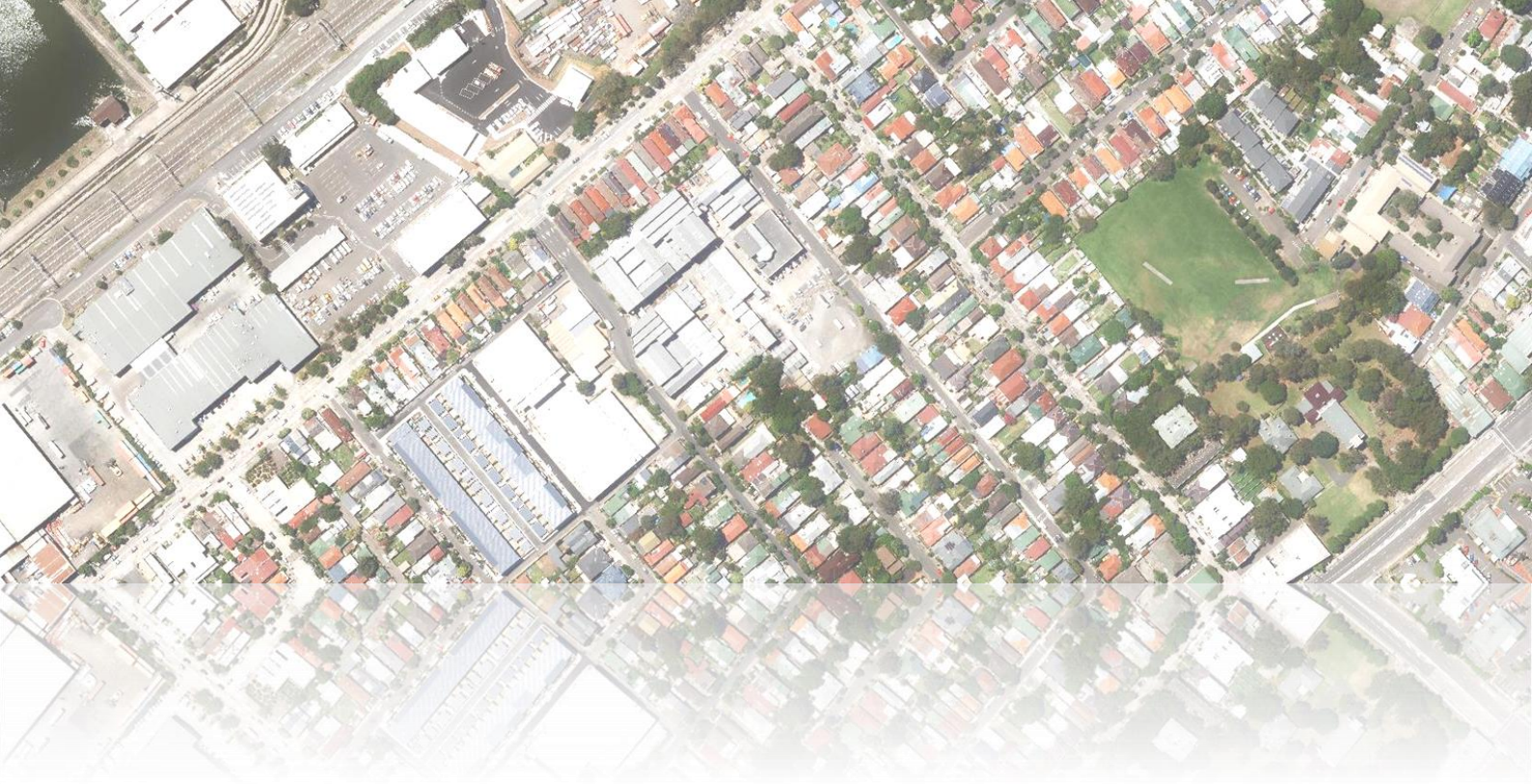

MIXED USE DEVELOPMENT

TRAFFIC & PARKING IMPACT ASSESSMENT

75 Mary Street, St Peters

Final Issue: A – 21st September 2015

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MIXED USE DEVELOPMENT

75 MARY STREET, ST PETERS

NSW 2044

Prepared for: Caliph
Job reference: 2014/313
Final issue: A- 21st September 2015

Status	Issue	Prepared By	Checked By	Date
Draft	**E**	**HC**	**CM**	**27th August 2015**
Final	**A**	**HC**	**CM**	**21st September 2015**

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1 INTRODUCTION

M^{C}Laren Traffic Engineering was commissioned by *Tonkin Zulaikha Greer Architects* on behalf of *Caliph* to prepare a traffic and parking impact assessment for the Planning Proposal for a residential development at 75 Mary Street, St Peters as part of a Master Plan Development identified as Precinct 75.

The development has proposed a total of 180 residential units including 38 adaptable units, 5,662m^2 of commercial office space and 9,676m^2 of light industrial being retained.

As shown in **Annexure A**, three basement levels are also proposed providing a total of 340 car parking spaces.

1.1 State Environmental Planning Policy (Infrastructure) 2007

The proposed development does qualify as a development with relevant size or capacity under Clause 104 of the SEPP (Infrastructure) 2007. Accordingly, formal referral to the Roads and Maritime Services (RMS) is necessary and both Marrickville Council and regional planning officers can determine this proposal accordingly.

2 EXISTING CONDITIONS

2.1 Site Description

The subject site is located at 75 Mary Street, St Peters, as shown in **Figures 1 & 2** and is currently occupied by a number of buildings with varying usages, much of which will be demolished during construction. The site is situated within a low-medium residential area with industrial and commercial business opposite Unwins Bridge Road (Marrickville Council Depot).

The site is occupied by a number of existing commercial / warehouse operations. The total gross leasable floor area is 12,854m^2 with an on-site parking provision of some 80 car parking spaces.

2.2 Road Hierarchy

Mary Street has the following characteristics within close proximity to the site:

- Unclassified LOCAL Road
- Variable 6-11m wide carriageway
- Signposted 50km/h speed limit
- ONE-WAY traffic flow east-to-west
- Parking generally permitted along both sides of the road at wider areas, and only on the northern side at narrower segments

Edith Street has the following characteristics within close proximity to the site:

- Unclassified LOCAL Road
- Approximately 7-8m in variable width facilitating two-way traffic flow with kerbside parking on both sides
- Signposted 50km/h speed limit
- Generally unrestricted kerbside parking on both sides of the road

Unwins Bridge Road has the following characteristics within close proximity to the site:

- Classified REGIONAL Road (Road No. 2099)
- Approximately 12-14m wide two-way carriageway
- Signposted 60km/h speed limit
- Parking permitted on either side of the road subject to “No Parking” restrictions signs which are generally 7-9am northbound and 4-6pm southbound.

Roberts Lane has the following characteristics within close proximity to the site:

- Unclassified LOCAL Road
- Approximately 7m in width at Edith Street whilst widening at the Mary Street end to accommodate angled 90 degree parking.
- 50km/h carriageway
- Two-way traffic permitted

2.3 Existing Traffic Management

The following existing traffic management and calming devices are found in close proximity to the site:

- Mary Street is one-way east-to-west
- Three (3) localised speed humps in Mary Street from Unwins Bridge Road to the Princes Highway
- Two (3) localised speed humps in Edith Street from Unwins Bridge Road to the Princes Highway
- Edith Street is signposted as a Local Traffic Area with speed zoning of 50km/h
- Edith Street is signposted at Unwins Bridge Road restricting vehicles to 3 tonnes or less
- Mary Street is signposted at the Princes Highway restricting vehicles to 3 tonnes or less and no buses.
- Pedestrian phases are provided across the Princess Highway as well as at Unwins Bridge Road intersection with Mary Street
- Princes Highway employs contra flow, whereby the lane configuration during the morning and evening peak reflects the tidal demand (i.e. northbound demand during the morning for capacity and southbound demand for capacity during the evening)
- A pedestrian refuge is provided on Unwins Bridge Road near the Edith Street intersection

2.4 Existing Traffic Flows

At Council's request, peak hour intersection surveys were conducted in 2015 on Thursday 12th February 2015during peak commuter periods from 7:00-10:00am and 3:00-6:00pm at the following junctions:

- Princes Highway / Canal Road / Mary Street
- Princes Highway / Edith Street
- Mary Street / Roberts Lane
- Edith Street / Roberts Road
- Unwins Bridge Road / Mary Street
- Unwins Bridge Road / Edith Street

Traffic conditions for the above intersections was observed in 2014 however surveys have been undertaken in 2015 due to recent completed works undertaken by Council at the intersection of Unwins Bridge Rd / Mary St. Recent works at this intersection undertaken by Council is a direct response in attempting to constrain traffic in Mary Street by reducing the Mary Street approach from 3 lanes to 2 lanes, such that it becomes an undesirable route for motorists.

The intersection surveys sheets are provided in **Annexure B** for reference. SIDRA INTERSECTION 5.1 has been used to model the respective intersections and assess their performance with respect to Degree of Saturation, Average Delay and Level of Service. **Table 1** summarises the intersection performances, with the SIDRA output summaries provided in **Annexure C**.

TABLE 1: EXISTING INTERSECTION PERFORMANCES (SIDRA INTERSECTION 5.1)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/vehicle)	Level of Service[3]	Control Type	Worst Movement
Year 2015 Baseline						
Princes Hwy / Canal Rd	AM	0.936	32.6	**C**	Signals	N/A
	PM	1.029	>70	**F**		N/A
Princes Hwy / Edith St	AM	0.509	7.1 (8.3)	**A (A)**	Priority	Left turn from Edith St
	PM	0.266	7.1 (8.2)	**A (A)**		Left turn from Princes Hwy (S)
Mary St / Roberts Ln	AM	0.270	0.6 (16.4)	**A (B)**	Priority	Right turn from Roberts Ln
	PM	0.376	0.9 (25.4)	**A (B)**		Right turn from Roberts Ln
Edith Street / Roberts St	AM	0.059	5.6 (6.8)	**A (A)**	Priority	Right turn from Edith St (W)
	PM	0.035	6.3 (6.9)	**A (A)**		Right turn into Edith St (W)
Unwins Bridge Rd / Mary St	AM	0.785	14.0	**A**	Signals	N/A
	PM	0.718	19.4	**B**		N/A
Unwins Bridge Rd / Edith Street	AM	0.334	2.0 (19.8)	**A (B)**	Priority	Right turn from Edith St
	PM	0.466	0.4 (20.5)	**A (B)**		Right turn from Edith St

NOTES:

(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.

Based on the SIDRA intersection performances, the critical link identified in the surrounding road network is the intersection of Unwins Bridge Road / Mary Street and Princes Highway / Canal Road. Whilst the SIDRA models report queuing in both Mary Street and Unwins Bridge Road, observations during these times show that any queue generally clears during the cycle, however based on the future access arrangement, it is anticipated that majority of outbound traffic flow will pass through this intersection.

The intersection of Princes Highway / Canal Road will not carry the same level of additional traffic volumes as a result of the development.

Based on the intersection surveys conducted, the following mid-block traffic flows have been adopted for the assessment.

TABLE 2: ADOPTED MID-BLOCK TRAFFIC FLOWS

Location	AM	PM
Mary Street (south of Roberts)	466	845
Mary Street (north of Roberts)	518	746
Unwins Bridge Rd (west of Mary)	1490	1672
Unwins Bridge Rd (east of Edith	1615	1722
Edith Street (south of Roberts)	106	34
Edith Street (north of Roberts)	101	56
Roberts Street	58	74

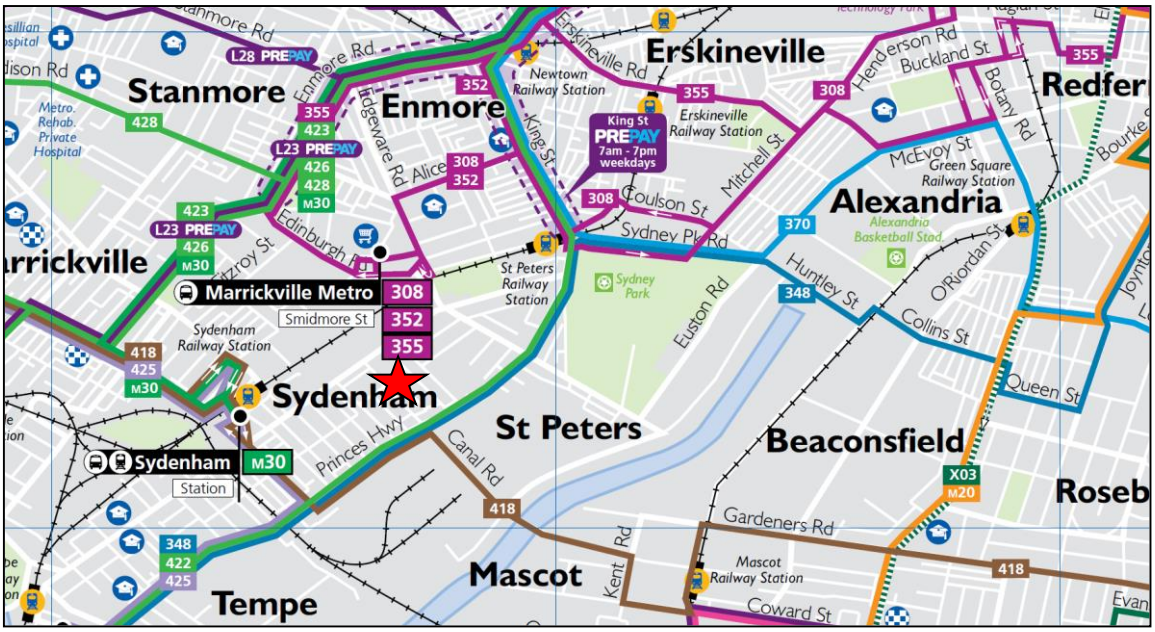
Based on the mid-block traffic flows, Mary Street is operating at traffic levels above the RMS residential amenity thresholds for a collector road, whilst Edith Street is below the residential amenity thresholds for a local street along with Roberts Street operating below residential amenity thresholds for a local street / access way.

Additionally, reference is made to the RMS Guide Table 4.3 which stipulates typical mid-block capacities for urban roads. The Guide outlines the mid-block capacity for a single lane is 900 vehicles per hour if a designated parking lane is provided, reducing to 600 vehicles per hour where occasional parked cars occur.

Based on this criteria, it is evident that Mary Street is operating at or near its mid-block capacity, particularly with due consideration to residential amenity.

2.5 Public Transport

There are multiple bus stops along Princes Highway within 400m walking distance. These bus routes provide links between major suburbs. Bus route 422 provides services between Kogarah and Sydney CBD via Temp and St Peters, whilst bus route 348 provides services between Wolli Creek and Bondi Junction via Alexandria, UNSW and Randwick Junction.



Site Location

The subject site is also serviced by rail with St Peters Railway Station located approximately 1.0km walking distance from the site to the east and Sydenham Railway Station located approximately 900m walking distance from the site to the west. St Peters Station services the T3 Bankstown Line whilst Sydenham Station also services the T3 Bankstown Line as well as the T2 Airport Line, T4 Eastern Suburbs & Illawarra Line, South Coast Line and Southern Highlands Line. Train frequencies during the morning and evening peak period are high will more than one service every 10 minutes.

2.6 Future Infrastructure & Development

According to Marrickville Council's DA notifications, there are no significant development proposals near the subject site that will impact on future traffic and parking conditions.

The WestConnex proposes to introduce an interchange under Stage 2 development. The planning and traffic modelling details of the interchange at the time of writing this report are still in progress, with only preliminary and feasibility identified, as shown in **Annexure D**. The most recent public notification identifies the following:

> *The St Peters Interchange will be located in the industrial area bounded by Canal Road, Burrows Road, Campbell Road and Princes Highway.... The St Peters Interchange will allow traffic to move between the M5 and M4 corridors, as well as providing access to Sydney Airport and Port Botany precincts and the local road network.*
>
> *It is proposed to widen Campbell Street and Euston Road and construct a new bridge over the Alexandria Canal to Bourke Road. These roads are subject to longstanding road widening orders, where a significant amount of the land is already owned by the RMS.*

3 DISCUSSION OF EXISTING DATA AND ANALYSIS

As part of this traffic impact assessment, preliminary advice was provided to both the Applicant's design team and Marrickville Council in order to ameliorate any forecast traffic impacts associated with the scale of development.

Intersection surveys were conducted at the junction of Unwins Bridge Road & Mary Street as part of the preliminary advice. The surveys were conducted in October 2014.

It has come to *M^CLaren Traffic Engineering's* attention that the surveys undertaken in October 2014 are not reliable and both human and equipment error may have been a factor in abnormally high traffic volumes recorded. A review of all available intersection data highlights the abnormality in the intersection volumes.

TABLE 3: PEAK HOUR TURN MOVEMENTS - AM

Approach	Movement	August 2010 Survey	November 2011 Survey	October 2014 Survey	February 2015 Survey	March 2015 Survey
From Unwins Bridge Road (south approach)	Through	N/A	983	1576	855	1256
From Unwins Bridge Road (north approach)	Through	N/A	503	653	494	591
From Mary Street	Left onto Unwins	N/A	143	139	141	161
	Right onto Unwins	N/A	346	375	325	273
Total		**N/A**	**1975**	**2743**	**1815**	**2281**

TABLE 4: PEAK HOUR TURN MOVEMENTS - PM

Approach	Movement	August 2010 Survey	November 2011 Survey	October 2014 Survey	February 2015 Survey	March 2015 Survey
From Unwins Bridge Road (south approach)	Through	439	N/A	1282	482	774
From Unwins Bridge Road (north approach)	Through	983	N/A	1932	814	1276
From Mary Street	Left onto Unwins	199	N/A	170	376	311
	Right onto Unwins	376	N/A	487	469	538
Total		**1997**	**N/A**	**3871**	**2141**	**2899**

It is evident that the intersection surveys undertaken in October 2014 are inconsistent with more recent data. As such, it is concluded that the development scale and access arrangements can be modified based on previous preliminary advice and discussion whereby vehicular access from Roberts Street is no longer necessary in order to alleviate any pressures on Mary Street.

Additionally, the staging of development may not be required given the intersection of Mary Street & Unwins Bridge Road has capacity for additional vehicle movements beyond what was previously considered under the October 2014 survey and preliminary advice.

Additionally, Marrickville Council has provided information with regards to its submission to the Roads & Maritime Services (RMS) to modify traffic conditions at both the intersection of Unwins Bridge Road / Mary Street and Princes Highway / Canal Road. Based on the modified approach to Unwins Bridge Road, the LoS remained unchanged with LoS A/B reported. This is consistent with the intersection performance outlined in **Table 1**.

The modification to these intersections involved reducing the Mary Street approach to Unwins Bridge Road from three (3) lanes, to two (2) lanes, which was accepted based on the supporting analysis. It is understood the proposed modification to the Princes Highway intersection was not accepted by the RMS, which involved adjustment to green time allocation as well as modify lane arrangements in order to reduce the Mary Street exit from two (2) lanes to one (1) lane.

4 SCALE OF DEVELOPMENT

4.1 Proposed Development

The proposed mixed use development (as depicted **Annexure A**) has the following scale across buildings A, B, C and Building 8:

- Two (2) x studio apartments
- Sixty-one (61) x 1 bedroom apartments
- One hundred (100) x 2 bedroom apartments
- Seventeen (17) x 3 bedroom apartments
- A total of 340 car parking spaces across two basement levels
- Existing 9,676m^2 industrial/commercial GFA to be retained
- Additional 5,662m^2 of new commercial office GFA

4.2 Vehicle Access

The site fronts Mary Street, Edith Street and Roberts Street, and access to the basement level car parks are from Mary Street and Edith Street respectively.

Mary Street access will be exit only for cars, and entry / exit for service vehicles. The driveway width is proposed to be 6.7m in width. It is anticipated, as a result of the development and recommendations within this report, that parking restrictions will be required at the driveway location, to provide sufficient view lines and manoeuvrability to / from the driveway.

Edith Street access will be entry only for cars and facilitate left and right turn entry. The driveway width proposed is approximately 5.1m in width, sufficient for single lane entry. It is anticipated, as a result of the development and recommendations within this report, that parking restrictions will be required at the driveway location, to provide sufficient manoeuvrability to the driveway.

There will be no vehicular access from Roberts Street, although there is planned to be a pedestrian connection.

5 PARKING ASSESSMENT

5.1 Council Parking Requirement

Reference is made to *Marrickville Development Control Plan 2011 Part 2.10 –Parking* which prescribes the following parking rates applicable to the proposed development within Parking Area 3:

> *Parking Area 3*
> *Non-adaptable units:*
> *0.6 per studio*
> *0.8 per 1 bedroom unit*
> *1.2 per 2 bedroom unit*
> *1.2 per 3+ bedroom unit*
> *0.1 per unit for visitors*
>
> *Adaptable Residential units:*
> *1 mobility space per studio, 1 bedroom, 2 bedroom or 3+ bedroom unit*
> *0.25 visitor mobility spaces per resident mobility space*
>
> *Office*
> *1 per 60m^2 GFA for staff & visitors*
>
> *Light industry*
> *1 per 200m^2 GFA for staff & customers*

The resultant car parking requirements based upon the current Council DCP for residential development is presented in **Table 3** below. The car parking rate for the existing light industrial uses has been applied to reflect a robust assessment, as it reflects a higher car parking rate and therefore a worst case scenario.

TABLE 5: CAR PARKING REQUIREMENTS

Allocation	Type	Scale	Rate	Spaces Required
Residents (non-adaptable)	Studio	2	0.6 spaces per unit	1.2
	1 bedroom	61	0.8 spaces per unit	48.8
	2 bedroom	100	1.2 spaces per unit	120
	3 bedroom	17	1.2 spaces per unit	20.4
Subtotal		**180**		**190.4 (190)**
Resident (adaptable)	-	38	1 mobility space per unit	Of which 38 are disabled
Visitor	-	180	0.1 spaces per unit	18
Sub Total				**18**
Existing Light Industrial	-	9,676m^2	1 space per 200m^2	48.4
Additional Commercial Office	-	5,662m^2	1 space per 60m^2	94.3
Sub Total				**142.7 (143)**
Total				**351 of which 38 are for disabled residents**

As summarised in **Table 5**, the proposed development requires a total of **351** car parking spaces, including 190 spaces for residents, 18 visitor, and 112 spaces for the existing light industrial and proposed commercial office. The proposed basement car parking area provides 340 parking spaces, representing a shortfall of 11 spaces above Council's requirement.

Whilst there is a shortfall of 11 car parking spaces, it is anticipated that the provision of GoGet car share vehicles will negate this shortfall.

5.2 Disabled Parking

Disabled parking for residents is specified in **Section 4.1** and **Table 5**. The proposed plans provide sufficient car parking for disabled users.

Disabled parking for non-residential uses, as per Marrickville Council DCP 2011 Part 2.5 requires 1 space for every 10 car parking spaces to be provided. This disabled car parking rate is excessive when compared to BCA requirements, which is generally 1-2% of the total provision.

It is therefore considered that 3-6 disabled car parking spaces for non-residential uses is sufficient for their likely demand.

5.3 Servicing & Loading

Marrickville Council 2011 DCP Part 2.10 prescribes the following service and delivery vehicle requirements:

> *Residential Flat Buildings*
> *One service vehicle space per 50 flats (above first 50) or home units up to 200, plus*
> *One space per 100 thereafter, plus*
> *One space per 1,000m^2 of public area set aside for bar, tavern, lounge and restaurant (50% of spaces adequate for trucks)*
>
> *Industrial*
> *One truck per 800m^2 GFA up to 8,000m^2 GFA, plus*
> *One truck per 1,000m^2 thereafter (all spaces adequate for trucks)*
>
> *Commercial Premises*
> *One truck space per 4,000m^2 GFA up to 20,000m^2. Plus*
> *One truck space per 8,000m^2 thereafter (50% of spaces adequate for trucks*

TABLE 6: SERVICE/DELIVERY PARKING REQUIREMENTS

Land Use	Scale	Parking Rate	Parking Required
Residential	180 units	1 per 50	4
No Change	9,676m^2	1 per 800m^2 up to 8,000m^2 + 1 per 1,000m^2	12
Commercial	5,662m^2	1 space for 4,000 – 20,000m^2 GFA	1
Total	-	-	**17**

The loading and servicing requirements, as per Councils DCP, are summarised in **Table 6**. It is evident, based on the number of loading bays required, that Council's DCP does not adequately consider large mixed use developments, where loading areas and loading bays can be shared and managed under an operational site loading management plan.

Generally, one loading bay for the residential component, to accommodate a 12.5m Heavy Rigid Vehicle (HRV) would be desirable. For the non-residential uses, excluding industry, two (2) loading bays able to accommodate a HRV and two (2) loading bays able to accommodate vehicles equivalent to an SRV is desirable.

Waste collection for the site will be detailed under a waste management plan, in order to avoid multiple mixed use components conducting waste collection at the same time, and thus significantly reducing the amount of loading bays required for the entire development. Details of waste collection and requirements are provided in the supporting waste management plan.

5.4 Bicycle & Motorcycle Requirements

Marrickville Council 2011 DCP Part 2.10 specifies the following bicycle parking requirements:

Residential Flat Building
1 per 2 units for residents, plus
1 per 10 units for visitors

Office
1 per 200m^2 GFA for staff, plus
1 per 500m^2 GFA for customers if premises over 1,000m^2

Industry
1 per 150m^2 GFA for staff

TABLE 7: BICYCLE PARKING REQUIREMENTS

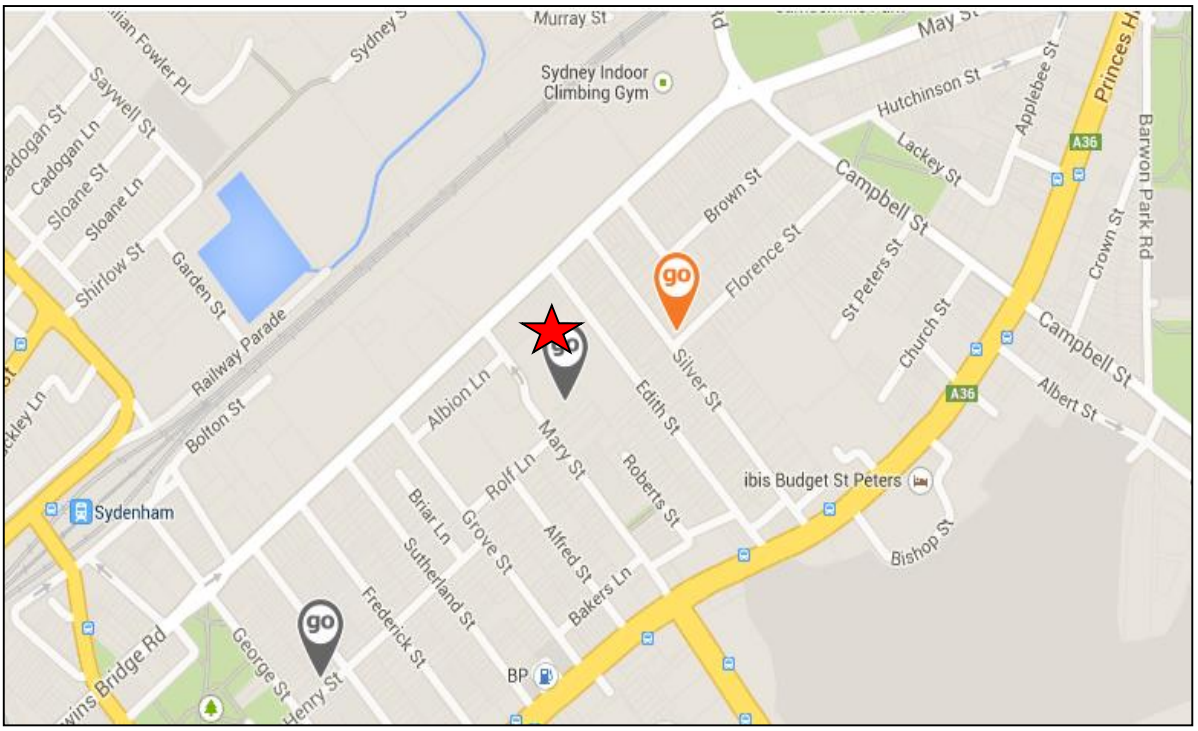
Land Use	Scale	Parking Rate	Parking Required
Residential	180 units	1 per 2 units + 1 per 10	108
Commercial office	5,662m^2	1 per 200m^2 + 1 per 500m^2	40
Retained Light Industrial	9,676m^2	1 per 150m^2	65
Total	-	-	**213**

As summarised in **Table 7** above, the proposed development requires a total of 213 bicycle spaces.

Council's DCP specifies motorcycle parking shall be provided at a rate of 5% of the car parking required. Therefore, sixteen (16) motorcycle spaces are required.

5.5 GoGet Car Share

Car share facilities are on the rise in popularity with numerous locations for such car share schemes such as *GoGet, Flexicar* and *Charter Drive* which are found within close proximity to the site. The popularity of car share is largely due to the ease of availability as well as the low expense to rent the vehicle. The figure below shows the available *GoGet* car locations surrounding 75 Mary Street, St Peters. Currently there are 2 *GoGet* cars within 200m of the site.



Site ★

Members of car share schemes typically have to hire / use a car share vehicle for a minimum of 1 hour and have typically already paid joining fees in order to rent the vehicle. Marrickville Council's DCP identifies car share vehicles are effective in all areas within the Marrickville LGA, especially Parking Areas 1 and 2. Given the increase in residential density expected with the development, as well as other land uses it is beneficial to provide additional *GoGet* vehicles in close proximity to the site, or on-site for the area.

It is understood that Council have suggested the provision of 7 car share vehicles on-site for the use of the surrounding public and future residents. This spaces will be located within the first parking level and accessible from Mary Street. It is anticipated that the usage of these vehicles utilising Mary Street for entry and exit can be easily managed and detailed further at D.A stage.

5.6 Car Park Design & Compliance

As this is a planning proposal, compliance of the car park can be undertaken at DA stage when further details regarding column locations etc. are available. However the proposed plans shown in **Annexure A** generally comply with relevant clauses of AS2890.1- 2004, AS2890.2:2002 & AS2890.6:2009 (or better) subject to a detailed compliance review. It should be noted that it is usual that a construction certificate is required prior to construction due to possible changes during or after D.A approval.

6 TRAFFIC ASSESSMENT

6.1 Existing Traffic Generation & Impact

Reference is made to the RMS Guide to Traffic Generating Development which prescribes trip generation rates for applicable land uses.

The site is currently occupied with 12,854m^2 floor area consisting of commercial / industrial and warehouse uses. As per the RMS Guide, the following traffic generation rates are applicable:

Factories
Evening peak hour vehicle trips = 1 per 100m^2 GFA

Warehouses
Morning peak hour vehicle trips = 0.5 per 100m^2 GFA

Business Parks
1.1 vehicles per hour two-way per 100m^2 of GLA

Given the various commercial / industrial / warehouse uses that exist on site, a traffic generation of 1 trip per 100m^2 of floor area is applicable. Therefore, based on 12,854m^2 of floor area, the site has existing generation of up to 139 vehicle trips.

For the purpose of this analysis, it has been assumed that only 20% of the existing site's traffic generation occurs during the peak times surveyed, as warehouse / industrial uses can typically have earlier peaks to the commuter morning and evening peak i.e. 28 trips during peak commuter hours.

6.2 Future Traffic Generation

With respect to future traffic generation, the existing traffic generation of 129 vehicle trips needs to be considered, and credited where appropriate. The following traffic generation rates, as per the RMS Guide, are applicable to the future development

High Rise Residential- Sub Regional
0.29 trips per apartment

Commercial
2 trips per 100m^2

Table 6 summarises the traffic generation of the proposed development.

TABLE 8: FORECAST TRAFFIC GENERATION

Land Use	Scale	Peak Hour Traffic Generation	AM		PM	
			In	Out	In	Out
Residential	180	52	10	42	42	10
Retained Light Industrial	9,676m^2	19	10	9	9	10
Commercial Office	5,662m^2	113	113	0	0	113
Sub Total		**184**	**133**	**51**	**51**	**133**
Less Existing Light Industrial	13,884m^2	-28	-14	-14	-14	-14
Total		**+156**	**+119**	**+37**	**+37**	**+119**

The proposed development is expected to generate a total of **156** additional peak hour vehicle trips. Based on the existing intersection performances and traffic flows, it was identified that the signalised intersection of Unwins Bridge Road / Mary Street and Princes Highway / Mary Street is critical to the development along with the mid-block capacity and residential amenity of Mary Street.

It should be noted that recent publicised RMS figures for residential traffic generation is lower than the 0.29 trips per unit adopted. Therefore, it is considered that the traffic generation provided for residential in **Table 8** is a worst case assessment.

6.3 Traffic Assignment

The traffic assignment adopted has been based on Journey to Work Data provided from the 2011 Census Data. An output of the JTW data is provided in **Annexure E**. For the purpose of this assessment, the JTW traffic assignment has been utilised for non-residential land uses as well.

The traffic split adopted is summarised in **Table 9 & 10** below.

TABLE 9: TRAFFIC ASSIGNMENT PERCENTAGE SPLIT

Movement	AM		PM	
	Inbound	Outbound	Inbound	Outbound
Left from Mary Street onto Unwins Bridge Rd		67%		67%
Right from Mary Street onto Unwins Bridge Rd		33%		33%
Right into Edith Street from Unwins Bridge Rd	22%		22%	
Left into Edith Street from Unwins Bridge Rd	50%		50%	
Left into Edith Street from Princes Hwy	22%		22%	
Through into Mary Street from Canal Rd	6%		6%	
Total	**100%**	**100%**	**100%**	**100%**

TABLE 10: TRAFFIC ASSIGNMENT TURNING MOVEMENTS

Movement	AM		PM	
	Inbound	Outbound	Inbound	Outbound
Left from Mary Street onto Unwins Bridge Rd		25		80
Right from Mary Street onto Unwins Bridge Rd		12		39
Right into Edith Street from Unwins Bridge Rd	26		8	
Left into Edith Street from Unwins Bridge Rd	60		19	
Left into Edith Street from Princes Hwy	26		8	
Through into Mary Street from Canal Rd	7		2	
Total	**119**	**37**	**37**	**119**

6.4 SIDRA Analysis & Impact

The traffic generation outlined in **Section 5.3** above has been added to the existing traffic volumes recorded. SIDRA INTERSECTION 5.1 was used to assess the intersection performance at the surveyed sites. The purpose of this assessment is to compare the existing intersection operations to the future scenario under the increased traffic load. The results of this assessment are shown in **Table 11**:

TABLE 11: FUTURE INTERSECTION PERFORMANCES (SIDRA INTERSECTION 5.1)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/vehicle)	Level of Service[3]	Control Type	Worst Movement
Year 2015 Baseline + Development						
Princes Hwy / Canal Rd	AM	0.936	32.7	**C**	Signals	N/A
	PM	1.029	>70	**F**		N/A
Princes Hwy / Edith St	AM	0.513	7.1 (8.3)	**A (A)**	Priority	Left turn from Edith St
	PM	0.267	7.1 (8.2)	**A (A)**		Left turn from Princes Hwy
Mary St / Roberts Ln	AM	0.272	0.7 (16.6)	**A (B)**	Priority	Right turn from Roberts Ln
	PM	0.377	0.9 (25.5)	**A (B)**		Right turn from Roberts Ln
Edith Street / Roberts St	AM	0.059	2.1 (7.5)	**A (A)**	Priority	Right turn from Roberts St
	PM	0.035	4.4 (7.0)	**A (A)**		Right turn from Edith St (W)
Unwins Bridge Rd / Mary St	AM	0.802	14.4	**A**	Signals	N/A
	PM	0.738	20.3	**B**		N/A
Unwins Bridge Rd / Edith Street	AM	0.357	2.3 (20.4)	**A (B)**	Priority	Right turn from Edith St
	PM	0.477	0.5 (20.9)	**A (B)**		Right turn from Edith St

NOTES:

(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.

It is evident from the SIDRA performances that the intersection of Unwins Bridge Road / Mary Street will maintain its performance of LoS B under the additional traffic load.

The intersection of Princes Highway / Canal Road has also maintained its LoS with little change in saturation or delay. This is largely due to a low amount of additional traffic loaded onto the road network at this location.

Additional traffic past Roberts Street from Princes Highway is low and as a result has not adjusted existing intersection performance of its intersection with Mary Street or Edith Street respectively.

Based on the additional traffic volumes, the expected increase in mid-block traffic flows are identified in **Table 12.**

TABLE 12: FORECAST MID-BLOCK TRAFFIC FLOWS

Location	AM	PM
Mary Street (south of Roberts)	466 + 7 = 473	845 + 2 = 847
Mary Street (north of Roberts)	518 + 37 = 555	746 + 119= 865
Unwins Bridge Rd (west of Mary)	1490 + 51 = 1541	1672 + 88 = 1760
Unwins Bridge Rd (east of Edith)	1615 + 72 = 1687	1722 + 58 = 1780
Edith Street (south of Roberts)	106 + 26 = 1132	34 + 8 = 42
Edith Street (north of Roberts)	101 + 33= 134	56 + 10 = 66
Roberts Street (East-West)	58 + 7 = 65	74 + 2 = 76

As shown in **Table 12**, the additional traffic within Mary Street will increase, however this is towards the northern end of Mary Street based on the development site's proposed exit driveway which will be away from dwellings further to the south on Mary Street.

The expected traffic flow increase within Edith Street remains within the RMS Guide for residential amenity of 200 – 300 for local streets. Additionally, as per the recommendations to follow this section, two-way passing has been promoted near to the site.

The forecast increase in traffic within Roberts Street within the east-west is unlikely to exceed the residential amenity threshold for a local access way. There will be no traffic associated with the development accessing the cul-de-sac of Roberts Street to the development.

6.5 Residential Amenity

In terms of residential amenity considerations the current flows along Edith Street are well below the 'environmental' goal of 200 vehicles per hour and well below the 'maximum' goal of 300 vehicles per hour for a local street.

However, the current traffic volumes on Mary Street have already exceeded the maximum goal. The additional 156 peak hour vehicle trips associated with the development will alter the existing traffic flows however, is largely contained to the

northern end of Mary Street and does not strictly apply to the mixed use nature of the site and localised access road network.

6.6 Recommendations

From observations at the intersection of Edith Street / Unwins Bridge Road, it was evident that kerbside parking reduces Edith Street to a single lane, which has intermittent flow on effects to Unwins Bridge Road. Based on the queue lengths within Edith Street at the Unwins Bridge Road intersection, it is recommended that kerbside parking be modified by either of the following:

1. Remove kerbside parking in Edith Street within 20m of Unwins Bridge Road
2. Time restrict kerbside parking in Edith Street within 20m of Unwins Bridge Road, such that No Parking is permitted during the morning and evening peak periods.

Additionally, based on the increase in traffic flows along Edith Street as a result of the development, passing opportunities should be provided. It is recommended that two passing opportunities be provided along Edith Street, in addition to the recommendation above in Edith Street at Unwins Bridge Road:

- Provide “No Stopping” along the site frontage, 10m either side of the Edith Street driveway (total 20m)
- Provide “No Stopping” along the site frontage for approximately 20m near the existing speed hump in Edith Street (near to the existing loading dock driveway to the north of the site which provides existing passing opportunity).

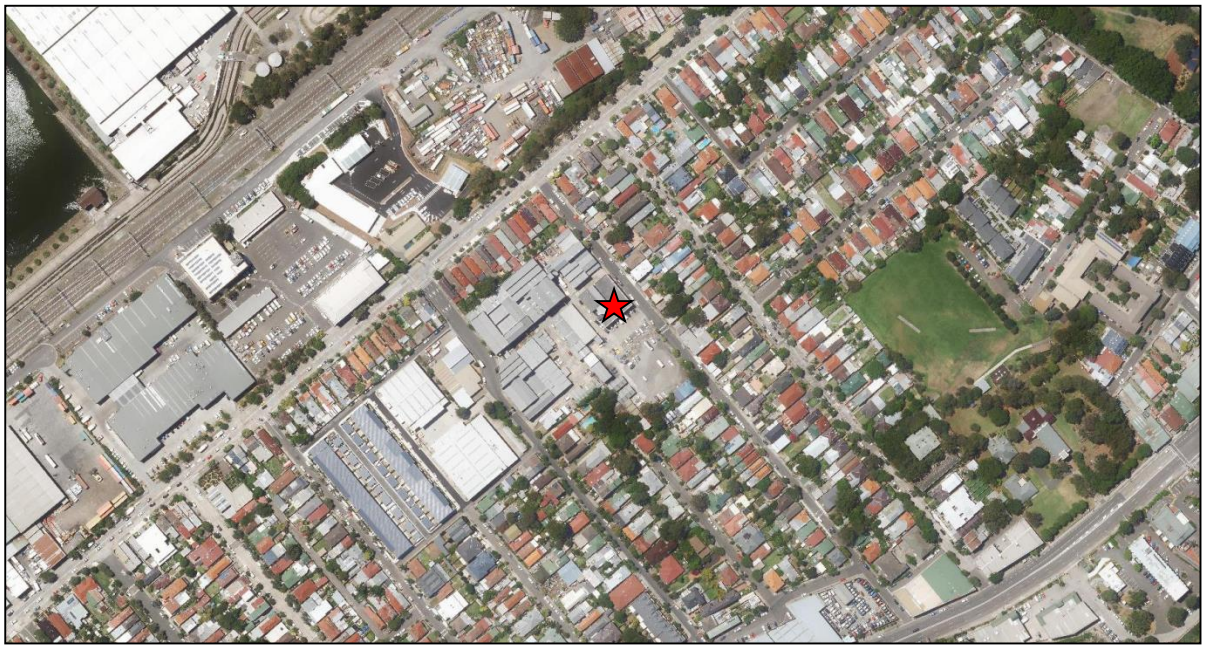
7 CONCLUSION

The subject Planning Proposal at 75 Mary Street, St Peters for residential and commercial development with associated off-street parking is fully supportable in terms of its traffic and parking impacts subject to the following recommendations:

- Development scale is to be consistent with 180 residential units, 45,662m^2 commercial office and 9,676m^2 to remain as light industrial use.
- On-site car parking for residential tenants and disabled tenants complies with Council's DCP requirement. The numeric shortfall of parking can be adequately accommodated by the provision of GoGet car share vehicles.
- On-site car parking for non-commercial uses complies with Council's DCP requirements, however a degree of dual use parking between residential visitors and commercial office can be established and detailed at D.A stage.
- Provision of bicycle and motorcycle requirements complies with Council's DCP
- Servicing and waste collection is detailed under a management plan in order to avoid multiple mixed use components conducting waste collection at the same time, and thus significantly reducing the amount of loading bays required for the entire development.
- The car park and loading area complies with AS2890.1:2004, AS2890.2:2002 & AS2890.6:2009 where applicable.
- It is recommended that kerbside parking within Edith Street be modified by the following:
    - Remove kerbside parking in Edith Street within 20m of Unwins Bridge Road, OR
    - Time restrict kerbside parking in Edith Street within 20m of Unwins Bridge Road, such that No Parking is permitted during the morning and evening peak periods.

      AND

    - Install "No Stopping" along the site frontage, 10m either side of the Edith Street driveway (total of 20m)
    - Install "No Stopping" along the site frontage for approximately 20m near the existing speed hump in Edith Street (near to the existing loading dock driveway to the north of the site which provides existing passing opportunity).



★ **Site Location**

MIXED USE

75 MARY STREET, ST PETERS

FIGURE 1:

AERIAL SITE LOCATION

PREPARED FOR: TONKIN ZULAIKHA GREER ARCHITECTS

BY: M^{C}LAREN TRAFFIC ENGINEERING

★ **Site Location**

MIXED USE

75 MARY STREET, ST PETERS

FIGURE 2:

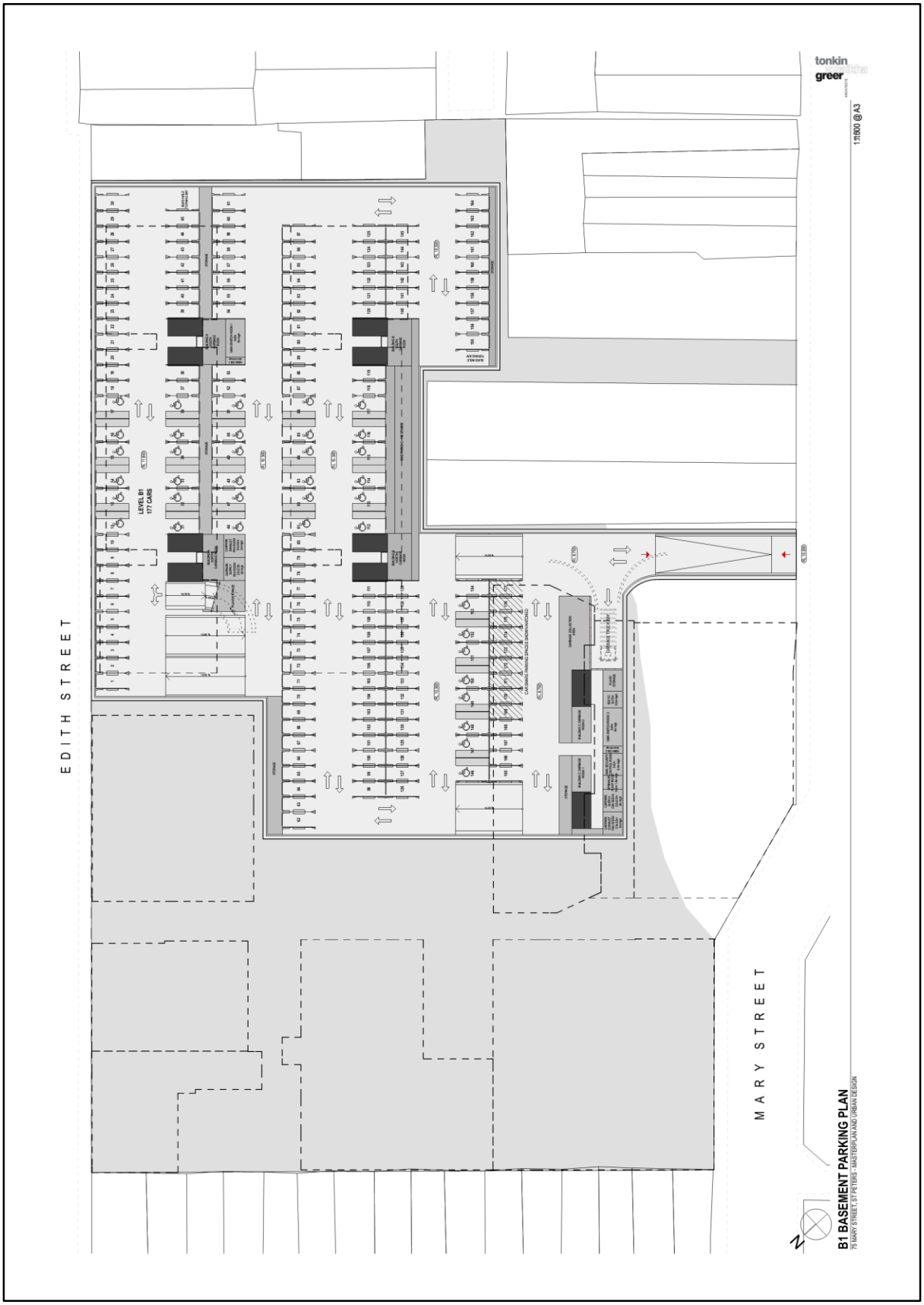
MAP LOCATION

PREPARED FOR: TONKIN ZULAIKHA GREER ARCHITECTS

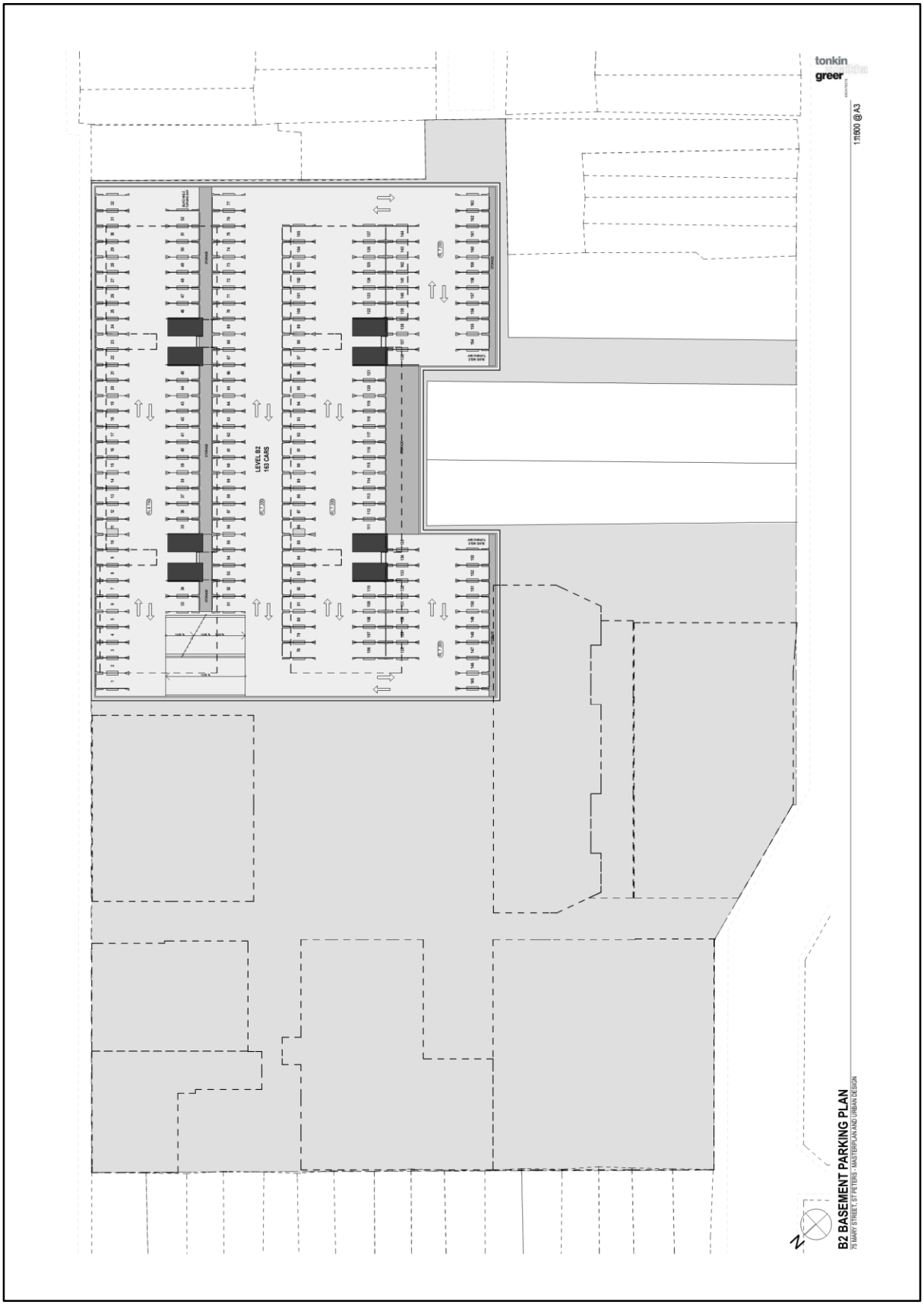
BY: MCLAREN TRAFFIC ENGINEERING

ANNEXURE A: PROPOSED PLANS (Sheet 1 of 3)

ANNEXURE A: PROPOSED PLANS (Sheet 2 of 3)



ANNEXURE A: PROPOSED PLANS (Sheet 3 of 3)



ANNEXURE B: TRAFFIC SURVEYS (Sheet 1 of 6)

BVY TRAFFIC SURVEY
Quality data services proven since 2000

QUALITY ENDORSED COMPANY BY AS/NZS ISO 9001:2008
OH&S SYSTEM CERTIFIED TO AS/NZS ISO 4801:2001

TURNING MOVEMENT SURVEY

Mary St and Princes Hwy, St Peters
Thursday, 12 February 2015

Weather:	Overcast
Suburban:	St Peters
Customer:	McLaren

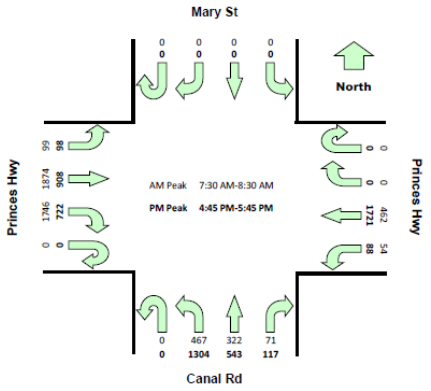
Survey Start	
AM:	7:00
PM:	15:00

Peakhour	
AM:	7:30 AM-8:30 AM
PM:	4:45 PM-5:45 PM

Time		North Approach Mary St				East Approach Princes Hwy				South Approach Canal Rd				West Approach Princes Hwy				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
7:00	7:15	0	0	0	0	0	0	106	18	0	15	63	83	0	361	446	16	4952	
7:15	7:30	0	0	0	0	0	0	118	25	0	22	92	112	0	403	459	18	5060	
7:30	7:45	0	0	0	0	0	0	108	14	0	18	79	104	0	394	513	23	5095	Peak
7:45	8:00	0	0	0	0	0	0	115	10	0	14	95	142	0	457	478	31	5089	
8:00	8:15	0	0	0	0	0	0	104	13	0	18	92	109	0	438	423	19	4944	
8:15	8:30	0	0	0	0	0	0	135	17	0	21	56	112	0	457	460	26		
8:30	8:45	0	0	0	0	0	0	112	20	0	24	100	120	0	411	444	16		
8:45	9:00	0	0	0	0	0	0	135	18	0	24	69	98	0	430	395	28		
15:00	15:15	0	0	0	0	0	0	421	26	0	39	118	259	0	170	187	24	5023	
15:15	15:30	0	0	0	0	0	0	396	23	0	36	150	309	0	157	197	28	5034	
15:30	15:45	0	0	0	0	0	0	402	21	0	27	110	277	0	186	177	18	5017	
15:45	16:00	0	0	0	0	0	0	390	14	0	33	116	272	0	178	239	23	5113	
16:00	16:15	0	0	0	0	0	0	467	28	0	22	107	236	0	162	213	20	5210	
16:15	16:30	0	0	0	0	0	0	402	19	0	34	114	289	0	203	196	22	5314	
16:30	16:45	0	0	0	0	0	0	420	15	0	21	110	294	0	192	235	27	5449	
16:45	17:00	0	0	0	0	0	0	437	23	0	23	119	316	0	194	221	29	5501	Peak
17:00	17:15	0	0	0	0	0	0	450	29	0	33	131	331	0	156	212	17	5390	
17:15	17:30	0	0	0	0	0	0	435	22	0	27	126	339	0	186	251	28		
17:30	17:45	0	0	0	0	0	0	399	14	0	34	167	318	0	186	224	24		
17:45	18:00	0	0	0	0	0	0	400	22	0	26	123	256	0	171	223	30		

Peak Time		North Approach Mary St				East Approach Princes Hwy				South Approach Canal Rd				West Approach Princes Hwy				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
7:30	8:30	0	0	0	0	0	0	462	54	0	71	322	467	0	1746	1874	99	5095
16:45	17:45	0	0	0	0	0	0	1721	88	0	117	543	1304	0	722	908	98	5501

Graphic



ANNEXURE B: TRAFFIC SURVEYS (Sheet 2 of 6)

TURNING MOVEMENT SURVEY

Edith St and Princes Hwy, St Peters
Thursday, 12 February 2015

Weather:	Overcast
Suburban:	St Peters
Customer:	McLaren

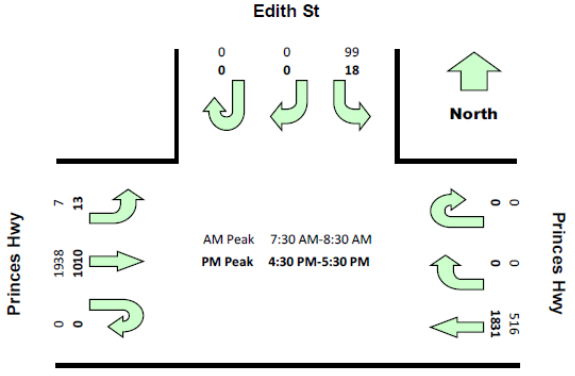
Survey Start	
AM:	7:00
PM:	15:00

Peakhour	
AM:	7:30 AM-8:30 AM
PM:	4:30 PM-5:30 PM

Time		North Approach Edith St			East Approach Princes Hwy			West Approach Princes Hwy			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
7:00	7:15	0	0	5	0	0	124	0	459	2	2555	
7:15	7:30	0	0	24	0	0	143	0	480	1	2551	
7:30	7:45	0	0	24	0	0	122	0	531	0	2560	Peak
7:45	8:00	0	0	23	0	0	125	0	486	6	2500	
8:00	8:15	0	0	28	0	0	117	0	441	0	2452	
8:15	8:30	0	0	24	0	0	152	0	480	1		
8:30	8:45	0	0	17	0	0	132	0	466	2		
8:45	9:00	0	0	20	0	0	153	0	417	2		
15:00	15:15	0	0	4	0	0	447	0	222	4	2647	
15:15	15:30	0	0	5	0	0	419	0	230	3	2705	
15:30	15:45	0	0	6	0	0	423	0	199	5	2706	
15:45	16:00	0	0	4	0	0	404	0	269	3	2769	
16:00	16:15	0	0	5	0	0	495	0	232	3	2801	
16:15	16:30	0	0	7	0	0	421	0	228	2	2795	
16:30	16:45	0	0	5	0	0	435	0	251	5	2872	Peak
16:45	17:00	0	0	8	0	0	460	0	244	0	2856	
17:00	17:15	0	0	5	0	0	479	0	243	2	2819	
17:15	17:30	0	0	0	0	0	457	0	272	6		
17:30	17:45	0	0	9	0	0	413	0	257	1		
17:45	18:00	0	0	4	0	0	422	0	247	2		

Peak Time		North Approach Edith St			East Approach Princes Hwy			West Approach Princes Hwy			Peak
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	total
7:30	8:30	0	0	99	0	0	516	0	1938	7	2560
16:30	17:30	0	0	18	0	0	1831	0	1010	13	2872

Graphic



ANNEXURE B: TRAFFIC SURVEYS (Sheet 3 of 6)

TURNING MOVEMENT SURVEY

Mary St and Robert Ln, St Peters
Thursday, 12 February 2015

Weather:	Overcast
Suburban:	St Peters
Customer:	McLaren

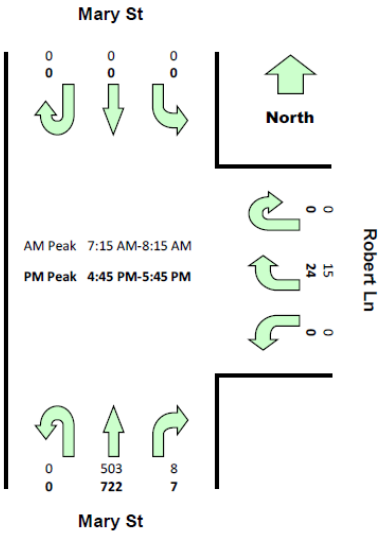
Survey Start	
AM:	7:00
PM:	15:00

Peakhour	
AM:	7:15 AM-8:15 AM
PM:	4:45 PM-5:45 PM

Time		North Approach Mary St			East Approach Robert Ln			South Approach Mary St			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
7:00	7:15	0	0	0	0	3	0	0	1	96	499	
7:15	7:30	0	0	0	0	4	0	0	2	133	526	Peak
7:30	7:45	0	0	0	0	5	0	0	2	114	490	
7:45	8:00	0	0	0	0	3	0	0	3	133	508	
8:00	8:15	0	0	0	0	3	0	0	1	123	487	
8:15	8:30	0	0	0	0	4	0	0	0	99		
8:30	8:45	0	0	0	0	3	0	0	1	135		
8:45	9:00	0	0	0	0	3	0	0	1	114		
15:00	15:15	0	0	0	0	4	0	0	2	166	695	
15:15	15:30	0	0	0	0	7	0	0	0	201	680	
15:30	15:45	0	0	0	0	5	0	0	2	147	636	
15:45	16:00	0	0	0	0	8	0	0	1	152	641	
16:00	16:15	0	0	0	0	2	0	0	4	151	660	
16:15	16:30	0	0	0	0	9	0	0	0	155	689	
16:30	16:45	0	0	0	0	7	0	0	1	151	703	
16:45	17:00	0	0	0	0	9	0	0	3	168	753	Peak
17:00	17:15	0	0	0	0	9	0	0	2	175	750	
17:15	17:30	0	0	0	0	2	0	0	1	175		
17:30	17:45	0	0	0	0	4	0	0	1	204		
17:45	18:00	0	0	0	0	2	0	0	3	172		

Peak Time		North Approach Mary St			East Approach Robert Ln			South Approach Mary St			Peak
Period Start	Period End	U	T	L	U	R	L	U	R	T	total
7:15	8:15	0	0	0	0	15	0	0	8	503	526
16:45	17:45	0	0	0	0	24	0	0	7	722	753

Graphic



ANNEXURE B: TRAFFIC SURVEYS (Sheet 4 of 6)

BVY TRAFFIC SURVEY ABN 18 434 555 435
3 Hepburn Way * Caroline Springs * Victoria * 3023 * Australia
Quality data services proven since 2000 Phone: 1300 883 936 * Fax: 1300 882 932

QUALITY ENDORSED COMPANY BY AS/NZS ISO 9001:2008
OH&S SYSTEM CERTIFIED TO AS/NZS ISO 4801:2001

TURNING MOVEMENT SURVEY
Edith St and Robert St, St Peters
Thursday, 12 February 2015

Weather:	Overcast
Suburban:	St Peters
Customer:	McLaren

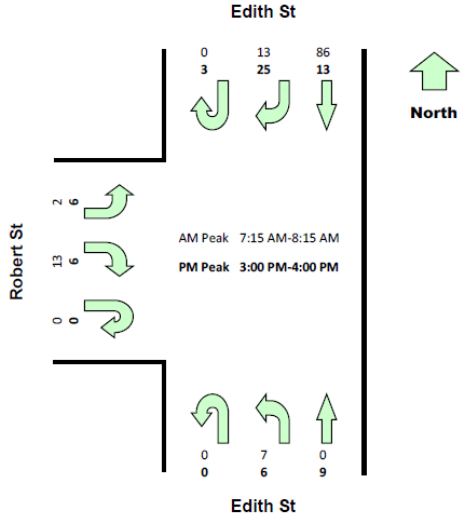
Survey Start	
AM:	7:00
PM:	15:00

Peakhour	
AM:	7:15 AM-8:15 AM
PM:	3:00 PM-4:00 PM

Time		North Approach Edith St			South Approach Edith St			West Approach Robert St			Hourly Total	
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Hour	Peak
7:00	7:15	0	1	5	0	1	1	0	0	0	98	
7:15	7:30	0	5	20	0	0	1	0	4	1	121	Peak
7:30	7:45	0	2	20	0	0	0	0	4	0	119	
7:45	8:00	0	3	20	0	0	6	0	3	1	115	
8:00	8:15	0	3	26	0	0	0	0	2	0	109	
8:15	8:30	0	4	22	0	0	1	0	2	0		
8:30	8:45	0	3	13	0	1	1	0	4	0		
8:45	9:00	0	4	19	0	2	0	0	1	1		
15:00	15:15	0	6	2	0	1	3	0	2	2	68	Peak
15:15	15:30	2	10	3	0	2	1	0	2	1	61	
15:30	15:45	0	2	4	0	3	2	0	2	2	56	
15:45	16:00	1	7	4	0	3	0	0	0	1	58	
16:00	16:15	0	1	3	0	3	0	0	2	0	60	
16:15	16:30	0	7	4	0	2	0	0	3	0	65	
16:30	16:45	0	5	4	0	3	2	0	1	2	60	
16:45	17:00	0	9	5	0	0	0	0	3	1	59	
17:00	17:15	0	7	3	0	0	2	0	2	0	51	
17:15	17:30	0	2	0	0	5	1	0	0	3		
17:30	17:45	0	5	9	0	1	0	0	0	1		
17:45	18:00	0	3	2	0	2	0	0	2	1		

Peak Time		North Approach Edith St			South Approach Edith St			West Approach Robert St			Peak total
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	
7:15	8:15	0	13	86	0	0	7	0	13	2	121
15:00	16:00	3	25	13	0	9	6	0	6	6	68

Graphic



ANNEXURE B: TRAFFIC SURVEYS (Sheet 5 of 6)

BVY TRAFFIC SURVEY
ABN 18 434 565 435
3 Hepburn Way * Caroline Springs * Victoria * 3023 * Australia
Quality data services proven since 2000
Phone: 1300 883 936 * Fax: 1300 882 932

QUALITY ENDORSED COMPANY BY AS/NZS ISO 9001:2008
OH&S SYSTEM CERTIFIED TO AS/NZS ISO 4801:2001

TURNING MOVEMENT SURVEY

Mary St and Unwins Bridge Rd, St Peters
Thursday, 12 February 2015

Weather:	Overcast
Suburban:	St Peters
Customer:	McLaren

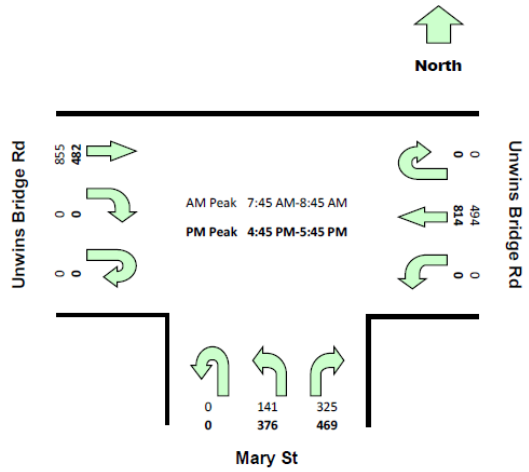
Survey Start	
AM:	7:00
PM:	15:00

Peakhour	
AM:	7:45 AM-8:45 AM
PM:	4:45 PM-5:45 PM

Time		East Approach Unwins Bridge R			South Approach Mary St			West Approach Unwins Bridge R			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
7:00	7:15	0	82	0	0	67	20	0	0	171	1713	
7:15	7:30	0	116	0	0	73	28	0	0	243	1814	
7:30	7:45	0	99	0	0	82	39	0	0	215	1788	
7:45	8:00	0	123	0	0	94	45	0	0	216	1815	Peak
8:00	8:15	0	125	0	0	80	31	0	0	205	1768	
8:15	8:30	0	121	0	0	77	30	0	0	206		
8:30	8:45	0	125	0	0	74	35	0	0	228		
8:45	9:00	0	118	0	0	80	28	0	0	205		
15:00	15:15	0	157	0	0	74	49	0	0	94	1839	
15:15	15:30	0	230	0	0	75	63	0	0	138	1953	
15:30	15:45	0	205	0	0	92	64	0	0	135	1961	
15:45	16:00	0	202	0	0	93	46	0	0	122	1957	
16:00	16:15	0	227	0	0	78	68	0	0	115	2008	
16:15	16:30	0	194	0	0	131	84	0	0	105	2075	
16:30	16:45	0	201	0	0	80	85	0	0	126	2104	
16:45	17:00	0	209	0	0	95	92	0	0	118	2141	Peak
17:00	17:15	0	214	0	0	132	96	0	0	113	2107	
17:15	17:30	0	205	0	0	107	98	0	0	133		
17:30	17:45	0	186	0	0	135	90	0	0	118		
17:45	18:00	0	185	0	0	106	73	0	0	116		

Peak Time		East Approach Unwins Bridge R			South Approach Mary St			West Approach Unwins Bridge R			Peak total
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	
7:45	8:45	0	494	0	0	325	141	0	0	855	1815
16:45	17:45	0	814	0	0	469	376	0	0	482	2141

Graphic



ANNEXURE B: TRAFFIC SURVEYS (Sheet 6 of 6)

BVY TRAFFIC SURVEY
ABN 18 434 955 435
3 Hepburn Way * Caroline Springs * Victoria * 3023 * Australia
Quality data services proven since 2000
Phone: 1300 883 936 * Fax: 1300 882 932

QUALITY ENDORSED COMPANY BY AS/NZS ISO 9001:2008
OH&S SYSTEM CERTIFIED TO AS/NZS ISO 4801:2001

TURNING MOVEMENT SURVEY

Edith St and Unwins Bridge Rd, St Peters
Thursday, 12 February 2015

Weather:	Overcast
Suburban:	St Peters
Customer:	McLaren

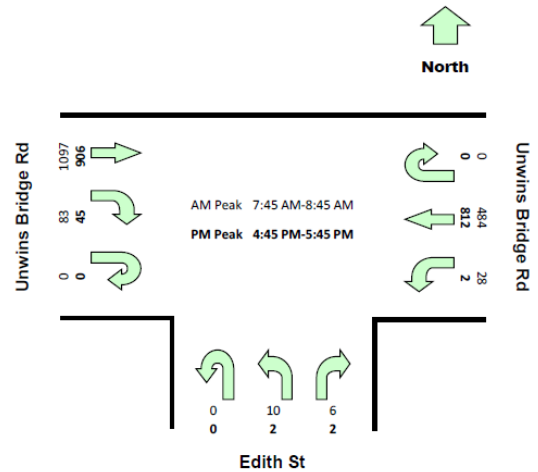
Survey Start	
AM:	7:00
PM:	15:00

Peakhour	
AM:	7:45 AM-8:45 AM
PM:	4:45 PM-5:45 PM

Time		East Approach Unwins Bridge Rd			South Approach Edith St			West Approach Unwins Bridge Rd			Hourly Total	
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	Hour	Peak
7:00	7:15	0	82	4	0	1	0	0	5	233	1611	
7:15	7:30	0	116	12	0	0	0	0	29	287	1706	
7:30	7:45	0	98	5	0	1	1	1	19	278	1677	
7:45	8:00	0	122	6	0	0	1	0	18	292	1708	Peak
8:00	8:15	0	122	7	0	3	3	0	26	259	1681	
8:15	8:30	0	119	10	0	1	2	0	26	257		
8:30	8:45	0	121	5	0	2	4	0	13	289		
8:45	9:00	0	116	8	0	1	2	0	9	276		
15:00	15:15	0	156	4	0	0	1	0	11	157	1634	
15:15	15:30	0	230	4	0	1	0	0	16	197	1728	
15:30	15:45	0	204	4	0	1	1	0	14	213	1713	
15:45	16:00	0	200	3	0	0	2	0	13	202	1685	
16:00	16:15	0	227	2	0	1	0	0	14	179	1689	
16:15	16:30	0	193	2	0	1	1	0	12	224	1726	
16:30	16:45	0	199	1	0	1	2	0	12	194	1738	
16:45	17:00	0	209	1	0	1	0	0	12	201	1769	Peak
17:00	17:15	0	213	1	0	0	1	0	12	233	1752	
17:15	17:30	0	204	0	0	0	1	0	11	229		
17:30	17:45	0	186	0	0	1	0	0	10	243		
17:45	18:00	0	185	0	0	0	0	0	10	212		

Peak Time		East Approach Unwins Bridge Rd			South Approach Edith St			West Approach Unwins Bridge Rd			Peak total
Period Start	Period End	U	WB	L	U	R	L	U	R	EB	
7:45	8:45	0	484	28	0	6	10	0	83	1097	1708
16:45	17:45	0	812	2	0	2	2	0	45	906	1769

Graphic



ANNEXURE C: EXISTING SIDRA ANALYSIS (Sheet 1 of 10)

Existing AM

MOVEMENT SUMMARY

Site: Princes Hwy & Canal Rd- AM EX

Princes Hwy & Canal Rd
AM Peak
Existing Conditions
Signals - Fixed Time Cycle Time = 125 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Canal Rd											
21	L	467	31.5	0.212	15.1	LOS B	4.5	39.8	0.34	0.74	43.3
22	T	322	1.9	0.813	63.2	LOS E	12.9	91.9	1.00	0.93	21.0
23	R	71	9.9	0.813	72.0	LOS F	12.5	90.8	1.00	0.93	20.7
Approach		860	18.6	0.813	37.8	LOS C	12.9	91.9	0.64	0.82	29.1
North East: Princes Hwy (N)											
24	L	54	24.1	0.848	71.4	LOS F	16.8	137.2	1.00	0.99	21.0
25	T	462	17.7	0.848	62.3	LOS E	17.2	138.5	1.00	0.99	21.3
Approach		516	18.4	0.848	63.2	LOS E	17.2	138.5	1.00	0.99	21.2
South West: Princes Hwy (S)											
30	L	99	0.0	0.665	15.0	LOS B	27.2	194.7	0.51	0.98	44.1
31	T	1874	2.9	0.665	6.8	LOS A	27.3	195.8	0.51	0.47	48.4
32	R	1746	3.9	0.936	49.6	LOS D	66.2	478.5	0.95	0.97	25.5
Approach		3719	3.3	0.936	27.1	LOS B	66.2	478.5	0.72	0.72	33.9
All Vehicles		5095	7.4	0.936	32.6	LOS C	66.2	478.5	0.73	0.77	31.2

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue Pedestrian	Average Back of Queue Distance	Prop. Queued	Effective Stop Rate
		ped/h	sec		ped	m		per ped
P9	Across SE approach	53	56.6	LOS E	0.2	0.2	0.95	0.95
P11	Across NE approach	53	56.6	LOS E	0.2	0.2	0.95	0.95
P13	Across NW approach	53	46.7	LOS E	0.2	0.2	0.86	0.86
All Pedestrians		159	53.3	LOS E			0.92	0.92

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.

Processed: Thursday, 26 February 2015 10:23:10 AM
SIDRA INTERSECTION 5.1.13.2093

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ANNEXURE C: EXISTING SIDRA ANALYSIS (Sheet 2 of 10)

Existing PM

MOVEMENT SUMMARY

Site: Princes Hwy & Canal Rd- PM EX

Princes Hwy & Canal Rd
PM Peak
Existing Conditions
Signals - Fixed Time Cycle Time = 145 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Canal Rd											
21	L	1304	4.0	0.595	26.8	LOS B	27.8	201.3	0.67	0.83	34.6
22	T	543	0.7	0.997	110.2	LOS F	32.2	226.7	1.00	1.22	14.5
23	R	117	2.6	0.997	118.6	LOS F	31.5	223.4	1.00	1.22	14.3
Approach		1964	3.0	0.997	55.3	LOS D	32.2	226.7	0.78	0.96	23.5
North East: Princes Hwy (N)											
24	L	88	2.3	1.014	119.9	LOS F	61.6	439.3	1.00	1.27	14.3
25	T	1721	2.3	1.014	111.5	LOS F	62.0	442.2	1.00	1.28	14.4
Approach		1809	2.3	1.014	111.9	LOS F	62.0	442.2	1.00	1.28	14.4
South West: Princes Hwy (S)											
30	L	98	0.0	0.352	14.9	LOS B	11.9	84.4	0.37	0.94	43.6
31	T	908	1.8	0.352	6.7	LOS A	12.0	85.3	0.37	0.34	49.0
32	R	722	5.7	1.029	125.6	LOS F	78.1	573.5	1.00	1.16	13.5
Approach		1728	3.3	1.029	56.9	LOS E	78.1	573.5	0.64	0.71	23.3
All Vehicles		5501	2.9	1.029	74.4	LOS F	78.1	573.5	0.81	0.99	19.4

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P9	Across SE approach	53	46.4	LOS E	0.2	0.2	0.80	0.80
P11	Across NE approach	53	61.0	LOS F	0.2	0.2	0.92	0.92
P13	Across NW approach	53	38.0	LOS D	0.2	0.2	0.72	0.72
All Pedestrians		159	48.5	LOS E			0.81	0.81

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.

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ANNEXURE C: EXISTING SIDRA ANALYSIS (Sheet 3 of 10)

Existing AM

MOVEMENT SUMMARY

Site: Princes Hwy & Edith St-AM EX

Princes Hwy & Edith St
AM Peak
Existing Conditions
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
North West: Edith St											
27	L	99	2.0	0.054	8.3	LOS A	0.0	0.0	0.00	0.67	49.0
Approach		99	2.0	0.054	8.3	LOS A	0.0	0.0	0.00	0.67	49.0
South West: Princes Hwy (S)											
30	L	7	0.0	0.509	8.2	LOS A	0.0	0.0	0.00	0.72	49.0
31	T	1938	3.2	0.509	7.1	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1945	3.2	0.509	7.1	LOS A	0.0	0.0	0.00	0.59	50.4
All Vehicles		2044	3.1	0.509	7.1	NA	0.0	0.0	0.00	0.59	50.3

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Existing PM

MOVEMENT SUMMARY

Site: Princes Hwy & Edith St-PM EX

Princes Hwy & Edith St
PM Peak
Existing Conditions
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
North West: Edith St											
27	L	18	0.0	0.010	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
Approach		18	0.0	0.010	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
South West: Princes Hwy (S)											
30	L	13	0.0	0.266	8.2	LOS A	0.0	0.0	0.00	0.72	49.0
31	T	1010	2.3	0.266	7.0	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1023	2.2	0.266	7.0	LOS A	0.0	0.0	0.00	0.59	50.3
All Vehicles		1041	2.2	0.266	7.1	NA	0.0	0.0	0.00	0.59	50.3

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

ANNEXURE C: EXISTING SIDRA ANALYSIS (Sheet 4 of 10)

Existing AM

MOVEMENT SUMMARY

Site: Mary St & Roberts Ln-AM EX

Mary Street & Roberts Lane
AM Peak
Existing Conditions
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Mary St (E)											
22	T	503	4.4	0.270	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
23	R	8	0.0	0.270	8.9	LOS A	0.0	0.0	0.00	1.32	48.1
Approach		511	4.3	0.270	0.1	NA	0.0	0.0	0.00	0.02	59.8
North East: Roberts L											
26	R	15	0.0	0.042	16.4	LOS B	0.1	1.0	0.61	0.85	41.2
Approach		15	0.0	0.042	16.4	LOS B	0.1	1.0	0.61	0.85	41.2
All Vehicles		526	4.2	0.270	0.6	NA	0.1	1.0	0.02	0.04	59.0

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Existing PM

MOVEMENT SUMMARY

Site: Mary St & Roberts Ln-PM EX

Mary Street & Roberts Lane
PM Peak
Existing Conditions
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Mary St (E)											
22	T	722	0.8	0.376	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
23	R	7	0.0	0.376	8.9	LOS A	0.0	0.0	0.00	1.33	48.1
Approach		729	0.8	0.376	0.1	NA	0.0	0.0	0.00	0.01	59.9
North East: Roberts L											
26	R	24	0.0	0.118	25.4	LOS B	0.4	2.7	0.80	0.94	35.2
Approach		24	0.0	0.118	25.4	LOS B	0.4	2.7	0.80	0.94	35.2
All Vehicles		753	0.8	0.376	0.9	NA	0.4	2.7	0.03	0.04	58.6

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

ANNEXURE C: EXISTING SIDRA ANALYSIS (Sheet 5 of 10)

Existing AM

MOVEMENT SUMMARY

Site: Edith St & Roberts St-AM EX

Edith St & Roberts St
AM Peak
Existing Conditions
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Edith St (E)											
21	L	7	0.0	0.004	6.4	LOS A	0.0	0.0	0.00	0.62	43.3
22	T	1	0.0	0.004	5.1	LOS A	0.0	0.0	0.00	0.48	44.5
Approach		8	0.0	0.004	6.3	LOS A	0.0	0.0	0.00	0.60	43.4
North West: Edith St (W)											
28	T	86	1.2	0.059	5.2	LOS A	0.4	3.1	0.08	0.47	44.1
29	R	13	0.0	0.059	6.8	LOS A	0.4	3.1	0.08	0.70	42.8
Approach		99	1.0	0.059	5.4	LOS A	0.4	3.1	0.08	0.50	44.0
South West: Roberts St											
30	L	2	0.0	0.008	6.4	LOS A	0.0	0.0	0.00	0.58	43.3
32	R	13	0.0	0.008	6.8	LOS A	0.0	0.0	0.00	0.66	43.0
Approach		15	0.0	0.008	6.7	LOS A	0.0	0.0	0.00	0.65	43.0
All Vehicles		122	0.8	0.059	5.6	NA	0.4	3.1	0.06	0.52	43.8

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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ANNEXURE C: EXISTING SIDRA ANALYSIS (Sheet 6 of 10)

Existing PM

MOVEMENT SUMMARY

Site: Edith St & Roberts St-PM EX

Edith St & Roberts St
PM Peak
Existing Conditions
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Edith St (E)											
21	L	6	0.0	0.008	6.4	LOS A	0.0	0.0	0.00	0.65	43.3
22	T	9	11.1	0.008	5.4	LOS A	0.0	0.0	0.00	0.50	44.5
Approach		15	6.7	0.008	5.8	LOS A	0.0	0.0	0.00	0.56	44.0
North West: Edith St (W)											
28	T	13	0.0	0.035	5.3	LOS A	0.2	1.2	0.10	0.43	44.0
29	R	25	0.0	0.035	6.9	LOS A	0.2	1.2	0.10	0.64	42.7
Approach		38	0.0	0.035	6.3	LOS A	0.2	1.2	0.10	0.57	43.1
South West: Roberts St											
30	L	6	0.0	0.006	6.4	LOS A	0.0	0.0	0.00	0.59	43.3
32	R	6	0.0	0.006	6.8	LOS A	0.0	0.0	0.00	0.67	43.0
Approach		12	0.0	0.006	6.6	LOS A	0.0	0.0	0.00	0.63	43.1
All Vehicles		65	1.5	0.035	6.3	NA	0.2	1.2	0.06	0.58	43.3

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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ANNEXURE C: EXISTING SIDRA ANALYSIS (Sheet 7 of 10)

Existing AM

MOVEMENT SUMMARY

Site: Unwins Br Rd & Mary St-AM EX

Unwins Bridge Road & Mary Street
AM Peak
Existing Conditions
Signals - Fixed Time Cycle Time = 40 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Mary St											
21	L	141	2.1	0.343	23.2	LOS B	2.5	17.5	0.88	0.78	36.7
23	R	325	1.2	0.785	28.3	LOS B	7.1	50.3	1.00	0.95	33.7
Approach		466	1.5	0.785	26.7	LOS B	7.1	50.3	0.96	0.90	34.5
North East: Unwins Br Rd (N)											
25	T	494	5.9	0.521	8.0	LOS A	6.5	48.1	0.73	0.63	46.4
Approach		494	5.9	0.521	8.0	LOS A	6.5	48.1	0.73	0.63	46.4
South West: Unwins Br Rd (S)											
31	T	855	4.2	0.752	10.6	LOS A	12.4	89.8	0.82	0.78	43.7
Approach		855	4.2	0.752	10.6	LOS A	12.4	89.8	0.82	0.78	43.7
All Vehicles		1815	4.0	0.785	14.0	LOS A	12.4	89.8	0.83	0.77	41.6

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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ANNEXURE C: EXISTING SIDRA ANALYSIS (Sheet 8 of 10)

Existing PM

MOVEMENT SUMMARY

Site: Unwins Br Rd & Mary St-PM EX

Unwins Bridge Road & Mary Street
PM Peak
Existing Conditions
Signals - Fixed Time Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Mary St											
21	L	376	0.0	0.718	29.6	LOS C	11.8	82.4	0.94	0.88	33.0
23	R	469	0.0	0.718	29.8	LOS C	11.8	82.4	0.94	0.88	32.9
Approach		845	0.0	0.718	29.7	LOS C	11.8	82.4	0.94	0.88	32.9
North East: Unwins Br Rd (N)											
25	T	814	1.0	0.713	14.2	LOS A	15.9	112.2	0.82	0.74	40.8
Approach		814	1.0	0.713	14.2	LOS A	15.9	112.2	0.82	0.74	40.8
South West: Unwins Br Rd (S)											
31	T	482	1.0	0.257	9.9	LOS A	4.2	29.6	0.63	0.53	45.0
Approach		482	1.0	0.257	9.9	LOS A	4.2	29.6	0.63	0.53	45.0
All Vehicles		2141	0.6	0.718	19.4	LOS B	15.9	112.2	0.82	0.75	38.0

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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ANNEXURE C: EXISTING SIDRA ANALYSIS (Sheet 9 of 10)

Existing AM

MOVEMENT SUMMARY

Site: Unwins Br Rd & Edith St-AM EX

Unwins Bridge Road & Edith Street
AM Peak
Existing Conditions
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Edith St											
21	L	10	0.0	0.056	19.0	LOS B	0.2	1.3	0.66	0.74	39.3
23	R	6	16.7	0.056	19.8	LOS B	0.2	1.3	0.66	0.89	39.3
Approach		16	6.3	0.056	19.3	LOS B	0.2	1.3	0.66	0.80	39.3
North East: Unwins Br Rd (N)											
24	L	28	3.6	0.051	8.3	LOS A	0.0	0.0	0.00	0.91	49.0
25	T	484	6.0	0.223	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		512	5.9	0.223	0.5	NA	0.0	0.0	0.00	0.05	59.3
South West: Unwins Br Rd (S)											
31	T	1097	3.6	0.344	1.7	LOS A	3.6	25.9	0.24	0.00	55.3
32	R	83	1.2	0.344	12.6	LOS A	3.6	25.9	0.59	1.00	46.7
Approach		1180	3.4	0.344	2.5	NA	3.6	25.9	0.26	0.07	54.6
All Vehicles		1708	4.2	0.344	2.0	NA	3.6	25.9	0.19	0.07	55.7

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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ANNEXURE C: EXISTING SIDRA ANALYSIS (Sheet 10 of 10)

Existing PM

MOVEMENT SUMMARY

Site: Unwins Br Rd & Edith St-PM EX

Unwins Bridge Road & Edith Street
PM Peak
Existing Conditions
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Edith St											
21	L	2	0.0	0.016	20.3	LOS B	0.0	0.3	0.76	0.78	38.4
23	R	2	0.0	0.016	20.5	LOS B	0.0	0.3	0.76	0.92	38.4
Approach		4	0.0	0.016	20.4	LOS B	0.0	0.3	0.76	0.85	38.4
North East: Unwins Br Rd (N)											
24	L	2	0.0	0.078	8.2	LOS A	0.0	0.0	0.00	1.08	49.0
25	T	812	1.0	0.343	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		814	1.0	0.343	0.0	NA	0.0	0.0	0.00	0.00	60.0
South West: Unwins Br Rd (S)											
31	T	906	0.6	0.466	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
32	R	45	0.0	0.082	13.0	LOS A	0.2	1.7	0.56	0.83	44.1
Approach		951	0.5	0.466	0.6	NA	0.2	1.7	0.03	0.04	59.0
All Vehicles		1769	0.7	0.466	0.4	NA	0.2	1.7	0.02	0.02	59.4

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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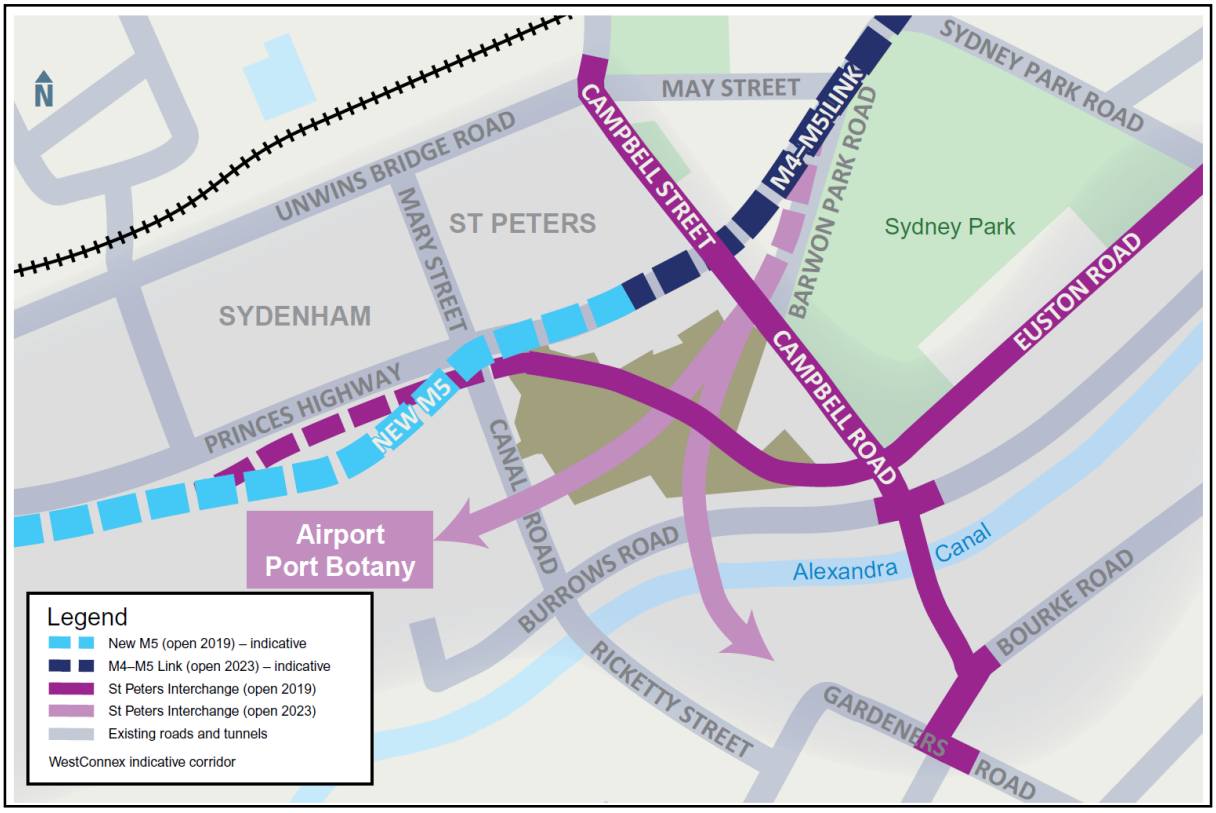
ANNEXURE D: WESTCONNEX



ANNEXURE E: 2011 JOURNEY TO WORK

Destination Standard Area 3s (SA3s) - where employed residents are travelling to																					
Destinatic	Destinatic	Train	Bus	Ferry/Trar	Vehicle dr	Vehicle pa	Other mo	Walked or	Mode not	Worked at	Total		Direction Out	Direction In		Outbound	Inbound	Car Drivers	Total W.F	Car %	% split
Maitland	10602	0	0	0	3	0	0	0	0	0	3		Right out Unwin	Left in Edith U		Right out Unwin	Left in Edith U	179	330	0.54	0.26
Wollongo	10704	0	0	0	5	0	0	0	0	0	5		Left out Unwin	Left in Edith P		Left out Unwin	Left in Edith P	148	197	0.75	0.22
Baulkham	11501	0	0	0	5	0	0	0	0	3	8		Left out Unwin	Right in Edith U		Left out Unwin	Right in Edith U	147	371	0.40	0.22
Botany	11701	0	7	0	41	3	10	3	3	5	72		right out Unwin	Through Canal		right out Unwin	Through Canal	44	72	0.61	0.06
Marrickvil	11702	11	3	0	77	3	14	43	3	86	240		Left out Unwin	Right in Edith U		Left out Unwin	left in Edith U	163	753	0.22	0.24
Sydney In	11703	339	64	0	148	15	45	58	7	77	753		Left out Unwin	left in Edith U				681	1723		1
Eastern Su	11801	12	5	0	19	3	3	0	0	4	46		Right out Unwin	Left in Edith U							
Eastern Su	11802	0	4	0	26	6	3	0	0	3	42		Right out Unwin	Left in Edith U		Outbound	Inbound	Split			
Bankstow	11901	6	0	0	14	0	0	0	0	3	23		Right out Unwin	Left in Edith U		Right out Unwin		0.33			
Canterbur	11902	0	0	0	13	4	0	0	0	0	17		Left out Unwin	Left in Edith P		Left out Unwin		0.67			
Hurstville	11903	0	0	0	10	0	0	0	0	3	13		Left out Unwin	Left in Edith P			Left in Edith U		0.5		
Kogarah -	11904	0	0	0	28	0	0	0	0	0	28		Left out Unwin	Left in Edith P			Left in Edith P		0.22		
Canada Ba	12001	0	0	0	9	0	0	0	0	0	9		Right out Unwin	Left in Edith U			Right in Edith U		0.22		
Leichhard	12002	5	0	0	20	0	0	0	0	0	25		Right out Unwin	Left in Edith U			Through Canal		0.06		
Strathfiel	12003	12	0	0	27	3	4	0	0	5	51		Left out Unwin	Right in Edith U							
Chatswoo	12101	27	0	0	19	0	0	0	0	10	56		right out Unwin	Left in Edith U							
Ku-ring-ga	12103	0	0	0	6	0	0	0	0	0	6		right out Unwin	Left in Edith U							
North Syd	12104	48	3	0	23	0	0	0	0	7	81		right out Unwin	Left in Edith U							
Manly	12201	0	0	0	6	0	0	0	0	0	6		right out Unwin	Left in Edith U							
Warringah	12203	0	3	0	8	0	0	0	0	0	11		right out Unwin	Left in Edith U							
Campbellt	12302	0	0	0	6	0	0	0	0	0	6		left out Unwin	Left in Edith P							
Penrith	12403	0	0	0	11	3	0	0	0	3	17		Left out Unwin	Left in Edith P							
Auburn	12501	14	3	0	22	0	0	0	0	0	39		Left out Unwin	Left in Edith P							
Carlingfor	12502	3	0	0	0	0	0	0	0	0	3		Left out Unwin	Right in Edith U							
Parramatt	12504	28	0	0	7	0	0	0	0	3	38		Left out Unwin	Right in Edith U							
Ryde - Hu	12602	6	0	0	25	0	0	0	0	0	31		Left out Unwin	Right in Edith U							
Fairfield	12702	0	0	0	4	0	0	0	0	0	4		right out Unwin	Left in Edith U							
Liverpool	12703	0	0	0	13	0	0	0	0	5	18		right out Unwin	Left in Edith U							
Cronulla -	12801	0	0	0	12	0	0	0	0	0	12		left out Unwin	Left in Edith P							
Sutherlan	12802	0	0	0	6	0	0	0	0	0	6		left out Unwin	Left in Edith P							
	19499	4	3	0	25	3	4	6	0	9	54		left out Unwin	Left in Edith P							
Total		515	95	0	638	43	83	110	13	226	1723										

ANNEXURE F: FUTURE SIDRA ANALYSIS (Sheet 1 of 10)

Future AM

MOVEMENT SUMMARY

Site: Princes Hwy & Canal Rd- FUTURE AM

Princes Hwy & Canal Rd
AM Peak
Existing Conditions + Development
Signals - Fixed Time Cycle Time = 125 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Canal Rd											
21	L	467	31.5	0.212	15.1	LOS B	4.5	39.8	0.34	0.74	43.3
22	T	326	1.9	0.821	63.7	LOS E	13.1	93.3	1.00	0.94	20.9
23	R	71	9.9	0.821	72.4	LOS F	12.7	92.2	1.00	0.94	20.6
Approach		864	18.5	0.821	38.2	LOS C	13.1	93.3	0.65	0.83	29.0
North East: Princes Hwy (N)											
24	L	54	24.1	0.848	71.4	LOS F	16.8	137.2	1.00	0.99	21.0
25	T	462	17.7	0.848	62.3	LOS E	17.2	138.5	1.00	0.99	21.3
Approach		516	18.4	0.848	63.2	LOS E	17.2	138.5	1.00	0.99	21.2
South West: Princes Hwy (S)											
30	L	99	0.0	0.665	15.0	LOS B	27.2	194.7	0.51	0.98	44.1
31	T	1874	2.9	0.665	6.8	LOS A	27.3	195.8	0.51	0.47	48.4
32	R	1746	3.9	0.936	49.6	LOS D	66.2	478.5	0.95	0.97	25.5
Approach		3719	3.3	0.936	27.1	LOS B	66.2	478.5	0.72	0.72	33.9
All Vehicles		5099	7.4	0.936	32.7	LOS C	66.2	478.5	0.73	0.77	31.2

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P9	Across SE approach	53	56.6	LOS E	0.2	0.2	0.95	0.95
P11	Across NE approach	53	56.6	LOS E	0.2	0.2	0.95	0.95
P13	Across NW approach	53	46.7	LOS E	0.2	0.2	0.86	0.86
All Pedestrians		159	53.3	LOS E			0.92	0.92

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.

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ANNEXURE F: FUTURE SIDRA ANALYSIS (Sheet 2 of 10)

Future PM

MOVEMENT SUMMARY

Site: Princes Hwy & Canal Rd- FUTURE PM

Princes Hwy & Canal Rd
PM Peak
Existing Conditions + Development
Signals - Fixed Time Cycle Time = 145 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Canal Rd											
21	L	1304	4.0	0.595	26.8	LOS B	27.8	201.3	0.67	0.83	34.6
22	T	545	0.7	1.000	111.8	LOS F	32.5	229.1	1.00	1.23	14.3
23	R	117	2.6	1.000	120.3	LOS F	31.9	225.7	1.00	1.23	14.2
Approach		1966	3.0	1.000	55.9	LOS D	32.5	229.1	0.78	0.97	23.4
North East: Princes Hwy (N)											
24	L	88	2.3	1.014	119.9	LOS F	61.6	439.3	1.00	1.27	14.3
25	T	1721	2.3	1.014	111.5	LOS F	62.0	442.2	1.00	1.28	14.4
Approach		1809	2.3	1.014	111.9	LOS F	62.0	442.2	1.00	1.28	14.4
South West: Princes Hwy (S)											
30	L	98	0.0	0.352	14.9	LOS B	11.9	84.4	0.37	0.94	43.6
31	T	908	1.8	0.352	6.7	LOS A	12.0	85.3	0.37	0.34	49.0
32	R	722	5.7	1.029	125.6	LOS F	78.1	573.5	1.00	1.16	13.5
Approach		1728	3.3	1.029	56.9	LOS E	78.1	573.5	0.64	0.71	23.3
All Vehicles		5503	2.9	1.029	74.6	LOS F	78.1	573.5	0.81	0.99	19.4

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate
					Pedestrian	Distance		
		ped/h	sec		ped	m		per ped
P9	Across SE approach	53	46.4	LOS E	0.2	0.2	0.80	0.80
P11	Across NE approach	53	61.0	LOS F	0.2	0.2	0.92	0.92
P13	Across NW approach	53	38.0	LOS D	0.2	0.2	0.72	0.72
All Pedestrians		159	48.5	LOS E			0.81	0.81

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.

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SIDRA INTERSECTION

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ANNEXURE F: FUTURE SIDRA ANALYSIS (Sheet 3 of 10)

Future AM

MOVEMENT SUMMARY

Site: Princes Hwy & Edith St- FUTURE AM

Princes Hwy & Edith St
AM Peak
Existing Conditions + Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
North West: Edith St											
27	L	99	2.0	0.054	8.3	LOS A	0.0	0.0	0.00	0.67	49.0
Approach		99	2.0	0.054	8.3	LOS A	0.0	0.0	0.00	0.67	49.0
South West: Princes Hwy (S)											
30	L	21	0.0	0.513	8.2	LOS A	0.0	0.0	0.00	0.72	49.0
31	T	1938	3.2	0.513	7.1	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1959	3.2	0.513	7.1	LOS A	0.0	0.0	0.00	0.59	50.3
All Vehicles		2058	3.1	0.513	7.1	NA	0.0	0.0	0.00	0.60	50.3

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Future PM

MOVEMENT SUMMARY

Site: Princes Hwy & Edith St- FUTURE PM

Princes Hwy & Edith St
PM Peak
Existing Conditions + Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
North West: Edith St											
27	L	18	0.0	0.010	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
Approach		18	0.0	0.010	8.2	LOS A	0.0	0.0	0.00	0.67	49.0
South West: Princes Hwy (S)											
30	L	17	0.0	0.267	8.2	LOS A	0.0	0.0	0.00	0.72	49.0
31	T	1010	2.3	0.267	7.0	LOS A	0.0	0.0	0.00	0.59	50.4
Approach		1027	2.2	0.267	7.0	LOS A	0.0	0.0	0.00	0.59	50.3
All Vehicles		1045	2.2	0.267	7.1	NA	0.0	0.0	0.00	0.59	50.3

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

ANNEXURE F: FUTURE SIDRA ANALYSIS (Sheet 4 of 10)

Future AM

MOVEMENT SUMMARY

Site: Mary St & Roberts Ln- FUTURE AM

Mary Street & Roberts Lane
AM Peak
Existing Conditions + Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Mary St (E)											
22	T	503	4.4	0.272	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
23	R	12	0.0	0.272	8.9	LOS A	0.0	0.0	0.00	1.31	48.1
Approach		515	4.3	0.272	0.2	NA	0.0	0.0	0.00	0.03	59.7
North East: Roberts L											
26	R	15	0.0	0.042	16.6	LOS B	0.1	1.0	0.62	0.85	41.1
Approach		15	0.0	0.042	16.6	LOS B	0.1	1.0	0.62	0.85	41.1
All Vehicles		530	4.2	0.272	0.7	NA	0.1	1.0	0.02	0.05	58.9

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Future PM

MOVEMENT SUMMARY

Site: Mary St & Roberts Ln- FUTURE PM

Mary Street & Roberts Lane
PM Peak
Existing Conditions + Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Mary St (E)											
22	T	722	0.8	0.377	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
23	R	9	0.0	0.377	8.9	LOS A	0.0	0.0	0.00	1.32	48.1
Approach		731	0.8	0.377	0.1	NA	0.0	0.0	0.00	0.02	59.8
North East: Roberts L											
26	R	24	0.0	0.119	25.5	LOS B	0.4	2.7	0.80	0.94	35.1
Approach		24	0.0	0.119	25.5	LOS B	0.4	2.7	0.80	0.94	35.1
All Vehicles		755	0.8	0.377	0.9	NA	0.4	2.7	0.03	0.05	58.5

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

ANNEXURE F: FUTURE SIDRA ANALYSIS (Sheet 5 of 10)

Future AM

MOVEMENT SUMMARY

Site: Edith St & Roberts St- FUTURE AM

Edith St & Roberts St
AM Peak
Existing Conditions + Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Edith St (E)											
21	L	7	0.0	0.011	6.4	LOS A	0.0	0.0	0.00	0.79	43.3
22	T	15	0.0	0.011	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		22	0.0	0.011	2.0	NA	0.0	0.0	0.00	0.25	47.6
North West: Edith St (W)											
28	T	86	1.2	0.059	0.2	LOS A	0.5	3.2	0.14	0.00	48.2
29	R	13	0.0	0.059	7.0	LOS A	0.5	3.2	0.14	0.87	42.9
Approach		99	1.0	0.059	1.1	NA	0.5	3.2	0.14	0.11	47.4
South West: Roberts St											
30	L	6	0.0	0.022	7.1	LOS A	0.1	0.6	0.12	0.54	42.6
32	R	13	0.0	0.022	7.5	LOS A	0.1	0.6	0.12	0.64	42.3
Approach		19	0.0	0.022	7.4	LOS A	0.1	0.6	0.12	0.61	42.4
All Vehicles		140	0.7	0.059	2.1	NA	0.5	3.2	0.12	0.20	46.7

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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ANNEXURE F: FUTURE SIDRA ANALYSIS (Sheet 6 of 10)

Future PM

MOVEMENT SUMMARY

Site: Edith St & Roberts St- FUTURE PM

Edith St & Roberts St
PM Peak
Existing Conditions + Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue Vehicles	95% Back of Queue Distance	Prop. Queued	Effective Stop Rate	Average Speed
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Edith St (E)											
21	L	6	0.0	0.010	6.4	LOS A	0.0	0.0	0.00	0.79	43.3
22	T	13	11.1	0.010	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		19	7.6	0.010	2.0	NA	0.0	0.0	0.00	0.25	47.7
North West: Edith St (W)											
28	T	13	0.0	0.035	0.2	LOS A	0.2	1.2	0.11	0.00	48.3
29	R	25	0.0	0.035	7.0	LOS A	0.2	1.2	0.11	0.69	42.7
Approach		38	0.0	0.035	4.6	NA	0.2	1.2	0.11	0.46	44.5
South West: Roberts St											
30	L	8	0.0	0.014	6.6	LOS A	0.1	0.4	0.08	0.56	43.0
32	R	6	0.0	0.014	7.0	LOS A	0.1	0.4	0.08	0.65	42.7
Approach		14	0.0	0.014	6.8	LOS A	0.1	0.4	0.08	0.60	42.9
All Vehicles		71	2.0	0.035	4.4	NA	0.2	1.2	0.08	0.43	45.0

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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ANNEXURE F: FUTURE SIDRA ANALYSIS (Sheet 7 of 10)

Future AM

MOVEMENT SUMMARY

Site: Unwins Br Rd & Mary St- FUTURE AM

Unwins Bridge Road & Mary Street
AM Peak
Existing Conditions + Development
Signals - Fixed Time Cycle Time = 40 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Mary St											
21	L	154	2.1	0.374	23.3	LOS B	2.7	19.3	0.89	0.78	36.6
23	R	332	1.2	0.802	28.9	LOS C	7.4	52.3	1.00	0.97	33.4
Approach		486	1.5	0.802	27.1	LOS B	7.4	52.3	0.96	0.91	34.3
North East: Unwins Br Rd (N)											
25	T	494	5.9	0.521	8.0	LOS A	6.5	48.1	0.73	0.63	46.4
Approach		494	5.9	0.521	8.0	LOS A	6.5	48.1	0.73	0.63	46.4
South West: Unwins Br Rd (S)											
31	T	869	4.2	0.764	11.0	LOS A	12.9	93.4	0.83	0.79	43.4
Approach		869	4.2	0.764	11.0	LOS A	12.9	93.4	0.83	0.79	43.4
All Vehicles		1849	3.9	0.802	14.4	LOS A	12.9	93.4	0.84	0.78	41.3

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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SIDRA INTERSECTION

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ANNEXURE F: FUTURE SIDRA ANALYSIS (Sheet 8 of 10)

Future PM

MOVEMENT SUMMARY

Site: Unwins Br Rd & Mary St- FUTURE PM

Unwins Bridge Road & Mary Street
PM Peak
Existing Conditions + Development
Signals - Fixed Time Cycle Time = 60 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Mary St											
21	L	418	0.0	0.733	29.3	LOS C	12.7	89.0	0.94	0.89	33.1
23	R	490	0.0	0.733	29.6	LOS C	12.7	89.0	0.94	0.89	33.0
Approach		908	0.0	0.733	29.5	LOS C	12.7	89.0	0.94	0.89	33.1
North East: Unwins Br Rd (N)											
25	T	814	1.0	0.738	15.9	LOS B	16.8	118.6	0.84	0.79	39.5
Approach		814	1.0	0.738	15.9	LOS B	16.8	118.6	0.84	0.79	39.5
South West: Unwins Br Rd (S)											
31	T	486	1.0	0.269	10.6	LOS A	4.4	30.8	0.65	0.54	44.3
Approach		486	1.0	0.269	10.6	LOS A	4.4	30.8	0.65	0.54	44.3
All Vehicles		2208	0.6	0.738	20.3	LOS B	16.8	118.6	0.84	0.77	37.4

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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ANNEXURE F: FUTURE SIDRA ANALYSIS (Sheet 9 of 10)

Future AM

MOVEMENT SUMMARY

Site: Unwins Br Rd & Edith St- FUTURE AM

Unwins Bridge Road & Edith Street
AM Peak
Existing Conditions + Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Edith St											
21	L	10	0.0	0.059	19.7	LOS B	0.2	1.4	0.67	0.75	38.8
23	R	6	16.7	0.059	20.4	LOS B	0.2	1.4	0.67	0.90	38.8
Approach		16	6.3	0.059	20.0	LOS B	0.2	1.4	0.67	0.81	38.8
North East: Unwins Br Rd (N)											
24	L	59	3.6	0.054	8.3	LOS A	0.0	0.0	0.00	0.79	49.0
25	T	484	6.0	0.237	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		543	5.7	0.237	0.9	NA	0.0	0.0	0.00	0.09	58.6
South West: Unwins Br Rd (S)											
31	T	1104	3.6	0.357	1.8	LOS A	3.9	27.9	0.24	0.00	55.2
32	R	97	1.2	0.357	13.1	LOS A	3.9	27.9	0.63	1.02	46.2
Approach		1201	3.4	0.357	2.8	NA	3.9	27.9	0.27	0.08	54.3
All Vehicles		1760	4.1	0.357	2.3	NA	3.9	27.9	0.19	0.09	55.4

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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ANNEXURE F: FUTURE SIDRA ANALYSIS (Sheet 10 of 10)

Future PM

MOVEMENT SUMMARY

Site: Unwins Br Rd & Edith St- FUTURE PM

Unwins Bridge Road & Edith Street
PM Peak
Existing Conditions + Development
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow	HV	Deg. Satn	Average Delay	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate	Average Speed
							Vehicles	Distance			
		veh/h	%	v/c	sec		veh	m		per veh	km/h
South East: Edith St											
21	L	2	0.0	0.016	20.8	LOS B	0.1	0.4	0.76	0.79	38.1
23	R	2	0.0	0.016	20.9	LOS B	0.1	0.4	0.76	0.93	38.0
Approach		4	0.0	0.016	20.9	LOS B	0.1	0.4	0.76	0.86	38.1
North East: Unwins Br Rd (N)											
24	L	12	0.0	0.079	8.2	LOS A	0.0	0.0	0.00	1.04	49.0
25	T	812	1.0	0.347	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		824	1.0	0.347	0.1	NA	0.0	0.0	0.00	0.02	59.8
South West: Unwins Br Rd (S)											
31	T	927	0.6	0.477	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
32	R	49	0.0	0.090	13.2	LOS A	0.3	1.9	0.57	0.84	44.0
Approach		976	0.5	0.477	0.7	NA	0.3	1.9	0.03	0.04	58.9
All Vehicles		1804	0.7	0.477	0.5	NA	0.3	1.9	0.02	0.03	59.3

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

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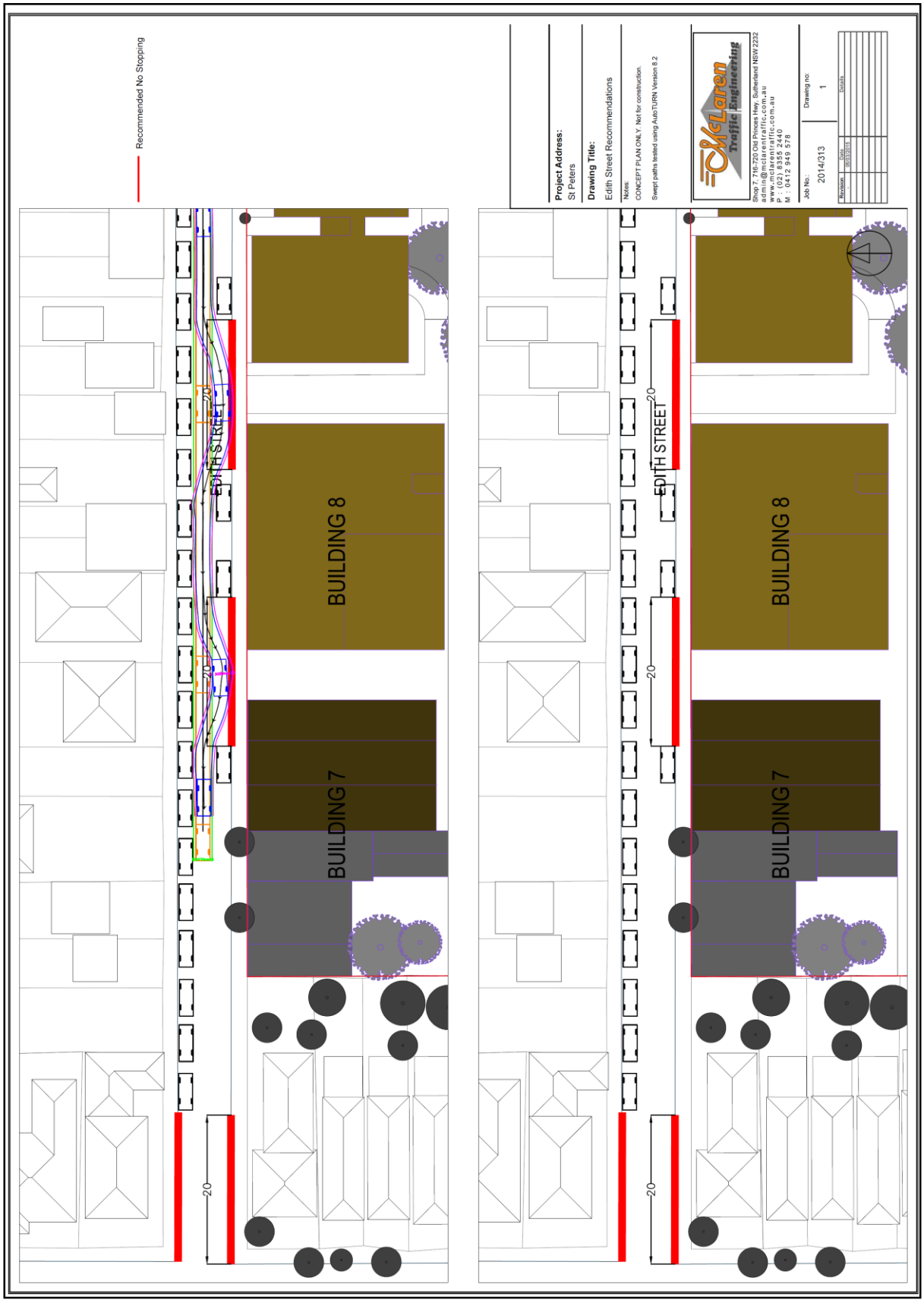
ANNEXURE G: EDITH STREET RECOMMENDATIONS



ANNEXURE H: SITE PHOTOS

Photo 1: Looking towards Unwins Bridge Road from Mary Street

Photo 2: Looking towards Mary Street from Unwins Bridge Road

ANNEXURE H: SITE PHOTOS

Photo 3: Looking towards Unwins Bridge Road from Edith Street

Photo 4: Looking north on Unwins Bridge Road adjacent to Edith Street