MARYLAND DEVELOPMENT COMPANY PTY LTD

JORDAN SPRINGS EAST - INTERNAL ROAD AND INTERSECTION ASSESSMENT WITH REZONING

NOVEMBER 2017

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Jordan Springs East - Internal Road and Intersection Assessment with Rezoning

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EXECUTIVE SUMMARY

The St Marys Development Site is located approximately 5 km to the north-east of Penrith and comprises five discrete precincts identified as:

- Jordan Springs – formerly known as Western Precinct
- Jordan Springs East – formerly known as Central Precinct
- Ropes Crossing – formerly known as Eastern Precinct and Ropes Creek Precinct
- North Dunheved
- South Dunheved.

The locations of the five precincts within the St Marys Development Site are shown in Figure ES.1.

Figure ES.1 St Marys Development Site precinct locations

Under SREP 30, the Jordan Springs East development contains approximately 95 hectares and 38 hectares of land zoned 'residential' and 'employment' respectively. It is understood that Lendlease is currently seeking to amend SREP 30 to rezone the 38 hectares of 'employment' land to 'residential'. The rezoning of 'employment' land to 'residential' will see an increase of approximately 500 low density dwellings and the removal of the employment zone. Should the amendment to SREP 30 be successful, the Jordan Springs East development would contain approximately 133 hectares of residential land.

The purpose of this report is to assess the implications of the proposed SREP 30 amendment on the internal road network due to proposed traffic generated as well as summarising the outcomes of the broader traffic impact assessment of the St Marys Development Site on the external road network.

Should the SREP 30 amendment be successful, it is envisaged that Jordan Springs East would contain the following:

- Approximately 1,930 low-density residential dwellings

A Village Centre Zone in the centre of the precinct, consisting of:

— 800 m^2 Gross Floor Area (GFA) of shopping centre

— 1,900 m^2 Gross Floor Area (GFA) of retail space

— A childcare to accommodate 180 children

— Medical centre employing a maximum of five (5) practitioners.

Sporting fields and associated 300 car parking spaces located to the east of the precinct consisting of:

— 6 sports fields floodlit

— 1 oval floodlit

— 4 tennis courts

— 1 multi-use court

— 1 netball court

— 3 cricket net lanes

— Maximum of three (3) synthetic cricket wickets in fields.

The internal road traffic assessment undertaken indicates that the key collector road network and adjoining intersections within Jordan Springs, Jordan Springs East and Ropes Crossing will perform within their capacity for both road sections and at intersections. The exception being the intersection of Jordan Springs Boulevard and Lakeside Parade which will require to be upgraded prior to 2021 (ultimate state). Intersections to the east of Jordan Springs, including one linking with the Dunheved Industrial Precinct and the other Ropes Crossing Boulevard will also operate within capacity.

It is important to note that a regional traffic assessment that takes into account the impact of the proposed amendment to SREP 30 on the regional traffic network has recently been completed under the guidance of a Steering Committee. The Steering Committee comprised of representatives from Department of Planning and Environment, Transport for NSW, RMS, Penrith City Council, Blacktown City Council, Lendlease and WSP. Recently, the final report was endorsed by the Steering Committee (*St Marys Development Site Regional Traffic Modelling, Traffic and Transport Assessment, WSP, October 2017*). A full copy of the report is attached to this report for reference.

The assessment of the external road network establishes a suite of theoretical road and intersection upgrades that are required for future year forecasts including 2021, 2026 and 2031. The suite of theoretical road and intersection upgrades were subject to detailed traffic apportionment calculations to establish the impact of the St Marys Development Site on the external road network and analyses to establish the impacts of the proposed rezoning on the external road network. The assessment established that the proposed land use had limited impact on the external road network.

The traffic apportionment calculations were used to inform a suite of Works in Kind items which Lendlease will undertake over the coming years. The works in kind items have been subject to negotiations with Penrith City Council, Roads and Maritime and Transport for NSW and are considered to offset the impacts on the external road network of the St Marys Development Site.

1 INTRODUCTION

Under SREP 30, the Jordan Springs East development contains approximately 95 hectares and 38 hectares of land zoned 'residential' and 'employment' respectively. It is understood that Lendlease is currently seeking to amend SREP 30 to rezone the 38 hectares of 'employment' land to 'residential'. Should the amendment to SREP 30 be successful, the Jordan Springs East development would contain approximately 133 hectares of residential land.

It is important to note that a regional traffic assessment that takes into account the impact of the proposed amendment to SREP 30 on the regional traffic network has recently been completed under the guidance of a Steering Committee. The Steering Committee comprised of representatives from Department of Planning and Environment, Transport for NSW, RMS, Penrith City Council, Blacktown City Council, Lendlease and WSP. Recently, the final report was endorsed by the Steering Committee (*St Marys Development Site Regional Traffic Modelling, Traffic and Transport Assessment, WSP, October 2017*). A full copy of the report is attached to this report for reference.

The aforementioned report considers the impact of the change in land use on the external road network and identifies a number of mitigation measures that should be incorporated into the existing road network. However, it does not deal specifically with the internal road network implications arising from the SREP 30 amendment. The purpose of this report is to assess the implications of the proposed SREP 30 amendment on the internal road network.

Should the SREP 30 amendment be successful, it is envisaged that Jordan Springs East would contain the following:

— Approximately 1,930 low-density residential dwellings

A Village Centre Zone in the centre of the precinct, consisting of:

— 800 m^2 Gross Floor Area (GFA) of shopping centre

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— Maximum of three (3) synthetic cricket wickets in fields.

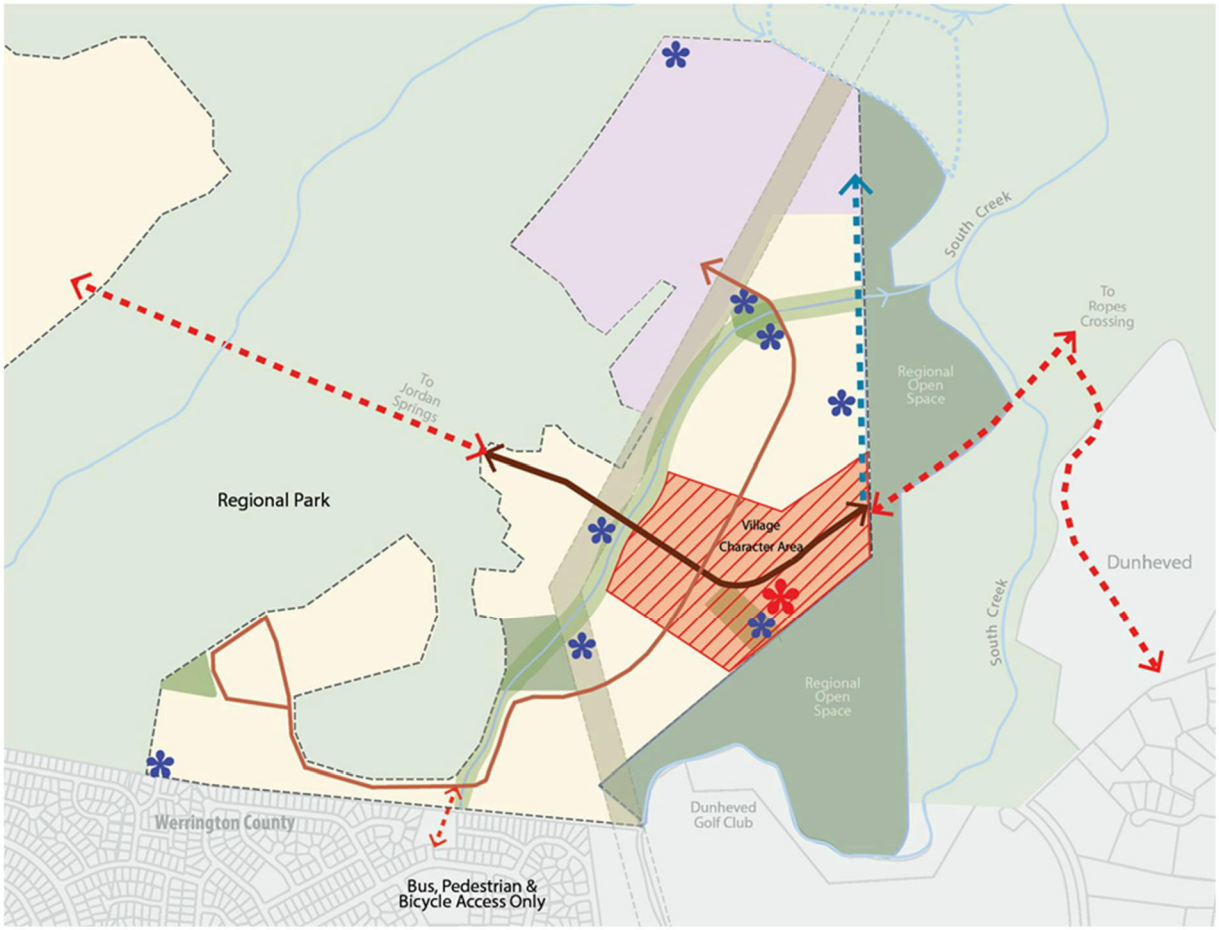


Figure 1 – Jordan Springs East Layout (existing SREP 30)

1.1 OBJECTIVES

This report has been prepared to provide an assessment on:

- Jordan Springs East with rezoning of the employment area to residential (i.e., purple area in Figure 1).
- Internal trip generation, trip assignment and distribution and assessment of the internal road network capacity within the Jordan Springs East to accommodate the anticipated traffic volumes at the year of ultimate development in 2021.
- Capacity of the internal (east-west) road within the Jordan Springs East and those roads that link to the external road network in accordance with the RMS' Guide to Traffic Generating Development v2.2.
- Intersection treatment and performance within the Jordan Springs East and interfacing link roads.

1.2 SUMMARY OF THE IMPACTS IN LAND USE CHANGE

This report has been prepared assuming that Jordan Spring East is rezoned. Under the with rezoning scenario, approximately 1,930 low density residential dwellings are proposed (increase of approximately 500 dwellings) and the removal of the employment area.

The without rezoning scenario includes 1,430 low density residential dwellings and an employment area of some 38 hectares (96,300 m2 GFA).

When undertaking a direct comparison of traffic generated with and without rezoning there is minimal difference between the two scenarios. The with rezoning will generate 102 less trips in the weekday AM peak and 3 more trips in the weekday PM peak when compared to the without rezoning. Therefore it is considered that the rezoning will have limited impact on the external and internal road networks.

It should be noted that a key difference would be trip directional splits to and from residential dwellings and the employment area during the weekday AM and PM peak periods. The residential dwelling trips for a weekday AM peak are 80% out and 20% in and vice versa in the PM peak. The employment area trips for a weekday AM peak are 20% out and 80% in and vice versa in the PM peak.

1.3 SUMMARY OF THE IMPACTS OF REZONING ON THE EXTERNAL ROAD NETWORK

The *St Marys Development Site Regional Traffic Modelling, Traffic and Transport Assessment, WSP, October 2017* report assessed the traffic impacts 'with rezoning' and 'without rezoning' of the employment land within Jordan Springs East. The assessment indicated that due to the minimal difference in traffic generated between the two scenarios, that limited impact would occur by both scenarios on the external and internal road networks. Some differences were noted in intersection performance at select locations, but in general, comparable traffic impacts were evidenced in the traffic modelling undertaken.

Those intersections where performance differences were noted between 'with rezoning' and 'without rezoning' include:

Year 2021

- The Northern Road, Borrowdale Way and Greenwood Parkway: this intersection performed worse under the 'with rezoning' scenario
- Christie Street, Dunheved Road and Werrington Road: in the PM peak, this intersection performed slightly worse (level of service change) under the 'with rezoning' scenario.

Year 2026

- Palmyra Avenue and Australis Drive: in the PM peak, this intersection performed slightly worse under the 'with rezoning' scenario
- Dunheved Road and John Oxley Avenue: in both the AM and PM peaks, this intersection performed slightly worse under the 'with rezoning' scenario

Year 2031

- Werrington Road and Great Western Highway: in the AM peak, this intersection performed slightly worse under the 'with rezoning' scenario.

1.4 ASSUMPTIONS

The following assumptions apply to this report:

- Trip generation rates are as per the RMS Guide to Traffic Generating Development v2.2 and those agreed to by the Steering Committee in preparation of the *St Marys Development Site Regional Traffic Modelling, Traffic and Transport Assessment, WSP, October 2017, Appendix A – Proposed traffic modelling methodology for St Marys Development Site*. The trip generation summary is detailed in Section 4 of this report and trip assignment in Section 5 of this report.
- Traffic distribution of 56%/44% (AM) and 50%/50% (PM) travelling from Jordan Springs East to the east (Forrester Road) and west (The Northern Road) from Jordan Springs East respectively. This distribution was derived from the

AIMSUN mesoscopic modelling study carried out in parallel to this study, which assessed the impact of the development to the external road network. The trip proportions applied between trips entering/exiting the Jordan Springs East development during the weekday AM and PM Peak periods are detailed in Section 6 of this report.

- This report utilises through traffic from adjacent precincts derived from the AIMSUN mesoscopic modelling using select link for precinct origin and destination demands. This includes through traffic to and from Jordan Springs towards the Dunheved Industrial Precinct which travel through Jordan Springs East.

1.5 EXCLUSIONS

The following exclusions apply to this report:

- This report excludes any assessment of intersections outside of the St Marys Development site as a study has been completed to assess the impact of the development to the external road network.
- This report excludes assessment of the minor local access roads (local streets) within Jordan Springs East. These are where local residential streets intersect with one another away from the collector road environment and would have much reduced traffic volumes when compared to the collector road leading to improved intersection operation.

2 PROPOSED ROAD LAYOUT

Please note that the naming convention of the roads is yet to be finalised and as such all roads are referred to in numerical form in this report. Road names are referred to in numerical form in this report.

Jordan Springs East is serviced by an east-west collector road which bisects the development approximately in the middle, referred to in this report as Road Number 1. Road Number 1 provides a connection to the external road network through Jordan Springs to the Northern Road to the east and is planned to connect to Ropes Crossing and Dunheved to the east and south.

A north-south collector road, referred to in this report as Road No.2 will run through the centre of the development and distribute traffic internally to service the development.

In total, the east-west collector road intersects with four (4) north-south link road which distribute the trips throughout the precinct. All four (4) of these intersections are proposed to be controlled by single-lane roundabouts. This is shown in Figure 2 below.

Figure 2 – Jordan Springs East internal collector road and intersection layout

3 MEASURE OF INTERSECTION PERFORMANCE AND ROAD CAPACITY

3.1 INTERSECTION PERFORMANCE

Level of Service (LoS) and Degree of Saturation (DoS) are both standard performance parameters used to describe the operation of an intersection. The LoS range from A to F based on the operational performance primarily determined by the average traffic delay at the signalised intersections and roundabouts as indicated in Table 3.1.

Table 3.1 Level of service criteria for signalised intersections

LEVEL OF SERVICE	AVERAGE DELAY (SECONDS PER VEHICLE)	TRAFFIC SIGNALS
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity and incident would cause excessive delays
F	Greater than 71	Unsatisfactory with excessive queuing

Source: Roads and Maritime 2002 *Guide to Traffic Generating Developments*

3.2 MID-BLOCK CAPACITY

Extracted from the Austroads Guide to Traffic Management Part 3, Table 3.2 sets out typical mid-block capacities for various types of urban roads with interrupted flow, with unflared major intersections and with interruptions from cross and turning traffic at minor intersections. These mid-block capacities are commonly used as a guideline for road and traffic related studies with capacities varying on the nature and layout of the road being assessed.

Table 3.2 Typical mid-block capacities for urban roads with interrupted flow

TYPE OF LANE	ONE-WAY MID-BLOCK CAPACITY (PC/H)
Median or inner lane	
— Divided road	1000
— Undivided road	900
Middle lane (of a 3 lane carriageway)	
— Divided road	900
— Undivided road	1000
Kerb lane	
— Adjacent to parking lane	900

— Occasional parked vehicles	600
— Clearway conditions	900

Sources: Austroads Guide to Traffic Management Part 3: Traffic Studies and Analysis

4 TRIP GENERATION

Table 4.1 below details the trip generation estimate of the Jordan Springs East development.

The trip generation rates are sourced from the RMS' Guide to Traffic Generating Developments v2.2. A number of trip rates however have been altered accordingly, with the endorsement of the Steering Committee, to reflect the existing travel pattern of the St Marys Development Site as surveyed from the partially completed Jordan Springs and Ropes Crossing developments.

Table 4.1 Jordan Springs East Land Use Type, Yield, Trip generation rate and Trips Counted

	Land Use	AM	PM	Unit	AM Peak Trips	PM Peak Trips
Residential Development	1,930 dwellings	0.76	0.97	Trip/dwelling	1,467	1,872
Shopping Centre	800 m^2 GFA	6.1	12.3	Trip/100m^2	165	332
Retail	1,900 m^2 GFA	6.1	12.3	Trip/100m^2		
Childcare	180 children	1.40	0.80	Trip/Child	252	144
Medical Centre	5 practitioners	5.80	5.80	Trip/practitioner	29	29
Sporting Field	380 capacity	0	1	Trip/capacity	0	380

The Shopping Centre, Retail, Childcare and Medical Centre are all located within the Shopping Village in Jordan Springs East.

5 TRIP ASSIGNMENT

Trips generated in Jordan Springs East can be classified as:

1. **Direct Residential** - trips made to/from residential developments directly to the external road network.
2. **Linked** – derived from trips made by residential developments. These trips are made by the residential developments to the external road network via the shopping village which consist of trip generating community/commercial developments.
3. **Internal Only** – derived from trips made by residential developments. These trips are attracted by the commercial/community developments in the Shopping Village. These are return trips between residential developments and the shopping village that is contained wholly within the Precinct.
4. **External Only** – additional trips into/out of Jordan Springs East that are not derived by the residential developments. These include part of the trips made to/from the sporting fields.

The above assumptions have been applied as the Shopping Village consists of community facilities such as retail shops, childcare and medical centre that are likely to only be utilised by those living within the residents of Jordan Springs East. Table 5.1 below details the trip assignment assumptions that are likely to be attracted by the commercial/recreational developments in Jordan Springs East.

Table 5.1 Trip Assignment derived for Jordan Springs East Shopping Village and sporting field

Land Use	Trips Derived From External Network Only (4)	Trips Derived From Jordan Springs East Residential Developments (Including Internal Only And Linked Trips)	
Shopping Centre & Retail	0	100%	
		Internal Only (3): 40%	Linked (2): 60%
Childcare	0	100%	
		Internal Only (3): 10%	Linked (2): 90%
Medical Centre	0	100%	
		Internal Only (3): 50%	Linked (2): 50%
Sporting Field	80%	20%	
		Internal Only (3): 6%	Linked (2): 14%

The resulting weekday AM and PM peak hour trips are summarised below.

Table 5.2 Resulting Peak Hour Trips to/from Jordan Springs East Shopping Village and sporting field

Land Use	External Only (4)		Internal Only (3)		Linked Via Shopping Village (2)	
	am	pm	am	pm	am	pm
Shopping Centre & Retail	0	0	66	133	100	200
Childcare	0	0	25	14	227	130
Medical Centre	0	0	15	15	15	15
Sporting Field	0	304	0	23	0	53
TOTAL	**0**	**304**	**106**	**185**	**342**	**398**

6 TRIP DISTRIBUTION

It is estimated that trips generated and attracted by the Jordan Springs East development are distributed 56%/44% (AM) and 50%/50% (PM) to the east towards Forrester Road (via Ropes Crossing and Dunheved Industrial Precinct) and west towards The Northern Road (via Jordan Springs) respectively as shown in Figure 3. The trip distribution from Jordan Springs East is shown in Table 6.1 below. This estimate was derived from the AIMSUN mesoscopic modelling study carried out in parallel to assess the impact of the development to the external road network.

Figure 3 – St Marys Development Site locality plan

Table 6.1 Trip Distribution of Jordan Springs East

	AM		PM	
	East	West	East	West
Jordan Springs East	56%	44%	50%	50%

The table below details the ratio between trips that are made into and out of the Jordan Springs East development. This split has been documented in the Proposed Traffic Modelling Methodology technical memorandum and endorsed by the Steering Committee.

Table 6.2 Trip Distribution by Land Use

	AM		PM	
	IN	OUT	IN	OUT
Residential dwellings	20%	80%	80%	20%
Shopping Centre & Retail	60%	40%	50%	50%
Childcare	50%	50%	50%	50%
Medical Centre	50%	50%	50%	50%
Sporting Field	0%	0%	50%	50%

7 JORDAN SPRINGS EAST INTERNAL ROAD ASSESSMENT

7.1 ZONES

Internal zones have been created within the Jordan Springs East to determine the impact of trips made into and out of the respective zones to the mid-block sections of the internal roads and intersections.

Figure 4 – Jordan Springs East Internal Zone Map

The zones have been formed in line with the shape of the sub-division corresponding to the road layout and the likely route option generated by the zones. The zones as shown in Figure 4, vary in size and number of dwellings. Prior to the employment area (Location 9 in Figure 4) being rezoned to provide for approximately 500 dwellings, there are approximately 1,430 dwellings proposed within Jordan Springs East.

Trips made into and out of the sporting fields were included in the assessment of the internal road network. It was assumed that the internal and linked trips were included with the village trips whilst external trips were assigned explicitly.

Trips to/from the Dunheved Industrial precinct east of Jordan Springs East were included in the assessment of the internal road network. These trips were estimated from the AIMSUN mesoscopic modelling study: 87 trips eastbound in the AM peak and 247 trips westbound in the PM peak. These trips were primarily from the Northern Road and Jordan Springs precinct.

The forecast of peak hour trips, as detailed in Table 5.2 were distributed across the internal road network accordingly to assess the traffic volumes at various locations of the internal road. This assessment is detailed in Section 6.

The resulting intersection volumes generated by the development within Jordan Springs East are assessed in Section 7.

7.2 TRAFFIC FLOWS

The forecast of peak hour trips were distributed across the internal road network accordingly to assess the traffic volumes at various locations of the internal road network. The resulting mid-block traffic volumes are shown in Figure 5 below.

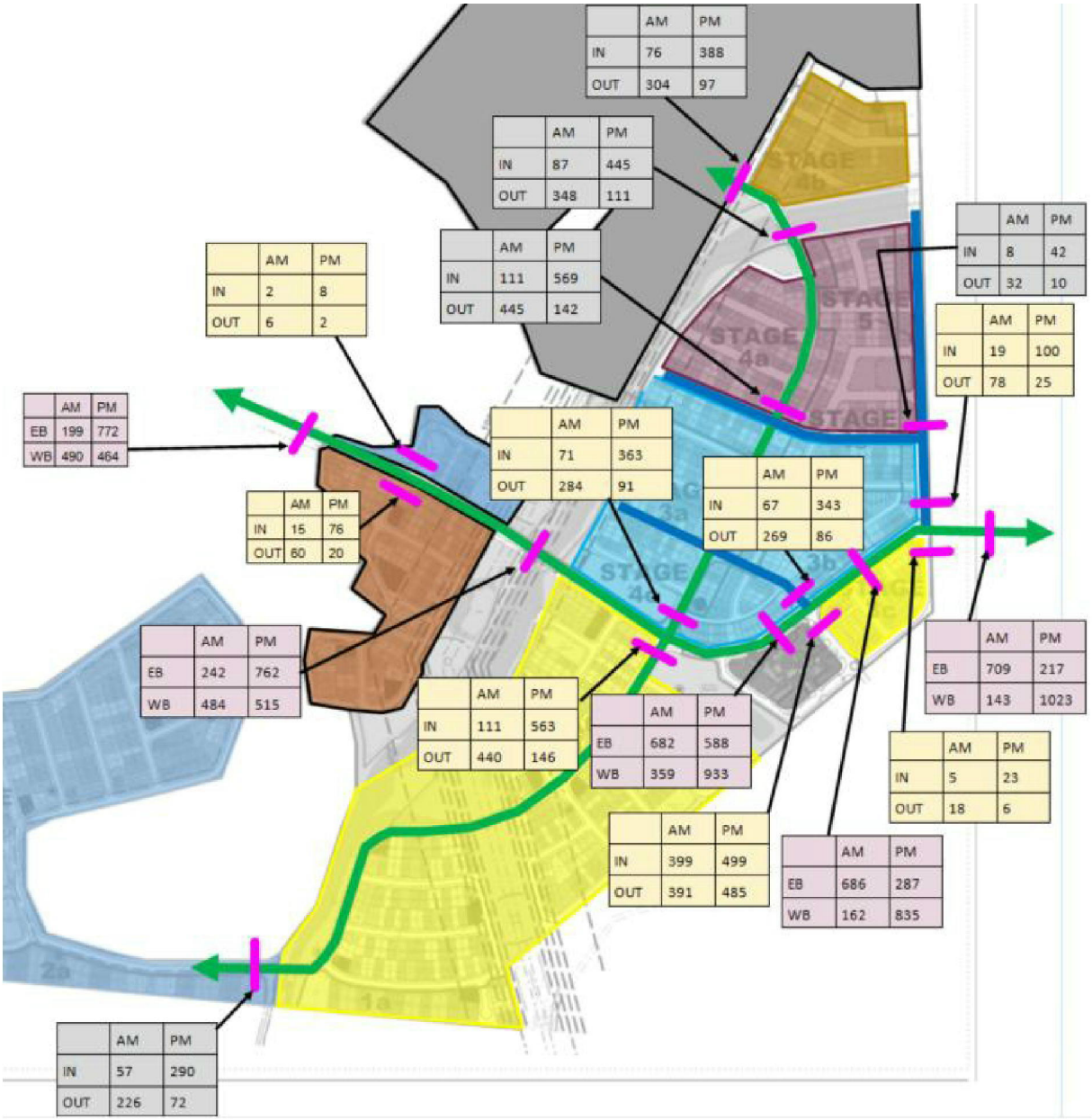


Figure 5 – Jordan Springs East Mid-Block Traffic Volumes

The assessment established:

- That the traffic mid-block volumes of the internal road network were found to be below the single lane road capacity of 1,000 passenger car unit (pcu)/hour as shown in Table 3.2. This includes the main collector road, Collector Road No.1 which runs east-west through Jordan Springs East. As such, two-lane/two-way roads within Jordan Springs East will be sufficient.
- That the highest mid-block volumes can be found on the Collector Road No.1 near the Village Centre. This is generally expected due to the number of trip attractors that exist at the location, including the retail, childcare and medical centre developments.

— The traffic volumes on the east-west road linking Jordan Springs East to the external road network to the east, carries approximately 1,000 passenger car unit (pcu) per hour. As such, a two-lane/two-way road to/from Jordan Springs East from the east will be sufficient. This includes through trips to/from Jordan Springs to/from Dunheved Industrial Precinct and Ropes Crossing.

7.2.1 INTERSECTIONS

The operation of the four (4) internal intersections along Road Number 1 with Jordan Springs East have been assessed in SIDRA to determine their performance. Furthermore, two proposed intersections along Road Number 1 to the east of Jordan Springs East have been assessed. One which connects with the Dunheved Industrial Precinct and the other Ropes Crossing Boulevard. The traffic volumes at these two intersections were adopted from the Aimsun Mesoscopic modelling study with their location shown in Figure 6 below.

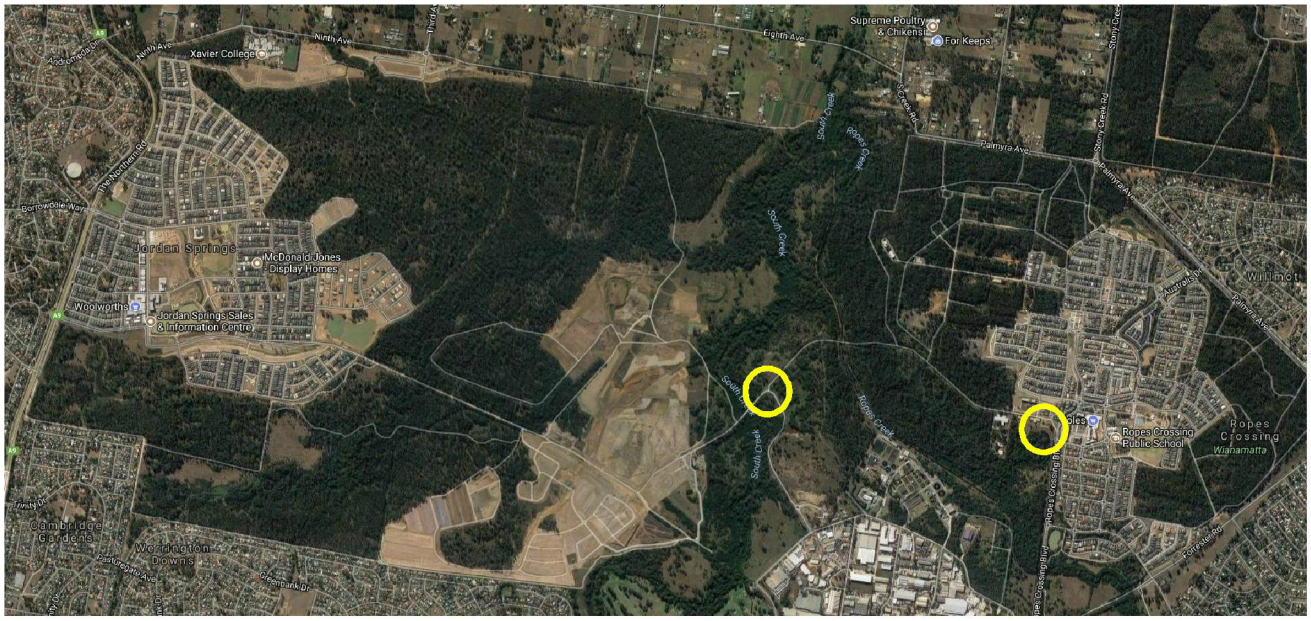


Figure 6 – Locations of two additional intersections on Road No 1 east of Jordan Springs East

7.2.1.1 INTERSECTION OF ROAD NO 1 WITH ROAD NO.60 AND 64

The intersection of Road Number 1 with No.60 and 64 generate the traffic volumes shown below. This intersection is controlled by a single lane roundabout with a diameter of approximately 20 metres. Concrete median island is proposed along Road Number 1 which would prohibit any right turn movements into and out of side streets and property accesses.

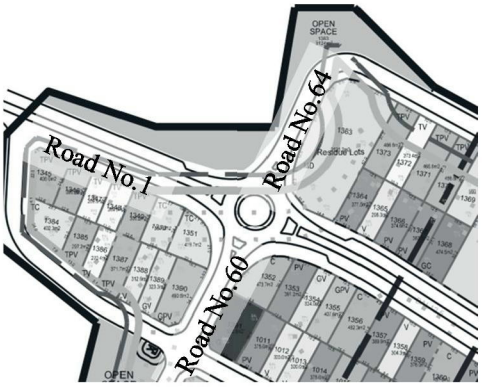


Table 7.1 Traffic Volume Intersection Road No.1, No.60 and No.64

	ROAD NO.60 (SOUTH)			ROAD NO.1 (EAST)			ROAD NO.64 (NORTH)			ROAD NO.1 (WEST)		
	L	T	R	L	T	R	L	T	R	L	T	R
AM	19	0	41	14	469	0	3	1	3	1	198	1
PM	1	1	20	49	463	4	1	1	1	4	741	27

The intersection has been modelled in SIDRA Intersections and was found to be performing satisfactorily. The result is summarised below:

Table 7.2 Intersection Road No.1, No.60 and No.64 Performance Summary

	AM Peak	PM Peak
Total Volume	752 vehicles	1,313 vehicles
Degree of Saturation	0.290 (Road No 1. West Approach)	0.492 (Road No 1. West Approach)
Average Delay	11.1 seconds (Road No. 60 South Approach)	11.0 seconds (Road No. 60 South Approach)
Level of Service	LOS A	LOS A
95% Back of Queue	13.7 metres (Road No 1. East Approach)	31.7 metres (Road No 1. West Approach)

For priority (sign) and roundabout controlled intersections, Level of Service is based upon the traffic movement with the worst vehicle average delay.

7.2.1.2 INTERSECTION OF ROAD NO1 WITH ROAD NO.2

The intersection of Road Number 1 with Road Number 2 generates the traffic volume shown below. This intersection is controlled by a single lane roundabout with an inscribed radius of approximately 20 metres. Concrete median island is proposed along Road Number 1 which would prohibit any right turn movements into and out of side streets and property accesses.

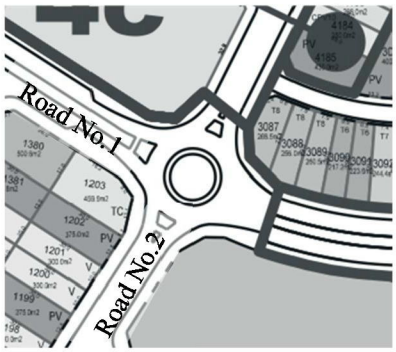


Table 7.3 Traffic Volume Intersection Road No.1 and No.2

	ROAD NO.2 (SOUTH)			ROAD NO.1 (EAST)			ROAD NO.2 (NORTH)			ROAD NO.1 (WEST)		
	L	T	R	L	T	R	L	T	R	L	T	R
AM	134	0	306	101	234	23	169	0	115	25	208	10
PM	0	0	146	355	481	97	57	0	34	169	385	208

The intersection has been modelled in SIDRA Intersections and was found to be performing satisfactorily. The result is summarised below:

Table 7.4 Intersection Road No.1 and No.2 Performance Summary

	AM Peak	PM Peak
Total Volume	1,327 vehicles	1,935 vehicles
Degree of Saturation	0.451 (Road No 2. South Approach)	0.825 (Road No 1. East Approach)
Average Delay	12.2 seconds (Road No. 2 North Approach)	14.8 seconds (Road No 1. East Approach)
Level of Service	LOS A	LOS B (Road No 1. East Approach)
95% Back of Queue	22.1 metres (Road No 2. South Approach)	103.2 metres (Road No 1. East Approach)

For priority (sign) and roundabout controlled intersections, Level of Service is based upon the traffic movement with the worst vehicle average delay.

7.2.1.3 INTERSECTION OF ROAD NO 1 WITH ROAD NO.3

The intersection of Road Number 1 with Road Number 3 generates the traffic volume shown below. This intersection is controlled by a single lane roundabout with a diameter of approximately 6 metres. Concrete median island is proposed along Road Number 1 which would prohibit any right turn movements into and out of side streets and property accesses.

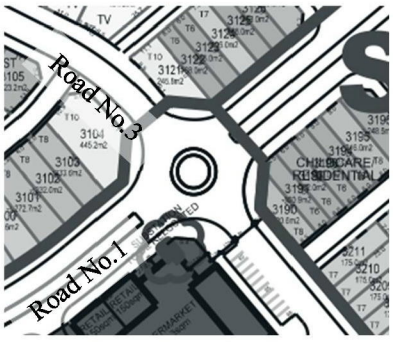


Table 7.5 Traffic Volume Intersection Road No.1 and No.3

	ROAD NO.3 (SOUTH)			ROAD NO.1 (EAST)			ROAD NO.3 (NORTH)			ROAD NO.1 (WEST)		
	L	T	R	L	T	R	L	T	R	L	T	R
AM	71	43	136	99	56	7	115	64	90	11	435	236
PM	97	70	124	132	635	68	8	70	8	136	154	297

The intersection has been modelled in SIDRA Intersections and was found to be performing satisfactorily. The result is summarised below:

Table 7.6 Intersection Road No.1 and No.3 Performance Summary

	AM Peak	PM Peak
Total Volume	1,363 vehicles	1,799 vehicles
Degree of Saturation	0.616 (Road No 1. West Approach)	0.945 (Road No 1. East Approach)
Average Delay	17.5 seconds (Road No. 2 North Approach)	33.9 seconds (Road No 1. East Approach)
Level of Service	LOS B	LOS C
95% Back of Queue	39.8 metres (Road No 1. West Approach)	215.7 metres (Road No 1. East Approach)

For priority (sign) and roundabout controlled intersections, Level of Service is based upon the traffic movement with the worst vehicle average delay.

7.2.1.4 INTERSECTION OF ROAD NO 1 WITH ROAD NO.4

The intersection of Road Number 1 with Road Number 4 generates the traffic volume shown below. This intersection is controlled by a single lane roundabout with a diameter of approximately 6 metres. Concrete median island is proposed along Road Number 1 which would prohibit any right turn movements into and out of side streets and property accesses.

Table 7.7 Traffic Volume Intersection Road No.1 and No.4

	ROAD NO.4 (SOUTH)			ROAD NO.1 (EAST)			ROAD NO.4 (NORTH)			ROAD NO.1 (WEST)		
	L	T	R	L	T	R	L	T	R	L	T	R
AM	8	0	10	3	107	32	31	0	47	16	668	2
PM	3	0	3	12	808	204	0	0	24	62	213	11

The intersection has been modelled in SIDRA Intersections and was found to be performing satisfactorily. The result is summarised below:

Table 7.8 Intersection Road No.1 and No.4 Performance Summary

	AM Peak	PM Peak
Total Volume	926 vehicles	1,343 vehicles
Degree of Saturation	0.485 (Road No 1. West Approach)	0.695 (Road No 1. East Approach)
Average Delay	12.3 seconds (Road No. 2 North Approach)	16.8 seconds (Road No 2. South Approach)
Level of Service	LOS A	LOS B
95% Back of Queue	27.7 metres (Road No 1. West Approach)	62.5 metres (Road No 1. East Approach)

For priority (sign) and roundabout controlled intersections, Level of Service is based upon the traffic movement with the worst vehicle average delay.

7.2.1.5 INTERSECTION OF ROAD NO 1 WITH LINK ROAD (TO INDUSTRIAL PRECINCT)

This intersection is proposed to be controlled by a single lane roundabout with a diameter of approximately 20 metres. The intersection of Road Number 1 with Link Road to the Dunheved Industrial area is located east of Jordan Springs East and generates the traffic volume shown below.

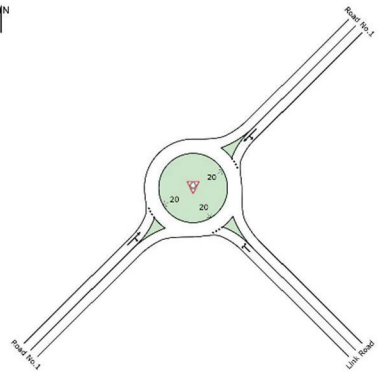


Table 7.9 Traffic Volume Intersection Road No.1 and Link Road

	ROAD NO.1 (WEST)		LINK ROAD (SOUTH)		ROAD NO.1 (EAST)	
	T	R	L	R	L	T
AM	152	652	84	0	0	70
PM	94	148	734	0	0	415

The intersection has been modelled in SIDRA Intersections and was found to be performing satisfactorily. The result is summarised below:

Table 7.10 Intersection Road No.1 and Link Road Performance Summary

	AM Peak	PM Peak
Total Volume	1,011 vehicles	1,466 vehicles
Degree of Saturation	0.496 (Road No 1. South Approach)	0.882 (Link Road)
Average Delay	9.1 seconds (Road No 1. North Approach)	22.4 seconds (Link Road)
Level of Service	LOS A	LOS B
95% Back of Queue	35.4 metres (Road No 1. South Approach)	143.7 metres (Link Road)

For priority (sign) and roundabout controlled intersections, Level of Service is based upon the traffic movement with the worst vehicle average delay.

7.2.1.6 INTERSECTION WITH ROAD NO 1 AND ROPES CROSSING BOULEVARDE

This intersection is proposed to be controlled by a single lane roundabout with a diameter of approximately 20 metres. The intersection of Road Number 1 with Ropes Crossing Boulevarde generates the traffic volume shown below.

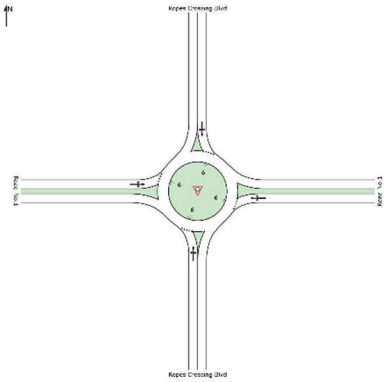


Table 7.11 Traffic Volume Intersection Road No.1 and Ropes Crossing Boulevarde

	ROPES CROSSING BLVD (SOUTH)			ROAD NO.1 (EAST)			ROPES CROSSING BLVD (NORTH)			ROAD NO.1 (WEST)		
	L	T	R	L	T	R	L	T	R	L	T	R
AM	34	157	27	85	6	6	6	422	40	99	0	56
PM	148	430	0	68	5	73	33	207	231	72	2	19

The intersection has been modelled in SIDRA Intersections and was found to be performing satisfactorily. The result is summarised below:

Table 7.12 Intersection Road No.1 and No.4 Performance Summary

	AM Peak	PM Peak
Total Volume	939 vehicles	1,289 vehicles
Degree of Saturation	0.345 (Ropes Crossing Blvd. North Approach)	0.544 (Ropes Crossing Blvd. South Approach)
Average Delay	11.6 seconds (Road No. 1 East Approach right turn)	11.5 seconds (Road No.1 West Approach)
Level of Service	LOS A	LOS A
95% Back of Queue	16.4 metres (Ropes Crossing Blvd. North Approach)	29.7 metres (Ropes Crossing Blvd. South Approach)

For priority (sign) and roundabout controlled intersections, Level of Service is based upon the traffic movement with the worst vehicle average delay.

8 JORDAN SPRINGS INTERNAL ROAD ASSESSMENT

An assessment of the traffic generated by the Jordan Springs East development under the with rezoning scenario has been undertaken to determine the likely impacts to key intersections within Jordan Springs primarily along Lakeside Parade. Figure 7 below shows an aerial image of Jordan Springs including the locations of intersections assessed along Lakeside Parade including Jordan Springs Boulevard, Jubilee Drive (East and West), Alinta Promenade, Illoura Way and Greenwood Parkway.

Figure 7 – Jordan Springs road network layout

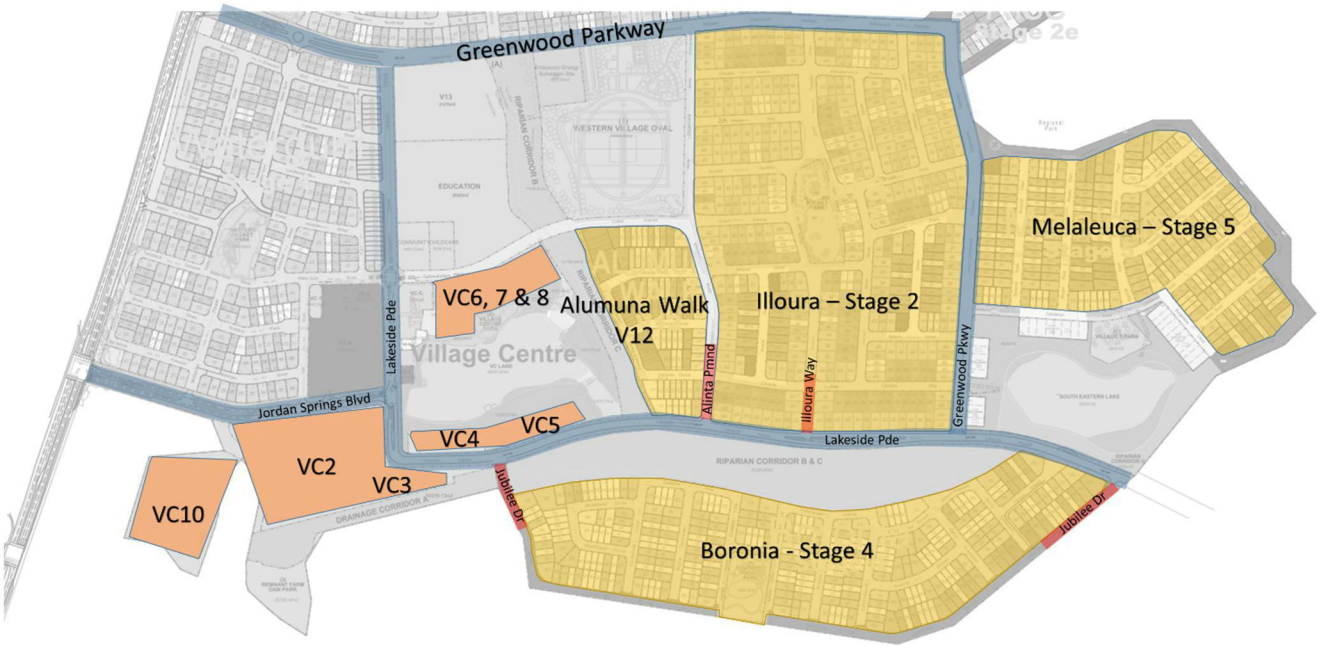


Figure 8 – Jordan Springs road network layout and development adjacent Lakeside Parade

The internal layout of Jordan Springs generally consists of two (2) east-west orientated collector roads that are designed with the intent of equally splitting the distribution of traffic between Greenwood Parkway to the north and Lakeside Parade to the south.

8.1 ASSUMPTIONS

For this exercise, to determine the volumes on Lakeside Parade between Jordan Springs Boulevarde and Jubilee Drive the following assumptions are made:

- All of Stage 4 (Boronia) traffic enter and exit the site via Lakeside Parade. The distribution is assumed equal between Jubilee Drive (east) and Jubilee Drive (west)
- 50% of Stage V12 (Alumuna Walk) traffic enter and exit to Lakeside Parade via Alinta Promenade. The remaining 50% would utilise Greenwood Parkway to/from the north.
- 50% of Stage 2 (Illoura) traffic enter and exit to Lakeside Parade, equally distributed between Alinta Promenade, Illoura Way and Greenwood Parkway. The remaining 50% would utilise Greenwood Parkway to/from the north.
- 50% of Stage 5 (Melaleuca) traffic enter and exit to Lakeside Parade via Greenwood Parkway (section running north/south). The remaining 50% would utilise Greenwood Parkway to/from the north.
- 100% of the Village Centre (VC) 3, 4, 5, 6, 7 & 8 is located within the vicinity of the intersection of Jordan Springs Boulevarde and Lakeside Parade and adjacent the Village Centre will travel through the Jordan Springs Boulevarde and Lakeside Parade intersection.
- 100% of the Village Centre (VC)2 would be via Jordan Springs Boulevard.
- All Stages 2, 4, 5, VC2, 3, 4, 5, 6, 7, 8, 10 and V12 are assumed to be residential dwellings.
- Due to the layout and location of the precinct being accessible only from The Northern Road as the major arterial road, this assessment assumes that all traffic entering and exiting the side streets north of Lakeside Parade carry out left-in and right-out movements. Similarly, all traffic entering/exiting the side streets south of Lakeside Parade carry out right-in and left-out movements. As per Table 6.2, the trip distribution for residential is 20/80 in/out for the AM peak and is reversed during the PM peak.

8.2 TRIP GENERATION

The resulting trips generated based on the above assumptions are as follows:

Table 8.1 Residential Trip Generation Stage 2, 4, 5, V12 and VC2 to VC8 in Jordan Springs

	NUMBER OF DWELLINGS/APARTMENTS	TRIPS IN AM PEAK (RATE OF 0.76 PER DWELLING)	TRIPS IN PM PEAK (RATE OF 0.97 PER DWELLING)	TRIPS IN AM PEAK (RATE OF 0.5 PER APARTMENT	TRIPS IN PM PEAK (RATE OF 0.5 PER APARTMENT)
Boronia (Stage 4)	292	222	283	-	-
Alumuna Walk (Stage V12)	292	222	283	-	-
Illoura (Stage 2)	427	325	414	-	-
Melaleuca (Stage 5)	248	188	241	-	-
Village Centre (VC 2, 3, 4, 5, 6 ,7 & 8)	599	-	-	300	300

8.3 TRIP DISTRIBUTION ON LOCAL STREETS TO LAKESIDE PARADE

Table 8.2 below distributes the resulting trips generated from the residential developments proposed as detailed in Table 8.1 to the side streets connecting Lakeside Parade including Jubilee Drive, Alinta Promenade, Illoura Way and Greenwood Parkway.

Table 8.2 Distribution of Residential Trips (Stage 2, 4, 5, V12, VC2 to VC8)

	DISTRIBUTION TO LAKESIDE PARADE		JUBILEE DR (WEST)		ALINTA PROMENADE		ILLOURA WAY		GREENWOOD PARKWAY		JUBILEE DR (EAST)	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
Boronia (Stage 4)	222	283	111	142							111	142
Alumuna Walk (Stage V12)	111	141			111	142						
Illoura (Stage 2)	162	207			54	69	54	69	54	69		
Melaleuca (Stage 5)	94	120							94	120		
Village Centre (VC 2, 3, 4, 5, 6 ,7 & 8	21	21	21	21								
TOTAL	610	773	132	162	165	210	54	69	148	189	111	141
IN	122	619	26	130	33	169	11	55	30	151	22	113
OUT	488	155	106	33	132	42	43	14	119	38	89	28

The resulting trips above are additional to the trips generated/attracted from Jordan Springs East. The cumulative trips made from Jordan Springs East and Jordan Springs Stage 2, 4, 5, Village 12 and Village Centre VC2 to VC8 are as follows:

Table 8.3 Cumulative Trips in Lakeside Parade

		Trips Generated From Jordan Springs East		Trips Generated From Jordan Springs		Total	
		AM	PM	AM	PM	AM	PM
Lakeside Parade	IN	112	772	122	619	**234**	**1391**
	OUT	490	217	488	155	**978**	**372**

8.4 TRIP ASSIGNMENT

8.4.1 ORIGIN DESTINATION SURVEY RESULT

The Origin Destination survey undertaken for trips currently generated and attracted from Jordan Springs to The Northern Road are as follows:

Table 8.4 Origin Destination survey result of Jordan Springs traffic on The Northern Road

	AM Outbound	AM Inbound	PM Outbound	PM Inbound
To/From North	29%	32%	24%	31%
To/From West	7%	20%	15%	20%
To/From South	64%	48%	61%	49%

Assuming that this pattern is followed by traffic into and out of Jordan Springs East. The distribution of the resulting trips out of Jordan Springs East and Stage 2, 4, 5, Village 12 and Village Centres VC2 to VC8 of Jordan Springs to The Northern Road are as follows:

Table 8.5 Applied Origin Destination Survey to combined Jordan Springs East & Jordan Springs Traffic on Lakeside Parade

	978 trips	234 trips	372 trips	1391 trips
	AM Outbound	AM Inbound	PM Outbound	PM Inbound
To/From North	283	74	89	431
To/From West	68	46	55	278
To/From South	625	112	226	681

8.5 LAKESIDE PARADE / JORDAN SPRINGS BOULEVARDE

8.5.1 INTERSECTION COUNT

An intersection count undertaken in October 2016 revealed the following volumes for the intersection of Lakeside Parade/Jordan Springs Boulevarde

Table 8.6 Intersection Count at Lakeside Parade/Jordan Springs Boulevarde

	LAKESIDE PARADE (NORTH)		LAKESIDE PARADE (SOUTH)		JORDAN SPRINGS BOULEVARDE	
PEAK HOUR	T	R	L	T	L	R
AM (7:45-8:45)	10	92	143	16	61	54
PM (17:00-18:00)	22	125	97	8	168	155

8.5.2 GROWTH

At the time of the survey, construction of Jordan Springs had been ongoing with the status of the development as follows:

Table 8.7 Land Use and Resulting Trips

Land Use	2016 Land Use	2021 (Ultimate) Land Use	2016 Resulting AM Trips	2016 Resulting PM Trips	2021 Resulting AM Trips	2021 Resulting PM Trips
Residential dwellings	1,897	3,437	1441.72	1840.09	2612.12	3333.89
Apartments	0	599	0	0	299.5	299.5
Retail (m^2) GFA	4,920	8,200	302.58	605.16	504.3	1008.6
Childcare	60	200	84	48	280	160
Medical Centre	3	3	17.4	17.4	17.4	17.4
School (children)	0	460	0	0	368	0
School Staff	0	15	0	0	15	0
TOTAL			1846	2511	4097	4819
Proportion of 2016 resulting trip to 2021 (ultimate) resulting trip			1,846/4,097 45.1%	2,511/4,819 52.1%	-	-

Based on the above assessment, it is therefore estimated that the traffic volumes surveyed in October 2016 account for approximately 45.1% and 52.1% of the respective AM and PM traffic volumes envisaged to be experienced in the ultimate completion year of 2021.

This growth rate will be applied to the traffic movements that have not been accounted for in the calculation detailed in Section 8.3 above which included trips out of Jordan Springs East and Stage 2, 4, 5, Village 12, VC2 to VC8 of Jordan Springs. These movements include the right turn out of Lakeside Parade (north approach) and left turn from Jordan Springs (west approach) to the intersection.

8.5.3 ROUTE OPTION

For the purpose of this study, the following assumptions are made at the intersection of Jordan Springs Boulevarde and Lakeside Parade with regards to the turning movements made by the trips out of Jordan Springs East and Stage 2, 4, 5, Village 12 and VC2 to VC8 of Jordan Springs. The assumptions are based on the number of vehicles entering/exiting the St Marys Development via Greenwood Parkway as estimated from the Aimsun mesoscopic modelling study.

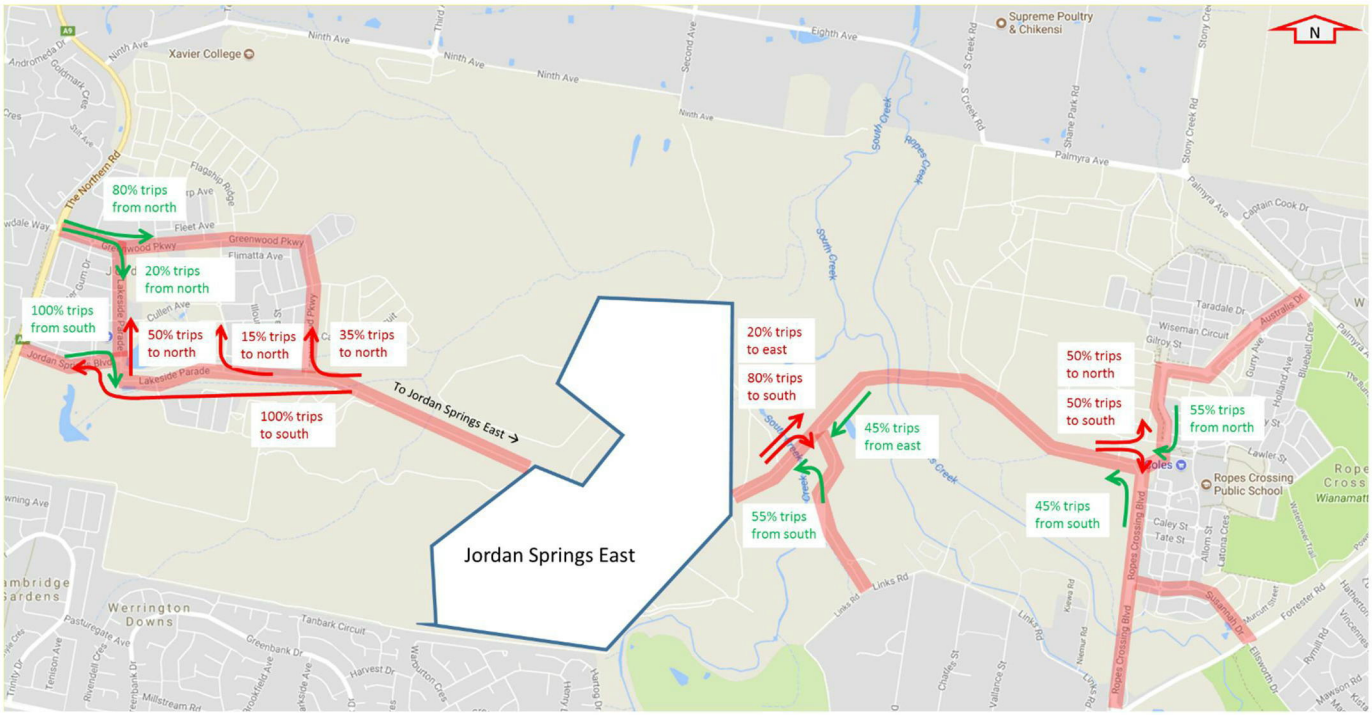


Figure 9 - Route Option to/from Jordan Springs East to Lakeside Parade/Jordan Springs Boulevarde, East-West Connector Road/Links Road and East-West Connector Road/Ropes Crossing Boulevard

8.5.4 JORDAN SPRINGS BOULEVARDE/LAKESIDE PARADE RESULTING 2021 INTERSECTION VOLUMES

The resulting traffic volume at the intersection of Jordan Springs Boulevarde and Lakeside Parade can be summarised in Table 8.8, considering:

- The traffic generated from Jordan Springs East as detailed in Section 7,
- Traffic generated from Jordan Springs Stage 2, 4, 5, Village 12, Village Centres VC2 to VC8 as detailed in Section 8.3 and
- Traffic growth as detailed in Section 8.5.2.associated with the turning movements not assessed in the abovementioned sections, including right turn out of Lakeside Parade (north approach) and left turn from Jordan Springs Boulevarde (west approach) to the intersection.

Table 8.8 Lakeside Parade/Jordan Springs Boulevarde – trips from Jordan Springs East

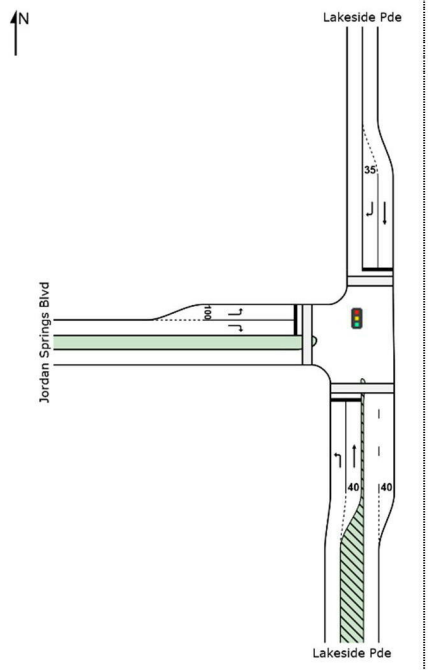
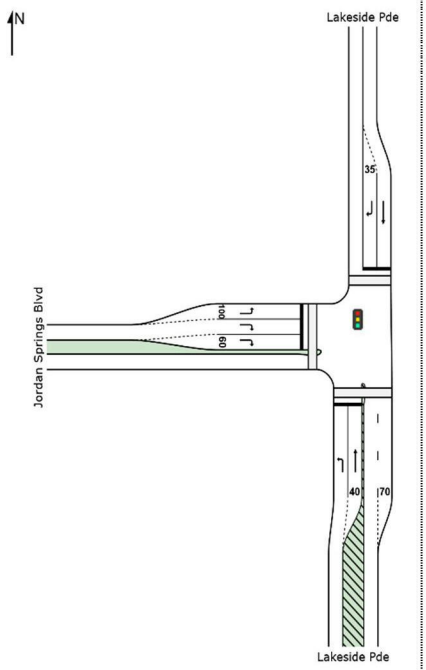
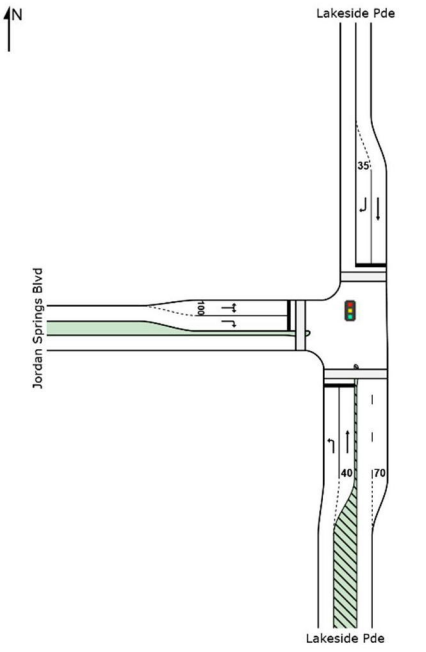
	Lakeside Parade (North)		Lakeside Parade (South)		Jordan Springs Boulevarde	
Peak Hour	T	R	L	T	L	R
AM Peak	35	150	800	90	99	187
PM Peak	133	201	472	39	99	935

The resulting trips as shown in Table 8.8 was modelled in SIDRA using the existing layout of the intersection of Jordan Springs Boulevarde and Lakeside Parade. The assessment found that the intersection of Jordan Springs Boulevarde and Lakeside Parade is likely to fail under its current layout prior to 2021 with the projected traffic volumes due to the growth in Jordan Springs and Jordan Springs East. This is due to the heavy right turn movement from Jordan Springs Boulevard to Lakeside Parade in the weekday PM peak. As such, two (2) options were developed for the intersection to improve the west-south approaches and have also been modelled accordingly (refer to Table 8.9).

The upgraded layouts consist of:

- Upgraded Layout Option 1
  - installation of an additional 60m right turn bay on Jordan Springs Boulevarde (west approach) to the intersection. This could be achieved by modifying the median island and the kerb alignment of the south-western corner of the intersection. The right turn bay into the shopping centre may need to be shortened or alternatively be replaced with a right turn bay into Tyler Street.
  - extension of the southbound departure lane from 40m to 70m.
- Upgraded Layout Option 2
  - extension of the southbound departure lane from 40m to 70m as in Option 1.
  - adjust pavement marking of the left turn lane on the western approach to a shared left and right turn lane.

Table 8.9 Lakeside Parade/Jordan Springs Boulevarde Existing and future layout

Existing Layout	Upgraded Layout Option 1	Upgraded Layout Option 2
		
Movement Summary		
AM Peak	2021 AM Peak Total Vehicle: 1,361 veh/h Degree of Saturation: 0.844 Average Delay: 20.6 Level of Service: B 95% Back of Queue: 124.1 metres (South approach)	2021 AM Peak Total Vehicle: 1,361 veh/h Degree of Saturation: 0.844 Average Delay: 19.8 Level of Service: B 95% Back of Queue: 124.1 metres (South approach)	2021 AM Peak Total Vehicle: 1,361 veh/h Degree of Saturation: 0.844 Average Delay: 19.9 Level of Service: B 95% Back of Queue: 124.1 metres (South approach)

	Existing Layout	Upgraded Layout Option 1	Upgraded Layout Option 2
PM Peak	2021 PM Peak Total Vehicle: 1,879 veh/h Degree of Saturation: 1.162 Average Delay: 245.8 Level of Service: F 95% Back of Queue: 1385.0 metres (West approach)	2021 PM Peak Total Vehicle: 1,879 veh/h Degree of Saturation: 0.730 Average Delay: 18.0 Level of Service: B 95% Back of Queue: 90.7 metres (West approach)	2021 PM Peak Total Vehicle: 1,879 veh/h Degree of Saturation: 0.841 Average Delay: 19.6 Level of Service: B 95% Back of Queue: 120.5 metres (West approach)

8.6 INTERSECTION OF JUBILEE DR (WEST) AND LAKESIDE PARADE

The intersection of Jubilee Drive (west) with Lakeside Parade is a priority controlled T-intersection with Lakeside Parade being the major road in the east-west direction. There is an existing concrete refuge island on Lakeside Parade, east of Jubilee Drive (west) to assist pedestrians crossing Lakeside Parade.

The intersection of Jubilee Drive (west) with Lakeside Parade is envisaged to comprise of traffic volumes as shown in Table 8.10 below upon the completion of the St Marys development site in 2021.

It is envisaged that there will be minimal demand of trips from/to Jubilee Drive to the Jordan Springs East.

Table 8.10 2021 Traffic Volumes at Jubilee Drive (west) and Lakeside Parade intersection

	JUBILEE DRIVE W (SOUTH)		LAKESIDE PARADE (EAST)		LAKESIDE PARADE (WEST)	
	L	R	L	T	T	R
AM	106	0	0	748	186	26
PM	33	0	0	470	902	130

The existing intersection layout has been modelled in SIDRA utilising future traffic volumes and was found to be performing adequately. The SIDRA results are summarised below:

Table 8.11 Jubilee Drive (west) and Lakeside Parade Intersection Performance Summary

	AM Peak	PM Peak
Total Volume	1.068 vehicles	1,537 vehicles
Degree of Saturation	0.384 (Lakeside Parade (east))	0.463 (Lakeside Parade (west) through)
Average Delay	9.5 seconds (Jubilee Drive left turn)	7.4 seconds (Lakeside Parade (west) right turn)
Level of Service	LOS A	LOS A

	AM Peak	PM Peak
95% Back of Queue	3.8 metres (Jubilee Drive left turn)	3.5 metres (Lakeside Parade (west) right turn)

8.7 INTERSECTION OF ALINTA PROMENADE AND LAKESIDE PARADE

The intersection of Alinta Promenade with Lakeside Parade is a priority controlled T-intersection with Lakeside Parade being the major road in the east-west direction. There is an existing concrete refuge island on Lakeside Parade, west of Alinta Promenade to assist pedestrians crossing Lakeside Parade.

The intersection of Alinta Promenade with Lakeside Parade is envisaged to comprise of a traffic volume as shown in Table 8.12 below upon the completion of the St Marys development site in 2021.

It is envisaged that there will be minimal demand of trips from/to Alinta Promenade to Jordan Springs East.

Table 8.12 2021 Traffic Volume at Alinta Promenade and Lakeside Parade

	ALINTA PROMENADE (NORTH)		LAKESIDE PARADE (EAST)		LAKESIDE PARADE (WEST)	
	L	R	T	R	T	L
AM	0	132	616	37	153	33
PM	0	42	427	35	733	169

The intersection has been modelled in SIDRA and was found to be performing adequately. The SIDRA results are summarised below:

Table 8.13 Alinta Promenade and Lakeside Parade Intersection Performance Summary

	AM Peak	PM Peak
Total Volume	972 vehicles	1,407 vehicles
Degree of Saturation	0.337 (Alinta Promenade right turn)	0.467 (Lakeside Parade (west))
Average Delay	15.7 seconds (Alinta Promenade right turn)	29.3 seconds (Alinta Promenade right turn)
Level of Service	LOS B	LOS C
95% Back of Queue	10.2 metres (Alinta Promenade right turn)	5.8 metres (Alinta Promenade right turn)

8.8 INTERSECTION OF ILLOURA WAY AND LAKESIDE PARADE

The intersection of Illoura Way with Lakeside Parade is a priority controlled T-intersection with Lakeside Parade being the major road in the east-west direction. There is an existing median island on Lakeside Parade east of Illoura Way which provides a combined right turn bay and pedestrian refuge island. A pedestrian refuge island also exists on Lakeside Parade west of Illoura Way.

The intersection of Illoura Way with Lakeside Parade is envisaged to comprise of traffic volumes as shown in Table 8.14 below upon the completion of the St Marys development site in 2021.

It is envisaged that there will be minimal demand of trips from/to Illoura Way to Jordan Springs East.

Table 8.14 2021 Traffic Volume at Illoura Way and Lakeside Parade

	ILLOURA WAY (NORTH)		LAKESIDE PARADE (EAST)		LAKESIDE PARADE (WEST)	
	L	R	T	R	T	L
AM	0	43	610	0	142	11
PM	0	14	448	0	678	55

The intersection has been modelled in SIDRA and was found to be performing adequately. The SIDRA results are summarised below:

Table 8.15 Illoura Way and Lakeside Parade Intersection Performance Summary

	AM Peak	PM Peak
Total Volume	808 vehicles	1,197 vehicles
Degree of Saturation	0.313 (Lakeside Parade (east))	0.377 (Lakeside Parade (west))
Average Delay	12.5 seconds (Illoura Way right turn)	21.0 seconds (Illoura Way right turn)
Level of Service	LOS A	LOS B
95% Back of Queue	2.5 metres (Illoura Way right turn)	1.4 metres (Illoura Way right turn)

8.9 INTERSECTION OF GREENWOOD PARKWAY AND LAKESIDE PARADE

The intersection of Greenwood Parkway with Lakeside Parade is a priority controlled T-intersection with Lakeside Parade being the major road in the east-west direction. There is an existing refuge island on Lakeside Parade, east of Greenwood Parkway to assist pedestrians with crossing Lakeside Parade.

The intersection of Greenwood Parkway with Lakeside Parade is envisaged to comprise of traffic volumes as shown in Table 8.16 below upon the completion of the St Marys development site in 2021.

It is envisaged that there will be minimal demand of trips into/out of Greenwood Parkway to the Jordan Springs East.

Table 8.16 2021 Traffic Volume at Greenwood Parkway and Lakeside Parade

	GREENWOOD PARKWAY (NORTH)		LAKESIDE PARADE (EAST)		LAKESIDE PARADE (WEST)	
	L	R	T	R	L	T
AM	109	119	492	87	30	113
PM	359	38	411	81	151	526

The intersection has been modelled in SIDRA and was found to be performing satisfactorily. The SIDRA results are summarised below:

Table 8.17 Lakeside Parade and Greenwood Parkway Intersection Performance Summary

	AM Peak	PM Peak
Total Volume	950 vehicles	1,566 vehicles
Degree of Saturation	0.309 (Greenwood Parkway right turn)	0.372 (Greenwood Parkway left turn)
Average Delay	9.6 seconds (Greenwood Parkway right turn)	13.3 seconds (Greenwood Parkway right turn)
Level of Service	LOS A	LOS A
95% Back of Queue	4.5 metres (Greenwood Parkway right turn)	13.9 metres (Greenwood Parkway left turn)

8.10 INTERSECTION OF JUBILEE DRIVE (EAST) AND LAKESIDE PARADE

The intersection of Jubilee Drive (east) with Lakeside Parade is a priority controlled T-intersection with Lakeside Parade being the major road in the east-west direction, which also provides a direct connection to Jordan Springs East. There is an existing refuge island on Lakeside Parade, west of Jubilee Drive to assist pedestrians with crossing Lakeside Parade.

The intersection of Jubilee Drive (east) with Lakeside Parade is envisaged to comprise of a traffic volume as shown in Table 8.18 below upon the completion of the St Marys development site in 2021.

It is envisaged that there will be minimal demand of trips between Stage 4 of Jordan Springs (serviced by Jubilee Drive) to Jordan Springs East. An input of 1 vehicle turning right out of and turning left into Jubilee Drive have been modelled to investigate the delay of these movements should there be a demand.

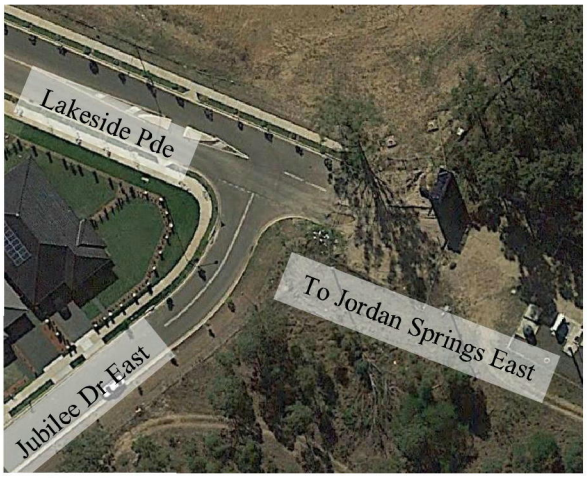


Table 8.18 Future Traffic Volume at Jubilee Drive (east) and Lakeside Parade

	JUBILEE DRIVE E (SOUTH)		LAKESIDE PARADE (EAST)		LAKESIDE PARADE (WEST)	
	L	R	T	L	T	R
AM	89	0	490	0	199	22
PM	28	0	464	0	772	113

The intersection has been modelled in SIDRA and was found to be performing satisfactorily. The SIDRA result is summarised below:

Table 8.19 Intersection Jubilee Drive (east) and Lakeside Parade Performance Summary

	AM Peak	PM Peak
Total Volume	802 vehicles	1,379 vehicles
Degree of Saturation	0.252 (Lakeside Parade (east))	0.499 (Lakeside Parade (west))
Average Delay	7.6 seconds (Lakeside Parade right turn)	9.2 seconds (Lakeside Parade right turn)
Level of Service	LOS A	LOS A
95% Back of Queue	2.4 metres (Jubilee Drive left turn)	16.1 metres (Lakeside Parade right turn)

It must be noted that whilst the intersection is determined to be performing satisfactorily under its current layout, safety benefits can be gained at the intersection by relocating the existing refuge island at the Lakeside Parade western approach to accommodate a right turn bay to service at least two (2) car lengths into Jubilee Drive. A right turn bay would separate traffic queues formed by vehicles turning right into Jubilee Drive from those travelling east-west into and out of Jordan Springs East and thus reducing the likelihood of a rear-end crash.

9 EXTERNAL ROAD NETWORK – TRAFFIC PROPORTIONS & WORKS IN KIND

The assessment of the external road network establishes a suite of theoretical road and intersection upgrades that are required for future year forecasts including 2021, 2026 and 2031. The suite of theoretical road and intersection upgrades were subject to detailed apportionment calculations to establish the impact of the St Marys Development Site on the external road network and analyses to establish the impacts of the proposed rezoning on the external road network. The assessment established that the proposed land use had limited impact on the external road network.

The apportionment calculations were used to inform a suite of Works in Kind items which Lendlease will undertake over the coming years. The works in kind items have been subject to negotiations with Penrith City Council, Roads and Maritime and Transport for NSW and are considered to offset the impacts on the external road network of the St Marys Development Site.

9.1 DEVELOPMENT TRAFFIC PROPORTIONS

The proportion of St Marys Development Site traffic on the road network under the 'with rezoning' scenario was completed utilising Aimsun traffic modelling. Development traffic proportions at identified intersection upgrades or road upgrades were extracted from the Aimsun modelling undertaken for the year 2021. For conservative traffic purposes, the traffic proportions are based upon 2021 AM and PM 'with Links Road extension' and 'with rezoning' scenario. Future year traffic demands and associated road networks were extracted from the Roads and Maritime EMME strategic model. Traffic volumes for year 2021 are tabled below for both intersections (refer to Table 9.1) and road mid-blocks sections (refer to Table 9.2) and show both background and development traffic over 1 hour AM and PM peak periods.

The EMME strategic modelling provided to WSP by Roads and Maritime includes road infrastructure projects that do not have any government commitment or funding but are input assumptions within the medium and long term future strategic EMME models. It does not necessarily mean these projects will be funded and constructed by government in the future. Road infrastructure link upgrades/intersection upgrades included in future EMME traffic models do not reflect any current Government policy or commitment. In this regard, it is an assumption for modelling purposes only.

Table 9.1 St Marys Development Site – Development Traffic Proportions at Intersections in Year 2021 under the 'with rezoning' scenario with 'Links Road extension'

INTERSECTIONS	2021 AM PEAK TOTAL TRAFFIC	2021 AM PEAK DEVELOPMENT TRAFFIC	2021 AM PEAK % DEV TRAFFIC	2021 PM PEAK TOTAL TRAFFIC	2021 PM PEAK DEVELOPMENT TRAFFIC	2021 PM PEAK % DEV TRAFFIC	2021 AVG AM & PM % DEV TRAFFIC
I-01 The Northern Road and Ninth Avenue	2,498	916	37%	2,614	1,073	41%	39%
I-03 The Northern Road and Greenwood Parkway	3,474	2,035	59%	3,772	2,274	60%	60%
I-07 The Northern Road and Andrews Road	4,625	1,989	43%	4,587	2,166	47%	45%
I-08 Richmond Road and Trinity Drive	4,222	1,640	39%	4,091	1,615	39%	39%
I-13 Great Western Highway and Parker Street	5,495	560	10%	5,881	619	11%	11%
I-16 Forrester Road and Palmyra Avenue	2,884	647	22%	2,838	877	31%	27%
I-18 Forrester Road, Ropes Crossing Blvd and Links Rd	3,971	1,989	50%	3,991	2,126	53%	52%
I-19 Forrester Road, Christie Street and Boronia Road	3,746	1,539	41%	4,098	1,703	42%	42%
I-22 Christie Street, Lee Holm Road and Links Rd Extension	2,112	582	28%	2,316	573	25%	27%
I-23 Christie Street, Dunheved Road and Werrington Road	2,824	504	18%	3,130	583	19%	19%
I-25 Dunheved Road and John Oxley Avenue	1,806	205	11%	2,251	293	13%	12%
I-26 Dunheved Road, Francis Street and Greenbank Drive	1,859	250	13%	2,111	281	13%	13%
I-31 Dunheved Precinct Frontage and Links Road	862	815	95%	1,018	913	90%	93%

Please note that the volumes tabled are for 1 hour peak AM and PM periods extracted from Aimsun.

Table 9.2 St Marys Development Site – Development Traffic Proportions at Road Sections in Year 2021 under the 'with rezoning' scenario with 'Links Road extension'

ROAD SECTIONS	2021 AM PEAK TOTAL TRAFFIC LINK (PEAK DIRECTION)	2021 AM PEAK DEVELOPMENT TRAFFIC LINK (PEAK DIRECTION)	2021 AM PEAK % DEV TRAFFIC (PEAK DIRECTION)	2021 PM PEAK TOTAL TRAFFIC LINK (PEAK DIRECTION)	2021 PM PEAK DEVELOPMENT TRAFFIC LINK (PEAK DIRECTION)	2021 PM PEAK % DEV TRAFFIC (PEAK DIRECTION)	2021 AVG AM & PM % DEV TRAFFIC (PEAK DIRECTIONS)
RN-01 Werrington Road – Dunheved Road to Parkes Avenue	1,167	258	22%	1,033	201	19%	21%
RN-19 Christie Street – South Creek to Forrester Road	1,059	161	15%	1,373	231	17%	16%
RN-20 Andrews Road – Castlereagh Road to Richmond Road	779	287	37%	813	424	52%	45%
RN-25 Links Road Upgrade – Dunheved Precinct to Dunheved Gold Club	293	281	96%	233	150	64%	80%
RN-26 Links Road Extension – Dunheved Gold Club to Christie Street	293	281	96%	233	150	64%	80%
RN-28 The Northern Road – Borrowdale Way to Andromeda Drive	1,226	582	47%	1,419	652	46%	47%
RN-29 Werrington Road – Parkes Avenue to The Kingsway	1,425	228	16%	1,033	201	19%	18%
RN-30 Gipps Street Extension – Great Western Highway to Werrington Road	690	69	10%	559	50	9%	10%
RN-31 Stony Creek Road – Palmyra Avenue to Study boundary	562	51	9%	503	127	25%	17%

Please note that the volumes tabled are for 1 hour AM and PM periods extracted from Aimsun.

9.2 LENDLEASE WORKS IN KIND

The following works in kind are detailed in the letter, *St Marys Development Site – Irrevocable Offer to enter a revised St Marys Penrith Planning Agreement with Penrith City Council*, King & Wood Mallesons, 17 October 2017. This letter details Lendlease's works in kind offer to Penrith City Council. The Local Transport Works which forms the works in kind include the following:

- Item 1: Intersection upgrade of Forrester Road, Links Road and Ropes Crossing Boulevarde
- Item 2: Intersection upgrade of Forrester Road, Christie Street and Boronia Avenue
- Item 3: Intersection upgrade of The Northern Road, Borrowdale Way and Greenwood Parkway
- Item 4: New intersection of Links Road Extension and Christie Street
- Item 5: Links Road Upgrade and Extension (Dunheved Precinct to Christie Street)
- Item 6: Linemarking: Christie Street (South Creek Bridge to Forrester Road)
- Item 7: Road widening: Forrester Road (Links Road intersection to Ropes Creek Bridge).

10 CONCLUSION

10.1 JORDAN SPRINGS EAST

10.1.1 MID-BLOCK

The mid-block traffic volume analysis revealed:

— That within Jordan Springs East, the traffic volumes assessed mid-block are found to be below the single lane road capacity of 1,000 passenger car unit (pcu)/hour and as such the planned internal road layout consisting of two-lane/two-way roads are considered satisfactory.

— The highest mid-block volumes can be found on the Collector Road No.1 (travelling east-west) near the Village Centre. This finding is expected due to the number of trip attractors that exist at the location, including the retail, childcare and medical centre developments.

— The East-West Connector Road to both Jordan Springs and Ropes Crossing have been assessed and carry approximately 1,000 passenger car unit (pcu) per hour per lane in any direction. As such, a two-lane/two-way road to Jordan Springs will be sufficient.

10.1.2 INTERSECTIONS

The performance of intersections along Collector Road No. 1 with the four (4) major north-south roads within the Jordan Springs East were investigated. The assessment of the internal intersections found that:

— All major intersections investigated in this report are performing adequately. The grid layout of Jordan Springs East, north of Collector Road No.1 allows for a greater route choice for drivers to reach their destinations.

— The use of roundabout control at intersections were found to be adequate to manage the traffic flow within Jordan Springs East.

The performance of the two proposed (2) intersections along Collector Road No. 1 with Link Road to the industrial precinct and Ropes Crossing Boulevarde to the east of Jordan Springs East were investigated. The assessment of the intersections found that:

— All proposed intersections investigated in this report are performing adequately.

— The use of roundabout control at intersections were found to be adequate to manage the traffic flow at Collector Road No1 with Link Road to industrial precinct and Ropes Crossing Boulevarde.

10.2 IMPACT OF JORDAN SPRINGS EAST WITHIN JORDAN SPRINGS

10.2.1 MID-BLOCK

An assessment of the internal road network in Jordan Springs with consideration of the Jordan Springs East traffic found that the mid-block volumes on Lakeside Parade between Jordan Springs Boulevarde and Jubilee Drive (west) will slightly exceed the 1,000 passenger car unit per lane of a typical mid-block capacities for urban roads with interrupted flow (*Austroads Part 3*, 2013). This section of Lakeside Parade is a mix of one and two lanes as well as having wide travel paths where single lane and therefore would be able to accommodate increased vehicle capacity in this section.

Lakeside Parade however has been designed with minimal intent of traffic interruption with most the land uses being open parks. The largest source of traffic interruptions along Lakeside Parade are likely to be generated from low-density

residential properties accessible from the northern kerbside between Alinta Promenade and Greenwood Parkway. To further reduce the interruptions associated with vehicles entering/exiting the developments, it is recommended that Lakeside Parade be line marked to separate the on-street parking spaces from the trafficable lane and that a median island to be installed restricting all access to a left-in/left-out only.

The performance and resulting queue lengths of each of the intersections along Lakeside Parade south of Jordan Springs Boulevarde have been assessed.

10.2.2 INTERSECTION

- The intersection of Jordan Springs and Lakeside Parade is likely to fail once both Jordan Springs and Jordan Springs East are completed. The intersection will need to be upgraded to the layout as shown in Table 8.9.
- The current layout of Lakeside Parade and Jubilee Drive (west) intersection was found to be performing satisfactorily when subjected to future (2021) volumes.
- The current layout of Lakeside Parade and Alinta Promenade intersection was found to be performing satisfactorily when subjected to future (2021) volumes.
- The current layout of Lakeside Parade and Illoura Way intersection was found to be performing satisfactorily when subjected to future (2021) volumes.
- The current layout of Greenwood Parkway and Lakeside Parade intersection was found to be performing satisfactorily when subjected to future (2021) volumes.
- The current layout of Jubilee Drive (east) and Lakeside Parade intersection was found to be performing satisfactorily when subjected to future (2021) volumes. However, to improve safety at the intersection it is recommended that the pedestrian refuge located west of Jubilee Drive be relocated to make way for a right turn bay.

10.3 IMPACT OF JORDAN SPRINGS EAST ON THE EXTERNAL ROAD NETWORK

The impact of Jordan Springs East 'with rezoning' with have limited impact on the external road network when compared to the 'without rezoning' scenario as assessed in the *St Marys Development Site Regional Traffic Modelling, Traffic and Transport Assessment, WSP, October 2017.*

Those intersections where performance differences were noted between 'with rezoning' and 'without rezoning' include:

Year 2021

- The Northern Road, Borrowdale Way and Greenwood Parkway: this intersection performed worse under the 'with rezoning' scenario
- Christie Street, Dunheved Road and Werrington Road: in the PM peak, this intersection performed slightly worse (level of service change) under the 'with rezoning' scenario.

Year 2026

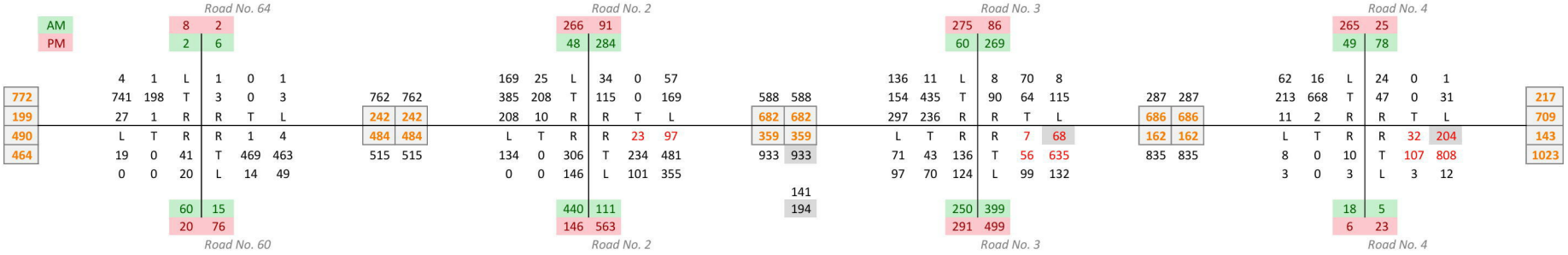
- Palmyra Avenue and Australis Drive: in the PM peak, this intersection performed slightly worse under the 'with rezoning' scenario
- Dunheved Road and John Oxley Avenue: in both the AM and PM peaks, this intersection performed slightly worse under the 'with rezoning' scenario

Year 2031

- Werrington Road and Great Western Highway: in the AM peak, this intersection performed slightly worse under the 'with rezoning' scenario.

APPENDIX A

TRIPS GENERATED ONTO ROAD NO.1 BY JORDAN SPRINGS EAST

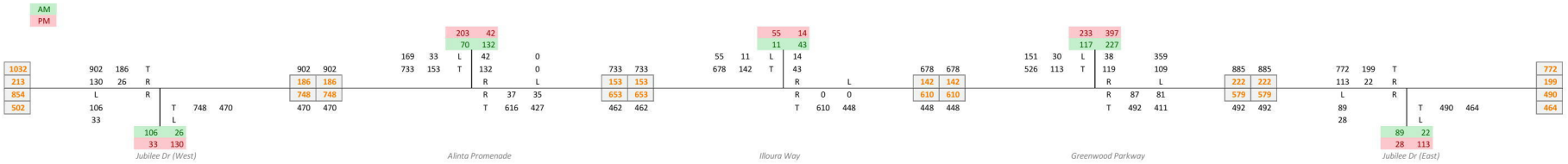


PM	AM	L	PM	PM	PM
PM	AM	T	AM	AM	AM
PM	AM	R	R	T	L
L	T	R	R	AM	PM
AM	AM	AM	T	AM	PM
PM	PM	PM	L	AM	PM

"\\APSYDFIL03\proj\M\MARYLAND_DVLPMNT_CO\2197037A_Central_Precinct_Traffic_Mode\05_WrkPapers\WP\Draft\Internal Road Assessment - Jordan Springs East\Calculations\TripAssignmentv4.xlsx"

APPENDIX B

TRIPS GENERATED ONTO LAKESIDE PARADE BY JORDAN SPRINGS AND JORDAN SPRINGS EAST



PM	AM	L	PM	PM	PM
PM	AM	T	AM	AM	AM
PM	AM	R	R	T	L
L	T	R	R	AM	PM
AM	AM	AM	T	AM	PM
PM	PM	PM	L	AM	PM

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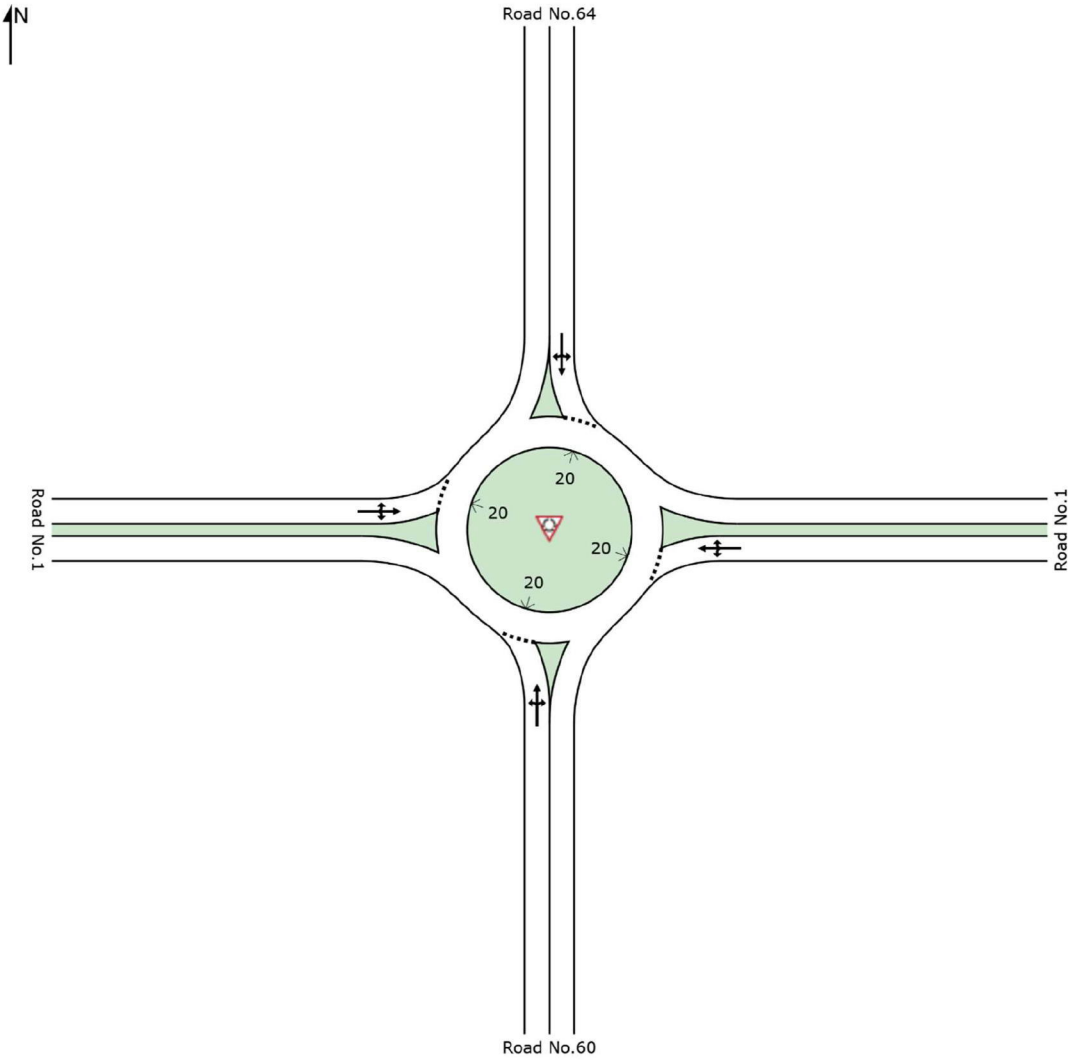
APPENDIX C

SIDRA SUMMARY OF INTERNAL ROADS IN JORDAN SPRINGS EAST

SITE LAYOUT

Site: I-Int_1 [AM_Road No.1, No.60 and No.64]

Intersection of Road No.1, No.60 and No.64
Roundabout



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MOVEMENT SUMMARY

Site: I-Int_1 [AM_Road No.1, No.60 and No.64]

Intersection of Road No.1, No.60 and No.64
Roundabout

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total	Demand Flows HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South: Road No.60											
1	L2	19	3.0	0.066	6.4	LOS A	0.3	2.4	0.53	0.67	51.2
2	T1	1	3.0	0.066	6.5	LOS A	0.3	2.4	0.53	0.67	52.3
3	R2	41	3.0	0.066	11.1	LOS A	0.3	2.4	0.53	0.67	51.7
Approach		61	3.0	0.066	9.6	LOS A	0.3	2.4	0.53	0.67	51.5
East: Road No.1											
4	L2	14	3.0	0.290	3.9	LOS A	1.9	13.7	0.05	0.40	54.8
5	T1	469	3.0	0.290	4.0	LOS A	1.9	13.7	0.05	0.40	56.2
6	R2	1	3.0	0.290	8.7	LOS A	1.9	13.7	0.05	0.40	56.1
Approach		484	3.0	0.290	4.0	LOS A	1.9	13.7	0.05	0.40	56.2
North: Road No.64											
7	L2	3	3.0	0.006	4.9	LOS A	0.0	0.2	0.38	0.54	52.2
8	T1	1	3.0	0.006	5.1	LOS A	0.0	0.2	0.38	0.54	53.9
9	R2	3	3.0	0.006	9.7	LOS A	0.0	0.2	0.38	0.54	53.8
Approach		7	3.0	0.006	7.0	LOS A	0.0	0.2	0.38	0.54	53.2
West: Road No.1											
10	L2	1	3.0	0.144	4.1	LOS A	0.8	6.1	0.18	0.40	54.6
11	T1	198	3.0	0.144	4.2	LOS A	0.8	6.1	0.18	0.40	55.5
12	R2	1	3.0	0.144	8.9	LOS A	0.8	6.1	0.18	0.40	55.8
Approach		200	3.0	0.144	4.2	LOS A	0.8	6.1	0.18	0.40	55.5
All Vehicles		752	3.0	0.290	4.6	LOS A	1.9	13.7	0.13	0.42	55.6

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.
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: I-Int_1 [PM_Road No.1, No.60 and No.64]

Intersection of Road No.1, No.60 and No.64
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: Road No.60											
1	L2	1	3.0	0.024	6.2	LOS A	0.1	0.9	0.53	0.65	50.6
2	T1	1	3.0	0.024	6.3	LOS A	0.1	0.9	0.53	0.65	51.7
3	R2	20	3.0	0.024	11.0	LOS A	0.1	0.9	0.53	0.65	51.0
Approach		22	3.0	0.024	10.6	LOS A	0.1	0.9	0.53	0.65	51.0
East: Road No.1											
4	L2	49	3.0	0.338	4.0	LOS A	2.2	16.0	0.15	0.40	54.3
5	T1	463	3.0	0.338	4.2	LOS A	2.2	16.0	0.15	0.40	55.7
6	R2	4	3.0	0.338	8.8	LOS A	2.2	16.0	0.15	0.40	55.6
Approach		516	3.0	0.338	4.2	LOS A	2.2	16.0	0.15	0.40	55.6
North: Road No.64											
7	L2	1	3.0	0.004	8.5	LOS A	0.0	0.2	0.69	0.59	50.1
8	T1	1	3.0	0.004	8.7	LOS A	0.0	0.2	0.69	0.59	51.9
9	R2	1	3.0	0.004	13.3	LOS A	0.0	0.2	0.69	0.59	51.8
Approach		3	3.0	0.004	10.2	LOS A	0.0	0.2	0.69	0.59	51.3
West: Road No.1											
10	L2	4	3.0	0.492	4.0	LOS A	4.4	31.7	0.19	0.40	54.4
11	T1	741	3.0	0.492	4.2	LOS A	4.4	31.7	0.19	0.40	55.4
12	R2	27	3.0	0.492	8.8	LOS A	4.4	31.7	0.19	0.40	55.6
Approach		772	3.0	0.492	4.3	LOS A	4.4	31.7	0.19	0.40	55.4
All Vehicles		1313	3.0	0.492	4.4	LOS A	4.4	31.7	0.18	0.41	55.4

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.

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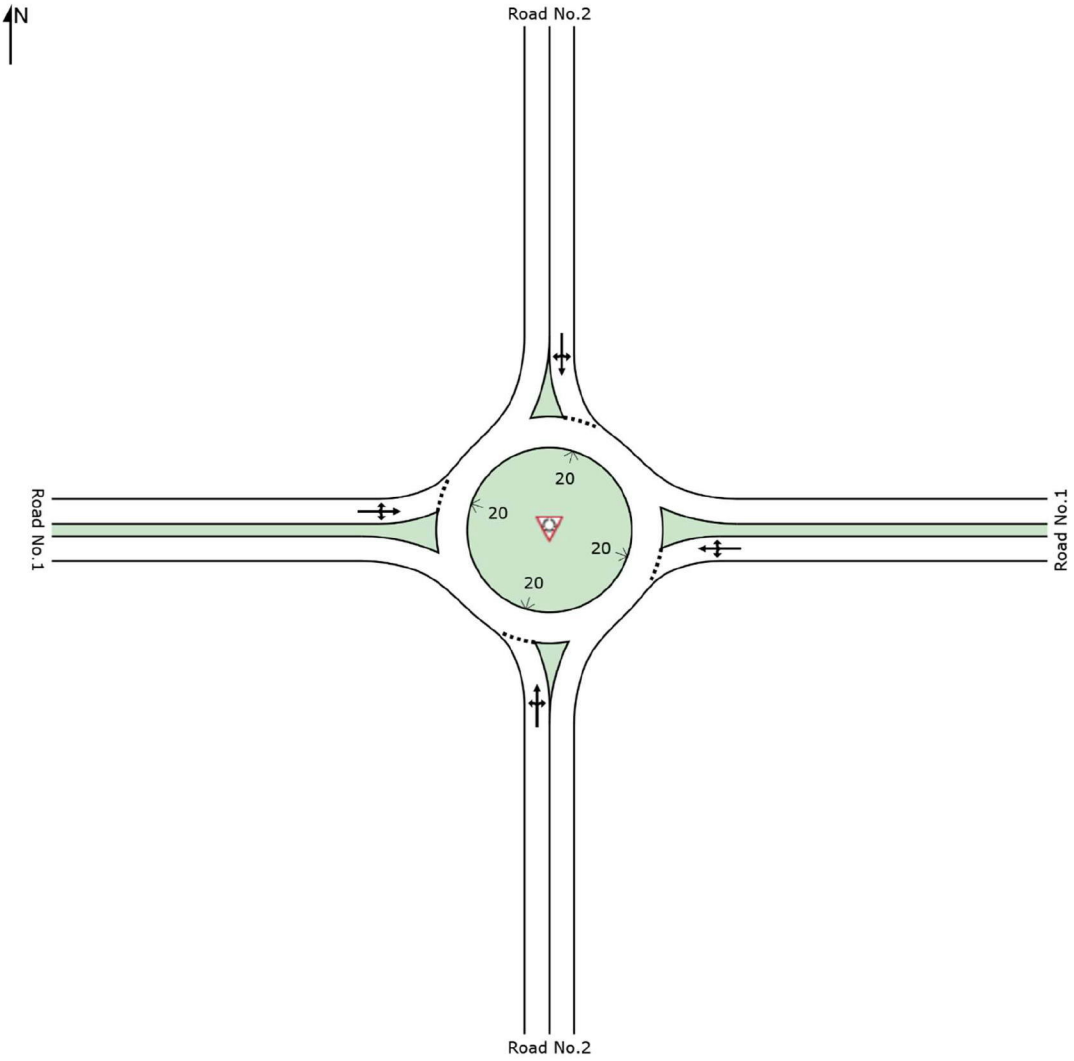
SITE LAYOUT

Site: I-Int_2 [AM_Road No.1, No.2]

Intersection of Road No.1, No.2
Roundabout



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MOVEMENT SUMMARY

Site: I-Int_2 [AM_Road No.1, No.2]

Intersection of Road No.1, No.2
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: Road No.2											
1	L2	134	3.0	0.451	6.6	LOS A	3.1	22.1	0.65	0.75	50.3
2	T1	1	3.0	0.451	6.8	LOS A	3.1	22.1	0.65	0.75	48.2
3	R2	306	3.0	0.451	11.4	LOS A	3.1	22.1	0.65	0.75	48.9
Approach		441	3.0	0.451	10.0	LOS A	3.1	22.1	0.65	0.75	49.4
East: Road No.1											
4	L2	101	3.0	0.288	4.6	LOS A	1.9	13.9	0.38	0.49	51.2
5	T1	234	3.0	0.288	4.7	LOS A	1.9	13.9	0.38	0.49	52.1
6	R2	23	3.0	0.288	9.4	LOS A	1.9	13.9	0.38	0.49	27.9
Approach		358	3.0	0.288	5.0	LOS A	1.9	13.9	0.38	0.49	50.4
North: Road No.2											
7	L2	169	3.0	0.336	7.4	LOS A	2.2	15.4	0.70	0.78	38.5
8	T1	1	3.0	0.336	7.5	LOS A	2.2	15.4	0.70	0.78	48.7
9	R2	115	3.0	0.336	12.2	LOS A	2.2	15.4	0.70	0.78	47.3
Approach		285	3.0	0.336	9.3	LOS A	2.2	15.4	0.70	0.78	42.9
West: Road No.1											
10	L2	25	3.0	0.248	5.8	LOS A	1.5	11.0	0.57	0.61	48.0
11	T1	208	3.0	0.248	6.0	LOS A	1.5	11.0	0.57	0.61	50.7
12	R2	10	3.0	0.248	10.6	LOS A	1.5	11.0	0.57	0.61	53.5
Approach		243	3.0	0.248	6.2	LOS A	1.5	11.0	0.57	0.61	50.6
All Vehicles		1327	3.0	0.451	7.8	LOS A	3.1	22.1	0.57	0.66	48.8

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.

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MOVEMENT SUMMARY

Site: I-Int_2 [PM_Road No.1, No.2]

Intersection of Road No.1, No.2
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: Road No.2											
1	L2	1	3.0	0.211	7.7	LOS A	1.4	10.1	0.77	0.81	48.7
2	T1	1	3.0	0.211	7.8	LOS A	1.4	10.1	0.77	0.81	46.1
3	R2	146	3.0	0.211	12.5	LOS A	1.4	10.1	0.77	0.81	46.9
Approach		148	3.0	0.211	12.4	LOS A	1.4	10.1	0.77	0.81	46.9
East: Road No.1											
4	L2	355	3.0	0.825	10.0	LOS A	14.4	103.2	0.95	0.84	47.1
5	T1	481	3.0	0.825	10.1	LOS A	14.4	103.2	0.95	0.84	47.3
6	R2	97	3.0	0.825	14.8	LOS B	14.4	103.2	0.95	0.84	25.2
Approach		933	3.0	0.825	10.5	LOS A	14.4	103.2	0.95	0.84	45.1
North: Road No.2											
7	L2	57	3.0	0.141	8.7	LOS A	0.9	6.4	0.78	0.79	37.1
8	T1	1	3.0	0.141	8.8	LOS A	0.9	6.4	0.78	0.79	47.6
9	R2	34	3.0	0.141	13.4	LOS A	0.9	6.4	0.78	0.79	46.1
Approach		92	3.0	0.141	10.4	LOS A	0.9	6.4	0.78	0.79	41.3
West: Road No.1											
10	L2	169	3.0	0.675	6.9	LOS A	7.2	51.9	0.74	0.71	46.3
11	T1	385	3.0	0.675	7.0	LOS A	7.2	51.9	0.74	0.71	48.9
12	R2	208	3.0	0.675	11.7	LOS A	7.2	51.9	0.74	0.71	52.2
Approach		762	3.0	0.675	8.2	LOS A	7.2	51.9	0.74	0.71	49.6
All Vehicles		1935	3.0	0.825	9.8	LOS A	14.4	103.2	0.84	0.79	46.9

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.

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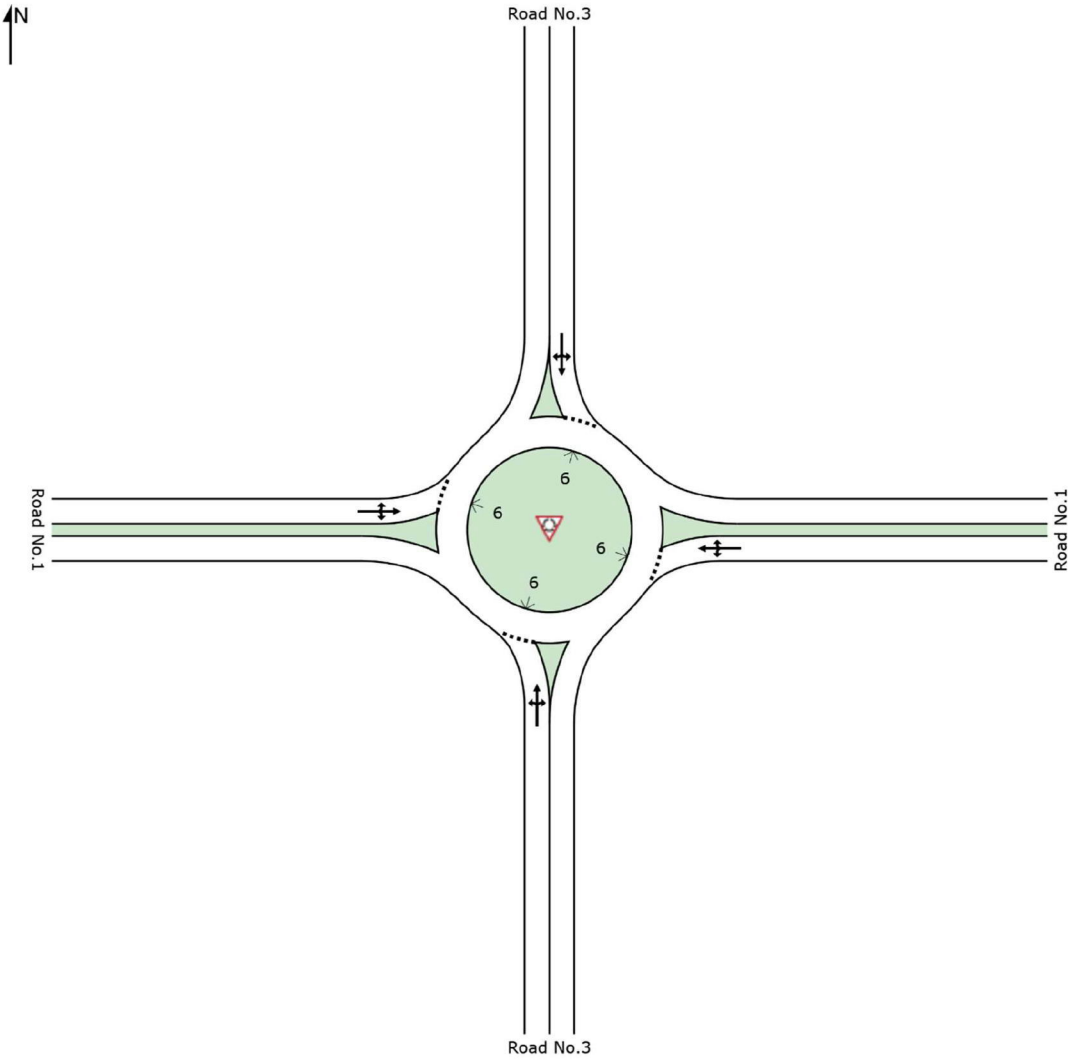
SITE LAYOUT

Site: I-Int_3 [AM_Road No.1, No.3]

Intersection of Road No.1, No.2
Roundabout



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MOVEMENT SUMMARY

Site: I-Int_3 [AM_Road No.1, No.3]

Intersection of Road No.1, No.2
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: Road No.2											
1	L2	71	3.0	0.233	5.9	LOS A	1.4	10.1	0.40	0.62	37.4
2	T1	43	3.0	0.233	5.4	LOS A	1.4	10.1	0.40	0.62	35.7
3	R2	136	3.0	0.233	8.2	LOS A	1.4	10.1	0.40	0.62	38.0
Approach		250	3.0	0.233	7.1	LOS A	1.4	10.1	0.40	0.62	37.5
East: Road No.1											
4	L2	99	3.0	0.191	7.9	LOS A	1.1	7.6	0.57	0.69	36.2
5	T1	56	3.0	0.191	7.5	LOS A	1.1	7.6	0.57	0.69	42.2
6	R2	7	3.0	0.191	10.1	LOS A	1.1	7.6	0.57	0.69	39.3
Approach		162	3.0	0.191	7.8	LOS A	1.1	7.6	0.57	0.69	38.6
North: Road No.2											
7	L2	115	3.0	0.501	15.3	LOS B	4.0	28.8	0.91	1.04	30.3
8	T1	64	3.0	0.501	14.9	LOS B	4.0	28.8	0.91	1.04	24.9
9	R2	90	3.0	0.501	17.5	LOS B	4.0	28.8	0.91	1.04	30.6
Approach		269	3.0	0.501	15.9	LOS B	4.0	28.8	0.91	1.04	29.3
West: Road No.1											
10	L2	11	3.0	0.616	7.2	LOS A	5.5	39.8	0.63	0.66	38.3
11	T1	435	3.0	0.616	6.8	LOS A	5.5	39.8	0.63	0.66	41.7
12	R2	236	3.0	0.616	9.4	LOS A	5.5	39.8	0.63	0.66	35.5
Approach		682	3.0	0.616	7.7	LOS A	5.5	39.8	0.63	0.66	39.7
All Vehicles		1363	3.0	0.616	9.2	LOS A	5.5	39.8	0.64	0.73	36.8

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.

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MOVEMENT SUMMARY

Site: I-Int_3 [PM_Road No.1, No.3]

Intersection of Road No.1, No.2
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: Road No.2											
1	L2	97	3.0	0.553	14.1	LOS A	4.9	34.9	0.96	1.06	29.1
2	T1	70	3.0	0.553	13.6	LOS A	4.9	34.9	0.96	1.06	26.4
3	R2	124	3.0	0.553	16.4	LOS B	4.9	34.9	0.96	1.06	29.4
Approach		291	3.0	0.553	15.0	LOS B	4.9	34.9	0.96	1.06	28.7
East: Road No.1											
4	L2	132	3.0	0.945	31.7	LOS C	30.0	215.7	1.00	1.49	19.4
5	T1	635	3.0	0.945	31.2	LOS C	30.0	215.7	1.00	1.49	24.3
6	R2	68	3.0	0.945	33.9	LOS C	30.0	215.7	1.00	1.49	21.6
Approach		835	3.0	0.945	31.5	LOS C	30.0	215.7	1.00	1.49	23.3
North: Road No.2											
7	L2	8	3.0	0.124	9.1	LOS A	0.7	5.1	0.68	0.74	37.2
8	T1	70	3.0	0.124	8.7	LOS A	0.7	5.1	0.68	0.74	32.1
9	R2	8	3.0	0.124	11.3	LOS A	0.7	5.1	0.68	0.74	37.7
Approach		86	3.0	0.124	9.0	LOS A	0.7	5.1	0.68	0.74	33.3
West: Road No.1											
10	L2	136	3.0	0.601	8.3	LOS A	5.6	40.1	0.73	0.75	37.0
11	T1	154	3.0	0.601	7.8	LOS A	5.6	40.1	0.73	0.75	40.4
12	R2	297	3.0	0.601	10.5	LOS A	5.6	40.1	0.73	0.75	34.2
Approach		587	3.0	0.601	9.3	LOS A	5.6	40.1	0.73	0.75	36.6
All Vehicles		1799	3.0	0.945	20.5	LOS B	30.0	215.7	0.89	1.14	27.5

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.

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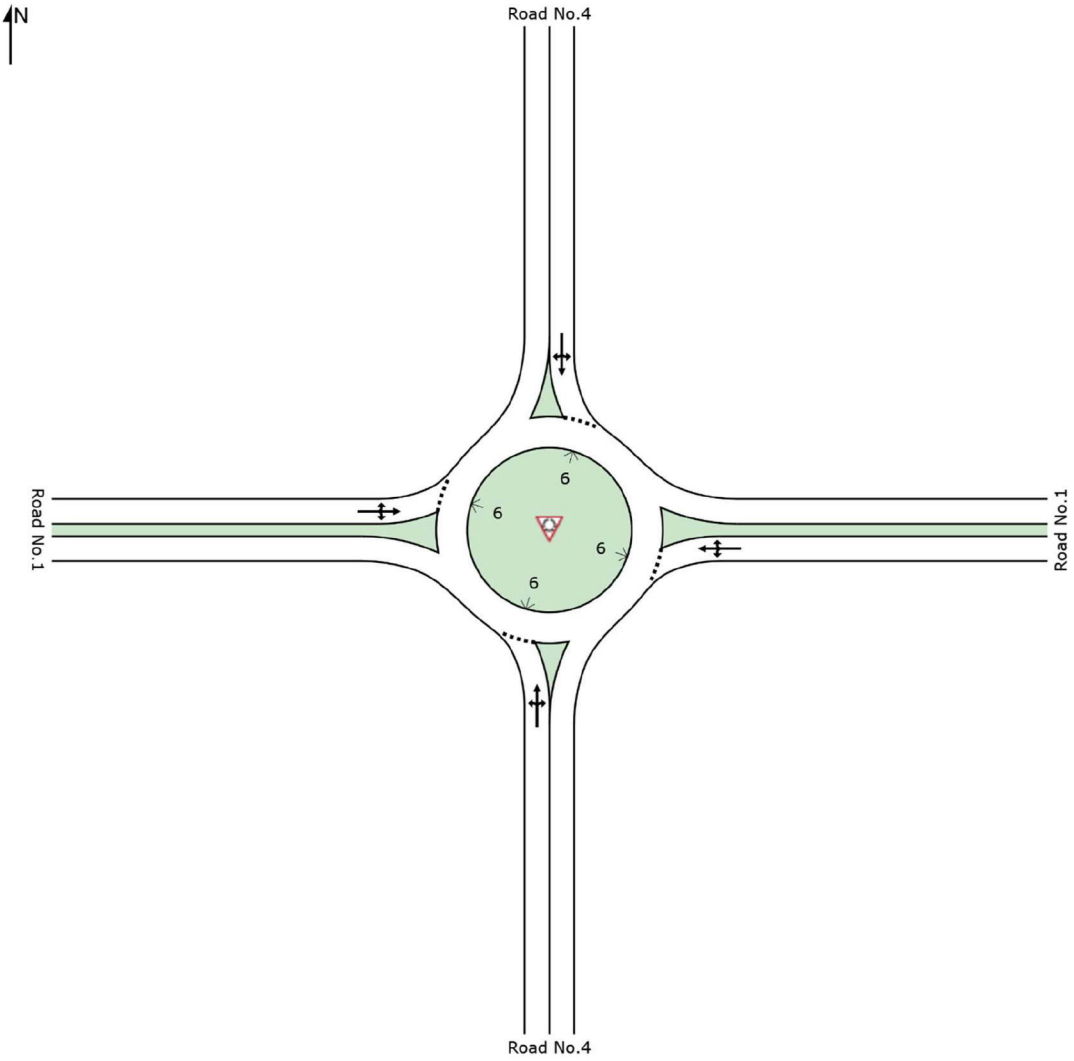
SITE LAYOUT

Site: I-Int_4 [AM_Road No.1, No.4]

Intersection of Road No.1, No.4
Roundabout



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MOVEMENT SUMMARY

Site: I-Int_4 [AM_Road No.1, No.4]

Intersection of Road No.1, No.4
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: Road No.2											
1	L2	8	3.0	0.018	6.3	LOS A	0.1	0.6	0.35	0.59	42.5
2	T1	1	3.0	0.018	5.9	LOS A	0.1	0.6	0.35	0.59	49.7
3	R2	10	3.0	0.018	8.5	LOS A	0.1	0.6	0.35	0.59	49.2
Approach		19	3.0	0.018	7.4	LOS A	0.1	0.6	0.35	0.59	47.1
East: Road No.1											
4	L2	3	3.0	0.114	5.6	LOS A	0.7	4.8	0.21	0.53	49.8
5	T1	107	3.0	0.114	5.2	LOS A	0.7	4.8	0.21	0.53	50.4
6	R2	32	3.0	0.114	7.8	LOS A	0.7	4.8	0.21	0.53	52.8
Approach		142	3.0	0.114	5.8	LOS A	0.7	4.8	0.21	0.53	51.1
North: Road No.2											
7	L2	31	3.0	0.118	10.1	LOS A	0.6	4.6	0.69	0.79	48.9
8	T1	1	3.0	0.118	9.7	LOS A	0.6	4.6	0.69	0.79	46.3
9	R2	47	3.0	0.118	12.3	LOS A	0.6	4.6	0.69	0.79	45.3
Approach		79	3.0	0.118	11.4	LOS A	0.6	4.6	0.69	0.79	47.0
West: Road No.1											
10	L2	16	3.0	0.485	5.6	LOS A	3.9	27.7	0.24	0.49	49.9
11	T1	668	3.0	0.485	5.2	LOS A	3.9	27.7	0.24	0.49	50.9
12	R2	2	3.0	0.485	7.9	LOS A	3.9	27.7	0.24	0.49	45.1
Approach		686	3.0	0.485	5.2	LOS A	3.9	27.7	0.24	0.49	50.9
All Vehicles		926	3.0	0.485	5.9	LOS A	3.9	27.7	0.28	0.52	50.5

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.

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MOVEMENT SUMMARY

Site: I-Int_4 [PM_Road No.1, No.4]

Intersection of Road No.1, No.4
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: Road No.2											
1	L2	3	3.0	0.016	14.5	LOS B	0.1	0.7	0.83	0.73	34.8
2	T1	1	3.0	0.016	14.1	LOS A	0.1	0.7	0.83	0.73	43.4
3	R2	3	3.0	0.016	16.8	LOS B	0.1	0.7	0.83	0.73	43.0
Approach		7	3.0	0.016	15.4	LOS B	0.1	0.7	0.83	0.73	40.2
East: Road No.1											
4	L2	12	3.0	0.695	5.7	LOS A	8.7	62.5	0.33	0.50	49.4
5	T1	808	3.0	0.695	5.3	LOS A	8.7	62.5	0.33	0.50	50.0
6	R2	204	3.0	0.695	8.0	LOS A	8.7	62.5	0.33	0.50	52.4
Approach		1024	3.0	0.695	5.8	LOS A	8.7	62.5	0.33	0.50	50.6
North: Road No.2											
7	L2	1	3.0	0.027	6.5	LOS A	0.1	1.0	0.41	0.63	50.7
8	T1	1	3.0	0.027	6.1	LOS A	0.1	1.0	0.41	0.63	48.6
9	R2	24	3.0	0.027	8.7	LOS A	0.1	1.0	0.41	0.63	47.6
Approach		26	3.0	0.027	8.6	LOS A	0.1	1.0	0.41	0.63	47.8
West: Road No.1											
10	L2	62	3.0	0.281	6.8	LOS A	1.7	12.0	0.46	0.61	48.9
11	T1	213	3.0	0.281	6.4	LOS A	1.7	12.0	0.46	0.61	49.8
12	R2	11	3.0	0.281	9.0	LOS A	1.7	12.0	0.46	0.61	43.6
Approach		286	3.0	0.281	6.5	LOS A	1.7	12.0	0.46	0.61	49.5
All Vehicles		1343	3.0	0.695	6.1	LOS A	8.7	62.5	0.36	0.53	50.3

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.

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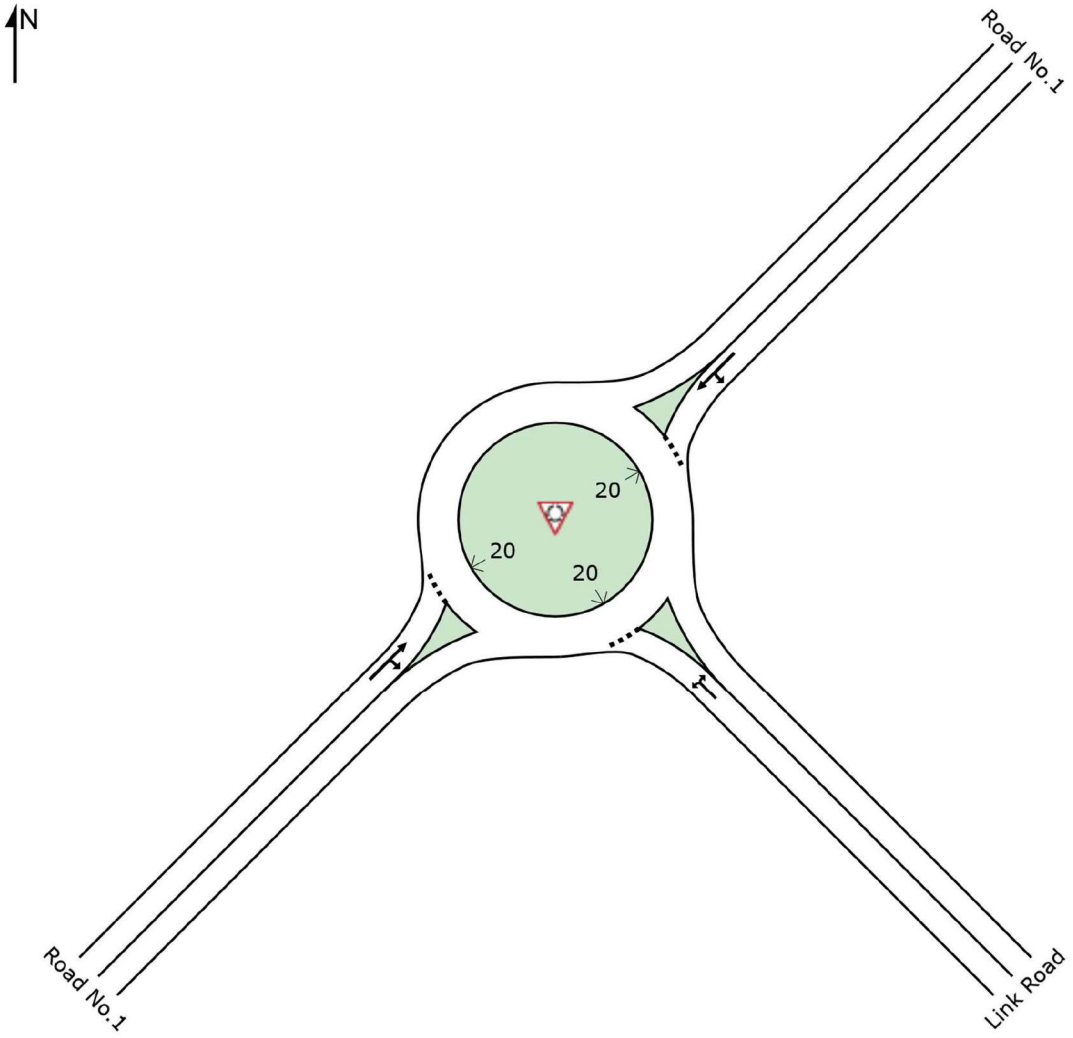
SITE LAYOUT

Site: 101v [Industry AM]

New Site
Roundabout



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MOVEMENT SUMMARY

Site: 101v [Industry AM]

New Site
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
SouthEast: Link Road											
4	L2	88	3.0	0.073	4.3	LOS A	0.5	3.3	0.28	0.47	54.6
6	R2	1	0.0	0.073	9.1	LOS A	0.5	3.3	0.28	0.47	55.9
Approach		89	3.0	0.073	4.3	LOS A	0.5	3.3	0.28	0.47	54.6
NorthEast: Road No.1											
7	L2	1	3.0	0.102	8.9	LOS A	0.6	4.2	0.70	0.69	51.5
8	T1	74	3.0	0.102	9.1	LOS A	0.6	4.2	0.70	0.69	52.7
Approach		75	3.0	0.102	9.1	LOS A	0.6	4.2	0.70	0.69	52.7
SouthWest: Road No.1											
2	T1	160	3.0	0.496	4.0	LOS A	4.9	35.4	0.03	0.62	53.7
3	R2	686	3.0	0.496	8.7	LOS A	4.9	35.4	0.03	0.62	53.5
Approach		846	3.0	0.496	7.8	LOS A	4.9	35.4	0.03	0.62	53.6
All Vehicles		1011	3.0	0.496	7.6	LOS A	4.9	35.4	0.10	0.61	53.6

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.
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.

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MOVEMENT SUMMARY

Site: 101v [Industry PM]

New Site
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
SouthEast: Link Road											
4	L2	773	3.0	0.882	22.4	LOS B	20.0	143.7	1.00	1.30	43.3
6	R2	1	0.0	0.882	27.0	LOS B	20.0	143.7	1.00	1.30	44.1
Approach		774	3.0	0.882	22.4	LOS B	20.0	143.7	1.00	1.30	43.3
NorthEast: Road No.1											
7	L2	1	3.0	0.362	5.1	LOS A	2.6	18.3	0.44	0.50	53.4
8	T1	437	3.0	0.362	5.2	LOS A	2.6	18.3	0.44	0.50	54.7
Approach		438	3.0	0.362	5.2	LOS A	2.6	18.3	0.44	0.50	54.7
SouthWest: Road No.1											
2	T1	99	3.0	0.150	4.0	LOS A	1.2	8.7	0.02	0.58	54.4
3	R2	156	3.0	0.150	8.7	LOS A	1.2	8.7	0.02	0.58	54.3
Approach		255	3.0	0.150	6.9	LOS A	1.2	8.7	0.02	0.58	54.3
All Vehicles		1466	3.0	0.882	14.6	LOS B	20.0	143.7	0.66	0.94	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.

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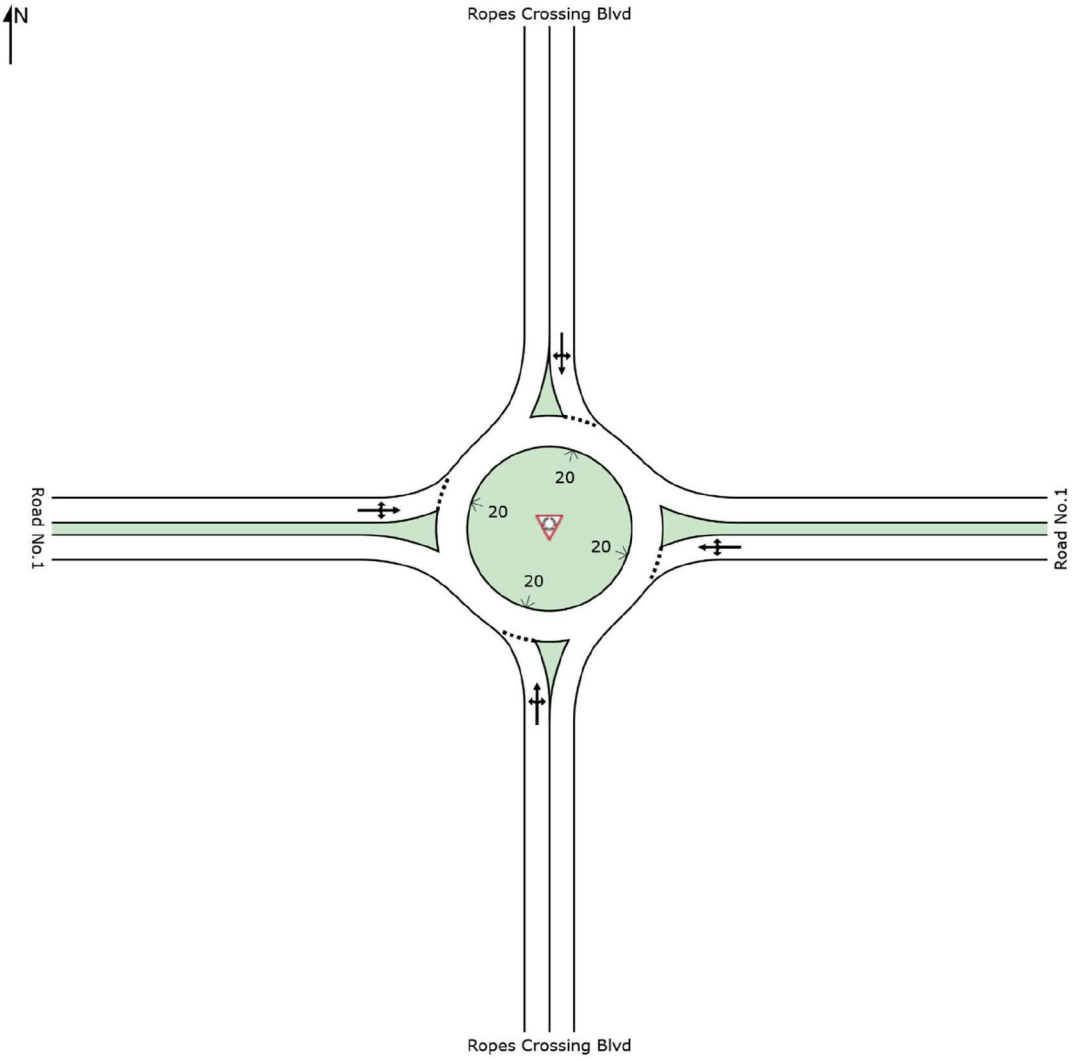
SITE LAYOUT

Site: I-Int_4 [Ropes RB AM]

Intersection of Road No.1, No.4
Roundabout



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MOVEMENT SUMMARY

Site: I-Int_4 [Ropes RB AM]

Intersection of Road No.1, No.4
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: Ropes Crossing Blvd											
1	L2	34	3.0	0.158	4.1	LOS A	0.9	6.2	0.19	0.45	47.5
2	T1	157	3.0	0.158	4.3	LOS A	0.9	6.2	0.19	0.45	54.0
3	R2	27	3.0	0.158	8.9	LOS A	0.9	6.2	0.19	0.45	53.8
Approach		218	3.0	0.158	4.8	LOS A	0.9	6.2	0.19	0.45	53.3
East: Road No.1											
4	L2	85	3.0	0.112	6.8	LOS A	0.6	4.4	0.60	0.66	50.3
5	T1	6	3.0	0.112	6.9	LOS A	0.6	4.4	0.60	0.66	51.6
6	R2	6	3.0	0.112	11.6	LOS A	0.6	4.4	0.60	0.66	54.0
Approach		97	3.0	0.112	7.1	LOS A	0.6	4.4	0.60	0.66	50.7
North: Ropes Crossing Blvd											
7	L2	6	3.0	0.345	4.4	LOS A	2.3	16.4	0.29	0.45	53.8
8	T1	422	3.0	0.345	4.5	LOS A	2.3	16.4	0.29	0.45	53.2
9	R2	40	3.0	0.345	9.2	LOS A	2.3	16.4	0.29	0.45	52.8
Approach		468	3.0	0.345	4.9	LOS A	2.3	16.4	0.29	0.45	53.2
West: Road No.1											
10	L2	99	3.0	0.137	4.9	LOS A	0.7	5.1	0.37	0.58	50.3
11	T1	1	3.0	0.137	5.0	LOS A	0.7	5.1	0.37	0.58	52.0
12	R2	56	3.0	0.137	9.7	LOS A	0.7	5.1	0.37	0.58	47.2
Approach		156	3.0	0.137	6.6	LOS A	0.7	5.1	0.37	0.58	49.5
All Vehicles		939	3.0	0.345	5.4	LOS A	2.3	16.4	0.31	0.49	52.4

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.

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MOVEMENT SUMMARY

Site: I-Int_4 [Ropes RB PM]

Intersection of Road No.1, No.4
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: Ropes Crossing Blvd											
1	L2	148	3.0	0.544	6.5	LOS A	4.1	29.7	0.65	0.67	44.8
2	T1	430	3.0	0.544	6.6	LOS A	4.1	29.7	0.65	0.67	52.0
3	R2	1	3.0	0.544	11.3	LOS A	4.1	29.7	0.65	0.67	51.8
Approach		579	3.0	0.544	6.6	LOS A	4.1	29.7	0.65	0.67	50.6
East: Road No.1											
4	L2	68	3.0	0.158	6.5	LOS A	0.8	6.1	0.56	0.70	48.9
5	T1	5	3.0	0.158	6.6	LOS A	0.8	6.1	0.56	0.70	49.9
6	R2	73	3.0	0.158	11.3	LOS A	0.8	6.1	0.56	0.70	52.7
Approach		146	3.0	0.158	8.9	LOS A	0.8	6.1	0.56	0.70	51.1
North: Ropes Crossing Blvd											
7	L2	33	3.0	0.305	4.0	LOS A	2.2	16.0	0.14	0.53	53.2
8	T1	207	3.0	0.305	4.1	LOS A	2.2	16.0	0.14	0.53	52.3
9	R2	231	3.0	0.305	8.8	LOS A	2.2	16.0	0.14	0.53	51.9
Approach		471	3.0	0.305	6.4	LOS A	2.2	16.0	0.14	0.53	52.2
West: Road No.1											
10	L2	72	3.0	0.111	6.7	LOS A	0.6	4.6	0.63	0.68	49.6
11	T1	2	3.0	0.111	6.8	LOS A	0.6	4.6	0.63	0.68	51.3
12	R2	19	3.0	0.111	11.5	LOS A	0.6	4.6	0.63	0.68	46.2
Approach		93	3.0	0.111	7.6	LOS A	0.6	4.6	0.63	0.68	49.2
All Vehicles		1289	3.0	0.544	6.9	LOS A	4.1	29.7	0.45	0.62	51.2

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.

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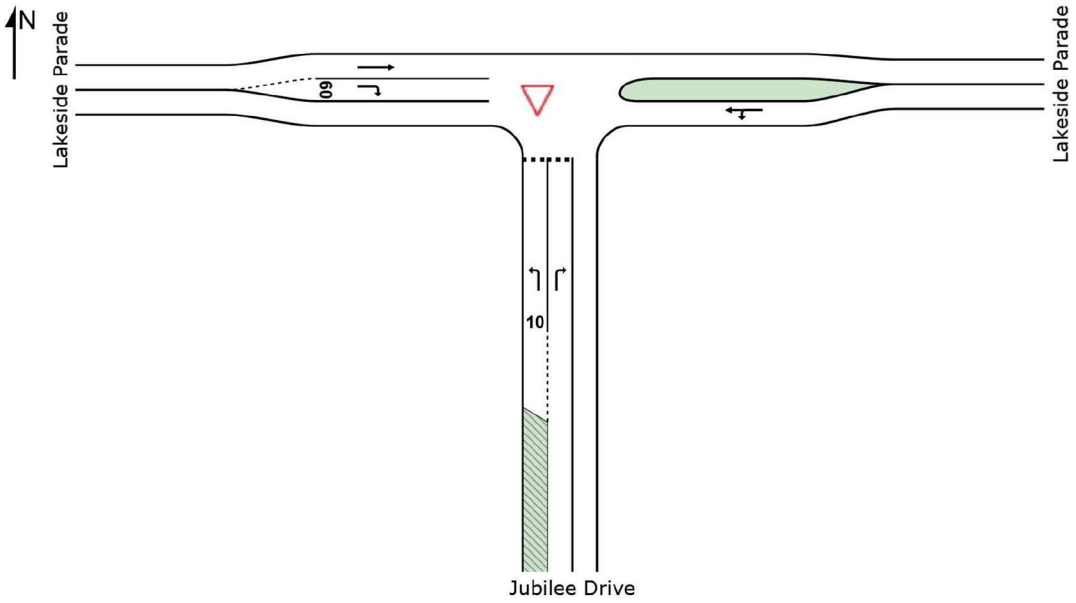
APPENDIX D

SIDRA SUMMARY OF INTERNAL ROADS IN JORDAN SPRINGS

SITE LAYOUT

Site: 2 [Jubilee Dr (west) and Lakeside Pde - AM]

Jubilee Dr (west) and Lakeside Pde
Giveway / Yield (Two-Way)



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MOVEMENT SUMMARY

Site: 2 [Jubilee Dr (west) and Lakeside Pde - AM]

Jubilee Dr (west) and Lakeside Pde
Giveway / Yield (Two-Way)

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: Jubilee Drive											
1	L2	106	0.0	0.150	9.5	LOS A	0.5	3.8	0.61	0.83	48.1
3	R2	1	0.0	0.003	15.6	LOS B	0.0	0.1	0.75	0.75	44.4
Approach		107	0.0	0.150	9.6	LOS A	0.5	3.8	0.61	0.83	48.1
East: Lakeside Parade											
4	L2	1	0.0	0.384	5.6	LOS A	0.0	0.0	0.00	0.00	58.0
5	T1	748	0.0	0.384	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		749	0.0	0.384	0.0	NA	0.0	0.0	0.00	0.00	59.9
West: Lakeside Parade											
11	T1	186	0.0	0.095	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
12	R2	26	0.0	0.034	9.1	LOS A	0.1	0.9	0.60	0.75	48.1
Approach		212	0.0	0.095	1.1	NA	0.1	0.9	0.07	0.09	57.8
All Vehicles		1068	0.0	0.384	1.2	NA	0.5	3.8	0.08	0.10	57.7

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

Site: 2 [Jubilee Dr (west) and Lakeside Pde - PM]

Jubilee Dr (west) and Lakeside Pde
Giveway / Yield (Two-Way)

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: Jubilee Drive											
1	L2	33	0.0	0.032	7.3	LOS A	0.1	0.8	0.45	0.64	50.0
3	R2	1	0.0	0.009	36.7	LOS C	0.0	0.2	0.91	0.96	34.0
Approach		34	0.0	0.032	8.1	LOS A	0.1	0.8	0.47	0.65	49.2
East: Lakeside Parade											
4	L2	1	0.0	0.242	5.6	LOS A	0.0	0.0	0.00	0.00	58.0
5	T1	470	0.0	0.242	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		471	0.0	0.242	0.0	NA	0.0	0.0	0.00	0.00	59.9
West: Lakeside Parade											
11	T1	902	0.0	0.463	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
12	R2	130	0.0	0.116	7.4	LOS A	0.5	3.5	0.50	0.69	49.6
Approach		1032	0.0	0.463	1.0	NA	0.5	3.5	0.06	0.09	58.0
All Vehicles		1537	0.0	0.463	0.8	NA	0.5	3.5	0.05	0.07	58.3

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

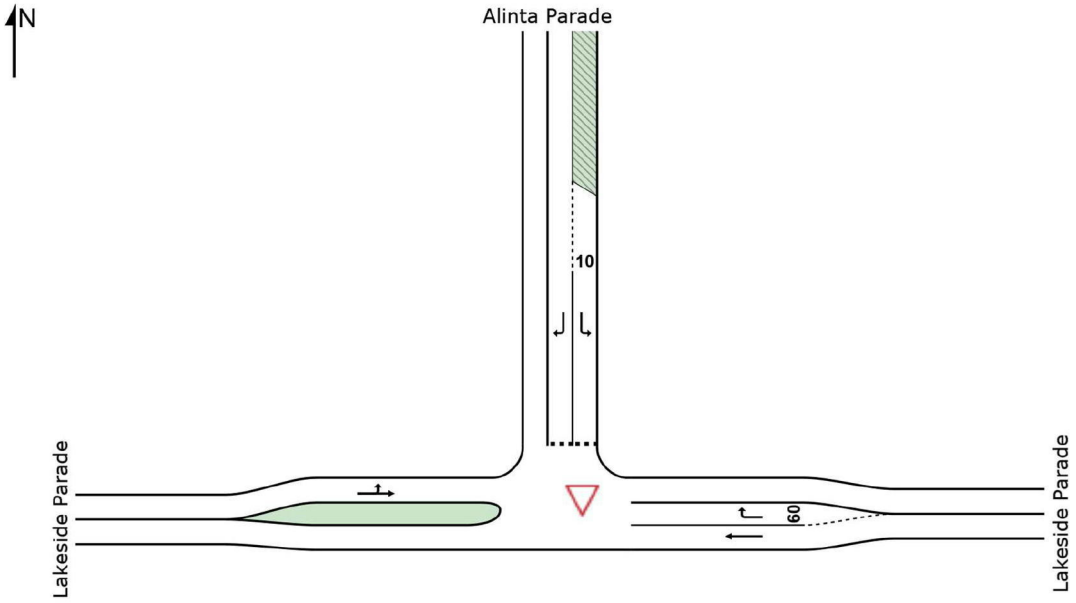
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 3 [Alinta Parade and Lakeside Parade - AM]

Alinta Parade and Lakeside Parade
Giveway / Yield (Two-Way)



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MOVEMENT SUMMARY

Site: 3 [Alinta Parade and Lakeside Parade - AM]

Alinta Parade and Lakeside Parade
Giveway / Yield (Two-Way)

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: Lakeside Parade											
5	T1	616	0.0	0.316	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
6	R2	37	0.0	0.024	6.0	LOS A	0.1	0.7	0.29	0.55	49.4
Approach		653	0.0	0.316	0.4	NA	0.1	0.7	0.02	0.03	59.0
North: Alinta Parade											
7	L2	1	0.0	0.001	5.9	LOS A	0.0	0.0	0.24	0.51	49.9
9	R2	132	0.0	0.337	15.7	LOS B	1.5	10.2	0.76	0.96	44.3
Approach		133	0.0	0.337	15.6	LOS B	1.5	10.2	0.75	0.95	44.3
West: Lakeside Parade											
10	L2	33	0.0	0.096	5.5	LOS A	0.0	0.0	0.00	0.11	57.0
11	T1	153	0.0	0.096	0.0	LOS A	0.0	0.0	0.00	0.11	58.1
Approach		186	0.0	0.096	1.0	NA	0.0	0.0	0.00	0.11	57.8
All Vehicles		972	0.0	0.337	2.6	NA	1.5	10.2	0.11	0.17	55.1

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

Site: 3 [Alinta Parade and Lakeside Parade - PM]

Alinta Parade and Lakeside Parade
Giveway / Yield (Two-Way)

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: Lakeside Parade											
5	T1	427	0.0	0.219	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R2	35	0.0	0.060	11.0	LOS A	0.2	1.5	0.69	0.87	45.4
Approach		462	0.0	0.219	0.8	NA	0.2	1.5	0.05	0.07	58.1
North: Alinta Parade											
7	L2	1	0.0	0.001	8.8	LOS A	0.0	0.0	0.56	0.61	47.7
9	R2	42	0.0	0.251	29.3	LOS C	0.8	5.8	0.89	0.98	37.0
Approach		43	0.0	0.251	28.8	LOS C	0.8	5.8	0.88	0.97	37.2
West: Lakeside Parade											
10	L2	169	0.0	0.467	5.6	LOS A	0.0	0.0	0.00	0.11	56.8
11	T1	733	0.0	0.467	0.1	LOS A	0.0	0.0	0.00	0.11	57.9
Approach		902	0.0	0.467	1.1	NA	0.0	0.0	0.00	0.11	57.6
All Vehicles		1407	0.0	0.467	1.9	NA	0.8	5.8	0.04	0.12	56.4

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

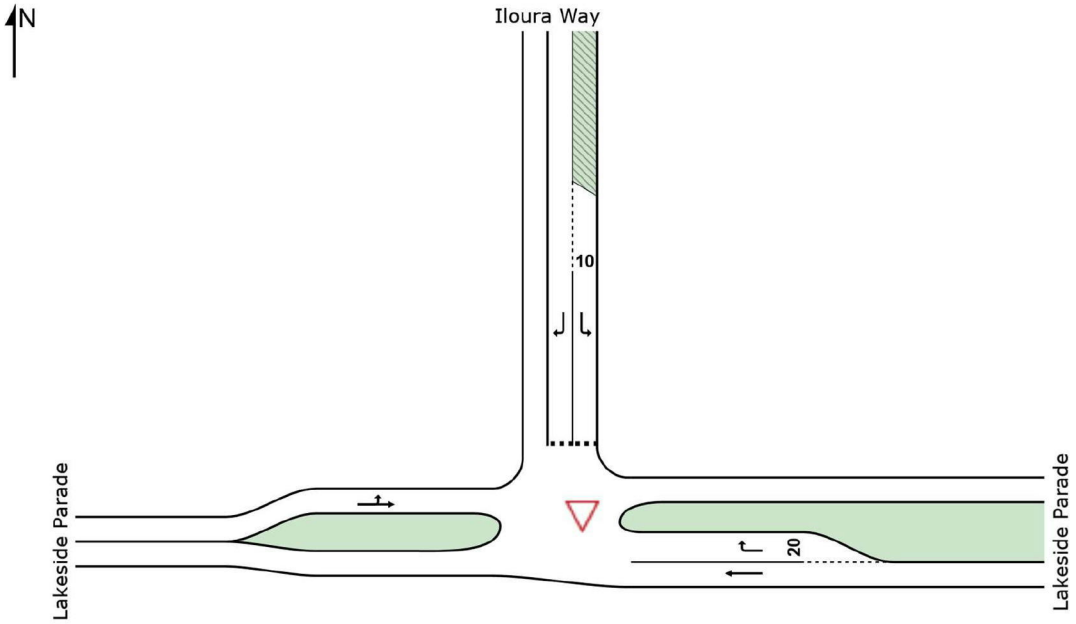
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 4 [Illoura Way and Lakeside Parade - AM]

Illoura Way and Lakeside Parade
Giveway / Yield (Two-Way)



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MOVEMENT SUMMARY

Site: 4 [Illoura Way and Lakeside Parade - AM]

Illoura Way and Lakeside Parade
Giveway / Yield (Two-Way)

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: Lakeside Parade											
5	T1	610	0.0	0.313	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
6	R2	1	0.0	0.001	5.9	LOS A	0.0	0.0	0.25	0.51	50.5
Approach		611	0.0	0.313	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: Iloura Way											
7	L2	1	0.0	0.001	5.9	LOS A	0.0	0.0	0.23	0.51	50.8
9	R2	43	0.0	0.100	12.5	LOS A	0.4	2.5	0.67	0.87	43.8
Approach		44	0.0	0.100	12.4	LOS A	0.4	2.5	0.66	0.86	43.9
West: Lakeside Parade											
10	L2	11	0.0	0.079	5.5	LOS A	0.0	0.0	0.00	0.04	57.0
11	T1	142	0.0	0.079	0.0	LOS A	0.0	0.0	0.00	0.04	59.0
Approach		153	0.0	0.079	0.4	NA	0.0	0.0	0.00	0.04	58.8
All Vehicles		808	0.0	0.313	0.8	NA	0.4	2.5	0.04	0.06	57.9

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

Site: 4 [Illoura Way and Lakeside Parade - PM]

Illoura Way and Lakeside Parade
Giveway / Yield (Two-Way)

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: Lakeside Parade											
5	T1	448	0.0	0.230	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R2	1	0.0	0.001	8.8	LOS A	0.0	0.0	0.59	0.60	48.5
Approach		449	0.0	0.230	0.0	NA	0.0	0.0	0.00	0.00	59.9
North: Iloura Way											
7	L2	1	0.0	0.001	8.4	LOS A	0.0	0.0	0.54	0.60	49.1
9	R2	14	0.0	0.064	21.0	LOS B	0.2	1.4	0.83	0.93	37.9
Approach		15	0.0	0.064	20.2	LOS B	0.2	1.4	0.81	0.91	38.6
West: Lakeside Parade											
10	L2	55	0.0	0.377	5.6	LOS A	0.0	0.0	0.00	0.04	56.9
11	T1	678	0.0	0.377	0.0	LOS A	0.0	0.0	0.00	0.04	58.9
Approach		733	0.0	0.377	0.4	NA	0.0	0.0	0.00	0.04	58.7
All Vehicles		1197	0.0	0.377	0.5	NA	0.2	1.4	0.01	0.04	58.5

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

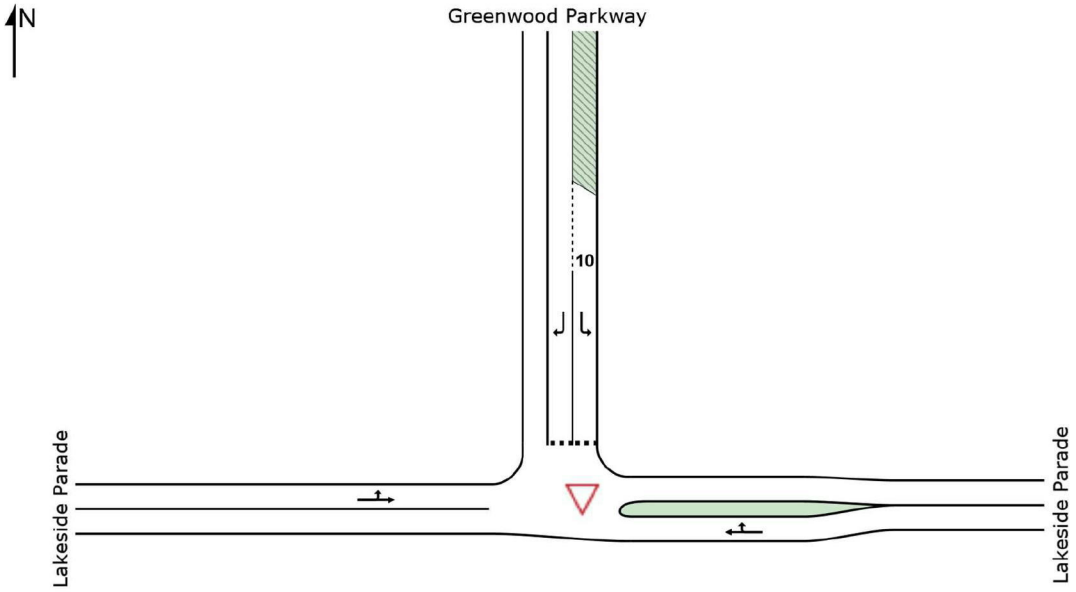
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 5 [Greenwood Parkway and Lakeside Parade - AM]

Greenwood Parkway and Lakeside Parade
Giveway / Yield (Two-Way)



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MOVEMENT SUMMARY

Site: 5 [Greenwood Parkway and Lakeside Parade - AM]

Greenwood Parkway and Lakeside Parade
Giveway / Yield (Two-Way)

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: Lakeside Parade											
5	T1	492	0.0	0.309	0.1	LOS A	0.7	5.1	0.11	0.09	57.5
6	R2	87	0.0	0.309	6.1	LOS A	0.7	5.1	0.11	0.09	55.9
Approach		579	0.0	0.309	1.0	NA	0.7	5.1	0.11	0.09	57.2
North: Greenwood Parkway											
7	L2	109	0.0	0.073	5.9	LOS A	0.3	2.1	0.21	0.55	51.0
9	R2	119	0.0	0.194	9.6	LOS A	0.6	4.5	0.58	0.83	47.4
Approach		228	0.0	0.194	7.8	LOS A	0.6	4.5	0.40	0.70	49.1
West: Lakeside Parade											
10	L2	30	0.0	0.074	5.5	LOS A	0.0	0.0	0.00	0.13	56.4
11	T1	113	0.0	0.074	0.0	LOS A	0.0	0.0	0.00	0.13	57.8
Approach		143	0.0	0.074	1.2	NA	0.0	0.0	0.00	0.13	57.4
All Vehicles		950	0.0	0.309	2.7	NA	0.7	5.1	0.16	0.24	54.5

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

Site: 5 [Greenwood Parkway and Lakeside Parade - PM]

Greenwood Parkway and Lakeside Parade
Giveway / Yield (Two-Way)

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: Lakeside Parade											
5	T1	411	0.0	0.308	1.5	LOS A	1.4	9.8	0.31	0.12	54.7
6	R2	81	0.0	0.308	10.0	LOS A	1.4	9.8	0.31	0.12	54.2
Approach		492	0.0	0.308	2.9	NA	1.4	9.8	0.31	0.12	54.6
North: Greenwood Parkway											
7	L2	359	0.0	0.372	8.7	LOS A	2.0	13.9	0.58	0.85	48.9
9	R2	38	0.0	0.101	13.3	LOS A	0.3	2.1	0.73	0.89	44.5
Approach		397	0.0	0.372	9.2	LOS A	2.0	13.9	0.60	0.86	48.4
West: Lakeside Parade											
10	L2	151	0.0	0.351	5.6	LOS A	0.0	0.0	0.00	0.13	56.3
11	T1	526	0.0	0.351	0.0	LOS A	0.0	0.0	0.00	0.13	57.6
Approach		677	0.0	0.351	1.3	NA	0.0	0.0	0.00	0.13	57.2
All Vehicles		1566	0.0	0.372	3.8	NA	2.0	13.9	0.25	0.31	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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

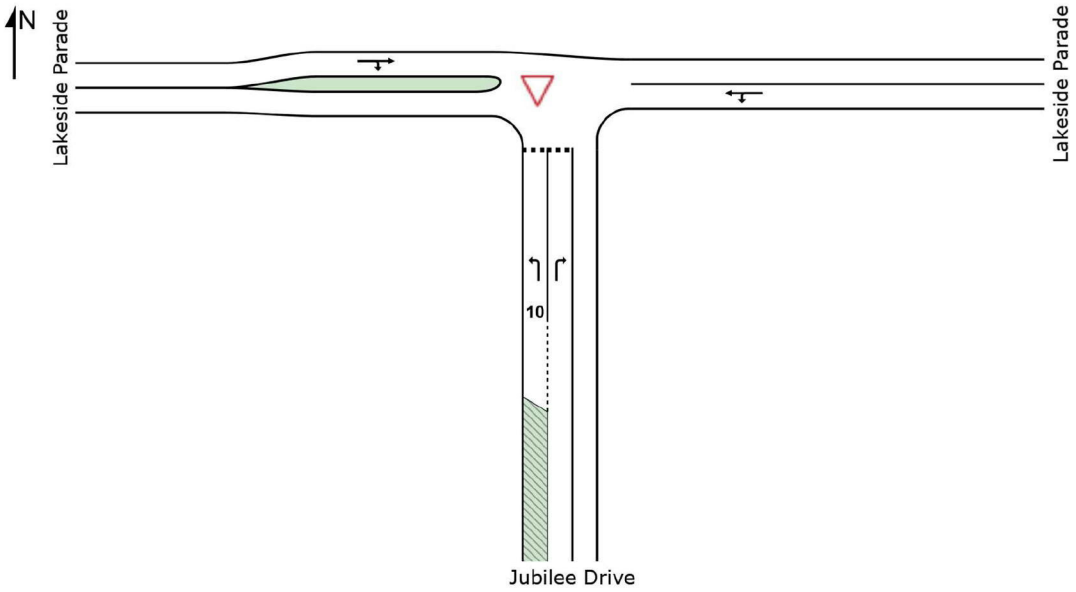
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 6 [Jubilee Dr (east) and Lakeside Pde - AM]

Jubilee Dr (east) and Lakeside Pde
Giveway / Yield (Two-Way)



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MOVEMENT SUMMARY

Site: 6 [Jubilee Dr (east) and Lakeside Pde - AM]

Jubilee Dr (east) and Lakeside Pde
Giveway / Yield (Two-Way)

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: Jubilee Drive											
1	L2	89	0.0	0.088	7.5	LOS A	0.3	2.4	0.48	0.69	50.0
3	R2	1	0.0	0.002	8.8	LOS A	0.0	0.0	0.52	0.63	50.7
Approach		90	0.0	0.088	7.5	LOS A	0.3	2.4	0.48	0.69	50.0
East: Lakeside Parade											
4	L2	1	0.0	0.252	5.6	LOS A	0.0	0.0	0.00	0.00	58.3
5	T1	490	0.0	0.252	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		491	0.0	0.252	0.0	NA	0.0	0.0	0.00	0.00	59.9
West: Lakeside Parade											
11	T1	199	0.0	0.123	0.4	LOS A	0.2	1.6	0.14	0.06	58.5
12	R2	22	0.0	0.123	7.6	LOS A	0.2	1.6	0.14	0.06	56.1
Approach		221	0.0	0.123	1.1	NA	0.2	1.6	0.14	0.06	58.3
All Vehicles		802	0.0	0.252	1.2	NA	0.3	2.4	0.09	0.10	58.2

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road 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 SUMMARY

Site: 6 [Jubilee Dr (east) and Lakeside Pde - PM]

Jubilee Dr (east) and Lakeside Pde
Giveway / Yield (Two-Way)

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: Jubilee Drive											
1	L2	28	0.0	0.027	7.2	LOS A	0.1	0.7	0.45	0.63	50.1
3	R2	1	0.0	0.004	18.6	LOS B	0.0	0.1	0.83	0.86	44.5
Approach		29	0.0	0.027	7.6	LOS A	0.1	0.7	0.46	0.64	49.8
East: Lakeside Parade											
4	L2	1	0.0	0.238	5.6	LOS A	0.0	0.0	0.00	0.00	58.3
5	T1	464	0.0	0.238	0.0	LOS A	0.0	0.0	0.00	0.00	59.9
Approach		465	0.0	0.238	0.0	NA	0.0	0.0	0.00	0.00	59.9
West: Lakeside Parade											
11	T1	772	0.0	0.499	1.0	LOS A	2.3	16.1	0.24	0.09	57.4
12	R2	113	0.0	0.499	9.2	LOS A	2.3	16.1	0.24	0.09	55.1
Approach		885	0.0	0.499	2.0	NA	2.3	16.1	0.24	0.09	57.1
All Vehicles		1379	0.0	0.499	1.5	NA	2.3	16.1	0.16	0.07	57.9

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.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

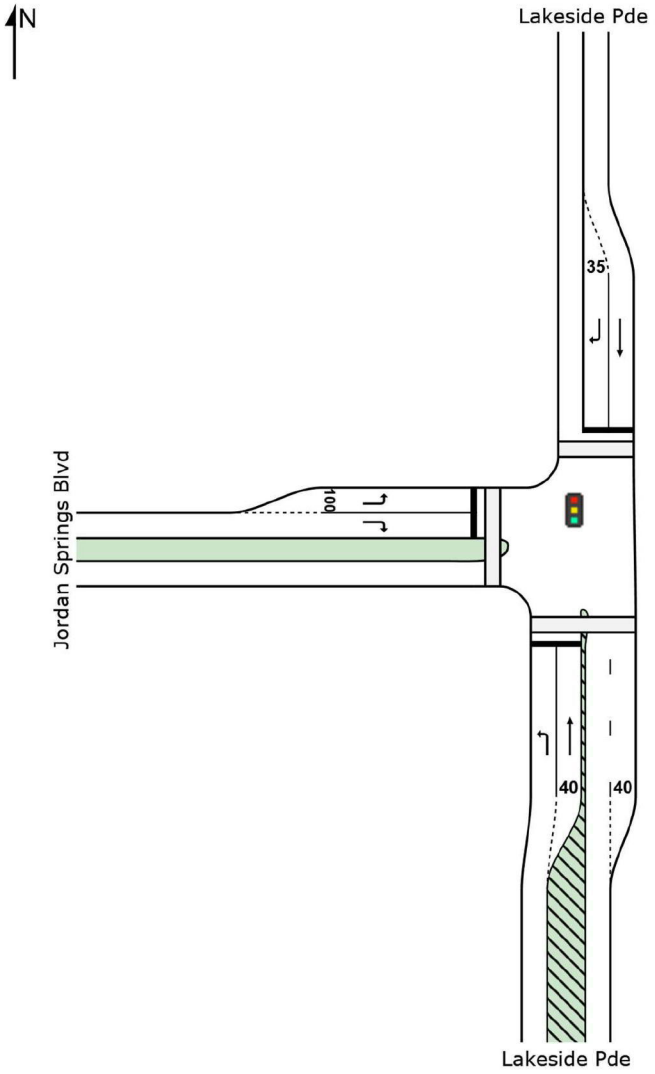
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - Existing - JS+CP - Factor Growth]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - Existing - JS+CP - Factor Growth]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical 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
South: Lakeside Pde											
1	L2	800	0.3	0.844	20.3	LOS B	17.7	124.1	0.90	1.00	28.4
2	T1	90	0.0	0.084	4.6	LOS A	0.8	5.8	0.49	0.39	43.3
Approach		890	0.3	0.844	18.7	LOS B	17.7	124.1	0.86	0.94	29.5
North: Lakeside Pde											
8	T1	35	1.3	0.033	4.4	LOS A	0.3	2.2	0.48	0.35	43.5
9	R2	150	1.1	0.634	23.7	LOS B	3.1	22.0	0.97	0.86	23.4
Approach		185	1.2	0.634	20.1	LOS B	3.1	22.0	0.88	0.77	26.3
West: Jordan Springs Blvd											
10	L2	99	5.0	0.442	23.9	LOS B	2.0	14.4	0.97	0.76	23.6
12	R2	187	1.9	0.816	28.2	LOS B	4.3	30.9	1.00	1.02	24.2
Approach		286	2.9	0.816	26.7	LOS B	4.3	30.9	0.99	0.93	24.0
All Vehicles		1361	1.0	0.844	20.6	LOS B	17.7	124.1	0.89	0.91	27.9

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.

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	14.5	LOS B	0.0	0.0	0.85	0.85
P3	North Full Crossing	50	14.5	LOS B	0.0	0.0	0.85	0.85
P4	West Full Crossing	50	7.8	LOS A	0.0	0.0	0.63	0.63
All Pedestrians		150	12.3	LOS B			0.78	0.78

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.

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MOVEMENT SUMMARY

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-PM - 2021 - Existing - JS+CP - Factor Growth]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 150 seconds (Practical 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
South: Lakeside Pde											
1	L2	472	0.3	0.669	43.1	LOS D	27.5	192.8	0.87	0.84	19.4
2	T1	39	0.0	0.047	26.3	LOS B	1.6	11.4	0.61	0.47	26.5
Approach		511	0.3	0.669	41.8	LOS C	27.5	192.8	0.85	0.81	19.8
North: Lakeside Pde											
8	T1	133	1.3	0.161	27.9	LOS B	5.9	41.5	0.65	0.54	25.8
9	R2	201	1.1	1.161	404.6	LOS F	41.8	295.1	1.00	1.81	2.6
Approach		334	1.2	1.161	254.6	LOS F	41.8	295.1	0.86	1.30	4.5
West: Jordan Springs Blvd											
10	L2	99	5.0	0.118	28.3	LOS B	4.0	29.1	0.60	0.70	21.5
12	R2	935	1.9	1.162	377.2	LOS F	194.8	1385.0	1.00	1.77	3.4
Approach		1034	2.2	1.162	343.8	LOS F	194.8	1385.0	0.96	1.67	3.6
All Vehicles		1879	1.5	1.162	245.8	LOS F	194.8	1385.0	0.91	1.37	4.9

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.

Movement Performance - Pedestrians

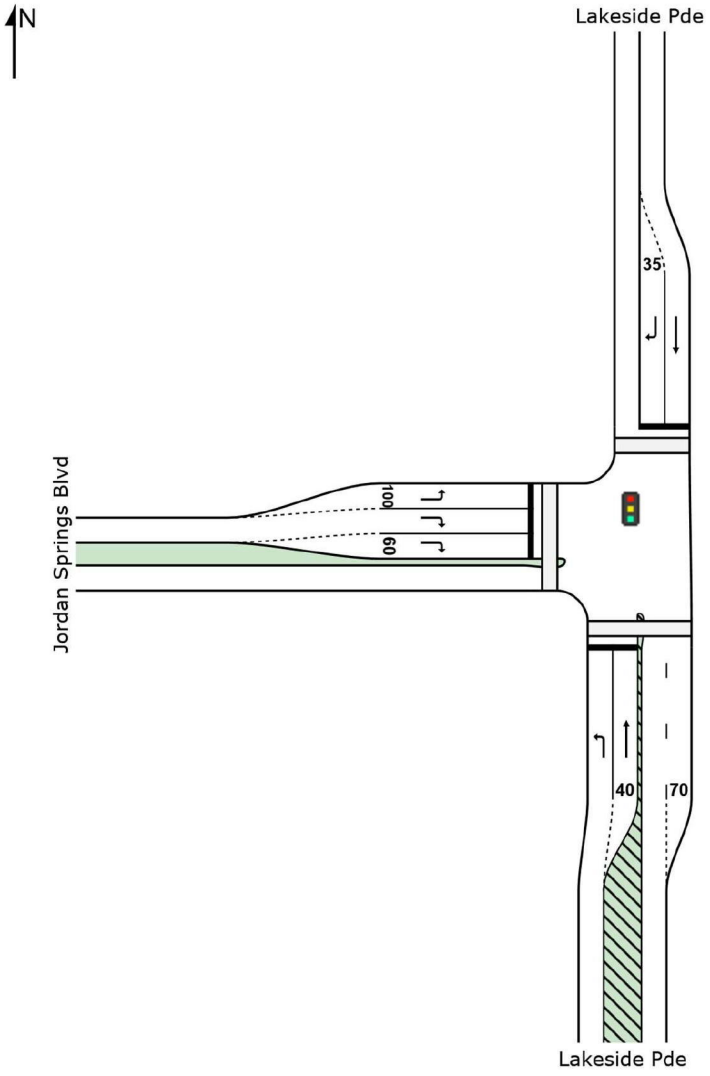
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	50	25.3	LOS C	0.1	0.1	0.58	0.58
P3	North Full Crossing	50	23.0	LOS C	0.1	0.1	0.55	0.55
P4	West Full Crossing	50	30.8	LOS D	0.1	0.1	0.64	0.64
All Pedestrians		150	26.4	LOS C			0.59	0.59

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.

SITE LAYOUT

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - OPT1 - JS+CP - Factor Growth]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - OPT1 - JS+CP - Factor Growth]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical 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
South: Lakeside Pde											
1	L2	800	0.3	0.844	20.3	LOS B	17.7	124.1	0.90	1.00	28.4
2	T1	90	0.0	0.084	4.6	LOS A	0.8	5.8	0.49	0.39	43.3
Approach		890	0.3	0.844	18.7	LOS B	17.7	124.1	0.86	0.94	29.5
North: Lakeside Pde											
8	T1	35	1.3	0.033	4.4	LOS A	0.3	2.2	0.48	0.35	43.5
9	R2	150	1.1	0.634	23.7	LOS B	3.1	22.0	0.97	0.86	23.7
Approach		185	1.2	0.634	20.0	LOS B	3.1	22.0	0.88	0.77	26.7
West: Jordan Springs Blvd											
10	L2	99	5.0	0.442	23.9	LOS B	2.0	14.4	0.97	0.76	23.6
12	R2	187	1.9	0.292	22.3	LOS B	2.5	17.7	0.94	0.74	27.0
Approach		286	2.9	0.442	22.9	LOS B	2.5	17.7	0.95	0.75	25.9
All Vehicles		1361	1.0	0.844	19.8	LOS B	17.7	124.1	0.88	0.87	28.4

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
P1	South Full Crossing	50	14.5	LOS B	0.0	0.0	0.85	0.85
P3	North Full Crossing	50	14.5	LOS B	0.0	0.0	0.85	0.85
P4	West Full Crossing	50	8.5	LOS A	0.0	0.0	0.65	0.65
All Pedestrians		150	12.5	LOS B			0.78	0.78

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.

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MOVEMENT SUMMARY

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-PM - 2021 - OPT1 - JS+CP - Factor Growth]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical 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
South: Lakeside Pde											
1	L2	472	0.3	0.637	15.6	LOS B	7.8	55.0	0.86	0.83	31.4
2	T1	39	0.0	0.047	7.3	LOS A	0.5	3.2	0.61	0.45	40.2
Approach		511	0.3	0.637	15.0	LOS B	7.8	55.0	0.84	0.80	32.0
North: Lakeside Pde											
8	T1	133	1.3	0.162	7.8	LOS A	1.6	11.6	0.65	0.52	39.7
9	R2	201	1.1	0.688	23.4	LOS B	4.2	29.7	0.98	0.90	23.9
Approach		334	1.2	0.688	17.2	LOS B	4.2	29.7	0.85	0.75	29.4
West: Jordan Springs Blvd											
10	L2	99	5.0	0.221	18.1	LOS B	1.6	11.8	0.83	0.74	26.9
12	R2	935	1.9	0.730	19.8	LOS B	12.8	90.7	0.94	0.85	28.5
Approach		1034	2.2	0.730	19.6	LOS B	12.8	90.7	0.93	0.84	28.3
All Vehicles		1879	1.5	0.730	18.0	LOS B	12.8	90.7	0.89	0.81	29.5

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
P1	South Full Crossing	50	14.5	LOS B	0.0	0.0	0.85	0.85
P3	North Full Crossing	50	13.6	LOS B	0.0	0.0	0.83	0.83
P4	West Full Crossing	50	12.0	LOS B	0.0	0.0	0.78	0.78
All Pedestrians		150	13.4	LOS B			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.

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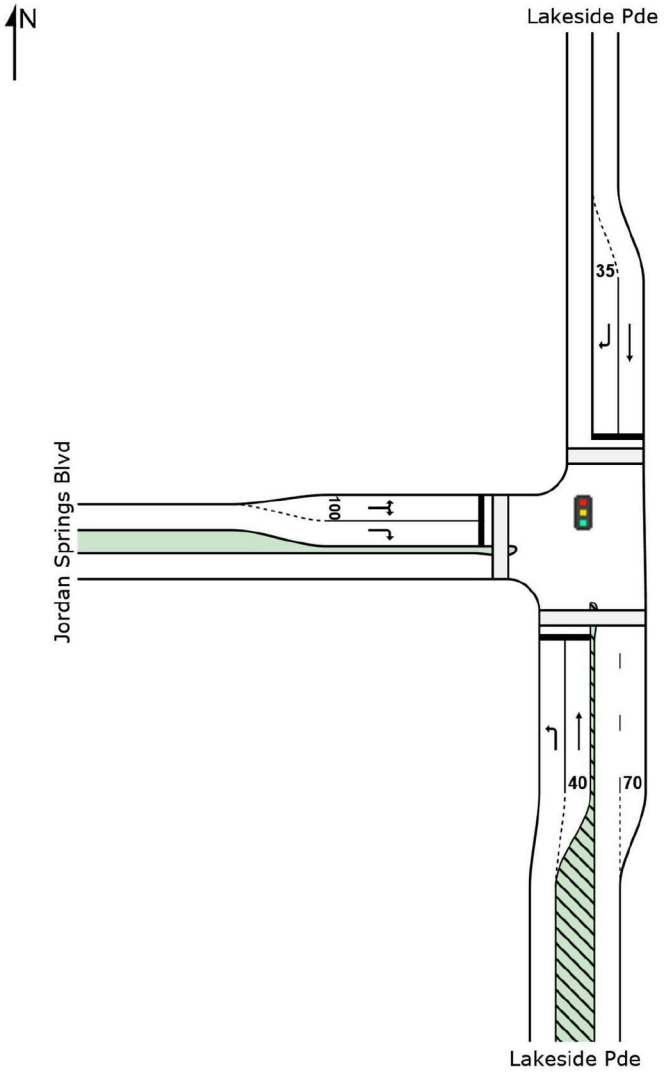
SITE LAYOUT

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - OPT2 - JS+CP - Factor Growth]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated



Organisation: PARSONS BRINCKERHOFF AUSTRALIA | Created: Friday, 27 October 2017 12:34:04 PM
Project: \\APSYDFIL03\proj\M\MARYLAND_DVLPMNT_CO\2197037A_Central_Precinct_Traffic_Mode\05_WrkPapers\WP\Draft\Internal Road Assessment - Jordan Springs East\SIDRA\170914_LakesidePdeJSBlvd v2.sip7

MOVEMENT SUMMARY

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-AM - 2021 - OPT2 - JS+CP - Factor Growth]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical 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
South: Lakeside Pde											
1	L2	800	0.3	0.844	20.3	LOS B	17.7	124.1	0.90	1.00	28.4
2	T1	90	0.0	0.084	4.6	LOS A	0.8	5.8	0.49	0.39	43.3
Approach		890	0.3	0.844	18.7	LOS B	17.7	124.1	0.86	0.94	29.5
North: Lakeside Pde											
8	T1	35	1.3	0.033	4.4	LOS A	0.3	2.2	0.48	0.35	43.5
9	R2	150	1.1	0.634	23.7	LOS B	3.1	22.0	0.97	0.86	23.4
Approach		185	1.2	0.634	20.1	LOS B	3.1	22.0	0.88	0.77	26.3
West: Jordan Springs Blvd											
10	L2	99	5.0	0.442	23.9	LOS B	2.0	14.4	0.97	0.76	23.6
12	R2	187	1.9	0.408	22.8	LOS B	3.5	25.2	0.96	0.77	26.8
Approach		286	2.9	0.442	23.2	LOS B	3.5	25.2	0.96	0.77	25.7
All Vehicles		1361	1.0	0.844	19.9	LOS B	17.7	124.1	0.88	0.88	28.3

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.
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	14.5	LOS B	0.0	0.0	0.85	0.85
P3	North Full Crossing	50	14.5	LOS B	0.0	0.0	0.85	0.85
P4	West Full Crossing	50	6.6	LOS A	0.0	0.0	0.58	0.58
All Pedestrians		150	11.9	LOS B			0.76	0.76

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.

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MOVEMENT SUMMARY

Site: 101 [I-28JordanSpringsBlvd-LakesideParade-PM - 2021 - OPT2 - JS+CP - Factor Growth]

Jordan Springs Blvd-Lakeside Parade
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical 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
South: Lakeside Pde											
1	L2	472	0.3	0.728	19.1	LOS B	9.1	63.9	0.93	0.90	29.2
2	T1	39	0.0	0.053	8.7	LOS A	0.5	3.5	0.66	0.49	38.7
Approach		511	0.3	0.728	18.3	LOS B	9.1	63.9	0.91	0.87	29.8
North: Lakeside Pde											
8	T1	133	1.3	0.183	9.3	LOS A	1.8	12.7	0.71	0.56	38.1
9	R2	201	1.1	0.841	29.2	LOS C	4.9	34.3	1.00	1.08	20.9
Approach		334	1.2	0.841	21.3	LOS B	4.9	34.3	0.88	0.87	26.6
West: Jordan Springs Blvd											
10	L2	99	5.0	0.313	16.8	LOS B	2.7	19.4	0.81	0.76	27.7
12	R2	935	1.9	0.786	20.0	LOS B	16.9	120.5	0.97	0.90	28.3
Approach		1034	2.2	0.786	19.7	LOS B	16.9	120.5	0.95	0.89	28.3
All Vehicles		1879	1.5	0.841	19.6	LOS B	16.9	120.5	0.93	0.88	28.4

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
P1	South Full Crossing	50	14.5	LOS B	0.0	0.0	0.85	0.85
P3	North Full Crossing	50	12.0	LOS B	0.0	0.0	0.78	0.78
P4	West Full Crossing	50	11.3	LOS B	0.0	0.0	0.75	0.75
All Pedestrians		150	12.6	LOS B			0.79	0.79

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.

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