Traffic Impact and Parking Report

Stage 1 and 2 -129 Marys Mount Road, Goulburn

Prepared for Devcore Property Group

31 October 2022

Calibre Professional Services Pty Ltd
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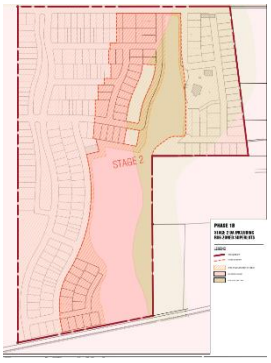

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DOCUMENT CONTROL

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1. Introduction

In May 2022, Calibre was engaged by Devcore Property Group to undertake a Transport and Parking Assessment (TIPA) for the proposed 256 lots of stage 1 and 2 developments at 129 Marys Mount Road, Goulburn.

1.1 Site of Works

The development site is currently a greenfield site located within an expanding residential release area precinct. The site is located approximately 4km north of the Goulburn CBD and approximately 92km north east of Canberra, ACT. The site includes a southern boundary frontage to Marys Mount Road. The east and west boundaries have developing estates being constructed while the north boundary is Greenfields. The location of the site is shown below in Figure 1.1 below.

Figure 1.1 Ariel Photograph of proposed development

1.2 Scope of Investigation

The aim of this investigation is to complete a Traffic Impact and Parking Assessment (TIPA) to support a Development Application (DA) and Construction Certificate (CC) for the residential development planned for 129 Marys Mount Road.

Our proposed scope of works includes the works listed below.

- Review of existing traffic information for the area including Goulburn Mulwaree Urban Fringe Strategy
- Traffic analysis of the site and surrounding road network, consisting of:
    - Existing Road Network
    - Surveying traffic rates for the intersection of Marys Mount Road and Road 1 (Site access Road)
    - Consider site traffic generation and distribution.
    - SIDRA analysis of the intersection
    - Assessment of parking provision and requirements for the site
    - Assessment of the public transport and active travel infrastructure surrounding the site

2. Existing Conditions

2.1 Surrounding Road Network

Marys Mount Road is a Collector Road linking key roads of Middle Arm Road to the east and Crookwell Road to the southwest. The road provides key access to recently constructed residential subdivisions surrounding the development site. All intersections along the road are either priority controlled or roundabout intersections. The closest intersections to the east and west of the development site, 129 Mary Mount Road, both include single lane roundabouts. the length of road at the southern boundary of the development site includes a carriage way of approximately 10.0m and a post speed limit of 50km/hr.

Kavanagh Street is a local street connecting Marys Mount Road to the north and Geoghegan Drive to the south. The street is connecting to Mary Mount Road via a single lane roundabout which will serve as the new access point for the proposed development. The street includes a single lane of travel in each direction, unrestricted parallel parking, and a posted speed limit of 50km/hr.

2.2 Existing Traffic Flows

To determine the existing traffic volumes on the surrounding road network, intersection counts of Marys Mount Road and Kavanagh Avenue were taken on Tuesday 21st July 2022. The peak periods were determined to be between 8:15 – 9:15 for the AM and 16:30 – 17:30 for the PM. A summary of the peak traffic volumed can be seen in Table 2.1 and Figure 2.1 below.

Table 2.1 Existing Peak Period Traffic Volumes

Peak Time		East Approach Marys Mount Rd			South Approach Kavanagh St			West Approach Marys Mount Rd			Peak total
Start	End	U	Through	Left	U	Right	Left	U	Right	Through	
8:15	9:15	1	119	6	0	6	57	0	39	124	352
16:30	17:30	0	112	5	0	1	35	0	56	91	300

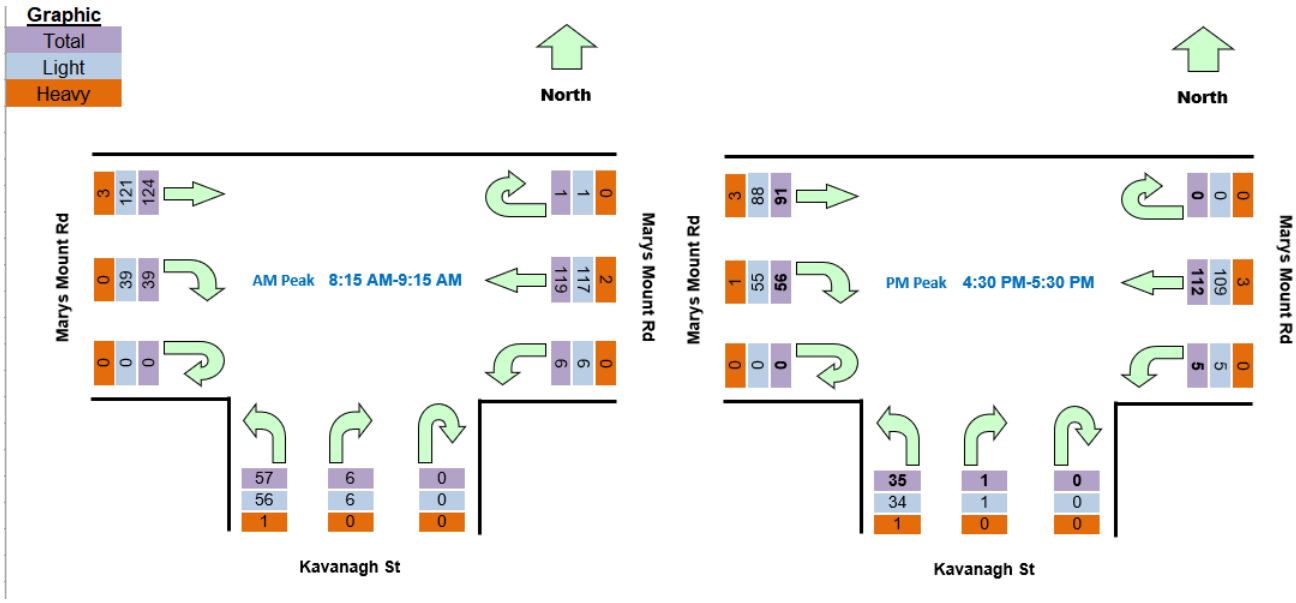


Figure 2.1 Existing Intersection Layout and Traffic Volumes

The traffic count spreadsheet, conducted by Trans Traffic Survey, can be found in Appendix A.

2.3 Intersection Performance Analysis

To ensure the adequate performance of the road network, where the new access road for 129 Marys Mount Road will be constructed, intersection performance analysis has been undertaken for the intersection of Marys Mount Road and Kavanagh Street.

Intersection performance analysis has been undertaken using SIDRA 9.0 analytical intersection modelling software. The SIDRA software represents intersection performance through the following four key parameters:

- Degree of Saturation (DOS) – The ratio of traffic to capacity,
- Delay – The average delay in seconds,
- Level of Service (LOS) – Conversion of the average delay into a letter grade, and
- Queue length – The length of the 95th percentile queue in metres.

2.4 Performance Criteria

The RMS Traffic Modelling Guidelines identify the maximum practical DOS for Roundabouts as 0.85. Intersections operating in excess of their maximum practical capacity typically experience unstable traffic flow whereby small disruptions result in excessive congestion and flow breakdown.

The RMS Traffic Modelling Guidelines also identify LOS criteria for intersections as shown in Table 2.2

Table 2.2 LOS Criteria for the Intersections (RTA NSW Method)

LOS	Average delay per vehicle	Description
A	≤ 14s	Good operation
B	15s – 28s	Acceptable delays and spare capacity
C	29s – 42s	Satisfactory
D	43s – 56s	Near capacity
E	57s – 70s	At capacity, priority-control not suitable
F	> 71s	Unsatisfactory with excessive queueing

The TCCS Traffic Impact Assessment Guidelines, similarly, identifies intersections operating at LOS D or better as acceptable.

95th percentile queue lengths have been assessed to ensure that queues in short lanes do not extend back to impact traffic in adjacent lanes and that queues in full-length lanes do not extend back to impact upstream intersections.

2.5 Existing Intersection Performance

The results of SIDRA for the existing intersection of Marys Mount Road and Kavanagh Avenue are summarised in Table 2.3.

Table 2.3 Existing Intersection Analysis Results

Intersection	AM Peak Hour				PM Peak Hour			
	DOS	Delay	LOS	Queue	DOS	Delay	LOS	Queue
Kavanagh Street								
Left	0.054	4.6s	A	1.9m	0.031	4.5s	A	1.1m
Right	0.054	9.2s	A	1.9m	0.031	9.1s	A	1.1m
Marys Mount Roads (East)								
Left	0.094	4.2s	A	3.2m	0.091	4.2s	A	3.1m
Through	0.094	4.4s	A	3.2m	0.091	4.5s	A	3.1m
Marys Mount Road (West)								
Through	0.107	4.3s	A	4.1m	0.091	4.3s	A	3.4m
Right	0.107	8.6s	A	4.1m	0.091	8.6s	A	3.4m

From the above table, it can be seen that all legs of the roundabout intersection adjacent to the development site are not expected to reach practical capacity for a roundabout intersection.

2.6 Public Transport

The PBC Goulburn Bus Route 821A/821B provides a bus service along a section of Marys Mount Road in a clockwise and anti-clockwise loop arrangement across the southern boundary of the proposed development site. The service provides direct access to the Goulburn CBD and majority of the northern suburbs. A map of the bus route 821A / 821B can be seen in Figure 2.2 below.

Figure 2.2 PBC Goulburn Bus Route

The centroid of the proposed development in seen to be 1km walking distance to the closest bus stop at the intersection of Gibson Street / Dourock Avenue. The walking route to the bus stop is shown in Figure 2.3 below.

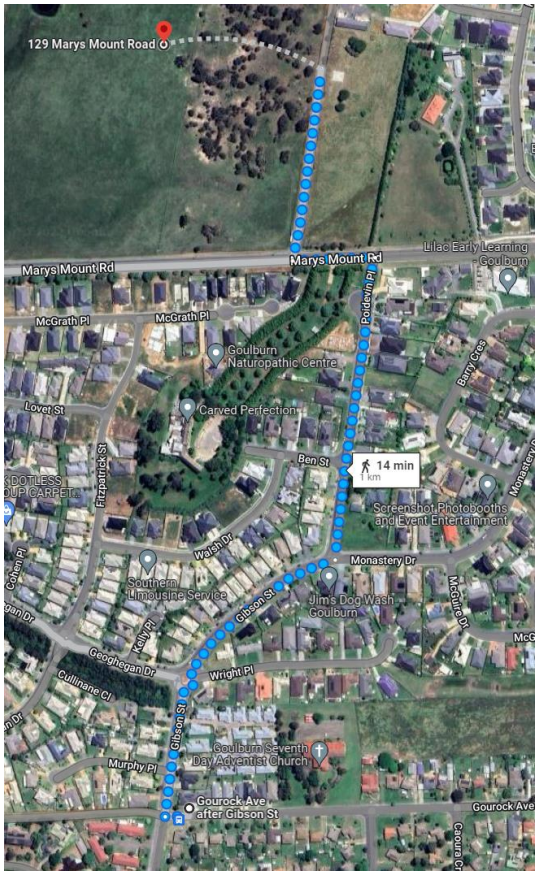


Figure 2.3 Walking Map From Development to Bus Stop

2.7 Active Travel

There is no noted active travel paths located along Marys Mount Road.

3. Proposed Site Development

3.1 Currently Proposed Layout

3.1.1 Land Use

The key components of the proposed development are summarised below.

- Construction of 273 residential lots over two stages.
- Internal road network
- Connection to Marys Mount Road via the roundabout intersection Marys Mount Road / Kavanagh Street

3.1.2 Access Locations

The main access to the proposed development at 129 Marys Mount Road will be via a newly constructed road (New Access Road) on the north side of the existing roundabout intersection of Marys Mount Road and Kavanagh Street. There will also be four open ended streets, two along the east and two along the west boundaries, for future road network constructions.

4. Traffic Generation

4.1 Introduction

The following presents an assessment of the potential traffic impacts of the proposal using the Roads and Traffic Authority Guide to Traffic Generating Developments standard approach.

4.2 Traffic Generation

The Transport for NSW Technical Direction TDT2013/04a generation rate was applied to the proposed development yields. With a rate of 0.71 and 0.78 per dwelling for regional areas in the AM and PM respectively, the proposed development is expected to have **194 AM** peak hour trips and **213 PM peak** hour trips. Applying the recommended distribution percentages from the RTA Guide to Traffic Generating Developments would result in 80% outbound and 20% inbound in the AM peak period. The reverse would occur during the PM peak hour.

4.3 Journey to Work Census Assessment

The 2016 Census of Population and Housing was used to create an assessment of the existing travel to work characteristics of the Goulburn area including the development site. This will provide an indication of the potential travel patterns of the residents of the proposed sub division. Using the provided data, it is possible to see the direction of travel in the surrounding road network. The statistical hierarchy level in and around the development site (SA2) is shown in Figure 4.1 below.

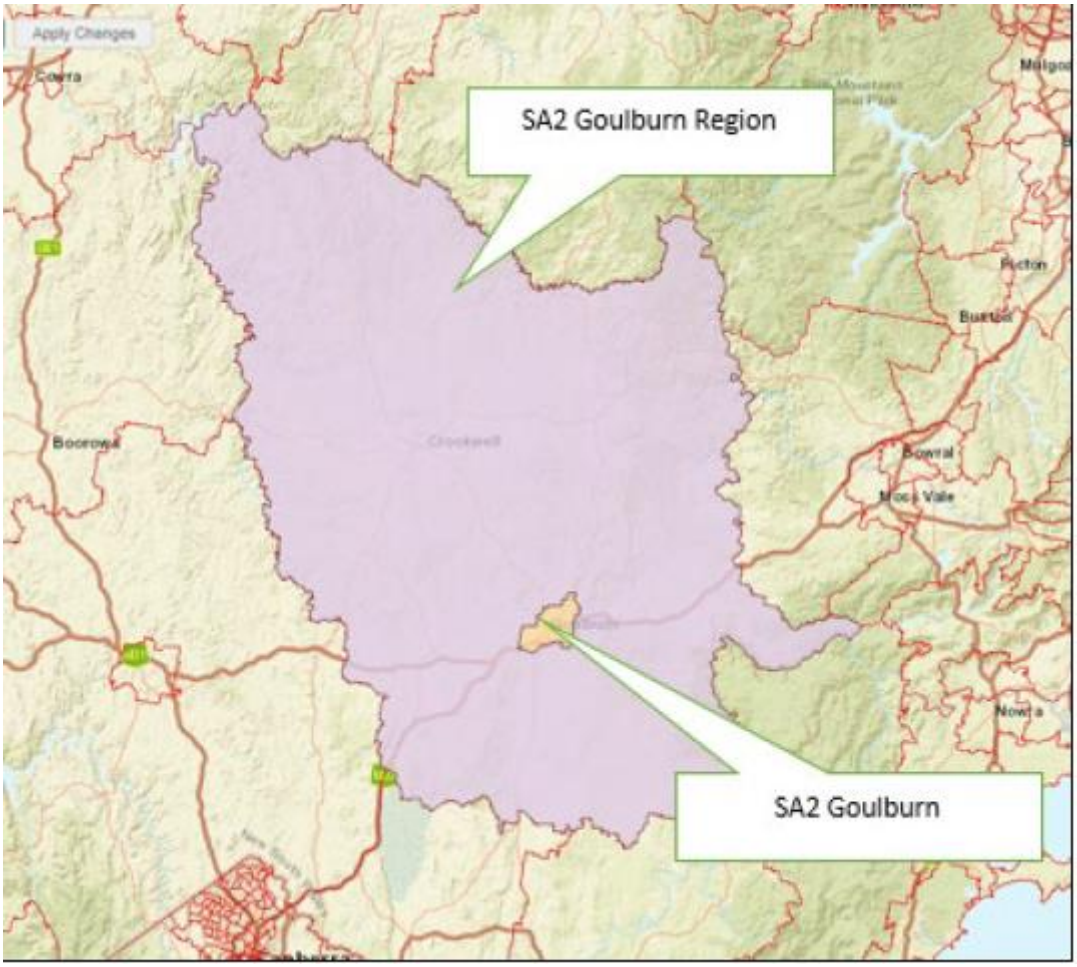


Figure 4.1 Statistical area level 2 (SA2) around Goulburn

This indicates that the main urban centre of Goulburn is contained within SA2 Goulburn, and this in turn is surrounded by SA2 Goulburn region. The number and type of dwellings in these two SA2s are summarised in Table 4.1 Dwelling types as per 2016 Census

Table 4.1 Dwelling types as per 2016 Census

Dwelling Type	SA2 – Goulburn		SA2 – Goulburn Region	
	No.	Percentage %	No.	Percentage %
Occupied private dwellings	9,059	89%	5,036	74%
Unoccupied private dwellings	1,036	10%	1,777	26%
Non-Private Dwellings	71	1%	17	0%
Total	10,166	100%	6830	100%

The data above summarises that the majority of dwelling types in each of the SA2's are private dwellings. It can also be seen that SA2 - Goulburn has a lower percentage of unoccupied homes, 10%, compared to that of the SA2 – Goulburn region, 26%. This is likely due to a significantly smaller proportion of holiday homes in Goulburn than in the Goulburn

Region. It should also be noted that although the SA2 – Goulburn has substantially more dwellings even though the SA2 -Goulburn Region has a substantially larger area.

The methods of journey to work are summarised in Table 4.2 below.

Table 4.2 Methods of Journey to Work, 2016 Census

Mode	SA2 -Goulburn		SA2 – Goulburn Region	
	No.	% of those who commuted	No.	% of those who commuted
Train	25	0.3%	24	0.6%
Bus	80	0.9%	23	0.6%
Ferry	0	0.0%	4	0.1%
Tram	0	0.0%	0	0.0%
Car (Driver)	7,116	82.2%	3,442	82.4%
Car (Passenger)	704	8.1%	228	5.5%
Motorbike/Scooter	44	0.5%	43	1.0%
Bicycle	25	0.3%	5	0.1%
Walked	422	4.9%	197	4.7%
Other	241	2.8%	213	5.1%
Did not work	978		595	
Worked at home	256		746	
Not Stated	112		86	
Total	10,003	100%	5,606	100%
Travelled	8,657		4,179	

The above modes indicates that the primary source of journey to work is car, in combination with car (passenger), making up 90.3% and 87.9% of the commuter trips for the Goulburn and Goulburn Region, respectively. The distribution of Journey to Work trips were examined using SA2 to local government area (LGA) geography. It is noted that areas within the Greater Sydney region have been condensed into “Greater Sydney” to allow for a smoother analysis.

Table 4.3 Journey to Work – LGA, 2016 Census

Places of Work LGA	From SA2 Goulburn		From SA2 Goulburn Region	
	No.	Percentage %	No.	Percentage %
Goulburn Mulwaree	6,200	85%	1,748	51%
ACT	504	7%	283	8%
Wingecarribee	135	2%	205	6%
Greater Sydney	121	2%	150	4%
Queanbeyan – Palerang Regional	118	2%	57	2%
Upper Lachlan Shire	109	2%	900	26%
Yass Valley	26	0%	20	1%
Wollongong	11	0%	17	0%
Griffith	7	0%	0	0%
Shellharbour	5	0%	5	0%
Bathurst Regional	5	0%	0	0%

Places of Work LGA	From SA2 Goulburn		From SA2 Goulburn Region	
	No.	Percentage %	No.	Percentage %
Cabonne	5	0%	0	0%
Hilltops	4	0%	12	0%
Shoalhaven	4	0%	10	0%
Albury	3	0%	0	0%
Wagga Wagga	3	0%	0	0%
Total	7,260	100%	3,672	100%

As the development site is situated with the SA2 – Goulburn, it is likely to see a similar trend in journey to work movement. The above analysis of journey to work movement indicates that the majority of commuting car trips are travelling to LGA Goulburn at 85%. This can be expected as the surrounding employment opportunities is roughly 90km away, ACT and Southern Highlands. The following highest percentages are the ACT at 7%, and Wingecarribee, Greater Sydney, Queanbeyan and Upper Lachlan Shire all at 2%.

4.4 Trip Distribution

Using the above Journey to Work data, it can be assumed that approximately 85% of the commuters generated from the proposed development would travel towards the Goulburn CBD. Through a desktop study of the local road network, it can be seen that both directions of Marys Mount Road can be utilised as well as Kavanagh Street. The remaining 15% is assumed to be split between traveling north or south on the Hume. It is assumed the 5% travelling towards Sydney will travel eastbound on Marys Mount Road, linking up with Sydney Road. The last 10% travelling towards ACT are assumed to travel west bound along Mary Mount Road, to link up with Hume Street.

The total AM and PM peak hour volumes for the existing plus development yield is summarised below in Table 4.4

Table 4.4 Existing plus Development Traffic Generation

Peak Time		East MMR			Kavanagh St			West MMR			New Access Road			Peak total
Start	End	R	T	L	R	T	L	R	T	L	R	T	L	
8:15	9:15	13	119	6	6	11	57	39	124	15	60	44	52	546
16:30	17:30	57	112	5	1	48	35	56	91	65	16	12	14	513

The new total peak hour traffic volume can be seen to be raised to 546 and 513 in the AM and PM peaks, respectively. This indicates that the road classification will not be changed from a Collector Road, expecting 2,000 – 10,000 vehicles per day (250-1,000 vehicles per hour).

5. Traffic Analysis

5.1 SIDRA Analysis

The SIDRA analysis is summarised in Table 5.1.

Table 5.1 SIDRA Analysis of Proposed Development

Intersection	AM Peak Hour				PM Peak Hour			
	DOS	Delay	LOS	Queue	DOS	Delay	LOS	Queue
Kavanagh Street								
Left	0.068	4.9s	A	2.4m	0.076	4.9s	A	2.7m
Through	0.068	5.2s	A	2.4m	0.076	5.1s	A	2.7m
Right	0.068	9.5s	A	2.4m	0.076	9.5s	A	2.7m
Marys Mount Roads (East)								
Left	0.121	4.7s	A	4.5m	0.141	4.4s	A	5.3m
Through	0.121	5.0s	A	4.5m	0.141	4.7s	A	5.3m
Right	0.121	9.3s	A	4.5m	0.141	9.0s	A	5.3m
New Access Road								
Left	0.139	4.9s	A	5.0m	0.037	4.7s	A	1.3m
Through	0.139	5.1s	A	5.0m	0.037	4.9s	A	1.3m
Right	0.139	9.5s	A	5.0m	0.037	9.3s	A	1.3m
Marys Mount Road (West)								
Left	0.129	4.1s	A	4.8m	0.175	4.5s	A	6.7m
Through	0.129	4.4s	A	4.8m	0.175	4.8s	A	6.7m
Right	0.129	8.7s	A	4.8m	0.175	9.2s	A	6.7m

The complete SIDRA analysis report can be found in Appendix B.

As seen from the table above, the intersection of Marys Mount Road / Kavanagh Street / New Access Road, is not expected to reach practical capacity for a roundabout intersection. DOS has a maximum value of 0.139 along the new access road in the AM and 0.175 along West approach of Marys Mount Road in the PM. Delays are expected to only reach a maximum of 9.5 seconds (LOS A) along Kavanagh Street and New Access Road in the AM and Kavanagh Street in the PM. Queue lengths are not expected to reach more than 5.0m and 6.7m in the AM and PM respectively thus, not impacting on any adjacent intersections or the surrounding road network.

5.2 Additional Rezoning – Stage 3

Calibre recognises the intent of rezoning a section of the development from Ru6 to R2. This would include an additional 23 lots to be constructed, and 13 lots from the neighbouring eastern development, total of 36 lots. The additional 36 lots would have the following impacts:

- AM Peak period – 194 vehicles to 219 vehicles (additional 26 vehicles)
- PM Peak Period – 213 vehicles to 241 vehicles (additional 28 vehicles)

As the SIDRA results for stage 1 and 2 are exceptionally low, a total increase of 26 and 28 vehicles in the AM and PM peak periods respectively is not considered to impact the results. Therefore, modelling is not deemed necessary as the intersection is not deemed to reach practical capacity.

6. Conclusion

In May 2022, Calibre was engaged by Devcore Property Group to undertake a Transport and Parking Assessment (TIPA) for the proposed 273 lots of stage 1 and 2 developments at 129 Marys Mount Road, Goulburn.

The proposed development is located approximately 4km north of the Goulburn CBD and approximately 92km north east of Canberra, ACT. The site includes a southern boundary frontage to Marys Mount Road. The east and west boundaries have developing estates being constructed while the north boundary is Greenfields. Access to the development will be via a newly constructed road on the north leg of the roundabout intersection of Marys Mount Road / Kavanagh Street.

The PBC Goulburn Bus Route 821A/821B provides a bus service along a section of Marys Mount Road in a clockwise and anti-clockwise loop arrangement across the southern boundary of the proposed development site. The service provides direct access to the Goulburn CBD and majority of the northern suburbs.

There is currently no noted active travel along Marys Mount Road.

A traffic impact assessment for the intersection of Marys Mount Road / Kavanagh Street, with and without the New Access Road, has been undertaken to assess the performance of the road network. All assessments have been completed during the AM and PM commuter peak periods for a typical weekday.

The SIDRA modelling for both the existing and proposed intersection showed all legs of the intersection operated within the acceptable parameters according to RMS Traffic Modelling Guidelines. DOS reached a maximum of 0.139 and 0.175 in the AM and PM respectively, delays reached a maximum of 9.5s for the AM and PM, while all legs received a delay score of LOS A, and the maximum queue length reached 5.0m and 6.7m in the AM and PM, respectively.

The intersection of Marys Mount Road / Kavanagh Street / New Access Road is not expected to reach practical capacity for a roundabout intersection.

Appendix A Trans Traffic Survey

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Marys Mount Rd and Kavanagh St, Goulburn

GPS -34.725103, 149.718549

Date:	Tue 21/06/22
Weather:	Overcast
Suburban:	Goulburn
Customer:	Calibre Group

North:	N/A
East:	Marys Mount Rd
South:	Kavanagh St
West:	Marys Mount Rd

Survey Period	AM:	7:30 AM-9:30 AM
	PM:	4:30 PM-6:30 PM
Traffic Peak	AM:	8:15 AM-9:15 AM
	PM:	4:30 PM-5:30 PM

All Vehicles

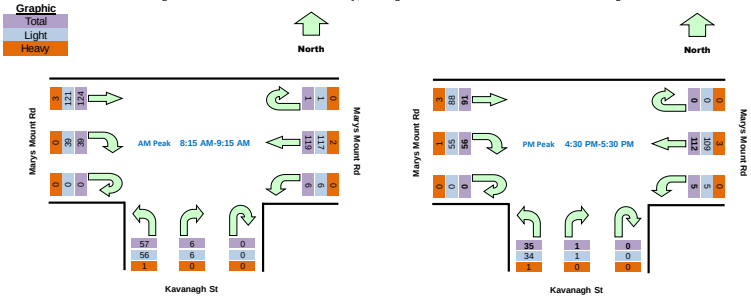
Time		East Approach Marys Mount Rd			South Approach Kavanagh St			West Approach Marys Mount Rd			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
7:30	7:45	0	12	0	0	2	10	0	2	11	225	
7:45	8:00	0	18	0	0	4	5	1	2	26	278	
8:00	8:15	0	27	1	0	0	5	0	6	25	342	
8:15	8:30	0	14	0	0	1	15	0	8	30	352	Peak
8:30	8:45	0	30	0	0	1	14	0	14	31	338	
8:45	9:00	1	48	3	0	3	19	0	12	34		
9:00	9:15	0	27	3	0	1	9	0	5	29		
9:15	9:30	0	21	0	0	1	8	0	9	15		
16:30	16:45	0	30	0	0	0	5	0	19	26	300	Peak
16:45	17:00	0	35	3	0	0	13	0	13	29	269	
17:00	17:15	0	22	0	0	0	7	0	14	17	226	
17:15	17:30	0	25	2	0	1	10	0	10	19	208	
17:30	17:45	0	17	1	0	0	7	0	8	16	172	
17:45	18:00	0	28	1	0	0	4	1	6	10		
18:00	18:15	0	21	1	0	0	8	0	3	9		
18:15	18:30	0	12	1	0	0	8	0	3	7		

Peak Time		East Approach Marys Mount Rd			South Approach Kavanagh St			West Approach Marys Mount Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
8:15	9:15	1	119	6	0	6	57	0	39	124	352
16:30	17:30	0	112	5	0	1	35	0	56	91	300

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy



Light Vehicles

Time		East Approach Marys Mount Rd			South Approach Kavanagh St			West Approach Marys Mount Rd		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
7:30	7:45	0	12	0	0	1	5	0	2	10
7:45	8:00	0	17	0	0	4	5	1	2	24
8:00	8:15	0	24	1	0	0	5	0	6	25
8:15	8:30	0	13	0	0	1	15	0	8	30
8:30	8:45	0	30	0	0	1	14	0	14	31
8:45	9:00	1	47	3	0	3	18	0	12	33
9:00	9:15	0	27	3	0	1	9	0	5	27
9:15	9:30	0	19	0	0	1	8	0	9	14
16:30	16:45	0	27	0	0	0	5	0	19	24
16:45	17:00	0	35	3	0	0	12	0	13	28
17:00	17:15	0	22	0	0	0	7	0	13	17
17:15	17:30	0	25	2	0	1	10	0	10	19
17:30	17:45	0	17	1	0	0	7	0	8	15
17:45	18:00	0	28	1	0	0	4	1	6	10
18:00	18:15	0	21	1	0	0	8	0	3	8
18:15	18:30	0	12	1	0	0	8	0	3	7

Peak Time		East Approach Marys Mount Rd			South Approach Kavanagh St			West Approach Marys Mount Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
8:15	9:15	1	117	6	0	6	56	0	39	121	346
16:30	17:30	0	109	5	0	1	34	0	55	88	292

Heavy Vehicles

Time		East Approach Marys Mount Rd			South Approach Kavanagh St			West Approach Marys Mount Rd		
Period Start	Period End	U	WB	L	U	R	L	U	R	EB
7:30	7:45	0	0	0	0	1	5	0	0	1
7:45	8:00	0	1	0	0	0	0	0	0	2
8:00	8:15	0	3	0	0	0	0	0	0	0
8:15	8:30	0	1	0	0	0	0	0	0	0
8:30	8:45	0	0	0	0	0	0	0	0	0
8:45	9:00	0	1	0	0	0	1	0	0	1
9:00	9:15	0	0	0	0	0	0	0	0	2
9:15	9:30	0	2	0	0	0	0	0	0	1
16:30	16:45	0	3	0	0	0	0	0	0	2
16:45	17:00	0	0	0	0	0	1	0	0	1
17:00	17:15	0	0	0	0	0	0	0	1	0
17:15	17:30	0	0	0	0	0	0	0	0	0
17:30	17:45	0	0	0	0	0	0	0	0	1
17:45	18:00	0	0	0	0	0	0	0	0	0
18:00	18:15	0	0	0	0	0	0	0	0	1
18:15	18:30	0	0	0	0	0	0	0	0	0

Peak Time		East Approach Marys Mount Rd			South Approach Kavanagh St			West Approach Marys Mount Rd			Peak
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	total
8:15	9:15	0	2	0	0	0	1	0	0	3	6
16:30	17:30	0	3	0	0	0	1	0	1	3	8

Appendix B SIDRA Analysis

USER REPORT FOR SITE

All Movement Classes

Project: Project1

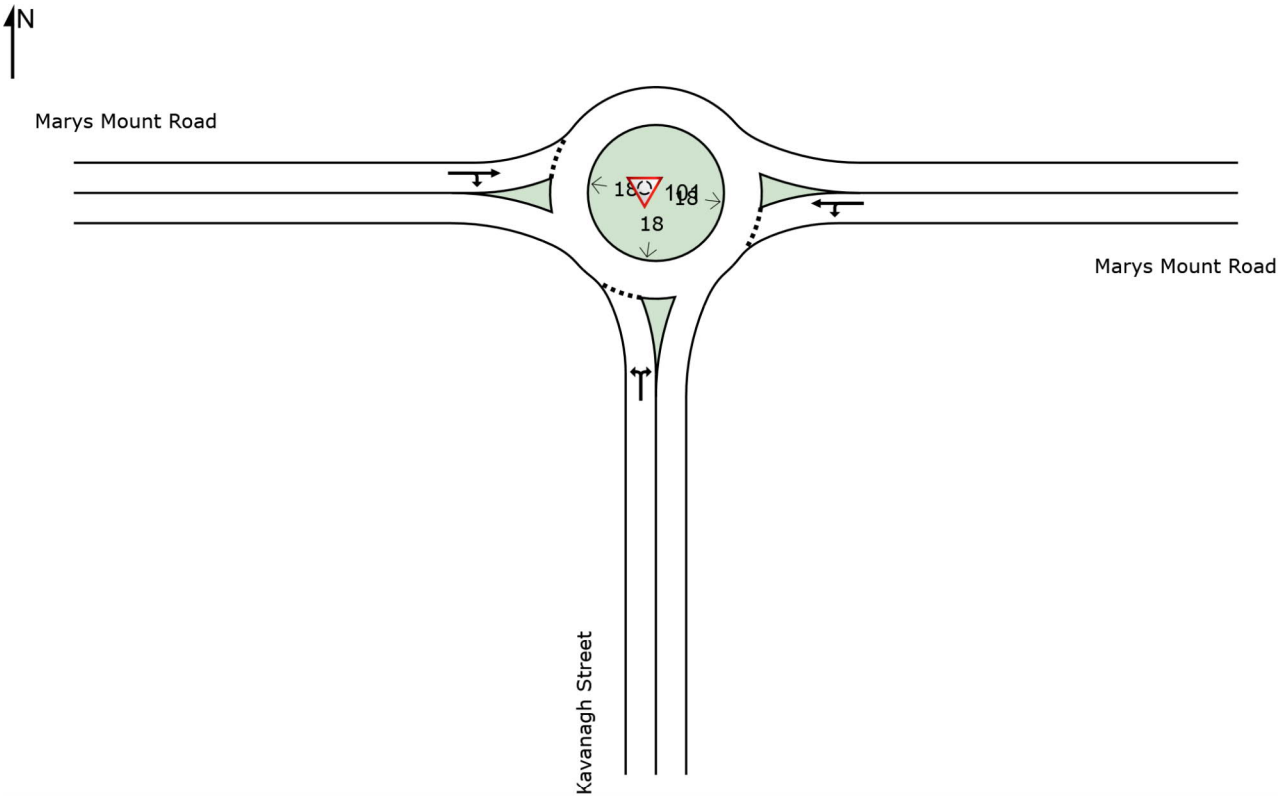
Template: Sidra Export 1 (unsignalised)

Site: 101 [Existing Layout AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kavanagh Street														
1	L2	57	1	60	1.8	0.054	4.6	LOS A	0.3	1.9	0.28	0.50	0.28	52.9
3	R2	6	0	6	0.0	0.054	9.2	LOS A	0.3	1.9	0.28	0.50	0.28	53.6
Approach		63	1	66	1.6	0.054	5.0	LOS A	0.3	1.9	0.28	0.50	0.28	52.9
East: Marys Mount Road														
4	L2	6	0	6	0.0	0.094	4.2	LOS A	0.5	3.2	0.14	0.41	0.14	52.7
5	T1	119	2	125	1.7	0.094	4.4	LOS A	0.5	3.2	0.14	0.41	0.14	55.5
Approach		125	2	132	1.6	0.094	4.4	LOS A	0.5	3.2	0.14	0.41	0.14	55.4
West: Marys Mount Road														
11	T1	124	3	131	2.4	0.107	4.3	LOS A	0.6	4.1	0.05	0.48	0.05	55.0
12	R2	39	0	41	0.0	0.107	8.6	LOS A	0.6	4.1	0.05	0.48	0.05	54.4
Approach		163	3	172	1.8	0.107	5.3	LOS A	0.6	4.1	0.05	0.48	0.05	54.9
All Vehicles		351	6	369	1.7	0.107	4.9	LOS A	0.6	4.1	0.12	0.46	0.12	54.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

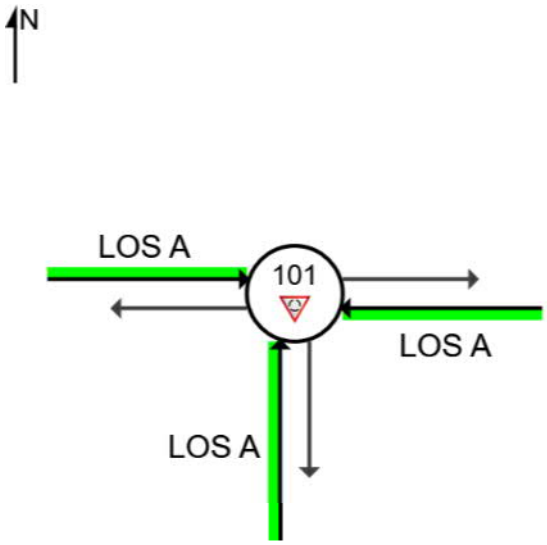
Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Kavanagh Street													
Lane 1[d]	66	1.6	1223	0.054	100	5.0	LOS A	0.3	1.9	Full	300	0.0	0.0
Approach	66	1.6		0.054		5.0	LOS A	0.3	1.9				
East: Marys Mount Road													
Lane 1[d]	132	1.6	1393	0.094	100	4.4	LOS A	0.5	3.2	Full	400	0.0	0.0
Approach	132	1.6		0.094		4.4	LOS A	0.5	3.2				
West: Marys Mount Road													
Lane 1[d]	172	1.8	1607	0.107	100	5.3	LOS A	0.6	4.1	Full	500	0.0	0.0
Approach	172	1.8		0.107		5.3	LOS A	0.6	4.1				
Intersection	369	1.7		0.107		4.9	LOS A	0.6	4.1				

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

d Dominant lane on roundabout approach

Level of Service



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
Delay Model: SIDRA Standard (Geometric Delay is included).

USER REPORT FOR SITE

All Movement Classes

Project: Project1

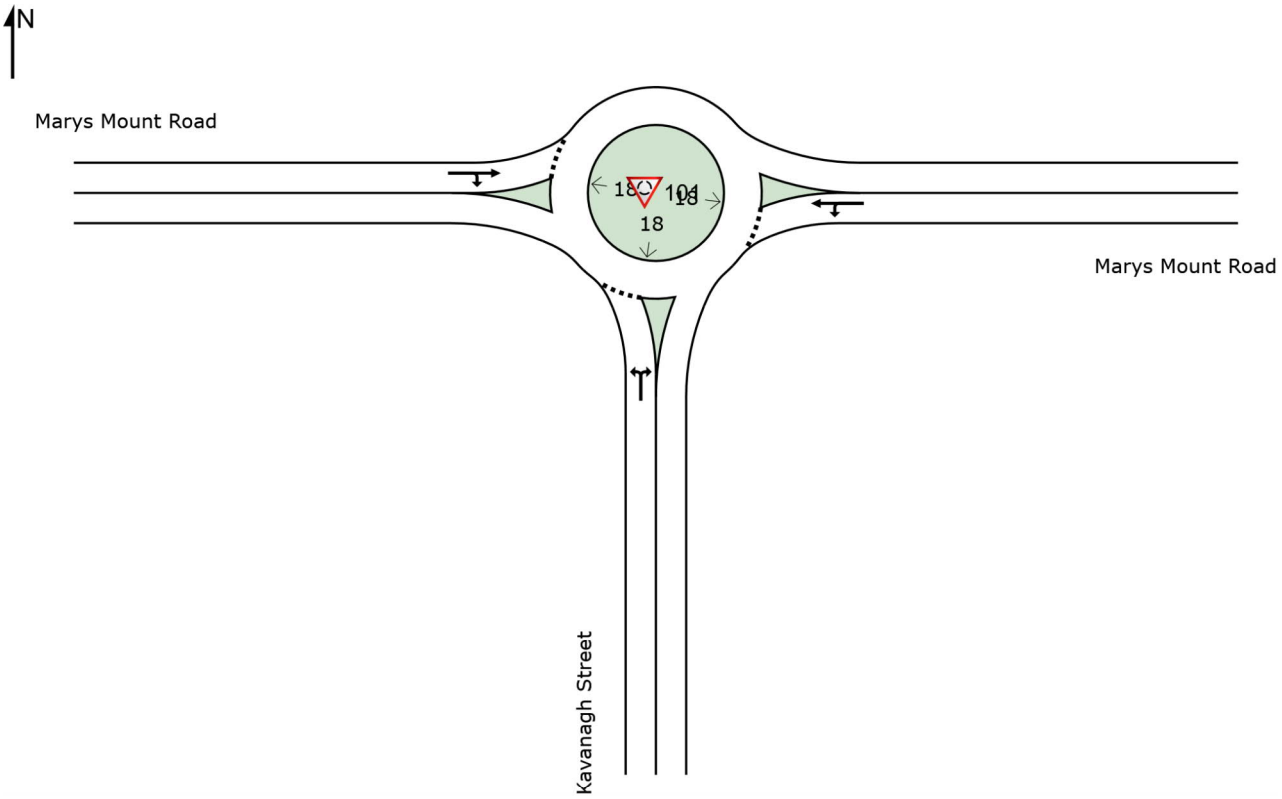
Template: Sidra Export 1 (unsignalised)

Site: 101 [Existing Layout PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kavanagh Street														
1	L2	35	1	37	2.9	0.031	4.5	LOS A	0.1	1.1	0.26	0.48	0.26	53.1
3	R2	1	0	1	0.0	0.031	9.1	LOS A	0.1	1.1	0.26	0.48	0.26	54.0
Approach		36	1	38	2.8	0.031	4.7	LOS A	0.1	1.1	0.26	0.48	0.26	53.2
East: Marys Mount Road														
4	L2	5	0	5	0.0	0.091	4.2	LOS A	0.4	3.1	0.18	0.41	0.18	52.5
5	T1	111	2	117	1.8	0.091	4.5	LOS A	0.4	3.1	0.18	0.41	0.18	55.3
Approach		116	2	122	1.7	0.091	4.5	LOS A	0.4	3.1	0.18	0.41	0.18	55.2
West: Marys Mount Road														
11	T1	91	3	96	3.3	0.091	4.3	LOS A	0.5	3.4	0.02	0.53	0.02	54.6
12	R2	56	1	59	1.8	0.091	8.6	LOS A	0.5	3.4	0.02	0.53	0.02	53.7
Approach		147	4	155	2.7	0.091	5.9	LOS A	0.5	3.4	0.02	0.53	0.02	54.3
All Vehicles		299	7	315	2.3	0.091	5.2	LOS A	0.5	3.4	0.11	0.48	0.11	54.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

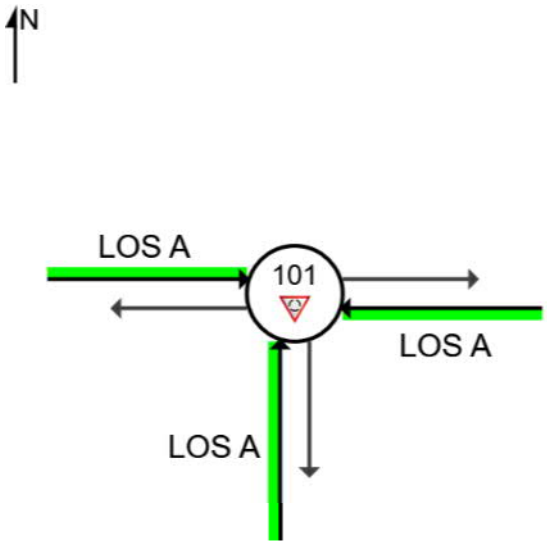
Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Kavanagh Street													
Lane 1[d]	38	2.8	1223	0.031	100	4.7	LOS A	0.1	1.1	Full	300	0.0	0.0
Approach	38	2.8		0.031		4.7	LOS A	0.1	1.1				
East: Marys Mount Road													
Lane 1[d]	122	1.7	1338	0.091	100	4.5	LOS A	0.4	3.1	Full	400	0.0	0.0
Approach	122	1.7		0.091		4.5	LOS A	0.4	3.1				
West: Marys Mount Road													
Lane 1[d]	155	2.7	1696	0.091	100	5.9	LOS A	0.5	3.4	Full	500	0.0	0.0
Approach	155	2.7		0.091		5.9	LOS A	0.5	3.4				
Intersection	315	2.3		0.091		5.2	LOS A	0.5	3.4				

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

d Dominant lane on roundabout approach

Level of Service



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
Delay Model: SIDRA Standard (Geometric Delay is included).

USER REPORT FOR SITE

All Movement Classes

Project: Project1

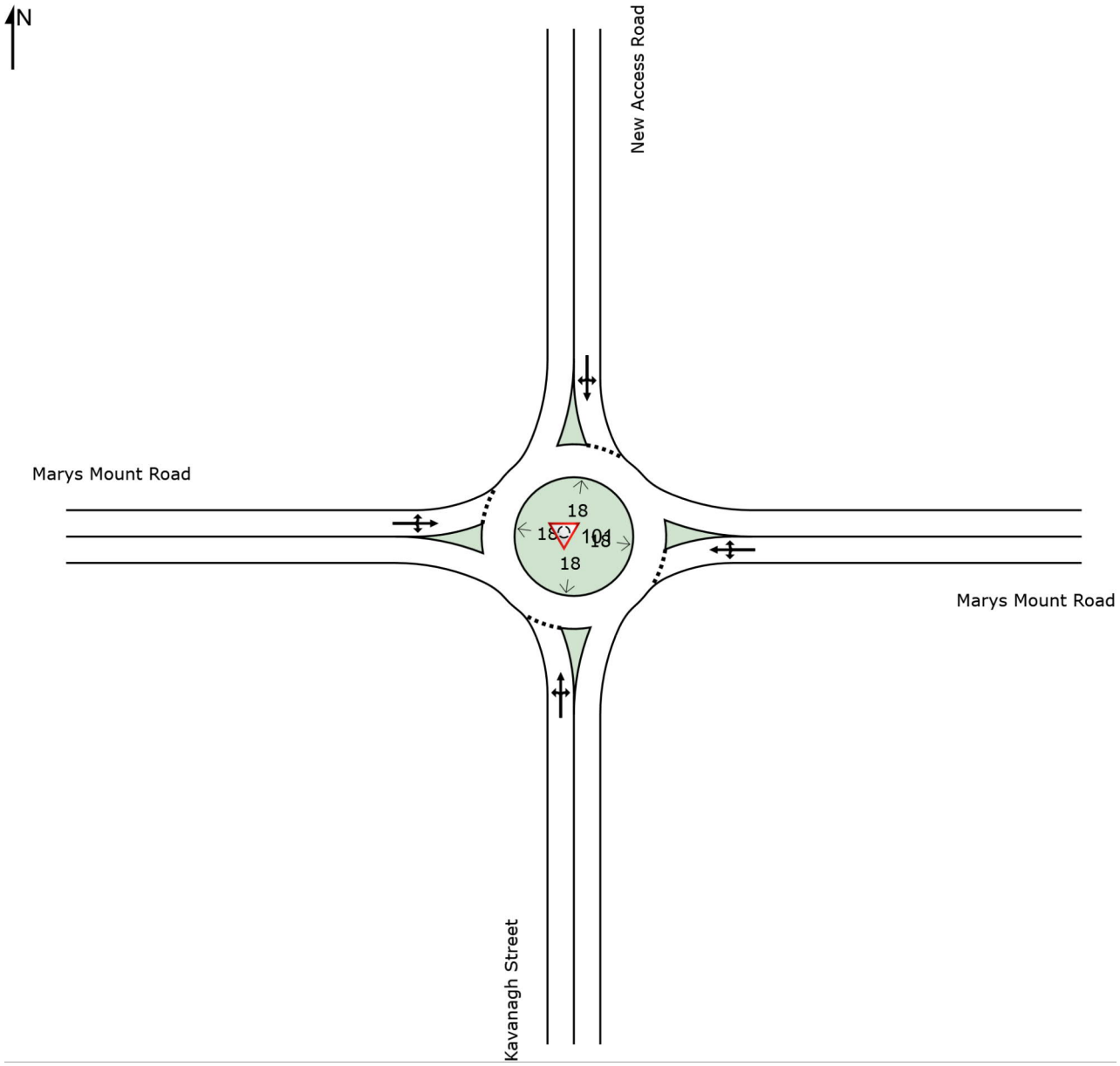
Template: Sidra Export 1 (unsignalised)

Site: 101 [Prpoposed Layout AM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.


N
New Access Road
Marys Mount Road
18
18
18
18
Marys Mount Road
Kavanagh Street

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kavanagh Street														
1	L2	57	1	60	1.8	0.068	4.9	LOS A	0.3	2.4	0.36	0.52	0.36	52.5
2	T1	11	0	12	0.0	0.068	5.2	LOS A	0.3	2.4	0.36	0.52	0.36	54.1
3	R2	6	0	6	0.0	0.068	9.5	LOS A	0.3	2.4	0.36	0.52	0.36	53.2
Approach		74	1	78	1.4	0.068	5.4	LOS A	0.3	2.4	0.36	0.52	0.36	52.8
East: Marys Mount Road														
4	L2	6	0	6	0.0	0.121	4.7	LOS A	0.6	4.5	0.33	0.48	0.33	51.3
5	T1	119	2	125	1.7	0.121	5.0	LOS A	0.6	4.5	0.33	0.48	0.33	54.3
6	R2	13	0	14	0.0	0.121	9.4	LOS A	0.6	4.5	0.33	0.48	0.33	54.2
Approach		138	2	145	1.4	0.121	5.4	LOS A	0.6	4.5	0.33	0.48	0.33	54.1
North: New Access Road														
7	L2	52	0	55	0.0	0.139	4.9	LOS A	0.7	5.0	0.35	0.57	0.35	52.2
8	T1	44	0	46	0.0	0.139	5.1	LOS A	0.7	5.0	0.35	0.57	0.35	52.8
9	R2	60	0	63	0.0	0.139	9.5	LOS A	0.7	5.0	0.35	0.57	0.35	54.0
Approach		156	0	164	0.0	0.139	6.7	LOS A	0.7	5.0	0.35	0.57	0.35	53.1
West: Marys Mount Road														
10	L2	15	0	16	0.0	0.129	4.1	LOS A	0.7	4.8	0.13	0.47	0.13	54.0
11	T1	124	3	131	2.4	0.129	4.4	LOS A	0.7	4.8	0.13	0.47	0.13	54.7
12	R2	39	0	41	0.0	0.129	8.7	LOS A	0.7	4.8	0.13	0.47	0.13	54.1
Approach		178	3	187	1.7	0.129	5.3	LOS A	0.7	4.8	0.13	0.47	0.13	54.5
All Vehicles		546	6	575	1.1	0.139	5.7	LOS A	0.7	5.0	0.28	0.51	0.28	53.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

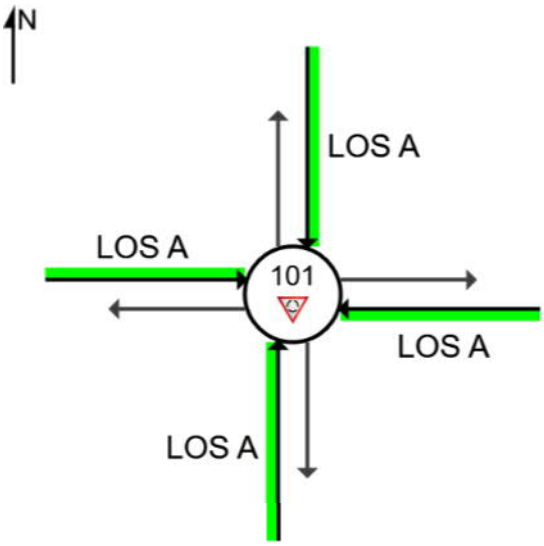
Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Kavanagh Street													
Lane 1[d]	78	1.4	1150	0.068	100	5.4	LOS A	0.3	2.4	Full	300	0.0	0.0
Approach	78	1.4		0.068		5.4	LOS A	0.3	2.4				
East: Marys Mount Road													
Lane 1[d]	145	1.4	1198	0.121	100	5.4	LOS A	0.6	4.5	Full	400	0.0	0.0
Approach	145	1.4		0.121		5.4	LOS A	0.6	4.5				
North: New Access Road													
Lane 1[d]	164	0.0	1184	0.139	100	6.7	LOS A	0.7	5.0	Full	500	0.0	0.0
Approach	164	0.0		0.139		6.7	LOS A	0.7	5.0				
West: Marys Mount Road													
Lane 1[d]	187	1.7	1451	0.129	100	5.3	LOS A	0.7	4.8	Full	500	0.0	0.0
Approach	187	1.7		0.129		5.3	LOS A	0.7	4.8				
Intersection	575	1.1		0.139		5.7	LOS A	0.7	5.0				

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

d Dominant lane on roundabout approach

Level of Service



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
Delay Model: SIDRA Standard (Geometric Delay is included).

USER REPORT FOR SITE

All Movement Classes

Project: Project1

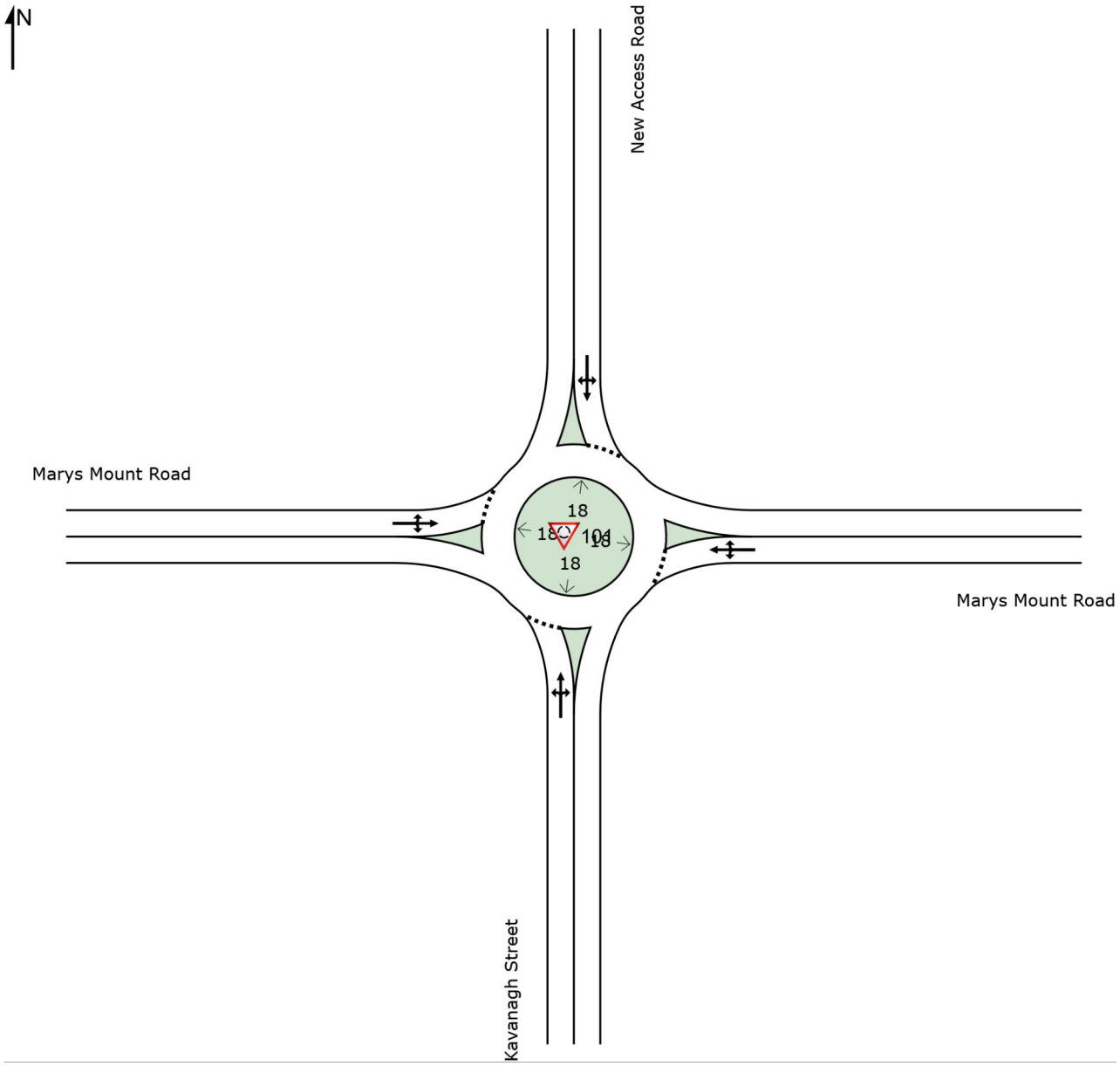
Template: Sidra Export 1 (unsignalised)

Site: 101 [Prpoposed Layout PM (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Site Layout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.


N
New Access Road
Marys Mount Road
18
18
18
18
Marys Mount Road
Kavanagh Street

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Kavanagh Street														
1	L2	35	1	37	2.9	0.076	4.9	LOS A	0.4	2.7	0.36	0.49	0.36	52.4
2	T1	48	0	51	0.0	0.076	5.1	LOS A	0.4	2.7	0.36	0.49	0.36	54.0
3	R2	1	0	1	0.0	0.076	9.5	LOS A	0.4	2.7	0.36	0.49	0.36	53.2
Approach		84	1	88	1.2	0.076	5.1	LOS A	0.4	2.7	0.36	0.49	0.36	53.4
East: Marys Mount Road														
4	L2	5	0	5	0.0	0.141	4.4	LOS A	0.7	5.3	0.25	0.51	0.25	50.9
5	T1	112	3	118	2.7	0.141	4.7	LOS A	0.7	5.3	0.25	0.51	0.25	53.9
6	R2	57	0	60	0.0	0.141	9.0	LOS A	0.7	5.3	0.25	0.51	0.25	53.8
Approach		174	3	183	1.7	0.141	6.1	LOS A	0.7	5.3	0.25	0.51	0.25	53.8
North: New Access Road														
7	L2	14	0	15	0.0	0.037	4.7	LOS A	0.2	1.3	0.32	0.54	0.32	52.3
8	T1	12	0	13	0.0	0.037	4.9	LOS A	0.2	1.3	0.32	0.54	0.32	53.0
9	R2	16	0	17	0.0	0.037	9.3	LOS A	0.2	1.3	0.32	0.54	0.32	54.1
Approach		42	0	44	0.0	0.037	6.5	LOS A	0.2	1.3	0.32	0.54	0.32	53.2
West: Marys Mount Road														
10	L2	65	0	68	0.0	0.175	4.5	LOS A	0.9	6.7	0.28	0.52	0.28	53.4
11	T1	91	3	96	3.3	0.175	4.8	LOS A	0.9	6.7	0.28	0.52	0.28	54.0
12	R2	56	1	59	1.8	0.175	9.2	LOS A	0.9	6.7	0.28	0.52	0.28	53.1
Approach		212	4	223	1.9	0.175	5.9	LOS A	0.9	6.7	0.28	0.52	0.28	53.6
All Vehicles		512	8	539	1.6	0.175	5.9	LOS A	0.9	6.7	0.29	0.51	0.29	53.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

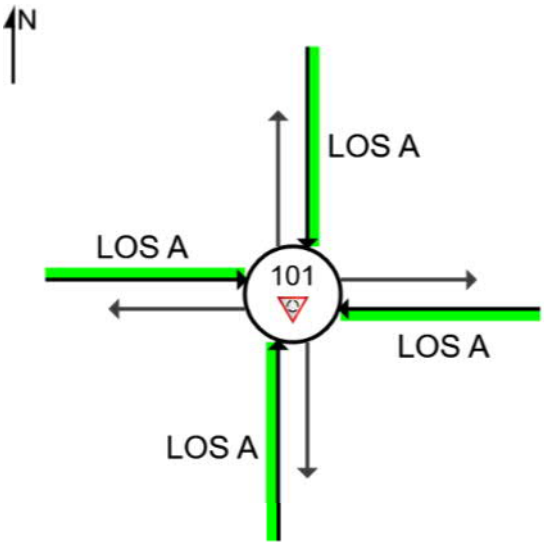
Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Kavanagh Street													
Lane 1[d]	88	1.2	1157	0.076	100	5.1	LOS A	0.4	2.7	Full	300	0.0	0.0
Approach	88	1.2		0.076		5.1	LOS A	0.4	2.7				
East: Marys Mount Road													
Lane 1[d]	183	1.7	1302	0.141	100	6.1	LOS A	0.7	5.3	Full	400	0.0	0.0
Approach	183	1.7		0.141		6.1	LOS A	0.7	5.3				
North: New Access Road													
Lane 1[d]	44	0.0	1200	0.037	100	6.5	LOS A	0.2	1.3	Full	500	0.0	0.0
Approach	44	0.0		0.037		6.5	LOS A	0.2	1.3				
West: Marys Mount Road													
Lane 1[d]	223	1.9	1275	0.175	100	5.9	LOS A	0.9	6.7	Full	500	0.0	0.0
Approach	223	1.9		0.175		5.9	LOS A	0.9	6.7				
Intersection	539	1.6		0.175		5.9	LOS A	0.9	6.7				

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

d Dominant lane on roundabout approach

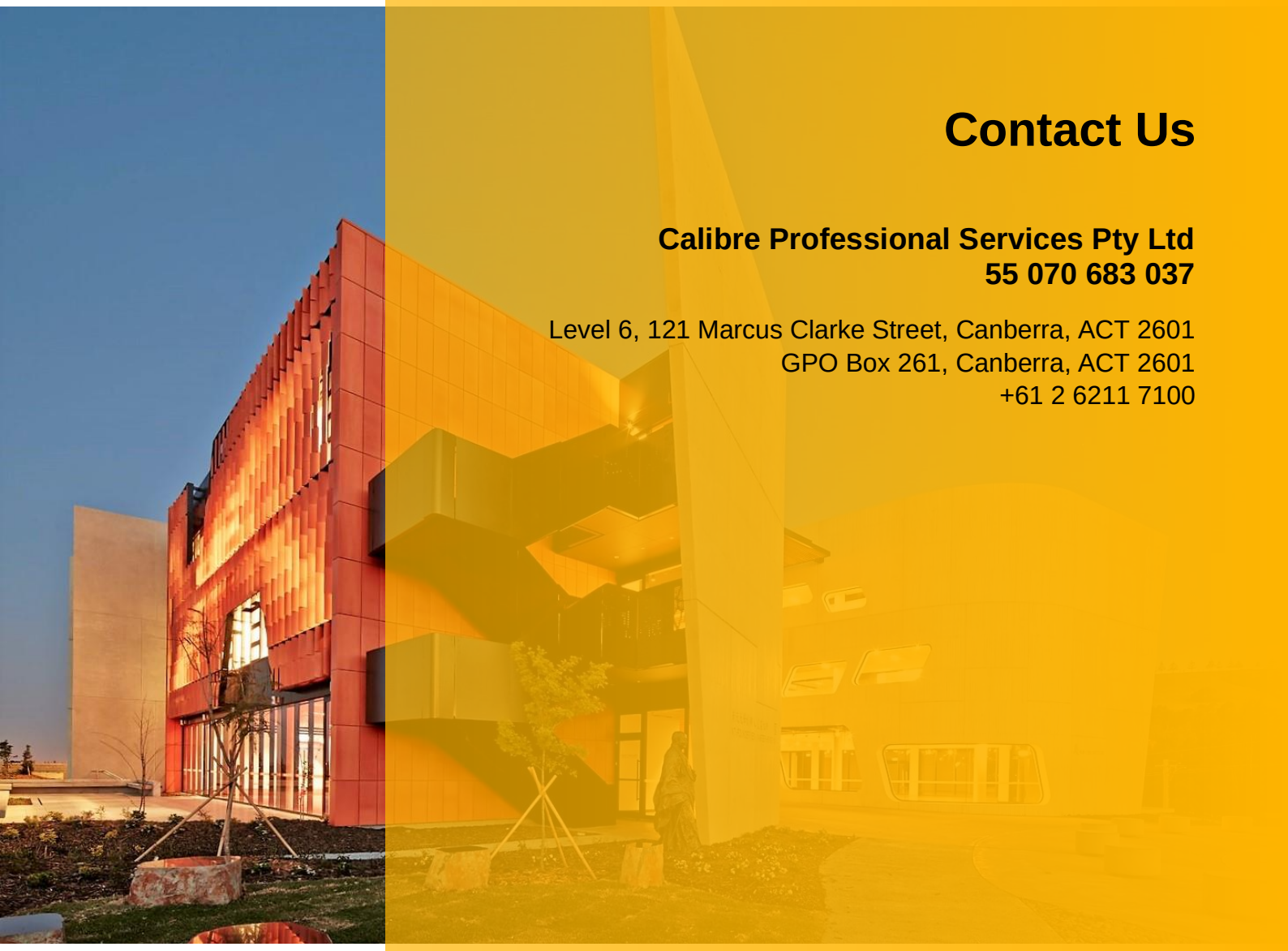
Level of Service



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Roundabout Level of Service Method: SIDRA Roundabout LOS
Delay Model: SIDRA Standard (Geometric Delay is included).



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