Surry Hills Shopping Village Planning Proposal
Traffic and Transport Assessment

Final

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1. Introduction

1.1. Background

TTM Consulting was engaged by Surry Hills Projects Pty Ltd (a Toga Group related entity) to prepare a traffic and transport report investigating a planning proposal for redevelopment of the Surry Hills Shopping Village, Redfern. It is understood that the planning proposal will be lodged with the City of Sydney.

1.2. Scope

This report investigates the transport aspects associated with the planning proposal. It is a preliminary assessment to be used for discussion with authorities for planning infrastructure to be upgraded in the local transport network. The scope of the transport aspects investigated includes:

- Identification of likely traffic volumes and traffic distribution from the proposed development;
- Identification of likely traffic impact of development on the public road network; and
- Access to public transport, pedestrian and cycle networks.

To assess the proposed transport arrangements, the proposed development has been assessed against the following guidelines and planning documents:

- City of Sydney – Sydney Local Environment Plan (LEP) 2012.
- City of Sydney – Sydney Development Control Plan (DCP) 2012.
- City of Sydney – Sydney Streets Code (2013).
- RMS (formerly RTA) Guide to Traffic Generating Developments (2002).

1.3. Site Location

The site is located on the corner of Cleveland Street and Baptist Streets, Redfern. Marriott Street runs along its western boundary (see **Figure 1-1**).

Figure 1-1: Site Location

2. Existing Transport Infrastructure and Traffic Conditions

2.1. Public Transport

The site has excellent access to public transport. Sydney Buses routes operate along Cleveland and Baptist Street stopping outside the site. These routes include:

- Buses stopping on Cleveland Street:
  - Route 355 running between Marrickville Metro and Bondi Junction.
  - Metrobus route M50 running between Drummoyne and Coogee Beach via Sydney CBD.
- Buses stopping on Baptist Street:
  - Route 352 running between Marrickville Metro and Bondi Junction.
  - Routes 301 and 302 running between Eastgardens and Circular Quay.
  - Routes 303 and X03 running between Sans Souci and Circular Quay.

The site is around 800 metres (as the crow flies) from Central Railway Station. It is around 1,000 metres walking distance via the local street network (10 minutes).

The regular bus services along Baptist Street and Cleveland Street make the site an attractive destination for shoppers with limited access to private vehicles.

2.2. Active Transport Network (Pedestrians & Cyclists)

Pedestrian activity is high in the vicinity of the site. Safe signalised crossing points are located along Cleveland Street. There is also a well-defined cycle network as shown in Figure 2-1. Baptist Street and Crown Street have dedicated on street bicycle lanes.

Figure 2-1: Surry Hills Cycle Network[1]

2.2.1. Connectivity for the Surry Hills Site

The Surry Hills Shopping Village is well connected to regional and local bus services. In addition, a taxi rank is available on Baptist Street, outside the building. Two car share spaces are located in the vicinity of the site, one at the south-east corner on Baptist Street and one at the north-west corner on Marriott Street. Provision of these facilities maximises the opportunity for shoppers to travel by modes other than personal car.

The site also has good connectivity for pedestrians from all directions via the local street network and the Marriott Street Reserve.

2.3. The Road Network

The main site frontage is to Cleveland Street. Cleveland Street is a State Road maintained and controlled by the NSW Roads & Maritime Services (RMS). The other streets surrounding the site are local roads under the authority of The City of Sydney.

Figure 2-2 shows the parking controls in the vicinity of the site. The close proximity of the bus stops on Cleveland Street and Baptist Street as well as the car share spaces highlight the opportunities for utilisation of public transport.

[1] Source: http://www.sydneycycleways.net/map/

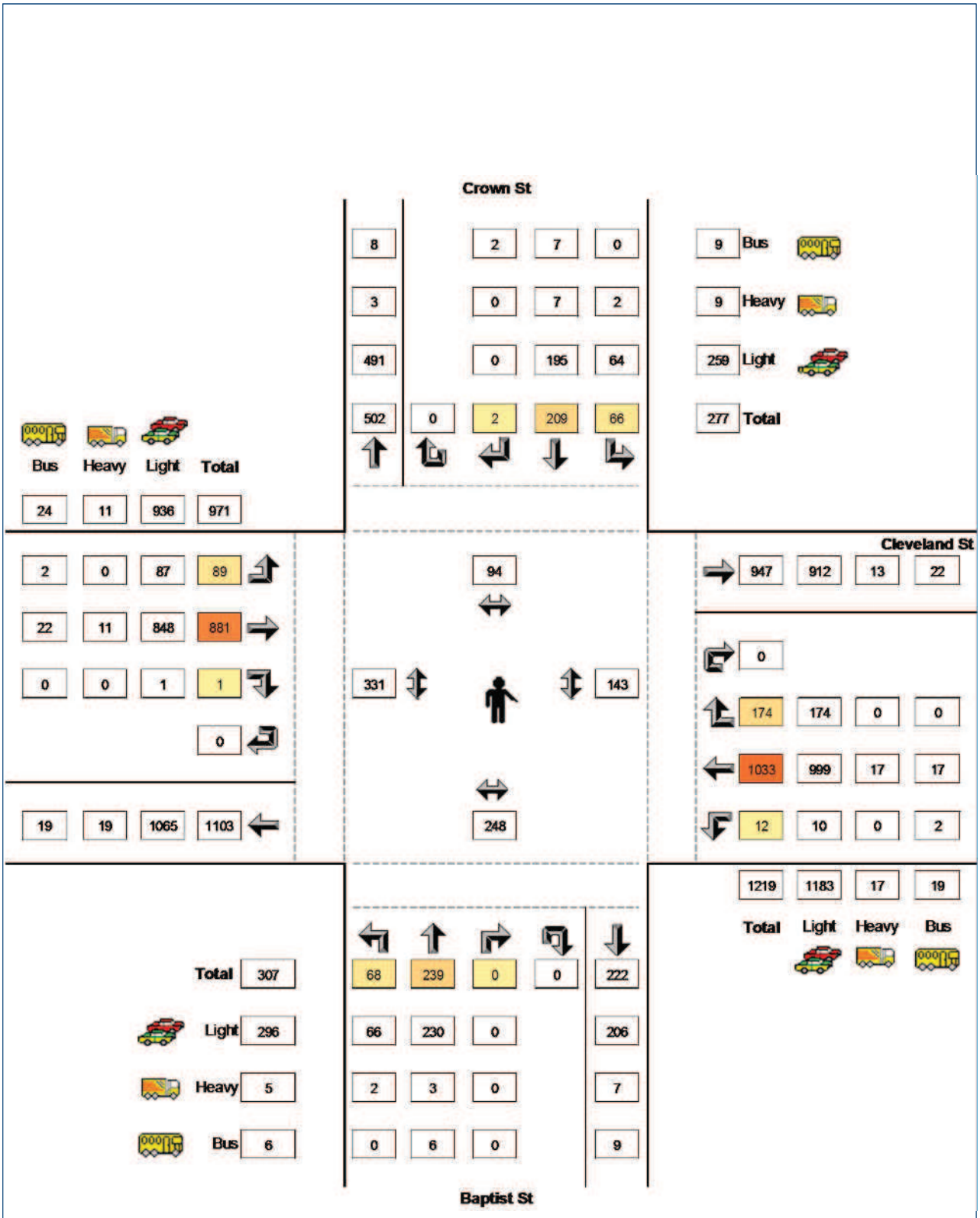
Figure 2-2: Parking Controls

2.3.1. Existing Traffic Flows

2.3.1.1. Peak Period Traffic Flows

Morning and evening weekday traffic flows at the intersection of Cleveland and Baptist Street were surveyed from 4:00 to 7:00 pm on a Thursday and from 9.00 am to midday on a Saturday. Peak hourly flows occurred between 4:00 and 5:00 pm on the Thursday and between 11.00 am and midday on the Saturday.

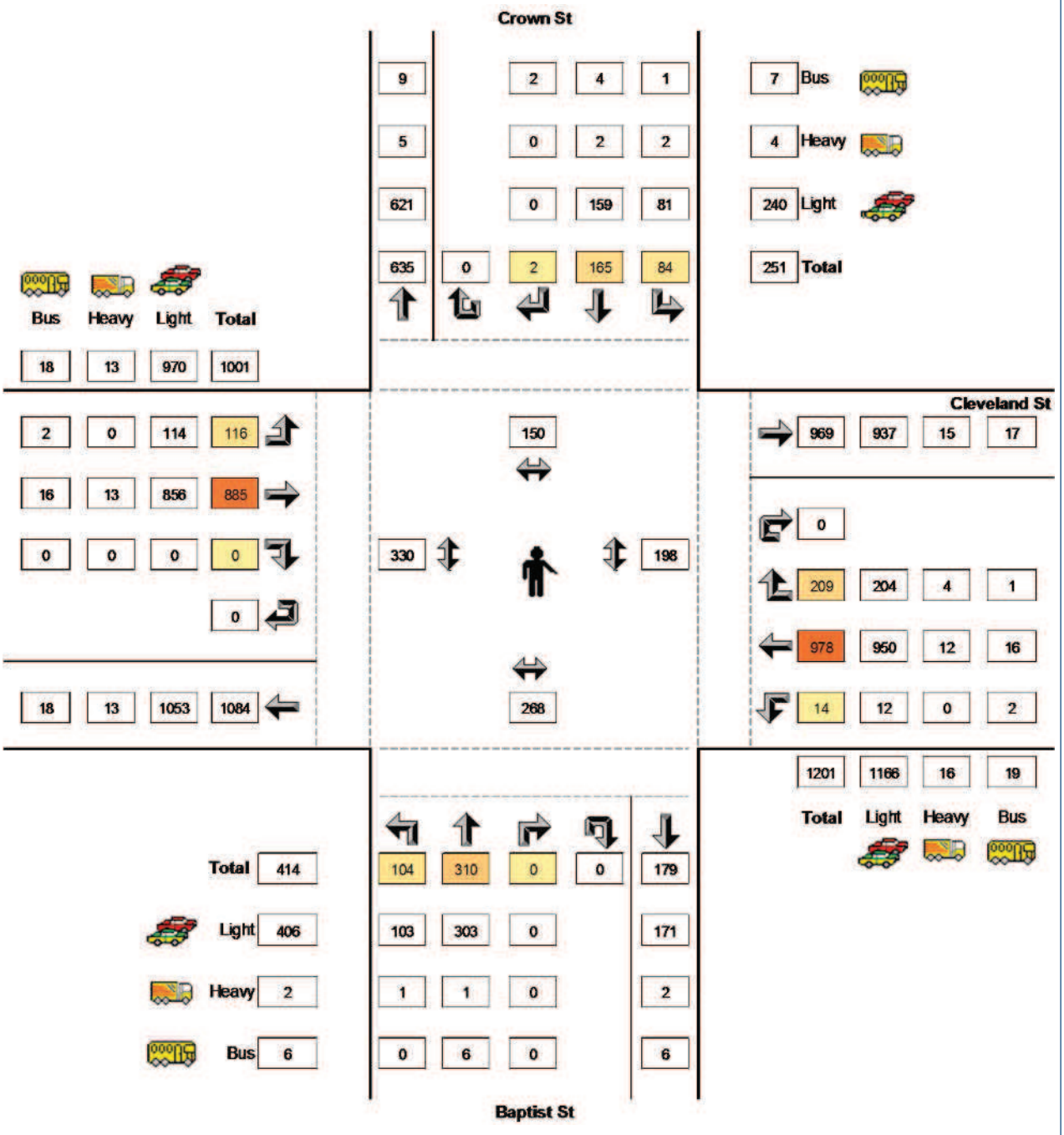
The surveyed peak hourly traffic flows are presented in Figure 2-3 and Figure 2-4. It can be seen that peak hourly flows on the Saturday are not significantly different than the Thursday flows. This reflects the high levels of activity in the area on weekends both locally and for through traffic.



Thursday 16th July 2015 (4.00 to 5.00 pm)

Note: Includes illegal left and right turns from Cleveland Street into Baptist Street

Figure 2-3: Peak Hour Intersection Movements (Thursday)



Saturday 18th July 2015 (11.00 am to midday)

Note: Includes illegal left turns from Cleveland Street into Baptist Street

Figure 2-4: Peak Hour Intersection Movements (Saturday)

2.3.2. Existing Intersection Operations

TTM has assessed the performance of the intersection of Cleveland Street and Baptist Street utilising the SIDRA Analysis Software (V6.1). Performance criteria for intersections are based on the RTA Guide to Traffic Generating Developments. A qualitative rating and its corresponding level of service are applied to the average delay per vehicle as shown in **Table 2.1**.

Table 2.1: Performance Criteria for Intersections

Level of Service	Average Delay per Vehicle (seconds)	Traffic Signals, Roundabouts
A	Less than 15	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity
E	57 to 70	At capacity; at signals incidents will cause excessive delays
F	Greater than 70	Roundabouts require other control mode

For signals, average delays per vehicle are for the intersection as a whole. If the average delay for the worst movement is greater than the cycle time, a Level of Service F is assigned, regardless of the average delay for the intersection as a whole. For Roundabouts / Give Way / Stop Signs, average delay per vehicle is for the worst movement.

The intersection has been modelled using the current phasing and cycle times observed on a Thursday and a Saturday. Results of the analysis are presented in Table 2.2.

Table 2.2: Existing Intersection Performance[2]

Cleveland Street / Baptist Street	**Thursday Evening (4.00 to 5.00 pm)**		**Saturday (11.00 am to midday)**	
	Average Delay (seconds)	**Level of Service**	**Average Delay (seconds)**	**Level of Service**
Existing	33.8	C	35.0	C

From **Table 2.2** it can be seen that the intersection of Cleveland and Baptist Streets is currently operating satisfactorily.

[2] Copies of SIDRA model outputs are contained in Appendix A.

3. Existing Development

3.1. Current Use

The site is currently operating as a shopping centre with one major retail tenant (Coles) and other small retail and commercial tenants. The makeup of the site is presented in Table 2.1.

Table 3.1: Current Site Use

Retail Component	**Floor Area (GFA)**	**Floor Area (NLA)**
Supermarket		3,215
Specialty Retail		2,091
Total Retail	6,365	5,306
Commercial Office Component	**Floor Area (GFA)**	**Floor Area (NLA)**
Commercial	148	129
Parking		**Spaces**
All cars		145

Access to the car parking spaces is via Baptist Street and Marriott Street.

Access to the loading dock for larger trucks is via Cooper Street and Marriott Street. Smaller trucks can access the loading dock via Marriott Street or Baptist Street. The current route for larger truck access is shown in Figure 3-1, via Cooper Street to and from Elizabeth Street. Elizabeth Street is one way southbound.

The carpark has gates at the access points on Marriott and Baptist Streets. The gates are closed outside of shopping hours.

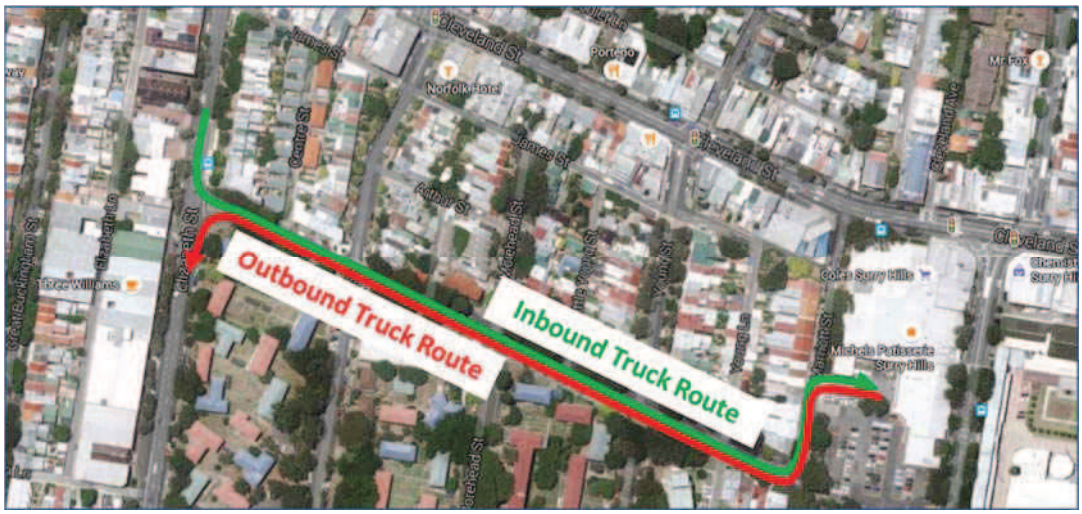


Figure 3-1: Current Access Route for Heavy Vehicles

3.2. Current Vehicle and Pedestrian Movements

Surveys of vehicle and pedestrian movements at the carpark driveways were conducted on Thursday 16th and Saturday 18th July 2015. Table 2.1 contains a summary of the surveyed

movements. Figure 3-2 and Figure 3-3 presents the pedestrian and vehicle movements at each location.

Table 3.2: Average Hourly Movements (IN + OUT)

	Thursday (4.00 pm to 6.00 pm)	Saturday (9.00 am to midday)
Pedestrians		
Cleveland Street Pedestrian	549	418
Baptist Street Pedestrian	148	189
Cooper Street Driveway and Marriott Street Reserve	81	82
Baptist Street Driveway	77	66
Marriott Street Carpark Driveway and Loading Dock Driveway	60	36
All Pedestrians	**915**	**791**
Cars		
Baptist Street Driveway Entry	202	178
Cooper Street Driveway	150	116
Marriott Street Carpark Driveway	29	20
Marriott Street Loading Dock Driveway	7	3
All Cars	**388**	**317**
Trucks		
Marriot Street Loading Dock Driveway	2.0	0.3

From Table 3.2 it can be seen that pedestrian movements are dominant compared to cars. Allowing for a car occupancy of 2 persons per vehicle pedestrian movements are still relatively high. This indicates that the Surry Hills Shopping Village is serving a much localised catchment resulting in low traffic generation rates.

The split between accessing the site via Cooper/Marriott Streets and Baptist Street was roughly 50/50.

Access to the loading docks during the survey periods was low. This is to be expected as most truck deliveries would occur during the weekday prior to the commencement of the Thursday surveys at 4.00 pm. Deliveries on Saturday would be incidental.

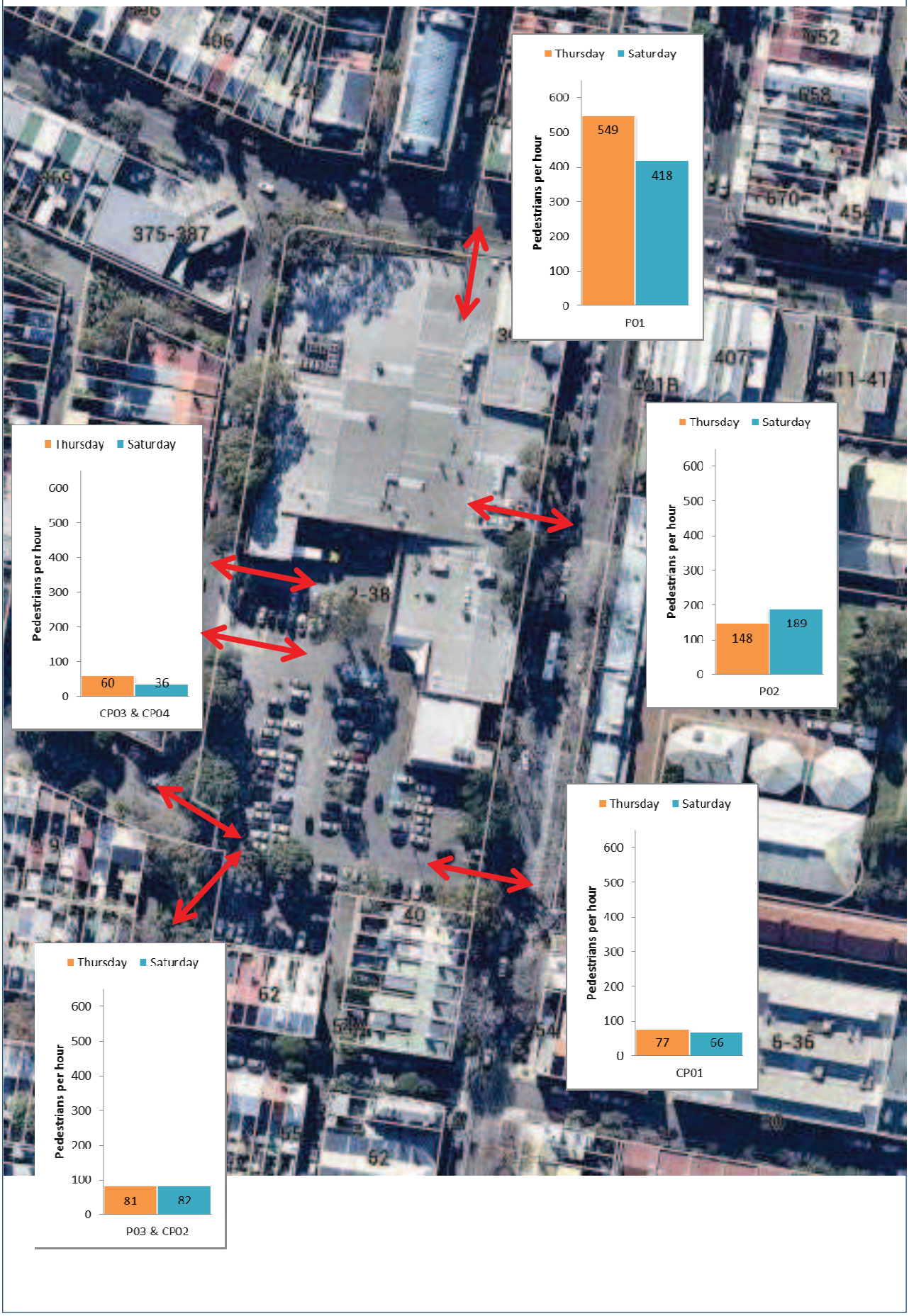


Figure 3-2: Average Two Way Hourly Pedestrian Movements
(Thursday: 4.00 pm to 6.00 pm and Saturday: 9.00 am to 12.00 noon)

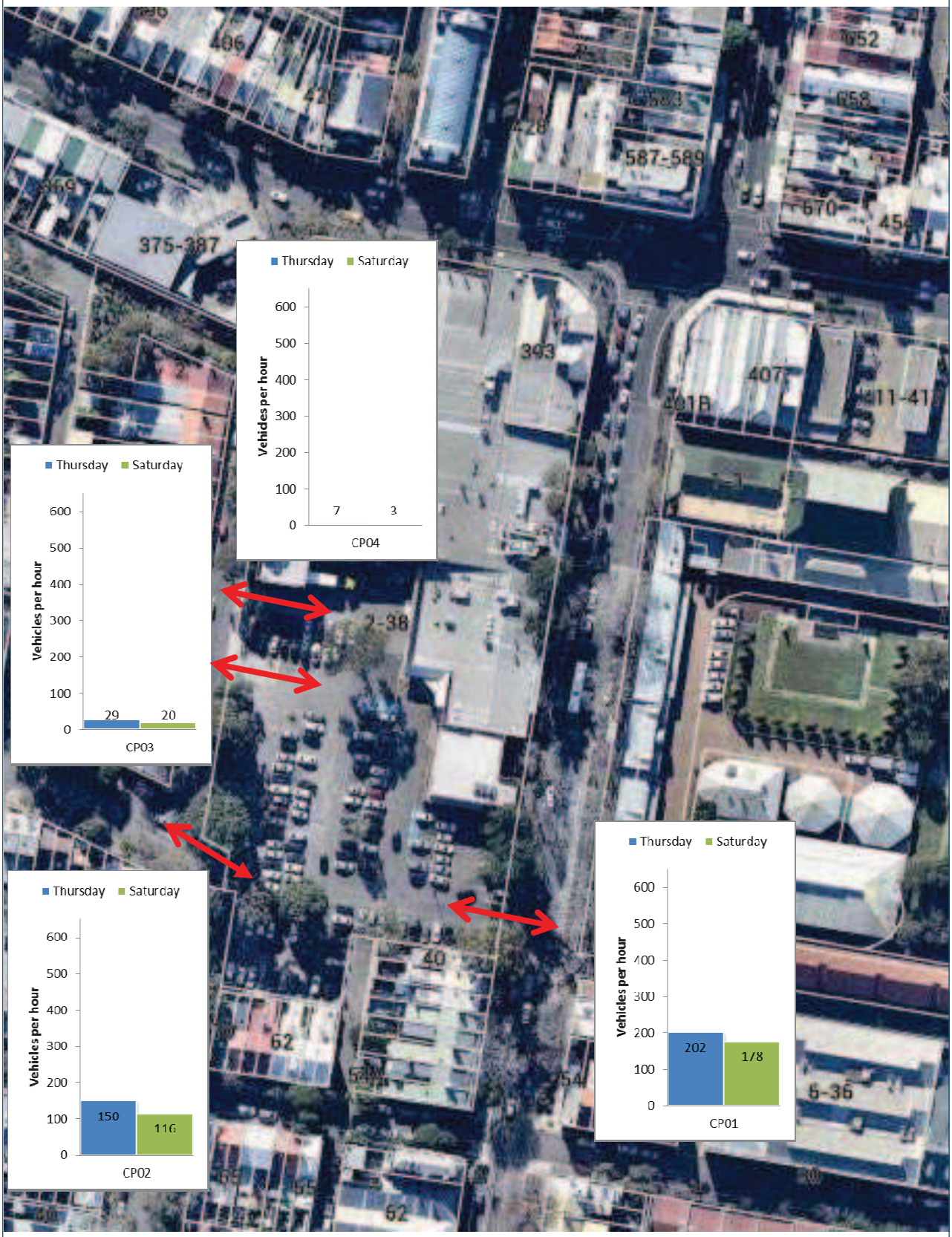


Figure 3-3:Average Two Way Hourly Car Movements - excluding delivery trucks (Thursday: 4.00 pm to 6.00 pm and Saturday: 9.00 am to 12.00 noon)

3.3. Current Peak Hour Trip Generation

Whist the average hourly trip generation has been presented in Table 3.2 the peak hour trips need to be separately identified for assessment of traffic conditions. Table 3.3 presents the peak hour trips generated by the current use.

Table 3.3: Peak Hour Trip Generation

	Thursday (4.00 pm to 5.00 pm)		Saturday (11.00 am to midday)	
	Inbound	Outbound	Inbound	Outbound
Pedestrians	446	435	482	498
Cars	210	191	202	199
Trucks	2	2	1	0

From Table 3.3 it can be seen that the peak car demands are a total of 401 vehicles in both the Thursday and Saturday Peak hours. This is equivalent to 6.16 vehicle trips per 100 m^2 GFA for the retail/commercial GFA as a whole (6,513 m^2).

The RMS Guide to Traffic Generating Developments recommends application of rates of 12.3 and 16.6 trips per 100 m^2 GFA for Thursdays and Saturdays respectively when assessing shopping centres with less than 10,000 m^2 of GLAR. This clearly does not apply here where the trip generation is substantially lower.

3.4. Current Carpark Demands

The surveys also identified the number of vehicles in the shopping centre carpark by time of day. Table 3.4 presents a summary of the overall occupancy.

Table 3.4: Surveyed Carpark Occupancy

Thursday		Saturday	
Time	Occupancy	Time	Occupancy
4:00 PM	117	9:00 AM	52
4:15 PM	123	9:15 AM	53
4:30 PM	128	9:30 AM	57
4:45 PM	119	9:45 AM	79
5:00 PM	105	10:00 AM	79
5:15 PM	111	10:15 AM	78
5:30 PM	103	10:30 AM	79
5:45 PM	90	10:45 AM	79
		11:00 AM	88
		11:15 AM	92
		11:30 AM	84
		11:45 AM	82
Peak	**128**	**Peak**	**92**

From Table 3.4 it can be seen that the highest demand surveyed was 128 cars on the Thursday. This is less than the 145 parking spaces currently on site.

Parking demands at other times of the year can be estimated by using rates published by the NSW Roads & Maritime Services accounting for seasonal fluctuations. Table 3.5 presents estimates of peak parking demands by month based on the July 2015 surveys.

Table 3.5: Shopping Centre Parking Demands by Month

Month	Seasonal Factor	Parking Demands
January	0.89	111
February	0.87	108
March	0.97	121
April	0.96	119
May	1.01	126
June	0.97	121
July	1.03	128
August	1.01	126
September	0.96	119
October	0.98	122
November	1.08	134
December	1.28	159

From Table 3.4 it can be seen that the 145 space carpark can accommodate demands in all months except for the December period. When designing a new carpark this peak needs to be taken into account plus growth that will occur over time as the surrounding area develops and more people reside in the precinct.

4. Proposed Development

4.1. Development Profile

The planning proposal essentially involves redevelopment of the existing Surry Hills Shopping Village to provide a slightly larger centre with residential apartments above. The proposal is to amend the zoning to allow for a higher height control, not for a change of permissible use.

Two access driveways are proposed:

- The primary access is via Baptist Street.
- A second access driveway is proposed via Cooper Street.

Table 4.1 presents a summary of the existing and proposed retail/commercial floor areas, apartments, and parking that could be provided as a result of the planning proposal.

Table 4.1: Schedule of Existing and Proposed Areas/Apartments/Parking

Component	**Existing**	**Existing**	**Proposed**	**Proposed**
Retail Component	**Floor Area (GFA)**	**Floor Area (NLA)**	**Floor Area (GFA)**	**Floor Area (NLA)**
Supermarket	n.a.	3,215	4,550	n.a.
Specialty Retail	n.a.	2,091	3,216	n.a.
Total Retail	6,365	5,306	7,766	n.a.
Sales GFA	n.a.	n.a.	5,816	n.a.
Commercial Office Component	**Floor Area (GFA)**	**Floor Area (NLA)**	**Floor Area (GFA)**	**Quantity**
Commercial	148.0	129.3	410	n.a.
Residential Component	**Unit Type**	**Quantity**	**Unit Type**	**Quantity**
Apartments	Studio	0	Studio	8
	1 bed	0	1 bed	143
	2 bed	0	2 bed	101
	3 bed	0	3 bed	13
Total		0		265
Ordinary	85%	0	85%	225
Adaptable (minimum)	15%	0	15%	40
Parking Spaces Provided		**Quantity**	**Type**	**Quantity**
Retail/Commercial - Street Level	Ordinary	142	Ordinary	0
	Accessible	3	Accessible	0
Retail/Commercial - Basement Level			Ordinary/Parents	275
			Accessible	17
			Motorcycle	26
Residential			Ordinary	111
			Accessible	41
			Visitor	16
			Motorcycle	14
Bicycle Spaces Provided			**Type**	**Quantity**
Resident			Bicycle	265
Resident Visitor			Bicycle	27
Retail Employees			Bicycle	42
Retail Visitors			Bicycle	22

Note: The 3 accessible spaces in the existing carpark are 3.2 metres wide in accordance with the now superseded Australian Standard AS2890.1 - 1993. They do not comply with the requirements of the current Australian Standard AS2890.6 - 2009.

The information contained in Table 4.1 should be treated as indicative only as it relates to a planning proposal and not a development application. Nevertheless, it provides a basis from which to assess the transport related impacts of the planning proposal.

4.2. Service Vehicles

A loading dock with access off Baptist Street is proposed to cater for the supermarket, specialty retail, and waste servicing requirements. The loading dock will have a truck turntable capable of catering for 17 metre long semi-trailers. This is a requirement for Coles delivery vehicles.

A small goods loading zone is also proposed on Marriott Street just south of the existing car share space for direct access to the specialty retail stores.

4.3. Car Share/Buses/Taxis

It is proposed that an existing car share space on Baptist Street is replaced by 2 car share spaces to the north of the primary retail/commercial carpark driveway on Baptist Street. The existing car share space on Marriott Street would be retained at its current location.

The existing bus zone in Baptist Street bus stop can be relocated further north to accommodate the proposed car share arrangements. Bus stop requirements are:

- 12.5 metres for the bus itself,
- 11.0 metres for the bus to draw into the stop.
- 6.0 metres for the bus to draw out of the stop if there is parking on the departure side (which would be the Taxi Zone).

5. Traffic Impacts

5.1. Scenarios Assessed

Existing and additional future peak hour traffic generated by the development is assessed for two scenarios:

1. Scenario 1 (December Short Term) – Traffic increases aligned to the increase in GFA for the retail / commercial component factored up to align with peak demands that would occur in December.
2. Scenario 2 (Long Term) – Long term traffic increases based on the scenario that the proposed carpark is full.

Scenario 1 represents traffic conditions that would be expected for the years immediately following completion of the development.

Scenario 2 is not expected to occur for a considerable period of time as the provision for retail parking is in excess of current demands. Nevertheless, it has been assessed particularly as a design benchmark for the carpark access.

Two critical intersections have been assessed. They are the intersection of Cleveland Street with Baptist Street and the intersection of the carpark entry/exit with Baptist Street.

5.2. Traffic Generation

The traffic generated by the development has been determined using the following principles.

Residential Component

1. The RMS rate of 0.150 PM peak (1 hour) vehicle trips per unit has been applied for the Thursday evening peak with 80 percent inbound and 20 percent outbound.

2. A nominal rate of 0.075 (1 hour) vehicle trips per unit has been applied for the Saturday with 80 percent inbound and 20 percent outbound.

Retail/Commercial Component

1. December Trips are the trips used for design purposes. They are December demands determined by factoring surveyed July traffic up to represent the existing December traffic. RMS seasonal factors of 1.03 for July and 1.28 for December were applied.
   Formula: December Trips = July Trips x (1.28/1.03)

2. Scenario 1 Retail / Commercial traffic generation are the December demands factored up by the change in floorspace.
   Formula: Scenario 1 = December Trips x (8,176/6,513)

3. Scenario 2 Retail / Commercial traffic generation are the December demands factored up by the assumption that the retail/commercial carpark is full on the Thursday. This is done by multiplying the surveyed demands by the relative change in spaces (full occupancy vs. surveyed as occupied).
   Formula 1: Scenario 2 = December Trips on the Thursday x 279 / 128
   The same number of trips are applied on the Saturday as this represents full capacity and the current peak hourly trip generation on the Thursday and Saturday are very similar.

The resultant traffic generation estimates are presented in Table 5.1.

Table 5.1: Existing and Future Traffic Generation (Cars)

	Thursday (4.00 pm to 5.00 pm)		Saturday (11.00 am to midday)	
	Inbound	Outbound	Inbound	Outbound
Existing Retail / Commercial				
Existing - December	261	237	251	247
Existing - July	210	191	202	199
Future Retail / Commercial				
Scenario 1 - December Short Term	328	298	315	310
Scenario 2 - Carpark at Capacity	458	416	458	458
Future Residential				
Future Residential	32	8	10	10
Future Total				
Scenario 1 - December Short Term	359	306	325	320
Scenario 2 - Carpark at Capacity	490	424	468	468
Increase in trips				
Scenario 1 - December Short Term	98	69	74	73
Scenario 2 - Carpark at Capacity	280	233	266	269

5.3. Baptist Street Traffic Flows

The most significant change in traffic flows will be on Baptist Street immediately north and south of the retail / commercial carpark driveway. Table 5.2 presents the estimated flows resulting from the retail / commercial carpark alone. The residential component would add an additional 3 to 4 vehicles per hour.

Table 5.2: Existing and Future Traffic Flows on Baptist Street

	Existing	Short Term	Change	Long Term	Change
Thursday (4.00 pm to 5.00 pm)					
Baptist Street, South of Cleveland Street	969	1,062	10%	1,437	48%
Baptist Street, South of Carpark	1,055	1,186	12%	1,305	24%
Saturday (11.00 am to midday)					
Baptist Street, South of Cleveland Street	561	648	16%	1,035	84%
Baptist Street, South of Carpark	647	762	18%	889	37%

The short and long term forecasts presented in Table 5.2 result in significant increases in traffic flows. Intersection conditions need to be assessed against these flows to determine whether intersection improvements are required. This analysis is reported in the following sections.

5.4. Cooper Street and Marriott Street Traffic Flows

Traffic flows on Cooper Street and Marriott Street are forecast to increase as a result of the planning proposal. The forecast increases are presented in Table 5.3.

Table 5.3: Existing and Future Traffic via Cooper Street and Marriott Street

	Thursday (4.00 pm to 6.00 pm)	Saturday (9.00 am to midday)
Existing	186	139
Scenario 1: Short Term Future	333	323
Scenario 2: Long Term Future	457	468

In relation to the traffic forecasts presented above in Table 5.3 it should be noted that the increases in traffic are cars. There will no longer be large semi-trailer trucks accessing the site via Cooper and Marriott Streets.

5.5. Cleveland Street / Baptist Street Intersection

The performance of the intersection of Cleveland and Baptist Streets has been assessed utilising the SIDRA Analysis Software (V6.1). The current phasing and cycle times have been retained for the future scenarios.

The results of the analysis are presented in Table 5.4.

Table 5.4: Existing and Future Intersection Performance (Cleveland Street / Baptist Street)[3]

Cleveland Street / Baptist Street	Thursday Evening (4.00 to 5.00 pm)		Saturday (11.00 am to midday)	
	Average Delay	Level of Service	Average Delay	Level of Service
Existing	33.8	C	35.0	C
Scenario 1 – Short Term Future	36.8	C	36.4	C
Scenario 2 – Long Term Future	45.4	D	46.6	D

From Table 5.2 it can be seen that the intersection of Cleveland Street and Baptist Street will continue to operate satisfactorily in the short term. In the long term conditions will be such that the intersection will be operating near capacity. No upgrades to this intersection are required as a result of the development.

5.6. Baptist Street / Carpark Driveway

Adequate functioning of the Baptist Street / carpark driveway intersection for the retail / commercial carpark is an essential component of the design. The operations of this intersection have been analysed for Scenarios 1 and 2 using the following principals:

1. 50 percent of traffic will use the Baptist Street driveway and 50% will use the Cooper Street driveway. This is what currently occurs.
2. For traffic to and from Baptist Street 30 percent of the resultant traffic will be to and from the north and 70 percent will be to and from the south.
3. There is a 20 percent increase in the number of pedestrians walking across the driveway.

The driveway has been modelled with separate left and right turn exit lanes. The driveway has also been modelled as having a theoretical pedestrian crossing to reflect the legal requirement for drivers to give way to pedestrians using the footway along Baptist Street.

[3] Copies of SIDRA model outputs are contained in Appendix A.

Table 5.5 presents the results of the analysis.

Table 5.5: Future Intersection Performance (Baptist Street / Carpark Driveway)[4]

Baptist Street / Carpark	Thursday Evening (4.00 to 5.00 pm)		Saturday (11.00 am to midday)	
	Average Delay (seconds)	Level of Service	Average Delay (seconds)	Level of Service
Scenario 1 – Short Term Future	24.2	B	12.6	A
Scenario 2 – Long Term Future	46.5	D	18.9	B

From Table 5.5 it can be seen that the proposed Baptist Street carpark driveway for the retail / commercial carpark will operate satisfactorily in the short term and will be approaching capacity in the long term if the carpark is full. This being full capacity for the carpark itself indicates that no further upgrades will be required. Hence the driveway access is satisfactory.

[4] Copies of SIDRA model outputs are contained in Appendix A.

6. Parking and Access

6.1. Parking Requirements

The parking requirements will ultimately depend on the final number and mix of apartments and proposed floorspace. The calculations below are based on the indicative schedule presented in Section 4.1.

6.1.1. Council Parking Rates

Council's parking requirements are specified in the Sydney Local Environment Plan 2012 and the Sydney Development Control Plan 2012. Rates of provision are summarised in Table 6.1.

Accessibility is categorised according to two indices, namely:

- The PTAL Index – the Public Transport Accessibility Level Index; and
- The LUTI Index – the Land Use and Transport Integration Index.

The rates are based on the site being Category C for the LUTI Index and Category E for the PTAL Index contained in Sydney LEP 2012.

Table 6.1: Council Parking Rates

Type	Residential buildings and serviced apartments	Shops, shopping centres	Commercial
Employee	n.a.	n.a.	1 space for each 125 sqm GFA (FSR of no more than 2.5:1)
Resident	for each studio dwelling—0.4 spaces, and	n.a.	n.a.
	for each 1 bedroom dwelling—0.5 spaces, and	n.a.	n.a.
	for each 2 bedroom dwelling—1 space, and	n.a.	n.a.
	for each 3 or more bedroom dwelling—1.2 spaces, and	n.a.	n.a.
Visitor Parking	for each dwelling up to 30 dwellings—0.2 spaces	n.a.	n.a.
	for each dwelling more than 30 and up to 70 dwellings—0.125 spaces	n.a.	n.a.
	for each dwelling more than 70 dwellings—0.067 spaces	n.a.	n.a.
Service Vehicles	1 space for the first 50 dwellings or serviced apartments; plus	1 space per 350sqm GFA, or part thereof, up to 2,000sqm; then	1 space per 3,300sqm GFA, or part thereof, up to 50,000sqm; then
	0.5 spaces for every 50 dwellings/serviced apartments or part thereafter.	1 space per 800sqm GFA thereafter.	1 space per 6,600sqm GFA, or part thereof, up to 100,000sqm; then
			1 space per 13,200sqm GFA thereafter.
Motorcycle parking spaces	1 motorcycle parking space for every 12 car parking spaces	1 motorcycle parking space for every 12 car parking spaces	1 motorcycle parking space for every 12 car parking spaces
Accessible car parking spaces	One space for every 20 car parking spaces or part thereof is to be allocated as accessible visitor parking.	One space for every 20 car parking spaces or part thereof is to be allocated as accessible visitor parking.	One space for every 20 car parking spaces or part thereof is to be allocated as accessible visitor parking.
	Allocation of accessible spaces:		
	- One accessible space for every adaptable residential unit		
	- Remainder to be allocated as visitor parking		
Car Share Scheme	1 car share space per 90 car spaces provided	1 car share space per 40 car spaces provided	1 car share space per 40 car spaces provided
Bicycle	1 resident bicycle space per dwelling	1 employee bicycle space per 200 sqm GFA	1 employee bicycle space per 150 sqm GFA
	1 visitor bicycle space per 10 dwellings	1 visitor bicycle space per 300 sqm **sales** GFA	1 visitor bicycle space per 400 sqm GFA
Buses and Coaches	nil	nil	nil
Passenger pick up / set down	nil	nil	nil

Council does not specify a parking rate for shopping centres such as Surry Hills Shopping Village. Instead the parking to be provided is allocated amongst various types. Other items to take into consideration in the allocation of parking include:

- Sydney DCP 2012 - Clause 3.11.4 – Vehicle Parking specifies that where a residential development proposes less than the maximum number of car parking spaces permissible under Sydney Local Environmental Plan 2012, the reduction in the number of spaces should be shared proportionally between resident parking spaces and visitor parking spaces.
- Sydney DCP 2012 - Clause 3.11.7 - Motorbike Parking specifies that parking for motorcycle spaces are to be included in the allocation of car parking. Therefore a motorbike space is also a "car" space under the LEP for the purposes of calculating requirements.
- Sydney DCP 2012 - Clause 3.11.2 Car share scheme parking spaces specifies that car share parking spaces may be provided in addition to the maximum number of car parking spaces permitted in the development.

6.1.2. Car Share

It is proposed that there would be 3 car share spaces provided on street (1 more than the existing 2 spaces). More spaces could be provided on street if required. Provision of car share spaces on site is problematic as the retail carpark is likely to be closed at certain times of the night for security reasons. Similarly, the residential carpark is not suited for such a use.

6.1.3. Residential Parking Requirements

The parking requirements for the residential component of the development are presented in Table 6.2. The number of spaces provided is less than the maximum permissible. The application of Sydney DCP 2012 - Clause 3.11.4 is shown as a "pro-rata" calculation.

Table 6.2: Residential Parking Requirements

Parking Type	Measure		Quantity	Rate / unit of measure	Spaces	Total
Maximum Allowable Spaces						
Resident Spaces	Studio		8	0.4	3.2	
(ordinary + accessible)	1 Bed		143	0.5	71.5	
	2 Bed		101	1.0	101.0	
	3 or more Bed		13	1.2	15.6	191
Visitor Spaces	Dwelling	up to 30	30	0.2	6.0	
(ordinary + accessible)	Dwelling	31 to 70	40	0.125	5.0	
	Dwelling	71 and more	225	0.067	15.1	26
Total Maximum Permissible					217.4	217
Pro-rata of Spaces	**Measure**					
Total Provided						182
Resident Spaces (maximum)	Pro-Rata				160.2	160
Visitor Spaces (minimum)	Pro-Rata				21.8	22
Allocation of Spaces	**Measure**					
Resident Ordinary Car Spaces	Maximum					107
Resident Accessible Car Spaces	Minimum				39.8	40
Resident Motorcycle Spaces	Maximum			0.083	13.3	13
Visitor Ordinary Car Spaces	Minimum					19
Visitor Accessible Car Spaces	Minimum			0.050	1.1	1
Visitor Motorcycle Spaces	Minimum			0.083	1.8	2
Total Spaces						182
Bicycle Spaces	**Measure**		**Quantity**	**Rate**	**Spaces**	**Total**
Resident Bicycle Spaces	Units		265	1.0	265.0	265
Resident Visitor Bicycle Spaces	Units		265	0.1	26.5	27

Table 6.2 shows that the residential component of the proposal can provide a maximum of 217 parking spaces under the DCP. However, given that only 182 spaces are proposed the parking allocation has been pro-rated as required by the DCP.

An indicative parking layout for the residential component has been prepared as part of the planning proposal. It demonstrates that sufficient room has been provided to satisfy the above requirements.

6.1.4. Retail / Commercial Parking Requirements

The parking requirements for the retail / commercial component of the development are presented in Table 6.3.

Table 6.3: Retail / Commercial Parking Requirements

Commercial Parking	Measure	Quantity	Rate (1/# or %)	Spaces	Total
Total Parking Spaces Allowed	GFA	410	125	3.3	3
Ordinary Car Parking Spaces	GFA				2
Accessible Car Parking Spaces	GFA		0.050	0.2	1
Motorcycle Parking Spaces	Car Spaces	3	0.083	0.3	0
Employee Bicycle Spaces	GFA	410	150	2.7	3
Visitor Bicycle Spaces	GFA	410	400	1.0	2
Retail Parking	**Measure**	**Quantity**	**Rate (1/# or %)**	**Spaces**	**Total**
Total Parking Spaces	n.a.				318
Ordinary Car Parking Spaces	Car Spaces				275
Accessible Car Parking Spaces	Car Spaces		0.050	15.9	16
Motorcycle Parking Spaces	Car Spaces	318	0.083	26.5	27
Employee Bicycle Spaces	GFA	7,766	200	38.8	39
Visitor Bicycle Spaces	Sales GFA	5,816	300	19.4	20

As noted previously. Council does not specify a parking rate for shopping centres such as Surry Hills Shopping Village. The table above allocates the proposed parking to ordinary, accessible, and motorcycle parking in accordance with the DCP.

An indicative parking layout for the retail / commercial component has been prepared as part of the planning proposal. It demonstrates that sufficient room has been provided to satisfy the above requirements.

6.1.5. Service Vehicle Parking Requirements

The parking requirements for service vehicles as stipulated in the DCP are presented in Table 6.4.

Table 6.4: Service Vehicle Parking Requirements

Parking Type	Measure		Quantity	Rate (1/#)	Spaces	Total
Retail / Commercial Service Vehicles						
Retail	GFA	up to 2,000 m2	2,000	350	5.7	
	GFA	additional m2	5,766	800	7.2	
Commercial	GFA	up to 50,000 m2	410	3,300	0.1	13
Residential Service Vehicles						
	Dwelling	up to 50	50	50	1.0	
	Dwelling	51 and more	215	100	2.2	3

From Table 6.4 it can be seen that strict application of DCP results in requirement for up to 15 loading bays. This is clearly in excess of what would be envisaged for a development such as the one being examined here. Current operations of the shopping centre include a single dock for the Coles supermarket and a single loading area for other deliveries. Furthermore, Coles has advised that deliveries for the supermarket are likely to be a maximum of 3 to 4 vehicles per day. Liquorland deliveries would be co-located with the Coles loading facilities.

Following consideration of the actual needs of the development the following is proposed:

- A dedicated dock for Coles deliveries capable of accommodating a 17.2 metre semi-trailer.
- A separate dock for the retail deliveries capable of accommodating a 12.5 metre heavy rigid vehicle.
- A separate compactor dock within the main loading dock for waste removal.
- A dock for small rigid vehicle deliveries to the residential apartments (in the residential carpark).
- A loading zone on Marriott Street for small truck deliveries to the specialty retail component.

The main dock has a truck turntable reducing the overall footprint required for dock access and increases safety for people within the dock area.

Overall, the provision for service vehicles is considered to be satisfactory.

6.2. Service Vehicle Access

6.2.1. Loading Facilities

Relocation of the loading facility from Marriott Street to Baptist Street will have an overall positive impact on residential amenity. It is understood that residents in Marriott Street currently have problems with delivery trucks that arrive early, park in Marriott Street and wait with their refrigeration running. This will no longer occur and would not occur on Baptists Street as there is no on street parking available for trucks at this location.

Access to the main dock has been assessed for a 17.2 metre semi-trailer. Swept paths (reproduced in Appendix B) demonstrate that the semi-trailer can access the dock without conflicting with other traffic.

6.2.2. Semi-Trailer Access Route

Access to the loading dock for larger trucks (semi-trailers) is proposed to be via Baptist to and from the south as shown in Figure 6-1. This route is already traversed by buses. Direct access via Cleveland Street inbound is not possible due to turn restrictions. The left turn from Cleveland Street into Baptist Street is not permitted (buses excepted). The right turn from Cleveland Street into Baptist Street is not permitted for all vehicles. The left turn from Baptist Street into Cleveland Street could be utilised for smaller outbound vehicles in general. However outbound semi-trailers would need to cross the centreline of Baptist Street in order to do so.

Figure 6-1: Proposed Access Route for Large Heavy Vehicles (semi-trailers)

The relocation of the current heavy vehicle access route from Cooper and Marriott Street to Baptist Street is a positive outcome for the local community as it redirects heavy vehicles onto roads more suited to accommodate this type of traffic.

7. Summary and Conclusions

7.1. Summary

This report has examined the transport implications of a planning proposal for the Surry Hills Shopping Village. The planning proposal essentially involves redevelopment of the existing Surry Hills Shopping Village to provide a slightly larger centre with residential apartments above. The proposal is to amend the zoning to allow for a higher height control, not for a change of permissible use.

The traffic impacts have been assessed for a worst case scenario where the proposed retail / commercial carpark is full. This is highly unlikely to occur for a considerable number of years and then would probably only occur during peak December trading times.

The findings of the assessment are as follows:

- Traffic changes can be accommodated within the existing street system without intersection upgrades.
- Access for modes of transport other than cars is excellent.
- The concept architectural scheme demonstrates that parking requirements can be accommodated on the site.
- Relocation of the loading dock from Marriott Street to Baptist Street will have a net positive impact on residential amenity.
- Design for service vehicles and parking in general is satisfactory.

7.2. Development Application Requirements

Additional information may be required as part of the development application. This includes:

- Requirements specified by Council.
- Preparation of a Green Travel Plan (required when the estimated peak trip generation is greater than or equal to 100 vehicles per hour for non-residential development).
- Preparation of a Transport Access Guide as part of the Green Travel Plan for visitors to the shopping centre.

7.3. Conclusions

It is concluded that transport issues associated with rezoning and development of the Surry Hills Shopping Village site have been satisfactorily addressed and there are no traffic or transport issues which would prevent the application from being approved.

Appendix A Sidra Intersection Analysis

MOVEMENT SUMMARY

Site: Cleveland / Baptist - Thursday - PM Base

Cleveland Street, Crown Street and Baptist Street Intersection
(4:00 to 5:00pm)
Signals - Fixed Time Isolated Cycle Time = 154 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Baptist Street											
1	L2	72	2.9	0.173	56.7	LOS E	4.3	30.8	0.84	0.75	24.5
2	T1	252	3.8	0.606	57.0	LOS E	16.8	121.6	0.95	0.80	27.4
Approach		323	3.6	0.606	56.9	LOS E	16.8	121.6	0.92	0.79	26.8
East: Cleveland Street											
4	L2	2	100.0	0.628	19.5	LOS B	33.0	237.9	0.59	0.55	41.3
5	T1	1087	3.3	0.628	18.5	LOS B	33.0	237.9	0.66	0.63	29.8
6	R2	183	0.0	0.628	40.4	LOS C	25.5	181.1	0.87	0.89	24.0
Approach		1273	3.0	0.628	21.6	LOS B	33.0	237.9	0.69	0.67	28.6
North: Crown Street											
7	L2	69	3.0	0.168	56.7	LOS E	4.2	29.9	0.84	0.75	18.5
8	T1	220	6.7	0.633	56.1	LOS D	14.5	107.1	0.93	0.78	27.6
Approach		289	5.8	0.633	56.2	LOS D	14.5	107.1	0.91	0.77	25.7
West: Cleveland Street											
10	L2	94	2.2	0.610	40.4	LOS C	28.7	207.1	0.82	0.75	25.1
11	T1	927	3.7	0.610	34.8	LOS C	28.9	209.1	0.82	0.74	20.9
Approach		1021	3.6	0.610	35.3	LOS C	28.9	209.1	0.82	0.75	21.3
All Vehicles		2906	3.5	0.633	33.8	LOS C	33.0	237.9	0.78	0.72	25.4

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 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	261	28.4	LOS C	0.7	0.7	0.61	0.61
P2	East Full Crossing	151	54.4	LOS E	0.6	0.6	0.84	0.84
P3	North Full Crossing	99	28.2	LOS C	0.3	0.3	0.61	0.61
P4	West Full Crossing	348	54.8	LOS E	1.3	1.3	0.85	0.85
All Pedestrians		859	43.6	LOS E			0.75	0.75

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.

MOVEMENT SUMMARY

Site: Cleveland / Baptist - Thursday - PM Short Term

Cleveland Street, Crown Street and Baptist Street Intersection
(4:00 to 5:00pm)
Signals - Fixed Time Isolated Cycle Time = 154 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Baptist Street											
1	L2	82	2.6	0.173	52.6	LOS D	4.7	33.9	0.81	0.75	25.6
2	T1	287	3.3	0.620	53.2	LOS D	18.7	134.9	0.93	0.79	28.4
Approach		369	3.1	0.620	53.1	LOS D	18.7	134.9	0.90	0.78	27.8
East: Cleveland Street											
4	L2	2	100.0	0.662	22.5	LOS B	36.8	265.5	0.65	0.61	39.2
5	T1	1087	3.3	0.662	22.1	LOS B	36.8	265.5	0.71	0.69	27.2
6	R2	183	0.0	0.662	46.2	LOS D	25.4	181.1	0.91	0.96	22.1
Approach		1273	3.0	0.662	25.6	LOS B	36.8	265.5	0.74	0.73	26.1
North: Crown Street											
7	L2	69	3.0	0.147	52.3	LOS D	4.0	28.5	0.81	0.75	19.5
8	T1	272	5.4	0.664	52.9	LOS D	17.6	128.8	0.92	0.78	28.5
Approach		341	4.9	0.664	52.7	LOS D	17.6	128.8	0.90	0.77	27.0
West: Cleveland Street											
10	L2	94	2.2	0.658	44.6	LOS D	30.5	219.6	0.87	0.79	23.5
11	T1	927	3.7	0.658	39.0	LOS C	30.7	221.7	0.87	0.78	19.4
Approach		1021	3.6	0.658	39.5	LOS C	30.7	221.7	0.87	0.78	19.8
All Vehicles		3004	3.4	0.664	36.8	LOS C	36.8	265.5	0.82	0.76	24.6

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 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 per ped
P1	South Full Crossing	261	31.5	LOS D	0.7	0.7	0.64	0.64
P2	East Full Crossing	151	50.2	LOS E	0.5	0.5	0.81	0.81
P3	North Full Crossing	99	31.3	LOS D	0.3	0.3	0.64	0.64
P4	West Full Crossing	348	50.7	LOS E	1.2	1.2	0.82	0.82
All Pedestrians		859	42.5	LOS E			0.74	0.74

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.

MOVEMENT SUMMARY

Site: Cleveland / Baptist - Thursday - PM Long Term

Cleveland Street, Crown Street and Baptist Street Intersection
(4:00 to 5:00pm)
Signals - Fixed Time Isolated Cycle Time = 154 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Baptist Street											
1	L2	127	1.7	0.191	41.0	LOS C	6.4	45.6	0.72	0.75	29.2
2	T1	444	2.1	0.728	43.1	LOS D	27.3	194.5	0.89	0.78	31.5
Approach		572	2.0	0.728	42.6	LOS D	27.3	194.5	0.85	0.77	31.1
East: Cleveland Street											
4	L2	2	100.0	0.808	35.0	LOS C	50.9	367.4	0.87	0.81	32.4
5	T1	1087	3.3	0.808	35.5	LOS C	50.9	367.4	0.90	0.88	20.6
6	R2	183	0.0	0.808	66.1	LOS E	26.9	190.9	1.00	1.12	17.2
Approach		1273	3.0	0.808	39.9	LOS C	50.9	367.4	0.91	0.91	19.9
North: Crown Street											
7	L2	69	3.0	0.105	39.8	LOS C	3.4	24.3	0.70	0.73	23.1
8	T1	503	2.9	0.813	47.5	LOS D	33.4	239.7	0.93	0.85	30.1
Approach		573	2.9	0.813	46.6	LOS D	33.4	239.7	0.90	0.84	29.5
West: Cleveland Street											
10	L2	94	2.2	0.813	58.1	LOS E	35.7	257.3	0.98	0.90	19.7
11	T1	927	3.7	0.813	52.5	LOS D	35.9	259.6	0.98	0.90	15.7
Approach		1021	3.6	0.813	53.0	LOS D	35.9	259.6	0.98	0.90	16.1
All Vehicles		3438	3.0	0.813	45.4	LOS D	50.9	367.4	0.92	0.87	23.0

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 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 per ped
P1	South Full Crossing	261	39.7	LOS D	0.8	0.8	0.72	0.72
P2	East Full Crossing	151	38.1	LOS D	0.5	0.5	0.71	0.71
P3	North Full Crossing	99	39.4	LOS D	0.3	0.3	0.72	0.72
P4	West Full Crossing	348	38.4	LOS D	1.1	1.1	0.71	0.71
All Pedestrians		859	38.9	LOS D			0.71	0.71

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.

MOVEMENT SUMMARY

Site: Cleveland / Baptist - Saturday - Midday Base

Cleveland Street, Crown Street and Baptist Street Intersection
(11:00am to 12:00pm)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Baptist Street											
1	L2	109	1.0	0.219	47.8	LOS D	5.7	40.6	0.82	0.76	27.0
2	T1	326	2.3	0.682	48.1	LOS D	19.5	139.3	0.94	0.80	29.9
Approach		436	1.9	0.682	48.0	LOS D	19.5	139.3	0.91	0.79	29.2
East: Cleveland Street											
4	L2	2	100.0	0.696	23.1	LOS B	36.9	265.2	0.70	0.65	38.8
5	T1	1029	2.9	0.696	21.4	LOS B	36.9	265.2	0.74	0.71	27.7
6	R2	220	2.4	0.696	48.3	LOS D	21.7	155.5	0.94	1.01	21.1
Approach		1252	2.9	0.696	26.2	LOS B	36.9	265.2	0.78	0.76	25.9
North: Crown Street											
7	L2	88	3.6	0.180	47.3	LOS D	4.6	33.1	0.81	0.75	20.8
8	T1	174	3.6	0.426	43.8	LOS D	9.5	68.3	0.85	0.70	31.3
Approach		262	3.6	0.426	44.9	LOS D	9.5	68.3	0.83	0.72	28.2
West: Cleveland Street											
10	L2	122	1.7	0.693	42.7	LOS D	29.4	211.1	0.89	0.81	24.1
11	T1	932	3.3	0.693	37.1	LOS C	29.7	213.7	0.89	0.80	20.0
Approach		1054	3.1	0.693	37.8	LOS C	29.7	213.7	0.89	0.80	20.5
All Vehicles		3003	2.9	0.696	35.0	LOS C	36.9	265.2	0.84	0.78	25.1

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 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	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	282	29.9	LOS C	0.7	0.7	0.66	0.66
P2	East Full Crossing	208	45.2	LOS E	0.7	0.7	0.81	0.81
P3	North Full Crossing	158	29.8	LOS C	0.4	0.4	0.65	0.65
P4	West Full Crossing	347	45.5	LOS E	1.1	1.1	0.81	0.81
All Pedestrians		996	38.5	LOS D			0.74	0.74

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.

MOVEMENT SUMMARY

Site: Cleveland / Baptist - Saturday - Midday Short Term

Cleveland Street, Crown Street and Baptist Street Intersection
(11:00am to 12:00pm)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Baptist Street											
1	L2	121	0.9	0.224	45.5	LOS D	6.2	43.7	0.80	0.76	27.7
2	T1	361	2.0	0.714	46.2	LOS D	21.4	152.3	0.93	0.80	30.5
Approach		482	1.7	0.714	46.0	LOS D	21.4	152.3	0.90	0.79	29.8
East: Cleveland Street											
4	L2	2	100.0	0.723	25.3	LOS B	39.5	284.1	0.75	0.69	37.4
5	T1	1029	2.9	0.723	23.6	LOS B	39.5	284.1	0.78	0.75	26.3
6	R2	220	2.4	0.723	51.0	LOS D	21.8	155.9	0.96	1.03	20.4
Approach		1252	2.9	0.723	28.4	LOS B	39.5	284.1	0.81	0.80	24.7
North: Crown Street											
7	L2	88	3.6	0.167	44.8	LOS D	4.4	32.1	0.78	0.75	21.5
8	T1	219	2.9	0.491	42.3	LOS C	11.9	85.1	0.85	0.71	31.8
Approach		307	3.1	0.491	43.0	LOS D	11.9	85.1	0.83	0.72	29.3
West: Cleveland Street											
10	L2	122	1.7	0.719	44.5	LOS D	30.2	216.3	0.91	0.83	23.5
11	T1	932	3.3	0.719	39.0	LOS C	30.4	219.0	0.91	0.82	19.3
Approach		1054	3.1	0.719	39.6	LOS C	30.4	219.0	0.91	0.82	19.9
All Vehicles		3095	2.8	0.723	36.4	LOS C	39.5	284.1	0.86	0.80	24.9

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 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 per ped
P1	South Full Crossing	282	31.3	LOS D	0.8	0.8	0.67	0.67
P2	East Full Crossing	208	42.8	LOS E	0.7	0.7	0.79	0.79
P3	North Full Crossing	158	31.1	LOS D	0.4	0.4	0.67	0.67
P4	West Full Crossing	347	43.1	LOS E	1.1	1.1	0.79	0.79
All Pedestrians		996	37.8	LOS D			0.74	0.74

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.

MOVEMENT SUMMARY

Site: Cleveland / Baptist - Saturday - Midday Long Term

Cleveland Street, Crown Street and Baptist Street Intersection
(11:00am to 12:00pm)
Signals - Fixed Time Isolated Cycle Time = 140 seconds (User-Given Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Baptist Street											
1	L2	179	0.6	0.256	37.3	LOS C	8.3	58.3	0.73	0.77	30.6
2	T1	531	1.4	0.867	48.8	LOS D	34.6	245.4	0.92	0.91	29.7
Approach		709	1.2	0.867	45.9	LOS D	34.6	245.4	0.87	0.87	29.9
East: Cleveland Street											
4	L2	2	100.0	0.861	38.2	LOS C	53.0	380.5	0.94	0.88	31.0
5	T1	1029	2.9	0.861	37.2	LOS C	53.0	380.5	0.95	0.93	20.0
6	R2	220	2.4	0.861	72.7	LOS F	24.5	175.4	1.00	1.16	15.9
Approach		1252	2.9	0.861	43.5	LOS D	53.0	380.5	0.96	0.97	18.9
North: Crown Street											
7	L2	88	3.6	0.129	35.6	LOS C	3.9	28.0	0.69	0.73	24.6
8	T1	444	1.4	0.711	37.4	LOS C	24.2	171.6	0.87	0.76	33.7
Approach		533	1.8	0.711	37.1	LOS C	24.2	171.6	0.84	0.76	32.5
West: Cleveland Street											
10	L2	122	1.7	0.863	60.7	LOS E	36.6	262.8	1.00	0.97	19.1
11	T1	932	3.3	0.863	55.0	LOS D	36.9	265.8	1.00	0.97	15.2
Approach		1054	3.1	0.863	55.7	LOS D	36.9	265.8	1.00	0.97	15.7
All Vehicles		3547	2.5	0.867	46.6	LOS D	53.0	380.5	0.93	0.92	22.8

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 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 per ped
P1	South Full Crossing	282	37.6	LOS D	0.8	0.8	0.74	0.74
P2	East Full Crossing	208	33.9	LOS D	0.6	0.6	0.70	0.70
P3	North Full Crossing	158	37.4	LOS D	0.5	0.5	0.73	0.73
P4	West Full Crossing	347	34.1	LOS D	1.0	1.0	0.70	0.70
All Pedestrians		996	35.6	LOS D			0.72	0.72

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.

MOVEMENT SUMMARY

Site: Baptist / Carpark - Thursday - Short Term

Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Baptist Street											
1	L2	207	0.0	0.426	5.6	LOS A	0.0	0.0	0.00	0.15	56.9
2	T1	597	4.0	0.426	0.1	LOS A	0.0	0.0	0.00	0.15	58.5
Approach		804	3.0	0.426	1.5	NA	0.0	0.0	0.00	0.15	58.1
North: Baptist Street											
8	T1	356	9.0	0.325	2.8	LOS A	1.9	14.2	0.44	0.17	55.7
9	R2	89	0.0	0.325	11.9	LOS A	1.9	14.2	0.44	0.17	54.0
Approach		445	7.2	0.325	4.7	NA	1.9	14.2	0.44	0.17	55.3
West: Shopping Centre Carpark											
10	L2	76	0.0	0.108	11.6	LOS A	0.4	2.8	0.56	0.97	50.0
12	R2	88	0.0	0.366	24.2	LOS B	1.3	8.9	0.86	1.05	42.5
Approach		164	0.0	0.366	18.4	LOS B	1.3	8.9	0.72	1.01	45.7
All Vehicles		1414	4.0	0.426	4.5	NA	1.9	14.2	0.22	0.26	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 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 SUMMARY

Site: Baptist / Carpark - Thursday - Long Term

Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Baptist Street											
1	L2	321	0.0	0.477	5.6	LOS A	0.0	0.0	0.00	0.21	56.4
2	T1	578	4.0	0.477	0.1	LOS A	0.0	0.0	0.00	0.21	57.9
Approach		899	2.6	0.477	2.1	NA	0.0	0.0	0.00	0.21	57.4
North: Baptist Street											
8	T1	346	9.0	0.749	13.0	LOS A	9.9	72.0	1.00	0.70	47.2
9	R2	321	0.0	0.749	19.9	LOS B	9.9	72.0	1.00	0.70	46.0
Approach		667	4.7	0.749	16.3	NA	9.9	72.0	1.00	0.70	46.7
West: Shopping Centre Carpark											
10	L2	312	0.0	0.432	13.4	LOS A	2.4	16.8	0.65	1.08	49.0
12	R2	105	0.0	0.686	46.5	LOS D	2.7	18.9	0.95	1.15	33.8
Approach		417	0.0	0.686	21.7	LOS B	2.7	18.9	0.73	1.10	44.0
All Vehicles		1983	2.7	0.749	11.0	NA	9.9	72.0	0.49	0.56	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 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 SUMMARY

Site: Baptist / Carpark - Saturday - Short Term

Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Baptist Street											
1	L2	187	0.0	0.301	5.6	LOS A	0.0	0.0	0.00	0.19	56.6
2	T1	385	2.0	0.301	0.0	LOS A	0.0	0.0	0.00	0.19	58.2
Approach		573	1.3	0.301	1.8	NA	0.0	0.0	0.00	0.19	57.7
North: Baptist Street											
8	T1	137	5.0	0.156	1.8	LOS A	0.8	5.5	0.45	0.28	56.1
9	R2	81	0.0	0.156	8.2	LOS A	0.8	5.5	0.45	0.28	54.4
Approach		218	3.1	0.156	4.2	NA	0.8	5.5	0.45	0.28	55.4
West: Shopping Centre Carpark											
10	L2	79	0.0	0.083	9.9	LOS A	0.3	2.2	0.45	0.90	51.1
12	R2	93	0.0	0.179	12.6	LOS A	0.6	4.2	0.60	1.00	48.8
Approach		172	0.0	0.179	11.3	LOS A	0.6	4.2	0.53	0.95	49.9
All Vehicles		962	1.5	0.301	4.1	NA	0.8	5.5	0.20	0.35	55.6

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 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 SUMMARY

Site: Baptist / Carpark - Saturday - Long Term

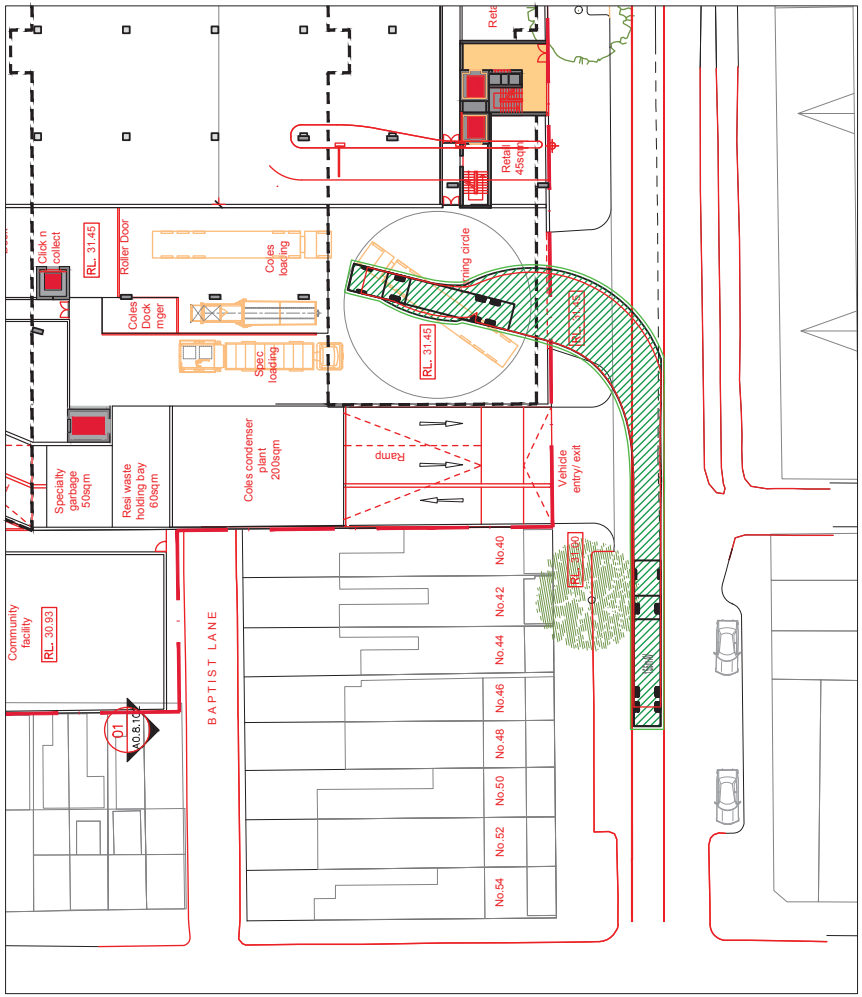
Stop (Two-Way)

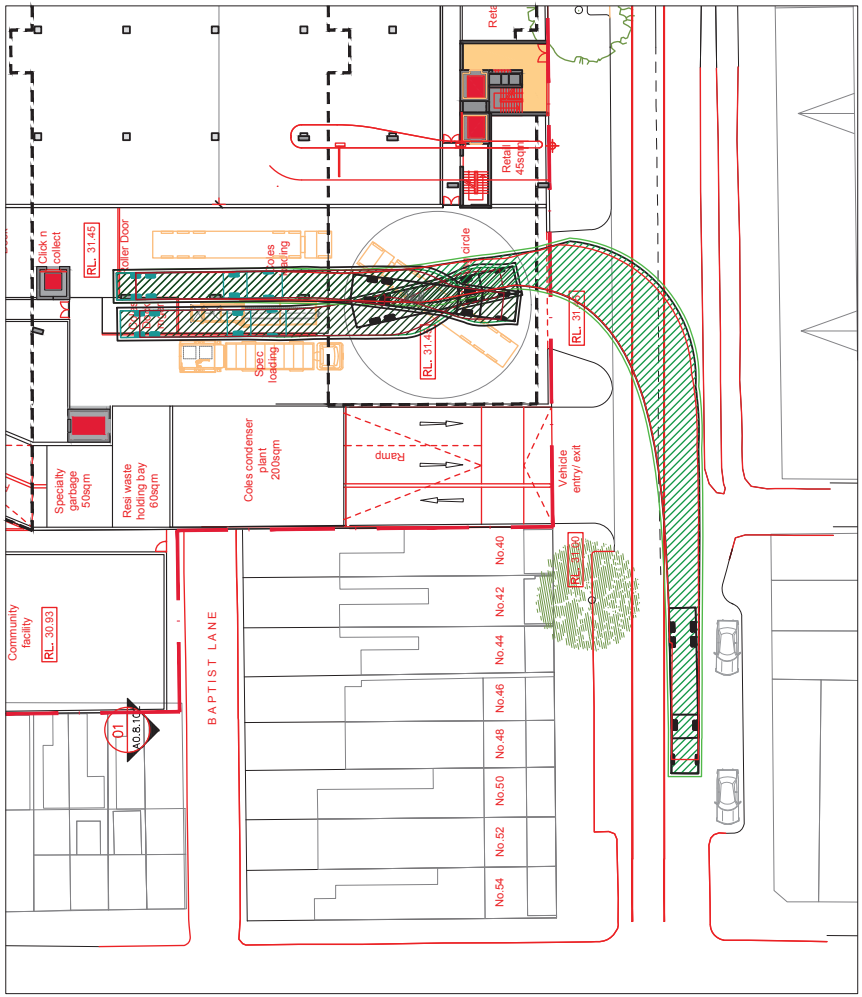
Movement Performance - Vehicles

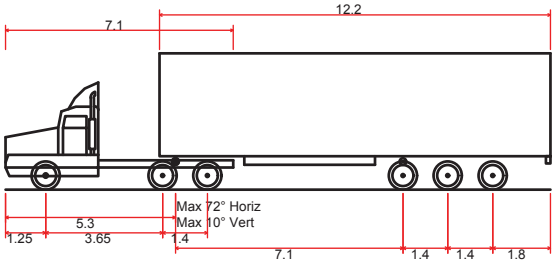
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Baptist Street											
1	L2	306	0.0	0.353	5.6	LOS A	0.0	0.0	0.00	0.27	56.0
2	T1	362	2.0	0.353	0.0	LOS A	0.0	0.0	0.00	0.27	57.5
Approach		668	1.1	0.353	2.6	NA	0.0	0.0	0.00	0.27	56.8
North: Baptist Street											
8	T1	115	5.0	0.420	4.9	LOS A	3.0	21.1	0.69	0.71	52.2
9	R2	306	0.0	0.420	10.5	LOS A	3.0	21.1	0.69	0.71	50.8
Approach		421	1.4	0.420	9.0	NA	3.0	21.1	0.69	0.71	51.2
West: Shopping Centre Carpark											
10	L2	306	0.0	0.312	10.2	LOS A	1.5	10.3	0.50	0.93	50.9
12	R2	154	0.0	0.414	18.3	LOS B	1.7	11.8	0.78	1.07	45.5
Approach		460	0.0	0.414	12.9	LOS A	1.7	11.8	0.60	0.98	49.0
All Vehicles		1549	0.8	0.420	7.4	NA	3.0	21.1	0.36	0.60	52.7

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 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 B Loading Dock Swept Paths







Semi-trailer (12.5m min. radius)

Overall Length	17.000m
Overall Width	2.500m
Overall Body Height	4.250m
Min Body Ground Clearance	0.417m
Track Width	2.500m
Lock-to-lock time	6.00s
Wall to Wall Turning Radius	12.500m

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2-38 BAPTIST STREET, REDFERN

SWEPT PATH ANALYSIS
17M AV DESIGN VEHICLE

TTM REFERENCE
15BRT0090-SK07

DRAWN CL
CHECKED CH

DATE
18 DEC 2015

0 5 10 15 20 25m
SCALE 1:500 AT ORIGINAL SIZE