

M^CLAREN TRAFFIC ENGINEERING

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

16 July 2024

Reference: 220450.04FA

Damasa Pty Ltd
c/- Morrison Design Partnership
Suite 2.02
146 Arthur Street
North Sydney NSW 2060
Attention: Rowan Huppert

LETTER OF RESPONSE OF MIXED USE DEVELOPMENT AT MORGAN STREET & MURRAY STREET, WAGGA WAGGA

Dear Rowan,

Reference is made to your request to provide a Letter of Response for the proposed Mixed Use Development at Morgan Street & Murray Street, Wagga Wagga, with proposed plans depicted in **Annexure A** for reference. This letter is in response to City of Wagga Wagga Council's comments within a letter dated 11 June 2024 for DA Number 2024/0075. The comments made by Council relevant to traffic and parking are shown below (*italicised*) with *M^CLaren Traffic Engineering's* (MTE) response thereafter.

An assessment of the performance and safety of the intersection of the eastern service road egress and Morgan Street. This should include both left out only and left and right-out scenarios. The leftout scenario shall also model impacts on the roundabout at the intersection of Morgan and Murray Street.

MTE Response: The estimated traffic generation of the proposed developed was previously determined within *MTE Report 220450.01FB – Section 4.4 Proposed Traffic Generation – Table 9: Estimated Traffic Generation of Subject Site*. The estimated traffic generation of the proposed development is in the order of **137** trips (53 inbound, 84 outbound) during the AM peak period and **118** trips (66 inbound, 52 outbound) during the PM peak period. The following scenarios have been undertaken to assess the level of performance of the vehicular egress on Morgan Street and the roundabout intersection of Morgan Street / Murray Street. The scenarios assessed are as follows:

- Scenario A: Vehicles are permitted to exit the service road egress on Morgan Street via both a left and right turn manoeuvre;
- Scenario B: Vehicles are only permitted to exit the service road on Morgan Street via a left turn manoeuvre. Vehicles who intended to turn right at the site driveway will instead complete a U-turn at the intersection of Morgan Street / Murray Street. All other vehicles will follow the same route completed in Scenario A;

- Scenario C: A sensitivity test assuming all vehicles turn left out of the service road and all of those vehicles undertake a U-turn at the roundabout intersection of Morgan Street / Murray Street.

Traffic distribution and subsequent traffic assignment for each scenario has been depicted diagrammatically in **Annexure B**, following the assumptions made in *MTE Report 220450.01FB – Section 4.5 Traffic Assignment – Figure 11: Trip Assignment – Masterplan*.

SIDRA INTERSECTION 9.1 was used to assess the intersections performance and the results of this assessment are shown in **Table 1**, with full SIDRA results reproduced in **Annexure C**.

TABLE 1: INTERSECTION PERFORMANCE (SIDRA INTERSECTION 9.1)

Intersection	Peak Hour	Degree of Saturation ⁽¹⁾	Average Delay ⁽²⁾ (sec/vehicle)	Level of Service ⁽³⁾⁽⁴⁾	Control Type	Worst Movement
SCENARIO A (LEFT AND RIGHT OUT OF SERVICE ROAD)						
Murray Street / Morgan Street	AM	0.26	4.2 (Worst: 10.8)	A (Worst: A)	Roundabout	UT from Morgan Street (W)
	PM	0.25	4 (Worst: 10.8)	A (Worst: A)		UT from Murray Street (N)
Morgan Street / Site Driveway	AM	0.19	0.3 (Worst: 3.0)	N/A (Worst: A)	Give Way	RT from Site Driveway
	PM	0.20	0.7 (Worst: 9.0)	N/A (Worst: A)		RT from Site Driveway
SCENARIO B (LEFT ONLY OUT OF SERVICE ROAD)						
Murray Street / Morgan Street	AM	0.31	4.9 (Worst: 10.9)	A (Worst: A)	Roundabout	UT from Murray Street (S)
	PM	0.28	4.3 (Worst: 11.1)	A (Worst: A)		UT from Morgan Street (W)
Morgan Street / Site Driveway	AM	0.19	0.8 (Worst: 6.8)	N/A (Worst: A)	Give Way	LT from Site Driveway
	PM	0.20	0.5 (Worst: 6.9)	N/A (Worst: A)		LT from Site Driveway
SCENARIO C (LEFT ONLY OUT OF SERVICE ROAD SENSITIVITY TEST)						
Murray Street / Morgan Street	AM	0.32	5.2 (Worst: 11.0)	A (Worst: A)	Roundabout	UT from Murray Street (S)
	PM	0.28	4.5 (Worst: 11.2)	A (Worst: A)		UT from Morgan Street (W)
Morgan Street / Site Driveway	AM	0.19	0.2 (Worst: 1.3)	N/A (Worst: A)	Give Way	LT from Site Driveway
	PM	0.20	0.1 (Worst: 1.4)	N/A (Worst: A)		LT from Site Driveway

Notes:

- (1) The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
- (2) The average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
- (3) The Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.
- (4) No overall Level of Service is provided for Give Way and Stop controlled intersections as the low delays associated with the dominant movements skew the average delay of the intersection. The Level of Service of the worst approach is an indicator of the operation of the intersection, with a worse Level of Service corresponding to long delays and reduced safety outcomes for that approach.

As shown, the relevant intersections will perform at a high level of efficiency, with a worst movement Level of Service “A” condition in both the AM & PM peak hour periods. The Level of Service “A” performance is characterised by low approach delays and spare capacity.

Scenario C has been modelled as a ‘worst-case scenario’ wherein all vehicles exiting the site via the Morgan Street egress do so by completing a U-turn at the intersection of Murray Street / Morgan Street. Under this worst-case scenario the intersection maintains performance at a Level of Service “A”, suggesting that even under a worst-case scenario, the proposed vehicular egress at Morgan Street will not have an adverse impact on the surrounding intersections, and the site driveway will perform at a high level of efficiency.

Furthermore, the average queue at the western leg of the intersection of the Morgan Street / Murray Street is less than 1 car under Scenario 3 (worst case). Therefore, no queueing will occur past the proposed service lane egress connection.

To assess the safety of the vehicular egress, a sight line assessment has been undertaken with the results depicted in **Annexure D**. Morgan Street has a signposted speed limit of 50km/h, and sight distance for departing and approaching vehicles should be provided in accordance with *Austroad Guide to Road Design Part 4A: Unsignalised and Signalised Intersections - Section 3.2.2 Safe Intersection Sight Distance (SISD)*. The SISD requirement for a 50km/h road is **97m**.

The assessment found that the Morgan Street egress of the subject site offers sight distance in excess of 200m to the west and east. As a result of this, the Morgan Street egress is in a suitable location to allow for compliant sightlines in both directions for light vehicles and heavy vehicles.

Please contact the undersigned on 9521 7199 should you require further information or assistance.

Yours faithfully,

McLaren Traffic Engineering



Daniel Walker

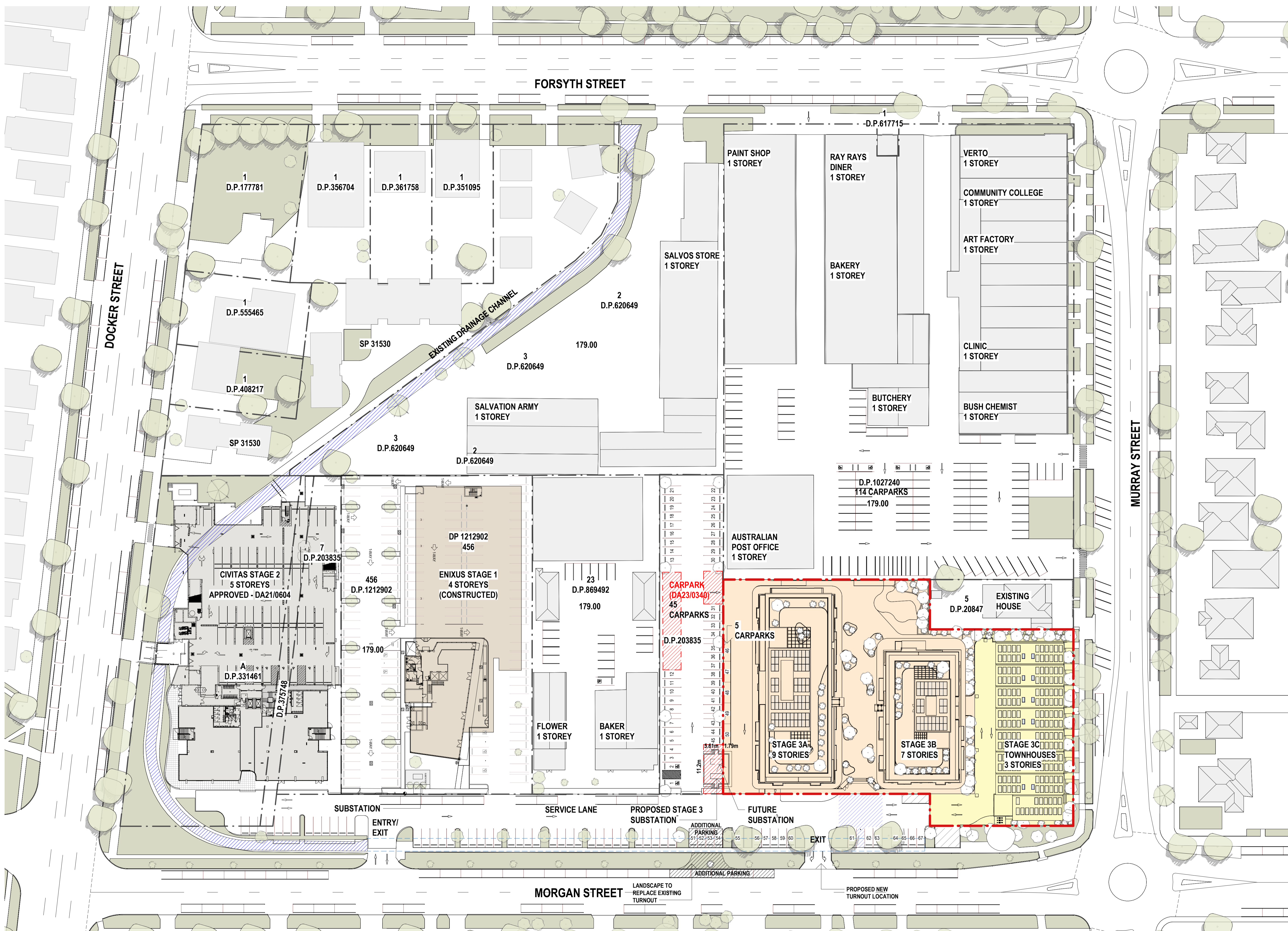
Senior Traffic Engineer

B.E. (Hons) (Schol) (Civil Engineering)

TfNSW Accredited Level 2 Road Safety Auditor



**ANNEXURE A: PROPOSED PLANS
(1 SHEET)**



TOTAL AREAS

SITE OF 3A + 3B MIXED USE APARTMENT BUILDINGS	4265m ²
SITE OF 3C TOWNHOUSES	1715m ²
TOTAL SITE	5982m²

- LEGEND**
- SITE BOUNDARY
 - EXISTING PLANTING
 - PROPOSED PLANTING
 - DEEPSOIL LANDSCAPE
 - STAGE 1
 - STAGE 2
 - SITE - APARTMENTS
 - SITE - TOWNHOUSES
 - EXISTING BUILDINGS
 - CARPARKS REMOVED FROM DA23/0340 TO ACCOMMODATE VEHICLE MOVEMENT AND SUBSTATION PLINTH AS PART OF STAGE 3 WORKS

GENERAL NOTES
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DO NOT SCALE THIS DRAWING.

MDP acknowledges the Cameragal people as the traditional custodians of this land.
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SURVEY NOTES
 Survey data included in this drawing is based on survey drawing and is provided for preliminary design purposes only. As this drawing is based on information supplied by others, reference must be made to original survey drawings verified against site conditions.

REV	DATE	AMENDMENT	INITIALS	CHECK	CLIENT
P01	2023-11-10	FOR REVIEW	SC	GO	
P02	2023-12-14	FOR REVIEW	SC	GO	
P03	2023-12-21	FOR REVIEW	SC	GO	
P04	2024-01-19	FOR REVIEW	SC	GO	
DA1	2024-02-09	DEVELOPMENT APPLICATION	SC	GO	

Damasa Pty Ltd

PROJECT: **CIVITAS STAGE 3**
 Morgan, Murray & Forsyth St, Wagga

DRAWING TITLE: **PROPOSED SITE PLAN**

DEVELOPMENT APPLICATION

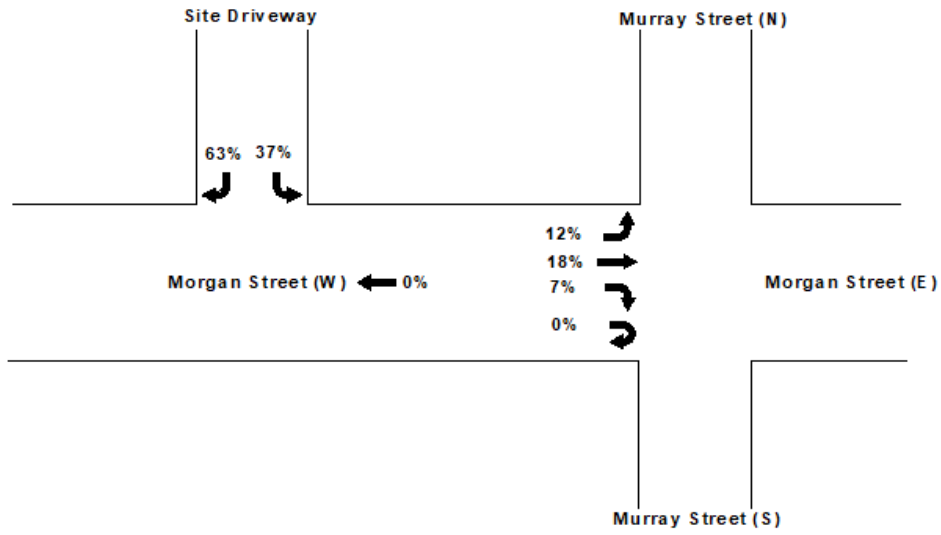
PROJECT NO.	DRAWING NO.	REVISION
3175	DA050	DA1
SCALE : 1 : 500 @ A1	DRAWN : Author	DATE : 2024-02-09
www.mdpa.com.au NSW Nom Architect: Glen Orlerton #7621.		



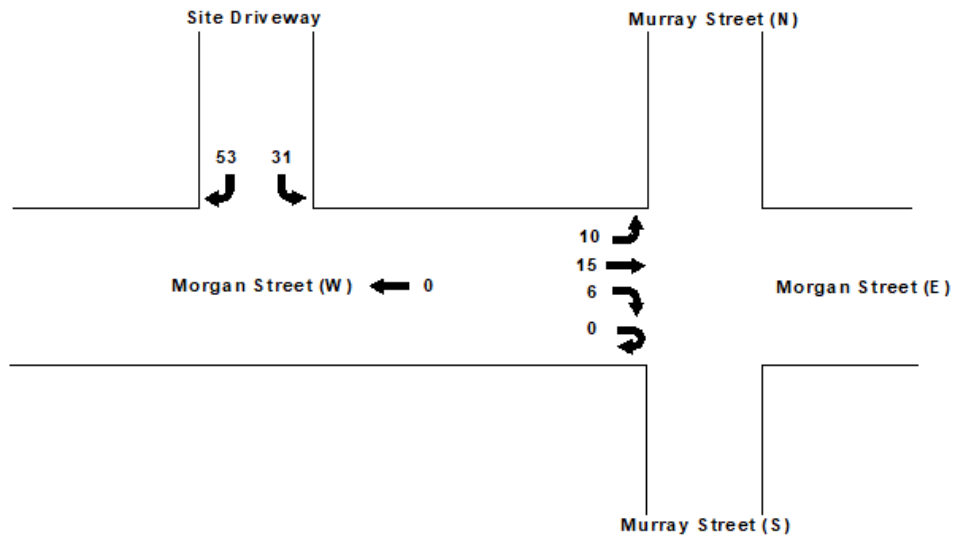


**ANNEXURE B: TRAFFIC DISTRIBUTION AND ASSIGNMENT
(6 SHEETS)**

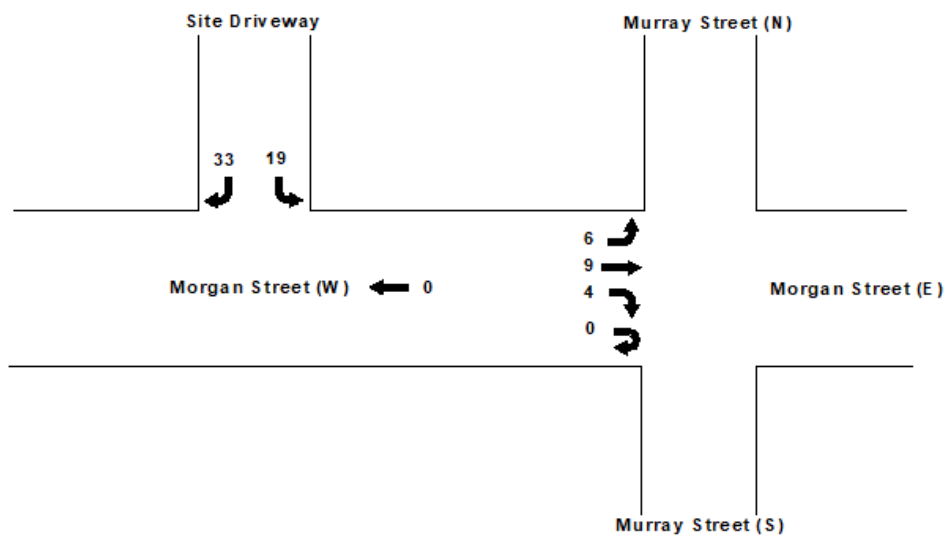
Scenario A: Traffic Assignment



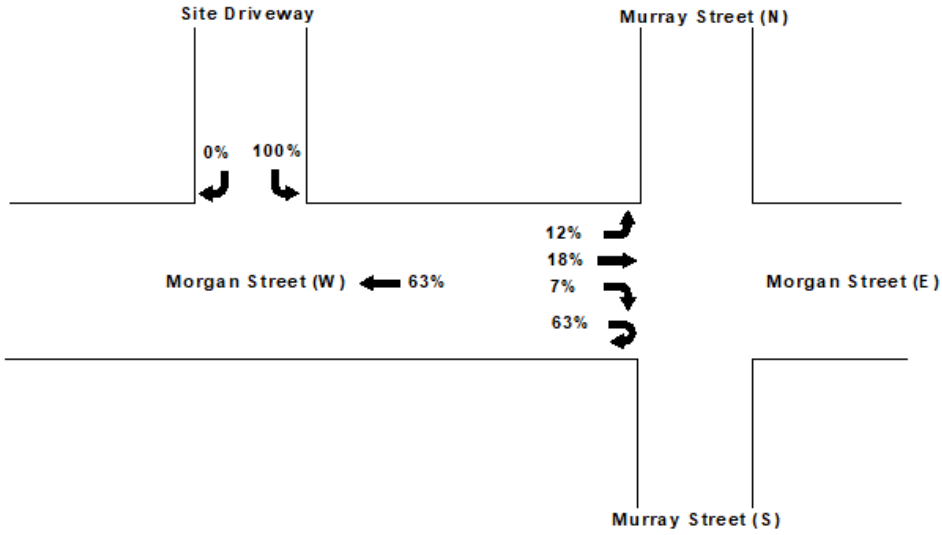
Scenario A: Traffic Distribution (AM)



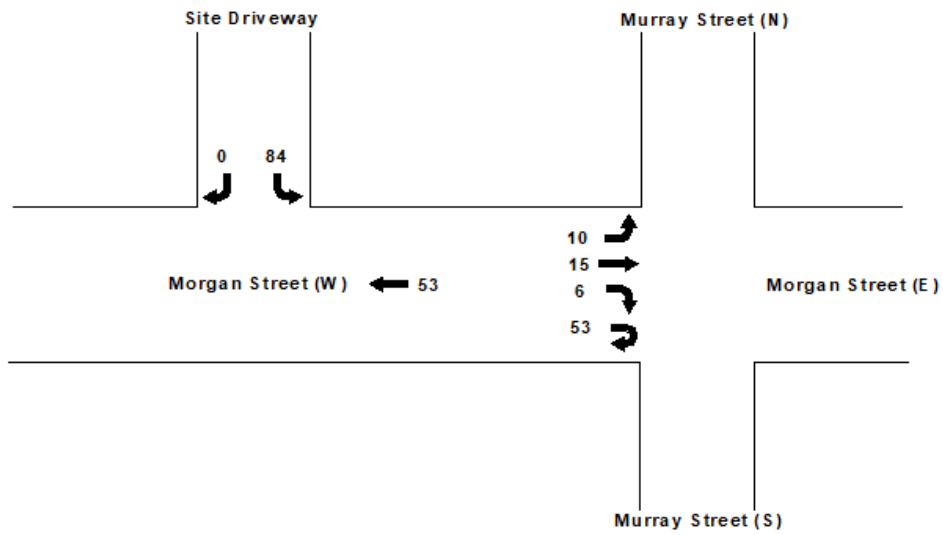
Scenario A: Traffic Distribution (PM)



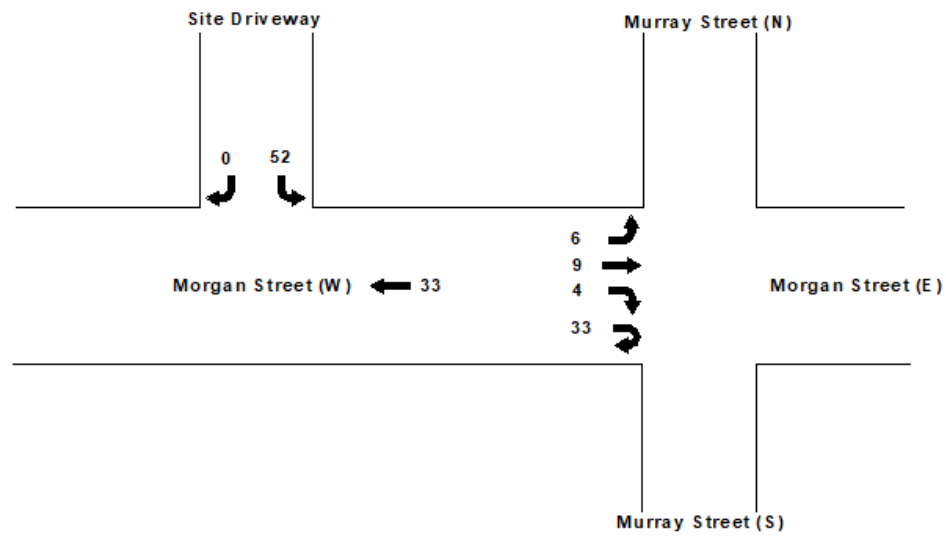
Scenario B: Traffic Assignment



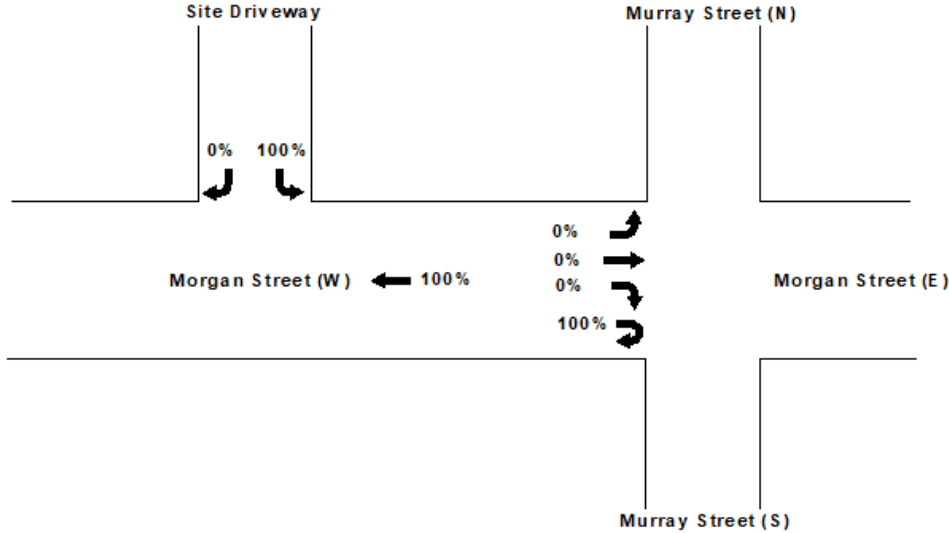
Scenario B: Traffic Distribution (AM)



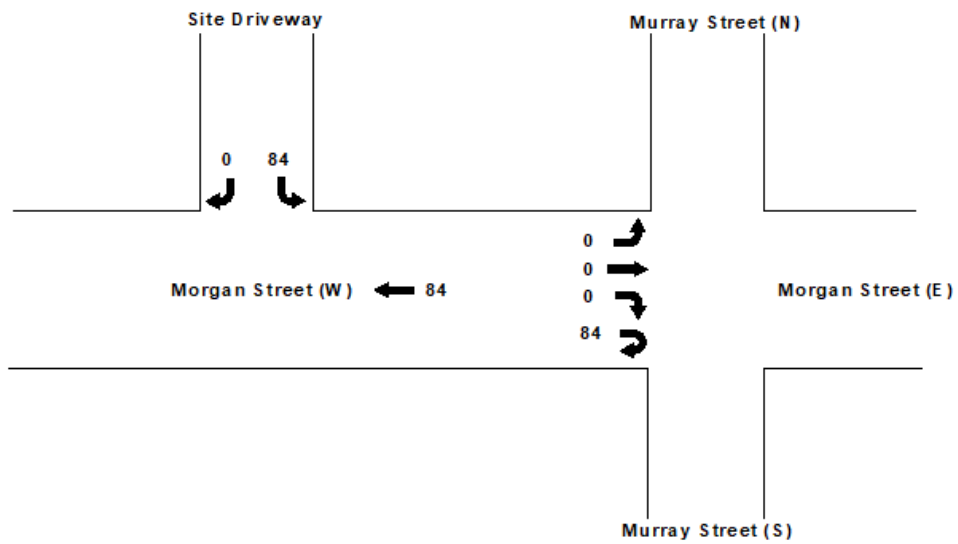
Scenario B: Traffic Distribution (PM)



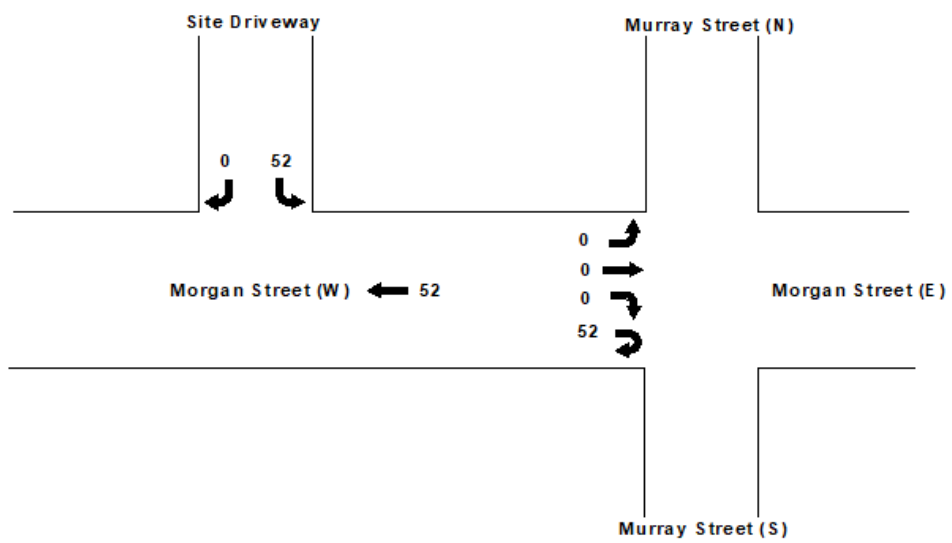
Scenario C: Traffic Assignment



Scenario C: Traffic Distribution (AM)



Scenario C: Traffic Distribution (PM)





**ANNEXURE C: SIDRA RESULTS
(12 SHEETS)**

MOVEMENT SUMMARY

Site: 101 [Fut AM Site Driveway / Morgan St (Site Folder: Scenario A: Left and Right Turns Stage 2 + Stage 3 + 10 year growth)]

Network: N101 [Scenario A AM (Network Folder: Scenario A)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Site Driveway / Morgan Street
 Future conditions
 AM Peak Period
 Site Category: (None)
 Give-Way (Two-Way)
 Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows [Total HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue [Veh.]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	Dist] m			km/h
East: Morgan Street (E)														
5	T1	All MCs	249	1.0	249	1.0	0.128	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach			249	1.0	249	1.0	0.128	0.0	NA	0.0	0.0	0.00	0.00	50.0
North: Site Driveway														
7	L2	All MCs	34	0.0	34	0.0	0.109	1.3	LOS A	0.2	1.1	0.47	0.40	9.9
9	R2	All MCs	57	0.0	57	0.0	0.109	3.0	LOS A	0.2	1.1	0.47	0.40	16.1
Approach			91	0.0	91	0.0	0.109	2.4	LOS A	0.2	1.1	0.47	0.40	14.1
West: Morgan Street (W)														
11	T1	All MCs	359	0.7	359	0.7	0.185	0.1	LOS A	0.0	0.0	0.00	0.00	49.9
Approach			359	0.7	359	0.7	0.185	0.1	NA	0.0	0.0	0.00	0.00	49.9
All Vehicles			699	0.7	699	0.7	0.185	0.3	NA	0.2	1.1	0.06	0.05	33.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (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).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Fut AM Morgan St / Murray St (Site Folder: Scenario A: Left and Right Turns Stage 2 + Stage 3 + 10 year growth)]

Network: N101 [Scenario A AM (Network Folder: Scenario A)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Morgan Street / Murray Street
 Future conditions
 AM Peak Period
 Site Category: (None)
 Roundabout
 Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				km/h
			veh/h		veh/h					veh	m				
South: Murray Street (S)															
1	L2	All MCs	25	5.1	25	5.1	0.033	4.5	LOS A	0.1	0.4	0.42	0.48	0.42	44.7
2	T1	All MCs	221	0.6	221	0.6	0.210	3.4	LOS A	0.4	3.0	0.42	0.42	0.42	46.5
3	R2	All MCs	39	0.0	39	0.0	0.210	8.6	LOS A	0.4	3.0	0.42	0.42	0.42	45.9
3u	U	All MCs	1	0.0	1	0.0	0.210	10.6	LOS A	0.4	3.0	0.42	0.42	0.42	45.9
Approach			286	0.9	286	0.9	0.210	4.2	LOS A	0.4	3.0	0.42	0.43	0.42	46.3
East: Morgan Street (E)															
4	L2	All MCs	27	0.0	27	0.0	0.029	3.1	LOS A	0.0	0.3	0.25	0.38	0.25	47.2
5	T1	All MCs	177	0.0	177	0.0	0.192	2.5	LOS A	0.4	2.6	0.24	0.41	0.24	44.2
6	R2	All MCs	101	0.0	101	0.0	0.192	7.8	LOS A	0.4	2.6	0.24	0.41	0.24	46.0
6u	U	All MCs	1	0.0	1	0.0	0.192	9.8	LOS A	0.4	2.6	0.24	0.41	0.24	46.0
Approach			306	0.0	306	0.0	0.192	4.3	LOS A	0.4	2.6	0.24	0.41	0.24	45.4
North: Murray Street (N)															
7	L2	All MCs	53	2.4	53	2.4	0.050	3.8	LOS A	0.1	0.7	0.43	0.48	0.43	46.7
8	T1	All MCs	25	5.1	25	5.1	0.054	3.2	LOS A	0.1	0.7	0.42	0.54	0.42	45.4
9	R2	All MCs	38	3.3	38	3.3	0.054	8.6	LOS A	0.1	0.7	0.42	0.54	0.42	42.3
9u	U	All MCs	1	0.0	1	0.0	0.054	10.5	LOS A	0.1	0.7	0.42	0.54	0.42	44.9
Approach			116	3.3	116	3.3	0.054	5.3	LOS A	0.1	0.7	0.43	0.51	0.43	45.3
West: Morgan Street (W)															
10	L2	All MCs	79	0.0	79	0.0	0.103	4.8	LOS A	0.2	1.3	0.47	0.52	0.47	44.4
11	T1	All MCs	267	0.5	267	0.5	0.259	3.4	LOS A	0.6	4.0	0.48	0.44	0.48	44.1
12	R2	All MCs	37	3.4	37	3.4	0.259	8.9	LOS A	0.6	4.0	0.48	0.44	0.48	43.2
12u	U	All MCs	9	0.0	9	0.0	0.259	10.8	LOS A	0.6	4.0	0.48	0.44	0.48	30.2
Approach			392	0.6	392	0.6	0.259	4.3	LOS A	0.6	4.0	0.48	0.46	0.48	44.0
All Vehicles			1101	0.8	1101	0.8	0.259	4.4	LOS A	0.6	4.0	0.39	0.44	0.39	45.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Fut PM Site Driveway / Morgan St (Site Folder: Scenario A: Left and Right Turns Stage 2 + Stage 3 + 10 year growth)]

Network: N101 [Scenario A PM (Network Folder: Scenario A)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Site Driveway / Morgan Street
 Future conditions
 PM Peak Period
 Site Category: (None)
 Give-Way (Two-Way)
 Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m			km/h	
East: Morgan Street (E)															
5	T1	All MCs	279	0.5	279	0.5	0.143	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			279	0.5	279	0.5	0.143	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.9
North: Site Driveway															
7	L2	All MCs	21	0.0	21	0.0	0.073	6.8	LOS A	0.1	0.7	0.48	0.71	0.48	46.0
9	R2	All MCs	36	0.0	36	0.0	0.073	9.0	LOS A	0.1	0.7	0.48	0.71	0.48	49.6
Approach			57	0.0	57	0.0	0.073	8.2	LOS A	0.1	0.7	0.48	0.71	0.48	48.7
West: Morgan Street (W)															
11	T1	All MCs	395	0.0	395	0.0	0.202	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			395	0.0	395	0.0	0.202	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			731	0.2	731	0.2	0.202	0.7	NA	0.1	0.7	0.04	0.06	0.04	49.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (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).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Fut PM Morgan St / Murray St (Site Folder: Scenario A: Left and Right Turns Stage 2 + Stage 3 + 10 year growth)]

Network: N101 [Scenario A PM (Network Folder: Scenario A)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Morgan Street / Murray Street
 Future conditions
 PM Peak Period
 Site Category: (None)
 Roundabout
 Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				km/h
			veh/h		veh/h					veh	m				
South: Murray Street (S)															
1	L2	All MCs	15	0.0	15	0.0	0.019	4.4	LOS A	0.0	0.2	0.42	0.47	0.42	44.7
2	T1	All MCs	61	0.0	61	0.0	0.083	3.2	LOS A	0.2	1.1	0.40	0.48	0.40	46.0
3	R2	All MCs	40	3.1	40	3.1	0.083	8.5	LOS A	0.2	1.1	0.40	0.48	0.40	45.5
3u	U	All MCs	1	0.0	1	0.0	0.083	10.5	LOS A	0.2	1.1	0.40	0.48	0.40	45.5
Approach			118	1.1	118	1.1	0.083	5.2	LOS A	0.2	1.1	0.40	0.48	0.40	45.7
East: Morgan Street (E)															
4	L2	All MCs	29	0.0	29	0.0	0.033	3.4	LOS A	0.1	0.4	0.31	0.41	0.31	47.0
5	T1	All MCs	208	0.6	208	0.6	0.199	2.6	LOS A	0.4	2.8	0.30	0.39	0.30	44.3
6	R2	All MCs	62	0.0	62	0.0	0.199	8.0	LOS A	0.4	2.8	0.30	0.39	0.30	46.1
6u	U	All MCs	5	0.0	5	0.0	0.199	10.0	LOS A	0.4	2.8	0.30	0.39	0.30	46.1
Approach			305	0.4	305	0.4	0.199	3.9	LOS A	0.4	2.8	0.30	0.39	0.30	45.3
North: Murray Street (N)															
7	L2	All MCs	56	0.0	56	0.0	0.061	4.2	LOS A	0.1	0.8	0.46	0.51	0.46	46.6
8	T1	All MCs	80	1.6	80	1.6	0.108	3.4	LOS A	0.2	1.5	0.45	0.50	0.45	45.9
9	R2	All MCs	47	0.0	47	0.0	0.108	8.8	LOS A	0.2	1.5	0.45	0.50	0.45	43.1
9u	U	All MCs	1	0.0	1	0.0	0.108	10.8	LOS A	0.2	1.5	0.45	0.50	0.45	45.4
Approach			184	0.7	184	0.7	0.108	5.0	LOS A	0.2	1.5	0.45	0.50	0.45	45.7
West: Morgan Street (W)															
10	L2	All MCs	63	0.0	63	0.0	0.072	3.5	LOS A	0.1	0.8	0.32	0.42	0.32	45.1
11	T1	All MCs	320	0.0	320	0.0	0.252	2.6	LOS A	0.5	3.6	0.31	0.34	0.31	45.2
12	R2	All MCs	23	0.0	23	0.0	0.252	8.0	LOS A	0.5	3.6	0.31	0.34	0.31	44.3
12u	U	All MCs	9	0.0	9	0.0	0.252	10.1	LOS A	0.5	3.6	0.31	0.34	0.31	32.9
Approach			415	0.0	415	0.0	0.252	3.2	LOS A	0.5	3.6	0.32	0.35	0.32	45.1
All Vehicles			1021	0.4	1021	0.4	0.252	4.0	LOS A	0.5	3.6	0.35	0.40	0.35	45.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Fut AM Site Driveway / Morgan St (Site Folder: Scenario B: Left Turns Only Stage 2 + Stage 3 + 10 year growth)]
 Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Scenario B AM (Network Folder: Scenario B)]

Site Driveway / Morgan Street
 Future conditions
 AM Peak Period
 Site Category: (None)
 Give-Way (Two-Way)
 Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue [Veh. veh]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h	
			veh/h	%	veh/h	%	v/c	sec							
East: Morgan Street (E)															
5	T1	All MCs	304	0.8	304	0.8	0.156	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	51.5
Approach			304	0.8	304	0.8	0.156	0.0	NA	0.0	0.0	0.00	0.00	0.00	51.5
North: Site Driveway															
7	L2	All MCs	90	0.0	90	0.0	0.077	6.8	LOS A	0.1	0.8	0.40	0.61	0.40	47.9
Approach			90	0.0	90	0.0	0.077	6.8	LOS A	0.1	0.8	0.40	0.61	0.40	47.9
West: Morgan Street (W)															
11	T1	All MCs	359	0.7	359	0.7	0.185	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			359	0.7	359	0.7	0.185	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			753	0.7	753	0.7	0.185	0.8	NA	0.1	0.8	0.05	0.07	0.05	50.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (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).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Fut AM Morgan St / Murray St (Site Folder: Scenario B: Left Turns Only Stage 2 + Stage 3 + 10 year growth)]
 Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Scenario B AM (Network Folder: Scenario B)]

Morgan Street / Murray Street
 Future conditions
 AM Peak Period
 Site Category: (None)
 Roundabout
 Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				km/h
			veh/h		veh/h					veh	m				
South: Murray Street (S)															
1	L2	All MCs	25	5.1	25	5.1	0.034	4.9	LOS A	0.1	0.4	0.46	0.51	0.46	44.4
2	T1	All MCs	221	0.6	221	0.6	0.217	3.6	LOS A	0.4	3.2	0.47	0.45	0.47	46.3
3	R2	All MCs	39	0.0	39	0.0	0.217	8.9	LOS A	0.4	3.2	0.47	0.45	0.47	45.8
3u	U	All MCs	1	0.0	1	0.0	0.217	10.9	LOS A	0.4	3.2	0.47	0.45	0.47	45.8
Approach			286	0.9	286	0.9	0.217	4.5	LOS A	0.4	3.2	0.46	0.45	0.46	46.2
East: Morgan Street (E)															
4	L2	All MCs	27	0.0	27	0.0	0.030	3.4	LOS A	0.0	0.3	0.31	0.41	0.31	47.0
5	T1	All MCs	177	0.0	177	0.0	0.203	2.8	LOS A	0.4	2.8	0.30	0.43	0.30	43.8
6	R2	All MCs	101	0.0	101	0.0	0.203	8.0	LOS A	0.4	2.8	0.30	0.43	0.30	45.8
6u	U	All MCs	1	0.0	1	0.0	0.203	10.0	LOS A	0.4	2.8	0.30	0.43	0.30	45.8
Approach			306	0.0	306	0.0	0.203	4.6	LOS A	0.4	2.8	0.31	0.43	0.31	45.1
North: Murray Street (N)															
7	L2	All MCs	53	2.4	53	2.4	0.053	4.0	LOS A	0.1	0.7	0.47	0.50	0.47	46.6
8	T1	All MCs	25	5.1	25	5.1	0.056	3.4	LOS A	0.1	0.8	0.46	0.56	0.46	45.3
9	R2	All MCs	38	3.3	38	3.3	0.056	8.8	LOS A	0.1	0.8	0.46	0.56	0.46	42.1
9u	U	All MCs	1	0.0	1	0.0	0.056	10.8	LOS A	0.1	0.8	0.46	0.56	0.46	44.8
Approach			116	3.3	116	3.3	0.056	5.5	LOS A	0.1	0.8	0.47	0.53	0.47	45.2
West: Morgan Street (W)															
10	L2	All MCs	79	0.0	79	0.0	0.104	4.8	LOS A	0.2	1.3	0.47	0.52	0.47	44.4
11	T1	All MCs	267	0.5	267	0.5	0.306	3.4	LOS A	0.7	4.9	0.50	0.50	0.50	43.4
12	R2	All MCs	37	3.4	37	3.4	0.306	8.9	LOS A	0.7	4.9	0.50	0.50	0.50	42.5
12u	U	All MCs	65	0.0	65	0.0	0.306	10.9	LOS A	0.7	4.9	0.50	0.50	0.50	29.1
Approach			447	0.6	447	0.6	0.306	5.2	LOS A	0.7	4.9	0.50	0.50	0.50	42.8
All Vehicles			1156	0.8	1156	0.8	0.306	4.9	LOS A	0.7	4.9	0.43	0.47	0.43	44.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

▼ Site: 101 [Fut PM Site Driveway / Morgan St (Site Folder: Scenario B: Left Turns Only Stage 2 + Stage 3 + 10 year growth)]
 Output produced by SIDRA INTERSECTION Version: 9.1.6.228

■ Network: N101 [Scenario B PM (Network Folder: Scenario B)]

Site Driveway / Morgan Street
 Future conditions
 PM Peak Period
 Site Category: (None)
 Give-Way (Two-Way)
 Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue [Veh.]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed	
			veh/h	%	veh/h	%	v/c	sec		veh	Dist] m			km/h	
East: Morgan Street (E)															
5	T1	All MCs	313	0.4	313	0.4	0.160	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.9
Approach			313	0.4	313	0.4	0.160	0.0	NA	0.0	0.0	0.00	0.00	0.00	50.9
North: Site Driveway															
7	L2	All MCs	56	0.0	56	0.0	0.050	6.9	LOS A	0.1	0.5	0.42	0.61	0.42	47.6
Approach			56	0.0	56	0.0	0.050	6.9	LOS A	0.1	0.5	0.42	0.61	0.42	47.6
West: Morgan Street (W)															
11	T1	All MCs	395	0.0	395	0.0	0.202	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			395	0.0	395	0.0	0.202	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			764	0.2	764	0.2	0.202	0.5	NA	0.1	0.5	0.03	0.04	0.03	50.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (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).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Fut PM Morgan St / Murray St (Site Folder: Scenario B: Left Turns Only Stage 2 + Stage 3 + 10 year growth)]
 Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [Scenario B PM (Network Folder: Scenario B)]

Morgan Street / Murray Street
 Future conditions
 PM Peak Period
 Site Category: (None)
 Roundabout
 Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				km/h
			veh/h		veh/h					veh	m				
South: Murray Street (S)															
1	L2	All MCs	15	0.0	15	0.0	0.019	4.6	LOS A	0.0	0.2	0.44	0.48	0.44	44.6
2	T1	All MCs	61	0.0	61	0.0	0.085	3.3	LOS A	0.2	1.1	0.42	0.49	0.42	46.0
3	R2	All MCs	40	3.1	40	3.1	0.085	8.7	LOS A	0.2	1.1	0.42	0.49	0.42	45.4
3u	U	All MCs	1	0.0	1	0.0	0.085	10.6	LOS A	0.2	1.1	0.42	0.49	0.42	45.4
Approach			118	1.1	118	1.1	0.085	5.4	LOS A	0.2	1.1	0.42	0.49	0.42	45.7
East: Morgan Street (E)															
4	L2	All MCs	29	0.0	29	0.0	0.034	3.6	LOS A	0.1	0.4	0.34	0.42	0.34	47.0
5	T1	All MCs	208	0.6	208	0.6	0.205	2.8	LOS A	0.4	2.9	0.33	0.40	0.33	44.2
6	R2	All MCs	62	0.0	62	0.0	0.205	8.1	LOS A	0.4	2.9	0.33	0.40	0.33	46.0
6u	U	All MCs	5	0.0	5	0.0	0.205	10.1	LOS A	0.4	2.9	0.33	0.40	0.33	46.0
Approach			305	0.4	305	0.4	0.205	4.1	LOS A	0.4	2.9	0.33	0.40	0.33	45.1
North: Murray Street (N)															
7	L2	All MCs	56	0.0	56	0.0	0.063	4.4	LOS A	0.1	0.8	0.48	0.52	0.48	46.6
8	T1	All MCs	80	1.6	80	1.6	0.110	3.5	LOS A	0.2	1.6	0.47	0.51	0.47	45.9
9	R2	All MCs	47	0.0	47	0.0	0.110	8.9	LOS A	0.2	1.6	0.47	0.51	0.47	43.0
9u	U	All MCs	1	0.0	1	0.0	0.110	10.9	LOS A	0.2	1.6	0.47	0.51	0.47	45.3
Approach			184	0.7	184	0.7	0.110	5.2	LOS A	0.2	1.6	0.47	0.51	0.47	45.6
West: Morgan Street (W)															
10	L2	All MCs	63	0.0	63	0.0	0.072	3.6	LOS A	0.1	0.8	0.32	0.43	0.32	45.8
11	T1	All MCs	320	0.0	320	0.0	0.276	2.6	LOS A	0.6	4.1	0.32	0.39	0.32	45.0
12	R2	All MCs	23	0.0	23	0.0	0.276	8.2	LOS A	0.6	4.1	0.32	0.39	0.32	45.0
12u	U	All MCs	44	0.0	44	0.0	0.276	11.1	LOS A	0.6	4.1	0.32	0.39	0.32	32.3
Approach			449	0.0	449	0.0	0.276	3.9	LOS A	0.6	4.1	0.32	0.39	0.32	44.8
All Vehicles			1056	0.4	1056	0.4	0.276	4.3	LOS A	0.6	4.1	0.36	0.43	0.36	45.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Fut AM Site Driveway / Morgan St (Site Folder: Scenario C: Stress Test Left Turns Only Stage 2 + Stage 3 + 10 year growth)]

Network: N101 [Scenario C AM (Network Folder: Scenario C)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Site Driveway / Morgan Street
 Future conditions
 AM Peak Period
 Site Category: (None)
 Give-Way (Two-Way)
 Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Morgan Street (E)															
5	T1	All MCs	337	0.7	337	0.7	0.173	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			337	0.7	337	0.7	0.173	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.9
North: Site Driveway															
7	L2	All MCs	90	0.0	90	0.0	0.077	1.3	LOS A	0.1	0.8	0.40	0.29	0.40	9.9
Approach			90	0.0	90	0.0	0.077	1.3	LOS A	0.1	0.8	0.40	0.29	0.40	9.9
West: Morgan Street (W)															
11	T1	All MCs	359	0.7	359	0.7	0.185	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			359	0.7	359	0.7	0.185	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			786	0.6	786	0.6	0.185	0.2	NA	0.1	0.8	0.05	0.03	0.05	34.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (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).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Fut AM Morgan St / Murray St (Site Folder: Scenario C: Stress Test Left Turns Only Stage 2 + Stage 3 + 10 year growth)]

Network: N101 [Scenario C AM (Network Folder: Scenario C)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Morgan Street / Murray Street
 Future conditions
 AM Peak Period
 Site Category: (None)
 Roundabout
 Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				km/h
			veh/h		veh/h					veh	m				
South: Murray Street (S)															
1	L2	All MCs	25	5.1	25	5.1	0.035	5.2	LOS A	0.1	0.4	0.47	0.52	0.47	44.2
2	T1	All MCs	221	0.6	221	0.6	0.221	3.8	LOS A	0.5	3.3	0.49	0.46	0.49	46.3
3	R2	All MCs	39	0.0	39	0.0	0.221	9.0	LOS A	0.5	3.3	0.49	0.46	0.49	45.7
3u	U	All MCs	1	0.0	1	0.0	0.221	11.0	LOS A	0.5	3.3	0.49	0.46	0.49	45.7
Approach			286	0.9	286	0.9	0.221	4.7	LOS A	0.5	3.3	0.49	0.47	0.49	46.1
East: Morgan Street (E)															
4	L2	All MCs	27	0.0	27	0.0	0.031	3.6	LOS A	0.0	0.3	0.34	0.42	0.34	47.0
5	T1	All MCs	177	0.0	177	0.0	0.207	2.9	LOS A	0.4	2.9	0.33	0.44	0.33	43.7
6	R2	All MCs	101	0.0	101	0.0	0.207	8.1	LOS A	0.4	2.9	0.33	0.44	0.33	45.8
6u	U	All MCs	1	0.0	1	0.0	0.207	10.1	LOS A	0.4	2.9	0.33	0.44	0.33	45.8
Approach			306	0.0	306	0.0	0.207	4.7	LOS A	0.4	2.9	0.33	0.43	0.33	45.0
North: Murray Street (N)															
7	L2	All MCs	53	2.4	53	2.4	0.053	4.1	LOS A	0.1	0.7	0.48	0.51	0.48	46.5
8	T1	All MCs	25	5.1	25	5.1	0.057	3.4	LOS A	0.1	0.8	0.47	0.56	0.47	45.3
9	R2	All MCs	38	3.3	38	3.3	0.057	8.8	LOS A	0.1	0.8	0.47	0.56	0.47	42.1
9u	U	All MCs	1	0.0	1	0.0	0.057	10.8	LOS A	0.1	0.8	0.47	0.56	0.47	44.8
Approach			116	3.3	116	3.3	0.057	5.6	LOS A	0.1	0.8	0.47	0.54	0.47	45.2
West: Morgan Street (W)															
10	L2	All MCs	68	0.0	68	0.0	0.090	4.8	LOS A	0.2	1.1	0.47	0.52	0.47	44.4
11	T1	All MCs	251	0.5	251	0.5	0.315	3.5	LOS A	0.7	5.1	0.51	0.52	0.51	43.1
12	R2	All MCs	31	4.1	31	4.1	0.315	9.0	LOS A	0.7	5.1	0.51	0.52	0.51	42.2
12u	U	All MCs	97	0.0	97	0.0	0.315	10.9	LOS A	0.7	5.1	0.51	0.52	0.51	28.8
Approach			447	0.6	447	0.6	0.315	5.7	LOS A	0.7	5.1	0.50	0.52	0.50	42.1
All Vehicles			1156	0.8	1156	0.8	0.315	5.2	LOS A	0.7	5.1	0.45	0.48	0.45	44.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Fut PM Site Driveway / Morgan St (Site Folder: Scenario C: Stress Test Left Turns Only Stage 2 + Stage 3 + 10 year growth)]

Network: N101 [Scenario C PM (Network Folder: Scenario C)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Site Driveway / Morgan Street
 Future conditions
 PM Peak Period
 Site Category: (None)
 Give-Way (Two-Way)
 Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows [Total HV]		Arrival Flows [Total HV]		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue [Veh. veh]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h	
			veh/h	%	veh/h	%	v/c	sec							
East: Morgan Street (E)															
5	T1	All MCs	333	0.4	333	0.4	0.171	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			333	0.4	333	0.4	0.171	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.9
North: Site Driveway															
7	L2	All MCs	56	0.0	56	0.0	0.050	1.4	LOS A	0.1	0.5	0.42	0.29	0.42	9.9
Approach			56	0.0	56	0.0	0.050	1.4	LOS A	0.1	0.5	0.42	0.29	0.42	9.9
West: Morgan Street (W)															
11	T1	All MCs	395	0.0	395	0.0	0.202	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			395	0.0	395	0.0	0.202	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
All Vehicles			784	0.2	784	0.2	0.202	0.1	NA	0.1	0.5	0.03	0.02	0.03	39.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (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).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: 101 [Fut PM Morgan St / Murray St (Site Folder: Scenario C: Stress Test Left Turns Only Stage 2 + Stage 3 + 10 year growth)]

Network: N101 [Scenario C PM (Network Folder: Scenario C)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Morgan Street / Murray Street
 Future conditions
 PM Peak Period
 Site Category: (None)
 Roundabout
 Design Life Analysis (Final Year): Results for 10 years

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	Aver. Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				km/h
			veh/h		veh/h					veh	m				
South: Murray Street (S)															
1	L2	All MCs	15	0.0	15	0.0	0.019	4.8	LOS A	0.0	0.2	0.45	0.49	0.45	44.5
2	T1	All MCs	61	0.0	61	0.0	0.086	3.4	LOS A	0.2	1.2	0.43	0.50	0.43	45.9
3	R2	All MCs	40	3.1	40	3.1	0.086	8.8	LOS A	0.2	1.2	0.43	0.50	0.43	45.4
3u	U	All MCs	1	0.0	1	0.0	0.086	10.7	LOS A	0.2	1.2	0.43	0.50	0.43	45.4
Approach			118	1.1	118	1.1	0.086	5.5	LOS A	0.2	1.2	0.43	0.50	0.43	45.6
East: Morgan Street (E)															
4	L2	All MCs	29	0.0	29	0.0	0.034	3.7	LOS A	0.1	0.4	0.35	0.43	0.35	46.9
5	T1	All MCs	208	0.6	208	0.6	0.207	2.9	LOS A	0.4	2.9	0.34	0.40	0.34	44.1
6	R2	All MCs	62	0.0	62	0.0	0.207	8.2	LOS A	0.4	2.9	0.34	0.40	0.34	46.0
6u	U	All MCs	5	0.0	5	0.0	0.207	10.2	LOS A	0.4	2.9	0.34	0.40	0.34	46.0
Approach			305	0.4	305	0.4	0.207	4.2	LOS A	0.4	2.9	0.34	0.41	0.34	45.1
North: Murray Street (N)															
7	L2	All MCs	56	0.0	56	0.0	0.063	4.5	LOS A	0.1	0.8	0.48	0.52	0.48	46.5
8	T1	All MCs	80	1.6	80	1.6	0.111	3.5	LOS A	0.2	1.6	0.48	0.51	0.48	45.8
9	R2	All MCs	47	0.0	47	0.0	0.111	8.9	LOS A	0.2	1.6	0.48	0.51	0.48	42.9
9u	U	All MCs	1	0.0	1	0.0	0.111	11.0	LOS A	0.2	1.6	0.48	0.51	0.48	45.3
Approach			184	0.7	184	0.7	0.111	5.2	LOS A	0.2	1.6	0.48	0.52	0.48	45.6
West: Morgan Street (W)															
10	L2	All MCs	57	0.0	57	0.0	0.065	3.5	LOS A	0.1	0.7	0.32	0.42	0.32	45.1
11	T1	All MCs	311	0.0	311	0.0	0.280	2.6	LOS A	0.6	4.1	0.32	0.40	0.32	44.6
12	R2	All MCs	19	0.0	19	0.0	0.280	8.0	LOS A	0.6	4.1	0.32	0.40	0.32	43.8
12u	U	All MCs	64	0.0	64	0.0	0.280	11.2	LOS A	0.6	4.1	0.32	0.40	0.32	31.9
Approach			449	0.0	449	0.0	0.280	4.1	LOS A	0.6	4.1	0.32	0.40	0.32	44.1
All Vehicles			1056	0.4	1056	0.4	0.280	4.5	LOS A	0.6	4.1	0.37	0.43	0.37	44.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Override Site Data 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.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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**ANNEXURE D: SIGHT LINE ASSESSMENT RESULTS
(1 SHEET)**



>200m sight distance

>200m sight distance



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 www.mclarentraffic.com.au

Client / Project:
 Civitas Stage 3 Wagga Wagga

Project Address:
 Morgan Street & Murray Street, Wagga Wagga

Notes:
 CONCEPT PLAN ONLY.
 NOT FOR CONSTRUCTION.

Tested Using:
 *AutoTURN 10
 *ZWCAD 2019
 Scale @ A3 1:1000

Project No:
 220450

Drawing Title:
 Sightline Assessment - Morgan Street Egress

Revision History		
Version	Date	Notes
A	26/06/2024	

