Proposed Naval College Road Signalised Pedestrian Crossing

Report on Pedestrian Usage and Traffic Implications

transportation planning, design and delivery

12S1310000 22/05/12

GTAconsultants

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GTA Consultants Office: NSW

Quality Record

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1. Introduction

This report has been prepared in response to a request by the Roads and Maritime Services (RMS) for additional information on the proposed signalised pedestrian crossing on The Wool Road between a proposed Anglican School on one side and the proposed Vincentia District Centre on the other.

In particular it responds to the following items requested in the RMS's letter dated 1 May 2012.

- *Pedestrian volumes likely to use the crossing including those attributable to the proposed Anglican School on the south-west side of naval College Road and volumes generated as a result of other, non-school related pedestrian traffic.*
- *Pedestrian and vehicle volumes in relation to the warrants for mid-block signals outlined in Section 2 Warrants of the RMS' Traffic Signal Design.*
- *SIDRA analysis of the intersection of The Wool Road and Naval College Road should be carried out for 10 year projected traffic volumes after completion of the shopping centre with and without the signals and including the traffic generated by the proposed Anglican School. In this regard, consideration should be given to the following:*
    - *Likely traffic movements should be based on RMS' Guide to Traffic Generating Developments.*
    - *Any assumptions for the distributions to and from the site must be justified.*
    - *Through traffic volumes must consider future growth on the road.*
- *Electronic copies of the SIDRA analysis should be provided to RMS.*

2. Estimation of Pedestrian Flows

Usage of the proposed crossing will arise from two principal sources:

- Pedestrians and cyclists related to the school
- Pedestrians and cyclists travelling to and from the shopping centre.

2.1 School Related

The immediate plan for the proposed Anglican School provides for about 100 students. A masterplan for the school provides for up to 130 students.

Sydney Anglican Schools Corporation has found that in similar locations typically only about one percent of students walk to school.

However given the proximity of the shopping centre some parents may choose to park in the shopping centre and then walk across the road to drop off or pick up their child. This would allow them to combine a school trip with a shopping trip.

Indicatively it is expected that there could be 10 to 15 pedestrians using the crossing before and after school. This allows for some parents making two movements to and from the shopping centre car park.

2.2 Shopping Centre Related Trips

In 2011 the then Roads and Traffic Authority conducted surveys of trip and traffic generation at shopping centres in the Sydney Metropolitan and in Regional areas. Table 2.1 below provides daily and peak hourly person trip generation rates along with estimated person trip generation for the proposed shopping centre at its final size of over 32,000 sq. m of lettable floor area.

Table 2.1: Estimation of Shopping Centre Person Trip Generation

Day	Rate/100m²		Shopping Centre Generation (32,000 sq.)	
	Daily	Peak Hour	Daily	Peak Hour
Thursday	81.56	7.50	26,100	2,400
Friday	67.04	7.96	21,450	2,550
Saturday	78.57	10.85	25,150	3,470
Sunday	56.44	8.35	18,050	2,670

The surveys found that in regional areas around 4 percent of generated trips could be by bicycle or on foot.

Based on the distribution of population, the transport report for the proposed shopping centre estimated that about 40 percent of customers would come to the centre from the South (Sanctuary Point) etc. On this basis some 38 to 55 pedestrians or cyclists per hour would walk or cycle to/from the centre from the south.

The most direct route for these groups would be via the proposed pedestrian route across the proposed signalised crossing of naval College Road.

2.3 Combined Pedestrian Forecasts

The school generated pedestrian movements would generally not coincide with peak pedestrian movements generated by the shopping centre.

Thus, allowing for a small number of pedestrian and cyclists from the south to divert to use an alternative route via the signalised crossing of The Wool Road to the north, likely peak pedestrian numbers across the proposed signalised crossing of naval College Road would be in the order of perhaps 30 to 50 pedestrians per hour.

3. Intersection Implications

Our previous report on the matter provided our analysis of queuing and traffic signal traffic delays for future development at a nominal year of 2016.

The traffic forecasts for 2016 were based on full development of the shopping centre and for an increase in the number of dwellings by about 2,910. This represented growth of about 35% on the number in existence in 2003 when the traffic surveys on which the analysis was based.

Shoalhaven Council's Section 94 plan of 2010 provides the following population figures for its Planning Area 3 which covers the bay and basin area.

Table 3.1: Population Figures for Shoalhaven Council Planning Area 3

Year	Population
2001	17,050
(2003)	(17,622)
2006	19,935
2016	21,336
2021	22,669
2026	23,894
2031	24,985
2036	25,966

The 2003 figures are by interpolation.

Applying 35% growth to the estimated population of 2003 (17,622 person) yields a population to which the nominal 2016 future analysis applies of 23,789 persons.

Thus because population growth in the area has been slowed to a rate below that previously anticipated, the nominal 2016 year analysis more correctly applies to the year 2026.

On this basis, the analysis of traffic effects provided in our previous report actually does cover a horizon ten years beyond the potential completion of the whole shopping centre.

For ease of reference the previous report is appended to this one. It is noted that the traffic forecasts used in that report were fully explained in the "Traffic Forecasting Report" covering the "Development Masterplan for land on The Wool Road and Naval College Road, Vincentia", prepared for Stockland Trust by Masson Wilson and Twiney in November 2005. This report was submitted to Shoalhaven Council and the then RTA. It was accepted by the Department of Planning when it consented to the original Masterplan and then to various Project Applications subsequently.

This report fully explains expected population growth in different parts of the bay and Basin area. Traffic growth and distribution were based on this information. The document still represents the worst case scenario.

4. Warrant for Midblock Signalised Pedestrian Crossing

RMS adopts Austroad Guide to Traffic Engineering Practise as a general guide to its policies. It has then issued a series of "Austroad Guide Supplements" which deal with any departures from or elaboration on the Austroad Guides that it has adopted.

Austroad Guide to Traffic Management part 6 Intersection, Interchanges and Crossings deals with signalised midblock pedestrian crossings. However the advice tends to be general and it defers to Australian Standard AS 1742.10-2009 Manual of Uniform Traffic Control Devices Part 10 Control and Protection.

This Australian Standard does not recommend specific warrants for different types of crossings. Rather it states that these are a matter of policy for individual road authorities.

The NSW Roads and Traffic Authority deals with this through a supplement to Austroad Guide to Traffic Management Part 6.

It is however noted that AS 1742.10-2009 Part 10 Pedestrian Control and Protection does specify the following requirements for a midblock marked pedestrian crossing:

(i) No more than one lane of moving traffic in any one direction shall be encountered by a pedestrian using a crossing.

(iii) The speed limit on approach to the crossing shall be 50km/h or lower and the 85th percentile shall not exceed 60km/h.

(iv) Crossing shall not be used on arterial roads.

From this it is apparent that if a surface crossing of Naval College Road was to be provided then it would need traffic signal control. The Australian Standard goes on to say:

"If any of these requirements are not met, pedestrian activated traffic signals (midblock) or a pedestrian refuge without zebra markings may be more appropriate"

Given the proximity of the proposed Anglican School, a pedestrian refuge would not be appropriate in this circumstance.

The RTA Supplement to Austroad Guide to Traffic management Part 6 does not provide numerical warrants for midblock signalised crossings but does provide the following warrants for marked crossings.

(i) Normal Warrant:

A pedestrian crossing should be considered for approval where:

(a) The product of the measured pedestrian flow per hour (P) and the measured vehicle traffic flow per hour (V), PV is equal or greater than 60,000 and;

(b) The measured flows, P and V are equal of greater than 30 and 500 respectively;

(c) The measured flows apply for three periods of one hour in any day.

(ii) Special Warrant:

In certain circumstances where the product of PV is greater or equal to 45,000 (but less than 60,000) and P is greater than or equal to 30 and V is greater than or equal to 500 then

consideration can be given to a potential pedestrian crossing site. In such circumstances, council should justify why this location is in need of special consideration.

(iii) Reduced warrant for children, the aged or physically impaired pedestrians. In cases where the crossing is to be used by children, the aged or physically impaired pedestrians a separate warrant applies and is as follows;

Crossings used by children

- *In two hours of one hour duration immediately before and after school hours P>30 (the crossing being predominantly used by school children) and V >200.*

Crossings for the aged and physically impaired

- *During three periods of one hour in any pone day P>30 (of which 50% using the crossing are aged or physically impaired) and V>200, and PV>60,000.*

From Section 2 above it is estimated that at peak times such as on Thursday evenings or Saturday mornings peak pedestrian movements are expected to be in the range of 30 to 50 pedestrians or cyclists per hour.

The previous report on this matter (see Appendix A) estimated that future peak traffic flows on Naval College Road would be as follows:

- Thursday evening 1,000 veh/h two way
- Saturday morning 1,3810 veh/h two way

Under the "normal" warrant above the criterion of:

- P (pedestrians per hour) would be greater than 30
- V (vehicles per hour) would be greater than 520

The product P x V would be at least 36,000 to 69,000 using the upper and lower estimation ranges above. The average of this is 52,520 which is below the product needed for the "normal" warrant but above that required for the "special" warrant.

In this case the "special" warrant criterion is considered to be appropriate because of:

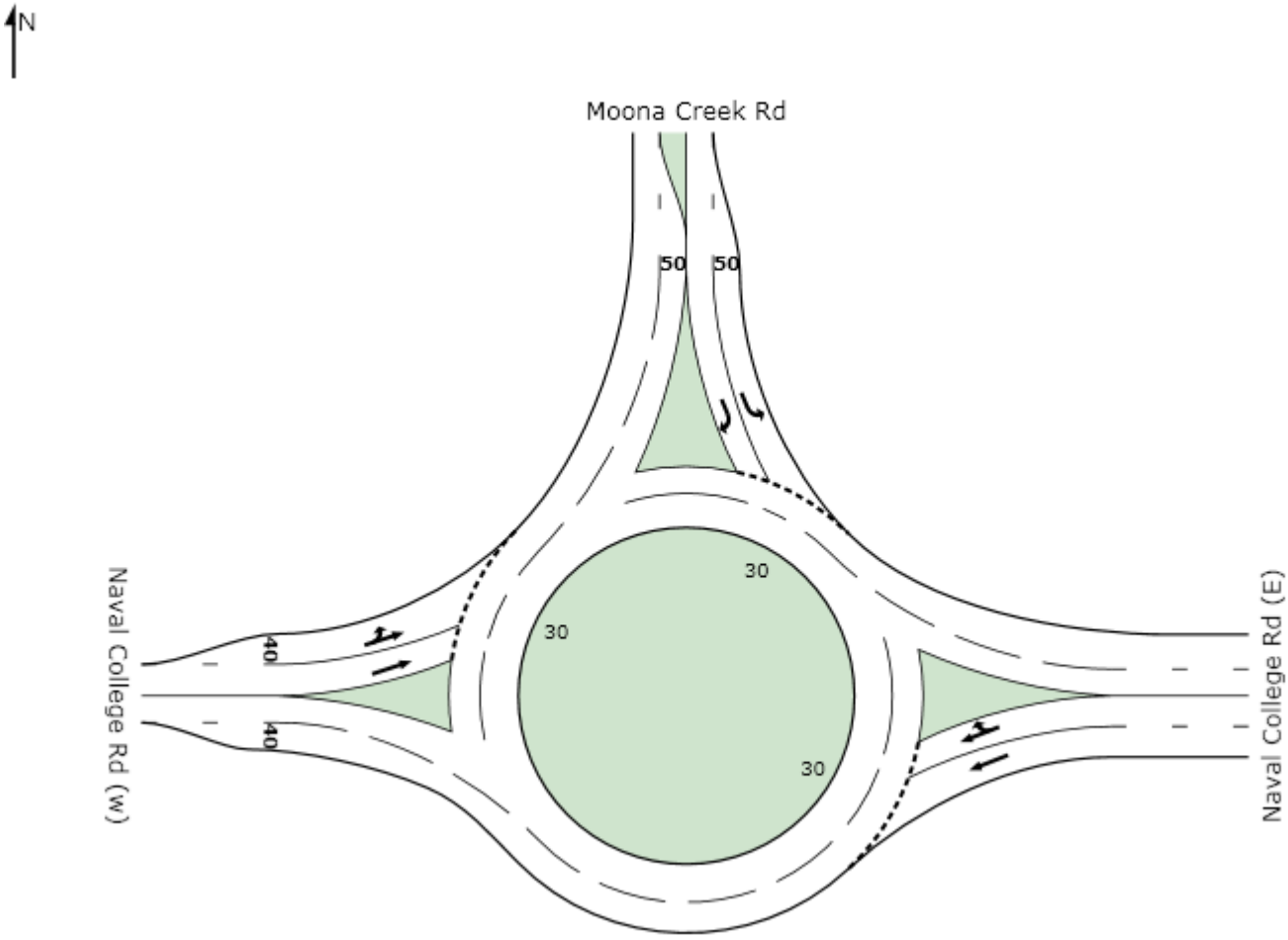
- The presence of a school adjacent to the site,
- The 80km/h design speed of Naval College Road; and
- The likelihood that a significant number of the pedestrians and cyclists that would use the crossing would be under driving age.

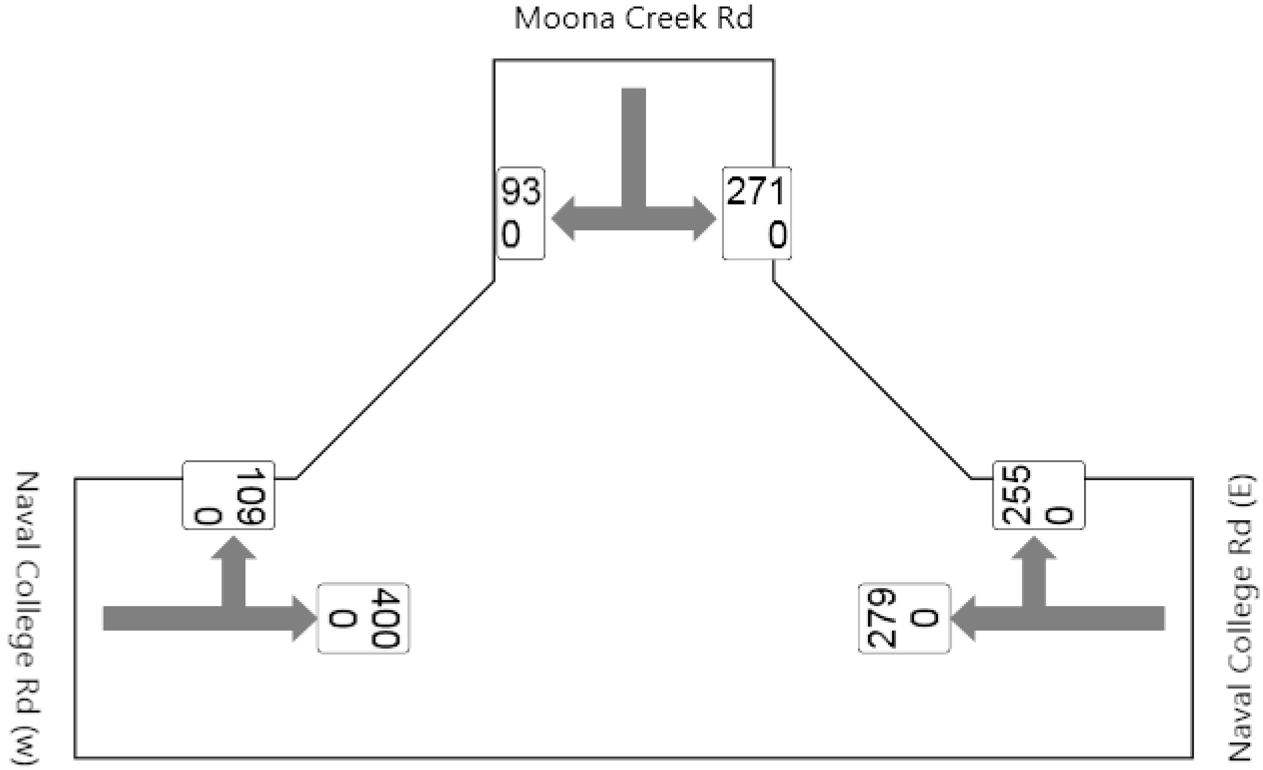
Having regard to the fact that a marked crossing could not be provided for safety and capacity reasons, a signalised crossing is considered to be the most appropriate solution.

Appendix A

April Report for 2026 Conditions

NOTE: Traffic growth referred to in the report is based on a population growth now found to relate to 2026 rather than a nominal year of 2016 indicated in the report.


N
Moona Creek Rd
50
50
30
30
30
40
40
Naval College Rd (w)
Naval College Rd (E)



Moona Creek Rd
93
0
271
0
109
0
400
0
255
0
279
0
Naval College Rd (w)
Naval College Rd (E)

MOVEMENT SUMMARY

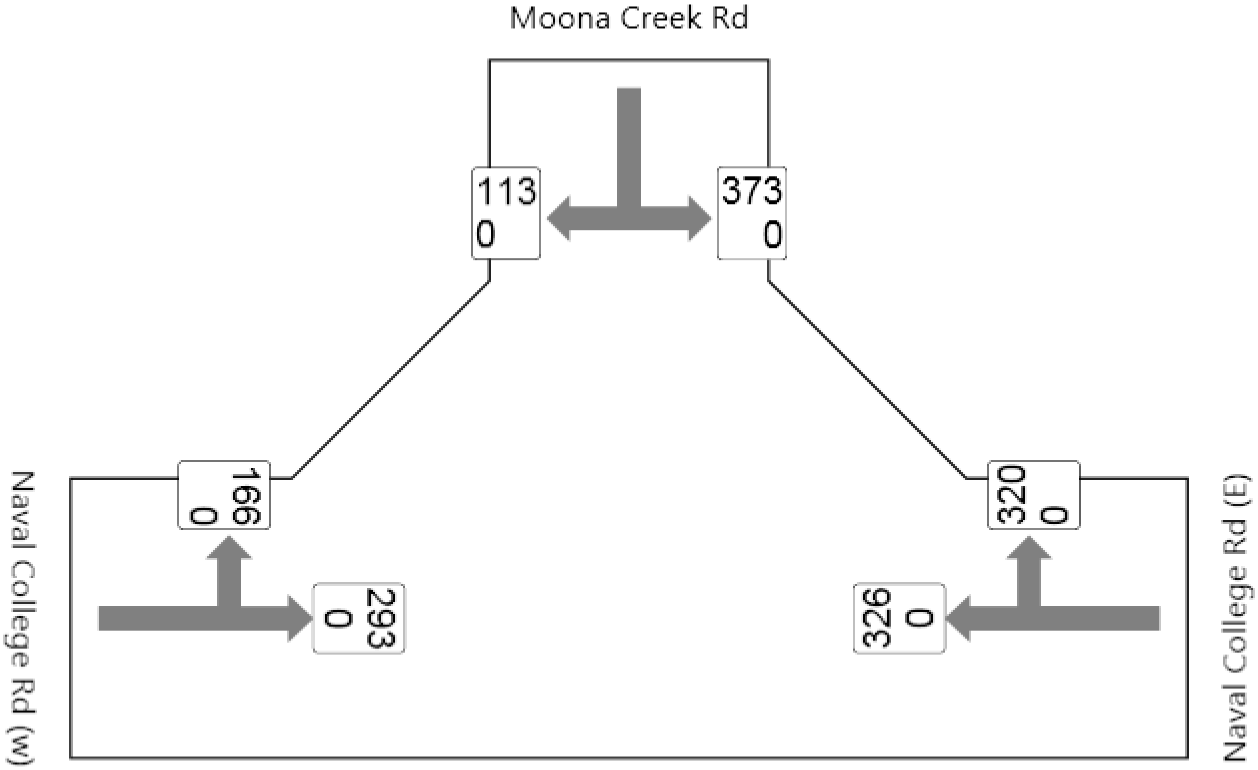
Site: 2016 PM Peak

Naval College Rd x Moona Creek Rd
2016 Thurs PM Peak
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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
East: Naval College Rd (E)											
5	T	294	0.0	0.302	2.7	LOS A	1.7	12.1	0.26	0.30	45.4
6	R	268	0.0	0.302	9.1	LOS A	1.7	12.1	0.26	0.70	41.4
Approach		562	0.0	0.302	5.8	LOS A	1.7	12.1	0.26	0.49	43.3
North: Moona Creek Rd											
7	L	285	0.0	0.251	5.1	LOS A	1.3	9.2	0.52	0.54	43.1
9	R	98	0.0	0.124	11.0	LOS A	0.6	3.9	0.51	0.73	40.0
Approach		383	0.0	0.251	6.6	LOS A	1.3	9.2	0.52	0.59	42.2
West: Naval College Rd (w)											
10	L	115	0.0	0.230	4.8	LOS A	1.0	7.1	0.40	0.51	44.0
11	T	421	0.0	0.230	3.3	LOS A	1.1	8.0	0.39	0.37	44.7
Approach		536	0.0	0.230	3.6	LOS A	1.1	8.0	0.39	0.40	44.5
All Vehicles		1481	0.0	0.302	5.2	LOS A	1.7	12.1	0.37	0.48	43.4

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.



Moona Creek Rd
113
0
373
0
166
0
320
0
293
0
326
0
Naval College Rd (w)
Naval College Rd (E)

MOVEMENT SUMMARY

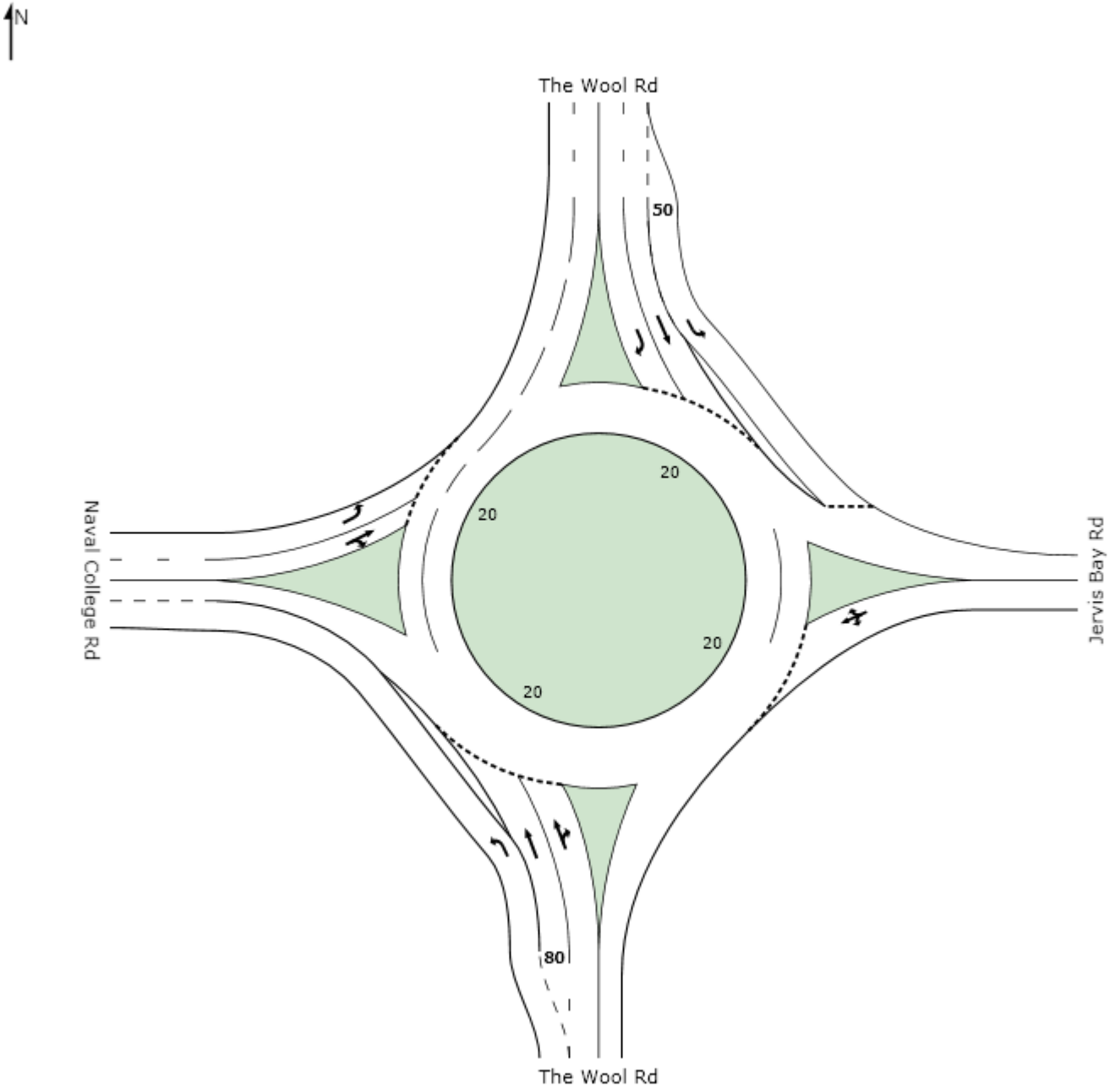
Site: 2016 Sat Peak

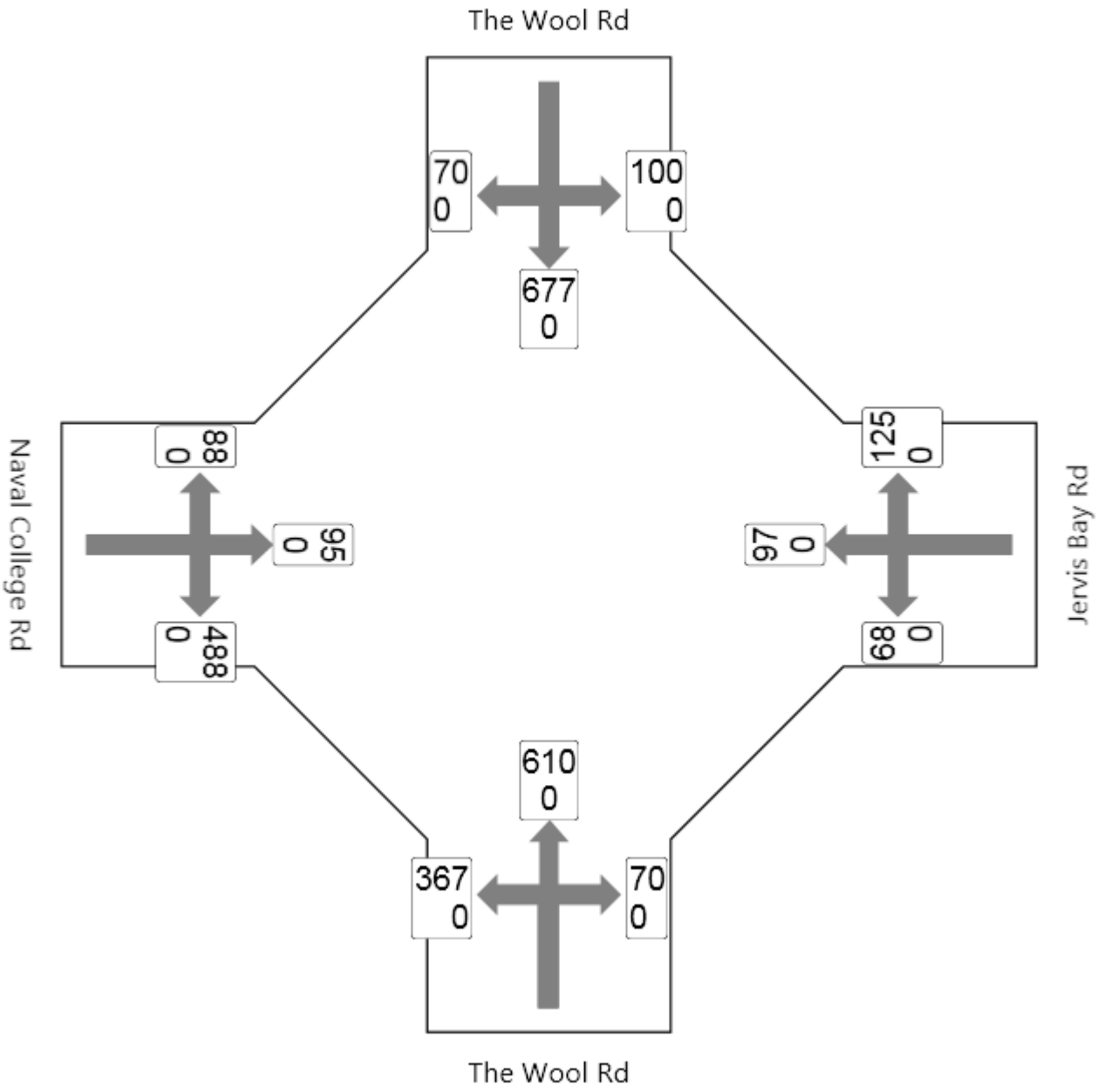
Naval College Rd x Moona Creek Rd
2016 Sat Peak
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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
East: Naval College Rd (E)											
5	T	343	0.0	0.371	2.9	LOS A	2.3	15.9	0.30	0.32	45.0
6	R	337	0.0	0.371	9.2	LOS A	2.3	15.9	0.31	0.69	41.3
Approach		680	0.0	0.371	6.0	LOS A	2.3	15.9	0.31	0.51	43.0
North: Moona Creek Rd											
7	L	393	0.0	0.326	4.9	LOS A	1.9	13.3	0.50	0.52	43.2
9	R	119	0.0	0.148	10.7	LOS A	0.7	4.9	0.48	0.70	40.2
Approach		512	0.0	0.326	6.2	LOS A	1.9	13.3	0.49	0.56	42.4
West: Naval College Rd (w)											
10	L	175	0.0	0.214	4.9	LOS A	1.0	7.1	0.43	0.52	43.7
11	T	308	0.0	0.214	3.6	LOS A	1.1	7.4	0.44	0.41	44.3
Approach		483	0.0	0.214	4.1	LOS A	1.1	7.4	0.44	0.45	44.1
All Vehicles		1675	0.0	0.371	5.5	LOS A	2.3	15.9	0.40	0.51	43.1

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.


N
The Wool Rd
50
20
20
20
20
Naval College Rd
Jervis Bay Rd
80
The Wool Rd


The Wool Rd
70
0
100
0
677
0
Naval College Rd
88
0
0
95
488
0
Jervis Bay Rd
125
0
97
0
68
0
610
0
367
0
70
0
The Wool Rd

MOVEMENT SUMMARY

Site: 2016 PM Peak

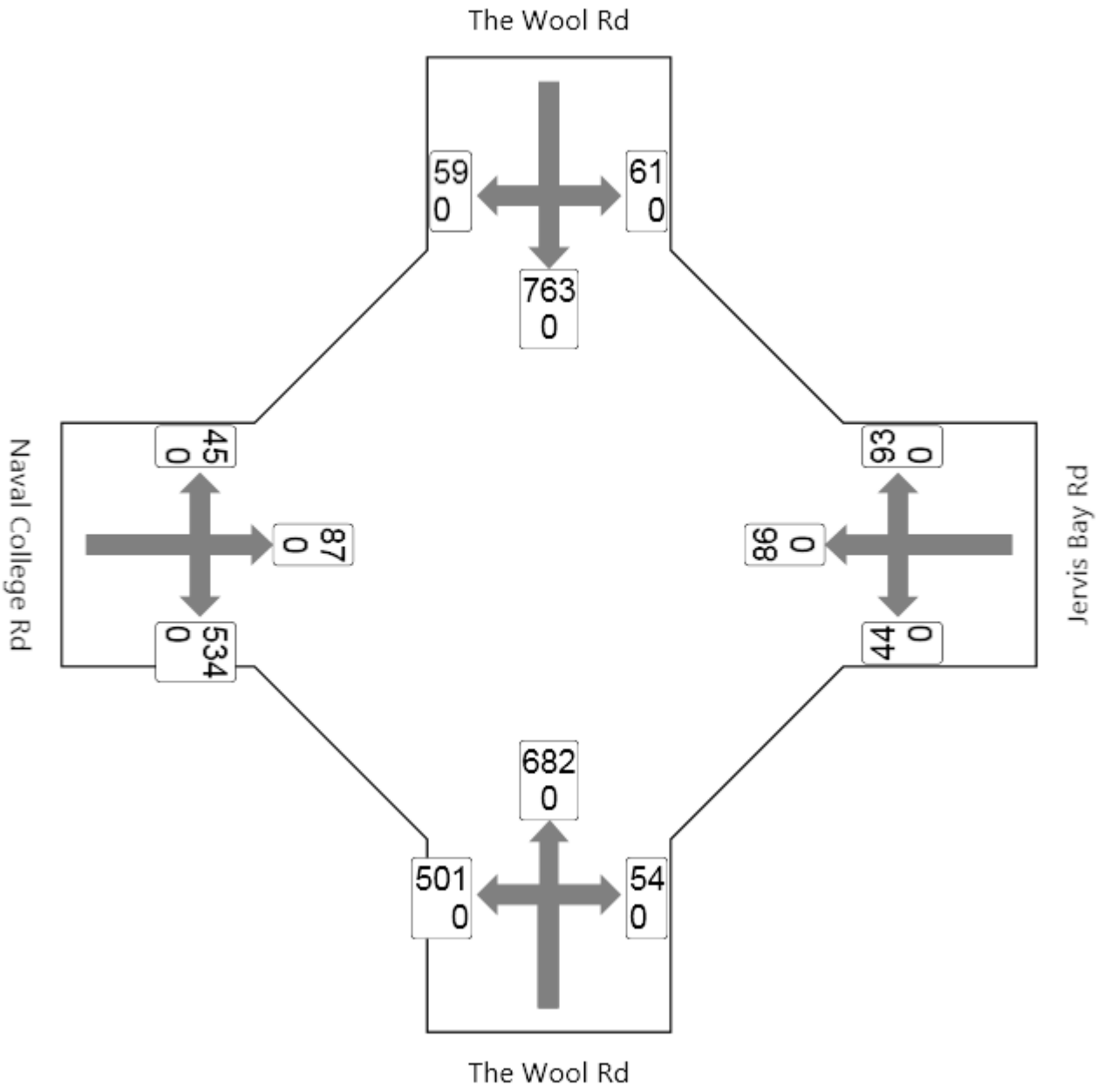
Wool Rd x Naval College Rd
2016 Thurs PM Peak
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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: The Wool Rd											
1	L	386	0.0	0.208	4.7	X	X	X	X	0.47	44.9
2	T	642	0.0	0.297	4.5	LOS A	1.8	12.4	0.48	0.48	43.3
3	R	74	0.0	0.297	10.1	LOS A	1.7	11.9	0.49	0.81	41.2
Approach		1102	0.0	0.297	4.9	LOS A	1.8	12.4	0.31	0.50	43.7
East: Jervis Bay Rd											
4	L	72	0.0	0.697	24.1	LOS B	6.4	44.9	0.97	1.23	31.5
5	T	102	0.0	0.697	23.1	LOS B	6.4	44.9	0.97	1.23	31.6
6	R	132	0.0	0.697	28.6	LOS C	6.4	44.9	0.97	1.24	30.7
Approach		305	0.0	0.697	25.7	LOS B	6.4	44.9	0.97	1.23	31.2
North: The Wool Rd											
7	L	105	0.0	0.085	5.0	LOS A	0.4	2.6	0.31	0.48	43.6
8	T	713	0.0	0.802	15.6	LOS B	12.8	89.5	1.00	1.23	36.3
9	R	74	0.0	0.130	13.5	LOS A	0.7	5.1	0.73	0.82	38.2
Approach		892	0.0	0.802	14.2	LOS A	12.8	89.5	0.90	1.11	37.2
West: Naval College Rd											
10	L	93	0.0	0.177	9.2	LOS A	0.7	5.1	0.64	0.81	40.9
11	T	100	0.0	0.683	9.2	LOS A	5.7	39.9	0.82	1.00	39.8
12	R	514	0.0	0.683	14.7	LOS B	5.7	39.9	0.82	1.08	37.6
Approach		706	0.0	0.683	13.2	LOS A	5.7	39.9	0.80	1.03	38.3
All Vehicles		3005	0.0	0.802	11.7	LOS A	12.8	89.5	0.67	0.88	38.8

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.


The Wool Rd
59
0
61
0
763
0
Naval College Rd
45
0
87
0
534
0
93
0
86
0
44
0
Jervis Bay Rd
682
0
501
0
54
0
The Wool Rd

MOVEMENT SUMMARY

Site: 2016 Sat Peak

Wool Rd x Naval College Rd
2016 Sat Peak
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow 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: The Wool Rd											
1	L	527	0.0	0.284	4.7	X	X	X	X	0.47	44.9
2	T	718	0.0	0.307	4.3	LOS A	1.8	12.8	0.44	0.46	43.6
3	R	57	0.0	0.307	9.9	LOS A	1.8	12.3	0.45	0.81	41.3
Approach		1302	0.0	0.307	4.7	LOS A	1.8	12.8	0.26	0.48	44.0
East: Jervis Bay Rd											
4	L	46	0.0	0.665	30.7	LOS C	6.0	41.9	1.00	1.25	28.7
5	T	91	0.0	0.665	29.7	LOS C	6.0	41.9	1.00	1.25	28.7
6	R	98	0.0	0.665	35.2	LOS C	6.0	41.9	1.00	1.25	28.1
Approach		235	0.0	0.665	32.2	LOS C	6.0	41.9	1.00	1.25	28.4
North: The Wool Rd											
7	L	64	0.0	0.052	4.9	LOS A	0.2	1.6	0.28	0.46	43.7
8	T	803	0.0	0.938	32.0	LOS C	25.8	180.4	1.00	1.73	28.3
9	R	62	0.0	0.114	13.7	LOS A	0.6	4.5	0.74	0.82	38.1
Approach		929	0.0	0.938	28.9	LOS C	25.8	180.4	0.93	1.58	29.5
West: Naval College Rd											
10	L	47	0.0	0.091	8.9	LOS A	0.4	2.5	0.62	0.78	41.1
11	T	92	0.0	0.728	10.0	LOS A	6.5	45.5	0.84	1.05	39.2
12	R	562	0.0	0.728	15.5	LOS B	6.5	45.5	0.84	1.11	37.1
Approach		701	0.0	0.728	14.3	LOS A	6.5	45.5	0.83	1.08	37.6
All Vehicles		3167	0.0	0.938	16.0	LOS B	25.8	180.4	0.64	0.99	36.0

X: Not applicable for Continuous movement.

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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