

# **TRAFFIC AND PARKING IMPACT ASSESSMENT OF A PROPOSED RESIDENTIAL DEVELOPMENT**

***185 Fifth Avenue in Austral***

## **Traffic and Parking Impact Assessment Report**

Prepared for: GM architects

N1715868A (Version 1a)

May 2017

## 1. INTRODUCTION

Motion Traffic Engineers was commissioned by gm architects to prepare a traffic and parking impact assessment of the proposed residential development located at 185 Fifth Avenue in Austral. Currently the site is a residential dwelling.

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

## 2. BACKGROUND AND EXISTING CONDITIONS

### 2.1 Location and Land Use

The development is located north of Leppington Train Station and the future Leppington Town Centre. The adjacent land uses are primarily residential dwellings on

large blocks of land.

Figure 1 presents an aerial view of the development site.

Figure 2 presents the location of the development using street directory.

Figure 3 presents a photograph of the development site.



**Figure 1: Location of the development site from an aerial view**

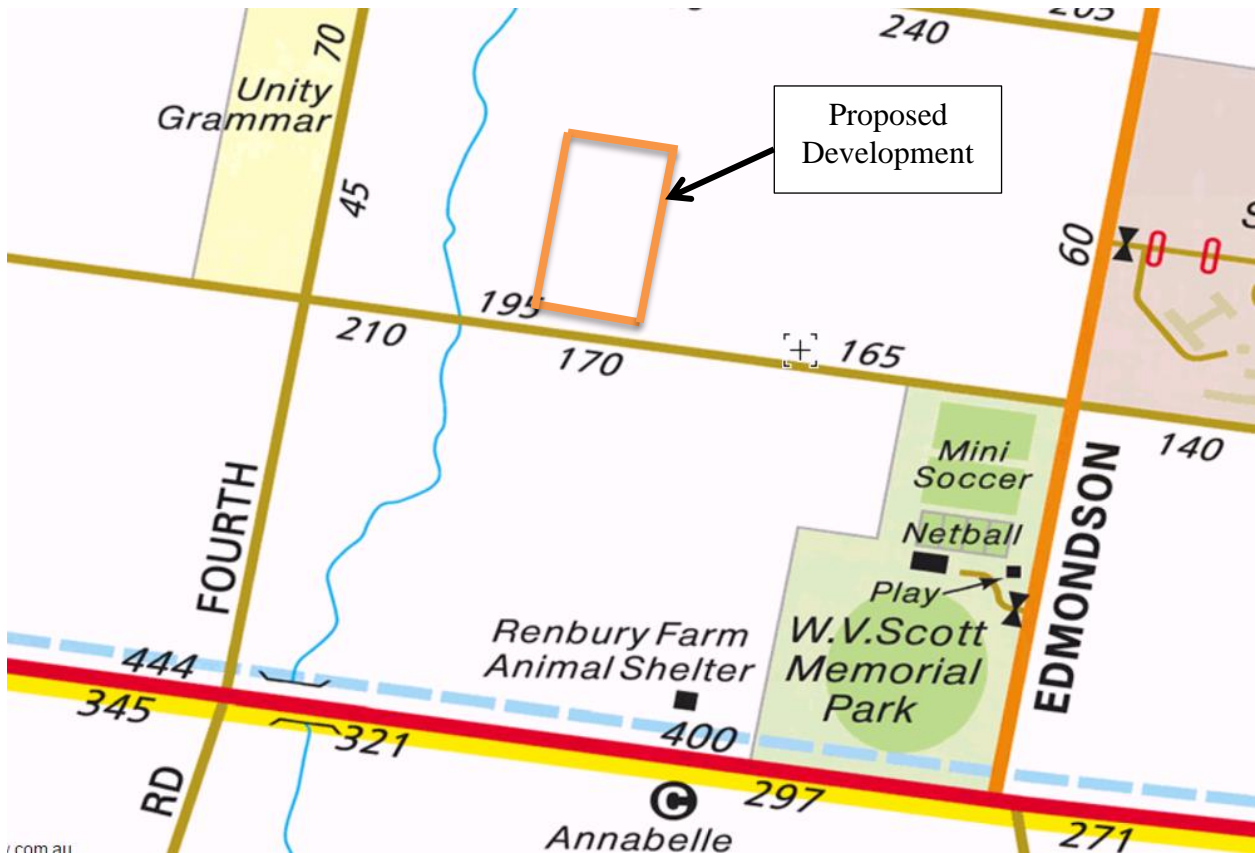


Figure 2: Location of the development using street directory



Figure 3: Photograph of 185 Fifth Avenue in Austral

## 2.2 Road Network

The development is located on and has frontage to Fifth Avenue and three future sub division roads that are yet to be built.

Fifth Avenue is a local road with one lane each way with a sign posted speed limit of 50km/hr. The road has a road shoulder and is used for emergency parking. Figure 4 presents a photograph of Fifth Avenue.

Edmondson Avenue is a collector road with one lane each way and a sign-posted speed limit of 60km/hr. On street parking is not permitted near Fifth Avenue except for emergency parking on the road shoulder (where it is present). Figure 5 presents a photograph of Edmondson Avenue.

Fourth Avenue is a collector road with one lane each way and a sign-posted speed limit of 60km/hr. Currently there is a road shoulder for emergency parking. A school zone is present on Fourth Avenue at the priority intersection of Fourth Avenue with Fifth Avenue. Figure 6 presents a photograph of Fourth Avenue.

Bringelly Road is an arterial road with one lane each way and a sign-posted speed limit of 60km/hr. Parking is not permitted on Bringelly Road. Roadworks are currently being performed on Bringelly Road. Figure 7 shows a photograph of Bringelly Road.



**Figure 4: Fifth Avenue Street facing East**





**Figure 5: Edmondson Avenue facing north**



**Figure 6: Fourth Avenue facing south**



**Figure 7: Bringelly Road facing east**

## **2.3 Public Car Parking Opportunities**

The development site has frontage to Fifth Avenue. There is no convenient on street parking near the site. Parking on the road shoulder is only permitted for emergency circumstances (car breaking down etc).

## **2.4 Intersection Description**

As part of the traffic impact assessment, the performance of four nearby intersections were surveyed and assessed:

- Priority intersection of Edmondson Avenue with Fifth Avenue
- Stop intersection of Fourth Avenue with Fifth Avenue
- Stop intersection of Bringelly Road with Edmondson Avenue and Rickard Road
- Stop intersection of Bringelly Road with Fourth Avenue and Dickson Road.

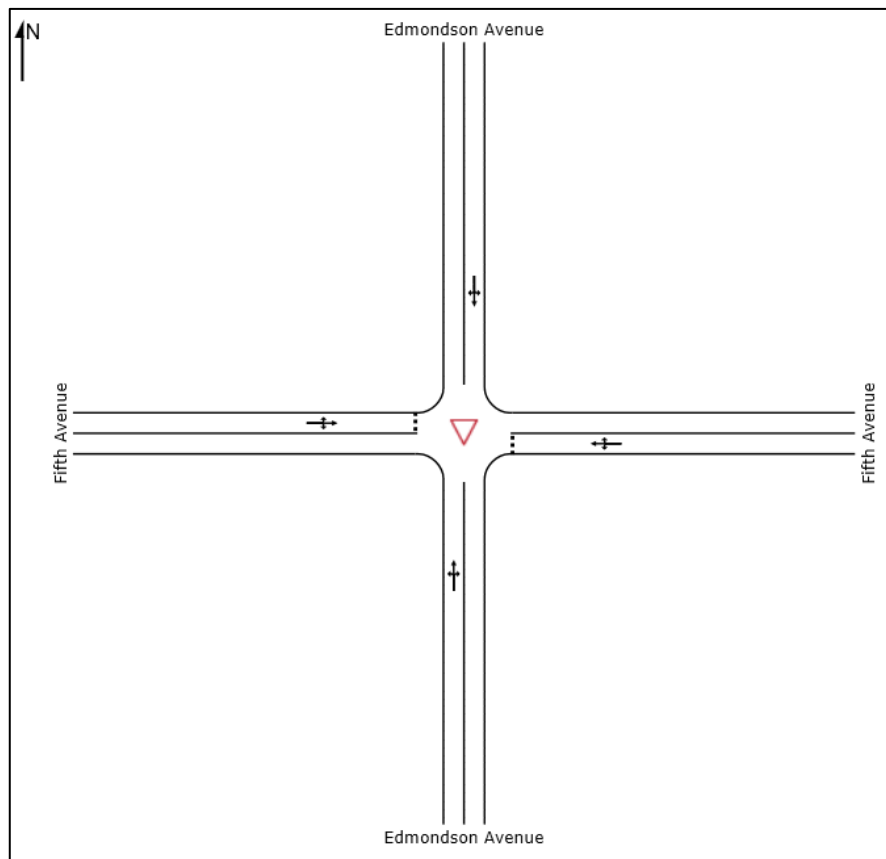
External traffic travelling to and from the development will have to travel through one of the above intersections.

The priority intersection of Edmondson Avenue with Fifth Avenue is a four-leg intersection with all turn movements permitted. Drivers from Fifth Avenue must yield for the main traffic on Edmondson Avenue. Figure 8 shows the layout of the intersection using SIDRA – an industry standard intersection software.

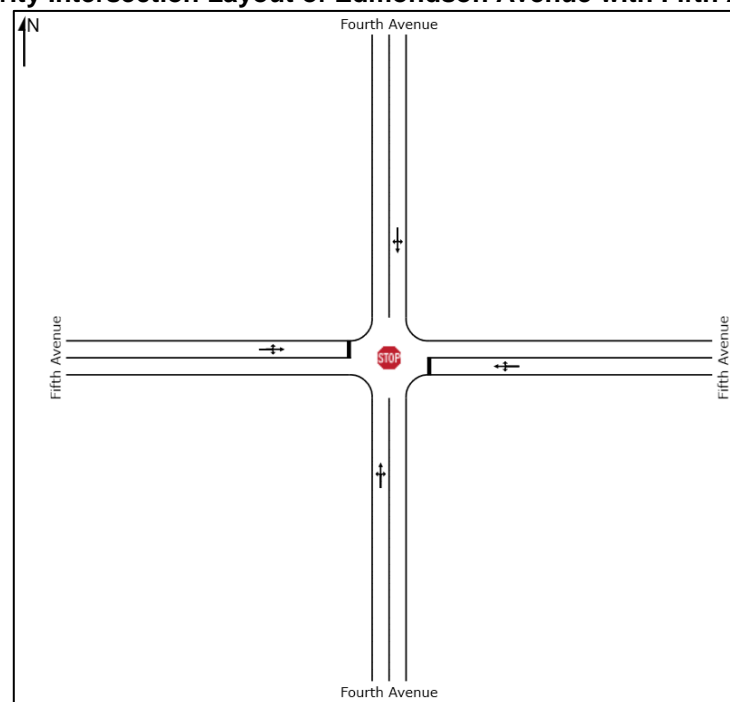
The stop-controlled intersection of Fourth Avenue with Fifth Avenue is a four-leg intersection with all turns permitted. Traffic from Fifth Avenue has to stop and wait for gap clearance on Fourth Avenue before crossing, turning or merging. Figure 9 presents the layout of this intersection using SIDRA.

The stop-controlled intersection of Bringelly Road with Edmondson Avenue and Rickard Road is a four-leg intersection with all turns permitted. Traffic from Edmondson Avenue and Rickard Road have to stop and wait for gap clearance on Bringelly Road before crossing, turning or merging. A dedicated left turn lane for drivers turning left into Bringelly Road has been provided. Figure 10 presents the layout of this intersection using SIDRA.

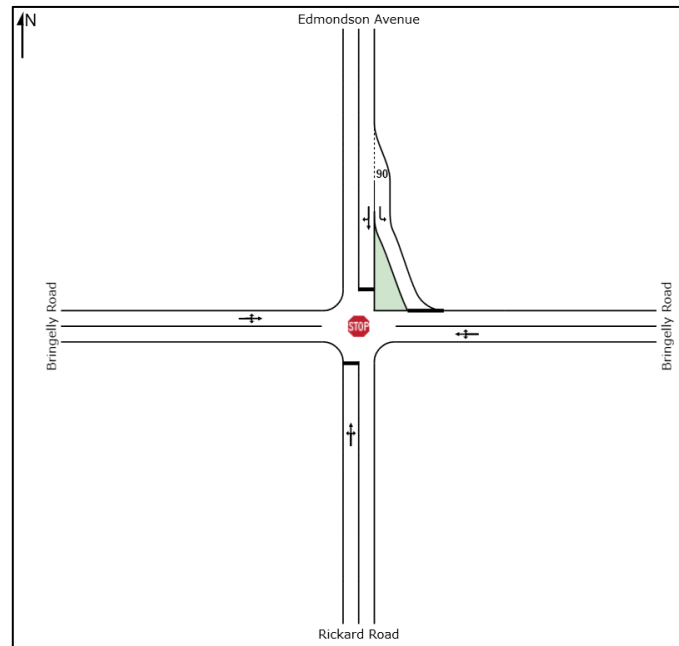
The stop-controlled intersection of Bringelly Road with Fourth Avenue and Dickson Road is a four-leg intersection with all turns permitted. Traffic from Fourth Avenue and Dickson Road have to stop and wait for gap clearance on Bringelly Road before crossing, turning or merging. Figure 11 presents the layout of this intersection using SIDRA.



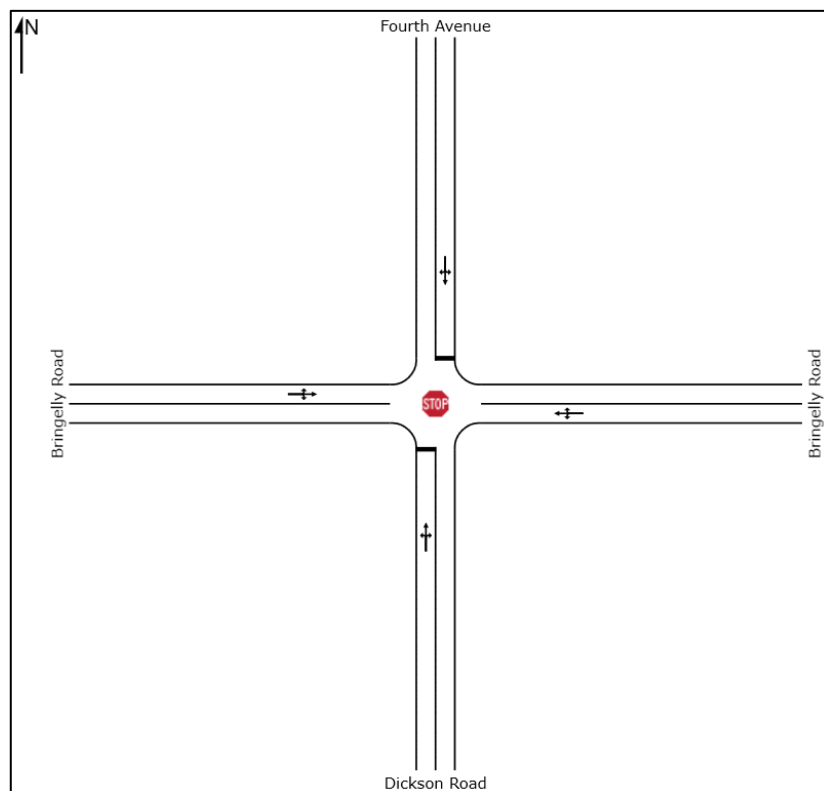
**Figure 8: Priority Intersection Layout of Edmondson Avenue with Fifth Avenue (SIDRA)**



**Figure 9 Stop Intersection Layout of Fourth Avenue with Fifth Avenue (SIDRA)**



**Figure 10 Stop Intersection Layout of Bringelly Road with Edmondson Avenue and Rickard Road (SIDRA)**



**Figure 11: Stop intersection Layout of Bringelly Road with Fourth Avenue and Dickson Road (SIDRA)**



## 2.5 Existing Traffic Volumes

Traffic volumes were collected as part of this project for the weekday AM and PM peak hours in May 2017 for the two surveyed intersections presented. The peak hours are from 8am to 9am and 5pm to 6pm.

Figures 12 and 13 present the existing weekday AM and PM peak hour traffic volumes respectively in vehicle numbers.

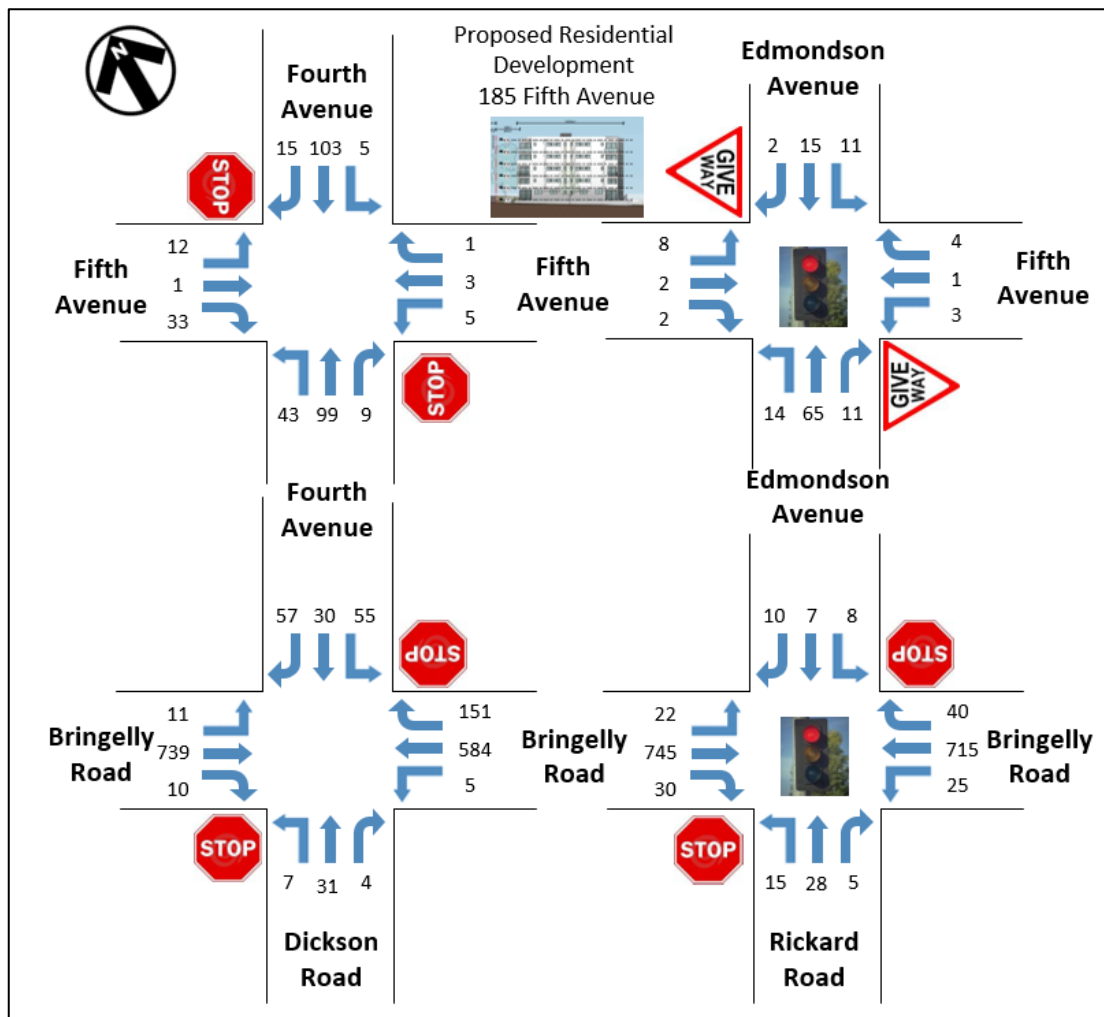


Figure 12: Weekday Existing AM Peak Hour Traffic Volumes

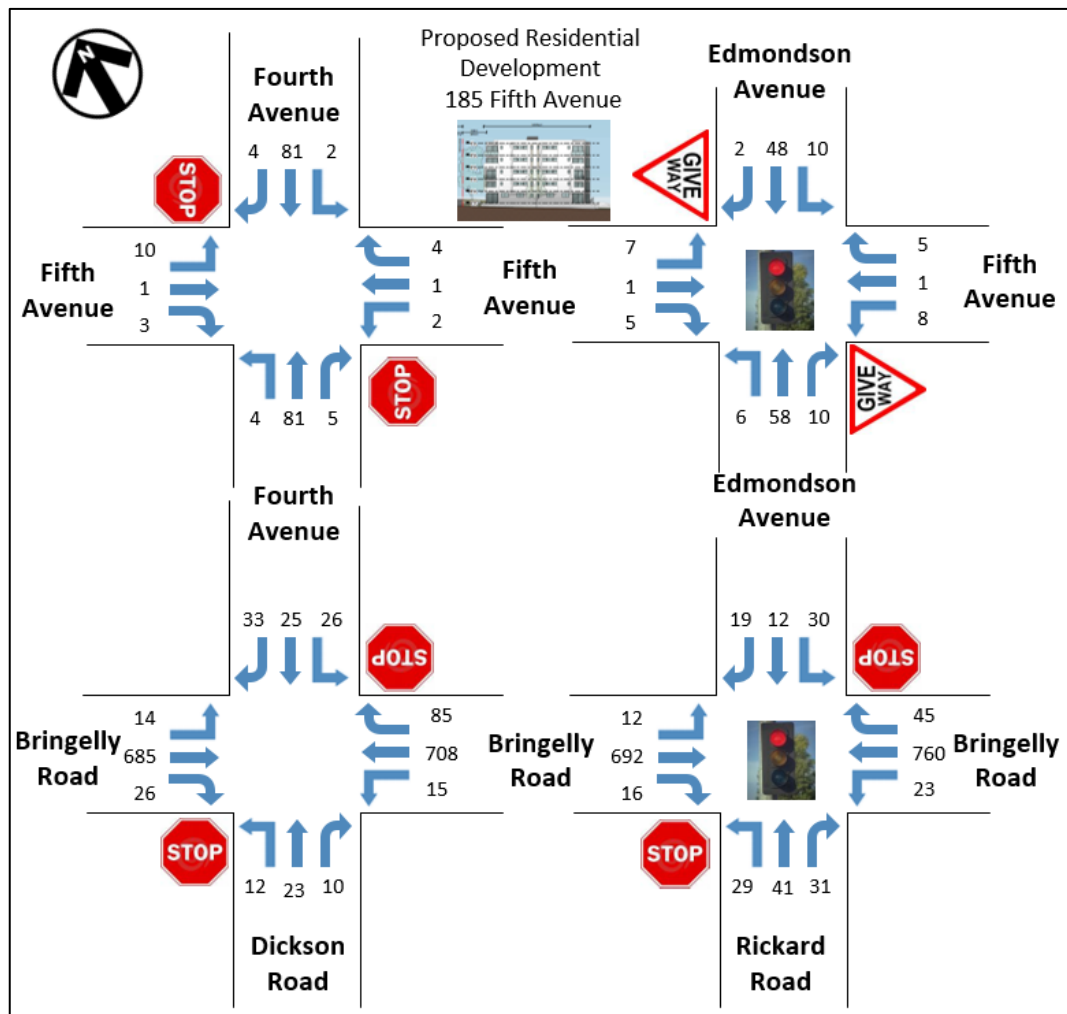


Figure 13: Weekday Existing PM Peak Hour Traffic Volumes

## 2.6 Intersection Assessment

An intersection assessment and survey has been undertaken for the weekday AM and PM peak hours for the four intersections.

The existing intersection operating performance was assessed using the SIDRA 7.0 software package 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 assessment are as follows:

*Stop control intersection of Edmondson Avenue with Fifth Avenue*

- The intersection has a LoS A or B for the AM and PM peak hours for all turn movements
- There is spare capacity at this intersection

*Stop control intersection of Fourth Avenue with Fifth Avenue*

- The intersection has a LoS A or B for the AM and PM peak hours for all turn movements
- There is spare capacity at this intersection

*Stop control intersection of Bringelly Road with Edmondson Avenue and Rickard Road*

- The intersection has an overall LoS B for the AM peak hour for all turn movements
- The intersection has an overall LoS B for the PM peak hour
  - Turning movements from Rickard Road have an overall LoS F

*Stop control intersection of Bringelly Road with Fourth Avenue and Dickson Road*

- All turn movements are generally acceptable for the AM peak hour except for traffic on the Fourth Avenue where the LoS is poor
- The intersection has an overall LoS B for the turn movements in the PM peak hour

The full SIDRA results are presented in Appendix A for the existing conditions.

## **2.7 Public Transport**

The nearest bus stop to the development site is 400 metres away on Edmondson Avenue. This stop is serviced by the 855 and 856 bus routes. These provide transport to a range of suburbs including Narellan, Casula, Liverpool, Bringelly and Leppington Railway Station. Leppington Railway Station is 1100 metres away with train services regularly departing to Liverpool, Parramatta and the city.

Figure 14 shows the proximity of the site to public transport services. The site has access to public transport.

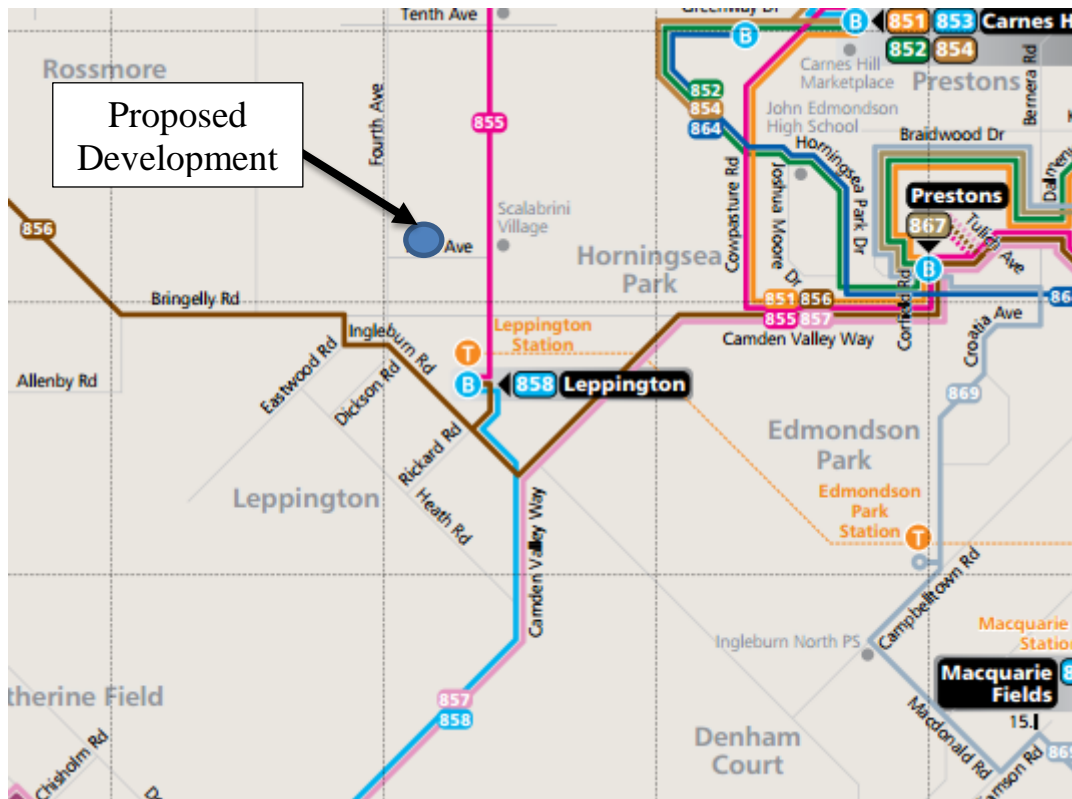


Figure 14: Public Transport Services near the site

## 2.8 Conclusions on the Existing Conditions

Overall there is spare capacity in the nearby road network.

The location of the development has access to public transport.

There is satisfactory on-street parking available surrounding the development.



### 3. INFRASTRUCTURE CHANGES TO THE AUSTRAL AREA

This section describes the planned infrastructure changes to the Austral and Leppington North areas overall.

#### 3.1 Development Site

The development site is situated on and has frontage to Fifth Avenue. A future road will be built surrounding the development so as to service all adjacent lots. In addition, the proposed development proposes this future road be widened on the east side of 185 Fifth Avenue. This proposed road widening is depicted in figure 15.

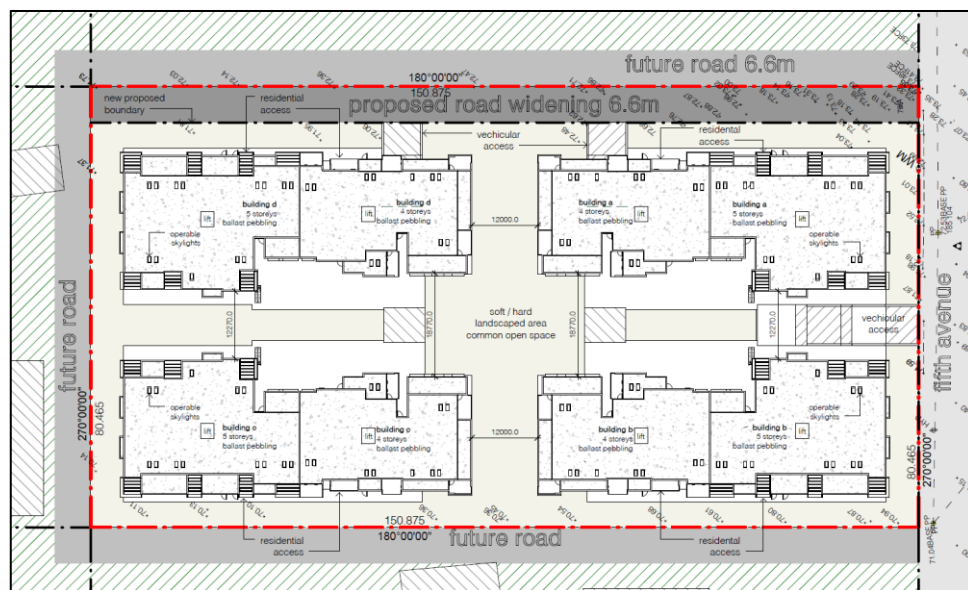


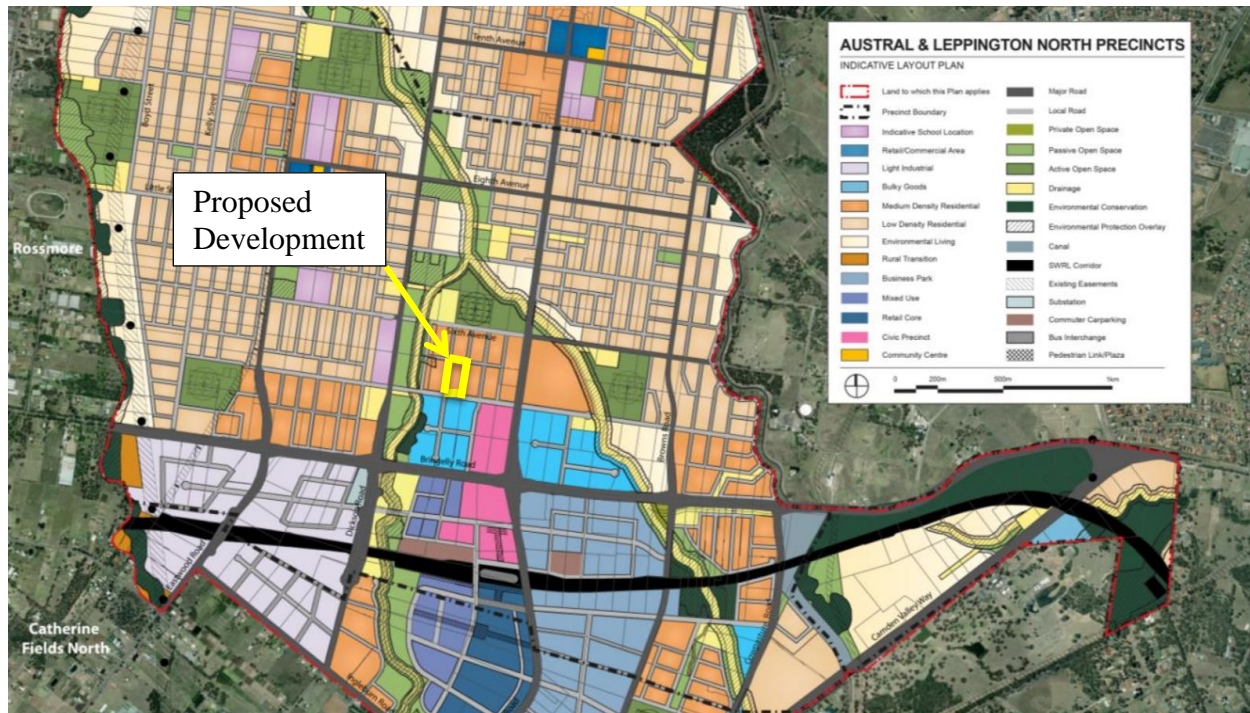
Figure 15: Future road and proposed road widening at the site

#### 3.2 Liverpool Growth Centre Precincts Development Control Plan

The Western Sydney Infrastructure Plan, funded by the Australian and NSW governments, aims to develop and upgrade roads and integrated transport within Western Sydney in preparation for the development of the Western Sydney Airport. Austral has been rezoned as part of the plan's South West Priority Growth Area. Between Austral and Leppington North, approximately 17,350 homes will be developed.

This increase of population in the area will be supported by the Leppington Major Centre and to a lesser degree by four local and neighbourhood centres within Austral. Leppington Major Centre in particular will provide residents with frequent public transport services, regional shopping facilities and entertainment venues.

The proposed development at 185 Fifth Avenue falls within the Leppington Major Centre and is zoned as Medium Density Residential according to the Liverpool Growth Centre Precincts Development Control Plan. Figure 16 shows the proposed development in relation to other nearby zonings.



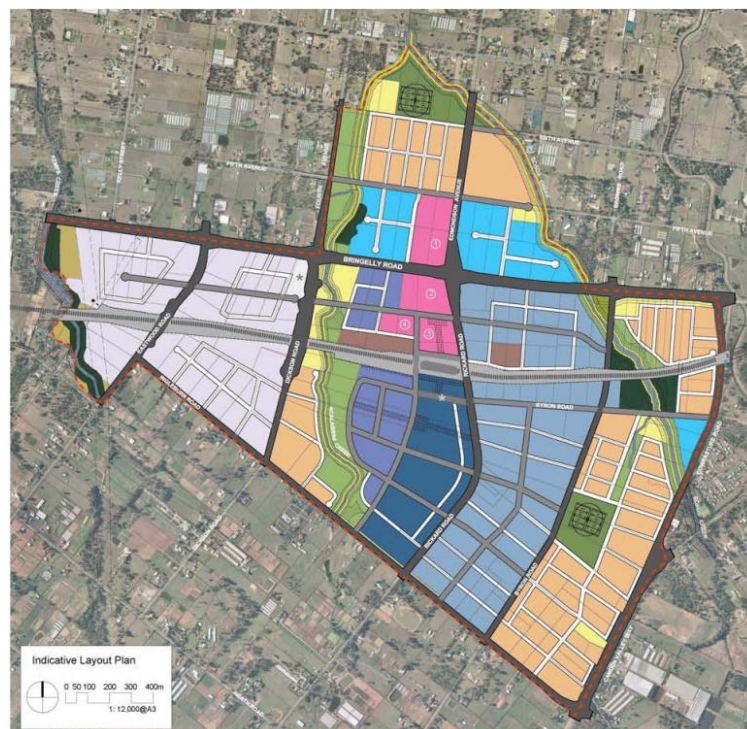
**Figure 16: Austral & Leppington North Indicative Layout Plan**  
(Source: Liverpool Growth Centre Precincts Development Plan)

### 3.3 Future Road Network

As a part of the development of the Leppington Major Centre, multiple local and collector roads will be built in the area. Figures 17 and 18 depict the existing and future road systems surrounding within Leppington Major Centre.



**Figure 17: Existing roads surrounding Leppington Major Centre**



**Figure 18: Future road system surrounding Leppington Major Centre**  
(Source: Liverpool Growth Centre Precincts Development Plan)



Bringelly Road is undergoing major development as part of the Western Sydney Infrastructure Plan. The Bringelly Road upgrade intends to improve access to the Western Sydney Airport, Leppington Railway Station, the new Leppington Town Centre and the M5 and M7 motorways, as well as provide increased capacity and more reliable travel times. The upgrade is being performed in two stages, the first of which is expected to be completed by late 2017. The second stage will commence in mid-2017 and is expected to be completed in mid-2020.

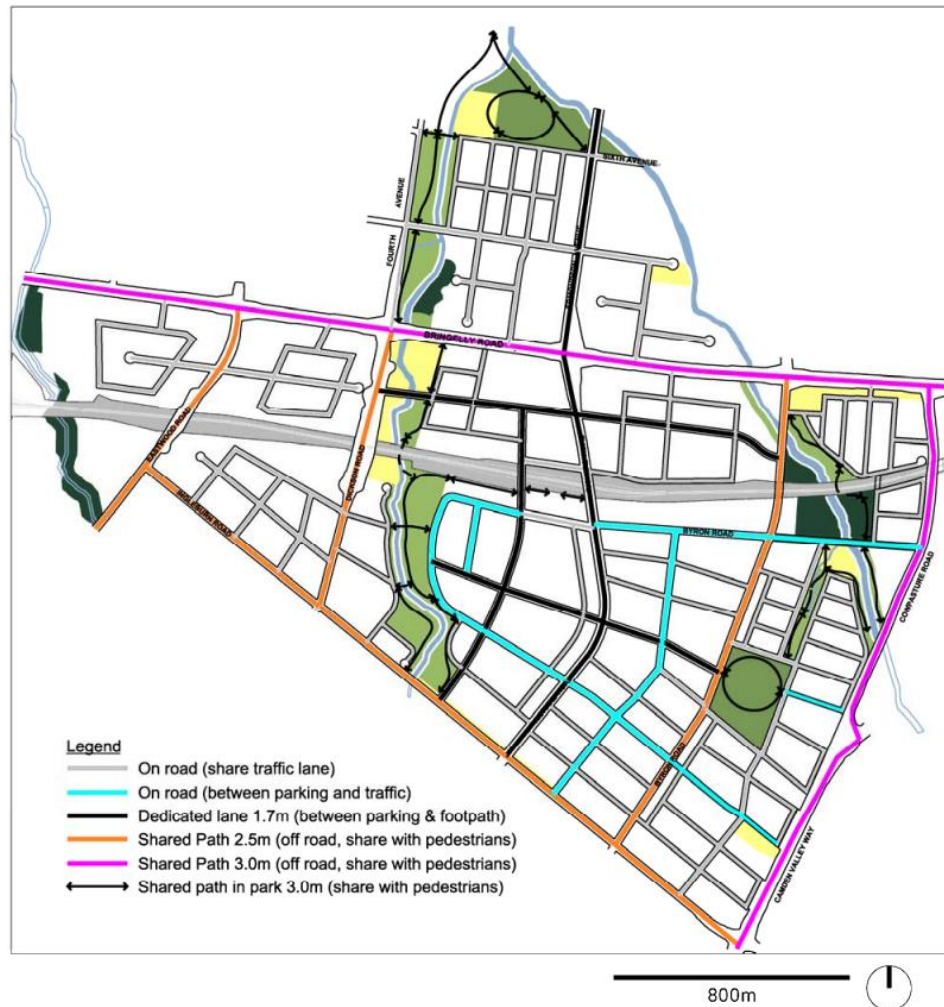
The intersection of Bringelly Road with Edmondson Avenue and Rickard Road and the intersection of Bringelly Road with Fourth Avenue and Dickson Road both lie on the later sections of stage 1 of the Bringelly Road upgrade. As such, the former intersection is currently undergoing development and the latter intersection is due to be upgraded in the near future.

### **3.4 Public Transport**

Rickard road is planned to be the key public transport, pedestrian and cyclist route to and from Leppingtown Town Centre and Leppington Railway Station. The design of Leppington Major Centre is such that walking, cycling and public transport are encouraged as the main modes of transport within the centre, while the upgrades to Bringelly Road will provide better private vehicle access to and from the centre.

### **3.5 Pedestrian and Cycle Infrastructure**

The Liverpool Growth Centre Precincts Development Control Plan details the availability of pedestrian and cycle infrastructure, both new and existing, within and around the Leppington Major Centre. These details are depicted in figure 19.



**Figure 19: Pedestrian and cycle routes surrounding Leppington Major Centre**  
(Source: Liverpool Growth Centre Precincts Development Plan)



#### **4. PROPOSED RESIDENTIAL DEVELOPMENT**

The land uses for the proposed development are as follows:

##### *Residential*

- 34 x one bedroom apartments
- 170 x two bedroom apartments
- 18 x three bedroom apartments

Car spaces are provided in two separate blocks, each with 2 basement level with 327 car spaces provided and an additional 4 car wash bays. Over 300 car spaces are proposed on site.

Vehicle access and egress is via Fifth Avenue and a proposed new sub division road.

A full scaled plan of the proposed development is provided as part of the Development Application. Scaled measurements should use these plans.

## 5. CAR PARKING CONSIDERATIONS

### 5.1 Liverpool City Council's Development Control Plan

The car parking requirements for zone R3 medium residential multi storey apartment developments are presented in *Liverpool City Council's Growth Centre Precincts Development Control Plan* with the car parking rates as follows:

#### R3 Residential Flat Buildings

- 1 car space per apartment
- 0.5 car spaces per 3 or more bedroom apartments
- 1 visitor car space per 5 apartments

Table 3 summarises the car parking requirements of the proposed development. In addition there are four car wash bays (one for each building).

The proposed development complies with council's car parking requirements

Apartment Type	Number	Parking Rate	Spaces Required	Spaces Provided
1 bedroom	34	1 per apartment	34	327
2 bedroom	170	1 per apartment	170	
3 bedroom	18	1.5 per apartment	27	
Visitor		1 per 5 dwellings	44	
		<b>Total</b>	<b>275</b>	<b>327</b>

**Table 3: Car Parking Requirements**

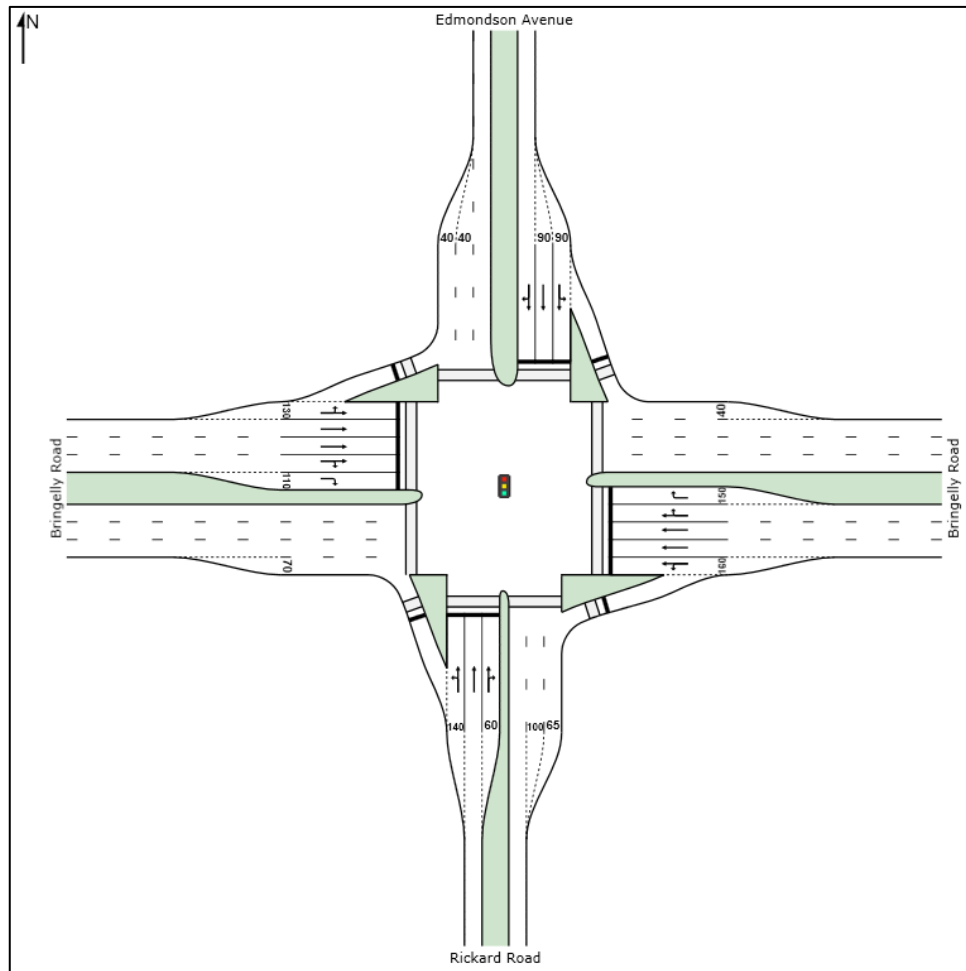
## **6. FUTURE TRAFFIC DEVELOPMENT IN THE AUSTRAL AND NORTH LEPPINGTON AREAS**

The Austral and North Leppington areas will change significantly over a period of time as residential and commercial buildings are completed. Chapter 3 summarises the road and public transport infrastructure expected to be provided in the area.

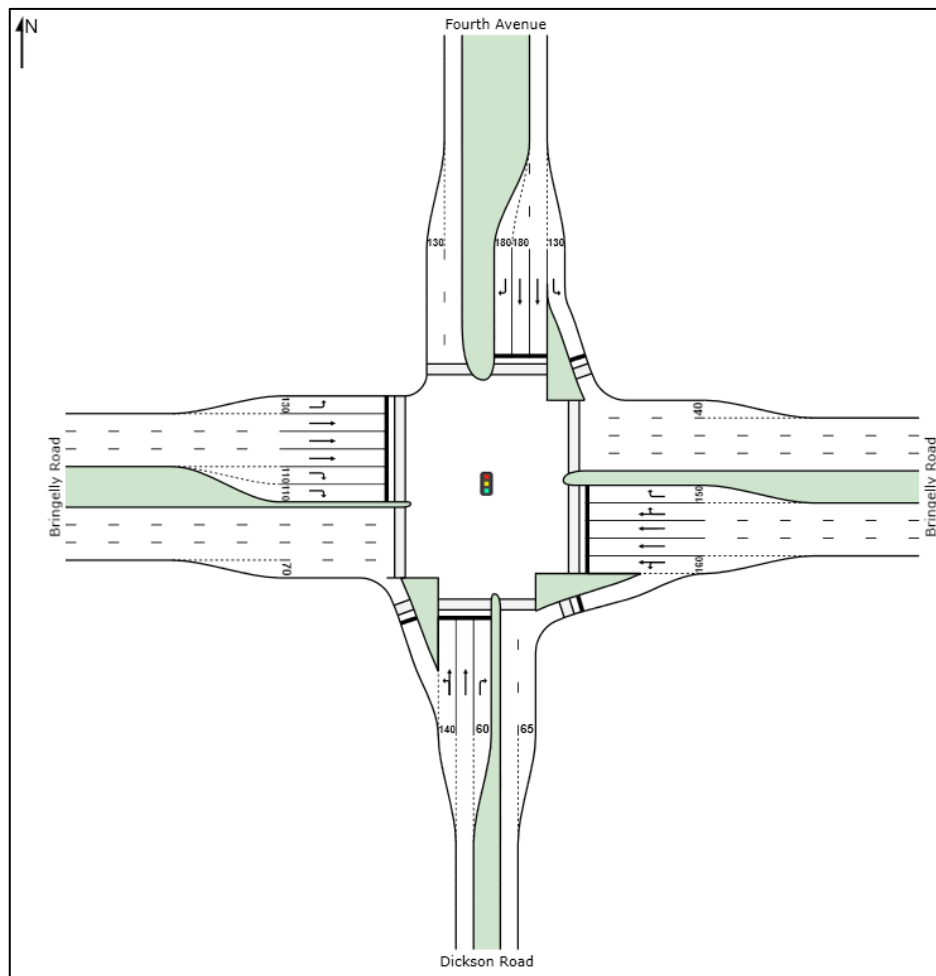
As discussed in section 3.3, Bringelly Road is currently undergoing a major upgrade in preparation for future developments in the South West Priority Growth Area. Section 2.4 details the intersections on Bringelly Road relevant to the proposed development as they currently exist.

The intersection of Bringelly Road with Edmondson Avenue, and Bringelly Road with Fourth Avenue and Dickson Road will be upgraded to traffic signals.

However, after their expected completion in late 2017, these intersections will be capable of accommodating significantly more traffic. Figures 20 and 21 depict these upgraded intersections using SIDRA. The intersection layout is based on our professional judgement of how these intersections will be upgrade. The precise intersection design is not in the public arena.



**Figure 20: Future Layout of Bringelly Road with Edmondson Avenue and Rickard Road (SIDRA)**



**Figure 21: Future Layout of Bringelly Road with Fourth Avenue and Dickson Road (SIDRA)**

Forecast traffic volumes for the Austral and North Leppington areas are not currently available publicly. Furthermore, it is unknown when these areas will be fully developed before the development subject to this report is built. It is evident that the relevant intersections on an upgraded Bringelly Road will be capable of accommodating the additional traffic the proposed development will introduce; however, without forecast traffic volumes for a fully-developed Austral and North Leppington, the impact of the proposed development on these future intersections cannot be assessed.

Models of these intersections as they exist in the present day will not provide insight into their performance either after the Bringelly Road upgrade nor the completed development of Leppington Major Centre. Despite this, an assessment can still be performed on the present-day intersections to determine the proposed development's impact on these intersections prior to the completion of stage 1 of the Bringelly Road upgrade.



## 7. VEHICLE TRAFFIC IMPACT CONSIDERATIONS

### 7.1 Traffic Generation

The RTA Guide to Traffic Generating Developments publishes car trip rates as follows for the weekday peak hour for high density apartments:

- 0.29 trips per apartment for the AM and PM peak hours

Table 4 summarises the proposed trip generation for the proposed development.

Table 5 summarises the trip distribution of the generated trips. The proposed development is a low trip generator.

Peak Hour	Apartments	Trip rate per apartment	Trips
AM	222	0.29	64
PM	222	0.29	64

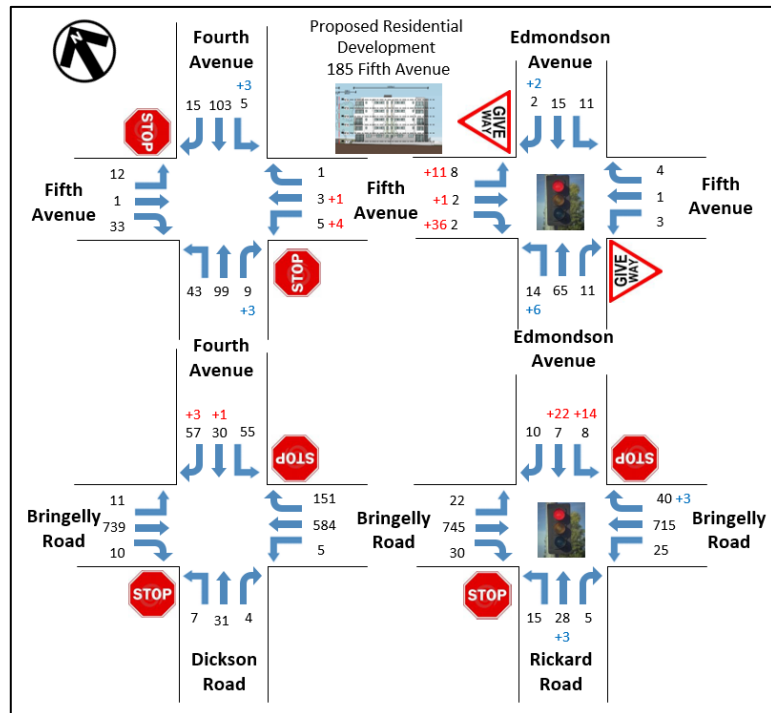
**Table 4: Trips Generated by the Residential Development Weekday AM and PM Peak Hours**

Peak Hour	Origin	Destination	Total
AM	53	13	66
PM	13	53	66

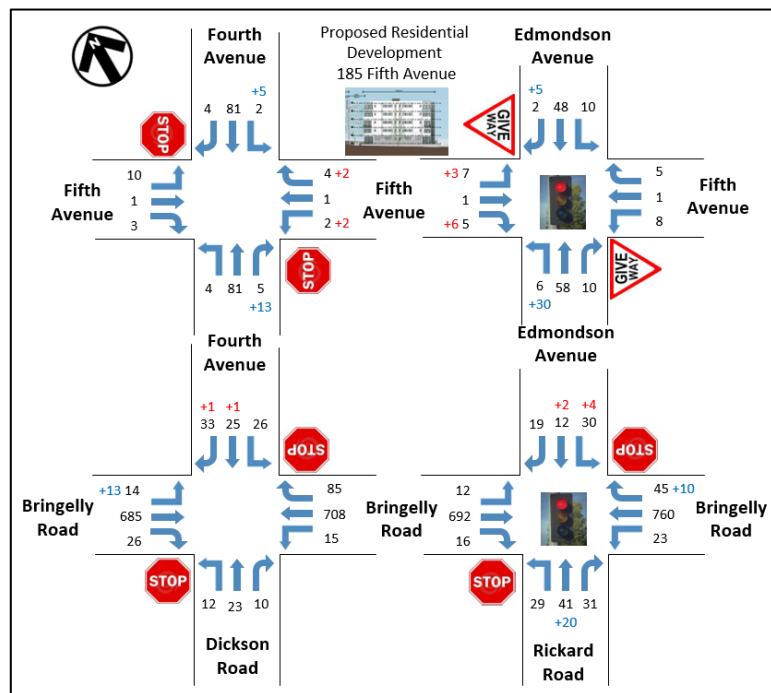
**Table 5: Trips Generated by the Residential Development in the Weekday AM Peak Hour**

### 7.2 Forecast Traffic Volumes

The following presents the existing and with development traffic volumes for the AM and PM peak hours distributed onto the two intersections with the development traffic. The additional traffic is in red for origin trips and blue for destination trips.



**Figure 22: Weekday AM Peak Hour with additional development Traffic in Red for Origin Trips and Blue for Destination Trips**



**Figure 23: Weekday PM Peak Hour with additional development Traffic in Red for Origin Trips and Blue for Destination Trips**

### 7.3 Intersection Assessment Using Existing Intersection Layout

This section assesses the following intersections for the existing traffic with the development traffic. The intersection results are as follows:

#### Stop control intersection of Edmondson Avenue with Fifth Avenue

- The intersection has a LoS A for the AM and PM peak hours for all turn movements
- The additional trips do not change the LoS for the turn movements or the overall LoS for the intersection during the AM and PM peak hours.

#### Stop control intersection of Fourth Avenue with Fifth Avenue

- The intersection has a LoS A for the AM and PM peak hours for all turn movements
- The additional trips do not change the LoS for the turn movements or the overall LoS for the intersection during the AM and PM peak hours.

#### Stop control intersection of Bringelly Road with Edmondson Avenue and Rickard Road

- The intersection has an overall LoS B for the AM peak hour for all turn movements
  - Right turn movements from Rickard Road and Edmondson Avenue change from LoS D to LoS E with the development traffic
  - Through movements from Edmondson Avenue change from LoS C to LoS D with the development traffic
- The intersection has an overall LoS B for the PM peak hour
  - Turning movements from Rickard Road have a LoS F

#### Stop control intersection of Bringelly Road with Fourth Avenue and Dickson Road

- The intersection has an overall LoS B for the AM peak hour
  - Turning movements from Fourth Avenue have a LoS F
- The intersection has an overall LoS B for the PM peak hour
  - Right turn movements from Fourth Avenue change from LoS E to LoS F with the development traffic

Traffic entering Bringelly Road (Fourth Avenue and Edmondson Avenue) are experiencing a poor LoS in general.

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

#### **7.4 Intersection Assessment with Upgrading to Traffic Signals for the Bringelly Road Intersection**

This section assesses the two intersections present on Bringelly Road (Bringelly Road with Fourth Avenue and Dickson Road, and Bringelly Road with Edmondson Avenue and Rickard Road) as signalised intersection.

The upgrades to signalisation are expected to be completed in late-2017.

Assessments were performed for the following intersections for the existing traffic with the development traffic. These assessments were made based on the assumption that, by the time this proposed development is completed and is fully generating its predicted trips, the Bringelly Road upgrade will be complete. The intersection results are as follows:

##### *Bringelly Road with Edmondson Avenue and Rickard Road*

- The intersection has an overall LoS A for the AM and PM peak hours for all turn movements

##### *Bringelly Road with Fourth Avenue and Dickson Road*

- The intersection has an overall LoS A for the AM and PM peak hours for all turn movements

The intersection assessment is presented in detail in Appendix C.

## 8. CONCLUSIONS

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

### Parking

- The proposed development complies with council's parking requirements

### Traffic

- The development is a moderate trip generator in the AM and PM peak hours
- The additional development trips cannot be accommodated in the nearby intersection without significantly affecting the performance or creating any additional delays or queues
- However, it is expected that the proposed development will not generate an impactful number of trips before the expected completion of stage 1 of the Bringelly Road upgrade in late 2017.
- There are no traffic engineering reasons why a planning permit for the development at 185 Fifth Avenue in Austral should be refused.



## APPENDIX A – SIDRA INTERSECTION EXISTING TRAFFIC CONDITIONS

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Edmondson Avenue											
1	L2	14	0.0	0.047	5.6	LOS A	0.1	0.6	0.03	0.16	52.7
2	T1	65	0.0	0.047	0.0	LOS A	0.1	0.6	0.03	0.16	58.4
3	R2	11	0.0	0.047	5.5	LOS A	0.1	0.6	0.03	0.16	52.2
Approach		90	0.0	0.047	1.6	NA	0.1	0.6	0.03	0.16	56.6
East: Fifth Avenue											
4	L2	3	0.0	0.007	4.6	LOS A	0.0	0.2	0.07	0.52	49.7
5	T1	1	0.0	0.007	3.6	LOS A	0.0	0.2	0.07	0.52	46.6
6	R2	4	0.0	0.007	5.0	LOS A	0.0	0.2	0.07	0.52	49.3
Approach		8	0.0	0.007	4.7	LOS A	0.0	0.2	0.07	0.52	49.1
North: Edmondson Avenue											
7	L2	11	0.0	0.015	5.6	LOS A	0.0	0.1	0.04	0.27	51.9
8	T1	15	0.0	0.015	0.0	LOS A	0.0	0.1	0.04	0.27	57.4
9	R2	2	0.0	0.015	5.7	LOS A	0.0	0.1	0.04	0.27	51.4
Approach		28	0.0	0.015	2.6	NA	0.0	0.1	0.04	0.27	54.7
West: Fifth Avenue											
10	L2	8	0.0	0.009	4.7	LOS A	0.0	0.2	0.15	0.49	49.6
11	T1	2	0.0	0.009	3.6	LOS A	0.0	0.2	0.15	0.49	46.5
12	R2	2	0.0	0.009	5.0	LOS A	0.0	0.2	0.15	0.49	49.1
Approach		12	0.0	0.009	4.6	LOS A	0.0	0.2	0.15	0.49	49.0
All Vehicles		138	0.0	0.047	2.2	NA	0.1	0.6	0.04	0.23	55.0

**Table A1: Existing Priority Intersection Performance of Edmondson Avenue with Fifth Avenue for the Weekday AM Peak Hour**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fourth Avenue											
1	L2	43	0.0	0.080	3.5	LOS A	0.1	0.6	0.04	0.16	39.6
2	T1	99	0.0	0.080	0.0	LOS A	0.1	0.6	0.04	0.16	39.4
3	R2	9	0.0	0.080	3.9	LOS A	0.1	0.6	0.04	0.16	39.2
Approach		151	0.0	0.080	1.2	NA	0.1	0.6	0.04	0.16	39.5
East: Fifth Avenue											
4	L2	5	0.0	0.008	7.0	LOS A	0.0	0.2	0.23	0.90	37.3
5	T1	3	0.0	0.008	7.8	LOS A	0.0	0.2	0.23	0.90	37.1
6	R2	1	0.0	0.008	7.6	LOS A	0.0	0.2	0.23	0.90	37.0
Approach		9	0.0	0.008	7.4	LOS A	0.0	0.2	0.23	0.90	37.2
North: Fourth Avenue											
7	L2	5	0.0	0.065	3.8	LOS A	0.1	0.8	0.08	0.08	39.8
8	T1	103	0.0	0.065	0.1	LOS A	0.1	0.8	0.08	0.08	39.6
9	R2	15	0.0	0.065	4.0	LOS A	0.1	0.8	0.08	0.08	39.4
Approach		123	0.0	0.065	0.7	NA	0.1	0.8	0.08	0.08	39.6
West: Fifth Avenue											
10	L2	12	0.0	0.053	7.0	LOS A	0.2	1.3	0.28	0.89	37.2
11	T1	1	0.0	0.053	7.8	LOS A	0.2	1.3	0.28	0.89	37.0
12	R2	33	0.0	0.053	7.8	LOS A	0.2	1.3	0.28	0.89	36.9
Approach		46	0.0	0.053	7.6	LOS A	0.2	1.3	0.28	0.89	37.0
All Vehicles		329	0.0	0.080	2.1	NA	0.2	1.3	0.09	0.25	39.1

**Table A2: Existing Stop Intersection Performance of Edmondson Avenue with Fifth Avenue for the Weekday AM Peak Hour**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rickard Road											
1	L2	15	0.0	0.351	18.0	LOS B	1.1	7.9	0.91	1.05	36.7
2	T1	28	0.0	0.351	47.4	LOS D	1.1	7.9	0.91	1.05	36.6
3	R2	5	0.0	0.351	54.0	LOS D	1.1	7.9	0.91	1.05	36.5
Approach		48	0.0	0.351	38.9	LOS C	1.1	7.9	0.91	1.05	36.6
East: Bringelly Road											
4	L2	25	0.0	0.435	11.4	LOS A	1.4	9.7	0.18	0.05	56.7
5	T1	715	0.0	0.435	0.9	LOS A	1.4	9.7	0.18	0.05	58.2
6	R2	40	0.0	0.435	12.6	LOS A	1.4	9.7	0.18	0.05	56.4
Approach		780	0.0	0.435	1.9	NA	1.4	9.7	0.18	0.05	58.1
North: Edmondson Avenue											
7	L2	8	0.0	0.014	13.5	LOS A	0.0	0.3	0.62	0.90	49.6
8	T1	7	0.0	0.191	42.2	LOS C	0.5	3.8	0.93	1.01	33.6
9	R2	10	0.0	0.191	51.3	LOS D	0.5	3.8	0.93	1.01	33.5
Approach		25	0.0	0.191	36.7	LOS C	0.5	3.8	0.83	0.98	37.4
West: Bringelly Road											
10	L2	22	0.0	0.434	10.7	LOS A	1.0	7.2	0.13	0.04	57.1
11	T1	745	0.0	0.434	0.6	LOS A	1.0	7.2	0.13	0.04	58.7
12	R2	30	0.0	0.434	12.2	LOS A	1.0	7.2	0.13	0.04	56.5
Approach		797	0.0	0.434	1.4	NA	1.0	7.2	0.13	0.04	58.6
All Vehicles		1650	0.0	0.435	3.2	NA	1.4	9.7	0.19	0.09	56.9

**Table A3: Existing Stop Intersection Performance of Bringelly Road with Edmondson Avenue and Rickard Road for the Weekday AM Peak Hour**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dickson Road											
1	L2	7	0.0	0.308	15.2	LOS B	1.0	6.8	0.90	1.04	37.2
2	T1	31	0.0	0.308	40.7	LOS C	1.0	6.8	0.90	1.04	37.1
3	R2	4	0.0	0.308	52.4	LOS D	1.0	6.8	0.90	1.04	36.9
Approach		42	0.0	0.308	37.6	LOS C	1.0	6.8	0.90	1.04	37.1
East: Bringelly Road											
4	L2	5	0.0	0.504	12.7	LOS A	4.1	28.4	0.52	0.19	53.7
5	T1	584	0.0	0.504	3.4	LOS A	4.1	28.4	0.52	0.19	55.1
6	R2	151	0.0	0.504	12.6	LOS A	4.1	28.4	0.52	0.19	53.2
Approach		740	0.0	0.504	5.4	NA	4.1	28.4	0.52	0.19	54.7
North: Fourth Avenue											
7	L2	55	0.0	0.960	105.5	LOS F	9.0	63.3	0.97	1.85	19.5
8	T1	30	0.0	0.960	132.2	LOS F	9.0	63.3	0.97	1.85	19.5
9	R2	57	0.0	0.960	142.6	LOS F	9.0	63.3	0.97	1.85	19.5
Approach		142	0.0	0.960	126.0	LOS F	9.0	63.3	0.97	1.85	19.5
West: Bringelly Road											
10	L2	11	0.0	0.396	8.2	LOS A	0.3	1.8	0.04	0.02	58.0
11	T1	739	0.0	0.396	0.1	LOS A	0.3	1.8	0.04	0.02	59.6
12	R2	10	0.0	0.396	9.8	LOS A	0.3	1.8	0.04	0.02	57.4
Approach		760	0.0	0.396	0.4	NA	0.3	1.8	0.04	0.02	59.6
All Vehicles		1684	0.0	0.960	14.1	NA	9.0	63.3	0.35	0.27	48.5

**Table A4: Existing Stop Intersection Performance of Bringelly Road with Fourth Avenue and Dickson Road for the Weekday AM Peak Hour**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Edmondson Avenue											
1	L2	6	0.0	0.039	5.7	LOS A	0.1	0.5	0.05	0.13	52.9
2	T1	58	0.0	0.039	0.0	LOS A	0.1	0.5	0.05	0.13	58.6
3	R2	10	0.0	0.039	5.6	LOS A	0.1	0.5	0.05	0.13	52.4
Approach		74	0.0	0.039	1.2	NA	0.1	0.5	0.05	0.13	57.2
East: Fifth Avenue											
4	L2	8	0.0	0.011	4.7	LOS A	0.0	0.3	0.13	0.51	49.5
5	T1	1	0.0	0.011	3.6	LOS A	0.0	0.3	0.13	0.51	46.4
6	R2	5	0.0	0.011	5.1	LOS A	0.0	0.3	0.13	0.51	49.1
Approach		14	0.0	0.011	4.8	LOS A	0.0	0.3	0.13	0.51	49.1
North: Edmondson Avenue											
7	L2	10	0.0	0.031	5.6	LOS A	0.0	0.1	0.02	0.12	53.1
8	T1	48	0.0	0.031	0.0	LOS A	0.0	0.1	0.02	0.12	58.9
9	R2	2	0.0	0.031	5.6	LOS A	0.0	0.1	0.02	0.12	52.5
Approach		60	0.0	0.031	1.1	NA	0.0	0.1	0.02	0.12	57.6
West: Fifth Avenue											
10	L2	7	0.0	0.010	4.7	LOS A	0.0	0.3	0.15	0.51	49.5
11	T1	1	0.0	0.010	3.6	LOS A	0.0	0.3	0.15	0.51	46.4
12	R2	5	0.0	0.010	5.1	LOS A	0.0	0.3	0.15	0.51	49.1
Approach		13	0.0	0.010	4.8	LOS A	0.0	0.3	0.15	0.51	49.1
All Vehicles		161	0.0	0.039	1.8	NA	0.1	0.5	0.05	0.19	55.8

**Table A5: Existing Priority Intersection Performance of Edmondson Avenue with Fifth Avenue for the Weekday PM Peak Hour**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fourth Avenue											
1	L2	4	0.0	0.047	3.5	LOS A	0.0	0.3	0.03	0.05	39.9
2	T1	81	0.0	0.047	0.0	LOS A	0.0	0.3	0.03	0.05	39.8
3	R2	5	0.0	0.047	3.8	LOS A	0.0	0.3	0.03	0.05	39.6
Approach		90	0.0	0.047	0.4	NA	0.0	0.3	0.03	0.05	39.8
East: Fifth Avenue											
4	L2	2	0.0	0.007	7.0	LOS A	0.0	0.2	0.22	0.89	37.4
5	T1	1	0.0	0.007	7.3	LOS A	0.0	0.2	0.22	0.89	37.2
6	R2	4	0.0	0.007	7.2	LOS A	0.0	0.2	0.22	0.89	37.1
Approach		7	0.0	0.007	7.2	LOS A	0.0	0.2	0.22	0.89	37.2
North: Fourth Avenue											
7	L2	2	0.0	0.045	3.6	LOS A	0.0	0.2	0.02	0.03	40.0
8	T1	81	0.0	0.045	0.0	LOS A	0.0	0.2	0.02	0.03	39.9
9	R2	4	0.0	0.045	3.8	LOS A	0.0	0.2	0.02	0.03	39.7
Approach		87	0.0	0.045	0.3	NA	0.0	0.2	0.02	0.03	39.8
West: Fifth Avenue											
10	L2	10	0.0	0.012	7.0	LOS A	0.0	0.3	0.18	0.89	37.4
11	T1	1	0.0	0.012	7.3	LOS A	0.0	0.3	0.18	0.89	37.2
12	R2	3	0.0	0.012	7.2	LOS A	0.0	0.3	0.18	0.89	37.1
Approach		14	0.0	0.012	7.0	LOS A	0.0	0.3	0.18	0.89	37.3
All Vehicles		198	0.0	0.047	1.0	NA	0.0	0.3	0.04	0.13	39.5

**Table A6: Existing Stop Intersection Performance of Edmondson Avenue with Fifth Avenue for the Weekday PM Peak Hour**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rickard Road											
1	L2	29	0.0	0.793	49.9	LOS D	3.7	25.7	0.96	1.26	27.2
2	T1	41	0.0	0.793	79.3	LOS F	3.7	25.7	0.96	1.26	27.1
3	R2	31	0.0	0.793	88.1	LOS F	3.7	25.7	0.96	1.26	27.1
Approach		101	0.0	0.793	73.6	LOS F	3.7	25.7	0.96	1.26	27.1
East: Bringelly Road											
4	L2	23	0.0	0.458	10.9	LOS A	1.4	10.0	0.17	0.05	56.8
5	T1	760	0.0	0.458	0.9	LOS A	1.4	10.0	0.17	0.05	58.3
6	R2	45	0.0	0.458	11.9	LOS A	1.4	10.0	0.17	0.05	56.5
Approach		828	0.0	0.458	1.7	NA	1.4	10.0	0.17	0.05	58.2
North: Edmondson Avenue											
7	L2	30	0.0	0.052	13.3	LOS A	0.2	1.3	0.61	0.97	49.7
8	T1	12	0.0	0.352	48.5	LOS D	1.1	7.4	0.95	1.03	31.5
9	R2	19	0.0	0.352	58.8	LOS E	1.1	7.4	0.95	1.03	31.4
Approach		61	0.0	0.352	34.4	LOS C	1.1	7.4	0.78	1.00	38.4
West: Bringelly Road											
10	L2	12	0.0	0.378	10.4	LOS A	0.4	3.0	0.06	0.02	57.8
11	T1	692	0.0	0.378	0.3	LOS A	0.4	3.0	0.06	0.02	59.4
12	R2	12	0.0	0.378	12.3	LOS A	0.4	3.0	0.06	0.02	57.1
Approach		716	0.0	0.378	0.7	NA	0.4	3.0	0.06	0.02	59.3
All Vehicles		1706	0.0	0.793	6.7	NA	3.7	25.7	0.19	0.14	54.0

**Table A7: Existing Stop Intersection Performance of Bringelly Road with Edmondson Avenue and Rickard Road for the Weekday PM Peak Hour**



Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dickson Road											
1	L2	12	0.0	0.346	17.9	LOS B	1.1	7.7	0.91	1.04	36.3
2	T1	23	0.0	0.346	45.0	LOS D	1.1	7.7	0.91	1.04	36.1
3	R2	10	0.0	0.346	55.2	LOS D	1.1	7.7	0.91	1.04	36.0
Approach		45	0.0	0.346	40.0	LOS C	1.1	7.7	0.91	1.04	36.1
East: Bringelly Road											
4	L2	15	0.0	0.477	11.6	LOS A	2.4	16.9	0.29	0.09	55.8
5	T1	708	0.0	0.477	1.6	LOS A	2.4	16.9	0.29	0.09	57.3
6	R2	85	0.0	0.477	11.8	LOS A	2.4	16.9	0.29	0.09	55.2
Approach		808	0.0	0.477	2.9	NA	2.4	16.9	0.29	0.09	57.0
North: Fourth Avenue											
7	L2	26	0.0	0.652	32.1	LOS C	2.5	17.7	0.94	1.15	31.3
8	T1	25	0.0	0.652	61.3	LOS E	2.5	17.7	0.94	1.15	31.2
9	R2	33	0.0	0.652	70.4	LOS E	2.5	17.7	0.94	1.15	31.1
Approach		84	0.0	0.652	55.8	LOS D	2.5	17.7	0.94	1.15	31.2
West: Bringelly Road											
10	L2	14	0.0	0.392	10.5	LOS A	0.8	5.4	0.11	0.03	57.3
11	T1	685	0.0	0.392	0.5	LOS A	0.8	5.4	0.11	0.03	58.9
12	R2	26	0.0	0.392	11.4	LOS A	0.8	5.4	0.11	0.03	56.7
Approach		725	0.0	0.392	1.1	NA	0.8	5.4	0.11	0.03	58.8
All Vehicles		1662	0.0	0.652	5.8	NA	2.5	17.7	0.26	0.14	54.6

**Table A8: Existing Stop Intersection Performance of Bringelly Road with Fourth Avenue and Dickson Road for the Weekday PM Peak Hour**

## APPENDIX B – SIDRA INTERSECTION EXISTING TRAFFIC CONDITIONS WITH ADDITIONAL RESIDENTIAL TRAFFIC

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Edmondson Avenue											
1	L2	20	0.0	0.051	5.6	LOS A	0.1	0.6	0.03	0.19	52.5
2	T1	65	0.0	0.051	0.0	LOS A	0.1	0.6	0.03	0.19	58.2
3	R2	11	0.0	0.051	5.5	LOS A	0.1	0.6	0.03	0.19	52.0
Approach		96	0.0	0.051	1.8	NA	0.1	0.6	0.03	0.19	56.2
East: Fifth Avenue											
4	L2	3	0.0	0.007	4.6	LOS A	0.0	0.2	0.07	0.52	49.7
5	T1	1	0.0	0.007	3.6	LOS A	0.0	0.2	0.07	0.52	46.6
6	R2	4	0.0	0.007	5.1	LOS A	0.0	0.2	0.07	0.52	49.3
Approach		8	0.0	0.007	4.7	LOS A	0.0	0.2	0.07	0.52	49.1
North: Edmondson Avenue											
7	L2	11	0.0	0.016	5.6	LOS A	0.0	0.2	0.07	0.28	51.7
8	T1	15	0.0	0.016	0.1	LOS A	0.0	0.2	0.07	0.28	57.1
9	R2	4	0.0	0.016	5.7	LOS A	0.0	0.2	0.07	0.28	51.2
Approach		30	0.0	0.016	2.8	NA	0.0	0.2	0.07	0.28	54.2
West: Fifth Avenue											
10	L2	19	0.0	0.052	4.7	LOS A	0.2	1.3	0.18	0.52	49.4
11	T1	3	0.0	0.052	3.6	LOS A	0.2	1.3	0.18	0.52	46.3
12	R2	38	0.0	0.052	5.1	LOS A	0.2	1.3	0.18	0.52	49.0
Approach		60	0.0	0.052	4.9	LOS A	0.2	1.3	0.18	0.52	49.0
All Vehicles		194	0.0	0.052	3.0	NA	0.2	1.3	0.08	0.32	53.1

**Table B1: Existing Priority Intersection Performance of Edmondson Avenue with Fifth Avenue for the Weekday AM Peak Hour with Development Traffic**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fourth Avenue											
1	L2	43	0.0	0.081	3.5	LOS A	0.1	0.7	0.05	0.16	39.5
2	T1	99	0.0	0.081	0.0	LOS A	0.1	0.7	0.05	0.16	39.4
3	R2	12	0.0	0.081	3.9	LOS A	0.1	0.7	0.05	0.16	39.2
Approach		154	0.0	0.081	1.3	NA	0.1	0.7	0.05	0.16	39.4
East: Fifth Avenue											
4	L2	9	0.0	0.013	7.0	LOS A	0.0	0.3	0.22	0.90	37.3
5	T1	4	0.0	0.013	7.8	LOS A	0.0	0.3	0.22	0.90	37.1
6	R2	1	0.0	0.013	7.7	LOS A	0.0	0.3	0.22	0.90	37.0
Approach		14	0.0	0.013	7.3	LOS A	0.0	0.3	0.22	0.90	37.3
North: Fourth Avenue											
7	L2	8	0.0	0.067	3.7	LOS A	0.1	0.8	0.08	0.09	39.7
8	T1	103	0.0	0.067	0.1	LOS A	0.1	0.8	0.08	0.09	39.6
9	R2	15	0.0	0.067	4.0	LOS A	0.1	0.8	0.08	0.09	39.4
Approach		126	0.0	0.067	0.8	NA	0.1	0.8	0.08	0.09	39.6
West: Fifth Avenue											
10	L2	12	0.0	0.053	7.0	LOS A	0.2	1.3	0.28	0.89	37.2
11	T1	1	0.0	0.053	7.8	LOS A	0.2	1.3	0.28	0.89	37.0
12	R2	33	0.0	0.053	7.9	LOS A	0.2	1.3	0.28	0.89	36.9
Approach		46	0.0	0.053	7.7	LOS A	0.2	1.3	0.28	0.89	37.0
All Vehicles		340	0.0	0.081	2.2	NA	0.2	1.3	0.10	0.26	39.0

**Table B2: Existing Stop Intersection Performance of Edmondson Avenue with Fifth Avenue for the Weekday AM Peak Hour with Development Traffic**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rickard Road											
1	L2	15	0.0	0.384	19.1	LOS B	1.2	8.7	0.91	1.05	36.0
2	T1	31	0.0	0.384	48.8	LOS D	1.2	8.7	0.91	1.05	35.9
3	R2	5	0.0	0.384	56.9	LOS E	1.2	8.7	0.91	1.05	35.7
Approach		51	0.0	0.384	40.9	LOS C	1.2	8.7	0.91	1.05	35.9
East: Bringelly Road											
4	L2	25	0.0	0.439	11.5	LOS A	1.5	10.4	0.19	0.05	56.6
5	T1	715	0.0	0.439	1.0	LOS A	1.5	10.4	0.19	0.05	58.1
6	R2	43	0.0	0.439	12.7	LOS A	1.5	10.4	0.19	0.05	56.3
Approach		783	0.0	0.439	2.0	NA	1.5	10.4	0.19	0.05	58.0
North: Edmondson Avenue											
7	L2	22	0.0	0.040	13.6	LOS A	0.1	1.0	0.63	0.96	49.5
8	T1	29	0.0	0.402	50.6	LOS D	1.2	8.7	0.95	1.05	32.0
9	R2	10	0.0	0.402	60.4	LOS E	1.2	8.7	0.95	1.05	31.9
Approach		61	0.0	0.402	38.9	LOS C	1.2	8.7	0.83	1.01	36.7
West: Bringelly Road											
10	L2	22	0.0	0.434	10.7	LOS A	1.0	7.2	0.13	0.04	57.1
11	T1	745	0.0	0.434	0.6	LOS A	1.0	7.2	0.13	0.04	58.7
12	R2	30	0.0	0.434	12.2	LOS A	1.0	7.2	0.13	0.04	56.5
Approach		797	0.0	0.434	1.4	NA	1.0	7.2	0.13	0.04	58.6
All Vehicles		1692	0.0	0.439	4.2	NA	1.5	10.4	0.21	0.11	56.0

**Table B3: Existing Stop Intersection Performance of Bringelly Road with Edmondson Avenue and Rickard Road for the Weekday AM Peak Hour with Development Traffic**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dickson Road											
1	L2	7	0.0	0.308	15.2	LOS B	1.0	6.8	0.90	1.04	37.2
2	T1	31	0.0	0.308	40.7	LOS C	1.0	6.8	0.90	1.04	37.0
3	R2	4	0.0	0.308	52.4	LOS D	1.0	6.8	0.90	1.04	36.9
Approach		42	0.0	0.308	37.6	LOS C	1.0	6.8	0.90	1.04	37.1
East: Bringelly Road											
4	L2	5	0.0	0.504	12.7	LOS A	4.1	28.4	0.52	0.19	53.7
5	T1	584	0.0	0.504	3.4	LOS A	4.1	28.4	0.52	0.19	55.1
6	R2	151	0.0	0.504	12.6	LOS A	4.1	28.4	0.52	0.19	53.2
Approach		740	0.0	0.504	5.4	NA	4.1	28.4	0.52	0.19	54.7
North: Fourth Avenue											
7	L2	55	0.0	1.001	139.9	LOS F	12.5	87.2	1.00	2.13	16.4
8	T1	31	0.0	1.001	167.3	LOS F	12.5	87.2	1.00	2.13	16.4
9	R2	60	0.0	1.001	178.1	LOS F	12.5	87.2	1.00	2.13	16.4
Approach		146	0.0	1.001	161.4	LOS F	12.5	87.2	1.00	2.13	16.4
West: Bringelly Road											
10	L2	11	0.0	0.396	8.2	LOS A	0.3	1.8	0.04	0.02	58.0
11	T1	739	0.0	0.396	0.1	LOS A	0.3	1.8	0.04	0.02	59.6
12	R2	10	0.0	0.396	9.8	LOS A	0.3	1.8	0.04	0.02	57.4
Approach		760	0.0	0.396	0.4	NA	0.3	1.8	0.04	0.02	59.6
All Vehicles		1688	0.0	1.001	17.4	NA	12.5	87.2	0.35	0.30	46.5

**Table B4: Existing Stop Intersection Performance of Bringelly Road with Fourth Avenue and Dickson Road for the Weekday AM Peak Hour with Development Traffic**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Edmondson Avenue											
1	L2	36	0.0	0.055	5.6	LOS A	0.1	0.6	0.04	0.25	52.0
2	T1	58	0.0	0.055	0.0	LOS A	0.1	0.6	0.04	0.25	57.5
3	R2	10	0.0	0.055	5.6	LOS A	0.1	0.6	0.04	0.25	51.5
Approach		104	0.0	0.055	2.5	NA	0.1	0.6	0.04	0.25	54.9
East: Fifth Avenue											
4	L2	8	0.0	0.011	4.7	LOS A	0.0	0.3	0.13	0.51	49.5
5	T1	1	0.0	0.011	3.8	LOS A	0.0	0.3	0.13	0.51	46.4
6	R2	5	0.0	0.011	5.2	LOS A	0.0	0.3	0.13	0.51	49.1
Approach		14	0.0	0.011	4.8	LOS A	0.0	0.3	0.13	0.51	49.1
North: Edmondson Avenue											
7	L2	10	0.0	0.034	5.7	LOS A	0.1	0.4	0.06	0.15	52.7
8	T1	48	0.0	0.034	0.0	LOS A	0.1	0.4	0.06	0.15	58.4
9	R2	7	0.0	0.034	5.7	LOS A	0.1	0.4	0.06	0.15	52.1
Approach		65	0.0	0.034	1.5	NA	0.1	0.4	0.06	0.15	56.7
West: Fifth Avenue											
10	L2	10	0.0	0.019	4.7	LOS A	0.1	0.5	0.16	0.52	49.5
11	T1	1	0.0	0.019	3.7	LOS A	0.1	0.5	0.16	0.52	46.4
12	R2	11	0.0	0.019	5.2	LOS A	0.1	0.5	0.16	0.52	49.0
Approach		22	0.0	0.019	4.9	LOS A	0.1	0.5	0.16	0.52	49.1
All Vehicles		205	0.0	0.055	2.6	NA	0.1	0.6	0.07	0.27	54.3

**Table B5: Existing Priority Intersection Performance of Edmondson Avenue with Fifth Avenue for the Weekday PM Peak Hour with Development Traffic**



Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Fourth Avenue											
1	L2	4	0.0	0.055	3.6	LOS A	0.1	0.8	0.08	0.10	39.7
2	T1	81	0.0	0.055	0.1	LOS A	0.1	0.8	0.08	0.10	39.5
3	R2	18	0.0	0.055	3.8	LOS A	0.1	0.8	0.08	0.10	39.3
Approach		103	0.0	0.055	0.9	NA	0.1	0.8	0.08	0.10	39.5
East: Fifth Avenue											
4	L2	4	0.0	0.011	7.0	LOS A	0.0	0.3	0.22	0.89	37.4
5	T1	1	0.0	0.011	7.4	LOS A	0.0	0.3	0.22	0.89	37.2
6	R2	6	0.0	0.011	7.4	LOS A	0.0	0.3	0.22	0.89	37.1
Approach		11	0.0	0.011	7.2	LOS A	0.0	0.3	0.22	0.89	37.2
North: Fourth Avenue											
7	L2	7	0.0	0.048	3.5	LOS A	0.0	0.2	0.02	0.06	39.9
8	T1	81	0.0	0.048	0.0	LOS A	0.0	0.2	0.02	0.06	39.8
9	R2	4	0.0	0.048	3.8	LOS A	0.0	0.2	0.02	0.06	39.6
Approach		92	0.0	0.048	0.4	NA	0.0	0.2	0.02	0.06	39.8
West: Fifth Avenue											
10	L2	10	0.0	0.012	7.0	LOS A	0.0	0.3	0.18	0.89	37.4
11	T1	1	0.0	0.012	7.4	LOS A	0.0	0.3	0.18	0.89	37.2
12	R2	3	0.0	0.012	7.3	LOS A	0.0	0.3	0.18	0.89	37.1
Approach		14	0.0	0.012	7.1	LOS A	0.0	0.3	0.18	0.89	37.3
All Vehicles		220	0.0	0.055	1.4	NA	0.1	0.8	0.07	0.17	39.4

**Table B6: Existing Stop Intersection Performance of Edmondson Avenue with Fifth Avenue for the Weekday PM Peak Hour with Development Traffic**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rickard Road											
1	L2	29	0.0	1.004	154.6	LOS F	11.0	76.8	1.00	1.97	15.1
2	T1	61	0.0	1.004	186.1	LOS F	11.0	76.8	1.00	1.97	15.1
3	R2	31	0.0	1.004	195.5	LOS F	11.0	76.8	1.00	1.97	15.1
Approach		121	0.0	1.004	180.9	LOS F	11.0	76.8	1.00	1.97	15.1
East: Bringelly Road											
4	L2	23	0.0	0.471	11.2	LOS A	1.7	12.2	0.21	0.06	56.5
5	T1	760	0.0	0.471	1.0	LOS A	1.7	12.2	0.21	0.06	58.0
6	R2	55	0.0	0.471	12.0	LOS A	1.7	12.2	0.21	0.06	56.3
Approach		838	0.0	0.471	2.0	NA	1.7	12.2	0.21	0.06	57.9
North: Edmondson Avenue											
7	L2	34	0.0	0.059	13.3	LOS A	0.2	1.4	0.61	0.97	49.7
8	T1	14	0.0	0.390	51.6	LOS D	1.2	8.2	0.95	1.04	30.5
9	R2	19	0.0	0.390	63.8	LOS E	1.2	8.2	0.95	1.04	30.4
Approach		67	0.0	0.390	35.6	LOS C	1.2	8.2	0.78	1.01	37.9
West: Bringelly Road											
10	L2	12	0.0	0.378	10.4	LOS A	0.4	3.0	0.06	0.02	57.8
11	T1	692	0.0	0.378	0.3	LOS A	0.4	3.0	0.06	0.02	59.4
12	R2	12	0.0	0.378	12.3	LOS A	0.4	3.0	0.06	0.02	57.1
Approach		716	0.0	0.378	0.7	NA	0.4	3.0	0.06	0.02	59.3
All Vehicles		1742	0.0	1.004	15.2	NA	11.0	76.8	0.22	0.21	47.9

**Table B7: Existing Stop Intersection Performance of Bringelly Road with Edmondson Avenue and Rickard Road for the Weekday PM Peak Hour with Development Traffic**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dickson Road											
1	L2	12	0.0	0.351	18.1	LOS B	1.1	7.8	0.91	1.05	36.0
2	T1	23	0.0	0.351	46.0	LOS D	1.1	7.8	0.91	1.05	35.9
3	R2	10	0.0	0.351	55.6	LOS D	1.1	7.8	0.91	1.05	35.8
Approach		45	0.0	0.351	40.7	LOS C	1.1	7.8	0.91	1.05	35.9
East: Bringelly Road											
4	L2	15	0.0	0.479	11.8	LOS A	2.5	17.3	0.30	0.09	55.7
5	T1	708	0.0	0.479	1.7	LOS A	2.5	17.3	0.30	0.09	57.2
6	R2	85	0.0	0.479	12.0	LOS A	2.5	17.3	0.30	0.09	55.2
Approach		808	0.0	0.479	2.9	NA	2.5	17.3	0.30	0.09	57.0
North: Fourth Avenue											
7	L2	26	0.0	0.680	35.0	LOS C	2.7	18.9	0.94	1.16	30.4
8	T1	26	0.0	0.680	64.7	LOS E	2.7	18.9	0.94	1.16	30.3
9	R2	34	0.0	0.680	73.9	LOS F	2.7	18.9	0.94	1.16	30.2
Approach		86	0.0	0.680	59.3	LOS E	2.7	18.9	0.94	1.16	30.3
West: Bringelly Road											
10	L2	27	0.0	0.399	9.7	LOS A	0.8	5.9	0.12	0.04	57.2
11	T1	685	0.0	0.399	0.5	LOS A	0.8	5.9	0.12	0.04	58.8
12	R2	26	0.0	0.399	11.5	LOS A	0.8	5.9	0.12	0.04	56.6
Approach		738	0.0	0.399	1.3	NA	0.8	5.9	0.12	0.04	58.6
All Vehicles		1677	0.0	0.680	6.1	NA	2.7	18.9	0.27	0.15	54.3

**Table B8: Existing Stop Intersection Performance of Bringelly Road with Fourth Avenue and Dickson Road for the Weekday PM Peak Hour with Development Traffic**

## APPENDIX C – SIDRA INTERSECTION EXISTING TRAFFIC CONDITIONS WITH ADDITIONAL RESIDENTIAL TRAFFIC AND TRAFFIC SIGNALS

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rickard Road											
1	L2	15	0.0	0.033	16.5	LOS B	0.2	1.3	0.83	0.66	46.8
2	T1	31	0.0	0.072	11.1	LOS A	0.3	2.3	0.83	0.60	50.4
3	R2	5	0.0	0.072	16.8	LOS B	0.3	2.3	0.84	0.62	49.7
Approach		51	0.0	0.072	13.3	LOS A	0.3	2.3	0.83	0.62	49.2
East: Bringelly Road											
4	L2	25	0.0	0.154	12.1	LOS A	1.1	7.7	0.67	0.57	52.7
5	T1	715	0.0	0.348	6.9	LOS A	2.9	20.3	0.72	0.59	53.8
6	R2	43	0.0	0.109	13.6	LOS A	0.5	3.3	0.72	0.70	48.6
Approach		783	0.0	0.348	7.4	LOS A	2.9	20.3	0.72	0.60	53.5
North: Edmondson Avenue											
7	L2	22	0.0	0.049	16.6	LOS B	0.3	1.9	0.83	0.68	46.8
8	T1	29	0.0	0.065	11.1	LOS A	0.3	2.0	0.83	0.60	50.1
9	R2	10	0.0	0.065	16.8	LOS B	0.3	2.0	0.84	0.63	48.8
Approach		61	0.0	0.065	14.0	LOS A	0.3	2.0	0.83	0.63	48.6
West: Bringelly Road											
10	L2	22	0.0	0.107	11.9	LOS A	0.7	5.1	0.65	0.56	52.5
11	T1	745	0.0	0.342	6.9	LOS A	2.8	19.9	0.72	0.59	53.8
12	R2	30	0.0	0.075	13.5	LOS A	0.3	2.2	0.71	0.68	48.6
Approach		797	0.0	0.342	7.3	LOS A	2.8	19.9	0.72	0.60	53.6
All Vehicles		1692	0.0	0.348	7.8	LOS A	2.9	20.3	0.72	0.60	53.2

**Table C1: Signalised Intersection Performance of Bringelly Road with Edmondson Avenue and Rickard Road for the Weekday AM Peak Hour with Development Traffic**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dickson Road											
1	L2	7	0.0	0.045	16.7	LOS B	0.2	1.4	0.83	0.62	48.7
2	T1	31	0.0	0.055	11.1	LOS A	0.3	1.9	0.83	0.60	50.4
3	R2	4	0.0	0.010	16.4	LOS B	0.0	0.3	0.82	0.62	46.9
Approach		42	0.0	0.055	12.5	LOS A	0.3	1.9	0.83	0.60	49.8
East: Bringelly Road											
4	L2	5	0.0	0.123	12.0	LOS A	0.9	6.3	0.66	0.53	53.5
5	T1	584	0.0	0.278	6.8	LOS A	2.2	15.7	0.70	0.58	53.8
6	R2	151	0.0	0.278	14.5	LOS A	1.3	9.0	0.78	0.71	48.8
Approach		740	0.0	0.278	8.4	LOS A	2.2	15.7	0.72	0.61	52.7
North: Fourth Avenue											
7	L2	55	0.0	0.122	16.9	LOS B	0.7	4.9	0.85	0.71	46.6
8	T1	31	0.0	0.054	11.0	LOS A	0.3	1.8	0.83	0.58	51.0
9	R2	60	0.0	0.153	17.1	LOS B	0.8	5.4	0.86	0.72	46.8
Approach		146	0.0	0.153	15.7	LOS B	0.8	5.4	0.85	0.69	47.5
West: Bringelly Road											
10	L2	11	0.0	0.015	11.5	LOS A	0.1	0.7	0.62	0.64	49.3
11	T1	739	0.0	0.410	7.2	LOS A	3.5	24.7	0.75	0.62	53.7
12	R2	10	0.0	0.016	13.1	LOS A	0.1	0.5	0.69	0.63	48.9
Approach		760	0.0	0.410	7.3	LOS A	3.5	24.7	0.74	0.62	53.6
All Vehicles		1688	0.0	0.410	8.7	LOS A	3.5	24.7	0.74	0.62	52.5

**Table C2: Signalised Intersection Performance of Bringelly Road with Fourth Avenue and Dickson Road for the Weekday AM Peak Hour with Development Traffic**

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Rickard Road											
1	L2	29	0.0	0.065	16.6	LOS B	0.4	2.5	0.84	0.69	46.7
2	T1	41	0.0	0.146	11.3	LOS A	0.7	4.7	0.85	0.64	49.6
3	R2	31	0.0	0.146	17.1	LOS B	0.7	4.7	0.86	0.68	48.0
Approach		101	0.0	0.146	14.6	LOS B	0.7	4.7	0.85	0.66	48.3
East: Bringelly Road											
4	L2	23	0.0	0.163	12.1	LOS A	1.2	8.3	0.67	0.57	52.8
5	T1	760	0.0	0.367	7.0	LOS A	3.1	21.6	0.72	0.60	53.8
6	R2	55	0.0	0.134	13.7	LOS A	0.6	4.2	0.73	0.71	48.5
Approach		838	0.0	0.367	7.5	LOS A	3.1	21.6	0.72	0.61	53.4
North: Edmondson Avenue											
7	L2	34	0.0	0.076	16.7	LOS B	0.4	3.0	0.84	0.69	46.7
8	T1	14	0.0	0.052	11.0	LOS A	0.3	1.8	0.83	0.57	50.7
9	R2	19	0.0	0.052	16.7	LOS B	0.3	1.8	0.83	0.67	47.0
Approach		67	0.0	0.076	15.5	LOS B	0.4	3.0	0.84	0.66	47.6
West: Bringelly Road											
10	L2	12	0.0	0.098	11.9	LOS A	0.7	4.7	0.65	0.53	53.0
11	T1	692	0.0	0.313	6.8	LOS A	2.6	18.0	0.71	0.58	53.9
12	R2	16	0.0	0.041	14.1	LOS A	0.2	1.2	0.73	0.67	48.2
Approach		720	0.0	0.313	7.1	LOS A	2.6	18.0	0.71	0.58	53.8
All Vehicles		1726	0.0	0.367	8.1	LOS A	3.1	21.6	0.73	0.60	53.0

**Table C3: Signalised Intersection Performance of Bringelly Road with Edmondson Avenue and Rickard Road for the Weekday PM Peak Hour with Development Traffic**



Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Dickson Road											
1	L2	12	0.0	0.040	16.6	LOS B	0.2	1.4	0.83	0.64	47.6
2	T1	23	0.0	0.049	11.0	LOS A	0.2	1.7	0.83	0.59	50.4
3	R2	10	0.0	0.025	16.5	LOS B	0.1	0.9	0.83	0.65	46.9
Approach		45	0.0	0.049	13.7	LOS A	0.2	1.7	0.83	0.62	48.8
East: Bringelly Road											
4	L2	15	0.0	0.129	12.0	LOS A	0.9	6.5	0.66	0.55	53.0
5	T1	708	0.0	0.291	6.8	LOS A	2.4	16.5	0.70	0.58	54.0
6	R2	85	0.0	0.217	14.8	LOS B	1.0	7.1	0.78	0.73	48.0
Approach		808	0.0	0.291	7.7	LOS A	2.4	16.5	0.71	0.59	53.2
North: Fourth Avenue											
7	L2	26	0.0	0.058	16.6	LOS B	0.3	2.3	0.84	0.68	46.7
8	T1	26	0.0	0.045	11.0	LOS A	0.2	1.5	0.83	0.57	51.0
9	R2	34	0.0	0.086	16.8	LOS B	0.4	3.0	0.84	0.69	46.9
Approach		86	0.0	0.086	15.0	LOS B	0.4	3.0	0.84	0.65	48.0
West: Bringelly Road											
10	L2	27	0.0	0.036	11.6	LOS A	0.2	1.7	0.63	0.67	49.3
11	T1	685	0.0	0.380	7.1	LOS A	3.2	22.5	0.74	0.61	53.8
12	R2	26	0.0	0.044	13.3	LOS A	0.2	1.3	0.70	0.66	48.8
Approach		738	0.0	0.380	7.5	LOS A	3.2	22.5	0.73	0.61	53.4
All Vehicles		1677	0.0	0.380	8.1	LOS A	3.2	22.5	0.73	0.61	52.9

**Table C4: Singalised Stop Intersection Performance of Bringelly Road with Fourth Avenue and Dickson Road for the Weekday PM Peak Hour with Development Traffic**