PACIFIC PLANNING PTY LTD

TRAFFIC AND PARKING IMPACT ASSESSMENT
FOR PLANNING PROPOSAL
FOR PROPOSED REZONING
FROM IN1 GENERAL INDUSTRIAL
TO B5 BUSINESS DEVELOPMENT
AT
2 BACHELL AVENUE
LIDCOMBE

REV A

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Job No.: 1179/1/19
Report No.: 21/18

JANUARY 2019

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1.0 INTRODUCTION

1.1 Background

This report has been prepared in support of a Planning Proposal to be submitted to Cumberland Council in relation to Industrial zoned land at 2 Bachell Avenue, Lidcombe. The existing site is zoned IN1 General Industrial, and the Planning Proposal seeks to rezone the land to B5 Business Development and amend the corresponding maximum floor space ratio control to facilitate a mix of employment generating business uses in accordance with the objectives of the Business Development zone.

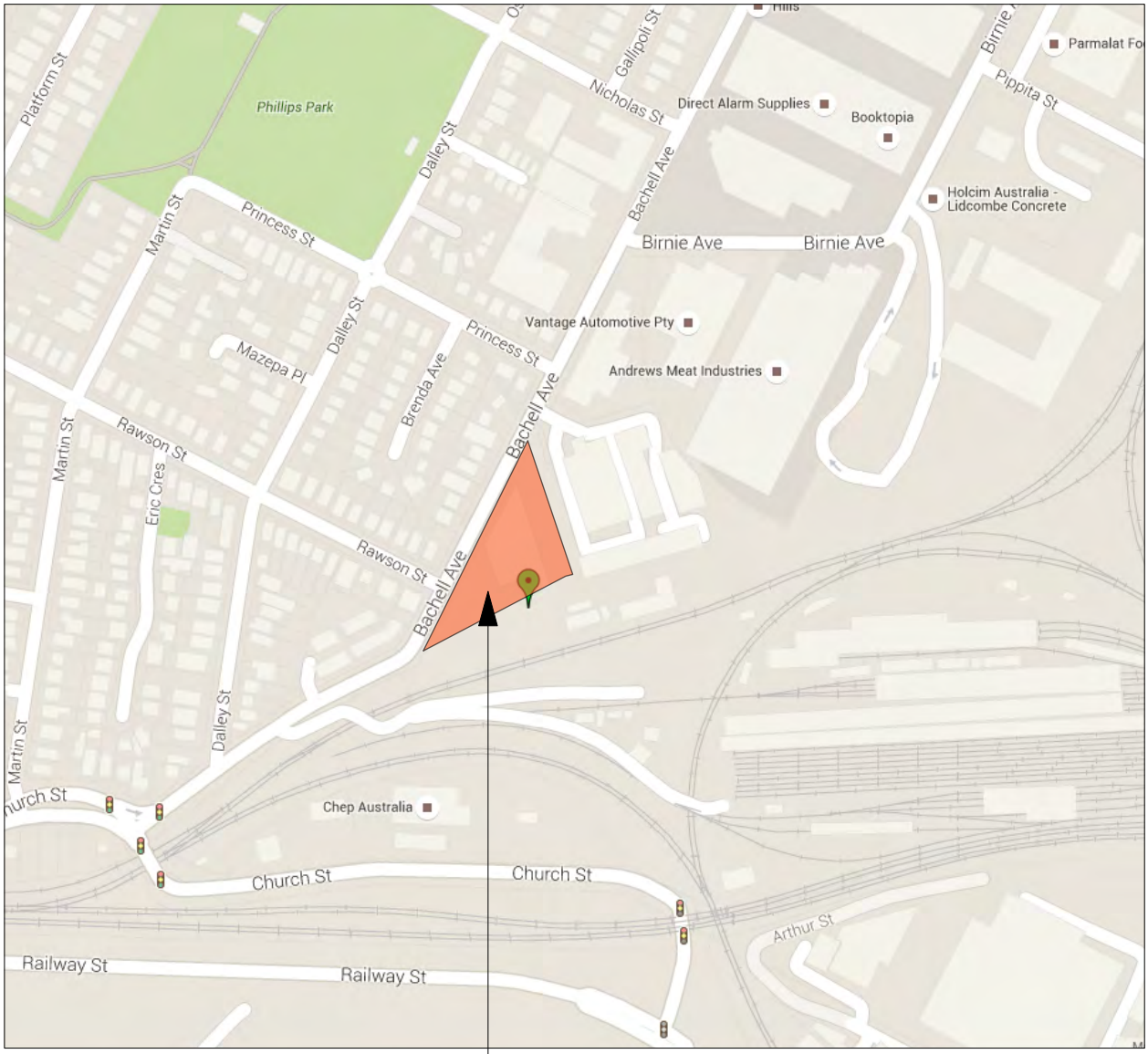
This Traffic and Parking report has been prepared to assess the traffic and parking impacts associated with the traffic generated under the proposed 3:1 FSR development scenario.

The site is shown in the Locality Plan at **Figure 1**. The site is also known as Lot 2 DP 219413 and is located on the eastern side of Bachell Avenue. The site area is 8738m^2.

1.2 Scope of Report

This report addresses the traffic and parking impacts arising from the operation of the proposed business development generally in accordance with *Section 2 of the RTA Guide to Traffic Generating developments* and describes our investigations and findings in respect of the following matters:-

- Road Inventory and Traffic Controls.
- Existing traffic volumes.
- Parking requirements and provision.
- Access to the site.
- Future traffic generation by the development.
- Assignment of Traffic to the Existing Road Network System
- Internal parking layout and traffic circulation.
- Delivery and service vehicles.
- Traffic and parking impacts.



PROPOSED SITE:
2 BACHELL AVE, LIDCOMBE

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FIGURE 1
LOCALITY MAP
SCALE 1:6000(A4)

1.3 Transport Choice

We refer to the Report Transport Choice- Integrating Land-use and Transport, Improving Transport Choice- Guidelines for Planning and Development DUAP 2001.

We refer to *Principle 1* in this document which states:-

"Develop concentrated centres containing the highest appropriate densities of housing, employment, services and public facilities within an acceptable walking distance — 400 to 1000 metres — of major public transport nodes, such as railway stations and high frequency bus routes with at least a 15-minute frequency at peak times."

The proposed development is located approximately 893 metres to Lidcombe Railway Station. The town centre is also located on the southern side of the Railway Station. To the west of Bachell Avenue the site is a residential area and south of the subject site is a number of schools, churches and nursing homes.

This development creates an environment which provides for a choice in transport modes, bicycles, walking, car share and public transport. Facilities will be provided that allow users to make sustainable choices creating a better environment and reducing car dependent trips.

2.0 EXISTING TRAFFIC CONDITIONS

2.1 Existing Road Network

The site has a frontage of approximately **203.935** metres to Bachell Avenue and is triangular in shape and has a site area of **8738m^2**. The site is also known as **Lot 2 D.P. 219413.** The site is located in Lidcombe and is approximately **893** metres from Lidcombe Railway Station from the south western corner (boundary) of the site.

Bachell Avenue runs north-south and has two lanes in each direction (one for kerb side parking and one for traffic flow.) Bachell Avenue connects to Church Street south of the subject site and Birnie Avenue north of the subject site. Bachell Avenue connects to Parramatta Road, with an unsignalized intersection.

The Road Inventory and number of traffic lanes are illustrated in **Figure 2a** Street Inventory.

2.2 Road Inventory and Parking

Bachell Avenue has a **60**Km/hr speed limit and is **13.04** metres wide kerb to kerb. The nearest cross street is Rawson Street which has a **50**Km/hr speed limit and has restricted **2P** special event parking. Many of the local residential streets to the west of Bachell Avenue have 2P *special event parking* to *restrict* patrons attending events at Olympic Park from parking in these residential streets. These signs are shown in Photographs **P1** and **P2.**

Bachell Avenue has *unrestricted parking on both sides*. Refer to **Figure 2a Street Inventory**.

2.3 Existing Peak Hour Traffic Volumes

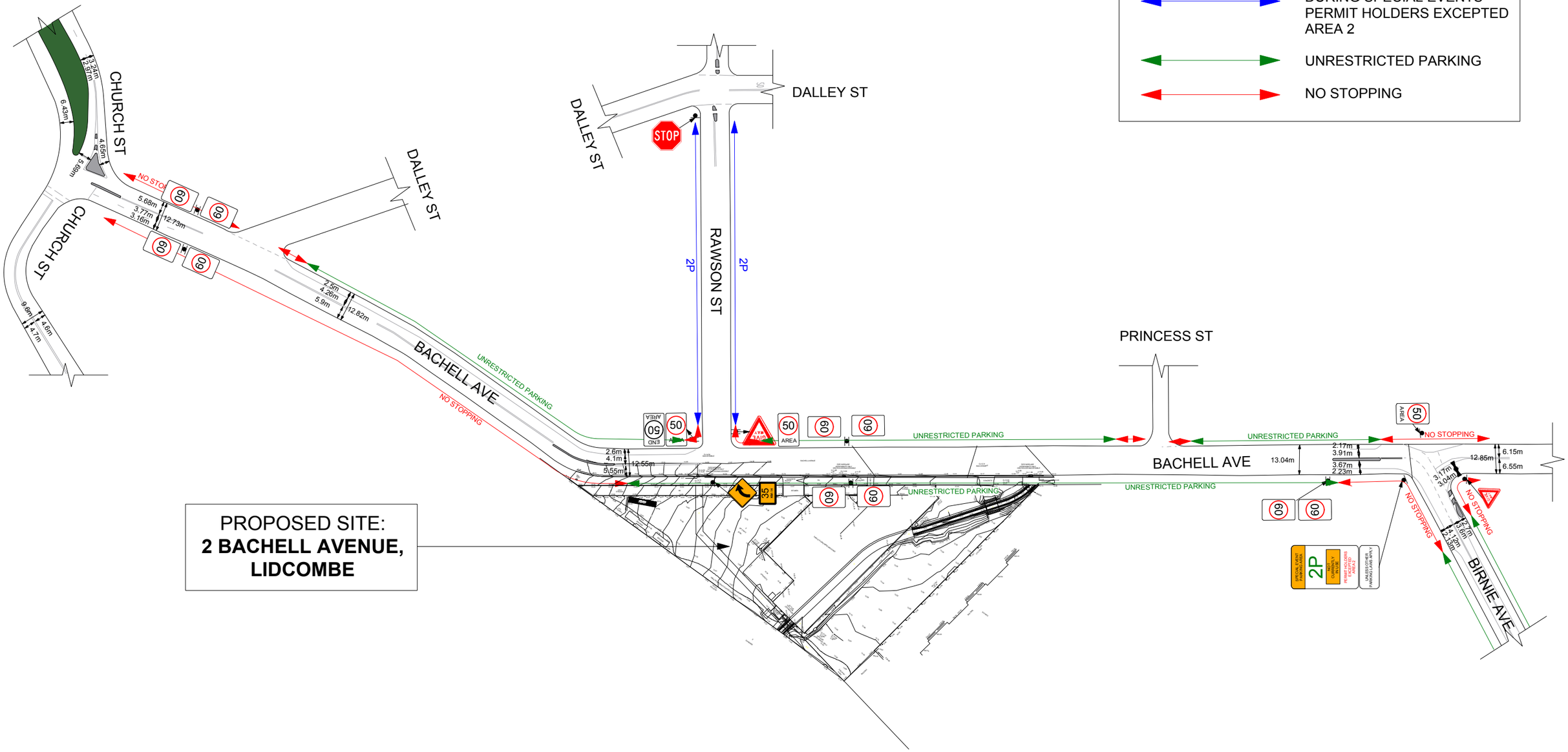
Traffic Counts were made at the following intersections in *15-minute intervals* on Tuesday 1st December 2015 from **7:00am** to **9:00am** and **4:00pm** to **6:00pm** to correspond with the commuter *peak hours* and on Wednesday 2nd December 2015 respectively. The location of the Traffic Counts are shown in **Figure 2b.**

Tuesday 1st December:

- Church Street Railway Street.
- Arthur Street/ Railway Street.

Wednesday 2nd December:

- Swete Street/ Church Street.
- Church Street/. Railway Street Bridge.
- Bachell Avenue/ Church Street.



LEGEND

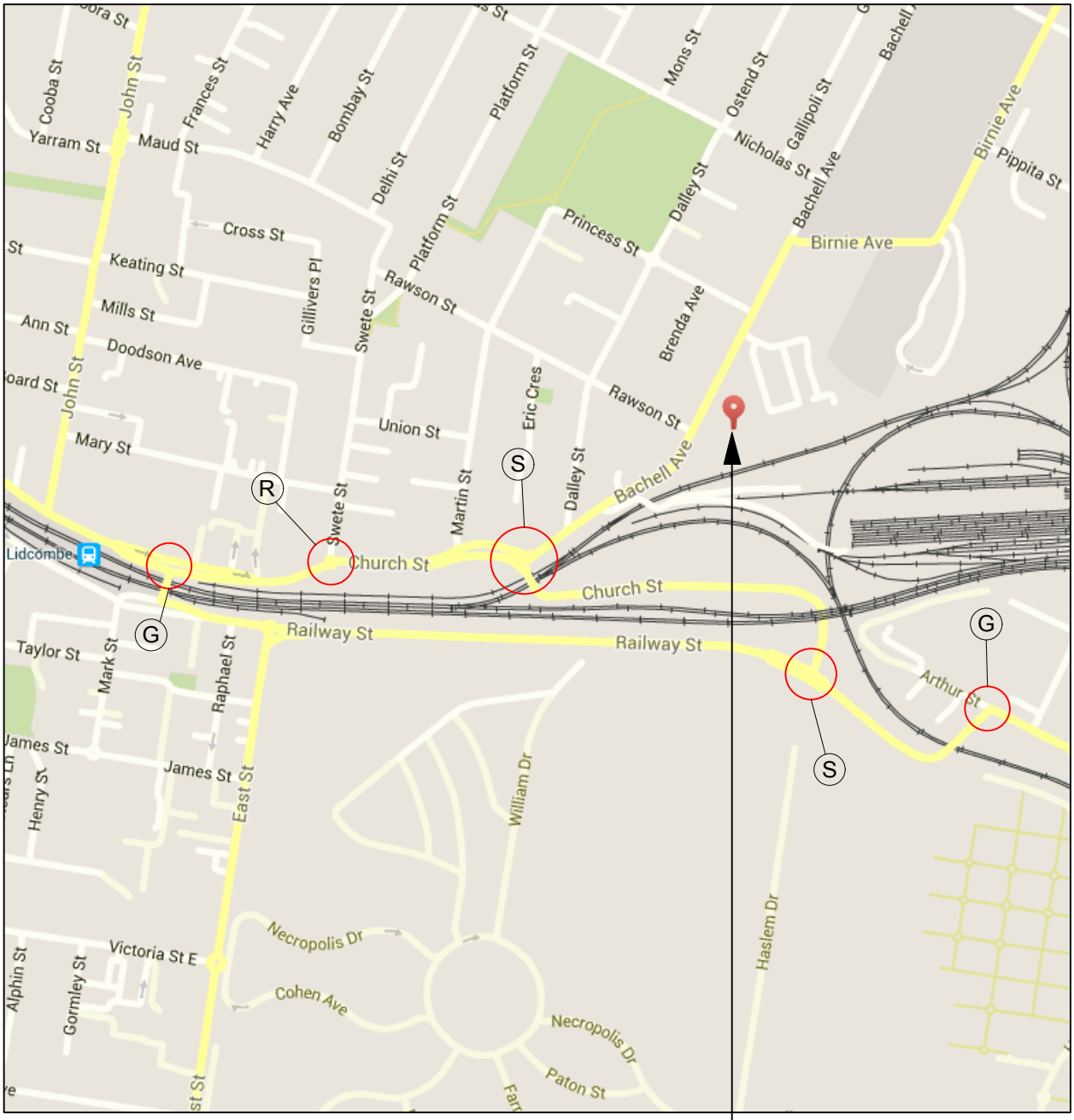
- 2P — 2P DURING SPECIAL EVENTS PERMIT HOLDERS EXCEPTED AREA 2
- UNRESTRICTED PARKING
- NO STOPPING

0m 50m

FIGURE 2a
STREET INVENTORY
2 BACHELL AVE, LIDCOMBE
SCALE - 1:1750(A3)

Photograph 1: **Sign on the corner of Bachell Avenue and Birnie Avenue**

Photograph 2: **Sign along Rawson Street**



LEGEND

- G — GIVEWAY/STOP
- S — SIGNALS
- R — ROUNDABOUT
- ○ — TRAFFIC COUNT LOCATION

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FIGURE 2b
TRAFFIC COUNT LOCATIONS

2.3 (Continued)

The **AM** peak hour was **7:30am – 8:30am** at Swete St and Church Street , Bachell Ave and Church Street and **7:45am - 8:45am** at Church Street / Railway Street and Arthur Street / Railway Street and **8:00am – 9:00am** at Church Street Railway Street Bridge. The **PM** peak hour was **5:00 – 6:00pm** at Swete St/ Church St, Church Street / Railway Street and Bachell Avenue / Church Street and at Arthur Street/ Railway Street and at Church Street/ Railway Street Bridge the **PM** peak hour was **4.45 – 5.45pm**.

The **AM** and **PM** peak hour Traffic Volume Counts are illustrated in **Figure 3**.

2.4 Intersection Performance

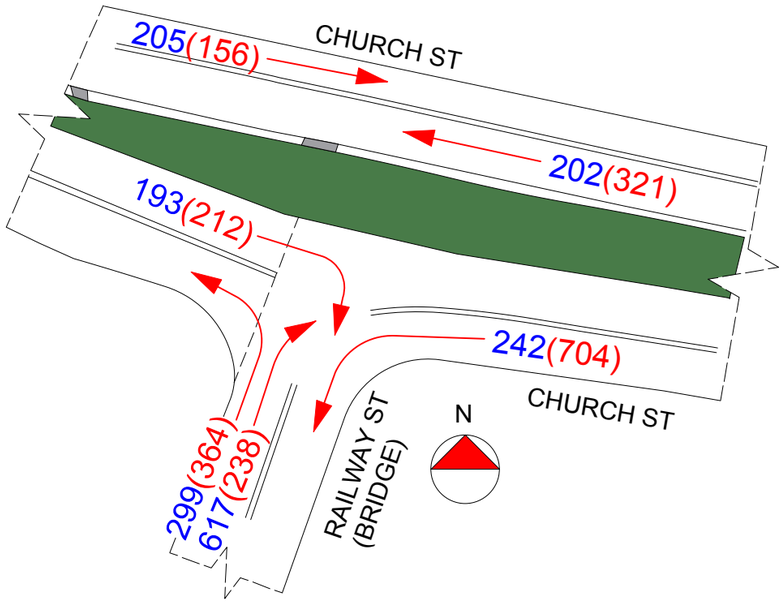
The signalized intersections have been analysed using **SIDRA**.

The network performance is determined by the *Level of Service* (**LoS**) *Average Vehicle Delay* (**AVD**), *Degree of Saturation* (**DoS**) and maximum delay on the critical movement during peak hours. The Level of Service criteria for intersections are explained in **Table 4.2** taken from the *RTA Guide to Traffic Engineering Developments*.

Table 4.2
(RTA Guide to Traffic Generating Developments)
Level of Service Criteria for Intersections.

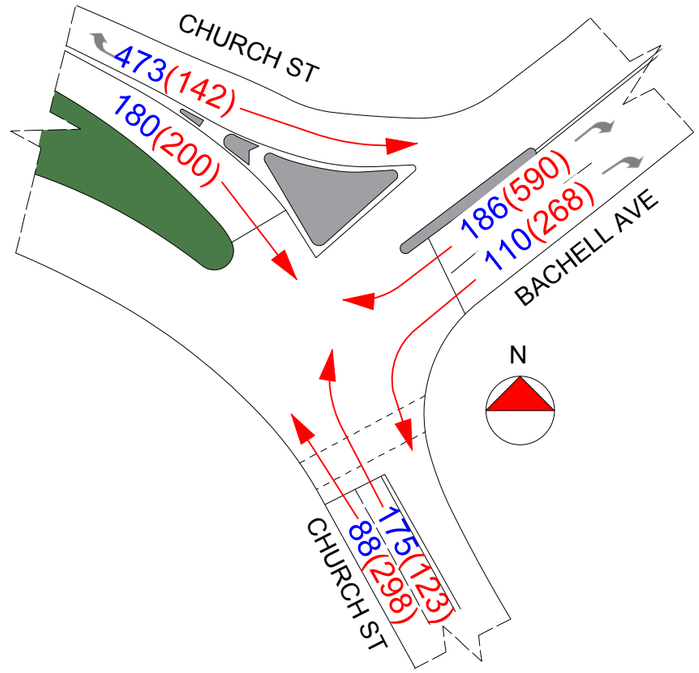
Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 TO 28	Good with acceptable delays spare capacity	Acceptable delays & spare capacity
C	29 TO 42	Satisfactory	Satisfactory, but accident study required
D	43 TO 56	Operating near capacity	Near capacity & accident study required
E	57 TO 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control mode	At capacity, requires other control mode

The results of the analysis are set out in **Table 2.4**



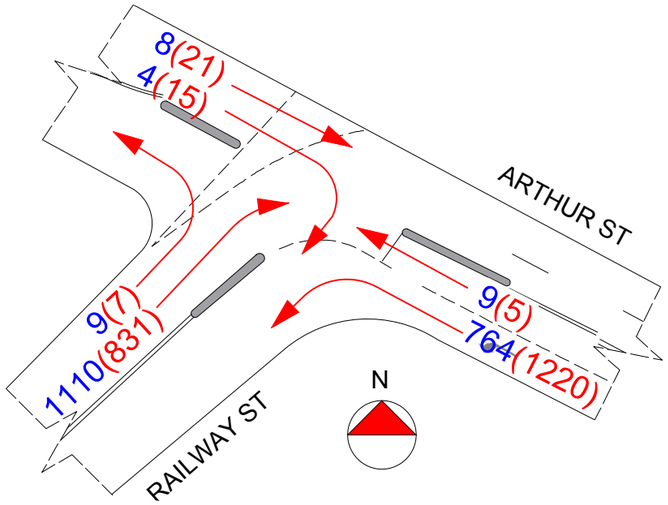
CHURCH ST/RAILWAY ST (BRIDGE)
TRAFFIC VOLUME COUNT
CARRIED OUT WEDNESDAY 2/12/15

LEGEND
AM PEAK HOUR
8:00-9:00AM = 193
PM PEAK HOUR
4:45-5:45PM = (212)



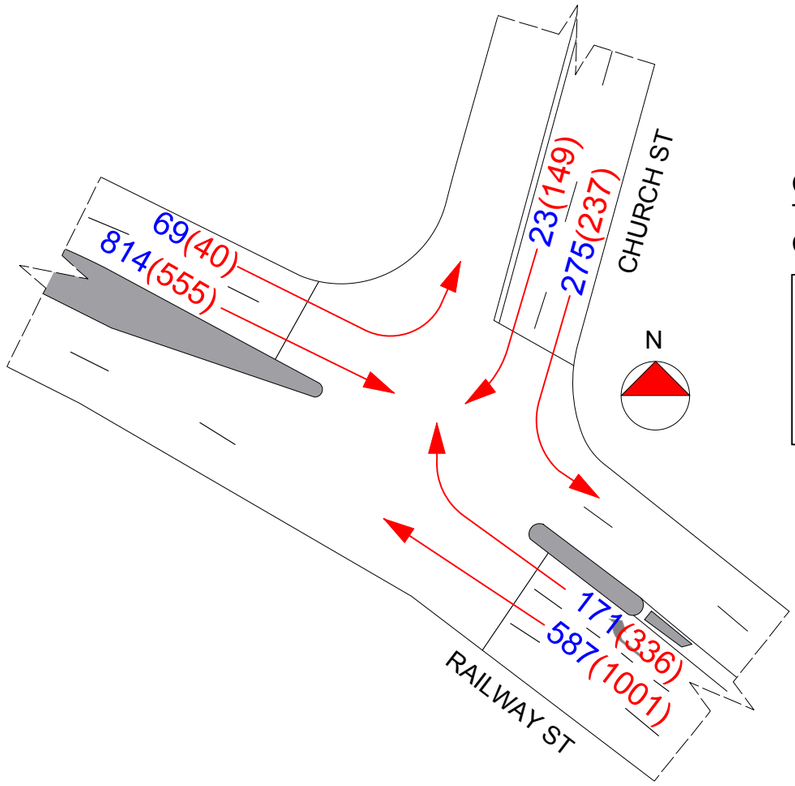
CHURCH ST/BACHELL AVENUE
TRAFFIC VOLUME COUNT
CARRIED OUT WEDNESDAY 2/12/15

LEGEND
AM PEAK HOUR
7:30-8:30AM = 180
PM PEAK HOUR
5:00-6:00PM = (200)



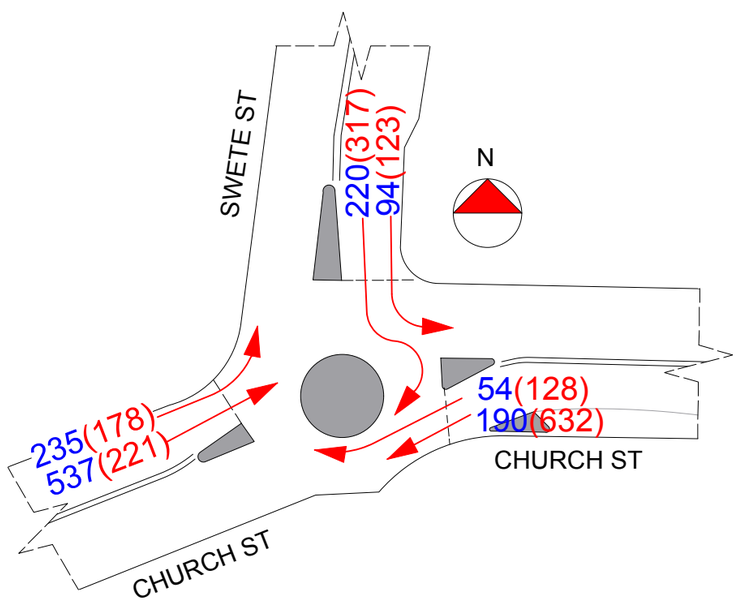
ARTHUR ST/RAILWAY ST
TRAFFIC VOLUME COUNT
CARRIED OUT TUESDAY 1/12/15

LEGEND
AM PEAK HOUR
7:45-8:45AM = 1110
PM PEAK HOUR
4:45-5:45PM = (831)



CHURCH ST/RAILWAY ST
TRAFFIC VOLUME COUNT
CARRIED OUT TUESDAY 1/12/15

LEGEND
AM PEAK HOUR
7:45-8:45AM = 814
PM PEAK HOUR
5:00-6:00PM = (555)



CHURCH ST/SWETE ST
TRAFFIC VOLUME COUNT
CARRIED OUT WEDNESDAY 2/12/15

LEGEND
AM PEAK HOUR
7:30-8:30AM = 235
PM PEAK HOUR
5:00-6:00PM = (178)

FIGURE 3
EXISTING AM & PM PEAK HOUR
TRAFFIC VOLUME COUNTS
CARRIED OUT ON TUES 1/12/15 & WED 2/12/15

2.4 (Continued)

Table 2.4 Existing Intersection Performance

No	Location	Sign/ Control	Peak Hour	Level Of Service (LoS)	Degree of Saturation (DoS)	Average Delay (Av)	Critical Movement
1	Church Street/ Railway Street	S	AM	F	1.130	161.8	RHT from Railway St (east) 299.4 secs
1	Church Street/ Railway Street	S	PM	D*	1.086	46.8	RHT from Railway St (east) 192.6 secs
2	Arthur Street/ Railway Street	G	AM	A*	0.603	6.1	RHT Arthur ST (west) 102 secs
2	Arthur Street/ Railway Street	G	PM	A	0.657	7.6	RHT Arthur ST (west) 187.1 secs
3	Swete St/ Church St	R	AM	A	0.545	6.2	RHT from, Swete ST 10.6 secs
3	Swete St/ Church St	R	PM	A	0.766	9.1	RHT from Church ST (East) 14.4 secs
4	Church St/ Bachell Ave	S	AM	A	0.601	12.2	RHT Bachell Ave 22.3 secs
4	Church St/ Bachell Ave	S	PM	B	0.855	19.4	Through Church St (West) 30.3 secs
5	Church Street/ Railway St Bridge	G	AM	A	0.493	6.2	RHT Church Street 15.5 secs
5	Church Street/ Railway St Bridge	G	PM	A	0.614	6.7	RHT Church Street 19.7 secs

NOTE
S = SIGNALS
G = GIVEWAY
R = ROUNDABOUT

(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

(3) 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.

- The results in Intersection Summary show NA in the LoS summary however review of the movement summary demonstrates that priority movements operate with plenty of spare capacity.

Note: **S** Analysed using SIDRA 8.0

2.5 Previous Use of Existing Site

The existing site is used as a warehouse/ factory building. The Factory/ Warehouse building has an approximate Gross Floor area of **1974sqm** and an ancillary office area of **250sqm**.

A total GFA of **2174sqm**. According to the **RMS** (RTA) *Guide To Traffic Generating Developments* the existing traffic generation can be calculated as follows:-

Warehouses- Daily Trips = 4 trips per 100m^2

Morning Peak Hour Trips = 0.5 per 100m^2
= 10.87 trips

2.6 Vehicle Driveway Access to Site

There are two existing vehicular laybacks in Bachell Avenue. One driveway is located near the northern corner of the site and the other one is located near the centre of the site.

2.7 Public Transport

The site is well served by public transport services. Lidcombe Railway Station is only **893** metres from the proposed development site, a 15 minute walk. The nearest bus stop is located in Swete Street/ Rawson Street intersection which services Sydney Buses Route 401 Lidcombe to Olympic Park and is an 8-minute walk. Public transport networks are shown in **Figure 4**.

2.8 Bicycle Paths in Lidcombe

The nearest *on road cycle route* runs north-south along Bachell Avenue north of Nicholas Avenue to Parramatta Road. A copy of Auburn Council's bicycle network map is located in **Appendix D**.

An off-road cycleway for recreational engagement is located in Philips Park between Nicolas Avenue and Platform Street west of the subject site.

PROPOSED SITE:
2 BACHELL AVENUE, LIDCOMBE

LEGEND

BUS STOPS

9 MINS WALK TO BUS STOP NO. 214132
SWETE STREET NEAR RAWSON STREET

SWETE STREET BUS STOP NO. 214132
TO LIDCOMBE STATION BUS STOP NO. 2141173
ROUTE NO. 401 (SYDNEY OLYMPIC PARK TO LIDCOMBE)

LIDCOMBE STATION (1.0KM - 13 MINS WALK/ 2MINS DRIVE)

FLEMINGTON STATION (2.7KM - 6 MINS DRIVE)

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FIGURE 4
PUBLIC TRANSPORT NETWORKS

3.0 TRAFFIC EFFECTS OF PROPOSED DEVELOPMENT

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3.1 Floor Areas and Uses

The gross floor areas for the proposed uses have been calculated by *MRA Michael Raad Architects Pty Ltd* and are shown on the concept plans for basement one, ground floor and levels 1 to 7 and are summarized in a Table on the ground floor plan. The proposed gross floor areas and uses shown on the plans are summarized in **Table 3.1**.

Table 3.1 Proposed Uses and Gross Floor Areas

Land Use Groups	Gross Floor Area m^2									Total
	Basement One	Ground	Level 1	Level 2	Level 3	Level 4	Level 5	Level 6	Level 7	
• Food and Drink Premises • Neighborhood Shops • Recreation Facility Indoor		3320	1958							5278 (5560)
• Light Industries • Industrial Retail Outlets • Hardware Building Supplies	1665	2055	2776	468	410					7374 (7769)
• High Technology Industry • Office & Business Premises • Digital Technologies & Creative Industries				2496	1762	700	700	700	700	7058 (7435)
• Warehouse & Distribution • Storage Facilities • Wholesale Suppliers	1963		1086	1127	997					5173 (5449)
TOTAL	**3628**	**5375**	**5820**	**4091**	**3169**	**700**	**700**	**700**	**700**	**24883 (26214)**

The FSR based on a site area of 8738m^2 is 2.848 to 1. An FSR of 3 to 1 yields a gross floor area of 26214m^2. The GFA in each use category has been increased pro-rata and rounded to the nearest whole number. The GFA for each use category for an FSR of 3 to 1 are shown in brackets.

Since the ancillary office in the warehouse use category is not stated, it has been assumed to be 15% of the GFA.

3.2 Car Parking Requirements

The car parking requirements have been calculated for each main land use group in accordance with **Tables 6 and 7** from *Auburn DCP 2010 Section 5.1.4*. The Parking and Loading Section of the *Auburn City Council DCP 2010* for an FSR of 3 to 1 and are listed in **Table 3.2.**

Table 3.2 Estimated Car Parking Requirements

Land Use Groups	Gross Floor Area (m^2)	Parking Rate	Parking Spaces Required
• **Food and Drink Premises** • **Neighborhood Shops** • **Recreation Facility Indoor**	5560 m^2	1 per 40 m^2	139
• **Light Industries** • **Industrial Retail Outlets** • **Hardware Building Supplies**	7769 m^2	1.3 per 100 m^2	101
• **High Technology Industry** • **Office & Business Premises** • **Digital Technologies & Creative Industries**	7435 m^2	1 per 40 m^2	186
• **Warehouse & Distribution** • **Storage Facilities** • **Wholesale Suppliers**	4632 m^2	1 per 300 m^2	16
• **Ancillary Offices 15%**	817 m^2	1 per 40 m^2	20
		TOTAL	**462**

These calculations are approximate as the uses in each of the 4 groups have different parking requirements. The concept that supports the Planning Proposal is indicative, and further refinement of the floorspace requirements of individual uses and tenancies will be done as part of the Development Application process, and further assessment of traffic implications undertaken at this time.

3.3 Car Parking Provision

There are 49 spaces shown on the ground floor plan and 28 spaces shown on the Level 1 plan. The large car parking area shown on basement 1 would provide in excess of 113 spaces and the larger car parking area of 6095m^2 on basement level 2 would provide a further 203 parking spaces. Therefore, the total parking provision based upon the concept plans would be about 393 spaces. A parking layout with circulation and parking aisles has yet to be prepared for Basements B1 and B2.

If 4 car share spaces were provided which would result in a reduction in parking as 1 car share space = 3 parking spaces, a reduction of 8 car parking spaces is possible. Refer to **Green Travel Plan Section 3.5** in this report.

3.4 Bicycle Storage Facilities

Clause 3.1 Bicycle Parking in the Parking and Loading part of *Auburn City Council DCP 2010* requires bicycle racks for all developments with a gross floor area exceeding 1000m^2. This site has a potential GFA of 26214m^2. There is no storage rate for bicycles in a B5 Business Development Zone in the Parking and Loading part of *DCP2010.* If a rate similar to Newington Business Park is applied to this site, some 26 bicycle racks would be required.

3.5 Green Travel Plan

3.5.1 Green Travel Plan

A Green Travel Plan is an initiative to encourage travel mode behavior change. Green Travel Plans are used to promote and encourage people to choose sustainable transport options such as walking, cycling, public transport and carpooling in preference to single occupant car trips whenever practicable.

The coordination, implementation and funding for the Green Travel Plan will be the responsibility of the Building Manager. Acknowledging the location and accessibility of the subject development, this Green Travel Plan seeks to minimize staff use of private vehicle transport through:-

a) Providing convenient access to current and relevant public transport information to all staff;
b) Improved road safety and personal security for pedestrians and cyclists; maximizing the efficient use of on-site bicycle parking;
c) Providing a mechanism to review the efficiency of green travel initiatives and amend existing or implement new initiatives as warranted.

3.5.2 Action Plan

A draft action plan is provided in **Appendix E**. The plan is an outline of the actions and incentives that will be adopted to encourage the use of sustainable transport modes.

3.5.3 Green Travel Initiatives

The site is ideally located to take advantage of the nearby public transport services. Future extension to the on-road Bicycle paths in Bachell Avenue could provide excellent connection opportunities to Sydney Olympic Park and to the Sydney CBD.

Sustainable transport information could be placed in key building foyer locations where it will be clearly visible to the staff and visitors of the building. Detailed travel information will be available in the end of trip facilities located within the basement for cyclists.

3.5.4 Public Transport

To encourage public transport use, information sourced Transport For NSW Apps and Cyclepath Finder will be provided through posters and leaflets and through wayfinding signage. The information provided will detail the scheduling / frequency of local services, the location of train stations / bus stops and linkages to other networks.

3.5.5 Cycling

To promote and market the use of bicycles, a map of the extensive network of on and off-street bicycle paths in the vicinity of the site will be provided to employees and visitors in the form of building signage.

Bicycle Network

Existing Auburn Bicycle Path and Transport for NSW Bicycle Routes are located in **Appendix D** of this report.

There could be a provision to extend the on-road cycleway from the subject site to connect to the existing northern bicycle route in Bachell Avenue that extends to Parramatta Road and off-road from Parramatta Road to Sydney Olympic Park.

3.5.6 Walking

To highlight pedestrian accessibility in the vicinity of the site, an access plan will be prepared showing pedestrian linkages in the vicinity of the site.

3.5.7 Motor Bike Parking

Provision for motorbike parking could be included within the basement car park. *Auburn DCP 2010* does not have lot rates for motorbike parking. A rate of 1 space per 50 cars could be provided within the car park.

3.6 Estimated Traffic Generation

The traffic generation has been estimated using the rates in *Section 3* of the *RMS Guide to Traffic Generating Developments 2002.* The rate for High Technology is based upon a car driver travel mode of 69% for employees travelling to work in TZ1337 and TZ1338 in the BTS-JTW (*Bureau of Statistics Journey to Work Explorer 2011 data*) and a gross floor area per employee of 50m^2 from *Section 3.10.1 Factories* in the *RMS Guide to Traffic Generating Developments*. The assumed traffic distribution is 80% IN and 20% OUT in the AM peak hour and 80% OUT and 20% IN in the PM peak hour. The rate for neighborhood retail shops is 46A(SS) vehicle trips per 1000m^2 in the PM peak hour on Thursday from the RMS Guide to Traffic Generating Developments. For slow trade shops like electrical and white goods stores, it is 20A(S) and medical office is 22A(OM). For the AM peak hour, the generation rate is 20% of the PM peak hour. The directional distribution in both peak hours is 50% In and 50% OUT. The estimated traffic generation is listed in **Table 3.5**.

Table 3.6 Estimated Traffic Generation

Land Use Groups	Peak Hour	Gross Floor Area (m^2)	Generation Rate	Traffic Generation		
				IN	OUT	TOTAL
· **Food and Drink Premises**/ Neighbourhood Shops and Recreational Facility	**AM**	**3058**	**46A/1000 X 20%**	**14.1**	**14.1**	**28.1**
	PM		**46A/1000 X 80%**	**56.3**	**56.3**	**112.5**
Slow Trade Shops	AM	2224	20A/1000 x 20%	4.4	4.4	8.9
	PM		20A/1000 x 80%	17.8	17.8	35.6
Medical Office	AM	278	**22A/1000x20%**	0.6	0.6	1.2
	PM		**22A/1000x80%**	2.4	2.4	4.9
		5560				
• **Light Industries**						
• **Industrial Retail Outlets**	AM	7769 m^2	1 per 100 m^2	62	16	78
• **Hardware Building Supplies**	PM		1 per 100 m^2	16	62	78
• **High Technology Industry**						
• **Office & Business Premises**	AM		1 per 50 m^2 x 0.69	82	21	103
• **Digital Technologies & Creative Industries**		7435 m^2	1 per 50 m^2 x 0.69			
	PM			21	82	103
• **Warehouse & Distribution**	AM	4632 m^2	0.5 x A/100*80%	19	4	23
• **Storage Facilities**	PM		0.5 x A/100*20%	4	19	23
• **Wholesale Suppliers**						
	AM		1.6 per 100 m^2	10	3	13
• **Ancillary Offices 15%**	PM	817m^2	1.2 per 100 m^2	2	8	10
			TOTAL AM	**192.1**	**63.1**	**255**
			TOTAL PM	**119.5**	**247.5**	**367**
			AM Reduction by 15%	**163**	**54**	**217**
			PM Reduction by 15%	**102**	**210**	**312**

3.6.1 Multi-purpose trips and reduction in traffic generation

A multi-purpose trip is where more than one shop or facility is visited. Any trip discounts would apply differently in new free-standing centres and for new shops within existing centres. *"An average discount of about 20% is suggested, with this figure reducing with increasing centre size, with rates of 25% (less than 10,000m^2 GLFA), 20% (10,000-30,000m^2 GLFA) and 15% (over 30,000m^2 GLFA) indicative."* as stated in the RMS Guide to Traffic Generating Developments Section 3 Land-Use Traffic Generation.

We have adopted a reduction of 15% to all trips as a Green Travel Plan has been adopted for employees and visitors and there are many retail uses and facilities provided within the development with good public transport access.

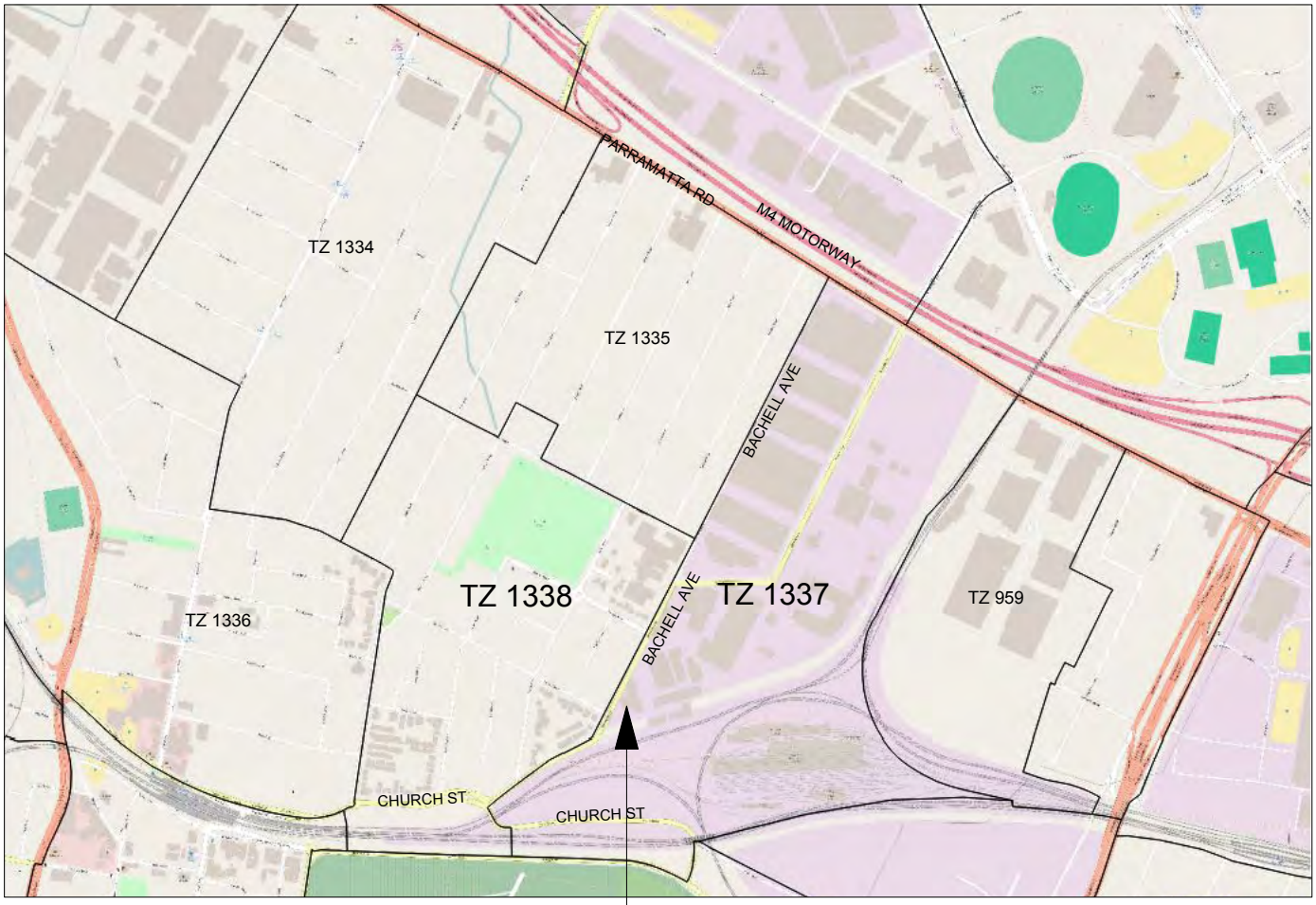
3.7 Future Traffic Volume Assignment to Road Network

The additional traffic volumes due to employees and retail customers travelling to TZ 1337 and TZ1338 (**Table 3.6)** in the **AM** peak hour and returning from work/ shopping in the **PM** peak hours have been distributed to the road network in the study area based upon using the *BTS-JTW (Bureau of Statistics Journey To Work Explorer) travel zone 1337 and 1338. The travel zones are shown in* ***Figure 5****.* The travel routes for employees and retail customers have been assigned to the Road Network as shown in **Figure 6A and 6B.**

Table 3.7 Journey To Work To Travel Zones: 1337 and 1338 for Employees

Origin SA3	Origin SA3 ID	No. of Vehicle Drivers	%
Merrylands - Guildford	12503	142.2	8.30%
Fairfield	12702	128.6	7.50%
Bankstown	11901	122.2	7.13%
Auburn	12501	113.6	6.63%
Parramatta	12504	93.8	5.47%
Blacktown	11601	93.2	5.44%
Mount Druitt	11603	87.4	5.10%
Baulkham Hills	11501	78	4.55%
Strathfield - Burwood - Ashfield	12003	70.4	4.11%
Campbelltown (NSW)	12302	61.6	3.59%
Canterbury	11902	60.2	3.51%
Penrith	12403	59	3.44%
Liverpool	12703	58.2	3.40%
Bringelly - Green Valley	12701	56	3.27%
Blacktown - North	11602	55.4	3.23%
Kogarah - Rockdale	11904	50.2	2.93%
St Marys	12405	44	2.57%
Sutherland - Menai - Heathcote	12802	43.8	2.56%
Ryde - Hunters Hill	12602	41.8	2.44%
Canada Bay	12001	36.4	2.12%
Cronulla - Miranda - Caringbah	12801	35.4	2.07%
Hurstville	11903	35.2	2.05%
Carlingford	12502	34	1.98%
Camden	12301	26	1.52%
Ku-ring-gai	12103	25.2	1.47%
Sydney Inner City	11703	21.4	1.25%
Leichhardt	12002	21.2	1.24%
Warringah	12203	19.2	1.12%
Total		**1713.6**	**100.00%**

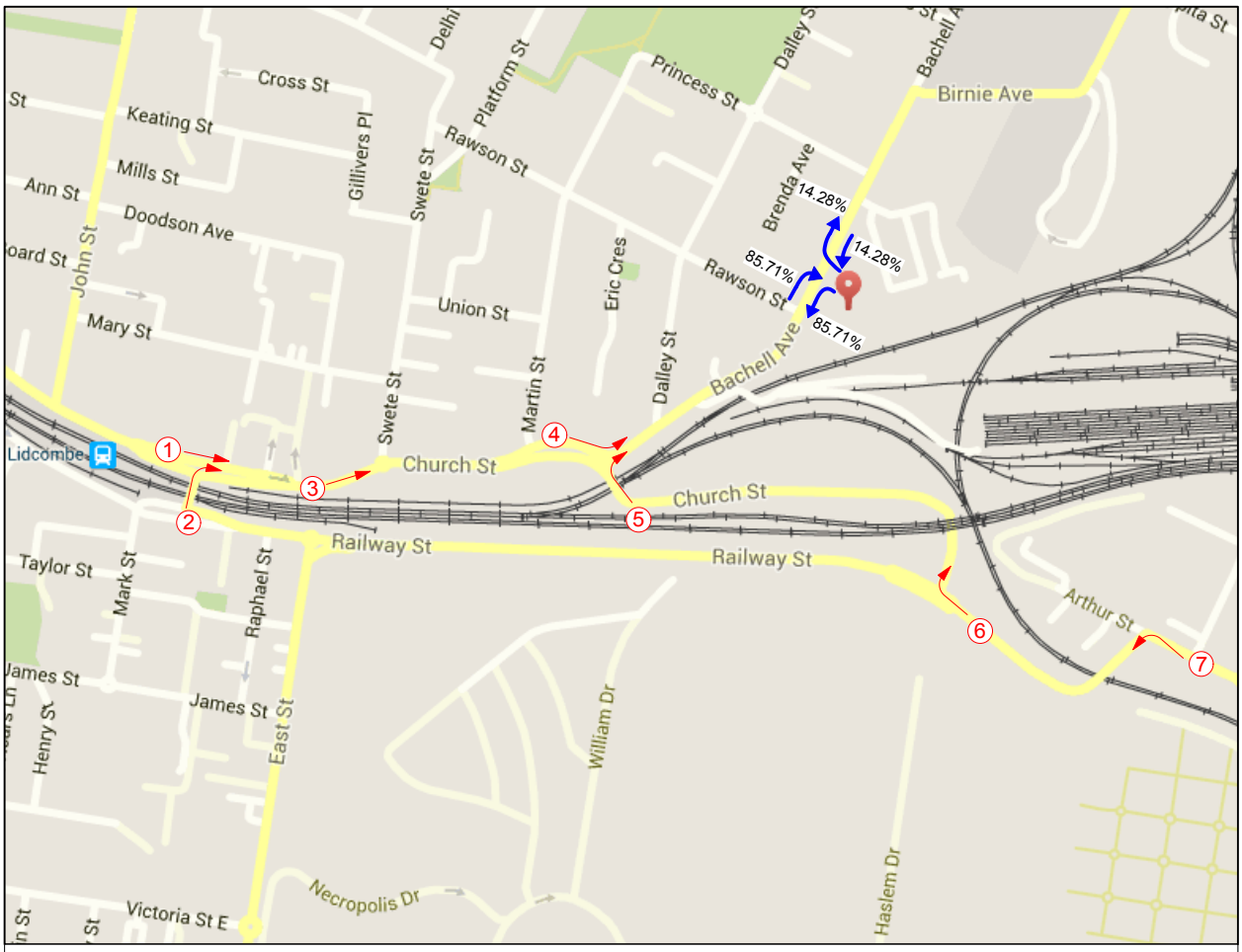
Note: Employees travelling from Origin SA3 to Travel Zones 1337 and 1338 with vehicle driver trips less than 1% of total trips have been omitted.



PROPOSED SITE:
2 BACHELL AVE, LIDCOMBE

N

FIGURE 5
TRAVEL ZONE LOCATIONS



1 CHURCH ST W THRU

FAIRFIELD	7.50%
CAMPBELLTOWN	3.59%
MERRYLANDS	8.30%
AUBURN	6.63%
GROUP NORTH & WEST	21.41%
TOTAL	**47.43%**

2 RAILWAY ST BRIDGE RHT

BANKSTOWN	7.13%
LIVERPOOL	3.40%
BRINGELLY	3.27%
SUTHERLAND	2.56%
TOTAL	**16.36%**

3 CHURCH ST W THRU

FAIRFIELD	7.50%
BANKSTOWN	7.13%
CAMPBELLTOWN	3.59%
LIVERPOOL	3.40%
BRINGELLY	3.27%
SUTHERLAND	2.56%
MERRYLANDS	8.30%
AUBURN	6.63%
GROUP NORTH & WEST	21.41%
TOTAL	**63.79%**

4 CHURCH ST W LHT

FAIRFIELD	7.50%
BANKSTOWN	7.13%
CAMPBELLTOWN	3.59%
LIVERPOOL	3.40%
BINGELLY	3.27%
SUTHERLAND	2.56%
MERRYLANDS	8.30%
AUBURN	6.63%
GROUP NORTH & WEST	21.41%
TOTAL	**63.79%**

5 CHURCH ST E RHT

STRATHFIELD	4.11%
CANTERBURY	3.51%
KOGARAH-ROCKDALE	2.93%
CANADA BAY	2.12%
CRONULLA	2.07%
HURSTVILLE	2.05%
CAMDEN	1.52%
CITY	1.25%
LEICHHARDT	1.24%
WARRINGAH	1.12%
TOTAL	**21.92%**

6 RAILWAY ST W RHT

STRATHFIELD	4.11%
CANTERBURY	3.51%
KOGARAH-ROCKDALE	2.93%
CANADA BAY	2.12%
CRONULLA	2.07%
HURSTVILLE	2.05%
CAMDEN	1.52%
CITY	1.25%
LEICHHARDT	1.24%
WARRINGAH	1.12%
TOTAL	**21.92%**

7 ARTHUR ST W LHT

STRATHFIELD	4.11%
CANTERBURY	3.51%
KOGARAH-ROCKDALE	2.93%
CANADA BAY	2.12%
CRONULLA	2.07%
HURSTVILLE	2.05%
CAMDEN	1.52%
CITY	1.25%
LEICHHARDT	1.24%
WARRINGAH	1.12%
TOTAL	**21.92%**

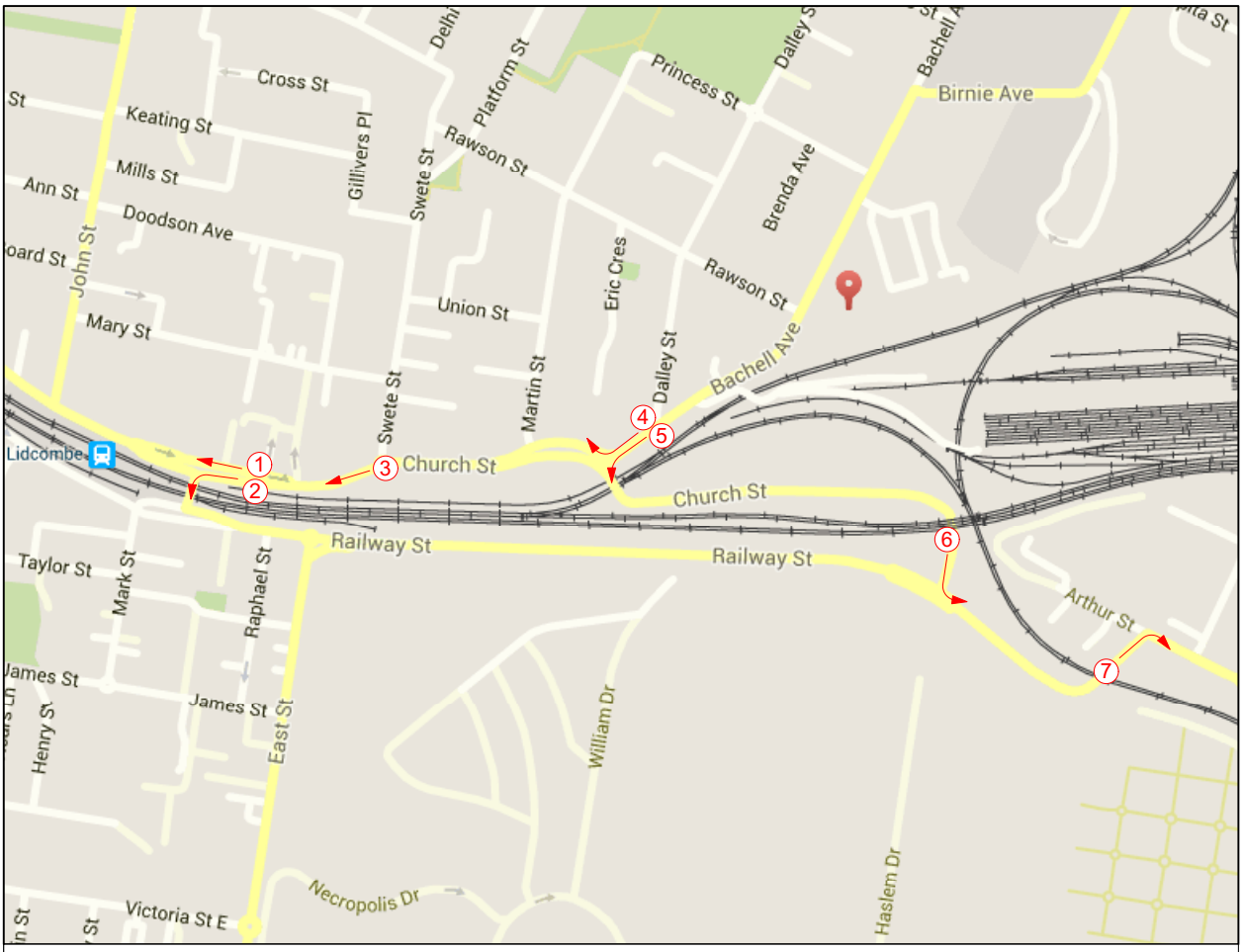
GROUP NORTH & WEST

-PARRAMATTA	5.47%
-BLACKTOWN	5.44%
-MOUNT DRUITT	5.10%
-BAULKHAM HILLS	4.55%
-PENRITH	3.44%
-BLACKTOWN	3.23%
-ST MARYS	2.57%
-RYDE	2.44%
-CARLINGFORD	1.98%
-KU-RING-GAI	1.47%
TOTAL	**35.69%**

-VIA PARRAMATTA RD	14.28%
-VIA CHURCH ST/ OLYMPIC DRIVE	21.41%

N

FIGURE 6A
TRIP ASSIGNMENT
EMPLOYEES JOURNEY TO WORK



①	CHURCH ST W THRU	
	FAIRFIELD	7.50%
	CAMPBELLTOWN	3.59%
	MERRYLANDS	8.30%
	AUBURN	6.63%
	GROUP NORTH & WEST	21.41%
	STRATHFIELD	4.11%
	HURSTVILLE	2.06%
	CAMDEN	1.52%
	TOTAL	**55.12%**

②	RAILWAY ST BRIDGE RHT	
	BANKSTOWN	7.13%
	LIVERPOOL	3.40%
	BRINGELLY	3.27%
	SUTHERLAND	2.56%
	CRONULLA	2.07%
	TOTAL	**18.43%**

③	CHURCH ST W THRU	
	FAIRFIELD	7.50%
	BANKSTOWN	7.13%
	CAMPBELLTOWN	3.59%
	LIVERPOOL	3.40%
	BRINGELLY	3.27%
	SUTHERLAND	2.56%
	MERRYLANDS	8.30%
	AUBURN	6.63%
	GROUP NORTH & WEST	21.42%
	STRATHFIELD	4.11%
	HURSTVILLE	2.06%
	CAMDEN	1.52%
	CRONULLA	2.07%
	TOTAL	**73.56%**

④	CHURCH ST W LHT	
	FAIRFIELD	7.50%
	BANKSTOWN	7.13%
	CAMPBELLTOWN	3.59%
	LIVERPOOL	3.40%
	BINGELLY	3.27%
	SUTHERLAND	2.56%
	MERRYLANDS	8.30%
	AUBURN	6.63%
	GROUP NORTH & WEST	21.42%
	STRATHFIELD	4.11%
	HURSTVILLE	2.06%
	CAMDEN	1.52%
	CRONULLA	2 07%
	TOTAL	**73.56%**

⑤	CHURCH ST E RHT	
	CANTERBURY	3.51%
	KOGARAH-ROCKDALE	2.93%
	CANADA BAY	2.12%
	CITY	1.25%
	LEICHHARDT	1.24%
	WARRINGAH	1.12%
	TOTAL	**12.17%**

⑥	RAILWAY ST W RHT	
	CANTERBURY	3.51%
	KOGARAH-ROCKDALE	2.93%
	CANADA BAY	2.12%
	CITY	1.25%
	LEICHHARDT	1.24%
	WARRINGAH	1.12%
	TOTAL	**12.17%**

⑦	ARTHUR ST W LHT	
	CANTERBURY	3.51%
	KOGARAH-ROCKDALE	2.93%
	CANADA BAY	2.12%
	CITY	1.25%
	LEICHHARDT	1.24%
	WARRINGAH	1.12%
	TOTAL	**12.17%**

GROUP NORTH & WEST	
-PARRAMATTA	5.47%
-BLACKTOWN	5.44%
-MOUNT DRUITT	5.10%
-BAULKHAM HILLS	4.55%
-PENRITH	3.44%
-BLACKTOWN	3.23%
-ST MARYS	2.57%
-RYDE	2.44%
-CARLINGFORD	1.98%
-KU-RING-GAI	1.47%
TOTAL	**35.69%**
-VIA PARRAMATTA RD	14.28%
-VIA CHURCH ST/ OLYMPIC DRIVE	21.41%

N

FIGURE 6B
TRIP ASSIGNMENT
EMPLOYEES JOURNEY FROM WORK

(3.7 Continued)

The estimated traffic generation due to the proposed development in the AM and PM peak hours is as follows from Table 3.6.

The traffic generation in our revision to Report No 21/18 is as follows:-

	Traffic Generation	
Peak Hour	**IN**	**OUT**
AM	163	54
PM	102	210

Figure 6A in our Report No 21/18 shows the trip assignment for the site. The traffic distribution to the north is 14.28%. Hence the traffic volumes to and from the north in the AM and PM peak hours are estimated as follows:-

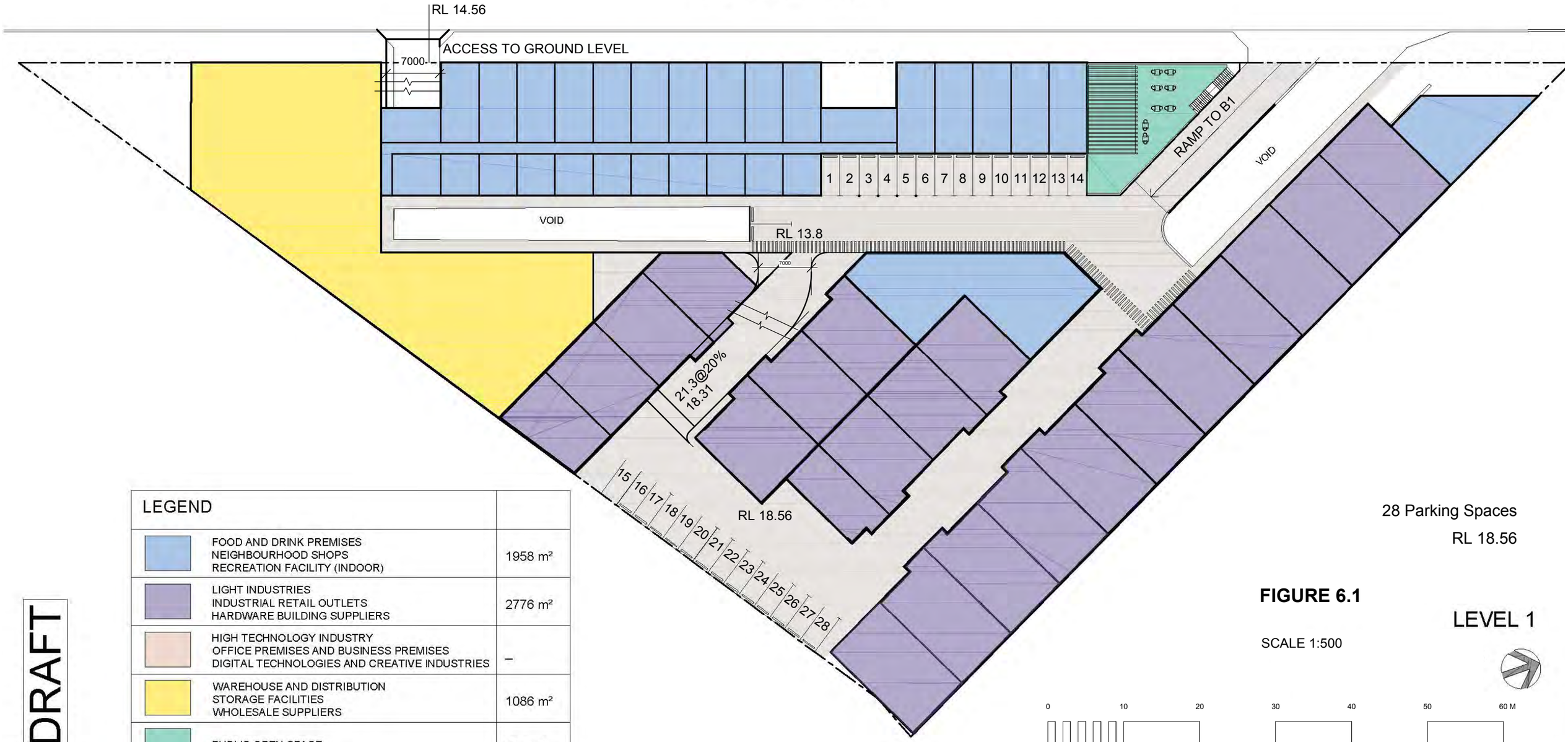
	Traffic Generation	
Peak Hour	**IN**	**OUT**
AM	23	8
PM	15	30

In our opinion, these volumes are relatively minor and will not reduce the Level of Service at the 4 northern intersections. Hence we do not believe that the additional counts and SIDRA analysis are required.

Concept plans which have been prepared show vehicular access and turning movements to the ground floor and basements B1 and B2. An internal ramp is proposed to provide a two-way connection between the car parking on Level 1 and ground level. On a pro rata basis, some 22.5% of the generated traffic will occur in and out of the ground floor/ level 1 access (91 spaces) and 77.5% from the basement B1 and B2 access (316 spaces). The concept plans **Figures 6.1, 6.2, 6.3 and 6.4** are included in this report.

RAWSON STREET

BACHELL AVENUE



28 Parking Spaces

RL 18.56

LEGEND		
	FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	1958 m²
	LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	2776 m²
	HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	–
	WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	1086 m²
	PUBLIC OPEN SPACE	200 m²
	RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

DRAFT

FIGURE 6.1

LEVEL 1

SCALE 1:500

0 10 20 30 40 50 60 M

RAWSON STREET

BACHELL AVENUE

32 (20)
2 (7)
10 (41)
5 (3)
RL 14.56
108 (67)
6 (23)
36 (139)
18 (12)
RL 12.29
RL 12.20
TO B1
B2
1
34
SLOPING 1.815%
RL 14.56
RL 13.80
7000
RAMP TO L1
35
49

AREA CALCULATIONS

BASEMENT 2 = NIL
BASEMENT 1 = 3630 m²
GROUND FLOOR = 5380 m²
LEVEL 1 = 5820 m²
LEVEL 2 = 4090 m²
LEVEL 3 = 3170 m²
LEVEL 4 = 700 m²
LEVEL 5 = 700 m²
LEVEL 6 = 700 m²
LEVEL 7 = 700 m²

TOTAL = 24890 m²
SITE AREA = 8950 m²

FSR = 2.7:1

LEGEND

PEAK HOUR

TRAFFIC GENERATION

AM 6

PM (23)

49 Parking Spaces

SLOPING

FIGURE 6.2 GROUND FLOOR

SCALE 1:500

0 10 20 30 40 50 60 M

DRAFT

LEGEND	
FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	3320 m²
LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	2055 m²
HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	–
WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	–
PUBLIC OPEN SPACE	190 m²
RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

RAWSON STREET

BACHELL AVENUE

CAR PARKING

RL 12.45

2000

12500

7m

2000

RL 9.45

113 Parking Spaces

LEGEND	
FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	–
LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	1665 m²
HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	–
WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	1963 m²
PUBLIC OPEN SPACE	–
RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

SLOPING

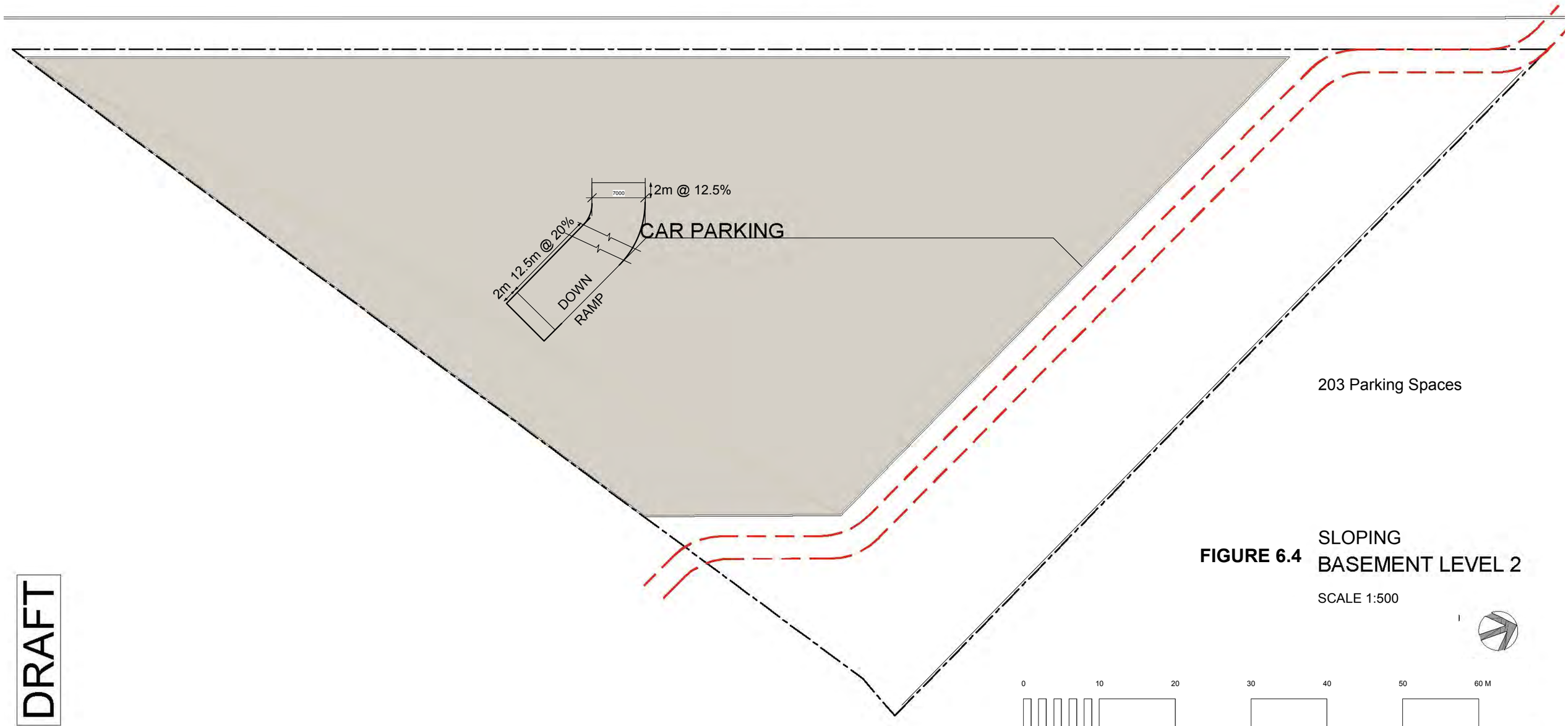
FIGURE 6.3 BASEMENT LEVEL 1

SCALE 1:500

0 10 20 30 40 50 60 M

RAWSON STREET

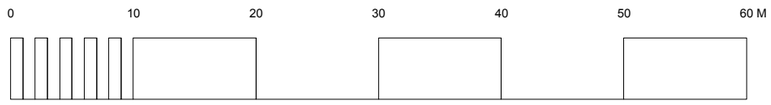
BACHELL AVENUE



203 Parking Spaces

FIGURE 6.4 SLOPING BASEMENT LEVEL 2

SCALE 1:500



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3.8 Intersection Performance

The future AM and PM peak hour traffic volumes comprising development traffic plus existing traffic volumes at the 5 intersections being analysed are shown in **Figures 7A** and **7B** respectively.

The Intersections have been analysed using computer program **SIDRA 8.0**.

Table 3.8 Future Intersection Performance

No	Location	Sign/ Control	Peak Hour	Level Of Service (LoS)	Degree of Saturation (DoS)	Average Delay (Av)	Critical Movement
1	Church Street/ Railway Street	S	AM	F	1.121	140.7	LHT from Railway St (west) 279.8 secs
1	Church Street/ Railway Street	S	PM	E	1.15	66.2	RHT from Church St (west) 314.4 secs
2	Arthur Street/ Railway Street	G	AM	A*	0.606	6.1	RHT Arthur ST (west) 88.7 secs
2	Arthur Street/ Railway Street	G	PM	A	0.72	8.2	RHT Arthur ST (west) 239.5 secs
3	Swete St/ Church St	R	AM	A	0.613	6.5	RHT from, Swete ST 12.2 secs
3	Swete St/ Church St	R	PM	A	0.912	14.5	RHT from Church ST (East) 24.6 secs
4	Church St/ Bachell Ave	S	AM	A	0.698	7.1	RHT Bachell Ave 23.1 secs
4	Church St/ Bachell Ave	S	PM	B*	0.897	28.9	RHT Church St (East) 46.9 secs
5	Church Street/ Railway St Bridge	G	AM	A*	0.519	6.3	RHT Church Street (west) 16.8 secs
5	Church Street/ Railway St Bridge	G	PM	A*	0.678	7.1	RHT Church Street (west) 23.1 secs

NOTE
S = SIGNALS
G = GIVEWAY
R = ROUNDABOUT

1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

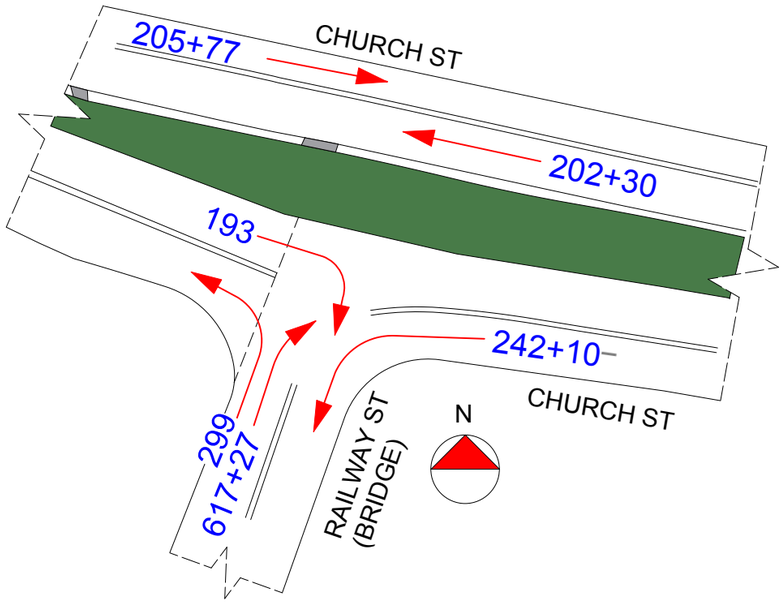
2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

3) 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.

- The results in Intersection Summary show NA in the LoS summary however review of the movement summary demonstrates that priority movements operate with plenty of spare capacity.

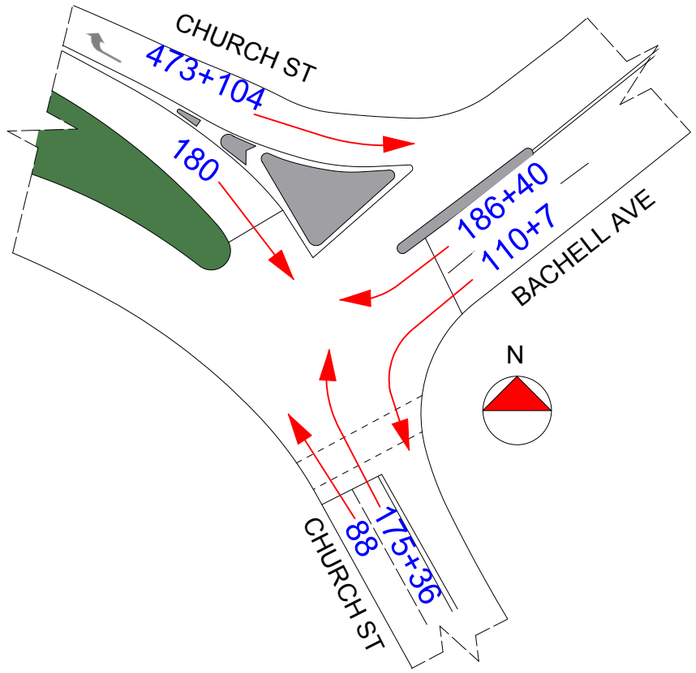
Note: **S** Analysed using SIDRA 8.0

*Refer to **Table 4.2** Level of Service Criteria in **Section 2.4** of this report.



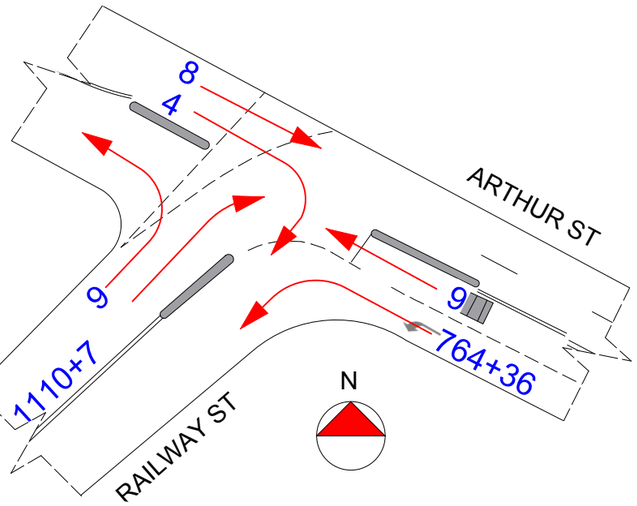
CHURCH ST/RAILWAY ST (BRIDGE)
TRAFFIC VOLUME COUNT
CARRIED OUT WEDNESDAY 2/12/15

LEGEND
AM PEAK HOUR
8:00-9:00AM = 617
ADDITIONAL
VOLUMES =+27



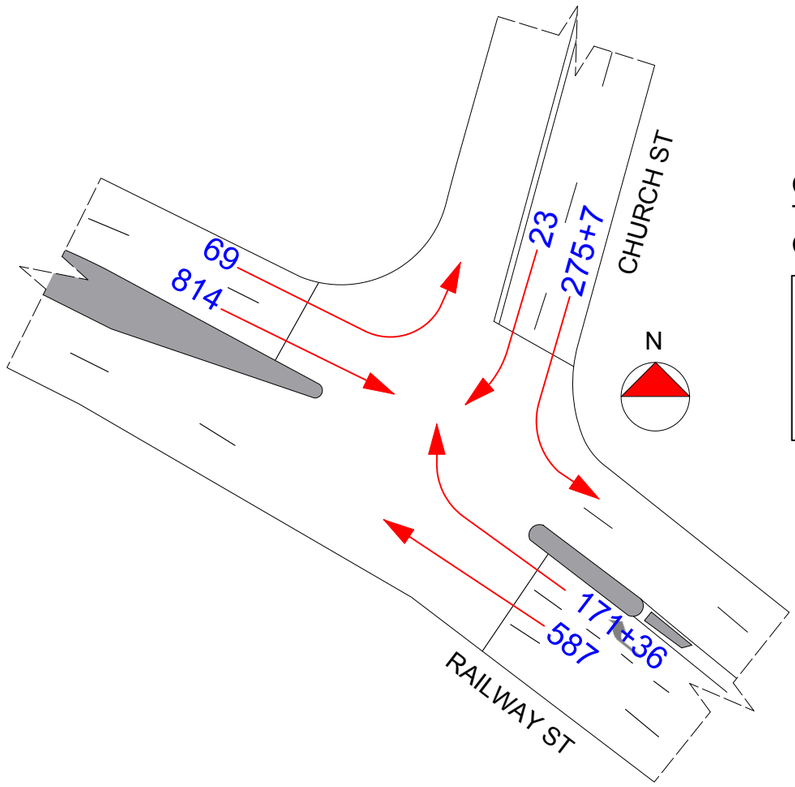
CHURCH ST/BACHELL AVENUE
TRAFFIC VOLUME COUNT
CARRIED OUT WEDNESDAY 2/12/15

LEGEND
AM PEAK HOUR
7:30-8:30AM = 473
ADDITIONAL
VOLUMES =+104



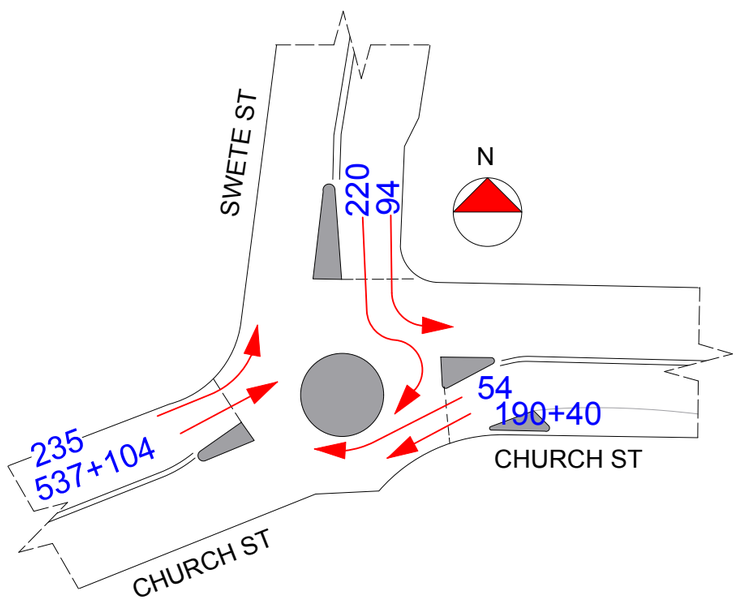
ARTHUR ST/RAILWAY ST
TRAFFIC VOLUME COUNT
CARRIED OUT TUESDAY 1/12/15

LEGEND
AM PEAK HOUR
7:45-8:45AM = 764
ADDITIONAL
VOLUMES =+36



CHURCH ST/RAILWAY ST
TRAFFIC VOLUME COUNT
CARRIED OUT TUESDAY 1/12/15

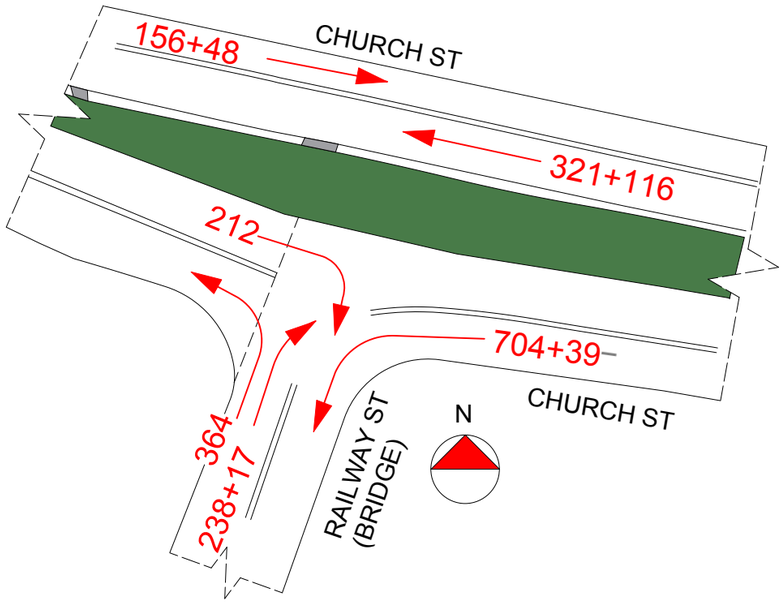
LEGEND
AM PEAK HOUR
7:45-8:45AM = 171
ADDITIONAL
VOLUMES =+36



CHURCH ST/SWETE ST
TRAFFIC VOLUME COUNT
CARRIED OUT WEDNESDAY 2/12/15

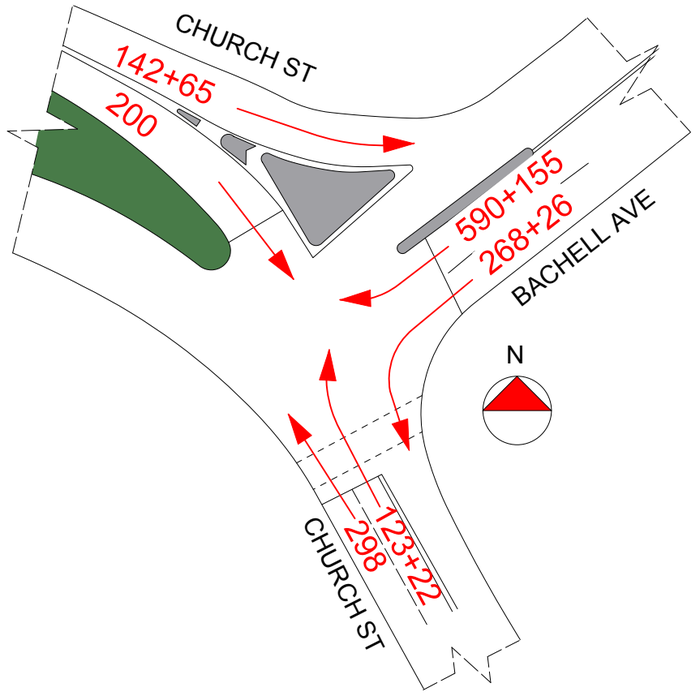
LEGEND
AM PEAK HOUR
7:30-8:30AM = 537
ADDITIONAL
VOLUMES =+104

FIGURE 7A
EXISTING PEAK HOUR TRAFFIC VOLUMES
PLUS DEVELOPMENT AM PEAK HOUR TRAFFIC VOLUMES



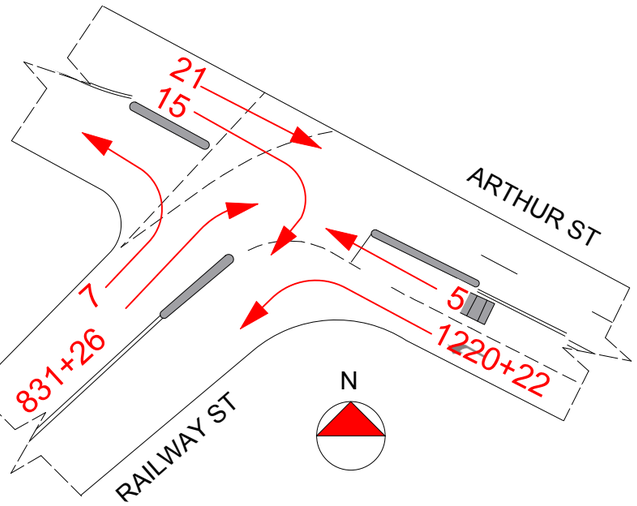
CHURCH ST/RAILWAY ST (BRIDGE)
TRAFFIC VOLUME COUNT
CARRIED OUT WEDNESDAY 2/12/15

LEGEND
PM PEAK HOUR
4:45-5:45PM = 238
ADDITIONAL
VOLUMES =+23



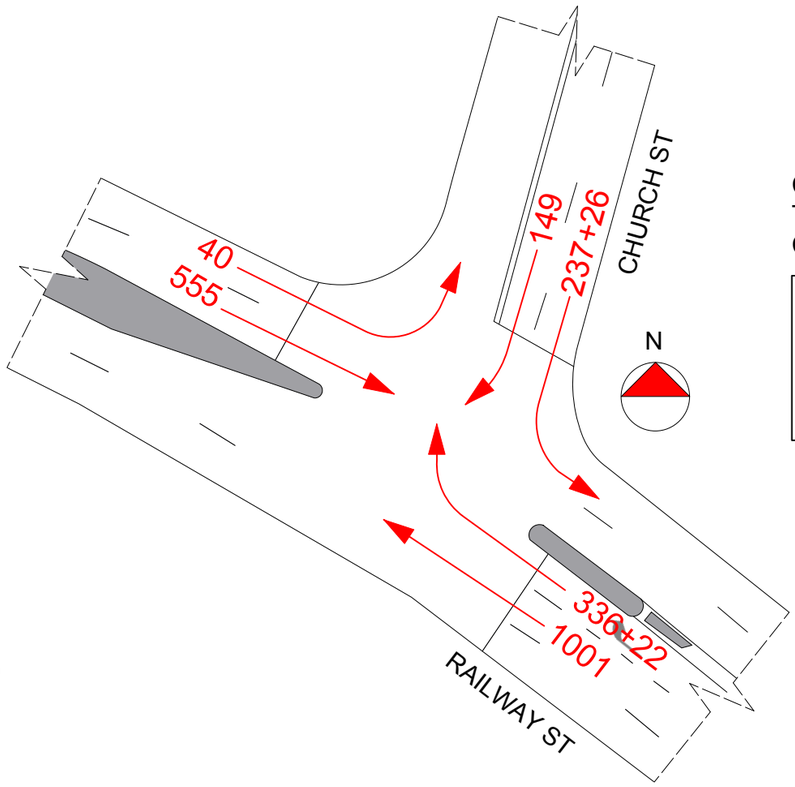
CHURCH ST/BACHELL AVENUE
TRAFFIC VOLUME COUNT
CARRIED OUT WEDNESDAY 2/12/15

LEGEND
PM PEAK HOUR
5:00-6:00PM = 142
ADDITIONAL
VOLUMES =+89



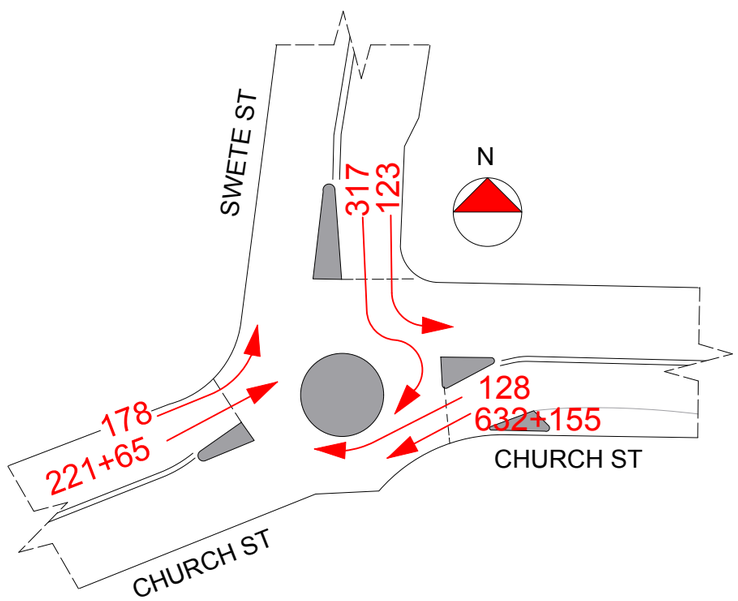
ARTHUR ST/RAILWAY ST
TRAFFIC VOLUME COUNT
CARRIED OUT TUESDAY 1/12/15

LEGEND
PM PEAK HOUR
4:45-5:45PM = 831
ADDITIONAL
VOLUMES =+55



CHURCH ST/RAILWAY ST
TRAFFIC VOLUME COUNT
CARRIED OUT TUESDAY 1/12/15

LEGEND
PM PEAK HOUR
5:00-6:00PM = 237
ADDITIONAL
VOLUMES =+55



CHURCH ST/SWETE ST
TRAFFIC VOLUME COUNT
CARRIED OUT WEDNESDAY 2/12/15

LEGEND
PM PEAK HOUR
5:00-6:00PM = 221
ADDITIONAL
VOLUMES =+89

FIGURE 7B
EXISTING PEAK HOUR TRAFFIC VOLUMES
PLUS DEVELOPMENT PM PEAK HOUR TRAFFIC VOLUMES

(3.8 continued)

The Levels of Service are unchanged from the existing in Table 2.4 at all 5 intersections in the AM and PM peak hours. The Levels of Service at Church Street/Railway Street are unchanged at F in the AM peak hour and E in the PM peak hour. The existing Level of Service at this intersection is unsatisfactory and the effect of the generated traffic by the proposed development is insignificant.

All other intersections will continue to operate with spare capacity in the AM and PM peak hours. A possible mitigation measure to improve the Level of Service at the Church Street/ Railway Street intersection are shown in concept form in **Figures 8 and 9** in **Appendix F**.

3.9 Delivery / Service Vehicles

The Planning Proposal will facilitate development potentially up to a gross floor area of **26214sq.m**.

Based upon **Table 5.1** in the *RTA Guide to Traffic Generating Developments,* the minimum number of unloading bays for commercial premises with a GFA exceeding 20,000m^2 is **5 spaces** and **1 space** per 8000m^2 over 20,000m^2. The total requirement is **6 bays**, 50% of which should be adequate for trucks. The majority of deliveries to commercial premises are in small vans and SRV trucks.

It is recommended that **2** loading bays be provided for trucks and that **4** visitor spaces be signposted **"Visitor / Small Delivery Vehicles"**. It is suggested that one is **3.5** metres wide by **6.4** metres long and suitable for **SRV** parking and the other is **3.5** metres wide by **12.5** metres long and suitable for **HRV** (heavy rigid vehicle) parking.

4.0 SUMMARY

- The Traffic and Parking Report has been prepared to support a rezoning application to change the zone from General Industrial **IN1** to **B5** Business Development at 2 Bachell Avenue.

- Peak hour traffic counts were conducted at 5 intersections in December 2015 on approach and departure routes from the proposed site. SIDRA analysis showed that the Church Street/ Railway Street intersection was operating at Level of Service F in the AM peak hour and Level of Service D towards E operating near capacity in the PM peak hour. Hence mitigation measures are suggested to improve the Level of Service.

- The other 4 intersections were providing satisfactory performance with spare capacity.

- The proposed business development based upon concept plans comprises 4 groups of retail/ light industry/ warehousing/ high technology uses totaling 26214m^2 at an FSR of 3 to 1.

- The car parking requirement to comply with the *Auburn Council DCP 2010* is approximately **462 spaces**. The concept plans show 49 spaces at ground level and 28 spaces at Level 1 but a parking layout has not been prepared for Basements 1 and 2. It is estimated that 113 spaces can be provided on Basement 1 and 203 spaces can be provided on Basement 2.

- Vehicular access is proposed to and from Bachell Avenue.

- The peak traffic volume generated by the development is **217** vehicles per hour in the **AM** peak hour and **312** vehicles per hour in the **PM** peak hour.

- The traffic volumes generated by the proposed development have been assigned to the road network at the 5 intersections where traffic counts were made. The increases in peak hour traffic generation are shown in **Figures 7A** and **7B**. The SIDRA analysis in **Table 3.8** shows that there is no change in the Level of Service in the AM peak hour and a change in Level of Service D to E in the PM peak hour at the Church Street/ Railway Street intersection. There is no change in the Level Of Service at the other 4 intersections which have spare capacity and will continue to provide satisfactory performance under future traffic conditions.

- Based upon RMS Guidelines, 6 spaces are required for delivery/ service vehicles. 4 of these spaces could be dual/ visitor parking spaces. One space should be provided for a HRV vehicle and 1 space for a SRV vehicle.

- A Green Travel Plan has been provided to increase travel by other modes such as walking and cycling and to reduce car travel dependency. An Action Plan is located in **Appendix E.**

(4.0 continued)

- A Mitigation option to improve the existing operational performance at the intersection of Church Street/ Railway Street Intersection has been investigated in **Appendix F** and would change the operational Level of Service to A in both AM and PM peak hours.

APPENDICES

APPENDIX A

DRAWING LIST

COVER PAGE / 3D

SITE PLAN
GROUND FLOOR
LEVEL 1
LEVEL 2
LEVEL 3
LEVEL 4-7
BASEMENT LEVEL 1
BASEMENT LEVEL 2

SHADOW DIAGRAMS

MASSING 3D - VIEW 1
MASSING 3D - VIEW 2
MASSING 3D - VIEW 3
MASSING 3D - VIEW 4
MASSING 3D - VIEW 5

DRAFT

COVER PAGE

0 2 5 10 20
SCALE (m) 1:500 @ A3

14 AUG 2018

PROPOSED DEVELOPMENT

CONCEPT DESIGN

2 BACHELL AVENUE, LIDCOMBE NSW 2141

MRA I Michael Raad Architects

SITE PLAN

0 5 10 20 50
SCALE (m) 1:1000 @ A3

14 AUG 2018

DRAFT

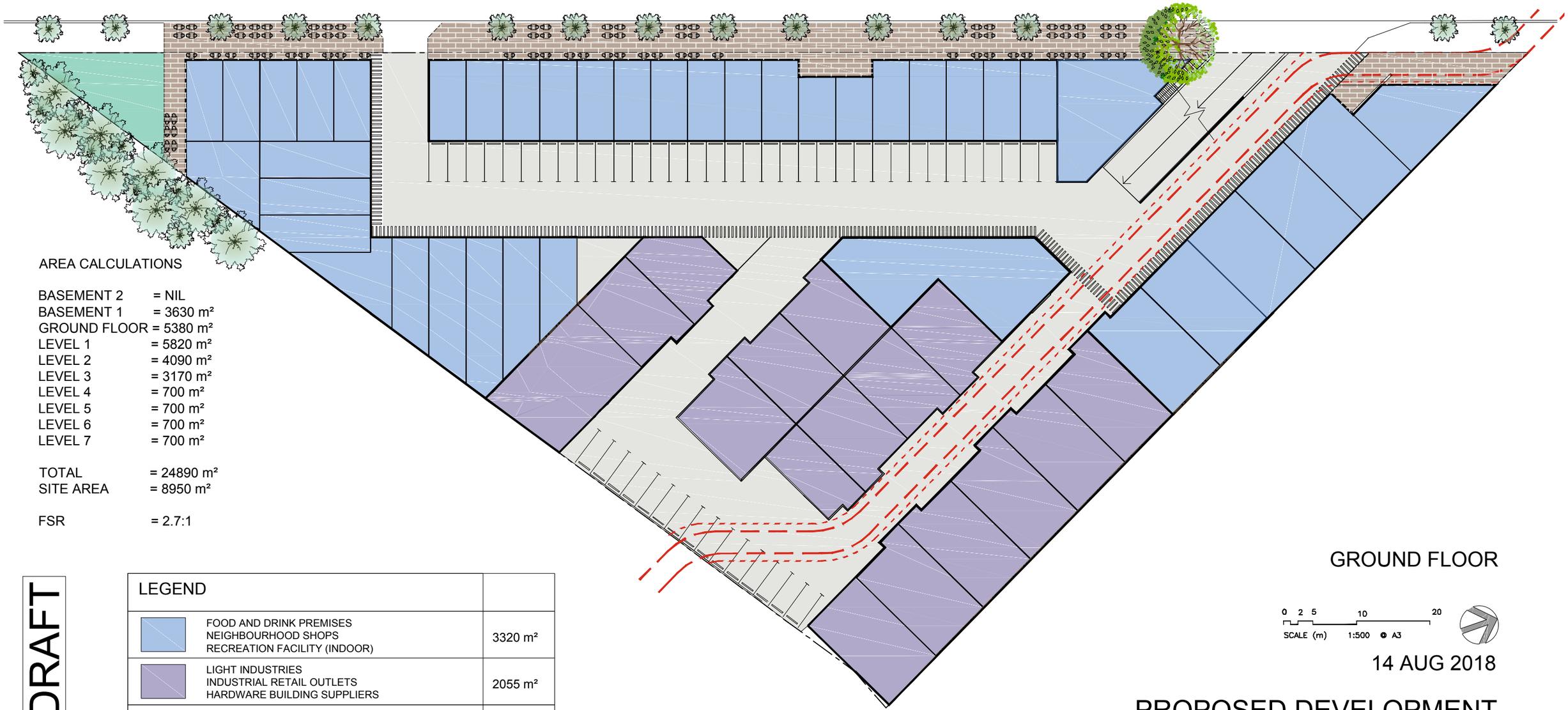
PROPOSED DEVELOPMENT

CONCEPT DESIGN

2 BACHELL AVENUE, LIDCOMBE NSW 2141

I Michael Raad Architects

BACHELL AVENUE



AREA CALCULATIONS

BASEMENT 2	= NIL
BASEMENT 1	= 3630 m²
GROUND FLOOR	= 5380 m²
LEVEL 1	= 5820 m²
LEVEL 2	= 4090 m²
LEVEL 3	= 3170 m²
LEVEL 4	= 700 m²
LEVEL 5	= 700 m²
LEVEL 6	= 700 m²
LEVEL 7	= 700 m²
TOTAL	= 24890 m²
SITE AREA	= 8950 m²
FSR	= 2.7:1

DRAFT

LEGEND	
FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	3320 m²
LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	2055 m²
HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	–
WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	–
PUBLIC OPEN SPACE	190 m²
RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

GROUND FLOOR

0 2 5 10 20
SCALE (m) 1:500 @ A3

14 AUG 2018

PROPOSED DEVELOPMENT

CONCEPT DESIGN

2 BACHELL AVENUE, LIDCOMBE NSW 2141

MRA I Michael Raad Architects

BACHELL AVENUE

LEGEND	
FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	1958 m²
LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	2776 m²
HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	–
WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	1086 m²
PUBLIC OPEN SPACE	200 m²
RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

DRAFT

LEVEL 1

0 2 5 10 20
SCALE (m) 1:500 @ A3

14 AUG 2018

PROPOSED DEVELOPMENT

CONCEPT DESIGN

2 BACHELL AVENUE, LIDCOMBE NSW 2141

MRA I Michael Raad Architects

BACHELL AVENUE

LEGEND	
FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	–
LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	468 m²
HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	2496 m²
WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	1127 m²
PUBLIC OPEN SPACE	110 m²
RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

DRAFT

LEVEL 2

0 2 5 10 20

SCALE (m) 1:500 @ A3

14 AUG 2018

PROPOSED DEVELOPMENT

CONCEPT DESIGN

2 BACHELL AVENUE, LIDCOMBE NSW 2141

MRA I Michael Raad Architects

BACHELL AVENUE

LEGEND	
FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	–
LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	410 m²
HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	1762 m²
WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	997 m²
PUBLIC OPEN SPACE	–
RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

DRAFT

LEVEL 3

0 2 5 10 20
SCALE (m) 1:500 @ A3

14 AUG 2018

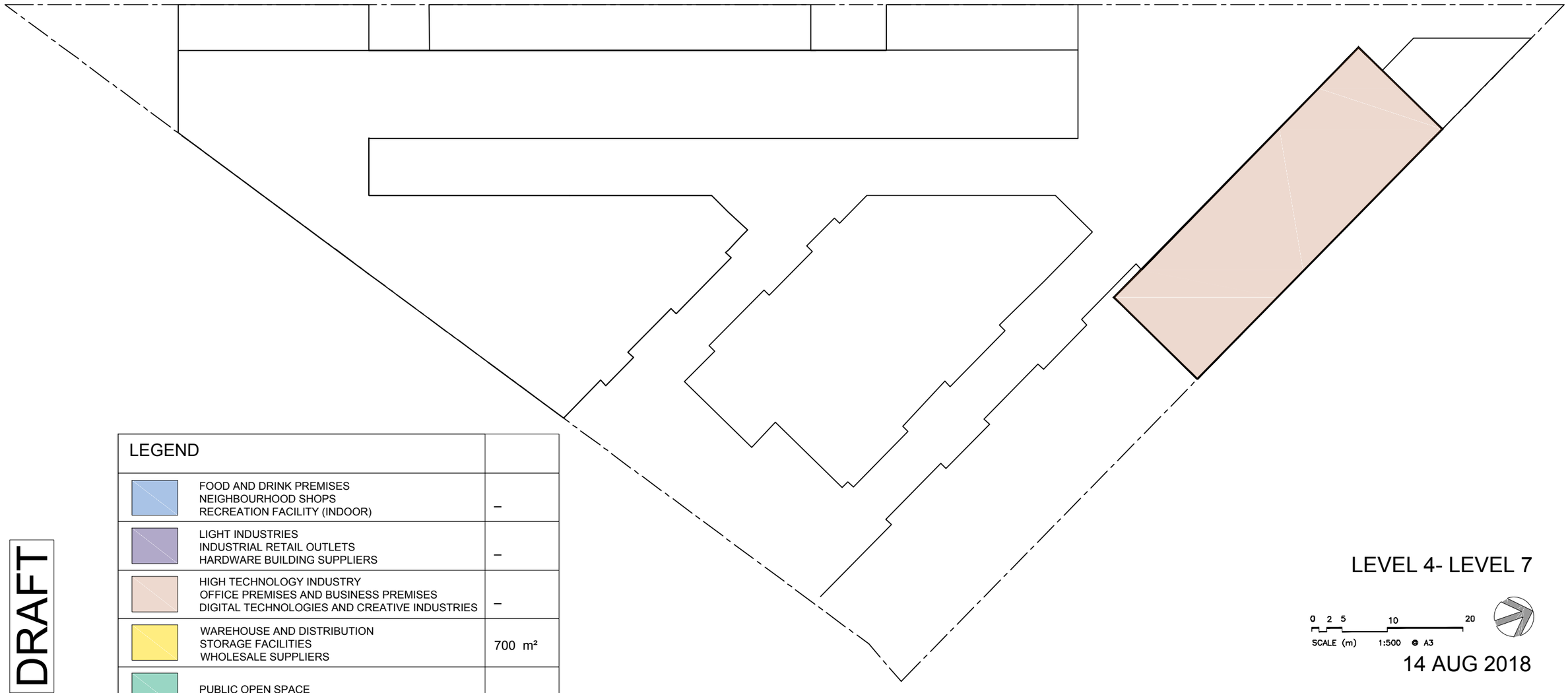
PROPOSED DEVELOPMENT

CONCEPT DESIGN

2 BACHELL AVENUE, LIDCOMBE NSW 2141

MRA I Michael Raad Architects

BACHELL AVENUE



LEGEND	
FOOD AND DRINK PREMISES NEIGHBOURHOOD SHOPS RECREATION FACILITY (INDOOR)	–
LIGHT INDUSTRIES INDUSTRIAL RETAIL OUTLETS HARDWARE BUILDING SUPPLIERS	–
HIGH TECHNOLOGY INDUSTRY OFFICE PREMISES AND BUSINESS PREMISES DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES	–
WAREHOUSE AND DISTRIBUTION STORAGE FACILITIES WHOLESALE SUPPLIERS	700 m²
PUBLIC OPEN SPACE	–
RELOCATED AND CAPPED STORM-WATER CULVERT WITH 1000 CLEARANCE	

DRAFT

LEVEL 4- LEVEL 7

0 2 5 10 20
SCALE (m) 1:500 @ A3

14 AUG 2018

PROPOSED DEVELOPMENT

CONCEPT DESIGN

2 BACHELL AVENUE, LIDCOMBE NSW 2141

MRA I Michael Raad Architects

LEGEND

FOOD AND DRINK PREMISES
NEIGHBOURHOOD SHOPS
RECREATION FACILITY (INDOOR)

LIGHT INDUSTRIES
INDUSTRIAL RETAIL OUTLETS
HARDWARE BUILDING SUPPLIERS

HIGH TECHNOLOGY INDUSTRY
OFFICE PREMISES AND BUSINESS PREMISES
DIGITAL TECHNOLOGIES AND CREATIVE INDUSTRIES

WAREHOUSE AND DISTRIBUTION
STORAGE FACILITIES
WHOLESALE SUPPLIERS

RELOCATED AND CAPPED
STORM-WATER CULVERT

MASSING MODEL
VIEW 5

14 AUG 2018

PROPOSED DEVELOPMENT

CONCEPT DESIGN

2 BACHELL AVENUE, LIDCOMBE NSW 2141

I Michael Raad Architects

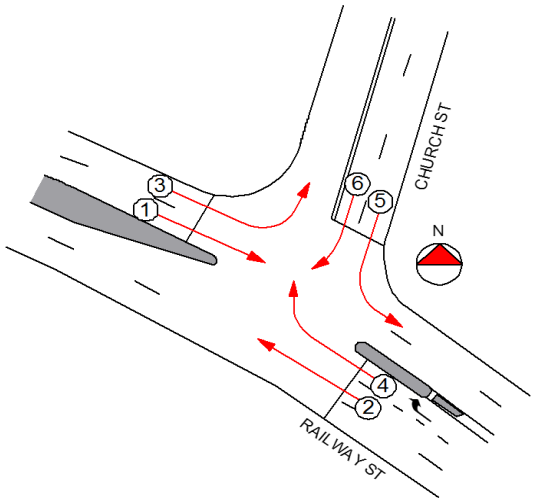
APPENDIX B

Lyle Marshall & Associates
PHONE (02) 9436 0086

INTERSECTION: CHURCH ST/RAILWAY ST, LIDCOMBE

TRAFFIC VOLUME COUNT

DAY: Tuesday….. DATE: 1.12.15.….WEATHER…Fine……..OBSERVER…R. Rabinovitch & G. Dodiak……



Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
7:00AM TO 7.15AM	187	89	20	34	36	2
7:15AM TO 7.30AM	218	105	30	22	63	6
7:30AM TO 7.45AM	188	133	20	35	42	2
7:45AM TO 8.00AM	193	168	16	37	81	4
8:00AM TO 8.15AM	208	136	20	46	60	5
8:15AM TO 8:30AM	198	124	22	44	63	8
8:30AM TO 8:45AM	215	159	11	44	71	6
8:45AM TO 9:00AM	213	142	13	39	54	3

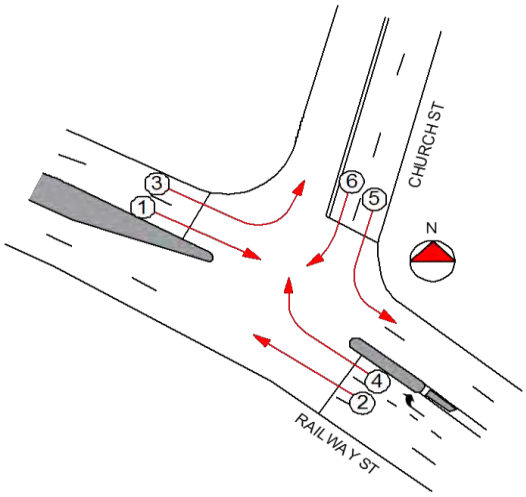
7:00 - 8:00	786	495	86	128	222	14
7:15 - 8:15	807	542	86	140	246	17
7:30 - 8:30	787	561	78	162	246	19
7:45 - 8:45	814	587	69	171	275	23
8:00 - 9:00	834	561	66	173	248	22

Lyle Marshall & Associates
PHONE (02) 9436 0086

INTERSECTION: CHURCH ST/RAILWAY ST, LIDCOMBE

TRAFFIC VOLUME COUNT

DAY: Tuesday….. DATE: 1.12.15.….WEATHER…Fine……..OBSERVER…R. Rabinovitch & G. Dodiak……



Time	MOVEMENT NUMBER					
AM	1	2	3	4	5	6
4.00PM TO 4.15PM	131	228	3	85	57	28
4.15PM TO 4.30PM	111	231	4	88	54	26
4.30PM TO 4.45PM	148	178	10	78	69	39
4.45PM TO 5.00PM	131	212	8	78	59	34
5.00PM TO 5.15PM	145	239	6	80	66	38
5.15PM TO 5.30PM	158	234	15	75	64	42
5.30PM TO 5.45PM	129	282	9	101	52	37
5.45PM TO 6.00PM	123	246	10	80	55	32

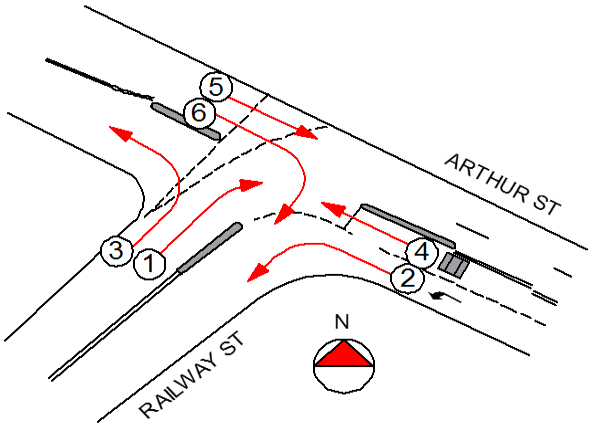
16:00 - 17:00	521	849	25	329	239	127
16:15 - 17:15	535	860	28	324	248	137
16:30 - 17:30	582	863	39	311	258	153
16:45 - 17:45	563	967	38	334	241	151
17:00 - 18:00	555	1001	40	336	237	149

Lyle Marshall & Associates
PHONE (02) 9436 0086

INTERSECTION: ARTHUR ST/RAILWAY ST, LIDCOMBE

TRAFFIC VOLUME COUNT

DAY: Tuesday….. DATE: 1.12.15.….WEATHER…Fine……..OBSERVER…B. Haldey & E. Haldey……



Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
7:00AM TO 7.15AM	249	133	1	5	3	–
7:15AM TO 7.30AM	269	140	3	2	4	2
7:30AM TO 7.45AM	237	167	1	3	2	2
7:45AM TO 8.00AM	274	189	1	1	3	1
8:00AM TO 8.15AM	266	194	2	1	1	2
8:15AM TO 8:30AM	275	180	2	2	1	1
8:30AM TO 8:45AM	295	201	4	5	3	–
8:45AM TO 9:00AM	250	195	7	7	4	2

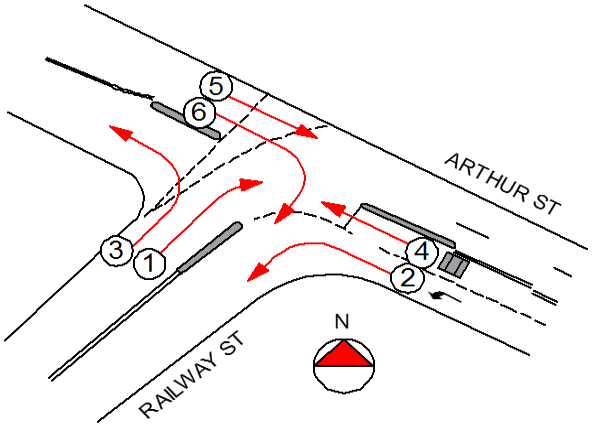
7:00 - 8:00	1029	629	6	11	12	5
7:15 - 8:15	1046	690	7	7	10	7
7:30 - 8:30	1052	730	6	7	7	6
7:45 - 8:45	1110	764	9	9	8	4
8:00 - 9:00	1086	770	15	15	9	5

Lyle Marshall & Associates
PHONE (02) 9436 0086

INTERSECTION: ARTHUR ST/RAILWAY ST, LIDCOMBE

TRAFFIC VOLUME COUNT

DAY: Tuesday….. DATE: 1.12.15.….WEATHER…Fine……..OBSERVER…B. Haldey & E. Haldey……



Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
4.00PM TO 4.15PM	190	338	1	1	1	4
4.15PM TO 4.30PM	188	268	_	3	7	_
4.30PM TO 4.45PM	205	250	_	7	2	2
4.45PM TO 5.00PM	197	274	2	1	6	3
5.00PM TO 5.15PM	223	303	1	2	9	9
5.15PM TO 5:30PM	227	292	3	1	4	2
5.30PM TO 5.45PM	184	351	1	1	2	1
5.45PM TO 6.00PM	188	232	_	3	4	1

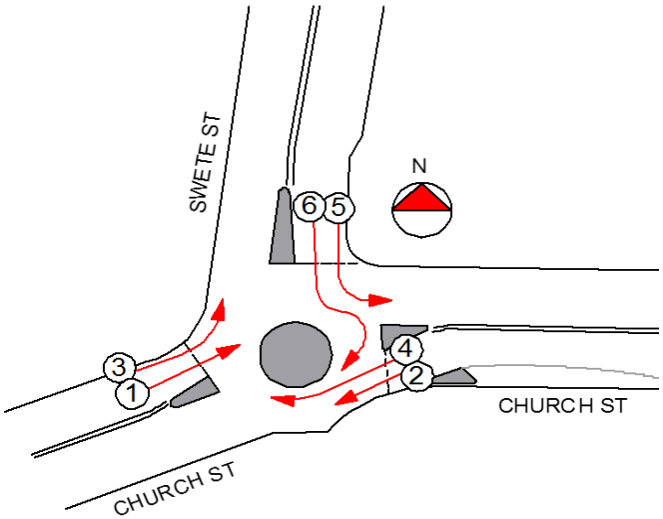
16:00 - 17:00	780	1130	3	12	16	9
16:15 - 17:15	813	1095	3	13	24	14
16:30 - 17:30	852	1119	6	11	21	16
16:45 - 17:45	831	1220	7	5	21	15
17:00 - 18:00	822	1178	5	7	19	13

Lyle Marshall & Associates
PHONE (02) 9436 0086

INTERSECTION: CHURCH ST/SWETE ST, LIDCOMBE

TRAFFIC VOLUME COUNT

DAY: Wednesday….. DATE: 2.12.15…..WEATHER…Fine……..OBSERVER…V. Karpel……



Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
7:00AM TO 7.15AM	108	31	53	9	19	27
7:15AM TO 7.30AM	125	42	36	6	23	36
7:30AM TO 7.45AM	143	48	54	10	25	56
7:45AM TO 8.00AM	149	47	51	10	19	53
8:00AM TO 8.15AM	128	57	51	22	22	56
8:15AM TO 8:30AM	117	38	79	12	28	55
8:30AM TO 8:45AM	108	45	80	17	19	44
8:45AM TO 9:00AM	113	51	85	15	21	47

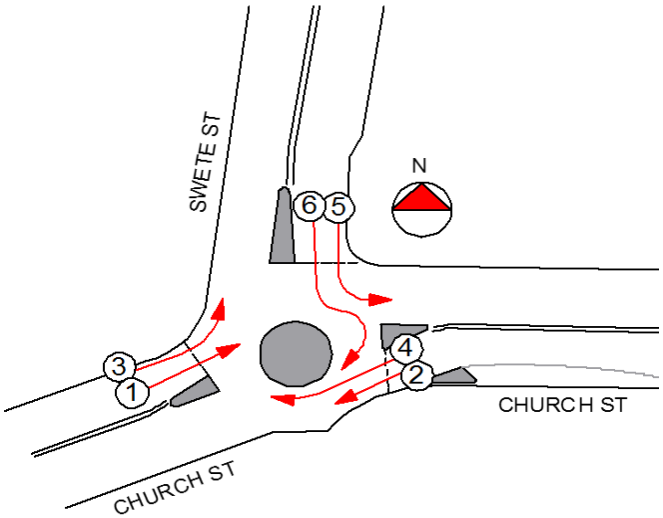
7:00 - 8:00	525	168	194	35	86	172
7:15 - 8:15	545	194	192	48	89	201
7:30 - 8:30	537	190	235	54	94	220
7:45 - 8:45	502	187	261	61	88	208
8:00 - 9:00	466	191	295	66	90	202

Lyle Marshall & Associates
PHONE (02) 9436 0086

INTERSECTION: CHURCH ST/SWETE ST, LIDCOMBE

TRAFFIC VOLUME COUNT

DAY: Wednesday….. DATE: 2.12.15.….WEATHER…Fine……..OBSERVER…V. Karpel……



Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
4.00PM TO 4.15PM	45	153	39	47	33	77
4.15PM TO 4.30PM	41	162	40	36	28	69
4.30PM TO 4.45PM	41	161	26	39	22	67
4.45PM TO 5.00PM	36	169	51	25	25	71
5.00PM TO 5.15PM	59	151	46	23	35	95
5.15PM TO 5.30PM	48	171	42	41	25	73
5.30PM TO 5.45PM	58	157	46	30	32	76
5.45PM TO 6.00PM	56	153	44	34	31	73

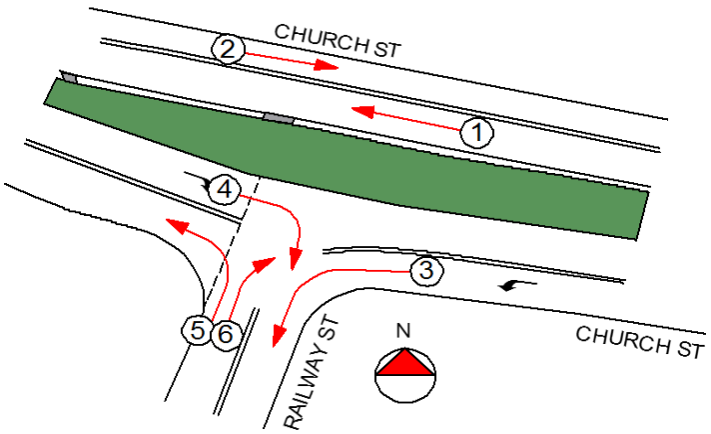
16:00 - 17:00	163	645	156	147	108	284
16:15 - 17:15	177	643	163	123	110	302
16:30 - 17:30	184	652	165	128	107	306
16:45 - 17:45	201	648	185	119	117	315
17:00 - 18:00	221	632	178	128	123	317

Lyle Marshall & Associates
PHONE (02) 9436 0086

INTERSECTION: CHURCH ST/RAILWAY ST BRIDGE, LIDCOMBE

TRAFFIC VOLUME COUNT

DAY: Wednesday….. DATE: 2.12.15..…WEATHER…Cloudy……..OBSERVER…R. Rabinovitch & G. Dodiak……



Time	MOVEMENT NUMBER					
AM	1	2	3	4	5	6
7:00AM TO 7.15AM	28	41	41	45	46	146
7:15AM TO 7.30AM	43	38	39	32	40	141
7:30AM TO 7.45AM	69	45	48	33	55	154
7:45AM TO 8.00AM	58	53	57	36	63	164
8:00AM TO 8.15AM	61	52	64	44	73	126
8:15AM TO 8:30AM	64	53	49	41	71	166
8:30AM TO 8:45AM	44	49	59	58	73	154
8:45AM TO 9:00AM	33	51	70	50	82	171

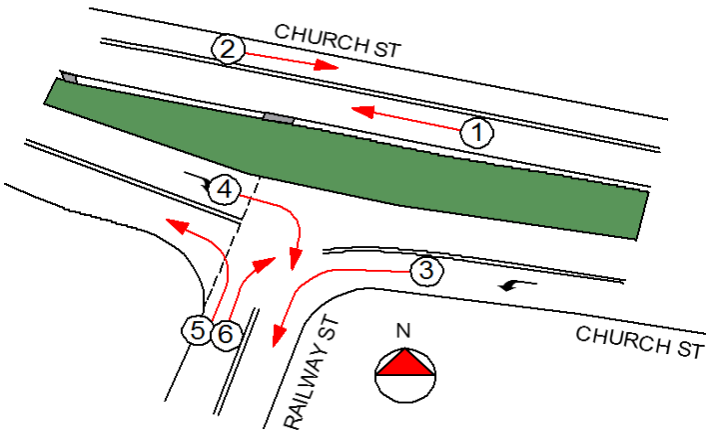
7:00 - 8:00	198	177	185	146	204	605
7:15 - 8:15	231	188	208	145	231	585
7:30 - 8:30	252	203	218	154	262	610
7:45 - 8:45	227	207	229	179	280	610
8:00 - 9:00	202	205	242	193	299	617

Lyle Marshall & Associates
PHONE (02) 9436 0086

INTERSECTION: CHURCH ST/RAILWAY ST BRIDGE, LIDCOMBE

TRAFFIC VOLUME COUNT

DAY: Wednesday….. DATE: 2.12.15..…WEATHER…Cloudy……..OBSERVER…R. Rabinovitch & G. Dodiak……



Time	MOVEMENT NUMBER					
AM	1	2	3	4	5	6
4.00PM TO 4.15PM	85	23	162	38	103	51
4.15PM TO 4.30PM	87	40	155	52	89	49
4.30PM TO 4.45PM	90	30	157	41	106	40
4.45PM TO 5.00PM	81	37	167	64	83	59
5.00PM TO 5.15PM	73	45	196	48	81	55
5.15PM TO 5.30PM	84	32	165	45	106	54
5.30PM TO 5.45PM	83	42	176	55	94	70
5.45PM TO 6.00PM	92	42	151	50	83	68

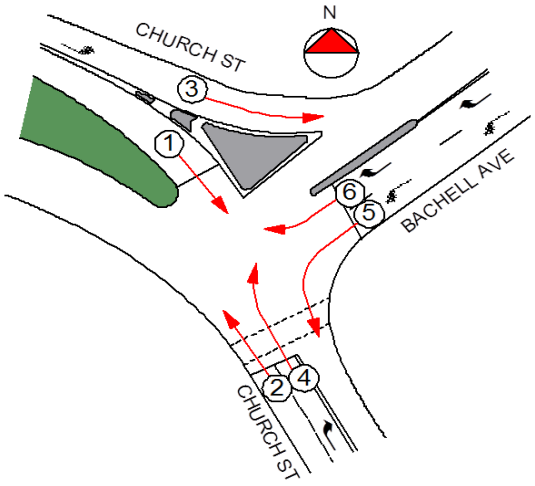
16:00 - 17:00	343	130	641	195	381	199
16:15 - 17:15	331	152	675	205	359	203
16:30 - 17:30	328	144	685	198	376	208
16:45 - 17:45	321	156	704	212	364	238
17:00 - 18:00	332	161	688	198	364	247

Lyle Marshall & Associates
PHONE (02) 9436 0086

INTERSECTION: CHURCH ST/BACHELL AVE, LIDCOMBE

TRAFFIC VOLUME COUNT

DAY: Wednesday….. DATE: 2.12.15.….WEATHER…Cloudy……..OBSERVER…B. Haldey & E. Haldey……



Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
7:00AM TO 7.15AM	42	11	115	30	11	34
7:15AM TO 7.30AM	53	16	117	49	11	34
7:30AM TO 7.45AM	39	22	132	42	23	40
7:45AM TO 8.00AM	44	13	116	47	26	50
8:00AM TO 8.15AM	49	34	119	40	29	54
8:15AM TO 8:30AM	48	19	106	46	32	42
8:30AM TO 8:45AM	50	24	88	43	16	45
8:45AM TO 9:00AM	41	39	105	38	12	45

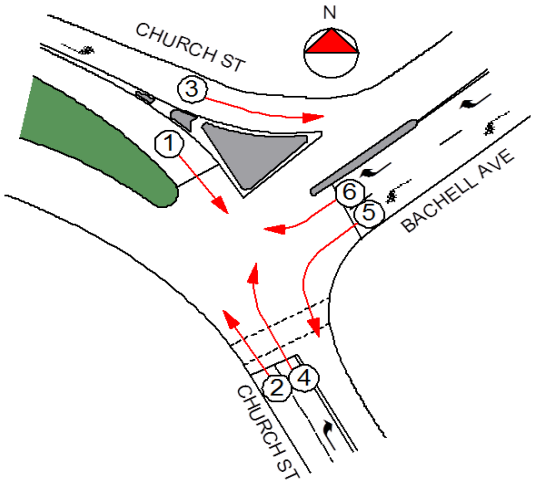
7:00 - 8:00	178	62	480	168	71	158
7:15 - 8:15	185	85	484	178	89	178
7:30 - 8:30	180	88	473	175	110	186
7:45 - 8:45	191	90	429	176	103	191
8:00 - 9:00	188	116	418	167	89	186

Lyle Marshall & Associates
PHONE (02) 9436 0086

INTERSECTION: CHURCH ST/BACHELL AVE, LIDCOMBE

TRAFFIC VOLUME COUNT

DAY: Wednesday….. DATE: 2.12.15.…WEATHER…Cloudy……..OBSERVER…B. Haldey & E. Haldey……



Time AM	MOVEMENT NUMBER					
	1	2	3	4	5	6
4.00PM TO 4.15PM	47	83	29	18	48	159
4.15PM TO 4.30PM	46	76	30	25	48	155
4.30PM TO 4.45PM	36	71	32	26	50	148
4.45PM TO 5.00PM	47	70	19	36	44	137
5.00PM TO 5.15PM	57	66	32	29	92	165
5.15PM TO 5.30PM	39	82	30	33	61	130
5.30PM TO 5.45PM	49	67	44	31	62	145
5.45PM TO 6.00PM	55	83	36	30	53	150

16:00 - 17:00	176	300	110	105	190	599
16:15 - 17:15	186	283	113	116	234	605
16:30 - 17:30	179	289	113	124	247	580
16:45 - 17:45	192	285	125	129	259	577
17:00 - 18:00	200	298	142	123	268	590

APPENDIX C

INTERSECTION SUMMARY

Site: 101 [Existing AM: Church St/Railway St, Lidcombe]

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 115 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	16.1	km/h	16.1	km/h
Travel Distance (Total)	1965.9	veh-km/h	2359.0	pers-km/h
Travel Time (Total)	122.3	veh-h/h	146.8	pers-h/h
Demand Flows (Total)	1939	veh/h	2327	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	1.130			
Practical Spare Capacity	-20.4	%		
Effective Intersection Capacity	1716	veh/h		
Control Delay (Total)	87.13	veh-h/h	104.55	pers-h/h
Control Delay (Average)	161.8	sec	161.8	sec
Control Delay (Worst Lane)	300.1	sec		
Control Delay (Worst Movement)	299.4	sec	299.4	sec
Geometric Delay (Average)	1.5	sec		
Stop-Line Delay (Average)	160.2	sec		
Idling Time (Average)	153.3	sec		
Intersection Level of Service (LOS)	LOS F			
95% Back of Queue - Vehicles (Worst Lane)	132.5	veh		
95% Back of Queue - Distance (Worst Lane)	927.2	m		
Queue Storage Ratio (Worst Lane)	1.14			
Total Effective Stops	2969	veh/h	3562	pers/h
Effective Stop Rate	1.53		1.53	
Proportion Queued	0.82		0.82	
Performance Index	247.0		247.0	
Cost (Total)	3872.69	$/h	3872.69	$/h
Fuel Consumption (Total)	279.5	L/h		
Carbon Dioxide (Total)	656.8	kg/h		
Hydrocarbons (Total)	0.066	kg/h		
Carbon Monoxide (Total)	0.610	kg/h		
NOx (Total)	0.170	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 2.2% 2.4% 0.5%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	930,720	veh/y	1,116,864	pers/y
Delay	41,821	veh-h/y	50,185	pers-h/y
Effective Stops	1,424,963	veh/y	1,709,956	pers/y
Travel Distance	943,613	veh-km/y	1,132,335	pers-km/y
Travel Time	58,711	veh-h/y	70,454	pers-h/y
Cost	1,858,892	$/y	1,858,892	$/y
Fuel Consumption	134,148	L/y		
Carbon Dioxide	315,249	kg/y		
Hydrocarbons	32	kg/y		
Carbon Monoxide	293	kg/y		
NOx	82	kg/y		

MOVEMENT SUMMARY

Site: 101 [Existing AM: Church St/Railway St, Lidcombe]

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 115 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Railway St E												
5	T1	587	0.0	0.304	18.2	LOS B	9.6	67.4	0.63	0.55	0.63	46.2
6	R2	171	0.0	1.059	194.4	LOS F	20.3	141.9	1.00	1.49	2.68	14.0
Approach		758	0.0	1.059	58.0	LOS E	20.3	141.9	0.72	0.76	1.10	30.4
North: Church St												
7	L2	275	0.0	0.275	20.7	LOS B	8.2	57.5	0.58	0.74	0.58	43.9
9	R2	23	0.0	0.031	27.6	LOS B	0.8	5.4	0.63	0.68	0.63	40.4
Approach		298	0.0	0.275	21.2	LOS B	8.2	57.5	0.58	0.74	0.58	43.6
West: Railway St W												
10	L2	69	0.0	1.130	285.2	LOS F	13.3	93.0	1.00	1.41	3.51	9.5
11	T1	814	0.0	1.130	299.4	LOS F	132.5	927.2	1.00	2.55	3.14	10.0
Approach		883	0.0	1.130	298.3	LOS F	132.5	927.2	1.00	2.46	3.17	9.9
All Vehicles		1939	0.0	1.130	161.8	LOS F	132.5	927.2	0.82	1.53	1.96	16.1

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

INTERSECTION SUMMARY

Site: 101 [Existing PM: Church St/Railway St, Lidcombe]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	33.7	km/h	33.7	km/h
Travel Distance (Total)	2350.1	veh-km/h	2820.1	pers-km/h
Travel Time (Total)	69.8	veh-h/h	83.7	pers-h/h
Demand Flows (Total)	2318	veh/h	2782	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	1.086			
Practical Spare Capacity	-17.1	%		
Effective Intersection Capacity	2135	veh/h		
Control Delay (Total)	30.10	veh-h/h	36.12	pers-h/h
Control Delay (Average)	46.8	sec	46.8	sec
Control Delay (Worst Lane)	192.6	sec		
Control Delay (Worst Movement)	192.6	sec	192.6	sec
Geometric Delay (Average)	1.8	sec		
Stop-Line Delay (Average)	44.9	sec		
Idling Time (Average)	33.3	sec		
Intersection Level of Service (LOS)	LOS D			
95% Back of Queue - Vehicles (Worst Lane)	30.9	veh		
95% Back of Queue - Distance (Worst Lane)	216.0	m		
Queue Storage Ratio (Worst Lane)	0.10			
Total Effective Stops	2806	veh/h	3368	pers/h
Effective Stop Rate	1.21		1.21	
Proportion Queued	0.83		0.83	
Performance Index	123.2		123.2	
Cost (Total)	2076.78	$/h	2076.78	$/h
Fuel Consumption (Total)	224.3	L/h		
Carbon Dioxide (Total)	527.0	kg/h		
Hydrocarbons (Total)	0.048	kg/h		
Carbon Monoxide (Total)	0.580	kg/h		
NOx (Total)	0.151	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 0.0% 0.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	1,112,640	veh/y	1,335,168	pers/y
Delay	14,449	veh-h/y	17,339	pers-h/y
Effective Stops	1,347,106	veh/y	1,616,528	pers/y
Travel Distance	1,128,041	veh-km/y	1,353,649	pers-km/y
Travel Time	33,492	veh-h/y	40,191	pers-h/y
Cost	996,852	$/y	996,852	$/y
Fuel Consumption	107,641	L/y		
Carbon Dioxide	252,957	kg/y		
Hydrocarbons	23	kg/y		
Carbon Monoxide	278	kg/y		
NOx	72	kg/y		

MOVEMENT SUMMARY

Site: 101 [Existing PM: Church St/Railway St, Lidcombe]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Railway St E												
5	T1	1001	0.0	0.513	6.7	LOS A	6.1	42.8	0.72	0.62	0.72	54.0
6	R2	336	0.0	1.086	192.6	LOS F	30.9	216.0	1.00	2.77	6.23	14.2
Approach		1337	0.0	1.086	53.4	LOS D	30.9	216.0	0.79	1.16	2.10	31.7
North: Church St												
7	L2	237	0.0	0.255	11.3	LOS A	2.5	17.2	0.61	0.73	0.61	49.5
9	R2	149	0.0	0.481	21.5	LOS B	2.6	18.1	0.95	0.78	0.95	43.3
Approach		386	0.0	0.481	15.2	LOS B	2.6	18.1	0.74	0.75	0.74	46.9
West: Railway St W												
10	L2	40	0.0	0.982	59.9	LOS E	9.8	68.4	1.00	1.61	3.72	31.0
11	T1	555	0.0	0.982	51.6	LOS D	11.4	80.0	1.00	1.62	3.37	32.4
Approach		595	0.0	0.982	52.2	LOS D	11.4	80.0	1.00	1.62	3.39	32.3
All Vehicles		2318	0.0	1.086	46.8	LOS D	30.9	216.0	0.83	1.21	2.21	33.7

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

INTERSECTION SUMMARY

Site: 101 [Existing AM: Railway St/Arthur St, Lidcombe]

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	53.0	km/h	53.0	km/h
Travel Distance (Total)	1931.0	veh-km/h	2317.2	pers-km/h
Travel Time (Total)	36.5	veh-h/h	43.7	pers-h/h
Demand Flows (Total)	1904	veh/h	2285	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.603			
Practical Spare Capacity	62.6	%		
Effective Intersection Capacity	3160	veh/h		
Control Delay (Total)	3.24	veh-h/h	3.89	pers-h/h
Control Delay (Average)	6.1	sec	6.1	sec
Control Delay (Worst Lane)	55.0	sec		
Control Delay (Worst Movement)	102.0	sec	102.0	sec
Geometric Delay (Average)	5.5	sec		
Stop-Line Delay (Average)	0.6	sec		
Idling Time (Average)	0.5	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.4	veh		
95% Back of Queue - Distance (Worst Lane)	3.0	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	1116	veh/h	1339	pers/h
Effective Stop Rate	0.59		0.59	
Proportion Queued	0.01		0.01	
Performance Index	42.1		42.1	
Cost (Total)	981.15	$/h	981.15	$/h
Fuel Consumption (Total)	154.7	L/h		
Carbon Dioxide (Total)	363.6	kg/h		
Hydrocarbons (Total)	0.031	kg/h		
Carbon Monoxide (Total)	0.433	kg/h		
NOx (Total)	0.112	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 96.1% 96.7% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	913,920	veh/y	1,096,704	pers/y
Delay	1,557	veh-h/y	1,868	pers-h/y
Effective Stops	535,486	veh/y	642,583	pers/y
Travel Distance	926,891	veh-km/y	1,112,269	pers-km/y
Travel Time	17,497	veh-h/y	20,996	pers-h/y
Cost	470,953	$/y	470,953	$/y
Fuel Consumption	74,258	L/y		
Carbon Dioxide	174,506	kg/y		
Hydrocarbons	15	kg/y		
Carbon Monoxide	208	kg/y		
NOx	54	kg/y		

MOVEMENT SUMMARY

Site: 101 [Existing AM: Railway St/Arthur St, Lidcombe]

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Railway St												
1	L2	9	0.0	0.603	5.7	LOS A	0.0	0.0	0.00	0.59	0.00	53.5
3	R2	1110	0.0	0.603	5.6	LOS A	0.0	0.0	0.00	0.59	0.00	53.2
Approach		1119	0.0	0.603	5.6	NA	0.0	0.0	0.00	0.59	0.00	53.2
East: Arthur St E												
4	L2	764	0.0	0.411	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.6
5	T1	9	0.0	0.141	55.0	LOS D	0.4	2.8	0.95	0.95	0.95	31.5
Approach		773	0.0	0.411	6.2	NA	0.4	2.8	0.01	0.58	0.01	53.1
West: Arthur St W												
11	T1	8	0.0	0.160	27.2	LOS B	0.4	3.0	0.94	1.01	0.95	32.3
12	R2	4	0.0	0.160	102.0	LOS F	0.4	3.0	0.94	1.01	0.95	32.2
Approach		12	0.0	0.160	52.1	LOS D	0.4	3.0	0.94	1.01	0.95	32.2
All Vehicles		1904	0.0	0.603	6.1	NA	0.4	3.0	0.01	0.59	0.01	53.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: 101 [Existing PM: Railway St/Arthur St, Lidcombe]

PM Peak Hour: 4:45-5:45pm
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	51.9	km/h	51.9	km/h
Travel Distance (Total)	2129.7	veh-km/h	2555.6	pers-km/h
Travel Time (Total)	41.0	veh-h/h	49.2	pers-h/h
Demand Flows (Total)	2099	veh/h	2519	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.657			
Practical Spare Capacity	26.9	%		
Effective Intersection Capacity	3195	veh/h		
Control Delay (Total)	4.40	veh-h/h	5.28	pers-h/h
Control Delay (Average)	7.6	sec	7.6	sec
Control Delay (Worst Lane)	116.2	sec		
Control Delay (Worst Movement)	187.1	sec	187.1	sec
Geometric Delay (Average)	5.5	sec		
Stop-Line Delay (Average)	2.0	sec		
Idling Time (Average)	1.8	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	4.9	veh		
95% Back of Queue - Distance (Worst Lane)	34.2	m		
Queue Storage Ratio (Worst Lane)	0.03			
Total Effective Stops	1212	veh/h	1454	pers/h
Effective Stop Rate	0.58		0.58	
Proportion Queued	0.05		0.05	
Performance Index	52.2		52.2	
Cost (Total)	1109.93	$/h	1109.93	$/h
Fuel Consumption (Total)	171.7	L/h		
Carbon Dioxide (Total)	403.4	kg/h		
Hydrocarbons (Total)	0.034	kg/h		
Carbon Monoxide (Total)	0.479	kg/h		
NOx (Total)	0.123	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 3 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 97.0% 90.5% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	1,007,520	veh/y	1,209,024	pers/y
Delay	2,114	veh-h/y	2,536	pers-h/y
Effective Stops	581,732	veh/y	698,078	pers/y
Travel Distance	1,022,242	veh-km/y	1,226,691	pers-km/y
Travel Time	19,698	veh-h/y	23,637	pers-h/y
Cost	532,765	$/y	532,765	$/y
Fuel Consumption	82,406	L/y		
Carbon Dioxide	193,653	kg/y		
Hydrocarbons	16	kg/y		
Carbon Monoxide	230	kg/y		
NOx	59	kg/y		

MOVEMENT SUMMARY

Site: 101 [Existing PM: Railway St/Arthur St, Lidcombe]

PM Peak Hour: 4:45-5:45pm
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Railway St												
1	L2	7	0.0	0.586	5.6	LOS A	4.9	34.2	0.07	0.56	0.07	53.4
3	R2	831	0.0	0.586	5.5	LOS A	4.9	34.2	0.07	0.56	0.07	53.2
Approach		838	0.0	0.586	5.5	NA	4.9	34.2	0.07	0.56	0.07	53.2
East: Arthur St E												
4	L2	1220	0.0	0.657	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	53.4
5	T1	5	0.0	0.027	18.1	LOS B	0.1	0.6	0.82	0.82	0.82	46.2
Approach		1225	0.0	0.657	5.7	NA	0.1	0.6	0.00	0.58	0.00	53.4
West: Arthur St W												
11	T1	21	0.0	0.630	65.5	LOS E	2.0	13.8	0.96	1.10	1.35	20.6
12	R2	15	0.0	0.630	187.1	LOS F	2.0	13.8	0.96	1.10	1.35	20.5
Approach		36	0.0	0.630	116.2	LOS F	2.0	13.8	0.96	1.10	1.35	20.6
All Vehicles		2099	0.0	0.657	7.6	NA	4.9	34.2	0.05	0.58	0.05	51.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: 101 [Existing AM: Church St/Swete St, Lidcombe]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	47.3	km/h	47.3	km/h
Travel Distance (Total)	1349.2	veh-km/h	1619.0	pers-km/h
Travel Time (Total)	28.5	veh-h/h	34.2	pers-h/h
Demand Flows (Total)	1330	veh/h	1596	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.544			
Practical Spare Capacity	56.2	%		
Effective Intersection Capacity	2445	veh/h		
Control Delay (Total)	2.29	veh-h/h	2.75	pers-h/h
Control Delay (Average)	6.2	sec	6.2	sec
Control Delay (Worst Lane)	10.0	sec		
Control Delay (Worst Movement)	10.6	sec	10.6	sec
Geometric Delay (Average)	4.7	sec		
Stop-Line Delay (Average)	1.5	sec		
Idling Time (Average)	0.4	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	5.2	veh		
95% Back of Queue - Distance (Worst Lane)	36.5	m		
Queue Storage Ratio (Worst Lane)	0.03			
Total Effective Stops	777	veh/h	933	pers/h
Effective Stop Rate	0.58		0.58	
Proportion Queued	0.45		0.45	
Performance Index	40.2		40.2	
Cost (Total)	746.42	$/h	746.42	$/h
Fuel Consumption (Total)	106.6	L/h		
Carbon Dioxide (Total)	250.6	kg/h		
Hydrocarbons (Total)	0.019	kg/h		
Carbon Monoxide (Total)	0.238	kg/h		
NOx (Total)	0.070	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 1.4 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.1% 1.4% 0.7%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	638,400	veh/y	766,080	pers/y
Delay	1,099	veh-h/y	1,319	pers-h/y
Effective Stops	373,195	veh/y	447,834	pers/y
Travel Distance	647,597	veh-km/y	777,116	pers-km/y
Travel Time	13,678	veh-h/y	16,414	pers-h/y
Cost	358,282	$/y	358,282	$/y
Fuel Consumption	51,183	L/y		
Carbon Dioxide	120,279	kg/y		
Hydrocarbons	9	kg/y		
Carbon Monoxide	114	kg/y		
NOx	34	kg/y		

MOVEMENT SUMMARY

Site: 101 [Existing AM: Church St/Swete St, Lidcombe]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	190	0.0	0.241	6.2	LOS A	1.5	10.6	0.49	0.62	0.49	48.9
6	R2	54	0.0	0.241	8.9	LOS A	1.5	10.6	0.49	0.62	0.49	48.6
Approach		244	0.0	0.241	6.8	LOS A	1.5	10.6	0.49	0.62	0.49	48.9
North: Swete St												
7	L2	94	0.0	0.397	8.7	LOS A	2.6	18.0	0.73	0.83	0.73	45.9
9	R2	220	0.0	0.397	10.6	LOS A	2.6	18.0	0.73	0.83	0.73	43.5
Approach		314	0.0	0.397	10.0	LOS A	2.6	18.0	0.73	0.83	0.73	44.2
West: Church St W												
10	L2	235	0.0	0.544	5.0	LOS A	5.2	36.5	0.32	0.47	0.32	45.7
11	T1	537	0.0	0.544	4.2	LOS A	5.2	36.5	0.32	0.47	0.32	49.5
Approach		772	0.0	0.544	4.5	LOS A	5.2	36.5	0.32	0.47	0.32	48.3
All Vehicles		1330	0.0	0.544	6.2	LOS A	5.2	36.5	0.45	0.58	0.45	47.3

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

INTERSECTION SUMMARY

Site: 101 [Existing PM: Church St/Swete St, Lidcombe]

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	46.1	km/h	46.1	km/h
Travel Distance (Total)	1623.2	veh-km/h	1947.8	pers-km/h
Travel Time (Total)	35.2	veh-h/h	42.2	pers-h/h
Demand Flows (Total)	1599	veh/h	1919	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.772			
Practical Spare Capacity	10.1	%		
Effective Intersection Capacity	2072	veh/h		
Control Delay (Total)	4.04	veh-h/h	4.84	pers-h/h
Control Delay (Average)	9.1	sec	9.1	sec
Control Delay (Worst Lane)	12.1	sec		
Control Delay (Worst Movement)	14.3	sec	14.3	sec
Geometric Delay (Average)	5.1	sec		
Stop-Line Delay (Average)	3.9	sec		
Idling Time (Average)	0.8	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	11.2	veh		
95% Back of Queue - Distance (Worst Lane)	78.6	m		
Queue Storage Ratio (Worst Lane)	0.06			
Total Effective Stops	1202	veh/h	1442	pers/h
Effective Stop Rate	0.75		0.75	
Proportion Queued	0.69		0.69	
Performance Index	54.0		54.0	
Cost (Total)	906.53	$/h	906.53	$/h
Fuel Consumption (Total)	127.3	L/h		
Carbon Dioxide (Total)	299.1	kg/h		
Hydrocarbons (Total)	0.023	kg/h		
Carbon Monoxide (Total)	0.279	kg/h		
NOx (Total)	0.082	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 1.2 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 1.9% 1.1% 0.6%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	767,520	veh/y	921,024	pers/y
Delay	1,938	veh-h/y	2,325	pers-h/y
Effective Stops	576,807	veh/y	692,169	pers/y
Travel Distance	779,113	veh-km/y	934,936	pers-km/y
Travel Time	16,886	veh-h/y	20,263	pers-h/y
Cost	435,136	$/y	435,136	$/y
Fuel Consumption	61,101	L/y		
Carbon Dioxide	143,588	kg/y		
Hydrocarbons	11	kg/y		
Carbon Monoxide	134	kg/y		
NOx	39	kg/y		

MOVEMENT SUMMARY

Site: 101 [Existing PM: Church St/Swete St, Lidcombe]

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	632	0.0	0.772	11.7	LOS A	11.2	78.6	0.92	0.91	1.15	46.0
6	R2	128	0.0	0.772	14.3	LOS A	11.2	78.6	0.92	0.91	1.15	45.7
Approach		760	0.0	0.772	12.1	LOS A	11.2	78.6	0.92	0.91	1.15	45.9
North: Swete St												
7	L2	123	0.0	0.413	6.2	LOS A	2.9	20.2	0.54	0.67	0.54	47.3
9	R2	317	0.0	0.413	8.1	LOS A	2.9	20.2	0.54	0.67	0.54	44.7
Approach		440	0.0	0.413	7.6	LOS A	2.9	20.2	0.54	0.67	0.54	45.4
West: Church St W												
10	L2	178	0.0	0.339	5.4	LOS A	2.5	17.7	0.43	0.54	0.43	45.4
11	T1	221	0.0	0.339	4.6	LOS A	2.5	17.7	0.43	0.54	0.43	49.1
Approach		399	0.0	0.339	5.0	LOS A	2.5	17.7	0.43	0.54	0.43	47.4
All Vehicles		1599	0.0	0.772	9.1	LOS A	11.2	78.6	0.69	0.75	0.80	46.1

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

INTERSECTION SUMMARY

Site: 101 [Existing AM: Church St/Bachell Ave, Lidcombe]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values								
Performance Measure	**Vehicles**			**Pedestrians**			**Persons**	
Travel Speed (Average)	49.2	km/h		3.1	km/h		48.4	km/h
Travel Distance (Total)	1233.2	veh-km/h		1.6	ped-km/h		1481.4	pers-km/h
Travel Time (Total)	25.1	veh-h/h		0.5	ped-h/h		30.6	pers-h/h
Demand Flows (Total)	1212	veh/h		50	ped/h		1504	pers/h
Percent Heavy Vehicles (Demand)	0.0	%						
Degree of Saturation	0.601			0.025				
Practical Spare Capacity	49.8	%						
Effective Intersection Capacity	2017	veh/h						
Control Delay (Total)	4.10	veh-h/h		0.17	ped-h/h		5.10	pers-h/h
Control Delay (Average)	12.2	sec		12.5	sec		12.2	sec
Control Delay (Worst Lane)	22.3	sec						
Control Delay (Worst Movement)	22.3	sec		12.5	sec		22.3	sec
Geometric Delay (Average)	4.3	sec						
Stop-Line Delay (Average)	7.9	sec						
Idling Time (Average)	4.8	sec						
Intersection Level of Service (LOS)	LOS A			LOS B				
95% Back of Queue - Vehicles (Worst Lane)	3.4	veh						
95% Back of Queue - Distance (Worst Lane)	23.7	m						
Queue Storage Ratio (Worst Lane)	0.03							
Total Effective Stops	880	veh/h		42	ped/h		1098	pers/h
Effective Stop Rate	0.73			0.84			0.73	
Proportion Queued	0.71			0.84			0.72	
Performance Index	37.8			0.7			38.6	
Cost (Total)	704.19	$/h		12.66	$/h		716.86	$/h
Fuel Consumption (Total)	102.6	L/h						
Carbon Dioxide (Total)	241.2	kg/h						
Hydrocarbons (Total)	0.021	kg/h						
Carbon Monoxide (Total)	0.285	kg/h						
NOx (Total)	0.074	kg/h						

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 6.9% 0.1% 0.0%

Intersection Performance - Annual Values								
Performance Measure	**Vehicles**			**Pedestrians**			**Persons**	
Demand Flows (Total)	581,760	veh/y		24,000	ped/y		722,112	pers/y
Delay	1,969	veh-h/y		84	ped-h/y		2,446	pers-h/y
Effective Stops	422,536	veh/y		20,042	ped/y		527,085	pers/y
Travel Distance	591,927	veh-km/y		766	ped-km/y		711,078	pers-km/y
Travel Time	12,037	veh-h/y		247	ped-h/y		14,691	pers-h/y
Cost	338,013	$/y		6,079	$/y		344,092	$/y
Fuel Consumption	49,266	L/y						
Carbon Dioxide	115,775	kg/y						
Hydrocarbons	10	kg/y						
Carbon Monoxide	137	kg/y						
NOx	36	kg/y						

MOVEMENT SUMMARY

Site: 101 [Existing AM: Church St/Bachell Ave, Lidcombe]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	88	0.0	0.361	5.7	LOS A	2.4	16.6	0.60	0.48	0.60	54.0
6	R2	175	0.0	0.361	13.5	LOS A	2.4	16.6	0.81	0.75	0.81	48.0
Approach		263	0.0	0.361	10.9	LOS A	2.4	16.6	0.74	0.66	0.74	49.9
North: Bachell Ave												
7	L2	110	0.0	0.118	10.8	LOS A	1.0	7.3	0.56	0.70	0.56	49.8
9	R2	186	0.0	0.601	22.3	LOS B	3.4	23.7	0.97	0.83	1.07	42.9
Approach		296	0.0	0.601	18.0	LOS B	3.4	23.7	0.82	0.78	0.88	45.2
West: Church St W												
10	L2	473	0.0	0.415	7.7	LOS A	2.5	17.5	0.53	0.71	0.53	52.4
11	T1	180	0.0	0.554	16.3	LOS B	3.2	22.4	0.96	0.79	1.01	47.3
Approach		653	0.0	0.554	10.1	LOS A	3.2	22.4	0.65	0.73	0.66	50.9
All Vehicles		1212	0.0	0.601	12.2	LOS A	3.4	23.7	0.71	0.73	0.73	49.2

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	50	12.5	LOS B	0.0	0.0	0.84	0.84
All Pedestrians		50	12.5	LOS B			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

INTERSECTION SUMMARY

Site: 101 [Existing PM: Church St/Bachell Ave, Lidcombe]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values								
Performance Measure	**Vehicles**			**Pedestrians**			**Persons**	
Travel Speed (Average)	44.5	km/h		3.0	km/h		44.0	km/h
Travel Distance (Total)	1644.6	veh-km/h		1.6	ped-km/h		1975.1	pers-km/h
Travel Time (Total)	36.9	veh-h/h		0.5	ped-h/h		44.9	pers-h/h
Demand Flows (Total)	1621	veh/h		50	ped/h		1995	pers/h
Percent Heavy Vehicles (Demand)	0.0	%						
Degree of Saturation	0.755			0.013				
Practical Spare Capacity	19.2	%						
Effective Intersection Capacity	2147	veh/h						
Control Delay (Total)	8.96	veh-h/h		0.19	ped-h/h		10.94	pers-h/h
Control Delay (Average)	19.9	sec		13.4	sec		19.7	sec
Control Delay (Worst Lane)	28.6	sec						
Control Delay (Worst Movement)	29.4	sec		13.4	sec		29.4	sec
Geometric Delay (Average)	3.8	sec						
Stop-Line Delay (Average)	16.1	sec						
Idling Time (Average)	12.3	sec						
Intersection Level of Service (LOS)	LOS B			LOS B				
95% Back of Queue - Vehicles (Worst Lane)	15.2	veh						
95% Back of Queue - Distance (Worst Lane)	106.7	m						
Queue Storage Ratio (Worst Lane)	0.05							
Total Effective Stops	1326	veh/h		33	ped/h		1624	pers/h
Effective Stop Rate	0.82			0.67			0.81	
Proportion Queued	0.77			0.67			0.77	
Performance Index	68.6			0.7			69.3	
Cost (Total)	1062.27	$/h		12.95	$/h		1075.22	$/h
Fuel Consumption (Total)	142.4	L/h						
Carbon Dioxide (Total)	334.6	kg/h						
Hydrocarbons (Total)	0.029	kg/h						
Carbon Monoxide (Total)	0.389	kg/h						
NOx (Total)	0.101	kg/h						

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 4.3 %
Number of Iterations: 4 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 4.4% 8.5% 0.0%

Intersection Performance - Annual Values								
Performance Measure	**Vehicles**			**Pedestrians**			**Persons**	
Demand Flows (Total)	778,080	veh/y		24,000	ped/y		957,696	pers/y
Delay	4,302	veh-h/y		89	ped-h/y		5,252	pers-h/y
Effective Stops	636,264	veh/y		16,033	ped/y		779,550	pers/y
Travel Distance	789,385	veh-km/y		766	ped-km/y		948,028	pers-km/y
Travel Time	17,730	veh-h/y		253	ped-h/y		21,528	pers-h/y
Cost	509,891	$/y		6,216	$/y		516,107	$/y
Fuel Consumption	68,351	L/y						
Carbon Dioxide	160,625	kg/y						
Hydrocarbons	14	kg/y						
Carbon Monoxide	187	kg/y						
NOx	49	kg/y						

MOVEMENT SUMMARY

Site: 101 [Existing PM: Church St/Bachell Ave, Lidcombe]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	298	0.0	0.725	20.8	LOS B	8.9	62.1	0.88	0.82	1.12	43.9
6	R2	123	0.0	0.725	29.4	LOS C	8.9	62.1	0.97	0.95	1.32	41.1
Approach		421	0.0	0.725	23.3	LOS B	8.9	62.1	0.91	0.86	1.18	43.1
North: Bachell Ave												
7	L2	268	0.0	0.222	10.2	LOS A	3.2	22.4	0.44	0.70	0.44	50.2
9	R2	590	0.0	0.755	22.1	LOS B	15.2	106.7	0.86	0.88	0.94	42.9
Approach		858	0.0	0.755	18.4	LOS B	15.2	106.7	0.73	0.82	0.79	45.0
West: Church St W												
10	L2	142	0.0	0.112	6.6	LOS A	0.6	4.5	0.27	0.62	0.27	53.3
11	T1	200	0.0	0.684	28.6	LOS C	6.1	42.4	1.00	0.86	1.12	40.8
Approach		342	0.0	0.684	19.5	LOS B	6.1	42.4	0.69	0.76	0.77	45.2
All Vehicles		1621	0.0	0.755	19.9	LOS B	15.2	106.7	0.77	0.82	0.88	44.5

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	50	13.4	LOS B	0.1	0.1	0.67	0.67
All Pedestrians		50	13.4	LOS B			0.67	0.67

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

INTERSECTION SUMMARY

Site: 101 [Existing AM: Church St/Railway St Bridge, Lidcombe]

AM Peak Hour: 8:00-9:00am
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	45.4	km/h	45.4	km/h
Travel Distance (Total)	1367.9	veh-km/h	1641.5	pers-km/h
Travel Time (Total)	30.1	veh-h/h	36.2	pers-h/h
Demand Flows (Total)	1351	veh/h	1621	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.493			
Practical Spare Capacity	64.1	%		
Effective Intersection Capacity	2739	veh/h		
Control Delay (Total)	2.32	veh-h/h	2.78	pers-h/h
Control Delay (Average)	6.2	sec	6.2	sec
Control Delay (Worst Lane)	15.5	sec		
Control Delay (Worst Movement)	15.5	sec	15.5	sec
Geometric Delay (Average)	4.6	sec		
Stop-Line Delay (Average)	1.6	sec		
Idling Time (Average)	0.9	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	2.0	veh		
95% Back of Queue - Distance (Worst Lane)	14.3	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	828	veh/h	994	pers/h
Effective Stop Rate	0.61		0.61	
Proportion Queued	0.12		0.12	
Performance Index	35.1		35.1	
Cost (Total)	736.48	$/h	736.48	$/h
Fuel Consumption (Total)	102.4	L/h		
Carbon Dioxide (Total)	240.5	kg/h		
Hydrocarbons (Total)	0.017	kg/h		
Carbon Monoxide (Total)	0.192	kg/h		
NOx (Total)	0.060	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 78.7% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	648,480	veh/y	778,176	pers/y
Delay	1,114	veh-h/y	1,337	pers-h/y
Effective Stops	397,625	veh/y	477,151	pers/y
Travel Distance	656,590	veh-km/y	787,908	pers-km/y
Travel Time	14,463	veh-h/y	17,355	pers-h/y
Cost	353,511	$/y	353,511	$/y
Fuel Consumption	49,133	L/y		
Carbon Dioxide	115,463	kg/y		
Hydrocarbons	8	kg/y		
Carbon Monoxide	92	kg/y		
NOx	29	kg/y		

MOVEMENT SUMMARY

Site: 101 [Existing AM: Church St/Railway St Bridge, Lidcombe]

AM Peak Hour: 8:00-9:00am
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Railway Street Bridge												
1	L2	299	0.0	0.493	4.6	LOS A	0.0	0.0	0.00	0.55	0.00	46.5
3	R2	617	0.0	0.493	4.6	LOS A	0.0	0.0	0.00	0.55	0.00	46.1
Approach		916	0.0	0.493	4.6	NA	0.0	0.0	0.00	0.55	0.00	46.2
East: Church St E												
4	L2	242	0.0	0.130	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
Approach		242	0.0	0.130	4.6	NA	0.0	0.0	0.00	0.53	0.00	46.6
West: Church St W												
12	R2	193	0.0	0.487	15.5	LOS B	2.0	14.3	0.81	1.03	1.19	40.5
Approach		193	0.0	0.487	15.5	LOS B	2.0	14.3	0.81	1.03	1.19	40.5
All Vehicles		1351	0.0	0.493	6.2	NA	2.0	14.3	0.12	0.61	0.17	45.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: 101 [Existing PM: Church St/Railway St Bridge, Lidcombe]

AM Peak Hour: 4:45-5:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	45.2	km/h	45.2	km/h
Travel Distance (Total)	1539.4	veh-km/h	1847.3	pers-km/h
Travel Time (Total)	34.0	veh-h/h	40.8	pers-h/h
Demand Flows (Total)	1518	veh/h	1822	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.614			
Practical Spare Capacity	30.4	%		
Effective Intersection Capacity	2473	veh/h		
Control Delay (Total)	2.83	veh-h/h	3.40	pers-h/h
Control Delay (Average)	6.7	sec	6.7	sec
Control Delay (Worst Lane)	19.7	sec		
Control Delay (Worst Movement)	19.7	sec	19.7	sec
Geometric Delay (Average)	4.6	sec		
Stop-Line Delay (Average)	2.2	sec		
Idling Time (Average)	1.3	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	2.8	veh		
95% Back of Queue - Distance (Worst Lane)	19.8	m		
Queue Storage Ratio (Worst Lane)	0.02			
Total Effective Stops	934	veh/h	1121	pers/h
Effective Stop Rate	0.62		0.62	
Proportion Queued	0.12		0.12	
Performance Index	39.9		39.9	
Cost (Total)	834.04	$/h	834.04	$/h
Fuel Consumption (Total)	115.1	L/h		
Carbon Dioxide (Total)	270.5	kg/h		
Hydrocarbons (Total)	0.019	kg/h		
Carbon Monoxide (Total)	0.216	kg/h		
NOx (Total)	0.067	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 81.4% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	728,640	veh/y	874,368	pers/y
Delay	1,358	veh-h/y	1,630	pers-h/y
Effective Stops	448,452	veh/y	538,142	pers/y
Travel Distance	738,932	veh-km/y	886,718	pers-km/y
Travel Time	16,333	veh-h/y	19,600	pers-h/y
Cost	400,339	$/y	400,339	$/y
Fuel Consumption	55,249	L/y		
Carbon Dioxide	129,835	kg/y		
Hydrocarbons	9	kg/y		
Carbon Monoxide	104	kg/y		
NOx	32	kg/y		

MOVEMENT SUMMARY

Site: 101 [Existing PM: Church St/Railway St Bridge, Lidcombe]

AM Peak Hour: 4:45-5:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Railway Street Bridge												
1	L2	364	0.0	0.324	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	46.6
3	R2	238	0.0	0.324	4.6	LOS A	0.0	0.0	0.00	0.54	0.00	46.2
Approach		602	0.0	0.324	4.6	NA	0.0	0.0	0.00	0.54	0.00	46.4
East: Church St E												
4	L2	704	0.0	0.379	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
Approach		704	0.0	0.379	4.6	NA	0.0	0.0	0.00	0.53	0.00	46.6
West: Church St W												
12	R2	212	0.0	0.614	19.7	LOS B	2.8	19.8	0.88	1.12	1.48	38.7
Approach		212	0.0	0.614	19.7	LOS B	2.8	19.8	0.88	1.12	1.48	38.7
All Vehicles		1518	0.0	0.614	6.7	NA	2.8	19.8	0.12	0.62	0.21	45.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: 101 [Future AM: Church St/Railway St, Lidcombe]

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - Actuated Isolated Cycle Time = 138 seconds (Site Practical Cycle Time)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	17.7	km/h	17.7	km/h
Travel Distance (Total)	2009.5	veh-km/h	2411.4	pers-km/h
Travel Time (Total)	113.4	veh-h/h	136.1	pers-h/h
Demand Flows (Total)	1982	veh/h	2378	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	1.121			
Practical Spare Capacity	-19.7	%		
Effective Intersection Capacity	1767	veh/h		
Control Delay (Total)	77.47	veh-h/h	92.97	pers-h/h
Control Delay (Average)	140.7	sec	140.7	sec
Control Delay (Worst Lane)	280.2	sec		
Control Delay (Worst Movement)	279.8	sec	279.8	sec
Geometric Delay (Average)	1.6	sec		
Stop-Line Delay (Average)	139.1	sec		
Idling Time (Average)	136.1	sec		
Intersection Level of Service (LOS)	LOS F			
95% Back of Queue - Vehicles (Worst Lane)	134.1	veh		
95% Back of Queue - Distance (Worst Lane)	938.5	m		
Queue Storage Ratio (Worst Lane)	1.15			
Total Effective Stops	2494	veh/h	2993	pers/h
Effective Stop Rate	1.26		1.26	
Proportion Queued	0.80		0.80	
Performance Index	233.9		233.9	
Cost (Total)	3576.07	$/h	3576.07	$/h
Fuel Consumption (Total)	265.8	L/h		
Carbon Dioxide (Total)	624.6	kg/h		
Hydrocarbons (Total)	0.062	kg/h		
Carbon Monoxide (Total)	0.592	kg/h		
NOx (Total)	0.160	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 2.8% 0.4% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	951,360	veh/y	1,141,632	pers/y
Delay	37,187	veh-h/y	44,624	pers-h/y
Effective Stops	1,197,299	veh/y	1,436,759	pers/y
Travel Distance	964,574	veh-km/y	1,157,489	pers-km/y
Travel Time	54,434	veh-h/y	65,321	pers-h/y
Cost	1,716,516	$/y	1,716,516	$/y
Fuel Consumption	127,579	L/y		
Carbon Dioxide	299,810	kg/y		
Hydrocarbons	30	kg/y		
Carbon Monoxide	284	kg/y		
NOx	77	kg/y		

MOVEMENT SUMMARY

Site: 101 [Future AM: Church St/Railway St, Lidcombe]

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - Actuated Isolated Cycle Time = 138 seconds (Site Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Railway St E												
5	T1	587	0.0	0.273	17.9	LOS B	10.2	71.5	0.55	0.48	0.55	46.4
6	R2	207	0.0	0.769	70.4	LOS E	13.7	96.0	0.99	0.82	0.99	27.5
Approach		794	0.0	0.769	31.6	LOS C	13.7	96.0	0.66	0.57	0.66	39.3
North: Church St												
7	L2	282	0.0	0.280	23.5	LOS B	9.8	68.9	0.55	0.73	0.55	42.5
9	R2	23	0.0	0.034	36.3	LOS C	1.0	6.8	0.65	0.69	0.65	36.8
Approach		305	0.0	0.280	24.4	LOS B	9.8	68.9	0.56	0.73	0.56	42.0
West: Railway St W												
10	L2	69	0.0	1.121	269.8	LOS F	12.4	87.0	1.00	1.21	2.59	9.9
11	T1	814	0.0	1.121	279.8	LOS F	134.1	938.5	1.00	2.14	2.57	10.5
Approach		883	0.0	1.121	279.0	LOS F	134.1	938.5	1.00	2.06	2.58	10.5
All Vehicles		1982	0.0	1.121	140.7	LOS F	134.1	938.5	0.80	1.26	1.50	17.7

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

INTERSECTION SUMMARY

Site: 101 [Future PM: Church St/Railway St, Lidcombe]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	28.5	km/h	28.5	km/h
Travel Distance (Total)	2398.8	veh-km/h	2878.6	pers-km/h
Travel Time (Total)	84.1	veh-h/h	100.9	pers-h/h
Demand Flows (Total)	2366	veh/h	2839	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	1.157			
Practical Spare Capacity	-22.2	%		
Effective Intersection Capacity	2046	veh/h		
Control Delay (Total)	43.48	veh-h/h	52.18	pers-h/h
Control Delay (Average)	66.2	sec	66.2	sec
Control Delay (Worst Lane)	314.4	sec		
Control Delay (Worst Movement)	314.4	sec	314.4	sec
Geometric Delay (Average)	1.9	sec		
Stop-Line Delay (Average)	64.3	sec		
Idling Time (Average)	50.4	sec		
Intersection Level of Service (LOS)	LOS E			
95% Back of Queue - Vehicles (Worst Lane)	48.4	veh		
95% Back of Queue - Distance (Worst Lane)	338.9	m		
Queue Storage Ratio (Worst Lane)	0.10			
Total Effective Stops	3211	veh/h	3853	pers/h
Effective Stop Rate	1.36		1.36	
Proportion Queued	0.83		0.83	
Performance Index	150.6		150.6	
Cost (Total)	2541.05	$/h	2541.05	$/h
Fuel Consumption (Total)	246.0	L/h		
Carbon Dioxide (Total)	578.2	kg/h		
Hydrocarbons (Total)	0.054	kg/h		
Carbon Monoxide (Total)	0.614	kg/h		
NOx (Total)	0.161	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 0.0% 0.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	1,135,680	veh/y	1,362,816	pers/y
Delay	20,873	veh-h/y	25,047	pers-h/y
Effective Stops	1,541,290	veh/y	1,849,548	pers/y
Travel Distance	1,151,441	veh-km/y	1,381,729	pers-km/y
Travel Time	40,369	veh-h/y	48,443	pers-h/y
Cost	1,219,705	$/y	1,219,705	$/y
Fuel Consumption	118,091	L/y		
Carbon Dioxide	277,513	kg/y		
Hydrocarbons	26	kg/y		
Carbon Monoxide	295	kg/y		
NOx	77	kg/y		

MOVEMENT SUMMARY

Site: 101 [Future PM: Church St/Railway St, Lidcombe]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Railway St E												
5	T1	1001	0.0	0.513	6.7	LOS A	6.1	42.8	0.72	0.62	0.72	54.0
6	R2	358	0.0	1.157	314.4	LOS F	48.4	338.9	1.00	3.67	8.65	9.6
Approach		1359	0.0	1.157	87.8	LOS F	48.4	338.9	0.79	1.43	2.81	24.4
North: Church St												
7	L2	263	0.0	0.283	11.4	LOS A	2.8	19.4	0.62	0.74	0.62	49.4
9	R2	149	0.0	0.481	21.5	LOS B	2.6	18.1	0.95	0.78	0.95	43.3
Approach		412	0.0	0.481	15.0	LOS B	2.8	19.4	0.74	0.75	0.74	47.0
West: Railway St W												
10	L2	40	0.0	0.982	59.9	LOS E	9.8	68.4	1.00	1.61	3.72	31.0
11	T1	555	0.0	0.982	51.6	LOS D	11.4	80.0	1.00	1.62	3.37	32.4
Approach		595	0.0	0.982	52.2	LOS D	11.4	80.0	1.00	1.62	3.39	32.3
All Vehicles		2366	0.0	1.157	66.2	LOS E	48.4	338.9	0.83	1.36	2.59	28.5

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

INTERSECTION SUMMARY

Site: 101 [Future AM: Railway St/Arthur St, Lidcombe]

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	53.0	km/h	53.0	km/h
Travel Distance (Total)	1974.7	veh-km/h	2369.6	pers-km/h
Travel Time (Total)	37.3	veh-h/h	44.7	pers-h/h
Demand Flows (Total)	1947	veh/h	2336	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.606			
Practical Spare Capacity	61.6	%		
Effective Intersection Capacity	3211	veh/h		
Control Delay (Total)	3.31	veh-h/h	3.97	pers-h/h
Control Delay (Average)	6.1	sec	6.1	sec
Control Delay (Worst Lane)	60.0	sec		
Control Delay (Worst Movement)	88.7	sec	88.7	sec
Geometric Delay (Average)	5.5	sec		
Stop-Line Delay (Average)	0.6	sec		
Idling Time (Average)	0.5	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	0.4	veh		
95% Back of Queue - Distance (Worst Lane)	2.7	m		
Queue Storage Ratio (Worst Lane)	0.00			
Total Effective Stops	1141	veh/h	1369	pers/h
Effective Stop Rate	0.59		0.59	
Proportion Queued	0.01		0.01	
Performance Index	43.0		43.0	
Cost (Total)	1002.69	$/h	1002.69	$/h
Fuel Consumption (Total)	158.2	L/h		
Carbon Dioxide (Total)	371.7	kg/h		
Hydrocarbons (Total)	0.031	kg/h		
Carbon Monoxide (Total)	0.443	kg/h		
NOx (Total)	0.114	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 96.5% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	934,560	veh/y	1,121,472	pers/y
Delay	1,588	veh-h/y	1,906	pers-h/y
Effective Stops	547,616	veh/y	657,139	pers/y
Travel Distance	947,847	veh-km/y	1,137,417	pers-km/y
Travel Time	17,888	veh-h/y	21,466	pers-h/y
Cost	481,291	$/y	481,291	$/y
Fuel Consumption	75,921	L/y		
Carbon Dioxide	178,415	kg/y		
Hydrocarbons	15	kg/y		
Carbon Monoxide	213	kg/y		
NOx	55	kg/y		

MOVEMENT SUMMARY

Site: 101 [Future AM: Railway St/Arthur St, Lidcombe]

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Railway St												
1	L2	9	0.0	0.606	5.7	LOS A	0.0	0.0	0.00	0.59	0.00	53.5
3	R2	1117	0.0	0.606	5.6	LOS A	0.0	0.0	0.00	0.59	0.00	53.2
Approach		1126	0.0	0.606	5.6	NA	0.0	0.0	0.00	0.59	0.00	53.2
East: Arthur St E												
4	L2	800	0.0	0.431	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.5
5	T1	9	0.0	0.134	60.0	LOS E	0.4	2.7	0.94	1.01	0.94	30.2
Approach		809	0.0	0.431	6.2	LOS A	0.4	2.7	0.01	0.58	0.01	53.1
West: Arthur St W												
11	T1	8	0.0	0.144	26.8	LOS B	0.4	2.7	0.93	1.00	0.94	33.7
12	R2	4	0.0	0.144	88.7	LOS F	0.4	2.7	0.93	1.00	0.94	33.6
Approach		12	0.0	0.144	47.4	LOS D	0.4	2.7	0.93	1.00	0.94	33.6
All Vehicles		1947	0.0	0.606	6.1	NA	0.4	2.7	0.01	0.59	0.01	53.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: 101 [Future PM: Railway St/Arthur St, Lidcombe]

PM Peak Hour: 4:45-5:45pm
Site Category: (None)
Stop (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	51.4	km/h	51.4	km/h
Travel Distance (Total)	2177.3	veh-km/h	2612.8	pers-km/h
Travel Time (Total)	42.3	veh-h/h	50.8	pers-h/h
Demand Flows (Total)	2146	veh/h	2575	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.725			
Practical Spare Capacity	10.3	%		
Effective Intersection Capacity	2959	veh/h		
Control Delay (Total)	4.91	veh-h/h	5.89	pers-h/h
Control Delay (Average)	8.2	sec	8.2	sec
Control Delay (Worst Lane)	157.2	sec		
Control Delay (Worst Movement)	239.3	sec	239.3	sec
Geometric Delay (Average)	5.5	sec		
Stop-Line Delay (Average)	2.7	sec		
Idling Time (Average)	2.5	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	2.4	veh		
95% Back of Queue - Distance (Worst Lane)	16.7	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	1265	veh/h	1518	pers/h
Effective Stop Rate	0.59		0.59	
Proportion Queued	0.02		0.02	
Performance Index	50.2		50.2	
Cost (Total)	1144.78	$/h	1144.78	$/h
Fuel Consumption (Total)	175.7	L/h		
Carbon Dioxide (Total)	412.8	kg/h		
Hydrocarbons (Total)	0.035	kg/h		
Carbon Monoxide (Total)	0.489	kg/h		
NOx (Total)	0.126	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 97.4% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	1,030,080	veh/y	1,236,096	pers/y
Delay	2,355	veh-h/y	2,826	pers-h/y
Effective Stops	607,237	veh/y	728,684	pers/y
Travel Distance	1,045,126	veh-km/y	1,254,151	pers-km/y
Travel Time	20,316	veh-h/y	24,379	pers-h/y
Cost	549,493	$/y	549,493	$/y
Fuel Consumption	84,324	L/y		
Carbon Dioxide	198,162	kg/y		
Hydrocarbons	17	kg/y		
Carbon Monoxide	235	kg/y		
NOx	60	kg/y		

MOVEMENT SUMMARY

Site: 101 [Future PM: Railway St/Arthur St, Lidcombe]

PM Peak Hour: 4:45-5:45pm
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Railway St												
1	L2	7	0.0	0.465	5.6	LOS A	0.0	0.0	0.00	0.59	0.00	53.5
3	R2	857	0.0	0.465	5.6	LOS A	0.0	0.0	0.00	0.59	0.00	53.3
Approach		864	0.0	0.465	5.6	NA	0.0	0.0	0.00	0.59	0.00	53.3
East: Arthur St E												
4	L2	1241	0.0	0.668	5.7	LOS A	0.0	0.0	0.00	0.57	0.00	53.4
5	T1	5	0.0	0.028	26.9	LOS B	0.1	0.6	0.83	1.02	0.83	41.5
Approach		1246	0.0	0.668	5.8	LOS A	0.1	0.6	0.00	0.58	0.00	53.3
West: Arthur St W												
11	T1	21	0.0	0.725	98.6	LOS F	2.4	16.7	0.97	1.13	1.50	16.7
12	R2	15	0.0	0.725	239.3	LOS F	2.4	16.7	0.97	1.13	1.50	16.7
Approach		36	0.0	0.725	157.2	LOS F	2.4	16.7	0.97	1.13	1.50	16.7
All Vehicles		2146	0.0	0.725	8.2	NA	2.4	16.7	0.02	0.59	0.03	51.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: 101 [Future AM: Church St/Swete St, Lidcombe]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	47.3	km/h	47.3	km/h
Travel Distance (Total)	1495.2	veh-km/h	1794.2	pers-km/h
Travel Time (Total)	31.6	veh-h/h	38.0	pers-h/h
Demand Flows (Total)	1474	veh/h	1769	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.613			
Practical Spare Capacity	38.7	%		
Effective Intersection Capacity	2405	veh/h		
Control Delay (Total)	2.64	veh-h/h	3.17	pers-h/h
Control Delay (Average)	6.5	sec	6.5	sec
Control Delay (Worst Lane)	11.7	sec		
Control Delay (Worst Movement)	12.2	sec	12.2	sec
Geometric Delay (Average)	4.6	sec		
Stop-Line Delay (Average)	1.8	sec		
Idling Time (Average)	0.6	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	6.7	veh		
95% Back of Queue - Distance (Worst Lane)	46.7	m		
Queue Storage Ratio (Worst Lane)	0.04			
Total Effective Stops	874	veh/h	1049	pers/h
Effective Stop Rate	0.59		0.59	
Proportion Queued	0.48		0.48	
Performance Index	45.8		45.8	
Cost (Total)	831.82	$/h	831.82	$/h
Fuel Consumption (Total)	118.6	L/h		
Carbon Dioxide (Total)	278.7	kg/h		
Hydrocarbons (Total)	0.022	kg/h		
Carbon Monoxide (Total)	0.266	kg/h		
NOx (Total)	0.078	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 1.7 %
Number of Iterations: 6 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.0% 1.1% 0.6%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	707,520	veh/y	849,024	pers/y
Delay	1,269	veh-h/y	1,523	pers-h/y
Effective Stops	419,586	veh/y	503,503	pers/y
Travel Distance	717,694	veh-km/y	861,233	pers-km/y
Travel Time	15,187	veh-h/y	18,224	pers-h/y
Cost	399,271	$/y	399,271	$/y
Fuel Consumption	56,933	L/y		
Carbon Dioxide	133,792	kg/y		
Hydrocarbons	10	kg/y		
Carbon Monoxide	128	kg/y		
NOx	37	kg/y		

MOVEMENT SUMMARY

Site: 101 [Future AM: Church St/Swete St, Lidcombe]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	230	0.0	0.280	6.2	LOS A	1.8	12.9	0.51	0.63	0.51	48.9
6	R2	54	0.0	0.280	8.9	LOS A	1.8	12.9	0.51	0.63	0.51	48.6
Approach		284	0.0	0.280	6.7	LOS A	1.8	12.9	0.51	0.63	0.51	48.8
North: Swete St												
7	L2	94	0.0	0.441	10.4	LOS A	3.1	22.0	0.80	0.91	0.86	45.0
9	R2	220	0.0	0.441	12.2	LOS A	3.1	22.0	0.80	0.91	0.86	42.7
Approach		314	0.0	0.441	11.7	LOS A	3.1	22.0	0.80	0.91	0.86	43.3
West: Church St W												
10	L2	235	0.0	0.613	5.1	LOS A	6.7	46.7	0.36	0.47	0.36	45.6
11	T1	641	0.0	0.613	4.3	LOS A	6.7	46.7	0.36	0.47	0.36	49.4
Approach		876	0.0	0.613	4.5	LOS A	6.7	46.7	0.36	0.47	0.36	48.3
All Vehicles		1474	0.0	0.613	6.5	LOS A	6.7	46.7	0.48	0.59	0.50	47.3

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

INTERSECTION SUMMARY

Site: 101 [Future PM: Church St/Swete St, Lidcombe]

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	43.3	km/h	43.3	km/h
Travel Distance (Total)	1846.3	veh-km/h	2215.5	pers-km/h
Travel Time (Total)	42.6	veh-h/h	51.1	pers-h/h
Demand Flows (Total)	1819	veh/h	2183	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.923			
Practical Spare Capacity	-7.9	%		
Effective Intersection Capacity	1971	veh/h		
Control Delay (Total)	7.32	veh-h/h	8.79	pers-h/h
Control Delay (Average)	14.5	sec	14.5	sec
Control Delay (Worst Lane)	22.4	sec		
Control Delay (Worst Movement)	24.6	sec	24.6	sec
Geometric Delay (Average)	5.1	sec		
Stop-Line Delay (Average)	9.4	sec		
Idling Time (Average)	4.1	sec		
Intersection Level of Service (LOS)	LOS A			
95% Back of Queue - Vehicles (Worst Lane)	26.1	veh		
95% Back of Queue - Distance (Worst Lane)	182.8	m		
Queue Storage Ratio (Worst Lane)	0.15			
Total Effective Stops	1659	veh/h	1991	pers/h
Effective Stop Rate	0.91		0.91	
Proportion Queued	0.77		0.77	
Performance Index	76.5		76.5	
Cost (Total)	1128.63	$/h	1128.63	$/h
Fuel Consumption (Total)	149.8	L/h		
Carbon Dioxide (Total)	352.1	kg/h		
Hydrocarbons (Total)	0.028	kg/h		
Carbon Monoxide (Total)	0.326	kg/h		
NOx (Total)	0.097	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 1.4 %
Number of Iterations: 5 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 2.2% 1.3% 0.7%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	873,120	veh/y	1,047,744	pers/y
Delay	3,515	veh-h/y	4,218	pers-h/y
Effective Stops	796,352	veh/y	955,622	pers/y
Travel Distance	886,206	veh-km/y	1,063,447	pers-km/y
Travel Time	20,453	veh-h/y	24,544	pers-h/y
Cost	541,740	$/y	541,740	$/y
Fuel Consumption	71,927	L/y		
Carbon Dioxide	169,028	kg/y		
Hydrocarbons	13	kg/y		
Carbon Monoxide	156	kg/y		
NOx	47	kg/y		

MOVEMENT SUMMARY

Site: 101 [Future PM: Church St/Swete St, Lidcombe]

AM Peak Hour: 5:00-6:00pm
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	787	0.0	0.923	22.0	LOS B	26.1	182.8	1.00	1.20	1.80	40.7
6	R2	128	0.0	0.923	24.6	LOS B	26.1	182.8	1.00	1.20	1.80	40.5
Approach		915	0.0	0.923	22.4	LOS B	26.1	182.8	1.00	1.20	1.80	40.7
North: Swete St												
7	L2	123	0.0	0.446	6.8	LOS A	3.2	22.2	0.62	0.72	0.62	47.0
9	R2	317	0.0	0.446	8.7	LOS A	3.2	22.2	0.62	0.72	0.62	44.5
Approach		440	0.0	0.446	8.2	LOS A	3.2	22.2	0.62	0.72	0.62	45.2
West: Church St W												
10	L2	178	0.0	0.392	5.5	LOS A	3.2	22.1	0.46	0.54	0.46	45.4
11	T1	286	0.0	0.392	4.7	LOS A	3.2	22.1	0.46	0.54	0.46	49.1
Approach		464	0.0	0.392	5.0	LOS A	3.2	22.1	0.46	0.54	0.46	47.6
All Vehicles		1819	0.0	0.923	14.5	LOS A	26.1	182.8	0.77	0.91	1.17	43.3

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

INTERSECTION SUMMARY

Site: 101 [Future AM: Church St/Bachell Ave, Lidcombe]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Travel Speed (Average)	48.9	km/h	3.1	km/h	48.3	km/h
Travel Distance (Total)	1423.7	veh-km/h	1.6	ped-km/h	1710.1	pers-km/h
Travel Time (Total)	29.1	veh-h/h	0.5	ped-h/h	35.4	pers-h/h
Demand Flows (Total)	1399	veh/h	50	ped/h	1729	pers/h
Percent Heavy Vehicles (Demand)	0.0	%				
Degree of Saturation	0.730		0.025			
Practical Spare Capacity	23.3	%				
Effective Intersection Capacity	1916	veh/h				
Control Delay (Total)	4.86	veh-h/h	0.17	ped-h/h	6.00	pers-h/h
Control Delay (Average)	12.5	sec	12.5	sec	12.5	sec
Control Delay (Worst Lane)	23.9	sec				
Control Delay (Worst Movement)	23.9	sec	12.5	sec	23.9	sec
Geometric Delay (Average)	4.5	sec				
Stop-Line Delay (Average)	8.0	sec				
Idling Time (Average)	4.7	sec				
Intersection Level of Service (LOS)	LOS A		LOS B			
95% Back of Queue - Vehicles (Worst Lane)	4.4	veh				
95% Back of Queue - Distance (Worst Lane)	30.8	m				
Queue Storage Ratio (Worst Lane)	0.03					
Total Effective Stops	1049	veh/h	42	ped/h	1300	pers/h
Effective Stop Rate	0.75		0.84		0.75	
Proportion Queued	0.73		0.84		0.73	
Performance Index	44.0		0.7		44.8	
Cost (Total)	819.22	$/h	12.66	$/h	831.89	$/h
Fuel Consumption (Total)	119.0	L/h				
Carbon Dioxide (Total)	279.7	kg/h				
Hydrocarbons (Total)	0.024	kg/h				
Carbon Monoxide (Total)	0.330	kg/h				
NOx (Total)	0.086	kg/h				

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 7.4% 0.0% 0.0%

Intersection Performance - Annual Values						
Performance Measure	**Vehicles**		**Pedestrians**		**Persons**	
Demand Flows (Total)	671,520	veh/y	24,000	ped/y	829,824	pers/y
Delay	2,332	veh-h/y	84	ped-h/y	2,882	pers-h/y
Effective Stops	503,315	veh/y	20,042	ped/y	624,020	pers/y
Travel Distance	683,398	veh-km/y	766	ped-km/y	820,843	pers-km/y
Travel Time	13,966	veh-h/y	247	ped-h/y	17,006	pers-h/y
Cost	393,226	$/y	6,079	$/y	399,305	$/y
Fuel Consumption	57,131	L/y				
Carbon Dioxide	134,258	kg/y				
Hydrocarbons	12	kg/y				
Carbon Monoxide	159	kg/y				
NOx	41	kg/y				

MOVEMENT SUMMARY

Site: 101 [Future AM: Church St/Bachell Ave, Lidcombe]

AM Peak Hour: 7:30-8:30am
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	88	0.0	0.413	5.4	LOS A	2.7	19.0	0.57	0.45	0.57	54.7
6	R2	211	0.0	0.413	13.6	LOS A	2.7	19.0	0.83	0.76	0.83	47.7
Approach		299	0.0	0.413	11.2	LOS A	2.7	19.0	0.75	0.67	0.75	49.6
North: Bachell Ave												
7	L2	117	0.0	0.126	10.8	LOS A	1.1	7.8	0.56	0.70	0.56	49.8
9	R2	226	0.0	0.730	23.9	LOS B	4.4	30.8	1.00	0.92	1.28	42.1
Approach		343	0.0	0.730	19.4	LOS B	4.4	30.8	0.85	0.84	1.04	44.4
West: Church St W												
10	L2	577	0.0	0.517	7.9	LOS A	3.3	23.1	0.58	0.72	0.58	52.3
11	T1	180	0.0	0.554	16.3	LOS B	3.2	22.4	0.96	0.79	1.01	47.3
Approach		757	0.0	0.554	9.9	LOS A	3.3	23.1	0.67	0.74	0.68	51.0
All Vehicles		1399	0.0	0.730	12.5	LOS A	4.4	30.8	0.73	0.75	0.78	48.9

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	50	12.5	LOS B	0.0	0.0	0.84	0.84
All Pedestrians		50	12.5	LOS B			0.84	0.84

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

INTERSECTION SUMMARY

Site: 101 [Future PM: Church St/Bachell Ave, Lidcombe]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Intersection Performance - Hourly Values								
Performance Measure	**Vehicles**			**Pedestrians**			**Persons**	
Travel Speed (Average)	40.1	km/h		3.2	km/h		39.8	km/h
Travel Distance (Total)	1924.2	veh-km/h		1.6	ped-km/h		2310.6	pers-km/h
Travel Time (Total)	48.0	veh-h/h		0.5	ped-h/h		58.1	pers-h/h
Demand Flows (Total)	1896	veh/h		50	ped/h		2325	pers/h
Percent Heavy Vehicles (Demand)	0.0	%						
Degree of Saturation	0.897			0.010				
Practical Spare Capacity	0.3	%						
Effective Intersection Capacity	2113	veh/h						
Control Delay (Total)	15.21	veh-h/h		0.16	ped-h/h		18.41	pers-h/h
Control Delay (Average)	28.9	sec		11.5	sec		28.5	sec
Control Delay (Worst Lane)	44.5	sec						
Control Delay (Worst Movement)	46.9	sec		11.5	sec		46.9	sec
Geometric Delay (Average)	4.1	sec						
Stop-Line Delay (Average)	24.8	sec						
Idling Time (Average)	20.1	sec						
Intersection Level of Service (LOS)	LOS C			LOS B				
95% Back of Queue - Vehicles (Worst Lane)	27.6	veh						
95% Back of Queue - Distance (Worst Lane)	192.9	m						
Queue Storage Ratio (Worst Lane)	0.07							
Total Effective Stops	1729	veh/h		29	ped/h		2103	pers/h
Effective Stop Rate	0.91			0.57			0.90	
Proportion Queued	0.74			0.57			0.73	
Performance Index	95.3			0.7			95.9	
Cost (Total)	1425.65	$/h		12.30	$/h		1437.95	$/h
Fuel Consumption (Total)	174.4	L/h						
Carbon Dioxide (Total)	409.8	kg/h						
Hydrocarbons (Total)	0.036	kg/h						
Carbon Monoxide (Total)	0.463	kg/h						
NOx (Total)	0.122	kg/h						

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Intersection LOS value for Vehicles is based on average delay for all vehicle movements.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 8.5 %
Number of Iterations: 8 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Main (Timing-Capacity) Iterations: 10.0% 12.3% 3.3%

Intersection Performance - Annual Values								
Performance Measure	**Vehicles**			**Pedestrians**			**Persons**	
Demand Flows (Total)	910,080	veh/y		24,000	ped/y		1,116,096	pers/y
Delay	7,300	veh-h/y		76	ped-h/y		8,837	pers-h/y
Effective Stops	829,919	veh/y		13,743	ped/y		1,009,646	pers/y
Travel Distance	923,599	veh-km/y		766	ped-km/y		1,109,084	pers-km/y
Travel Time	23,024	veh-h/y		240	ped-h/y		27,869	pers-h/y
Cost	684,313	$/y		5,903	$/y		690,215	$/y
Fuel Consumption	83,696	L/y						
Carbon Dioxide	196,685	kg/y						
Hydrocarbons	18	kg/y						
Carbon Monoxide	222	kg/y						
NOx	59	kg/y						

MOVEMENT SUMMARY

Site: 101 [Future PM: Church St/Bachell Ave, Lidcombe]

PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Church St E												
5	T1	298	0.0	0.890	33.8	LOS C	13.0	90.7	0.92	0.98	1.51	38.0
6	R2	144	0.0	0.890	46.9	LOS D	13.0	90.7	1.00	1.18	1.91	34.3
Approach		442	0.0	0.890	38.0	LOS C	13.0	90.7	0.95	1.04	1.64	36.7
North: Bachell Ave												
7	L2	291	0.0	0.219	9.2	LOS A	3.3	23.3	0.36	0.68	0.36	50.9
9	R2	732	0.0	0.889	33.9	LOS C	27.6	192.9	0.84	0.97	1.14	37.7
Approach		1023	0.0	0.889	26.9	LOS B	27.6	192.9	0.70	0.88	0.92	40.7
West: Church St W												
10	L2	231	0.0	0.178	6.6	LOS A	1.1	7.6	0.26	0.62	0.26	53.4
11	T1	200	0.0	0.897	44.5	LOS D	8.4	58.6	1.00	1.10	1.68	34.7
Approach		431	0.0	0.897	24.2	LOS B	8.4	58.6	0.60	0.84	0.92	42.7
All Vehicles		1896	0.0	0.897	28.9	LOS C	27.6	192.9	0.74	0.91	1.09	40.1

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	50	11.5	LOS B	0.1	0.1	0.57	0.57
All Pedestrians		50	11.5	LOS B			0.57	0.57

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

INTERSECTION SUMMARY

Site: 101 [Future AM: Church St/Railway St Bridge, Lidcombe]

AM Peak Hour: 8:00-9:00am
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	45.3	km/h	45.3	km/h
Travel Distance (Total)	1405.3	veh-km/h	1686.4	pers-km/h
Travel Time (Total)	31.0	veh-h/h	37.2	pers-h/h
Demand Flows (Total)	1388	veh/h	1666	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.519			
Practical Spare Capacity	54.2	%		
Effective Intersection Capacity	2676	veh/h		
Control Delay (Total)	2.44	veh-h/h	2.92	pers-h/h
Control Delay (Average)	6.3	sec	6.3	sec
Control Delay (Worst Lane)	16.8	sec		
Control Delay (Worst Movement)	16.8	sec	16.8	sec
Geometric Delay (Average)	4.6	sec		
Stop-Line Delay (Average)	1.8	sec		
Idling Time (Average)	1.0	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	2.2	veh		
95% Back of Queue - Distance (Worst Lane)	15.4	m		
Queue Storage Ratio (Worst Lane)	0.01			
Total Effective Stops	853	veh/h	1024	pers/h
Effective Stop Rate	0.61		0.61	
Proportion Queued	0.12		0.12	
Performance Index	36.2		36.2	
Cost (Total)	758.32	$/h	758.32	$/h
Fuel Consumption (Total)	105.2	L/h		
Carbon Dioxide (Total)	247.3	kg/h		
Hydrocarbons (Total)	0.018	kg/h		
Carbon Monoxide (Total)	0.197	kg/h		
NOx (Total)	0.062	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 80.0% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	666,240	veh/y	799,488	pers/y
Delay	1,169	veh-h/y	1,403	pers-h/y
Effective Stops	409,435	veh/y	491,322	pers/y
Travel Distance	674,560	veh-km/y	809,472	pers-km/y
Travel Time	14,885	veh-h/y	17,862	pers-h/y
Cost	363,996	$/y	363,996	$/y
Fuel Consumption	50,509	L/y		
Carbon Dioxide	118,697	kg/y		
Hydrocarbons	8	kg/y		
Carbon Monoxide	95	kg/y		
NOx	30	kg/y		

MOVEMENT SUMMARY

Site: 101 [Future AM: Church St/Railway St Bridge, Lidcombe]

AM Peak Hour: 8:00-9:00am
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Railway Street Bridge												
1	L2	299	0.0	0.508	4.6	LOS A	0.0	0.0	0.00	0.55	0.00	46.5
3	R2	644	0.0	0.508	4.6	LOS A	0.0	0.0	0.00	0.55	0.00	46.1
Approach		943	0.0	0.508	4.6	NA	0.0	0.0	0.00	0.55	0.00	46.2
East: Church St E												
4	L2	252	0.0	0.136	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
Approach		252	0.0	0.136	4.6	NA	0.0	0.0	0.00	0.53	0.00	46.6
West: Church St W												
12	R2	193	0.0	0.519	16.8	LOS B	2.2	15.4	0.84	1.05	1.26	40.0
Approach		193	0.0	0.519	16.8	LOS B	2.2	15.4	0.84	1.05	1.26	40.0
All Vehicles		1388	0.0	0.519	6.3	NA	2.2	15.4	0.12	0.61	0.17	45.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site 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: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INTERSECTION SUMMARY

Site: 101 [Future PM: Church St/Railway St Bridge, Lidcombe]

AM Peak Hour: 4:45-5:45pm
Site Category: (None)
Giveway / Yield (Two-Way)

Intersection Performance - Hourly Values				
Performance Measure	**Vehicles**		**Persons**	
Travel Speed (Average)	45.0	km/h	45.0	km/h
Travel Distance (Total)	1597.3	veh-km/h	1916.7	pers-km/h
Travel Time (Total)	35.5	veh-h/h	42.6	pers-h/h
Demand Flows (Total)	1575	veh/h	1890	pers/h
Percent Heavy Vehicles (Demand)	0.0	%		
Degree of Saturation	0.678			
Practical Spare Capacity	18.0	%		
Effective Intersection Capacity	2324	veh/h		
Control Delay (Total)	3.11	veh-h/h	3.73	pers-h/h
Control Delay (Average)	7.1	sec	7.1	sec
Control Delay (Worst Lane)	23.1	sec		
Control Delay (Worst Movement)	23.1	sec	23.1	sec
Geometric Delay (Average)	4.6	sec		
Stop-Line Delay (Average)	2.5	sec		
Idling Time (Average)	1.6	sec		
Intersection Level of Service (LOS)	NA			
95% Back of Queue - Vehicles (Worst Lane)	3.2	veh		
95% Back of Queue - Distance (Worst Lane)	22.7	m		
Queue Storage Ratio (Worst Lane)	0.02			
Total Effective Stops	977	veh/h	1172	pers/h
Effective Stop Rate	0.62		0.62	
Proportion Queued	0.12		0.12	
Performance Index	41.8		41.8	
Cost (Total)	870.86	$/h	870.86	$/h
Fuel Consumption (Total)	119.6	L/h		
Carbon Dioxide (Total)	281.1	kg/h		
Hydrocarbons (Total)	0.020	kg/h		
Carbon Monoxide (Total)	0.224	kg/h		
NOx (Total)	0.070	kg/h		

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
NA: Intersection LOS for Vehicles is Not Applicable for two-way sign control since the average intersection delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Site Model Variability Index (Iterations 3 to N): 0.0 %
Number of Iterations: 2 (Maximum: 10)
Largest change in Lane Degrees of Saturation for the last three Flow-Capacity Iterations: 0.0% 83.2% 0.0%

Intersection Performance - Annual Values				
Performance Measure	**Vehicles**		**Persons**	
Demand Flows (Total)	756,000	veh/y	907,200	pers/y
Delay	1,491	veh-h/y	1,789	pers-h/y
Effective Stops	468,885	veh/y	562,662	pers/y
Travel Distance	766,681	veh-km/y	920,017	pers-km/y
Travel Time	17,029	veh-h/y	20,434	pers-h/y
Cost	418,012	$/y	418,012	$/y
Fuel Consumption	57,426	L/y		
Carbon Dioxide	134,951	kg/y		
Hydrocarbons	10	kg/y		
Carbon Monoxide	108	kg/y		
NOx	34	kg/y		

MOVEMENT SUMMARY

Site: 101 [Future PM: Church St/Railway St, Lidcombe]

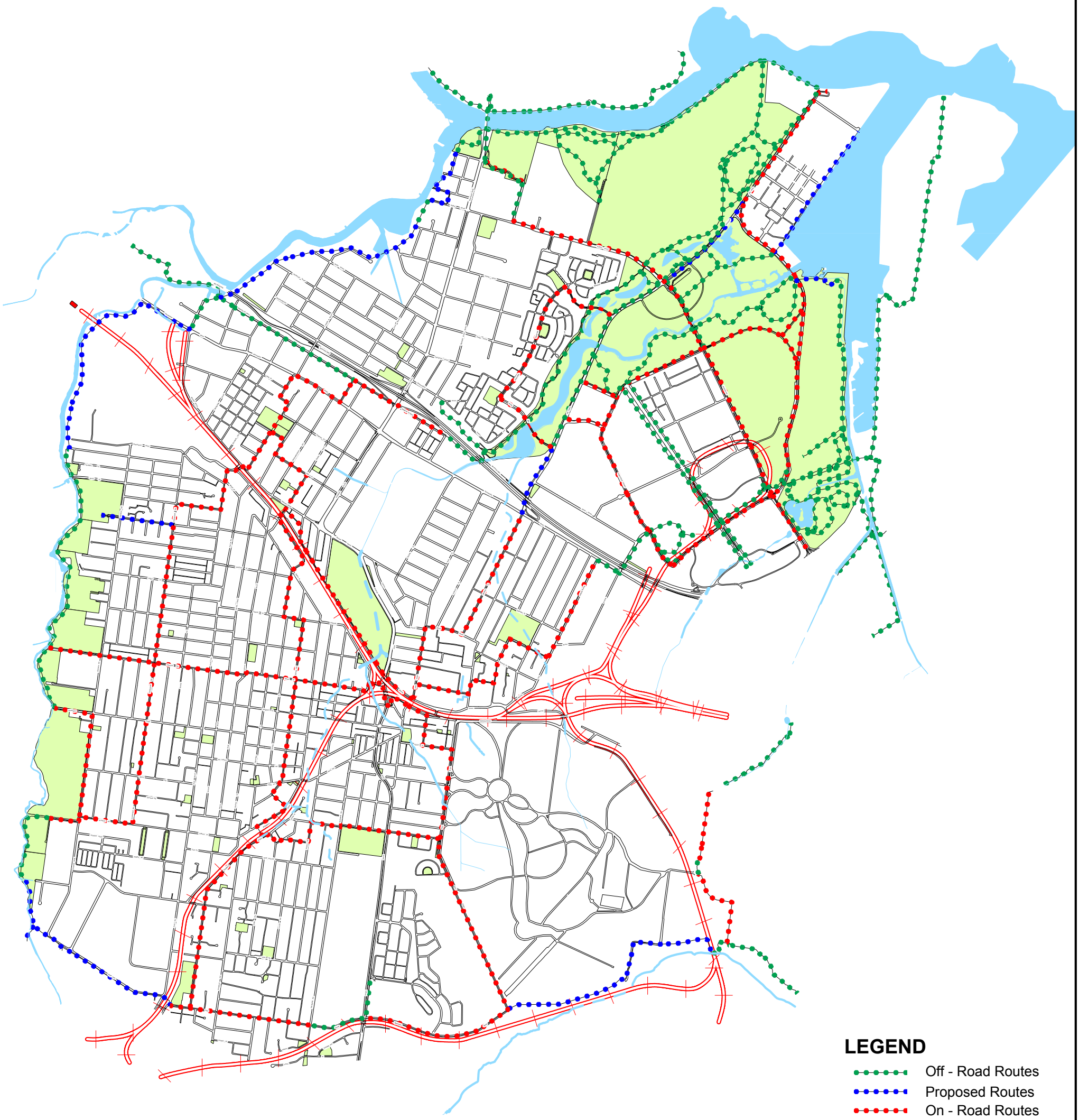
PM Peak Hour: 5:00-6:00pm
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 36 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
East: Railway St E												
5	T1	1001	0.0	0.513	6.7	LOS A	6.1	42.8	0.72	0.62	0.72	54.0
6	R2	358	0.0	1.157	314.4	LOS F	48.4	338.9	1.00	3.67	8.65	9.6
Approach		1359	0.0	1.157	87.8	LOS F	48.4	338.9	0.79	1.43	2.81	24.4
North: Church St												
7	L2	263	0.0	0.283	11.4	LOS A	2.8	19.4	0.62	0.74	0.62	49.4
9	R2	149	0.0	0.481	21.5	LOS B	2.6	18.1	0.95	0.78	0.95	43.3
Approach		412	0.0	0.481	15.0	LOS B	2.8	19.4	0.74	0.75	0.74	47.0
West: Railway St W												
10	L2	40	0.0	0.982	59.9	LOS E	9.8	68.4	1.00	1.61	3.72	31.0
11	T1	555	0.0	0.982	51.6	LOS D	11.4	80.0	1.00	1.62	3.37	32.4
Approach		595	0.0	0.982	52.2	LOS D	11.4	80.0	1.00	1.62	3.39	32.3
All Vehicles		2366	0.0	1.157	66.2	LOS E	48.4	338.9	0.83	1.36	2.59	28.5

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

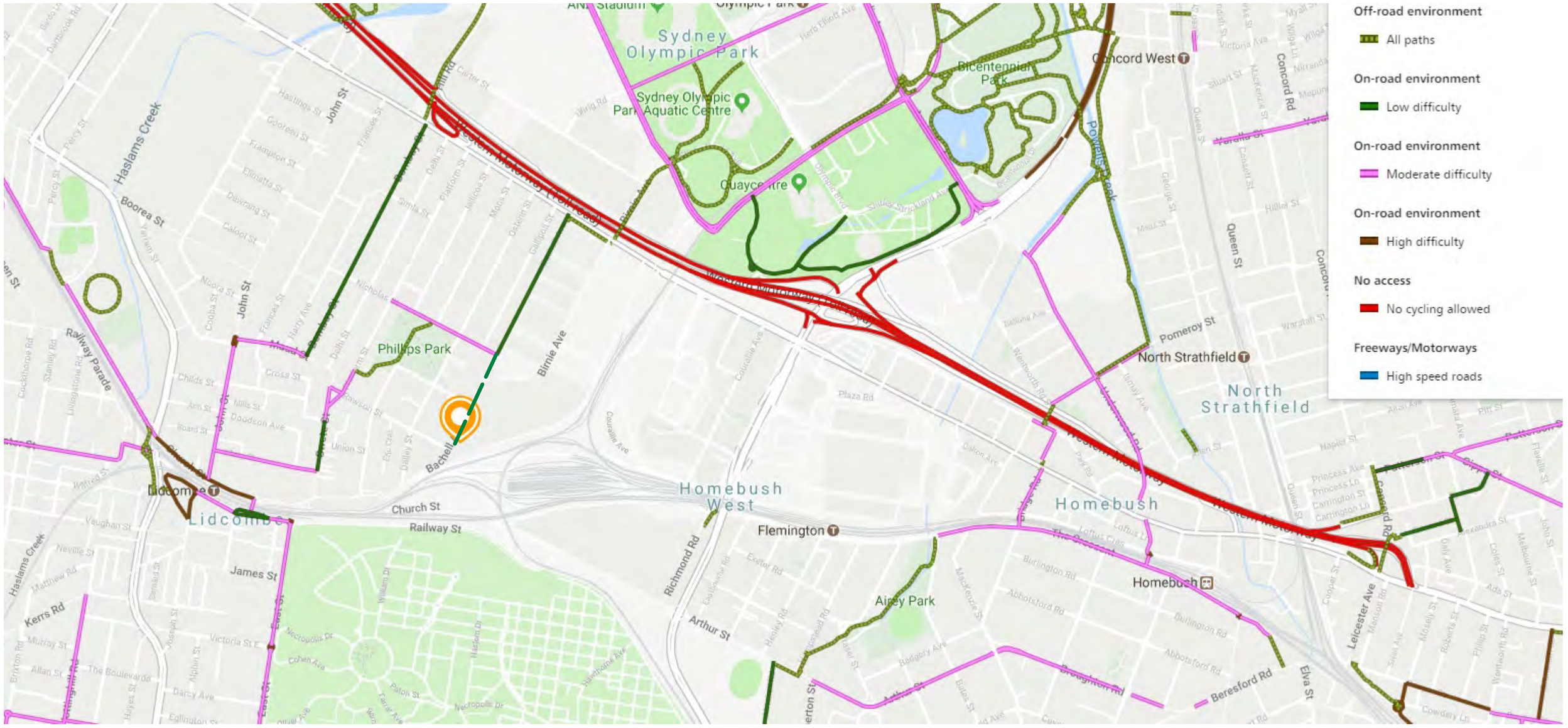
APPENDIX D



Auburn LGA Cycling Routes

AUBURN CITY COUNCIL
MANY CULTURES ONE COMMUNITY

Map projection: UTM
Coordinate System:
GDA/MGA 1994 Zone 56
File Name: Cycle Routes
Date: 14/12/2009



SOURCE TRANSPORT FOR NSW CYCLEPATH FINDER

POSSIBLE FUTURE ON ROAD CONNECTION IN BACHELL AVENUE

EXISTING AND FUTURE BICYCLE PATHS

APPENDIX E

DRAFT ACTION PLAN

GENERAL ACTIONS

Action	Timeline	By whom
Promotion including: Promote “Walk To Work Day” or “ Ride To Work Day”, Car Share incentives for employees such as car share scheme. Display boards in prominent locations to show public transport maps and timetables.	On Occupation	Corporation Owners/ Business

WALKING

Action	Timeline	By whom
Produce a map showing safe walking routes to and from the site with times, distances to local facilities, such as shops and bus stops	On Occupation	Corporation Owners

CYCLING

Action	Timeline	By whom
Provide sufficient cycle parking to meet peak needs, which is easily accessible and secure	On Occupation	Developer
Provide cycle parking for visitors	On Occupation	Developer
Ensure cycle parking is clearly visible or provide signage to direct people to cycle bays	On Occupation	Developer
Produce a map showing quiet cycle routes in the area	On Occupation	Developer

PUBLIC TRANSPORT

Action	Timeline	By whom
Develop a map showing public transport routes in the area	On Occupation	Developer
Put up a noticeboard with leaflets and maps showing the main public transport routes to and from the site	On Occupation	Developer

APPENDIX F

Appendix F

Possible Mitigation Measure at Church Street/ Railway Street developments

The Nearmap image in **Figure 8** indicates that it may be feasible to construct a left turn slip lane from Railway Street west to Church Street.

The SIDRA analysis shows that a slip lane would significantly improve the Level of Service to A in the AM peak hour and to A in the PM peak hour.

Left turn slip lane from west approach to Church Street north. 60 metres.

No	Location	Sign/ Control	Peak Hour	Level Of Service (LoS)	Degree of Saturation (DoS)	Average Delay (Av)	Critical Movement
1	Church Street/ Railway Street	S	AM	A	0.626	14.5	North Approach Church Street RHT 32.7 secs
1	Church Street/ Railway Street	S	PM	A	0.669	13.8	North Approach Church Street RHT 31.2 secs

The mitigation measure is illustrated in **Figure 9.**

NORTH

SOURCE: NEARMAPS

LEGEND

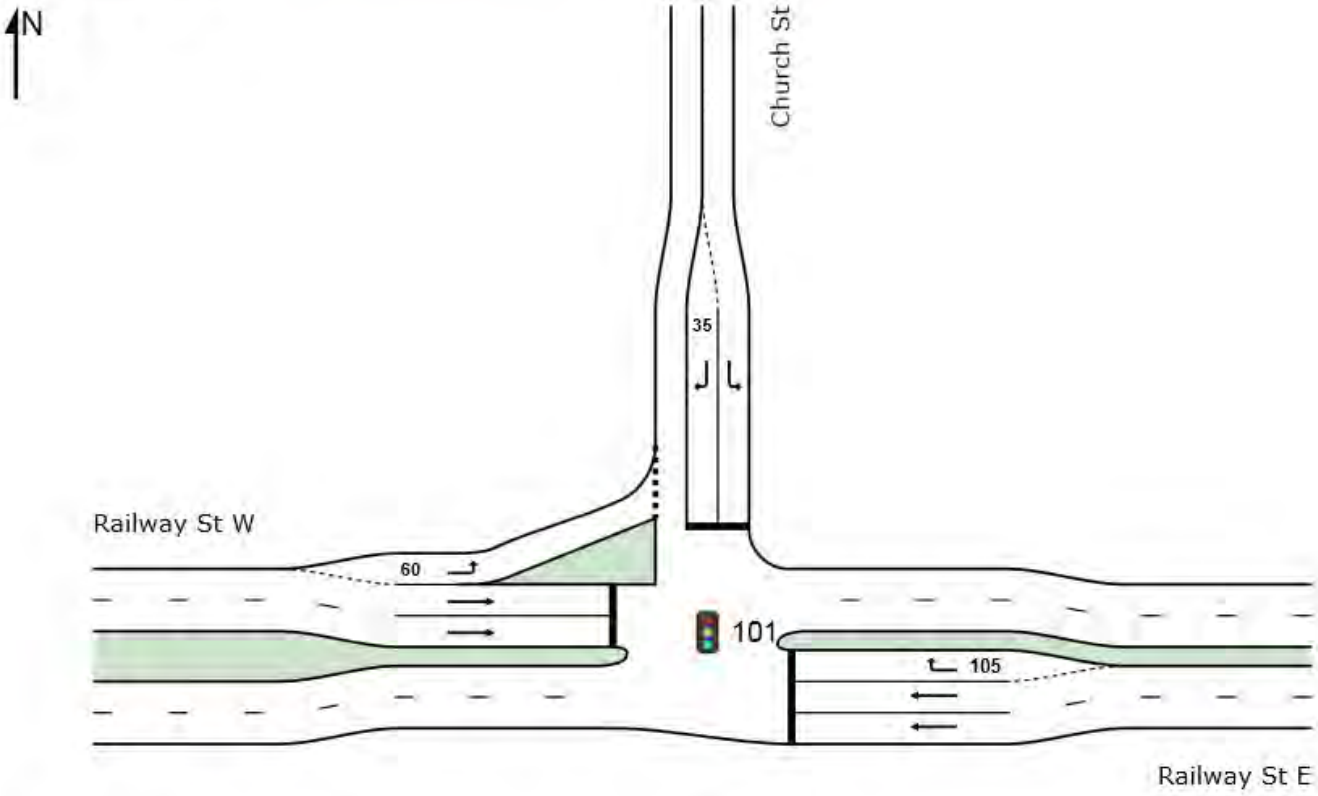
FUTURE
SLIP LANE LOCATION
MITIGATION WORKS

FIGURE 8
RAILWAY STREET AND
CHURCH STREET
INTERSECTION

SITE LAYOUT

Site: 101 [Future Mitigation AM: Church St/Railway St, Lidcombe - Copy]

AM Peak Hour: 7:45-8:45am
Site Category: (None)
Signals - Actuated Isolated



Organisation: LYLE MARSHALL & PARTNERS PTY LTD | Created: Thursday, 20 September 2018 3:01:40 PM
Project: Z:\LMA Jobs\SIDRA\1179-18 2 BACHELL AVENUE LIDCOMBE\1157-15 2 Bachell Avenue_EM-20.9.18.sip8

FIGURE 9
FUTURE MITIGATION
AT CHURCH STREET AND RAILWAY STREET
LIDCOMBE