PROPOSED PLACE OF WORSHIP DEVELOPMENT

53 Dwyer Road in Bringelly

Traffic and Parking Impact Report

Prepared for: Sasanadhaja Temple Pty Ltd

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1. INTRODUCTION

ML Traffic Engineers was commissioned by Sasanadhaja Temple Pty Ltd d to undertake a traffic and parking impact assessment of a proposed Place of Worship at 53 Dwyer Road in Bringelly an. The site is currently a residential dwelling.

This traffic report focuses on the proposed development and changes in car usage and car park utilisation and additional trips from the proposed development.

In the course of preparing this assessment, the subject site and its environments have been inspected, plans of the development examined, and all relevant traffic and parking data collected and analysed.

2. BACKGROUND AND EXISTING CONDITIONS OF THE PROPOSED LOCATION

2.1 Location and Land Use

The proposed Place of Worship development is located on Dwyer Road in a rural area where housing is on large rural blocks.

Figure 1 and 2 shows the site from an aerial and street map respectively.

Figure 3 shows the development site from Dwyer Road.

Figure 1: Location of the Subject Site on Aerial

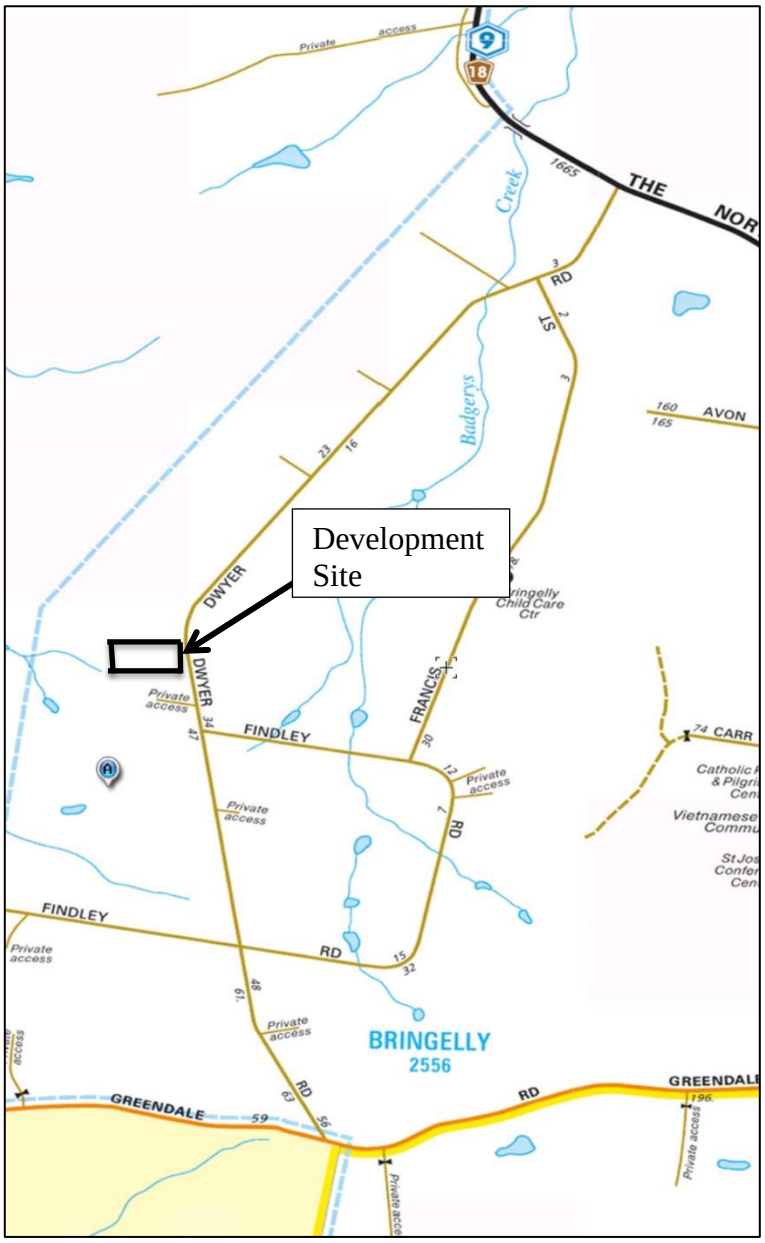

Figure 2: Street Map of the Location of the Development Site

Figure 3: Place of Worship Site from Dwyer Road

2.2 Road Network

This section describes the roads near the proposed development.

Dwyer Road is a rural road adjacent to the development with one lane each with a sign posted speed limit of 80km/hr with a road shoulder. A double barrier centre line is present on Dwyer Road adjacent to the proposed Place of Worship. Figure 4 presents a photograph of Dwyer Road near the development site.

Figure 4: Dwyer Road adjacent to the Development Site

2.3 Public Parking Opportunities

No public parking is provided near the proposed Place of Worship. Parking on the road shoulder is not acceptable since it poses a traffic hazard to passing cars.

2.4 Intersection Description

As part of the traffic assessment, two intersections are assessed:

- Priority intersection of The Northern Road with Dwyer Road
- Priority intersection of Greendale Road with Dwyer Road

External traffic travelling to and from the development site will most likely need to travel through this intersection.

The priority intersection of The Northern Road with Dwyer Road is a three-leg intersection with drivers from Dwyer Road need to give way to traffic on The Northern Road. Figure 5 shows the layout of this intersection using SIDRA – an industry standard intersection assessment software package.

The priority intersection of Greendale Road with Dwyer Road is a three leg intersection with drivers from Dwyer Road need to give way to traffic on Greendale Road. Figure 6 shows the layout of this intersection using SIDRA.

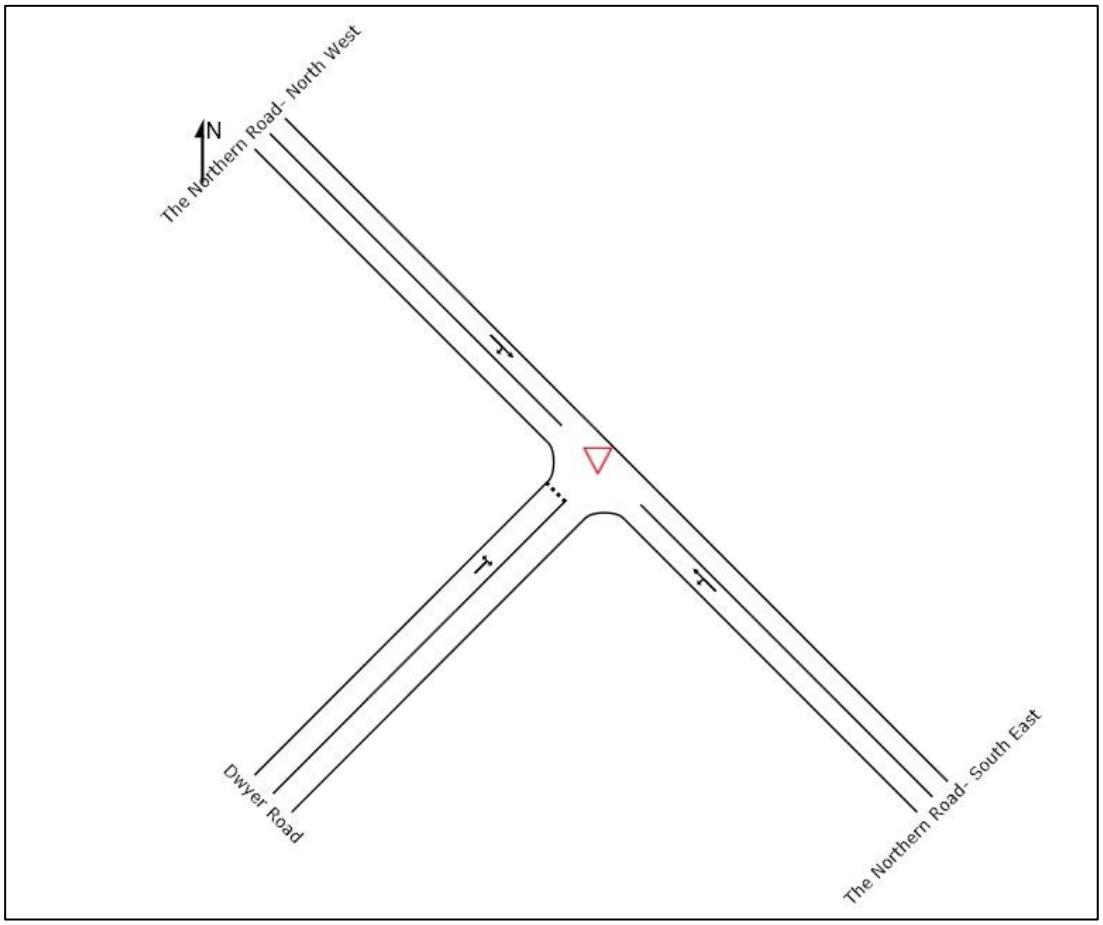

Figure 5: Priority Intersection of The Northern Road with Dwyer Road (SIDRA)

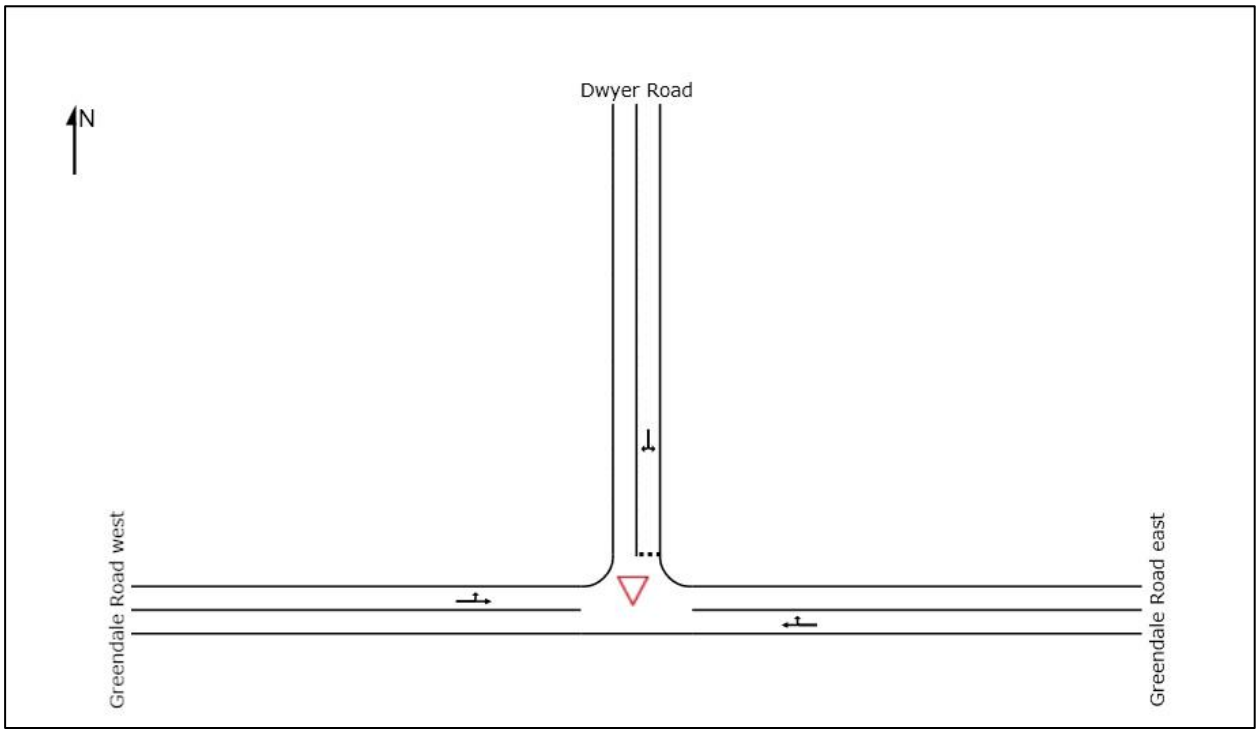

Figure 6: Priority Intersection of Greendale Road with Dwyer Road (SIDRA)

2.5 Existing Traffic Volumes

As part of the traffic assessment, traffic counts have been undertaken at the two intersections for Saturday 8am to 9am and Saturday 4pm to 5pm for an event held on Saturday (twice a month) where typically 25 people maximum are in attendance. In a typical month, this time period will have the highest attendance. The traffic counts were undertaken on Saturday 16th August 2014. The Place of Worship will have special events six times a year on a weekend between 9am and 3pm.

The following Figures present the traffic volumes in vehicles for the Saturday peak hours.

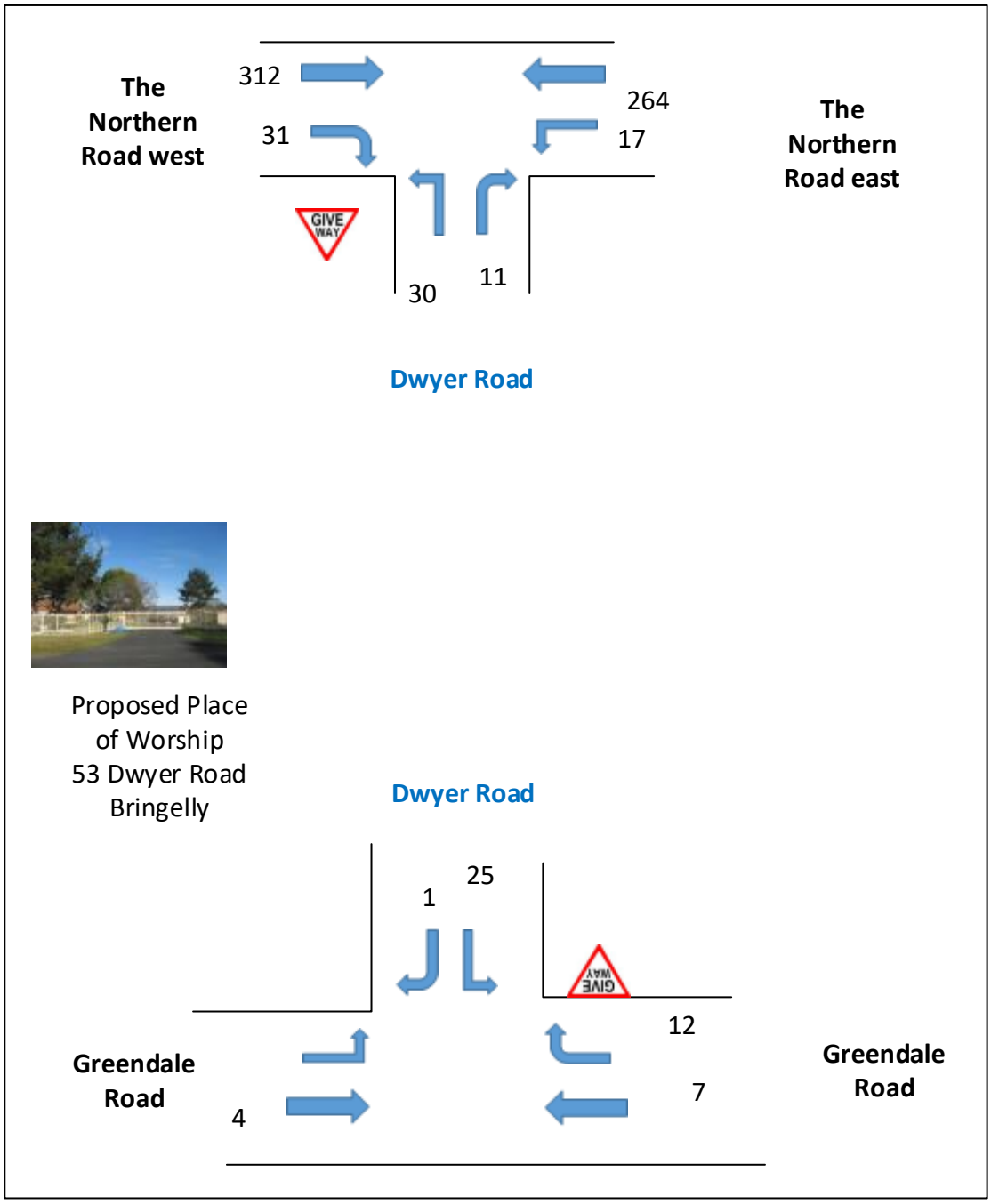

Figure 7: Existing Saturday Traffic Volumes 8am to 9am (arrival hour)

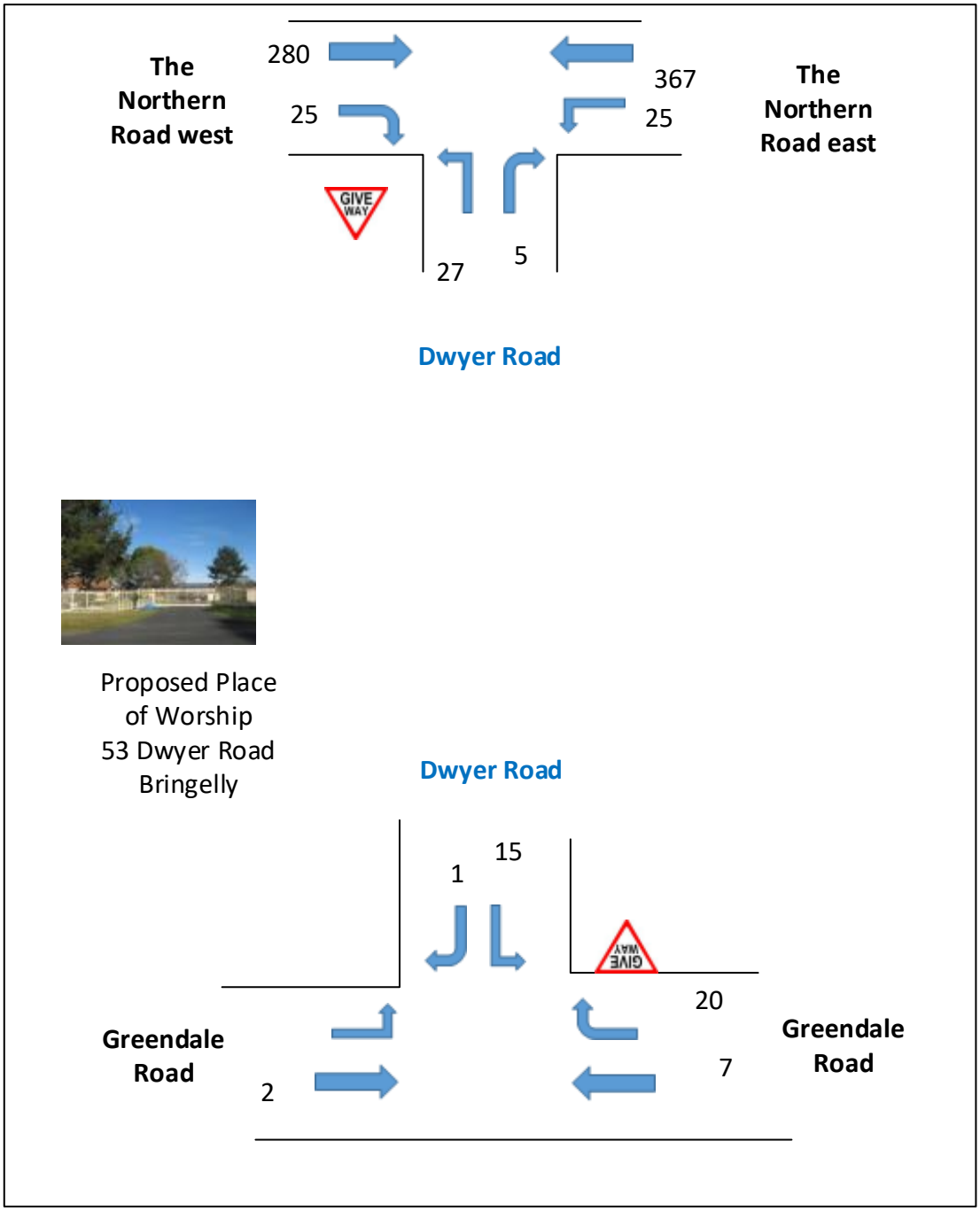

Figure 9: Existing Saturday Traffic Volumes 4pm to 5pm (departure hour)

2.6 Intersection Assessment

An intersection assessment has been undertaken of the two intersections.

The existing intersection operating performance was assessed using the SIDRA software package (version 6) to determine the Degree of Saturation (DS), Average Delay (AVD in seconds) and Level of Service (LoS) at each intersection. The SIDRA program provides Level of Service Criteria Tables for various intersection types. The key indicator of intersection performance is Level of Service, where results are placed on a continuum from 'A' to 'F', as shown in Table 1.

LoS	**Traffic Signal / Roundabout**	**Give Way / Stop Sign / T-Junction control**
A	Good operation	Good operation
B	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	Satisfactory	Satisfactory, but accident study required
D	Operating near capacity	Near capacity & accident study required
E	At capacity, at signals incidents will cause excessive delays.	At capacity, requires other control mode
F	Unsatisfactory and requires additional capacity, Roundabouts require other control mode	At capacity, requires other control mode

Table 1: Intersection Level of Service

The Average Vehicle Delay (AVD) provides a measure of the operational performance of an intersection as indicated below, which relates AVD to LOS. The AVD's should be taken as a guide only as longer delays could be tolerated in some locations (i.e. inner city conditions) and on some roads (i.e. minor side street intersecting with a major arterial route). For traffic signals, the average delay over all movements should be taken. For roundabouts and priority control intersections (sign control) the critical movement for level of service assessment should be that movement with the highest average delay.

LoS	Average Delay per Vehicles (seconds/vehicle)
A	Less than 14
B	15 to 28
C	29 to 42
D	43 to 56
E	57 to 70
F	>70

Table 2: Intersection Average Delay (AVD)

The degree of saturation (DS) is another measure of the operational performance of individual intersections. For intersections controlled by traffic signals both queue length and delay increase rapidly as DS approaches 1. It is usual to attempt to keep DS to less than 0.9. Degrees of Saturation in the order of 0.7 generally represent satisfactory intersection operation. When DS exceed 0.9 queues can be anticipated.

The results of the intersection analysis are as follows:

Priority intersection of The Northern Road with Dwyer Road

- All turn movements have a LoS of A or B for the AM peak hour
- All turn movements have a LoS of A, B or C for the PM peak hou
- There is spare capacity at this intersection in both peak hours

Priority intersection of Greendale Road with Dwyer Road

- All turn movements have a LoS of A for both peak hours
- There is spare capacity at this intersection in both peak hours

The full Sidra results are presented in Appendix A.

2.7 Public Transport

The proposed Place of Worship development does not have access to public transport.

2.8 Conclusions on the Existing Conditions

The proposed Place of Worship is located in an area where there is no public parking or public transport.

The nearby intersection overall performs well with spare capacity to accommodate additional traffic.

3. PROPOSED PLACE OF WORSHIP DEVELOPMENT

The land uses for the proposed development are as follows:

Infrastructure

- The total gross floor area (GFA) of the development is 657.86 m^2
  - The main shine GFA is 440.50 m^2
  - The kitchen GFA is 131.3 m^2
- Storage area
- Toilets
- Reception area

Operation details (Typical week without a special event)

- The weekday activities typically involve no more than six people on site between 9am and 3pm
- On a typical weekend (no special event) a maximum of 25 people is in attendance between 9am and 4pm

Operation details (Special event on the weekend)

- The weekday activities typically involve no more than six people on site between 9am and 3pm
- On a typical weekend a maximum of 95 people is in attendance

A full scaled plan of the proposed development is provided as part of the Development Application.

4. PARKING CONSIDERATIONS

4.1 Liverpool City Council Planning Scheme for Car Parking

The car parking requirements for most land uses but not for the Place of Worship apartment are presented in Council's Development Control Plan.

As part of the project, a travel mode survey of the existing congregation was undertaken for the assessment a special event (75 in attendance) and a typical event. The survey forms can be made available for verification. The results showed the following:

- Average of 3.1 persons per car for typical events
- Average of 4.75 people per car for a special event

A special event will have a maximum of 95 people present and generate a car parking demand of 20 cars.

A typical event has a maximum of 25 people present and generate a car parking demand of 8 cars.

The details of the car parking spaces of the proposed Place of Worship are as follows:

- 28 single car spaces
- 2 disabled car spaces
- A total of 30 car spaces plus;
- 17 extra car spaces in the overflow parking area (for special events)

The proposed development will provide 30 on site car spaces and has sufficient car spaces to accommodate a typical and special event without parking overspilling into Dwyer Road.

5. VEHICLE TRAFFIC IMPACT CONSIDERATIONS

5.1 Traffic Generation

The RTA Guide to Traffic Generating Developments provides typical trip rates for most land uses but not for Place of Worships.

The trip rate and distribution is derived from the car parking assessment (see section 4.1) with the trip rates are as follows for a special event for a worst case scenario:

Arrival hour

- 47 arrival cars

Departure hour

- 47 departing cars

5.2 Traffic Volumes

The additional development trips are assigned onto the local traffic network. The following figures present the existing with the development trips (in red for origin trips and blue for destination trips) for the respective peak hours. The trip distribution is based on information provided by the Place of Worship.

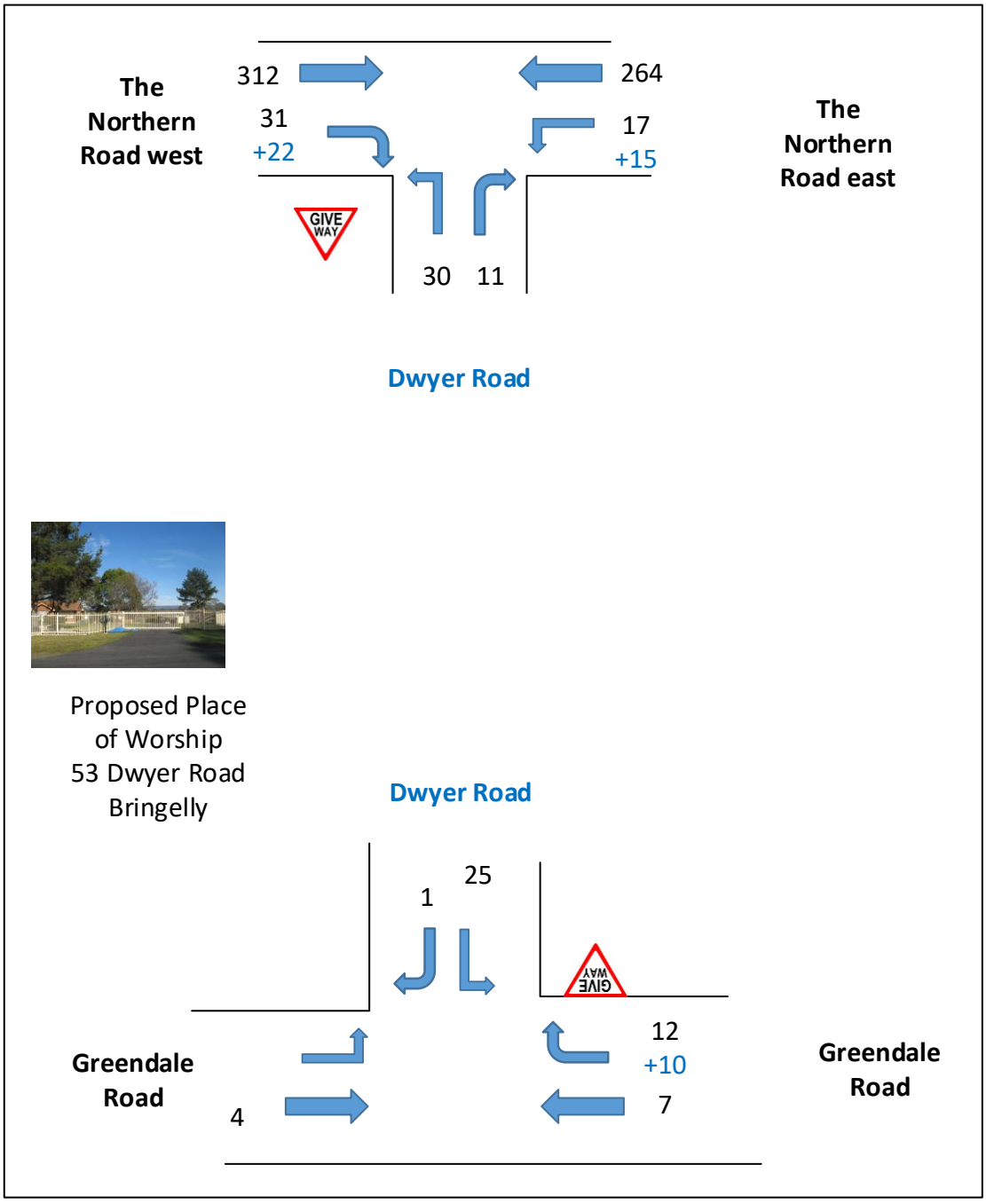

Figure 10: Saturday 8am to 9am Arrival Hour Traffic Volumes (Development Origin Trips in Red and Destination Trips in Blue)

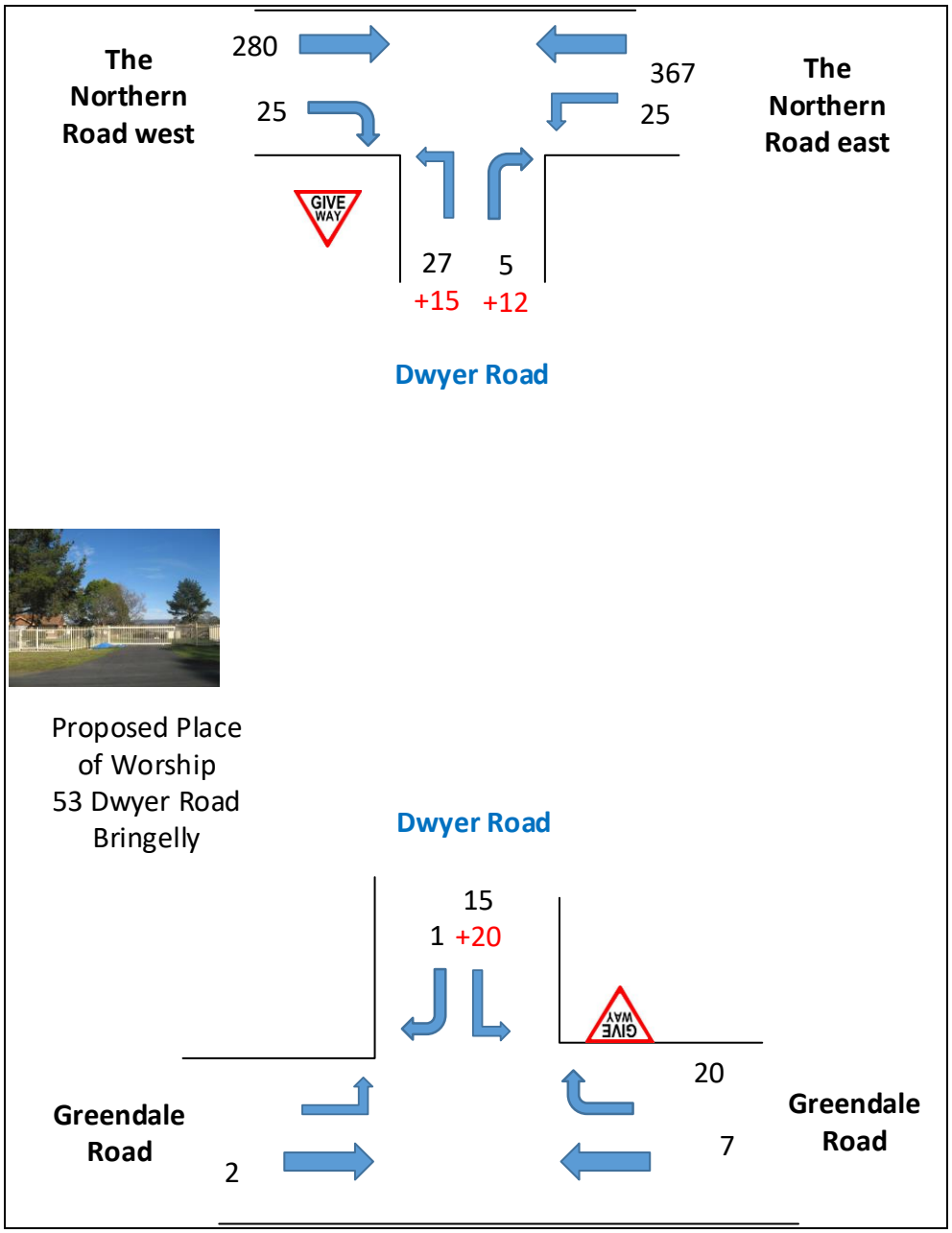

Figure 11: Saturday 4pm to 5pm Departure Peak Hour Traffic Volumes (Development Origin Trips in Red and Destination Trips in Blue)

5.3 Intersection Assessment

An intersection assessment has been undertaken for the three intersections on Bringelly Road.

The results of the intersection analysis are as follows:

Priority intersection of The Northern Road with Dwyer Road

- All turn movements have a LoS of A or B for the AM peak hour
- All turn movements have a LoS of A, B or C for the PM peak hour
- The additional traffic generated by the development does not change the existing LoS for the overall intersection or for any turn movement for either peak hours

Priority intersection of Greendale Road with Dwyer Road

- All turn movements have a LoS of A for both peak hours
- The additional traffic generated by the development does not change the existing LoS for the overall intersection or for any turn movement for either peak hours

Overall the development trips do not have a noticeable impact on the nearby intersections.

The full Sidra results with the development traffic are presented in Appendix B. The Sidra results for the existing conditions are presented in Appendix A.

6. CONCLUSIONS

Based on the considerations presented in this report, it is considered that:

Parking

- The proposed development provides 30 car spaces on site
- Based on the existing levels of car usage and the number of people per car (for a typical and a special event), there are sufficient number of on-site car spaces to accommodate all car parking demand
- No parking overspill will occur into public areas

Traffic

- The proposed development is a modest trip generator for the weekday and weekend peak hours.
- The additional trips from the proposed development can be accommodated at the nearby intersection without noticeably affecting intersection performance, delays or queues.
- There are no traffic engineering reasons why a planning permit for the proposed Place of Worship at 53 Dwyer Road, in Bringelly, should be refused.

APPENDIX A

SIDRA Intersection Results for Existing Traffic Conditions

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: The Northern Road- South East											
21	L2	17	0.0	0.145	6.3	LOS A	0.0	0.0	0.00	0.04	65.7
22	T1	264	0.0	0.145	0.0	LOS A	0.0	0.0	0.00	0.04	68.9
Approach		281	0.0	0.145	0.4	NA	0.0	0.0	0.00	0.04	68.7
NorthWest: The Northern Road- North West											
28	T1	312	0.0	0.215	0.9	LOS A	0.8	5.3	0.15	0.06	67.4
29	R2	31	0.0	0.215	10.0	LOS B	0.8	5.3	0.15	0.06	60.1
Approach		343	0.0	0.215	1.7	NA	0.8	5.3	0.15	0.06	66.6
SouthWest: Dwyer Road											
30	L2	30	0.0	0.068	6.0	LOS A	0.2	1.7	0.45	0.64	44.6
32	R2	11	0.0	0.068	14.1	LOS B	0.2	1.7	0.45	0.64	44.3
Approach		41	0.0	0.068	8.2	LOS A	0.2	1.7	0.45	0.64	44.5
All Vehicles		665	0.0	0.215	1.5	NA	0.8	5.3	0.11	0.09	65.4

Table A1: Saturday Intersection Performance of The Northern Road with Dwyer Road 8am to 9am

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Greendale Road east											
5	T1	7	0.0	0.010	0.0	LOS A	0.0	0.3	0.03	0.38	56.7
6	R2	12	0.0	0.010	5.5	LOS A	0.0	0.3	0.03	0.38	54.6
Approach		19	0.0	0.010	3.5	NA	0.0	0.3	0.03	0.38	55.4
North: Dwyer Road											
7	L2	25	0.0	0.016	4.6	LOS A	0.1	0.4	0.03	0.52	46.6
9	R2	1	0.0	0.016	4.6	LOS A	0.1	0.4	0.03	0.52	46.1
Approach		26	0.0	0.016	4.6	LOS A	0.1	0.4	0.03	0.52	46.6
West: Greendale Road west											
10	L2	1	0.0	0.003	4.6	LOS A	0.0	0.0	0.00	0.11	48.9
11	T1	4	0.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.11	49.4
Approach		5	0.0	0.003	0.9	NA	0.0	0.0	0.00	0.11	49.3
All Vehicles		50	0.0	0.016	3.8	NA	0.1	0.4	0.03	0.42	49.8

Table A2: Saturday Intersection Performance of Greendale Road with Dwyer Road and Raby Road 8am to 9am

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: The Northern Road- South East											
21	L2	25	0.0	0.202	6.3	LOS A	0.0	0.0	0.00	0.04	65.6
22	T1	367	0.0	0.202	0.0	LOS A	0.0	0.0	0.00	0.04	68.8
Approach		392	0.0	0.202	0.4	NA	0.0	0.0	0.00	0.04	68.6
NorthWest: The Northern Road- North West											
28	T1	280	0.0	0.198	1.4	LOS A	0.8	5.6	0.18	0.06	66.6
29	R2	25	0.0	0.198	12.3	LOS B	0.8	5.6	0.18	0.06	59.5
Approach		305	0.0	0.198	2.3	NA	0.8	5.6	0.18	0.06	66.0
SouthWest: Dwyer Road											
30	L2	27	0.0	0.053	6.7	LOS A	0.2	1.3	0.49	0.66	44.6
32	R2	5	0.0	0.053	16.0	LOS C	0.2	1.3	0.49	0.66	44.3
Approach		32	0.0	0.053	8.1	LOS A	0.2	1.3	0.49	0.66	44.5
All Vehicles		729	0.0	0.202	1.6	NA	0.8	5.6	0.10	0.07	65.9

Table A3: Saturday Intersection Performance of The Northern Road with Dwyer Road 4pm-5pm

Movement Performance - Vehicles												
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Greendale Road east											
5	T1	7	0.0	0.015	0.0	LOS A	0.1	0.5	0.02	0.44	56.2
6	R2	20	0.0	0.015	5.5	LOS A	0.1	0.5	0.02	0.44	54.2
Approach		27	0.0	0.015	4.0	NA	0.1	0.5	0.02	0.44	54.7
North: Dwyer Road											
7	L2	25	0.0	0.016	4.6	LOS A	0.1	0.4	0.02	0.52	46.6
9	R2	1	0.0	0.016	4.6	LOS A	0.1	0.4	0.02	0.52	46.2
Approach		26	0.0	0.016	4.6	LOS A	0.1	0.4	0.02	0.52	46.6
West: Greendale Road west											
10	L2	1	0.0	0.002	4.6	LOS A	0.0	0.0	0.00	0.18	48.5
11	T1	2	0.0	0.002	0.0	LOS A	0.0	0.0	0.00	0.18	49.0
Approach		3	0.0	0.002	1.5	NA	0.0	0.0	0.00	0.18	48.8
All Vehicles		56	0.0	0.016	4.2	NA	0.1	0.5	0.02	0.46	50.3

Table A4: Saturday Intersection Performance of Greendale Road with Dwyer Road and Raby Road 4pm-5pm

APPENDIX B

SIDRA Intersection Results for Existing and Development Traffic Conditions

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: The Northern Road- South East											
21	L2	32	0.0	0.153	6.3	LOS A	0.0	0.0	0.00	0.07	65.0
22	T1	264	0.0	0.153	0.0	LOS A	0.0	0.0	0.00	0.07	68.0
Approach		296	0.0	0.153	0.7	NA	0.0	0.0	0.00	0.07	67.7
NorthWest: The Northern Road- North West											
28	T1	312	0.0	0.256	1.5	LOS A	1.3	9.1	0.25	0.10	65.7
29	R2	53	0.0	0.256	10.5	LOS B	1.3	9.1	0.25	0.10	58.8
Approach		365	0.0	0.256	2.8	NA	1.3	9.1	0.25	0.10	64.6
SouthWest: Dwyer Road											
30	L2	30	0.0	0.071	6.0	LOS A	0.2	1.7	0.46	0.65	44.4
32	R2	11	0.0	0.071	15.0	LOS B	0.2	1.7	0.46	0.65	44.1
Approach		41	0.0	0.071	8.4	LOS A	0.2	1.7	0.46	0.65	44.4
All Vehicles		702	0.0	0.256	2.3	NA	1.3	9.1	0.16	0.12	64.1

Table B1: Saturday Intersection Performance of The Northern Road with Dwyer Road 8am to 9am with Place of Worship Traffic

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Greendale Road east											
5	T1	7	0.0	0.016	0.0	LOS A	0.1	0.5	0.03	0.45	56.1
6	R2	22	0.0	0.016	5.5	LOS A	0.1	0.5	0.03	0.45	54.1
Approach		29	0.0	0.016	4.1	NA	0.1	0.5	0.03	0.45	54.5
North: Dwyer Road											
7	L2	25	0.0	0.016	4.6	LOS A	0.1	0.4	0.02	0.52	46.6
9	R2	1	0.0	0.016	4.7	LOS A	0.1	0.4	0.02	0.52	46.1
Approach		26	0.0	0.016	4.6	LOS A	0.1	0.4	0.02	0.52	46.6
West: Greendale Road west											
10	L2	1	0.0	0.003	4.6	LOS A	0.0	0.0	0.00	0.11	48.9
11	T1	4	0.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.11	49.4
Approach		5	0.0	0.003	0.9	NA	0.0	0.0	0.00	0.11	49.3
All Vehicles		60	0.0	0.016	4.1	NA	0.1	0.5	0.03	0.45	50.3

Table B2: Saturday Intersection Performance of Greendale Road with Dwyer Road and Raby Road 8am to 9am with Place of Worship Traffic

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
SouthEast: The Northern Road- South East											
21	L2	25	0.0	0.202	6.3	LOS A	0.0	0.0	0.00	0.04	65.6
22	T1	367	0.0	0.202	0.0	LOS A	0.0	0.0	0.00	0.04	68.8
Approach		392	0.0	0.202	0.4	NA	0.0	0.0	0.00	0.04	68.6
NorthWest: The Northern Road- North West											
28	T1	280	0.0	0.198	1.4	LOS A	0.8	5.6	0.18	0.06	66.6
29	R2	25	0.0	0.198	12.3	LOS B	0.8	5.6	0.18	0.06	59.5
Approach		305	0.0	0.198	2.3	NA	0.8	5.6	0.18	0.06	66.0
SouthWest: Dwyer Road											
30	L2	42	0.0	0.115	6.8	LOS A	0.4	2.9	0.54	0.72	43.8
32	R2	17	0.0	0.115	16.5	LOS C	0.4	2.9	0.54	0.72	43.5
Approach		59	0.0	0.115	9.6	LOS A	0.4	2.9	0.54	0.72	43.7
All Vehicles		756	0.0	0.202	1.9	NA	0.8	5.6	0.11	0.10	64.7

Table B3: Saturday Intersection Performance of The Northern Road with Dwyer Road 4pm-5pm with Place of Worship Traffic

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Greendale Road east											
5	T1	7	0.0	0.015	0.0	LOS A	0.1	0.5	0.02	0.44	56.2
6	R2	20	0.0	0.015	5.5	LOS A	0.1	0.5	0.02	0.44	54.2
Approach		27	0.0	0.015	4.0	NA	0.1	0.5	0.02	0.44	54.7
North: Dwyer Road											
7	L2	35	0.0	0.022	4.6	LOS A	0.1	0.6	0.02	0.52	46.6
9	R2	1	0.0	0.022	4.7	LOS A	0.1	0.6	0.02	0.52	46.2
Approach		36	0.0	0.022	4.6	LOS A	0.1	0.6	0.02	0.52	46.6
West: Greendale Road west											
10	L2	1	0.0	0.002	4.6	LOS A	0.0	0.0	0.00	0.18	48.5
11	T1	2	0.0	0.002	0.0	LOS A	0.0	0.0	0.00	0.18	49.0
Approach		3	0.0	0.002	1.5	NA	0.0	0.0	0.00	0.18	48.8
All Vehicles		66	0.0	0.022	4.2	NA	0.1	0.6	0.02	0.47	49.7

Table B4: Saturday Intersection Performance of Greendale Road with Dwyer Road and Raby Road 4pm-5pm with Place of Worship Traffic