

**TRAFFIC AND ACCESS ASSESSMENTS  
TO ACCOMPANY  
A DEVELOPMENT APPLICATION**

**FOR**

**MASTERPLAN TO PROVIDE AGED  
RESIDENTIAL AND INDEPENDENT LIVING  
FOR CARRINGTON CENTENNIAL CARE  
ON  
SMALLS ROAD  
GRASMERE**

Ref. 20031r

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## 1.0 INTRODUCTION

This report has been prepared as a Traffic Impact Assessment on behalf of the applicant “Carrington Centennial Care Board” to accompany a proposed development masterplan for staged residential development to be located off Smalls Road at Grasmere.

A masterplan by Jackson Teece dated March 2020 (see **Appendix 1**) has been prepared for the site which provided a long-term vision for the development of the Werombi Road (Carrington Campus Site) and Smalls Road Site for a comprehensive range of aged care and support facilities to meet the unique heritage and environmental qualities of the land holdings in conjunction with the existing planning and environmental legislation for this site.

The longer term proposal detailed in this application involves a residential development comprising:

- RACF x 128 beds;
- Dementia cottage, 24 beds;
- Premium independent living units x 79;
- Assisted living units x 60;
- Standard independent living units x 120;
- 2 bedroom villas x 32;
- 3 bedroom villas x 50.

In addition the non residential uses (conceptual at this stage) comprise:-

- A 90 place child care facility;
- Wellness Centre, 962m<sup>2</sup>;
- Health centre, 2,000m<sup>2</sup> (including pharmacy and specialist medical rooms for visiting doctors); and
- Café/coffee shop and Retail

Access is proposed from Smalls Road at one location some 67 metres west of Werombi Road.

These assessments have been prepared in accordance with the aims and objectives of State Environmental Planning Policy Infrastructure ISEPP and in accordance with the guidelines and procedures for traffic generating developments as prepared by the Traffic Authority of NSW 2002 Ver 2.0 (RMS).

This report also references the planning controls of Camden Council and considers the following matters:

- The site, adjoining road and traffic controls;
- Vehicular access to/from Smalls Road and impact upon Werombi Road;
- Public transport provisions;
- Traffic Generation; and
- Future traffic impacts and car parking requirements.

This study is based on the site master plan and the site layouts prepared by Jackson Teece accompanying this proposal.

## **2.0 SITE DETAILS**

### **2.1 Site Location**

The subject land, approximately 27 hectares in area, is located on the western side of Werombi Road and south side of Smalls Road of Camden township with access from Smalls Road west of the Werombi Road roundabout.

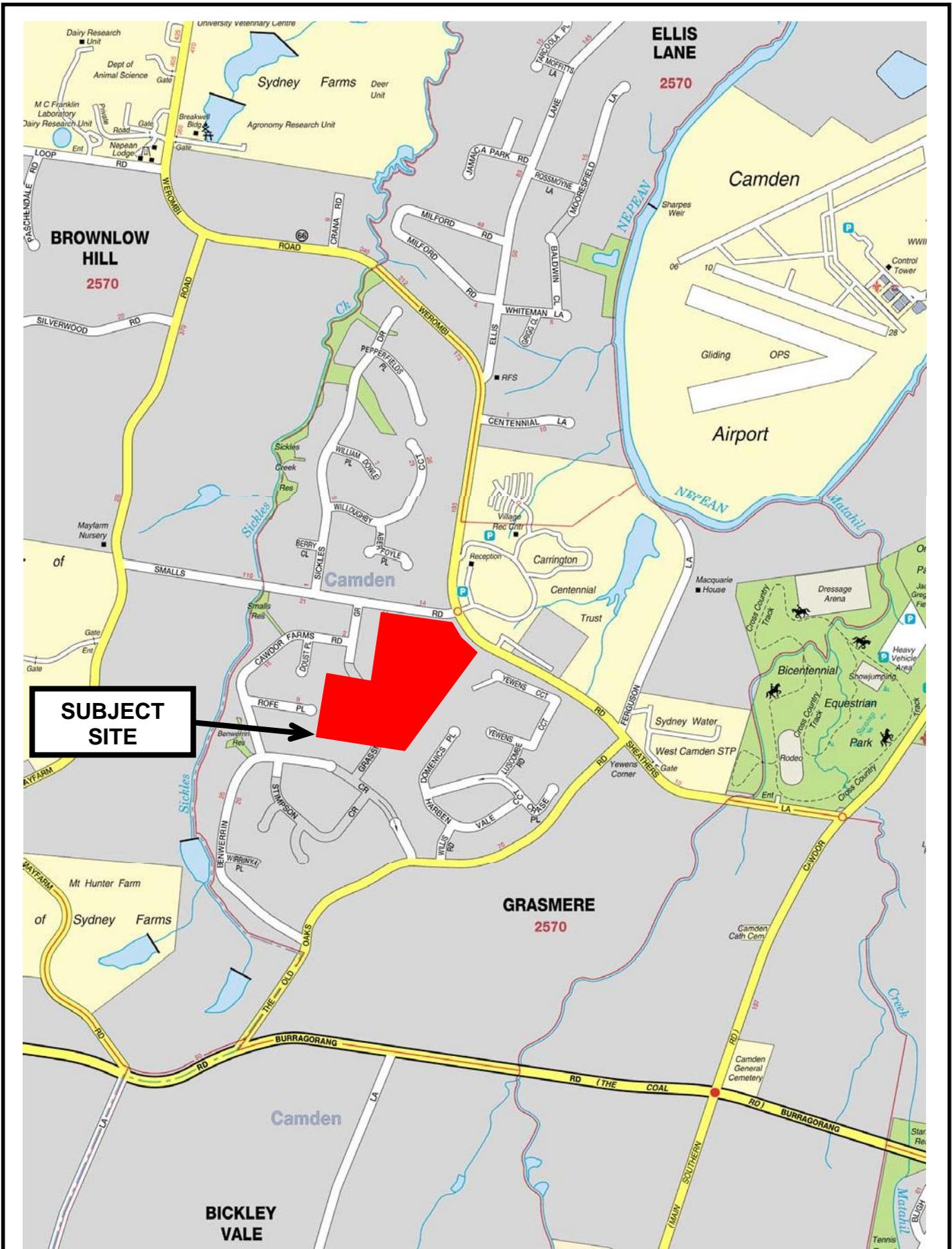
The location of the land in the regional context is shown in **Figure 1** and in the local context in **Figure 2**.

### **2.2 Site Description and Existing Development**

Except for minor rural improvements the subject land is described as Lot 10 in DP 845472 (No. 90 Werombi Road Grasmere) the site is currently vacant with a moderate level of scrub and light tree vegetation.

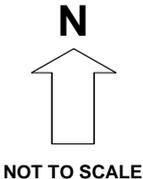
### **2.3 Adjoining Development**

Adjoining developments consist primarily of historic Carrington Village and buildings to the north east and newer freestanding residential and rural residential dwellings to the north, west and south.



**SUBJECT SITE**

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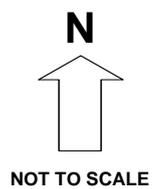


**FIGURE 1**  
**CARRINGTON CARE**  
**SMALLS RD AND WEROMBI RD, GRASMERE**  
**SITE LOCATION**

JOB NO. 20031  
 26/03/20



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**FIGURE 2**  
CARRINGTON CARE  
SMALL RD AND WEROMBI RD, GRASMERE  
**SITE**

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## 3.0 DEVELOPMENT PROPOSAL

### 3.1 Development Concept

The concept Masterplan is designed to integrate the proposed development elements:

#### **Vehicular connectivity**

The plan proposed a single access point along Smalls Road for all left and right turn movements to/from the site, as shown in the accompanying concept layout plans.

#### **Pedestrian connectivity**

A key feature of the concept Masterplan is the north-south pedestrian walkway “spine” through the centre of the site. This connects to a pedestrian walk proposed at the Carrington Centennial Care sites to the north of Werombi Road providing a continuous link to facilities and amenities between the sites to their residents. The future option for pedestrian link is to be made via longer term pedestrian crossing at/or to the south of the Werombi Road Smalls Road roundabout.

However, advice from Carrington Management is that the two sites will operate as two separate self sufficient villages with all services (excluding laundry for the RACF. Food for the RACF will be prepared in the commercial kitchen in the recreation centre). This will facilitate the two sites operating independently, allowing the two villages to develop their own identity and culture.

In the longer term and subject to further negotiation between the applicant, Camden Council and Transport NSW (the RMS) the opportunity to remove the existing roundabout and control the intersection with traffic control signals including signalised pedestrian facilities may be realised, subject to warrants and agreements by the above stake hold authorities, however this intersection and infrastructure upgrade is not part of this proposal.

#### **Built Form**

The proposal involves a mix of medium density units aged care residential facilities, health care and ancillary uses as shown in the concept layout plan prepared by Jackson Teece Architects.

The ultimate staged development proposes a mix of medium density (1 to 3 bedroom) villas, residential dwelling and non residential proposals including:

- 128 bed RACF;
- 79 premium independent living units;
- 60 assisted independent living units;
- 120 standard independent living units;
- Health Centre;
- 90 place child care centre;
- 82 x 2 to 3 bedroom villas;
- 24 bed dementia cottage.

**TABLE 3.1****PROPOSED RESIDENTIAL ACCOMODATION**

<b>Accommodation Type</b>	<b>1 Bed Unit</b>	<b>2 Bed Unit</b>	<b>3 Bed Unit</b>	<b>2&amp;3 Bed Villas</b>	<b>Total</b>
Single storey villas	-	-	-	82	<b>82</b>
Standard ILU Apartment (6 buildings)		72	48		<b>120</b>
Assisted Living Apartments (3 buildings)	24	36			<b>60</b>
Premium ILU Apartments (3 buildings)		59	20		<b>79</b>
<b>Total</b>	<b>24</b>	<b>167</b>	<b>68</b>	<b>82</b>	<b>341</b>

**TABLE 3.2****PROPOSED AGED CARE ACCOMODATION**

<b>Accommodation Type</b>	<b>Total Beds</b>
RACF	<b>128</b>
Dementia Cottage (2 x 12 bed)	<b>24</b>
<b>Total</b>	<b>152</b>

**3.2 Road Layout and Guideline Standards**

It is generally accepted with similar new mixed use residential uses that the internal and private road layout be proposed generally in accordance with Landcom and Council Subdivision Guidelines where a hierarchical road network is essential to maximise road safety, residential amenity and legibility. Access roads within the site will serve a distinct set of residential functions and will be designed accordingly. The design will convey to motorists the predominant low volume, low speed function of the internal streetscape.

Within the site the access roads will reflect a role in the road hierarchy by its visual appearance and related physical design standards. Access roads will differ in alignment and design standard according to the volume they are intended to carry, the desirable traffic speeds and other factors.

The number of turning movements at junctions that a resident or visitor is required to undertake to reach a particular address within the development will be minimised.

Low speeds are desirable in lightly trafficked access roads to protect pedestrian/cyclists and allow them to share the accessway with vehicles

Existing bus services to the Grasmere area may be extended from Smalls Road into the site to loop around inside the proposed development. Future bus stops will be within acceptable walking distance of all dwellings.

The aims of the proposed road system within the site are to achieve:

- Convenient and safe access to all allotments for pedestrians, vehicles and cyclists.
- Safe, logical and hierarchical transport linkages with existing street system.
- Appropriate access, emergency and service vehicles.
- A quality product that minimises maintenance costs.
- An opportunity for street landscaping.
- Convenient parking for visitors.

Landcom via Amcord Guidelines recommends the following standards for the various classes of roads in new subdivisions including private roads.

### RECOMMENDED GUIDELINES

Road Classification	Recommended Pavement Width	Max. Flow veh/day	Max. Road Length	Max. Dwellings Served
Access Place	3.5 – 3.7 metres	300	100 metres	30
Local Access Streets (A)	5.0 – 5.5 metres	1000	250 metres	100
Local Access Streets (B)	5.5 or 7.0 metres	2000	N/A	200
Collector Road	7.0 – 7.5 metres	3000	N/A	N/A

These roads should in terms of amenity and road safety afford the following environmental capacity/performance standards.

Road Class	Road Type	Desirable Max. Speed (km/hr)	Desirable Max. Peak Hour Volume (veh/hr)
Local	Accessway (with footpath) Street	25	100
	Street	40	200 environmental goal
	Street	40	300 maximum
Collector	Street	50	300 environmental goal
	Street	50	500 maximum

The development proposes an access street design and carriageway width (including kerbing) in accordance with Council's sub division code, i.e. AADT <500 veh/day and carriageway width nominally loop road at 8.0m width and internal roads 6.5m width.

The proposed intersections are generally located in such a way that:

- The streets intersect at right angles;
- The landform allows clear sight distance on each of the approach legs of the intersection;
- The minor street intersects the convex side of the major street;
- The vertical grade lines at the intersection do not impose undue driving difficulties;
- The vertical grade lines at the intersection will allow for any direct surface drainage;
- Adequate stopping and sight distances will be provided for horizontal and vertical curves at all intersections.

### 3.3 Council Guidelines

Camden Council DCP 2019 for residential subdivisions indicates amongst other development standards that;

The proposed development should;

- a. Minimise vehicular and pedestrian entry and exit point to the site;

- b. Provide a defined and well lit pedestrian “safe route” which can be clearly viewed by residents for passive surveillance;
- c. Consider site accessibility to people in wheelchairs and with lesser mobility;
- d. The proposed development should be designed to comply with “Safer by Design” Guidelines.

The proposal aim is to meet these objectives.

The provision of a road system within the site subdivision is to be designed so as to achieve the following aims:

- Provide convenient and safe access to all allotments for pedestrians, vehicles and cyclists;
  - Provide safe, logical and hierarchical transport linkages with the existing street system;
  - Provide appropriate access for buses, emergency and service vehicles;
  - Provide for a quality product that minimises maintenance costs;
  - Provide a convenient way for public utilities;
  - Provide an opportunity for street landscaping;
  - Provide convenient parking for visitors;
  - Have appropriate regard for the climate, geology and topography of the area.
- **Car Parking**

**A total of 420 on site car parking spaces located about the site and under the Health Centre and Recreation Centre are proposed in accord with Council’s and AS2890.1 Guidelines.**

1. The parking requirements for normal levels of activity associated with any land use should be accommodated on site in accordance with Camden Council’s Development Control Plan 2019 and development conditions.
2. All off street parking should be designed in accordance with Development Control Plan 2019 Part 2 Car Parking which indicates:

SEPP (Seniors Living) 2004:	
(a) Crown Development	1 space per 5 dwellings
(b) Private Self Contained Units	0.5 spaces for dwellings less than 55m <sup>2</sup> 0.85 spaces for dwellings between 55m <sup>2</sup> and 85m <sup>2</sup> 1 spaces for dwellings greater than 85m <sup>2</sup>
(c) Nursing/Hostel Convalescent Homes	1 per 10 beds; plus 1 per 2 employees; plus 1 ambulance space

Calculation

- 128 beds at 1 space per 10 beds	=	12.8 spaces
- 24 dementia beds at 1 space per 10 beds	=	2.4 spaces
- Employees (50) at 1 space per 2 beds	=	25.0 spaces
- 120 standard units at 0.5 spaces per unit	=	60.0 spaces
- 60 assisted units at 0.85 spaces per unit	=	51 spaces
- 79 premium units at 1.0 spaces per unit	=	79 spaces
- Childcare Centre at 1 space per 4 children	=	22.5 spaces
- Admin and visitor spaces	=	30 spaces
<b>TOTAL</b>	<b>=</b>	<b>283 spaces</b>

## Bus Routes

1. Council will normally identify bus routes. Roads identified as bus routes shall be designed to local distributor standards.

**TABLE 3.3**

### **BUS BAY AND BUS SHELTER REQUIREMENTS (PUBLIC ROADS)**

<b>Road</b>	<b>Carriageway Width (Min)</b>	<b>Stops (Spacings)</b>	<b>Bays</b>
Access	9m	400 metre*	Single
Collector	11m	400 metre	Shelters ** and Bays
Local Distributor	13m	400 metre	Shelters ** and Bays

\* Loop Roads with single entry/exit only require stops and bays on one side road.

\*\* Shelters are subject to Council's requirements.

## 3.4 Access

The site is accessed via Werombi Road, thence Smalls Road. A 12.0m wide two way vehicular access road to the site is proposed from Smalls Road at a location approximately 70 metres west of Werombi Road. Pedestrian walkways are proposed either side of this 120 metre wide roadway.

Kerb and guttering is to be provided from the Werombi Road roundabout to the proposed site entry location to accommodate 1 westbound left turning lane and 1 through lane. Smalls Road adjacent to the site is to accommodate pavement widening to facilitate two eastbound lanes and the passing of any eastbound vehicles right turning into the site.

### • Vehicular circulation

The internal road network consists of a hierarchy of low speed roadways to establish a legible and efficient means of circulation through the site. The loop road from the Smalls Road access point is the primary vehicular circulation route in the development.

In the northern half of the site a network of secondary vehicular circulation routes link the primary routes to service the development in this area, establishing a highly permeable road network. In the northern half of the site, secondary spur routes off the primary route services the residential community. Together, the primary and secondary routes provide a highly permeable road network with access to the various uses within the site and the residential communities.

### • Pedestrian Links

A very low level of pedestrian interaction between the two, Carrington Campus site and Smalls Road site can be expected for the aged care support facilities i.e. medical, pharmaceutical etc and some of the small shop group services i.e. café/restaurant, to this end a future the pedestrian link between the two sites is an option via a pedestrian crossing/refuge over Werombi Road at the Smalls Road roundabout, with a view to replacing the roundabout with traffic signals in the longer term subject to warrants and RMS concurrence.

## 4.0 THE EXISTING SITUATION

### 4.1 Access Roads

Werombi Road is an undivided two lane semi rural road speed zoned to 60km/h and having a 6.5m – 7.0 metre sealed pavement and includes 1-2 metre gravel shoulders. The existing alignments approaching Smalls Road are curved and undulating with moderate to good sight lines.

Smalls Road is also a two lane undivided semi rural road speed zoned to 60km/hr and having a sealed pavement 6.3m to 6.5 metre and 0.5 to 1.0 metre gavel shoulders. The existing alignment west of Werombi Road are generally level and straight.

### 4.2 Existing Intersection

The existing 4 way intersection of Werombi Road, Smalls Road and “Carrington Village” access is conditioned by a one lane roundabout (10 metre annulus).

### 4.3 Existing Traffic Volumes

#### 4.3.1 Average Daily Traffic

Existing average Monday – Friday daily traffic volumes on Werombi Road and Smalls Road adjacent to the site are:

- Werombi Road NB 2,300veh/day + SB 3,700veh/day 2 way 6,000veh/day
- Smalls Road EB 600veh/day + WB 450veh/day 2 way 1,050veh/day

#### 4.3.2 Peak Hour Volumes

Recent AM and PM peak and Saturday peak hour traffic counts undertaken for the assessment are attached in **Appendix 2** and summarised as follows:

**TABLE 4.1**

**PEAK HOURLY VOLUMES – MARCH 2020**

Mon – Fri Time	Werombi Road			Smalls Road		
	Northbound veh/hr	Southbound veh/hr	2 way veh/hr	Eastbound veh/hr	Westbound veh/hr	2 way veh/hr
7.00-8.00am	162	191	<b>353</b>	85	32	<b>117</b>
8.00-9.00am	181	298	<b>479</b>	74	25	<b>99</b>
4.00-5.00pm	269	249	<b>578</b>	43	65	<b>108</b>
5.00-6.00pm	269	187	<b>456</b>	38	82	<b>120</b>

In summary, two way peak hour volumes on Werombi Road are in the order of 450 to 520 vehicles per hour and 100 to 120 vehicles per hour on Smalls Road.

#### 4.4 Existing Service Levels

To assess the existing operation of the Werombi Road and Smalls Road roundabout intersections during peak hours, a SIDRA analysis has been undertaken using the existing geometry for the intersections and the peak hour volumes shown in **Appendix 2** above.

SIDRA is an RMS approved traffic simulation model and assesses the operational performance of intersections under traffic signal, roundabout or sign control. Criteria for interpreting Level of Service (LOS) modelling results are reproduced below Table 4.2.

For intersections controlled by Give Way or Stop signs, satisfactory intersection performance is achieved where no individual movement (highest movement delay) through the intersection experiences a delay greater than 40 secs.

The results of the modelling are shown below with output data attached as Appendix 3, and reveal that the existing Tee intersection currently operates at a satisfactory Level of Service (LOS) 'A' operation with acceptable average vehicle delays.

**TABLE 4.2**

**EXISTING PEAK HOUR SIDRA ANALYSIS FOR  
WEROMBI ROAD AND SMALLS ROAD INTERSECTION – YEAR 2020  
(ROUNDBOUT CONTROL)**

		AM Peak				PM Peak			
		DS	LOS	AVD	95% back of Vehicles	DS	LOS	AVD	95% back of Vehicles
1	L	0.021	A	3.8	0.1	0.061	A	3.8	0.3
2	T	0.116	A	3.5	0.6	0.143	A	3.5	0.7
3	R	0.116	A	7.0	0.6	0.143	A	7.0	0.7
Approach		0.116	A	4.2	0.6	0.143	A	3.7	0.7
4	L	0.027	A	3.9	0.1	0.040	A	3.5	0.2
5	T	0.027	A	3.5	0.1	0.040	A	3.2	0.2
6	R	0.027	A	6.9	0.1	0.040	A	6.6	0.2
Approach		0.027	A	4.3	0.1	0.040	A	3.7	0.2
7	L	0.039	A	4.7	0.2	0.030	A	4.2	0.1
8	T	0.166	A	3.9	0.8	0.127	A	3.6	0.6
9	R	0.166	A	7.8	0.8	0.127	A	7.1	0.6
Approach		0.166	A	4.1	0.8	0.127	A	3.7	0.6
10	L	0.008	A	5.3	0.0	0.012	A	6.2	0.1
11	T	0.062	A	4.2	0.3	0.034	A	4.4	0.2
12	R	0.062	A	7.7	0.3	0.034	A	7.9	0.2
Approach		0.062	A	7.3	0.3	0.034	A	7.2	0.2
<b>All Vehicles</b>		<b>0.166</b>	<b>A</b>	<b>4.6</b>	<b>0.8</b>	<b>0.143</b>	<b>A</b>	<b>4.0</b>	<b>0.7</b>

Where:

- LS           Level of Service
- DS           Degree of Saturation
- AVD         Average Vehicle Delay in seconds
- 95%         95% back of queuing vehicles

LOS	Roundabouts	Highest Movement Delay (in seconds)
A	Good	0-14
B	Acceptable delays and spare capacity	15-28
C	Satisfactory but accident study required	29-42
D	Near capacity and accident study required	43-56
E	At capacity and requires other Control Delays Mode	57-70
F	Unsatisfactory and requires other Control Mode	>70

The above Table 4.2 SIDRA output summary indicates the existing intersection operates at a very good LOS A with minimal vehicle delays.

The SIDRA output data is included as **Appendix 3**.

#### 4.5 Road Safety

A review of Police records for the above intersection did not reveal any recorded accidents at the site in the last three years to mid 2019. The intersection approach and exit sight lines satisfy Austroad and RTA standards for intersections and stopping sight distances within a 60km/h zone. Accordingly, it is our view that there are no current sight distance constraints or road safety issues with the existing intersection.

Existing sight lines at the proposed Smalls Road (and Werombi Road) access locations satisfy the minimum Austroad requirements SISD for 60km/h speed environments.

#### 4.6 Public Transport

Werombi Road and adjoining Smalls Road are both access corridors linking to Camden and the broader Macarthur road system. Bus connections are available along Werombi Road providing access to Camden and Narellan town centres.

As part of the future site operations it is expected that a privately operated Carrington Care bus would also convey aged residents to and from Camden and Narellan and CBD destinations for banking, medical, shopping and similar journeys on a daily basis.

## 5.0 TRAFFIC GENERATION AND IMPLICATIONS

### 5.1 Trip Generation

Trip generation for the proposal has been determined in order to assess the likely impact of the development on road safety and network efficiency. The proposal's trip generation rate can also be utilised to assess the impact on the adjoining intersections.

The Roads and Traffic Authority's (RMS) Guide to Traffic Generating Developments (2002 Ver 2.2) provides the following trip generation rates for aged, disabled person and medium density residential developments:

#### **Housing for seniors – (82 villas)**

Surveys conducted in 2009 for the RMS, within the Sydney urban area and regional NSW derived through the following trip generation rates:

- Weekday vehicle trips = 2.1 per dwelling; and
- Weekday peak hour trips = 0.4 per dwelling.

Calculation:  $82 \times 2.1 = 172$  trips daily; and

$82 \times 0.4 = 33$  peak hour trips

#### **Housing for Aged and Disabled Persons – 259 apartments**

##### **Rates**

- *Daily vehicle trips = 1-2 per dwelling*
- *Evening peak hour vehicle trips = 0.1-0.2 per dwelling*

##### **Factors**

*These figures at the lower end of the above rates are based on research conducted by the Authority. This research concentrates on subsidised developments (often run by religious organisations). Generation rates of resident funded developments are often greater, as indicated at the higher end of the range.*

Calculation:  $259 \times 2 = 518$  trips daily; and

$259 \times 0.2 = 52$  peak hour trips

The primary level of traffic generation is more likely to relate to staff trips at shift changeover times i.e. 7.00-9.00am and 2.30-4.00pm and able bodied resident trips 8.30-9.30am (outbound) and 4.00-5.00pm (inbound).

#### **Child Care Facilities – 90 places**

The RMS's Guide also suggests that Long Day Care Centres have the following traffic generation rates and characteristics during the AM and PM peak periods:

- *0.8 trips/child in the 2 hour AM arrival period between 7.00am – 9.00am;*
- *0.7 trips/child in the 2 hour PM pick up period between 4.00pm – 6.00pm;*
- *Vehicle occupancy of 1.2 children per vehicle.*
- *Mode split by car – 94%*

Adopting the RMS traffic generation rates and assuming that a 60% proportion of trips will occur over the 1 hour in the 8-9am and 5-6pm periods then the peak hour traffic generation of the proposed Long Day Care Centre (90 children) will be:

Calculation

- 22 arrivals and 22 departures in the AM peak hour (i.e. 44 trips); and
- 15 arrivals and 15 departures in the PM peak hour (i.e. 38 trips).

NB: This assumes that no traffic trips relate to staff working on site.

### **Wellness Centre**

Day spa, yoga and physical exercise centre surveys undertaken in the 1990's for the RTA/RMS indicated that car based trips to similar centres had reduced by about 15% since the late 1970's and that trips per 100m<sup>2</sup> GLFA of a centre reduced as the centre size increased for centres over 500m<sup>2</sup>. With a moderate floor area of 926m<sup>2</sup> GFA for the wellness activities, then we would adopt an evening peak hour traffic generation rate of 6.0 trips per 100m<sup>2</sup> GLFA.

This would equate to 56 trips per hour in the evening peak i.e. 28 in + 28 out.

### **Healthcare and Specialist Medical Rooms**

Apart from admin and support staff, up to 10 persons within the healthcare and specialist rooms are likely to offer GP, diagnostic, medical oncology and pharmaceutical services, and whilst up to 8/9 specialists may visit the site on a weekly basis (say once / twice a week) only 4 specialist rooms will be occupied at any one time. Other larger areas of the building will be utilized for exercise and rehabilitation activities.

RTA data is not available for health care and specialist medical rooms 2,000m<sup>2</sup> GFA, but assuming the rooms (up to 4 rooms) are open for appointments 8.00am to 6.00pm Monday to Friday and each appointment duration is 15 minutes, then each specialist room can be expected to turn over up to 5 patients per hour 8.00am to 6.00pm.

With up to four specialist rooms available, this would evaluate to 40 vehicle trips per hour if every patient is a single vehicle self drive trip i.e. 15 arrivals and 15 departures/trips.

### **Café/Coffee Shop/Retail**

The café/coffee shop is for the use of the residents, staff and visitors, but also for the use of the surrounding community. It is intended that this facility and the amenity of the landscaped walkways will encourage those from outside the facility to venture in.

**TABLE 5.1**  
**PROJECTED TRAFFIC GENERATION LEVELS**  
**Vehicle trips per hour**

Use	Time					
	6.30-7.30am	7.30-8.30am	8.30-9.30am	2.00-3.00pm	3.00-4.00pm	4.00-5.00pm
RACF 128 beds	17	26	35	17	26	35
82 Villas	17	26	33	17	26	33
259 ILU Units	20	36	52	20	36	52
Child Care (90 places)*	10	44	20	10	20	38
Wellness Centre °	2	15	15	10	28	28
Health Care	Closed	20	40	40	40	40
Café/Coffee Shop <sup>+</sup>	-	-	-	-	-	-
<b>TOTALS</b>	<b>51 veh/hr</b>	<b>167 veh/hr</b>	<b>181 veh/hr</b>	<b>114 veh/hr</b>	<b>176 veh/hr</b>	<b>226 veh/hr</b>

\*This facility is primarily for residents, staff and resident visitors

The projected AM/PM peak hours are 8.30-9.30am with 181 vehicles per hour and 4.00-5.00pm with 226 vehicles per hour entering or leaving site including staff, service vehicle, and visitor trips.

° Indicates up to 70% of wellness centre and health care trips could be related to residents already within the site.

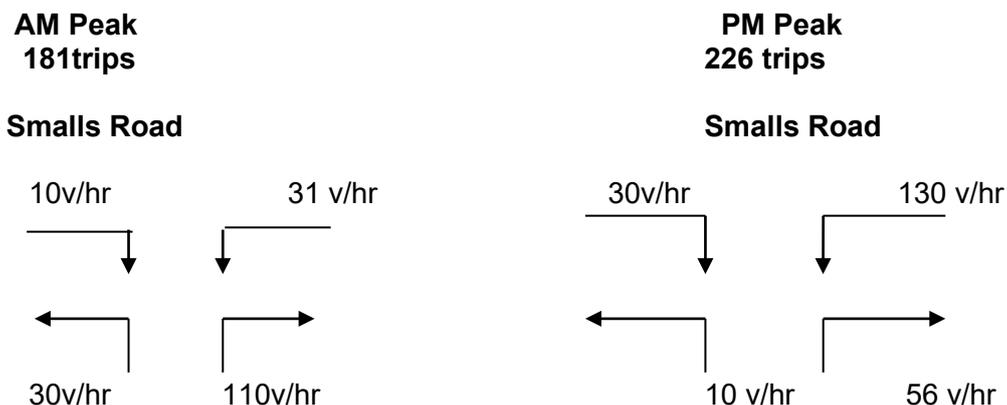
\* Indicates it may be reasonable to expect 50% of the child care related trips to be connected to staff working on site within the complex.

+ Indicates walk trips only.

## 5.2 Post Development Traffic Impacts

### 5.2.1 Trip Assignments

An assignment of projected design (peak) hour traffic movements to/from the site via Smalls Road is shown below.



The post development traffic assignments, (including service vehicles) equates to about 3 vehicle movement every 60 seconds in the AM peak and 3 vehicle movement every 60 seconds in the PM peak (i.e. 226 trips) realising an increase in existing AM and PM traffic generation levels on Smalls Road. But not beyond any capacity or environmental threshold. (see page 5).

**5.2.2 Traffic Impacts**

Two way vehicular access and egress to/from the on site car parking area is proposed from Smalls Road. The additional post development peak traffic flows are expected to be (at a maximum) an additional +181 trips per hour AM and 226 trips per hour PM over existing traffic levels.

Up to three additional vehicle movements (every 60 seconds AM and PM) upon Smalls Road or to/from adjacent Werombi Road intersection is unlikely to compromise existing traffic accessibility or road safety entering or exiting the site at any time. See post DA SIDRA output summary below.

**TABLE 5.2**

**POST DEVELOPMENT PEAK HOUR SIDRA ANALYSIS FOR WEROMBI ROAD AND SMALLS ROAD INTERSECTION – (ROUNDABOUT CONTROL)**

		AM Peak				PM Peak			
		DS	LOS	AVD	95% back of Vehicles	DS	LOS	AVD	95% back of Vehicles
1	L	0.039	A	3.9	0.2	0.114	A	4.0	0.5
2	T	0.121	A	3.6	0.6	0.165	A	3.7	0.8
3	R	0.121	A	7.1	0.6	0.165	A	7.2	0.8
Approach		0.121	A	4.3	0.6	0.165	A	4.0	0.8
4	L	0.027	A	4.1	0.1	0.041	A	3.7	0.2
5	T	0.027	A	3.8	0.1	0.041	A	3.5	0.2
6	R	0.027	A	7.2	0.1	0.041	A	6.9	0.2
Approach		0.027	A	4.6	0.1	0.041	A	3.9	0.2
7	L	0.045	A	5.2	0.2	0.039	A	4.3	0.2
8	T	0.186	A	4.3	0.9	0.164	A	3.8	0.8
9	R	0.186	A	7.9	0.9	0.164	A	7.2	0.8
Approach		0.186	A	4.6	0.9	0.164	A	4.5	0.8
10	L	0.060	A	5.0	0.3	0.025	A	5.6	0.1
11	T	0.117	A	4.3	0.6	0.051	A	4.5	0.2
12	R	0.117	A	7.8	0.6	0.051	A	8.0	0.2
Approach		0.117	A	6.9	0.6	0.051	A	7.2	0.2
<b>All Vehicles</b>		<b>0.186</b>	<b>A</b>	<b>5.1</b>	<b>0.9</b>	<b>0.165</b>	<b>A</b>	<b>4.5</b>	<b>0.8</b>

Where:

- LS Level of Service
- DS Degree of Saturation
- AVD Average Vehicle Delay in seconds
- 95% 95% back of queuing vehicles

In summary, the post DA outputs indicate no change to LoS and small 0.5 second increase to AVD (Average Vehicle Delay) AM and PM.

### 5.3 Service Levels

The impact of the additional, (inbound plus outbound), vehicle movements from Smalls Road or at adjoining intersections commensurate with AM and PM is unlikely to realise any noticeable traffic impact on existing favourable traffic service levels on Smalls Road or at the Werombi Road roundabout access intersections during these times as shown in Table 4.2.

### 5.4 Car Parking and Servicing

#### 5.4.1 Car Parking

On site car parking for residents, staff and visitors is proposed about the site in marked spaces in accord with Council's Car Parking DCP 2019 Part 2, which indicates 283 on site spaces are required to meet the normal weekly 85<sup>th</sup> demand.

However, for the 82, 2 and 3 bedroom villas we have allowed on site garaged car parking for the 2 bedroom villas at 1 space per villa and for the 3 bedroom villas at 2 spaces per villa ie. 132 spaces + 1 visitor spaces per 5 villas ie. 17 spaces giving a total of 151 spaces. In addition, the 128 bed RACF and 24 bed dementia cottage required 15 spaces, employees, 25 spaces, childcare 22.5 spaces and admin and visitors at 30 spaces as follows:

**TABLE 5.3**

#### PROPOSED ON SITE CAR PARKING

Component	Single and Double Garages	On Grade and Basement	Total
82 Villas	132	-	132
Residential Visitors	-	17	17
128 Bed RACF + 24 Bed Dementia Cottage	-	15	15
On Site Staff and Employees	-	25	25
120 Standard Units	-	60	60
60 Assisted Units	-	51	51
79 Premium Units	-	79	79
Child Care Centre	-	22.5	22.5
Admin and Health Care Visitors	-	30	30
<b>TOTAL CAR SPACES</b>	<b>132</b>	<b>219</b>	<b>351</b>

Accordingly, we would contend the peak normal weekly parking demands to be around 351 parking spaces.

A total of **420** on site car parking spaces, displaced about the site is envisaged in the proposed masterplan. These 420 spaces are above our projected peak 85<sup>th</sup> demand of 351 spaces and are to satisfy those infrequent special occasions, i.e. open days and community events, 2-3 per year when parking demand may exceed 351 spaces.

It is our view that for developments requiring 3 or more off-street parking spaces, parking areas should be designed to enable all vehicles to enter and leave a site in a forward direction with sufficient room provided so as to require only one reversing movement to enter or leave a parking space. These objectives in our view will be achieved with this proposal.

### 5.4.2 Servicing and Manoeuvring

Service vehicle traffic generated by the proposed development is to be confined to business hours. It is intended that only medium rigid, service and courier vehicles will access this site. A review of the road network serving the site and the traffic conditions on that road network indicates that all truck traffic generated by the proposed development will approach/depart the site via Smalls Road, from Werombi Road.

Truck manoeuvring areas to access service areas and the like should be adequate in width. This width should allow all MRV vehicles (to 8.8 metres), to drive into manoeuvring aiseways and reverse into the loading dock areas provided and depart the site in a forward direction to Smalls Road as required.

No loading or unloading should occur within the on-site access driveway nor the entrance to the site. Operations within the property regarding loading and unloading and waiting to unload will be no different from similar strata residential unit developments. All loading and/or unloading will occur within the site. There is no possibility of queuing occurring at Smalls Road due to loading and unloading operations or the location of loading areas.

In business hours (9.00am – 5.00pm) traffic arrivals and departures, up to 8 vehicles per day, can generally be expected at 20% westbound and 80% eastbound to/from Smalls Road.

In the longer term, negotiations with public bus operators may see route bus service extended into the site, providing route services to Camden, Narellan and beyond.

## 6.0 CONCLUSIONS

This report primarily examines the traffic access and parking impacts of a Masterplan proposal to provide residential independent living and aged care facilities on a land parcel located on the south west corner of Werombi Road and Smalls Road at Grasmere. The use is permissible with the consent of Camden Council.

The development proposal envisages 259 independent living units, 82 villa apartment units, 128 bed aged care facilities and 24 bed dementia cottage. The proposal also includes a 90 place child care facility, administration centre (including specialist medical consulting rooms) small shop group and ancillary cafe for residents, staff and visitors.

Car parking for 420 cars on site for residents, staff and visitors is proposed. Our table 5.3 on page 15 indicates up to 351 spaces are required to meet normal weekly demands. The additional spaces proposed are to accommodate any infrequent and unexpected car parking events that may occur so that no overflow parking onto Smalls Road occurs.

The village hub of the development is located along the Werombi Road, Smalls Road frontage is in the west of the existing roundabout. It would have a street presence suitable to its function and location in this semi rural setting and be seen in relation to other existing aged care related facilities to the north of the site along Werombi Road.

The village hub is the focal centre for the proposed retirement community with the proposed health care and community uses creating a more active public realm. It would also service the surrounding communities fostering social interaction between the proposed aged car community and the surrounding residential community helping to integrate the different communities. The range of public uses and circulation patterns encourage passive surveillance.

An assessment of the proposal based on RMS 2002 Guidelines and similar use surveys indicates that there will be a maximum (indicative) traffic generation level of up to 181 vehicle trips per hour during the morning peak hours and 226 vehicle trips per hour in the afternoon peak hour, i.e. about three additional vehicles every 60 seconds in peak times on Smalls Road to Werombi Road.

A very low level of pedestrian activity between the existing Carrington sites and across Werombi Road can be expected, in this regard a future marked foot crossing and/or pedestrian refuge (depending on actual demand and warrants) is an option but not proposed over Werombi Road at this time. In the longer term and subject to negotiation between RMS, Council and the applicant the Smalls Road roundabout may be replaced with traffic control signals, again depending on safety assessments and future warrants.

The existing traffic conditions on the adjoining Werombi Road and Smalls Road network surrounding the site are acceptable with a Level of Service A operation in Monday – Friday peak hours and based on our traffic assessments and post DA SIDRA modelling will remain at these acceptable service levels post development.

The access to and from the site is proposed from a two way 12.0 metre wide divided entry/exit roadway on Smalls Road some 67 metres west of Werombi Road.

The sight distances at the access location is good and meets Austroad requirements for the 60km/h operating speed limits within the precinct and on the adjoining access roads.

The proposal in terms of on site car parking and vehicle manoeuvring provisions is proposed in accordance with AS 2890.1.

Importantly, these peak volumes indicate a worst case scenario when in reality these volumes represent a lot of double counting, for example trips to/from the child care centre may also be staff trips to/from work and trips to/from the health and wellness centres are likely to be mostly internal site trips.

In concluding the proposal is a 7 day use and moderate traffic generating development overlapping into shoulder peaks and in off peak times and will result in minimal traffic and or pedestrian impacts on the adjacent Smalls or Werombi Road, road network. The proposal will have adequate car parking available in the proposed on site car park areas and the internal low volume vehicle circulation and manoeuvring for the 85<sup>th</sup> design vehicle is considered to be satisfactory.

The impact of increased traffic and car parking demands as a result of the proposal on the adjoining area or road system during overlapping peak hours is minimal and within the available capacity of the site and access road network.

It is **recommended** that Camden Council approve this application so that the proposed seniors living and aged care facilities can proceed.

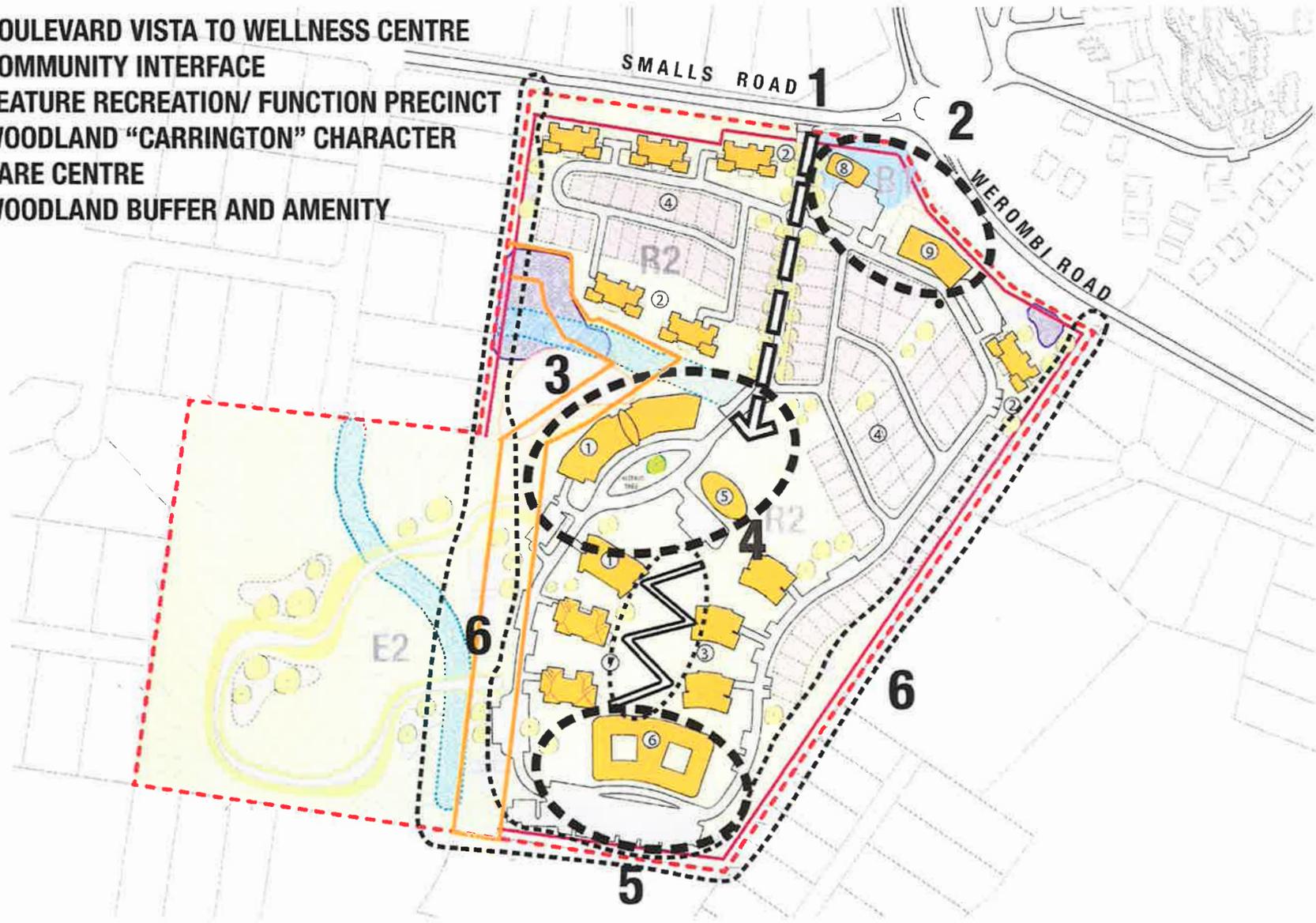
# APPENDIX 1

## CARRINGTON SMALLS ROAD - CONCEPT MASTERPLAN



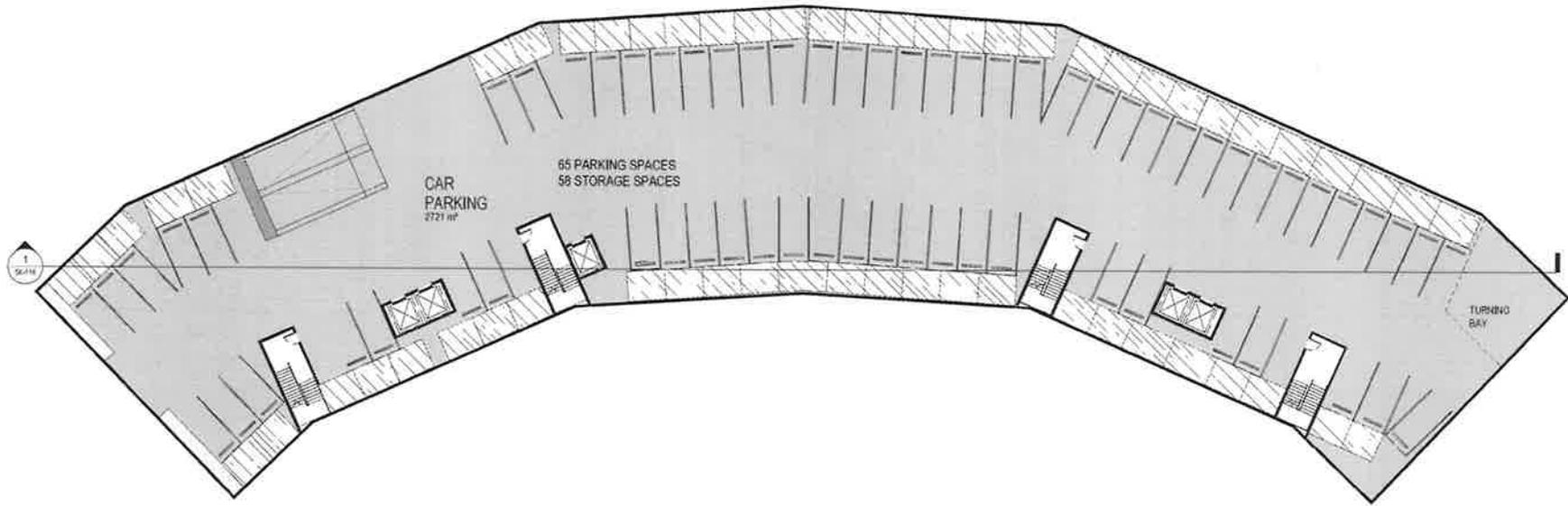
## KEY DESIGN PRINCIPLES

1. BOULEVARD VISTA TO WELLNESS CENTRE
2. COMMUNITY INTERFACE
3. FEATURE RECREATION/ FUNCTION PRECINCT
4. WOODLAND "CARRINGTON" CHARACTER
5. CARE CENTRE
6. WOODLAND BUFFER AND AMENITY

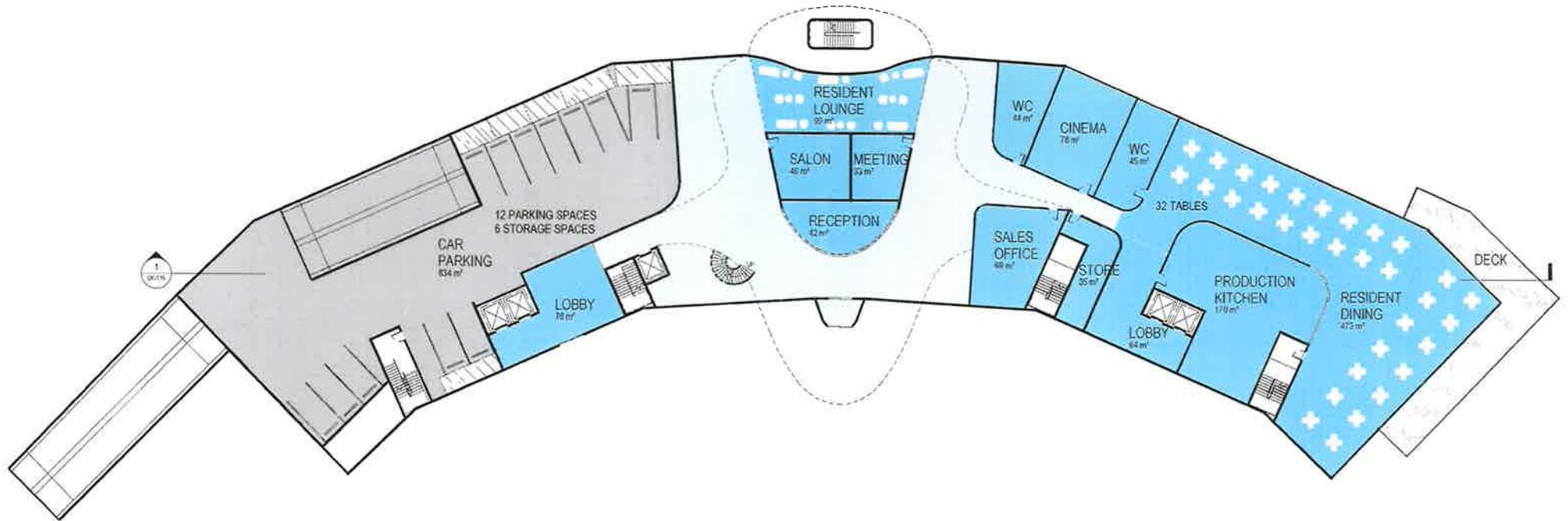


SITE AREAS				
	Footprint	Parking	Yield	Comments
RACF	4,508	1,380	128 Beds	
Premium ILUs	2,984	3,840	56 Units	
Assisted Living	1,625	960	63 Units	( 3 x 21 Apartments)
Wellness Centre	828			Option 02: 891m <sup>2</sup>
Standard ILUs	4,212	15,876	120 Units	( 6 x 20 Apartments)
Health Centre	524	1,152		
Childcare	795	605	70 Children	90 children : 863m <sup>2</sup>
<b>Total</b>	<b>15,475</b>	<b>23,813</b>		
Landscape Allowance to R2 (ex Villa's)	39,288			Allows Site Coverage of 50%. 50% building footprint and hard surface to 50% landscape.
Main Loop Road Area	9500			
R2 Available Site Area	146,000			Excludes Riparian Zone
<b>Area available for villas</b>	<b>57,924</b>			
Density m <sup>2</sup> /villa	1100			Denser than Mayfarm, but similar FSR as Mayfarm @ 1100m <sup>2</sup> .
<b>Number of Villas</b>	<b>80</b>		87 Villas	<b>Actual Villas achieved 87 (1006m<sup>2</sup>/Villa)</b>
VILLAS				
Room	Area	Quantity	Total Area m <sup>2</sup>	Comment
2 Bed Villa	130	43	5,590	Numbers TBC
3 Bed Villa	146	44	6,424	Note: Mayfarm 3 bed 160-170m <sup>2</sup> + Garage - Numbers TBC
Garage	20	131	2,620	Numbers TBC. (assume single garage for 2 bed double garage for 3 bed)
<b>TOTAL FLOOR AREA (incl Garage)</b>			<b>14,634</b>	<b>Note:</b> 87 Villas assumes remaining available site of 87600m <sup>2</sup> used for villas, at a density of 1006m <sup>2</sup> /villa. Denser then Mayfarm which is 1200m <sup>2</sup> /villa.

# RECREATION CENTRE BASEMENT



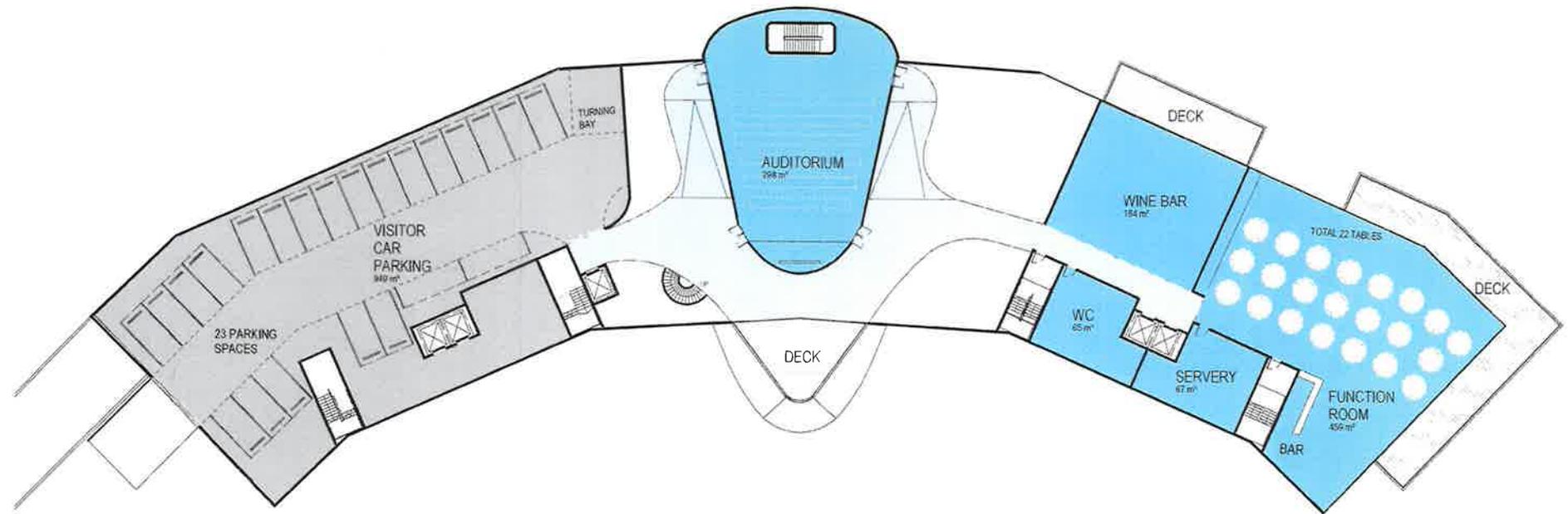
# RECREATION CENTRE GROUND FLOOR



SMALLS ROAD

# RECREATION CENTRE

## MEZZANINE LEVEL



APPENDIX 2



**R.O.A.R. DATA**  
 Reliable, Original & Authentic Results  
 Ph.88196847, Mob. 0418 239019

Client : TUPA  
 Job No/Name : 7361 CAMDEN Smalls Rd  
 Day/Date : Wednesday 18th March 2020

Lights	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	L	T	R	L	T	R	L	T	R	L	T	R	
Time Per	0	32	2	1	2	15	4	26	14	2	1	0	99
0700 - 0715	0	32	2	1	2	15	4	26	14	2	1	0	99
0715 - 0730	2	36	3	5	2	17	6	28	10	3	0	0	112
0730 - 0745	2	44	2	7	0	20	7	34	8	4	0	0	128
0745 - 0800	4	34	1	1	2	13	6	27	21	2	0	1	112
0800 - 0815	2	53	1	0	1	11	4	26	13	6	0	0	117
0815 - 0830	1	52	0	3	0	22	4	27	9	7	0	2	127
0830 - 0845	2	58	2	1	1	10	6	33	6	3	0	0	122
0845 - 0900	0	49	2	1	4	20	3	36	8	4	1	2	130
Period End	13	358	13	19	12	128	40	237	89	31	2	5	947

Lights	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	L	T	R	L	T	R	L	T	R	L	T	R	
Peak Time	8	146	8	14	6	65	23	115	53	11	1	1	451
0700 - 0800	8	146	8	14	6	65	23	115	53	11	1	1	451
0715 - 0815	10	167	7	13	5	61	23	115	52	15	0	1	469
0730 - 0830	9	183	4	11	3	66	21	114	51	19	0	3	484
0745 - 0845	9	197	4	5	4	56	20	113	49	18	0	3	478
0800 - 0900	5	212	5	5	6	63	17	122	36	20	1	4	496
PEAK HOUR	5	212	5	5	6	63	17	122	36	20	1	4	496

Combined	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	L	T	R	L	T	R	L	T	R	L	T	R	
Time Per	0	32	2	1	2	15	4	28	14	2	1	0	101
0700 - 0715	0	32	2	1	2	15	4	28	14	2	1	0	101
0715 - 0730	2	38	3	6	2	17	7	29	10	3	0	0	117
0730 - 0745	2	44	3	7	0	20	7	35	8	4	0	0	130
0745 - 0800	4	35	1	1	2	13	6	27	21	2	0	1	113
0800 - 0815	2	54	1	0	1	11	4	26	13	6	0	0	118
0815 - 0830	1	52	2	3	0	22	4	28	9	7	0	2	130
0830 - 0845	2	59	2	1	1	10	6	34	6	3	0	0	124
0845 - 0900	0	50	2	1	4	20	3	40	8	4	1	2	135
Period End	13	364	16	20	12	128	41	247	89	31	2	5	968

Combined	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	L	T	R	L	T	R	L	T	R	L	T	R	
Peak Time	8	149	9	15	6	65	24	119	53	11	1	1	461
0700 - 0800	8	149	9	15	6	65	24	119	53	11	1	1	461
0715 - 0815	10	171	8	14	5	61	24	117	52	15	0	1	478
0730 - 0830	9	185	7	11	3	66	21	116	51	19	0	3	491
0745 - 0845	9	200	6	5	4	56	20	115	49	18	0	3	485
0800 - 0900	5	215	7	5	6	63	17	128	36	20	1	4	507
PEAK HOUR	5	215	7	5	6	63	17	128	36	20	1	4	507

Heavies	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	L	T	R	L	T	R	L	T	R	L	T	R	
Time Per	0	0	0	0	0	0	0	2	0	0	0	0	2
0700 - 0715	0	0	0	0	0	0	0	2	0	0	0	0	2
0715 - 0730	0	2	0	1	0	0	1	1	0	0	0	0	5
0730 - 0745	0	0	1	0	0	0	0	1	0	0	0	0	2
0745 - 0800	0	1	0	0	0	0	0	0	0	0	0	0	1
0800 - 0815	0	1	0	0	0	0	0	0	0	0	0	0	1
0815 - 0830	0	0	2	0	0	0	0	1	0	0	0	0	3
0830 - 0845	0	1	0	0	0	0	0	1	0	0	0	0	2
0845 - 0900	0	1	0	0	0	0	0	4	0	0	0	0	5
Period End	0	6	3	1	0	0	1	10	0	0	0	0	21

Heavies	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	L	T	R	L	T	R	L	T	R	L	T	R	
Peak Time	0	3	1	1	0	0	1	4	0	0	0	0	10
0700 - 0800	0	3	1	1	0	0	1	4	0	0	0	0	10
0715 - 0815	0	4	1	1	0	0	1	2	0	0	0	0	9
0730 - 0830	0	2	3	0	0	0	0	2	0	0	0	0	7
0745 - 0845	0	3	2	0	0	0	0	2	0	0	0	0	7
0800 - 0900	0	3	2	0	0	0	0	6	0	0	0	0	11
PEAK HOUR	0	3	2	0	0	0	0	6	0	0	0	0	11

Peds	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			
Time Per	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			TOT
0700 - 0715	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			0
0715 - 0730	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			0
0730 - 0745	Not Required			Not Required			Not Required			Not Required			0
0745 - 0800	Not Required			Not Required			Not Required			Not Required			0
0800 - 0815	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			0
0815 - 0830	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			0
0830 - 0845	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			0
0845 - 0900	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			0
Period End	0			0			0			0			0

Peds	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			
Peak Per	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			TOT
0700 - 0800	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			0
0715 - 0815	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			0
0730 - 0830	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			0
0745 - 0845	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			0
0800 - 0900	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			0
PEAK HR	0			0			0			0			0



# R.O.A.R DATA

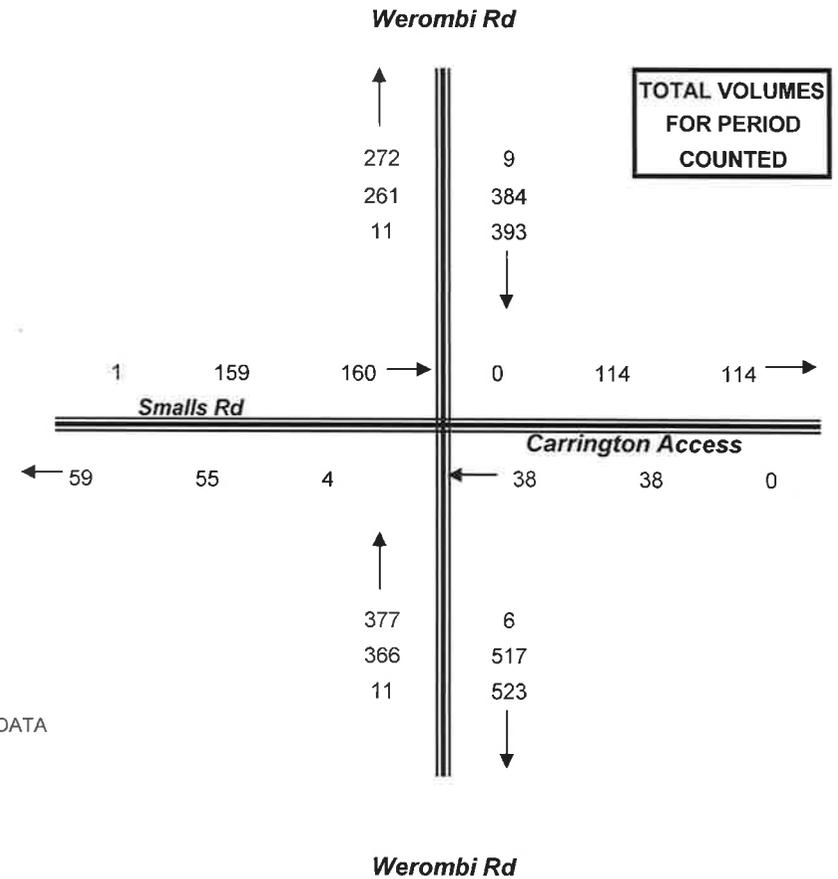
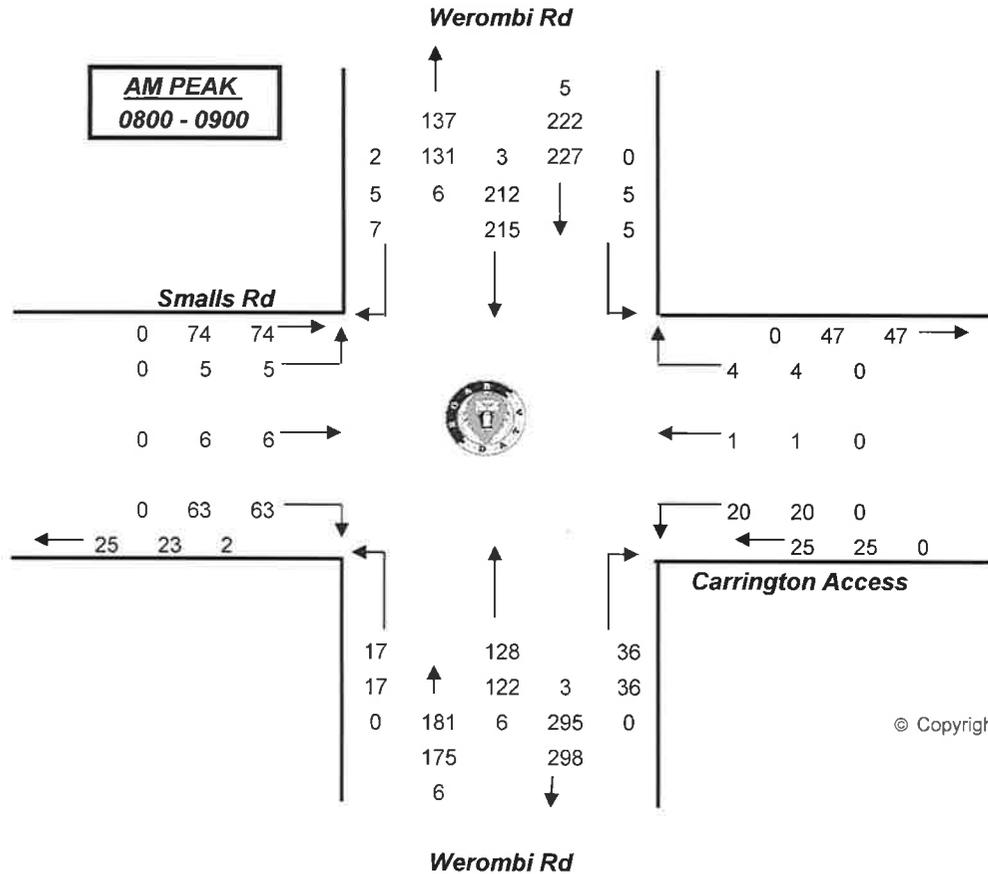
Reliable, Original & Authentic Results

Ph.88196847, Mob. 0418 239019

Client : TUPA

Job No/Name : 7361 CAMDEN Smalls Rd

Day/Date : Wednesday 18th March 2020



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# R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Mob. 0418 239019

Client : TUPA  
Job No/Name : 7361 CAMDEN Smalls Rd  
Day/Date : Wednesday 18th March 2020

Time Per	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	L	I	R	L	I	R	L	I	R	L	I	R	
1600 - 1615	1	60	0	0	0	8	12	55	5	15	1	1	158
1615 - 1630	0	51	1	4	4	11	10	58	2	12	0	2	155
1630 - 1645	0	36	1	1	0	6	19	33	3	4	2	0	105
1645 - 1700	0	31	0	1	1	6	17	43	2	3	1	0	105
1700 - 1715	0	33	2	1	0	10	19	46	1	9	0	0	121
1715 - 1730	0	26	3	1	0	10	18	39	5	3	0	3	108
1730 - 1745	0	54	4	0	0	11	16	29	4	1	1	0	120
1745 - 1800	1	30	1	2	0	3	17	36	1	2	0	1	94
Period End	2	321	12	10	5	65	128	339	23	49	5	7	966

Peak Time	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	L	I	R	L	I	R	L	I	R	L	I	R	
1600 - 1700	1	178	2	6	5	31	58	189	12	34	4	3	523
1615 - 1715	0	151	4	7	5	33	65	180	8	28	3	2	486
1630 - 1730	0	126	6	4	1	32	73	161	11	19	3	3	439
1645 - 1745	0	144	9	3	1	37	70	157	12	16	2	3	454
1700 - 1800	1	143	10	4	0	34	70	150	11	15	1	4	443
PEAK HOUR	1	178	2	6	5	31	58	189	12	34	4	3	523

Time Per	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	L	I	R	L	I	R	L	I	R	L	I	R	
1600 - 1615	1	62	0	1	0	8	12	57	5	15	1	1	163
1615 - 1630	0	52	1	4	4	11	10	59	2	12	0	2	157
1630 - 1645	0	38	1	1	0	6	19	36	3	4	2	0	110
1645 - 1700	0	32	0	1	1	6	18	46	2	3	1	0	110
1700 - 1715	0	34	3	1	0	10	19	47	1	9	0	0	124
1715 - 1730	0	26	3	1	0	10	18	39	5	3	0	3	108
1730 - 1745	0	55	4	0	0	11	16	30	4	1	1	0	122
1745 - 1800	1	30	1	2	0	3	17	37	1	2	0	1	95
Period End	2	329	13	11	5	65	129	351	23	49	5	7	989

Peak Time	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	L	I	R	L	I	R	L	I	R	L	I	R	
1600 - 1700	1	184	2	7	5	31	59	198	12	34	4	3	540
1615 - 1715	0	156	5	7	5	33	66	188	8	28	3	2	501
1630 - 1730	0	130	7	4	1	32	74	168	11	19	3	3	452
1645 - 1745	0	147	10	3	1	37	71	162	12	16	2	3	464
1700 - 1800	1	145	11	4	0	34	70	153	11	15	1	4	449
PEAK HOUR	1	184	2	7	5	31	59	198	12	34	4	3	540

Time Per	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	L	I	R	L	I	R	L	I	R	L	I	R	
1600 - 1615	0	2	0	1	0	0	0	2	0	0	0	0	5
1615 - 1630	0	1	0	0	0	0	0	1	0	0	0	0	2
1630 - 1645	0	2	0	0	0	0	0	3	0	0	0	0	5
1645 - 1700	0	1	0	0	0	0	1	3	0	0	0	0	5
1700 - 1715	0	1	1	0	0	0	0	1	0	0	0	0	3
1715 - 1730	0	0	0	0	0	0	0	0	0	0	0	0	0
1730 - 1745	0	1	0	0	0	0	0	1	0	0	0	0	2
1745 - 1800	0	0	0	0	0	0	0	1	0	0	0	0	1
Period End	0	8	1	1	0	0	1	12	0	0	0	0	23

Peak Time	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	L	I	R	L	I	R	L	I	R	L	I	R	
1600 - 1700	0	6	0	1	0	0	1	9	0	0	0	0	17
1615 - 1715	0	5	1	0	0	0	1	8	0	0	0	0	15
1630 - 1730	0	4	1	0	0	0	1	7	0	0	0	0	13
1645 - 1745	0	3	1	0	0	0	1	5	0	0	0	0	10
1700 - 1800	0	2	1	0	0	0	0	3	0	0	0	0	6
PEAK HOUR	0	6	0	1	0	0	1	9	0	0	0	0	17

Time Per	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			
1600 - 1615													0
1615 - 1630													0
1630 - 1645	<i>Not Required</i>			0									
1645 - 1700	<i>Required</i>			<i>Required</i>			<i>Required</i>			<i>Required</i>			0
1700 - 1715													0
1715 - 1730													0
1730 - 1745													0
1745 - 1800													0
Period End	0			0			0			0			0

Peak Per	NORTH			WEST			SOUTH			EAST			TOT
	Werombi Rd			Smalls Rd			Werombi Rd			Carrington Access			
	UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			UNCLASSIFIED			
1600 - 1700	0			0			0			0			0
1615 - 1715	0			0			0			0			0
1630 - 1730	0			0			0			0			0
1645 - 1745	0			0			0			0			0
1700 - 1800	0			0			0			0			0
PEAK HR	0			0			0			0			0



# R.O.A.R DATA

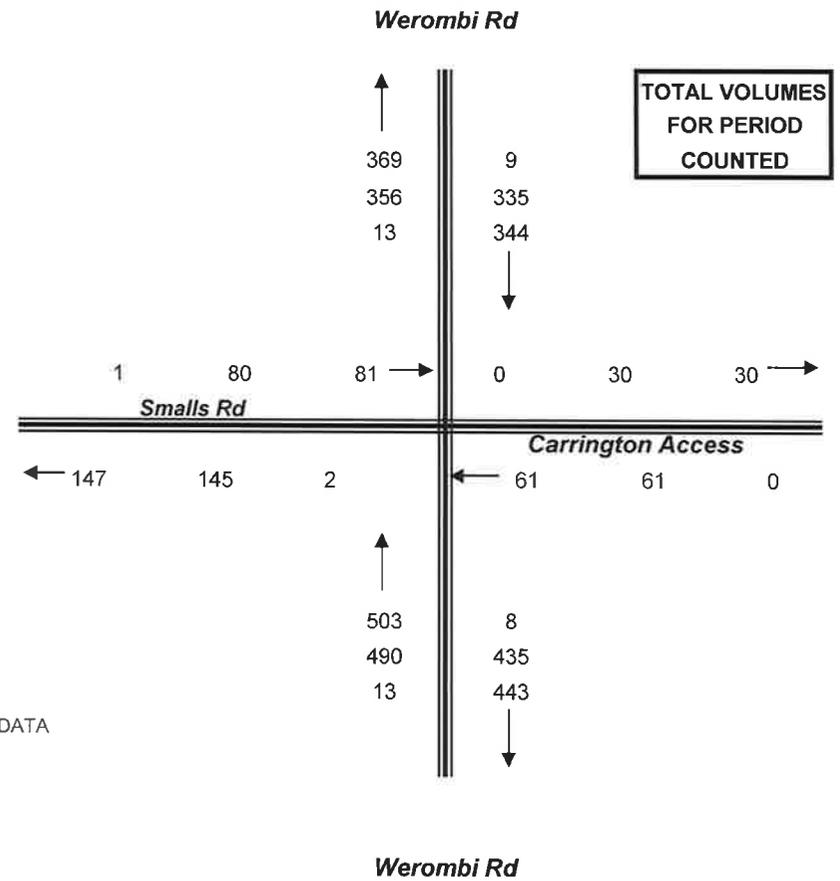
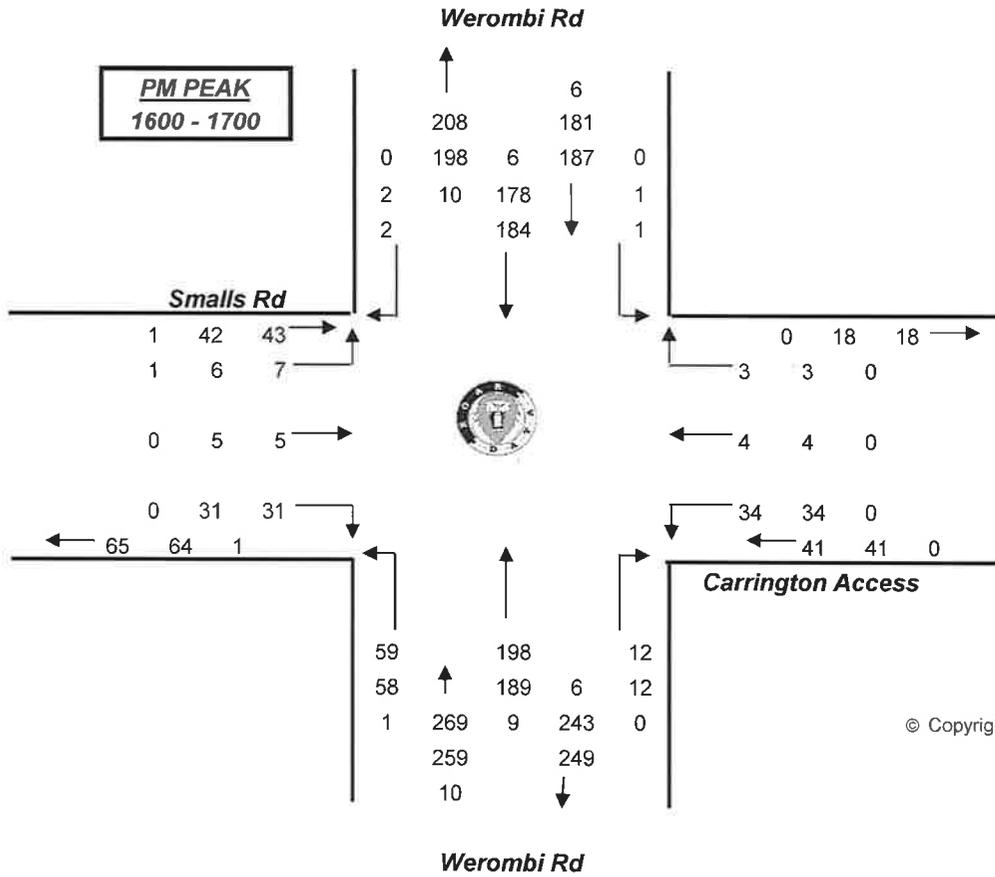
Reliable, Original & Authentic Results

Ph.88196847, Mob. 0418 239019

Client : TUPA

Job No/Name : 7361 CAMDEN Smalls Rd

Day/Date : Wednesday 18th March 2020



## MOVEMENT SUMMARY

 Site: 1 [New Site - 1]

WEROMBI & SMALLS ROADS

am peak 2020  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %								
<b>South: werombi rd</b>											
1	L2	18	0.0	0.021	3.8	LOS A	0.1	0.6	0.09	0.47	46.8
2	T1	135	4.7	0.116	3.5	LOS A	0.6	4.0	0.08	0.45	50.6
3	R2	38	0.0	0.116	7.0	LOS A	0.6	4.0	0.08	0.45	43.2
Approach		191	3.3	0.116	4.2	LOS A	0.6	4.0	0.08	0.45	48.6
<b>East: carrington village</b>											
4	L2	21	0.0	0.027	3.9	LOS A	0.1	0.9	0.43	0.49	41.7
5	T1	2	0.0	0.027	3.5	LOS A	0.1	0.9	0.43	0.49	42.4
6	R2	4	0.0	0.027	6.9	LOS A	0.1	0.9	0.43	0.49	42.3
Approach		27	0.0	0.027	4.3	LOS A	0.1	0.9	0.43	0.49	41.8
<b>North: werombi rd</b>											
7	L2	5	0.0	0.039	4.7	LOS A	0.2	1.1	0.28	0.44	46.3
8	T1	226	1.4	0.166	3.9	LOS A	0.8	5.6	0.26	0.43	47.3
9	R2	7	28.6	0.166	7.8	LOS A	0.8	5.6	0.25	0.43	46.8
Approach		239	2.2	0.166	4.1	LOS A	0.8	5.6	0.26	0.43	47.2
<b>West: smalls rd</b>											
10	L2	5	0.0	0.008	5.3	LOS A	0.0	0.2	0.38	0.50	46.1
11	T1	6	0.0	0.062	4.2	LOS A	0.3	2.0	0.32	0.60	45.6
12	R2	66	0.0	0.062	7.7	LOS A	0.3	2.0	0.32	0.60	45.4
Approach		78	0.0	0.062	7.3	LOS A	0.3	2.0	0.33	0.59	45.5
All Vehicles		535	2.2	0.166	4.6	LOS A	0.8	5.6	0.21	0.46	47.1

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 LEVEL OF SERVICE

## Lane Level of Service

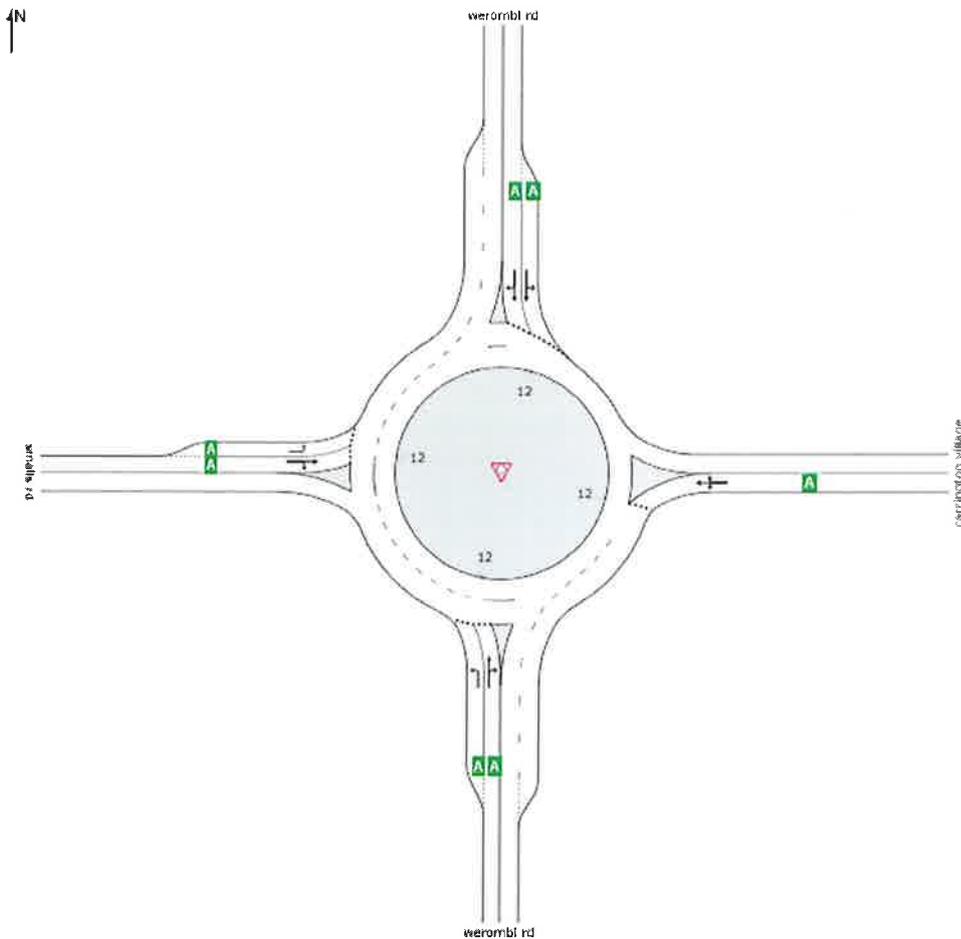
 Site: 1 [New Site - 1]

WEROMBI & SMALLS ROADS

am peak 2020  
Roundabout

### All Movement Classes

	South	East	North	West	Intersection
LOS	A	A	A	A	A



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.

# MOVEMENT SUMMARY

 Site: 1 [New Site - 1]

WEROMBI & SMALLS ROADS

pm peak 2020  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
<b>South: werombi rd</b>											
1	L2	62	1.7	0.061	3.8	LOS A	0.3	2.0	0.07	0.48	46.8
2	T1	208	4.5	0.143	3.5	LOS A	0.7	5.3	0.06	0.40	51.1
3	R2	13	0.0	0.143	7.0	LOS A	0.7	5.3	0.06	0.40	43.5
Approach		283	3.7	0.143	3.7	LOS A	0.7	5.3	0.06	0.42	49.7
<b>East: carrington village</b>											
4	L2	36	0.0	0.040	3.5	LOS A	0.2	1.3	0.38	0.46	41.9
5	T1	4	0.0	0.040	3.2	LOS A	0.2	1.3	0.38	0.46	42.6
6	R2	3	0.0	0.040	6.6	LOS A	0.2	1.3	0.38	0.46	42.5
Approach		43	0.0	0.040	3.7	LOS A	0.2	1.3	0.38	0.46	42.0
<b>North: werombi rd</b>											
7	L2	1	0.0	0.030	4.2	LOS A	0.1	0.9	0.19	0.40	46.6
8	T1	194	3.3	0.127	3.6	LOS A	0.6	4.3	0.16	0.40	47.6
9	R2	2	0.0	0.127	7.1	LOS A	0.6	4.3	0.16	0.40	47.5
Approach		197	3.2	0.127	3.7	LOS A	0.6	4.3	0.16	0.40	47.6
<b>West: smalls rd</b>											
10	L2	7	14.3	0.012	6.2	LOS A	0.1	0.4	0.43	0.54	45.4
11	T1	5	0.0	0.034	4.4	LOS A	0.2	1.1	0.36	0.59	45.6
12	R2	33	0.0	0.034	7.9	LOS A	0.2	1.1	0.36	0.59	45.5
Approach		45	2.3	0.034	7.2	LOS A	0.2	1.1	0.37	0.58	45.5
All Vehicles		568	3.1	0.143	4.0	LOS A	0.7	5.3	0.15	0.43	47.9

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.

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.

# MOVEMENT SUMMARY

 Site: 1 [New Site - 1]

WEROMBI & SMALLS ROADS

am peak 2020 post DA  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
South: werombi rd											
1	L2	34	0.0	0.039	3.9	LOS A	0.2	1.2	0.13	0.47	46.7
2	T1	135	4.7	0.121	3.6	LOS A	0.6	4.3	0.11	0.44	50.5
3	R2	38	0.0	0.121	7.1	LOS A	0.6	4.3	0.11	0.44	43.1
Approach		206	3.1	0.121	4.3	LOS A	0.6	4.3	0.11	0.45	48.4
East: carrington village											
4	L2	21	0.0	0.027	4.1	LOS A	0.1	0.9	0.48	0.51	41.7
5	T1	1	0.0	0.027	3.8	LOS A	0.1	0.9	0.48	0.51	42.4
6	R2	4	0.0	0.027	7.2	LOS A	0.1	0.9	0.48	0.51	42.3
Approach		26	0.0	0.027	4.6	LOS A	0.1	0.9	0.48	0.51	41.8
North: werombi rd											
7	L2	5	0.0	0.045	5.2	LOS A	0.2	1.3	0.36	0.48	46.1
8	T1	226	1.4	0.186	4.3	LOS A	0.9	6.5	0.34	0.48	47.0
9	R2	19	11.1	0.186	7.9	LOS A	0.9	6.5	0.33	0.48	46.7
Approach		251	2.1	0.186	4.6	LOS A	0.9	6.5	0.34	0.48	47.0
West: smalls rd											
10	L2	52	0.0	0.060	5.0	LOS A	0.3	1.9	0.36	0.53	46.2
11	T1	6	0.0	0.117	4.3	LOS A	0.6	4.0	0.34	0.61	45.5
12	R2	129	0.0	0.117	7.8	LOS A	0.6	4.0	0.34	0.61	45.4
Approach		187	0.0	0.117	6.9	LOS A	0.6	4.0	0.35	0.59	45.6
All Vehicles		671	1.7	0.186	5.1	LOS A	0.9	6.5	0.28	0.50	46.8

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.

# MOVEMENT SUMMARY

 Site: 1 [New Site - 1]

WEROMBI & SMALLS ROADS

pm peak 2020 post DA  
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
<b>South: werombi rd</b>											
1	L2	132	0.8	0.114	4.0	LOS A	0.5	3.7	0.20	0.48	46.6
2	T1	208	4.5	0.165	3.7	LOS A	0.8	6.0	0.19	0.41	50.6
3	R2	13	0.0	0.165	7.2	LOS A	0.8	6.0	0.19	0.41	43.2
Approach		353	3.0	0.165	4.0	LOS A	0.8	6.0	0.19	0.44	48.7
<b>East: carrington village</b>											
4	L2	36	0.0	0.041	3.7	LOS A	0.2	1.4	0.43	0.48	41.9
5	T1	4	0.0	0.041	3.5	LOS A	0.2	1.4	0.43	0.48	42.6
6	R2	3	0.0	0.041	6.9	LOS A	0.2	1.4	0.43	0.48	42.5
Approach		43	0.0	0.041	3.9	LOS A	0.2	1.4	0.43	0.48	42.0
<b>North: werombi rd</b>											
7	L2	1	0.0	0.039	4.3	LOS A	0.2	1.2	0.23	0.41	46.5
8	T1	194	3.3	0.164	3.8	LOS A	0.8	5.7	0.20	0.45	47.1
9	R2	55	0.0	0.164	7.2	LOS A	0.8	5.7	0.20	0.46	47.0
Approach		249	2.5	0.164	4.5	LOS A	0.8	5.7	0.20	0.46	47.1
<b>West: smalls rd</b>											
10	L2	18	5.9	0.025	5.6	LOS A	0.1	0.8	0.42	0.54	45.8
11	T1	5	0.0	0.051	4.5	LOS A	0.2	1.7	0.37	0.60	45.5
12	R2	52	0.0	0.051	8.0	LOS A	0.2	1.7	0.37	0.60	45.4
Approach		75	1.4	0.051	7.2	LOS A	0.2	1.7	0.38	0.59	45.5
All Vehicles		720	2.5	0.165	4.5	LOS A	0.8	6.0	0.23	0.46	47.4

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 LEVEL OF SERVICE

## Lane Level of Service

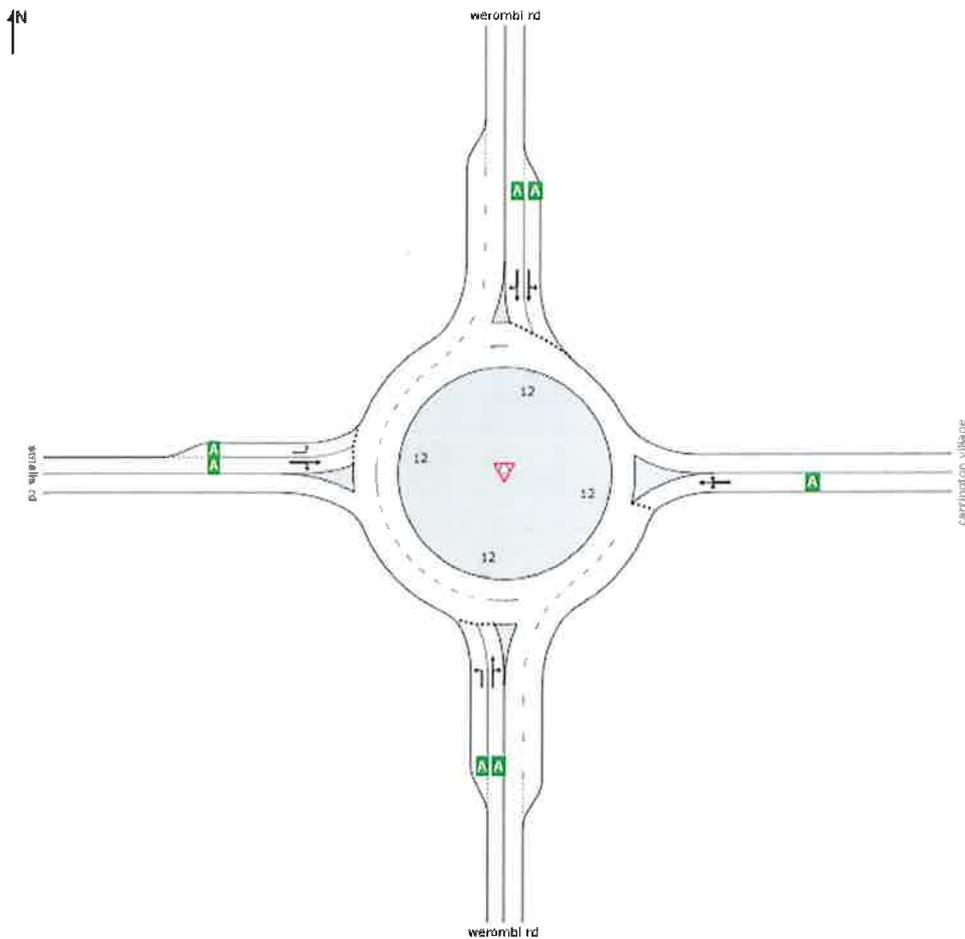
 Site: 1 [New Site - 1]

WEROMBI & SMALLS ROADS

pm peak 2020  
Roundabout

### All Movement Classes

	South	East	North	West	Intersection
LOS	A	A	A	A	A



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.