the boom-gated car park using an intercom system and residents with a remotely activated gate system. The estimated traffic generation associated with each is less than one car every 55 seconds on average and consequently, no queues are expected at either of these entry/exit points.

1.3.3 Total Proposed Parking Provision and Allocation

Clarification on the proposed car parking provisions, noting that the EA states that 1078 spaces are proposed but the Traffic and Transport Assessment states that 1028 spaces are proposed.

The amended total parking provision, divided by physically separated parking areas, is provided in **Table 3**.

TABLE 3: TOTAL PARKING SUPPLY AND ALLOCATION

Area	Location	Use By	Number of Spaces
Shared Retail Car Park	Levels 1,3,4	Retail Centre Staff and Visitors, Visitors to Residents	770
Residential Car Park	Levels 5,6	Residents	259
Hotel Car Park	Levels 3, 4, 5	Hotel Staff & Guests and Residents	91(1)
Centre of Excellence Car Park	Centre of Excellence	Centre of Excellence Staff and Visitors	50
Total			**1170**

Notes:
(1) The total of 91 spaces includes 69 spaces for hotel guests and staff and 22 for residents in a secure area.

2 Sutherland Shire Council Comments

Each of the relevant comments is reproduced in *italics* and responded to in the sub-sections below. In addition to the specific responses provided below, the wider context of the site should be considered.

The Woolooware Bay project has, from its inception, been a fundamentally different development to that previously undertaken in the Sutherland Shire. The reduction of private car ownership and use has always been a key objective of the project and this is consistent with the goals of the Department of Planning and Environment for State Significant Development. While the development may not provide private car parking or wider road network improvements to the level desired by SSC based on the existing high rate of private car ownership in the LGA, significant effort has been undertaken to improve alternative transport options for residents and visitors such that the traffic and parking impacts of the entire development are reduced.

2.1 Parking Impact

> *With the residential stage 1 now occupied, there is already an acute parking problem on-site and in the local area. New residents are experiencing difficulty finding sufficient parking and are impacting the users of adjacent sporting facilities. Council has had to gate off nearby public parking areas and is contemplating installing signs to time limit public parking, which will further frustrate new residents. Stages 2 and 3 of the residential development are yet to be completed and will inevitably worsen the problem once occupied.*
>
> *If supported, the parking rates applied to the additional residential apartments need to be carefully considered in response to the outcomes of stage 1 being occupied.*

It is acknowledged that there has been an undesirable impact on the parking availability in the surrounds of the site, however, it is not agreed that the parking provided to residents should be increased on this basis. Each of the residential units is sold with a defined provision of parking, such that the purchaser is aware of the number of car spaces that are available for their use. While some owners have retained vehicles in excess of the number of car spaces that are provided for their use, it is expected that over time the adoption of alternative transport modes will increase such that there will be no noticeable impact on the on-street parking supply immediately surrounding the site. The installation and enforcement of restrictions to limit the parking of residents on the street and in public parking areas is supported and would encourage residents to reduce their private car usage.

The location of the units and the facilities of the town centre will contribute to a behavioural shift towards a reduction in private car use. The factors that will contribute to a reduced private car parking demand include:

- The physical location of the units, being directly on top of a retail centre, which will provide for the day-to-day shopping needs of the residents. The retail centre will be completed and in operation prior to the occupation of the proposed units.
- The availability of Car Share vehicles, which will have the effect of reducing the attractiveness of owning a second car;
- The high availability of public transport;
- The bicycle storage facilities available on-site and the surrounding bicycle-friendly roadways.

2.2 Traffic Impact

Aside from the proposed intersection works to facilitate traffic movements onto the site, the conditions of the current Project Approval do not require the proponent to undertake or make any contribution to works on the wider road network to ameliorate the impact of the traffic that will be generated from the approved development.

The proposed increased development will generate additional traffic, which will result in further delays in the surrounding road network and is not supported from a capacity point of view unless alternative transport means are provided.

Extensive intersection and road works have been committed to as part of the Residential and Retail Centre projects in direct response to the existing limitations of the road network servicing the site. The additional development of the site will result in an estimated increase of some 126 trips in the weekday peak hour and 114 trips in the weekend peak hour which is considered a minor increase in traffic generation not requiring further contribution to or works on the wider road network servicing the site.

While no further improvements to the wider traffic network are proposed, a number of initiatives have been undertaken and are underway as outlined below:

- Consultation is underway with SSC to improve the bicycle network in the surrounds of the site, with the view to providing a contribution of $1.4 million over and above Section 94 contributions, which will be expended by Council on the design and construction of bicycle routes in the locality;
- Consultation with TfNSW has resulted in the commencement of bus route 985 which provides a benefit to both the site and all residents/commercial developments along the route;
- Consultation with TfNSW to encourage further public bicycle parking at Woolooware Station.

2.3 Parking Management

2.3.1 Parking Guidance System

Given the scale and complexity of allocation of allocating parking for the different user groups, in the event that the MOD is approved, a condition should be imposed requiring the provision of an electronic dynamic parking guidance system as recommended in Section 5.3 of the TMAP.

It is agreed that an electronic parking guidance system should be provided for the car park to improve its function.

2.3.2 Hotel Parking

There may also be value in the hotel having access to its own parking spaces within the hotel building footprint accessed from the upper level internal road as a means of potentially increasing parking numbers, but more importantly making the arrival sequence simpler for visitors.

The hotel has been provided with a separate parking area accessible from the Level 3 roadway, such that visitors can easily park their vehicle upon arrival at the hotel.

2.3.3 Entrance/Exit Design

The increased vehicle numbers and movements as a result of the modification will likely require redesign of the exit driveway on Woolooware Road North as insufficient queuing distance is available.

The proposed parking entry/exit system includes a number plate reader system which significantly reduces the wait time for patrons entering and exiting the car park. With reference to the SSC comments regarding the potential for queueing of vehicles at the exit to Woolooware Road north, the following analysis has been undertaken:

Based on the assumption that 50% of the exiting vehicles will have prepaid their parking, corresponding to a five (5) second wait time, and that the remaining 50% will pay via contactless payment at the gate, corresponding to a ten (10) second wait time, each exit terminal has the capacity for some 480 vehicles per hour. This results in a total capacity for some 960 vehicles to exit each hour at the Woolooware Road north exit and 960 per hour at the L3 exit for a net capacity of 1920 vehicles per hour. The total traffic generation of land-uses that utilise this car park in peak times is approximately 1440 vehicles, constituted by approximately 770 trips IN and 770 trips OUT. Based on this, the 770 outgoing vehicles per hour, of which approximately half would use the Woolooware Road exit, will be able to exit without queues forming.

3 Addendum to Submitted Report

The below subsections should be considered in place of the equivalent sections of the Traffic and Parking Impact Assessment dated 13 January by *M^C Laren Traffic Engineering*. Any subsections not included below have not been altered from the original submission.

3.1 Proposed Development Modifications

Table 4 outlines the proposed modifications to the approved project. The revised application includes some 75 hotel rooms and 244 residential units.

TABLE 4: WOOLOOWARE BAY TOWN CENTRE – STAGE 4 MODIFICATIONS

Land Use	WBTC Previously Proposed Scale	Modified Scale		
Parking (spaces)	770	1170		
Specialty Retail	4146 m^2	4391 m^2		
Residential (units)	0	**1 Bed**	**2 Bed**	**3 Bed**
		86	121	37
		Total of 244 Units		
Sharks Accommodation	0	**1 Bed**	**2 Bed**	
		2	2	
		Total of 4 Units		
Leisure	908 m^2	1228 m^2		
Hotel	0	75 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.

3.2 Parking Assessment

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;
- 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 5 summarises the parking rates applicable to the subject development.

TABLE 5: 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
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 5:30 pm, Friday after 6:30 pm 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 9 am to 5 pm with progressively higher parking demand in the PM and a peak at approximately 9 pm.

TABLE 6: PARKING ACCUMULATION FRIDAY PRIOR TO 5:30 PM

Land Use	Peak Parking Demand (spaces)	Operating Factor	Friday Prior to 5:30 PM (spaces)
Residential Parking Areas			
1 Bedroom Unit	86	100%	86
2 Bedroom Unit	121	100%	121
3 Bedroom Unit	37	100%	37
Sub Total	**244**		**244 Spaces**
Retail Parking Areas			
Visitors (Residential)	59	25%	15
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	22	100%	22
Leisure	0	100%	0
Community Facility	4	100%	4
Individual Sub-Total			**673 Spaces**
Dual Use	360+198 = 558	-10%	-56
Retail Sub-Total			**617 Spaces**
Total Demand	**861 Spaces**		
Total Supplied	**1170** **(770 Retail/69 Hotel/281 Residential/50 Center For Excellence)**		

TABLE 7: PARKING ACCUMULATION FRIDAY AFTER 6:30 PM

Land Use	Peak Parking Demand (spaces)	Operating Factor	Friday after 5:30 PM (spaces)
Residential Parking Areas			
1 Bedroom Unit	86	100%	86
2 Bedroom Unit	121	100%	121
3 Bedroom Unit	37	100%	37
Sub Total	**244**		**244 Spaces**
Retail Parking Areas			
Visitors (Residential)	59	100%	59
Sharks Accommodation	0	100%	0
Supermarket	360	100%	360
Secondary Retail	198	25%	50
Medical Centre	7	100%	7
Club	99	100%	99
Restaurant	35	50%	18
Childcare Centre	19	0%	0
Hotel	22	100%	22
Leisure	0	100%	0
Community Facility	4	100%	4
Individual Sub-Total			**619 Spaces**
Dual Use	360+198 = 558	-10%	-56
Retail Sub-Total			**563 Spaces**
Total Demand	**807 Spaces**		
Total Supplied	**1170** **(770 Retail/69 Hotel/281 Residential/50 Center For Excellence)**		

TABLE 8: PARKING ACCUMULATION SATURDAY MIDDAY

Land Use	Peak Parking Demand (spaces)	Operating Factor	Saturday Midday (spaces)
Residential Parking Areas			
1 Bedroom Unit	86	100%	86
2 Bedroom Unit	121	100%	121
3 Bedroom Unit	37	100%	37
Sub Total	**244**		**244 Spaces**
Retail Parking Areas			
Visitors (Residential)	59	50%	30
Sharks Accommodation	0	100%	0
Supermarket	360	100%	360
Secondary Retail	198	100%	198
Medical Centre	7	50%	4
Club	99	70%	69
Restaurant	35	75%	26
Childcare Centre	19	0%	0
Hotel	22	100%	22
Leisure	0	100%	0
Community Facility	4	100%	4
Individual Sub-Total			**713 Spaces**
Dual Use	360+198 = 558	-10%	-56
Retail Sub-Total			**657 Spaces**
Total Demand	**901 Spaces**		
Total Supplied	**1170** **(770 Retail/69 Hotel/281 Residential/50 Center For Excellence)**		

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 901 spaces on Saturday at midday. 1120 spaces are provided (excluding the 50 spaces in the Centre of Excellence) which exceeds the estimate of demand by 219 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 657 non-residential spaces. The parking supply also allows the site to operate effectively as a town centre with a variety of complementary 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 901 parking spaces on Saturday, due to a provision of four 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.

3.2.1 Parking Allocation

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

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 9 am to 5 pm – 149 Club spaces (including 50 for staff)
- Monday to Friday 5 pm to close of Club Trading – 272 Club spaces (including 50 for staff)
- Saturday and Sunday – 5 pm to close of Club Trading – 427 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 570 spaces would be for retail staff, club staff and club patrons. This operation will be subject to change following monitoring.

3.2.2 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 67 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.

3.3 Traffic Assessment

3.3.1 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 9 and Table 10.

TABLE 9: 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
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 10: 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	71	18
Supermarket	1179	1258
Secondary Retail	274	264
Medical	4	4
Community Use	2	3
Club	127	41
Child Care	53	0
Leisure	0	0
Restaurant	62	54
Hotel	35	17
10% Dual Use of Retail	-145	-153
TOTAL (2017 MOD)	**1661**	**1545**
TOTAL (2015 Approval)	**1500**	**1454**

The updated project application, including new land uses, will produce a slightly increased peak traffic generation of approximately 161 trips (10.7%) for the weekday peak and 91 trips (6.3%) for the weekend peak. It is noted that the residential component accounts for only 4.2% (Weekday) and 1.2% (Weekend) of the total traffic generation.

3.3.2 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 are 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. 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 11**, with the detailed SIDRA results reproduced in **Annexure E**.

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. 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 model of the Gannons Road/Captain Cook Drive roundabout has been updated to more accurately reflect the geometric layout out the roundabout. Both the approved Town Centre and proposed volumes have been tested on this new, more accurate model. A Level of Service of B is maintained under the traffic volumes imposed by both the approved Town Centre and the proposed Stage 4 development, which is reflective of good operation with acceptable delays and spare capacity.

While the model of the roundabout reflects good operation, it has been 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 eastern approach experiences reduced delays.

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

TABLE 11: 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(1)	FRI PM	0.97	23.4	B
	SAT MID	0.93	16.5	B
Proposed Project Application Scale (SIDRA 7.0)				
Western Retail Signals	FRI PM	0.91	8.7	A
	SAT MID	0.69	4.9	A
Captain Cook Drive / Woolooware Road	FRI PM	0.92	20.9	B
	SAT MID	0.69	19.0	B
Captain Cook Drive / Gannons Road	FRI PM	0.97	23.6	B
	SAT MID	0.96	19.8	B

Notes:
(1) The Captain Cook Drive/Gannons Road roundabout model has been updated to more accurately reflect the geometric layout of the roundabout. The volumes associated with the approved Town Centre have been retested on this updated model, with the latest results shown.

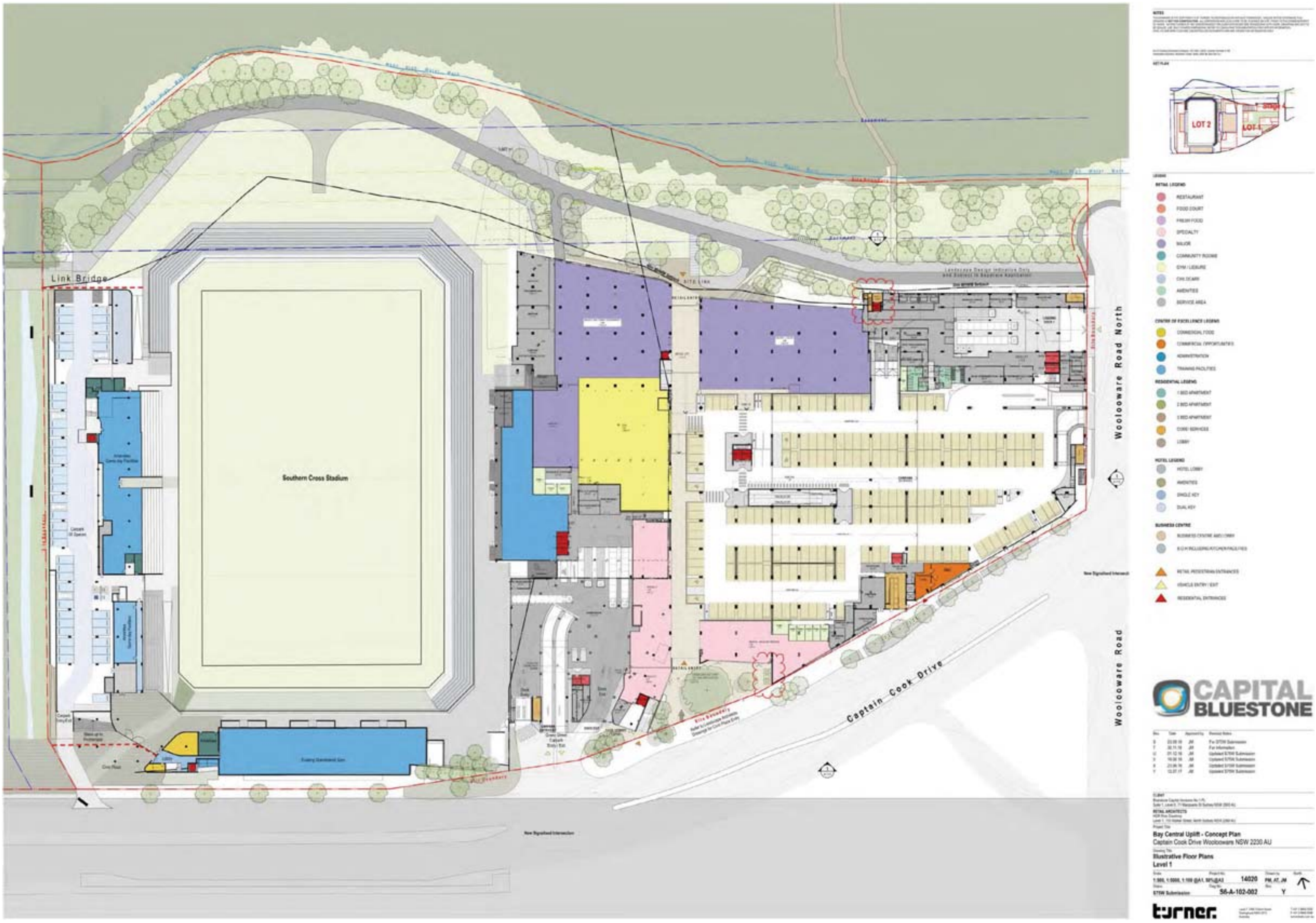
Please contact Tom Heal or the undersigned on 02 8355 2440 should you require further information or assistance.

McLaren Traffic Engineering

Craig McLaren
Director
BE Civil. Graduate Diploma (Transport Eng) MAITPM MITE [1985]
RMS Accredited Level 3 Road Safety Auditor
RMS Accredited Traffic Control Planner, Auditor & Certifier (Orange Card)

ANNEXURE A: REDUCED PLANS

(5 SHEETS)


Link Bridge
Southern Cross Stadium
SITE LINK
Woolooware Road North
Woolooware Road
Captain Cook Drive
New Signalised Intersection
LOT 2
LOT 1
RESTAURANT
FOOD COURT
FRESH FOOD
SPECIALTY
MAJOR
COMMUNITY ROOMS
GYM / LEISURE
CHILDCARE
AMENITIES
SERVICE AREA
CAPITAL BLUESTONE
Bay Central Uplift - Concept Plan
Captain Cook Drive Woolooware NSW 2230 AU
Illustrative Floor Plans
Level 1
14020
PM, AT, JM
S6-A-102-002
Y
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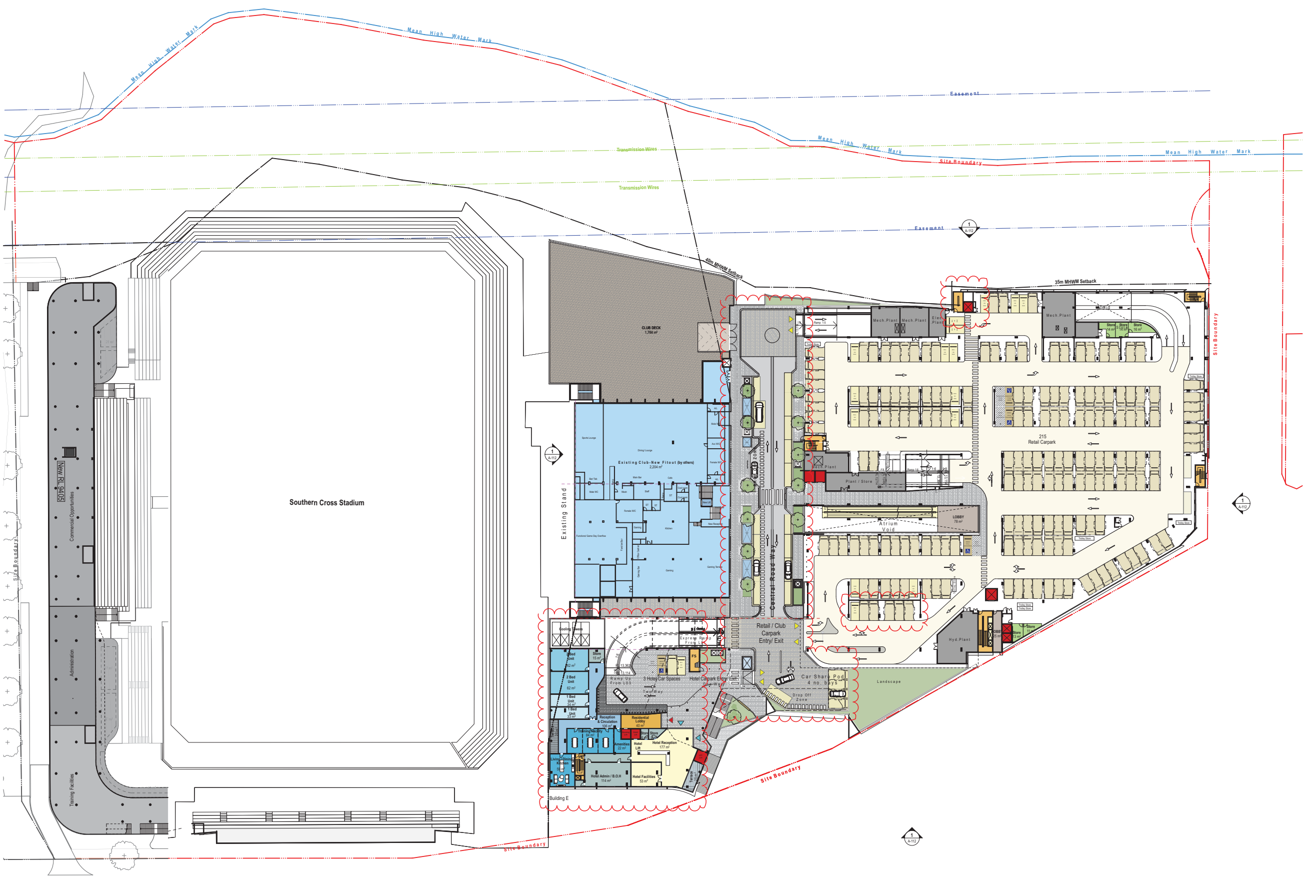
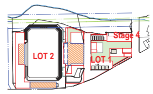


NOTES

DLCS Quality Endorsed Company ISO 9001:2008, Licence Number 4168
Nominated Architect: Nicholas Turner 6695, ABN 86 064 084 911

KEY PLAN



LEGEND

RETAIL LEGEND

- RESTAURANT
- FOOD COURT
- FRESH FOOD
- SPECIALTY
- MAJOR
- COMMUNITY ROOMS
- GYM / LIESURE
- CHILDCARE
- AMENITIES
- SERVICE AREA

CENTRE OF EXCELLENCE LEGEND

- COMMERCIAL FOOD
- COMMERCIAL OPPORTUNITIES
- ADMINISTRATION
- TRAINING FACILITIES

RESIDENTIAL LEGEND

- 1 BED APARTMENT
- 2 BED APARTMENT
- 3 BED APARTMENT
- CORE/ SERVICES
- LOBBY

HOTEL LEGEND

- HOTEL LOBBY
- AMENITIES
- SINGLE KEY
- DUAL KEY

BUSINESS CENTRE

- BUSINESS CENTRE AND LOBBY
- B.O.H INCLUDING KITCHEN FACILITIES

- RETAIL PEDESTRIAN ENTRANCES
- VEHICLE ENTRY / EXIT
- RESIDENTIAL ENTRANCES

Rev.	Date	Approved by	Revision Notes
Y	23.06.16	JM	Updated S75W Submission
Z	12.07.17	JM	Updated S75W Submission

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RETAIL ARCHITECTS
HDR Rice Daubney
Level 1, 110 Walker Street, North Sydney NSW 2060 AU

Project Title
Bay Central Uplift - Concept Plan
Captain Cook Drive Woolooware NSW 2230 AU

Drawing Title
Illustrative Floor Plans
Level 3

Scale	Project No.	Drawn by	North
1:500, 1:5000, 1:100 @A1, 50%@A3	14020	PM, AT, JM	
Status	**Dwg No.**	**Rev**	
S75W Submission	S6-A-104-004	Z	

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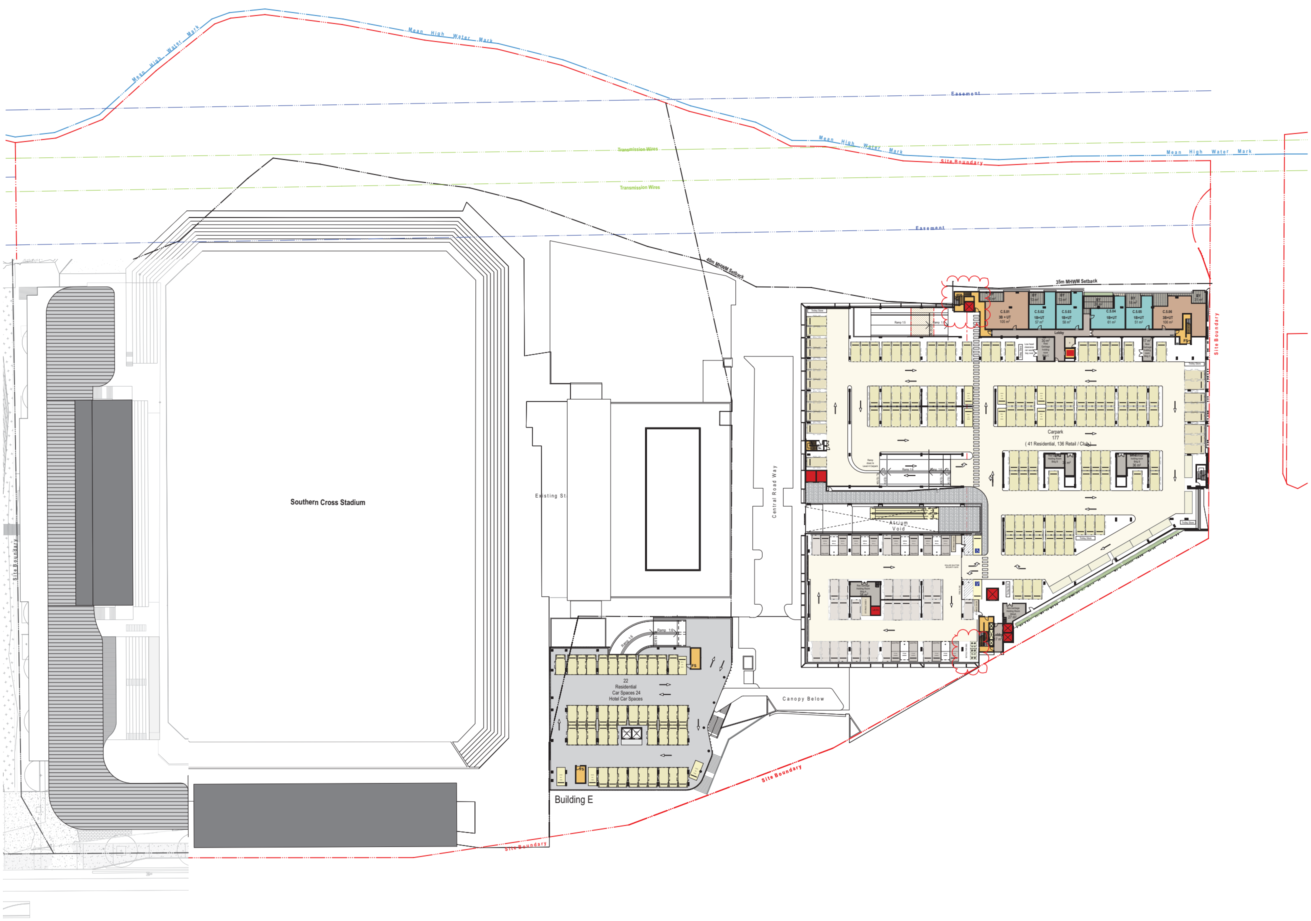

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Nominated Architect: Nicholas Turner 6695, ABN 86 064 084 911

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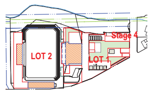

LEGEND

RESIDENTIAL LEGEND

- 1 BED APARTMENT
- 2 BED APARTMENT
- 3 BED APARTMENT
- CORE/ SERVICES
- LOBBY

HOTEL LEGEND

- HOTEL LOBBY
- AMENITIES
- SINGLE KEY
- DUAL KEY

BUSINESS CENTRE

- BUSINESS CENTRE AND LOBBY
- B.O.H INCLUDING KITCHEN FACILITIES

- RETAIL PEDESTRIAN ENTRANCES
- VEHICLE ENTRY / EXIT
- RESIDENTIAL ENTRANCES

CAPITAL BLUESTONE

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Z	12.07.17	JM	Updated S75W Submission

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Drawing Title
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Level 5

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Status	**Dwg No.**	**Rev**	
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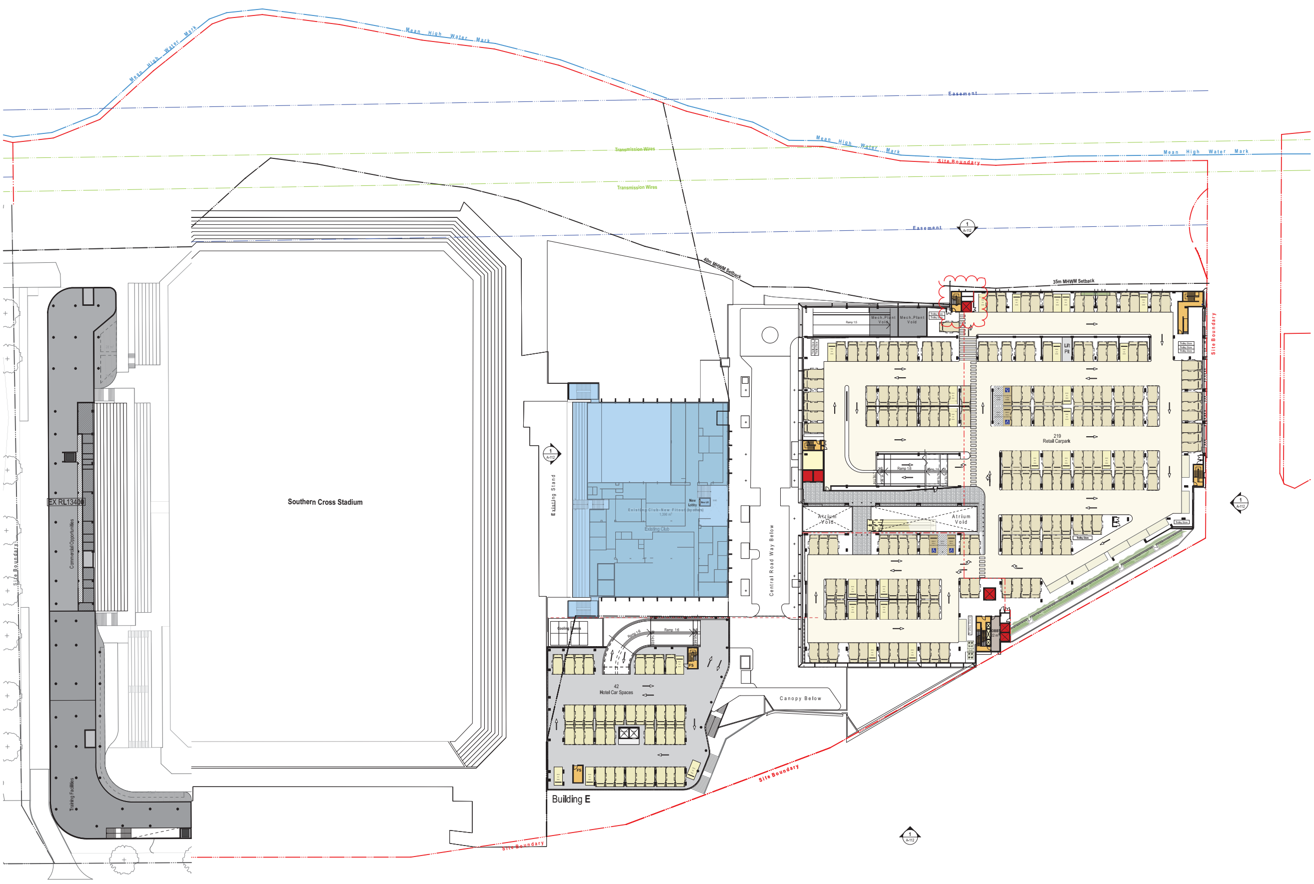

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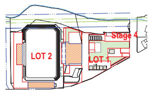

LEGEND

CENTRE OF EXCELLENCE LEGEND
- COMMERCIAL FOOD
- COMMERCIAL OPPORTUNITIES
- ADMINISTRATION
- TRAINING FACILITIES

RESIDENTIAL LEGEND
- 1 BED APARTMENT
- 2 BED APARTMENT
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- LOBBY

HOTEL LEGEND
- HOTEL LOBBY
- AMENITIES
- SINGLE KEY
- DUAL KEY

BUSINESS CENTRE
- BUSINESS CENTRE AND LOBBY
- B.O.H INCLUDING KITCHEN FACILITIES

- RETAIL PEDESTRIAN ENTRANCES
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Captain Cook Drive Woolooware NSW 2230 AU

Drawing Title
Illustrative Floor Plans
Level 4

Scale	Project No.	Drawn by	North
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Status	**Dwg No.**	**Rev**	
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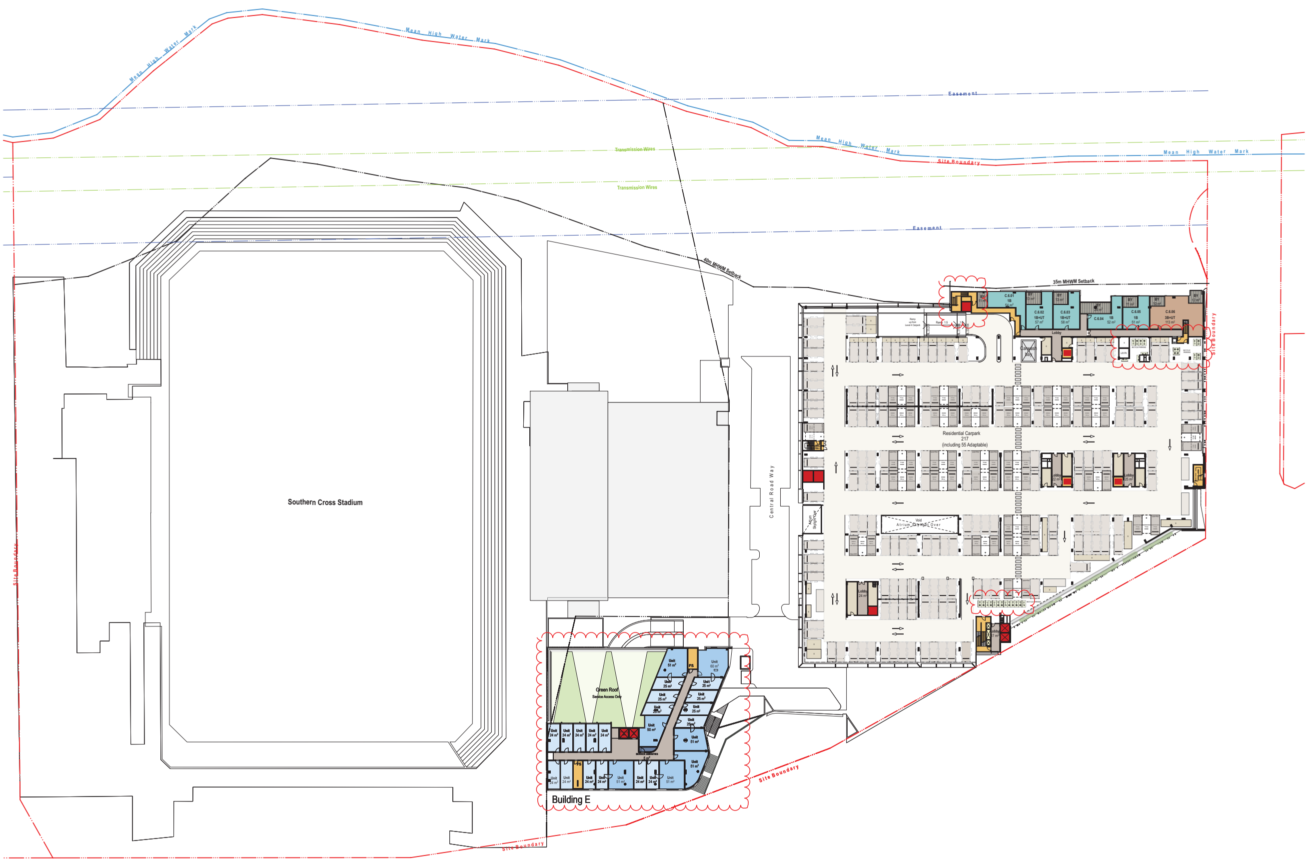

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Nominated Architect: Nicholas Turner 6695, ABN 86 064 084 911

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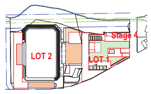

LEGEND

RESIDENTIAL LEGEND
- 1 BED APARTMENT
- 2 BED APARTMENT
- 3 BED APARTMENT
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- HOTEL LOBBY
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BUSINESS CENTRE
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Drawing Title
Illustrative Floor Plans
Level 6

Scale	Project No.	Drawn by	North
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Status	Dwg No.	Rev	
S75W Submission	S6-A-107-007	Z	

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ANNEXURE B: SUMMARY OF RESPONSES

Key Issue	Mclaren Traffic Engineering Response
Department of Planning and Environment	
Further consideration should be given to strategies and mechanisms to reduce the traffic and parking demands of the development. In particular:	
▪ A specific commitment to providing a minimum amount of car share spaces along with justification for how this number was derived;	A total of 4 car share spaces are proposed; consistent with the maximum number of cars estimated by GoGet to be viable for the residential and hotel components of the development. Further detail is provided in Section 1.1.1 of this letter.
▪ Retaining or reinstating the shuttle bus to Woolooware station to provide residents with a direct link to the nearest train station for services to the city and other centres on the rail network; and	An alternative bus route has been proposed to Transport for New South Wales which includes Woolooware Train Station and a private shuttle service will be operated between the Centre & Woolooware Train Station until such time as a public bus service provides a direct link. Further detail is provided in Section 1.1.2 of this letter.
▪ A commitment to increase bicycle parking.	A total of 67 additional bicycle storage spaces are proposed for both residents and visitors, consistent with the storage rates suggested in the NSW Planning Guidelines for Walking and Cycling.
A further explanation should be provided on how the Captain Cook Drive/ Gannons Road roundabout is improved from the level of service F to C in the Saturday peak.	The Level of Service of "F" detailed as part of the original M^{C}Laren Transport Management and Accessibility Plan resulted from a minor error in the SIDRA modelling completed for that report. The apparent improvement to a Level of Service of B follows the correction of that original model. Further detail is provided in Section 1.2 of this letter.
Further details on the management of access and parking for each of the land uses, including consideration on whether shared or separate access will be provided, ease of access for visitors and dispersion of traffic to minimise queuing on both arrival and exiting the site.	Further detail on the allocation and management of the parking and access for each land use is provided in Section 1.3 of this letter.
Clarification on the proposed car parking provisions, noting that the EA states that 1078 spaces are proposed but the Traffic and Transport Assessment states that 1028 spaces are proposed.	Detail on the total provision and allocation of parking spaces is provided in Section 1.3.3 of this report.

ANNEXURE C: BICYCLE STORAGE PROVISION GUIDELINES

From left, this page:

Hospital staff bicycle enclosure, Melbourne (Photo: Warren Salomon)

Vertical racks in residential apartment car park, Melbourne (Photo: Warren Salomon)

From left, facing page:

Public domain bike rack serving surrounding retail uses at Chippendale in inner Sydney (Photo: Warren Salomon)

Public domain bike rack serving surrounding retail uses and transport interchange at Manly, north east of Sydney (Photo: Warren Salomon)

Table 1. Suggested bicycle parking provision rates for different land-use types

Key to source of data underlying rate (shown as a superscript in columns two and three):

1. 3–5% of journey-to-work trips (also consistent with Lake Macquarie DCP 1) (Ref 7.21)
2. 5–10% of non-work-related trips, e.g. recreation and entertainment
3. Austroads *Part 14* (Ref 2.3)
4. South Sydney DCP (Ref 7.22)
5. Canada Bay DCP (Ref 7.23).

Land-use type	Resident/staff (Long-term use)	Customer/visitor (Short-term use)
Residential housing and casual accommodation		
Single dwelling houses and terraces	1/D[5]	3–5%D 1 Min[5]
Houses with >2 individual dwellings	1/D[5]	3–5%D 1 Min[5]
1-bedroom units/flats and bedsitters	20–30%U	5–10%U
2- or more bedroom units/flats	20–30%U	5–10%U
Aged or disabled self-contained housing	3–5%U[1]	3–5%U[3,5]
Boarding houses	5–10%R	3–5%R
Tourist hotels, serviced apartments	3–5%R	3–5%R
Backpacker hotels	5–10%B	3–5%B
Motels	3–5%R	–
Key: D=Dwelling houses, terraces and townhouses; U=Units and apartments; R=Rooms; B=Beds; Min=minimum; Max=Maximum; *Type of unit not specified in source document		
Office, commercial and industry		
Commercial offices, auction/sale rooms	3–5%S[1]	5–10%S
Retail shops	3–5%S[1]	5–10%S
Banks, service centres	3–5%S[1]	5–10%S
Retail and bulky goods showrooms	3–5%S[1]	5–10%S
Major shopping centres and markets	3–5%S[1]	5–10%S
Car showrooms and repair centres	3–5%S[1]	5–10%S
Service stations (service industry)	3–5%S[1]	5–10%S
Hire equipment and car rental offices	3–5%S[1]	5–10%S
Industrial and warehousing	3–5%S[1]	5–10%S
General industry	3–5%S[1]	5–10%S
Key: S=Staff; Gfa=Gross floor area; G=Guests, visitors or spectators		
Food, entertainment and recreation		
Cafes and restaurants	3–5%S[1]	3–5%Sc
Licensed clubs and hotels (pubs)	3–5%S[1]	3–5%Sc
Drive-in takeaway with seating	3–5%S[1]	3–5%Sc
Reception and conference centres	3–5%S[1]	3–5%Sc
Take-away food shops (>20 seating)	3–5%S[1]	3–5%Sc
Amusement centres, bowling alleys	3–5%S[1]	3–5%Sc
Theme park, fun park	3–5%S[1]	3–5%Sc
Cinemas, theatres, brothels	3–5%S[1]	3–5%Sc
Gyms, indoor sport/recreation	3–5%S[1]	5–10%S
Squash and tennis courts	3–5%S[1]	5–10%S
Sports arena	3–5%S[1]	3–5%Sc
Swimming pools	3–5%S[1]	5–10%S
Key: S=Staff; Gfa=Gross floor area; Sfa=Sales floor area; Bfa=Bar floor area; Bga=Beer garden floor area; Pa=Public area; G=Guests, visitors or spectators; Psa=Pool surface area; Sc=Seating capacity		
Health, education, community and cultural facilities		
Hospitals — doctors and staff	5–10%S or 10–15%B[3]	5–10%S
Health and medical centres	5–10%P[3]	5–10%S
Professional consulting rooms	5–10%P[3]	5–10%S
Nursing/convalescent homes	3–5%S[1]	5–10%S
Childcare centres	3–5%S[1]	5–10%S
Primary schools	3–5%S[1]	5–10%S
Secondary schools	3–5%S[1]	5–10%S
Tertiary education establishments, Universities/TAFEs	3–5%S[1] 5–10%Fts[2]	5–10%S
Business and language schools	3–5%S[1] 5–10%Fts[2]	5–10%S
Museums and art galleries	3–5%S[1]	5–10%S
Libraries and community centres	3–5%S[1]	5–10%S
Places of assembly and worship	3–5%S[1]	5–10%S
Public/town halls	3–5%S[1]	5–10%S
Key: S=Staff; Gfa=Gross floor area; Fts=Full time students; Pts=Part time students; P=Practitioners, professional; B=Beds		

ANNEXURE D: EMAIL FROM TRANSPORT FOR NEW SOUTH WALES

From: Pegg, Brendan [mailto:Brendan.Pegg@transport.nsw.gov.au]
Sent: Tuesday, 20 June 2017 5:21 PM
To: Emily McLaughlin <emclaughlin@capitalbluestone.com.au>
Cc: Ozinga, Mark <Mark.Ozinga@transport.nsw.gov.au>; Dessanti, Adrian <Adrian.Dessanti@transport.nsw.gov.au>; Hunt, Gordon <Gordon.Hunt@transport.nsw.gov.au>; petra.blumkaitis@planning.nsw.gov.au; ben.lusher@planning.nsw.gov.au
Subject: RE: Woolooware Bay Town Centre- Bus Route 985

Hi Emily,

I have spoken to the Department of Planning and Environment (DP&E) regarding the development and the operations of the 985 bus route. I can confirm that:

- TfNSW, at this time, will not be altering the existing route 985. However, TfNSW will continually review the development progress in the area, with any enhancements to existing bus services would be subjected to TfNSW Growth Services Program. The Program has certain criteria and funding limitations, so it cannot be guaranteed or assumed;

- TfNSW believes that the 985 connects users of the development to the transport interchanges of Miranda, Caringbah and Cronulla – which operates the same Heavy Rail train line from Woolooware. It should also be noted that TfNSW is restricted to the bus services that operate via Woolooware Station (particularly the eastern end of Denman Avenue) due to the restricted road space available and the ability to accommodate a 14.5m bus;

As per our discussion, TfNSW recommends the following to promote sustainable transport options to the site:

- Continue to advise TfNSW of impending land releases/development progress (at least quarterly) to assist in future transport planning;

- Consider providing bus shelters, at the bus stops outside the development (will need consultation with Council as to their requirements). Currently, the bus stop locations have no infrastructure indicating to potential customers that bus services can be accessed from the location;

- Consider additional bicycle parking onsite to support/encourage active transport. TfNSW is reviewing the bicycle parking at Woolooware, with the potential to increase bicycle parking at this location;

- Review onsite wayfinding/information to patrons regarding bus services and active transport links.

If you require any more additional information, on the above please let me know.

Kind regards,

Brendan Pegg
Integrated Transport Analyst, Precinct & Corridor Planning
Integrated Planning
Infrastructure and Services
Transport for NSW

T 02 8202 2862| **M** 0400 250 950
Level 2, 18 Lee St Chippendale NSW 2008

ANNEXURE E: SIDRA INTERSECTION OUTPUT REPORTS

MOVEMENT SUMMARY

Site: 1 [Captain Cook Drive / Elouera Road - Friday Existing]

Captain Cook Drive / Elouera Road
Existing Volumes (4/11/16)
Friday Peak 5:00pm - 6:00pm
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Elouera Rd (S)											
1	L2	328	0.3	0.160	2.4	LOS A	0.0	0.0	0.00	0.35	48.4
3	R2	139	3.5	0.111	8.6	LOS A	0.7	4.9	0.52	0.64	48.2
3u	U	1	0.0	0.111	10.4	LOS A	0.7	4.9	0.52	0.64	49.0
Approach		468	1.2	0.160	4.2	LOS A	0.7	4.9	0.16	0.44	48.3
East: Captain Cook Drive (E)											
4	L2	163	2.5	0.255	9.4	LOS A	1.6	11.4	0.79	0.82	47.3
5	T1	360	2.0	0.412	8.5	LOS A	3.2	22.7	0.85	0.81	52.9
6u	U	1	0.0	0.412	15.3	LOS B	3.2	22.7	0.85	0.81	53.9
Approach		524	2.2	0.412	8.8	LOS A	3.2	22.7	0.83	0.82	51.1
West: Captain Cook Drive (W)											
11	T1	333	3.8	0.298	4.8	LOS A	2.0	14.1	0.41	0.48	55.0
12	R2	692	0.3	0.485	9.5	LOS A	4.1	28.7	0.46	0.62	48.5
12u	U	24	0.0	0.485	11.7	LOS A	4.1	28.7	0.46	0.62	52.7
Approach		1049	1.4	0.485	8.0	LOS A	4.1	28.7	0.44	0.57	50.4
All Vehicles		2041	1.6	0.485	7.4	LOS A	4.1	28.7	0.48	0.60	50.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 1 [Captain Cook Drive / Elouera Road - Friday Existing]

Captain Cook Drive / Elouera Road
Existing Volumes (4/11/16)
Friday Peak 5:00pm - 6:00pm
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Elouera Rd (S)													
Lane 1	328	0.3	2046	0.160	100	2.4	LOS A	0.0	0.0	Short	50	0.0	NA
Lane 2[d]	140	3.5	1257	0.111	100	8.6	LOS A	0.7	4.9	Full	500	0.0	0.0
Approach	468	1.2		0.160		4.2	LOS A	0.7	4.9				
East: Captain Cook Drive (E)													
Lane 1	163	2.5	640	0.255	100	9.4	LOS A	1.6	11.4	Short	60	0.0	NA
Lane 2[d]	361	2.0	877	0.412	100	8.5	LOS A	3.2	22.7	Full	500	0.0	0.0
Approach	524	2.2		0.412		8.8	LOS A	3.2	22.7				
West: Captain Cook Drive (W)													
Lane 1	333	3.8	1119	0.298	100	4.8	LOS A	2.0	14.1	Full	500	0.0	0.0
Lane 2[d]	716	0.3	1476	0.485	100	9.6	LOS A	4.1	28.7	Short	100	0.0	NA
Approach	1049	1.4		0.485		8.0	LOS A	4.1	28.7				
Intersection	2041	1.6		0.485		7.4	LOS A	4.1	28.7				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 2 [Captain Cook Drive / Woolooware Road (Signals) - Friday Existing]

Captain Cook Drive / Woolooware Road
Existing Volumes (4/11/16)
Friday Peak 4:45pm - 5:45pm
Signals - Fixed Time Coordinated Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Woolooware Road (S)											
1	L2	189	0.0	0.146	7.1	LOS A	2.2	15.4	0.30	0.60	44.3
2	T1	10	0.0	0.031	39.9	LOS C	0.4	3.0	0.87	0.59	34.6
3	R2	19	0.0	0.061	44.9	LOS D	0.8	5.8	0.88	0.69	32.4
Approach		218	0.0	0.146	11.9	LOS A	2.2	15.4	0.38	0.60	41.7
East: Captain Cook Drive (E)											
4	L2	22	4.5	0.479	33.3	LOS C	13.3	93.3	0.82	0.72	38.2
5	T1	652	1.0	0.479	27.8	LOS B	13.3	93.6	0.82	0.71	35.5
6	R2	4	0.0	0.006	13.2	LOS A	0.1	0.4	0.53	0.61	48.7
Approach		678	1.1	0.479	27.9	LOS B	13.3	93.6	0.82	0.71	35.7
North: Car Park Access (N)											
7	L2	1	0.0	0.005	42.9	LOS D	0.1	0.6	0.84	0.59	35.4
8	T1	1	0.0	0.005	38.6	LOS C	0.1	0.6	0.84	0.59	34.0
9	R2	1	0.0	0.003	44.8	LOS D	0.0	0.3	0.85	0.59	28.2
Approach		3	0.0	0.005	42.1	LOS C	0.1	0.6	0.84	0.59	32.8
West: Captain Cook Drive (W)											
10	L2	4	0.0	0.006	15.3	LOS B	0.1	0.4	0.29	0.60	42.2
11	T1	931	0.7	0.653	13.2	LOS A	12.6	88.1	0.56	0.49	45.2
12	R2	462	0.2	0.608	6.2	LOS A	0.9	6.1	0.07	0.59	45.8
Approach		1397	0.5	0.653	10.9	LOS A	12.6	88.1	0.40	0.53	45.4
All Vehicles		2296	0.7	0.653	16.0	LOS B	13.3	93.6	0.52	0.59	41.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	31.3	LOS D	0.1	0.1	0.77	0.77
P2	East Full Crossing	50	46.8	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	50	31.3	LOS D	0.1	0.1	0.77	0.77
P4	West Full Crossing	50	46.8	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		200	39.0	LOS D			0.86	0.86

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 2 [Captain Cook Drive / Woolooware Road (Signals) - Friday Existing]

Captain Cook Drive / Woolooware Road
Existing Volumes (4/11/16)
Friday Peak 4:45pm - 5:45pm
Signals - Fixed Time Coordinated Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Woolooware Road (S)													
Lane 1	189	0.0	1297	0.146	100	7.1	LOS A	2.2	15.4	Short	80	0.0	NA
Lane 2	10	0.0	319	0.031	100	39.9	LOS C	0.4	3.0	Short (P)	100	0.0	NA
Lane 3	19	0.0	314	0.061	100	44.9	LOS D	0.8	5.8	Full	500	0.0	0.0
Approach	218	0.0		0.146		11.9	LOS A	2.2	15.4				
East: Captain Cook Drive (E)													
Lane 1	336	1.2	702	0.479	100	28.1	LOS B	13.3	93.3	Full	500	0.0	0.0
Lane 2	338	1.0	706	0.479	100	27.8	LOS B	13.3	93.6	Full	500	0.0	0.0
Lane 3	4	0.0	695	0.006	100	13.2	LOS A	0.1	0.4	Short	120	0.0	NA
Approach	678	1.1		0.479		27.9	LOS B	13.3	93.6				
North: Car Park Access (N)													
Lane 1	2	0.0	370	0.005	100	40.8	LOS C	0.1	0.6	Full	500	0.0	0.0
Lane 2	1	0.0	306	0.003	100	44.8	LOS D	0.0	0.3	Full	500	0.0	0.0
Approach	3	0.0		0.005		42.1	LOS C	0.1	0.6				
West: Captain Cook Drive (W)													
Lane 1	4	0.0	679	0.006	100	15.3	LOS B	0.1	0.4	Short	50	0.0	NA
Lane 2	465	0.7	712[1]	0.653	100	13.1	LOS A	12.5	87.7	Full	155	0.0	0.0
Lane 3	466	0.7	713	0.653	100	13.2	LOS A	12.6	88.1	Full	155	0.0	0.0
Lane 4	462	0.2	760	0.608	100	6.2	LOS A	0.9	6.1	Short	45	0.0	NA
Approach	1397	0.5		0.653		10.9	LOS A	12.6	88.1				
Intersection	2296	0.7		0.653		16.0	LOS B	13.3	93.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

PHASING SUMMARY

Site: 2 [Captain Cook Drive / Woolooware Road (Signals) - Friday Existing]

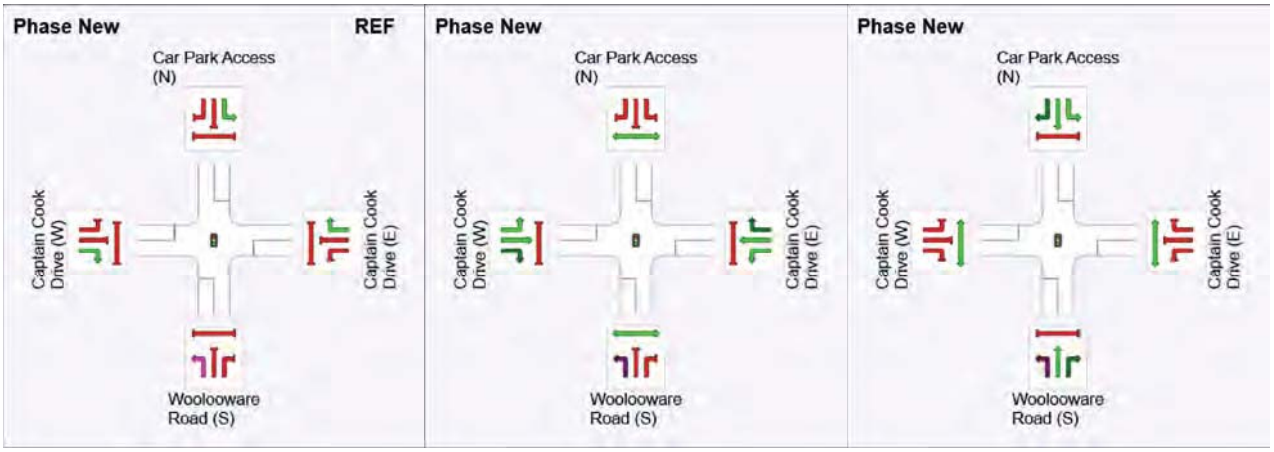
Captain Cook Drive / Woolooware Road
Existing Volumes (4/11/16)
Friday Peak 4:45pm - 5:45pm
Signals - Fixed Time Coordinated Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

Phase Times determined by the program
Phase Sequence: D0C0
Reference Phase: Phase New
Input Phase Sequence: New, New, New
Output Phase Sequence: New, New, New

Phase Timing Results

Phase	New	New	New
Phase Change Time (sec)	0	38	82
Green Time (sec)	32	38	17
Phase Time (sec)	38	44	23
Phase Split	36%	42%	22%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class Running	Other Movement Class Stopped
Mixed Running & Stopped Movement Classes	
Undetected Movement	Phase Transition Applied

MOVEMENT SUMMARY

Site: 1 [Captain Cook Drive / Gannons Road - Saturday Existing]

Captain Cook Drive / Gannons Road
Existing Volumes (4/11/16)
Saturday Peak 10:00AM - 11:00AM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Gannons Rd (S)											
1	L2	536	1.3	0.295	2.3	LOS A	0.0	0.0	0.00	0.34	48.8
2	T1	4	0.0	0.178	6.8	LOS A	0.9	6.7	0.74	0.86	34.4
3	R2	123	2.5	0.178	10.5	LOS A	0.9	6.7	0.74	0.86	49.3
3u	U	1	0.0	0.178	12.3	LOS A	0.9	6.7	0.74	0.86	46.1
Approach		664	1.5	0.295	3.9	LOS A	0.9	6.7	0.14	0.44	48.8
East: Captain Cook Drive (E)											
4	L2	133	2.2	0.605	9.7	LOS A	5.1	36.6	0.75	0.86	50.7
5	T1	1017	4.5	0.605	9.7	LOS A	5.2	37.6	0.75	0.85	59.0
6	R2	1	0.0	0.605	14.2	LOS A	5.2	37.6	0.75	0.84	41.1
6u	U	1	0.0	0.605	16.6	LOS B	5.2	37.6	0.75	0.84	60.1
Approach		1152	4.2	0.605	9.7	LOS A	5.2	37.6	0.75	0.85	57.9
North: Toyota Access (N)											
7	L2	4	0.0	0.009	5.7	LOS A	0.0	0.3	0.70	0.58	38.6
8	T1	8	0.0	0.037	3.6	LOS A	0.2	1.3	0.71	0.69	35.7
9	R2	17	5.0	0.037	6.4	LOS A	0.2	1.3	0.71	0.69	38.2
9u	U	1	0.0	0.037	7.1	LOS A	0.2	1.3	0.71	0.69	30.9
Approach		30	2.8	0.037	5.6	LOS A	0.2	1.3	0.71	0.68	37.3
West: Captain Cook Drive (W)											
10	L2	2	50.0	0.484	6.8	LOS A	3.9	28.3	0.45	0.51	39.7
11	T1	888	4.5	0.484	5.9	LOS A	4.0	29.2	0.44	0.54	60.1
12	R2	470	3.4	0.484	10.7	LOS A	4.0	29.2	0.43	0.60	52.4
12u	U	1	0.0	0.484	13.1	LOS A	4.0	29.2	0.43	0.60	59.8
Approach		1361	4.2	0.484	7.6	LOS A	4.0	29.2	0.44	0.56	57.1
All Vehicles		3207	3.6	0.605	7.6	LOS A	5.2	37.6	0.49	0.64	55.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 1 [Captain Cook Drive / Gannons Road - Saturday Existing]

Captain Cook Drive / Gannons Road
Existing Volumes (4/11/16)
Saturday Peak 10:00AM - 11:00AM
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Gannons Rd (S)													
Lane 1	536	1.3	1819	0.295	100	2.3	LOS A	0.0	0.0	Short	100	0.0	NA
Lane 2[d]	128	2.4	721	0.178	100	10.4	LOS A	0.9	6.7	Full	500	0.0	0.0
Approach	664	1.5		0.295		3.9	LOS A	0.9	6.7				
East: Captain Cook Drive (E)													
Lane 1	550	4.0	909	0.605	100	9.9	LOS A	5.1	36.6	Full	500	0.0	0.0
Lane 2[d]	602	4.5	994	0.605	100	9.5	LOS A	5.2	37.6	Full	500	0.0	0.0
Approach	1152	4.2		0.605		9.7	LOS A	5.2	37.6				
North: Toyota Access (N)													
Lane 1	4	0.0	452	0.009	100	5.7	LOS A	0.0	0.3	Full	500	0.0	0.0
Lane 2[d]	26	3.3	698	0.037	100	5.6	LOS A	0.2	1.3	Full	500	0.0	0.0
Approach	30	2.8		0.037		5.6	LOS A	0.2	1.3				
West: Captain Cook Drive (W)													
Lane 1	625	4.6	1289	0.484	100	6.0	LOS A	3.9	28.3	Full	500	0.0	0.0
Lane 2[d]	736	3.8	1520	0.484	100	9.0	LOS A	4.0	29.2	Full	500	0.0	0.0
Approach	1361	4.2		0.484		7.6	LOS A	4.0	29.2				
Intersection	3207	3.6		0.605		7.6	LOS A	5.2	37.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 101 [Captain Cook Drive / Woolooware Road (Roundabout) - Friday Existing]

Captain Cook Drive / Woolooware Road
Existing Volumes (4/11/16)
Friday Peak 4:45PM - 5:45PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Woolooware Road (S)											
1	L2	189	0.0	0.198	5.3	LOS A	0.9	6.2	0.57	0.68	51.6
2	T1	10	0.0	0.054	6.6	LOS A	0.2	1.4	0.57	0.76	45.5
3	R2	19	0.0	0.054	10.6	LOS A	0.2	1.4	0.57	0.76	50.1
3u	U	1	0.0	0.054	12.3	LOS A	0.2	1.4	0.57	0.76	46.0
Approach		219	0.0	0.198	5.9	LOS A	0.9	6.2	0.57	0.69	51.1
East: Captain Cook Drive (E)											
4	L2	22	4.5	0.361	8.1	LOS A	2.0	14.4	0.61	0.72	50.8
5	T1	652	1.0	0.361	8.3	LOS A	2.0	14.4	0.61	0.72	58.8
6	R2	4	0.0	0.361	12.5	LOS A	2.0	14.1	0.61	0.73	52.3
6u	U	3	0.0	0.361	14.6	LOS B	2.0	14.1	0.61	0.73	59.6
Approach		681	1.1	0.361	8.4	LOS A	2.0	14.4	0.61	0.72	58.5
North: Sharks Car Park (N)											
7	L2	1	0.0	0.007	7.5	LOS A	0.0	0.2	0.63	0.70	48.8
8	T1	1	0.0	0.007	7.5	LOS A	0.0	0.2	0.63	0.70	44.8
9	R2	1	0.0	0.007	11.5	LOS A	0.0	0.2	0.63	0.70	49.5
9u	U	1	0.0	0.007	13.3	LOS A	0.0	0.2	0.63	0.70	45.7
Approach		4	0.0	0.007	9.9	LOS A	0.0	0.2	0.63	0.70	47.1
West: Captain Cook Drive (W)											
10	L2	4	0.0	0.477	5.6	LOS A	3.5	24.6	0.19	0.47	52.8
11	T1	931	0.7	0.477	5.7	LOS A	3.5	24.6	0.19	0.49	60.7
12	R2	462	0.2	0.477	9.8	LOS A	3.5	24.2	0.20	0.61	51.9
12u	U	44	0.0	0.477	11.9	LOS A	3.5	24.2	0.20	0.61	59.3
Approach		1441	0.5	0.477	7.2	LOS A	3.5	24.6	0.20	0.53	57.5
All Vehicles		2345	0.6	0.477	7.4	LOS A	3.5	24.6	0.35	0.60	57.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 101 [Captain Cook Drive / Woolooware Road (Roundabout) - Friday Existing]

Captain Cook Drive / Woolooware Road
Existing Volumes (4/11/16)
Friday Peak 4:45PM - 5:45PM
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Woolooware Road (S)													
Lane 1[d]	189	0.0	954	0.198	100	5.3	LOS A	0.9	6.2	Full	500	0.0	0.0
Lane 2	30	0.0	555	0.054	100	9.3	LOS A	0.2	1.4	Short	70	0.0	NA
Approach	219	0.0		0.198		5.9	LOS A	0.9	6.2				
East: Captain Cook Drive (E)													
Lane 1[d]	350	1.2	969	0.361	100	8.2	LOS A	2.0	14.4	Full	500	0.0	0.0
Lane 2	331	1.0	915	0.361	100	8.5	LOS A	2.0	14.1	Full	500	0.0	0.0
Approach	681	1.1		0.361		8.4	LOS A	2.0	14.4				
North: Sharks Car Park (N)													
Lane 1[d]	4	0.0	574	0.007	100	9.9	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	4	0.0		0.007		9.9	LOS A	0.0	0.2				
West: Captain Cook Drive (W)													
Lane 1[d]	760	0.7	1593	0.477	100	5.7	LOS A	3.5	24.6	Full	500	0.0	0.0
Lane 2	681	0.3	1427	0.477	100	8.9	LOS A	3.5	24.2	Full	500	0.0	0.0
Approach	1441	0.5		0.477		7.2	LOS A	3.5	24.6				
Intersection	2345	0.6		0.477		7.4	LOS A	3.5	24.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 2 [Captain Cook Drive / Woolooware Road (Signals) - Saturday Existing]

Captain Cook Drive / Woolooware Road
Existing Volumes (5/11/16)
Saturday Peak 10:00am - 11:00am
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Woolooware Road (S)											
1	L2	316	0.0	0.261	7.4	LOS A	4.0	28.0	0.35	0.62	44.1
2	T1	10	0.0	0.032	38.3	LOS C	0.4	2.9	0.87	0.60	35.2
3	R2	14	0.0	0.045	42.8	LOS D	0.6	3.9	0.87	0.67	32.4
Approach		340	0.0	0.261	9.8	LOS A	4.0	28.0	0.38	0.62	42.7
East: Captain Cook Drive (E)											
4	L2	13	0.0	0.422	24.8	LOS B	12.2	87.0	0.72	0.63	41.7
5	T1	739	5.2	0.422	19.3	LOS B	12.2	87.2	0.72	0.63	40.1
6	R2	5	0.0	0.007	10.0	LOS A	0.1	0.5	0.37	0.59	50.1
Approach		757	5.1	0.422	19.4	LOS B	12.2	87.2	0.71	0.63	40.2
North: Car Park Access (N)											
7	L2	1	0.0	0.005	41.3	LOS C	0.1	0.6	0.84	0.59	36.0
8	T1	1	0.0	0.005	37.0	LOS C	0.1	0.6	0.84	0.59	34.5
9	R2	1	0.0	0.003	43.2	LOS D	0.0	0.3	0.86	0.59	28.8
Approach		3	0.0	0.005	40.5	LOS C	0.1	0.6	0.84	0.59	33.4
West: Captain Cook Drive (W)											
10	L2	19	5.2	0.023	7.9	LOS A	0.1	0.5	0.08	0.59	48.2
11	T1	686	4.8	0.380	3.4	LOS A	2.4	17.0	0.15	0.13	54.3
12	R2	166	0.6	0.275	6.0	LOS A	0.2	1.3	0.04	0.57	45.7
Approach		871	4.0	0.380	4.0	LOS A	2.4	17.0	0.13	0.23	52.3
All Vehicles		1971	3.7	0.422	11.0	LOS A	12.2	87.2	0.40	0.45	45.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	23.2	LOS C	0.1	0.1	0.68	0.68
P2	East Full Crossing	50	44.3	LOS E	0.1	0.1	0.94	0.94
P3	North Full Crossing	50	23.2	LOS C	0.1	0.1	0.68	0.68
P4	West Full Crossing	50	44.3	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		200	33.7	LOS D			0.81	0.81

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 2 [Captain Cook Drive / Woolooware Road (Signals) - Saturday Existing]

Captain Cook Drive / Woolooware Road
Existing Volumes (5/11/16)
Saturday Peak 10:00am - 11:00am
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Woolooware Road (S)													
Lane 1	316	0.0	1210	0.261	100	7.4	LOS A	4.0	28.0	Short	80	0.0	NA
Lane 2	10	0.0	315	0.032	100	38.3	LOS C	0.4	2.9	Short (P)	100	0.0	NA
Lane 3	14	0.0	314	0.045	100	42.8	LOS D	0.6	3.9	Full	500	0.0	0.0
Approach	340	0.0		0.261		9.8	LOS A	4.0	28.0				
East: Captain Cook Drive (E)													
Lane 1	376	5.0	890	0.422	100	19.5	LOS B	12.2	87.0	Full	500	0.0	0.0
Lane 2	376	5.2	892	0.422	100	19.3	LOS B	12.2	87.2	Full	500	0.0	0.0
Lane 3	5	0.0	675	0.007	100	10.0	LOS A	0.1	0.5	Short	120	0.0	NA
Approach	757	5.1		0.422		19.4	LOS B	12.2	87.2				
North: Car Park Access (N)													
Lane 1	2	0.0	367	0.005	100	39.2	LOS C	0.1	0.6	Full	500	0.0	0.0
Lane 2	1	0.0	304	0.003	100	43.2	LOS D	0.0	0.3	Full	500	0.0	0.0
Approach	3	0.0		0.005		40.5	LOS C	0.1	0.6				
West: Captain Cook Drive (W)													
Lane 1	19	5.2	832	0.023	100	7.9	LOS A	0.1	0.5	Short	50	0.0	NA
Lane 2	343	4.8	903	0.380	100	3.4	LOS A	2.4	17.0	Full	155	0.0	0.0
Lane 3	343	4.8	903	0.380	100	3.4	LOS A	2.4	17.0	Full	155	0.0	0.0
Lane 4	166	0.6	604	0.275	100	6.0	LOS A	0.2	1.3	Short	45	0.0	NA
Approach	871	4.0		0.380		4.0	LOS A	2.4	17.0				
Intersection	1971	3.7		0.422		11.0	LOS A	12.2	87.2				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PHASING SUMMARY

Site: 2 [Captain Cook Drive / Woolooware Road (Signals) - Saturday Existing]

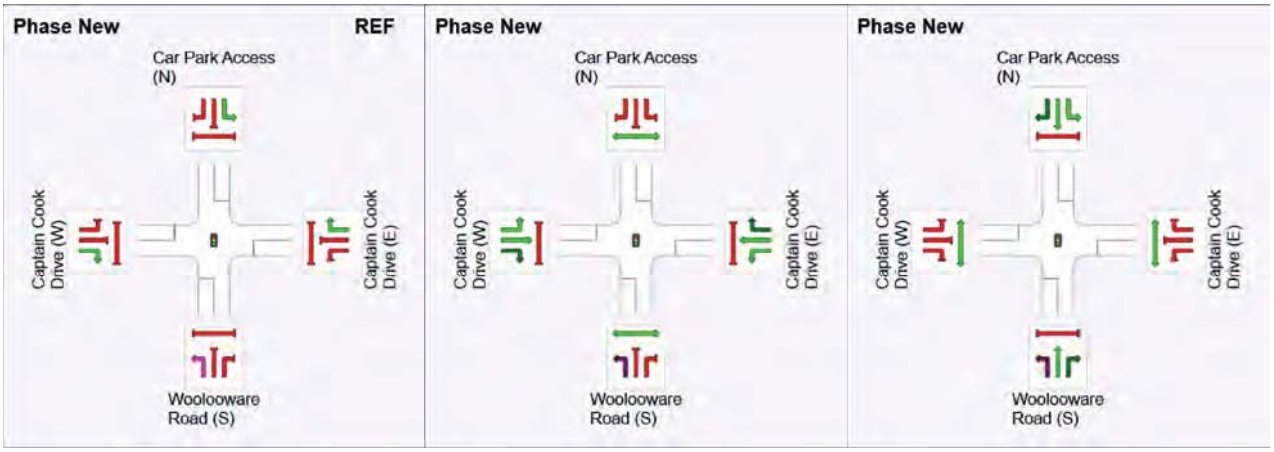
Captain Cook Drive / Woolooware Road
Existing Volumes (5/11/16)
Saturday Peak 10:00am - 11:00am
Signals - Fixed Time Coordinated Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

Phase Times determined by the program
Phase Sequence: D0C0
Reference Phase: Phase New
Input Phase Sequence: New, New, New
Output Phase Sequence: New, New, New

Phase Timing Results

Phase	New	New	New
Phase Change Time (sec)	0	26	78
Green Time (sec)	20	46	16
Phase Time (sec)	26	52	22
Phase Split	26%	52%	22%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



REF: Reference Phase
VAR: Variable Phase

Normal Movement		Permitted/Opposed	
Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane	
Stopped Movement		Turn On Red	
Other Movement Class Running		Other Movement Class Stopped	
Mixed Running & Stopped Movement Classes			
Undetected Movement		Phase Transition Applied	

MOVEMENT SUMMARY

Site: 1 [Captain Cook Drive / Elouera Road - Saturday Existing]

Captain Cook Drive / Elouera Road
Existing Volumes (5/11/16)
Saturday Peak 10:00am - 11:00am
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Elouera Rd (S)											
1	L2	410	1.5	0.204	2.4	LOS A	0.0	0.0	0.00	0.35	48.5
3	R2	119	0.9	0.091	8.4	LOS A	0.5	3.6	0.47	0.63	48.3
3u	U	1	0.0	0.091	10.2	LOS A	0.5	3.6	0.47	0.63	49.1
Approach		530	1.4	0.204	3.8	LOS A	0.5	3.6	0.11	0.41	48.5
East: Captain Cook Drive (E)											
4	L2	123	0.8	0.146	6.5	LOS A	0.8	5.5	0.57	0.64	48.5
5	T1	339	10.0	0.306	5.9	LOS A	2.0	14.6	0.60	0.60	52.1
6u	U	1	0.0	0.306	12.5	LOS A	2.0	14.6	0.60	0.60	54.1
Approach		463	7.5	0.306	6.1	LOS A	2.0	14.6	0.59	0.61	51.1
West: Captain Cook Drive (W)											
11	T1	362	10.0	0.291	4.5	LOS A	1.9	14.6	0.36	0.45	55.0
12	R2	368	1.0	0.270	9.0	LOS A	1.8	12.3	0.33	0.61	48.2
12u	U	31	3.0	0.270	11.2	LOS A	1.8	12.3	0.33	0.61	51.7
Approach		761	5.4	0.291	7.0	LOS A	1.9	14.6	0.35	0.53	51.3
All Vehicles		1754	4.7	0.306	5.8	LOS A	2.0	14.6	0.34	0.52	50.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 1 [Captain Cook Drive / Elouera Road - Saturday Existing]

Captain Cook Drive / Elouera Road
Existing Volumes (5/11/16)
Saturday Peak 10:00am - 11:00am
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Elouera Rd (S)													
Lane 1	410	1.5	2011	0.204	100	2.4	LOS A	0.0	0.0	Short	50	0.0	NA
Lane 2[d]	120	0.9	1324	0.091	100	8.4	LOS A	0.5	3.6	Full	500	0.0	0.0
Approach	530	1.4		0.204		3.8	LOS A	0.5	3.6				
East: Captain Cook Drive (E)													
Lane 1	123	0.8	841	0.146	100	6.5	LOS A	0.8	5.5	Short	60	0.0	NA
Lane 2[d]	340	10.0	1111	0.306	100	5.9	LOS A	2.0	14.6	Full	500	0.0	0.0
Approach	463	7.5		0.306		6.1	LOS A	2.0	14.6				
West: Captain Cook Drive (W)													
Lane 1	362	10.0	1244	0.291	100	4.5	LOS A	1.9	14.6	Full	500	0.0	0.0
Lane 2[d]	399	1.2	1480	0.270	100	9.2	LOS A	1.8	12.3	Short	100	0.0	NA
Approach	761	5.4		0.291		7.0	LOS A	1.9	14.6				
Intersection	1754	4.7		0.306		5.8	LOS A	2.0	14.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 101 [Captain Cook Drive / Woolooware Road (Roundabout) - Saturday Existing]

Captain Cook Drive / Woolooware Road
Existing Volumes (5/11/16)
Friday Peak 10:00AM - 11:00AM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Woolooware Road (S)											
1	L2	316	0.0	0.335	5.8	LOS A	1.6	10.9	0.62	0.74	51.4
2	T1	10	0.0	0.046	6.8	LOS A	0.2	1.1	0.57	0.75	45.2
3	R2	14	0.0	0.046	10.8	LOS A	0.2	1.1	0.57	0.75	49.2
3u	U	1	0.0	0.046	12.5	LOS A	0.2	1.1	0.57	0.75	45.7
Approach		341	0.0	0.335	6.1	LOS A	1.6	10.9	0.61	0.74	51.1
East: Captain Cook Drive (E)											
4	L2	13	0.0	0.335	6.3	LOS A	1.8	12.6	0.40	0.57	51.4
5	T1	739	5.2	0.335	6.6	LOS A	1.8	12.6	0.41	0.57	58.1
6	R2	5	0.0	0.335	10.6	LOS A	1.8	12.5	0.41	0.58	52.5
6u	U	12	0.0	0.335	12.7	LOS A	1.8	12.5	0.41	0.58	59.4
Approach		769	5.0	0.335	6.7	LOS A	1.8	12.6	0.41	0.57	57.9
North: Sharks Car Park (N)											
7	L2	1	0.0	0.006	5.9	LOS A	0.0	0.1	0.53	0.64	49.8
8	T1	1	0.0	0.006	5.9	LOS A	0.0	0.1	0.53	0.64	45.6
9	R2	1	0.0	0.006	9.9	LOS A	0.0	0.1	0.53	0.64	50.6
9u	U	1	0.0	0.006	11.7	LOS A	0.0	0.1	0.53	0.64	46.5
Approach		4	0.0	0.006	8.4	LOS A	0.0	0.1	0.53	0.64	48.0
West: Captain Cook Drive (W)											
10	L2	19	5.2	0.319	5.5	LOS A	1.8	12.8	0.16	0.47	52.6
11	T1	686	4.8	0.319	5.7	LOS A	1.8	12.8	0.16	0.51	59.0
12	R2	166	0.6	0.319	9.7	LOS A	1.8	12.6	0.17	0.58	52.2
12u	U	57	1.8	0.319	11.9	LOS A	1.8	12.6	0.17	0.58	59.3
Approach		928	3.9	0.319	6.8	LOS A	1.8	12.8	0.17	0.52	57.5
All Vehicles		2042	3.6	0.335	6.6	LOS A	1.8	12.8	0.33	0.58	56.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 101 [Captain Cook Drive / Woolooware Road (Roundabout) - Saturday Existing]

Captain Cook Drive / Woolooware Road
Existing Volumes (5/11/16)
Friday Peak 10:00AM - 11:00AM
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Woolooware Road (S)													
Lane 1[d]	316	0.0	944	0.335	100	5.8	LOS A	1.6	10.9	Full	500	0.0	0.0
Lane 2	25	0.0	548	0.046	100	9.3	LOS A	0.2	1.1	Short	70	0.0	NA
Approach	341	0.0		0.335		6.1	LOS A	1.6	10.9				
East: Captain Cook Drive (E)													
Lane 1[d]	392	5.0	1168	0.335	100	6.6	LOS A	1.8	12.6	Full	500	0.0	0.0
Lane 2	377	5.0	1125	0.335	100	6.9	LOS A	1.8	12.5	Full	500	0.0	0.0
Approach	769	5.0		0.335		6.7	LOS A	1.8	12.6				
North: Sharks Car Park (N)													
Lane 1[d]	4	0.0	712	0.006	100	8.4	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	4	0.0		0.006		8.4	LOS A	0.0	0.1				
West: Captain Cook Drive (W)													
Lane 1[d]	484	4.8	1519	0.319	100	5.6	LOS A	1.8	12.8	Full	500	0.0	0.0
Lane 2	444	2.8	1393	0.319	100	8.0	LOS A	1.8	12.6	Full	500	0.0	0.0
Approach	928	3.9		0.319		6.8	LOS A	1.8	12.8				
Intersection	2042	3.6		0.335		6.6	LOS A	1.8	12.8				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 1 [Captain Cook Drive / Gannons Road - Friday Future]

Captain Cook Drive / Gannons Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45PM - 5:45PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Gannons Rd (S)											
1	L2	309	1.3	0.171	2.3	LOS A	0.0	0.0	0.00	0.34	48.8
2	T1	1	0.0	0.251	7.6	LOS A	1.5	10.3	0.83	0.94	34.2
3	R2	148	0.8	0.251	11.3	LOS A	1.5	10.3	0.83	0.94	49.1
3u	U	1	0.0	0.251	13.2	LOS A	1.5	10.3	0.83	0.94	45.7
Approach		459	1.1	0.251	5.2	LOS A	1.5	10.3	0.27	0.53	48.9
East: Captain Cook Drive (E)											
4	L2	154	0.0	0.966	55.2	LOS D	28.2	199.4	1.00	1.87	31.3
5	T1	1087	1.5	0.966	54.0	LOS D	31.0	219.6	1.00	1.89	34.8
6	R2	1	0.0	0.966	57.7	LOS E	31.0	219.6	1.00	1.90	27.8
6u	U	22	0.0	0.966	60.1	LOS E	31.0	219.6	1.00	1.90	35.4
Approach		1264	1.3	0.966	54.2	LOS D	31.0	219.6	1.00	1.89	34.3
North: Toyota Access (N)											
7	L2	31	0.0	0.211	20.3	LOS B	1.1	7.7	0.95	0.95	33.4
8	T1	36	0.0	0.573	35.3	LOS C	3.8	26.6	1.00	1.22	27.6
9	R2	72	0.0	0.573	37.9	LOS C	3.8	26.6	1.00	1.22	29.4
9u	U	1	0.0	0.573	38.8	LOS C	3.8	26.6	1.00	1.22	24.6
Approach		140	0.0	0.573	33.3	LOS C	3.8	26.6	0.99	1.16	29.6
West: Captain Cook Drive (W)											
10	L2	5	0.0	0.901	10.6	LOS A	20.7	146.1	1.00	0.75	38.3
11	T1	1822	1.8	0.901	10.0	LOS A	20.7	146.1	0.98	0.72	57.4
12	R2	681	0.8	0.901	13.6	LOS A	20.3	143.0	0.94	0.67	51.0
12u	U	1	0.0	0.901	16.0	LOS B	20.3	143.0	0.94	0.67	57.9
Approach		2509	1.5	0.901	11.0	LOS A	20.7	146.1	0.97	0.71	55.4
All Vehicles		4372	1.4	0.966	23.6	LOS B	31.0	219.6	0.90	1.04	45.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 1 [Captain Cook Drive / Gannons Road - Friday Future]

Captain Cook Drive / Gannons Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45PM - 5:45PM
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Gannons Rd (S)													
Lane 1	309	1.3	1811	0.171	100	2.3	LOS A	0.0	0.0	Short	100	0.0	NA
Lane 2[d]	150	0.8	598	0.251	100	11.3	LOS A	1.5	10.3	Full	500	0.0	0.0
Approach	459	1.1		0.251		5.2	LOS A	1.5	10.3				
East: Captain Cook Drive (E)													
Lane 1	592	1.1	612	0.966	100	55.4	LOS D	28.2	199.4	Full	500	0.0	0.0
Lane 2[d]	672	1.4	696	0.966	100	53.2	LOS D	31.0	219.6	Full	500	0.0	0.0
Approach	1264	1.3		0.966		54.2	LOS D	31.0	219.6				
North: Toyota Access (N)													
Lane 1	31	0.0	147	0.211	100	20.3	LOS B	1.1	7.7	Full	500	0.0	0.0
Lane 2[d]	109	0.0	190	0.573	100	37.0	LOS C	3.8	26.6	Full	500	0.0	0.0
Approach	140	0.0		0.573		33.3	LOS C	3.8	26.6				
West: Captain Cook Drive (W)													
Lane 1	1143	1.8	1269	0.901	100	10.8	LOS A	20.7	146.1	Full	500	0.0	0.0
Lane 2[d]	1366	1.3	1517	0.901	100	11.2	LOS A	20.3	143.0	Full	500	0.0	0.0
Approach	2509	1.5		0.901		11.0	LOS A	20.7	146.1				
Intersection	4372	1.4		0.966		23.6	LOS B	31.0	219.6				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 1 [Captain Cook Drive / Residential Access - Friday Future]

Captain Cook Drive / Residential Access
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45PM - 5:45PM
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Captain Cook Drive (E)											
5	T1	1201	8.0	0.436	3.7	LOS A	7.7	58.0	0.41	0.37	65.4
Approach		1201	8.0	0.436	3.7	LOS A	7.7	58.0	0.41	0.37	65.4
North: Residential Access (N)											
7	L2	5	0.0	0.031	35.0	LOS C	0.2	1.1	0.94	0.63	29.2
9	R2	43	0.0	0.270	36.7	LOS C	1.5	10.3	0.97	0.72	28.7
Approach		48	0.0	0.270	36.6	LOS C	1.5	10.3	0.97	0.71	28.8
West: Captain Cook Drive (W)											
10	L2	188	0.0	0.792	13.4	LOS A	24.2	179.1	0.68	0.68	39.2
11	T1	1994	8.0	0.792	7.0	LOS A	24.2	179.1	0.68	0.66	61.2
Approach		2182	7.3	0.792	7.5	LOS A	24.2	181.0	0.68	0.66	58.3
All Vehicles		3431	7.4	0.792	6.6	LOS A	24.2	181.0	0.59	0.56	59.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 1 [Captain Cook Drive / Residential Access - Friday Future]

Captain Cook Drive / Residential Access
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45PM - 5:45PM
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Captain Cook Drive (E)													
Lane 1	601	8.0	1377	0.436	100	3.7	LOS A	7.7	58.0	Full	500	0.0	0.0
Lane 2	601	8.0	1377	0.436	100	3.7	LOS A	7.7	58.0	Full	500	0.0	0.0
Approach	1201	8.0		0.436		3.7	LOS A	7.7	58.0				
North: Residential Access (N)													
Lane 1	5	0.0	159	0.031	100	35.0	LOS C	0.2	1.1	Short	15	0.0	NA
Lane 2	43	0.0	159	0.270	100	36.7	LOS C	1.5	10.3	Full	500	0.0	0.0
Approach	48	0.0		0.270		36.6	LOS C	1.5	10.3				
West: Captain Cook Drive (W)													
Lane 1	1091	6.6	1377	0.792	100	8.1	LOS A	24.2	179.1	Full	500	0.0	0.0
Lane 2	1091	8.0	1377	0.792	100	7.0	LOS A	24.2	181.0	Full	500	0.0	0.0
Approach	2182	7.3		0.792		7.5	LOS A	24.2	181.0				
Intersection	3431	7.4		0.792		6.6	LOS A	24.2	181.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PHASING SUMMARY

Site: 1 [Captain Cook Drive / Residential Access - Friday Future]

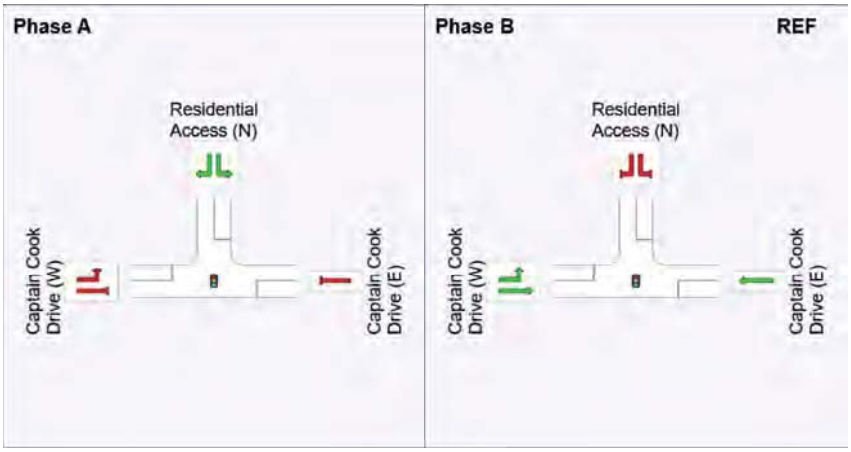
Captain Cook Drive / Residential Access
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45PM - 5:45PM
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: Two-Phase
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Results

Phase	A	B
Phase Change Time (sec)	58	0
Green Time (sec)	6	52
Phase Time (sec)	12	58
Phase Split	17%	83%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



REF: Reference Phase
VAR: Variable Phase

Normal Movement		Permitted/Opposed	
Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane	
Stopped Movement		Turn On Red	
Other Movement Class Running		Other Movement Class Stopped	
Mixed Running & Stopped Movement Classes			
Undetected Movement		Phase Transition Applied	

MOVEMENT SUMMARY

Site: 1 [Captain Cook Drive / Residential Access - Saturday Future]

Captain Cook Drive / Residential Access
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00AM - 11:00AM
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Captain Cook Drive (E)											
5	T1	1472	8.0	0.535	4.1	LOS A	10.7	79.8	0.46	0.42	64.9
Approach		1472	8.0	0.535	4.1	LOS A	10.7	79.8	0.46	0.42	64.9
North: Residential Access (N)											
7	L2	3	0.0	0.019	34.8	LOS C	0.1	0.7	0.94	0.61	29.3
9	R2	22	0.0	0.138	36.0	LOS C	0.7	5.2	0.96	0.69	28.9
Approach		25	0.0	0.138	35.9	LOS C	0.7	5.2	0.95	0.68	28.9
West: Captain Cook Drive (W)											
10	L2	24	0.0	0.507	10.3	LOS A	9.8	73.0	0.45	0.42	40.9
11	T1	1373	8.0	0.507	4.0	LOS A	9.8	73.0	0.45	0.41	64.9
Approach		1397	7.9	0.507	4.1	LOS A	9.8	73.2	0.45	0.41	64.3
All Vehicles		2894	7.9	0.535	4.4	LOS A	10.7	79.8	0.46	0.42	63.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 1 [Captain Cook Drive / Residential Access - Saturday Future]

Captain Cook Drive / Residential Access
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00AM - 11:00AM
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Captain Cook Drive (E)													
Lane 1	736	8.0	1377	0.535	100	4.1	LOS A	10.7	79.8	Full	500	0.0	0.0
Lane 2	736	8.0	1377	0.535	100	4.1	LOS A	10.7	79.8	Full	500	0.0	0.0
Approach	1472	8.0		0.535		4.1	LOS A	10.7	79.8				
North: Residential Access (N)													
Lane 1	3	0.0	159	0.019	100	34.8	LOS C	0.1	0.7	Short	15	0.0	NA
Lane 2	22	0.0	159	0.138	100	36.0	LOS C	0.7	5.2	Full	500	0.0	0.0
Approach	25	0.0		0.138		35.9	LOS C	0.7	5.2				
West: Captain Cook Drive (W)													
Lane 1	699	7.7	1377	0.507	100	4.2	LOS A	9.8	73.0	Full	500	0.0	0.0
Lane 2	698	8.0	1377	0.507	100	4.0	LOS A	9.8	73.2	Full	500	0.0	0.0
Approach	1397	7.9		0.507		4.1	LOS A	9.8	73.2				
Intersection	2894	7.9		0.535		4.4	LOS A	10.7	79.8				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PHASING SUMMARY

Site: 1 [Captain Cook Drive / Residential Access - Saturday Future]

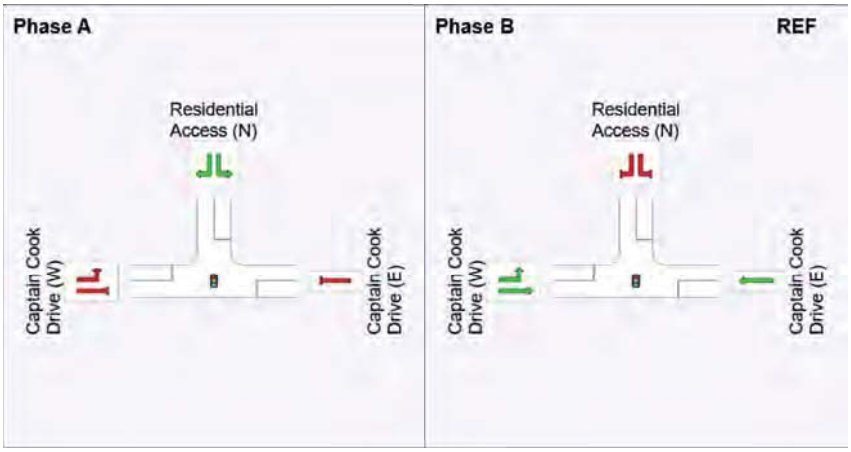
Captain Cook Drive / Residential Access
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00AM - 11:00AM
Signals - Fixed Time Isolated Cycle Time = 70 seconds (User-Given Cycle Time)

Phase Times determined by the program
Phase Sequence: Two-Phase
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Results

Phase	A	B
Phase Change Time (sec)	58	0
Green Time (sec)	6	52
Phase Time (sec)	12	58
Phase Split	17%	83%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



REF: Reference Phase
VAR: Variable Phase

Normal Movement		Permitted/Opposed	
Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane	
Stopped Movement		Turn On Red	
Other Movement Class Running		Other Movement Class Stopped	
Mixed Running & Stopped Movement Classes			
Undetected Movement		Phase Transition Applied	

MOVEMENT SUMMARY

Site: 3 [Captain Cook Drive / Retail Access - Friday Future]

Captain Cook Drive / Retail Access
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45PM - 5:45PM
Signals - Fixed Time Coordinated Cycle Time = 85 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Captain Cook Drive (E)											
5	T1	990	6.3	0.374	0.4	LOS A	0.6	4.7	0.03	0.03	59.5
6	R2	92	0.0	0.369	5.8	LOS A	0.1	0.5	0.03	0.58	50.5
Approach		1082	5.7	0.374	0.8	LOS A	0.6	4.7	0.03	0.08	58.6
North: Retail Access (N)											
7	L2	162	0.0	0.824	46.0	LOS D	9.9	69.4	0.96	0.94	27.4
9	R2	211	0.0	0.824	48.3	LOS D	9.9	69.4	0.96	0.95	32.9
Approach		373	0.0	0.824	47.3	LOS D	9.9	69.4	0.96	0.94	30.8
West: Captain Cook Drive (W)											
10	L2	207	0.0	0.907	10.5	LOS A	10.4	76.4	0.20	0.33	53.1
11	T1	1713	7.1	0.907	5.0	LOS A	10.4	76.4	0.20	0.27	52.7
Approach		1920	6.3	0.907	5.6	LOS A	10.4	76.4	0.20	0.28	52.8
All Vehicles		3375	5.4	0.907	8.7	LOS A	10.4	76.4	0.23	0.29	49.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	50	36.8	LOS D	0.1	0.1	0.93	0.93
P3	North Full Crossing	50	12.5	LOS B	0.1	0.1	0.54	0.54
P4	West Full Crossing	50	36.8	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		150	28.7	LOS C			0.80	0.80

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 3 [Captain Cook Drive / Retail Access - Friday Future]

Captain Cook Drive / Retail Access
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45PM - 5:45PM
Signals - Fixed Time Coordinated Cycle Time = 85 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Captain Cook Drive (E)													
Lane 1	495	6.3	1323	0.374	100	0.4	LOS A	0.6	4.7	Full	155	0.0	0.0
Lane 2	495	6.3	1323	0.374	100	0.4	LOS A	0.6	4.7	Full	155	0.0	0.0
Lane 3	92	0.0	249	0.369	100	5.8	LOS A	0.1	0.5	Short	60	0.0	NA
Approach	1082	5.7		0.374		0.8	LOS A	0.6	4.7				
North: Retail Access (N)													
Lane 1	227	0.0	276[1]	0.824	100	46.0	LOS D	9.9	69.4	Short	15	0.0	NA
Lane 2	146	0.0	177[1]	0.824	100	49.3	LOS D	6.4	45.1	Full	500	0.0	0.0
Approach	373	0.0		0.824		47.3	LOS D	9.9	69.4				
West: Captain Cook Drive (W)													
Lane 1	965	5.5	1064	0.907	100	6.2	LOS A	10.4	76.4	Full	500	0.0	0.0
Lane 2	955	7.1	1053	0.907	100	5.0	LOS A	10.3	76.4	Full	500	0.0	0.0
Approach	1920	6.3		0.907		5.6	LOS A	10.4	76.4				
Intersection	3375	5.4		0.907		8.7	LOS A	10.4	76.4				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

PHASING SUMMARY

Site: 3 [Captain Cook Drive / Retail Access - Friday Future]

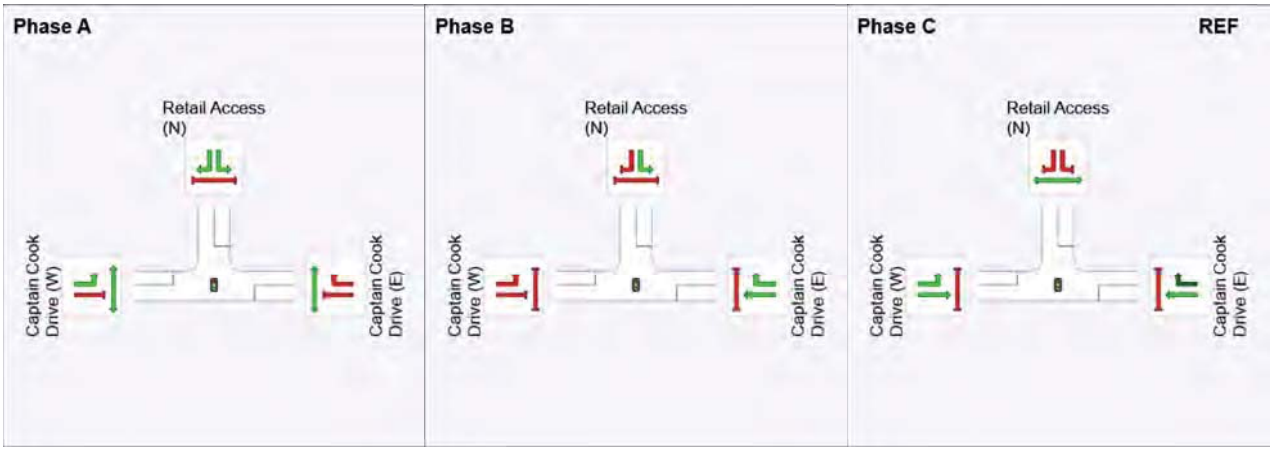
Captain Cook Drive / Retail Access
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45PM - 5:45PM
Signals - Fixed Time Coordinated Cycle Time = 85 seconds (Optimum Cycle Time - Minimum Delay)

Phase Times determined by the program
Green Split Priority applies
Phase Sequence: Two-Phase
Reference Phase: Phase C
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	54	73	0
Green Time (sec)	13	6	48
Phase Time (sec)	19	12	54
Phase Split	22%	14%	64%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



REF: Reference Phase
VAR: Variable Phase

MOVEMENT SUMMARY

Site: 3 [Captain Cook Drive / Retail Access - Saturday Future]

Captain Cook Drive / Retail Access
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00AM - 11:00AM
Signals - Fixed Time Coordinated Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Captain Cook Drive (E)											
5	T1	1274	6.3	0.506	0.4	LOS A	0.9	6.3	0.04	0.04	59.4
6	R2	79	0.0	0.208	5.8	LOS A	0.1	0.4	0.03	0.58	50.6
Approach		1353	5.9	0.506	0.7	LOS A	0.9	6.3	0.04	0.07	58.8
North: Retail Access (N)											
7	L2	155	0.0	0.651	32.5	LOS C	6.6	46.1	0.92	0.83	32.4
9	R2	199	0.0	0.651	35.7	LOS C	6.6	46.1	0.95	0.83	37.0
Approach		354	0.0	0.651	34.3	LOS C	6.6	46.1	0.94	0.83	35.3
West: Captain Cook Drive (W)											
10	L2	161	0.0	0.691	6.1	LOS A	1.4	10.2	0.07	0.20	56.6
11	T1	1138	7.1	0.691	0.6	LOS A	1.4	10.2	0.07	0.12	58.3
Approach		1299	6.2	0.691	1.3	LOS A	1.4	10.2	0.07	0.13	57.9
All Vehicles		3006	5.3	0.691	4.9	LOS A	6.6	46.1	0.16	0.18	53.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P2	East Full Crossing	50	29.3	LOS C	0.1	0.1	0.92	0.92
P3	North Full Crossing	50	13.9	LOS B	0.1	0.1	0.63	0.63
P4	West Full Crossing	50	29.3	LOS C	0.1	0.1	0.92	0.92
All Pedestrians		150	24.2	LOS C			0.82	0.82

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 3 [Captain Cook Drive / Retail Access - Saturday Future]

Captain Cook Drive / Retail Access
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00AM - 11:00AM
Signals - Fixed Time Coordinated Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Captain Cook Drive (E)													
Lane 1	637	6.3	1258	0.506	100	0.4	LOS A	0.9	6.3	Full	155	0.0	0.0
Lane 2	637	6.3	1258	0.506	100	0.4	LOS A	0.9	6.3	Full	155	0.0	0.0
Lane 3	79	0.0	379	0.208	100	5.8	LOS A	0.1	0.4	Short	60	0.0	NA
Approach	1353	5.9		0.506		0.7	LOS A	0.9	6.3				
North: Retail Access (N)													
Lane 1	209	0.0	321[1]	0.651	100	32.5	LOS C	6.6	46.1	Short	15	0.0	NA
Lane 2	145	0.0	222[1]	0.651	100	36.9	LOS C	4.9	34.0	Full	500	0.0	0.0
Approach	354	0.0		0.651		34.3	LOS C	6.6	46.1				
West: Captain Cook Drive (W)													
Lane 1	655	5.3	948	0.691	100	1.9	LOS A	1.4	10.2	Full	500	0.0	0.0
Lane 2	644	7.1	932	0.691	100	0.6	LOS A	1.4	10.2	Full	500	0.0	0.0
Approach	1299	6.2		0.691		1.3	LOS A	1.4	10.2				
Intersection	3006	5.3		0.691		4.9	LOS A	6.6	46.1				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

PHASING SUMMARY

Site: 3 [Captain Cook Drive / Retail Access - Saturday Future]

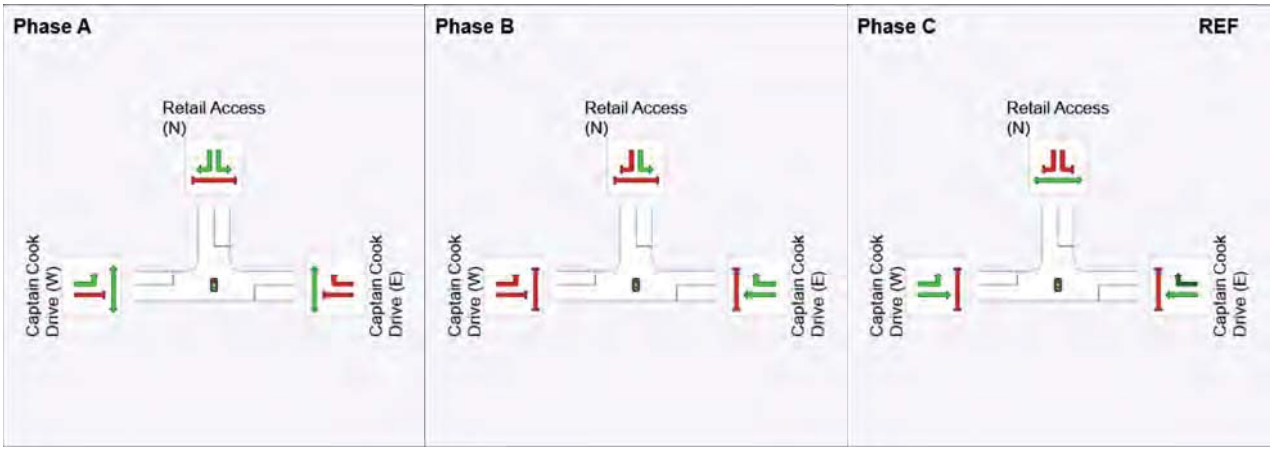
Captain Cook Drive / Retail Access
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00AM - 11:00AM
Signals - Fixed Time Coordinated Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Phase Times determined by the program
Green Split Priority applies
Phase Sequence: Two-Phase
Reference Phase: Phase C
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	41	58	0
Green Time (sec)	11	6	35
Phase Time (sec)	17	12	41
Phase Split	24%	17%	59%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class Running	Other Movement Class Stopped
Mixed Running & Stopped Movement Classes	
Undetected Movement	Phase Transition Applied

MOVEMENT SUMMARY

Site: 2 [Captain Cook Drive / Woolooware Road (Signals) - Friday Future]

Captain Cook Drive / Woolooware Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45pm - 5:45pm
Signals - Fixed Time Coordinated Cycle Time = 78 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Woolooware Road (S)											
1	L2	199	0.0	0.164	8.4	LOS A	2.0	14.0	0.37	0.65	49.1
2	T1	249	0.0	0.657	34.1	LOS C	9.2	64.2	0.98	0.84	36.3
3	R2	19	0.0	0.187	47.9	LOS D	0.8	5.3	1.00	0.68	34.4
Approach		467	0.0	0.657	23.7	LOS B	9.2	64.2	0.72	0.75	39.6
East: Captain Cook Drive (E)											
4	L2	22	4.5	0.531	28.0	LOS B	11.3	79.2	0.84	0.73	45.6
5	T1	720	1.0	0.531	21.5	LOS B	11.3	79.4	0.84	0.73	43.1
6	R2	243	0.0	0.472	19.9	LOS B	4.5	31.7	0.88	0.80	44.5
Approach		985	0.8	0.531	21.3	LOS B	11.3	79.4	0.85	0.75	43.6
North: Car Park Access (N)											
7	L2	159	0.0	0.924	54.9	LOS D	19.8	138.8	1.00	1.24	31.1
8	T1	239	0.0	0.924	50.4	LOS D	19.8	138.8	1.00	1.24	31.0
9	R2	40	0.0	0.259	43.4	LOS D	1.5	10.7	0.98	0.72	26.8
Approach		438	0.0	0.924	51.4	LOS D	19.8	138.8	1.00	1.19	30.8
West: Captain Cook Drive (W)											
10	L2	84	0.0	0.125	14.3	LOS A	1.0	6.9	0.33	0.67	40.4
11	T1	1154	0.7	0.841	12.5	LOS A	17.1	119.9	0.73	0.68	51.5
12	R2	465	0.2	0.779	10.5	LOS A	4.8	33.1	0.45	0.75	48.0
Approach		1703	0.5	0.841	12.0	LOS A	17.1	119.9	0.64	0.69	49.9
All Vehicles		3593	0.5	0.924	20.9	LOS B	19.8	138.8	0.75	0.78	42.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	26.3	LOS C	0.1	0.1	0.82	0.82
P2	East Full Crossing	50	33.3	LOS D	0.1	0.1	0.93	0.93
P3	North Full Crossing	50	26.3	LOS C	0.1	0.1	0.82	0.82
P4	West Full Crossing	50	33.3	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		200	29.8	LOS C			0.87	0.87

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 2 [Captain Cook Drive / Woolooware Road (Signals) - Friday Future]

Captain Cook Drive / Woolooware Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45pm - 5:45pm
Signals - Fixed Time Coordinated Cycle Time = 78 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Woolooware Road (S)													
Lane 1	199	0.0	1210	0.164	100	8.4	LOS A	2.0	14.0	Short	80	0.0	NA
Lane 2	249	0.0	379	0.657	100	34.1	LOS C	9.2	64.2	Short (P)	100	0.0	NA
Lane 3	19	0.0	102	0.187	100	47.9	LOS D	0.8	5.3	Full	500	0.0	0.0
Approach	467	0.0		0.657		23.7	LOS B	9.2	64.2				
East: Captain Cook Drive (E)													
Lane 1	370	1.2	697	0.531	100	21.9	LOS B	11.3	79.2	Full	500	0.0	0.0
Lane 2	372	1.0	700	0.531	100	21.5	LOS B	11.3	79.4	Full	500	0.0	0.0
Lane 3	243	0.0	515	0.472	100	19.9	LOS B	4.5	31.7	Short	120	0.0	NA
Approach	985	0.8		0.531		21.3	LOS B	11.3	79.4				
North: Car Park Access (N)													
Lane 1	398	0.0	431	0.924	100	52.2	LOS D	19.8	138.8	Full	500	0.0	0.0
Lane 2	40	0.0	155	0.259	100	43.4	LOS D	1.5	10.7	Full	500	0.0	0.0
Approach	438	0.0		0.924		51.4	LOS D	19.8	138.8				
West: Captain Cook Drive (W)													
Lane 1	84	0.0	674	0.125	100	14.3	LOS A	1.0	6.9	Short	50	0.0	NA
Lane 2	559	0.7	664[1]	0.841	100	12.4	LOS A	14.8	103.6	Full	155	0.0	0.0
Lane 3	595	0.7	708	0.841	100	12.6	LOS A	17.1	119.9	Full	155	0.0	0.0
Lane 4	465	0.2	597	0.779	100	10.5	LOS A	4.8	33.1	Short	45	0.0	NA
Approach	1703	0.5		0.841		12.0	LOS A	17.1	119.9				
Intersection	3593	0.5		0.924		20.9	LOS B	19.8	138.8				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

PHASING SUMMARY

Site: 2 [Captain Cook Drive / Woolooware Road (Signals) - Friday Future]

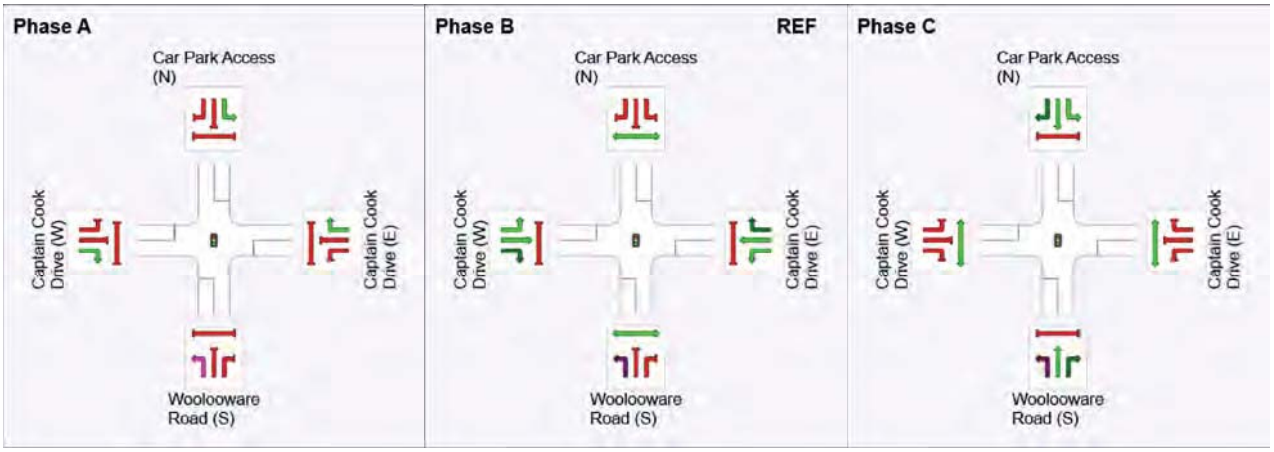
Captain Cook Drive / Woolooware Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45pm - 5:45pm
Signals - Fixed Time Coordinated Cycle Time = 78 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Phase Times determined by the program
Phase Sequence: D0C0
Reference Phase: Phase B
Input Phase Sequence: A, B, B1*, B2*, C, C1*, C2*
Output Phase Sequence: A, B, C
(* Variable Phase)

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	55	0	34
Green Time (sec)	17	28	15
Phase Time (sec)	23	34	21
Phase Split	29%	44%	27%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



REF: Reference Phase
VAR: Variable Phase

Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class Running	Other Movement Class Stopped
Mixed Running & Stopped Movement Classes	
Undetected Movement	Phase Transition Applied

MOVEMENT SUMMARY

Site: 2 [Captain Cook Drive / Woolooware Road (Signals) - Saturday Future]

Captain Cook Drive / Woolooware Road
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00am - 11:00am
Signals - Fixed Time Coordinated Cycle Time = 75 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Woolooware Road (S)											
1	L2	318	0.0	0.277	9.9	LOS A	4.2	29.6	0.48	0.69	47.6
2	T1	240	0.0	0.481	27.4	LOS B	7.6	53.4	0.90	0.77	38.9
3	R2	14	0.0	0.087	40.9	LOS C	0.5	3.3	0.94	0.68	36.8
Approach		572	0.0	0.481	18.0	LOS B	7.6	53.4	0.67	0.72	42.3
East: Captain Cook Drive (E)											
4	L2	13	0.0	0.678	30.0	LOS C	14.1	100.3	0.92	0.80	44.7
5	T1	863	5.2	0.678	23.6	LOS B	14.1	100.5	0.92	0.80	41.6
6	R2	235	0.0	0.462	16.9	LOS B	4.2	29.0	0.78	0.78	46.1
Approach		1111	4.0	0.678	22.3	LOS B	14.1	100.5	0.89	0.80	42.9
North: Car Park Access (N)											
7	L2	153	0.0	0.685	31.4	LOS C	12.9	90.4	0.95	0.84	38.9
8	T1	230	0.0	0.685	26.9	LOS B	12.9	90.4	0.95	0.84	38.7
9	R2	39	0.0	0.148	34.8	LOS C	1.3	8.9	0.89	0.72	29.7
Approach		422	0.0	0.685	29.3	LOS C	12.9	90.4	0.94	0.83	38.0
West: Captain Cook Drive (W)											
10	L2	96	5.2	0.159	16.0	LOS B	1.3	9.6	0.39	0.68	39.2
11	T1	805	4.8	0.615	11.5	LOS A	8.4	60.1	0.60	0.52	52.7
12	R2	168	0.6	0.354	12.7	LOS A	1.8	12.2	0.49	0.71	45.9
Approach		1069	4.2	0.615	12.1	LOS A	8.4	60.1	0.57	0.56	50.0
All Vehicles		3174	2.8	0.685	19.0	LOS B	14.1	100.5	0.75	0.71	43.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	27.4	LOS C	0.1	0.1	0.86	0.86
P2	East Full Crossing	50	31.8	LOS D	0.1	0.1	0.92	0.92
P3	North Full Crossing	50	27.4	LOS C	0.1	0.1	0.86	0.86
P4	West Full Crossing	50	31.8	LOS D	0.1	0.1	0.92	0.92
All Pedestrians		200	29.6	LOS C			0.89	0.89

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

LANE SUMMARY

Site: 2 [Captain Cook Drive / Woolooware Road (Signals) - Saturday Future]

Captain Cook Drive / Woolooware Road
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00am - 11:00am
Signals - Fixed Time Coordinated Cycle Time = 75 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total	HV						Veh	Dist				
	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
South: Woolooware Road (S)													
Lane 1	318	0.0	1148	0.277	100	9.9	LOS A	4.2	29.6	Short	80	0.0	NA
Lane 2	240	0.0	499	0.481	100	27.4	LOS B	7.6	53.4	Short (P)	100	0.0	NA
Lane 3	14	0.0	161	0.087	100	40.9	LOS C	0.5	3.3	Full	500	0.0	0.0
Approach	572	0.0		0.481		18.0	LOS B	7.6	53.4				
East: Captain Cook Drive (E)													
Lane 1	438	5.0	645	0.678	100	23.8	LOS B	14.1	100.3	Full	500	0.0	0.0
Lane 2	438	5.2	646	0.678	100	23.6	LOS B	14.1	100.5	Full	500	0.0	0.0
Lane 3	235	0.0	509	0.462	100	16.9	LOS B	4.2	29.0	Short	120	0.0	NA
Approach	1111	4.0		0.678		22.3	LOS B	14.1	100.5				
North: Car Park Access (N)													
Lane 1	383	0.0	559	0.685	100	28.7	LOS C	12.9	90.4	Full	500	0.0	0.0
Lane 2	39	0.0	264	0.148	100	34.8	LOS C	1.3	8.9	Full	500	0.0	0.0
Approach	422	0.0		0.685		29.3	LOS C	12.9	90.4				
West: Captain Cook Drive (W)													
Lane 1	96	5.2	603	0.159	100	16.0	LOS B	1.3	9.6	Short	50	0.0	NA
Lane 2	403	4.8	655	0.615	100	11.5	LOS A	8.4	60.1	Full	155	0.0	0.0
Lane 3	403	4.8	655	0.615	100	11.5	LOS A	8.4	60.1	Full	155	0.0	0.0
Lane 4	168	0.6	475	0.354	100	12.7	LOS A	1.8	12.2	Short	45	0.0	NA
Approach	1069	4.2		0.615		12.1	LOS A	8.4	60.1				
Intersection	3174	2.8		0.685		19.0	LOS B	14.1	100.5				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PHASING SUMMARY

Site: 2 [Captain Cook Drive / Woolooware Road (Signals) - Saturday Future]

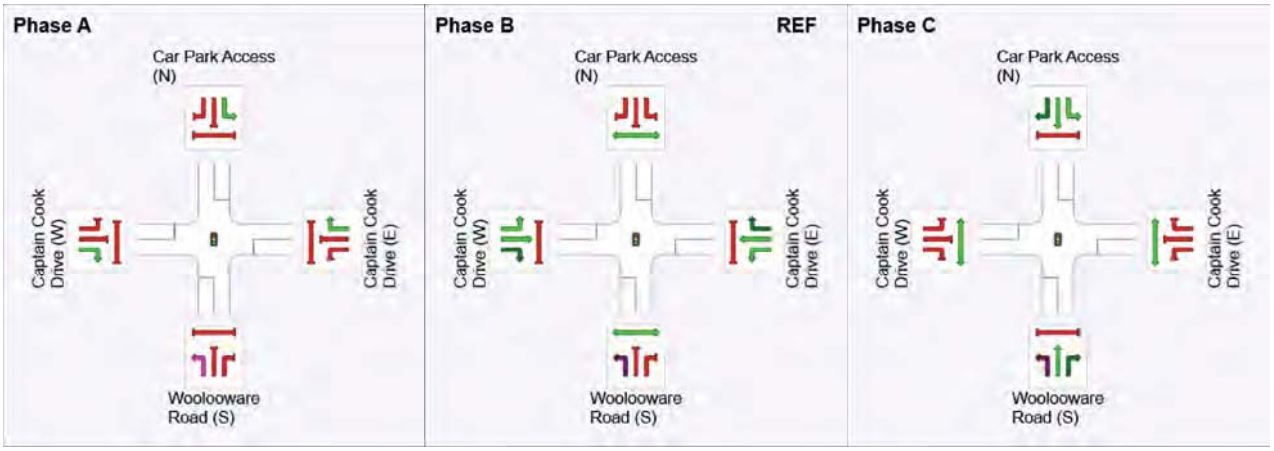
Captain Cook Drive / Woolooware Road
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00am - 11:00am
Signals - Fixed Time Coordinated Cycle Time = 75 seconds (Optimum Cycle Time - Minimum Delay)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Phase Times determined by the program
Green Split Priority applies
Phase Sequence: D0C0
Reference Phase: Phase B
Input Phase Sequence: A, B, B1*, B2*, C, C1*, C2*
Output Phase Sequence: A, B, C
(* Variable Phase)

Phase Timing Results

Phase	A	B	C
Phase Change Time (sec)	56	0	31
Green Time (sec)	13	25	19
Phase Time (sec)	19	31	25
Phase Split	25%	41%	33%

See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.



REF: Reference Phase
VAR: Variable Phase

MOVEMENT SUMMARY

Site: 101 [Captain Cook Drive / Woolooware Road (Roundabout) - Friday Future]

Captain Cook Drive / Woolooware Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45PM - 5:45PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Woolooware Road (S)											
1	L2	199	0.0	0.337	7.1	LOS A	1.7	11.9	0.76	0.87	50.8
2	T1	249	0.0	0.370	6.1	LOS A	2.0	14.3	0.77	0.71	46.3
3	R2	19	0.0	0.370	10.1	LOS A	2.0	14.3	0.77	0.71	51.1
3u	U	1	0.0	0.370	11.9	LOS A	2.0	14.3	0.77	0.71	46.9
Approach		468	0.0	0.370	6.7	LOS A	2.0	14.3	0.76	0.78	48.3
East: Captain Cook Drive (E)											
4	L2	22	4.5	0.705	15.2	LOS B	7.9	55.3	0.96	1.11	46.8
5	T1	717	1.0	0.705	15.5	LOS B	7.9	55.3	0.96	1.11	52.9
6	R2	243	0.0	0.705	20.1	LOS B	7.6	53.0	0.96	1.12	46.6
6u	U	3	0.0	0.705	22.1	LOS B	7.6	53.0	0.96	1.12	52.2
Approach		985	0.8	0.705	16.6	LOS B	7.9	55.3	0.96	1.11	51.0
North: Sharks Car Park (N)											
7	L2	159	0.0	1.340	632.3	LOS F	147.9	1035.1	1.00	8.68	5.3
8	T1	239	0.0	1.340	632.4	LOS F	147.9	1035.1	1.00	8.68	5.2
9	R2	40	0.0	1.340	636.3	LOS F	147.9	1035.1	1.00	8.68	5.3
9u	U	1	0.0	1.340	638.1	LOS F	147.9	1035.1	1.00	8.68	5.2
Approach		439	0.0	1.340	632.7	LOS F	147.9	1035.1	1.00	8.68	5.2
West: Captain Cook Drive (W)											
10	L2	84	0.0	0.892	19.5	LOS B	18.7	131.1	1.00	1.24	44.6
11	T1	1110	0.7	0.892	20.0	LOS B	18.7	131.1	1.00	1.25	49.7
12	R2	465	0.2	0.892	25.1	LOS B	18.0	125.5	1.00	1.28	43.4
12u	U	44	0.0	0.892	27.2	LOS B	18.0	125.5	1.00	1.28	48.4
Approach		1703	0.5	0.892	21.6	LOS B	18.7	131.1	1.00	1.26	47.5
All Vehicles		3595	0.5	1.340	92.9	LOS F	147.9	1035.1	0.96	2.06	24.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 101 [Captain Cook Drive / Woolooware Road (Roundabout) - Friday Future]

Captain Cook Drive / Woolooware Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 4:45PM - 5:45PM
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Woolooware Road (S)													
Lane 1	199	0.0	591	0.337	100	7.1	LOS A	1.7	11.9	Full	500	0.0	0.0
Lane 2[d]	269	0.0	727	0.370	100	6.4	LOS A	2.0	14.3	Short	70	0.0	NA
Approach	468	0.0		0.370		6.7	LOS A	2.0	14.3				
East: Captain Cook Drive (E)													
Lane 1[d]	513	1.2	728	0.705	100	15.3	LOS B	7.9	55.3	Full	500	0.0	0.0
Lane 2	472	0.5	670	0.705	100	18.1	LOS B	7.6	53.0	Full	500	0.0	0.0
Approach	985	0.8		0.705		16.6	LOS B	7.9	55.3				
North: Sharks Car Park (N)													
Lane 1[d]	439	0.0	327	1.340	100	632.7	LOS F	147.9	1035.1	Full	500	0.0	34.5
Approach	439	0.0		1.340		632.7	LOS F	147.9	1035.1				
West: Captain Cook Drive (W)													
Lane 1[d]	896	0.6	1004	0.892	100	19.7	LOS B	18.7	131.1	Full	500	0.0	0.0
Lane 2	807	0.4	904	0.892	100	23.7	LOS B	18.0	125.5	Full	500	0.0	0.0
Approach	1703	0.5		0.892		21.6	LOS B	18.7	131.1				
Intersection	3595	0.5		1.340		92.9	LOS F	147.9	1035.1				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 101 [Captain Cook Drive / Woolooware Road (Roundabout) - Saturday Future]

Captain Cook Drive / Woolooware Road
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 10:00AM - 11:00AM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Woolooware Road (S)											
1	L2	318	0.0	0.450	7.5	LOS A	2.6	18.4	0.80	0.93	50.5
2	T1	240	0.0	0.447	8.2	LOS A	2.4	17.0	0.79	0.92	45.9
3	R2	14	0.0	0.447	12.2	LOS A	2.4	17.0	0.79	0.92	50.1
3u	U	1	0.0	0.447	14.0	LOS A	2.4	17.0	0.79	0.92	46.4
Approach		573	0.0	0.450	7.9	LOS A	2.6	18.4	0.80	0.92	48.4
East: Captain Cook Drive (E)											
4	L2	13	0.0	0.617	9.9	LOS A	5.5	39.4	0.78	0.87	49.7
5	T1	851	5.2	0.617	10.4	LOS A	5.5	39.4	0.78	0.89	55.3
6	R2	235	0.0	0.617	14.5	LOS B	5.5	38.2	0.78	0.91	49.5
6u	U	12	0.0	0.617	16.6	LOS B	5.5	38.2	0.78	0.91	55.5
Approach		1111	4.0	0.617	11.3	LOS A	5.5	39.4	0.78	0.89	53.9
North: Sharks Car Park (N)											
7	L2	153	0.0	0.723	11.8	LOS A	5.4	37.5	0.87	1.08	47.4
8	T1	230	0.0	0.723	11.9	LOS A	5.4	37.5	0.87	1.08	43.5
9	R2	39	0.0	0.723	15.8	LOS B	5.4	37.5	0.87	1.08	48.1
9u	U	1	0.0	0.723	17.6	LOS B	5.4	37.5	0.87	1.08	44.3
Approach		423	0.0	0.723	12.2	LOS A	5.4	37.5	0.87	1.08	45.2
West: Captain Cook Drive (W)											
10	L2	96	5.2	0.565	9.3	LOS A	4.6	32.8	0.73	0.82	50.4
11	T1	748	4.8	0.565	9.6	LOS A	4.6	32.8	0.74	0.84	56.0
12	R2	168	0.6	0.565	13.7	LOS A	4.5	31.8	0.74	0.87	50.0
12u	U	57	1.8	0.565	15.9	LOS B	4.5	31.8	0.74	0.87	56.4
Approach		1069	4.0	0.565	10.5	LOS A	4.6	32.8	0.74	0.84	54.4
All Vehicles		3176	2.7	0.723	10.6	LOS A	5.5	39.4	0.78	0.91	51.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 101 [Captain Cook Drive / Woolooware Road (Roundabout) - Saturday Future]

Captain Cook Drive / Woolooware Road
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 10:00AM - 11:00AM
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Woolooware Road (S)													
Lane 1[d]	318	0.0	707	0.450	100	7.5	LOS A	2.6	18.4	Full	500	0.0	0.0
Lane 2	255	0.0	570	0.447	100	8.5	LOS A	2.4	17.0	Short	70	0.0	NA
Approach	573	0.0		0.450		7.9	LOS A	2.6	18.4				
East: Captain Cook Drive (E)													
Lane 1[d]	567	5.1	919	0.617	100	10.3	LOS A	5.5	39.4	Full	500	0.0	0.0
Lane 2	544	2.8	882	0.617	100	12.4	LOS A	5.5	38.2	Full	500	0.0	0.0
Approach	1111	4.0		0.617		11.3	LOS A	5.5	39.4				
North: Sharks Car Park (N)													
Lane 1[d]	423	0.0	585	0.723	100	12.2	LOS A	5.4	37.5	Full	500	0.0	0.0
Approach	423	0.0		0.723		12.2	LOS A	5.4	37.5				
West: Captain Cook Drive (W)													
Lane 1[d]	556	4.9	985	0.565	100	9.4	LOS A	4.6	32.8	Full	500	0.0	0.0
Lane 2	513	3.1	909	0.565	100	11.8	LOS A	4.5	31.8	Full	500	0.0	0.0
Approach	1069	4.0		0.565		10.5	LOS A	4.6	32.8				
Intersection	3176	2.7		0.723		10.6	LOS A	5.5	39.4				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 1 [Captain Cook Drive / Elouera Road - Saturday Future]

Captain Cook Drive / Elouera Road
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00am - 11:00am
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Elouera Rd (S)											
1	L2	566	1.5	0.281	2.4	LOS A	0.0	0.0	0.00	0.35	48.5
3	R2	119	0.9	0.119	9.7	LOS A	0.8	5.8	0.72	0.71	47.6
3u	U	1	0.0	0.119	11.5	LOS A	0.8	5.8	0.72	0.71	48.4
Approach		686	1.4	0.281	3.7	LOS A	0.8	5.8	0.13	0.41	48.4
East: Captain Cook Drive (E)											
4	L2	123	0.8	0.192	8.4	LOS A	1.1	7.5	0.70	0.76	47.3
5	T1	601	10.0	0.626	10.0	LOS A	6.8	48.9	0.88	0.92	50.3
6u	U	1	0.0	0.626	16.5	LOS B	6.8	48.9	0.88	0.92	52.1
Approach		725	8.4	0.626	9.8	LOS A	6.8	48.9	0.85	0.89	49.7
West: Captain Cook Drive (W)											
11	T1	624	10.0	0.439	4.5	LOS A	3.7	28.1	0.43	0.46	54.7
12	R2	524	1.0	0.435	9.3	LOS A	3.6	24.7	0.44	0.61	47.9
12u	U	43	3.0	0.435	11.5	LOS A	3.6	24.7	0.44	0.61	51.4
Approach		1191	5.8	0.439	6.9	LOS A	3.7	28.1	0.43	0.53	51.4
All Vehicles		2602	5.4	0.626	6.8	LOS A	6.8	48.9	0.47	0.60	50.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 1 [Captain Cook Drive / Elouera Road - Saturday Future]

Captain Cook Drive / Elouera Road
Existing Volumes (5/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00am - 11:00am
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Elouera Rd (S)													
Lane 1	566	1.5	2011	0.281	100	2.4	LOS A	0.0	0.0	Short	50	0.0	NA
Lane 2[d]	120	0.9	1011	0.119	100	9.7	LOS A	0.8	5.8	Full	500	0.0	0.0
Approach	686	1.4		0.281		3.7	LOS A	0.8	5.8				
East: Captain Cook Drive (E)													
Lane 1	123	0.8	641	0.192	100	8.4	LOS A	1.1	7.5	Short	60	0.0	NA
Lane 2[d]	602	10.0	962	0.626	100	10.1	LOS A	6.8	48.9	Full	500	0.0	0.0
Approach	725	8.4		0.626		9.8	LOS A	6.8	48.9				
West: Captain Cook Drive (W)													
Lane 1[d]	624	10.0	1421	0.439	100	4.5	LOS A	3.7	28.1	Full	500	0.0	0.0
Lane 2	567	1.2	1302	0.435	100	9.5	LOS A	3.6	24.7	Short	100	0.0	NA
Approach	1191	5.8		0.439		6.9	LOS A	3.7	28.1				
Intersection	2602	5.4		0.626		6.8	LOS A	6.8	48.9				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 1 [Captain Cook Drive / Elouera Road - Friday Future]

Captain Cook Drive / Elouera Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 5:00pm - 6:00pm
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Elouera Rd (S)											
1	L2	346	0.3	0.169	2.4	LOS A	0.0	0.0	0.00	0.35	48.4
3	R2	141	3.5	0.138	9.5	LOS A	1.0	7.0	0.70	0.71	47.7
3u	U	1	0.0	0.138	11.3	LOS A	1.0	7.0	0.70	0.71	48.5
Approach		488	1.2	0.169	4.4	LOS A	1.0	7.0	0.21	0.45	48.2
East: Captain Cook Drive (E)											
4	L2	318	2.5	0.593	17.5	LOS B	5.8	40.6	0.98	1.13	42.8
5	T1	553	2.0	0.772	23.1	LOS B	12.3	87.7	1.00	1.30	44.1
6u	U	1	0.0	0.772	30.0	LOS C	12.3	87.7	1.00	1.30	44.8
Approach		872	2.2	0.772	21.1	LOS B	12.3	87.7	0.99	1.24	43.6
West: Captain Cook Drive (W)											
11	T1	674	3.8	0.549	5.0	LOS A	5.1	36.9	0.55	0.51	54.4
12	R2	849	0.3	0.597	9.7	LOS A	6.1	42.8	0.55	0.62	48.2
12u	U	29	0.0	0.597	11.8	LOS A	6.1	42.8	0.55	0.62	52.4
Approach		1552	1.8	0.597	7.7	LOS A	6.1	42.8	0.55	0.57	50.8
All Vehicles		2912	1.8	0.772	11.1	LOS A	12.3	87.7	0.63	0.75	48.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 1 [Captain Cook Drive / Elouera Road - Friday Future]

Captain Cook Drive / Elouera Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Friday Peak 5:00pm - 6:00pm
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Elouera Rd (S)													
Lane 1	346	0.3	2046	0.169	100	2.4	LOS A	0.0	0.0	Short	50	0.0	NA
Lane 2[d]	142	3.5	1028	0.138	100	9.5	LOS A	1.0	7.0	Full	500	0.0	0.0
Approach	488	1.2		0.169		4.4	LOS A	1.0	7.0				
East: Captain Cook Drive (E)													
Lane 1	318	2.5	536	0.593	100	17.5	LOS B	5.8	40.6	Short	60	0.0	NA
Lane 2[d]	554	2.0	717	0.772	100	23.1	LOS B	12.3	87.7	Full	500	0.0	0.0
Approach	872	2.2		0.772		21.1	LOS B	12.3	87.7				
West: Captain Cook Drive (W)													
Lane 1	674	3.8	1227	0.549	100	5.0	LOS A	5.1	36.9	Full	500	0.0	0.0
Lane 2[d]	878	0.3	1471	0.597	100	9.7	LOS A	6.1	42.8	Short	100	0.0	NA
Approach	1552	1.8		0.597		7.7	LOS A	6.1	42.8				
Intersection	2912	1.8		0.772		11.1	LOS A	12.3	87.7				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 1 [Captain Cook Drive / Gannons Road - Friday Existing]

Captain Cook Drive / Gannons Road
Existing Volumes (4/11/16)
Friday Peak 4:45PM - 5:45PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Gannons Rd (S)											
1	L2	357	1.3	0.197	2.3	LOS A	0.0	0.0	0.00	0.34	48.8
2	T1	2	0.0	0.152	6.4	LOS A	0.8	5.6	0.70	0.82	34.4
3	R2	116	0.8	0.152	10.1	LOS A	0.8	5.6	0.70	0.82	49.6
3u	U	1	0.0	0.152	11.9	LOS A	0.8	5.6	0.70	0.82	46.2
Approach		476	1.2	0.197	4.2	LOS A	0.8	5.6	0.17	0.46	48.9
East: Captain Cook Drive (E)											
4	L2	69	0.0	0.557	10.9	LOS A	4.5	31.7	0.81	0.94	49.9
5	T1	850	1.5	0.557	10.9	LOS A	4.7	33.1	0.81	0.92	58.2
6	R2	1	0.0	0.557	15.4	LOS B	4.7	33.1	0.81	0.91	40.7
6u	U	1	0.0	0.557	17.8	LOS B	4.7	33.1	0.81	0.91	59.4
Approach		921	1.4	0.557	10.9	LOS A	4.7	33.1	0.81	0.92	57.5
North: Toyota Access (N)											
7	L2	25	0.0	0.072	9.3	LOS A	0.3	2.4	0.83	0.84	37.1
8	T1	35	0.0	0.202	7.4	LOS A	1.1	7.9	0.88	0.91	34.6
9	R2	63	0.0	0.202	10.0	LOS A	1.1	7.9	0.88	0.91	37.5
9u	U	1	0.0	0.202	10.9	LOS A	1.1	7.9	0.88	0.91	30.1
Approach		124	0.0	0.202	9.1	LOS A	1.1	7.9	0.87	0.90	36.5
West: Captain Cook Drive (W)											
10	L2	5	0.0	0.678	6.0	LOS A	7.4	52.7	0.57	0.53	39.4
11	T1	1407	1.8	0.678	6.1	LOS A	7.6	53.5	0.56	0.54	59.6
12	R2	575	0.8	0.678	10.9	LOS A	7.6	53.5	0.53	0.58	52.4
12u	U	1	0.0	0.678	13.2	LOS A	7.6	53.5	0.53	0.58	59.8
Approach		1988	1.5	0.678	7.5	LOS A	7.6	53.5	0.55	0.55	57.3
All Vehicles		3509	1.4	0.678	8.0	LOS A	7.6	53.5	0.58	0.65	55.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 1 [Captain Cook Drive / Gannons Road - Friday Existing]

Captain Cook Drive / Gannons Road
Existing Volumes (4/11/16)
Friday Peak 4:45PM - 5:45PM
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Gannons Rd (S)													
Lane 1	357	1.3	1811	0.197	100	2.3	LOS A	0.0	0.0	Short	100	0.0	NA
Lane 2[d]	119	0.8	782	0.152	100	10.0	LOS A	0.8	5.6	Full	500	0.0	0.0
Approach	476	1.2		0.197		4.2	LOS A	0.8	5.6				
East: Captain Cook Drive (E)													
Lane 1	435	1.3	781	0.557	100	11.2	LOS A	4.5	31.7	Full	500	0.0	0.0
Lane 2[d]	486	1.5	873	0.557	100	10.6	LOS A	4.7	33.1	Full	500	0.0	0.0
Approach	921	1.4		0.557		10.9	LOS A	4.7	33.1				
North: Toyota Access (N)													
Lane 1	25	0.0	348	0.072	100	9.3	LOS A	0.3	2.4	Full	500	0.0	0.0
Lane 2[d]	99	0.0	491	0.202	100	9.1	LOS A	1.1	7.9	Full	500	0.0	0.0
Approach	124	0.0		0.202		9.1	LOS A	1.1	7.9				
West: Captain Cook Drive (W)													
Lane 1	908	1.8	1339	0.678	100	6.2	LOS A	7.4	52.7	Full	500	0.0	0.0
Lane 2[d]	1080	1.3	1593	0.678	100	8.6	LOS A	7.6	53.5	Full	500	0.0	0.0
Approach	1988	1.5		0.678		7.5	LOS A	7.6	53.5				
Intersection	3509	1.4		0.678		8.0	LOS A	7.6	53.5				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 1 [Captain Cook Drive / Gannons Road - Saturday Future]

Captain Cook Drive / Gannons Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00AM - 11:00AM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Gannons Rd (S)											
1	L2	536	1.3	0.295	2.3	LOS A	0.0	0.0	0.00	0.34	48.8
2	T1	4	0.0	0.261	8.8	LOS A	1.5	11.1	0.88	0.95	33.8
3	R2	127	2.5	0.261	12.6	LOS A	1.5	11.1	0.88	0.95	48.1
3u	U	1	0.0	0.261	14.3	LOS A	1.5	11.1	0.88	0.95	45.1
Approach		668	1.5	0.295	4.3	LOS A	1.5	11.1	0.17	0.46	48.5
East: Captain Cook Drive (E)											
4	L2	215	2.3	0.957	40.7	LOS C	28.3	203.1	1.00	1.77	35.6
5	T1	1302	4.5	0.957	39.6	LOS C	30.3	218.0	1.00	1.77	40.1
6	R2	15	0.0	0.957	43.4	LOS D	30.3	218.0	1.00	1.77	31.1
6u	U	15	0.0	0.957	45.8	LOS D	30.3	218.0	1.00	1.77	41.0
Approach		1547	4.1	0.957	39.9	LOS C	30.3	218.0	1.00	1.77	39.3
North: Toyota Access (N)											
7	L2	4	0.0	0.011	7.5	LOS A	0.0	0.3	0.79	0.67	37.8
8	T1	8	0.0	0.049	5.5	LOS A	0.3	1.8	0.82	0.79	35.1
9	R2	17	5.0	0.049	8.3	LOS A	0.3	1.8	0.82	0.79	37.5
9u	U	1	0.0	0.049	9.0	LOS A	0.3	1.8	0.82	0.79	30.5
Approach		30	2.8	0.049	7.5	LOS A	0.3	1.8	0.82	0.77	36.6
West: Captain Cook Drive (W)											
10	L2	2	50.0	0.630	7.5	LOS A	6.1	44.0	0.60	0.57	39.3
11	T1	1099	4.5	0.630	6.4	LOS A	6.3	45.4	0.59	0.58	59.3
12	R2	623	3.4	0.630	11.1	LOS A	6.3	45.4	0.56	0.62	51.9
12u	U	1	0.0	0.630	13.4	LOS A	6.3	45.4	0.56	0.62	59.2
Approach		1725	4.2	0.630	8.1	LOS A	6.3	45.4	0.58	0.60	56.3
All Vehicles		3970	3.7	0.957	19.8	LOS B	30.3	218.0	0.68	1.03	47.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 1 [Captain Cook Drive / Gannons Road - Saturday Future]

Captain Cook Drive / Gannons Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail + Residential Uplift
Saturday Peak 10:00AM - 11:00AM
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Gannons Rd (S)													
Lane 1	536	1.3	1819	0.295	100	2.3	LOS A	0.0	0.0	Short	100	0.0	NA
Lane 2[d]	132	2.4	505	0.261	100	12.5	LOS A	1.5	11.1	Full	500	0.0	0.0
Approach	668	1.5		0.295		4.3	LOS A	1.5	11.1				
East: Captain Cook Drive (E)													
Lane 1	730	3.8	763	0.957	100	40.9	LOS C	28.3	203.1	Full	500	0.0	0.0
Lane 2[d]	817	4.3	854	0.957	100	39.0	LOS C	30.3	218.0	Full	500	0.0	0.0
Approach	1547	4.1		0.957		39.9	LOS C	30.3	218.0				
North: Toyota Access (N)													
Lane 1	4	0.0	368	0.011	100	7.5	LOS A	0.0	0.3	Full	500	0.0	0.0
Lane 2[d]	26	3.3	531	0.049	100	7.4	LOS A	0.3	1.8	Full	500	0.0	0.0
Approach	30	2.8		0.049		7.5	LOS A	0.3	1.8				
West: Captain Cook Drive (W)													
Lane 1	789	4.6	1251	0.630	100	6.5	LOS A	6.1	44.0	Full	500	0.0	0.0
Lane 2[d]	936	3.8	1485	0.630	100	9.5	LOS A	6.3	45.4	Full	500	0.0	0.0
Approach	1725	4.2		0.630		8.1	LOS A	6.3	45.4				
Intersection	3970	3.7		0.957		19.8	LOS B	30.3	218.0				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 1 [Captain Cook Drive / Gannons Road - Friday Approved]

Captain Cook Drive / Gannons Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail (Approved)
Friday Peak 4:45PM - 5:45PM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Gannons Rd (S)											
1	L2	275	0.0	0.150	2.3	LOS A	0.0	0.0	0.00	0.34	48.8
2	T1	3	0.0	0.400	7.3	LOS A	2.6	18.2	0.81	0.92	34.3
3	R2	304	0.0	0.400	11.0	LOS A	2.6	18.2	0.81	0.92	49.5
3u	U	1	0.0	0.400	12.9	LOS A	2.6	18.2	0.81	0.92	45.9
Approach		583	0.0	0.400	6.9	LOS A	2.6	18.2	0.43	0.65	49.1
East: Captain Cook Drive (E)											
4	L2	308	0.0	0.724	14.9	LOS B	8.0	56.3	0.97	1.12	47.3
5	T1	759	0.0	0.724	14.5	LOS A	8.5	59.7	0.97	1.10	55.2
6	R2	1	0.0	0.724	19.1	LOS B	8.5	59.7	0.98	1.10	39.2
6u	U	1	0.0	0.724	21.5	LOS B	8.5	59.7	0.98	1.10	56.1
Approach		1069	0.0	0.724	14.6	LOS B	8.5	59.7	0.97	1.11	52.6
North: Toyota Access (N)											
7	L2	12	0.0	0.086	20.4	LOS B	0.4	3.0	0.94	0.94	33.4
8	T1	41	0.0	0.791	70.5	LOS F	5.8	40.6	0.98	1.50	21.9
9	R2	94	0.0	0.791	73.2	LOS F	5.8	40.6	0.98	1.50	23.1
9u	U	1	0.0	0.791	74.0	LOS F	5.8	40.6	0.98	1.50	20.0
Approach		148	0.0	0.791	68.2	LOS E	5.8	40.6	0.98	1.45	23.3
West: Captain Cook Drive (W)											
10	L2	5	0.0	0.971	30.1	LOS C	39.8	278.4	1.00	1.39	32.0
11	T1	1788	0.0	0.971	28.3	LOS B	41.3	288.8	1.00	1.34	45.3
12	R2	567	0.0	0.971	30.1	LOS C	41.3	288.8	1.00	1.27	42.3
12u	U	1	0.0	0.971	32.5	LOS C	41.3	288.8	1.00	1.27	47.0
Approach		2361	0.0	0.971	28.7	LOS C	41.3	288.8	1.00	1.32	44.5
All Vehicles		4161	0.0	0.971	23.4	LOS B	41.3	288.8	0.91	1.18	45.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 1 [Captain Cook Drive / Gannons Road - Friday Approved]

Captain Cook Drive / Gannons Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail (Approved)
Friday Peak 4:45PM - 5:45PM
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Gannons Rd (S)													
Lane 1	275	0.0	1828	0.150	100	2.3	LOS A	0.0	0.0	Short	100	0.0	NA
Lane 2[d]	308	0.0	770	0.400	100	10.9	LOS A	2.6	18.2	Full	500	0.0	0.0
Approach	583	0.0		0.400		6.9	LOS A	2.6	18.2				
East: Captain Cook Drive (E)													
Lane 1	503	0.0	695	0.724	100	15.0	LOS B	8.0	56.3	Full	500	0.0	0.0
Lane 2[d]	566	0.0	782	0.724	100	14.3	LOS A	8.5	59.7	Full	500	0.0	0.0
Approach	1069	0.0		0.724		14.6	LOS B	8.5	59.7				
North: Toyota Access (N)													
Lane 1	12	0.0	140	0.086	100	20.4	LOS B	0.4	3.0	Full	500	0.0	0.0
Lane 2[d]	136	0.0	172	0.791	100	72.4	LOS F	5.8	40.6	Full	500	0.0	0.0
Approach	148	0.0		0.791		68.2	LOS E	5.8	40.6				
West: Captain Cook Drive (W)													
Lane 1	1075	0.0	1106	0.971	100	30.3	LOS C	39.8	278.4	Full	500	0.0	0.0
Lane 2[d]	1286	0.0	1324	0.971	100	27.4	LOS B	41.3	288.8	Full	500	0.0	0.0
Approach	2361	0.0		0.971		28.7	LOS C	41.3	288.8				
Intersection	4161	0.0		0.971		23.4	LOS B	41.3	288.8				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

MOVEMENT SUMMARY

Site: 1 [Captain Cook Drive / Gannons Road - Saturday Approved]

Captain Cook Drive / Gannons Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail (Approved)
Saturday Peak 10:00AM - 11:00AM
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Gannons Rd (S)											
1	L2	561	0.0	0.307	2.3	LOS A	0.0	0.0	0.00	0.34	48.8
2	T1	1	0.0	0.478	9.7	LOS A	3.3	22.8	0.90	1.02	33.6
3	R2	272	0.0	0.478	13.3	LOS A	3.3	22.8	0.90	1.02	48.0
3u	U	1	0.0	0.478	15.2	LOS B	3.3	22.8	0.90	1.02	44.7
Approach		835	0.0	0.478	5.9	LOS A	3.3	22.8	0.30	0.56	48.5
East: Captain Cook Drive (E)											
4	L2	207	0.0	0.926	31.0	LOS C	20.9	146.1	1.00	1.50	39.3
5	T1	1212	0.0	0.926	30.2	LOS C	22.3	156.1	1.00	1.50	44.8
6	R2	1	0.0	0.926	34.3	LOS C	22.3	156.1	1.00	1.49	33.8
6u	U	1	0.0	0.926	36.7	LOS C	22.3	156.1	1.00	1.49	45.6
Approach		1421	0.0	0.926	30.3	LOS C	22.3	156.1	1.00	1.50	43.9
North: Toyota Access (N)											
7	L2	5	0.0	0.020	11.6	LOS A	0.1	0.8	0.90	0.79	36.3
8	T1	10	0.0	0.096	9.6	LOS A	0.6	4.1	0.95	0.93	33.9
9	R2	21	0.0	0.096	12.2	LOS A	0.6	4.1	0.95	0.93	36.6
9u	U	1	0.0	0.096	13.1	LOS A	0.6	4.1	0.95	0.93	29.5
Approach		37	0.0	0.096	11.4	LOS A	0.6	4.1	0.94	0.91	35.6
West: Captain Cook Drive (W)											
10	L2	1	0.0	0.797	10.0	LOS A	12.2	85.6	0.92	0.82	38.5
11	T1	1341	0.0	0.797	9.7	LOS A	12.2	85.6	0.90	0.81	57.8
12	R2	633	0.0	0.797	13.8	LOS A	12.2	85.5	0.88	0.77	50.9
12u	U	1	0.0	0.797	16.2	LOS B	12.2	85.5	0.88	0.77	57.8
Approach		1976	0.0	0.797	11.0	LOS A	12.2	85.6	0.90	0.79	55.4
All Vehicles		4269	0.0	0.926	16.5	LOS B	22.3	156.1	0.81	0.98	49.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: 1 [Captain Cook Drive / Gannons Road - Saturday Approved]

Captain Cook Drive / Gannons Road
Existing Volumes (4/11/16) + Stage 3 Residential + RMS Kurnell Development Volumes + Retail (Approved)
Saturday Peak 10:00AM - 11:00AM
Roundabout

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
South: Gannons Rd (S)													
Lane 1	561	0.0	1828	0.307	100	2.3	LOS A	0.0	0.0	Short	100	0.0	NA
Lane 2[d]	274	0.0	573	0.478	100	13.3	LOS A	3.3	22.8	Full	500	0.0	0.0
Approach	835	0.0		0.478		5.9	LOS A	3.3	22.8				
East: Captain Cook Drive (E)													
Lane 1	671	0.0	724	0.926	100	31.2	LOS C	20.9	146.1	Full	500	0.0	0.0
Lane 2[d]	750	0.0	810	0.926	100	29.5	LOS C	22.3	156.1	Full	500	0.0	0.0
Approach	1421	0.0		0.926		30.3	LOS C	22.3	156.1				
North: Toyota Access (N)													
Lane 1	5	0.0	245	0.020	100	11.6	LOS A	0.1	0.8	Full	500	0.0	0.0
Lane 2[d]	32	0.0	333	0.096	100	11.4	LOS A	0.6	4.1	Full	500	0.0	0.0
Approach	37	0.0		0.096		11.4	LOS A	0.6	4.1				
West: Captain Cook Drive (W)													
Lane 1	903	0.0	1132	0.797	100	10.1	LOS A	12.2	85.6	Full	500	0.0	0.0
Lane 2[d]	1073	0.0	1346	0.797	100	11.8	LOS A	12.2	85.5	Full	500	0.0	0.0
Approach	1976	0.0		0.797		11.0	LOS A	12.2	85.6				
Intersection	4269	0.0		0.926		16.5	LOS B	22.3	156.1				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach