

TRAFFIC AND PARKING IMPACT ASSESSMENT OF THE PROPOSED CHILD CARE CENTRE AT 84 BROOK STREET, MUSWELLBROOK



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Prepared for:	Janssen Designs

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1 INTRODUCTION

M^cLaren Traffic Engineering was commissioned by *Janssen Designs* to provide a traffic and parking impact assessment of the proposed Child Care Centre at 84 Brook Street, Muswellbrook as depicted in **Annexure A**.

1.1 Description and Scale of Development

The proposed development has the following characteristics relevant to traffic and parking:

- A child care centre accommodating **90** children and **16** staff members as per the following:
 - **20** children between 0-2 years old (staff assigned at 1 per 4 children, or **5** staff);
 - **20** children between 2-3 years old (staff assigned at 1 per 5 children, or **4** staff);
 - **50** children between 3-6 years old (staff assigned at 1 per 10 children, or **5** staff);
 - One (1) director;
 - One (1) cook.
- An at-grade parking area with vehicular access via a proposed two-way driveway from Brook Street, accommodating a total of **26** car parking spaces including:
 - Ten (10) parent / visitor car parking spaces including one (1) accessible space and one (1) designated emergency space for vehicles up to a B99 design vehicle;
 - **16** staff car parking spaces.

1.2 State Environmental Planning Policy (Transport and Infrastructure) 2021

The proposed development does not qualify as a traffic generating development with relevant size and/or capacity under *Clause 2.122* of the *SEPP (Transport and Infrastructure) 2021*. Accordingly, formal referral to Transport for NSW (TfNSW) is unnecessary and the application can be assessed by Muswellbrook Shire Council officers accordingly.

1.3 Site Description

The subject development involves the development of a single vacant lot currently zoned R1 - General Residential under the *Muswellbrook Shire Council Local Environmental Plan 2009*. The site has a single frontage to Brook Street to the South.

The site is generally surrounded by low-density residential developments in all directions with the local town centre located approximately 300m to the west of the site. Notable traffic generating developments within the town centre include a shopping complex which is located to the west of the site within a 100m vicinity and contains a Big W and Woolworths. Also of note, Muswellbrook Train Station is located approximately 700m walking distance to the south of the site, Muswellbrook High School is located approximately 850m to the southeast of the site, Muswellbrook Hospital is located approximately 850m to the east of the site and Muswellbrook Public School is located approximately 750m north of the site.



1.4 Site Context

The location of the site is shown on an aerial photo and a street map in **Figure 1** and **Figure 2** respectively.



Site Location





Site Location

FIGURE 2: SITE CONTEXT – STREET MAP



2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Road Hierarchy

The road network servicing the site has characteristics as described in the following subsections.

- 2.1.1 Brook Street
 - Unclassified COLLECTOR Road;
 - Approximately 21m wide carriageway divided by a median approximately 6.8m wide facilitating one (1) traffic flow lane in each direction and kerbside parking on both sides of the road;
 - Signposted 50km/h speed limit;
 - Generally, unrestricted parking permitted along both sides of the road;
 - Time-restricted 1-hour parking permitted along both sides of the road between Bridge Street and Sowerby Street between the hours of 8:30AM – 6:00PM, Monday to Friday and 8:30AM – 12:30PM, Saturday;
 - Signposted 'Bus Zone' between the hours of 8:30AM 6PM, Monday to Friday and 8:30AM – 12:30PM, Saturday along the 'Brook Medical Centre' frontage to the eastbound carriageway.

2.1.2 Sowerby Street

- Unclassified LOCAL Road;
- Approximately 15m wide carriageway facilitating traffic flow in both directions and kerbside parking;
- Default 50km/h speed limit applies;
- 40km/h speed limit applies near preschool during school zone hours;
- Generally, unrestricted kerbside parking permitted on both sides of the road.

2.1.3 Carl Street

- Unclassified LOCAL Road;
- Approximately 9m wide carriageway with no capacity for kerbside parking which widens into a 16m wide carriageway facilitating one (1) lane of traffic flow in each direction and kerbside parking;
- Signposted 50km/h speed limit applies;
- 40km/h 'School Zone' speed limit applies at the Carl Street approach to Cook Street during school zone hours;
- Generally, unrestricted kerbside parking permitted on both sides of the road.
- 2.1.4 Bridge Street (New England Highway)
 - TfNSW Classified STATE Road (No. 9);



- Approximately 20m wide carriageway facilitating two (2) traffic flow lanes in each direction and kerbside parking;
- Signposted 50km/h speed limit applies;
- Generally, time-restricted 1-hour parking permitted along both sides of the road between the hours of 8:30AM – 6PM, Monday to Friday and 8:30AM – 12:30PM, Saturday.

2.2 Existing Traffic Management

- Roundabout controlled intersection of Brook Street / Sowerby Street;
- "Stop" controlled intersection of Brook Street / Carl Street;
- Signalised intersection of Brook Street / New England Highway.

2.3 Existing Traffic Environment

Turning movement count traffic surveys were conducted at the intersections of Brook Street / Sowerby Street, Carl Street / Brook Street and Brook Street / Bridge Street (New England Highway) from 7:00am to 9:30am and 2:30pm to 6:00pm on Tuesday 2 May 2023 representing a typical operating weekday. Additionally, one 7-day automatic traffic count survey was undertaken outside Property 82 on Brook Street in both directions from 12:00am Tuesday 2 May 2023. The full survey results are shown in **Annexure B** for reference.

2.3.1 Existing Road Performance

The performance of the surrounding intersections under the existing traffic conditions has been assessed using SIDRA INTERSECTION 9.1. **Table 1** summarises the resultant intersection performance data, with full SIDRA results reproduced in **Annexure C**.

The following considerations have been undertaken to ensure a realistic calibrated model:

- Consideration to the TCS Plan for signalised intersection Brook Street / New England Highway (Annexure D);
- A review of the phase length and cycle times based upon video footage which is reproduced in **Annexure E** for reference:
 - Output cycle and phase lengths fall within observed cycle and phase lengths.
- Validation of the model using approach queue lengths with consideration to the following input modifications:
 - Signal Coordination Arrival Type (assumption that the corridor is coordinated to optimise through vehicle movements);
 - Reported maximum queue lengths along the New England Highway and Brook Street.



TABLE 1: EXISTING INTERSECTION PERFORMANCES (SIDRA INTERSECTION 9.1)

Intersection	Peak Hour	Degree of Saturation ⁽¹⁾	Average Delay ⁽²⁾ (sec/vehicle)	Level of Service ⁽³⁾	Control Type	Worst Movement
		EX	XISTING PERFO	ORMANCE		
New England	AM	0.42	21.5	В	Signala	RT from Brooke Street (E)
Highway / Brook Street	PM	0.38	19.1	В	Signals	RT from Brooke Street (E)
			5.7	Α		UT from
Sowerby	AM	0.25	(Worst: 10.4)	(Worst: A)	Doundahout	Sowerby Street (S)
Brook Street		0.04	6	Α	Roundabout	UT from
	PIN	0.24	(Worst: 10.5)	(Worst: A)		Sowerby Street (S)
	A N /	0.17	4.3	N/A		RT from Carl
Carl Street /	Alvi	0.17	(Worst: 11.9)	(Worst: A)	Stop	Street (N)
Brook Street	РM	0.21	4.6	N/A	Stop	RT from Carl
	1 111	0.21	(Worst: 13.6)	(Worst: A)		Street (S)

Notes:

 The Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
 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 are currently performing at a high level of efficiency, with worst movement level of service "A" or "B" conditions in both the AM & PM peak hour periods. The worst movement level of service "A" and "B" performance is characterised by low approach delays and spare capacity.



2.3.2 Automatic Tube Count Results

The results from the 7-day automatic traffic count surveys for Brook Street have been summarised below in **Table 2** and are also provided in **Annexure B** for reference.

Road	Direction	Peak Hour Volume		Average Daily	85 th Percentile	Heavy	
noud	Dirotitoii	Time	Volume	Volume	Speed	Vehicles	
AM (8am – 9am) 239		2 200	50.01 //	4.00/			
Westbound	Westbound	PM (3pm – 4pm)	227	2,300	55.0KH/H	4.070	
Brook Street	Eastbound	AM (8am – 9am)	183	2,159	53.8km/h	5.2%	
		PM (3pm – 4pm)	288				
	Combined (Both directions)	AM (8am – 9am)	421	5 077	53.7km/h	4.9%	
		PM (3pm – 4pm)	515	5,077			

TABLE 2: AUTOMATIC TUBE COUNT SUMMARY

As shown in **Table 2** above, Brook Street has 5,077 average vehicle trips, with approximately 4.9% heavy vehicles and an 85th percentile speed of 53.7km/h.

2.4 Public Transport

The subject site has access to the existing bus stop (ID: 233327) located approximately 190m (2-minutes) walking distance to the west of the site on Brook Street.

The bus stop services existing bus routes 411 (Muswellbrook to Sydney Street Loop Service), 412 (Muswellbrook to Muswellbrook North Loop Service), 414 (Muswellbrook to Scone via Aberdeen Loop Service), 415 (Muswellbrook to Denman Loop Service), 418 (Muswellbrook to Eastlinks Loop Service) and 419 (Muswellbrook to Queen Street Loop Service), provided by Osborn's Transport Services.

Muswellbrook Train Station is located 700m (9-minutes) walking distance to the south of the site, servicing the Regional Trains – North West NSW Line. A train service is not provided in commuter peak periods.

The location of the site subject to the surrounding public transport network is shown in **Figure 3**.





FIGURE 3: PUBLIC TRANSPORT NETWORK MAP

2.5 Future Road and Infrastructure Upgrades

From Muswellbrook Shire Council Development Application tracker and website, it appears that there are no future planned road or public transport changes that will affect traffic conditions within the immediate vicinity of the subject site.

It is noted that there are planned upgrades to Hill Street between Bridge Street and the railway line which is scheduled to commence 11 April 2023. These works will include road pavement construction, asphalt surfacing, new kerb and gutter and landscaping. Whilst construction is underway, Hill Street will be accessible to residents and business operators only. However, works are expected to be completed by mid-June 2023. Since the Hill Street road upgrade is expected to be complete well before the Construction Certificate is issued, the planned road closure will have no affect on traffic conditions within vicinity of the site.



3 PARKING ASSESSMENT

3.1 Council Parking Requirement

Reference is made to the *Muswellbrook Shire Development Control Plan 2009* (MSDCP 2009) *Section 16 – Car Parking and Access* which designates the following parking rates applicable to the proposed development:

16.6 Car Parking Schedule for Specific Land Uses

Child Care Centre

1 space per employee, **PLUS** 1 space per 15 children enrolled (if provision of 3 set down/pick up areas) or 1 per 10 children.

Council may give consideration to varying the specified parking requirement, depending upon the nature and type of street frontage available for the setting down and picking up of children or if home based child care is proposed.

Table 3 presents the parking requirements of the proposal according to Council's above car parking rates.

Land Use	Scale	Rate	Spaces Required	Spaces Provided
Child Care	90 Children	1 space per 10 children	9	9
Centre	16 staff	1 per employee	16	16
TOTAL	-	-	25	25

TABLE 3: DCP PARKING RATES

As shown, strict application of the MSDCP requires the provision of **25** car parking spaces, with **9** for parent / visitor use and **16** for staff use. The proposed plans detail the provision of **25** car parking spaces with an allocation of **9** for parent / visitor use and **16** for staff use. This meets the MSDCP 2009 parking requirements.

Additionally, Clause 18.2.1 (i) of the MSDCP 2009 requires an additional vehicle space for emergencies. Accordingly, an additional space has been provided for emergency vehicles. This emergency space is provided with additional width to assist in emergency situations. It is also noted that emergency vehicles could stop within the car parking aisle if needed in an emergency situation.



3.2 Parking for People with Disabilities

The MSDCP 2009 states the following regarding accessible parking provision relevant to the proposed development:

Section 16 – Car Parking and Access

16.4.3 Parking for People with Disabilities

Special parking spaces for people with disabilities are to be provided at the rate of two percent (2%) of the overall spaces provided for a retail/business/industry development. These spaces must be clearly signposted and marked and have a minimum width of 3.2 metres, and comply with the provisions of AS2890.1.

Section 18 – Child Care Centres

18.2.1 Drop off and pick up of children

<u>Controls</u>

- (i) Provide 2 designated vehicle spaces one for Disabled Access, and one for emergency use – on site in residential zones, and within close proximity in local centre/village zones, in accordance with the provisions of AS2890.1.
- (ii) Provide accessible parking spaces for the set down and pick up of children, no more than 50m from the Child Care Centre.

The proposed site provides **26** car parking spaces and as such the DCP requires the provision of one (**1**) accessible parking space. The proposed car parking layout incorporates one (**1**) parking space for people with disabilities designed in accordance with *AS2890.6*:2022, resulting in compliance with Council's DCP requirements.

Further, the proposed development provides on-site parking for two (2) designated vehicle spaces, one (1) for disabled access, and one (1) for emergency use, which fully complies with Section 18.2.1 (i) of the MSDCP 2009.

3.3 Bicycle & Motorcycle Parking Requirements

The MSDCP 2009 does not outline any requirements for the provision of bicycle / motorcycle parking facilities for a child care centre. Accordingly, no bicycle / motorcycle parking facilities have been provided, thus satisfying Council requirements.



3.4 Servicing & Loading

The MSDCP 2009 specifies the requirement of service facilities for a van are to be made available for child care centres. It is expected that all deliveries will be undertaken within the proposed car parking area outside peak drop off / pick up times, under a plan of management if necessary. A van (standard B99 design vehicle) or similar can be accommodated within the car parking area, utilising vacant visitor spaces. This is common practice for child care centres and will not noticeably affect operation of the site. It is reiterated that deliveries and other arrivals of similar nature are low in frequency and can be easily managed.

It is expected that site will be serviced by Council's waste collection services from the Brook Street frontage, similar to existing operations.

3.5 Car Park Design & Compliance

The car parking layout as depicted in **Annexure A**, has been assessed to achieve the relevant clauses and objectives of *AS2890.1:2004* and *AS2890.6:2022*. Swept path testing has been undertaken and the results are reproduced within **Annexure F** for reference.

The proposed car parking and vehicular access design achieves the following:

- 6.6m wide two-way driveway facilitating access to Brook Street;
- Minimum 5.8m wide parking aisles;
- Minimum 5.4m long, 2.4m wide spaces for staff;
- Minimum 5.4m long, 2.6m wide spaces for parents / visitors;
- Minimum 5.4m long, 2.4m wide accessible spaces with adjacent associated 5.4m long, 2.4m wide shared space;
- Minimum headroom of 2.2m for general circulation and 2.5m headroom clearance provided over accessible and adaptable parking areas;
- 2.0m x 2.5m pedestrian sight triangle which is to remain clear of obstructions greater than 600mm in height for the life of the development.

Whilst the plans have been assessed to comply with the relevant standards, it is usual and expected that a design certificate be required at the Construction Certificate stage to account for any changes following the development application.



4 TRAFFIC IMPACT ASSESSMENT

The impact of the expected traffic generation levels associated with the subject proposal is discussed in the following sub-sections.

4.1 Traffic Generation

Traffic generation rates for the relevant land uses are provided in the *RTA Guide to Traffic Generating Developments (2002)* and recent supplements as adopted by *Transport for NSW* (TfNSW) and are as follows:

3.11.3 Child care centres

Long-day care

7.00-9.00am	0.8 peak vehicle trips per child
2.30-4.00pm	0.3 peak vehicle trips per child
4.00-6.00pm	0.7 peak vehicle trips per child

The resulting AM and PM peak hourly traffic generation is summarised in Table 4.

Use	Scale	Peak	Generation Rate	Trips ⁽¹⁾
Long day cara	00 Childron	AM	0.8 per child	72 (36 in, 36 out)
Long-day care		PM	0.7 per child	63 (32 in, 31 out)

Notes:

(1) 50/50 inbound/outbound split.

As shown, the expected traffic generation associated with the proposed development is in the order of **72** vehicle trips in the AM peak period (36 in, 36 out) and **63** vehicle trips in the PM peak period (32 in, 31 out).

4.2 Traffic Assignment

The road network, traffic surveys and locations of residential areas surrounding the site have been assessed and the following traffic assignment has been assumed for all traffic to and from the site:

- 70% to / from the west via Bridge Street (New England Highway);
 - 35% to/from New England Highway (North);
 - 35% to/from New England Highway (South);
- 30% to / from the east via Brook Street.

Figure 4 illustrates the assumed traffic assignment to and from the site.





Outbound





4.3 Traffic Impact

The traffic generation outlined in **Section 4.1** & **4.2** above has been added to the existing traffic volumes recorded. SIDRA INTERSECTION 9.1 was used to assess the intersections performance. The purpose of this assessment is to compare the existing intersection operations to the future scenario under the increased traffic load. The results of this assessment are shown in **Table 5**.

Intersection	Peak Hour	Degree of Saturation ⁽¹⁾	Average Delay ⁽²⁾ (sec/vehicle)	Level of Service ⁽³⁾	Control Type	Worst Movement						
		E	XISTING PERF	ORMANCE								
New England Highway /	AM	0.42	21.5	В	Signala	RT from Brooke Street (E)						
Brooke Street	PM	0.38	19.1	В	Signais	RT from Brooke Street (E)						
Sowerby	AM	0.25	5.7	Α		UT from Sowerby						
Street /			(Worst: 10.4)	(Worst: A)	Roundabout	Sileer (5)						
Brook Street	РМ	0.24	6	Α		UT from Sowerby						
		0121	(Worst: 10.5)	(Worst: A)		Street (S)						
	<u> </u>	0.17	4.3	N/A		RT from Carl						
Carl Street /		0.17	(Worst: 11.9)	(Worst: A)	Stop	Street (N)						
Brook Street						DM	t DM	0.21	4.6	N/A	Stop	RT from Carl
		0.21	(Worst: 13.6)	(Worst: A)		Street (S)						
		FUTURE (PO	ST-DEVELOPN	IENT) PERF	ORMANCE							
New England	AM	0.42	21.7	В	Signala	RT from Brooke Street (E)						
Highway / Brook Street	PM	0.41	19.4	В	Signais	RT from Brooke Street (E)						
	0 N /	0.07	5.7	Α		UT from Sowerby						
Sowerby	Alvi	0.27	(Worst: 10.5)	(Worst: A)	Doundobout	Street (S)						
Brook Street		0.00	5.9	Α	Roundabout	UT from Sowerby						
	PIVI	0.26	(Worst: 10.6)	(Worst: A)		Street (S)						
	A N A	0.17	4.3	N/A		RT from Carl						
Carl Street /	AIVI	0.17	(Worst: 12.2)	(Worst: A)	Stop	Street (N)						
Brook Street		0.21	4.5	N/A	Stop	RT from Carl						
		0.21	(Worst: 14)	(Worst: A)		Street (S)						

TABLE 5: INTERSECTION PERFORMANCE (SIDRA INTERSECTION 9.1)

Notes: Refer to Table 1.

As shown, the intersections of Brook Street / New England Highway, Brook Street / Sowerby Street and Brook Street / Carl Street all retain the same overall and worst movement level of service under future conditions with minimal delays and additional capacity, indicating that there will be no adverse impact on the existing road network as a result of the proposed development.



5 CONCLUSION

In view of the foregoing, the subject Child Care Centre proposal at 84 Brook Street, Muswellbrook (as depicted in **Annexure A**) is fully supportable in terms of its traffic and parking impacts. The following outcomes of this traffic impact assessment are relevant to note:

- a) The proposal includes the provision of a total of 26 car parking spaces within a proposed at-grade carpark, comprised of 16 for staff use, 9 for parent / visitor use and one (1) for emergency use, satisfying the relevant controls applicable to the development, including Council's DCP requirements. An accessible parking space is also included as part of the nine (9) parent / visitor car parking spaces.
- b) Council's DCP does not require the provision of bicycle and motorcycle parking facilities. As such nil (0) bicycle / motorcycle parking spaces have been provided, satisfying DCP requirements.
- c) The parking areas of the site have been assessed against the relevant sections of AS2890.1:2004 and AS2890.6:2022 and have been found to satisfy the objectives of each standard Swept path testing has been undertaken and the results are reproduced within Annexure F.
- d) The traffic generation of the proposed development has been estimated to be some 72 trips in the AM peak period (36 in, 36 out) and 63 trips in the PM peak period (32 in, 31 out). The impacts of the traffic generation have been modelled using SIDRA INTERSECTION 9.1, indicating that there will be no adverse impact to the performance of the intersections as a result of the generated traffic.



ANNEXURE A: PROPOSED PLANS (1 SHEET)



	AME	NDMENTS		- Draig at Til
ISSUE:	DESCRIPTION		DATE:	Project II
				Proposoo
				⁻ Centre
				-
				-
				_
				-

LOCAL GOVERNMENT AREA:						
Muswellbrook Council						
	Issue For: DA	<u>lssue:</u> A				
Date:	Scale:	Drawing #:		Project #:		



ANNEXURE B: TRAFFIC SURVEY DATA (4 SHEETS)



Intersection of Brook St and New England Hwy, Muswellbrook

GPS	-32.263326, 150.8888	34			_			
Date:	Tue 02/05/23		North:	New England Hwy		Survey	AM:	7:00 AM-9:30 AM
Weather:	Fine		East:	Brook St		Period	PM:	2:30 PM-6:00 PM
Suburban:	Muswellbrook		South:	New England Hwy		Traffic	AM:	8:15 AM-9:15 AM
Customer:	McLaren		West:	Brook St		Peak	PM:	4:00 PM-5:00 PM

All Vehicles South Approach New England Hwy Time North Approach New England Hwy East Approach Brook St West Approach Brook St Hourly Total Period Start Period End SB U WB U R NB U R EB Peak U R R L Hour L L 7:00 7:15 7:15 7:30 7:45 7:30 7:45 8:00 8:00 8:15 8:15 8:30 Peak 8:30 8:45 8:45 9:00 9:00 9:15 9:15 9:30 14:45 14:30 14:45 15:00 15:00 15:15 15:15 15:30 15:30 15:45 15:45 16:00 16:00 16:15 Peak 16:15 16:30 16:30 16:45 17:00 16:45 17:00 17:15 17:15 17:30 17:30 17:45 18:00 17:45

Peak	Time	North A	pproach I	New Engla	and Hwy	Ea	st Approa	ch Brook	St	South	Approach	New Engla	nd Hwy	We	st Approa	ach Brool	< St	Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
8:15	9:15	0	54	513	107	2	48	55	100	0	133	411	57	0	50	41	20	1591
16:00	17:00	0	24	478	69	13	67	46	114	0	160	664	85	0	68	54	23	1865

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





Intersection of Brook St and Sowerby St, Muswellbrook

GPS	-32.263634, 150.8912	81			_			
Date:	Tue 02/05/23		North:	Sowerby St		Survey	AM:	7:00 AM-9:30 AM
Weather:	Fine		East:	Brook St		Period	PM:	2:30 PM-6:00 PM
Suburban:	Muswellbrook		South:	Sowerby St		Traffic	AM:	8:00 AM-9:00 AM
Customer:	McLaren		West:	Brook St		Peak	PM:	3:00 PM-4:00 PM

All Vehicles North Approach Sowerby St East Approach Brook St Hourly Total Time South Approach Sowerby St West Approach Brook St Period Start Period End U SB U WB NB U R EB Peak R L R U R L Hour L 7:15 7:00 7:30 7:15 7:45 7:30 7:45 8:00 8:00 8:15 Peak 8:15 8:30 8:30 8:45 8:45 9:00 9:00 9:15 9:15 9:30 14:45 14:30 15:00 14:45 15:15 15:00 Peak 15:15 15:30 15:30 15:45 16:00 15:45 16:00 16:15 16:15 16:30 16:45 16:30 17:00 16:45 17:00 17:15 17:15 17:30 17:30 17:45 17:45 18:00

Peak	Time	Nort	h Approa	ch Sower	by St	Ea	st Approa	ch Brook	St	Soι	th Approa	ch Sowerb	y St	We	st Approa	ach Brook	(St	Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
8:00	9:00	5	48	39	58	0	121	136	19	0	12	34	11	30	10	108	61	692
15:00	16:00	8	61	54	76	8	113	121	12	0	22	36	17	41	5	158	69	801

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





Intersection of Brook St and Carl St, Muswellbrook

GPS	-32.263959, 150.8937	12			_			
Date:	Tue 02/05/23		North:	Carl St		Survey	AM:	7:00 AM-9:30 AM
Weather:	Fine		East:	Brook St		Period	PM:	2:30 PM-6:00 PM
Suburban:	Muswellbrook		South:	Carl St		Traffic	AM:	8:00 AM-9:00 AM
Customer:	McLaren		West:	Brook St		Peak	PM:	3:00 PM-4:00 PM

All Vehicles North Approach Carl St East Approach Brook St West Approach Brook St Hourly Total Time South Approach Carl St Period Start Period End U SB U R WB U R NB U R EB Peak R Hour L L 7:15 7:00 7:30 7:15 7:45 7:30 7:45 8:00 8:00 8:15 Peak 8:15 8:30 8:30 8:45 8:45 9:00 9:00 9:15 9:15 9:30 14:45 14:30 15:00 14:45 15:15 15:00 Peak 15:15 15:30 15:30 15:45 15:45 16:00 16:00 16:15 16:15 16:30 16:45 16:30 17:00 16:45 17:00 17:15 17:15 17:30 17:30 17:45 17:45 18:00

Peak	Time	No	orth Appr	oach Carl	St	Ea	st Approa	ach Brook	St	S	outh Appr	oach Carl S	St	We	est Approa	ach Brool	k St	Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
8:00	9:00	0	10	41	10	0	22	168	17	0	7	49	94	2	38	121	19	598
15:00	16:00	0	7	47	15	1	12	163	24	2	19	63	82	1	78	164	21	699

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



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_		AUTOMATIC COU	NT SUMMA	ARY	
Street Name :	Brook	St	Location :	Outside Property 8	32
Suburb :	Muswe	llbrook	Start Date :	00:00 Tue 02/May	/2023
Machine ID:	U342B	PW4/P	Finish Date :	00:00 Tue 09/May	/2023
Site ID:	2474		Speed Zone :	50 km/h	
Prepared By :	Vo Sor	ו Binh	Email:	binh@trafficsurvey.c	com.au
GPS information	Lat	32° 15' 49.33 South		Direction of Trave	el
	Long	150° 53' 30.91 East	Both directions	Westbound	Eastbound
Traffic Volume :		Weekdays Average	5,077	2,388	2,689
(Vehicles/Day)		7 Day Average	4,565	2,159	2,406
Weekday	AM	08:00	421	239	183
Peak hour start	РМ	15:00	515	227	288
Speeds :		85th Percentile	53.7	53.6	53.8
(Km/Hr)		Average	48.3	48.3	48.3
Classification % :		Light Vehicles up to 5.5m	95.1%	95.4%	94.8%





QUALITY ASSURED COMPANY BY ISO 9001:2015 OH&S SYSTEM CERTIFIED TO ISO 4801:2001 ENVIRONMENT MANAGEMENT SYSTEM CERTIFIED TO ISO14001:2015

Status of movement - Covid 19

"Traffic behaviour is not the same as pre-pandemic (traditional morning/afternoon peak is much less pronounced and school start/finish times are much more pronounced), the current patterns are close enough to what probably is going to be a 'COVID normal' situation for at least the next year or two. Workplaces are currently not all yet open. These results should be used for indicative assessment only."



ANNEXURE C: SIDRA RESULTS (12 SHEETS)

Site: 101 [EX AM - New England Hwy / Brook St (Site Folder:

Existing AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Existing AM (Network Folder: General)]

Signalised intersection of New England Highway / Brook Street Existing Conditions AM Peak Hour Period Site Category: (None) Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance Aver. Back Of Queue Prop. Que Aver. Delay Mov ID Turn Mov Class Deg. Satn Demand Arrival Aver Flows Service Stop No. of Speed [Total HV] [Total HV] [Veh. Dist] Rate Cycles km/h eh/h veh/h sec veh South: New England Highway (S) 0.53 0.55 1 L2 All MCs 60 0.0 60 0.0 0.247 15.5 LOS B 3.4 26.4 0.55 42.0 2 T1 All MCs 433 14.4 433 14.4 0.247 11.0 LOS A 3.4 26.4 0.55 0.49 0.55 43.2 3 R2 All MCs 140 3.8 140 3.8 *0.311 17.4 LOS B 1.9 13.8 0.73 0.72 0.73 34.2 Approach 633 10.6 633 10.6 0.311 12.8 LOS A 3.4 26.4 0.59 0.55 0.59 41.7 East: Brooke Street (E) 4 L2 All MCs 105 5.0 105 5.0 0.163 25.2 LOS B 1.9 13.9 0.71 0.72 0.71 32.7 5 LOS C 0.88 T1 All MCs 58 0.0 58 0.0 0.164 34.3 9.4 0.88 0.67 30.1 1.3 6 R2 All MCs 51 6.3 51 6.2 *0.188 39.5 LOS C 1.2 8.8 0.89 0.73 0.89 28.0 LOS C 214 3.9 0.80 Approach 214 3.9 0.188 31.1 1.9 13.9 0.80 0.71 30.8 North: New England Highway (N) 7 L2 All MCs 113 2.8 113 2.8 0.171 25.3 LOS B 2.0 14.7 0.71 0.73 0.71 29.8 8 T1 All MCs 540 9.0 540 9.0 *0.421 24.9 LOS B 5.7 42.7 0.80 0.68 0.80 38.1 9 All MCs 0.159 LOS C 7.4 0.71 R2 57 0.0 57 0.0 29.3 1.1 0.71 0.71 36.5 Approach 709 7.3 709 7.3 0.421 25.3 LOS B 5.7 42.7 0.78 0.69 0.78 37.0 West: Brook Street (W) L2 All MCs 21 5.0 21 5.0 LOS B 0.4 2.9 0.72 0.72 10 0.038 27.7 0.67 35.6 11 T1 All MCs 43 2.4 43 2.4 0.073 23.4 LOS B 0.8 5.8 0.74 0.56 0.74 30.8 12 R2 All MCs 53 2.0 53 2.0 *0.160 30.6 LOS C 7.7 0.85 0.71 0.85 34.8 1.1 Approach 117 2.7 117 2.7 0.160 27.4 LOS B 1.1 7.7 0.78 0.65 0.78 33.9 All Vehicles 1673 7.8 1673 7.8 0.421 21.5 LOS B 5.7 42.7 0.71 0.63 0.71 37.6

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.

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 Green.

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.

* Critical Movement (Signal Timing)

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V Site: 101 [EX AM - Brook St / Sowerby St (Site Folder: Existing AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

■ Network: N101 [Existing AM (Network Folder: General)]

Roundabout intersection of Brook Street / Sowerby Street Existing Conditions AM Peak Hour Period Site Category: (None) Roundabout

Vehic	le Mo	ovemen	t Perfo	orma	nce										
Mov ID	Turn	Mov Class	Dem Fl [Total	nand lows HV]	Ar Fl Total]	rival lows HV]	Deg. Satn	Aver. Delay	Level of Service	Aver. Back [Veh.	Of Queue Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South	Sow	erby Stre	et (S)												
1	L2	All MCs	12	0.0	12	0.0	0.065	5.4	LOS A	0.1	0.9	0.50	0.58	0.50	42.6
2	T1	All MCs	36	0.0	36	0.0	0.065	5.3	LOS A	0.1	0.9	0.50	0.58	0.50	45.3
3	R2	All MCs	13	0.0	13	0.0	0.065	8.8	LOS A	0.1	0.9	0.50	0.58	0.50	42.6
3u	U	All MCs	1	0.0	1	0.0	0.065	10.4	LOS A	0.1	0.9	0.50	0.58	0.50	44.8
Appro	ach		61	0.0	61	0.0	0.065	6.1	LOS A	0.1	0.9	0.50	0.58	0.50	44.6
East: I	Brook	Street (E	E)												
4	L2	All MCs	20	0.0	20	0.0	0.252	4.4	LOS A	0.6	4.4	0.36	0.52	0.36	43.4
5	T1	All MCs	143	3.7	143	3.7	0.252	4.4	LOS A	0.6	4.4	0.36	0.52	0.36	36.0
6	R2	All MCs	127	3.3	127	3.3	0.252	7.8	LOS A	0.6	4.4	0.36	0.52	0.36	43.0
6u	U	All MCs	1	0.0	1	0.0	0.252	9.3	LOS A	0.6	4.4	0.36	0.52	0.36	36.0
Appro	ach		292	3.2	292	3.2	0.252	5.9	LOS A	0.6	4.4	0.36	0.52	0.36	41.2
North:	Sowe	erby Stree	et (N)												
7	L2	All MCs	61	0.0	61	0.0	0.054	4.7	LOS A	0.1	0.9	0.37	0.50	0.37	43.9
8	T1	All MCs	41	2.6	41	2.6	0.075	4.2	LOS A	0.2	1.4	0.36	0.53	0.36	45.1
9	R2	All MCs	51	4.2	51	4.2	0.075	7.8	LOS A	0.2	1.4	0.36	0.53	0.36	42.3
9u	U	All MCs	5	0.0	5	0.0	0.075	9.3	LOS A	0.2	1.4	0.36	0.53	0.36	44.6
Appro	ach		158	2.0	158	2.0	0.075	5.7	LOS A	0.2	1.4	0.36	0.52	0.36	44.0
West:	Brool	k Street (N	W)												
10	L2	All MCs	64	9.8	64	9.8	0.070	5.2	LOS A	0.1	0.9	0.31	0.53	0.31	43.9
11	T1	All MCs	114	1.9	114	1.9	0.123	4.2	LOS A	0.2	1.7	0.29	0.52	0.29	36.7
12	R2	All MCs	11	0.0	11	0.0	0.123	7.7	LOS A	0.2	1.7	0.29	0.52	0.29	43.4
12u	U	All MCs	32	3.3	32	3.3	0.123	9.4	LOS A	0.2	1.7	0.29	0.52	0.29	36.7
Appro	ach		220	4.3	220	4.3	0.123	5.4	LOS A	0.2	1.7	0.30	0.52	0.30	40.8
All Vel	nicles		731	3.0	731	3.0	0.252	5.7	LOS A	0.6	4.4	0.35	0.53	0.35	42.3

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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Site: 101 [EX AM - Carl St / Brook St (Site Folder: Existing AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Existing AM (Network Folder: General)]

Stop sign controlled intersection of Carl Street / Brook Street Existing Conditions AM Peak Hour Period Site Category: (None) Stop (Two-Way)

Vehic	le M	ovement	t Perfor	ma	nce										
Mov	Turn	Mov	Dema	and	Arri	′al	Deg.	Aver.	Level of	Aver. Bac	k Of Queue	Prop.	Eff.	Aver.	Aver.
ט ו		Class	FIO Total H	ws V1	FIO\ Total H\	vs /1	Sath	Delay	Service	[Veh	Dist 1	Que	Stop Rate	NO. OT Cvcles	Speed
			veh/h	%	veh/h	,] %	v/c	sec		veh	m		- tato	C y cicc	km/h
South	Carl	Street (S)												
1	L2	All MCs	99 ⁻	1.1	99 1	.1	0.165	8.3	LOS A	0.3	1.9	0.38	0.88	0.38	40.8
2	T1	All MCs	52 6	6.1	52 6	.1	0.165	10.9	LOS A	0.3	1.9	0.38	0.88	0.38	43.8
3	R2	All MCs	7 (0.0	7 0	.0	0.165	11.3	LOS A	0.3	1.9	0.38	0.88	0.38	44.0
Appro	ach		158 2	2.7	158 2	.7	0.165	9.3	LOS A	0.3	1.9	0.38	0.88	0.38	42.4
East: I	Brook	Street (E	.)												
4	L2	All MCs	18 క	5.9	18 5	.9	0.117	4.6	LOS A	0.1	0.6	0.09	0.13	0.09	47.9
5	T1	All MCs	177 4	4.8	177 4	.8	0.117	0.0	LOS A	0.1	0.6	0.09	0.13	0.09	48.4
6	R2	All MCs	23 13	3.6	23 13	.6	0.117	6.2	LOS A	0.1	0.6	0.09	0.13	0.09	48.1
Appro	ach		218 క	5.8	218 5	.8	0.117	1.0	NA	0.1	0.6	0.09	0.13	0.09	48.3
North:	Carl	Street (N))												
7	L2	All MCs	11 10	0.0	11 10	.0	0.090	8.4	LOS A	0.1	1.0	0.43	0.89	0.43	43.2
8	T1	All MCs	43 12	2.2	43 12	.2	0.090	11.1	LOS A	0.1	1.0	0.43	0.89	0.43	43.1
9	R2	All MCs	11 (0.0	11 0	.0	0.090	11.9	LOS A	0.1	1.0	0.43	0.89	0.43	39.8
Appro	ach		64 9	9.8	64 9	.8	0.090	10.8	LOS A	0.1	1.0	0.43	0.89	0.43	42.8
West:	Brool	< Street (V	N)												
10	L2	All MCs	20 (0.0	20 0	.0	0.098	4.6	LOS A	0.1	0.9	0.18	0.23	0.18	46.3
11	T1	All MCs	127 ⁻	1.7	127 1	.7	0.098	0.0	LOS A	0.1	0.9	0.18	0.23	0.18	47.9
12	R2	All MCs	40 (0.0	40 0	.0	0.098	6.2	LOS A	0.1	0.9	0.18	0.23	0.18	46.4
Appro	ach		187 <i>·</i>	1.1	187 1	.1	0.098	1.8	NA	0.1	0.9	0.18	0.23	0.18	47.4
All Vel	nicles		627 4	4.0	627 4	.0	0.165	4.3	NA	0.3	1.9	0.22	0.42	0.22	45.6

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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Site: 101 [EX PM - New England Hwy / Brook St (Site Folder:

Existing PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Existing PM (Network Folder: General)]

Signalised intersection of New England Highway / Brook Street Existing Conditions PM Peak Hour Period Site Category: (None) Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Vehic	le M	ovement	t Perfo	orma	nce										
Mov	Turn	Mov	Dem	nand	Ar	rival	Deg.	Aver.	Level of	Aver. Back	Of Queue	Prop.	Eff.	Aver.	Aver.
ט ו		Class	rا Total آ	IOWS HV 1	ا٦ Total آ	ows HV 1	Sath	Delay	Service	[Veh	Dist 1	Que	Stop Rate	NO. OT Cvcles	Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South	: New	England	Highwa	ay (S)										
1	L2	All MCs	89	1.2	89	1.2	0.384	16.6	LOS B	6.0	44.7	0.61	0.58	0.61	41.5
2	T1	All MCs	699	8.4	699	8.4	0.384	12.1	LOS A	6.0	44.7	0.61	0.55	0.61	42.7
3	R2	All MCs	168	0.0	168	0.0	*0.380	17.4	LOS B	2.4	16.8	0.72	0.72	0.72	34.2
Appro	ach		957	6.3	957	6.3	0.384	13.4	LOS A	6.0	44.7	0.62	0.58	0.62	41.6
East:	Brook	e Street (E)												
4	L2	All MCs	120	1.8	120	1.8	0.206	28.5	LOS B	2.4	16.7	0.76	0.74	0.76	31.5
5	T1	All MCs	48	0.0	48	0.0	0.138	34.1	LOS C	1.1	7.8	0.88	0.66	0.88	30.2
6	R2	All MCs	71	3.0	71	3.0	*0.261	40.0	LOS C	1.7	12.2	0.90	0.75	0.90	27.9
Appro	ach		239	1.8	239	1.8	0.261	33.0	LOS C	2.4	16.7	0.83	0.73	0.83	30.1
North:	New	England	Highwa	ay (N))										
7	L2	All MCs	73	0.0	73	0.0	0.097	21.9	LOS B	1.2	8.3	0.64	0.69	0.64	31.5
8	T1	All MCs	503	9.4	503	9.4	*0.341	20.2	LOS B	4.7	35.4	0.73	0.62	0.73	39.5
9	R2	All MCs	25	0.0	25	0.0	0.084	23.6	LOS B	0.4	3.0	0.64	0.67	0.64	37.7
Appro	ach		601	7.9	601	7.9	0.341	20.5	LOS B	4.7	35.4	0.71	0.63	0.71	38.8
West:	Brool	< Street (\	N)												
10	L2	All MCs	24	0.0	24	0.0	0.043	27.7	LOS B	0.5	3.2	0.72	0.68	0.72	35.6
11	T1	All MCs	57	0.0	57	0.0	0.095	23.6	LOS B	1.1	7.6	0.74	0.57	0.74	30.7
12	R2	All MCs	72	5.9	72	5.9	*0.229	31.3	LOS C	1.5	11.1	0.87	0.73	0.87	34.6
Appro	ach		153	2.8	153	2.8	0.229	27.9	LOS B	1.5	11.1	0.80	0.66	0.80	33.8
All Ve	hicles		1949	5.9	1949	5.9	0.384	19.1	LOS B	6.0	44.7	0.69	0.62	0.69	38.6

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.

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 Green.

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.

* Critical Movement (Signal Timing)

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Site: 101 [EX PM - Brook St / Sowerby St (Site Folder: Existing PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Existing PM (Network Folder: General)]

Roundabout intersection of Brook Street / Sowerby Street Existing Conditions PM Peak Hour Period Site Category: (None) Roundabout

Vehic	le M	ovemen	t Perfo	orma	nce										
Mov ID	Turn	Mov Class	Dem Fl [Total	nand lows HV]_	Ar Fl [Total	rival lows HV]_	Deg. Satn	Aver. Delay	Level of Service	Aver. Back	Of Queue Dist]	Prop. Que	Eff. Stop Rate	Aver. No. of Cycle <u>s</u>	Aver. Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m			,	km/h
South:	Sow	erby Stre	et (S)												
1	L2	All MCs	18	0.0	18	0.0	0.085	5.5	LOS A	0.2	1.3	0.51	0.59	0.51	42.4
2	T1	All MCs	38	0.0	38	0.0	0.085	5.4	LOS A	0.2	1.3	0.51	0.59	0.51	45.2
3	R2	All MCs	23	0.0	23	0.0	0.085	8.9	LOS A	0.2	1.3	0.51	0.59	0.51	42.4
3u	U	All MCs	1	0.0	1	0.0	0.085	10.5	LOS A	0.2	1.3	0.51	0.59	0.51	44.7
Approa	ach		80	0.0	80	0.0	0.085	6.5	LOS A	0.2	1.3	0.51	0.59	0.51	44.2
East: E	Brook	Street (E)												
4	L2	All MCs	13	0.0	13	0.0	0.241	4.7	LOS A	0.6	4.1	0.41	0.55	0.41	43.1
5	T1	All MCs	127	0.8	127	0.8	0.241	4.6	LOS A	0.6	4.1	0.41	0.55	0.41	35.5
6	R2	All MCs	119	0.0	119	0.0	0.241	8.0	LOS A	0.6	4.1	0.41	0.55	0.41	42.8
6u	U	All MCs	8	0.0	8	0.0	0.241	9.6	LOS A	0.6	4.1	0.41	0.55	0.41	35.5
Approa	ach		267	0.4	267	0.4	0.241	6.3	LOS A	0.6	4.1	0.41	0.55	0.41	40.8
North:	Sowe	erby Stree	et (N)												
7	L2	All MCs	80	0.0	80	0.0	0.077	5.2	LOS A	0.2	1.3	0.45	0.53	0.45	43.6
8	T1	All MCs	58	1.8	58	1.8	0.107	4.6	LOS A	0.3	2.0	0.44	0.55	0.44	45.0
9	R2	All MCs	64	3.3	64	3.3	0.107	8.2	LOS A	0.3	2.0	0.44	0.55	0.44	42.1
9u	U	All MCs	8	0.0	8	0.0	0.107	9.7	LOS A	0.3	2.0	0.44	0.55	0.44	44.5
Approa	ach		211	1.5	211	1.5	0.107	6.1	LOS A	0.3	2.0	0.45	0.54	0.45	43.8
West:	Brool	< Street (\	N)												
10	L2	All MCs	73	5.8	73	5.8	0.083	5.4	LOS A	0.1	1.1	0.33	0.55	0.33	43.8
11	T1	All MCs	166	0.6	166	0.6	0.170	4.3	LOS A	0.3	2.4	0.31	0.52	0.31	36.7
12	R2	All MCs	5	0.0	5	0.0	0.170	7.9	LOS A	0.3	2.4	0.31	0.52	0.31	43.4
12u	U	All MCs	43	0.0	43	0.0	0.170	9.4	LOS A	0.3	2.4	0.31	0.52	0.31	36.7
Approa	ach		287	1.8	287	1.8	0.170	5.4	LOS A	0.3	2.4	0.32	0.53	0.32	40.2
All Veh	nicles		845	1.1	845	1.1	0.241	6.0	LOS A	0.6	4.1	0.40	0.54	0.40	42.1

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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Site: 101 [EX PM - Carl St / Brook St (Site Folder: Existing PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Existing PM (Network Folder: General)]

Stop sign controlled intersection of Carl Street / Brook Street Existing Conditions PM Peak Hour Period Site Category: (None) Stop (Two-Way)

Vehic	le M	ovement	t Perfo	orma	nce										
Mov	Turn	Mov	Dem	hand	Ar	rival	Deg.	Aver.	Level of	Aver. Bac	k Of Queue	Prop.	Eff.	Aver.	Aver.
ט ו		Class	FI Total	IOWS	FI [Total	IOWS HV/ 1	Sath	Delay	Service	[Veh	Dist 1	Que	Stop Rate	NO. OT Cycles	Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m		, tato	0,000	km/h
South	Carl	Street (S)												
1	L2	All MCs	86	0.0	86	0.0	0.207	8.2	LOS A	0.3	2.4	0.43	0.88	0.43	40.2
2	T1	All MCs	66	1.6	66	1.6	0.207	11.4	LOS A	0.3	2.4	0.43	0.88	0.43	43.5
3	R2	All MCs	20	10.5	20	10.5	0.207	13.6	LOS A	0.3	2.4	0.43	0.88	0.43	43.5
Appro	ach		173	1.8	173	1.8	0.207	10.1	LOS A	0.3	2.4	0.43	0.88	0.43	42.3
East: I	Brook	Street (E	.)												
4	L2	All MCs	25	4.2	25	4.2	0.108	4.6	LOS A	0.1	0.4	0.06	0.12	0.06	48.0
5	T1	All MCs	172	0.6	172	0.6	0.108	0.0	LOS A	0.1	0.4	0.06	0.12	0.06	48.6
6	R2	All MCs	13	8.3	13	8.3	0.108	6.8	LOS A	0.1	0.4	0.06	0.12	0.06	48.3
Appro	ach		209	1.5	209	1.5	0.108	1.0	NA	0.1	0.4	0.06	0.12	0.06	48.5
North:	Carl	Street (N))												
7	L2	All MCs	16	0.0	16	0.0	0.103	8.1	LOS A	0.1	1.1	0.46	0.90	0.46	43.2
8	T1	All MCs	49	6.4	49	6.4	0.103	11.4	LOS A	0.1	1.1	0.46	0.90	0.46	43.1
9	R2	All MCs	7	0.0	7	0.0	0.103	12.8	LOS A	0.1	1.1	0.46	0.90	0.46	39.7
Appro	ach		73	4.3	73	4.3	0.103	10.8	LOS A	0.1	1.1	0.46	0.90	0.46	42.9
West:	Brool	< Street (\	N)												
10	L2	All MCs	22	0.0	22	0.0	0.148	4.6	LOS A	0.2	1.7	0.23	0.27	0.23	46.0
11	T1	All MCs	173	0.6	173	0.6	0.148	0.0	LOS A	0.2	1.7	0.23	0.27	0.23	47.5
12	R2	All MCs	82	0.0	82	0.0	0.148	6.1	LOS A	0.2	1.7	0.23	0.27	0.23	46.1
Appro	ach		277	0.4	277	0.4	0.148	2.2	NA	0.2	1.7	0.23	0.27	0.23	47.0
All Vel	nicles		732	1.4	732	1.4	0.207	4.6	NA	0.3	2.4	0.25	0.43	0.25	45.5

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.

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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Site: 101 [FU AM - New England Hwy / Brook St (Site Folder:

Future AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Future AM (Network Folder: General)]

Signalised intersection of New England Highway / Brook Street Future Conditions AM Peak Hour Period Site Category: (None) Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance Mov Turn Mov Demand Arrival Deg. Aver. Level of Aver. Back Of Queue P <u>rop. Eff. Aver. Aver.</u>															
Mov	Turn	Mov	Dem	nand	Ar	rival	Deg.	Aver.	Level of	Aver. Back	Of Queue	Prop.	Eff.	Aver.	Aver.
U		Class	Fi Total	IOWS HV 1	FI [Total	IOWS HV 1	Sath	Delay	Service	[Veh	Dist 1	Que	Stop Rate	NO. OT Cvcles	Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m			- ,	km/h
South	New	England	Highwa	ay (S)										
1	L2	All MCs	60	0.0	60	0.0	0.247	15.5	LOS B	3.4	26.4	0.55	0.53	0.55	42.0
2	T1	All MCs	433	14.4	433	14.4	0.247	11.0	LOS A	3.4	26.4	0.55	0.49	0.55	43.2
3	R2	All MCs	154	3.4	154	3.4	*0.342	17.5	LOS B	2.1	15.3	0.74	0.73	0.74	34.1
Appro	ach		646	10.4	646	10.4	0.342	13.0	LOS A	3.4	26.4	0.59	0.55	0.59	41.6
East: I	Brook	e Street (E)												
4	L2	All MCs	119	4.4	119	4.4	0.183	25.4	LOS B	2.2	15.8	0.72	0.73	0.72	32.7
5	T1	All MCs	58	0.0	58	0.0	0.164	34.3	LOS C	1.3	9.4	0.88	0.67	0.88	30.1
6	R2	All MCs	64	4.9	64	4.9	*0.238	39.8	LOS C	1.5	11.2	0.90	0.74	0.90	27.9
Appro	ach		241	3.5	241	3.5	0.238	31.4	LOS C	2.2	15.8	0.80	0.72	0.80	30.6
North:	New	England	Highwa	ay (N))										
7	L2	All MCs	126	2.5	126	2.5	0.192	25.5	LOS B	2.3	16.5	0.72	0.73	0.72	29.7
8	T1	All MCs	540	9.0	540	9.0	*0.421	24.9	LOS B	5.7	42.7	0.80	0.68	0.80	38.1
9	R2	All MCs	57	0.0	57	0.0	0.159	29.3	LOS C	1.1	7.4	0.71	0.71	0.71	36.5
Appro	ach		723	7.1	723	7.1	0.421	25.3	LOS B	5.7	42.7	0.78	0.69	0.78	36.9
West:	Brool	k Street (\	N)												
10	L2	All MCs	21	5.0	21	5.0	0.038	27.7	LOS B	0.4	2.9	0.72	0.67	0.72	35.6
11	T1	All MCs	43	2.4	43	2.4	0.073	23.4	LOS B	0.8	5.8	0.74	0.56	0.74	30.8
12	R2	All MCs	53	2.0	53	2.0	*0.163	30.7	LOS C	1.1	7.7	0.86	0.71	0.86	34.7
Appro	ach		117	2.7	117	2.7	0.163	27.5	LOS B	1.1	7.7	0.79	0.65	0.79	33.9
All Vel	nicles		1727	7.6	1727	7.6	0.421	21.7	LOS B	5.7	42.7	0.71	0.64	0.71	37.4

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.

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 Green.

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.

* Critical Movement (Signal Timing)

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V Site: 101 [FU AM - Brook St / Sowerby St (Site Folder: Future AM)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Future AM (Network Folder: General)]

Roundabout intersection of Brook Street / Sowerby Street Future Conditions AM Peak Hour Period Site Category: (None) Roundabout

Vehicle Movement Performance Mov Turn Mov Demand Arrival Deg. Aver. Level of Aver. Back Of Queue Prop. Eff. Aver. Aver.															
Mov	Turn	Mov	Dem	nand	Ar	rival	Deg.	Aver.	Level of	Aver. Back	Of Queue	e Prop.	Eff.	Aver.	Aver.
ID		Class	FI FIT-A-L	lows	FI	ows	Satn	Delay	Service	r \ / - I-	D:-+1	Que	Stop	No. of	Speed
			[IOTAI veh/h	HV]	l Iotai veh/h	HV J %	v/c	sec		l ven. veh	DIST J m		Rate	Cycles	km/h
South	Sow	erby Stre	et (S)	70	VON/IT	70	0,0	000		Von		_	_		1(11)/11
1	12	All MCs	12	0.0	12	0.0	0.066	56	LOSA	0.1	10	0.51	0.59	0.51	42.5
2	 T1	All MCs	36	0.0	36	0.0	0.066	5.5	LOSA	0.1	1.0	0.51	0.59	0.51	45.3
3	R2	All MCs	13	0.0	13	0.0	0.066	9.0	LOSA	0.1	1.0	0.51	0.59	0.51	42.5
3u	U	All MCs	1	0.0	1	0.0	0.066	10.5	LOSA	0.1	1.0	0.51	0.59	0.51	44.8
Appro	ach		61	0.0	61	0.0	0.066	6.3	LOSA	0.1	1.0	0.51	0.59	0.51	44.5
East: I	Brook	Street (E	=)												
4	L2	All MCs	20	0.0	20	0.0	0.274	4.4	LOS A	0.7	4.9	0.37	0.52	0.37	43.4
5	T1	All MCs	171	3.1	171	3.1	0.274	4.4	LOS A	0.7	4.9	0.37	0.52	0.37	36.1
6	R2	All MCs	127	3.3	127	3.3	0.274	7.8	LOS A	0.7	4.9	0.37	0.52	0.37	43.1
6u	U	All MCs	1	0.0	1	0.0	0.274	9.3	LOS A	0.7	4.9	0.37	0.52	0.37	36.1
Appro	ach		319	3.0	319	3.0	0.274	5.8	LOS A	0.7	4.9	0.37	0.52	0.37	41.0
North:	Sow	erby Stre	et (N)												
7	L2	All MCs	61	0.0	61	0.0	0.056	4.9	LOS A	0.1	0.9	0.40	0.51	0.40	43.8
8	T1	All MCs	41	2.6	41	2.6	0.077	4.4	LOS A	0.2	1.4	0.39	0.54	0.39	45.1
9	R2	All MCs	51	4.2	51	4.2	0.077	7.9	LOS A	0.2	1.4	0.39	0.54	0.39	42.2
9u	U	All MCs	5	0.0	5	0.0	0.077	9.4	LOS A	0.2	1.4	0.39	0.54	0.39	44.6
Appro	ach		158	2.0	158	2.0	0.077	5.9	LOS A	0.2	1.4	0.39	0.53	0.39	43.9
West:	Brool	< Street (W)												
10	L2	All MCs	64	9.8	64	9.8	0.074	5.3	LOS A	0.1	1.0	0.32	0.54	0.32	43.8
11	T1	All MCs	141	1.5	141	1.5	0.144	4.2	LOS A	0.3	2.0	0.30	0.51	0.30	36.9
12	R2	All MCs	11	0.0	11	0.0	0.144	7.8	LOS A	0.3	2.0	0.30	0.51	0.30	43.5
12u	U	All MCs	32	3.3	32	3.3	0.144	9.4	LOS A	0.3	2.0	0.30	0.51	0.30	36.9
Appro	ach		247	3.8	247	3.8	0.144	5.3	LOS A	0.3	2.0	0.30	0.52	0.30	40.6
All Vel	nicles		785	2.8	785	2.8	0.274	5.7	LOS A	0.7	4.9	0.36	0.53	0.36	42.1

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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Site: 101 [FU AM - Carl St / Brook St (Site Folder: Future AM)] Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Stop sign controlled intersection of Carl Street / Brook Street Future Conditions AM Peak Hour Period Site Category: (None) Stop (Two-Way)

Vehicle Movement Performance Mov Turn Mov Demand Arrival Deg. Aver. Level of Aver. Back Of Queue Prop. Eff. Aver. Aver.														
Mov	Turn	Mov	Demar	nd	Arrival	Deg.	Aver.	Level of	Aver. Bacl	k Of Queue	e Prop.	Eff.	Aver.	Aver.
שו		Class	Fiov Total H\	vs /] [Tot	Flows al HV 1	Sam	Delay	Service	[Veh	Dist 1	Que	Rate	Cvcles	Speed
			veh/h	% veh	h %	v/c	sec		veh	m				km/h
South:	Carl	Street (S)											
1	L2	All MCs	99 1	.1 9	9 1.1	0.168	8.3	LOS A	0.3	2.0	0.39	0.88	0.39	40.7
2	T1	All MCs	52 6	.1 5	2 6.1	0.168	11.2	LOS A	0.3	2.0	0.39	0.88	0.39	43.7
3	R2	All MCs	70	.0	7 0.0	0.168	11.6	LOS A	0.3	2.0	0.39	0.88	0.39	43.9
Appro	ach		158 2	.7 15	8 2.7	0.168	9.4	LOS A	0.3	2.0	0.39	0.88	0.39	42.3
East: I	Brook	Street (E)											
4	L2	All MCs	18 5	.9 1	8 5.9	0.123	4.6	LOS A	0.1	0.6	0.09	0.13	0.09	47.9
5	T1	All MCs	188 4	.5 18	8 4.5	0.123	0.0	LOS A	0.1	0.6	0.09	0.13	0.09	48.5
6	R2	All MCs	23 13	.6 2	3 13.6	0.123	6.4	LOS A	0.1	0.6	0.09	0.13	0.09	48.1
Appro	ach		229 5	.5 22	9 5.5	0.123	1.0	NA	0.1	0.6	0.09	0.13	0.09	48.4
North:	Carl	Street (N)											
7	L2	All MCs	11 10	.0 1	1 10.0	0.093	8.4	LOS A	0.1	1.0	0.45	0.90	0.45	43.1
8	T1	All MCs	43 12	.2 4	3 12.2	0.093	11.3	LOS A	0.1	1.0	0.45	0.90	0.45	43.0
9	R2	All MCs	11 0	.0 1	1 0.0	0.093	12.2	LOS A	0.1	1.0	0.45	0.90	0.45	39.7
Appro	ach		64 9	.8 6	4 9.8	0.093	11.0	LOS A	0.1	1.0	0.45	0.90	0.45	42.7
West:	Brool	k Street (\	N)											
10	L2	All MCs	20 0	.0 2	0.0	0.103	4.6	LOS A	0.1	0.9	0.18	0.22	0.18	46.4
11	T1	All MCs	139 1	.5 13	9 1.5	0.103	0.0	LOS A	0.1	0.9	0.18	0.22	0.18	48.0
12	R2	All MCs	40 0	.0 4	0.0	0.103	6.4	LOS A	0.1	0.9	0.18	0.22	0.18	46.5
Appro	ach		199 1	.1 19	9 1.1	0.103	1.7	NA	0.1	0.9	0.18	0.22	0.18	47.5
All Vel	nicles		651 3	.9 65	1 3.9	0.168	4.3	NA	0.3	2.0	0.22	0.41	0.22	45.7

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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Site: 101 [FU PM - New England Hwy / Brook St (Site Folder:

Future PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Future PM (Network Folder: General)]

Signalised intersection of New England Highway / Brook Street Future Conditions PM Peak Hour Period Site Category: (None) Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance Mov Turn Mov Demand Arrival Deg. Aver. Level of Aver. Back Of Queue Prop. Eff. Aver. Aver.															
Mov	Turn	Mov	Dem	hand	Ar	rival	Deg.	Aver.	Level of	Aver. Back	Of Queue	Prop.	Eff.	Aver.	Aver.
ט ו		Class	۲ Total آ	IOWS HV 1	۲۱ Total آ	ows HV 1	Sath	Delay	Service	[Veh.	Dist 1	Que	Stop Rate	NO. OT Cvcles	Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m			- ,	km/h
South	New	England	Highwa	ay (S)										
1	L2	All MCs	89	1.2	89	1.2	0.384	16.6	LOS B	6.0	44.7	0.61	0.58	0.61	41.5
2	T1	All MCs	699	8.4	699	8.4	0.384	12.1	LOS A	6.0	44.7	0.61	0.55	0.61	42.7
3	R2	All MCs	180	0.0	180	0.0	*0.409	17.5	LOS B	2.6	18.1	0.72	0.73	0.72	34.1
Appro	ach		968	6.2	968	6.2	0.409	13.5	LOS A	6.0	44.7	0.63	0.59	0.63	41.5
East: I	Brook	e Street (E)												
4	L2	All MCs	133	1.6	133	1.6	0.228	28.7	LOS C	2.6	18.6	0.77	0.75	0.77	31.4
5	T1	All MCs	48	0.0	48	0.0	0.138	34.1	LOS C	1.1	7.8	0.88	0.66	0.88	30.2
6	R2	All MCs	83	2.5	83	2.5	* 0.307	40.4	LOS C	2.0	14.4	0.91	0.76	0.91	27.7
Appro	ach		264	1.6	264	1.6	0.307	33.4	LOS C	2.6	18.6	0.83	0.73	0.83	29.9
North:	New	England	Highwa	ay (N))										
7	L2	All MCs	84	0.0	84	0.0	0.112	22.0	LOS B	1.4	9.7	0.65	0.70	0.65	31.4
8	T1	All MCs	503	9.4	503	9.4	*0.341	20.2	LOS B	4.7	35.4	0.73	0.62	0.73	39.5
9	R2	All MCs	25	0.0	25	0.0	0.084	23.6	LOS B	0.4	3.0	0.64	0.67	0.64	37.7
Appro	ach		613	7.7	613	7.7	0.341	20.6	LOS B	4.7	35.4	0.71	0.63	0.71	38.7
West:	Brool	< Street (\	N)												
10	L2	All MCs	24	0.0	24	0.0	0.043	27.7	LOS B	0.5	3.2	0.72	0.68	0.72	35.6
11	T1	All MCs	57	0.0	57	0.0	0.095	23.6	LOS B	1.1	7.6	0.74	0.57	0.74	30.7
12	R2	All MCs	72	5.9	72	5.9	*0.234	31.3	LOS C	1.5	11.1	0.87	0.73	0.87	34.6
Approach			153	2.8	153	2.8	0.234	27.9	LOS B	1.5	11.1	0.80	0.66	0.80	33.8
All Vel	nicles		1998	5.8	1998	5.8	0.409	19.4	LOS B	6.0	44.7	0.69	0.63	0.69	38.4

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.

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 Green.

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.

* Critical Movement (Signal Timing)

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V Site: 101 [FU PM - Brook St / Sowerby St (Site Folder: Future PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Future PM (Network Folder: General)]

Roundabout intersection of Brook Street / Sowerby Street Future Conditions PM Peak Hour Period Site Category: (None) Roundabout

Vehicle Movement Performance															
Mov	Turn	Mov	Dem	hand	Ar	rival	Deg.	Aver.	Level of	Aver. Back	Of Queue	Prop.	Eff.	Aver.	Aver.
שו		Class	Total	HV 1	וח [Total]	HV 1	Sam	Delay	Service	[Veh	Dist 1	Que	Rate	Cvcles	Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m		1 10.110	0,000	km/h
South	Sow	erby Stre	et (S)												
1	L2	All MCs	18	0.0	18	0.0	0.087	5.7	LOS A	0.2	1.3	0.52	0.60	0.52	42.3
2	T1	All MCs	38	0.0	38	0.0	0.087	5.5	LOS A	0.2	1.3	0.52	0.60	0.52	45.1
3	R2	All MCs	23	0.0	23	0.0	0.087	9.1	LOS A	0.2	1.3	0.52	0.60	0.52	42.3
3u	U	All MCs	1	0.0	1	0.0	0.087	10.6	LOS A	0.2	1.3	0.52	0.60	0.52	44.6
Appro	ach		80	0.0	80	0.0	0.087	6.7	LOS A	0.2	1.3	0.52	0.60	0.52	44.1
East:	Brook	Street (E	E)												
4	L2	All MCs	13	0.0	13	0.0	0.261	4.7	LOS A	0.6	4.5	0.42	0.54	0.42	43.2
5	T1	All MCs	152	0.7	152	0.7	0.261	4.6	LOS A	0.6	4.5	0.42	0.54	0.42	35.6
6	R2	All MCs	119	0.0	119	0.0	0.261	8.0	LOS A	0.6	4.5	0.42	0.54	0.42	42.9
6u	U	All MCs	8	0.0	8	0.0	0.261	9.6	LOS A	0.6	4.5	0.42	0.54	0.42	35.6
Approach			292	0.4	292	0.4	0.261	6.1	LOS A	0.6	4.5	0.42	0.54	0.42	40.6
North:	Sow	erby Stre	et (N)												
7	L2	All MCs	80	0.0	80	0.0	0.078	5.4	LOS A	0.2	1.4	0.47	0.54	0.47	43.5
8	T1	All MCs	57	0.0	57	0.0	0.107	4.7	LOS A	0.3	2.0	0.46	0.56	0.46	44.9
9	R2	All MCs	64	3.3	64	3.3	0.107	8.3	LOS A	0.3	2.0	0.46	0.56	0.46	42.0
9u	U	All MCs	8	0.0	8	0.0	0.107	9.8	LOS A	0.3	2.0	0.46	0.56	0.46	44.4
Appro	ach		209	1.0	209	1.0	0.107	6.3	LOS A	0.3	2.0	0.47	0.55	0.47	43.8
West:	Brool	k Street (W)												
10	L2	All MCs	73	5.8	73	5.8	0.087	5.5	LOS A	0.2	1.1	0.34	0.55	0.34	43.7
11	T1	All MCs	189	0.6	189	0.6	0.188	4.3	LOS A	0.4	2.7	0.32	0.52	0.32	36.8
12	R2	All MCs	5	0.0	5	0.0	0.188	7.9	LOS A	0.4	2.7	0.32	0.52	0.32	43.5
12u	U	All MCs	43	0.0	43	0.0	0.188	9.4	LOS A	0.4	2.7	0.32	0.52	0.32	36.8
Appro	ach		311	1.7	311	1.7	0.188	5.4	LOS A	0.4	2.7	0.32	0.52	0.32	40.1
All Ve	All Vehicles			0.9	892	0.9	0.261	5.9	LOS A	0.6	4.5	0.41	0.54	0.41	41.9

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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Site: 101 [FU PM - Carl St / Brook St (Site Folder: Future PM)] Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Future PM (Network Folder: General)]

Stop sign controlled intersection of Carl Street / Brook Street Future Conditions PM Peak Hour Period Site Category: (None) Stop (Two-Way)

Vehicle Movement Performance Mov Turn Mov Demand Arrival Deg. Aver. Level of Aver. Back Of Queue Prop. Eff. Aver. Aver.															
Mov	Turn	Mov	Den	hand	Ar	rival	Deg.	Aver.	Level of	Aver. Bac	k Of Queue	Prop.	Eff.	Aver.	Aver.
שו		Class	F Total	IOWS	۲۱ Total آ	iows HV/1	Sain	Delay	Service	[Veh	Dist 1	Que	Stop Rate	NO. OI Cycles	Speed
			veh/h	%	veh/h	%	v/c	sec		veh	m		- tato	0,000	km/h
South	: Carl	Street (S)												
1	L2	All MCs	86	0.0	86	0.0	0.212	8.3	LOS A	0.3	2.4	0.44	0.88	0.44	40.1
2	T1	All MCs	66	1.6	66	1.6	0.212	11.6	LOS A	0.3	2.4	0.44	0.88	0.44	43.4
3	R2	All MCs	20	10.5	20	10.5	0.212	14.0	LOS A	0.3	2.4	0.44	0.88	0.44	43.5
Appro	ach		173	1.8	173	1.8	0.212	10.2	LOS A	0.3	2.4	0.44	0.88	0.44	42.2
East:	Brook	Street (E	.)												
4	L2	All MCs	25	4.2	25	4.2	0.113	4.6	LOS A	0.1	0.4	0.06	0.12	0.06	48.0
5	T1	All MCs	182	0.6	182	0.6	0.113	0.0	LOS A	0.1	0.4	0.06	0.12	0.06	48.7
6	R2	All MCs	13	8.3	13	8.3	0.113	7.0	LOS A	0.1	0.4	0.06	0.12	0.06	48.3
Appro	ach		220	1.4	220	1.4	0.113	0.9	NA	0.1	0.4	0.06	0.12	0.06	48.5
North:	Carl	Street (N))												
7	L2	All MCs	16	0.0	16	0.0	0.105	8.2	LOS A	0.2	1.1	0.47	0.91	0.47	43.1
8	T1	All MCs	49	6.4	49	6.4	0.105	11.6	LOS A	0.2	1.1	0.47	0.91	0.47	43.0
9	R2	All MCs	7	0.0	7	0.0	0.105	13.1	LOS A	0.2	1.1	0.47	0.91	0.47	39.5
Appro	ach		73	4.3	73	4.3	0.105	11.0	LOS A	0.2	1.1	0.47	0.91	0.47	42.8
West:	Brool	< Street (\	N)												
10	L2	All MCs	22	0.0	22	0.0	0.154	4.6	LOS A	0.2	1.7	0.23	0.27	0.23	46.0
11	T1	All MCs	183	0.6	183	0.6	0.154	0.0	LOS A	0.2	1.7	0.23	0.27	0.23	47.6
12	R2	All MCs	82	0.0	82	0.0	0.154	6.3	LOS A	0.2	1.7	0.23	0.27	0.23	46.1
Appro	Approach			0.4	287	0.4	0.154	2.1	NA	0.2	1.7	0.23	0.27	0.23	47.0
All Ve	All Vehicles		753	1.4	753	1.4	0.212	4.5	NA	0.3	2.4	0.25	0.43	0.25	45.5

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.

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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ANNEXURE D: TCS PLANS (1 SHEET)



	1					i	
5		6			7	8	
Wiring Chart	VV0506-10			Date:		DATE	
Cable Installation	VV0506-9					02/03/1993	
Type 5 Mast Arm	VM211-6			Recommended for	or approval.		
Type 2 Posts	VM202-1			Passed	T KEATING	_	BRIDGE AN
Det Schedule Explanation	VD018-10			Checked		DIVISIONAL ENGINEER	0.11.3 NLV
Presence Detectors	VC005-17			Designed	J MCBLANE		
Standard Positioning	VD001-5			UBD Reference	Muswel'brk E4		SHIRE (
Symbols & Abbreviations	VD003-6	Construction Plans:	RC.3748	FLD DATA	DIGITISED		
	REFEREN	NCE PLANS		DATE	01.93	APPROVED	ROADS AND
				SURVEYOR	DESIGN		



ANNEXURE E: PHASE TIMES (1 SHEET)

Phasing Review

Review Completed By: Monique Date of Review Completed: 30/05/2023

New England Hwy / Brook St

Multiply Factor 86400

End

Start Start of Green End of Red (Start of next Green)



C phase

AM Peak	8:15AM - 9:15AM
AM Watched	8:45AM - 9:00AM

AM	Sta	t	Finish	Time (Sec)	Start	Finish	Time (Sec)	Start	Finish	Time (Sec)	Start	Finish	Time (Sec)	Start	Finish	Time (Sec)		Cycle Time (sec)
Phase	Α				D			E			F			F1				
1	L	8:45:49 AM	8:46:56 AM	67	8:46:56 AM	8:47:10 AM	14	8:47:10 AM	8:47:24 AM	14	8:47:24 AM	8:47:24 AM	0	8:47:24 AM	8:47:24 AM	0		95
2	2	8:47:24 AM	8:48:27 AM	63	8:48:27 AM	8:48:39 AM	12	8:48:39 AM	8:48:56 AM	17	8:48:56 AM	8:48:56 AM	0	8:48:56 AM	8:49:13 AM	17		109
3	3	8:49:13 AM	8:49:56 AM	43	8:49:56 AM	8:49:56 AM	0	8:49:56 AM	8:50:19 AM	23	8:50:19 AM	8:50:19 AM	0	8:50:19 AM	8:50:37 AM	18		84
4	ţ	8:50:37 AM	8:51:28 AM	51	8:51:28 AM	8:51:44 AM	16	8:51:44 AM	8:51:57 AM	13	8:51:57 AM	8:51:57 AM	0	8:51:57 AM	8:52:15 AM	18		98
5	5	8:52:15 AM	8:52:57 AM	42	8:52:57 AM	8:53:08 AM	11	8:53:08 AM	8:53:32 AM	24	8:53:32 AM	8:53:50 AM	18	8:53:50 AM	8:53:50 AM	0		95
6	5	8:53:50 AM	8:54:23 AM	33	8:54:23 AM	8:54:35 AM	12	8:54:35 AM	8:54:51 AM	16	8:54:51 AM	8:54:51 AM	0	8:54:51 AM	8:55:09 AM	18		79
7	7	8:55:09 AM	8:55:53 AM	44	8:55:53 AM	8:56:07 AM	14	8:56:07 AM	8:56:20 AM	13	8:56:20 AM	8:56:38 AM	18	8:56:38 AM	8:56:38 AM	0		89
8	3	8:56:38 AM	8:57:25 AM	47	8:57:25 AM	8:57:25 AM	0	8:57:25 AM	8:57:46 AM	21	8:57:46 AM	8:57:46 AM	0	8:57:46 AM	8:58:07 AM	21		89
9	Ð	8:58:07 AM	8:58:54 AM	47	8:58:54 AM	8:59:08 AM	14	8:59:08 AM	8:59:30 AM	22	8:59:30 AM	8:59:30 AM	0	8:59:30 AM	8:59:48 AM	18		101
10	D	8:59:48 AM	9:00:26 AM	38	9:00:26 AM	9:00:26 AM	0	9:00:26 AM	9:00:51 AM	25	9:00:51 AM	9:00:51 AM	0	9:00:51 AM	9:01:08 AM	17		80
			Min	33		Min	0		Min	13		Min	0		Min	0	Min	79
			Max	67		Max	16		Max	25		Max	18		Max	21	Max	109
			Average	47.5		Average	13.28571429		Average	18.8		Average	18		Average	18.14286	Average	91.9
			Occurrence	100%		Occurrence	70%		Occurrence	100%		Occurrence	20%		Occurrence	70%		

- PM Peak 4:00-5:00pm
- AM Watched 4:15-4:30pm

PM	Star	t Fii	nish	Time (Sec)	Start	Finish	Time (Sec)		Cycle Time (sec)									
Phase	Α				D			E			F			F1				
1		4:14:15 PM	4:15:38 PM	83	4:15:38 PM	4:15:51 PM	13	4:15:51 PM	4:16:15 PM	24	4:16:15 PM	4:16:15 PM	0	4:16:15 PM	4:16:15 PM	0		120
2		4:16:15 PM	4:17:07 PM	52	4:17:07 PM	4:17:07 PM	0	4:17:07 PM	4:17:32 PM	25	4:17:32 PM	4:17:32 PM	0	4:17:32 PM	4:17:52 PM	20		97
3		4:17:52 PM	4:18:40 PM	48	4:18:40 PM	4:18:53 PM	13	4:18:53 PM	4:19:11 PM	18	4:19:11 PM	4:19:11 PM	0	4:19:11 PM	4:19:24 PM	13		92
4		4:19:24 PM	4:20:09 PM	45	4:20:09 PM	4:20:09 PM	0	4:20:09 PM	4:20:34 PM	25	4:20:34 PM	4:20:34 PM	0	4:20:34 PM	4:20:34 PM	0		70
5		4:20:34 PM	4:21:39 PM	65	4:21:39 PM	4:21:55 PM	16	4:21:55 PM	4:22:20 PM	25	4:22:20 PM	4:22:20 PM	0	4:22:20 PM	4:22:20 PM	0		106
6		4:22:20 PM	4:23:10 PM	50	4:23:10 PM	4:23:10 PM	0	4:23:10 PM	4:23:35 PM	25	4:23:35 PM	4:23:35 PM	0	4:23:35 PM	4:23:55 PM	20		95
7		4:23:55 PM	4:24:40 PM	45	4:24:40 PM	4:24:54 PM	14	4:24:54 PM	4:25:10 PM	16	4:25:10 PM	4:25:10 PM	0	4:25:10 PM	4:25:25 PM	15		90
8		4:25:25 PM	4:26:10 PM	45	4:26:10 PM	4:26:10 PM	0	4:26:10 PM	4:26:35 PM	25	4:26:35 PM	4:26:35 PM	0	4:26:35 PM	4:26:35 PM	0		70
9		4:26:35 PM	4:27:40 PM	65	4:27:40 PM	4:27:53 PM	13	4:27:53 PM	4:28:18 PM	25	4:28:18 PM	4:28:18 PM	0	4:28:18 PM	4:28:33 PM	15		118
10		4:28:33 PM	4:29:10 PM	37	4:29:10 PM	4:29:10 PM	0	4:29:10 PM	4:29:25 PM	15	4:29:25 PM	4:29:25 PM	0	4:29:25 PM	4:29:43 PM	18	I	70
		м	lin	37		Min	0		Min	15		Min	0		Min	0	Min	70
		М	lax	83		Max	16		Max	25		Max	0		Max	20	Max	120
		Av	verage	53.5		Average	13.8		Average	22.3		Average	0		Average	16.83333	Average	92.8
		00	ccurrence	100%		Occurrence	50%		Occurrence	100%		Occurrence	0%		Occurrence	60%		

F2 phase



ANNEXURE F: SWEPT PATH TESTING (2 SHEETS)



AUSTRALIAN STANDARD 85TH PERCENTILE SIZE VEHICLE (B85)



Tested @ 5-km/h internally; 10-km/h on public roads.



TWO-WAY PASSING BETWEEN A B85 / B99 AT THE SITE BOUNDARY Successful



B85 CIRCULATION OF SITE USING TURNING BAY Successful